CapXon

ELECTROLYTIC CAPACITORS

AUTOMOTIVE APPLICATIONS

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10 FACTS ABOUT CAPXON

Founded 1980 by Victor Lin

Established in Taipei Taiwan

Family owned and independent

40 years experience in electrolytic capacitors

2500 professional employees

Fully owned factories 1 e-cap and 3 foil factories

ISO9001, ISO14001 and IATF 16949 certified

Patented production process

Belongs to the TOP 10 manufacturers in e-caps

Production of more than 1 bio pcs per month

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A WORLD OF ELECTROLYTIC CAPACITORS

CapXon's know-how in Electrolytic Capacitors covers technologies with aluminium foil. These are Aluminum Electrolytics, Solid Conductive Polymers and the combination known as Hybrid Conductive Polymers:

Aluminum Electrolytic	Description	Features
	Rated Voltage ▪ V_R	4 VDC to 650 VDC
	Cathode Material	Liquid Electrolyte
	Self-healing of Dielectric	Yes
	Package	Widest range in all sizes
	Stability	Reduced performance at low temperature
	Lifetime	Limited life at high temperature
	Reliability	Automotive AEC-Q200 qualified

Solid Conductive Polymer	Description	Features
	Rated Voltage ▪ V_R	2.5 VDC to 100 VDC
	Cathode Material	Solid Conductive Polymer
	Self-Healing of Dielectric	No
	ESR	Ultra-low ESR at high frequency
	Stability	Stable for low and high temperature
	Lifetime	Very stable and long life - no dry out
	Reliability	Only internal standard qualification

Hybrid Conductive Polymer	Description	Features
	Rated Voltage ▪ V_R	16 VDC to 400 VDC
	Cathode Material	Solid Conductive Polymer & Liquid Electrolyte
	Self-Healing of Dielectric	Yes
	ESR	Very low ESR at high frequency
	Stability	Even more stable than liquid type
	Leakage Current ▪ I_{LEAK}	Lower leakage current than Solid Conductive Polymer Type
	Reliability	Automotive AEC-Q200 qualified

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COMPARISON OF ELECTROLYTIC CAPACITOR TECHNOLOGIES

Characteristics	Aluminum Electrolytic Capacitor	Solid Conductive Polymer Capacitor	Hybrid Conductive Polymer Capacitor
ESR at High Frequency	● (120 ~ 1 000 mΩ)	++ (7 ~ 15 mΩ)	+ (20 ~ 30 mΩ)
Leakage Current ▪ I_{LEAK}	++ ($0.01*C_R*V_R$)	● ($0.2*C_R*VR$)	++ ($0.01*C_R*V_R$)
Ripple Current ▪ I_R	● (~ 600 mA)	++ (2 000 ~ 7 000 mA)	+ (2 000 ~ 3 000 mA)
Rated Voltage ▪ V_R	++ (~ 700 V)	● (~ 100 V)	+ (~ 400 V)
Operating Temperature Characteristics	+ (-40 ~ + 125 °C)	+ (-55 ~ + 125 °C)	++ (-55 ~ + 150 °C)
Low Temperature Characteristics	● (-40 ~ + 125 °C)	++ (-55 ~ + 125 °C)	+ (-55 ~ + 150 °C)
Lifetime	● (105 °C / 3 000h)	++ (105 °C / 5 000h)	++ (105 °C / 10 000h)
Failure Mode	+ Open	● Short	+ Open

++ ... best performance

+ ... well performance

● ... basic performance

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IATF 16949 CERTIFICATION

As an international standard for quality management in the automotive industry, IATF 16949 forms the basis for delivering electronic components to automobile manufacturers or their producers.

CapXon's IATF 16949 certificate stands for:

- Improvement and idealization of all product and process flows in development and production
- Minimization of production fluctuations and error reduction
- Compliance and methodology according to a worldwide quality standard
- Meeting the demands of global quality systems for the automotive industry
- Increase product quality

intertek
Total Quality. Assured.

CERTIFICATE
OF REGISTRATION

This is to certify that the management system of:

CapXon Electronic (Shenzhen) Co., Ltd.

Tangwei Section, Tangwei Village, Gongming Town, Guangming New District, Shenzhen City, Guangdong Province, 518132, P.R. China

has been registered by Intertek as conforming to the requirements of:

IATF 16949:2016

The management system is applicable to:

Design and manufacture of aluminum electrolytic capacitors

Permissible exclusions include: None

IATF Certificate Number:
0298828

Certificate Number:
2015-0043

Certificate Issue Date:
18 March 2018

Certificate Expiry Date:
17 March 2021

Calin Moldovean
President, Business Assurance

Intertek – 4700 Broadmoor, Suite 200, Kentwood MI 49512, USA

In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone. The certificate remains the property of Intertek, to whom it must be returned upon request.

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RELIABILITY TESTS ▪ AEC-Q200

As a prerequisite for being active in the supply chain of automobile manufacturers or their suppliers, compliance with the reliability standard AEC-Q200 (for passive components) and the quality standards according to IATF 16949 for zero defect quality are necessary. CapXon performs all reliability tests in its ISO/IEC 17025: 2005 accredited laboratory.

Endurance, useful life and temperature stress tests

Humidity bias, electrical characterization and temperature cycling tests

Board flex, terminal strength, solderability, solvents, surge voltage, vent, free fall, mechanical shock and vibration tests

For further information please contact sales@capxon.org

ISO/IEC 17025 ACCREDITED LABORATORY

ISO/IEC 17025 specifies the requirements of laboratories in which reliability tests or calibrations are carried out. The focus is on the reliability and quality of test methods and the evidence that tests are consistently reliable and trustworthy.

CapXon qualifies the used measuring instruments, validates the test methods carried out for robustness, reproducibility and accuracy. The quality of the laboratory is periodically accredited by an external audit by CNAS (China National Accreditation Service of Conformity Assessment). **The results, certified according to ISO/IEC 17025, maximize the acceptance of the laboratory as an independent test center.**

China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(Registration No. CNAS L11158)

Capxon Electronic (Shenzhen) Co., Ltd. Central Laboratory

(Legal Entity: Capxon Electronic (Shenzhen) Co., Ltd.)

Tangwei Industrial Area, Tangwei, Gongming, Guangming New District, Shenzhen, Guangdong, China

is accredited in accordance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence to undertake the service described in the schedule attached to this certificate.

The scope of accreditation is detailed in the attached schedule bearing the same registration number as above. The schedule forms an integral part of this certificate.

Effective Date：2018-07-06

Expiry Date：2024-07-05

Signed on behalf of China National Accreditation Service for Conformity Assessment

China National Accreditation Service for Conformity Assessment(CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is a signatory of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC MRA) and the Asia Pacific Laboratory Accreditation Cooperation Mutual Recognition Arrangement (APLAC MRA).

The validity of the certificate can be checked on CNAS website at http://www.cnas.org.cn/english/findanaccreditedbody/index.shtml

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PPAP ▪ PRODUCTION PART APPROVAL PROCESS

The **Production Part Approval Process** (PPAP) is a documented and standardized sampling procedure for series products in the automotive sector. The PPAP is part of the APQP requirements from the IATF 16949 and shows that CapXon can permanently produce, electrolytic capacitors under the requirements and specifications, specified by the customer.

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IMDS ▪ INTERNATIONAL MATERIAL DATA SYSTEM

The IMDS – **International Material Database System** contains information about the used materials within the build-up of the component. IMDS has become a global standard used by almost all of the global OEMs.

With IMDS, it is possible to monitor and control hazardous substances and prohibited substances down to the single component. IMDS is mainly used to fulfil various reporting requirements of automotive manufacturers.

For all our AEC-Q200 components and in case of an automotive use case, we provide IMDS entries on request.

COMPONENT RELIABILITY DATA

In this section, the main parameters for predictive reliability and availability calculations are explained and in which way CapXon can provide you with such data.

FAILURE RATE λ

The failure rate λ describes the frequency which components possibly fail. The failure rate describes how many defects can be expected, if you run the application in operation for a certain time.

The failure rate can be calculated as following:

(1) $$\lambda = \frac{n}{N*t}$$

n … Number of defect components

N … Number of tested components

t … Amount of operating hours

FAILURE CRITERIA

Capacitors will show certain wear-out phenomenon's by aging and so as times goes by the capacitors can possibly change their electrical performance.

As soon as the component is no longer fulfilling their electrical spec, stated features or with customer agreed parameters, the status of capacitor is seen as in failure mode or defect. This does not necessarily mean that the application will fail. An essential influence are the design and dimensioning by customer, which lead to major impact on possible failure modes and fail criteria for the application itself.

All given data by CapXon is just concerning the failure mode cases of the single component and is not representing the complexity of complete applications, assembled systems nor full electronic PCB boards.

BATHTUB CURVE

It's a widely used model within the reliability engineering to describe the expected failure rates over the whole application lifetime / product life cycle.

Bathtub curve

The Bathtub Curve states the failure rate behaviour within the three different product life cycle stages. These are the Early Failure Period, the Useful Life Period and the Wear Out Period.

With production control, monitoring and quality assurance, it is possible to reduce the early failures to a best possible minimum.

Failures within the Useful Life Period, which are described as FIT or MTBF value, are defined as events of coincidence and are not representing any systematic or epidemic failures.

FIT – FAILURES IN TIME

FIT - Failures In Time is the common way to describe the expected failure rate for electronics.

The FIT values describe certain failure rate within the useful life period and provides the basis for calculations, assumptions and extrapolation of reliability and availability to gather the understanding for expected failures / defects. These calculated figures are used to decide whether the component is a proper choice for the desired use case. Additionally, it need to be clarified whether redundancies are necessary and which redundancies are needed to fulfil the desired mission profile of an application.

The unit FIT defines the expected amount of failures per application hour.

(2) $$1\ FIT = \frac{10^{-9}}{h} = \frac{10^{-9} failures}{per\ operating\ hour}$$

So as higher the stated FIT value is, as higher the statistical chance of defect is.

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Please find the following example of a failure rate test determined by a useful life test:

- Number of failures n = 2
- Number of tested components N = 10 000
- Operating hours t = 20 000 h

(3) $$\lambda = \frac{n}{N*t} = \frac{2}{10\,000*20\,000h} = 10\ FIT$$

(4) $$10\ FIT = \frac{10^{-8}}{h} = \frac{0.001\%}{1000h}$$

MTBF ▪ MEANTIME BETWEEN FAILURES

It's the predicted elapsed time between inherent failures of an electronic system during normal operation. The MTBF can be calculated as arithmetic mean / average time between failures of a system.

Assuming a constant failure rate, the MTBF can be easily calculated by reciprocal value of the Failure Rate λ**:**

(5) $$MTBF = \frac{1}{\lambda}$$

MTBF is just a different way to describe the failure rate and can be easily converted to FIT and vice versa:

(6) $$MTBF = \frac{10^9 h}{FIT} = \frac{114\,000\ years}{FIT}$$

(7) $$FIT = \frac{10^9 h}{MTBF} = \frac{114\,000\ years}{MTBF}$$

The **MTBF** values are just covering the useful life period (flat middle section) of the bathtub curve. Because of this, a FIT or MTBF value can't be extrapolated to estimate the service lifetime for a component. FIT or MTBF values doesn't cover the higher failure rates of the wear-out period, where the expected failure rate would be higher due to occurring wear-out phenomenon's.

LIFETIME TESTS

Due to the fact that all electrolytic capacitors show aging behaviour and a possible drift of electrical parameters over usage time, lifetime tests are performed by manufacturers to describe the related reliability and performance of a certain capacitor. Different product series as well as the single product itself can provide very different lifetime performance. So, these test results are given to select the proper product in relation to the applied stress profile of application to gain the desired application performance within the whole product life cycle.

There are various names (e.g. Endurance, Load Life, Useful Life, Operational Life, Life Expectancy, Shelf Life, …) and different lifetime tests that are existing within the industry. Please kindly check the specific test specification and given data for the capacitor before design-in.

Sadly, there is no standardized naming and test criteria existing, given by any international accepted standard committee for all the lifetime tests, which are applied to electrolytic capacitors. Customers need to compare competitor products carefully with each other to see if test specifications are similar or different.

Please see particular datasheets for the specific test results and criteria of an individual product of CapXon.

Again, please note that the criteria of failure are given by the test specification limits of the dedicated lifetime test and as soon as a component is not fulfilling these given limits, it is rated as a failure. So, failure does not necessarily mean defect or breakdown of application. It is just describing that the drift of electrical performance is bigger than the checked limits of the particular test. It doesn't matter whether the measured C value is lower as the allowed test limit or the component is in a failure mode of open circuit, both cases are treated the same as a failure. Design and dimensioning of application will arrange how much drift of electrical parameters can be accepted for the individual capacitor. For example, when the rate of capacitance change is becoming critical within the application is defined by customer design. The lifetime tests are in place to provide a common and industry-wide comparable performance index of the capacitors.

As manufacturer, we can state and check how fast a drift of capacitance and further parameters will happen. Dimensioning within application design will set how long an error-free operation is possible. A proper dimensioning can enlarge the acceptable drift and so the lifetime performance. But be aware, if it is not done properly or component is overstressed, it also can shorten the expected lifetime performance. Please be aware to check dimensioning and drift estimation to assure your product performance for the desired lifetime. For support with lifetime estimations and dimensioning, we are pleased to support you and feel free to get in touch with our technical support.

In the following section CapXon's lifetime tests, which are performed with our products, are described in detail.

ENDURANCE

The Endurance test of the product checks the performance of its electrical parameters, such as capacitance change, leakage current and dissipation factor on their behaviour over time at a predetermined test setup of electrical stress and ambient condition.

Depending on the product series, the Endurance test is performed according to one of the settings below:

Setting 1 - applying Endurance test:

- max. Temperature
- V_R - Rated Voltage

Setting 2 - applying Endurance test:

- max. Temperature
- V_R - Rated Voltage
- I_R - Rated Ripple

Setting 1 is in accordance to the IEC 60364-4 / JIS 51001-4 test criteria and Setting 2 is enlarging the electrical stress setup with additional appliance of IR, to get a more representative result in comparison to possible real-life application stress.

The Endurance test is performed within product qualification at the stage of internal product validation and is repeated periodically for product requalification.

USEFUL LIFE

To get more representative understanding of lifetime performance for typical capacitor use, the useful life test represents such criteria.

The applied electrical stress is like the Endurance test - Setting 2. The test specification limits are wider as the endurance test specification, but as described the applied electrical stress stays similar. So, a larger acceptable drift of electrical parameters results in a larger expected lifetime. This represents the operational frame which is set by customer at dimensioning the capacitor specification for their application and the possible borders of an error-free operation.

Also, we state a FIT value related to the useful life test. These failure rate describes the deviation / possibility of occurrence of failures within the useful life period when the settings of useful life test are applied. This is related to the middle section of the bathtub curve the so-called useful life period (see above page 12 - Bathtub Curve of Product Reliability).

In the datasheet you will find the following phrase:

Failure Rate (during useful Life): 1%/1 000h with a confidence level of 60%. As a result, this is like a 10 000 FIT:

$$\lambda = \frac{1\%}{h} = 10\,000\ FIT = 10\,000\ failures * 10^{-9h}$$

Example:

If you have 8 000 components running in applications for 5 000 hours with the test conditions applied like the useful life test, you can estimate the number of components that show a higher drift as given by the useful life test spec borders as follows:

- Number of components N = 8 000
- Operating hours t = 5 000 h

$$\lambda = \frac{n}{N * t}$$

$$n = \lambda * N * t = \frac{1\%}{1\,000h} * 8\,000 * 5\,000h = 400$$

This means that when there are 8 000 pcs in operation for 5 000 hours at the maximum possible operating conditions (max. temp., V_R & I_R similar to useful life test criteria) an amount of 400 products (with a confidence level of 60%) can be expected to show a higher drift as given in the test spec.

SHELF LIFE

The shelf life test simulates the aging of the capacitor, if it is just stressed with ambient temperature without any electrical load. The shelf life is not defining the possible storage time of the capacitor but just to describe the aging situation before mounting / PCB assembly.

The Shelf Life test criteria shall be satisfied, if the capacitor was restored to 20°C and following a conditioning by voltage treatment in accordance with 4.1 of JIS 5101-4 was applied, before measuring the capacitor.

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LIFETIME TEST EXAMPLES

Example 1 **-** Useful Life, Endurance (Setting 1) and Shelf life tests of SMD types – HV Series:

Lifetime Test		
Endurance 105°C (V_R applied)	Test	**2 000 hours**
	△C/C	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (None)	Test	**1 000 hours**
	△C/C	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed below	
	△C/C	Within ±10% of initial value
	tanδ	Less than specified value
	I_{Leak}	Less than specified value

Example 2 - of Useful Life, Endurance (Setting 2) and Shelf life tests of Radial types – GF Series

Lifetime Test			
Endurance 105°C (V_R & I_R applied)	Test	**2 000 hours**	ø D 5 ~ 6.3 mm
		3 000 hours	ø D 8 mm
		5 000 hours	ø D ≥ 10 mm
	△C/C	≤ ±20% of initial measured value	
	tanδ	≤ 200% of initial specified value	
	I_{Leak}	≤ the initial specified value	
Shelf Life 105°C (None)	Test	**1 000 hours**	
	△C/C	≤ ±20% of initial measured value	
	tanδ	≤ 200% of initial specified value	
	I_{Leak}	≤ the initial specified value	

Example 3 - of Useful Life, Endurance (Setting 2) and Shelf life tests of Snap In types – HU Series:

Lifetime Test		V_R ≤ 100V	V_R > 100V
Useful Life 105°C (V_R & I_R applied)	Test	**5 000 hours**	**8 000 hours**
	△C/C	≤ ±30% of initial measured value	≤ ±20% of initial measured value
	tanδ	≤ 300% of initial specified value	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value	≤ the initial specified value
Endurance 105°C (V_R applied)	Test	**3 000 hours**	
	△C/C	≤ ±15% of initial measured value	≤ ±10% of initial measured value
	tanδ	≤ 130% of initial specified value	≤ 130% of initial specified value
	I_{Leak}	≤ the initial specified value	≤ the initial specified value
Shelf Life 105°C (None)	Test	**1 000 hours**	
	△C/C	≤ ±15% of initial measured value	≤ ±10% of initial measured value
	tanδ	≤ 130% of initial specified value	≤ 130% of initial specified value
	I_{Leak}	≤ the initial specified value	≤ the initial specified value

Example 4 - Useful Life, Endurance (Setting 2) and Shelf life tests of Screw types – RK Series:

Lifetime Test		
Useful Life 105°C (V_R & I_R applied)	Test	**4 000 hours**
	△C/C	≤ ±45% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
Endurance 105°C (V_R applied)	Test	**2 000 hours**
	△C/C	≤ ±15% of initial measured value
	tanδ	≤ 130% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (None)	Test	**1 000 hours**
	△C/C	≤ ±15% of initial measured value
	tanδ	≤ 130% of initial specified value
	I_{Leak}	≤ the initial specified value

TELCORDIA SR-332

This industry-wide accepted standard provides data and tools for reliability predictions of components, devices or full hardware units of electronic equipment. Telcordia (formerly Bellcore). With the given figures and data, it is possible to assure system availability and to gather the desired system reliability.

FIT & MTBF DATA OF CAPXON PRODUCTS

CapXon provides FIT & MTBF values based on Telcordia SR332 standard for all components. From our perspective, it provides more reliable prediction because it is more specific and detailed than MIL-217 or Siemens SN 29500.

Please find the FIT values for CapXon components and application-based reliability prediction calculations on the following page.

The table of SMD / RADIAL / Snap-In is covering all Electrolytic Technologies – Liquid, Solid and Hybrid Electrolytic Capacitors in SMD & Radial.

The table of Screw capacitors is just concerning Liquid Aluminum Electrolytic Capacitors.

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Mounting Type	SMD / Radial / Snap-In					
Electrical Stress	100%		75%		50%	
Opera-ting Temp. [°C]	λ [FIT]	σ [FIT]	λ [FIT]	σ [FIT]	λ [FIT]	σ [FIT]
≤ 30	1,19	0,28	0,65	0,15	0,36	0,08
35	1,52	0,35	0,84	0,19	0,46	0,11
40	1,94	0,45	1,06	0,25	0,58	0,14
45	2,45	0,57	1,34	0,31	0,74	0,17
50	3,07	0,71	1,68	0,39	0,92	0,22
55	3,82	0,89	2,10	0,49	1,15	0,27
60	4,72	1,10	2,59	0,60	1,42	0,33
65	5,80	1,35	3,19	0,74	1,75	0,41
70	7,09	1,65	3,89	0,91	2,14	0,50
75	8,61	2,01	4,73	1,10	2,59	0,60
80	10,40	2,42	5,71	1,33	3,13	0,73
85	12,50	2,91	6,86	1,60	3,76	0,88
90	14,94	3,48	8,20	1,91	4,50	1,05
95	17,78	4,14	9,76	2,27	5,35	1,25
100	21,05	4,90	11,55	2,69	6,34	1,48
105	24,82	5,78	13,62	3,17	7,47	1,74
110	29,13	6,78	15,99	3,72	8,77	2,04
115	34,05	7,93	18,69	4,35	10,26	2,39
120	39,65	9,23	21,76	5,07	11,94	2,78
125	45,99	10,71	25,24	5,88	13,85	3,23
130	53,15	12,38	29,17	6,79	16,01	3,73
135	61,20	14,25	33,59	7,82	18,43	4,29
140	70,24	16,36	38,55	8,98	21,15	4,93
145	80,34	18,71	44,09	10,27	24,20	5,64
150	91,60	21,33	50,27	11,71	27,59	6,43

Table 1: FIT values for SMD, Radial, Snap-In

Remark: Above values are only valid within the max. specified temperature range of the particular component. All given FIT data is meant for lifetime predictions only and is not representing any warranty.

For particular products (e.g. screw capacitors) within the datasheet, further FIT or MTBF data is added and in such a case, this substitutes the general information stated above.

Mounting Type	Screw terminal					
Electrical Stress	100%		75%		50%	
Opera-ting Temp. [°C]	λ [FIT]	σ [FIT]	λ [FIT]	σ [FIT]	λ [FIT]	σ [FIT]
≤ 30	34,20	24,43	18,77	13,40	10,30	7,36
35	43,85	31,32	24,06	17,19	13,21	9,43
40	55,78	39,84	30,61	21,87	16,80	12,00
45	70,42	50,30	38,65	27,61	21,21	15,15
50	88,27	63,05	48,44	34,60	26,59	18,99
55	109,88	78,48	60,30	43,07	33,09	23,64
60	135,88	97,06	74,57	53,27	40,93	29,23
65	166,99	119,28	91,65	65,46	50,30	35,93
70	203,99	145,71	111,95	79,97	61,44	43,89
75	247,76	176,97	135,97	97,12	74,62	53,30
80	299,26	213,76	164,24	117,31	90,14	64,38
85	359,57	256,84	197,34	140,96	108,30	77,36
90	429,86	307,04	235,91	168,51	129,47	92,48
95	511,39	365,28	280,66	200,47	154,03	110,02
100	605,57	432,55	332,34	237,39	182,39	130,28
105	713,89	509,92	391,79	279,85	215,02	153,59

Table 2: FIT values for Screw types

λ - Mean Component Failure Rate

σ - Standard Deviation of Component Failure Rate

CALCULATION OF FIT VALUE FOR APPLICATION CASE

By using the given Telcordia SR-332 figures and by the assumption that the failure rate follows a gamma distribution, the FIT value can be calculated with given mean λ and standard deviation σ (see section tables in section 8.8) and desired UCL - Upper Confidence Level as follows:

$$shape\ \kappa = \left(\frac{\lambda}{\sigma}\right)^2$$

$$scale\ \theta = \frac{\sigma^2}{\lambda}$$

The desired FIT value for the application case is the P% quantile of the gamma distribution and it can be calculated by the inverse cumulative gamma distribution with the shape κ and scale θ parameters as follows:

$$\lambda_{P\%UCL} = G^{-1}(90/100; \kappa; \theta)$$

If the shape κ parameter is >100 the FIT can also be calculated by using the P% quantile of the normal distribution, by inverse cumulative distribution of normal distribution with mean λ and standard deviation σ:

$$\lambda_{P\%UCL} = N^{-1}(P/100;\ \lambda; \sigma)$$

Customer need to define which UCL is desired for the reliability prediction for their application case (typical values for UCL are e.g. 60%,90%, 95%, 99%).

CALCULATION EXAMPLE

Example 1:

GF Series – Radial type
Aluminum Electrolytic Capacitor

@ 70°C and 75% electrical stress
Upper Confidence Level (UCL) = 90%

Values according to table 1 at page 16:
λ= 3.89 FIT / σ= 0.91 FIT

$$shape\ \kappa = \left(\frac{3.89}{0.91}\right)^2 = 18.27$$

$$scale\ \theta = \frac{0.91^2}{3.89} = 0.21$$

$$\lambda_{90\%UCL} = G^{-1}(90/100; 18.27; 0.21) = 5.02\ FIT$$

In Microsoft Excel you can solve this with the following formula:

International / American Excel Version:
=GAMMAINV(0.9,18.27,0.21)

European Excel Version:
=GAMMAINV(0,9;18,27;0.21)

Example 2:

RG Series - Screw type
Aluminum Electrolytic Capacitor

@ 60°C and 75% electrical stress
Upper Confidence Level (UCL) = 90%

Values according to table 2 at page 16:
λ= 74.57 FIT / σ= 53,27 FIT

$$shape\ \kappa = \left(\frac{74.57}{53.27}\right)^2 = 2.01$$

$$scale\ \theta = \frac{0.91^2}{3.89} = 38.05\ FIT$$

$$\lambda_{90\%UCL} = G^{-1}(90/100; 2.01; 38.05) = 148.57 FIT$$

In Microsoft Excel you can solve this with the following formula:

International / American Excel Version:
=GAMMAINV(0.9,2.01,38.05)

European Excel Version:
=GAMMAINV(0,9;2,01;38,05)

For further information please contact sales@capxon.org

QUALITY MANAGEMENT SYSTEM

We are committed and living the principle of **QUALITY FIRST - to offer highly satisfying products and service to the customer**. This global aim is shared by the CapXon quality and environmental management system and part of our business philosophy:

QUALITY MANAGEMENT SYSTEM CERTIFICATION

In accordance with our quality commitment, CapXon quality management is certified by **ISO 9001** and **IATF 16949**. The certification covers our production plants as well as our sales organization. This standard is applied throughout the company and is used to implement, monitor and to proceed the CapXon quality policy in all process steps.

PRODUCT AND PROCESS QUALITY

Our product and process development follows the sequence and phases of **APQP – Advance Product Quality Planning:**

5 Phases of APQP

Quality tools such quality tools, including **5S, PDCA, FMEA, (DFMEA & PFMEA), MSA, APQP, PPAP, SPC** and others, are in place to minimize risks, provide constant monitoring and ensure continuous improvements in conjunction with regular internal audits and QM reviews.

QUALITY ASSURANCE

For our sample checks, we refer to **AQL - Acceptable Quality Level** figures, which are based on a random sampling plan in accordance with **MIL-STD-1916**. Referring to instructions of this standard, a delivered lot will be accepted with a probability of 90%, if the percentage of non-conformance does not exceed the stated AQL figure. As a general internal target, the percentage of non-conformance in deliveries from CapXon is significantly below the AQL figure. The acceptance value we apply to non-conform components is c= 0.

INCOMING GOODS INSPECTION BY CUSTOMER

We recommend applying planned random sampling checks in accordance with MIL-STD-1916 , is compliant with MIL STD 105 D and IEC 60410, for incoming goods inspection. The test methods, which shall be applied, are laid down in the relevant standards.

ENVIRONMENTAL MANAGEMENT

Environmental Policy

CapXon defines internally the following environmental **protection principles**:

- **comply with the given law & regulations**
- **observe and act to reduce pollution**
- **produce cleanly**
- **reduce the consumption and save resources**
- **cut down usage of toxic substances**
- **make continuous improvements**
- **protect the environment**

ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATION

CapXon environmental management system is certified in accordance with ISO 14001 and is applied throughout the whole company as well as CapXon's environmental policy is implemented.

ENVIRONMENTAL HAZARDOUS SUBSTANCES FREE MANAGEMENT SYSTEM

To show our commitment to protect the environment and people, CapXon drives a sustainable effort to produce environment-friendly products.

IECQ QC 080000 HSPM - Hazardous Substance Process Management, which is based on the quality management system of ISO 9001.

For further information please contact sales@capxon.org

The CapXon QC080000 based HSF management system is company-wide applied for implementing the CapXon environmental Hazardous Substances management and that CapXon products effectively in the management of hazardous substances.

ENERGY MANAGEMENT SYSTEM

CapXon establishes comprehensive energy use management in accordance with the requirements of ISO 50001 Energy Management System in order to meet the social responsibility of low carbon environmental protection and efficiency

CERTIFICATION IN ACCORDANCE TO ISO 14001, ISO 50001, QC 080000

The CapXon Group operates an environmental management system that conforms to the requirements of **ISO 14001** and is mandatory for all plants. The CapXon Group operates an Energy management system that conforms to the requirements of **ISO 50001** and is mandatory for all plants. The CapXon Group operates an environmental **Hazardous Substances Free management system** that conforms to the requirements of QC 080000 and is mandatory for all plants. The company certificate is posted on the CapXon internet: (www.capxongroup.com).

RoHS COMPLIANCE

The abbreviation **RoHS** is usually **called Restriction of Hazardous Substances**, the full term is the short term for the **Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment** and is referring to the EU directive 2011/65/EU. The RoHS 2 – 2011/65/Eu substituted the former RoHS 1- 2002/95/EC.

The aim of RoHS is to banish Hazardous Substances of electronic waste, which can harm the environment and others. Based on this regulation, we as component manufacturer, need to design, observe and control that such hazardous materials are fully avoided and reduced to the max. Morever, it's possible to replace them by adequate non concerned materials within the given limitations .

For all by RoHS scoped materials (excluding exempt products) the maximum permitted concentrations are:

all concerned materials (except Cd)

- 0,1% / 1000ppm

Cadmium -Cd:

- 0,01% or 100ppm

These limitations for the restricted materials focus on each homogeneous material within the product. So, the limitations are concerning each individual / single substance or part, which can be separated mechanically (e.g. aluminum can, rubber sealant) and are not apply to the weight of the whole component itself.

Last update of RoHS was Directive (EU) 2015/863, which was published on 2015-03-31 and implemented by 2019-07-22. According to this directive, the following ten substances are restricted:

- **Pb** - Lead
- **Hg**- Mercury
- **Cd** - Cadmium
- **Cr^{+6}** - Hexavalent chromium
- **PBB** - Polybrominated biphenyls
- **PBDE** - Polybrominated diphenyl ether
- **DEHP** - Bis (2-ethylhexyl) phthalate
- **BBP** - Butyl benzyl phthalate
- **DBP** - Dibutyl phthalate
- **DIBP** - Diisobutyl phthalate

By the update DEHP, BBP, DBP and DIBP were added to the list of hazardous substances.

Since 2011 RoHS compliance is mandatory to be able to get CE approval.

C-RoHS / CHINA RoHS COMPLIANCE

The common speech so called China RoHS means the conformance to **SJ/T 11363-2006** for electronical components and assemblies and is fully called **Administrative Measure on the Control of Pollution Caused by Electronic Information Products**.

In China RoHS, the following substances are banned because they are considered as environmentally hazardous:

- **Pb** - Lead
- **Hg**- Mercury
- **Cd** - Cadmium
- **Cr^{+6}** - Hexavalent chromium
- **PBB** - Polybrominated biphenyls
- **PBDE** - Polybrominated diphenyl ether

Since December 2012, CapXon has provided China RoHS certification for our products and certifications.

SONY GP CERTIFICATION

Since Nov 2011, CapXon has been certified as Green Partner by SONY and we are running an environmental management system that continuously meet the requirements of the SONY Green Partner Program and we are working in

accordance with the Sony environmental quality assurance. The Certificate is listed by **SONY GP Certificate No.: FC012746**

REACH CERTIFICATION

REACH is the abbreviation for Registration, Evaluation, Authorization of Chemicals and by Regulation (EC) No 1907 /2006 it is

So each manufacturer or importer, who is shipping goods to the European Union, need to declare and be compliant according to REACH, if within the shipped goods a substance, which is listed out SVHC-List (Substances of Very High Concern) is included and overall a total mass of bigger a ton per year is imported.

CapXon is working in accordance with REACH requirements and certification is available for our products.

ROHS & REACH MARKING

Within our datasheets, we mark the RoHS and REACH compliance with our "RoHS & REACH compliant"- marking, please see marking below for reference:

HALOGEN FREE (HF)

The Halogen Free requirements are based on customer and environmental regulations on management and control requirements of halogens, such as the **European Directive 2002/95/EC**, **IEC 61249-2-21**, **Montreal Protocol on Substances that Deplete the Ozone Layer and Controls the Stockholm joint pledge about durable organic pollutant**.

Concerned by the halogen-free initiative are elements like:

- **Fluorine**
- **Chlorine**
- **Bromine**
- **Iodine**
- **Astatine**

In case of fire, these elements can release toxic fumes, which could harm humans and can also cause corrosion of metals.

CapXon is using halogen-free materials for all our electrolytic capacitors. Since 31st of Oct 2009 all products meet the halogen-free requirements.

BANNED AND ENVIRONMENTAL HAZARDOUS SUBSTANCES IN COMPONENTS

As a manufacturer of passive components, we develop our products focussing on sustainability. In order to guarantee a standardized procedure within CapXon, a mandatory avoidance list of Environmental Hazardous Substances with special interest is part of our environmental management system. The planning and development instructions include regulations and guidelines that aim to identify environmental aspects and to optimize products as well as processes with respect to material usage and environmental compliance to design them with sparing use of resources and to substitute hazardous substances as far as possible.

The environmental officer provides support in the assessment of the environmental impacts of our development projects and as part of our environmental management these aspects are checked and recorded in internal design reviews.

EV ON BOARD CHARGER (OBC)

Example of an EV On Board Charger with 2 channel interleaved Power Factor Correction (PFC) and isolated full bridge DC/DC converter with recommended products.

Designation	Circuit	Purpose	Specification	Series	Part Number
C_2	Interleaved PFC	Inductor ripple current filtering	150µF; 450V; 105°C; Radial; 12000h D18xL50mm; 1.07A@120Hz	FL	FL151M450K500AX
C_2	Interleaved PFC	Inductor ripple current filtering	680µF; 450V; 105°C; Snap-In ; 10000h D35xL50mm; 2.5A@120Hz	UL	UL681M450P500AP6X
C_3	Full-bridge DC/DC	Clamp voltage ringing filtering	3.3µF; 450V; 105°C; ±20%; 8000h D8xL16mm; 0.15A@100kHz	FL	FL3R3M450F160AX
C_4	Full-bridge DC/DC	Low pass filtering	33µF; 450V; 105°C; Radial; 12000h D18xL25mm; 1.1A@100kHz	KH	KH330M450J250AX

12V TO 48V BOARD NET SYSTEM ▪ 3-PHASE INVERTER CIRCUIT

Example of a dual battery system 12V / 48V combined with 48V electric motors in mild hybrid cars with recommended products for the DC link capacitor bank.

Designation	Circuit	Purpose	Specification	Series	Part Number
C_1	DC link bank	Energy coupling	150µF; 63V; 105°C; SMD; 10000h D10xL16.5mm; 4.35A@100kHz	AA	AA151M063G165PTRX
C_1	DC link bank	Energy coupling	150µF; 63V; 125°C; SMD; 10000h D10xL16.5mm; 3.5A@100kHz	AA	AC151M063G165PTRX

12V TO 48V BOARD NET SYSTEM ▪ BIDIRECTONAL DC/DC CIRCUIT

Example of a dual battery system 12V / 48V combined with 48V electric motors in mild hybrid cars with recommended products for the bidirectional DC/DC converter.

Designation	Circuit	Purpose	Specification	Series	Part Number
C_1 to C_5	48V power side	Ripple filtering and ensure stabilty	33µF; 63V; 105°C; SMD; 10000h D10.5xL12.4mm; 1.7A@100kHz	AA	AA330M063F105PTRX
C_1 to C_{10}	12V power side	Ripple filtering and ensure stabilty	33µF; 25V; 105°C; SMD; 10000h D5xL5.8mm; 0.9A@100kHz	AA	AA330M025C058PTRX

DIRECT INJECTOR CIRCUIT

Example of a gasoline injection circuit for a n-cylinder engine with recommend products for the input noise filter (Pi- or π-filter) and the boost converter output.

Designation	Circuit	Purpose	Specification	Series	Part Number
C_1 ,C_2	Input π-filter	Noise ripple filter	220µF; 25V; 125°C; SMD; 2000h D10.5xL10.5mm; 0.14A@100kHz	TV	TV221M025G105ETRX
C_1 ,C_2	Input π-filter	Noise ripple filter	470µF; 25V; 125°C; SMD; 4000h D10.5xL12.4mm; 2.26A@100kHz	AC	AC471M025G124PTRX
C_3	Boost converter	Output buffering and ensure stability	68µF; 80V; 125°C; SMD; 4000h D10xL12.4mm; 1.54A@100kHz	AC	AC680M080G124PTRX

TRUNK LIFT MOTOR DRIVE

Example of a brushed DC motor (BDC) for a gear-driven lift with recommend products to hold the standby voltage on a constant level.

Designation	Circuit	Purpose	Specification	Series	Part Number
C_1	Trunk lift drive	Bulk cap. to hold standby voltage	680µF; 25V; 105°C; SMD; 2000h D12.5xL14mm; 0.61A@120Hz	HV	HV681M025Z140ETRX
C_1	Trunk lift drive	Bulk cap. to hold standby voltage	680µF; 25V; 105°C; Radial; 7000h D10xL20mm; 1.1A@120Hz	GH	GH681M025G200AX

LED LIGHTING

Example of a boost automotive LED lighting system for multiple LED strings with recommend products for input and output smoothing.

Designation	Circuit	Purpose	Specification	Series	Part Number
C_1	Boost converter	Input smoothing	330µF; 35V; 105°C; SMD; 5000h D10xL10.5mm; 0.85A@100kHz	RV	RV331M035G105ETRX
C_4 ,C_5	Boost converter	Output buffering and ensure stability	470µF; 35V; 105°C; SMD; 7000h D16xL17mm; 1.5A@100kHz	CV	CV471M035J170ETRX
C_4 ,C_5	Boost converter	Output buffering and ensure stability	68µF; 35V; 105°C; SMD; 10000h D6.3xL7.7mm; 2A@100kHz	AA	AA680M035E077PTRX

TECHNICAL TERMS

Item	Description	SI units
V_R	Rated voltage	V
V_S	Surge voltage	V
V_{Ripple_AC}	Ripple voltage	V
$V_{Reverse}$	Reverse voltage	V
V_A	Application voltage, operating voltage	A
I_R	Rated ripple current, rated alternating current	A
I_A	Application current, operating current	A
I_{A_Max}	Maximum application current, maximum operating current	A
I_{Leak}	Leakage current	A
T_{0_Max}	Upper category temperature	°C
T_{0_Min}	Lower category temperature	°C
T_A	Application temperature, operating temperature	°C
T_S	Capacitor surface temperature	°C
ΔT_0	Core temperature increase by internal heating due to rated ripple current	°C
ΔT_A	Core temperature increase by internal heating due to application ripple current	°C
C_R	Rated capacitance	F
ΔC	Capacitance tolerance	%
C/C_R	Capacitance drift	-
tan δ	Dissipation factor	-
Z	Impedance	Ω
ESR	Equivalent series resistance	Ω
ESL	Equivalent series inductance	H
X_C	Capacitive reactance	Ω
X_L	Inductive reactance	Ω
f	Frequency	Hz
ω	Angular frequency	Hz
λ	FIT = failure in time	-
K_f	Multiplier for ripple current vs. frequency	-
K_T	Multiplier for ripple current vs. temperature	-
K_0	Dielectric constant derating coefficient at high temperature	-
L_0	Specified lifetime at max. capacitor temperature, rated voltage (and rated ripple current)	h
L_A	Expected lifetime at application conditions	h

For further information please contact sales@capxon.org

Aluminum Electrolytic Capacitors

Hybrid Conductive Polymer Capacitors

Automotive Portfolio

OVERVIEW ▪ SMD ALUMINUM ELECTROLYTIC CAPACITORS

Features

Series	Page	AEC-Q200	High Temperature	Long Life	Low ESR	Standard	Ultra Long Life	Ultra Low ESR	Vibration Proof	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)
LV	31	●				●			●	-40	+85	4	450	0.1	6800	2000
EV	39	●				●			●	-55	+105	6.3	50	0.1	150	1000
HV	44	●		●					●	-55	+105	6.3	100	0.1	6800	2000
										-40		160	450	2.2	68	
JV	52	●		●					●	-55	+105	6.3	50	0.1	1000	3000
DV	56	●			●				●	-55	+105	6.3	100	1	6800	2000 to 5000
RV	63	●						●	●	-55	+105	6.3	100	1	6800	2000 to 5000
										-40		160	450	2.2	68	
CV	69	●			●		●		●	-25	+105	6.3	50	22	1500	7000
TV	73	●	●						●	-40	+125	10	450	1	330	1000 to 2000

OVERVIEW ▪ SMD HYBRID CONDUCTIVE POLYMER CAPACITORS

Features

Series	Page	AEC-Q200	High Temperature	Low ESR	Slim Type	Standard	Ultra Miniaturized	Vibration Proof	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)
AA	219	●		●	●	●		●	-55	+105	16	200	10	1500	10000
AC	223	●	●	●	●			●	-55	+125	16	100	10	1500	4000
AB	227	●	●	●			●	●	-55	+125	25	35	33	470	4000
AN	230	●	●	●				●	-55	+135	16	100	10	820	4000
AR	234	●	●	●				●	-55	+145	16	80	22	560	2000
AP	237	●	●	●				●	-55	+150	16	80	22	560	1000

For further information please contact sales@capxon.org

OVERVIEW ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

Features

Series	Page	AEC-Q200	High Temperature	Low ESR	Low Height	Ultra Long Life	Ultra Miniaturized	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)
SG	84	●			●		●	-40	+105	6.3	50	0.1	470	4000
KL	88	●				●		-40	+105	160	400	3.3	330	5000
								-25		450	500	2.2	180	
GH	95	●		●				-55	+105	6.3	100	0.47	12000	5000 to 10000
FK	111	●				●		-40	+105	160	450	1	330	6000 to 8000
								-25		500		4.7	120	
FL	119	●				●		-40	+105	160	450	1	680	8000 to 12000
								-25		500		10	68	
GT	129	●				●		-40	+105	10	100	1	330	10000
TH	132	●	●					-40	+125	10	400	0.47	8200	1000 to 3000
								-25		450		1	47	
TE	143	●	●					-40	+130	10	400	2.2	4700	1000 to 3000

OVERVIEW ▪ RADIAL HYBRID CONDUCTIVE POLYMER CAPACITORS

Features

Series	Page	AEC-Q200	High Temperature	High Voltage	Low ESR	Slim Type	Standard	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)
AS	247	●		●	●	●	●	-55	+105	16	400	8.2	1500	10000
AT	250	●	●		●	●		-55	+125	16	100	8.2	1500	4000
AK	253	●	●		●			-55	+135	16	100	8.2	560	2000 to 3000
AL	256	●	●		●			-55	+145	16	80	8.2	560	2000
AM	259	●	●		●			-55	+150	16	80	8.2	560	1000

OVERVIEW ▪ SNAP-IN ALUMINUM ELECTROLYTIC CAPACITORS

Features

Series	Page	AEC-Q200	High Reliability	High Temperature	Low ESR	Long Life	Multipin	Ultra Long Life	Vibration Proof	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)	Useful Life (hours)
UJ	172	●	●				●		●	-40	+105	200	450	82	3300	2000	5000
										-25		500	550	47	1000		
UK	181	●	●			●	●		●	-40	+105	200	450	68	2200	3000	8000
										-25		500	550	47	680		
UL	191	●	●		●		●	●	●	-40	+105	200	450	82	2700	5000	10000
										-25		500	550	47	680		
HC	204	●	●	●	●		●	●	●	-55	+125	25	63	600	3300	3000	4000
HH	208	●	●	●			●	●	●	-40	+125	400	450	47	560	3000	4000

For further information please contact sales@capxon.org

Aluminum Electrolytic Capacitors

SMD Types

OVERVIEW ▪ SMD ALUMINUM ELECTROLYTIC CAPACITORS

Features

Series	Page	AEC-Q200	High Temperature	Long Life	Low ESR	Standard	Ultra Long Life	Ultra Low ESR	Vibration Proof	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)
LV	31	●				●			●	-40	+85	4	450	0.1	6800	2000
EV	39	●				●			●	-55	+105	6.3	50	0.1	150	1000
HV	44	●		●					●	-55	+105	6.3	100	0.1	6800	2000
										-40		160	450	2.2	68	
JV	52	●		●					●	-55	+105	6.3	50	0.1	1000	3000
DV	56	●			●				●	-55	+105	6.3	100	1	6800	2000 to 5000
RV	63	●						●	●	-55	+105	6.3	100	1	6800	2000 to 5000
										-40		160	450	2.2	68	
CV	69	●			●		●		●	-25	+105	6.3	50	22	1500	7000
TV	73	●	●						●	-40	+125	10	450	1	330	1000 to 2000

For further information please contact sales@capxon.org

LV SERIES ▪ HIGH VOLTAGE, AUTOMOTIVE 85°C TYPE

KEY FEATURES

AEC-Q 200 HIGH VOLTAGE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ SMD type
- Endurance: 85°C ▪ 2 000 hours
- Low ESR and high ripple current
- Vibration-proof (VP) version (up to 30g) available upon request
- AEC-Q200 qualified

MSL 1 RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics	
Operating Temperature Range		-40 ~ +85°C	
Rated Voltage Range	V_R	4 ~ 100V DC	160 ~ 450V DC
Surge Voltage	V_S	($V_R \le 315V$): $V_S = 1.15 \cdot V_R$	($V_R > 315V$): $V_S = 1.10 \cdot V_R$
Capacitance Range	C_R	0.1 ~ 6800µF	3.3 ~ 68µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)	
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	$\le 0.01 \cdot C_R \cdot V_R$ or 3µA Whichever is greater ▪ After 2 minutes	$\le 0.04 \cdot C_R \cdot V_R$ + 100µA After 1 minute
		[I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]	

Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	4	6.3	10	16	25	35	50	63	80	100	160 ~ 250	>250
		Ø 4 ~ 6.3	42	30	22	18	16	14	14	12	12	10	-	-
		Ø 8 ~ 10	45	34	26	20	16	14	14	12	12	10	15	20
		≥ Ø 12.5	45	40	36	24	18	15	14	12	12	10	15	20

Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	4	6.3	10	16	25	35	50	63	80	100	160 ~ 250	400	450
		Z-25°C/Z+20°C	7	4	3	2	2	2	2	3	3	3	3	6	6
		Z-40°C/Z+20°C	15	8	8	4	4	3	3	4	4	4	6	10	15

Lifetime Test		
Endurance 85°C (V_R applied)	Test	**2 000 hours**
	△C/C_R	≤ ±25% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 85°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±25% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed below	
	△C/C_R	Within ±10% of initial value
	tanδ	Less than specified value
	I_{Leak}	Less than specified value

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +85°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
4	●		47	4	5.5	28	LV470M004B055ETRX [ ]
	●		100	5	5.5	34	LV101M004C055ETRX [ ]
	●	●	150	6.3	6.1	50	LV151M004E061ETRX [ ]
	●	●	220	6.3	5.5	61	LV221M004E055ETRX [ ]
	●	●	330	6.3	7.7	135	LV331M004E077ETRX [ ]
	●	*	330	8	6.5	145	LV331M004F065ETRX [ ]
	●	*	470	8	6.5	180	LV471M004F065ETRX [ ]
	●	●	470	8	10.5	220	LV471M004F105ETRX [ ]
	●	●	560	8	10.5	242	LV561M004F105ETRX [ ]
	●	●	680	8	10.5	285	LV681M004F105ETRX [ ]
	●	●	1000	10	10.5	370	LV102M004G105ETRX [ ]
	●	●	1200	10	10.5	410	LV122M004G105ETRX [ ]
	●	●	1500	10	10.5	470	LV152M004G105ETRX [ ]
6.3	●		22	4	5.5	29	LV220M6R3B055ETRX [ ]
	●		33	4	5.5	33	LV330M6R3B055ETRX [ ]
	●		33	5	5.5	37	LV330M6R3C055ETRX [ ]
	●		47	4	5.5	40	LV470M6R3B055ETRX [ ]
	●		47	5	5.5	46	LV470M6R3C055ETRX [ ]
	●		100	5	5.5	70	LV101M6R3C055ETRX [ ]
	●	●	100	6.3	6.1	85	LV101M6R3E061ETRX [ ]
	●	●	150	6.3	6.1	100	LV151M6R3E061ETRX [ ]
	●	●	220	6.3	6.1	130	LV221M6R3E061ETRX [ ]
	●	●	220	6.3	7.7	141	LV221M6R3E077ETRX [ ]
	●	*	220	8	6.5	150	LV221M6R3F065ETRX [ ]
	●	●	330	6.3	7.7	197	LV331M6R3E077ETRX [ ]
	●	*	330	8	6.5	210	LV331M6R3F065ETRX [ ]
	●		470	8	10.5	380	LV471M6R3F105ETRX [ ]
	●		560	8	10.5	410	LV561M6R3F105ETRX [ ]
	●	●	680	8	10.5	460	LV681M6R3F105ETRX [ ]
	●	●	1000	8	10.5	480	LV102M6R3F105ETRX [ ]
	●	●	1000	10	10.5	500	LV102M6R3G105ETRX [ ]
	●	●	1200	10	10.5	510	LV122M6R3G105ETRX [ ]
	●	●	1500	10	10.5	530	LV152M6R3G105ETRX [ ]
	●	●	3300	12.5	14	750	LV332M6R3Z140ETRX [ ]
	●	●	6800	16	17	1330	LV682M6R3J170ETRX [ ]
10	●		10	4	5.5	21	LV100M010B055ETRX [ ]
	●		22	4	5.5	33	LV220M010B055ETRX [ ]
	●		22	5	5.5	37	LV220M010C055ETRX [ ]
	●		33	4	5.5	41	LV330M010B055ETRX [ ]
	●		33	5	5.5	43	LV330M010C055ETRX [ ]
	●		47	5	5.5	52	LV470M010C055ETRX [ ]
	●		100	6.3	5.5	76	LV101M010E055ETRX [ ]
	●	●	150	6.3	6.1	88	LV151M010E061ETRX [ ]
	●	●	220	6.3	7.7	170	LV221M010E077ETRX [ ]

***Consult CapXon for availability**

[ ]: Enter **W** for Vibration proof version

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +85°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
10	●	*	220	8	6.5	190	LV221M010F065ETRX ⊏⊐
	●	●	330	8	10.5	330	LV331M010F105ETRX ⊏⊐
	●	●	470	8	10.5	420	LV471M010F105ETRX ⊏⊐
	●	●	560	10	10.5	450	LV561M010G105ETRX ⊏⊐
	●	●	680	10	10.5	480	LV681M010G105ETRX ⊏⊐
	●	●	1000	10	10.5	510	LV102M010G105ETRX ⊏⊐
	●	●	2200	12.5	14	730	LV222M010Z140ETRX ⊏⊐
	●	●	4700	16	17	1200	LV472M010J170ETRX ⊏⊐
16	●		10	4	5.5	23	LV100M016B055ETRX ⊏⊐
	●		22	4	5.5	37	LV220M016B055ETRX ⊏⊐
	●		33	5	5.5	45	LV330M016C055ETRX ⊏⊐
	●		47	5	5.5	50	LV470M016C055ETRX ⊏⊐
	●		47	6.3	5.5	60	LV470M016E055ETRX ⊏⊐
	●		100	6.3	5.5	100	LV101M016E055ETRX ⊏⊐
	●	●	100	6.3	6.1	108	LV101M016E061ETRX ⊏⊐
	●	●	150	6.3	7.7	135	LV151M016E077ETRX ⊏⊐
	●	●	220	6.3	7.7	185	LV221M016E077ETRX ⊏⊐
	●	●	220	8	10.5	290	LV221M016F105ETRX ⊏⊐
	●	●	330	8	10.5	330	LV331M016F105ETRX ⊏⊐
	●	●	470	8	10.5	430	LV471M016F105ETRX ⊏⊐
	●	●	470	10	10.5	460	LV471M016G105ETRX ⊏⊐
	●	●	560	10	10.5	500	LV561M016G105ETRX ⊏⊐
	●	●	680	10	10.5	550	LV681M016G105ETRX ⊏⊐
	●	●	1000	12.5	14	600	LV102M016Z140ETRX ⊏⊐
	●	●	1200	12.5	14	660	LV122M016Z140ETRX ⊏⊐
	●	●	1500	12.5	14	710	LV152M016Z140ETRX ⊏⊐
	●	●	3300	16	17	1200	LV332M016J170ETRX ⊏⊐
25	●		4.7	4	5.5	18	LV4R7M025B055ETRX ⊏⊐
	●		10	4	5.5	27	LV100M025B055ETRX ⊏⊐
	●		22	5	5.5	40	LV220M025C055ETRX ⊏⊐
	●		22	6.3	5.5	46	LV220M025E055ETRX ⊏⊐
	●		33	5	5.5	46	LV330M025C055ETRX ⊏⊐
	●		33	6.3	5.5	54	LV330M025E055ETRX ⊏⊐
	●		47	6.3	5.5	60	LV470M025E055ETRX ⊏⊐
	●	●	47	6.3	6.1	68	LV470M025E061ETRX ⊏⊐
	●	●	100	6.3	7.7	150	LV101M025E077ETRX ⊏⊐
	●	*	100	8	6.5	160	LV101M025F065ETRX ⊏⊐
	●	●	150	8	10.5	200	LV151M025F105ETRX ⊏⊐
	●	●	220	8	10.5	300	LV221M025F105ETRX ⊏⊐
	●	●	330	8	10.5	390	LV331M025F105ETRX ⊏⊐
	●	●	330	10	10.5	450	LV331M025G105ETRX ⊏⊐
	●	●	470	10	10.5	480	LV471M025G105ETRX ⊏⊐
	●	●	560	12.5	14	520	LV561M025Z140ETRX ⊏⊐
	●	●	680	12.5	14	580	LV681M025Z140ETRX ⊏⊐

***Consult CapXon for availability**

⊏⊐: Enter **W** for Vibration proof version

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +85°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
25	●	●	1000	12.5	14	660	LV102M025Z140ETRX [ ]
	●	●	2200	16	17	1150	LV222M025J170ETRX [ ]
35	●		4.7	4	5.5	18	LV4R7M035B055ETRX [ ]
	●		10	4	5.5	29	LV100M035B055ETRX [ ]
	●		22	5	5.5	45	LV220M035C055ETRX [ ]
	●		22	6.3	5.5	48	LV220M035E055ETRX [ ]
	●		33	6.3	5.5	58	LV330M035E055ETRX [ ]
	●		47	6.3	5.5	65	LV470M035E055ETRX [ ]
	●	●	47	6.3	6.1	70	LV470M035E061ETRX [ ]
	●	*	47	8	6.5	115	LV470M035F065ETRX [ ]
	●	●	100	6.3	7.7	250	LV101M035E077ETRX [ ]
	●	●	100	8	10.5	280	LV101M035F105ETRX [ ]
	●	●	150	8	10.5	300	LV151M035F105ETRX [ ]
	●	●	220	8	10.5	350	LV221M035F105ETRX [ ]
	●	●	220	10	10.5	400	LV221M035G105ETRX [ ]
	●	●	330	10	10.5	460	LV331M035G105ETRX [ ]
	●	●	470	12.5	14	590	LV471M035Z140ETRX [ ]
	●	●	560	12.5	14	600	LV561M035Z140ETRX [ ]
	●	●	680	12.5	14	610	LV681M035Z140ETRX [ ]
	●	●	1500	16	17	1060	LV152M035J170ETRX [ ]
50	●		0.1	4	5.5	1	LV0R1M050B055ETRX [ ]
	●		0.22	4	5.5	2	LVR22M050B055ETRX [ ]
	●		0.33	4	5.5	2.8	LVR33M050B055ETRX [ ]
	●		0.47	4	5.5	4	LVR47M050B055ETRX [ ]
	●		1	4	5.5	8.4	LV010M050B055ETRX [ ]
	●		2.2	4	5.5	14	LV2R2M050B055ETRX [ ]
	●		3.3	4	5.5	17	LV3R3M050B055ETRX [ ]
	●		4.7	4	5.5	22	LV4R7M050B055ETRX [ ]
	●		10	5	5.5	30	LV100M050C055ETRX [ ]
	●		10	6.3	5.5	35	LV100M050E055ETRX [ ]
	●	●	22	6.3	6.1	60	LV220M050E061ETRX [ ]
	●	●	22	6.3	7.7	75	LV220M050E077ETRX [ ]
	●	*	22	8	6.5	80	LV220M050F065ETRX [ ]
	●	●	33	6.3	7.7	188	LV330M050E077ETRX [ ]
	●	*	33	8	6.5	200	LV330M050F065ETRX [ ]
	●	●	47	6.3	7.7	225	LV470M050E077ETRX [ ]
	●	*	47	8	6.5	240	LV470M050F065ETRX [ ]
	●	●	100	8	10.5	300	LV101M050F105ETRX [ ]
	●	●	150	10	10.5	320	LV151M050G105ETRX [ ]
	●	●	220	10	10.5	450	LV221M050G105ETRX [ ]
	●	●	330	12.5	14	520	LV331M050Z140ETRX [ ]
	●	●	470	16	17	925	LV471M050J170ETRX [ ]
	●	●	1000	16	17	940	LV102M050J170ETRX [ ]

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +85°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
63	●		0.1	4	5.5	1	LV0R1M063B055ETRX [ ]
	●		0.22	4	5.5	2	LVR22M063B055ETRX [ ]
	●		0.33	4	5.5	2.8	LVR33M063B055ETRX [ ]
	●		0.47	4	5.5	4	LVR47M063B055ETRX [ ]
	●		1	4	5.5	8.4	LV010M063B055ETRX [ ]
	●		2.2	4	5.5	14	LV2R2M063B055ETRX [ ]
	●		3.3	5	5.5	18	LV3R3M063C055ETRX [ ]
	●		4.7	5	5.5	23	LV4R7M063C055ETRX [ ]
	●		4.7	6.3	5.5	27	LV4R7M063E055ETRX [ ]
	●		10	6.3	5.5	35	LV100M063E055ETRX [ ]
	●	●	22	6.3	7.7	75	LV220M063E077ETRX [ ]
	●	*	22	8	6.5	75	LV220M063F065ETRX [ ]
	●	●	33	8	10.5	160	LV330M063F105ETRX [ ]
	●	●	47	8	10.5	170	LV470M063F105ETRX [ ]
	●	●	100	10	10.5	270	LV101M063G105ETRX [ ]
	●	●	100	12.5	14	340	LV101M063Z140ETRX [ ]
	●	●	150	12.5	14	380	LV151M063Z140ETRX [ ]
	●	●	220	12.5	14	460	LV221M063Z140ETRX [ ]
	●	●	330	16	17	560	LV331M063J170ETRX [ ]
	●	●	470	16	17	700	LV471M063J170ETRX [ ]
80	●		1	4	5.5	8	LV010M080B055ETRX [ ]
	●		2.2	5	5.5	16	LV2R2M080C055ETRX [ ]
	●		3.3	6.3	5.5	25	LV3R3M080E055ETRX [ ]
	●		4.7	6.3	5.5	30	LV4R7M080E055ETRX [ ]
	●	●	10	6.3	7.7	40	LV100M080E077ETRX [ ]
	●	●	22	6.3	7.7	70	LV220M080E077ETRX [ ]
	●	●	33	8	10.5	160	LV330M080F105ETRX [ ]
	●	●	47	10	10.5	195	LV470M080G105ETRX [ ]
	●	●	100	12.5	14	380	LV101M080Z140ETRX [ ]
	●	●	150	12.5	14	450	LV151M080Z140ETRX [ ]
	●	●	220	16	17	550	LV221M080J170ETRX [ ]
100	●		1	4	5.5	8	LV010M100B055ETRX [ ]
	●		2.2	6.3	5.5	18	LV2R2M100E055ETRX [ ]
	●	●	2.2	6.3	6.1	20	LV2R2M100E061ETRX [ ]
	●		3.3	6.3	5.5	25	LV3R3M100E055ETRX [ ]
	●	●	3.3	6.3	6.1	28	LV3R3M100E061ETRX [ ]
	●	●	4.7	6.3	7.7	38	LV4R7M100E077ETRX [ ]
	●	*	4.7	8	6.5	38	LV4R7M100F065ETRX [ ]
	●	●	10	6.3	7.7	50	LV100M100E077ETRX [ ]
	●	●	22	8	10.5	120	LV220M100F105ETRX [ ]
	●	●	33	10	10.5	190	LV330M100G105ETRX [ ]
	●	●	47	12.5	14	330	LV470M100Z140ETRX [ ]
	●	●	100	12.5	14	380	LV101M100Z140ETRX [ ]
	●	●	150	16	17	560	LV151M100J170ETRX [ ]

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +85°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
160	●	●	10	8	10.5	70	LV100M160F105ETRX [ ]
	●	●	12	8	10.5	80	LV120M160F105ETRX [ ]
	●	●	18	10	10.5	100	LV180M160G105ETRX [ ]
	●	●	22	10	10.5	150	LV220M160G105ETRX [ ]
	●	●	27	12.5	14	235	LV270M160Z140ETRX [ ]
	●	●	33	12.5	14	250	LV330M160Z140ETRX [ ]
	●	●	39	12.5	14	270	LV390M160Z140ETRX [ ]
	●	●	47	16	17	400	LV470M160J170ETRX [ ]
	●	●	68	16	17	500	LV680M160J170ETRX [ ]
200	●	●	10	10	10.5	100	LV100M200G105ETRX [ ]
	●	●	10	12.5	14	130	LV100M200Z140ETRX [ ]
	●	●	22	12.5	14	235	LV220M200Z140ETRX [ ]
	●	●	27	12.5	14	250	LV270M200Z140ETRX [ ]
	●	●	33	12.5	14	270	LV330M200Z140ETRX [ ]
	●	●	39	16	17	370	LV390M200J170ETRX [ ]
	●	●	47	16	17	420	LV470M200J170ETRX [ ]
	●	●	68	16	17	520	LV680M200J170ETRX [ ]
250	●	●	4.7	8	10.5	70	LV4R7M250F105ETRX [ ]
	●	●	6.8	10	10.5	95	LV6R8M250G105ETRX [ ]
	●	●	10	10	10.5	115	LV100M250G105ETRX [ ]
	●	●	15	12.5	14	180	LV150M250Z140ETRX [ ]
	●	●	22	16	17	280	LV220M250J170ETRX [ ]
	●	●	27	16	17	305	LV270M250J170ETRX [ ]
	●	●	33	16	17	340	LV330M250J170ETRX [ ]
	●	●	39	16	17	370	LV390M250J170ETRX [ ]
	●	●	47	16	17	430	LV470M250J170ETRX [ ]
400	●	●	3.3	10	10.5	50	LV3R3M400G105ETRX [ ]
	●	●	4.7	10	10.5	90	LV4R7M400G105ETRX [ ]
	●	●	4.7	12.5	14	115	LV4R7M400Z140ETRX [ ]
	●	●	6.8	12.5	14	130	LV6R8M400Z140ETRX [ ]
	●	●	8.2	12.5	14	140	LV8R2M400Z140ETRX [ ]
	●	●	10	12.5	14	145	LV100M400Z140ETRX [ ]
	●	●	10	16	17	160	LV100M400J170ETRX [ ]
	●	●	12	16	17	175	LV120M400J170ETRX [ ]
	●	●	15	16	17	170	LV150M400J170ETRX [ ]
	●	●	18	16	17	195	LV180M400J170ETRX [ ]
	●	●	22	16	17	235	LV220M400J170ETRX [ ]

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +85°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
450	●	●	4.7	12.5	14	115	LV4R7M450Z140ETRX [ ]
	●	●	6.8	12.5	14	130	LV6R8M450Z140ETRX [ ]
	●	●	8.2	12.5	14	140	LV8R2M450Z140ETRX [ ]
	●	●	10	12.5	14	145	LV100M450Z140ETRX [ ]
	●	●	10	16	17	160	LV100M450J170ETRX [ ]
	●	●	12	16	17	175	LV120M450J170ETRX [ ]
	●	●	15	16	17	170	LV150M450J170ETRX [ ]
	●	●	18	16	17	195	LV180M450J170ETRX [ ]
	●	●	22	16	17	235	LV220M450J170ETRX [ ]

[ ]: Enter **W** for Vibration proof version

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
4	5.5	Max	4.3	4.3	4.9	0.5 to 0.8	1
5	5.5	Max	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.5	0.2	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	6.1	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	7.7	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	Max	8.3	8.3	9	0.5 to 0.8	2.3
8	10.5	Max	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	Max	10.3	10.3	11	0.7 to 1.1	4.5
12.5	14	Max	13	13	13.9	1 to 1.4	4.5
16	17	0.5	17	17	18	1 to 1.4	6.6

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	6.1	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	7.7	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
8	10.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	0.5	10.5	10.5	11.2	0.7 to 1.1	4.5
12.5	14	0.5	13	13	13.9	1 to 1.4	5.5
16	17	0.5	17	17	18	1 to 1.4	6.6

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	50/60	100/120	500	1k	≥ 10k
$0.1 \le C_R \le 100$	0.8	1	1.2	1.3	1.5
$100 < C_R \le 6800$	0.8	1	1.1	1.15	1.2

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid SMD
Page 274	Page 77 and following

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

EV SERIES ▪ STANDARD, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ SMD type
- Endurance: 105°C ▪ 1 000 hours
- Small dimensions
- Vibration-proof (VP) version (up to 30g) available upon request
- AEC-Q200 qualified

MSL 1

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics						
Operating Temperature Range		-55 ~ +105°C						
Rated Voltage Range	V_R	6.3 ~ 50V DC						
Surge Voltage	V_S	$V_S = 1.15 \cdot V_R$						
Capacitance Range	C_R	0.1 ~ 1500µF						
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)						
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ $0.01 \cdot C_R \cdot V_R$ or 3µA, whichever is greater ▪ After 2 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]						
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	6.3	10	16	25	35	50
		Ø4 to 6.3	30	24	20	18	16	14
		Ø8 to 10	35	28	24	18	16	14
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	6.3	10	16	25	35	50
		Z-25°C/Z+20°C	4	3	2	2	2	2
		Z-40°C/Z+20°C	6	6	4	4	3	3
		Z-55°C/Z+20°C	8	8	6	4	3	3

Lifetime Test			
Endurance 105°C (V_R applied)	Test	**1 000 hours**	
	$\triangle C/C_R$	≤ ±25% of initial measured value	≤16V
		≤ ±20% of initial measured value	≥25V
	tanδ	≤ 200% of initial specified value	
	I_{Leak}	≤ the initial specified value	
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**	
	$\triangle C/C_R$	≤ ±25% of initial measured value	≤16V
		≤ ±20% of initial measured value	≥25V
	tanδ	≤ 200% of initial specified value	
	I_{Leak}	≤ the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min acc. JIS-C-5101-4		
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed below		
	$\triangle C/C_R$	Within ±10% of initial value	
	tanδ	Less than specified value	
	I_{Leak}	Less than specified value	

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
6.3	●		22	4	5.5	22	EV220M6R3B055ETRX ⊏⊐
	●		33	4	5.5	30	EV330M6R3B055ETRX ⊏⊐
	●		47	4	5.5	36	EV470M6R3B055ETRX ⊏⊐
	●		100	5	5.5	60	EV101M6R3C055ETRX ⊏⊐
	●		150	6.3	5.5	86	EV151M6R3E055ETRX ⊏⊐
	●		220	6.3	5.5	89	EV221M6R3E055ETRX ⊏⊐
	●	●	220	6.3	7.7	102	EV221M6R3E077ETRX ⊏⊐
	●	*	220	8	6.5	102	EV221M6R3F065ETRX ⊏⊐
	●	●	330	6.3	7.7	105	EV331M6R3E077ETRX ⊏⊐
	●	*	330	8	6.5	105	EV331M6R3F065ETRX ⊏⊐
	●	●	470	8	10.5	210	EV471M6R3F105ETRX ⊏⊐
	●	●	1000	8	10.5	202	EV102M6R3F105ETRX ⊏⊐
	●	●	1000	10	10.5	230	EV102M6R3G105ETRX ⊏⊐
	●	●	1500	10	10.5	310	EV152M6R3G105ETRX ⊏⊐
10	●		22	4	5.5	27	EV220M010B055ETRX ⊏⊐
	●		33	4	5.5	25	EV330M010B055ETRX ⊏⊐
	●		33	5	5.5	40	EV330M010C055ETRX ⊏⊐
	●		47	5	5.5	46	EV470M010C055ETRX ⊏⊐
	●		100	5	5.5	52	EV101M010C055ETRX ⊏⊐
	●		100	6.3	5.5	60	EV101M010E055ETRX ⊏⊐
	●		150	6.3	5.5	86	EV151M010E055ETRX ⊏⊐
	●	●	220	6.3	7.7	105	EV221M010E077ETRX ⊏⊐
	●	*	220	8	6.5	105	EV221M010F065ETRX ⊏⊐
	●	●	330	8	10.5	195	EV331M010F105ETRX ⊏⊐
	●	●	470	8	10.5	210	EV471M010F105ETRX ⊏⊐
	●	●	1000	10	10.5	310	EV102M010G105ETRX ⊏⊐
16	●		10	4	5.5	18	EV100M016B055ETRX ⊏⊐
	●		22	4	5.5	30	EV220M016B055ETRX ⊏⊐
	●		33	5	5.5	40	EV330M016C055ETRX ⊏⊐
	●		47	5	5.5	51	EV470M016C055ETRX ⊏⊐
	●		100	6.3	5.5	60	EV101M016E055ETRX ⊏⊐
	●	●	150	6.3	7.7	95	EV151M016E077ETRX ⊏⊐
	●	*	150	8	6.5	95	EV151M016F065ETRX ⊏⊐
	●	●	220	6.3	7.7	105	EV221M016E077ETRX ⊏⊐
	●	●	330	8	10.5	195	EV331M016F105ETRX ⊏⊐
	●	●	470	8	10.5	210	EV471M016F105ETRX ⊏⊐
25	●		4.7	4	5.5	16	EV4R7M025B055ETRX ⊏⊐
	●		10	4	5.5	26	EV100M025B055ETRX ⊏⊐
	●		22	5	5.5	38	EV220M025C055ETRX ⊏⊐
	●		33	5	5.5	48	EV330M025C055ETRX ⊏⊐
	●		47	6.3	5.5	63	EV470M025E055ETRX ⊏⊐
	●	●	100	6.3	7.7	91	EV101M025E077ETRX ⊏⊐
	●	*	100	8	6.5	91	EV101M025F065ETRX ⊏⊐
	●	●	150	8	10.5	140	EV151M025F105ETRX ⊏⊐

***Consult CapXon for availability**

⊏⊐: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
25	●	●	220	8	10.5	155	EV221M025F105ETRX [ ]
	●	●	330	8	10.5	175	EV331M025F105ETRX [ ]
	●	●	330	10	10.5	198	EV331M025G105ETRX [ ]
	●	●	470	10	10.5	300	EV471M025G105ETRX [ ]
35	●		4.7	4	5.5	16	EV4R7M035B055ETRX [ ]
	●		10	4	5.5	27	EV100M035B055ETRX [ ]
	●		22	5	5.5	37	EV220M035C055ETRX [ ]
	●		22	6.3	5.5	42	EV220M035E055ETRX [ ]
	●		33	6.3	5.5	50	EV330M035E055ETRX [ ]
	●	●	33	6.3	7.7	58	EV330M035E077ETRX [ ]
	●		47	6.3	5.5	58	EV470M035E055ETRX [ ]
	●	●	47	6.3	7.7	66	EV470M035E077ETRX [ ]
	●	●	100	6.3	7.7	84	EV101M035E077ETRX [ ]
	●	*	100	8	6.5	84	EV101M035F065ETRX [ ]
	●	●	150	8	10.5	155	EV151M035F105ETRX [ ]
	●	●	220	8	10.5	167	EV221M035F105ETRX [ ]
	●	●	220	10	10.5	190	EV221M035G105ETRX [ ]
	●	●	330	10	10.5	300	EV331M035G105ETRX [ ]
50	●		0.1	4	5.5	1	EV0R1M050B055ETRX [ ]
	●		0.22	4	5.5	2.6	EVR22M050B055ETRX [ ]
	●		0.33	4	5.5	3.2	EVR33M050B055ETRX [ ]
	●		0.47	4	5.5	3.8	EVR47M050B055ETRX [ ]
	●		1	4	5.5	6.3	EV010M050B055ETRX [ ]
	●		2.2	4	5.5	11	EV2R2M050B055ETRX [ ]
	●		3.3	4	5.5	14	EV3R3M050B055ETRX [ ]
	●		4.7	4	5.5	19	EV4R7M050B055ETRX [ ]
	●		4.7	5	5.5	22	EV4R7M050C055ETRX [ ]
	●		10	5	5.5	29	EV100M050C055ETRX [ ]
	●		10	6.3	5.5	33	EV100M050E055ETRX [ ]
	●		22	6.3	5.5	51	EV220M050E055ETRX [ ]
	●	●	33	6.3	7.7	60	EV330M050E077ETRX [ ]
	●	*	33	8	6.5	60	EV330M050F065ETRX [ ]
	●	●	47	6.3	7.7	66	EV470M050E077ETRX [ ]
	●	*	47	8	6.5	66	EV470M050F065ETRX [ ]
	●	●	100	8	10.5	140	EV101M050F105ETRX [ ]
	●	●	150	10	10.5	180	EV151M050G105ETRX [ ]
	●	●	220	10	10.5	220	EV221M050G105ETRX [ ]

***Consult CapXon for availability**

[ ]: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
4	5.5	Max	4.3	4.3	4.9	0.5 to 0.8	1
5	5.5	Max	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.5	0.2	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	7.7	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	Max	8.3	8.3	9	0.5 to 0.8	2.3
8	10.5	Max	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	Max	10.3	10.3	11	0.7 to 1.1	4.5

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	7.7	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
8	10.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	0.5	10.5	10.5	11.2	0.7 to 1.1	4.5

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	50/60	100/120	500	1k	≥ 10k
$0.1 \le C_R \le 100$	0.8	1	1.2	1.3	1.5
$100 < C_R \le 1500$	0.8	1	1.1	1.15	1.2

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid SMD
Page 274	Page 77 and following

For further information please contact sales@capxon.org

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

HV SERIES ▪ HIGH VOLTAGE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · HIGH VOLTAGE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ SMD type
- Endurance: 105°C ▪ 2 000 hours
- Low ESR and high ripple current
- Vibration-proof (VP) version (up to 30g) available upon request
- AEC-Q200 qualified

MSL 1 · RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics	
Operating Temperature Range		-55 ~ +105°C	-40 ~ +105°C
Rated Voltage Range	V_R	6.3 ~ 100V DC	160 ~ 450V DC
Surge Voltage	V_S	($V_R \le 315V$): $V_S = 1.15 \cdot V_R$	($V_R > 315V$): $V_S = 1.10 \cdot V_R$
Capacitance Range	C_R	0.1 ~ 6800µF	2.2 ~ 68µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)	
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	$\le 0.01 \cdot C_R \cdot V_R$ or 3µA Whichever is greater ▪ After 2 minutes	$\le 0.04 \cdot C_R \cdot V_R$ + 100µA After 1 minute
		[I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]	

Dissipation Factor % (20°C ▪ 120Hz)	tanδ											
		V_R (V DC)	6.3	10	16	25	35	50	63	80	100	160 ~ 250	>250
		Ø 4 ~ 6.3	30	24	20	16	14	14	12	10	10	-	-
		Ø 8 ~ 10	35	26	24	18	14	14	12	10	10	15	20
		≥ Ø 12.5	37	34	24	18	14	14	12	10	10	15	20

Low Temperature Characteristics at 120Hz	Z ratio max.												
		V_R (V DC)	6.3	10	16	25	35	50	63	80	100	160 ~ 250	400	450
		Z-25°C/Z+20°C	6	4	4	3	2	2	2	3	3	3	6	6
		Z-40°C/Z+20°C	12	10	8	6	4	4	4	4	4	6	10	15
		Z-55°C/Z+20°C	14	12	10	6	4	4	4	4	4	6	10	15

Lifetime Test		
Endurance 105°C (V_R applied)	Test	**2 000 hours**
	△C/C_R	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed below	
	△C/C_R	Within ±10% of initial value
	tanδ	Less than specified value
	I_{Leak}	Less than specified value

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
6.3	●		22	4	5.5	23	HV220M6R3B055ETRX ☐
	●		33	4	5.5	28	HV330M6R3B055ETRX ☐
	●		47	4	5.5	37	HV470M6R3B055ETRX ☐
	●		47	5	5.5	40	HV470M6R3C055ETRX ☐
	●		100	5	5.5	46	HV101M6R3C055ETRX ☐
	●		100	6.3	5.5	57	HV101M6R3E055ETRX ☐
	●		150	6.3	5.5	70	HV151M6R3E055ETRX ☐
	●	*	150	8	6.5	90	HV151M6R3F065ETRX ☐
	●	●	220	6.3	7.7	90	HV221M6R3E077ETRX ☐
	●	*	220	8	6.5	130	HV221M6R3F065ETRX ☐
	●	●	330	6.3	7.7	140	HV331M6R3E077ETRX ☐
	●	●	330	8	10.5	170	HV331M6R3F105ETRX ☐
	●	●	470	8	10.5	210	HV471M6R3F105ETRX ☐
	●	●	560	8	10.5	310	HV561M6R3F105ETRX ☐
	●	●	680	8	10.5	330	HV681M6R3F105ETRX ☐
	●	●	680	10	10.5	370	HV681M6R3G105ETRX ☐
	●	●	1000	8	10.5	420	HV102M6R3F105ETRX ☐
	●	●	1000	10	10.5	480	HV102M6R3G105ETRX ☐
	●	●	1200	10	10.5	500	HV122M6R3G105ETRX ☐
	●	●	1500	10	10.5	520	HV152M6R3G105ETRX ☐
	●	●	1800	12.5	14	600	HV182M6R3Z140ETRX ☐
	●	●	2200	12.5	14	650	HV222M6R3Z140ETRX ☐
	●	●	3300	12.5	14	700	HV332M6R3Z140ETRX ☐
	●	●	6800	16	17	930	HV682M6R3J170ETRX ☐
10	●		22	4	5.5	25	HV220M010B055ETRX ☐
	●		33	4	5.5	34	HV330M010B055ETRX ☐
	●		47	5	5.5	42	HV470M010C055ETRX ☐
	●		100	6.3	5.5	55	HV101M010E055ETRX ☐
	●	*	100	8	6.5	60	HV101M010F065ETRX ☐
	●		150	6.3	5.5	90	HV151M010E055ETRX ☐
	●	*	150	8	6.5	110	HV151M010F065ETRX ☐
	●	●	220	6.3	7.7	140	HV221M010E077ETRX ☐
	●	*	220	8	6.5	160	HV221M010F065ETRX ☐
	●	●	330	8	10.5	195	HV331M010F105ETRX ☐
	●	●	470	8	10.5	350	HV471M010F105ETRX ☐
	●	●	470	10	10.5	420	HV471M010G105ETRX ☐
	●	●	560	10	10.5	450	HV561M010G105ETRX ☐
	●	●	680	10	10.5	480	HV681M010G105ETRX ☐
	●	●	1000	10	10.5	530	HV102M010G105ETRX ☐
	●	●	1200	12.5	14	570	HV122M010Z140ETRX ☐
	●	●	1500	12.5	14	750	HV152M010Z140ETRX ☐
	●	●	4700	16	17	880	HV472M010J170ETRX ☐

***Consult CapXon for availability**

☐: Enter **W** for Vibration proof version

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
16	●		10	4	5.5	20	HV100M016B055ETRX ⊏⊐
	●		22	4	5.5	31	HV220M016B055ETRX ⊏⊐
	●		22	5	5.5	35	HV220M016C055ETRX ⊏⊐
	●		33	5	5.5	36	HV330M016C055ETRX ⊏⊐
	●		33	6.3	5.5	40	HV330M016E055ETRX ⊏⊐
	●	●	47	5	5.5	45	HV470M016C055ETRX ⊏⊐
	●		47	6.3	5.5	56	HV470M016E055ETRX ⊏⊐
	●	●	100	6.3	7.7	58	HV101M016E077ETRX ⊏⊐
	●	*	100	8	6.5	62	HV101M016F065ETRX ⊏⊐
	●	●	150	6.3	7.7	125	HV151M016E077ETRX ⊏⊐
	●	*	150	8	6.5	140	HV151M016F065ETRX ⊏⊐
	●	●	220	6.3	7.7	170	HV221M016E077ETRX ⊏⊐
	●	●	220	8	10.5	185	HV221M016F105ETRX ⊏⊐
	●	●	330	8	10.5	250	HV331M016F105ETRX ⊏⊐
	●		470	8	10.5	370	HV471M016F105ETRX ⊏⊐
	●		470	10	10.5	420	HV471M016G105ETRX ⊏⊐
	●		560	10	10.5	480	HV561M016G105ETRX ⊏⊐
	●		680	10	10.5	540	HV681M016G105ETRX ⊏⊐
	●		1000	12.5	14	580	HV102M016Z140ETRX ⊏⊐
	●	●	1200	12.5	14	590	HV122M016Z140ETRX ⊏⊐
	●	●	1500	12.5	14	620	HV152M016Z140ETRX ⊏⊐
	●	●	3300	16	17	850	HV332M016J170ETRX ⊏⊐
25	●		4.7	4	5.5	12	HV4R7M025B055ETRX ⊏⊐
	●		10	4	5.5	22	HV100M025B055ETRX ⊏⊐
	●		22	5	5.5	38	HV220M025C055ETRX ⊏⊐
	●		33	6.3	5.5	48	HV330M025E055ETRX ⊏⊐
	●	●	47	6.3	7.7	56	HV470M025E077ETRX ⊏⊐
	●	*	47	8	6.5	60	HV470M025F065ETRX ⊏⊐
	●	●	100	6.3	7.7	110	HV101M025E077ETRX ⊏⊐
	●	●	100	8	10.5	160	HV101M025F105ETRX ⊏⊐
	●	●	150	8	10.5	175	HV151M025F105ETRX ⊏⊐
	●	●	220	8	10.5	180	HV221M025F105ETRX ⊏⊐
	●	●	220	10	10.5	190	HV221M025G105ETRX ⊏⊐
	●	●	330	8	10.5	290	HV331M025F105ETRX ⊏⊐
	●	●	470	10	10.5	440	HV471M025G105ETRX ⊏⊐
	●		560	12.5	14	490	HV561M025Z140ETRX ⊏⊐
	●		680	12.5	14	510	HV681M025Z140ETRX ⊏⊐
	●		1000	12.5	14	600	HV102M025Z140ETRX ⊏⊐
	●		2200	16	17	805	HV222M025J170ETRX ⊏⊐
35	●		4.7	4	5.5	14	HV4R7M035B055ETRX ⊏⊐
	●		10	4	5.5	24	HV100M035B055ETRX ⊏⊐
	●		22	5	5.5	40	HV220M035C055ETRX ⊏⊐
	●		22	6.3	5.5	46	HV220M035E055ETRX ⊏⊐
	●	●	33	6.3	7.7	47	HV330M035E077ETRX ⊏⊐

***Consult CapXon for availability**

⊏⊐: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
35	●	*	33	8	6.5	50	HV330M035F065ETRX ☐
	●	●	47	6.3	7.7	60	HV470M035E077ETRX ☐
	●	*	47	8	6.5	65	HV470M035F065ETRX ☐
	●	●	100	6.3	7.7	130	HV101M035E077ETRX ☐
	●	●	100	8	10.5	180	HV101M035F105ETRX ☐
	●	●	150	8	10.5	190	HV151M035F105ETRX ☐
	●	●	220	8	10.5	250	HV221M035F105ETRX ☐
	●	●	220	10	10.5	280	HV221M035G105ETRX ☐
	●	●	330	10	10.5	360	HV331M035G105ETRX ☐
	●	●	470	12.5	14	460	HV471M035Z140ETRX ☐
	●	●	560	12.5	14	500	HV561M035Z140ETRX ☐
	●	●	1500	16	17	740	HV152M035J170ETRX ☐
50	●		0.1	4	5.5	1	HV0R1M050B055ETRX ☐
	●		0.22	4	5.5	2	HVR22M050B055ETRX ☐
	●		0.33	4	5.5	3	HVR33M050B055ETRX ☐
	●		0.47	4	5.5	4	HVR47M050B055ETRX ☐
	●		1	4	5.5	8.4	HV010M050B055ETRX ☐
	●		2.2	4	5.5	11	HV2R2M050B055ETRX ☐
	●		3.3	4	5.5	13	HV3R3M050B055ETRX ☐
	●		4.7	4	5.5	18	HV4R7M050B055ETRX ☐
	●		10	6.3	5.5	28	HV100M050E055ETRX ☐
	●	●	22	6.3	7.7	50	HV220M050E077ETRX ☐
	●	*	22	8	6.5	55	HV220M050F065ETRX ☐
	●	●	33	6.3	7.7	95	HV330M050E077ETRX ☐
	●	●	33	8	10.5	135	HV330M050F105ETRX ☐
	●	●	47	6.3	7.7	115	HV470M050E077ETRX ☐
	●	●	47	8	10.5	155	HV470M050F105ETRX ☐
	●	●	100	10	10.5	315	HV101M050G105ETRX ☐
	●	●	150	10	10.5	330	HV151M050G105ETRX ☐
	●	●	220	10	10.5	350	HV221M050G105ETRX ☐
	●	●	330	12.5	14	400	HV331M050Z140ETRX ☐
	●	●	470	16	17	570	HV471M050J170ETRX ☐
	●	●	1000	16	17	655	HV102M050J170ETRX ☐
63	●		0.1	4	5.5	0.7	HV0R1M063B055ETRX ☐
	●		0.22	4	5.5	1.6	HVR22M063B055ETRX ☐
	●		0.33	4	5.5	2.5	HVR33M063B055ETRX ☐
	●		0.47	4	5.5	3.5	HVR47M063B055ETRX ☐
	●		1	4	5.5	7	HV010M063B055ETRX ☐
	●		2.2	4	5.5	11	HV2R2M063B055ETRX ☐
	●		3.3	5	5.5	14	HV3R3M063C055ETRX ☐
	●		4.7	5	5.5	22	HV4R7M063C055ETRX ☐
	●		10	6.3	5.5	40	HV100M063E055ETRX ☐
	●	●	22	6.3	7.7	58	HV220M063E077ETRX ☐
	●	●	33	8	10.5	112	HV330M063F105ETRX ☐

***Consult CapXon for availability**

☐: Enter **W** for Vibration proof version

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
63	●	●	47	8	10.5	119	HV470M063F105ETRX [ ]
	●	●	100	10	10.5	280	HV101M063G105ETRX [ ]
	●	●	220	12.5	14	300	HV221M063Z140ETRX [ ]
	●	●	470	16	17	630	HV471M063J170ETRX [ ]
80	●		1	4	5.5	7	HV010M080B055ETRX [ ]
	●		2.2	5	5.5	12	HV2R2M080C055ETRX [ ]
	●		3.3	6.3	5.5	17	HV3R3M080E055ETRX [ ]
	●		4.7	6.3	5.5	25	HV4R7M080E055ETRX [ ]
	●	●	10	6.3	7.7	35	HV100M080E077ETRX [ ]
	●	●	22	6.3	7.7	58	HV220M080E077ETRX [ ]
	●	●	33	8	10.5	112	HV330M080F105ETRX [ ]
	●	●	47	10	10.5	160	HV470M080G105ETRX [ ]
	●	●	100	12.5	14	380	HV101M080Z140ETRX [ ]
	●	●	150	16	17	500	HV151M080J170ETRX [ ]
	●		220	16	17	600	HV221M080J170ETRX [ ]
100	●		1	4	5.5	7	HV010M100B055ETRX [ ]
	●	●	2.2	6.3	6.1	15	HV2R2M100E061ETRX [ ]
	●		2.2	6.3	5.5	13	HV2R2M100E055ETRX [ ]
	●	●	3.3	6.3	6.1	20	HV3R3M100E061ETRX [ ]
	●	●	4.7	6.3	7.7	28	HV4R7M100E077ETRX [ ]
	●	●	10	6.3	7.7	35	HV100M100E077ETRX [ ]
	●	●	22	8	10.5	85	HV220M100F105ETRX [ ]
	●	●	33	10	10.5	135	HV330M100G105ETRX [ ]
	●	●	47	12.5	14	240	HV470M100Z140ETRX [ ]
	●	●	150	16	17	500	HV151M100J170ETRX [ ]
160	●	●	10	8	10.5	57	HV100M160F105ETRX [ ]
	●	●	12	8	10.5	60	HV120M160F105ETRX [ ]
	●	●	18	10	10.5	65	HV180M160G105ETRX [ ]
	●	●	22	10	10.5	70	HV220M160G105ETRX [ ]
	●	●	27	12.5	14	85	HV270M160Z140ETRX [ ]
	●	●	33	12.5	14	95	HV330M160Z140ETRX [ ]
	●	●	39	12.5	14	105	HV390M160Z140ETRX [ ]
	●	●	47	16	17	260	HV470M160J170ETRX [ ]
	●	●	68	16	17	300	HV680M160J170ETRX [ ]
200	●	●	10	10	10.5	64	HV100M200G105ETRX [ ]
	●	●	10	12.5	14	80	HV100M200Z140ETRX [ ]
	●	●	22	12.5	14	105	HV220M200Z140ETRX [ ]
	●	●	27	12.5	14	115	HV270M200Z140ETRX [ ]
	●	●	33	12.5	14	170	HV330M200Z140ETRX [ ]
	●	●	33	16	17	220	HV330M200J170ETRX [ ]
	●	●	47	16	17	260	HV470M200J170ETRX [ ]

***Consult CapXon for availability**

[ ]: Enter **W** for Vibration proof version

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
250	●	●	4.7	8	10.5	50	HV4R7M250F105ETRX [ ]
	●	●	6.8	10	10.5	60	HV6R8M250G105ETRX [ ]
	●	●	10	10	10.5	75	HV100M250G105ETRX [ ]
	●	●	15	12.5	14	120	HV150M250Z140ETRX [ ]
	●	●	22	16	17	180	HV220M250J170ETRX [ ]
	●	●	27	16	17	200	HV270M250J170ETRX [ ]
	●	●	33	16	17	230	HV330M250J170ETRX [ ]
	●	●	39	16	17	260	HV390M250J170ETRX [ ]
	●	●	47	16	17	285	HV470M250J170ETRX [ ]
400	●	●	2.2	8	10.5	27	HV2R2M400F105ETRX [ ]
	●	●	3.3	8	10.5	34	HV3R3M400F105ETRX [ ]
	●	●	3.9	10	10.5	40	HV3R9M400G105ETRX [ ]
	●	●	4.7	10	10.5	40	HV4R7M400G105ETRX [ ]
	●	●	4.7	12.5	14	50	HV4R7M400Z140ETRX [ ]
	●	●	6.8	12.5	14	60	HV6R8M400Z140ETRX [ ]
	●	●	8.2	12.5	14	65	HV8R2M400Z140ETRX [ ]
	●	●	10	12.5	14	70	HV100M400Z140ETRX [ ]
	●	●	10	16	17	85	HV100M400J170ETRX [ ]
	●	●	12	16	17	95	HV120M400J170ETRX [ ]
	●	●	22	16	17	120	HV220M400J170ETRX [ ]
450	●	●	3.3	10	10.5	40	HV3R3M450G105ETRX [ ]
	●	●	3.9	10	10.5	40	HV3R9M450G105ETRX [ ]
	●	●	4.7	12.5	14	50	HV4R7M450Z140ETRX [ ]
	●	●	6.8	12.5	14	60	HV6R8M450Z140ETRX [ ]
	●	●	8.2	12.5	14	65	HV8R2M450Z140ETRX [ ]
	●	●	10	12.5	14	70	HV100M450Z140ETRX [ ]
	●	●	10	16	17	85	HV100M450J170ETRX [ ]
	●	●	12	16	17	95	HV120M450J170ETRX [ ]
	●	●	15	16	17	100	HV150M450J170ETRX [ ]
	●	●	22	16	17	120	HV220M450J170ETRX [ ]

[ ]: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
4	5.5	Max	4.3	4.3	4.9	0.5 to 0.8	1
5	5.5	Max	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.5	0.2	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	6.1	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	7.7	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	Max	8.3	8.3	9	0.5 to 0.8	2.3
8	10.5	Max	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	Max	10.3	10.3	11	0.7 to 1.1	4.5
12.5	14	Max	13	13	13.9	1 to 1.4	4.5
16	17	0.5	17	17	18	1 to 1.4	6.6

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	6.1	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	7.7	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
8	10.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	0.5	10.5	10.5	11.2	0.7 to 1.1	4.5
12.5	14	0.5	13	13	13.9	1 to 1.4	5.5
16	17	0.5	17	17	18	1 to 1.4	6.6

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	50/60	100/120	500	1k	≥ 10k
$0.1 \le C_R \le 100$	0.8	1	1.2	1.3	1.5
$100 < C_R \le 6800$	0.8	1	1.1	1.15	1.2

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid SMD
Page 274	Page 77 and following

For further information please contact sales@capxon.org

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

JV SERIES ▪ LONG LIFE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ SMD type
- Endurance: 105°C ▪ 3 000 hours
- Small dimensions
- Vibration-proof (VP) version (up to 30g) available upon request
- AEC-Q200 qualified

MSL 1

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics						
Operating Temperature Range		-55 ~ +105°C						
Rated Voltage Range	V_R	6.3 ~ 50V DC						
Surge Voltage	V_S	$V_S = 1.15 \cdot V_R$						
Capacitance Range	C_R	0.1 ~ 1000µF						
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)						
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ $0.01 \cdot C_R \cdot V_R$ or 3µA, whichever is greater ▪ After 2 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]						
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	6.3	10	16	25	35	50
		tanδ	28	24	20	16	13	12
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	6.3	10	16	25	35	50
		Z-25°C/Z+20°C	4	3	2	2	2	2
		Z-40°C/Z+20°C	10	7	5	3	3	3
		Z-55°C/Z+20°C	12	10	6	5	4	4

Lifetime Test		
Endurance 105°C (V_R applied)	Test	**3 000 hours**
	△C/C_R	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed below	
	△C/C_R	Within ±10% of initial value
	tanδ	Less than specified value
	I_{Leak}	Less than specified value

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
6.3	●		22	4	5.5	22	JV220M6R3B055ETRX [ ]
	●		33	5	5.5	33	JV330M6R3C055ETRX [ ]
	●		47	5	5.5	36	JV470M6R3C055ETRX [ ]
	●		100	6.3	5.5	68	JV101M6R3E055ETRX [ ]
	●	●	220	6.3	7.7	120	JV221M6R3E077ETRX [ ]
	●	●	330	8	10.5	230	JV331M6R3F105ETRX [ ]
	●	●	470	10	10.5	290	JV471M6R3G105ETRX [ ]
	●	●	1000	10	10.5	360	JV102M6R3G105ETRX [ ]
10	●		22	5	5.5	30	JV220M010C055ETRX [ ]
	●		33	5	5.5	35	JV330M010C055ETRX [ ]
	●		47	6.3	5.5	52	JV470M010E055ETRX [ ]
	●	●	100	6.3	7.7	81	JV101M010E077ETRX [ ]
	●	●	220	8	10.5	142	JV221M010F105ETRX [ ]
	●	●	330	10	10.5	280	JV331M010G105ETRX [ ]
	●		470	10	10.5	305	JV471M010G105ETRX [ ]
16	●		10	4	5.5	18	JV100M016B055ETRX [ ]
	●		22	5	5.5	31	JV220M016C055ETRX [ ]
	●		33	6.3	5.5	48	JV330M016E055ETRX [ ]
	●		47	6.3	5.5	51	JV470M016E055ETRX [ ]
	●	●	100	6.3	7.7	83	JV101M016E077ETRX [ ]
	●	●	220	10	10.5	222	JV221M016G105ETRX [ ]
	●	●	330	10	10.5	305	JV331M016G105ETRX [ ]
	●	●	470	10	10.5	330	JV471M016G105ETRX [ ]
25	●		4.7	4	5.5	16	JV4R7M025B055ETRX [ ]
	●		10	4	5.5	26	JV100M025B055ETRX [ ]
	●		22	6.3	5.5	44	JV220M025E055ETRX [ ]
	●		33	6.3	5.5	50	JV330M025E055ETRX [ ]
	●	●	47	6.3	7.7	66	JV470M025E077ETRX [ ]
	●	●	100	8	10.5	118	JV101M025F105ETRX [ ]
	●	●	220	10	10.5	300	JV221M025G105ETRX [ ]
	●	●	330	10	10.5	395	JV331M025G105ETRX [ ]
	●	●	470	10	10.5	470	JV471M025G105ETRX [ ]
35	●		4.7	4	5.5	16	JV4R7M035B055ETRX [ ]
	●		10	5	5.5	27	JV100M035C055ETRX [ ]
	●		22	6.3	5.5	45	JV220M035E055ETRX [ ]
	●	●	33	6.3	7.7	58	JV330M035E077ETRX [ ]
	●	●	47	8	10.5	93	JV470M035F105ETRX [ ]
	●	●	100	10	10.5	155	JV101M035G105ETRX [ ]
	●	●	220	10	10.5	340	JV221M035G105ETRX [ ]
	●	●	330	10	10.5	420	JV331M035G105ETRX [ ]

[ ]: Enter **W** for Vibration proof version

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
50	●		0.1	4	5.5	1	JV0R1M050B055ETRX [ ]
	●		0.22	4	5.5	2.6	JVR22M050B055ETRX [ ]
	●		0.33	4	5.5	3.2	JVR33M050B055ETRX [ ]
	●		0.47	4	5.5	5	JVR47M050B055ETRX [ ]
	●		1	4	5.5	8	JV010M050B055ETRX [ ]
	●		2.2	4	5.5	12	JV2R2M050B055ETRX [ ]
	●		3.3	4	5.5	17	JV3R3M050B055ETRX [ ]
	●		4.7	5	5.5	22	JV4R7M050C055ETRX [ ]
	●		10	6.3	5.5	33	JV100M050E055ETRX [ ]
	●	●	22	6.3	7.7	58	JV220M050E077ETRX [ ]
	●	●	33	8	10.5	140	JV330M050F105ETRX [ ]
	●	●	47	8	10.5	170	JV470M050F105ETRX [ ]
	●	●	100	10	10.5	300	JV101M050G105ETRX [ ]

[ ]: Enter **W** for Vibration proof version

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
4	5.5	Max	4.3	4.3	4.9	0.5 to 0.8	1
5	5.5	Max	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.5	0.2	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	7.7	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
8	10.5	Max	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	Max	10.3	10.3	11	0.7 to 1.1	4.5

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	7.7	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
8	10.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	0.5	10.5	10.5	11.2	0.7 to 1.1	4.5

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	50/60	100/120	500	1k	≥ 10k
$0.1 \le C_R \le 100$	0.8	1	1.2	1.3	1.5
$100 < C_R \le 1000$	0.8	1	1.1	1.15	1.2

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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General Precautions and Guidelines	Packaging Information Liquid SMD
Page 274	Page 77 and following

DISCLAIMER

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CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

DV SERIES ▪ LOW IMPEDANCE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · LOW IMPEDANCE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ SMD type
- Endurance: 105°C ▪ 2 000 hours up to 5 000 hours
- Low impedance type
- Vibration-proof (VP) version (up to 30g) available upon request
- AEC-Q200 qualified

MSL 1 · RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics									
Operating Temperature Range		-55 ~ +105°C									
Rated Voltage Range	V_R	6.3 ~ 100V DC									
Surge Voltage	V_S	$V_S = 1.15 \cdot V_R$									
Capacitance Range	C_R	1 ~ 6800µF									
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)									
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ $0.01 \cdot C_R \cdot V_R$ or 3µA, whichever is greater ▪ After 2 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]									
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	6.3	10	16	25	35	50	63	80	100
		tanδ	24	19	16	14	14	12	10	9	8
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	6.3	10	16	25	35	50	63	80	100
		Z-25°C/Z+20°C	2	2	2	2	2	2	2	2	2
		Z-40°C/Z+20°C	8	6	4	4	3	3	3	3	3
		Z-55°C/Z+20°C	12	10	6	6	4	4	4	4	4

Lifetime Test			
Endurance 105°C (V_R applied)	Test	**5 000 hours**	≥ Ø 12.5mm
		2 000 hours	< Ø 12.5mm
	△C/C_R	≤ ±30% of initial measured value	
	tanδ	≤ 300% of initial specified value	
	I_{Leak}	≤ the initial specified value	
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**	
	△C/C_R	≤ ±30% of initial measured value	
	tanδ	≤ 300% of initial specified value	
	I_{Leak}	≤ the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4		
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed below		
	△C/C_R	Within ±10% of initial value	
	tanδ	Less than specified value	
	I_{Leak}	Less than specified value	

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
6.3	●		22	4	5.5	2200	75	DV220M6R3B055ETRX ⬚
	●		27	4	5.5	1980	79	DV270M6R3B055ETRX ⬚
	●		33	4	5.5	1900	82	DV330M6R3B055ETRX ⬚
	●		33	5	5.5	1300	130	DV330M6R3C055ETRX ⬚
	●		47	4	5.5	1880	86	DV470M6R3B055ETRX ⬚
	●		47	5	5.5	1100	150	DV470M6R3C055ETRX ⬚
	●		56	5	5.5	1100	150	DV560M6R3C055ETRX ⬚
	●		68	5	5.5	900	160	DV680M6R3C055ETRX ⬚
	●		68	6.3	5.5	550	220	DV680M6R3E055ETRX ⬚
	●		100	5	5.5	800	170	DV101M6R3C055ETRX ⬚
	●		100	6.3	5.5	530	230	DV101M6R3E055ETRX ⬚
	●		150	6.3	5.5	510	235	DV151M6R3E055ETRX ⬚
	●	*	150	8	6.5	480	250	DV151M6R3F065ETRX ⬚
	●	●	220	6.3	7.7	450	260	DV221M6R3E077ETRX ⬚
	●		220	6.3	5.5	480	240	DV221M6R3E055ETRX ⬚
	●	●	330	6.3	7.7	360	275	DV331M6R3E077ETRX ⬚
	●	*	330	8	6.5	340	290	DV331M6R3F065ETRX ⬚
	●	●	470	8	10.5	280	450	DV471M6R3F105ETRX ⬚
	●	●	680	8	10.5	250	500	DV681M6R3F105ETRX ⬚
	●	●	1000	8	10.5	200	530	DV102M6R3F105ETRX ⬚
	●	●	1000	10	10.5	170	570	DV102M6R3G105ETRX ⬚
	●	●	1200	10	10.5	160	600	DV122M6R3G105ETRX ⬚
	●	●	1500	10	10.5	130	650	DV152M6R3G105ETRX ⬚
	●	●	1800	10	10.5	80	860	DV182M6R3G105ETRX ⬚
	●	●	3300	12.5	14	80	1100	DV332M6R3Z140ETRX ⬚
	●	●	6800	16	17	52	1250	DV682M6R3J170ETRX ⬚
10	●		22	4	5.5	2200	80	DV220M010B055ETRX ⬚
	●		27	5	5.5	1900	125	DV270M010C055ETRX ⬚
	●		33	4	5.5	1850	90	DV330M010B055ETRX ⬚
	●		33	5	5.5	1200	150	DV330M010C055ETRX ⬚
	●		47	5	5.5	1100	165	DV470M010C055ETRX ⬚
	●		47	6.3	5.5	590	180	DV470M010E055ETRX ⬚
	●		56	6.3	5.5	570	210	DV560M010E055ETRX ⬚
	●		68	6.3	5.5	550	220	DV680M010E055ETRX ⬚
	●		100	5	5.5	800	210	DV101M010C055ETRX ⬚
	●		100	6.3	5.5	530	240	DV101M010E055ETRX ⬚
	●		150	6.3	5.5	490	250	DV151M010E055ETRX ⬚
	●	*	150	8	6.5	470	260	DV151M010F065ETRX ⬚
	●	●	220	6.3	7.7	440	270	DV221M010E077ETRX ⬚
	●	*	220	8	6.5	400	285	DV221M010F065ETRX ⬚
	●	●	330	8	10.5	250	500	DV331M010F105ETRX ⬚
	●	●	470	8	10.5	250	550	DV471M010F105ETRX ⬚
	●	●	680	10	10.5	200	680	DV681M010G105ETRX ⬚

***Consult CapXon for availability**

⬚: Enter **W** for Vibration proof version

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
10	●	●	1000	10	10.5	150	740	DV102M010G105ETRX ⬚
	●	●	2200	12.5	14	80	1100	DV222M010Z140ETRX ⬚
	●	●	4700	16	17	52	1250	DV472M010J170ETRX ⬚
16	●		10	4	5.5	2200	80	DV100M016B055ETRX ⬚
	●		15	4	5.5	2000	85	DV150M016B055ETRX ⬚
	●		22	4	5.5	1980	90	DV220M016B055ETRX ⬚
	●		22	5	5.5	1600	140	DV220M016C055ETRX ⬚
	●		27	5	5.5	740	170	DV270M016C055ETRX ⬚
	●		33	6.3	5.5	600	185	DV330M016E055ETRX ⬚
	●		47	5	5.5	1050	195	DV470M016C055ETRX ⬚
	●		47	6.3	5.5	580	210	DV470M016E055ETRX ⬚
	●		56	6.3	5.5	560	220	DV560M016E055ETRX ⬚
	●		68	6.3	5.5	540	230	DV680M016E055ETRX ⬚
	●	*	68	8	6.5	500	240	DV680M016F065ETRX ⬚
	●		100	6.3	5.5	520	255	DV101M016E055ETRX ⬚
	●	●	150	6.3	7.7	450	265	DV151M016E077ETRX ⬚
	●	*	150	8	6.5	440	270	DV151M016F065ETRX ⬚
	●	●	220	6.3	7.7	430	275	DV221M016E077ETRX ⬚
	●	*	220	8	6.5	410	285	DV221M016F065ETRX ⬚
	●	●	330	8	10.5	250	550	DV331M016F105ETRX ⬚
	●	●	470	8	10.5	220	590	DV471M016F105ETRX ⬚
	●	●	680	10	10.5	160	720	DV681M016G105ETRX ⬚
	●	●	1500	12.5	14	80	1100	DV152M016Z140ETRX ⬚
	●	●	3300	16	17	52	1250	DV332M016J170ETRX ⬚
25	●		6.8	4	5.5	2800	70	DV6R8M025B055ETRX ⬚
	●		10	4	5.5	2100	85	DV100M025B055ETRX ⬚
	●		15	5	5.5	1900	125	DV150M025C055ETRX ⬚
	●		22	5	5.5	1200	145	DV220M025C055ETRX ⬚
	●		22	6.3	5.5	1150	160	DV220M025E055ETRX ⬚
	●		27	6.3	5.5	620	200	DV270M025E055ETRX ⬚
	●		33	5	5.5	1050	160	DV330M025C055ETRX ⬚
	●		33	6.3	5.5	580	220	DV330M025E055ETRX ⬚
	●	●	47	6.3	7.7	540	230	DV470M025E077ETRX ⬚
	●		47	6.3	5.5	560	220	DV470M025E055ETRX ⬚
	●		56	6.3	5.5	540	230	DV560M025E055ETRX ⬚
	●		68	6.3	5.5	480	240	DV680M025E055ETRX ⬚
	●	*	68	8	6.5	450	260	DV680M025F065ETRX ⬚
	●	●	100	6.3	7.7	380	290	DV101M025E077ETRX ⬚
	●	*	100	8	6.5	360	300	DV101M025F065ETRX ⬚
	●	●	150	8	10.5	250	480	DV151M025F105ETRX ⬚
	●	●	220	8	10.5	220	530	DV221M025F105ETRX ⬚
	●	●	330	8	10.5	200	570	DV331M025F105ETRX ⬚
	●	●	470	10	10.5	150	650	DV471M025G105ETRX ⬚

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
25	●	●	1000	12.5	14	80	1100	DV102M025Z140ETRX ⬚
	●	●	2200	16	17	52	1250	DV222M025J170ETRX ⬚
35	●		3.3	4	5.5	2800	80	DV3R3M035B055ETRX ⬚
	●		4.7	4	5.5	2500	85	DV4R7M035B055ETRX ⬚
	●		6.8	4	5.5	2200	88	DV6R8M035B055ETRX ⬚
	●		10	4	5.5	2000	90	DV100M035B055ETRX ⬚
	●		10	5	5.5	1400	125	DV100M035C055ETRX ⬚
	●		15	5	5.5	1200	140	DV150M035C055ETRX ⬚
	●		22	5	5.5	1100	155	DV220M035C055ETRX ⬚
	●		22	6.3	5.5	1050	170	DV220M035E055ETRX ⬚
	●		27	6.3	5.5	600	210	DV270M035E055ETRX ⬚
	●		33	6.3	5.5	540	230	DV330M035E055ETRX ⬚
	●	*	33	8	6.5	510	260	DV330M035F065ETRX ⬚
	●		47	6.3	5.5	530	240	DV470M035E055ETRX ⬚
	●	*	47	8	6.5	490	250	DV470M035F065ETRX ⬚
	●	●	56	6.3	7.7	490	250	DV560M035E077ETRX ⬚
	●	●	68	6.3	7.7	400	265	DV680M035E077ETRX ⬚
	●	●	100	6.3	7.7	380	300	DV101M035E077ETRX ⬚
	●	●	100	8	10.5	280	420	DV101M035F105ETRX ⬚
	●	●	150	8	10.5	240	510	DV151M035F105ETRX ⬚
	●	●	220	8	10.5	210	570	DV221M035F105ETRX ⬚
	●	●	330	10	10.5	150	650	DV331M035G105ETRX ⬚
	●	●	470	12.5	14	80	1100	DV471M035Z140ETRX ⬚
	●	●	680	12.5	14	80	1100	DV681M035Z140ETRX ⬚
	●	●	1500	16	17	52	1250	DV152M035J170ETRX ⬚
50	●		1	4	5.5	4500	55	DV010M050B055ETRX ⬚
	●		2.2	4	5.5	4500	55	DV2R2M050B055ETRX ⬚
	●		3.3	4	5.5	4500	55	DV3R3M050B055ETRX ⬚
	●		4.7	4	5.5	4500	55	DV4R7M050B055ETRX ⬚
	●		6.8	5	5.5	3800	75	DV6R8M050C055ETRX ⬚
	●		10	5	5.5	2800	95	DV100M050C055ETRX ⬚
	●		10	6.3	5.5	2200	130	DV100M050E055ETRX ⬚
	●		15	6.3	5.5	1600	140	DV150M050E055ETRX ⬚
	●		22	6.3	5.5	1300	150	DV220M050E055ETRX ⬚
	●	●	27	6.3	7.7	1200	180	DV270M050E077ETRX ⬚
	●	●	33	6.3	7.7	710	190	DV330M050E077ETRX ⬚
	●	*	33	8	6.5	700	200	DV330M050F065ETRX ⬚
	●	●	47	6.3	7.7	700	230	DV470M050E077ETRX ⬚
	●	*	47	8	6.5	690	240	DV470M050F065ETRX ⬚
	●	●	56	8	10.5	520	300	DV560M050F105ETRX ⬚
	●	●	68	8	10.5	500	320	DV680M050F105ETRX ⬚
	●	●	100	8	10.5	460	350	DV101M050F105ETRX ⬚
	●	●	150	10	10.5	250	600	DV151M050G105ETRX ⬚

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
50	●	●	220	10	10.5	230	650	DV221M050G105ETRX ⬚
	●	●	330	12.5	14	210	800	DV331M050Z140ETRX ⬚
	●	●	1000	16	17	78	1000	DV102M050J170ETRX ⬚
63	●		4.7	5	5.5	2800	45	DV4R7M063C055ETRX ⬚
	●		10	6.3	5.5	1600	80	DV100M063E055ETRX ⬚
	●	●	22	6.3	7.7	1100	150	DV220M063E077ETRX ⬚
	●	●	33	8	10.5	800	230	DV330M063F105ETRX ⬚
	●	●	47	8	10.5	550	260	DV470M063F105ETRX ⬚
	●	●	68	10	10.5	400	380	DV680M063G105ETRX ⬚
	●	●	100	10	10.5	280	400	DV101M063G105ETRX ⬚
	●	●	100	12.5	14	260	520	DV101M063Z140ETRX ⬚
	●	●	150	12.5	14	200	780	DV151M063Z140ETRX ⬚
	●	●	220	12.5	14	180	810	DV221M063Z140ETRX ⬚
	●	●	470	16	17	85	1390	DV471M063J170ETRX ⬚
80	●		4.7	6.3	5.5	3800	50	DV4R7M080E055ETRX ⬚
	●	●	10	6.3	7.7	3000	70	DV100M080E077ETRX ⬚
	●	●	22	6.3	7.7	1700	110	DV220M080E077ETRX ⬚
	●	●	33	8	10.5	1100	200	DV330M080F105ETRX ⬚
	●	●	47	10	10.5	900	320	DV470M080G105ETRX ⬚
	●	●	68	10	10.5	650	490	DV680M080G105ETRX ⬚
	●	●	100	12.5	14	420	580	DV101M080Z140ETRX ⬚
	●	●	220	16	17	260	930	DV221M080J170ETRX ⬚
100	●	●	10	6.3	7.7	4000	65	DV100M100E077ETRX ⬚
	●	●	22	8	10.5	2000	110	DV220M100F105ETRX ⬚
	●	●	33	10	10.5	1300	180	DV330M100G105ETRX ⬚
	●	●	47	10	10.5	1000	370	DV470M100G105ETRX ⬚
	●	●	47	12.5	14	950	480	DV470M100Z140ETRX ⬚
	●	●	68	12.5	14	600	580	DV680M100Z140ETRX ⬚
	●	●	100	12.5	14	500	620	DV101M100Z140ETRX ⬚
	●	●	220	16	17	280	1050	DV221M100J170ETRX ⬚

⬚: Enter **W** for Vibration proof version

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DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
4	5.5	Max	4.3	4.3	4.9	0.5 to 0.8	1
5	5.5	Max	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.5	0.2	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	7.7	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	Max	8.3	8.3	9	0.5 to 0.8	2.3
8	10.5	Max	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	Max	10.3	10.3	11	0.7 to 1.1	4.5
12.5	14	Max	13	13	13.9	1 to 1.4	4.5
16	17	0.5	17	17	18	1 to 1.4	6.6

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	7.7	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
8	10.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	0.5	10.5	10.5	11.2	0.7 to 1.1	4.5
12.5	14	0.5	13	13	13.9	1 to 1.4	5.5
16	17	0.5	17	17	18	1 to 1.4	6.6

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	50/60	100/120	500	1k	10k	50k ~ 100k
$1 \le C_R \le 10$	0.47	0.59	0.76	0.85	0.97	1
$10 < C_R \le 6800$	0.52	0.65	0.8	0.89	0.97	1

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Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

RV SERIES ▪ HIGH VOLTAGE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 | HIGH VOLTAGE | LOW IMPEDANCE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ SMD type
- Endurance: 105°C ▪ 2 000 hours up to 5 000 hours
- High voltage and low impedance
- Vibration-proof (VP) version (up to 30g) available upon request
- AEC-Q200 qualified

MSL 1 | RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics	
Operating Temperature Range		-55 ~ +105°C	-40 ~ +105°C
Rated Voltage Range	V_R	6.3 ~ 100V DC	160 ~ 450V DC
Surge Voltage	V_S	($V_R \le 315V$): $V_S = 1.15 \cdot V_R$	($V_R > 315V$): $V_S = 1.10 \cdot V_R$
Capacitance Range	C_R	1 ~ 6800µF	2.2 ~ 68µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)	
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	$\le 0.01 \cdot C_R \cdot V_R$ or 3µA Whichever is greater ▪ After 2 minutes	$\le 0.04 \cdot C_R \cdot V_R$ + 100µA After 1 minute
		[I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]	

Dissipation Factor % (20°C ▪ 120Hz)	tanδ												
		V_R (V DC)	6.3	10	16	25	35	50	63	80	100	160 ~ 250	>250
		tanδ (%)	22	19	16	14	14	12	10	9	8	15	20

Low Temperature Characteristics at 120Hz	Z ratio max.													
		V_R (V DC)	6.3	10	16	25	35	50	63	80	100	160 ~ 250	400	450
		Z-25°C/Z+20°C	4	3	2	2	2	2	2	2	2	3	6	6
		Z-40°C/Z+20°C	8	6	4	4	3	3	3	3	3	6	10	15
		Z-55°C/Z+20°C	12	10	6	6	4	4	4	4	4	-	-	-

Lifetime Test			
Endurance 105°C (V_R applied)	Test	**5 000 hours**	> Ø 6.3mm
		2 000 hours	≤ Ø 6.3mm
	△C/C_R	≤ ±30% of initial measured value	
	tanδ	≤ 300% of initial specified value	
	I_{Leak}	≤ the initial specified value	
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**	
	△C/C_R	≤ ±30% of initial measured value	
	tanδ	≤ 300% of initial specified value	
	I_{Leak}	≤ the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4		
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed below		
	△C/C_R	Within ±10% of initial value	
	tanδ	Less than specified value	
	I_{Leak}	Less than specified value	

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
6.3	●		22	4	5.5	1350	80	RV220M6R3B055ETRX ⬚
	●		33	4	5.5	1350	85	RV330M6R3B055ETRX ⬚
	●		47	5	5.5	800	160	RV470M6R3C055ETRX ⬚
	●		100	6.3	5.5	440	240	RV101M6R3E055ETRX ⬚
	●		150	6.3	5.5	440	240	RV151M6R3E055ETRX ⬚
	●	●	220	6.3	7.7	360	280	RV221M6R3E077ETRX ⬚
	●	●	330	6.3	7.7	320	350	RV331M6R3E077ETRX ⬚
	●	●	330	8	10.5	170	450	RV331M6R3F105ETRX ⬚
	●	●	470	8	10.5	170	500	RV471M6R3F105ETRX ⬚
	●	●	680	8	10.5	170	550	RV681M6R3F105ETRX ⬚
	●	●	1000	8	10.5	170	550	RV102M6R3F105ETRX ⬚
	●	●	1500	10	10.5	90	690	RV152M6R3G105ETRX ⬚
	●	●	3300	12.5	14	66	1150	RV332M6R3Z140ETRX ⬚
	●	●	6800	16	17	35	1800	RV682M6R3J170ETRX ⬚
10	●		22	4	5.5	1350	90	RV220M010B055ETRX ⬚
	●		33	5	5.5	800	160	RV330M010C055ETRX ⬚
	●		47	6.3	5.5	440	230	RV470M010E055ETRX ⬚
	●		100	6.3	5.5	440	240	RV101M010E055ETRX ⬚
	●		150	6.3	5.5	440	250	RV151M010E055ETRX ⬚
	●	●	220	6.3	7.7	360	280	RV221M010E077ETRX ⬚
	●	●	330	8	10.5	170	500	RV331M010F105ETRX ⬚
	●	●	470	8	10.5	170	550	RV471M010F105ETRX ⬚
	●	●	680	10	10.5	90	690	RV681M010G105ETRX ⬚
	●	●	1000	10	10.5	90	690	RV102M010G105ETRX ⬚
	●	●	2200	12.5	14	66	1150	RV222M010Z140ETRX ⬚
	●	●	4700	16	17	35	1800	RV472M010J170ETRX ⬚
16	●		10	4	5.5	1350	90	RV100M016B055ETRX ⬚
	●		22	5	5.5	800	150	RV220M016C055ETRX ⬚
	●		33	6.3	5.5	440	230	RV330M016E055ETRX ⬚
	●		47	6.3	5.5	440	230	RV470M016E055ETRX ⬚
	●		100	6.3	5.5	440	255	RV101M016E055ETRX ⬚
	●	●	150	6.3	7.7	360	280	RV151M016E077ETRX ⬚
	●	●	220	6.3	7.7	360	280	RV221M016E077ETRX ⬚
	●	●	330	8	10.5	170	550	RV331M016F105ETRX ⬚
	●	●	470	8	10.5	170	600	RV471M016F105ETRX ⬚
	●	●	470	10	10.5	90	670	RV471M016G105ETRX ⬚
	●	●	680	10	10.5	90	750	RV681M016G105ETRX ⬚
	●	●	1500	12.5	14	66	1150	RV152M016Z140ETRX ⬚
	●	●	3300	16	17	35	1800	RV332M016J170ETRX ⬚
25	●		10	4	5.5	1350	90	RV100M025B055ETRX ⬚
	●		22	5	5.5	800	150	RV220M025C055ETRX ⬚
	●		33	6.3	5.5	440	230	RV330M025E055ETRX ⬚
	●		47	6.3	5.5	440	230	RV470M025E055ETRX ⬚
	●	●	100	6.3	7.7	360	300	RV101M025E077ETRX ⬚

⬚: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
25	●	●	150	8	10.5	170	500	RV151M025F105ETRX ⬚
	●	●	220	8	10.5	170	550	RV221M025F105ETRX ⬚
	●	●	330	8	10.5	170	600	RV331M025F105ETRX ⬚
	●	●	470	10	10.5	90	670	RV471M025G105ETRX ⬚
	●	●	1000	12.5	14	66	1150	RV102M025Z140ETRX ⬚
	●	●	2200	16	17	35	1800	RV222M025J170ETRX ⬚
35	●		4.7	4	5.5	1900	90	RV4R7M035B055ETRX ⬚
	●		10	5	5.5	800	150	RV100M035C055ETRX ⬚
	●		22	6.3	5.5	440	230	RV220M035E055ETRX ⬚
	●		33	6.3	5.5	440	230	RV330M035E055ETRX ⬚
	●		47	6.3	5.5	440	240	RV470M035E055ETRX ⬚
	●	●	100	8	10.5	170	450	RV101M035F105ETRX ⬚
	●	●	150	8	10.5	170	550	RV151M035F105ETRX ⬚
	●	●	220	8	10.5	160	600	RV221M035F105ETRX ⬚
	●	●	220	10	10.5	90	670	RV221M035G105ETRX ⬚
	●	●	330	10	10.5	80	850	RV331M035G105ETRX ⬚
	●	●	470	12.5	14	66	1150	RV471M035Z140ETRX ⬚
	●	●	680	12.5	14	66	1150	RV681M035Z140ETRX ⬚
	●	●	1000	16	17	48	1800	RV102M035J170ETRX ⬚
	●	●	1500	16	17	48	1800	RV152M035J170ETRX ⬚
50	●		1	4	5.5	4400	60	RV010M050B055ETRX ⬚
	●		2.2	4	5.5	3900	60	RV2R2M050B055ETRX ⬚
	●		3.3	4	5.5	3900	60	RV3R3M050B055ETRX ⬚
	●		4.7	4	5.5	3900	75	RV4R7M050B055ETRX ⬚
	●		4.7	5	5.5	1520	85	RV4R7M050C055ETRX ⬚
	●		10	6.3	5.5	1400	165	RV100M050E055ETRX ⬚
	●		22	6.3	5.5	1200	165	RV220M050E055ETRX ⬚
	●	●	33	6.3	7.7	680	185	RV330M050E077ETRX ⬚
	●	●	47	6.3	7.7	680	185	RV470M050E077ETRX ⬚
	●	●	68	8	10.5	340	300	RV680M050F105ETRX ⬚
	●	●	100	8	10.5	340	350	RV101M050F105ETRX ⬚
	●	●	100	10	10.5	250	555	RV101M050G105ETRX ⬚
	●	●	150	10	10.5	250	555	RV151M050G105ETRX ⬚
	●	●	220	10	10.5	230	600	RV221M050G105ETRX ⬚
	●	●	470	16	17	73	1610	RV471M050J170ETRX ⬚
	●	●	680	16	17	73	1610	RV681M050J170ETRX ⬚
	●	●	1000	16	17	73	1610	RV102M050J170ETRX ⬚
63	●		4.7	5	5.5	2600	50	RV4R7M063C055ETRX ⬚
	●		10	6.3	5.5	1500	80	RV100M063E055ETRX ⬚
	●	●	22	6.3	7.7	1000	120	RV220M063E077ETRX ⬚
	●	●	33	8	10.5	700	250	RV330M063F105ETRX ⬚
	●	●	47	8	10.5	650	280	RV470M063F105ETRX ⬚
	●	●	68	10	10.5	380	400	RV680M063G105ETRX ⬚
	●	●	100	10	10.5	240	420	RV101M063G105ETRX ⬚

⬚: Enter **W** for Vibration proof version

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
63	●	●	100	12.5	14	220	540	RV101M063Z140ETRX ☐
	●	●	150	12.5	14	180	800	RV151M063Z140ETRX ☐
	●	●	220	12.5	14	160	830	RV221M063Z140ETRX ☐
	●	●	470	16	17	82	1410	RV471M063J170ETRX ☐
80	●	●	10	6.3	7.7	2600	60	RV100M080E077ETRX ☐
	●	●	22	8	10.5	1700	130	RV220M080F105ETRX ☐
	●	●	33	8	10.5	1600	140	RV330M080F105ETRX ☐
	●	●	47	10	10.5	700	210	RV470M080G105ETRX ☐
	●	●	68	12.5	14	500	500	RV680M080Z140ETRX ☐
	●	●	100	12.5	14	450	550	RV101M080Z140ETRX ☐
	●	●	150	12.5	14	420	600	RV151M080Z140ETRX ☐
	●	●	220	16	17	380	700	RV221M080J170ETRX ☐
	●	●	330	16	17	320	800	RV331M080J170ETRX ☐
100	●	●	10	6.3	7.7	3900	65	RV100M100E077ETRX ☐
	●	●	22	8	10.5	1900	130	RV220M100F105ETRX ☐
	●	●	33	10	10.5	1250	200	RV330M100G105ETRX ☐
	●	●	47	10	10.5	950	390	RV470M100G105ETRX ☐
	●	●	47	12.5	14	900	500	RV470M100Z140ETRX ☐
	●	●	68	12.5	14	570	600	RV680M100Z140ETRX ☐
	●	●	100	12.5	14	480	640	RV101M100Z140ETRX ☐
	●	●	100	16	17	450	800	RV101M100J170ETRX ☐
160	●	●	10	8	10.5	-	88	RV100M160F105ETRX ☐
	●	●	18	10	10.5	-	104	RV180M160G105ETRX ☐
	●	●	22	10	10.5	-	112	RV220M160G105ETRX ☐
	●	●	27	12.5	14	-	136	RV270M160Z140ETRX ☐
	●	●	33	12.5	14	-	152	RV330M160Z140ETRX ☐
	●	●	47	16	17	-	416	RV470M160J170ETRX ☐
	●	●	68	16	17	-	480	RV680M160J170ETRX ☐
200	●	●	10	12.5	14	-	128	RV100M200Z140ETRX ☐
	●	●	22	12.5	14	-	168	RV220M200Z140ETRX ☐
	●	●	27	12.5	14	-	184	RV270M200Z140ETRX ☐
	●	●	33	16	17	-	352	RV330M200J170ETRX ☐
	●	●	47	16	17	-	416	RV470M200J170ETRX ☐
250	●	●	4.7	8	10.5	-	80	RV4R7M250F105ETRX ☐
	●	●	4.7	12.5	14	-	104	RV4R7M250Z140ETRX ☐
	●	●	6.8	10	10.5	-	96	RV6R8M250G105ETRX ☐
	●	●	6.8	12.5	14	-	125	RV6R8M250Z140ETRX ☐
	●	●	10	10	10.5	-	120	RV100M250G105ETRX ☐
	●	●	15	12.5	14	-	192	RV150M250Z140ETRX ☐
	●	●	22	16	17	-	288	RV220M250J170ETRX ☐
400	●	●	2.2	8	10.5	-	40	RV2R2M400F105ETRX ☐
	●	●	3.3	8	10.5	-	48	RV3R3M400F105ETRX ☐
	●	●	3.9	10	10.5	-	56	RV3R9M400G105ETRX ☐
	●	●	4.7	10	10.5	-	64	RV4R7M400G105ETRX ☐

☐: Enter **W** for Vibration proof version

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STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
400	●	●	6.8	12.5	14	-	96	RV6R8M400Z140ETRX [ ]
	●	●	8.2	12.5	14	-	104	RV8R2M400Z140ETRX [ ]
	●	●	10	12.5	14	-	112	RV100M400Z140ETRX [ ]
	●	●	12	16	17	-	152	RV120M400J170ETRX [ ]
	●	●	22	16	17	-	192	RV220M400J170ETRX [ ]
450	●	●	3.3	10	10.5	-	64	RV3R3M450G105ETRX [ ]
	●	●	3.9	10	10.5	-	64	RV3R9M450G105ETRX [ ]
	●	●	4.7	12.5	14	-	80	RV4R7M450Z140ETRX [ ]
	●	●	6.8	12.5	14	-	96	RV6R8M450Z140ETRX [ ]
	●	●	8.2	12.5	14	-	104	RV8R2M450Z140ETRX [ ]
	●	●	10	12.5	14	-	112	RV100M450Z140ETRX [ ]
	●	●	12	16	17	-	144	RV120M450J170ETRX [ ]
	●	●	15	16	17	-	160	RV150M450J170ETRX [ ]

[ ]: Enter **W** for Vibration proof version

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
4	5.5	Max	4.3	4.3	4.9	0.5 to 0.8	1
5	5.5	Max	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.5	0.2	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	7.7	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	Max	8.3	8.3	9	0.5 to 0.8	2.3
8	10.5	Max	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	Max	10.3	10.3	11	0.7 to 1.1	4.5
12.5	14	Max	13	13	13.9	1 to 1.4	4.5
16	17	0.5	17	17	18	1 to 1.4	6.6

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	7.7	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
8	10.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	0.5	10.5	10.5	11.2	0.7 to 1.1	4.5
12.5	14	0.5	13	13	13.9	1 to 1.4	5.5
16	17	0.5	17	17	18	1 to 1.4	6.6

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

< 160V

C_R (µF) / Frequency (Hz)	50/60	100/120	500	1k	10k	50k ~ 100k
$1 \le C_R \le 10$	0.47	0.59	0.76	0.85	0.97	1
$10 < C_R \le 6800$	0.52	0.65	0.8	0.89	0.97	1

≥ 160V

C_R (µF) / Frequency (Hz)	50/60	100/120	400	1k	10k	50k ~ 100k
$10 \le C_R \le 68$	0.5	0.63	0.78	0.88	0.97	1

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid SMD
Page 274	Page 77 and following

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

CV SERIES ▪ LONG LIFE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 | LONG LIFE | LOW IMPEDANCE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ SMD type
- Endurance: 105°C ▪ 7 000 hours
- Low impedance and high ripple current
- Vibration-proof (VP) version (up to 30g) available upon request
- AEC-Q200 qualified

MSL 1 | RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics						
Operating Temperature Range		-40 ~ +105°C						
Rated Voltage Range	V_R	6.3 ~ 50V DC						
Surge Voltage	V_S	$V_S = 1.15 \cdot V_R$						
Capacitance Range	C_R	22 ~ 1500µF						
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)						
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ $0.01 \cdot C_R \cdot V_R$ or 3µA, whichever is greater ▪ After 2 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]						
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	6.3	10	16	25	35	50
		tanδ	32	28	26	16	14	14
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	6.3	10	16	25	35	50
		Z-25°C/Z+20°C	4	3	2	2	2	2
		Z-40°C/Z+20°C	8	6	4	4	3	3

Lifetime Test		
Endurance 105°C (V_R applied)	Test	**7 000 hours**
	△C/C_R	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed below	
	△C/C_R	Within ±10% of initial value
	tanδ	Less than specified value
	I_{Leak}	Less than specified value

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
6.3	●	●	100	6.3	7.7	1100	140	CV101M6R3E077ETRX [ ]
	●	●	150	6.3	7.7	900	180	CV151M6R3E077ETRX [ ]
	●	●	220	6.3	7.7	750	230	CV221M6R3E077ETRX [ ]
	●	●	330	8	10.5	500	400	CV331M6R3F105ETRX [ ]
	●	●	470	8	10.5	220	600	CV471M6R3F105ETRX [ ]
	●	●	680	10	10.5	200	700	CV681M6R3G105ETRX [ ]
	●	●	1000	12.5	14	100	1100	CV102M6R3Z140ETRX [ ]
	●	●	1500	16	17	80	1500	CV152M6R3J170ETRX [ ]
10	●	●	100	6.3	7.7	1100	140	CV101M010E077ETRX [ ]
	●	●	150	6.3	7.7	900	180	CV151M010E077ETRX [ ]
	●	●	220	6.3	7.7	750	230	CV221M010E077ETRX [ ]
	●	●	330	8	10.5	500	400	CV331M010F105ETRX [ ]
	●	●	470	8	10.5	220	600	CV471M010F105ETRX [ ]
	●	●	680	10	10.5	200	700	CV681M010G105ETRX [ ]
	●	●	1000	12.5	14	100	1100	CV102M010Z140ETRX [ ]
	●	●	1500	16	17	80	1500	CV152M010J170ETRX [ ]
16	●	●	100	6.3	7.7	1100	140	CV101M016E077ETRX [ ]
	●	●	150	8	10.5	600	250	CV151M016F105ETRX [ ]
	●	●	220	8	10.5	400	280	CV221M016F105ETRX [ ]
	●	●	330	8	10.5	220	600	CV331M016F105ETRX [ ]
	●	●	470	8	10.5	220	600	CV471M016F105ETRX [ ]
	●	●	470	10	10.5	160	850	CV471M016G105ETRX [ ]
	●	●	680	12.5	14	100	1100	CV681M016Z140ETRX [ ]
	●	●	1000	16	17	80	1500	CV102M016J170ETRX [ ]
25	●	●	22	6.3	7.7	1500	95	CV220M025E077ETRX [ ]
	●	●	33	6.3	7.7	1300	120	CV330M025E077ETRX [ ]
	●	●	47	6.3	7.7	1100	140	CV470M025E077ETRX [ ]
	●	●	100	8	10.5	700	280	CV101M025F105ETRX [ ]
	●	●	150	8	10.5	600	380	CV151M025F105ETRX [ ]
	●	●	220	8	10.5	220	600	CV221M025F105ETRX [ ]
	●	●	330	8	10.5	200	650	CV331M025F105ETRX [ ]
	●	●	390	10	10.5	190	750	CV391M025G105ETRX [ ]
	●	●	470	10	10.5	160	850	CV471M025G105ETRX [ ]
	●	●	680	12.5	14	100	1100	CV681M025Z140ETRX [ ]
	●	●	1000	16	17	80	1500	CV102M025J170ETRX [ ]
35	●	●	47	6.3	7.7	1000	230	CV470M035E077ETRX [ ]
	●	●	100	8	10.5	220	600	CV101M035F105ETRX [ ]
	●	●	220	10	10.5	160	850	CV221M035G105ETRX [ ]
	●	●	330	12.5	14	100	1100	CV331M035Z140ETRX [ ]
	●	●	470	16	17	80	1500	CV471M035J170ETRX [ ]

[ ]: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
50	●	●	47	8	10.5	530	350	CV470M050F105ETRX [ ]
	●	●	100	8	10.5	530	350	CV101M050F105ETRX [ ]
	●	●	100	10	10.5	510	400	CV101M050G105ETRX [ ]
	●	●	150	10	10.5	480	450	CV151M050G105ETRX [ ]
	●	●	220	12.5	14	400	850	CV221M050Z140ETRX [ ]
	●	●	330	16	17	300	1100	CV331M050J170ETRX [ ]

[ ]: Enter **W** for Vibration proof version

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	7.7	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
8	10.5	Max	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	Max	10.3	10.3	11	0.7 to 1.1	4.5
12.5	14	Max	13	13	13.9	1 to 1.4	4.5
16	17	0.5	17	17	18	1 to 1.4	6.6

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	7.7	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
8	10.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	0.5	10.5	10.5	11.2	0.7 to 1.1	4.5
12.5	14	0.5	13	13	13.9	1 to 1.4	5.5
16	17	0.5	17	17	18	1 to 1.4	6.6

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	50/60	100/120	500	1k	10k ~ 100k
$22 \le C_R \le 100$	0.53	0.67	0.8	0.87	1
$100 < C_R \le 1500$	0.67	0.83	0.92	0.96	1

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PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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General Precautions and Guidelines	Packaging Information Liquid SMD
Page 274	Page 77 and following

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

TV SERIES ▪ HIGH TEMP., AUTOMOTIVE 125°C TYPE

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · °C HIGH TEMPERATURE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ SMD type
- Endurance: 125°C ▪ 1 000 hours up to 2 000 hours
- Especially for applications with high ambient temperatures
- Vibration-proof (VP) version (up to 30g) available upon request
- AEC-Q200 qualified

MSL 1 · RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics										
Operating Temperature Range		-40 ~ +125°C										
Rated Voltage Range	V_R	10 ~ 50V DC					160 ~ 450V DC					
Surge Voltage	V_S	($V_R \le 315V$): $V_S = 1.15 \cdot V_R$					($V_R > 315V$): $V_S = 1.10 \cdot V_R$					
Capacitance Range	C_R	10 ~ 330µF					1 ~ 18µF					
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)										
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ $0.03 \cdot C_R \cdot V_R$ or 3µA Whichever is greater ▪ After 1 minute					≤ $0.04 \cdot C_R \cdot V_R$ + 100µA After 1 minute					
		[I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]										
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	10	16	25	35	50	160	200	250	400	450
		tanδ (%)	32	24	21	18	18	20	20	25	25	30
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	10	16	25	35	50	160	200	250	400	450
		Z-25°C/Z+20°C	12	8	6	4	4	8	8	8	12	15
		Z-40°C/Z+20°C	14	8	6	4	4	-	-	-	-	-

Lifetime Test			
Endurance 125°C (V_R applied)	Test	**2 000 hours**	Ø 8 x 10.5mm & Ø 10 x 10.5mm
		1 000 hours	Ø 6.3 x 7.7mm & Ø 8 x 6.5mm
	$\triangle C/C_R$	≤ ±30% of initial measured value	
	tanδ	≤ 300% of initial specified value	
	I_{Leak}	≤ the initial specified value	
Shelf Life 125°C (V_R = 0)	Test	**1 000 hours**	
	$\triangle C/C_R$	≤ ±30% of initial measured value	
	tanδ	≤ 300% of initial specified value	
	I_{Leak}	≤ the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4		
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed below		
	$\triangle C/C_R$	Within ±10% of initial value	
	tanδ	Less than specified value	
	I_{Leak}	Less than specified value	

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +125°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
10	●	●	100	6.3	7.7	53	TV101M010E077ETRX ⊏⊐
	●	*	100	8	6.5	58	TV101M010F065ETRX ⊏⊐
	●	●	220	8	10.5	90	TV221M010F105ETRX ⊏⊐
	●	●	330	10	10.5	112	TV331M010G105ETRX ⊏⊐
16	●	●	100	8	10.5	66	TV101M016F105ETRX ⊏⊐
	●	●	220	10	10.5	102	TV221M016G105ETRX ⊏⊐
25	●	●	47	6.3	7.7	45	TV470M025E077ETRX ⊏⊐
	●	*	47	8	6.5	48	TV470M025F065ETRX ⊏⊐
	●	●	100	8	10.5	74	TV101M025F105ETRX ⊏⊐
	●	●	220	10	10.5	116	TV221M025G105ETRX ⊏⊐
35	●	●	33	6.3	7.7	40	TV330M035E077ETRX ⊏⊐
	●	*	33	8	6.5	44	TV330M035F065ETRX ⊏⊐
	●	●	47	8	10.5	52	TV470M035F105ETRX ⊏⊐
	●	●	100	10	10.5	80	TV101M035G105ETRX ⊏⊐
50	●	●	10	6.3	7.7	22	TV100M050E077ETRX ⊏⊐
	●	*	10	8	6.5	24	TV100M050F065ETRX ⊏⊐
	●	●	22	6.3	7.7	35	TV220M050E077ETRX ⊏⊐
	●	*	22	8	6.5	38	TV220M050F065ETRX ⊏⊐
	●	●	33	8	10.5	46	TV330M050F105ETRX ⊏⊐
	●	●	47	10	10.5	58	TV470M050G105ETRX ⊏⊐
160	●	●	6.8	8	10.5	42	TV6R8M160F105ETRX ⊏⊐
	●	●	10	10	10.5	59	TV100M160G105ETRX ⊏⊐
	●	●	18	10	10.5	65	TV180M160G105ETRX ⊏⊐
200	●	●	4.7	8	10.5	36	TV4R7M200F105ETRX ⊏⊐
	●	●	6.8	10	10.5	59	TV6R8M200G105ETRX ⊏⊐
	●	●	10	10	10.5	59	TV100M200G105ETRX ⊏⊐
250	●	●	3.3	8	10.5	28	TV3R3M250F105ETRX ⊏⊐
	●	●	4.7	10	10.5	59	TV4R7M250G105ETRX ⊏⊐
400	●	●	1	8	10.5	27	TV010M400F105ETRX ⊏⊐
	●	●	1.8	8	10.5	30	TV1R8M400F105ETRX ⊏⊐
	●	●	2.2	8	10.5	33	TV2R2M400F105ETRX ⊏⊐
	●	●	2.2	10	10.5	37	TV2R2M400G105ETRX ⊏⊐
	●	●	3.3	8	10.5	36	TV3R3M400F105ETRX ⊏⊐
	●	●	3.3	10	10.5	39	TV3R3M400G105ETRX ⊏⊐
	●	●	4.7	10	10.5	46	TV4R7M400G105ETRX ⊏⊐
	●	●	5.6	10	10.5	50	TV5R6M400G105ETRX ⊏⊐
450	●	●	2.2	8	10.5	28	TV2R2M450F105ETRX ⊏⊐
	●	●	3.3	10	10.5	32	TV3R3M450G105ETRX ⊏⊐
	●	●	3.9	10	10.5	38	TV3R9M450G105ETRX ⊏⊐

***Consult CapXon for availability**

⊏⊐: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	7.7	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	Max	8.3	8.3	9	0.5 to 0.8	2.3
8	10.5	Max	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	Max	10.3	10.3	11	0.7 to 1.1	4.5

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	7.7	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
8	10.5	0.5	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	0.5	10.5	10.5	11.2	0.7 to 1.1	4.5

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	50/60	100/120	500	1k	10k ~ 100k
$1 \le C_R \le 47$	0.8	1	1.2	1.3	1.5
$100 < C_R \le 330$	0.8	1	1.1	1.15	1.2

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For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

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PRODUCT CODE ▪ SMD ALUMINUM ELECTROLYTIC CAPACITORS

SMD type example:
DV series ▪ 220µF ▪ 50V ▪ ±20% ▪ Ø 10mm ▪ L 10.5mm ▪ Tape & Reel ▪ AEC-Q200

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
D	V	2	2	1	M	0	5	0	G	1	0	5	E	T	R	X	-	-	-
Series		Capacitance			Capacitance tolerance	Voltage			Case Ø (mm)	Height (mm)			Type code	Taping		Special requirement			

Code	µF
0R1	0.1
R47	0.47
010	1
4R7	4.7
100	10
101	100
102	1000
682	6800

Code	%
H	±5
K	±10
S	±15
M	±20
N	±30
D	±40
I	+5 to +20
B	0 to -20
G	0 to +10
Z	0 to +20
Y	0 to +30
X	0 to +40
A	0 to +50
J	-5 to +20
C	-5 to +30
E	-8 to +5
V	-10 to +20
Q	-10 to +30
T	-10 to +50
W	-20 to +10
P	-15 to +20
L	-25 to +20
U	-30 to 0
F	-35 to 0
O	-50 to 0

Please consult CapXon for further assistance

Code	Volt
004	4
6R3	6.3
010	10
016	16
025	25
035	35
050	50
063	63
080	80
100	100
160	160
200	200
250	250
400	400
450	450

Code	ØD
B	4
C	5
E	6.3
F	8
G	10
H	12
Z	12.5
I	13
J	16
K	18
L	20
M	22

Code	H
055	5.5
061	6.1
065	6.5
077	7.7
105	10.5
140	14
170	17
215	21.5

Code	Type
E	Standard

Code	
TR	Tape on reel

Code	Special
U	Plastic reel
W	Vibration proof
X	AEC-Q200

See datasheet for reference

MARKING ▪ SMD ALUMINUM ELECTROLYTIC CAPACITORS

Aluminum Electrolytic Capacitor ▪ SMD type

220: Nominal capacitance (µF)
50X: Rated voltage (V) ▪ AEC-Q200 type
▬ (-) polarity (Cathode indicate)
D: DV Series
96: Production datacode year/month (ex. 2019/June)

Top view
AEC-Q200 type

Digits	Description
1st	Last digit of the year
2nd	Month 1, 2, 3…9, A (10), B (11), C (12)

For further information please contact sales@capxon.org

TAPING ▪ SMD ALUMINUM ELECTROLYTIC CAPACITORS ▪ REEL PACK

All dimensions in mm

Ø D x L	4 x 5.5	5 x 5.5	6.3 x 5.5	6.3 x 6.1	6.3 x 7.7	8 x 6.5	8 x 10.5	10 x 10.5	12.5 x 14	16 x 17	16 x 21.5	18 x 16.5	18 x 21.5
W	12	12	16	16	16	16	24	24	32	44	44	44	44
P	8	12	12	12	12	12	16	16	24	28	32	32	32
F	5.5	5.5	7.5	7.5	7.5	7.5	11.5	11.5	16	22	22	22	22
A1	4.7	5.7	7	7	7	8.7	8.7	10.7	13.9	17.5	17.5	19.9	19.9
B1	4.7	5.7	7	7	7	8.7	8.7	10.7	13.9	17.5	17.5	19.9	19.9
T1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
T2	5.7	5.7	5.7	6.2	8	7	11	11	14.5	17.3	23	17.5	23

For further information please contact sales@capxon.org

TAPING ▪ SMD ALUMINUM ELECTROLYTIC CAPACITORS ▪ REEL PACK

Ø D (mm)	L (mm)	A (mm)	Reel quantity (pcs)	Inner box quantity (pcs)	Inner box size L x W x H (mm)	Outer box quantity (pcs)	Outer box size L x W x H (mm)	Country of origin	Tariff number
4	5.5	14	2000	10000	400 x 390 x 106	30000	425 x 412 x 340	China	85322200
5	5.5	14	1000	5000	400 x 390 x 106	15000	425 x 412 x 340	China	85322200
6.3	5.5	18	1000	4000	400 x 390 x 106	12000	425 x 412 x 340	China	85322200
	6.1	18	1000	4000	400 x 390 x 106	12000	425 x 412 x 340	China	85322200
	7.7	18	900	3600	400 x 390 x 106	10800	425 x 412 x 340	China	85322200
8	6.5	18	1000	4000	400 x 390 x 106	12000	425 x 412 x 340	China	85322200
	10.5	26	500	1500	400 x 390 x 106	4500	425 x 412 x 340	China	85322200
10	10.5	26	500	1500	400 x 390 x 106	4500	425 x 412 x 340	China	85322200
12.5	14	34	200	600	400 x 390 x 130	1800	425 x 412 x 340	China	85322200
16	17	46	125	250	400 x 390 x 106	750	425 x 412 x 340	China	85322200
	21.5	46	100	200	400 x 390 x 106	600	425 x 412 x 340	China	85322200
18	16.5	46	125	250	400 x 390 x 106	750	425 x 412 x 340	China	85322200
	21.5	46	100	200	400 x 390 x 106	600	425 x 412 x 340	China	85322200

Remark: Standard = Paper reel
Plastic reel = Add code "U" at the end of the part number

For further information please contact sales@capxon.org

DIMENSIONS AND PAD LAYOUT STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
4	5.5	Max	4.3	4.3	4.9	0.5 to 0.8	1
5	5.5	Max	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.5	0.2	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	6.1	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	7.7	Max	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	Max	8.3	8.3	9	0.5 to 0.8	2.3
8	10.5	Max	8.3	8.3	9	0.7 to 1.1	3.1
10	10.5	Max	10.3	10.3	11	0.7 to 1.1	4.5
12.5	14	Max	13	13	13.9	1 to 1.4	4.5
16	17	0.5	17	17	18	1 to 1.4	6.6
16	21.5	0.5	17	17	18	1 to 1.4	6.6
18	16.5	0.5	19	19	20	1 to 1.4	6.6
18	21.5	0.5	19	19	20	1 to 1.4	6.6

ø D	L	A	B	C
4	5.5	1	2.6	1.6
5	5.5	1.4	3	1.6
6.3	5.5	2.1	3.5	1.6
6.3	6.1	2.1	3.5	1.6
6.3	7.7	2.1	3.5	1.6
8	6.5	2.1	4.5	1.6
8	10.5	2.8	4.2	1.9
10	10.5	4.3	4.4	1.9
12.5	14	4.3	5.8	2.5
16	17	6	6.5	3.5
16	21.5	6	6.5	3.5
18	16.5	6	7.5	3.5
18	21.5	6	7.5	3.5

DIMENSIONS AND PAD LAYOUT VIBRATION-PROOF PACKAGE ▪ All dimensions in mm

ø D	L	a	A	B	C	W	P±0.2
6.3	6.1	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
6.3	7.7	0.5	6.6	6.6	7.2	0.5 to 0.8	2.2
8	6.5	0.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	10.5	0.5	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	0.5	10.5	10.5	11.2	0.7 to 1.1	4.5
12.5	14	0.5	13	13	13.9	1 to 1.4	5.5
16	17	0.5	17	17	18	1 to 1.4	7.5
16	21.5	0.5	17	17	18	1 to 1.4	7.5
18	16.5	0.5	19	19	20	1 to 1.4	7.5
18	21.5	0.5	19	19	20	1 to 1.4	7.5

ø D	L	A	B	C	D	E	F
6.3	6.1	1.8	3.7	4.5	0.8	0.8	1.7
6.3	7.7	1.8	3.7	4.5	0.8	0.8	1.7
8	6.5	2.5	4.5	5	0.8	1.1	2.3
8	10.5	2.5	4.5	5	0.8	1.1	2.3
10	10.5	3	5	5.5	0.8	1.3	2.4
12.5	14	3.5	5.5	8	1	2.6	2.8
16	17	5	7.6	11	1.2	4.1	2.8
16	21.5	5	7.6	11	1.2	4.1	2.8
18	16.5	5	7.6	11	2.2	4.1	2.8
18	21.5	5	7.6	11	2.2	4.1	2.8

For further information please contact sales@capxon.org

VIBRATION SPECIFICATION ▪ STANDARD AND VIBRATION PROOF PACKAGE

Package	Test Standard	Condition	Determinant Standard
Standard package	IEC 60384-1 IEC 60384-18 IEC 60068-2-6 MIL-STD 202 Method 204	1. 10Hz ~ 2kHz ~ 10Hz (20 minutes) 2. Amplitude (single peak): 0.35 mm (at 10 ~ 55Hz) 3. Acceleration: 49m/s^2 (5g at 55 ~ 2kHz) 4. X, Y, Z directions, 4 hours per direction, total 12 hours	1. ΔC/C ≤ ±5% of initial value 2. DF ≤ stated limit 3. LC ≤ stated limit 4. No visible damage 5. No leakage of electrolyte
Vibration-proof package		1. Consult CapXon for test details	1. Consult CapXon for test details

For further information please contact sales@capxon.org

Aluminum Electrolytic Capacitors

Radial Types

OVERVIEW ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

Features

Series	Page	AEC-Q200	High Temperature	Low ESR	Low Height	Ultra Long Life	Ultra Miniaturized	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)
SG	84	●			●		●	-40	+105	6.3	50	0.1	470	4000
KL	88	●				●		-40	+105	160	400	3.3	330	5000
								-25		450	500	2.2	180	
GH	95	●		●				-55	+105	6.3	100	0.47	12000	5000 to 10000
FK	111	●				●		-40	+105	160	450	1	330	6000 to 8000
								-25		500		4.7	120	
FL	119	●				●		-40	+105	160	450	1	680	8000 to 12000
								-25		500		10	68	
GT	129	●				●		-40	+105	10	100	1	330	10000
TH	132	●	●					-40	+125	10	400	0.47	8200	1000 to 3000
								-25		450		1	47	
TE	143	●	●					-40	+130	10	400	2.2	4700	1000 to 3000

For further information please contact sales@capxon.org

SG SERIES ▪ 7/9 MM HEIGHT, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 LOW HEIGHT

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ THT type
- Endurance: 105°C ▪ 4 000 hours
- Miniaturized for space critical applications
- Low height ▪ 7mm and 9mm
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics						
Operating Temperature Range		-40 ~ +105°C						
Rated Voltage Range	V_R	6.3 ~ 50V DC						
Surge Voltage	V_S	$V_S = 1.15 \cdot V_R$						
Capacitance Range	C_R	0.1 ~ 470µF						
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)						
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ 0.01CV or 3µA, whichever is greater After 2 minutes						
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	6.3	10	16	25	35	50
		tanδ (%)	24	20	17	15	13	12
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	6.3	10	16	25	35	50
		Z-25°C/Z+20°C	4	3	2	2	2	2
		Z-40°C/Z+20°C	8	6	4	3	3	3

Lifetime Test		
Endurance 105°C (V_R applied)	Test	**4 000 hours**
	△C/C_R	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	50/60	100/120	1k	50k ~ 100k
$0.1 < C_R \leq 470$	0.65	1	1.35	1.5

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
6.3	22	4	7	35	SG220M6R3B070AX
	33	5	7	43	SG330M6R3C070AX
	47	5	7	50	SG470M6R3C070AX
	100	6.3	7	76	SG101M6R3E070AX
	220	8	7	131	SG221M6R3F070AX
	330	8	9	145	SG331M6R3F090AX
	470	8	9	145	SG471M6R3F090AX
10	22	5	7	42	SG220M010C070AX
	33	5	7	50	SG330M010C070AX
	47	6.3	7	60	SG470M010E070AX
	100	8	7	96	SG101M010F070AX
	220	8	9	145	SG221M010F090AX
	330	8	9	145	SG331M010F090AX
	470	8	9	145	SG471M010F090AX
	470	10	9	165	SG471M010G090AX
16	10	4	7	29	SG100M016B070AX
	10	5	7	29	SG100M016C070AX
	22	5	7	46	SG220M016C070AX
	33	6.3	7	58	SG330M016E070AX
	47	6.3	7	70	SG470M016E070AX
	100	6.3	7	95	SG101M016E070AX
	100	8	7	110	SG101M016F070AX
	220	8	9	145	SG221M016F090AX
	330	8	9	145	SG331M016F090AX
	330	10	9	165	SG331M016G090AX
	470	10	9	165	SG471M016G090AX
25	10	5	7	36	SG100M025C070AX
	22	6.3	7	52	SG220M025E070AX
	33	6.3	7	65	SG330M025E070AX
	47	6.3	7	70	SG470M025E070AX
	47	8	7	80	SG470M025F070AX
	100	8	7	100	SG101M025F070AX
	100	8	9	145	SG101M025F090AX
	150	8	9	145	SG151M025F090AX
	220	10	9	165	SG221M025G090AX
35	10	4	7	26	SG100M035B070AX
	22	6.3	7	60	SG220M035E070AX
	33	8	7	75	SG330M035F070AX
	47	8	9	89	SG470M035F090AX
	100	10	9	165	SG101M035G090AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
50	0.1	4	7	1.5	SG0R1M050B070AX
	0.22	4	7	2.5	SGR22M050B070AX
	0.33	4	7	3.5	SGR33M050B070AX
	0.47	4	7	5	SGR47M050B070AX
	1	4	7	12	SG010M050B070AX
	2.2	4	7	21	SG2R2M050B070AX
	3.3	4	7	26	SG3R3M050B070AX
	4.7	5	7	31	SG4R7M050C070AX
	10	6.3	7	46	SG100M050E070AX
	22	8	7	67	SG220M050F070AX
	33	8	9	89	SG330M050F090AX
	47	8	9	89	SG470M050F090AX
	100	10	9	165	SG101M050G090AX

See "PACKAGING INFORMATION" to taped or formed products.

DIMENSIONS ▪ All dimensions in mm

ø D	4	5	6.3	8		10	
F	1.5	2	2.5	3.5		5	
ø d	0.45	0.45	0.5	0.5		0.6	
a	1	1	1	L = 7	L = 9	L = 7	L = 9
				1	1.5	1	1.5

For further information please contact sales@capxon.org

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

General Precautions and Guidelines	Packaging Information Liquid Radial
Page 274	Page 151 and following

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

KL SERIES ▪ HIGH VOLTAGE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 LONG LIFE HIGH VOLTAGE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ THT type
- Endurance: 105°C ▪ 5 000 hours
- High voltage version up to 500V
- High reliability
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics							
Operating Temperature Range		-40 ~ +105°C				-25 ~ +105°C			
Rated Voltage Range	V_R	160 ~ 400V DC				450V ~ 500V DC			
Surge Voltage	V_S	($V_R \le 315V$): $V_S = 1.15 \cdot V_R$				($V_R > 315V$): $V_S = 1.10 \cdot V_R$			
Capacitance Range	C_R	3.3 ~ 330µF				2.2 ~ 180µF			
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)							
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	$C_R \cdot V_R \le 1000$				$\le 0.1 \cdot C_R \cdot V_R + 40µA$ (After 1 minute)			
		$C_R \cdot V_R > 1000$				$\le 0.04 \cdot C_R \cdot V_R + 100µA$ (After 1 minute)			
		[I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]							
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	160	200	250	350	400	450	500
		tanδ (%)	12	12	12	15	15	17	20
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	160	200	250	350	400	450	500
		Z-25°C/Z+20°C	3	3	3	6	6	6	6
		Z-40°C/Z+20°C	6	6	6	6	6	-	-

Lifetime Test		
Endurance 105°C (V_R & I_R applied)	Test	**5 000 hours**
	△C/C_R	≤ ±20% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±20% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
160	3.3	10	12.5	52	KL3R3M160G125AX
	4.7	10	12.5	60	KL4R7M160G125AX
	10	10	12.5	104	KL100M160G125AX
	10	10	16	115	KL100M160G160AX
	15	10	16	150	KL150M160G160AX
	22	10	16	190	KL220M160G160AX
	22	10	20	210	KL220M160G200AX
	33	10	16	235	KL330M160G160AX
	33	10	20	258	KL330M160G200AX
	33	13	20	300	KL330M160I200AX
	47	10	20	270	KL470M160G200AX
	47	13	20	310	KL470M160I200AX
	68	13	20	430	KL680M160I200AX
	68	13	25	470	KL680M160I250AX
	100	13	25	540	KL101M160I250AX
	100	16	20	540	KL101M160J200AX
	100	16	25	590	KL101M160J250AX
	120	16	20	560	KL121M160J200AX
	150	16	25	650	KL151M160J250AX
	180	16	31.5	750	KL181M160J315AX
	220	16	31.5	820	KL221M160J315AX
	220	18	25	710	KL221M160K250AX
	270	18	31.5	880	KL271M160K315AX
	330	18	31.5	930	KL331M160K315AX
	330	18	40	1000	KL331M160K400AX
200	3.3	10	12.5	52	KL3R3M200G125AX
	4.7	10	12.5	60	KL4R7M200G125AX
	6.8	10	12.5	70	KL6R8M200G125AX
	10	10	12.5	104	KL100M200G125AX
	10	10	16	115	KL100M200G160AX
	10	10	20	125	KL100M200G200AX
	15	10	16	150	KL150M200G160AX
	22	10	16	210	KL220M200G160AX
	22	10	20	230	KL220M200G200AX
	33	10	20	290	KL330M200G200AX
	33	13	20	350	KL330M200I200AX
	47	13	20	380	KL470M200I200AX
	68	13	25	530	KL680M200I250AX
	68	16	20	530	KL680M200J200AX
	100	16	20	570	KL101M200J200AX
	100	16	25	610	KL101M200J250AX
	120	16	25	700	KL121M200J250AX
	150	16	25	700	KL151M200J250AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
200	150	16	31.5	750	KL151M200J315AX
	180	18	31.5	830	KL181M200K315AX
	220	18	31.5	970	KL221M200K315AX
	270	18	40	1100	KL271M200K400AX
	330	18	45	1250	KL331M200K450AX
250	4.7	10	12.5	60	KL4R7M250G125AX
	6.8	10	12.5	75	KL6R8M250G125AX
	10	10	16	160	KL100M250G160AX
	10	10	20	170	KL100M250G200AX
	15	10	16	180	KL150M250G160AX
	22	10	20	250	KL220M250G200AX
	22	13	20	290	KL220M250I200AX
	33	13	20	360	KL330M250I200AX
	33	13	25	380	KL330M250I250AX
	47	13	25	430	KL470M250I250AX
	68	16	20	530	KL680M250J200AX
	68	16	25	550	KL680M250J250AX
	68	18	20	550	KL680M250K200AX
	100	16	25	630	KL101M250J250AX
	100	16	31.5	700	KL101M250J315AX
	100	18	25	680	KL101M250K250AX
	100	18	31.5	750	KL101M250K315AX
	120	18	31.5	790	KL121M250K315AX
	150	18	31.5	840	KL151M250K315AX
	150	18	35.5	880	KL151M250K355AX
	180	18	40	980	KL181M250K400AX
	220	18	35.5	960	KL221M250K355AX
	220	18	40	1020	KL221M250K400AX
350	4.7	10	12.5	65	KL4R7M350G125AX
	6.8	10	16	100	KL6R8M350G160AX
	10	10	20	170	KL100M350G200AX
	10	13	20	180	KL100M350I200AX
	15	13	20	200	KL150M350I200AX
	22	13	20	290	KL220M350I200AX
	33	13	25	320	KL330M350I250AX
	33	16	20	320	KL330M350J200AX
	47	16	25	430	KL470M350J250AX
	47	16	31.5	440	KL470M350J315AX
	68	16	35.5	550	KL680M350J355AX
	100	18	31.5	750	KL101M350K315AX
	100	18	35.5	780	KL101M350K355AX
400	3.3	10	12.5	55	KL3R3M400G125AX
	4.7	10	16	100	KL4R7M400G160AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
400	6.8	10	16	120	KL6R8M400G160AX
	6.8	10	20	125	KL6R8M400G200AX
	10	10	16	156	KL100M400G160AX
	10	10	20	170	KL100M400G200AX
	10	13	20	200	KL100M400I200AX
	15	10	16	156	KL150M400G160AX
	15	13	20	200	KL150M400I200AX
	22	13	25	320	KL220M400I250AX
	22	16	20	320	KL220M400J200AX
	33	16	20	400	KL330M400J200AX
	33	16	25	430	KL330M400J250AX
	47	16	20	420	KL470M400J200AX
	47	16	25	450	KL470M400J250AX
	47	16	31.5	530	KL470M400J315AX
	68	16	25	480	KL680M400J250AX
	68	16	31.5	530	KL680M400J315AX
	82	16	31.5	580	KL820M400J315AX
	100	16	31.5	710	KL101M400J315AX
	100	18	35.5	750	KL101M400K355AX
	120	16	35.5	800	KL121M400J355AX
	120	18	31.5	800	KL121M400K315AX
	150	16	40	920	KL151M400J400AX
	150	18	31.5	890	KL151M400K315AX
	180	18	40	1060	KL181M400K400AX
	220	18	45	1200	KL221M400K450AX
450	2.2	10	12.5	45	KL2R2M450G125AX
	3.3	10	16	65	KL3R3M450G160AX
	4.7	10	12.5	95	KL4R7M450G125AX
	4.7	10	16	105	KL4R7M450G160AX
	6.8	10	16	125	KL6R8M450G160AX
	6.8	10	20	140	KL6R8M450G200AX
	10	10	20	170	KL100M450G200AX
	10	13	20	190	KL100M450I200AX
	10	13	25	220	KL100M450I250AX
	15	16	20	270	KL150M450J200AX
	22	13	20	280	KL220M450I200AX
	22	16	20	320	KL220M450J200AX
	22	16	25	360	KL220M450J250AX
	33	16	25	440	KL330M450J250AX
	33	18	25	460	KL330M450K250AX
	47	16	31.5	480	KL470M450J315AX
	47	18	25	450	KL470M450K250AX
	56	16	31.5	530	KL560M450J315AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
450	68	16	35.5	600	KL680M450J355AX
	68	18	25	580	KL680M450K250AX
	68	18	31.5	620	KL680M450K315AX
	82	16	35.5	680	KL820M450J355AX
	100	16	35.5	750	KL101M450J355AX
	120	18	35.5	840	KL121M450K355AX
	150	18	40	970	KL151M450K400AX
	180	18	45	1090	KL181M450K450AX
500	4.7	13	20	82	KL4R7M500I200AX
	6.8	13	20	96	KL6R8M500I200AX
	10	13	25	130	KL100M500I250AX
	22	16	25	210	KL220M500J250AX
	33	16	31.5	280	KL330M500J315AX
	47	16	35.5	360	KL470M500J355AX
	47	18	31.5	360	KL470M500K315AX
	56	16	40	420	KL560M500J400AX
	56	18	31.5	400	KL560M500K315AX
	68	16	45	480	KL680M500J450AX
	68	18	35.5	460	KL680M500K355AX
	68	18	40	490	KL680M500K400AX
	82	18	40	540	KL820M500K400AX
	100	18	45	630	KL101M500K450AX
	100	20	40	660	KL101M500L400AX
	120	22	45	800	KL121M500M450AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

DIMENSIONS ▪ All dimensions in mm

ø D	10	13	16	18	22
F	5	5	7.5	7.5	10
ø d	0.6		0.8		

a	ø D < 16	ø D = 16		ø D = 18		ø D > 18
	1.5	L = 25 to 35.5	L < 25 and L ≥ 40	L = 25 to 31.5	L < 25 and L ≥ 35.5	2
		1.5	2	1.5	2	

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	100/120	1k	10k	≥ 50k
$3.3 < C_R \leq 330$	1	1.5	1.7	1.9

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

General Precautions and Guidelines	Packaging Information Liquid Radial
Page 274	Page 151 and following

For further information please contact sales@capxon.org

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

GH SERIES ▪ LOW IMPEDANCE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 LOW IMPEDANCE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ THT type
- Endurance: 105°C ▪ 3 000 hours up to 10 000 hours
- Low impedance and high ripple current
- Wide capacitance range
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +105°C
Rated Voltage Range	V_R	6.3 ~ 100V DC
Surge Voltage	V_S	$V_S = 1.15 \cdot V_R$
Capacitance Range	C_R	0.47 ~ 12000µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ $0.01 \cdot C_R \cdot V_R$ or 3µA, whichever is greater ▪ After 2 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]

Dissipation Factor % (20°C ▪ 120Hz) — tanδ

V_R (V DC)	6.3	10	16	25	35	50	63	80	100
tanδ (%)	22	19	16	14	12	10	9	9	10

For C_R ≥ 1000µF, add 2% per every multiple 1000µF of rated capacitance value

Low Temperature Characteristics at 120Hz — Z ratio max.

V_R (V DC)	6.3	10	16	25	35	50	63	80	100
Z-25°C/Z+20°C	4	3	2	2	1.5	1.5	1.5	1.5	1.5
Z-40°C/Z+20°C	6	4	3	3	2	2	2	2	2
Z-55°C/Z+20°C	8	6	5	5	4	4	4	4	4

For capacitance > 1000µF

Z-25°C/Z+20°C	Add 0.5 for every multiple 1000µF of rated capacitance value
Z-40°C/Z+20°C	Add 1 for every multiple 1000µF of rated capacitance value
Z-55°C/Z+20°C	Add 1.5 for every multiple 1000µF of rated capacitance value

Lifetime Test

Endurance 105°C (V_R & I_R applied)	Test	**5 000 hours**	ø D 5 ~ 6.3 mm
		7 000 hours	ø D 8 ~ 12 mm
		10 000 hours	ø D ≥ 13 mm
	△C/C_R	≤ ±25% of initial measured value	
	tanδ	≤ 200% of initial specified value	
	I_{Leak}	≤ the initial specified value	
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**	
	△C/C_R	≤ ±25% of initial measured value	
	tanδ	≤ 200% of initial specified value	
	I_{Leak}	≤ the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4		

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
6.3	82	5	11	1630	198	GH820M6R3C110AX
	100	5	11	1450	210	GH101M6R3C110AX
	120	5	11	1280	222	GH121M6R3C110AX
	150	6.3	11	1160	240	GH151M6R3E110AX
	180	6.3	11	1040	282	GH181M6R3E110AX
	220	6.3	11	890	378	GH221M6R3E110AX
	270	6.3	11	770	396	GH271M6R3E110AX
	330	6.3	11	770	396	GH331M6R3E110AX
	330	6.3	15	680	426	GH331M6R3E150AX
	330	8	11.5	680	444	GH331M6R3F115AX
	390	6.3	15	580	462	GH391M6R3E150AX
	390	8	11.5	520	480	GH391M6R3F115AX
	470	6.3	15	410	504	GH471M6R3E150AX
	470	8	11.5	380	534	GH471M6R3F115AX
	470	10	12.5	380	564	GH471M6R3G125AX
	560	8	11.5	360	570	GH561M6R3F115AX
	560	8	16	360	600	GH561M6R3F160AX
	560	10	12.5	360	612	GH561M6R3G125AX
	680	8	11.5	330	582	GH681M6R3F115AX
	680	8	16	330	618	GH681M6R3F160AX
	680	10	12.5	330	642	GH681M6R3G125AX
	820	8	11.5	250	666	GH821M6R3F115AX
	820	10	12.5	250	720	GH821M6R3G125AX
	1000	8	16	220	690	GH102M6R3F160AX
	1000	8	20	220	756	GH102M6R3F200AX
	1000	10	12.5	220	708	GH102M6R3G125AX
	1200	8	20	180	840	GH122M6R3F200AX
	1200	10	16	180	888	GH122M6R3G160AX
	1500	8	20	150	1056	GH152M6R3F200AX
	1500	10	16	120	1128	GH152M6R3G160AX
	1500	10	20	120	1176	GH152M6R3G200AX
	1800	8	25	110	1230	GH182M6R3F250AX
	1800	10	20	110	1308	GH182M6R3G200AX
	2200	10	20	100	1350	GH222M6R3G200AX
	2200	10	25	100	1362	GH222M6R3G250AX
	2700	10	25	90	1488	GH272M6R3G250AX
	2700	10	30	90	1560	GH272M6R3G300AX
	2700	13	20	90	1512	GH272M6R3I200AX
	3300	10	30	85	1620	GH332M6R3G300AX
	3300	13	20	85	1584	GH332M6R3I200AX
	3900	13	25	80	1860	GH392M6R3I250AX
	4700	13	25	75	1938	GH472M6R3I250AX
	4700	13	30	70	1992	GH472M6R3I300AX

See "PACKAGING INFORMATION" to taped or formed products.

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
6.3	5600	13	30	68	1992	GH562M6R3I300AX
	5600	16	25	68	2196	GH562M6R3J250AX
	6800	13	30	63	2520	GH682M6R3I300AX
	6800	16	25	63	2718	GH682M6R3J250AX
10	22	5	11	3080	66	GH220M010C110AX
	27	5	11	2670	72	GH270M010C110AX
	33	5	11	2330	72	GH330M010C110AX
	39	5	11	2020	120	GH390M010C110AX
	47	5	11	1710	132	GH470M010C110AX
	56	5	11	1470	144	GH560M010C110AX
	68	5	11	1300	162	GH680M010C110AX
	82	5	11	1150	192	GH820M010C110AX
	100	5	11	1020	222	GH101M010C110AX
	100	6.3	11	1020	240	GH101M010E110AX
	120	5	11	1020	246	GH121M010C110AX
	120	6.3	11	1020	258	GH121M010E110AX
	150	6.3	11	950	282	GH151M010E110AX
	180	6.3	11	680	318	GH181M010E110AX
	220	6.3	11	600	366	GH221M010E110AX
	220	6.3	15	580	390	GH221M010E150AX
	270	6.3	15	560	414	GH271M010E150AX
	270	8	11.5	530	420	GH271M010F115AX
	330	6.3	11	500	402	GH331M010E110AX
	330	6.3	15	470	462	GH331M010E150AX
	330	8	11.5	450	492	GH331M010F115AX
	390	6.3	15	420	456	GH391M010E150AX
	390	8	11.5	420	516	GH391M010F115AX
	470	6.3	15	370	480	GH471M010E150AX
	470	8	11.5	300	552	GH471M010F115AX
	560	8	11.5	280	588	GH561M010F115AX
	560	8	16	250	636	GH561M010F160AX
	560	10	12.5	250	636	GH561M010G125AX
	680	8	16	210	660	GH681M010F160AX
	680	8	20	200	684	GH681M010F200AX
	680	10	12.5	200	684	GH681M010G125AX
	820	8	16	200	732	GH821M010F160AX
	820	8	20	180	828	GH821M010F200AX
	820	10	12.5	160	876	GH821M010G125AX
	820	10	16	160	936	GH821M010G160AX
	1000	8	16	160	1020	GH102M010F160AX
	1000	8	20	140	1122	GH102M010F200AX
	1000	10	12.5	140	1032	GH102M010G125AX
	1000	10	16	130	1140	GH102M010G160AX

See "PACKAGING INFORMATION" to taped or formed products.

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
10	1200	8	20	130	1248	GH122M010F200AX
	1200	10	16	130	1272	GH122M010G160AX
	1200	10	20	120	1368	GH122M010G200AX
	1500	10	20	106	1536	GH152M010G200AX
	1500	13	16	110	1619	GH152M010I160AX
	1800	10	25	102	1650	GH182M010G250AX
	1800	13	20	98	1704	GH182M010I200AX
	2200	10	25	95	1776	GH222M010G250AX
	2200	10	30	93	1860	GH222M010G300AX
	2200	13	20	93	1872	GH222M010I200AX
	2200	16	16	93	1926	GH222M010J160AX
	2700	10	30	84	2076	GH272M010G300AX
	2700	13	20	84	2028	GH272M010I200AX
	2700	13	25	84	2124	GH272M010I250AX
	2700	18	16	84	2240	GH272M010K160AX
	3300	10	30	70	2232	GH332M010G300AX
	3300	13	25	70	2268	GH332M010I250AX
	3300	16	25	70	2316	GH332M010J250AX
	3900	13	25	65	2304	GH392M010I250AX
	3900	13	30	65	2376	GH392M010I300AX
	3900	16	20	70	2362	GH392M010J200AX
	3900	16	25	65	2544	GH392M010J250AX
	4700	13	30	65	2484	GH472M010I300AX
	4700	13	35	60	2568	GH472M010I350AX
	4700	16	25	57	2634	GH472M010J250AX
	5600	13	35	54	2640	GH562M010I350AX
	5600	16	25	54	2472	GH562M010J250AX
	5600	16	31.5	50	2736	GH562M010J315AX
	5600	18	20	57	2459	GH562M010K200AX
	6800	16	31.5	46	2964	GH682M010J315AX
	6800	18	25	52	2865	GH682M010K250AX
	8200	16	35.5	43	3350	GH822M010J355AX
	8200	18	31.5	44	3392	GH822M010K315AX
	10000	16	40	40	3850	GH103M010J400AX
	10000	18	35.5	41	3850	GH103M010K355AX
	12000	18	40	37	4150	GH123M010K400AX
16	10	5	11	3900	36	GH100M016C110AX
	15	5	11	3320	72	GH150M016C110AX
	22	5	11	2640	72	GH220M016C110AX
	27	5	11	2370	132	GH270M016C110AX
	33	5	11	2000	144	GH330M016C110AX
	39	5	11	1610	168	GH390M016C110AX
	47	5	11	1350	186	GH470M016C110AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	56	5	11	1240	210	GH560M016C110AX
	68	5	11	1180	228	GH680M016C110AX
	82	6.3	11	1030	264	GH820M016E110AX
	100	5	11	1100	228	GH101M016C110AX
	100	6.3	11	860	264	GH101M016E110AX
	120	6.3	11	660	312	GH121M016E110AX
	150	6.3	11	580	336	GH151M016E110AX
	150	6.3	15	580	396	GH151M016E150AX
	180	6.3	15	560	420	GH181M016E150AX
	180	8	11.5	540	426	GH181M016F115AX
	220	6.3	15	520	504	GH221M016E150AX
	220	8	11.5	460	540	GH221M016F115AX
	270	6.3	15	420	540	GH271M016E150AX
	270	8	11.5	380	582	GH271M016F115AX
	330	6.3	15	340	588	GH331M016E150AX
	330	8	11.5	370	588	GH331M016F115AX
	330	8	16	350	618	GH331M016F160AX
	390	8	11.5	330	612	GH391M016F115AX
	390	8	16	330	654	GH391M016F160AX
	390	10	12.5	330	648	GH391M016G125AX
	470	8	16	290	846	GH471M016F160AX
	470	8	20	280	900	GH471M016F200AX
	470	10	12.5	280	882	GH471M016G125AX
	560	8	16	260	864	GH561M016F160AX
	560	8	20	240	936	GH561M016F200AX
	560	10	12.5	240	882	GH561M016G125AX
	560	10	16	200	960	GH561M016G160AX
	680	8	20	200	960	GH681M016F200AX
	680	10	16	180	1044	GH681M016G160AX
	820	8	20	170	1104	GH821M016F200AX
	820	10	16	150	1254	GH821M016G160AX
	820	10	20	150	1320	GH821M016G200AX
	1000	10	16	140	1404	GH102M016G160AX
	1000	10	20	120	1476	GH102M016G200AX
	1200	10	20	130	1500	GH122M016G200AX
	1200	10	25	110	1578	GH122M016G250AX
	1500	10	25	96	1620	GH152M016G250AX
	1500	13	20	95	1728	GH152M016I200AX
	1500	16	16	95	1778	GH152M016J160AX
	1800	10	30	97	1776	GH182M016G300AX
	1800	13	20	94	1854	GH182M016I200AX
	1800	13	25	90	1956	GH182M016I250AX
	2200	13	20	90	2082	GH222M016I200AX

See "PACKAGING INFORMATION" to taped or formed products.

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	2200	13	25	85	2340	GH222M016I250AX
	2200	18	16	90	2300	GH222M016K160AX
	2700	13	25	76	2436	GH272M016I250AX
	2700	13	30	72	2496	GH272M016I300AX
	2700	16	20	74	2362	GH272M016J200AX
	2700	16	25	72	2544	GH272M016J250AX
	3300	13	30	68	2562	GH332M016I300AX
	3300	13	35	66	2628	GH332M016I350AX
	3300	16	25	64	2700	GH332M016J250AX
	3900	13	35	50	2664	GH392M016I350AX
	3900	16	25	60	2736	GH392M016J250AX
	3900	16	31.5	58	2856	GH392M016J315AX
	3900	18	20	60	2721	GH392M016K200AX
	4700	16	31.5	50	2886	GH472M016J315AX
	4700	18	25	55	2844	GH472M016K250AX
	5600	16	35.5	46	2968	GH562M016J355AX
	5600	18	31.5	48	3084	GH562M016K315AX
	5600	18	35.5	45	3168	GH562M016K355AX
	6800	16	40	40	3252	GH682M016J400AX
	6800	18	35.5	40	3252	GH682M016K355AX
	8200	18	35.5	38	3750	GH822M016K355AX
	10000	18	40	36	4150	GH103M016K400AX
25	10	5	11	3010	66	GH100M025C110AX
	15	5	11	2640	120	GH150M025C110AX
	22	5	11	2300	144	GH220M025C110AX
	27	5	11	2030	156	GH270M025C110AX
	33	5	11	1720	174	GH330M025C110AX
	39	5	11	1500	174	GH390M025C110AX
	47	5	11	1370	222	GH470M025C110AX
	47	6.3	11	1280	240	GH470M025E110AX
	56	5	11	1250	264	GH560M025C110AX
	68	6.3	11	970	300	GH680M025E110AX
	82	6.3	11	790	312	GH820M025E110AX
	100	6.3	11	680	360	GH101M025E110AX
	100	8	11.5	540	516	GH101M025F115AX
	120	6.3	11	580	402	GH121M025E110AX
	120	6.3	15	560	462	GH121M025E150AX
	150	6.3	15	540	510	GH151M025E150AX
	150	8	11.5	520	528	GH151M025F115AX
	180	6.3	15	510	546	GH181M025E150AX
	180	8	11.5	460	552	GH181M025F115AX
	220	8	11.5	420	618	GH221M025F115AX
	220	8	16	400	642	GH221M025F160AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
25	270	8	11.5	340	750	GH271M025F115AX
	270	8	16	320	756	GH271M025F160AX
	270	10	12.5	320	816	GH271M025G125AX
	330	8	16	250	960	GH331M025F160AX
	330	10	12.5	240	924	GH331M025G125AX
	470	8	20	230	1056	GH471M025F200AX
	470	10	12.5	210	1020	GH471M025G125AX
	470	10	16	210	1080	GH471M025G160AX
	560	8	20	170	1224	GH561M025F200AX
	560	10	16	150	1260	GH561M025G160AX
	680	10	20	110	1470	GH681M025G200AX
	680	13	16	100	1550	GH681M025I160AX
	820	10	20	110	1668	GH821M025G200AX
	820	10	25	100	1704	GH821M025G250AX
	1000	10	25	93	1812	GH102M025G250AX
	1000	13	20	90	1872	GH102M025I200AX
	1000	16	16	88	1926	GH102M025J160AX
	1200	13	20	82	2028	GH122M025I200AX
	1200	18	16	80	2240	GH122M025K160AX
	1500	13	20	67	2124	GH152M025I200AX
	1500	13	25	65	2190	GH152M025I250AX
	1800	13	30	58	2310	GH182M025I300AX
	1800	16	20	56	2172	GH182M025J200AX
	1800	16	25	58	2340	GH182M025J250AX
	2200	13	30	52	2592	GH222M025I300AX
	2200	16	25	50	2712	GH222M025J250AX
	2200	18	20	52	2697	GH222M025K200AX
	2700	13	35	50	2850	GH272M025I350AX
	2700	16	25	48	2673	GH272M025J250AX
	2700	16	31.5	46	2958	GH272M025J315AX
	3300	16	31.5	38	3204	GH332M025J315AX
	3300	16	35.5	36	3288	GH332M025J355AX
	3300	18	25	41	3156	GH332M025K250AX
	3900	16	35.5	36	3500	GH392M025J355AX
	3900	18	31.5	36	3544	GH392M025K315AX
	4700	16	40	34	3800	GH472M025J400AX
	4700	18	35.5	34	3800	GH472M025K355AX
	5600	18	40	30	4100	GH562M025K400AX
35	10	5	11	2650	84	GH100M035C110AX
	15	5	11	2290	144	GH150M035C110AX
	22	5	11	1900	162	GH220M035C110AX
	27	5	11	1580	174	GH270M035C110AX
	27	6.3	11	1420	198	GH270M035E110AX

See "PACKAGING INFORMATION" to taped or formed products.

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
35	33	5	11	1250	222	GH330M035C110AX
	33	6.3	11	1250	240	GH330M035E110AX
	39	6.3	11	1100	252	GH390M035E110AX
	47	5	11	96	232	GH470M035C110AX
	47	6.3	11	920	264	GH470M035E110AX
	56	6.3	11	750	282	GH560M035E110AX
	56	6.3	15	680	306	GH560M035E150AX
	68	6.3	11	620	312	GH680M035E110AX
	68	6.3	15	550	348	GH680M035E150AX
	82	6.3	15	510	354	GH820M035E150AX
	82	8	11.5	470	384	GH820M035F115AX
	100	6.3	11	490	329	GH101M035E110AX
	100	6.3	15	470	378	GH101M035E150AX
	100	8	11.5	450	414	GH101M035F115AX
	120	8	11.5	420	546	GH121M035F115AX
	120	8	16	380	612	GH121M035F160AX
	150	8	11.5	380	618	GH151M035F115AX
	150	8	16	350	714	GH151M035F160AX
	150	10	12.5	350	720	GH151M035G125AX
	180	8	16	320	792	GH181M035F160AX
	180	10	12.5	320	804	GH181M035G125AX
	220	8	16	260	864	GH221M035F160AX
	220	8	20	240	936	GH221M035F200AX
	220	10	12.5	240	888	GH221M035G125AX
	270	8	20	220	1056	GH271M035F200AX
	270	10	12.5	240	984	GH271M035G125AX
	270	10	16	210	1068	GH271M035G160AX
	330	8	20	160	1140	GH331M035F200AX
	330	10	16	150	1176	GH331M035G160AX
	470	10	20	110	1302	GH471M035G200AX
	470	10	25	100	1398	GH471M035G250AX
	470	13	16	110	1272	GH471M035I160AX
	470	13	20	100	1398	GH471M035I200AX
	560	10	25	96	1572	GH561M035G250AX
	560	13	20	96	1584	GH561M035I200AX
	680	10	25	84	1680	GH681M035G250AX
	680	13	20	82	1692	GH681M035I200AX
	680	16	16	80	1740	GH681M035J160AX
	820	13	20	68	1818	GH821M035I200AX
	820	13	25	62	1944	GH821M035I250AX
	1000	10	30	60	2136	GH102M035G300AX
	1000	13	25	60	2184	GH102M035I250AX
	1000	13	30	58	2280	GH102M035I300AX

See "PACKAGING INFORMATION" to taped or formed products.

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
35	1000	18	16	56	2189	GH102M035K160AX
	1200	13	25	52	2292	GH122M035I250AX
	1200	16	20	52	2384	GH122M035J200AX
	1200	16	25	50	2568	GH122M035J250AX
	1500	13	35	48	2820	GH152M035I350AX
	1500	16	31.5	48	2928	GH152M035J315AX
	1800	13	35	45	2976	GH182M035I350AX
	1800	16	25	48	2722	GH182M035J250AX
	1800	16	31.5	45	3012	GH182M035J315AX
	1800	18	20	48	2707	GH182M035K200AX
	2200	16	31.5	36	3228	GH222M035J315AX
	2200	18	25	36	3132	GH222M035K250AX
	2700	16	35.5	32	3294	GH272M035J355AX
	2700	18	31.5	32	3336	GH272M035K315AX
	3300	16	40	29	3800	GH332M035J400AX
	3300	18	35.5	29	3800	GH332M035K355AX
	3900	18	40	26	4100	GH392M035K400AX
50	0.47	5	11	7230	12	GHR47M050C110AX
	1	5	11	4310	24	GH010M050C110AX
	2.2	5	11	3600	36	GH2R2M050C110AX
	3.3	5	11	3500	48	GH3R3M050C110AX
	4.7	5	11	3300	66	GH4R7M050C110AX
	5.6	5	11	3200	96	GH5R6M050C110AX
	6.8	5	11	3000	96	GH6R8M050C110AX
	8.2	5	11	2800	108	GH8R2M050C110AX
	10	5	11	2600	120	GH100M050C110AX
	15	5	11	1870	150	GH150M050C110AX
	22	5	11	1600	162	GH220M050C110AX
	22	6.3	11	1270	168	GH220M050E110AX
	27	6.3	11	1020	192	GH270M050E110AX
	33	6.3	11	870	282	GH330M050E110AX
	33	6.3	15	850	296	GH330M050E150AX
	39	6.3	11	720	306	GH390M050E110AX
	39	6.3	15	700	330	GH390M050E150AX
	47	6.3	11	580	303	GH470M050E110AX
	47	6.3	15	550	348	GH470M050E150AX
	47	8	11.5	550	366	GH470M050F115AX
	56	6.3	11	490	323	GH560M050E110AX
	56	8	11.5	470	378	GH560M050F115AX
	68	8	11.5	470	420	GH680M050F115AX
	82	6.3	15	460	462	GH820M050E150AX
	82	8	11.5	460	492	GH820M050F115AX
	82	8	16	450	528	GH820M050F160AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
50	100	8	11.5	450	540	GH101M050F115AX
	100	8	16	250	576	GH101M050F160AX
	120	8	16	250	630	GH121M050F160AX
	150	8	16	240	696	GH151M050F160AX
	150	8	20	240	756	GH151M050F200AX
	150	10	12.5	250	702	GH151M050G125AX
	150	10	16	240	780	GH151M050G160AX
	180	8	20	240	864	GH181M050F200AX
	180	10	16	240	912	GH181M050G160AX
	220	10	16	240	1056	GH221M050G160AX
	220	10	20	200	1122	GH221M050G200AX
	270	10	20	100	1212	GH271M050G200AX
	270	10	25	100	1284	GH271M050G250AX
	270	13	16	100	1278	GH271M050I160AX
	330	10	25	95	1404	GH331M050G250AX
	330	13	20	82	1500	GH331M050I200AX
	470	10	30	78	1749	GH471M050G300AX
	470	13	20	78	1776	GH471M050I200AX
	470	13	25	78	1860	GH471M050I250AX
	470	16	16	78	1827	GH471M050J160AX
	560	13	20	75	2094	GH561M050I200AX
	560	13	25	70	2172	GH561M050I250AX
	560	18	16	73	2313	GH561M050K160AX
	680	13	25	57	2304	GH681M050I250AX
	680	16	25	57	2376	GH681M050J250AX
	820	13	30	52	2412	GH821M050I300AX
	820	16	20	54	2084	GH821M050J200AX
	820	16	31.5	52	2484	GH821M050J315AX
	1000	13	40	48	2750	GH102M050I400AX
	1000	16	25	50	2676	GH102M050J250AX
	1000	16	31.5	48	2736	GH102M050J315AX
	1000	18	20	50	2661	GH102M050K200AX
	1200	16	31.5	45	2952	GH122M050J315AX
	1200	16	35.5	42	3048	GH122M050J355AX
	1200	18	25	47	2854	GH122M050K250AX
	1500	16	35.5	38	3216	GH152M050J355AX
	1800	16	40	35	3550	GH182M050J400AX
	1800	18	31.5	35	3367	GH182M050K315AX
	2200	18	35.5	32	3550	GH222M050K355AX
	2700	18	40	30	3790	GH272M050K400AX
	3300	18	40	28	3810	GH332M050K400AX
63	10	5	11	3015	116	GH100M063C110AX
	15	5	11	2370	130	GH150M063C110AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
63	22	5	11	1770	151	GH220M063C110AX
	22	6.3	11	1391	194	GH220M063E110AX
	27	6.3	11	1290	201	GH270M063E110AX
	33	6.3	11	1013	227	GH330M063E110AX
	39	6.3	11	890	242	GH390M063E110AX
	47	6.3	11	755	263	GH470M063E110AX
	47	8	11.5	730	313	GH470M063F115AX
	56	8	11.5	700	319	GH560M063F115AX
	68	8	11.5	500	378	GH680M063F115AX
	68	8	16	420	476	GH680M063F160AX
	82	8	11.5	470	390	GH820M063F115AX
	82	8	16	420	476	GH820M063F160AX
	82	10	12.5	430	480	GH820M063G125AX
	100	8	16	360	514	GH101M063F160AX
	100	10	12.5	375	514	GH101M063G125AX
	120	8	16	365	511	GH121M063F160AX
	120	8	20	320	603	GH121M063F200AX
	120	10	12.5	357	527	GH121M063G125AX
	120	10	16	300	639	GH121M063G160AX
	150	8	20	320	603	GH151M063F200AX
	150	10	16	276	666	GH151M063G160AX
	180	8	25	260	741	GH181M063F250AX
	180	10	16	280	662	GH181M063G160AX
	180	10	20	260	757	GH181M063G200AX
	220	8	25	230	788	GH221M063F250AX
	220	10	16	230	730	GH221M063G160AX
	220	10	20	200	891	GH221M063G200AX
	220	13	16	200	910	GH221M063I160AX
	270	10	20	164	986	GH271M063G200AX
	270	13	20	130	1241	GH271M063I200AX
	330	10	25	126	1242	GH331M063G250AX
	330	13	16	150	1086	GH331M063I160AX
	330	13	20	130	1281	GH331M063I200AX
	330	13	25	100	1611	GH331M063I250AX
	390	13	25	93	1618	GH391M063I250AX
	470	13	20	93	1516	GH471M063I200AX
	470	13	25	90	1698	GH471M063I250AX
	470	13	30	88	1863	GH471M063I300AX
	470	16	20	82	1856	GH471M063J200AX
	560	13	25	87	1727	GH561M063I250AX
	560	13	30	81	1942	GH561M063I300AX
	560	16	20	82	1857	GH561M063J200AX
	680	13	30	71	2081	GH681M063I300AX

See "PACKAGING INFORMATION" to taped or formed products.

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
63	680	13	35	68	2273	GH681M063I350AX
	680	16	20	84	1834	GH681M063J200AX
	820	13	40	66	2453	GH821M063I400AX
	820	16	25	66	2229	GH821M063J250AX
	820	18	20	73	2108	GH821M063K200AX
	1000	13	45	63	2652	GH102M063I450AX
	1000	16	31.5	56	2689	GH102M063J315AX
	1000	18	25	71	2307	GH102M063K250AX
	1200	16	31.5	54	2726	GH122M063J315AX
	1200	18	25	62	2470	GH122M063K250AX
	1500	18	31.5	51	2996	GH152M063K315AX
	1500	18	35.5	48	3256	GH152M063K355AX
	1800	16	40	36	3759	GH182M063J400AX
	1800	18	35.5	42	3480	GH182M063K355AX
	2200	18	40	35	3937	GH222M063K400AX
80	10	5	11	4070	99	GH100M080C110AX
	15	5	11	3200	112	GH150M080C110AX
	22	6.3	11	1878	167	GH220M080E110AX
	27	6.3	11	1742	173	GH270M080E110AX
	33	6.3	11	1367	195	GH330M080E110AX
	39	8	11.5	1202	244	GH390M080F115AX
	47	8	11.5	1019	265	GH470M080F115AX
	56	8	11.5	945	275	GH560M080F115AX
	56	8	16	900	325	GH560M080F160AX
	68	8	16	660	380	GH680M080F160AX
	68	10	12.5	660	388	GH680M080G125AX
	82	8	16	630	389	GH820M080F160AX
	82	10	12.5	660	389	GH820M080G125AX
	100	8	20	450	509	GH101M080F200AX
	100	10	16	450	521	GH101M080G160AX
	100	13	16	440	634	GH101M080I160AX
	120	10	16	430	533	GH121M080G160AX
	150	10	20	345	657	GH151M080G200AX
	150	13	16	400	664	GH151M080I160AX
	180	10	20	330	677	GH181M080G200AX
	180	10	25	320	755	GH181M080G250AX
	180	13	16	340	721	GH181M080I160AX
	220	10	25	310	766	GH221M080G250AX
	220	13	20	310	830	GH221M080I200AX
	270	13	20	270	889	GH271M080I200AX
	270	13	25	250	1018	GH271M080I250AX
	330	13	20	190	1060	GH331M080I200AX
	330	16	20	180	1253	GH331M080J200AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
80	390	13	30	150	1427	GH391M080I300AX
	470	13	30	130	1533	GH471M080I300AX
	470	13	35	120	1711	GH471M080I350AX
	470	16	25	160	1431	GH471M080J250AX
	470	18	20	150	1470	GH471M080K200AX
	560	13	40	140	1684	GH561M080I400AX
	560	16	25	150	1478	GH561M080J250AX
	560	18	20	150	1470	GH561M080K200AX
	680	16	31.5	130	1757	GH681M080J315AX
	680	18	25	150	1581	GH681M080K250AX
	820	16	35.5	120	1929	GH821M080J355AX
	820	18	25	130	1699	GH821M080K250AX
	1000	16	35.5	120	1929	GH102M080J355AX
	1000	16	40	110	2150	GH102M080J400AX
	1000	18	31.5	110	2040	GH102M080K315AX
	1200	16	40	90	2377	GH122M080J400AX
	1200	18	35.5	95	2314	GH122M080K355AX
	1500	16	40	84	2461	GH152M080J400AX
	1500	18	40	83	2641	GH152M080K400AX
	1800	18	40	82	2657	GH182M080K400AX
100	4.7	5	11	5750	54	GH4R7M100C110AX
	5.6	5	11	5000	90	GH5R6M100C110AX
	6.8	5	11	4360	96	GH6R8M100C110AX
	8.2	5	11	3675	105	GH8R2M100C110AX
	10	6.3	11	2625	141	GH100M100E110AX
	10	8	11.5	2200	180	GH100M100F115AX
	15	6.3	11	2313	150	GH150M100E110AX
	22	6.3	11	1850	168	GH220M100E110AX
	22	8	11.5	1375	228	GH220M100F115AX
	27	8	11.5	1310	233	GH270M100F115AX
	33	8	11.5	1238	240	GH330M100F115AX
	39	8	16	1200	281	GH390M100F160AX
	47	8	16	850	335	GH470M100F160AX
	47	10	12.5	810	350	GH470M100G125AX
	47	10	16	780	357	GH470M100G160AX
	56	8	16	760	354	GH560M100F160AX
	56	8	20	680	414	GH560M100F200AX
	56	10	12.5	750	364	GH560M100G125AX
	68	8	20	650	423	GH680M100F200AX
	68	10	16	680	424	GH680M100G160AX
	82	8	20	520	473	GH820M100F200AX
	82	10	16	520	485	GH820M100G160AX
	100	8	30	420	635	GH101M100F300AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Z ▪ Max. Impedance +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
100	100	10	16	450	521	GH101M100G160AX
	100	10	20	420	595	GH101M100G200AX
	100	13	16	430	641	GH101M100I160AX
	100	13	20	380	749	GH101M100I200AX
	120	8	35	360	738	GH121M100F350AX
	120	10	20	400	610	GH121M100G200AX
	120	10	25	370	701	GH121M100G250AX
	120	13	16	400	664	GH121M100I160AX
	150	10	25	330	743	GH151M100G250AX
	150	10	30	310	833	GH151M100G300AX
	150	13	20	330	804	GH151M100I200AX
	180	13	20	290	858	GH181M100I200AX
	180	13	25	280	962	GH181M100I250AX
	220	13	20	270	889	GH221M100I200AX
	220	13	25	250	108	GH221M100I250AX
	220	16	16	270	915	GH221M100J160AX
	220	16	20	250	1063	GH221M100J200AX
	270	10	40	230	1106	GH271M100G400AX
	270	13	30	200	1235	GH271M100I300AX
	270	16	25	200	1280	GH271M100J250AX
	330	13	30	160	1381	GH331M100I300AX
	330	13	35	140	1584	GH331M100I350AX
	330	16	25	140	1530	GH331M100J250AX
	390	13	40	130	1748	GH391M100I400AX
	390	18	25	150	1581	GH391M100K250AX
	470	16	25	150	1478	GH471M100J250AX
	470	16	31.5	110	1910	GH471M100J315AX
	470	18	25	140	1637	GH471M100K250AX
	560	16	35.5	130	1853	GH561M100J355AX
	560	18	31.5	130	1877	GH561M100K315AX
	680	16	35.5	120	1929	GH681M100J355AX
	680	18	35.5	110	2150	GH681M100K355AX
	820	18	35.5	105	2201	GH821M100K355AX
	820	18	40	100	2406	GH821M100K400AX
	1000	18	40	95	2468	GH102M100K400AX

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DIMENSIONS ▪ All dimensions in mm

ø D	5	6.3	8		10	13	16	18
F	2	2.5	3.5		5	5	7.5	7.5
ø d	0.5		L < 20	L ≥ 20	0.6		0.8	
			0.5	0.6				

a	ø D < 16	ø D = 16		ø D = 18	
	1.5	L = 25 to 35.5	L < 25 and L ≥ 40	L = 25 to 31.5	L < 25 and L ≥ 35.5
		1.5	2	1.5	2

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	100/120	400	1k	10k	100k
$C_R \leq 10$	0.4	0.52	0.6	0.92	1
$10 < C_R \leq 100$	0.67	0.8	0.83	0.94	1
$100 < C_R \leq 1000$	0.75	0.84	0.88	0.95	1
$1000 \leq C_R$	0.82	0.87	0.92	0.95	1

For further information please contact sales@capxon.org

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

General Precautions and Guidelines	Packaging Information Liquid Radial
Page 274	Page 151 and following

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

FK SERIES ▪ HIGH VOLTAGE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 HIGH VOLTAGE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ THT type
- Endurance: 105°C ▪ 6 000 hours up to 8 000 hours
- High voltage up to 500V
- High reliability
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics	
Operating Temperature Range		-40 ~ +105°C	-25 ~ +105°C
Rated Voltage Range	V_R	160 ~ 450V DC	500V DC
Surge Voltage	V_S	($V_R \le 315V$): $V_S = 1.15 \cdot V_R$	($V_R > 315V$): $V_S = 1.10 \cdot V_R$
Capacitance Range	C_R	1 ~ 330µF	4.7 ~ 120µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)	
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ $0.1 \cdot C_R \cdot V_R$ + 40µA ▪ After 1 minute [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]	

Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	160	200	250	350	400	450	500
		tanδ (%)	15	15	15	20	20	20	24

Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	160	200	250	350	400	450	500
		Z-25°C/Z+20°C	3	3	3	5	5	6	6
		Z-40°C/Z+20°C	6	6	6	6	6	-	-

Lifetime Test			
Endurance 105°C (V_R & I_R applied)	Test	**6 000 hours**	ø D 6.3 ~ 8 mm
		6 000 hours	ø D 10 x L 9 mm
		8 000 hours	ø D 10 x L 12.5 mm
		8 000 hours	ø D > 10 mm
	△C/C_R	≤ ±20% of initial measured value	
	tanδ	≤ 200% of initial specified value	
	I_{Leak}	≤ the initial specified value	
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**	
	△C/C_R	≤ ±20% of initial measured value	
	tanδ	≤ 200% of initial specified value	
	I_{Leak}	≤ the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4		

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
160	1	6.3	11	20.4	51	FK010M160E110AX
	1	6.3	9	18.4	46	FK010M160E090AX
	1.5	6.3	11	22.4	56	FK1R5M160E110AX
	1.5	6.3	9	20.4	51	FK1R5M160E090AX
	2.2	6.3	11	28.4	71	FK2R2M160E110AX
	2.2	6.3	9	26	65	FK2R2M160E090AX
	3.3	6.3	11	32.4	81	FK3R3M160E110AX
	3.3	6.3	9	29.2	73	FK3R3M160E090AX
	4.7	6.3	11	36.4	91	FK4R7M160E110AX
	4.7	6.3	9	34.4	86	FK4R7M160E090AX
	5.6	6.3	11	38.4	96	FK5R6M160E110AX
	5.6	6.3	9	36.4	91	FK5R6M160E090AX
	5.6	8	11.5	44	110	FK5R6M160F115AX
	6.8	6.3	11	44	110	FK6R8M160E110AX
	6.8	8	11.5	52	130	FK6R8M160F115AX
	6.8	8	9	44	110	FK6R8M160F090AX
	8.2	8	11.5	60	150	FK8R2M160F115AX
	8.2	8	9	56	140	FK8R2M160F090AX
	10	8	11.5	96	240	FK100M160F115AX
	10	8	16	110	275	FK100M160F160AX
	10	8	9	88	220	FK100M160F090AX
	10	10	12.5	120	300	FK100M160G125AX
	15	8	16	110	275	FK150M160F160AX
	15	10	9	100	250	FK150M160G090AX
	22	8	20	180	450	FK220M160F200AX
	22	10	12.5	160	400	FK220M160G125AX
	22	10	16	180	450	FK220M160G160AX
	33	10	16	230	575	FK330M160G160AX
	33	10	20	250	625	FK330M160G200AX
	47	10	16	300	750	FK470M160G160AX
	47	10	20	300	750	FK470M160G200AX
	68	13	20	470	1175	FK680M160I200AX
	82	13	20	520	1300	FK820M160I200AX
	100	13	25	620	1395	FK101M160I250AX
	100	16	20	630	1418	FK101M160J200AX
	150	16	25	840	1890	FK151M160J250AX
	220	18	25	1090	2453	FK221M160K250AX
	270	16	31.5	1260	2835	FK271M160J315AX
	330	18	31.5	1400	3150	FK331M160K315AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
200	1	6.3	11	22.8	57	FK010M200E110AX
	1	6.3	9	21.2	53	FK010M200E090AX
	1.5	6.3	11	24.4	61	FK1R5M200E110AX
	1.5	6.3	9	22.8	57	FK1R5M200E090AX
	2.2	6.3	11	30	75	FK2R2M200E110AX
	2.2	6.3	9	27.6	69	FK2R2M200E090AX
	3.3	6.3	11	38.8	97	FK3R3M200E110AX
	3.3	6.3	9	34.8	87	FK3R3M200E090AX
	4.7	6.3	11	52	130	FK4R7M200E110AX
	4.7	8	9	52	130	FK4R7M200F090AX
	5.6	6.3	11	56	140	FK5R6M200E110AX
	5.6	8	11.5	64	160	FK5R6M200F115AX
	5.6	8	9	56	140	FK5R6M200F090AX
	6.8	8	11.5	76	190	FK6R8M200F115AX
	6.8	8	9	64	160	FK6R8M200F090AX
	8.2	8	11.5	84	210	FK8R2M200F115AX
	10	8	11.5	110	275	FK100M200F115AX
	10	8	16	120	300	FK100M200F160AX
	10	10	12.5	130	325	FK100M200G125AX
	10	10	9	110	275	FK100M200G090AX
	22	8	20	220	550	FK220M200F200AX
	22	10	16	220	550	FK220M200G160AX
	22	10	20	250	625	FK220M200G200AX
	33	10	16	260	650	FK330M200G160AX
	33	10	20	280	700	FK330M200G200AX
	47	13	16	360	900	FK470M200I160AX
	47	13	20	390	975	FK470M200I200AX
	68	13	20	470	1175	FK680M200I200AX
	68	13	25	520	1300	FK680M200I250AX
	100	13	25	630	1418	FK101M200I250AX
	100	16	25	680	1530	FK101M200J250AX
	150	18	25	900	2025	FK151M200K250AX
	220	16	31.5	1090	2453	FK221M200J315AX
250	1	6.3	11	23.6	59	FK010M250E110AX
	1	6.3	9	21.2	53	FK010M250E090AX
	1.5	6.3	11	24.4	61	FK1R5M250E110AX
	1.5	6.3	9	22.8	57	FK1R5M250E090AX
	2.2	6.3	11	30.4	76	FK2R2M250E110AX
	2.2	6.3	9	27.6	69	FK2R2M250E090AX
	2.2	8	11.5	38	95	FK2R2M250F115AX
	3.3	6.3	11	40	100	FK3R3M250E110AX
	3.3	6.3	9	34.8	87	FK3R3M250E090AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
250	3.3	8	11.5	56	140	FK3R3M250F115AX
	4.7	8	11.5	64	160	FK4R7M250F115AX
	4.7	8	16	72	180	FK4R7M250F160AX
	4.7	8	9	52	130	FK4R7M250F090AX
	4.7	10	12.5	76	190	FK4R7M250G125AX
	5.6	8	11.5	72	180	FK5R6M250F115AX
	5.6	8	9	64	160	FK5R6M250F090AX
	6.8	8	11.5	80	200	FK6R8M250F115AX
	6.8	8	16	92	230	FK6R8M250F160AX
	6.8	10	12.5	100	250	FK6R8M250G125AX
	8.2	8	16	88	220	FK8R2M250F160AX
	8.2	10	9	80	200	FK8R2M250G090AX
	10	8	16	120	300	FK100M250F160AX
	10	10	12.5	120	300	FK100M250G125AX
	15	10	16	130	325	FK150M250G160AX
	22	10	16	180	450	FK220M250G160AX
	22	10	20	200	500	FK220M250G200AX
	33	10	20	270	675	FK330M250G200AX
	33	13	16	270	675	FK330M250I160AX
	33	13	20	320	800	FK330M250I200AX
	47	13	20	400	1000	FK470M250I200AX
	47	13	25	430	1075	FK470M250I250AX
	56	13	25	500	1250	FK560M250I250AX
	68	16	25	560	1400	FK680M250J250AX
	100	16	25	680	1530	FK101M250J250AX
	150	16	31.5	900	2025	FK151M250J315AX
	220	18	31.5	1130	2543	FK221M250K315AX
350	1	6.3	11	26.4	66	FK010M350E110AX
	1	6.3	9	21.2	53	FK010M350E090AX
	1	8	11.5	30.8	77	FK010M350F115AX
	1.5	6.3	11	30	75	FK1R5M350E110AX
	1.5	6.3	9	26.4	66	FK1R5M350E090AX
	2.2	6.3	11	38	95	FK2R2M350E110AX
	2.2	8	11.5	48	120	FK2R2M350F115AX
	2.2	8	9	35.2	88	FK2R2M350F090AX
	3.3	8	11.5	56	140	FK3R3M350F115AX
	3.3	8	9	48	120	FK3R3M350F090AX
	3.3	10	12.5	64	160	FK3R3M350G125AX
	4.7	8	16	72	180	FK4R7M350F160AX
	4.7	10	12.5	76	190	FK4R7M350G125AX
	4.7	10	9	64	160	FK4R7M350G090AX
	5.6	8	16	84	210	FK5R6M350F160AX

See "PACKAGING INFORMATION" to taped or formed products.

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
350	5.6	10	12.5	88	220	FK5R6M350G125AX
	6.8	8	20	110	275	FK6R8M350F200AX
	6.8	10	16	110	275	FK6R8M350G160AX
	8.2	8	20	130	325	FK8R2M350F200AX
	10	8	20	130	325	FK100M350F200AX
	10	10	16	130	325	FK100M350G160AX
	15	10	20	150	375	FK150M350G200AX
	22	13	20	260	650	FK220M350I200AX
	33	13	25	380	950	FK330M350I250AX
	47	16	20	430	1075	FK470M350J200AX
	47	16	25	460	1150	FK470M350J250AX
	68	18	20	560	1400	FK680M350K200AX
	68	18	25	600	1500	FK680M350K250AX
	82	18	25	610	1525	FK820M350K250AX
	100	16	31.5	720	1620	FK101M350J315AX
	150	18	35.5	960	2160	FK151M350K355AX
400	1	6.3	11	30.4	76	FK010M400E110AX
	1	6.3	9	25.2	63	FK010M400E090AX
	1.5	6.3	9	30.4	76	FK1R5M400E090AX
	1.5	8	11.5	36.4	91	FK1R5M400F115AX
	2.2	6.3	11	44	110	FK2R2M400E110AX
	2.2	8	11.5	48	120	FK2R2M400F115AX
	2.2	8	9	40	100	FK2R2M400F090AX
	3.3	8	11.5	60	150	FK3R3M400F115AX
	3.3	8	9	52	130	FK3R3M400F090AX
	4.7	8	11.5	80	200	FK4R7M400F115AX
	4.7	8	16	88	220	FK4R7M400F160AX
	4.7	10	12.5	92	230	FK4R7M400G125AX
	4.7	10	9	72	180	FK4R7M400G090AX
	5.6	8	16	88	220	FK5R6M400F160AX
	5.6	10	12.5	100	250	FK5R6M400G125AX
	6.8	8	16	110	275	FK6R8M400F160AX
	6.8	10	12.5	110	275	FK6R8M400G125AX
	8.2	8	16	110	275	FK8R2M400F160AX
	8.2	10	12.5	120	300	FK8R2M400G125AX
	8.2	10	16	130	325	FK8R2M400G160AX
	10	8	20	140	350	FK100M400F200AX
	10	10	16	140	350	FK100M400G160AX
	10	10	20	160	400	FK100M400G200AX
	15	10	20	190	475	FK150M400G200AX
	15	13	16	200	500	FK150M400I160AX
	22	13	20	260	650	FK220M400I200AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
400	33	13	25	360	900	FK330M400I250AX
	33	16	20	360	900	FK330M400J200AX
	47	16	25	470	1175	FK470M400J250AX
	56	18	25	560	1400	FK560M400K250AX
	68	18	25	590	1475	FK680M400K250AX
	82	16	31.5	630	1575	FK820M400J315AX
	100	18	31.5	770	1733	FK101M400K315AX
	120	18	31.5	830	1868	FK121M400K315AX
	150	18	35.5	930	2093	FK151M400K355AX
450	1	6.3	11	30.4	76	FK010M450E110AX
	1	6.3	9	25.2	63	FK010M450E090AX
	1.5	8	11.5	36.4	91	FK1R5M450F115AX
	2.2	8	11.5	48	120	FK2R2M450F115AX
	2.2	8	16	56	140	FK2R2M450F160AX
	2.2	8	9	40	100	FK2R2M450F090AX
	2.2	10	12.5	60	150	FK2R2M450G125AX
	3.3	8	11.5	64	160	FK3R3M450F115AX
	3.3	10	12.5	80	200	FK3R3M450G125AX
	3.3	10	9	68	170	FK3R3M450G090AX
	4.7	8	16	100	250	FK4R7M450F160AX
	4.7	10	12.5	100	250	FK4R7M450G125AX
	4.7	10	16	110	275	FK4R7M450G160AX
	5.6	10	16	110	275	FK5R6M450G160AX
	6.8	8	20	120	300	FK6R8M450F200AX
	6.8	10	16	130	325	FK6R8M450G160AX
	6.8	10	20	140	350	FK6R8M450G200AX
	8.2	10	20	140	350	FK8R2M450G200AX
	10	10	20	160	400	FK100M450G200AX
	15	13	20	220	550	FK150M450I200AX
	22	13	25	290	725	FK220M450I250AX
	22	16	20	290	725	FK220M450J200AX
	33	13	25	360	900	FK330M450I250AX
	33	16	25	390	975	FK330M450J250AX
	47	16	25	470	1175	FK470M450J250AX
	47	18	25	500	1250	FK470M450K250AX
	68	16	31.5	630	1575	FK680M450J315AX
	68	18	25	590	1475	FK680M450K250AX
	82	18	31.5	680	1700	FK820M450K315AX
	100	18	35.5	800	1800	FK101M450K355AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
500	4.7	10	20	88	220	FK4R7M500G200AX
	5.6	10	20	92	230	FK5R6M500G200AX
	6.8	10	20	130	325	FK6R8M500G200AX
	8.2	10	20	130	325	FK8R2M500G200AX
	10	13	20	140	350	FK100M500I200AX
	15	13	25	180	450	FK150M500I250AX
	22	16	25	230	575	FK220M500J250AX
	33	18	25	390	975	FK330M500K250AX
	47	16	31.5	500	1250	FK470M500J315AX
	56	18	31.5	570	1425	FK560M500K315AX
	68	18	35.5	630	1575	FK680M500K355AX
	82	18	40	680	1700	FK820M500K400AX
	100	18	45	800	1800	FK101M500K450AX
	120	22	45	840	1890	FK121M500M450AX

See "PACKAGING INFORMATION" to taped or formed products.

DIMENSIONS ▪ All dimensions in mm

ø D	6.3	8		10	13	16	18	22
F	2.5	3.5		5	5	7.5	7.5	10
ø d	0.5	L < 20	L ≥ 20	0.6		0.8		
		0.5	0.6					

a	ø D < 16	ø D = 16		ø D = 18		ø D > 18
	1.5	L = 25 to 35.5	L < 25 and L ≥ 40	L = 25 to 31.5	L < 25 and L ≥ 35.5	2
		1.5	2	1.5	2	

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	100/120	1k	10k	100k
1 ~ 82	1	1.75	2.25	2.5
≥ 100	1	1.67	2.05	2.25

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

General Precautions and Guidelines	Packaging Information Liquid Radial
Page 274	Page 151 and following

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

FL SERIES ▪ LONG LIFE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 HIGH VOLTAGE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ THT type
- Endurance: 105°C ▪ 8 000 hours up to 12 000 hours
- High voltage up to 500V
- High reliability
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics									
Operating Temperature Range		-40 ~ +105°C					-25 ~ +105°C				
Rated Voltage Range	V_R	160 ~ 450V DC					500V DC				
Surge Voltage	V_S	($V_R \le 315V$): $V_S = 1.15 \cdot V_R$					($V_R > 315V$): $V_S = 1.10 \cdot V_R$				
Capacitance Range	C_R	1 ~ 680µF					10 ~ 68µF				
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)									
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ $0.1 \cdot C_R \cdot V_R$ + 40µA ▪ After 1 minute [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]									
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	160	200	220	250	350	400	420	450	500
		tanδ (%)	15	15	15	15	20	20	20	20	24
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	160	200	220	250	350	400	420	450	500
		Z-25°C/Z+20°C	3	3	3	3	5	5	6	6	6
		Z-40°C/Z+20°C	6	6	6	6	6	6	-	-	-

Lifetime Test			
Endurance 105°C (V_R & I_R applied)	Test	**8 000 hours**	ø D = 6.3 ~ 8 mm
		10 000 hours	ø D = 10 mm
		12 000 hours	ø D ≥ 13 mm ▪ ≤450V
		10 000 hours	ø D ≥ 13 mm ▪ 500V
	△C/C_R	≤ ±20% of initial measured value	
	tanδ	≤ 200% of initial specified value	
	I_{Leak}	≤ the initial specified value	
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**	
	△C/C_R	≤ ±20% of initial measured value	
	tanδ	≤ 200% of initial specified value	
	I_{Leak}	≤ the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4		

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
160	1	6.3	11	18.4	46	FL010M160E110AX
	1.5	6.3	11	20.4	51	FL1R5M160E110AX
	2.2	6.3	11	24.8	62	FL2R2M160E110AX
	3.3	6.3	11	37.2	93	FL3R3M160E110AX
	4.7	8	11.5	38	95	FL4R7M160F115AX
	5.6	8	11.5	40	100	FL5R6M160F115AX
	6.8	8	11.5	50	125	FL6R8M160F115AX
	6.8	8	16	59.2	148	FL6R8M160F160AX
	10	8	11.5	72	180	FL100M160F115AX
	15	8	16	100	250	FL150M160F160AX
	15	10	12.5	100	250	FL150M160G125AX
	22	10	16	140	350	FL220M160G160AX
	22	10	20	150	375	FL220M160G200AX
	33	10	16	190	475	FL330M160G160AX
	33	10	20	210	525	FL330M160G200AX
	39	10	16	240	600	FL390M160G160AX
	47	10	20	300	750	FL470M160G200AX
	56	10	20	310	775	FL560M160G200AX
	68	13	20	480	1200	FL680M160I200AX
	68	13	25	520	1300	FL680M160I250AX
	82	10	25	440	1100	FL820M160G250AX
	82	13	20	510	1275	FL820M160I200AX
	100	13	20	590	1328	FL101M160I200AX
	100	13	25	630	1418	FL101M160I250AX
	100	16	20	630	1418	FL101M160J200AX
	150	13	25	730	1643	FL151M160I250AX
	150	16	20	770	1733	FL151M160J200AX
	150	16	25	820	1845	FL151M160J250AX
	180	16	20	870	1958	FL181M160J200AX
	220	16	25	1020	2295	FL221M160J250AX
	220	18	20	1000	2250	FL221M160K200AX
	220	18	25	1040	2340	FL221M160K250AX
	330	16	31.5	1350	3038	FL331M160J315AX
	330	18	31.5	1380	3105	FL331M160K315AX
	390	16	35.5	1510	3398	FL391M160J355AX
	470	16	40	1710	3848	FL471M160J400AX
	470	18	35.5	1720	3870	FL471M160K355AX
	560	18	40	1910	4298	FL561M160K400AX
	680	18	45	2130	4793	FL681M160K450AX

See "PACKAGING INFORMATION" to taped or formed products.

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
200	1	6.3	11	26	65	FL010M200E110AX
	1.5	6.3	11	28	70	FL1R5M200E110AX
	2.2	6.3	11	34	85	FL2R2M200E110AX
	3.3	6.3	11	46	115	FL3R3M200E110AX
	4.7	8	11.5	64	160	FL4R7M200F115AX
	5.6	8	11.5	66.4	166	FL5R6M200F115AX
	6.8	8	11.5	70	175	FL6R8M200F115AX
	6.8	10	12.5	76	190	FL6R8M200G125AX
	10	8	16	92	230	FL100M200F160AX
	10	10	16	100	250	FL100M200G160AX
	12	10	12.5	100	250	FL120M200G125AX
	15	8	20	140	350	FL150M200F200AX
	22	10	16	180	450	FL220M200G160AX
	22	10	20	200	500	FL220M200G200AX
	27	10	16	200	500	FL270M200G160AX
	33	10	20	260	650	FL330M200G200AX
	33	13	20	300	750	FL330M200I200AX
	47	10	20	310	775	FL470M200G200AX
	47	13	20	400	1000	FL470M200I200AX
	56	10	25	380	950	FL560M200G250AX
	68	13	20	470	1175	FL680M200I200AX
	68	13	25	520	1300	FL680M200I250AX
	68	16	20	520	1300	FL680M200J200AX
	82	16	20	560	1400	FL820M200J200AX
	100	13	25	640	1440	FL101M200I250AX
	100	16	20	670	1508	FL101M200J200AX
	100	16	25	690	1553	FL101M200J250AX
	100	18	20	710	1598	FL101M200K200AX
	120	16	20	720	1620	FL121M200J200AX
	150	16	20	790	1778	FL151M200J200AX
	150	16	25	840	1890	FL151M200J250AX
	150	18	25	890	2003	FL151M200K250AX
	180	16	25	910	2048	FL181M200J250AX
	180	18	20	910	2048	FL181M200K200AX
	220	18	25	1050	2363	FL221M200K250AX
	220	18	31.5	1160	2610	FL221M200K315AX
	270	16	35.5	1250	2813	FL271M200J355AX
	330	16	40	1430	3218	FL331M200J400AX
	330	18	31.5	1400	3150	FL331M200K315AX
	330	18	35.5	1440	3240	FL331M200K355AX
	390	18	35.5	1520	3420	FL391M200K355AX
	470	18	40	1750	3938	FL471M200K400AX
	470	18	45	1820	4095	FL471M200K450AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
220	27	10	16	200	500	FL270M220G160AX
	39	10	20	270	675	FL390M220G200AX
	68	13	20	480	1200	FL680M220I200AX
	150	16	25	850	1913	FL151M220J250AX
	220	16	31.5	1110	2498	FL221M220J315AX
	270	18	31.5	1260	2835	FL271M220K315AX
	330	16	45	1450	3263	FL331M220J450AX
	390	18	45	1620	3645	FL391M220K450AX
	470	18	50	1840	4140	FL471M220K500AX
250	1	6.3	11	26	65	FL010M250E110AX
	1.5	6.3	11	28	70	FL1R5M250E110AX
	2.2	6.3	11	34	85	FL2R2M250E110AX
	3.3	6.3	11	46	115	FL3R3M250E110AX
	3.3	8	11.5	60	150	FL3R3M250F115AX
	4.7	8	11.5	68	170	FL4R7M250F115AX
	5.6	8	11.5	76	190	FL5R6M250F115AX
	6.8	8	16	96	240	FL6R8M250F160AX
	6.8	10	12.5	96	240	FL6R8M250G125AX
	8.2	8	20	120	300	FL8R2M250F200AX
	10	8	16	120	300	FL100M250F160AX
	10	10	16	130	325	FL100M250G160AX
	15	8	20	150	375	FL150M250F200AX
	22	10	16	200	500	FL220M250G160AX
	22	10	20	220	550	FL220M250G200AX
	22	13	20	250	625	FL220M250I200AX
	33	10	20	270	675	FL330M250G200AX
	33	13	16	270	675	FL330M250I160AX
	33	13	20	320	800	FL330M250I200AX
	47	13	20	400	1000	FL470M250I200AX
	47	13	25	410	1025	FL470M250I250AX
	47	16	20	450	1125	FL470M250J200AX
	56	13	20	430	1075	FL560M250I200AX
	68	13	25	500	1250	FL680M250I250AX
	68	16	20	530	1325	FL680M250J200AX
	68	16	25	570	1425	FL680M250J250AX
	68	18	20	570	1425	FL680M250K200AX
	82	13	25	570	1425	FL820M250I250AX
	82	16	20	580	1450	FL820M250J200AX
	100	16	25	760	1710	FL101M250J250AX
	100	16	31.5	800	1800	FL101M250J315AX
	100	18	20	720	1620	FL101M250K200AX
	100	18	25	780	1755	FL101M250K250AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
250	120	16	25	780	1755	FL121M250J250AX
	120	18	20	780	1755	FL121M250K200AX
	150	18	25	890	2003	FL151M250K250AX
	150	18	31.5	980	2205	FL151M250K315AX
	180	16	31.5	1020	2295	FL181M250J315AX
	180	18	25	980	2205	FL181M250K250AX
	220	16	35.5	1130	2543	FL221M250J355AX
	220	18	31.5	1130	2543	FL221M250K315AX
	270	16	40	1290	2903	FL271M250J400AX
	270	18	35.5	1310	2948	FL271M250K355AX
	330	18	40	1460	3285	FL331M250K400AX
350	1	8	11.5	30	75	FL010M350F115AX
	1.5	8	11.5	32	80	FL1R5M350F115AX
	2.2	10	12.5	44	110	FL2R2M350G125AX
	3.3	10	12.5	60	150	FL3R3M350G125AX
	4.7	10	16	80	200	FL4R7M350G160AX
	6.8	10	16	100	250	FL6R8M350G160AX
	10	10	20	130	325	FL100M350G200AX
	15	10	20	160	400	FL150M350G200AX
	18	10	20	180	450	FL180M350G200AX
	22	10	20	200	500	FL220M350G200AX
	22	13	20	260	650	FL220M350I200AX
	27	10	25	260	650	FL270M350G250AX
	33	13	20	330	825	FL330M350I200AX
	33	13	25	360	900	FL330M350I250AX
	33	16	20	380	950	FL330M350J200AX
	47	13	25	430	1075	FL470M350I250AX
	47	16	20	440	1100	FL470M350J200AX
	47	18	20	470	1175	FL470M350K200AX
	56	16	20	480	1200	FL560M350J200AX
	68	16	25	570	1425	FL680M350J250AX
	68	16	31.5	620	1550	FL680M350J315AX
	68	18	20	570	1425	FL680M350K200AX
	68	18	25	620	1550	FL680M350K250AX
	82	16	25	620	1550	FL820M350J250AX
	82	18	25	640	1600	FL820M350K250AX
	100	16	31.5	800	1800	FL101M350J315AX
	100	18	25	780	1755	FL101M350K250AX
	120	16	35.5	860	1935	FL121M350J355AX
	120	18	31.5	870	1958	FL121M350K315AX
	150	16	40	1020	2295	FL151M350J400AX
	150	18	35.5	1020	2295	FL151M350K355AX
	180	18	40	1080	2430	FL181M350K400AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
400	1	8	9	26	65	FL010M400F090AX
	1	8	11.5	30	75	FL010M400F115AX
	1.5	8	9	30.4	76	FL1R5M400F090AX
	1.5	8	11.5	36.4	91	FL1R5M400F115AX
	1.5	8	16	40.4	101	FL1R5M400F160AX
	2.2	8	11.5	40	100	FL2R2M400F115AX
	2.2	8	16	56	140	FL2R2M400F160AX
	3.3	8	11.5	52	130	FL3R3M400F115AX
	3.3	8	16	60	150	FL3R3M400F160AX
	3.3	8	20	61.2	153	FL3R3M400F200AX
	3.3	10	12.5	60.4	151	FL3R3M400G125AX
	3.3	10	16	72.8	182	FL3R3M400G160AX
	3.9	8	16	66	165	FL3R9M400F160AX
	4.7	8	11.5	72	180	FL4R7M400F115AX
	4.7	8	20	92	230	FL4R7M400F200AX
	4.7	10	16	96	240	FL4R7M400G160AX
	5.6	8	20	100	250	FL5R6M400F200AX
	5.6	10	16	100	250	FL5R6M400G160AX
	5.6	10	20	110	275	FL5R6M400G200AX
	6.8	8	20	120	300	FL6R8M400F200AX
	6.8	10	16	120	300	FL6R8M400G160AX
	8.2	10	16	120	300	FL8R2M400G160AX
	8.2	10	20	130	325	FL8R2M400G200AX
	10	10	16	130	325	FL100M400G160AX
	10	10	20	140	350	FL100M400G200AX
	15	10	20	180	450	FL150M400G200AX
	15	13	20	200	500	FL150M400I200AX
	22	13	20	280	700	FL220M400I200AX
	22	13	25	310	775	FL220M400I250AX
	22	16	20	320	800	FL220M400J200AX
	27	13	20	300	750	FL270M400I200AX
	33	13	25	330	825	FL330M400I250AX
	33	16	20	340	850	FL330M400J200AX
	39	13	25	390	975	FL390M400I250AX
	47	16	25	480	1200	FL470M400J250AX
	47	16	31.5	530	1325	FL470M400J315AX
	47	18	20	470	1175	FL470M400K200AX
	47	18	25	510	1275	FL470M400K250AX
	56	16	25	500	1250	FL560M400J250AX
	56	18	20	500	1250	FL560M400K200AX
	68	16	25	580	1450	FL680M400J250AX
	68	18	25	630	1575	FL680M400K250AX
	68	18	31.5	700	1750	FL680M400K315AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
400	82	16	31.5	660	1650	FL820M400J315AX
	82	18	25	650	1625	FL820M400K250AX
	82	18	31.5	710	1775	FL820M400K315AX
	100	16	35.5	760	1710	FL101M400J355AX
	100	18	31.5	770	1733	FL101M400K315AX
	120	16	40	870	1958	FL121M400J400AX
	120	18	35.5	870	1958	FL121M400K355AX
	150	18	40	1020	2295	FL151M400K400AX
	180	18	45	1100	2475	FL181M400K450AX
420	6.8	10	16	120	300	FL6R8M420G160AX
	12	10	20	150	375	FL120M420G200AX
	15	10	25	190	475	FL150M420G250AX
	22	13	20	290	725	FL220M420I200AX
	27	13	25	340	850	FL270M420I250AX
	33	16	20	390	975	FL330M420J200AX
	47	16	25	500	1250	FL470M420J250AX
	47	18	20	500	1250	FL470M420K200AX
	68	16	31.5	650	1625	FL680M420J315AX
	68	18	25	620	1550	FL680M420K250AX
	82	16	35.5	730	1825	FL820M420J355AX
	82	18	31.5	730	1825	FL820M420K315AX
	100	16	40	830	1868	FL101M420J400AX
	100	18	35.5	840	1890	FL101M420K355AX
	120	18	40	930	2093	FL121M420K400AX
	120	18	45	950	2138	FL121M420K450AX
	150	18	50	1060	2385	FL151M420K500AX
450	1	8	9	26	65	FL010M450F090AX
	1	8	11.5	33.2	83	FL010M450F115AX
	1.5	8	11.5	36.8	92	FL1R5M450F115AX
	1.5	10	9	37.2	93	FL1R5M450G090AX
	1.8	8	11.5	38.8	97	FL1R8M450F115AX
	1.8	10	9	39.2	98	FL1R8M450G090AX
	2.2	8	16	56.4	141	FL2R2M450F160AX
	3.3	8	16	61.2	153	FL3R3M450F160AX
	4.7	10	16	92	230	FL4R7M450G160AX
	5.6	10	16	100	250	FL5R6M450G160AX
	6.8	10	16	130	325	FL6R8M450G160AX
	6.8	10	20	140	350	FL6R8M450G200AX
	8.2	10	20	140	350	FL8R2M450G200AX
	10	10	20	140	350	FL100M450G200AX
	10	10	25	160	400	FL100M450G250AX
	10	13	16	150	375	FL100M450I160AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
450	15	10	25	190	475	FL150M450G250AX
	15	13	20	200	500	FL150M450I200AX
	18	13	20	260	650	FL180M450I200AX
	22	13	25	290	725	FL220M450I250AX
	22	16	20	300	750	FL220M450J200AX
	22	18	20	320	800	FL220M450K200AX
	27	13	25	340	850	FL270M450I250AX
	33	16	20	390	975	FL330M450J200AX
	33	16	25	420	1050	FL330M450J250AX
	33	16	31.5	460	1150	FL330M450J315AX
	33	18	20	420	1050	FL330M450K200AX
	33	18	25	450	1125	FL330M450K250AX
	39	18	20	440	1100	FL390M450K200AX
	47	16	25	500	1250	FL470M450J250AX
	47	16	31.5	560	1400	FL470M450J315AX
	47	18	25	540	1350	FL470M450K250AX
	47	18	31.5	590	1475	FL470M450K315AX
	56	16	31.5	590	1475	FL560M450J315AX
	56	18	25	560	1400	FL560M450K250AX
	56	18	31.5	630	1575	FL560M450K315AX
	68	16	35.5	660	1650	FL680M450J355AX
	68	18	31.5	660	1650	FL680M450K315AX
	82	16	40	750	1875	FL820M450J400AX
	82	18	31.5	720	1800	FL820M450K315AX
	82	18	35.5	750	1875	FL820M450K355AX
	100	18	35.5	840	1890	FL101M450K355AX
	100	18	40	900	2025	FL101M450K400AX
	120	18	45	950	2138	FL121M450K450AX
	150	18	50	1070	2408	FL151M450K500AX
500	10	13	20	130	325	FL100M500I200AX
	12	13	20	140	350	FL120M500I200AX
	15	13	25	180	450	FL150M500I250AX
	15	16	20	180	450	FL150M500J200AX
	22	16	25	230	575	FL220M500J250AX
	22	18	20	220	550	FL220M500K200AX
	33	16	31.5	290	725	FL330M500J315AX
	33	18	25	280	700	FL330M500K250AX
	47	18	31.5	360	900	FL470M500K315AX
	56	18	35.5	390	975	FL560M500K355AX
	68	18	40	420	1050	FL680M500K400AX

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DIMENSIONS ▪ All dimensions in mm

ø D	6.3	8		10	13	16	18
F	2.5	3.5		5	5	7.5	7.5
ø d	0.5	L < 20	L ≥ 20	0.6		0.8	
		0.5	0.6				

a	ø D < 16	ø D = 16		ø D = 18	
	1.5	L = 25 to 35.5	L < 25 and L ≥ 40	L = 25 to 31.5	L < 25 and L ≥ 35.5
		1.5	2	1.5	2

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

CAP (µF) / Frequency (Hz)	100/120	1k	10k	100k
1 ~ 82	1	1.75	2.25	2.5
≥ 100	1	1.67	2.05	2.25

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

General Precautions and Guidelines	Packaging Information Liquid Radial
Page 274	Page 151 and following

For further information please contact sales@capxon.org

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

GT SERIES ▪ MINIATURIZED, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 MINIATURIZED LONG LIFE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ THT type
- Endurance: 105°C ▪ 10 000 hours
- Miniaturized for space critical applications
- High reliability
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics							
Operating Temperature Range		-40 ~ +105°C							
Rated Voltage Range	V_R	10 ~ 100V DC							
Surge Voltage	V_S	$V_S = 1.15 \cdot V_R$							
Capacitance Range	C_R	1 ~ 330µF							
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)							
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ $0.01 \cdot C_R \cdot V_R$ or 3µA, whichever is greater ▪ After 2 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]							
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	10	16	25	35	50	63	100
		tanδ (%)	45	35	30	22	19	17	15
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	10	16	25	35	50	63	100
		Z-25°C/Z+20°C	10	8	6	6	5	5	5
		Z-40°C/Z+20°C	14	10	8	8	8	8	6

Lifetime Test		
Endurance 105°C (V_R & I_R applied)	Test	**10 000 hours**
	△C/C_R	≤ ±25% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±25% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
10	100	5	11	140	GT101M010C110AX
	220	6.3	11	220	GT221M010E110AX
	330	8	11.5	340	GT331M010F115AX
16	47	5	11	140	GT470M016C110AX
	100	6.3	11	220	GT101M016E110AX
	220	8	11.5	340	GT221M016F115AX
25	33	5	11	140	GT330M025C110AX
	47	5	11	140	GT470M025C110AX
	100	6.3	11	220	GT101M025E110AX
35	33	5	11	90	GT330M035C110AX
	47	6.3	11	220	GT470M035E110AX
	100	8	11.5	340	GT101M035F115AX
50	1	5	11	26	GT010M050C110AX
	2.2	5	11	36	GT2R2M050C110AX
	3.3	5	11	75	GT3R3M050C110AX
	4.7	5	11	85	GT4R7M050C110AX
	10	5	11	95	GT100M050C110AX
	22	5	11	140	GT220M050C110AX
	33	6.3	11	200	GT330M050E110AX
	47	6.3	11	200	GT470M050E110AX
	100	8	11.5	280	GT101M050F115AX
63	10	5	11	85	GT100M063C110AX
	22	6.3	11	180	GT220M063E110AX
	33	6.3	11	180	GT330M063E110AX
	47	8	11.5	250	GT470M063F115AX
100	1	5	11	40	GT010M100C110AX
	2.2	5	11	50	GT2R2M100C110AX
	3.3	5	11	60	GT3R3M100C110AX
	4.7	5	11	70	GT4R7M100C110AX
	10	6.3	11	150	GT100M100E110AX
	22	8	11.5	230	GT220M100F115AX

See "PACKAGING INFORMATION" to taped or formed products.

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	100/120	1k	10k	100k
1 ~ 10	0.42	0.6	0.8	1
22 ~ 33	0.55	0.75	0.9	1
47 ~ 330	0.7	0.85	0.95	1

For further information please contact sales@capxon.org

DIMENSIONS ▪ All dimensions in mm

ø D	5	6.3	8
F	2	2.5	3.5
ø d	0.5	0.5	0.5
a	1.5	1.5	1.5

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

General Precautions and Guidelines	Packaging Information Liquid Radial
Page 274	Page 151 and following

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

TH SERIES ▪ HIGH TEMP., AUTOMOTIVE 125°C TYPE

KEY FEATURES

AEC-Q 200 | HIGH VOLTAGE | HIGH TEMPERATURE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ THT type
- Endurance: 125°C ▪ 1 000 hours up to 3 000 hours
- Especially for applications with high ambient temperatures
- High reliability
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics		
Operating Temperature Range		-40 ~ +125°C		-25 ~ +125°C
Rated Voltage Range	V_R	10 ~ 400V DC		450V DC
Surge Voltage	V_S	($V_R \le 315V$): $V_S = 1.15 \cdot V_R$		($V_R > 315V$): $V_S = 1.10 \cdot V_R$
Capacitance Range	C_R	0.47 ~ 8200µF		1 ~ 47µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)		
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	10 ~ 100V		≤ $0.01C_R \cdot V_R$ or 3µA (After 2 minutes)
		160 ~ 450V	$C_R \cdot V_R \le 1000$	≤ $0.1C_R \cdot V_R$ + 40µA (After 1 minute)
			$C_R \cdot V_R > 1000$	≤ $0.04C_R \cdot V_R$ + 100µA (After 1 minute)
		[I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]		

Dissipation Factor % (20°C ▪ 120Hz)	tanδ							
		V_R (V DC)	10	16	25	35	50	63	80
		tanδ (%)	18	15	13	12	10	8	8
		V_R (V DC)	100	160	200	250	350	400	450
		tanδ (%)	7	12	12	12	15	15	20
		For $C_R \ge 1000$µF, add 2% per every multiple 1000µF of rated capacitance value							

Low Temperature Characteristics at 120Hz	Z ratio max.					
		V_R (V DC)	10	16 ~ 100	160 ~ 250	350 ~ 400	450
		Z-25°C/Z+20°C	3	2	3	6	6
		Z-40°C/Z+20°C	4	4	6	12	-
		For capacitance > 1000µF					
		Z-25°C/Z+20°C	Add 0.5 for every multiple 1000µF of rated capacitance value				
		Z-40°C/Z+20°C	Add 1 for every multiple 1000µF of rated capacitance value				

Lifetime Test			
Endurance 125°C (V_R & I_R applied)	Test	**1 000 hours**	ø D < 8 mm
		2 000 hours	ø D = 8 ~ 10 mm
		3 000 hours	ø D ≥ 13 mm
	△C/C_R	≤ ±20% of initial measured value	
	tanδ	≤ 300% of initial specified value	
	I_{Leak}	≤ the initial specified value	
Shelf Life 125°C (V_R = 0)	Test	**1 000 hours**	
	△C/C_R	≤ ±20% of initial measured value	
	tanδ	≤ 300% of initial specified value	
	I_{Leak}	≤ the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4		

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +125°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
10	47	5	11	92	TH470M010C110AX
	56	5	11	100	TH560M010C110AX
	100	5	11	130	TH101M010C110AX
	100	6.3	11	145	TH101M010E110AX
	120	6.3	11	160	TH121M010E110AX
	330	8	11.5	350	TH331M010F115AX
	330	10	12.5	410	TH331M010G125AX
	470	8	11.5	430	TH471M010F115AX
	470	8	16	500	TH471M010F160AX
	470	10	12.5	505	TH471M010G125AX
	470	10	16	525	TH471M010G160AX
	560	10	12.5	530	TH561M010G125AX
	680	8	20	640	TH681M010F200AX
	680	10	16	660	TH681M010G160AX
	1000	10	16	870	TH102M010G160AX
	1000	10	20	960	TH102M010G200AX
	1200	10	20	1000	TH122M010G200AX
	1500	10	20	1120	TH152M010G200AX
16	22	5	11	66	TH220M016C110AX
	33	6.3	11	91	TH330M016E110AX
	47	5	11	97	TH470M016C110AX
	47	6.3	11	110	TH470M016E110AX
	100	6.3	11	175	TH101M016E110AX
	100	8	11.5	206	TH101M016F115AX
	220	8	11.5	340	TH221M016F115AX
	220	10	12.5	400	TH221M016G125AX
	330	8	11.5	400	TH331M016F115AX
	330	8	16	460	TH331M016F160AX
	330	10	12.5	470	TH331M016G125AX
	330	10	16	525	TH331M016G160AX
	470	8	11.5	500	TH471M016F115AX
	470	8	20	640	TH471M016F200AX
	470	10	12.5	590	TH471M016G125AX
	470	10	16	650	TH471M016G160AX
	470	10	20	720	TH471M016G200AX
	680	10	20	760	TH681M016G200AX
	820	10	16	740	TH821M016G160AX
	820	10	25	900	TH821M016G250AX
	1000	10	20	860	TH102M016G200AX
	1000	10	25	950	TH102M016G250AX
	1000	13	20	1000	TH102M016I200AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +125°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
25	22	6.3	11	70	TH220M025E110AX
	33	5	11	88	TH330M025C110AX
	33	6.3	11	100	TH330M025E110AX
	47	5	11	97	TH470M025C110AX
	47	6.3	11	110	TH470M025E110AX
	47	8	11.5	130	TH470M025F115AX
	56	6.3	11	120	TH560M025E110AX
	100	8	11.5	210	TH101M025F115AX
	100	10	12.5	250	TH101M025G125AX
	120	8	11.5	220	TH121M025F115AX
	150	8	11.5	260	TH151M025F115AX
	180	8	11.5	290	TH181M025F115AX
	220	8	11.5	360	TH221M025F115AX
	220	8	16	415	TH221M025F160AX
	220	10	12.5	420	TH221M025G125AX
	220	10	16	470	TH221M025G160AX
	270	8	20	470	TH271M025F200AX
	270	10	12.5	435	TH271M025G125AX
	330	8	16	510	TH331M025F160AX
	330	10	12.5	520	TH331M025G125AX
	330	10	16	570	TH331M025G160AX
	330	10	20	631	TH331M025G200AX
	390	10	16	650	TH391M025G160AX
	470	8	20	620	TH471M025F200AX
	470	10	16	640	TH471M025G160AX
	470	10	20	700	TH471M025G200AX
	470	10	25	770	TH471M025G250AX
	470	13	20	810	TH471M025I200AX
	560	10	20	680	TH561M025G200AX
	560	10	25	750	TH561M025G250AX
	680	10	20	740	TH681M025G200AX
	1000	13	20	880	TH102M025I200AX
	1000	13	25	970	TH102M025I250AX
	1000	16	25	1100	TH102M025J250AX
	1200	10	20	1010	TH122M025G200AX
	1500	10	25	1220	TH152M025G250AX
	1800	13	20	1350	TH182M025I200AX
	2700	13	25	1710	TH272M025I250AX
	3300	13	30	2070	TH332M025I300AX
	5600	18	25	2730	TH562M025K250AX
	6800	16	35.5	3300	TH682M025J355AX
	8200	16	40	3750	TH822M025J400AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +125°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
35	22	5	11	72	TH220M035C110AX
	22	6.3	11	82	TH220M035E110AX
	33	8	11.5	108	TH330M035F115AX
	47	6.3	11	110	TH470M035E110AX
	47	8	11.5	130	TH470M035F115AX
	47	10	12.5	158	TH470M035G125AX
	56	6.3	11	130	TH560M035E110AX
	100	8	11.5	200	TH101M035F115AX
	100	10	12.5	230	TH101M035G125AX
	100	10	16	262	TH101M035G160AX
	120	8	11.5	300	TH121M035F115AX
	120	8	16	350	TH121M035F160AX
	150	10	12.5	360	TH151M035G125AX
	180	8	20	410	TH181M035F200AX
	180	10	12.5	380	TH181M035G125AX
	220	10	12.5	440	TH221M035G125AX
	220	10	16	490	TH221M035G160AX
	220	10	20	540	TH221M035G200AX
	270	10	16	500	TH271M035G160AX
	270	10	20	550	TH271M035G200AX
	330	10	16	560	TH331M035G160AX
	330	10	25	680	TH331M035G250AX
	330	13	20	718	TH331M035I200AX
	390	10	20	590	TH391M035G200AX
	470	10	20	700	TH471M035G200AX
	470	13	20	810	TH471M035I200AX
	470	13	25	900	TH471M035I250AX
	560	10	20	580	TH561M035G200AX
	560	13	16	610	TH561M035I160AX
	680	10	20	800	TH681M035G200AX
	820	10	25	980	TH821M035G250AX
	1000	13	25	1140	TH102M035I250AX
	1000	16	25	1280	TH102M035J250AX
	1200	10	30	1290	TH122M035G300AX
	1500	13	25	1368	TH152M035I250AX
	2200	13	30	1660	TH222M035I300AX
	2700	13	40	2350	TH272M035I400AX
	3300	16	31.5	2480	TH332M035J315AX
	3300	18	25	2400	TH332M035K250AX
	4700	16	40	3000	TH472M035J400AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +125°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
50	2.2	8	11.5	25	TH2R2M050F115AX
	3.3	8	11.5	30	TH3R3M050F115AX
	4.7	5	11	32	TH4R7M050C110AX
	4.7	8	11.5	42.5	TH4R7M050F115AX
	10	5	11	42	TH100M050C110AX
	10	6.3	11	48	TH100M050E110AX
	10	8	11.5	56	TH100M050F115AX
	22	5	11	66	TH220M050C110AX
	22	6.3	11	75	TH220M050E110AX
	22	8	11.5	86	TH220M050F115AX
	33	8	11.5	118	TH330M050F115AX
	47	6.3	11	120	TH470M050E110AX
	47	8	11.5	140	TH470M050F115AX
	47	10	12.5	164	TH470M050G125AX
	56	8	11.5	150	TH560M050F115AX
	68	8	11.5	160	TH680M050F115AX
	82	8	11.5	170	TH820M050F115AX
	100	10	12.5	230	TH101M050G125AX
	100	10	16	250	TH101M050G160AX
	100	10	20	277	TH101M050G200AX
	120	10	16	290	TH121M050G160AX
	180	10	20	400	TH181M050G200AX
	220	10	20	510	TH221M050G200AX
	220	10	25	560	TH221M050G250AX
	220	13	20	587	TH221M050I200AX
	270	10	20	610	TH271M050G200AX
	330	10	20	700	TH331M050G200AX
	330	13	20	810	TH331M050I200AX
	330	13	25	900	TH331M050I250AX
	470	13	25	900	TH471M050I250AX
	470	16	25	1000	TH471M050J250AX
	560	10	30	950	TH561M050G300AX
	680	13	25	1050	TH681M050I250AX
	1000	13	30	1390	TH102M050I300AX
	1200	13	35	1510	TH122M050I350AX
	1200	18	20	1450	TH122M050K200AX
	1500	13	40	1960	TH152M050I400AX
	1800	18	25	1960	TH182M050K250AX
	2200	18	31.5	2500	TH222M050K315AX
	2700	18	35.5	2750	TH272M050K355AX
	3300	18	40	2950	TH332M050K400AX

See "PACKAGING INFORMATION" to taped or formed products.

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +125°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
63	4.7	6.3	11	38	TH4R7M063E110AX
	10	8	11.5	58	TH100M063F115AX
	22	8	11.5	93	TH220M063F115AX
	33	8	11.5	115	TH330M063F115AX
	33	10	12.5	132	TH330M063G125AX
	47	10	12.5	155	TH470M063G125AX
	47	10	16	172	TH470M063G160AX
	100	10	16	260	TH101M063G160AX
	180	10	20	400	TH181M063G200AX
	220	10	25	520	TH221M063G250AX
	220	13	25	595	TH221M063I250AX
	330	13	25	880	TH331M063I250AX
	330	16	25	1000	TH331M063J250AX
	390	13	20	800	TH391M063I200AX
	680	13	30	1290	TH681M063I300AX
	820	13	35	1420	TH821M063I350AX
	820	18	20	1360	TH821M063K200AX
	1200	18	25	1620	TH122M063K250AX
	1500	18	31.5	1980	TH152M063K315AX
	1800	16	40	2260	TH182M063J400AX
	2200	18	40	2680	TH222M063K400AX
80	22	8	11.5	120	TH220M080F115AX
	33	10	12.5	170	TH330M080G125AX
	47	10	12.5	200	TH470M080G125AX
	100	10	20	370	TH101M080G200AX
	330	13	25	870	TH331M080I250AX
	390	16	20	900	TH391M080J200AX
	470	16	25	1010	TH471M080J250AX
	560	13	35	1100	TH561M080I350AX
	560	16	25	1060	TH561M080J250AX
	560	18	20	1050	TH561M080K200AX
	680	16	31.5	1300	TH681M080J315AX
100	0.47	6.3	11	14	THR47M100E110AX
	1	6.3	11	24	TH010M100E110AX
	2.2	6.3	11	31	TH2R2M100E110AX
	3.3	6.3	11	36	TH3R3M100E110AX
	4.7	6.3	11	38	TH4R7M100E110AX
	4.7	8	11.5	48	TH4R7M100F115AX
	10	8	11.5	60	TH100M100F115AX
	10	10	12.5	70	TH100M100G125AX
	22	8	11.5	76	TH220M100F115AX
	22	10	12.5	90	TH220M100G125AX
	22	10	16	100	TH220M100G160AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +125°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
100	33	10	12.5	130	TH330M100G125AX
	33	10	16	140	TH330M100G160AX
	33	10	20	158	TH330M100G200AX
	47	10	16	150	TH470M100G160AX
	47	10	25	175	TH470M100G250AX
	47	13	20	185	TH470M100I200AX
	100	13	25	320	TH101M100I250AX
	100	16	25	350	TH101M100J250AX
	330	13	35	890	TH331M100I350AX
	330	16	25	860	TH331M100J250AX
	330	18	20	850	TH331M100K200AX
	390	13	40	1050	TH391M100I400AX
	390	16	31.5	1050	TH391M100J315AX
	560	18	31.5	1290	TH561M100K315AX
	680	18	35.5	1480	TH681M100K355AX
	820	18	40	1850	TH821M100K400AX
160	1	6.3	11	23	TH010M160E110AX
	2.2	6.3	11	35	TH2R2M160E110AX
	3.3	6.3	11	37	TH3R3M160E110AX
	3.3	8	11.5	41	TH3R3M160F115AX
	4.7	8	11.5	52	TH4R7M160F115AX
	6.8	10	12.5	70	TH6R8M160G125AX
	10	8	11.5	70	TH100M160F115AX
	10	10	12.5	82	TH100M160G125AX
	22	10	16	115	TH220M160G160AX
	22	10	20	128	TH220M160G200AX
	33	13	20	200	TH330M160I200AX
	47	13	20	240	TH470M160I200AX
	47	13	25	260	TH470M160I250AX
	82	10	30	340	TH820M160G300AX
	100	10	35	380	TH101M160G350AX
	100	13	25	390	TH101M160I250AX
	100	16	25	430	TH101M160J250AX
	120	10	40	450	TH121M160G400AX
	150	13	30	500	TH151M160I300AX
	180	13	35	600	TH181M160I350AX
	180	18	20	550	TH181M160K200AX
	220	16	31.5	690	TH221M160J315AX
	330	18	35.5	900	TH331M160K355AX
200	1	6.3	11	23	TH010M200E110AX
	2.2	6.3	11	35	TH2R2M200E110AX
	3.3	8	11.5	48	TH3R3M200F115AX
	4.7	8	11.5	50	TH4R7M200F115AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +125°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
200	4.7	10	12.5	60	TH4R7M200G125AX
	6.8	10	12.5	70	TH6R8M200G125AX
	10	10	12.5	80	TH100M200G125AX
	22	10	20	140	TH220M200G200AX
	22	10	25	150	TH220M200G250AX
	22	13	20	160	TH220M200I200AX
	33	13	20	200	TH330M200I200AX
	33	13	25	220	TH330M200I250AX
	47	13	20	245	TH470M200I200AX
	47	13	25	270	TH470M200I250AX
	47	16	25	300	TH470M200J250AX
	56	13	20	260	TH560M200I200AX
	82	13	25	360	TH820M200I250AX
	100	13	30	430	TH101M200I300AX
	100	16	20	400	TH101M200J200AX
	100	16	25	440	TH101M200J250AX
	100	16	31.5	490	TH101M200J315AX
	150	13	40	600	TH151M200I400AX
	150	16	25	530	TH151M200J250AX
	180	18	25	650	TH181M200K250AX
	220	18	31.5	850	TH221M200K315AX
	330	18	35.5	1100	TH331M200K355AX
250	1	6.3	11	23	TH010M250E110AX
	2.2	6.3	11	35	TH2R2M250E110AX
	2.2	8	11.5	40	TH2R2M250F115AX
	3.3	8	11.5	50	TH3R3M250F115AX
	3.3	10	12.5	53	TH3R3M250G125AX
	4.7	10	12.5	60	TH4R7M250G125AX
	4.7	10	16	68	TH4R7M250G160AX
	6.8	10	16	75	TH6R8M250G160AX
	10	10	16	83	TH100M250G160AX
	22	13	20	160	TH220M250I200AX
	22	13	25	170	TH220M250I250AX
	33	13	25	220	TH330M250I250AX
	33	16	25	240	TH330M250J250AX
	39	10	30	230	TH390M250G300AX
	47	10	35	280	TH470M250G350AX
	47	16	25	300	TH470M250J250AX
	47	16	31.5	330	TH470M250J315AX
	56	10	40	300	TH560M250G400AX
	68	13	30	330	TH680M250I300AX
	82	13	35	380	TH820M250I350AX
	82	18	20	350	TH820M250K200AX

See "PACKAGING INFORMATION" to taped or formed products.

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +125°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
250	100	13	40	490	TH101M250I400AX
	120	18	25	460	TH121M250K250AX
	220	18	35.5	850	TH221M250K355AX
350	1	8	11.5	26	TH010M350F115AX
	2.2	8	11.5	40	TH2R2M350F115AX
	2.2	10	12.5	47	TH2R2M350G125AX
	3.3	10	12.5	55	TH3R3M350G125AX
	3.3	10	16	60	TH3R3M350G160AX
	4.7	10	16	68	TH4R7M350G160AX
	4.7	10	20	75	TH4R7M350G200AX
	5.6	10	20	78	TH5R6M350G200AX
	6.8	13	20	85	TH6R8M350I200AX
	10	10	25	105	TH100M350G250AX
	10	13	20	110	TH100M350I200AX
	22	13	25	180	TH220M350I250AX
	22	16	25	200	TH220M350J250AX
	27	10	30	180	TH270M350G300AX
	33	10	35	220	TH330M350G350AX
	33	16	25	230	TH330M350J250AX
	33	16	31.5	260	TH330M350J315AX
	47	13	30	280	TH470M350I300AX
	47	16	31.5	320	TH470M350J315AX
	47	16	35.5	340	TH470M350J355AX
	56	13	35	330	TH560M350I350AX
	56	16	25	320	TH560M350J250AX
	56	18	20	310	TH560M350K200AX
	68	13	40	390	TH680M350I400AX
400	1	10	12.5	30	TH010M400G125AX
	2.2	10	16	50	TH2R2M400G160AX
	3.3	10	16	60	TH3R3M400G160AX
	4.7	10	16	70	TH4R7M400G160AX
	4.7	10	20	80	TH4R7M400G200AX
	5.6	10	20	85	TH5R6M400G200AX
	6.8	13	20	90	TH6R8M400I200AX
	10	13	20	110	TH100M400I200AX
	22	13	25	180	TH220M400I250AX
	27	13	25	190	TH270M400I250AX
	33	16	20	220	TH330M400J200AX
	33	16	25	240	TH330M400J250AX
	47	16	25	290	TH470M400J250AX
	47	16	31.5	320	TH470M400J315AX

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DIMENSIONS ▪ All dimensions in mm

ø D	5	6.3	8		10	13	16	18
F	2	2.5	3.5		5	5	7.5	7.5
ø d	0.5		L < 20	L ≥ 20	0.6		0.8	
			0.5	0.6				

a	ø D < 16	ø D = 16		ø D = 18	
	1.5	L = 25 to 35.5	L < 25 and L ≥ 40	L = 25 to 31.5	L < 25 and L ≥ 35.5
		1.5	2	1.5	2

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (µF) / Frequency (Hz)	50/60	100/120	400	1k	10k	50k ~ 100k
$C_R \leq 10$	0.8	1	1.3	1.45	1.65	1.7
$10 < C_R \leq 100$	0.8	1	1.23	1.36	1.48	1.53
$100 < C_R \leq 1000$	0.8	1	1.16	1.25	1.35	1.38
$1000 \leq C_R$	0.8	1	1.11	1.17	1.25	1.28

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

General Precautions and Guidelines	Packaging Information Liquid Radial
Page 274	Page 151 and following

For further information please contact sales@capxon.org

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

TE SERIES ▪ HIGH TEMP., AUTOMOTIVE 130°C TYPE

KEY FEATURES

AEC-Q 200 | HIGH VOLTAGE | °C HIGH TEMPERATURE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ THT type
- Endurance: 130°C ▪ 1 000 hours up to 3 000 hours
- Especially for applications with high ambient temperatures
- High reliability
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics		
Operating Temperature Range		-40 ~ +130°C		-25 ~ +130°C
Rated Voltage Range	V_R	10 ~ 400V DC		450V DC
Surge Voltage	V_S	($V_R \le 315V$): $V_S = 1.15 \cdot V_R$		($V_R > 315V$): $V_S = 1.10 \cdot V_R$
Capacitance Range	C_R	2.2 ~ 4700µF		1 ~ 100µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)		
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	10 ~ 100V		≤ $0.01C_R \cdot V_R$ or 3µA (After 2 minutes)
		160 ~ 450V	$C_R \cdot V_R \le 1000$	≤ $0.1C_R \cdot V_R$ + 40µA (After 1 minute)
			$C_R \cdot V_R > 1000$	≤ $0.04C_R \cdot V_R$ + 100µA (After 1 minute)

Dissipation Factor % (20°C ▪ 120Hz) — tanδ

V_R (V DC)	10	16	25	35	50	63
tanδ (%)	20	16	14	12	10	9

V_R (V DC)	100	160	200	250	350	400	450
tanδ (%)	8	15	15	15	20	20	25

For $C_R \ge 1000$µF, add 2% per every multiple 1000µF of rated capacitance value

Low Temperature Characteristics at 120Hz — Z ratio max.

V_R (V DC)	10	16 ~ 100	160 ~ 250	350 ~ 400	450
Z-25°C/Z+20°C	3	2	3	5	6
Z-40°C/Z+20°C	4	4	6	-	-

For capacitance > 1000µF

Z-25°C/Z+20°C	Add 0.5 for every multiple 1000µF of rated capacitance value
Z-40°C/Z+20°C	Add 1 for every multiple 1000µF of rated capacitance value

Lifetime Test			
Endurance 130°C (V_R & I_R applied)	Test	**1 000 hours**	ø D 6.3 mm
		2 000 hours	ø D 8 mm
		3 000 hours	ø D ≥ 10 mm ▪ 10 ~ 100V
		2 000 hours	ø D ≥ 10 mm ▪ 160 ~ 450V
	△C/C_R	≤ ±30% of initial measured value	
	tanδ	≤ 300% of initial specified value	
	I_{Leak}	≤ the initial specified value	
Shelf Life 130°C (V_R = 0)	Test	**1 000 hours**	
	△C/C_R	≤ ±30% of initial measured value	
	tanδ	≤ 300% of initial specified value	
	I_{Leak}	≤ the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4		

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +130°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
10	220	8	11.5	360	TE221M010F115AX
	330	8	11.5	475	TE331M010F115AX
	330	10	12.5	500	TE331M010G125AX
	470	10	12.5	670	TE471M010G125AX
	470	10	16	720	TE471M010G160AX
	1000	10	20	1175	TE102M010G200AX
	1500	13	20	1495	TE152M010I200AX
	2200	13	25	1690	TE222M010I250AX
	3300	16	25	2275	TE332M010J250AX
	4700	16	31.5	2765	TE472M010J315AX
16	220	8	11.5	360	TE221M016F115AX
	220	10	12.5	375	TE221M016G125AX
	330	8	11.5	395	TE331M016F115AX
	330	10	16	515	TE331M016G160AX
	470	10	12.5	655	TE471M016G125AX
	470	10	20	800	TE471M016G200AX
	1000	10	20	1175	TE102M016G200AX
	1000	13	20	1240	TE102M016I200AX
	1500	13	20	1515	TE152M016I200AX
	1500	13	25	1665	TE152M016I250AX
	2200	13	25	1690	TE222M016I250AX
	2200	16	25	1875	TE222M016J250AX
	3300	16	31.5	2690	TE332M016J315AX
	4700	16	35.5	2940	TE472M016J355AX
25	220	8	11.5	360	TE221M025F115AX
	220	10	16	475	TE221M025G160AX
	330	10	12.5	630	TE331M025G125AX
	330	10	20	775	TE331M025G200AX
	470	10	16	755	TE471M025G160AX
	470	13	20	960	TE471M025I200AX
	1000	13	20	1240	TE102M025I200AX
	1000	16	25	1465	TE102M025J250AX
	1500	16	25	1865	TE152M025J250AX
	1500	16	31.5	2065	TE152M025J315AX
	2200	16	31.5	2380	TE222M025J315AX
	2200	16	35.5	2515	TE222M025J355AX
	3300	16	35.5	2695	TE332M025J355AX
	3300	18	35.5	2875	TE332M025K355AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +130°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
35	100	8	11.5	460	TE101M035F115AX
	100	10	16	600	TE101M035G160AX
	220	10	12.5	610	TE221M035G125AX
	220	10	20	745	TE221M035G200AX
	330	10	16	790	TE331M035G160AX
	330	13	20	1000	TE331M035I200AX
	470	10	20	920	TE471M035G200AX
	470	13	25	1175	TE471M035I250AX
	1000	13	25	1235	TE102M035I250AX
	1000	16	31.5	1535	TE102M035J315AX
	1500	16	31.5	2340	TE152M035J315AX
	1500	16	35.5	2465	TE152M035J355AX
	2200	16	35.5	2695	TE222M035J355AX
	2200	18	35.5	2875	TE222M035K355AX
50	10	6.3	11	140	TE100M050E110AX
	22	6.3	11	200	TE220M050E110AX
	22	8	11.5	240	TE220M050F115AX
	33	8	11.5	285	TE330M050F115AX
	47	8	11.5	275	TE470M050F115AX
	47	10	12.5	315	TE470M050G125AX
	100	10	12.5	465	TE101M050G125AX
	100	10	16	515	TE101M050G160AX
	220	10	20	865	TE221M050G200AX
	220	13	20	1000	TE221M050I200AX
	330	13	20	1065	TE331M050I200AX
	330	13	25	1175	TE331M050I250AX
	470	16	20	1240	TE471M050J200AX
	470	16	25	1335	TE471M050J250AX
	1000	16	31.5	2465	TE102M050J315AX
	2200	18	40	3065	TE222M050K400AX
63	33	8	11.5	255	TE330M063F115AX
	47	10	12.5	285	TE470M063G125AX
	100	10	16	415	TE101M063G160AX
	220	13	20	845	TE221M063I200AX
	330	13	25	1145	TE331M063I250AX
	470	16	25	1455	TE471M063J250AX
	1000	16	31.5	1865	TE102M063J315AX
	1500	18	40	2735	TE152M063K400AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +130°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
100	4.7	8	11.5	115	TE4R7M100F115AX
	10	8	11.5	130	TE100M100F115AX
	22	8	11.5	190	TE220M100F115AX
	33	10	12.5	275	TE330M100G125AX
	47	10	16	285	TE470M100G160AX
	100	13	20	545	TE101M100I200AX
	220	16	25	1000	TE221M100J250AX
	330	16	31.5	1345	TE331M100J315AX
	470	18	31.5	1600	TE471M100K315AX
160	3.3	6.3	11	65	TE3R3M160E110AX
	4.7	6.3	11	70	TE4R7M160E110AX
	4.7	8	11.5	85	TE4R7M160F115AX
	5.6	8	11.5	100	TE5R6M160F115AX
	6.8	8	11.5	110	TE6R8M160F115AX
	6.8	8	16	130	TE6R8M160F160AX
	10	8	16	145	TE100M160F160AX
	15	8	16	190	TE150M160F160AX
	22	10	16	310	TE220M160G160AX
	33	10	20	360	TE330M160G200AX
	47	13	20	460	TE470M160I200AX
	68	13	25	585	TE680M160I250AX
	100	16	25	820	TE101M160J250AX
	150	16	31.5	940	TE151M160J315AX
200	3.3	6.3	11	70	TE3R3M200E110AX
	4.7	6.3	11	75	TE4R7M200E110AX
	4.7	8	11.5	85	TE4R7M200F115AX
	5.6	8	11.5	100	TE5R6M200F115AX
	5.6	8	16	120	TE5R6M200F160AX
	6.8	8	11.5	115	TE6R8M200F115AX
	6.8	8	16	135	TE6R8M200F160AX
	10	8	16	160	TE100M200F160AX
	10	8	20	180	TE100M200F200AX
	15	8	16	190	TE150M200F160AX
	15	8	20	210	TE150M200F200AX
	22	8	20	310	TE220M200F200AX
	22	10	16	310	TE220M200G160AX
	22	10	20	320	TE220M200G200AX
	33	10	20	360	TE330M200G200AX
	33	13	20	410	TE330M200I200AX
	47	13	20	460	TE470M200I200AX
	47	13	25	515	TE470M200I250AX
	68	16	20	585	TE680M200J200AX
	68	16	25	630	TE680M200J250AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +130°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
200	100	13	30	675	TE101M200I300AX
	100	16	25	820	TE101M200J250AX
	150	13	40	880	TE151M200I400AX
	150	16	35.5	945	TE151M200J355AX
250	3.3	6.3	11	75	TE3R3M250E110AX
	4.7	8	11.5	110	TE4R7M250F115AX
	5.6	8	11.5	110	TE5R6M250F115AX
	6.8	8	16	135	TE6R8M250F160AX
	8.2	8	16	165	TE8R2M250F160AX
	10	8	16	180	TE100M250F160AX
	15	8	20	220	TE150M250F200AX
	22	10	16	300	TE220M250G160AX
	33	13	20	450	TE330M250I200AX
	47	13	20	475	TE470M250I200AX
	68	13	30	640	TE680M250I300AX
	68	16	25	640	TE680M250J250AX
	100	13	35	710	TE101M250I350AX
	100	16	31.5	835	TE101M250J315AX
	150	13	50	980	TE151M250I500AX
	150	16	35.5	1025	TE151M250J355AX
350	2.2	6.3	11	60	TE2R2M350E110AX
	3.3	8	11.5	85	TE3R3M350F115AX
	4.7	8	11.5	110	TE4R7M350F115AX
	5.6	8	16	125	TE5R6M350F160AX
	6.8	8	20	150	TE6R8M350F200AX
	8.2	8	20	170	TE8R2M350F200AX
	10	10	20	195	TE100M350G200AX
	15	10	20	250	TE150M350G200AX
	22	13	20	310	TE220M350I200AX
	33	16	20	450	TE330M350J200AX
	47	16	20	540	TE470M350J200AX
	68	18	25	645	TE680M350K250AX
	100	18	31.5	850	TE101M350K315AX
400	2.2	6.3	11	75	TE2R2M400E110AX
	2.2	8	11.5	85	TE2R2M400F115AX
	2.2	8	16	95	TE2R2M400F160AX
	2.7	8	16	100	TE2R7M400F160AX
	3.3	8	11.5	95	TE3R3M400F115AX
	3.3	8	16	115	TE3R3M400F160AX
	3.3	8	20	125	TE3R3M400F200AX
	4.7	8	11.5	110	TE4R7M400F115AX
	4.7	8	20	125	TE4R7M400F200AX
	4.7	10	16	125	TE4R7M400G160AX

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STANDARD RATINGS

Part number shows bulk version with straight leads

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_R ▪ Max. Ripple Current +130°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
400	5.6	8	20	135	TE5R6M400F200AX
	5.6	10	16	135	TE5R6M400G160AX
	5.6	10	20	150	TE5R6M400G200AX
	6.8	8	20	150	TE6R8M400F200AX
	6.8	10	16	150	TE6R8M400G160AX
	6.8	10	20	165	TE6R8M400G200AX
	8.2	10	16	170	TE8R2M400G160AX
	8.2	10	20	190	TE8R2M400G200AX
	10	10	16	190	TE100M400G160AX
	10	10	20	200	TE100M400G200AX
	10	10	25	215	TE100M400G250AX
	15	13	20	260	TE150M400I200AX
	22	13	25	345	TE220M400I250AX
	33	16	25	460	TE330M400J250AX
	47	13	40	520	TE470M400I400AX
	47	16	31.5	610	TE470M400J315AX
	47	18	25	579	TE470M400K250AX
	68	13	55	745	TE680M400I550AX
	68	18	31.5	660	TE680M400K315AX
	100	18	40	880	TE101M400K400AX
450	1	8	11.5	65	TE010M450F115AX
	2.2	8	16	95	TE2R2M450F160AX
	3.3	8	16	100	TE3R3M450F160AX
	4.7	8	20	125	TE4R7M450F200AX
	5.6	10	16	135	TE5R6M450G160AX
	6.8	10	20	165	TE6R8M450G200AX
	8.2	10	20	190	TE8R2M450G200AX
	10	10	25	215	TE100M450G250AX
	10	13	20	215	TE100M450I200AX
	15	13	20	260	TE150M450I200AX
	22	10	40	350	TE220M450G400AX
	22	16	20	345	TE220M450J200AX
	22	16	25	385	TE220M450J250AX
	33	10	50	450	TE330M450G500AX
	33	16	25	485	TE330M450J250AX
	33	16	31.5	545	TE330M450J315AX
	47	13	45	565	TE470M450I450AX
	47	16	35.5	600	TE470M450J355AX
	68	18	31.5	660	TE680M450K315AX
	100	18	40	880	TE101M450K400AX

See "PACKAGING INFORMATION" to taped or formed products.

For further information please contact sales@capxon.org

DIMENSIONS ▪ All dimensions in mm

ø D	6.3	8		10	13	16	18
F	2.5	3.5		5	5	7.5	7.5
ø d	0.5	L < 20	L ≥ 20	0.6		0.8	
		0.5	0.6				

a	ø D < 16	ø D = 16		ø D = 18	
	1.5	L = 25 to 35.5	L < 25 and L ≥ 40	L = 25 to 31.5	L < 25 and L ≥ 35.5
		1.5	2	1.5	2

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

10 ~ 100V

C_R (µF) / Frequency (Hz)	50/60	100/120	1k	10k	50k ~ 100k
C_R < 10	0.35	0.42	0.6	0.8	1
10 ~ 33	0.45	0.55	0.75	0.9	1
47 ~ 330	0.6	0.7	0.85	0.95	1
470 ~ 1500	0.65	0.75	0.9	0.98	1
1500 ≤ C_R	0.75	0.8	0.95	1	1

160 ~ 450V

C_R (µF) / Frequency (Hz)	100/120	400	1k	10k	50k ~ 100k
C_R < 33	0.4	0.6	0.75	0.9	1
C_R ≥ 33	0.45	0.65	0.8	0.95	1

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

General Precautions and Guidelines	Packaging Information Liquid Radial
Page 274	Page 151 and following

For further information please contact sales@capxon.org

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

PRODUCT CODE ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

THT type example:

GH series ▪ 330µF ▪ 80V ▪ ±20% ▪ Ø 13mm ▪ H 20mm ▪ P 5mm ▪ Tape Ammo ▪ AEC-Q200

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
G	H	3	3	1	M	0	8	0	I	2	0	0	E	T	A	X	-	-	-
Series		Capacitance			Capacitance tolerance	Voltage			Case Ø (mm)	Height (mm)			Type code	Taping / lead treatment *		Special requirement			

Code	µF
0R1	0.1
R47	0.47
010	1
4R7	4.7
100	10
220	22
101	100
561	560
102	1000
472	4700
103	10000
333	33000

Code	%
H	±5
K	±10
S	±15
M	±20
N	±30
D	±40
I	+5 to +20
B	0 to -20
G	0 to +10
Z	0 to +20
Y	0 to +30
X	0 to +40
A	0 to +50
J	-5 to +20
C	-5 to +30
E	-8 to +5
V	-10 to +20
Q	-10 to +30
T	-10 to +50
W	-20 to +10
P	-15 to +20
L	-25 to +20
U	-30 to 0
F	-35 to 0
O	-50 to 0

Code	Volt
004	4
6R3	6.3
010	10
016	16
025	25
035	35
050	50
063	63
080	80
100	100
160	160
200	200
220	220
250	250
350	350
400	400
420	420
450	450
500	500

Code	ØD
B	4
C	5
E	6.3
F	8
G	10
H	12
Z	12.5
I	13
J	16
K	18
L	20
M	22

Code	H
050	5
070	7
090	9
110	11
115	11.5
125	12.5
130	13
140	14
150	15
160	16
200	20
250	25
300	30
315	31.5
350	35
355	35.5
400	40
450	45
500	50
550	55
600	60

Code	Type
A	Without lead treatment
E	With lead treatment

See chapters taping or lead treatment

Code	Special
X	AEC-Q200

See datasheet for reference

* See chapter taping or lead treatment for further information
Please consult CapXon for further assistance

MARKING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

Aluminum Electrolytic Capacitor ▪ Radial type

CapXon:	Manufacturer trademark
330µF:	Nominal capacitance
80V:	Rated voltage (V) ▪ Standard type
	(-) polarity (Cathode indicate)
GH:	Series
105°C:	Maximum operating temperature
P1944:	Production datacode year/week (ex. 2019/CW44)
X:	AEC-Q200 type
VENT:	Safety vent

AEC-Q200 type

Front side

Back side

For further information please contact sales@capxon.org

TAPING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

T1 taping ▪ ØD 5mm ▪ standard lead spacing

Example

G H	4 7 0	M	0 2 5	C	1 1 0	E	T B	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

All dimensions in mm

	D	L	d	P	P0	P1	P2	F	F1	W	W0	W1	W2	H	D0	Δh	Δp	T	Code
Tol	±0.5	-	±0.02	±1.0	±0.2	±0.7	±1.3	+0.4 -0.2	±0.5	±0.5	±0.5	±0.5	Max	+0.75 -0.5	±0.2	Max	Max	Max	
Item	5	5-7 (+1)	0.45	12.7	12.7	5.35	6.35	**2**	5	18	11	9	2	18.5	4	1	1	1.5	TB
		9 (±2)	0.5																
		11-15 (±1.5)	0.5																
	6.3	5 (+1)	0.45	12.7	12.7	5.1	6.35	**2.5**	5	18	11	9	2	18.5	4	1	1	1.5	TC
		7 (+1)	0.5																
		9 (±2)	0.5																
		11-15 (±1.5)	0.5																

Table and example show the ammo package version. Coding RB or RC instead of TB or TC means the reel package version.

For further information please contact sales@capxon.org

TAPING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

T2 taping ▪ ØD 4 and 5mm ▪ wide lead spacing

Example

S G	4 R 7	M	0 5 0	C	0 7 0	E	T C	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

All dimensions in mm

	D	L	d	P	P0	P1	P2	F	F1	W	W0	W1	W2	H	D0	Δh	Δp	T	Code
Tol	±0.5	-	±0.02	±1.0	±0.2	±0.7	±1.3	+0.4 -0.2	±0.5	±0.5	±0.5	±0.5	Max	+0.75 -0.5	±0.2	Max	Max	Max	
Item	4	5-7 (+1)	0.45	12.7	12.7	5.1	6.35	**2** **2.5**	5	18	11	9	2	18.5	4	1	1	1.5	**TB** **TC**
	5	5-7 (+1) 9 (±2) 11-15 (±1.5)	0.45 0.5 0.5	12.7	12.7	5.1	6.35	**2.5**	5	18	11	9	2	18.5	4	1	1	1.5	**TC**

Table and example show the ammo package version. Coding RB or RC instead of TB or TC means the reel package version.

For further information please contact sales@capxon.org

TAPING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

All dimensions in mm

	D	L	d	P	P0	P1	P2	F	W	W0	W1	W2	H	D0	Δh	Δp	T	Code
Tol	±0.5	-	±0.02	±1.0	±0.2	±0.7	±1.3	+0.4 -0.2	±0.5	±0.5	±0.5	Max	+0.75 -0.5	±0.2	Max	Max	Max	
Item	8	5 (+1)	0.45	12.7	12.7	4.6	6.35	**3.5**	18	11	9	2	18.5	4	1	1	1	TD
		7 (+1)	0.5															
		9 (±2)	0.5															
		11.5-16 (±1.5)	0.5															
		20-25 (±1.5)	0.6															
	10	7-9 (±2)	0.6	12.7	12.7	3.85	6.35	**5**	18	11	9	2	18.5	4	1	1	1.5	TA
		12.3-35 (±1.5)	0.6															
	13	13-16 (+2)	0.6	15	15	5	7.5	**5**	18	15	9	2	18.5	4	2	2	1.5	TA
		20-35 (±1.5)	0.6															

Table and example show the ammo package version. Coding RA or RD instead of TA or TD means the reel package version.

For further information please contact sales@capxon.org

TAPING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

T4 taping ▪ wide lead spacing 5mm

Example

G H	8 2 1	M	6 R 3	F	1 1 5	E	T A	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

All dimensions in mm

	D	L	d	P	P0	P1	P2	F	W	W0	W1	W2	H	H0	D0	Δh	Δp	T	Code
Tol	±0.5	-	±0.02	±1.0	±0.2	±0.7	±1.3	+0.4 -0.2	±0.5	±0.5	±0.5	Max	+0.75 -0.5	±0.5	±0.2	Max	Max	Max	
Item	4	5-7 (+1)	0.45	12.7	12.7	3.85	6.35	**5**	18	11	9	2	18.5	16.5	4	1	1	1.5	TA
	5	5-7 (+1)	0.45	12.7	12.7	3.85	6.35	**5**	18	11	9	2	18.5	16.5	4	1	1	1.5	
		9 (±2)	0.5																
		11-15 (±1.5)	0.5																
	6.3	5 (+1)	0.45	12.7	12.7	3.85	6.35	**5**	18	11	9	2	18.5	16.5	4	1	1	1.5	
		7 (+1)	0.5																
		9 (±2)	0.5																
		11-15 (±1.5)	0.5																
	8	5 (+1)	0.45	12.7	12.7	3.85	6.35	**5**	18	11	9	2	18.5	16.5	4	1	1	1	
		7 (+1)	0.5																
		8 (+1)	0.6																
		9 (±2)	0.5																
		11.5-16 (±1.5)	0.5																
		20-25 (±1.5)	0.6																

Table and example show the ammo package version. Coding RA instead of TA means the reel package version.

For further information please contact sales@capxon.org

TAPING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

T5 taping ▪ ØD ≥13mm ▪ long distance spacing

Example

F L	4 7 0	M	4 5 0	J	3 1 5	E	T E	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

All dimensions in mm

	D	L	d	P	P0	P1	P2	F	W	W0	W1	W2	H	D0	Δh	Δp	T	Code
Tol	±0.5	-	±0.02	±1.0	±0.2	±0.7	±1.3	+0.4 -0.2	±0.5	±0.5	±0.5	Max	+0.75 -0.5	±0.2	Max	Max	Max	
Item	13	13-16 (+2) 20-35 (±1.5)	0.6	25.4	12.7	3.85	6.35	**5**	18	15	9	2	18.5	4	2	2	1.5	PA
	16	16-21 (±2) 25-35.5 (±1.5)	0.8	30	15	3.75	7.5	**7.5**	18	15	9	2	18.5	4	2	2	1.5	TE
	18	13-21 (±2) 25-31.5 (±1.5) 35.5 (±2)	0.8	30	15	3.75	7.5	**7.5**	18	15	9	2	18.5	4	2	2	1.5	

Table and example show the ammo package version. Coding RE or QA instead of TE or PA means the reel package version.

For further information please contact sales@capxon.org

TAPING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS ▪ AMMO PACK

Ø D (mm)	Length L (mm)	Inner box quantity (pcs)	Inner box size L x W x H (mm)	Outer box quantity (pcs)	Outer box size L x W x H (mm)	Country of origin	Tariff number
4	All	2500	331 x 227 x 51	25000	474 x 343 x 285	China	85322200
5	All	2000	331 x 227 x 51	20000	474 x 343 x 285	China	85322200
6.3	All	1500	331 x 227 x 51	15000	474 x 343 x 285	China	85322200
8	5 to 16	800	331 x 227 x 51	8000	474 x 343 x 285	China	85322200
	17 to 25	800	327 x 191 x 67	8000	474 x 343 x 285	China	85322200
	30 to 35	800	327 x 191 x 67	6400	474 x 343 x 285	China	85322200
10	7 to 15	600	331 x 227 x 51	6000	474 x 343 x 285	China	85322200
	16 to 20	500	331 x 227 x 51	5000	474 x 343 x 285	China	85322200
	21 to 25	500	332 x 190 x 60	2500	474 x 343 x 285	China	85322200
	30	500	327 x 216 x 64	4000	474 x 343 x 285	China	85322200
	35	500	318 x 254 x 67	2500	474 x 343 x 285	China	85322200
13	13 to 20	300	321 x 191 x 57	3000	474 x 343 x 285	China	85322200
	25 to 30	300	327 x 216 x 64	2400	474 x 343 x 285	China	85322200
	35	400	318 x 254 x 70	2000	474 x 343 x 285	China	85322200
16	16	200	327 x 191 x 57	1600	474 x 343 x 285	China	85322200
	20 to 25	200	327 x 216 x 64	1600	474 x 343 x 285	China	85322200
	> 25	250	343 x 230 x 71	1250	474 x 343 x 285	China	85322200
18	16 to 25	200	310 x 260 x 61	1000	474 x 343 x 285	China	85322200
	> 25	200	310 x 260 x 71	1000	474 x 343 x 285	China	85322200

For further information please contact sales@capxon.org

TAPING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS ▪ REEL PACK

Ø D (mm)	Length L (mm)	A (mm)	Inner box quantity (pcs)	Inner box size L x W x H (mm)	Outer box quantity (pcs)	Outer box size L x W x H (mm)	Country of origin	Tariff number
4	All	45	1800	350 x 350 x 105	10800	375 x 375 x 343	China	85322200
5	All	45	1300	350 x 350 x 105	7800	375 x 375 x 343	China	85322200
6.3	All	45	1000	350 x 350 x 105	6000	375 x 375 x 343	China	85322200
8	5 to 17	45	800	350 x 350 x 105	4800	375 x 375 x 343	China	85322200
	18 to 28	55	800	349 x 349 x 121	4800	375 x 375 x 385	China	85322200
10	7 to 17	45	600	350 x 350 x 105	3600	375 x 375 x 343	China	85322200
	18 to 28	55	600	349 x 349 x 121	3600	375 x 375 x 385	China	85322200
12	17	45	400	350 x 350 x 105	2400	375 x 375 x 343	China	85322200
	18 to 28	55	400	349 x 349 x 121	2400	375 x 375 x 385	China	85322200
13	13 to 17	45	300	350 x 350 x 105	1800	375 x 375 x 343	China	85322200
	18 to 28	55	300	349 x 349 x 121	1800	375 x 375 x 385	China	85322200
16	13 to 17	45	200	350 x 350 x 105	1200	375 x 375 x 343	China	85322200
	18 to 28	55	200	349 x 349 x 121	1200	375 x 375 x 385	China	85322200

For further information please contact sales@capxon.org

PACKAGING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS
STRAIGHT LEADS ▪ BULK PACK

Ø D (mm)	Length L (mm)	Inner bag / Inner row (pcs)	Inner box quantity (pcs)	Inner box size L x W x H (mm)	Outer box quantity (pcs)	Outer box size L x W x H (mm)	Country of origin	Tariff number
3	5	1000/bag	20000	293 x 181 x 223	60000	562 x 318 x 238	China	85322200
4	5 to 7	1000/bag	15000	293 x 181 x 223	45000	562 x 318 x 238	China	85322200
5	7 to 9	1000/bag	15000	293 x 181 x 223	45000	562 x 318 x 238	China	85322200
	11 to 12	1000/bag	10000	293 x 181 x 223	30000	562 x 318 x 238	China	85322200
6.3	5 to 7	1000/bag	10000	293 x 181 x 223	30000	562 x 318 x 238	China	85322200
	11 to 20	1000/bag	8000	293 x 181 x 223	24000	562 x 318 x 238	China	85322200
8	5 to 9	500/bag	6000	293 x 181 x 223	18000	562 x 318 x 238	China	85322200
	11 to 14	500/bag	5000	293 x 181 x 223	15000	562 x 318 x 238	China	85322200
	15 to 16	500/bag	4000	293 x 181 x 223	12000	562 x 318 x 238	China	85322200
	20	500/bag	3000	293 x 181 x 223	9000	562 x 318 x 238	China	85322200
	25 to 30	400/bag	2400	293 x 181 x 223	7200	562 x 318 x 238	China	85322200
	30 to 34	40/line	840	334 x 217 x 68	6720	448 x 354 x 295	China	85322200
	35 to 41	40/line	840	334 x 217 x 79.5	5040	448 x 354 x 248	China	85322200
	42 to 51	40/line	840	334 x 217 x 92	5040	448 x 354 x 295	China	85322200
	53 to 60	40/line	840	334 x 217 x 92	5040	448 x 354 x 295	China	85322200
10	≤ 13	500/bag	4000	293 x 181 x 223	12000	562 x 318 x 238	China	85322200
	14 to 17	500/bag	3000	293 x 181 x 223	9000	562 x 318 x 238	China	85322200
	20	500/bag	2500	293 x 181 x 223	7500	562 x 318 x 238	China	85322200
	24 to 25	400/bag	2000	293 x 181 x 223	6000	562 x 318 x 238	China	85322200
	31 to 34	32/line	544	334 x 217 x 68	4352	448 x 354 x 295	China	85322200
	35 to 41	32/line	544	334 x 217 x 79.5	3264	448 x 354 x 248	China	85322200
	42 to 51	32/line	544	334 x 217 x 92	3264	448 x 354 x 295	China	85322200
	55 to 60	32/line	544	334 x 217 x 92	3264	448 x 354 x 295	China	85322200
12.5	≤ 21	300/bag	1500	293 x 181 x 223	4500	562 x 318 x 238	China	85322200
	25	200/bag	1200	293 x 181 x 223	3600	562 x 318 x 238	China	85322200
	30	200/bag	1000	293 x 181 x 223	3000	562 x 318 x 238	China	85322200
	35	26/line	364	334 x 217 x 79.5	3184	448 x 354 x 248	China	85322200
	40 to 50	26/line	364	334 x 217 x 92	2184	448 x 354 x 295	China	85322200
13	≤ 21	300/bag	1500	293 x 181 x 223	4500	562 x 318 x 238	China	85322200
	25 to 31.5	25/line	350	334 x 217 x 68	2800	448 x 354 x 295	China	85322200
	35.5 to 41	25/line	350	334 x 217 x 79.5	2100	448 x 354 x 248	China	85322200
	42 to 51	25/line	350	334 x 217 x 92	2100	448 x 354 x 295	China	85322200
14.5	31.5 to 32	20/line	220	304 x 196 x 68	1760	415 x 320 x 295	China	85322200
	37	20/line	220	305 x 197 x 79.5	1320	415 x 320 x 295	China	85322200
16	16 to 17	18/line	180	304 x 196 x 55	1800	415 x 320 x 295	China	85322200
	20 to 26	18/line	180	304 x 196 x 68	1440	415 x 320 x 295	China	85322200
	30 to 35.5	18/line	180	305 x 197 x 79.5	1080	415 x 320 x 248	China	85322200
	40 to 50	18/line	180	304 x 196 x 92	1080	415 x 320 x 295	China	85322200
18	15 to 17	32 in all/2 lines	160	304 x 196 x 55	1600	415 x 320 x 295	China	85322200
	20 to 31.5	32 in all/2 lines	160	304 x 196 x 68	1280	415 x 320 x 295	China	85322200
	35	32 in all/2 lines	160	305 x 197 x 79.5	960	415 x 320 x 248	China	85322200
	40 to 51	32 in all/2 lines	160	304 x 196 x 92	960	415 x 320 x 295	China	85322200
20	21 to 31.5	32 in all/2 lines	160	334 x 217 x 68	1280	448 x 354 x 295	China	85322200
	35 to 36	32 in all/2 lines	160	334 x 217 x 79.5	960	448 x 354 x 248	China	85322200
	42 to 51	32 in all/2 lines	160	334 x 217 x 92	960	448 x 354 x 295	China	85322200

PACKAGING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS
STRAIGHT LEADS ▪ BULK PACK

Ø D (mm)	Length L (mm)	Inner bag / Inner row (pcs)	Inner box quantity (pcs)	Inner box size L x W x H (mm)	Outer box quantity (pcs)	Outer box size L x W x H (mm)	Country of origin	Tariff number
22	21 to 26	25 in all/2 lines	100	304 x 196 x 68	800	415 x 320 x 295	China	85322200
	30 to 36	25 in all/2 lines	100	305 x 197 x 79.5	600	415 x 320 x 248	China	85322200
	41 to 46	25 in all/2 lines	100	304 x 196 x 92	600	415 x 320 x 295	China	85322200
	47 to 70	25 in all/2 lines	100	304 x 196 x 92	600	415 x 320 x 295	China	85322200
25	21 to 26	25 in all/2 lines	100	334 x 217 x 68	800	448 x 354 x 295	China	85322200
	30	25 in all/2 lines	100	334 x 217 x 79.5	600	448 x 354 x 260	China	85322200
	≥ 41	25 in all/2 lines	100	334 x 217 x 92	600	448 x 354 x 295	China	85322200

For further information please contact sales@capxon.org

PACKAGING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS
CUTTED LEADS ▪ BULK PACK

Ø D (mm)	Length L (mm)	Inner bag / Inner row (pcs)	Inner box quantity (pcs)	Cutting height (mm)	Outer box quantity (pcs)	Outer carton quantity (pcs)	Country of origin	Tariff number
3	All L	2500/bag	10000	N/A	6	60000	China	85322200
4	5 to 7	2000/bag	8000	N/A	5	40000	China	85322200
5	5 to 7	2000/bag	8000	N/A	5	40000	China	85322200
	11 to 12	1000/bag	6000	C < 7	5	30000	China	85322200
	11 to 12	1000/bag	4000	C ≥ 7	5	20000	China	85322200
6.3	5 to 7	1000/bag	6000	N/A	5	30000	China	85322200
	9 to 12	1000/bag	4000	N/A	5	20000	China	85322200
	15 to 20	1000/bag	4000	N/A	6	24000	China	85322200
8	≤ 9	500/bag	4000	N/A	6	24000	China	85322200
	11 to 13	500/bag	3000	C < 7	6	18000	China	85322200
	14	500/bag	2500	C < 7	6	15000	China	85322200
	15 to 16	500/bag	2000	C < 7	6	12000	China	85322200
	20	500/bag	1000	C < 7	12	12000	China	85322200
	30 to 35.5	500/bag	1000	C < 7	8	8000	China	85322200
	36 to 41	40/line	840	C < 7	10	8400	China	85322200
	42 to 51	40/line	840	C < 7	6	5040	China	85322200
	52 to 60	40/line	840	C < 7	6	5040	China	85322200
10	7 to 10	500/bag	1000	C < 7	12	12000	China	85322200
	12 to 17	500/bag	1000	C < 7	10	10000	China	85322200
	20	500/bag	1000	C < 7	8	8000	China	85322200
	24 to 25	500/bag	1000	C < 7	6	6000	China	85322200
	30 to 35.5	32/line	1000	C < 7	12	6480	China	85322200
	36 to 41	32/line	540	C < 7	10	5400	China	85322200
	42 to 51	32/line	540	C < 7	6	3240	China	85322200
	52 to 60	32/line	540	C < 7	6	3240	China	85322200
13	31 to 35.5	25/line	350	C < 7	6	2100	China	85322200
	36 to 41	25/line	350	C < 7	5	1750	China	85322200
	42 to 51	25/line	350	C < 7	4	1400	China	85322200
	52 to 60	25/line	350	C < 7	4	1400	China	85322200
	35 to 40	25/line	350	C ≥ 12	4	1400	China	85322200
16	16 to 32	18/line	180	C < 7	6	1080	China	85322200
	35 to 41	18/line	180	C < 7	5	900	China	85322200
	21 to 24	18/line	180	C ≥ 7	6	1080	China	85322200
	25 to 30	18/line	180	C ≥ 7	5	900	China	85322200
	31 to 41	18/line	180	C ≥ 7	4	720	China	85322200
18	15 to 21	32 in all/2 lines	160	N/A	6	960	China	85322200
	25 to 31.5	32 in all/2 lines	160	C < 7	6	960	China	85322200
	25 to 31.5	32 in all/2 lines	160	C ≥ 7	5	800	China	85322200
	35.5 to 41	32 in all/2 lines	160	C < 7	5	800	China	85322200
	35.5 to 41	32 in all/2 lines	160	C ≥ 7	4	640	China	85322200
	≥ 45	32 in all/2 lines	160	N/A	4	640	China	85322200
20	25 to 40	30 in all/2 lines	150	C < 7	5	750	China	85322200
	25 to 40	30 in all/2 lines	150	C ≥ 7	4	600	China	85322200
	≥ 41	30 in all/2 lines	150	C < 7	4	600	China	85322200
	≥ 41	30 in all/2 lines	150	C ≥ 7	3	450	China	85322200

For further information please contact sales@capxon.org

PACKAGING ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS
CUTTED LEADS ▪ BULK PACK

Ø D (mm)	Length L (mm)	Inner bag / Inner row (pcs)	Inner box quantity (pcs)	Cutting height (mm)	Outer box quantity (pcs)	Outer carton quantity (pcs)	Country of origin	Tariff number
22	21 to 31	25 in all/2 lines	100	C < 7	6	600	China	85322200
	21 to 31	25 in all/2 lines	100	C ≥ 7	5	500	China	85322200
	36 to 41	25 in all/2 lines	100	C < 7	5	500	China	85322200
	36 to 41	25 in all/2 lines	100	C ≥ 7	6	600	China	85322200
	46 to 51	25 in all/2 lines	100	C < 7	4	400	China	85322200
	46 to 51	25 in all/2 lines	100	C ≥ 7	3	300	China	85322200
	≥ 56	25 in all/2 lines	100	C < 7	3	300	China	85322200
25	21 to 26	25 in all/2 lines	100	N/A	6	600	China	85322200
	30 to 37	25 in all/2 lines	100	N/A	5	500	China	85322200
	40 to 51	25 in all/2 lines	100	N/A	4	400	China	85322200
	≥ 52	25 in all/2 lines	100	N/A	3	300	China	85322200

For further information please contact sales@capxon.org

AVAILABLE LEAD TREATMENTS ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

Radial type ▪ standard version ▪ standard lead spacing (all dimension in mm)

Ø D (mm)	4	5		6.3		8				10	13	16		18		22	25
F (mm)	1.5	2		2.5		3.5				5		7.5		7.5		10	12.5
L (mm)	All	≤ 7	> 7	≤ 5	> 5	≤ 5	7	9 to < 20	≥ 20	All		25 to 35.5	< 25 & ≥ 40	25 to 31.5	< 25 & ≥ 35	All	All
Ø d (mm)	0.45	0.45	0.5	0.45	0.5	0.45	0.5		0.6	0.6		0.8		0.8		0.8	1
a (mm)	1	1		1		1	1	1.5	1.5	1.5		1.5	2	1.5	2	2	

Radial type ▪ CA version ▪ cutted leads ▪ standard lead spacing

Example

Length „H“ customized. See product code table customized lead length for further reference.

Ø D (mm)	4	5	6.3	8	10	13	16	18	22	25
F (mm)	1.5	2	2.5	3.5	5	5	7.5	7.5	10	12.5

G H	2 2 1	M	6 R 3	E	1 1 0	E	C A	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

Radial type ▪ CE version ▪ cutted leads ▪ wide lead spacing ≤ 2.5mm

Example

Length „H“ customized. See product code table customized lead length for further reference.

Ø D (mm)	4	5
F (mm)	2	2.5

S G	2 R 2	M	0 5 0	B	0 7 0	E	C E	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

For further information please contact sales@capxon.org

AVAILABLE LEAD TREATMENTS ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

Radial type ▪ CF / CG / CH / CI version ▪ cutted leads ▪ wide lead spacing ≥ 2.5mm

Ø D (mm)	4	4	4	5	5	6.3	6.3	8	10	13
F (mm)	2.5	3.5	5	3.5	5	3.5	5	5	7.5	7.5
Code	CF	CG	CH	CG	CH	CG	CH	CH	CI	CI

Example

Length „H“ customized. See product code table customized lead length for further reference.

G H	1 2 1	M	0 1 6	E	1 1 0	E	C H	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

Radial type ▪ FB / FC / FD version ▪ wide lead spacing ≤ 3.5mm ▪ long anode

Ø D (mm)	4	5	6.3
F (mm)	2	2.5	3.5
Code	FB	FC	FD

Example

Length „H“ customized. See product code table customized lead length for further reference.

S G	R 4 7	M	0 5 0	B	0 7 0	E	F B	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

Radial type ▪ FA / FE version ▪ wide lead spacing ≥ 5mm ▪ long anode

Ø D (mm)	4	5	6.3	8	10	13
F (mm)	5	5	5	5	7.5	7.5
Code	FA	FA	FA	FA	FE	FE

Example

Length „H“ customized. See product code table customized lead length for further reference.

G T	2 2 1	M	0 1 0	E	1 1 0	E	F A	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

For further information please contact sales@capxon.org

AVAILABLE LEAD TREATMENTS ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

Radial type ▪ KA version ▪ kinked anode and cathode ▪ standard lead spacing

Ø D (mm)	5	6.3	8	10	13	16	18	22
F (mm)	2	2.5	3.5	5	5	7.5	7.5	10
H_1 (mm)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
H_2 (mm)	4	4	4	4.5	4.5	4.5	4.5	4.5
E (mm)	1.12	1.12	1.32	1.32	1.32	1.32	1.32	1.82

Example

T E	2 2 2	M	0 2 5	J	3 5 5	E	K A	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

Radial type ▪ KE version ▪ kinked anode and cathode ▪ wide lead spacing ≤ 2.5mm

Ø D (mm)	4	5
F (mm)	2	2.5
H_1 (mm)	1.8	1.8
H_2 (mm)	4	4
E (mm)	1.12	1.12

Example

S G	3 3 0	M	0 1 0	C	0 7 0	E	K E	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

Radial type ▪ KF version ▪ kinked anode and cathode ▪ wide lead spacing 5mm

Ø D (mm)	5	6.3	8
F (mm)	5	5	5
H_1 (mm)	4	4	4
E (mm)	1.12	1.12	1.32

Example

T H	2 2 1	M	0 2 5	F	1 1 5	E	K F	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

For further information please contact sales@capxon.org

AVAILABLE LEAD TREATMENTS ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

Radial type ▪ CK version ▪ kinked anode

Ø D (mm)	4	5	6.3	8	10	13	16	18
F (mm)	1.5	2	2.5	3.5	5	5	7.5	7.5
H_1 (mm)	4	4	4	4	4.5	4.5	4.5	4.5
H_2 (mm)	4	4	4	4	4.5	4.5	4.5	4.5

Example

F K	1 0 0	M	4 0 0	G	2 0 0	E	C K	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

Radial type ▪ EF version ▪ double kinked anode and cathode ▪ lead spacing 5mm

Ø D (mm)	4	5	6.3	8
F (mm)	5	5	5	5
H_1 (mm)	1.8	1.8	1.8	1.8
H_2 (mm)	4	4	4	4
F_1 (mm)	1.2	1.2	1.2	1.2

Example

T E	3 3 0	M	0 6 3	F	1 1 5	E	E F	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

Radial type ▪ CR version ▪ L - bended leads ▪ cathode right

Ø D (mm)	4	5	6.3	8	10	13	16	18	22	25
F (mm)	1.5	2	2.5	3.5	5	5	7.5	7.5	10	12.5
H_1 (mm)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Example

Length „H“ customized. See product code table customized lead length for further reference.

F K	1 0 1	M	4 5 0	K	3 5 5	E	C R	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

For further information please contact sales@capxon.org

AVAILABLE LEAD TREATMENTS ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

Radial type ▪ CL version ▪ L - bended leads ▪ cathode left

Length „H“ customized. See product code table customized lead length for further reference.

Ø D (mm)	4	5	6.3	8	10	13	16	18	22	25
F (mm)	1.5	2	2.5	3.5	5	5	7.5	7.5	10	12.5
H_1 (mm)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Example

G H	5 6 0	M	0 8 0	F	1 1 5	E	C L	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

Radial type ▪ CS version ▪ SMD - bended leads ▪ cathode left

Length „H“, „H_1“ and „H_2“ customized
Ask CapXon for further assistance

Ø D (mm)	4	5	6.3	8	10	13	16	18	22	25
F (mm)	1.5	2	2.5	3.5	5	5	7.5	7.5	10	12.5

Example

F K	3 R 3	M	4 5 0	G	0 9 0	E	C S	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

Radial type ▪ CZ version ▪ SMD - bended leads ▪ cathode right

Length „H“, „H_1“ and „H_2“ customized
Ask CapXon for further assistance

Ø D (mm)	4	5	6.3	8	10	13	16	18	22	25
F (mm)	1.5	2	2.5	3.5	5	5	7.5	7.5	10	12.5

Example

T H	4 7 2	M	0 3 5	J	4 0 0	E	C Z	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

For further information please contact sales@capxon.org

AVAILABLE LEAD TREATMENTS ▪ RADIAL ALUMINUM ELECTROLYTIC CAPACITORS

Radial type ▪ JI version ▪ polarity protected footprint ▪ cathode bended

Ø D (mm)	10	12.5	13	16	18	22
F (mm)	5	5	5	7.5	7.5	10
J (mm)	1.5	1.5	1.5	1.9	1.9	1.9
Ø d (mm)	0.6	0.6	0.6	0.8	0.8	0.8

Example

Length „H“ customized. See product code table customized lead length for further reference.

G H	1 5 2	M	0 6 3	K	3 1 5	E	J I	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

Radial type ▪ CD version ▪ polarity protected footprint ▪ anode pressed

Ø D (mm)	10	12.5	13	16	18	22
F (mm)	5	5	5	7.5	7.5	10
C (mm)	1.1	1.1	1.1	1.4	1.4	1.4
Ø d (mm)	0.6	0.6	0.6	0.8	0.8	0.8

Example

Length „H“ customized. See product code table customized lead length for further reference.

T E	3 3 1	M	0 5 0	I	2 0 0	E	C D	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

For further information please contact sales@capxon.org

PRODUCT CODE TABLE ▪ CUSTOMIZED LEAD LENGTH

THT type example:

SG series ▪ 2.2µF ▪ 50V ▪ ±20% ▪ Ø 4mm ▪ L 5mm ▪ CE version, wide lead spacing ▪ P 2.5mm ▪ H 4.5mm ▪ AEC-Q200

Product code 17th digit	H (mm)
A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
I	9
J	10
K	11
L	12
M	13
N	14
O	15
P	16
Q	17
R	18
S	19
T	20
U	21
V	22
W	23
X	24
Y	25
Z	26

Product code 18st digit	H (mm)
0	0.0
1	0.1
2	0.2
3	0.3
4	0.4
5	0.5
6	0.6
7	0.7
8	0.8
9	0.9

Example H (mm)	Product code Automotive
4.5	**XD5**
6.0	**XF0**
10.7	**XX7**
16.5	**XP5**

The 18th digit is according basic ordering of the Latin alphabet and shows the measure "H" in front of the decimal separator. The 19th digit follows the numbering from 0 to 9 and shows the measure "H" after the decimal separator.

For further information please contact sales@capxon.org

Aluminum Electrolytic Capacitors

Snap In Types

OVERVIEW ▪ SNAP-IN ALUMINUM ELECTROLYTIC CAPACITORS

Features

Series	Page	AEC-Q200	High Reliability	High Temperature	Low ESR	Long Life	Multipin	Ultra Long Life	Vibration Proof	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)	Useful Life (hours)
UJ	172	●	●			●	●			-40	+105	200	450	82	3300	2000	5000
										-25		500	550	47	1000		
UK	181	●	●				●	●		-40	+105	200	450	68	2200	3000	8000
										-25		500	550	47	680		
UL	191	●	●		●		●	●		-40	+105	200	450	82	2700	5000	10000
										-25		500	550	47	680		
HC	204	●	●	●	●		●	●	●	-55	+125	25	63	600	3300	3000	4000
HH	208	●	●	●			●	●		-40	+125	400	450	47	560	3000	4000

For further information please contact sales@capxon.org

UJ SERIES ▪ LONG LIFE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · LONG LIFE · HIGH VOLTAGE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ Snap-In type
- Useful life: 105°C ▪ 5 000 hours
- Extremely stable dissipation factor and leakage current
- Especially for applications with demanding operating environment
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics			
Operating Temperature Range		-40 ~ +105°C		-25 ~ +105°C	
Rated Voltage Range	V_R	200 ~ 450V DC		500 ~ 550V DC	
Surge Voltage	V_S	($V_R \leq 315V$) ▪ $V_S = 1.15 \cdot V_R$		($V_R > 315V$) ▪ $V_S = 1.10 \cdot V_R$	
Capacitance Range	C_R	82 ~ 3300µF		47 ~ 1000µF	
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)			
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	$\leq 3 \cdot \sqrt{C_R \cdot V_R}$ ▪ After 5 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]			
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	200 ~ 400	450 ~ 550	
		tanδ	15	20	
Self-Resistance (20°C ▪ 120Hz)	ESR	Not to exceed the values shown in standard ratings			
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	200 ~ 250	315 ~ 450	500 ~ 550
		Z-25°C/Z+20°C	4	5	6
		Z-40°C/Z+20°C	7	10	-

Lifetime Test		
Useful Life 105°C (V_R & I_R applied)	Test	**5 000 hours**
	△C/C_R	≤ ±20% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
	Deviation Rate @ Useful Life: 10 000 FIT = 1%/1000h with 60% confidence level ▪ parts show higher drift as test criteria	
Endurance 105°C (V_R & I_R applied)	Test	**2 000 hours**
	△C/C_R	≤ ±15% of initial measured value
	tanδ	≤ 175% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±15% of initial measured value
	tanδ	≤ 175% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	
Vibration Resistance Test	Max. 10g force, f_{RANGE} 10Hz … 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ▪ IEC 60068-2-6	

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
200	330	22	25	330	600	1130	UJ331M200M250A□□X
	390	22	25	280	510	1210	UJ391M200M250A□□X
	390	22	30	280	510	1250	UJ391M200M300A□□X
	390	25	25	280	510	1310	UJ391M200N250A□□X
	470	22	30	230	420	1400	UJ471M200M300A□□X
	470	25	25	230	420	1400	UJ471M200N250A□□X
	470	25	30	230	420	1520	UJ471M200N300A□□X
	560	22	35	200	360	1610	UJ561M200M350A□□X
	560	25	30	200	360	1610	UJ561M200N300A□□X
	560	30	25	200	360	1620	UJ561M200O250A□□X
	680	22	40	160	290	1860	UJ681M200M400A□□X
	680	25	30	160	290	1690	UJ681M200N300A□□X
	680	30	25	160	290	1980	UJ681M200O250A□□X
	820	22	45	130	240	2140	UJ821M200M450A□□X
	820	25	35	130	240	2140	UJ821M200N350A□□X
	820	30	30	130	240	2290	UJ821M200O300A□□X
	1000	22	50	110	200	2480	UJ102M200M500A□□X
	1000	25	40	110	200	2480	UJ102M200N400A□□X
	1000	30	30	110	200	2520	UJ102M200O300A□□X
	1000	35	25	110	200	2440	UJ102M200P250A□□X
	1200	25	45	94	170	2890	UJ122M200N450A□□X
	1200	30	35	94	170	2890	UJ122M200O350A□□X
	1200	35	30	94	170	3030	UJ122M200P300A□□X
	1500	25	55	72	130	3520	UJ152M200N550A□□X
	1500	30	40	72	130	3590	UJ152M200O400A□□X
	1500	35	35	72	130	3520	UJ152M200P350A□□X
	1800	30	45	61	110	4090	UJ182M200O450A□□X
	1800	35	35	61	110	3770	UJ182M200P350A□□X
	2200	30	55	50	90	4820	UJ222M200O550A□□X
	2200	35	45	50	90	4820	UJ222M200P450A□□X
	2700	35	50	41	74	5160	UJ272M200P500A□□X
	3300	35	55	33	60	5850	UJ332M200P550A□□X
250	220	22	25	500	900	910	UJ221M250M250A□□X
	270	22	25	410	740	1030	UJ271M250M250A□□X
	330	22	30	330	600	1200	UJ331M250M300A□□X
	390	22	35	280	510	1370	UJ391M250M350A□□X
	390	25	25	280	510	1260	UJ391M250N250A□□X
	470	22	35	230	420	1530	UJ471M250M350A□□X
	470	25	30	230	420	1530	UJ471M250N300A□□X
	470	30	25	230	420	1690	UJ471M250O250A□□X
	560	22	40	200	360	1760	UJ561M250M400A□□X
	560	25	35	200	360	1680	UJ561M250N350A□□X
	680	22	45	160	290	2040	UJ681M250M450A□□X
	680	25	40	160	290	2130	UJ681M250N400A□□X

□□ **see description at end of standard ratings**

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
250	680	30	30	160	290	2130	UJ681M250O300A□□X
	680	35	25	160	290	2120	UJ681M250P250A□□X
	820	25	45	130	240	2230	UJ821M250N450A□□X
	820	30	35	130	240	2450	UJ821M250O350A□□X
	820	35	30	130	240	2620	UJ821M250P300A□□X
	1000	25	50	110	200	2570	UJ102M250N500A□□X
	1000	30	40	110	200	2850	UJ102M250O400A□□X
	1000	35	30	110	200	2770	UJ102M250P300A□□X
	1200	30	45	94	170	3420	UJ122M250O450A□□X
	1200	35	35	94	170	3260	UJ122M250P350A□□X
	1500	30	50	72	130	3720	UJ152M250O500A□□X
	1500	35	40	72	130	3780	UJ152M250P400A□□X
	1800	35	45	61	110	4090	UJ182M250P450A□□X
	2200	35	55	50	90	5040	UJ222M250P550A□□X
350	100	22	25	1110	1990	590	UJ101M350M250A□□X
	120	22	30	920	1660	690	UJ121M350M300A□□X
	120	25	25	920	1660	690	UJ121M350N250A□□X
	150	22	35	740	1330	800	UJ151M350M350A□□X
	180	25	30	620	1110	850	UJ181M350N300A□□X
	180	30	25	620	1110	890	UJ181M350O250A□□X
	220	22	40	500	900	990	UJ221M350M400A□□X
	220	25	40	500	900	1100	UJ221M350N400A□□X
	220	30	30	500	900	1080	UJ221M350O300A□□X
	220	35	25	500	900	1080	UJ221M350P250A□□X
	270	25	45	410	740	1280	UJ271M350N450A□□X
	270	30	35	410	740	1250	UJ271M350O350A□□X
	270	35	25	410	740	1250	UJ271M350P250A□□X
	330	25	50	330	600	1550	UJ331M350N500A□□X
	330	30	35	330	600	1460	UJ331M350O350A□□X
	330	35	30	330	600	1460	UJ331M350P300A□□X
	390	35	40	280	510	1920	UJ391M350P400A□□X
	470	35	45	230	420	2170	UJ471M350P450A□□X
	560	35	45	200	360	2410	UJ561M350P450A□□X
	560	40	40	200	360	2460	UJ561M350Q400A□□X
	680	35	55	160	290	2790	UJ681M350P550A□□X
	680	40	45	160	290	2790	UJ681M350Q450A□□X
	820	35	60	130	240	3210	UJ821M350P600A□□X
	820	40	50	130	240	3150	UJ821M350Q500A□□X
	820	45	40	130	240	3110	UJ821M350V400A□□X
	1000	35	60	110	200	3230	UJ102M350P600A□□X
	1000	40	50	110	200	3260	UJ102M350Q500A□□X
	1200	40	55	94	170	3680	UJ122M350Q550A□□X
	1500	40	65	72	130	4560	UJ152M350Q650A□□X
	1800	40	75	61	110	5670	UJ182M350Q750A□□X

□□ see description at end of standard ratings

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
400	100	22	25	1110	1990	650	UJ101M400M250A□□X
	120	22	25	920	1660	920	UJ121M400M250A□□X
	150	22	30	740	1330	1080	UJ151M400M300A□□X
	180	22	30	620	1110	1150	UJ181M400M300A□□X
	180	25	25	620	1110	1120	UJ181M400N250A□□X
	220	22	35	500	900	1320	UJ221M400M350A□□X
	220	25	30	500	900	1300	UJ221M400N300A□□X
	270	22	40	410	740	1500	UJ271M400M400A□□X
	270	25	35	410	740	1490	UJ271M400N350A□□X
	270	30	25	410	740	1330	UJ271M400O250A□□X
	330	22	50	330	600	1760	UJ331M400M500A□□X
	330	25	40	330	600	1680	UJ331M400N400A□□X
	330	30	30	330	600	1550	UJ331M400O300A□□X
	330	35	25	330	600	1440	UJ331M400P250A□□X
	390	22	55	280	510	1940	UJ391M400M550A□□X
	390	25	45	280	510	1860	UJ391M400N450A□□X
	390	30	35	280	510	1750	UJ391M400O350A□□X
	390	35	30	280	510	1750	UJ391M400P300A□□X
	470	25	50	230	420	2070	UJ471M400N500A□□X
	470	30	40	230	420	1970	UJ471M400O400A□□X
	470	35	30	230	420	1910	UJ471M400P300A□□X
	560	25	60	200	360	2370	UJ561M400N600A□□X
	560	30	45	200	360	2180	UJ561M400O450A□□X
	560	35	35	200	360	1920	UJ561M400P350A□□X
	680	30	50	160	290	2410	UJ681M400O500A□□X
	680	35	40	160	290	2350	UJ681M400P400A□□X
	820	30	60	130	240	2760	UJ821M400O600A□□X
	820	35	45	130	240	2670	UJ821M400P450A□□X
	1000	35	55	110	200	3160	UJ102M400P550A□□X
	1000	40	50	110	200	3240	UJ102M400Q500A□□X
	1200	35	60	94	170	3560	UJ122M400P600A□□X
	1200	40	55	94	170	3640	UJ122M400Q550A□□X
	1500	45	70	72	130	4680	UJ152M400V700A□□X
	1800	45	80	61	110	5290	UJ182M400V800A□□X
450	82	22	25	1790	3230	590	UJ820M450M250A□□X
	100	22	30	1470	2650	690	UJ101M450M300A□□X
	100	25	25	1470	2650	690	UJ101M450N250A□□X
	120	22	35	1230	2210	720	UJ121M450M350A□□X
	150	22	35	980	1770	920	UJ151M450M350A□□X
	150	25	30	980	1770	910	UJ151M450N300A□□X
	150	30	25	980	1770	970	UJ151M450O250A□□X
	180	22	40	820	1470	1280	UJ181M450M400A□□X
	180	25	30	820	1470	1200	UJ181M450N300A□□X
	180	30	25	820	1470	1180	UJ181M450O250A□□X

□□ see description at end of standard ratings

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
450	220	22	45	670	1210	1440	UJ221M450M450A□□X
	220	25	35	670	1210	1370	UJ221M450N350A□□X
	220	30	30	670	1210	1360	UJ221M450O300A□□X
	330	22	60	440	800	1860	UJ331M450M600A□□X
	330	25	50	440	800	1820	UJ331M450N500A□□X
	330	30	35	440	800	1640	UJ331M450O350A□□X
	330	35	30	440	800	1640	UJ331M450P300A□□X
	390	25	55	380	680	2010	UJ391M450N550A□□X
	390	30	40	380	680	1830	UJ391M450O400A□□X
	390	35	35	380	680	1830	UJ391M450P350A□□X
	470	25	60	310	560	2210	UJ471M450N600A□□X
	470	30	45	310	560	2050	UJ471M450O450A□□X
	470	35	40	310	560	2050	UJ471M450P400A□□X
	560	30	50	260	470	2260	UJ561M450O500A□□X
	560	35	45	260	470	2180	UJ561M450P450A□□X
	680	30	60	220	390	2590	UJ681M450O600A□□X
	680	35	50	220	390	2580	UJ681M450P500A□□X
	820	35	60	180	320	2800	UJ821M450P600A□□X
	820	40	50	180	320	2800	UJ821M450Q500A□□X
	1000	35	65	150	270	3210	UJ102M450P650A□□X
	1000	40	55	150	270	3210	UJ102M450Q550A□□X
	1200	40	70	120	220	3540	UJ122M450Q700A□□X
500	56	22	25	2630	4740	630	UJ560M500M250A□□X
	82	22	35	1790	3230	820	UJ820M500M350A□□X
	82	25	25	1790	3230	780	UJ820M500N250A□□X
	120	22	45	1230	2210	1050	UJ121M500M450A□□X
	120	25	35	1230	2210	1020	UJ121M500N350A□□X
	120	30	25	1230	2210	970	UJ121M500O250A□□X
	150	22	50	980	1770	1200	UJ151M500M500A□□X
	150	25	40	980	1770	1170	UJ151M500N400A□□X
	150	30	30	980	1770	1130	UJ151M500O300A□□X
	150	35	25	980	1770	1090	UJ151M500P250A□□X
	180	22	60	820	1470	1370	UJ181M500M600A□□X
	180	25	45	820	1470	1310	UJ181M500N450A□□X
	180	30	35	820	1470	1280	UJ181M500O350A□□X
	180	35	30	820	1470	1260	UJ181M500P300A□□X
	220	25	50	670	1210	1460	UJ221M500N500A□□X
	220	30	40	670	1210	1450	UJ221M500O400A□□X
	220	35	35	670	1210	1440	UJ221M500P350A□□X
	270	25	60	540	980	1700	UJ271M500N600A□□X
	270	30	45	540	980	1630	UJ271M500O450A□□X
	270	35	35	540	980	1630	UJ271M500P350A□□X
	330	30	50	440	800	1810	UJ331M500O500A□□X
	330	35	40	440	800	1710	UJ331M500P400A□□X

□□ see description at end of standard ratings

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
500	390	30	60	380	680	2060	UJ391M500O600A□□X
	390	35	50	380	680	2060	UJ391M500P500A□□X
	470	35	55	310	560	2190	UJ471M500P550A□□X
	560	35	60	260	470	2650	UJ561M500P600A□□X
	680	40	60	220	390	3000	UJ681M500Q600A□□X
	820	40	70	180	320	4000	UJ821M500Q700A□□X
	1000	40	80	150	270	4680	UJ102M500Q800A□□X
550	47	25	25	3130	5640	470	UJ470M550N250A□□X
	56	25	30	2630	4740	540	UJ560M550N300A□□X
	68	25	35	2170	3900	620	UJ680M550N350A□□X
	68	30	25	2170	3900	650	UJ680M550O250A□□X
	82	25	35	1790	3230	690	UJ820M550N350A□□X
	82	30	30	1790	3230	730	UJ820M550O300A□□X
	100	25	40	1470	2650	800	UJ101M550N400A□□X
	100	30	35	1470	2650	840	UJ101M550O350A□□X
	100	35	25	1470	2650	870	UJ101M550P250A□□X
	120	25	50	1230	2210	920	UJ121M550N500A□□X
	120	30	35	1230	2210	940	UJ121M550O350A□□X
	120	35	30	1230	2210	1040	UJ121M550P300A□□X
	150	25	55	980	1770	1090	UJ151M550N550A□□X
	150	30	45	980	1770	1170	UJ151M550O450A□□X
	150	35	35	980	1770	1210	UJ151M550P350A□□X
	180	30	50	820	1470	1330	UJ181M550O500A□□X
	180	35	40	820	1470	1360	UJ181M550P400A□□X
	180	35	35	820	1470	1290	UJ181M550P350A□□X
	220	30	55	670	1210	1540	UJ221M550O550A□□X
	220	35	45	670	1210	1560	UJ221M550P450A□□X
	220	35	35	670	1210	1400	UJ221M550P350A□□X
	270	35	50	540	980	1790	UJ271M550P500A□□X
	270	35	40	540	980	1630	UJ271M550P400A□□X
	330	35	50	440	800	1660	UJ331M550P500A□□X
	390	35	55	380	680	1850	UJ391M550P550A□□X
	470	35	60	310	560	2100	UJ471M550P600A□□X

□□: Enter **P6** for standard type ▪ 6mm pin length

□□: Enter **Z6** for 3-pin type ▪ 6mm pin length

□□: Enter **Y6** for multi-pin type ▪ 6mm pin length

□□: Enter **P4** for standard type ▪ 4mm pin length

□□: Enter **Z4** for 3-pin type ▪ 4mm pin length

□□: Enter **Y4** for multi-pin type ▪ 4mm pin length

For further information please contact sales@capxon.org

DIMENSIONS ▪ All dimensions in mm

2-pin version ▪ Standard type

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 6 ± 1mm. Also available H = 4 ± 1mm

3-pin version ▪ Polarity protection

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 4 ± 1mm. Also available H = 6 ± 1mm

Multipin version ▪ Diameter ø D ≥ 30 mm

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 6 ± 1mm. Also available H = 4 ± 1mm

Further possible terminal styles can be found in our packaging information liquid snap-in.

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

V_R (V) / Frequency (Hz)	50/60	100/120	300	1k	10k	50k - 100k
$200 \le V_R \le 250$	0.81	1	1.17	1.32	1.45	1.5
$350 \le V_R \le 550$	0.77	1	1.16	1.3	1.41	1.43

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid Snap-In
Page 274	Page 212 and following

For further information please contact sales@capxon.org

USEFUL LIFE

With: I_A: Application current
I_R: Rated ripple current (A RMS)
T_A: Application temperature of the capacitor

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

UK SERIES ▪ ULTRA LONG LIFE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · LONG LIFE · HIGH VOLTAGE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ Snap-In type
- Useful life: 105°C ▪ 8 000 hours
- Extremely stable dissipation factor and leakage current
- Especially for applications with demanding operating environment
- AEC-Q200 qualified

SPECIFICATIONS

Items		Performance Characteristics			
Operating Temperature Range		-40 ~ +105°C		-25 ~ +105°C	
Rated Voltage Range	V_R	200 ~ 450V DC		500 ~ 550V DC	
Surge Voltage	V_S	($V_R \leq 315V$) ▪ $V_S = 1.15 \cdot V_R$		($V_R > 315V$) ▪ $V_S = 1.10 \cdot V_R$	
Capacitance Range	C_R	68 ~ 2200µF		47 ~ 680µF	
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)			
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	$\leq 3 \cdot \sqrt{C_R \cdot V_R}$ ▪ After 5 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]			
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	200 ~ 400	450 ~ 550	
		tanδ	15	20	
Self-Resistance (20°C ▪ 120Hz)	ESR	Not to exceed the values shown in standard ratings			
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	200 ~ 250	315 ~ 450	500 ~ 550
		Z-25°C/Z+20°C	4	5	6
		Z-40°C/Z+20°C	7	10	-

Lifetime Test		
Useful Life 105°C (V_R & I_R applied)	Test	**8 000 hours**
	△C/C_R	≤ ±20% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
	Deviation Rate @ Useful Life: 10 000 FIT = 1%/1000h with 60% confidence level ▪ parts show higher drift as test criteria	
Endurance 105°C (V_R & I_R applied)	Test	**3 000 hours**
	△C/C_R	≤ ±15% of initial measured value
	tanδ	≤ 175% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±15% of initial measured value
	tanδ	≤ 175% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	
Vibration Resistance Test	Max. 10g force, f_{RANGE} 10Hz … 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ▪ IEC 60068-2-6	

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
200	330	22	25	320	600	1380	UK331M200M250A□□X
	390	22	25	280	510	1450	UK391M200M250A□□X
	470	22	30	230	420	1680	UK471M200M300A□□X
	470	25	25	230	420	1680	UK471M200N250A□□X
	560	22	35	190	360	1810	UK561M200M350A□□X
	560	25	30	190	360	1780	UK561M200N300A□□X
	560	30	25	190	360	1960	UK561M200O250A□□X
	680	22	40	160	290	2150	UK681M200M400A□□X
	680	25	35	160	290	2060	UK681M200N350A□□X
	680	30	25	160	290	2170	UK681M200O250A□□X
	820	22	45	130	240	2420	UK821M200M450A□□X
	820	25	35	130	240	2220	UK821M200N350A□□X
	820	30	25	130	240	2340	UK821M200O250A□□X
	1000	25	45	110	200	2720	UK102M200N450A□□X
	1000	30	30	110	200	2910	UK102M200O300A□□X
	1000	35	25	110	200	3140	UK102M200P250A□□X
	1200	25	50	92	170	2870	UK122M200N500A□□X
	1200	30	35	92	170	3420	UK122M200O350A□□X
	1200	35	30	92	170	3380	UK122M200P300A□□X
	1500	25	60	70	130	3290	UK152M200N600A□□X
	1500	30	45	70	130	4120	UK152M200O450A□□X
	1500	35	35	70	130	3910	UK152M200P350A□□X
	1800	30	50	59	110	4330	UK182M200O500A□□X
	1800	35	40	59	110	4460	UK182M200P400A□□X
	2200	30	60	49	90	4750	UK222M200O600A□□X
	2200	35	45	49	90	5110	UK222M200P450A□□X
250	220	22	25	490	900	1150	UK221M250M250A□□X
	270	22	25	400	740	1210	UK271M250M250A□□X
	330	22	30	320	600	1520	UK331M250M300A□□X
	330	25	25	320	600	1450	UK331M250N250A□□X
	390	22	35	280	510	1720	UK391M250M350A□□X
	390	22	40	280	510	1820	UK391M250M400A□□X
	390	25	30	280	510	1580	UK391M250N300A□□X
	390	30	25	280	510	1620	UK391M250O250A□□X
	470	22	40	230	420	1960	UK471M250M400A□□X
	470	25	30	230	420	1720	UK471M250N300A□□X
	470	30	25	230	420	1880	UK471M250O250A□□X
	560	22	45	190	360	2160	UK561M250M450A□□X
	560	25	35	190	360	1960	UK561M250N350A□□X
	560	30	30	190	360	2220	UK561M250O300A□□X
	560	35	25	190	360	2080	UK561M250P250A□□X
	680	22	50	160	290	2410	UK681M250M500A□□X
	680	25	40	160	290	2210	UK681M250N400A□□X
	680	30	30	160	290	2350	UK681M250O300A□□X

□□ **see description at end of standard ratings**

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
250	680	35	25	160	290	2500	UK681M250P250A□□X
	820	30	35	130	240	2780	UK821M250O350A□□X
	820	35	30	130	240	2900	UK821M250P300A□□X
	1000	30	40	110	200	3300	UK102M250O400A□□X
	1000	35	35	110	200	3360	UK102M250P350A□□X
	1200	30	50	92	170	3850	UK122M250O500A□□X
	1200	35	40	92	170	3820	UK122M250P400A□□X
	1500	30	55	70	130	4330	UK152M250O550A□□X
	1500	35	45	70	130	4340	UK152M250P450A□□X
	1800	35	50	59	110	4700	UK182M250P500A□□X
	2200	35	60	49	90	5580	UK222M250P600A□□X
315	150	22	25	720	1330	1000	UK151M315M250A□□X
	180	22	30	600	1110	1150	UK181M315M300A□□X
	220	22	30	490	900	1300	UK221M315M300A□□X
	220	25	25	490	900	1300	UK221M315N250A□□X
	270	22	35	400	740	1410	UK271M315M350A□□X
	270	25	30	400	740	1420	UK271M315N300A□□X
	330	22	40	320	600	1740	UK331M315M400A□□X
	330	25	35	320	600	1580	UK331M315N350A□□X
	330	30	25	320	600	1620	UK331M315O250A□□X
	390	22	50	280	510	1940	UK391M315M500A□□X
	390	25	35	280	510	1700	UK391M315N350A□□X
	390	30	30	280	510	1780	UK391M315O300A□□X
	390	35	25	280	510	1800	UK391M315P250A□□X
	470	22	55	230	420	2050	UK471M315M550A□□X
	470	25	45	230	420	2040	UK471M315N450A□□X
	470	30	35	230	420	2030	UK471M315O350A□□X
	470	35	30	230	420	2070	UK471M315P300A□□X
	560	25	50	190	360	2280	UK561M315N500A□□X
	560	30	35	190	360	2230	UK561M315O350A□□X
	560	35	30	190	360	2250	UK561M315P300A□□X
	680	25	55	160	290	2700	UK681M315N550A□□X
	680	30	40	160	290	2660	UK681M315O400A□□X
	680	35	35	160	290	2700	UK681M315P350A□□X
	820	30	50	130	240	3120	UK821M315O500A□□X
	820	35	40	130	240	3100	UK821M315P400A□□X
	1000	30	55	110	200	3640	UK102M315O550A□□X
	1000	35	45	110	200	3560	UK102M315P450A□□X
	1200	35	50	92	170	4050	UK122M315P500A□□X
	1500	35	60	70	130	4350	UK152M315P600A□□X
350	100	22	25	1080	1990	740	UK101M350M250A□□X
	100	25	20	1080	1990	520	UK101M350N200A□□X
	120	22	25	900	1660	920	UK121M350M250A□□X
	150	22	30	720	1330	1060	UK151M350M300A□□X

□□ see description at end of standard ratings

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STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
350	180	22	30	600	1110	1170	UK181M350M300A□□X
	180	25	25	600	1110	1170	UK181M350N250A□□X
	220	22	35	490	900	1320	UK221M350M350A□□X
	220	22	40	490	900	1400	UK221M350M400A□□X
	220	25	30	490	900	1330	UK221M350N300A□□X
	220	30	25	490	900	1350	UK221M350O250A□□X
	270	22	45	400	740	1550	UK271M350M450A□□X
	270	25	35	400	740	1470	UK271M350N350A□□X
	270	30	25	400	740	1370	UK271M350O250A□□X
	330	22	50	320	600	1760	UK331M350M500A□□X
	330	25	40	320	600	1680	UK331M350N400A□□X
	330	30	30	320	600	1640	UK331M350O300A□□X
	330	35	25	320	600	1690	UK331M350P250A□□X
	390	25	45	280	510	1860	UK391M350N450A□□X
	390	30	35	280	510	1840	UK391M350O350A□□X
	390	35	30	280	510	1870	UK391M350P300A□□X
	470	25	50	230	420	2090	UK471M350N500A□□X
	470	30	40	230	420	2090	UK471M350O400A□□X
	470	35	30	230	420	2080	UK471M350P300A□□X
	560	30	45	190	360	2240	UK561M350O450A□□X
	560	35	35	190	360	2260	UK561M350P350A□□X
	680	30	50	160	290	2670	UK681M350O500A□□X
	680	35	40	160	290	2710	UK681M350P400A□□X
	820	35	45	130	240	3110	UK821M350P450A□□X
	820	35	50	130	240	3250	UK821M350P500A□□X
	1000	35	55	110	200	3580	UK102M350P550A□□X
	1200	35	60	92	170	4100	UK122M350P600A□□X
400	82	22	25	1310	2430	610	UK820M400M250A□□X
	100	22	25	1080	1990	670	UK101M400M250A□□X
	120	22	30	900	1660	790	UK121M400M300A□□X
	120	25	25	900	1660	790	UK121M400N250A□□X
	120	25	30	900	1660	850	UK121M400N300A□□X
	150	22	35	720	1330	950	UK151M400M350A□□X
	150	22	40	720	1330	1000	UK151M400M400A□□X
	150	25	25	720	1330	890	UK151M400N250A□□X
	150	25	30	720	1330	960	UK151M400N300A□□X
	150	30	25	720	1330	990	UK151M400O250A□□X
	180	22	35	600	1110	1040	UK181M400M350A□□X
	180	22	40	600	1110	1100	UK181M400M400A□□X
	180	25	30	600	1110	1050	UK181M400N300A□□X
	180	25	35	600	1110	1120	UK181M400N350A□□X
	180	30	25	600	1110	1090	UK181M400O250A□□X
	180	30	30	600	1110	1170	UK181M400O300A□□X
	220	22	45	490	900	1200	UK221M400M450A□□X

□□ see description at end of standard ratings

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STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
400	220	25	35	490	900	1200	UK221M400N350A□□X
	220	25	45	490	900	1240	UK221M400N450A□□X
	220	30	25	490	900	1150	UK221M400O250A□□X
	220	30	30	490	900	1240	UK221M400O300A□□X
	220	35	25	490	900	1240	UK221M400P250A□□X
	270	22	50	400	740	1320	UK271M400M500A□□X
	270	25	40	400	740	1290	UK271M400N400A□□X
	270	25	50	400	740	1420	UK271M400N500A□□X
	270	30	30	400	740	1270	UK271M400O300A□□X
	270	30	35	400	740	1350	UK271M400O350A□□X
	270	35	25	400	740	1300	UK271M400P250A□□X
	270	35	30	400	740	1390	UK271M400P300A□□X
	330	25	45	320	600	1500	UK331M400N450A□□X
	330	25	50	320	600	1570	UK331M400N500A□□X
	330	30	35	320	600	1500	UK331M400O350A□□X
	330	30	40	320	600	1580	UK331M400O400A□□X
	330	35	30	320	600	1540	UK331M400P300A□□X
	330	35	35	320	600	1640	UK331M400P350A□□X
	390	25	50	280	510	1700	UK391M400N500A□□X
	390	30	40	280	510	1720	UK391M400O400A□□X
	390	30	45	280	510	1800	UK391M400O450A□□X
	390	35	30	280	510	1700	UK391M400P300A□□X
	390	35	35	280	510	1780	UK391M400P350A□□X
	470	30	45	230	420	1980	UK471M400O450A□□X
	470	30	50	230	420	2070	UK471M400O500A□□X
	470	35	35	230	420	1980	UK471M400P350A□□X
	470	35	40	230	420	2070	UK471M400P400A□□X
	470	35	45	230	420	2160	UK471M400P450A□□X
	560	30	50	190	360	2260	UK561M400O500A□□X
	560	35	40	190	360	2260	UK561M400P400A□□X
	560	35	45	190	360	2360	UK561M400P450A□□X
	680	30	50	160	290	2490	UK681M400O500A□□X
	680	35	45	160	290	2600	UK681M400P450A□□X
	680	35	50	160	290	2720	UK681M400P500A□□X
	820	35	55	130	240	3110	UK821M400P550A□□X
	820	35	60	130	240	3230	UK821M400P600A□□X
	1000	35	55	110	200	3440	UK102M400P550A□□X
	1000	35	60	110	200	3570	UK102M400P600A□□X
	1200	35	60	92	170	3910	UK122M400P600A□□X
450	68	22	25	2110	3900	550	UK680M450M250A□□X
	82	22	25	1750	3230	610	UK820M450M250A□□X
	100	22	30	1430	2650	720	UK101M450M300A□□X
	100	25	25	1430	2650	720	UK101M450N250A□□X
	120	22	35	1190	2210	850	UK121M450M350A□□X

□□ see description at end of standard ratings

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STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
450	120	22	40	1190	2210	900	UK121M450M400A□□X
	120	25	30	1190	2210	850	UK121M450N300A□□X
	120	25	35	1190	2210	910	UK121M450N350A□□X
	120	30	25	1190	2210	850	UK121M450O250A□□X
	150	22	40	960	1770	1000	UK151M450M400A□□X
	150	25	30	960	1770	960	UK151M450N300A□□X
	150	25	35	960	1770	1020	UK151M450N350A□□X
	150	30	25	960	1770	1000	UK151M450O250A□□X
	150	30	30	960	1770	1060	UK151M450O300A□□X
	150	35	25	960	1770	1090	UK151M450P250A□□X
	180	22	45	790	1470	1160	UK181M450M450A□□X
	180	22	50	790	1470	1210	UK181M450M500A□□X
	180	25	35	790	1470	1120	UK181M450N350A□□X
	180	25	40	790	1470	1210	UK181M450N400A□□X
	180	30	30	790	1470	1210	UK181M450O300A□□X
	180	30	35	790	1470	1240	UK181M450O350A□□X
	180	35	25	790	1470	1210	UK181M450P250A□□X
	180	35	30	790	1470	1280	UK181M450P300A□□X
	220	25	40	650	1210	1240	UK221M450N400A□□X
	220	25	45	650	1210	1280	UK221M450N450A□□X
	220	30	30	650	1210	1240	UK221M450O300A□□X
	220	30	35	650	1210	1280	UK221M450O350A□□X
	220	35	25	650	1210	1240	UK221M450P250A□□X
	220	35	30	650	1210	1280	UK221M450P300A□□X
	270	25	50	530	980	1420	UK271M450N500A□□X
	270	30	30	530	980	1280	UK271M450O300A□□X
	270	30	35	530	980	1350	UK271M450O350A□□X
	270	35	30	530	980	1390	UK271M450P300A□□X
	270	35	35	530	980	1480	UK271M450P350A□□X
	330	30	40	430	800	1580	UK331M450O400A□□X
	330	30	45	430	800	1660	UK331M450O450A□□X
	330	35	30	430	800	1580	UK331M450P300A□□X
	330	35	35	430	800	1660	UK331M450P350A□□X
	390	30	45	370	680	1800	UK391M450O450A□□X
	390	30	50	370	680	1890	UK391M450O500A□□X
	390	35	40	370	680	1890	UK391M450P400A□□X
	390	35	45	370	680	1970	UK391M450P450A□□X
	470	30	50	300	560	2080	UK471M450O500A□□X
	470	35	35	300	560	1970	UK471M450P350A□□X
	470	35	40	300	560	2080	UK471M450P400A□□X
	470	35	45	300	560	2160	UK471M450P450A□□X
	560	35	50	250	470	2470	UK561M450P500A□□X
	560	35	55	250	470	2570	UK561M450P550A□□X
	680	35	50	210	390	2720	UK681M450P500A□□X

□□ **see description at end of standard ratings**

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STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
450	680	35	60	210	390	2940	UK681M450P600A□□X
	820	35	60	170	320	3230	UK821M450P600A□□X
	820	35	65	170	320	3350	UK821M450P650A□□X
500	47	22	25	3050	5640	450	UK470M500M250A□□X
	56	22	30	2560	4740	520	UK560M500M300A□□X
	68	22	30	2110	3900	520	UK680M500M300A□□X
	68	22	35	2110	3900	560	UK680M500M350A□□X
	68	25	25	2110	3900	540	UK680M500N250A□□X
	68	25	30	2110	3900	580	UK680M500N300A□□X
	82	22	35	1750	3230	700	UK820M500M350A□□X
	82	25	30	1750	3230	710	UK820M500N300A□□X
	100	22	40	1430	2650	810	UK101M500M400A□□X
	100	25	35	1430	2650	860	UK101M500N350A□□X
	100	30	30	1430	2650	850	UK101M500O300A□□X
	120	22	50	1190	2210	980	UK121M500M500A□□X
	120	25	40	1190	2210	950	UK121M500N400A□□X
	120	30	35	1190	2210	1000	UK121M500O350A□□X
	120	35	30	1190	2210	1030	UK121M500P300A□□X
	150	22	50	960	1770	1100	UK151M500M500A□□X
	150	25	45	960	1770	1130	UK151M500N450A□□X
	150	30	40	960	1770	1190	UK151M500O400A□□X
	150	35	35	960	1770	1230	UK151M500P350A□□X
	180	25	50	790	1470	1240	UK181M500N500A□□X
	180	30	45	790	1470	1310	UK181M500O450A□□X
	220	25	55	650	1210	1450	UK221M500N550A□□X
	220	30	45	650	1210	1470	UK221M500O450A□□X
	220	35	40	650	1210	1530	UK221M500P400A□□X
	220	35	35	650	1210	1450	UK221M500P350A□□X
	270	30	50	530	980	1550	UK271M500O500A□□X
	270	35	40	530	980	1620	UK271M500P400A□□X
	330	30	55	430	800	1890	UK331M500O550A□□X
	390	35	45	370	680	1850	UK391M500P450A□□X
	390	35	55	370	680	2020	UK391M500P550A□□X
	470	35	60	300	560	2280	UK471M500P600A□□X
	560	35	65	250	470	2320	UK561M500P650A□□X
	680	40	60	210	390	2450	UK681M500Q600A□□X
550	220	35	35	650	1210	1300	UK221M550P350A□□X
	270	35	45	530	980	1600	UK271M550P450A□□X
	330	35	50	430	800	1630	UK331M550P500A□□X
	390	35	55	370	680	1800	UK391M550P550A□□X
	470	35	65	300	560	2100	UK471M550P650A□□X

□□□: Enter **P6** for standard type ▪ 6mm pin length

□□□: Enter **Z6** for 3-pin type ▪ 6mm pin length

□□□: Enter **Y6** for multi-pin type ▪ 6mm pin length

□□: Enter **P4** for standard type ▪ 4mm pin length

□□: Enter **Z4** for 3-pin type ▪ 4mm pin length

□□: Enter **Y4** for multi-pin type ▪ 4mm pin length

For further information please contact sales@capxon.org

DIMENSIONS ▪ All dimensions in mm

2-pin version ▪ Standard type

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 6 ± 1mm. Also available H = 4 ± 1mm

3-pin version ▪ Polarity protection

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 4 ± 1mm. Also available H = 6 ± 1mm

Multipin version ▪ Diameter ø D ≥ 30 mm

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 6 ± 1mm. Also available H = 4 ± 1mm

Further possible terminal styles can be found in our packaging information liquid snap-in.

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

V_R (V) / Frequency (Hz)	50/60	100/120	300	1k	10k	50k - 100k
$200 \le V_R \le 250$	0.81	1	1.17	1.32	1.45	1.5
$315 \le V_R \le 550$	0.77	1	1.16	1.3	1.41	1.43

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid Snap-In
Page 274	Page 212 and following

USEFUL LIFE

With: I_A: Application current
I_R: Rated ripple current (A RMS)
T_A: Application temperature of the capacitor

For further information please contact sales@capxon.org

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

UL SERIES ▪ ULTRA LONG LIFE, AUTOMOTIVE 105°C TYPE

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · LONG LIFE · HIGH VOLTAGE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ Snap-In type
- Useful life: 105°C ▪ 10 000 hours
- Extremely stable dissipation factor and leakage current
- Especially for applications with demanding operating environment
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics			
Operating Temperature Range		-40 ~ +105°C		-25 ~ +105°C	
Rated Voltage Range	V_R	200 ~ 450V DC		500 ~ 550V DC	
Surge Voltage	V_S	($V_R \leq 315V$) ▪ $V_S = 1.15 \cdot V_R$		($V_R > 315V$) ▪ $V_S = 1.10 \cdot V_R$	
Capacitance Range	C_R	82 ~ 2700µF		47 ~ 680µF	
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)			
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	$\leq 3 \cdot \sqrt{C_R \cdot V_R}$ ▪ After 5 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]			
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V_R (V DC)	200 ~ 400	450 ~ 550	
		tanδ	15	20	
Self-Resistance (20°C ▪ 120Hz)	ESR	Not to exceed the values shown in standard ratings			
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	200 ~ 250	315 ~ 450	500 ~ 550
		Z-25°C/Z+20°C	4	5	6
		Z-40°C/Z+20°C	7	10	-

Lifetime Test		
Useful Life 105°C (V_R & I_R applied)	Test	**10 000 hours**
	△C/C_R	≤ ±20% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
	Deviation Rate @ Useful Life: 10 000 FIT = 1%/1000h with 60% confidence level ▪ parts show higher drift as test criteria	
Endurance 105°C (V_R & I_R applied)	Test	**5 000 hours**
	△C/C_R	≤ ±15% of initial measured value
	tanδ	≤ 175% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 105°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±15% of initial measured value
	tanδ	≤ 175% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	
Vibration Resistance Test	Max. 10g force, f_{RANGE} 10Hz … 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ▪ IEC 60068-2-6	

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
200	180	22	20	580	1110	750	UL181M200M200A□□X
	220	22	25	470	900	800	UL221M200M250A□□X
	270	22	25	390	740	1310	UL271M200M250A□□X
	270	22	30	390	740	1350	UL271M200M300A□□X
	270	25	25	390	740	1350	UL271M200N250A□□X
	330	22	25	320	600	1410	UL331M200M250A□□X
	330	22	30	320	600	1530	UL331M200M300A□□X
	330	25	25	320	600	1480	UL331M200N250A□□X
	390	22	30	270	510	1630	UL391M200M300A□□X
	390	22	35	270	510	1680	UL391M200M350A□□X
	390	25	25	270	510	1630	UL391M200N250A□□X
	390	25	30	270	510	1680	UL391M200N300A□□X
	390	30	25	270	510	1680	UL391M200O250A□□X
	470	22	30	220	420	1720	UL471M200M300A□□X
	470	22	35	220	420	1840	UL471M200M350A□□X
	470	25	25	220	420	1630	UL471M200N250A□□X
	470	25	30	220	420	1750	UL471M200N300A□□X
	470	35	25	220	420	1750	UL471M200P250A□□X
	560	22	35	190	360	1950	UL561M200M350A□□X
	560	22	40	190	360	2070	UL561M200M400A□□X
	560	25	30	190	360	1840	UL561M200N300A□□X
	560	25	35	190	360	1920	UL561M200N350A□□X
	560	30	30	190	360	1840	UL561M200O300A□□X
	560	35	25	190	360	1840	UL561M200P250A□□X
	680	22	40	150	290	2220	UL681M200M400A□□X
	680	22	45	150	290	2320	UL681M200M450A□□X
	680	25	35	150	290	2110	UL681M200N350A□□X
	680	25	40	150	290	2320	UL681M200N400A□□X
	680	30	30	150	290	2110	UL681M200O300A□□X
	680	30	35	150	290	2320	UL681M200O350A□□X
	680	35	30	150	290	2320	UL681M200P300A□□X
	820	22	50	130	240	2600	UL821M200M500A□□X
	820	25	40	130	240	2370	UL821M200N400A□□X
	820	30	30	130	240	2110	UL821M200O300A□□X
	820	30	35	130	240	2370	UL821M200O350A□□X
	820	35	30	130	240	2370	UL821M200P300A□□X
	1000	22	60	110	200	3000	UL102M200M600A□□X
	1000	25	45	110	200	2630	UL102M200N450A□□X
	1000	30	35	110	200	2370	UL102M200O350A□□X
	1000	30	40	110	200	2420	UL102M200O400A□□X
	1000	35	30	110	200	2370	UL102M200P300A□□X
	1000	35	35	110	200	2420	UL102M200P350A□□X
	1200	25	50	89	170	2880	UL122M200N500A□□X
	1200	30	40	89	170	2550	UL122M200O400A□□X

□□ see description at end of standard ratings

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STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
200	1200	35	30	89	170	2440	UL122M200P300A□□X
	1200	35	35	89	170	2880	UL122M200P350A□□X
	1500	30	45	68	130	2820	UL152M200O450A□□X
	1500	30	50	68	130	3000	UL152M200O500A□□X
	1500	35	35	68	130	2980	UL152M200P350A□□X
	1500	35	40	68	130	3080	UL152M200P400A□□X
	1800	30	50	58	110	3080	UL182M200O500A□□X
	1800	35	40	58	110	3180	UL182M200P400A□□X
	1800	35	45	58	110	3280	UL182M200P450A□□X
	2200	35	50	48	90	3450	UL222M200P500A□□X
	2700	35	60	39	74	4000	UL272M200P600A□□X
250	220	22	25	470	900	850	UL221M250M250A□□X
	270	22	25	390	740	1320	UL271M250M250A□□X
	270	22	30	390	740	1360	UL271M250M300A□□X
	270	25	25	390	740	1360	UL271M250N250A□□X
	330	22	30	320	600	1550	UL331M250M300A□□X
	330	22	35	320	600	1600	UL331M250M350A□□X
	330	25	25	320	600	1450	UL331M250N250A□□X
	330	25	30	320	600	1600	UL331M250N300A□□X
	390	22	35	270	510	1750	UL391M250M350A□□X
	390	22	40	270	510	1800	UL391M250M400A□□X
	390	25	30	270	510	1680	UL391M250N300A□□X
	390	25	35	270	510	1730	UL391M250N350A□□X
	390	30	30	270	510	1730	UL391M250O300A□□X
	470	22	40	220	420	1970	UL471M250M400A□□X
	470	22	45	220	420	2020	UL471M250M450A□□X
	470	25	30	220	420	1750	UL471M250N300A□□X
	470	25	35	220	420	1800	UL471M250N350A□□X
	470	30	25	220	420	1750	UL471M250O250A□□X
	470	30	30	220	420	1800	UL471M250O300A□□X
	560	22	45	190	360	2200	UL561M250M450A□□X
	560	25	40	190	360	2200	UL561M250N400A□□X
	560	30	30	190	360	1970	UL561M250O300A□□X
	560	30	35	190	360	2050	UL561M250O350A□□X
	560	35	30	190	360	2050	UL561M250P300A□□X
	680	22	50	150	290	2450	UL681M250M500A□□X
	680	25	45	150	290	2250	UL681M250N450A□□X
	680	30	35	150	290	2180	UL681M250O350A□□X
	680	30	40	150	290	2250	UL681M250O400A□□X
	680	35	30	150	290	2180	UL681M250P300A□□X
	820	25	50	130	240	2490	UL821M250N500A□□X
	820	30	45	130	240	2190	UL821M250O450A□□X
	820	35	35	130	240	2150	UL821M250P350A□□X
	1000	25	55	110	200	2910	UL102M250N550A□□X

□□ **see description at end of standard ratings**

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STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
250	1000	30	40	110	200	2440	UL102M250O400A□□X
	1000	30	45	110	200	2540	UL102M250O450A□□X
	1000	35	35	110	200	2380	UL102M250P350A□□X
	1000	35	40	110	200	2540	UL102M250P400A□□X
	1200	30	45	89	170	2680	UL122M250O450A□□X
	1200	30	50	89	170	2730	UL122M250O500A□□X
	1200	35	40	89	170	2720	UL122M250P400A□□X
	1500	30	55	68	130	3150	UL152M250O550A□□X
	1500	35	45	68	130	3150	UL152M250P450A□□X
	1500	35	50	68	130	3200	UL152M250P500A□□X
	1800	35	50	58	110	3420	UL182M250P500A□□X
	1800	35	55	58	110	3600	UL182M250P550A□□X
	2200	35	60	48	90	3750	UL222M250P600A□□X
315	120	22	25	870	1660	720	UL121M315M250A□□X
	150	22	25	700	1330	1000	UL151M315M250A□□X
	150	22	30	700	1330	1030	UL151M315M300A□□X
	150	30	25	700	1330	1000	UL151M315O250A□□X
	180	22	30	580	1110	1140	UL181M315M300A□□X
	180	22	35	580	1110	1180	UL181M315M350A□□X
	180	25	30	580	1110	1180	UL181M315N300A□□X
	220	22	35	470	900	1310	UL221M315M350A□□X
	220	22	40	470	900	1350	UL221M315M400A□□X
	220	25	30	470	900	1310	UL221M315N300A□□X
	220	25	35	470	900	1350	UL221M315N350A□□X
	220	30	25	470	900	1310	UL221M315O250A□□X
	270	22	40	390	740	1490	UL271M315M400A□□X
	270	22	45	390	740	1540	UL271M315M450A□□X
	270	25	35	390	740	1390	UL271M315N350A□□X
	270	25	40	390	740	1540	UL271M315N400A□□X
	270	30	30	390	740	1390	UL271M315O300A□□X
	330	22	45	320	600	1690	UL331M315M450A□□X
	330	22	50	320	600	1760	UL331M315M500A□□X
	330	25	35	320	600	1590	UL331M315N350A□□X
	330	25	40	320	600	1630	UL331M315N400A□□X
	330	30	25	320	600	1410	UL331M315O250A□□X
	330	30	30	320	600	1460	UL331M315O300A□□X
	330	35	25	320	600	1460	UL331M315P250A□□X
	390	22	50	270	510	1870	UL391M315M500A□□X
	390	25	40	270	510	1780	UL391M315N400A□□X
	390	25	45	270	510	1830	UL391M315N450A□□X
	390	30	30	270	510	1630	UL391M315O300A□□X
	390	30	35	270	510	1680	UL391M315O350A□□X
	390	35	25	270	510	1480	UL391M315P250A□□X
	390	35	30	270	510	1550	UL391M315P300A□□X

□□ see description at end of standard ratings

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STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
315	470	22	55	220	420	2090	UL471M315M550A□□X
	470	25	45	220	420	1990	UL471M315N450A□□X
	470	30	35	220	420	1860	UL471M315O350A□□X
	470	30	40	220	420	1990	UL471M315O400A□□X
	470	35	30	220	420	1740	UL471M315P300A□□X
	470	35	35	220	420	1990	UL471M315P350A□□X
	560	22	60	190	360	2290	UL561M315M600A□□X
	560	25	50	190	360	2210	UL561M315N500A□□X
	560	30	40	190	360	2080	UL561M315O400A□□X
	560	30	45	190	360	2160	UL561M315O450A□□X
	560	35	30	190	360	2080	UL561M315P300A□□X
	560	35	35	190	360	2160	UL561M315P350A□□X
	680	25	55	150	290	2440	UL681M315N550A□□X
	680	25	60	150	290	2500	UL681M315N600A□□X
	680	30	45	150	290	2320	UL681M315O450A□□X
	680	30	50	150	290	2400	UL681M315O500A□□X
	680	35	35	150	290	2160	UL681M315P350A□□X
	680	35	40	150	290	2130	UL681M315P400A□□X
	820	30	50	130	240	2550	UL821M315O500A□□X
	820	30	55	130	240	2590	UL821M315O550A□□X
	820	35	40	130	240	2260	UL821M315P400A□□X
	820	35	45	130	240	2350	UL821M315P450A□□X
	1000	30	55	110	200	2780	UL102M315O550A□□X
	1000	30	60	110	200	2820	UL102M315O600A□□X
	1000	35	50	110	200	2700	UL102M315P500A□□X
	1200	30	60	89	170	3010	UL122M315O600A□□X
	1200	35	55	89	170	2920	UL122M315P550A□□X
	1200	35	60	89	170	2960	UL122M315P600A□□X
	1500	35	60	68	130	3420	UL152M315P600A□□X
	1500	35	65	68	130	3620	UL152M315P650A□□X
350	100	22	25	1050	1990	500	UL101M350M250A□□X
	120	22	25	870	1660	920	UL121M350M250A□□X
	120	22	30	870	1660	940	UL121M350M300A□□X
	150	22	30	700	1330	1080	UL151M350M300A□□X
	150	25	25	700	1330	1050	UL151M350N250A□□X
	180	22	35	580	1110	1220	UL181M350M350A□□X
	180	22	40	580	1110	1270	UL181M350M400A□□X
	180	25	30	580	1110	1200	UL181M350N300A□□X
	220	22	40	470	900	1390	UL221M350M400A□□X
	220	22	45	470	900	1430	UL221M350M450A□□X
	220	25	30	470	900	1300	UL221M350N300A□□X
	220	25	35	470	900	1350	UL221M350N350A□□X
	220	30	25	470	900	1300	UL221M350O250A□□X
	270	22	45	390	740	1570	UL271M350M450A□□X

□□ see description at end of standard ratings

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STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
350	270	22	50	390	740	1620	UL271M350M500A□□X
	270	25	35	390	740	1490	UL271M350N350A□□X
	270	25	40	390	740	1530	UL271M350N400A□□X
	270	30	25	390	740	1340	UL271M350O250A□□X
	270	30	30	390	740	1490	UL271M350O300A□□X
	270	35	25	390	740	1420	UL271M350P250A□□X
	330	22	50	320	600	1770	UL331M350M500A□□X
	330	25	40	320	600	1690	UL331M350N400A□□X
	330	25	45	320	600	1770	UL331M350N450A□□X
	330	30	30	320	600	1560	UL331M350O300A□□X
	330	30	35	320	600	1690	UL331M350O350A□□X
	330	35	25	320	600	1560	UL331M350P250A□□X
	390	22	55	270	510	1960	UL391M350M550A□□X
	390	25	45	270	510	1880	UL391M350N450A□□X
	390	25	50	270	510	1970	UL391M350N500A□□X
	390	30	35	270	510	1770	UL391M350O350A□□X
	390	30	40	270	510	1830	UL391M350O400A□□X
	390	30	45	270	510	1920	UL391M350O450A□□X
	390	35	30	270	510	1660	UL391M350P300A□□X
	390	35	35	270	510	1730	UL391M350P350A□□X
	470	25	50	220	420	2090	UL471M350N500A□□X
	470	25	55	220	420	2140	UL471M350N550A□□X
	470	30	40	220	420	1990	UL471M350O400A□□X
	470	30	45	220	420	2090	UL471M350O450A□□X
	470	35	35	220	420	1900	UL471M350P350A□□X
	560	25	55	190	360	2300	UL561M350N550A□□X
	560	25	60	190	360	2380	UL561M350N600A□□X
	560	30	45	190	360	2200	UL561M350O450A□□X
	560	30	50	190	360	2300	UL561M350O500A□□X
	560	35	40	190	360	2130	UL561M350P400A□□X
	560	35	45	190	360	2350	UL561M350P450A□□X
	680	30	50	150	290	2430	UL681M350O500A□□X
	680	30	55	150	290	2480	UL681M350O550A□□X
	680	35	40	150	290	2170	UL681M350P400A□□X
	680	35	45	150	290	2400	UL681M350P450A□□X
	820	30	55	130	240	2500	UL821M350O550A□□X
	820	30	60	130	240	2650	UL821M350O600A□□X
	820	35	45	130	240	2450	UL821M350P450A□□X
	820	35	50	130	240	2500	UL821M350P500A□□X
	1000	35	50	110	200	2800	UL102M350P500A□□X
	1000	35	60	110	200	3000	UL102M350P600A□□X
	1000	40	50	110	200	3000	UL102M350Q500A□□X
	1200	35	60	89	170	3010	UL122M350P600A□□X
	1200	35	70	89	170	3230	UL122M350P700A□□X

□□ see description at end of standard ratings

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
350	1200	40	60	89	170	3250	UL122M350Q600A□□X
	1500	40	80	68	130	4210	UL152M350Q800A□□X
	1500	45	60	68	130	4060	UL152M350V600A□□X
	1800	40	90	58	110	4900	UL182M350Q900A□□X
	1800	45	70	58	110	4750	UL182M350V700A□□X
	2200	45	85	48	90	5400	UL222M350V850A□□X
	2700	45	100	39	74	6430	UL272M350VA00A□□X
400	82	22	25	1280	2430	550	UL820M400M250A□□X
	100	22	25	1050	1990	660	UL101M400M250A□□X
	100	22	30	1050	1990	680	UL101M400M300A□□X
	100	25	25	1050	1990	680	UL101M400N250A□□X
	120	22	25	870	1660	700	UL121M400M250A□□X
	120	22	30	870	1660	760	UL121M400M300A□□X
	120	25	25	870	1660	760	UL121M400N250A□□X
	150	22	30	700	1330	850	UL151M400M300A□□X
	150	22	35	700	1330	900	UL151M400M350A□□X
	150	25	25	700	1330	850	UL151M400N250A□□X
	150	25	30	700	1330	900	UL151M400N300A□□X
	180	22	35	580	1110	990	UL181M400M350A□□X
	180	22	40	580	1110	1050	UL181M400M400A□□X
	180	25	30	580	1110	1050	UL181M400N300A□□X
	180	25	35	580	1110	1100	UL181M400N350A□□X
	180	30	25	580	1110	1050	UL181M400O250A□□X
	220	22	45	470	900	1120	UL221M400M450A□□X
	220	22	50	470	900	1160	UL221M400M500A□□X
	220	25	30	470	900	1070	UL221M400N300A□□X
	220	25	35	470	900	1120	UL221M400N350A□□X
	220	30	25	470	900	1100	UL221M400O250A□□X
	220	30	30	470	900	1160	UL221M400O300A□□X
	270	22	50	390	740	1260	UL271M400M500A□□X
	270	25	40	390	740	1260	UL271M400N400A□□X
	270	25	45	390	740	1290	UL271M400N450A□□X
	270	30	30	390	740	1260	UL271M400O300A□□X
	270	30	35	390	740	1290	UL271M400O350A□□X
	270	35	25	390	740	1260	UL271M400P250A□□X
	330	22	55	320	600	1450	UL331M400M550A□□X
	330	25	40	320	600	1350	UL331M400N400A□□X
	330	25	45	320	600	1420	UL331M400N450A□□X
	330	30	30	320	600	1350	UL331M400O300A□□X
	330	30	35	320	600	1420	UL331M400O350A□□X
	330	35	30	320	600	1460	UL331M400P300A□□X
	390	25	50	270	510	1620	UL391M400N500A□□X
	390	25	55	270	510	1690	UL391M400N550A□□X
	390	30	40	270	510	1620	UL391M400O400A□□X

□□ **see description at end of standard ratings**

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
400	390	30	45	270	510	1690	UL391M400O450A□□X
	390	35	30	270	510	1590	UL391M400P300A□□X
	390	35	35	270	510	1690	UL391M400P350A□□X
	470	30	45	220	420	1880	UL471M400O450A□□X
	470	30	50	220	420	1970	UL471M400O500A□□X
	470	35	35	220	420	1860	UL471M400P350A□□X
	470	35	40	220	420	1960	UL471M400P400A□□X
	560	35	40	190	360	2130	UL561M400P400A□□X
	560	35	45	190	360	2250	UL561M400P450A□□X
	680	35	45	150	290	2480	UL681M400P450A□□X
	680	35	50	150	290	2600	UL681M400P500A□□X
	820	35	55	130	240	2670	UL821M400P550A□□X
	820	35	60	130	240	2780	UL821M400P600A□□X
	820	40	50	130	240	2780	UL821M400Q500A□□X
	1000	35	65	110	200	3250	UL102M400P650A□□X
	1000	40	55	110	200	3250	UL102M400Q550A□□X
	1200	35	75	89	170	3720	UL122M400P750A□□X
	1200	40	65	89	170	3720	UL122M400Q650A□□X
	1200	45	55	89	170	3720	UL122M400V550A□□X
	1500	40	80	68	130	4560	UL152M400Q800A□□X
	1500	45	65	68	130	4560	UL152M400V650A□□X
	1800	45	80	58	110	5360	UL182M400V800A□□X
450	82	22	25	1700	3230	600	UL820M450M250A□□X
	100	22	25	1390	2650	640	UL101M450M250A□□X
	100	22	30	1390	2650	690	UL101M450M300A□□X
	100	25	25	1390	2650	690	UL101M450N250A□□X
	120	22	30	1160	2210	760	UL121M450M300A□□X
	120	22	35	1160	2210	810	UL121M450M350A□□X
	120	25	25	1160	2210	760	UL121M450N250A□□X
	120	25	30	1160	2210	810	UL121M450N300A□□X
	150	22	35	930	1770	900	UL151M450M350A□□X
	150	22	40	930	1770	960	UL151M450M400A□□X
	150	25	30	930	1770	900	UL151M450N300A□□X
	150	25	35	930	1770	960	UL151M450N350A□□X
	150	30	25	930	1770	900	UL151M450O250A□□X
	150	30	30	930	1770	960	UL151M450O300A□□X
	180	22	40	770	1470	1050	UL181M450M400A□□X
	180	22	45	770	1470	1100	UL181M450M450A□□X
	180	25	30	770	1470	1050	UL181M450N300A□□X
	180	25	35	770	1470	1100	UL181M450N350A□□X
	180	30	25	770	1470	1030	UL181M450O250A□□X
	180	30	30	770	1470	1110	UL181M450O300A□□X
	180	35	25	770	1470	1110	UL181M450P250A□□X
	220	22	45	640	1210	1160	UL221M450M450A□□X

□□ **see description at end of standard ratings**

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
450	220	25	35	640	1210	1150	UL221M450N350A□□X
	220	25	40	640	1210	1180	UL221M450N400A□□X
	220	30	30	640	1210	1150	UL221M450O300A□□X
	220	30	35	640	1210	1200	UL221M450O350A□□X
	220	35	25	640	1210	1150	UL221M450P250A□□X
	270	22	55	520	980	1310	UL271M450M550A□□X
	270	25	45	520	980	1290	UL271M450N450A□□X
	270	25	50	520	980	1310	UL271M450N500A□□X
	270	30	30	520	980	1230	UL271M450O300A□□X
	270	30	40	520	980	1350	UL271M450O400A□□X
	270	35	30	520	980	1350	UL271M450P300A□□X
	330	25	50	420	800	1500	UL331M450N500A□□X
	330	30	40	420	800	1500	UL331M450O400A□□X
	330	30	45	420	800	1580	UL331M450O450A□□X
	330	35	30	420	800	1500	UL331M450P300A□□X
	330	35	35	420	800	1580	UL331M450P350A□□X
	390	25	55	360	680	1690	UL391M450N550A□□X
	390	30	45	360	680	1720	UL391M450O450A□□X
	390	30	50	360	680	1800	UL391M450O500A□□X
	390	35	35	360	680	1720	UL391M450P350A□□X
	390	35	40	360	680	1790	UL391M450P400A□□X
	470	30	50	290	560	1970	UL471M450O500A□□X
	470	30	55	290	560	2060	UL471M450O550A□□X
	470	35	40	290	560	1950	UL471M450P400A□□X
	470	35	45	290	560	2060	UL471M450P450A□□X
	560	30	55	250	470	2240	UL561M450O550A□□X
	560	35	45	250	470	2160	UL561M450P450A□□X
	560	35	50	250	470	2360	UL561M450P500A□□X
	680	35	50	210	390	2500	UL681M450P500A□□X
	680	35	55	210	390	2620	UL681M450P550A□□X
	820	35	65	170	320	3000	UL821M450P650A□□X
	820	40	55	170	320	3000	UL821M450Q550A□□X
	1000	35	70	140	270	3100	UL102M450P700A□□X
	1000	35	80	140	270	3560	UL102M450P800A□□X
	1000	40	70	140	270	3600	UL102M450Q700A□□X
	1000	45	60	140	270	3600	UL102M450V600A□□X
	1200	40	80	120	220	3950	UL122M450Q800A□□X
	1500	45	80	95	180	4800	UL152M450V800A□□X
	1800	45	90	79	150	5670	UL182M450V900A□□X
500	47	22	25	2970	5640	400	UL470M500M250A□□X
	56	22	25	2490	4740	430	UL560M500M250A□□X
	56	22	30	2490	4740	470	UL560M500M300A□□X
	56	25	25	2490	4740	470	UL560M500N250A□□X
	68	22	30	2050	3900	520	UL680M500M300A□□X

□□ **see description at end of standard ratings**

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	Typ. ESR +20°C ▪ 120Hz (mΩ)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
500	68	22	35	2050	3900	550	UL680M500M350A□□X
	68	25	25	2050	3900	520	UL680M500N250A□□X
	68	25	30	2050	3900	550	UL680M500N300A□□X
	82	22	35	1700	3230	610	UL820M500M350A□□X
	82	25	30	1700	3230	610	UL820M500N300A□□X
	100	22	40	1390	2650	720	UL101M500M400A□□X
	100	25	35	1390	2650	720	UL101M500N350A□□X
	100	30	30	1390	2650	720	UL101M500O300A□□X
	120	22	45	1160	2210	740	UL121M500M450A□□X
	120	25	40	1160	2210	740	UL121M500N400A□□X
	120	30	35	1160	2210	770	UL121M500O350A□□X
	120	35	30	1160	2210	800	UL121M500P300A□□X
	150	22	50	930	1770	960	UL151M500M500A□□X
	150	25	45	930	1770	980	UL151M500N450A□□X
	150	30	35	930	1770	920	UL151M500O350A□□X
	150	35	30	930	1770	920	UL151M500P300A□□X
	180	25	50	770	1470	1130	UL181M500N500A□□X
	180	30	35	770	1470	1050	UL181M500O350A□□X
	180	35	30	770	1470	1100	UL181M500P300A□□X
	220	25	50	640	1210	1220	UL221M500N500A□□X
	220	30	45	640	1210	1250	UL221M500O450A□□X
	220	35	30	640	1210	1100	UL221M500P300A□□X
	220	35	35	640	1210	1230	UL221M500P350A□□X
	270	30	50	520	980	1510	UL271M500O500A□□X
	270	35	35	520	980	1310	UL271M500P350A□□X
	270	35	40	520	980	1420	UL271M500P400A□□X
	330	35	40	420	800	1480	UL331M500P400A□□X
	330	35	45	420	800	1560	UL331M500P450A□□X
	390	35	50	360	680	1780	UL391M500P500A□□X
	470	35	55	290	560	2140	UL471M500P550A□□X
	470	35	60	290	560	2260	UL471M500P600A□□X
	560	35	65	250	470	2380	UL561M500P650A□□X
	680	40	65	210	390	2520	UL681M500Q650A□□X
550	220	35	40	640	1210	1300	UL221M550P400A□□X
	270	35	50	520	980	1600	UL271M550P500A□□X
	330	35	55	420	800	1630	UL331M550P550A□□X
	390	35	60	360	680	1800	UL391M550P600A□□X
	470	35	70	290	560	2100	UL471M550P700A□□X

□□: Enter **P6** for standard type ▪ 6mm pin length

□□: Enter **Z6** for 3-pin type ▪ 6mm pin length

□□: Enter **Y6** for multi-pin type ▪ 6mm pin length

□□: Enter **P4** for standard type ▪ 4mm pin length

□□: Enter **Z4** for 3-pin type ▪ 4mm pin length

□□: Enter **Y4** for multi-pin type ▪ 4mm pin length

For further information please contact sales@capxon.org

DIMENSIONS ▪ All dimensions in mm

2-pin version ▪ Standard type

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 6 ± 1mm. Also available H = 4 ± 1mm

3-pin version ▪ Polarity protection

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 4 ± 1mm. Also available H = 6 ± 1mm

Multipin version ▪ Diameter ø D ≥ 30 mm

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 6 ± 1mm. Also available H = 4 ± 1mm

Further possible terminal styles can be found in our packaging information liquid snap-in.

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

V_R (V) / Frequency (Hz)	50/60	100/120	300	1k	10k	50k - 100k
$200 \le V_R \le 250$	0.81	1	1.17	1.32	1.45	1.5
$315 \le V_R \le 550$	0.77	1	1.16	1.3	1.41	1.43

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid Snap-In
Page 274	Page 212 and following

USEFUL LIFE

With: I_A: Application current
I_R: Rated ripple current (A RMS)
T_A: Application temperature of the capacitor

For further information please contact sales@capxon.org

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

HC SERIES ▪ HIGH RELIABILITY, AUTOMOTIVE 125°C TYPE

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · °C HIGH TEMPERATURE

- **DOUBLE-CRAMPING** ▪ Snap-In type
- Useful life: 125°C ▪ 4 000 hours
- Low ESR and high ripple current
- High vibration (up to 30g) stability. Consult CapXon for test details
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics				
Operating Temperature Range		-55 ~ +125°C				
Rated Voltage Range	V_R	25 ~ 63V DC				
Surge Voltage	V_S	$V_S = 1.15 \cdot V_R$				
Capacitance Range	C_R	600 ~ 3300µF				
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)				
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	$\leq 3 \cdot \sqrt{C_R \cdot V_R}$ ▪ After 5 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]				
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings				
Self-Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings				
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	25	35	50	63
		Z-25°C/Z+20°C	4	4	4	4
		Z-55°C/Z+20°C	10	8	6	6

Lifetime Test		
Useful Life 125°C (V_R & I_R applied)	Test	**4 000 hours**
	△C/C_R	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
	Deviation Rate @ Useful Life: 10 000 FIT = 1%/1000h with 60% confidence level ▪ parts show higher drift as test criteria	
Endurance 125°C (V_R & I_R applied)	Test	**3 000 hours**
	△C/C_R	≤ ±20% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 125°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±20% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	
Vibration Resistance Test	Max. 30g force, f_{RANGE} 10Hz … 2kHz, amplitude max. 2mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ▪ JIS-C-5101-1 (2010)	

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 5min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +125°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
25	1800	20	30	637	20	28	4100	HC182M025L300A□□X
	2200	20	35	704	20	22	4870	HC222M025L350A□□X
	3300	20	40	862	20	16	5500	HC332M025L400A□□X
35	1200	20	30	615	15	31	3900	HC122M035L300A□□X
	1500	20	35	687	15	26	5000	HC152M035L350A□□X
	2200	20	40	832	15	19	5900	HC222M035L400A□□X
50	1200	20	35	735	10	36	4200	HC122M050L350A□□X
	1500	20	40	822	10	33	4900	HC152M050L400A□□X
63	600	20	30	583	10	50	3740	HC601M063L300A□□X
	820	20	35	682	10	39	4300	HC821M063L350A□□X
	1000	20	40	753	10	31	5250	HC102M063L400A□□X

POSSIBLE CAN SIZES ▪ Please consult us to individual requirements

Size with ø D 20		Size with ø D 22		Size with ø D 25		Size with ø D 30		Size with ø D 35	
ø D (mm)	L (mm)	ø D (mm)	L (mm)	ø D (mm)	L (mm)	ø D (mm)	L (mm)	ø D (mm)	L (mm)
20	30	22	30	25	30	30	30	35	30
20	35	22	35	25	35	30	35	35	35
20	40	22	40	25	40	30	40	35	40
		22	45	25	45	30	45	35	45

□□: Enter **P6** for standard type ▪ 6mm pin length

□□: Enter **Z6** for 3-pin type ▪ 6mm pin length

□□: Enter **Y6** for multi-pin type ▪ 6mm pin length

□□: Enter **P4** for standard type ▪ 4mm pin length

□□: Enter **Z4** for 3-pin type ▪ 4mm pin length

□□: Enter **Y4** for multi-pin type ▪ 4mm pin length

DIMENSIONS ▪ All dimensions in mm

2-pin version ▪ Diameter ø D 20 mm to 25 mm ▪ Standard type

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 6 ± 1mm. Also available H = 4 ± 1mm

For further information please contact sales@capxon.org

DIMENSIONS ▪ All dimensions in mm

3-pin version ▪ Polarity protection ▪ Diameter ø D 20 mm to 25 mm

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 4 ± 1mm. Also available H = 6 ± 1mm

Multipin version ▪ Diameter ø D ≥ 30 mm

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 6 ± 1mm. Also available H = 4 ± 1mm

Further possible terminal styles can be found in our packaging information liquid snap-in.

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

V_R (V) / Frequency (Hz)	50/60	100/120	300	1k	10k
$25 \le V_R \le 63$	0.56	0.7	0.83	0.92	1

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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General Precautions and Guidelines	Packaging Information Liquid Snap-In
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Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

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HH SERIES ▪ HIGH VOLTAGE, AUTOMOTIVE 125°C TYPE

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · °C HIGH TEMPERATURE · HIGH VOLTAGE

- **HIGH TEMPERATURE** ▪ Snap-In type
- Useful life: 125°C ▪ 4 000 hours
- High reliability and high voltage applications
- Extremely stable dissipation factor and leakage current
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics		
Operating Temperature Range		-40 ~ +125°C		
Rated Voltage Range	V_R	400 ~ 450V DC		
Surge Voltage	V_S	$V_S = 1.10 \cdot V_R$		
Capacitance Range	C_R	47 ~ 560µF		
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)		
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	≤ $0.02 \cdot C_R \cdot V_R$ ▪ After 5 minutes [I_{LEAK} (µA) ; C_R (µF) ; V_R (V)]		
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings		
Self-Resistance (20°C ▪ 120Hz)	ESR	Not to exceed the values shown in standard ratings		
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	400	450
		Z-25°C/Z+20°C	6	6
		Z-40°C/Z+20°C	10	10

Lifetime Test		
Useful Life 125°C (V_R & I_R applied)	Test	**4 000 hours**
	△C/C_R	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I_{Leak}	≤ the initial specified value
	Deviation Rate @ Useful Life: 10 000 FIT = 1%/1000h with 60% confidence level ▪ parts show higher drift as test criteria	
Endurance 125°C (V_R & I_R applied)	Test	**3 000 hours**
	△C/C_R	≤ ±20% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
Shelf Life 125°C (V_R = 0)	Test	**1 000 hours**
	△C/C_R	≤ ±20% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{Leak}	≤ the initial specified value
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4	
Vibration Resistance Test	Max. 10g force, f_{RANGE} 10Hz … 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ▪ IEC 60068-2-6	

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 5min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 120Hz (mΩ)	I_R ▪ Max. Ripple Current +125°C ▪ 120Hz (mA rms)	CapXon Part Number Automotive Type
400	47	22	25	376	20	4230	260	HH470M400M250A□□X
	68	22	30	544	20	2930	340	HH680M400M300A□□X
	82	22	30	656	20	2430	380	HH820M400M300A□□X
	100	22	35	800	20	1990	430	HH101M400M350A□□X
	120	22	35	960	20	1660	500	HH121M400M350A□□X
	150	22	40	1200	20	1330	550	HH151M400M400A□□X
	180	22	45	1440	20	1110	640	HH181M400M450A□□X
	220	25	45	1760	20	900	780	HH221M400N450A□□X
	270	25	50	2160	20	740	920	HH271M400N500A□□X
	330	30	45	2640	20	600	1020	HH331M400O450A□□X
	390	30	50	3120	20	510	1160	HH391M400O500A□□X
	470	35	45	3760	20	420	1340	HH471M400P450A□□X
	560	35	50	4480	20	360	1560	HH561M400P500A□□X
450	68	22	30	612	20	2930	380	HH680M450M300A□□X
	82	22	35	738	20	2430	440	HH820M450M350A□□X
	100	22	40	900	20	1990	460	HH101M450M400A□□X
	120	22	45	1080	20	1660	540	HH121M450M450A□□X
	150	22	50	1350	20	1330	620	HH151M450M500A□□X
	180	22	55	1620	20	1110	730	HH181M450M550A□□X
	220	25	50	1980	20	900	870	HH221M450N500A□□X
	270	30	45	2430	20	740	1120	HH271M450O450A□□X
	330	30	50	2970	20	600	1300	HH331M450O500A□□X
	390	35	45	3510	20	510	1480	HH391M450P450A□□X
	470	35	50	4230	20	420	1670	HH471M450P500A□□X

□□: Enter **P6** for standard type ▪ 6mm pin length

□□: Enter **Z6** for 3-pin type ▪ 6mm pin length

□□: Enter **Y6** for multi-pin type ▪ 6mm pin length

□□: Enter **P4** for standard type ▪ 4mm pin length

□□: Enter **Z4** for 3-pin type ▪ 4mm pin length

□□: Enter **Y4** for multi-pin type ▪ 4mm pin length

DIMENSIONS ▪ All dimensions in mm

2-pin version ▪ Diameter ø D 20 mm to 25 mm ▪ Standard type

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 6 ± 1mm. Also available H = 4 ± 1mm

For further information please contact sales@capxon.org

DIMENSIONS ▪ All dimensions in mm

3-pin version ▪ Polarity protection ▪ Diameter ø D 20 mm to 25 mm

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 4 ± 1mm. Also available H = 6 ± 1mm

Multipin version ▪ Diameter ø D ≥ 30 mm

H (mm)	6	4
h (mm)	2.5	1.5

Standard: H = 6 ± 1mm. Also available H = 4 ± 1mm

Further possible terminal styles can be found in our packaging information liquid snap-in.

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

V_R (V) / Frequency (Hz)	50/60	100/120	300	1k	10k	50k
$400 \le V_R \le 450$	0.77	1	1.16	1.3	1.41	1.43

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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PRODUCT CODE ▪ SNAP-IN ALUMINUM ELECTROLYTIC CAPACITORS

Snap-in type example:
UJ series ▪ 470µF ▪ 450V ▪ ±20% ▪ Ø 30mm ▪ L 45mm ▪ 2-pin ▪ 6mm pin length ▪ AEC-Q200

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
U	J	4	7	1	M	4	5	0	O	4	5	0	A	P	6	X	-	-	-
Series		Capacitance			Capacitance tolerance	Voltage			Case Ø (mm)	Height (mm)			Type code	Terminals		Special requirement			

See chapter terminals or lead treatment

Code	µF
100	10
220	22
101	100
561	560
102	1000
472	4700
103	10000
683	68000
104	100000

Code	%
H	±5
K	±10
S	±15
M	±20
N	±30
D	±40
I	+5 to +20
B	0 to -20
G	0 to +10
Z	0 to +20
Y	0 to +30
X	0 to +40
A	0 to +50
J	-5 to +20
C	-5 to +30
E	-8 to +5
V	-10 to +20
Q	-10 to +30
T	-10 to +50
W	-20 to +10
P	-15 to +20
L	-25 to +20
U	-30 to 0
F	-35 to 0
O	-50 to 0

Code	Volt
6R3	6.3
010	10
016	16
025	25
035	35
050	50
063	63
080	80
100	100
160	160
180	180
200	200
220	220
250	250
315	315
350	350
385	385
400	400
420	420
450	450
500	500
550	550
575	575
600	600
630	630

Code	ØD
L	20
M	22
N	25
O	30
P	35
Q	40
U	42
V	45

Code	H
150	15
200	20
250	25
300	30
350	35
400	40
450	45
500	50
550	55
600	60
650	65
700	70
750	75
800	80
850	85
900	90
950	95
A00	100
A05	105

Code	Type
A	Without lead treatment
E	With lead treatment

Code	Special
X	AEC-Q200

See datasheet for reference

Please consult CapXon for further assistance

MARKING ▪ SNAP-IN ALUMINUM ELECTROLYTIC CAPACITORS

Aluminum Electrolytic Capacitor ▪ Snap-In type

CapXon:	Manufacturer trademark
470µF:	Nominal capacitance
450V:	Rated voltage
▬	(-) polarity (Cathode indicate)
UJ:	Series
VENT:	Safety vent
105°C:	Maximum operating temperature
X:	AEC-Q200
191213:	Production datecode year/month/day (ex. 2019/December/13th)

Side view

AEC-Q200 type

Top view

For further information please contact sales@capxon.org

PACKAGING ▪ SNAP-IN ALUMINUM ELECTROLYTIC CAPACITORS

Ø D (mm)	Length L (mm)	Terminal length H (mm)	Inner box quantity (pcs)	Inner box size L x W x H (mm)	Outer box quantity (pcs)	Outer box size L x W x H (mm)	Country of origin	Tariff number
20	≤ 25		120	268 x 265 x 38	720	560 x 280 x 135	China	85322200
	27 to 35	< 6 (L=35)	120	268 x 265 x 48	720	560 x 275 x 167	China	85322200
	35	≥ 6	120	268 x 265 x 64	720	560 x 275 x 208	China	85322200
	40 to 51		120	268 x 265 x 64	720	560 x 275 x 208	China	85322200
22	≤ 25		100	268 x 265 x 38	600	560 x 280 x 135	China	85322200
	27 to 35	< 6 (L=35)	100	268 x 265 x 48	600	560 x 275 x 167	China	85322200
	35	≥ 6	100	268 x 265 x 64	600	560 x 275 x 208	China	85322200
	40 to 51		100	268 x 265 x 64	600	560 x 275 x 208	China	85322200
	52 to 61		100	268 x 265 x 72	400	560 x 275 x 167	China	85322200
	62 to 75		100	268 x 265 x 90	400	560 x 275 x 208	China	85322200
25	≤ 25		100	295 x 293 x 38	500	310 x 308 x 211	China	85322200
	26 to 35	< 6 (L=35)	100	295 x 293 x 48	500	315 x 313 x 258	China	85322200
	35	≥ 6	100	295 x 293 x 64	500	310 x 308 x 340	China	85322200
	40 to 51		100	295 x 293 x 64	500	310 x 308 x 340	China	85322200
	52 to 60		100	295 x 293 x 72	500	310 x 308 x 383	China	85322200
	61 to 75		100	295 x 293 x 90	400	310 x 308 x 383	China	85322200
30	≤ 25		50	173 x 344 x 38	400	375 x 361 x 175	China	85322200
	26 to 35	< 6 (L=35)	50	173 x 344 x 48	400	375 x 361 x 220	China	85322200
	35	≥ 6	50	173 x 344 x 64	300	375 x 361 x 200	China	85322200
	40 to 51		50	173 x 344 x 64	300	375 x 361 x 220	China	85322200
	52 to 65		50	182 x 350 x 80	300	375 x 361 x 260	China	85322200
	70 to 85		50	182 x 350 x 100	200	375 x 361 x 220	China	85322200
35	≤ 25		50	195 x 392 x 38	400	405 x 407 x 175	China	85322200
	26 to 35	< 6 (L=35)	50	195 x 392 x 48	300	405 x 407 x 164	China	85322200
	35	≥ 6	50	195 x 392 x 64	300	405 x 407 x 212	China	85322200
	36 to 44		50	195 x 392 x 64	300	405 x 407 x 212	China	85322200
	45 to 52		50	195 x 392 x 64	200	410 x 210 x 280	China	85322200
	56 to 65		50	195 x 392 x 80	200	405 x 407 x 175	China	85322200
	66 to 75		50	195 x 392 x 90	200	405 x 407 x 212	China	85322200
	80 to 85		50	195 x 392 x 100	200	405 x 407 x 220	China	85322200
	90 to 100		50	195 x 392 x 115	100	405 x 407 x 130	China	85322200
40	26 to 35	< 6 (L=35)	40	375 x 230 x 48	200	390 x 250 x 265	China	85322200
	35	≥ 6	40	375 x 230 x 64	160	390 x 250 x 280	China	85322200
	36 to 46		40	375 x 230 x 64	160	390 x 250 x 280	China	85322200
	47 to 62		40	375 x 230 x 80	120	390 x 250 x 265	China	85322200
	63 to 75		40	375 x 230 x 90	120	390 x 250 x 295	China	85322200
	80 to 105		40	375 x 230 x 120	80	390 x 250 x 265	China	85322200
45	35 to 50		35	360 x 260 x 64	140	550 x 380 x 150	China	85322200
	55 to 65		35	360 x 260 x 80	140	550 x 380 x 180	China	85322200
	70 to 80		35	360 x 260 x 95	70	550 x 380 x 115	China	85322200
	85 to 100		35	360 x 260 x 115	70	550 x 380 x 130	China	85322200
50	50 to 60		30	370 x 310 x 75	120	770 x 330 x 170	China	85322200
	65 to 75		30	370 x 310 x 90	60	770 x 330 x 110	China	85322200
	80 to 100		30	370 x 310 x 115	60	770 x 330 x 130	China	85322200

For further information please contact sales@capxon.org

AVAILABLE TERMINALS ▪ SNAP-IN ALUMINUM ELECTROLYTIC CAPACITORS

Snap-In type ▪ PP version ▪ 2-pin ▪ standard type ▪ ØD = 20 to 45mm

Standard: H = 6 mm. Also available H = 4 mm

H (mm)	6	4
h (mm)	2.5	1.5
Type / Terminal code	A P6	A P4

Example

U J	4 7 1	M	4 5 0	O	4 5 0	A	P 6	X -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Terminals	Special requirement

Snap-In type ▪ ZP version ▪ 3-pin ▪ polarity protection ▪ ØD = 20 to 45mm

Standard: H = 4 mm. Also available H = 6 mm

H (mm)	6	4
h (mm)	2.5	1.5
Type / Terminal code	A Z6	A Z4

Example

U J	4 7 1	M	4 5 0	O	4 5 0	A	Z 4	X -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Terminals	Special requirement

For further information please contact sales@capxon.org

AVAILABLE TERMINALS ▪ SNAP-IN ALUMINUM ELECTROLYTIC CAPACITORS

Snap-In type ▪ YP version ▪ Multi-pin ▪ polarity protection ▪ ØD = 30 to 45mm

Standard: H = 6 mm. Also available H = 4 mm

H (mm)	6	4
h (mm)	2.5	1.5
Type / Terminal code	A Y6	A Y4

Example

U J	4 7 1	M	4 5 0	O	4 5 0	A	Y 6	X -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Terminals	Special requirement

Snap-In type ▪ LP version ▪ slim terminal ▪ ØD = 20 to 45mm

Standard: H = 9.5 mm. Also available H = 4 mm

H (mm)	9.5	4
Type / Terminal code	A L9	A L4

Example

U J	4 7 1	M	4 5 0	O	4 5 0	A	L 9	X -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Terminals	Special requirement

For further information please contact sales@capxon.org

AVAILABLE TERMINALS ▪ SNAP-IN ALUMINUM ELECTROLYTIC CAPACITORS

Snap-In type ▪ CP version ▪ lug type ▪ T type ▪ ØD = 30 to 45mm

Standard: H = 4.5 mm. Also available H = 5.5 mm

H (mm)	5.5	4.5
Type / Terminal code	A C5	A C4

Example

U J	4 7 1	M	4 5 0	O	4 5 0	A	C 4	X -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Terminals	Special requirement

Snap-In type ▪ HP version ▪ lug type▪ U type ▪ ØD = 30 to 45mm

Standard: H = 6 mm

H (mm)	6
Type / Terminal code	A H6

Example

U J	4 7 1	M	4 5 0	O	4 5 0	A	H 6	X -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Terminals	Special requirement

For further information please contact sales@capxon.org

AVAILABLE TERMINALS ▪ SNAP-IN ALUMINUM ELECTROLYTIC CAPACITORS

Snap-In type ▪ TP version ▪ long terminal ▪ cathode right side ▪ ØD = 20 to 45mm

Standard: H = 2.5 mm

H (mm)	2.5
Type / Terminal code	E CR

Example

U J	4 7 1	M	4 5 0	O	4 5 0	E	C R	X -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Terminals	Special requirement

Snap-In type ▪ TP version ▪ long terminal ▪ cathode left side ▪ ØD = 20 to 45mm

Standard: H = 2.5 mm

H (mm)	2.5
Type / Terminal code	E CL

Example

U J	4 7 1	M	4 5 0	O	4 5 0	E	C L	X -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Terminals	Special requirement

For further information please contact sales@capxon.org

AVAILABLE TERMINALS ▪ SNAP-IN ALUMINUM ELECTROLYTIC CAPACITORS

Snap-In type ▪ VP version ▪ lug type ▪ ØD = 20 to 45mm

Standard: H = 6 mm. Also available H = 5 mm and H = 12 mm
Consult CapXon for further lug heights

H (mm)	12	6	5
Type / Terminal code	A VC	A V6	A V5

Example

U J	4 7 1	M	4 5 0	O	4 5 0	A	V 6	X -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Terminals	Special requirement

H ± 0.5	ØD	L1 ± 0.1	L2 ± 0.2	W ± 0.2	W1 ± 0.2	W2 ± 0.2	d ± 0.1
12	25	3.3	1.3	4	3.2	1.8	0.6
	30	3.3	1	4.6	3.7	2	0.8
	35	3.3	1	4.6	3.7	2	0.8
	40	3.3	1	4.6	3.7	2	0.8
	45	3.3	1	4.6	3.7	2	0.8
6	25	3.3	1.3	4	3.2	1.8	0.6
	30	3.3	1	4.6	3.7	2	0.8
	35	3.3	1	4.6	3.7	2	0.8
	40	3.3	1	4.6	3.7	2	0.8
	45	3.3	1	4.6	3.7	2	0.8
5	25	3.3	1.3	4	3.2	1.8	0.6
	30	3.3	1	4.6	3.7	2	0.8
	35	3.3	1	4.6	3.7	2	0.8
	40	3.3	1	4.6	3.7	2	0.8
	45	3.3	1	4.6	3.7	2	0.8

For further information please contact sales@capxon.org

VIBRATION SPECIFICATION ▪ STANDARD AND VIBRATION PROOF DESIGN

Package	Test Standard	Condition	Determinant Standard
Standard design all pin-styles	IEC 60384-1 IEC 60384-4 IEC 60068-2-6 MIL-STD 202 Method 204	1. Frequency range: 10Hz ~ 55Hz 2. Amplitude (single peak): 0.75 mm 3. Acceleration: 100m/s^2 (10g at 10 ~ 55Hz) 4. X, Y, Z directions, 2 hours per direction, total 6 hours	1. ΔC/C ≤ ±5% of initial value 2. DF ≤ stated limit 3. LC ≤ stated limit 4. No visible damage 5. No leakage of electrolyte
Vibration-proof design		1. Consult CapXon for test details	1. Consult CapXon for test details

For further information please contact sales@capxon.org

Hybrid Conductive Polymer Capacitors

SMD Types

OVERVIEW ▪ SMD HYBRID CONDUCTIVE POLYMER CAPACITORS

Features

Series	Page	AEC-Q200	High Temperature	Low ESR	Slim Type	Standard	Ultra Miniaturized	Vibration Proof	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)
AA	222	●		●	●	●		●	-55	+105	16	200	10	1500	5000 to 10000
AC	226	●	●	●	●			●	-55	+125	16	100	10	1500	4000
AB	230	●	●	●			●	●	-55	+125	25	35	33	470	4000
AN	233	●	●	●				●	-55	+135	16	100	10	820	4000
AR	237	●	●	●				●	-55	+145	16	80	22	560	2000
AP	240	●	●	●				●	-55	+150	16	80	22	560	1000

For further information please contact sales@capxon.org

AA SERIES ▪ LONG LIFE UP TO 10 000 HOURS

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · HIGH VOLTAGE

- **HYBRID CONDUCTIVE POLYMER** ▪ SMD type
- Endurance: 105°C ▪ 5000 up to 10 000 hours
- Low ESR and high ripple current
- Vibration Proof (VP) version (up to 30g) available
- AEC-Q200 qualified

MSL 1 · RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +105°C
Rated Voltage Range	V_R	16 ~ 200V DC
Surge Voltage	V_S	($V_R \le 100V$): $V_S = 1.25 \cdot V_R$ ($V_R \ge 200V$): $V_S = 1.15 \cdot V_R$
Capacitance Range	C_R	10 ~ 1500µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test			
Endurance 105°C (V_R & I_R applied)	Test	**10 000 hours**	≤ 100V
		5 000 hours	> 100V
	$\triangle C/C_R$	Within ±30% of the initial value	
	tanδ	Less than 200% of the specified value	
	ESR	Less than 200% of the specified value	
	I_{Leak}	Less than the specified value	

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
5	5.8	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.8	6.5	6.5	7.2	0.5 to 0.8	2.2
6.3	7.7	6.5	6.5	7.2	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.3	10.3	11.0	0.7 to 1.1	4.5
10	12.4	10.3	10.3	11.0	0.7 to 1.1	4.5
10	16.5	10.3	10.3	11.0	0.7 to 1.1	4.5

For further information please contact sales@capxon.org

DIMENSIONS VP PACKAGE (VIBRATION PROOF) ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
6.3	5.8	6.6	6.6	7.3	0.5 to 0.8	2.2
6.3	7.7	6.6	6.6	7.3	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.5	10.5	11.2	0.7 to 1.1	4.5
10	12.4	10.5	10.5	11.2	0.7 to 1.1	4.5
10	16.5	10.5	10.5	11.2	0.7 to 1.1	4.5

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	●	●	100	6.3	5.8	16.0	16	50	1300	AA101M016E058PTRX ⬚
	●	●	120	6.3	5.8	19.2	16	50	1300	AA121M016E058PTRX ⬚
	●	●	150	6.3	5.8	24.0	16	50	1300	AA151M016E058PTRX ⬚
	●	●	220	6.3	7.7	35.2	16	30	2000	AA221M016E077PTRX ⬚
	●	●	270	6.3	7.7	43.2	16	30	2000	AA271M016E077PTRX ⬚
	●	●	330	10	10.5	52.8	16	20	2500	AA331M016G105PTRX ⬚
	●	●	470	8	10.5	75.2	16	27	2300	AA471M016F105PTRX ⬚
	●	●	470	10	10.5	75.2	16	20	2500	AA471M016G105PTRX ⬚
	●	●	560	8	11.7	89.6	16	23	2400	AA561M016F117PTRX ⬚
	●	●	560	10	10.5	89.6	16	20	2500	AA561M016G105PTRX ⬚
	●	●	820	10	12.4	131.2	16	16	2800	AA821M016G124PTRX ⬚
	●	●	1500	10	16.5	240.0	16	11	5000	AA152M016G165PTRX ⬚
25	●		33	5	5.8	8.3	14	80	900	AA330M025C058PTRX ⬚
	●	●	56	6.3	5.8	14.0	14	50	1300	AA560M025E058PTRX ⬚
	●	●	100	6.3	7.7	25.0	14	30	2000	AA101M025E077PTRX ⬚
	●	●	220	8	10.5	55.0	14	27	2300	AA221M025F105PTRX ⬚
	●	●	270	8	11.7	67.5	14	25	2400	AA271M025F117PTRX ⬚
	●	●	330	10	10.5	82.5	14	20	2500	AA331M025G105PTRX ⬚
	●	●	470	10	12.4	117.5	14	16	2800	AA471M025G124PTRX ⬚
	●	●	560	10	16.5	140.0	14	11	5000	AA561M025G165PTRX ⬚
35	●		22	5	5.8	7.7	12	100	900	AA220M035C058PTRX ⬚
	●	●	27	6.3	5.8	9.5	12	60	1300	AA270M035E058PTRX ⬚
	●	●	47	6.3	5.8	16.5	12	60	1300	AA470M035E058PTRX ⬚
	●	●	68	6.3	7.7	23.8	12	35	2000	AA680M035E077PTRX ⬚
	●	●	100	8	10.5	35.0	12	27	2300	AA101M035F105PTRX ⬚
	●	●	150	8	10.5	52.5	12	27	2300	AA151M035F105PTRX ⬚
	●	●	180	8	11.7	63.0	12	25	2400	AA181M035F117PTRX ⬚
	●	●	270	10	10.5	94.5	12	20	2500	AA271M035G105PTRX ⬚
	●	●	330	10	12.4	115.5	12	17	2800	AA331M035G124PTRX ⬚
	●	●	470	10	16.5	164.5	12	11	5000	AA471M035G165PTRX ⬚

⬚: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
50	●		10	5	5.8	5.0	10	120	750	AA100M050C058PTRX ⬚
	●	●	22	6.3	5.8	11.0	10	80	1100	AA220M050E058PTRX ⬚
	●	●	33	6.3	7.7	16.5	10	40	1600	AA330M050E077PTRX ⬚
	●	●	56	10	10.5	28.0	10	28	2000	AA680M050F105PTRX ⬚
	●	●	68	8	10.5	34.0	10	30	1800	AA820M050F117PTRX ⬚
	●	●	82	8	11.7	41.0	10	28	1880	AA680M050G105PTRX ⬚
	●	●	100	10	10.5	50.0	10	28	2000	AA101M050G105PTRX ⬚
	●	●	120	10	12.4	60.0	10	25	2200	AA121M050G124PTRX ⬚
	●	●	220	10	16.5	110.0	10	13	4600	AA221M050G165PTRX ⬚
63	●	●	10	6.3	5.8	6.3	8	120	1000	AA100M063E058PTRX ⬚
	●	●	22	6.3	7.7	13.9	8	80	1500	AA220M063E077PTRX ⬚
	●	●	33	8	10.5	20.8	8	40	1700	AA330M063F105PTRX ⬚
	●	●	47	8	10.5	29.6	8	40	1700	AA470M063F105PTRX ⬚
	●	●	47	8	11.7	29.6	8	38	1750	AA470M063F117PTRX ⬚
	●	●	56	10	10.5	35.3	8	30	1800	AA560M063G105PTRX ⬚
	●	●	68	10	10.5	42.8	8	30	1800	AA680M063G105PTRX ⬚
	●	●	82	10	12.4	51.7	8	22	2100	AA820M063G124PTRX ⬚
	●	●	150	10	16.5	94.5	8	15	4350	AA151M063G165PTRX ⬚
80	●	●	22	8	10.5	17.6	8	45	1550	AA220M080F105PTRX ⬚
	●	●	27	8	11.7	21.6	8	43	1600	AA270M080F117PTRX ⬚
	●	●	33	10	10.5	26.4	8	36	1700	AA330M080G105PTRX ⬚
	●	●	47	10	10.5	37.6	8	36	1700	AA470M080G105PTRX ⬚
	●	●	56	10	12.4	44.8	8	32	1800	AA560M080G124PTRX ⬚
100	●	●	22	8	10.5	22.0	8	55	1400	AA220M100F105PTRX ⬚
	●	●	22	8	11.7	22.0	8	52	1450	AA220M100F117PTRX ⬚
	●	●	22	10	10.5	22.0	8	45	1500	AA220M100G105PTRX ⬚
	●	●	27	10	12.4	27.0	8	40	1600	AA270M100G124PTRX ⬚
	●	●	33	10	12.4	33.0	8	40	1600	AA330M100G124PTRX ⬚
200	●	●	10	10	12.4	20.0	12	100	800	AA100M200G124PTRX ⬚

⬚: Enter **W** for Vibration proof version

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

For further information please contact sales@capxon.org

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

General Precautions and Guidelines	Packaging Information Hybrid SMD
Page 274	Page 243 and following

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

AC SERIES ▪ LONG LIFE AT 125°C

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · °C HIGH TEMPERATURE

- **HYBRID CONDUCTIVE POLYMER** ▪ SMD type
- Endurance: 125°C ▪ 4 000 hours
- Low ESR and high ripple current
- Vibration Proof (VP) version (up to 30g) available
- AEC-Q200 qualified

MSL 1 · RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +125°C
Rated Voltage Range	V_R	16 ~ 100V DC
Surge Voltage	V_S	($V_R \leq 100V$): $V_S = 1.25 \cdot V_R$
Capacitance Range	C_R	10 ~ 1500µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test		
Endurance 125°C (V_R & I_R applied)	Test	**4 000 hours**
	$\triangle C/C_R$	Within ±30% of the initial value
	tanδ	Less than 200% of the specified value
	ESR	Less than 200% of the specified value
	I_{Leak}	Less than the specified value

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
5	5.8	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.8	6.5	6.5	7.2	0.5 to 0.8	2.2
6.3	7.7	6.5	6.5	7.2	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.3	10.3	11.0	0.7 to 1.1	4.5
10	12.4	10.3	10.3	11.0	0.7 to 1.1	4.5
10	16.5	10.3	10.3	11.0	0.7 to 1.1	4.5

For further information please contact sales@capxon.org

DIMENSIONS VP PACKAGE (VIBRATION PROOF) ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
6.3	5.8	6.6	6.6	7.3	0.5 to 0.8	2.2
6.3	7.7	6.6	6.6	7.3	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.5	10.5	11.2	0.7 to 1.1	4.5
10	12.4	10.5	10.5	11.2	0.7 to 1.1	4.5
10	16.5	10.5	10.5	11.2	0.7 to 1.1	4.5

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +125°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	●	●	100	6.3	5.8	16.0	16	50	900	AC101M016E058PTRX ⬚
	●	●	120	6.3	5.8	19.2	16	50	900	AC121M016E058PTRX ⬚
	●	●	150	6.3	5.8	24.0	16	50	900	AC151M016E058PTRX ⬚
	●	●	220	6.3	7.7	35.2	16	30	1400	AC221M016E077PTRX ⬚
	●	●	270	6.3	7.7	43.2	16	30	1700	AC271M016E077PTRX ⬚
	●	●	330	10	10.5	52.8	16	20	2000	AC331M016G105PTRX ⬚
	●	●	470	8	10.5	75.2	16	27	1600	AC471M016F105PTRX ⬚
	●	●	470	10	10.5	75.2	16	20	2000	AC471M016G105PTRX ⬚
	●	●	560	8	11.7	89.6	16	23	1650	AC561M016F117PTRX ⬚
	●	●	560	10	10.5	89.6	16	20	2000	AC561M016G105PTRX ⬚
	●	●	820	10	12.4	131.2	16	16	2260	AC821M016G124PTRX ⬚
	●	●	1500	10	16.5	240.0	16	11	4000	AC152M016G165PTRX ⬚
25	●		33	5	5.8	8.3	14	80	550	AC330M025C058PTRX ⬚
	●	●	56	6.3	5.8	14.0	14	50	900	AC560M025E058PTRX ⬚
	●	●	100	6.3	7.7	25.0	14	30	1400	AC101M025E077PTRX ⬚
	●	●	220	8	10.5	55.0	14	27	1600	AC221M025F105PTRX ⬚
	●	●	270	8	11.7	67.5	14	25	1650	AC271M025F117PTRX ⬚
	●	●	330	10	10.5	82.5	14	20	2000	AC331M025G105PTRX ⬚
	●	●	470	10	12.4	117.5	14	16	2260	AC471M025G124PTRX ⬚
	●	●	560	10	16.5	140.0	14	11	4000	AC561M025G165PTRX ⬚
35	●		22	5	5.8	7.7	12	100	550	AC220M035C058PTRX ⬚
	●	●	47	6.3	5.8	16.5	12	60	900	AC470M035E058PTRX ⬚
	●	●	68	6.3	7.7	23.8	12	35	1400	AC680M035E077PTRX ⬚
	●	●	100	8	10.5	35.0	12	27	1600	AC101M035F105PTRX ⬚
	●	●	150	8	10.5	52.5	12	27	1600	AC151M035F105PTRX ⬚
	●	●	180	8	11.7	63.0	12	25	1650	AC181M035F117PTRX ⬚
	●	●	270	10	10.5	94.5	12	20	2000	AC271M035G105PTRX ⬚
	●	●	330	10	12.4	115.5	12	17	2260	AC331M035G124PTRX ⬚
	●	●	470	10	16.5	164.5	12	11	4000	AC471M035G165PTRX ⬚

⬚: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on reel version

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +125°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
50	●		10	5	5.8	5.0	10	120	500	AC100M050C058PTRX ⊡
	●	●	22	6.3	5.8	11.0	10	80	750	AC220M050E058PTRX ⊡
	●	●	33	6.3	7.7	16.5	10	40	1100	AC330M050E077PTRX ⊡
	●	●	56	10	10.5	28.0	10	28	1600	AC560M050G105PTRX ⊡
	●	●	68	8	10.5	34.0	10	30	1250	AC680M050F105PTRX ⊡
	●	●	82	8	11.7	41.0	10	28	1300	AC820M050F117PTRX ⊡
	●	●	100	10	10.5	50.0	10	28	1600	AC101M050G105PTRX ⊡
	●	●	120	10	10.5	60.0	10	28	1600	AC121M050G105PTRX ⊡
	●	●	120	10	12.4	60.0	10	25	1750	AC121M050G124PTRX ⊡
	●	●	220	10	16.5	110.0	10	13	3700	AC221M050G165PTRX ⊡
63	●	●	10	6.3	5.8	6.3	8	120	700	AC100M063E058PTRX ⊡
	●	●	22	6.3	7.7	13.9	8	80	900	AC220M063E077PTRX ⊡
	●	●	33	8	10.5	20.8	8	40	1100	AC330M063F105PTRX ⊡
	●	●	47	8	10.5	29.6	8	40	1100	AC470M063F105PTRX ⊡
	●	●	47	8	11.7	29.6	8	38	1130	AC470M063F117PTRX ⊡
	●	●	56	10	10.5	35.3	8	30	1400	AC560M063G105PTRX ⊡
	●	●	68	10	10.5	42.8	8	30	1400	AC680M063G105PTRX ⊡
	●	●	82	10	12.4	51.7	8	22	1650	AC820M063G124PTRX ⊡
	●	●	150	10	16.5	94.5	8	15	3500	AC151M063G165PTRX ⊡
80	●	●	22	8	10.5	17.6	8	45	1050	AC220M080F105PTRX ⊡
	●	●	27	8	11.7	21.6	8	43	1080	AC270M080F117PTRX ⊡
	●	●	33	10	10.5	26.4	8	36	1360	AC330M080G105PTRX ⊡
	●	●	47	10	10.5	37.6	8	36	1360	AC470M080G105PTRX ⊡
	●	●	56	10	12.4	44.8	8	35	1440	AC560M080G124PTRX ⊡
	●	●	68	10	12.4	54.4	8	32	1540	AC680M080G124PTRX ⊡
100	●	●	22	8	10.5	22.0	8	55	950	AC220M100F105PTRX ⊡
	●	●	22	8	11.7	22.0	8	52	980	AC220M100F117PTRX ⊡
	●	●	22	10	10.5	22.0	8	45	1200	AC220M100G105PTRX ⊡
	●	●	27	10	12.4	27.0	8	40	1360	AC270M100G124PTRX ⊡
	●	●	33	10	12.4	33.0	8	40	1360	AC330M100G124PTRX ⊡

⊡: Enter **W** for Vibration proof version

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

For further information please contact sales@capxon.org

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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General Precautions and Guidelines	Packaging Information Hybrid SMD
Page 274	Page 243 and following

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Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

AB SERIES ▪ MINIATURIZED HIGH RIPPLE CURRENT TYPE

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · °C HIGH TEMPERATURE · MINIATURIZED

- **HYBRID CONDUCTIVE POLYMER** ▪ SMD type
- Endurance: 125°C ▪ 2 000 up to 4 000 hours
- Low ESR and **extremely** high ripple current in small dimensions
- Vibration Proof (VP) version (up to 30g) available
- AEC-Q200 qualified

MSL 1 · RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +125°C
Rated Voltage Range	V_R	25 ~ 35V DC
Surge Voltage	V_S	($V_R \leq 100V$): $V_S = 1.25 \cdot V_R$
Capacitance Range	C_R	33 ~ 680µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test			
Endurance 125°C (V_R & I_R applied)	Test	**4 000 hours**	25V DC
		4 000 hours	< Ø D 10 ▪ 35V DC
		2 000 hours	≥ Ø D 10 ▪ 35V DC
	△C/C_R	Within ±30% of the initial value	
	tanδ	Less than 200% of the specified value	
	ESR	Less than 200% of the specified value	
	I_{Leak}	Less than the specified value	

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
5	5.8	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.8	6.5	6.5	7.2	0.5 to 0.8	2.2
6.3	7.7	6.5	6.5	7.2	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.3	10.3	11.0	0.7 to 1.1	4.5
10	12.4	10.3	10.3	11.0	0.7 to 1.1	4.5

For further information please contact sales@capxon.org

DIMENSIONS VP PACKAGE (VIBRATION PROOF) ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
6.3	5.8	6.6	6.6	7.3	0.5 to 0.8	2.2
6.3	7.7	6.6	6.6	7.3	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.5	10.5	11.2	0.7 to 1.1	4.5
10	12.4	10.5	10.5	11.2	0.7 to 1.1	4.5

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +125°C ▪ 100kHz (mA rms)	CapXon Part Number
25	●		47	5	5.8	11.8	14	80	850	AB470M025C058PTRX [ ]
	●		56	5	5.8	14.0	14	80	850	AB560M025C058PTRX [ ]
	●	●	68	6.3	5.8	17.0	14	50	1300	AB680M025E058PTRX [ ]
	●	●	82	6.3	5.8	20.5	14	50	1300	AB820M025E058PTRX [ ]
	●	●	100	6.3	5.8	25.0	14	50	1300	AB101M025E058PTRX [ ]
	●	●	150	6.3	7.7	37.5	14	30	1800	AB151M025E077PTRX [ ]
	●	●	180	6.3	7.7	45.0	14	30	1800	AB181M025E077PTRX [ ]
	●	●	270	8	10.5	67.5	14	27	2000	AB271M025F105PTRX [ ]
	●	●	330	8	10.5	82.5	14	27	2000	AB331M025F105PTRX [ ]
	●	●	470	10	10.5	117.5	14	20	2800	AB471M025G105PTRX [ ]
	●	●	560	10	10.5	140.0	14	20	2800	AB561M025G105PTRX [ ]
	●	●	680	10	12.4	170.0	14	16	3160	AB681M025G124PTRX [ ]
35	●		33	5	5.8	11.5	12	100	750	AB330M035C058PTRX [ ]
	●		39	5	5.8	13.7	12	100	750	AB390M035C058PTRX [ ]
	●	●	56	6.3	5.8	19.6	12	60	1200	AB560M035E058PTRX [ ]
	●	●	68	6.3	5.8	23.8	12	60	1200	AB680M035E058PTRX [ ]
	●	●	100	6.3	7.7	35.0	12	35	1700	AB101M035E077PTRX [ ]
	●	●	120	6.3	7.7	42.0	12	35	1700	AB121M035E077PTRX [ ]
	●	●	180	8	10.5	63.0	12	27	2000	AB181M035F105PTRX [ ]
	●	●	220	8	10.5	77.0	12	27	2000	AB221M035F105PTRX [ ]
	●	●	330	10	10.5	115.5	12	20	2800	AB331M035G105PTRX [ ]
	●	●	390	10	10.5	136.5	12	20	2800	AB391M035G105PTRX [ ]

[ ]: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

General Precautions and Guidelines	Packaging Information Hybrid SMD
Page 274	Page 243 and following

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

AN SERIES ▪ LONG LIFE AT 135°C

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · °C HIGH TEMPERATURE

- **HYBRID CONDUCTIVE POLYMER** ▪ SMD type
- Endurance: 135°C ▪ 4 000 hours
- Low ESR and high ripple current
- Vibration Proof (VP) version (up to 30g) available
- AEC-Q200 qualified

MSL 1 · RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +135°C
Rated Voltage Range	V_R	16 ~ 100V DC
Surge Voltage	V_S	($V_R \leq 100V$): $V_S = 1.25 \cdot V_R$
Capacitance Range	C_R	10 ~ 820µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test		
Endurance 135°C (V_R & I_R applied)	Test	**4 000 hours**
	$\triangle C/C_R$	Within ±30% of the initial value
	tanδ	Less than 200% of the specified value
	ESR	Less than 200% of the specified value
	I_{Leak}	Less than the specified value

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
5	5.8	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.8	6.5	6.5	7.2	0.5 to 0.8	2.2
6.3	7.7	6.5	6.5	7.2	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.3	10.3	11.0	0.7 to 1.1	4.5
10	12.4	10.3	10.3	11.0	0.7 to 1.1	4.5

For further information please contact sales@capxon.org

DIMENSIONS VP PACKAGE (VIBRATION PROOF) ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
6.3	5.8	6.6	6.6	7.3	0.5 to 0.8	2.2
6.3	7.7	6.6	6.6	7.3	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.5	10.5	11.2	0.7 to 1.1	4.5
10	12.4	10.5	10.5	11.2	0.7 to 1.1	4.5

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +135°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	●	●	100	6.3	5.8	16.0	16	50	900	AN101M016E058PTRX ⬚
	●	●	120	6.3	5.8	19.2	16	50	900	AN121M016E058PTRX ⬚
	●	●	150	6.3	5.8	24.0	16	50	900	AN151M016E058PTRX ⬚
	●	●	220	6.3	7.7	35.2	16	30	1400	AN221M016E077PTRX ⬚
	●	●	270	6.3	7.7	43.2	16	30	1700	AN271M016E077PTRX ⬚
	●	●	330	10	10.5	52.8	16	20	2000	AN331M016G105PTRX ⬚
	●	●	470	8	10.5	75.2	16	27	1600	AN471M016F105PTRX ⬚
	●	●	470	10	10.5	75.2	16	20	2000	AN471M016G105PTRX ⬚
	●	●	560	8	11.7	89.6	16	23	1650	AN561M016F117PTRX ⬚
	●	●	560	10	10.5	89.6	16	20	2000	AN561M016G105PTRX ⬚
	●	●	820	10	12.4	131.2	16	16	2260	AN821M016G124PTRX ⬚
25	●		33	5	5.8	8.3	14	80	550	AN330M025C058PTRX ⬚
	●	●	56	6.3	5.8	14.0	14	50	900	AN560M025E058PTRX ⬚
	●	●	100	6.3	7.7	25.0	14	30	1400	AN101M025E077PTRX ⬚
	●	●	220	8	10.5	55.0	14	27	1600	AN221M025F105PTRX ⬚
	●	●	270	8	11.7	67.5	14	25	1650	AN271M025F117PTRX ⬚
	●	●	330	10	10.5	82.5	14	20	2000	AN331M025G105PTRX ⬚
	●	●	470	10	12.4	117.5	14	16	2260	AN471M025G124PTRX ⬚
35	●		22	5	5.8	7.7	12	100	550	AN220M035C058PTRX ⬚
	●	●	47	6.3	5.8	16.5	12	60	900	AN470M035E058PTRX ⬚
	●	●	68	6.3	7.7	23.8	12	35	1400	AN680M035E077PTRX ⬚
	●	●	100	8	10.5	35.0	12	27	1600	AN101M035F105PTRX ⬚
	●	●	150	8	10.5	52.5	12	27	1600	AN151M035F105PTRX ⬚
	●	●	180	8	11.7	63.0	12	25	1650	AN181M035F117PTRX ⬚
	●	●	270	10	10.5	94.5	12	20	2000	AN271M035G105PTRX ⬚
	●	●	330	10	12.4	115.5	12	17	2260	AN331M035G124PTRX ⬚
50	●		10	5	5.8	5.0	10	120	500	AN100M050C058PTRX ⬚
	●	●	22	6.3	5.8	11.0	10	80	750	AN220M050E058PTRX ⬚
	●	●	33	6.3	7.7	16.5	10	40	1100	AN330M050E077PTRX ⬚
	●	●	56	10	10.5	28.0	10	28	1600	AN560M050G105PTRX ⬚

⬚: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +135°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
50	●	●	68	8	10.5	34.0	10	30	1250	AN680M050F105PTRX ⬚
	●	●	82	8	11.7	41.0	10	28	1300	AN820M050F117PTRX ⬚
	●	●	100	10	10.5	50.0	10	28	1600	AN101M050G105PTRX ⬚
	●	●	120	10	10.5	60.0	10	28	1600	AN121M050G105PTRX ⬚
	●	●	120	10	12.4	60.0	10	25	1750	AN121M050G124PTRX ⬚
63	●	●	10	6.3	5.8	6.3	8	120	700	AN100M063E058PTRX ⬚
	●	●	22	6.3	7.7	13.9	8	80	900	AN220M063E077PTRX ⬚
	●	●	33	8	10.5	20.8	8	40	1100	AN330M063F105PTRX ⬚
	●	●	47	8	10.5	29.6	8	40	1100	AN470M063F105PTRX ⬚
	●	●	47	8	11.7	29.6	8	38	1130	AN470M063F117PTRX ⬚
	●	●	56	10	10.5	35.3	8	30	1400	AN560M063G105PTRX ⬚
	●	●	68	10	10.5	42.8	8	30	1400	AN680M063G105PTRX ⬚
	●	●	82	10	12.4	51.7	8	22	1650	AN820M063G124PTRX ⬚
80	●	●	22	8	10.5	17.6	8	45	1050	AN220M080F105PTRX ⬚
	●	●	27	8	11.7	21.6	8	43	1080	AN270M080F117PTRX ⬚
	●	●	33	10	10.5	26.4	8	36	1360	AN330M080G105PTRX ⬚
	●	●	47	10	10.5	37.6	8	36	1360	AN470M080G105PTRX ⬚
	●	●	56	10	12.4	44.8	8	35	1440	AN560M080G124PTRX ⬚
	●	●	68	10	12.4	54.4	8	32	1540	AN680M080G124PTRX ⬚
100	●	●	22	8	10.5	22.0	8	55	950	AN220M100F105PTRX ⬚
	●	●	22	8	11.7	22.0	8	52	980	AN220M100F117PTRX ⬚
	●	●	22	10	10.5	22.0	8	45	1200	AN220M100G105PTRX ⬚
	●	●	27	10	12.4	27.0	8	40	1360	AN270M100G124PTRX ⬚
	●	●	33	10	12.4	33.0	8	40	1360	AN330M100G124PTRX ⬚

⬚: Enter **W** for Vibration proof version

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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General Precautions and Guidelines	Packaging Information Hybrid SMD
Page 274	Page 243 and following

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Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

AR SERIES ▪ HIGH TEMPERATURE TYPE 145°C

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · °C HIGH TEMPERATURE

- **HYBRID CONDUCTIVE POLYMER** ▪ SMD type
- Endurance: 145°C ▪ 2 000 hours
- Low ESR and high ripple current
- Vibration-proof (VP) version (up to 30g) available
- AEC-Q200 qualified

MSL 1 · RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +145°C
Rated Voltage Range	V_R	16 ~ 80V DC
Surge Voltage	V_S	($V_R \leq 100V$): $V_S = 1.25 \cdot V_R$
Capacitance Range	C_R	22 ~ 560µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test		
Endurance 145°C (V_R & I_R applied)	Test	**2 000 hours**
	$\triangle C/C_R$	Within ±30% of the initial value
	tanδ	Less than 200% of the specified value
	ESR	Less than 200% of the specified value
	I_{Leak}	Less than the specified value

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.3	10.3	11.0	0.7 to 1.1	4.5
10	12.4	10.3	10.3	11.0	0.7 to 1.1	4.5

For further information please contact sales@capxon.org

DIMENSIONS VP PACKAGE (VIBRATION PROOF) ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.5	10.5	11.2	0.7 to 1.1	4.5
10	12.4	10.5	10.5	11.2	0.7 to 1.1	4.5

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +145°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	●	●	270	8	10.5	43.2	16	27	700	AR271M016F105PTRX [ ]
	●	●	330	8	10.5	52.8	16	25	770	AR331M016F105PTRX [ ]
	●	●	470	10	10.5	75.2	16	20	900	AR471M016G105PTRX [ ]
	●	●	560	10	12.4	89.6	16	16	1050	AR561M016G124PTRX [ ]
25	●	●	220	8	10.5	55.0	14	27	700	AR221M025F105PTRX [ ]
	●	●	270	8	11.7	67.5	14	25	770	AR271M025F117PTRX [ ]
	●	●	330	10	10.5	82.5	14	20	900	AR331M025G105PTRX [ ]
	●	●	470	10	12.4	117.5	14	16	1050	AR471M025G124PTRX [ ]
35	●	●	100	8	10.5	35.0	12	27	700	AR101M035F105PTRX [ ]
	●	●	150	8	10.5	52.5	12	27	700	AR151M035F105PTRX [ ]
	●	●	180	8	11.7	63.0	12	25	770	AR181M035F117PTRX [ ]
	●	●	270	10	10.5	94.5	12	20	900	AR271M035G105PTRX [ ]
	●	●	330	10	12.4	115.5	12	17	1020	AR331M035G124PTRX [ ]
50	●	●	68	8	10.5	34.0	10	30	600	AR680M050F105PTRX [ ]
	●	●	82	8	11.7	41.0	10	28	660	AR820M050F117PTRX [ ]
	●	●	56	10	10.5	28.0	10	28	800	AR560M050G105PTRX [ ]
	●	●	100	10	10.5	50.0	10	28	800	AR101M050G105PTRX [ ]
	●	●	120	10	10.5	60.0	10	28	800	AR121M050G105PTRX [ ]
	●	●	120	10	12.4	60.0	10	25	900	AR121M050G124PTRX [ ]
63	●	●	33	8	10.5	20.8	8	40	600	AR330M063F105PTRX [ ]
	●	●	47	8	10.5	29.6	8	40	600	AR470M063F105PTRX [ ]
	●	●	47	8	11.7	29.6	8	38	650	AR470M063F117PTRX [ ]
	●	●	56	10	10.5	35.3	8	30	800	AR560M063G105PTRX [ ]
	●	●	68	10	10.5	42.8	8	30	800	AR680M063G105PTRX [ ]
	●	●	82	10	12.4	51.7	8	27	900	AR820M063G124PTRX [ ]
80	●	●	22	8	10.5	17.6	8	45	560	AR220M080F105PTRX [ ]
	●	●	27	8	11.7	21.6	8	43	580	AR270M080F117PTRX [ ]
	●	●	33	8	10.5	26.4	8	36	730	AR330M080G105PTRX [ ]
	●	●	47	10	10.5	37.6	8	36	730	AR470M080G105PTRX [ ]
	●	●	56	10	12.4	44.8	8	34	800	AR560M080G124PTRX [ ]
	●	●	68	10	12.4	54.4	8	34	800	AR680M080G124PTRX [ ]

[ ]: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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General Precautions and Guidelines	Packaging Information Hybrid SMD
Page 274	Page 243 and following

DISCLAIMER

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Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

AP SERIES ▪ HIGH TEMPERATURE TYPE 150°C

KEY FEATURES

AEC-Q 200 · HIGH VIBRATION · °C HIGH TEMPERATURE

- **HYBRID CONDUCTIVE POLYMER** ▪ SMD type
- Endurance: 150°C ▪ 1 000 hours
- Low ESR and high ripple current
- Vibration Proof (VP) version (up to 30g) available
- AEC-Q200 qualified

MSL 1 · RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +150°C
Rated Voltage Range	V_R	16 ~ 80V DC
Surge Voltage	V_S	($V_R \leq 100V$): $V_S = 1.25 \cdot V_R$
Capacitance Range	C_R	22 ~ 560µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test		
Endurance 150°C (V_R & I_R applied)	Test	**1 000 hours**
	$\triangle C/C_R$	Within ±30% of the initial value
	tanδ	Less than 200% of the specified value
	ESR	Less than 200% of the specified value
	I_{Leak}	Less than the specified value

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.3	10.3	11.0	0.7 to 1.1	4.5
10	12.4	10.3	10.3	11.0	0.7 to 1.1	4.5

For further information please contact sales@capxon.org

DIMENSIONS VP PACKAGE (VIBRATION PROOF) ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.5	10.5	11.2	0.7 to 1.1	4.5
10	12.4	10.5	10.5	11.2	0.7 to 1.1	4.5

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +150°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	●	●	270	8	10.5	43.2	16	27	700	AP271M016F105PTRX [ ]
	●	●	330	8	10.5	52.8	16	25	770	AP331M016F105PTRX [ ]
	●	●	470	10	10.5	75.2	16	20	900	AP471M016G105PTRX [ ]
	●	●	560	10	12.4	89.6	16	16	1050	AP561M016G124PTRX [ ]
25	●	●	220	8	10.5	55.0	14	27	700	AP221M025F105PTRX [ ]
	●	●	270	8	11.7	67.5	14	25	770	AP271M025F117PTRX [ ]
	●	●	330	10	10.5	82.5	14	20	900	AP331M025G105PTRX [ ]
	●	●	470	10	12.4	117.5	14	16	1050	AP471M025G124PTRX [ ]
35	●	●	100	8	10.5	35.0	12	27	700	AP101M035F105PTRX [ ]
	●	●	150	8	10.5	52.5	12	27	700	AP151M035F105PTRX [ ]
	●	●	180	8	11.7	63.0	12	25	770	AP181M035F117PTRX [ ]
	●	●	270	10	10.5	94.5	12	20	900	AP271M035G105PTRX [ ]
	●	●	330	10	12.4	115.5	12	17	1020	AP331M035G124PTRX [ ]
50	●	●	56	10	10.5	28.0	10	28	800	AP560M050G105PTRX [ ]
	●	●	68	8	10.5	34.0	10	30	600	AP680M050F105PTRX [ ]
	●	●	82	8	11.7	41.0	10	28	660	AP820M050F117PTRX [ ]
	●	●	100	10	10.5	50.0	10	28	800	AP101M050G105PTRX [ ]
	●	●	120	10	10.5	60.0	10	28	800	AP121M050G105PTRX [ ]
	●	●	120	10	12.4	60.0	10	25	900	AP121M050G124PTRX [ ]
63	●	●	33	8	10.5	20.8	8	40	600	AP330M063F105PTRX [ ]
	●	●	47	8	10.5	29.6	8	40	600	AP470M063F105PTRX [ ]
	●	●	47	8	11.7	29.6	8	38	650	AP470M063F117PTRX [ ]
	●	●	56	10	10.5	35.3	8	30	800	AP560M063G105PTRX [ ]
	●	●	68	10	10.5	42.8	8	30	800	AP680M063G105PTRX [ ]
	●	●	82	10	12.4	51.7	8	27	900	AP820M063G124PTRX [ ]
80	●	●	22	8	10.5	17.6	8	45	560	AP220M080F105PTRX [ ]
	●	●	27	8	11.7	21.6	8	43	580	AP270M080F117PTRX [ ]
	●	●	33	8	10.5	26.4	8	36	730	AP330M080G105PTRX [ ]
	●	●	47	10	10.5	37.6	8	36	730	AP470M080G105PTRX [ ]
	●	●	56	10	12.4	44.8	8	34	800	AP560M080G124PTRX [ ]
	●	●	68	10	12.4	54.4	8	34	800	AP680M080G124PTRX [ ]

[ ]: Enter **W** for Vibration proof version

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

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For further information, please visit our website www.capxongroup.com or contact CapXon directly.

PRODUCT CODE ▪ SMD HYBRID CONDUCTIVE POLYMER CAPACITORS

SMD type example:

AA series ▪ 220µF ▪ 25V ▪ ±20% ▪ Ø 8mm ▪ L 10.5mm ▪ Tape & Reel ▪ AEC-Q200 ▪ Vibration proof package

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	A	2	2	1	M	0	2	5	F	1	0	5	P	T	R	X	W	-	-
Series		Capacitance			Capacitance tolerance	Voltage			Case Ø (mm)	Height (mm)			Type code	Taping		Special requirement			

Code	µF
010	1
4R7	4.7
100	10
101	100
102	1000
152	1500

Code	%
M	±20

Code	Volt
016	16
025	25
035	35
050	50
063	63
080	80
100	100
200	200

Code	ØD
C	5
E	6.3
F	8
G	10

Code	H
058	5.8
077	7.7
105	10.5
117	11.7
124	12.4
165	16.5

Code	Type
P	Polymer

Code	
TR	Tape on reel

Code	Special
U	Plastic reel
W	Vibration proof
X	AEC-Q200

See datasheet for reference

Please consult CapXon for further assistance

MARKING ▪ SMD HYBRID CONDUCTIVE POLYMER CAPACITORS

Hybrid Polymer Capacitor ▪ SMD type

CapXon:	Manufacturer trademark
220:	Nominal capacitance (µF)
25X:	Rated voltage (V) ▪ AEC-Q200 type
▬	(-) polarity (Cathode indicate)
AA:	AA Series
003:	Production datacode year/week (ex. 2020/3rd week)

Top view
AEC-Q200 type

0 03
→ Production week
→ Last digit of the year

For further information please contact sales@capxon.org

TAPING ▪ SMD HYBRID CONDUCTIVE POLYMER CAPACITORS ▪ REEL PACK

All dimensions in mm

Ø D	5 x 5.8	6.3 x 5.8	6.3 x 7.7	8 x 10.5	8 x 11.7	10 x 10.5	10 x 12.4	10 x 16.5
W	12	16	16	24	24	24	24	24
P	12	12	12	16	16	16	16	16
F	5.5	7.5	7.5	11.5	11.5	11.5	11.5	11.5
A1	5.7	7	7	8.7	8.7	10.7	10.7	13.3
B1	5.7	7	7	8.7	8.7	10.7	10.7	10.7
T1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5
T2	6.1	5.7	8	11	13	11	12.9	17.5

For further information please contact sales@capxon.org

TAPING ▪ SMD HYBRID CONDUCTIVE POLYMER CAPACITORS ▪ REEL PACK

Ø D (mm)	L (mm)	A (mm)	Reel quantity (pcs)	Inner box quantity (pcs)	Inner box size L x W x H (mm)	Outer box quantity (pcs)	Outer box size L x W x H (mm)	Country of origin	Tariff number
5	5.8	14	1000	5000	400 x 390 x 106	15000	474 x 343 x 285	China	85322200
6.3	5.8	18	1000	4000	400 x 390 x 106	12000	474 x 343 x 285	China	85322200
	7.7	18	900	3600	400 x 390 x 106	10800	474 x 343 x 285	China	85322200
8	10.5	26	500	1500	400 x 390 x 106	4500	474 x 343 x 285	China	85322200
	11.7	26	400	1200	400 x 390 x 106	3600	474 x 343 x 285	China	85322200
10	10.5	26	500	1500	400 x 390 x 106	4500	474 x 343 x 285	China	85322200
	12.4	26	400	1200	400 x 390 x 106	3600	474 x 343 x 285	China	85322200
	16.5	26	250	750	400 x 390 x 106	2250	474 x 343 x 285	China	85322200

Remark: Standard = Paper reel
Plastic reel = Add code "U" at the end of the part number

For further information please contact sales@capxon.org

DIMENSIONS STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
5	5.8	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.8	6.5	6.5	7.2	0.5 to 0.8	2.2
6.3	7.7	6.5	6.5	7.2	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.3	10.3	11.0	0.7 to 1.1	4.5
10	12.4	10.3	10.3	11.0	0.7 to 1.1	4.5
10	16.5	10.3	10.3	11.0	0.7 to 1.1	4.5

PAD LAYOUT STANDARD PACKAGE ▪ All dimensions in mm

ø D	L	A	B	C
5	5.8	1.4	3.0	1.6
6.3	5.8	2.1	3.5	1.6
6.3	7.7	2.1	3.5	1.6
8	10.5	2.8	4.2	1.9
8	11.7	2.8	4.2	1.9
10	10.5	4.3	4.4	1.9
10	12.4	4.3	4.4	1.9
10	16.5	4.3	4.4	1.9

DIMENSIONS VIBRATION PROOF PACKAGE ▪ All dimensions in mm

ø D	L	A	B	C	W	P±0.2
6.3	5.8	6.6	6.6	7.3	0.5 to 0.8	2.2
6.3	7.7	6.6	6.6	7.3	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.5	10.5	11.2	0.7 to 1.1	4.5
10	12.4	10.5	10.5	11.2	0.7 to 1.1	4.5
10	16.5	10.5	10.5	11.2	0.7 to 1.1	4.5

PAD LAYOUT VIBRATION PROOF PACKAGE ▪ All dimensions in mm

ø D	L	A	B	C	D	E	F
6.3	5.8	2.1	3.5	3.3	0.8	0.8	1.7
6.3	7.7	2.1	3.5	3.3	0.8	0.8	1.7
8	10.5	2.8	4.2	4.5	0.8	1.1	2.3
8	11.7	2.8	4.2	4.5	0.8	1.1	2.3
10	10.5	4.3	4.5	5.0	0.8	1.3	2.4
10	12.4	4.3	4.5	5.0	0.8	1.3	2.4
10	16.5	4.3	4.5	5.0	0.8	1.3	2.4

For further information please contact sales@capxon.org

VIBRATION SPECIFICATION ▪ STANDARD AND VIBRATION PROOF PACKAGE

Reference JIS C 60068-2 / IEC 60068-2-6

Package	Condition	Determinant Standard
Standard	1. 10Hz ~ 2kHz ~ 10Hz (20 minutes) 2. Amplitude (single peak): 0.35 mm (at 10 ~ 55Hz) 3. Acceleration: 49m/s^2 (5g at 55 ~ 2kHz) 4. X, Y, Z directions, 4 hours per direction, total 12 hours	1. ΔC/C ≤ ±5% of initial value 2. DF ≤ stated limit 3. LC ≤ stated limit 4. No visible damage 5. No leakage of electrolyte
Vibration-proof	1. 10Hz ~ 2kHz ~ 10Hz (10 minutes) 2. Amplitude (single peak): 2 mm (at 10 ~ 55Hz) 3. Acceleration: 294m/s^2 (30g at 55 ~ 2kHz) 4. X, Y, Z directions, 4 hours per direction, total 12 hours	1. ΔC/C ≤ ±5% of initial value 2. DF ≤ stated limit 3. LC ≤ stated limit 4. No visible damage 5. No leakage of electrolyte

For further information please contact sales@capxon.org

Radial Types

OVERVIEW ▪ RADIAL HYBRID POLYMER CONDUCTIVE CAPACITORS

Features

Series	Page	AEC-Q200	High Temperature	High Voltage	Low ESR	Slim Type	Standard	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)
AS	250	●		●	●	●	●	-55	+105	16	400	1.2	1500	2000 to 10000
AT	253	●	●		●	●		-55	+125	16	100	8.2	1500	4000
AK	256	●	●		●			-55	+135	16	100	8.2	560	2000 to 3000
AL	259	●	●		●			-55	+145	16	80	8.2	560	2000
AM	262	●	●		●			-55	+150	16	80	8.2	560	1000

For further information please contact sales@capxon.org

AS SERIES ▪ LONG LIFE UP TO 10 000 HOURS

KEY FEATURES

AEC-Q 200 HIGH VOLTAGE

- **HYBRID CONDUCTIVE POLYMER** ▪ THT type
- Endurance: 105°C ▪ 2 000 up to 10 000 hours
- Low ESR and high ripple current
- Superior electrical stability over application lifetime
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +105°C
Rated Voltage Range	V_R	16 ~ 400V DC
Surge Voltage	V_S	($V_R \le 100V$): $V_S = 1.25 \cdot V_R$ ($V_R \ge 200V$): $V_S = 1.15 \cdot V_R$
Capacitance Range	C_R	1.2 ~ 1500µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test			
Endurance 105°C (V_R & I_R applied)	Test	**10 000 hours**	≥ ø D 8 ▪ < 250V
		5 000 hours	≤ ø D 6.3 ▪ < 250V DC
		5 000 hours	250V
		2 000 hours	400V
	$\triangle C/C_R$	Within ±30% of the initial value	
	tanδ	Less than 200% of the specified value	
	ESR	Less than 200% of the specified value	
	I_{Leak}	Less than the specified value	

DIMENSIONS ▪ All dimensions in mm

ø D	L	ØD0.5	a	F±0.5	Ød±0.05
6.3	8	6.3	1	2.5	0.6
8	9	8	1.5	3.5	0.6
8	11.5	8	1.5	3.5	0.6
10	10	10	1.5	5	0.6
10	12.5	10	1.5	5	0.6
10	18	10	2	5	0.6

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	120	6.3	8	19.2	16	40	1500	AS121M016E080PTCX
	270	8	9	43.2	16	26	2000	AS271M016F090PTDX
	330	8	11.5	52.8	16	23	2350	AS331M016F115PTDX
	470	10	10	75.2	16	21	2600	AS471M016G100PTAX
	560	10	12.5	89.6	16	15	3000	AS561M016G125PTAX
	1500	10	18	240.0	16	12	5000	AS152M016G180PTAX
25	68	6.3	8	17.0	16	45	1400	AS680M025E080PTCX
	150	8	9	37.5	16	27	1900	AS151M025F090PTDX
	220	8	11.5	55.0	16	24	2250	AS221M025F115PTDX
	270	10	10	67.5	16	22	2530	AS271M025G100PTAX
	330	10	12.5	82.5	16	16	2900	AS331M025G125PTAX
	1000	10	18	250,0	16	12	5000	AS102M025G180PTAX
35	47	6.3	8	16.5	16	60	1300	AS470M035E080PTCX
	100	8	9	35.0	16	30	1800	AS101M035F090PTDX
	150	8	11.5	52.5	16	25	2100	AS151M035F115PTDX
	150	10	10	52.5	16	23	2470	AS151M035G100PTAX
	220	10	12.5	77.0	16	17	2830	AS221M035G125PTAX
	680	10	18	238.0	16	14	4600	AS681M035G180PTAX
40	27	6.3	8	10.8	16	70	1250	AS270M040E080PTCX
	56	8	9	22.4	16	32	1750	AS560M040F090PTDX
	82	8	11.5	32.8	16	27	2000	AS820M040F115PTDX
	100	10	10	40.0	16	24	2400	AS101M040G100PTAX
	120	10	10	48.0	16	18	2750	AS121M040G100PTAX
	180	10	12.5	72.0	16	18	3000	AS181M040G125PTAX
50	15	6.3	8	7.5	16	80	1200	AS150M050E080PTCX
	33	8	9	16.5	16	35	1670	AS330M050F090PTDX
	47	8	11.5	23.5	16	30	1900	AS470M050F115PTDX
	56	10	10	28.0	16	25	2320	AS560M050G100PTAX
	82	10	12.5	41.0	16	19	2650	AS820M050G125PTAX
	220	10	18	110.0	16	15	4350	AS221M050G180PTAX
63	10	6.3	8	6.3	16	100	1060	AS100M063E080PTCX
	22	8	9	13.9	16	40	1560	AS220M063F090PTDX
	27	8	11.5	17.0	16	35	1750	AS270M063F115PTDX
	33	10	10	20.8	16	30	2100	AS330M063G100PTAX
	47	10	10	29.6	16	30	2100	AS470M063G100PTAX
	56	10	12.5	35.3	16	22	2400	AS560M063G125PTAX
	150	10	18	94.5	16	18	4000	AS151M063G180PTAX
80	8.2	8	9	6.6	16	90	1050	AS8R2M080F115PTDX
	15	8	11.5	12.0	16	70	1400	AS150M080F115PTDX
	12	10	10	9.6	16	70	1600	AS120M080G100PTAX
	15	10	10	12.0	16	70	1600	AS150M080G100PTAX
	18	10	12.5	14.4	16	50	1830	AS180M080G125PTAX

Part number shows taped version with straight leads and Ammo Pack packaging.
See "ADDITIONAL INFORMATION" for further lead treatment options.

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +105°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
100	8.2	8	9	8.2	16	100	1000	AS8R2M100F090PTDX
	10	8	11.5	10.0	16	80	1300	AS100M100F115PTDX
	10	10	10	10.0	16	80	1450	AS100M100G100PTAX
	12	10	10	12.0	16	80	1450	AS120M100G100PTAX
	15	10	12.5	15.0	16	60	1660	AS150M100G125PTAX
	47	10	12.5	47.0	16	60	1660	AS470M100G125PTAX
250	8.2	10	12.5	20.5	16	120	740	AS8R2M250G125PTAX
400	1.2	8	9	4.8	16	200	430	AS1R2M400F090PTDX
	2.2	8	11.5	8.8	16	170	510	AS2R2M400F115PTDX
	4.7	10	12.5	18.8	16	150	650	AS4R7M400G125PTAX

Part number shows taped version with straight leads and Ammo Pack packaging.
See "PACKAGING INFORMATION" for further lead treatment options.

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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General Precautions and Guidelines	Packaging Information Hybrid Radial
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DISCLAIMER

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Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

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For further information, please visit our website www.capxongroup.com or contact CapXon directly.

AT SERIES ▪ LONG LIFE AT 125°C UP TO 4000 hours

KEY FEATURES

AEC-Q 200 · °C HIGH TEMPERATURE

- **HYBRID CONDUCTIVE POLYMER** ▪ THT type
- Endurance: 125°C ▪ 2000 up to 4000 hours
- Low ESR and high ripple current
- Superior electrical stability over application lifetime
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +125°C
Rated Voltage Range	V_R	16 ~ 100V DC
Surge Voltage	V_S	($V_R \leq 100V$): $V_S = 1.25 \cdot V_R$
Capacitance Range	C_R	8.2 ~ 1500µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test			
Endurance 125°C (V_R & I_R applied)	Test	**4000 hours**	≥ ø D 8
		2000 hours	≤ ø D 6.3
	$\triangle C/C_R$	Within ±30% of the initial value	
	tanδ	Less than 200% of the specified value	
	ESR	Less than 200% of the specified value	
	I_{Leak}	Less than the specified value	

DIMENSIONS ▪ All dimensions in mm

ø D	L	ØD±0.5	a	F±0.5	Ød±0.05
6.3	8	6.3	1	2.5	0.6
8	9	8	1.5	3.5	0.6
8	11.5	8	1.5	3.5	0.6
10	10	10	1.5	5	0.6
10	12.5	10	1.5	5	0.6
10	18	10	2	5	0.6

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +125°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	120	6.3	8	19.2	16	32	1440	AT121M016E080PTCX
	270	8	9	43.2	16	23	1970	AT271M016F090PTDX
	330	8	11.5	52.8	16	20	2340	AT331M016F115PTDX
	470	10	10	75.2	16	18	2620	AT471M016G100PTAX
	560	10	12.5	89.6	16	14	3030	AT561M016G125PTAX
	1500	10	18	240.0	16	12	4000	AT152M016G180PTAX
25	68	6.3	8	17.0	16	35	1380	AT680M025E080PTCX
	150	8	9	37.5	16	25	1880	AT151M025F090PTDX
	220	8	11.5	55.0	16	22	2230	AT221M025F115PTDX
	270	10	10	67.5	16	19	2500	AT271M025G100PTAX
	330	10	12.5	82.5	16	14	2890	AT331M025G125PTAX
	1000	10	18	250.0	16	12	4000	AT102M025G180PTAX
35	47	6.3	8	16.5	16	45	1280	AT470M035E080PTCX
	100	8	9	35.0	16	28	1780	AT101M035F090PTDX
	150	8	11.5	52.5	16	25	2100	AT151M035F115PTDX
	150	10	10	52.5	16	20	2440	AT151M035G100PTAX
	220	10	12.5	77.0	16	15	2800	AT221M035G125PTAX
	680	10	18	238.0	16	14	3700	AT681M035G180PTAX
40	27	6.3	8	10.8	16	48	1230	AT270M040E080PTCX
	56	8	9	22.4	16	30	1710	AT560M040F090PTDX
	82	8	11.5	32.8	16	27	2000	AT820M040F115PTDX
	100	10	10	40.0	16	21	2360	AT101M040G100PTAX
	120	10	10	48.0	16	20	2400	AT121M040G100PTAX
	180	10	12.5	72.0	16	18	2550	AT181M040G125PTAX
50	15	6.3	8	7.5	16	80	960	AT150M050E080PTCX
	33	8	9	16.5	16	35	1330	AT330M050F090PTDX
	47	8	11.5	23.5	16	30	1520	AT470M050F115PTDX
	56	10	10	28.0	16	30	1850	AT560M050G100PTAX
	82	10	12.5	41.0	16	25	2120	AT820M050G125PTAX
	220	10	18	110.0	16	15	3500	AT221M050G180PTAX
63	10	6.3	8	6.3	16	100	840	AT100M063E080PTCX
	22	8	9	13.9	16	40	1240	AT220M063F090PTDX
	27	8	11.5	17	16	35	1400	AT270M063F115PTDX
	33	10	10	20.8	16	35	1680	AT330M063G100PTAX
	47	10	10	29.6	16	35	1680	AT470M063G100PTAX
	56	10	12.5	35.3	16	30	1920	AT560M063G125PTAX
	150	10	18	94.5	16	18	3200	AT151M063G180PTAX
80	8.2	8	9	6.6	16	90	840	AT8R2M080F090PTDX
	15	8	11.5	12	16	70	1120	AT150M080F115PTDX
	12	10	10	9.6	16	70	1280	AT120M080G100PTAX
	15	10	10	12	16	70	1280	AT150M080G100PTAX
	18	10	12.5	14.4	16	60	1460	AT180M080G125PTAX

Part number shows taped version with straight leads and Ammo Pack packaging.
See "PACKAGING INFORMATION" for further lead treatment options.

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +125°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
100	8.2	8	9	8.2	16	100	800	AT8R2M100F090PTDX
	10	8	11.5	10	16	80	1040	AT100M100F115PTDX
	10	10	10	10	16	80	1160	AT100M100G100PTAX
	12	10	10	12	16	80	1160	AT120M100G100PTAX
	15	10	12.5	15	16	70	1320	AT150M100G125PTAX
	47	10	12.5	15	16	70	1320	AT470M100G125PTAX

□: Leave **blank** for Standard type □: Enter **X** for AEC-Q200 type

Part number shows taped version with straight leads and Ammo Pack packaging.

See "PACKAGING INFORMATION" for further lead treatment options.

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our "General Precautions and Guidelines" as well as our "Packaging Information". Please refer to the following links in the table.

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DISCLAIMER

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Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

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For further information, please visit our website www.capxongroup.com or contact CapXon directly.

AK SERIES ▪ LONG LIFE AT 135°C UP TO 3 000 hours

KEY FEATURES

AEC-Q 200 · °C HIGH TEMPERATURE

- **HYBRID CONDUCTIVE POLYMER** ▪ THT type
- Endurance: 135°C ▪ 3 000 hours
- Low ESR and high ripple current
- Superior electrical stability over application lifetime
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +135°C
Rated Voltage Range	V_R	16 ~ 100V DC
Surge Voltage	V_S	($V_R \leq 100V$): $V_S = 1.25 \cdot V_R$
Capacitance Range	C_R	8.2 ~ 560µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test			
Endurance 135°C (V_R & I_R applied)	Test	**3 000 hours**	≥ Ø 8
		2 000 hours	≤ Ø 6.3
	$\triangle C/C_R$	Within ±30% of the initial value	
	tanδ	Less than 200% of the specified value	
	ESR	Less than 200% of the specified value	
	I_{Leak}	Less than the specified value	

DIMENSIONS ▪ All dimensions in mm

ø D	L	ØD±0.5	a	F±0.5	Ød±0.05
6.3	8	6.3	1	2.5	0.6
8	9	8	1.5	3.5	0.6
8	11.5	8	1.5	3.5	0.6
10	10	10	1.5	5	0.6
10	12.5	10	1.5	5	0.6

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +135°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	120	6.3	8	19.2	16	32	1440	AK121M016E080PTCX
	270	8	9	43.2	16	23	1970	AK271M016F090PTDX
	330	8	11.5	52.8	16	20	2340	AK331M016F115PTDX
	470	10	10	75.2	16	18	2620	AK471M016G100PTAX
	560	10	12.5	89.6	16	14	3030	AK561M016G125PTAX
25	68	6.3	8	17.0	16	35	1380	AK680M025E080PTCX
	150	8	9	37.5	16	25	1880	AK151M025F090PTDX
	220	8	11.5	55.0	16	22	2230	AK221M025F115PTDX
	270	10	10	67.5	16	19	2500	AK271M025G100PTAX
	330	10	12.5	82.5	16	14	2890	AK331M025G125PTAX
35	47	6.3	8	16.5	16	45	1280	AK470M035E080PTCX
	100	8	9	35.0	16	28	1780	AK101M035F090PTDX
	150	8	11.5	52.5	16	25	2100	AK151M035F115PTDX
	150	10	10	52.5	16	20	2440	AK151M035G100PTAX
	220	10	12.5	77.0	16	15	2800	AK221M035G125PTAX
40	27	6.3	8	10.8	16	48	1230	AK270M040E080PTCX
	56	8	9	22.4	16	30	1710	AK560M040F090PTDX
	82	8	11.5	32.8	16	27	2000	AK820M040F115PTDX
	100	10	10	40.0	16	21	2360	AK101M040G100PTAX
	120	10	10	48.0	16	20	2400	AK121M040G100PTAX
	180	10	12.5	72.0	16	18	2550	AK181M040G125PTAX
50	15	6.3	8	7.5	16	80	960	AK150M050E080PTCX
	33	8	9	16.5	16	35	1330	AK330M050F090PTDX
	47	8	11.5	23.5	16	30	1520	AK470M050F115PTDX
	56	10	10	28.0	16	30	1850	AK560M050G100PTAX
	82	10	12.5	41.0	16	25	2120	AK820M050G125PTAX
63	10	6.3	8	6.3	16	100	840	AK100M063E080PTCX
	22	8	9	13.9	16	40	1240	AK220M063F090PTDX
	27	8	11.5	17.0	16	35	1400	AK270M063F115PTDX
	33	10	10	20.8	16	35	1680	AK330M063G100PTAX
	47	10	10	29.6	16	35	1680	AK470M063G100PTAX
	56	10	12.5	35.3	16	30	1920	AK560M063G125PTAX
80	8.2	8	9	6.6	16	90	840	AK8R2M080F090PTDX
	15	8	11.5	12.0	16	70	1120	AK150M080F115PTDX
	12	10	10	9.6	16	70	1280	AK120M080G100PTAX
	15	10	10	12.0	16	70	1280	AK150M080G100PTAX
	18	10	12.5	14.4	16	60	1460	AK180M080G125PTAX
100	8.2	8	9	8.2	16	100	800	AK8R2M100F090PTDX
	10	8	11.5	10.0	16	80	1040	AK100M100F115PTDX
	10	10	10	10.0	16	80	1160	AK100M100G100PTAX
	12	10	10	12.0	16	80	1160	AK120M100G100PTAX
	15	10	12.5	15.0	16	70	1320	AK150M100G125PTAX

Part number shows taped version with straight leads and Ammo Pack packaging.
See "PACKAGING INFORMATION" for further lead treatment options.

For further information please contact sales@capxon.org

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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For further information, please visit our website www.capxongroup.com or contact CapXon directly.

AL SERIES ▪ HIGH TEMPERATURE TYPE 145°C

KEY FEATURES

AEC-Q 200 · °C HIGH TEMPERATURE

- **HYBRID CONDUCTIVE POLYMER** ▪ THT type
- Endurance: 145°C ▪ 2 000 hours
- Low ESR and high ripple current
  Superior electrical stability over application lifetime
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +145°C
Rated Voltage Range	V_R	16 ~ 80V DC
Surge Voltage	V_S	($V_R \leq 100V$): $V_S = 1.25 \cdot V_R$
Capacitance Range	C_R	8.2 ~ 560µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test		
Endurance 145°C (V_R & I_R applied)	Test	**2 000 hours**
	$\triangle C/C_R$	Within ±30% of the initial value
	tanδ	Less than 200% of the specified value
	ESR	Less than 200% of the specified value
	I_{Leak}	Less than the specified value

DIMENSIONS ▪ All dimensions in mm

ø D	L	ØD±0.5	a	F±0.5	Ød±0.05
8	9	8	1.5	3.5	0.6
8	11.5	8	1.5	3.5	0.6
10	10	10	1.5	5	0.6
10	12.5	10	1.5	5	0.6

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +145°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	270	8	9	43.2	16	25	780	AL271M016F090PTDX
	330	8	11.5	52.8	16	23	950	AL331M016F115PTDX
	470	10	10	75.2	16	20	1050	AL471M016G100PTAX
	560	10	12.5	89.6	16	16	1220	AL561M016G125PTAX
25	150	8	9	37.5	16	27	750	AL151M025F090PTDX
	220	8	11.5	55	16	25	900	AL221M025F115PTDX
	270	10	10	67.5	16	22	1000	AL271M025G100PTAX
	330	10	12.5	82.5	16	16	1150	AL331M025G125PTAX
35	100	8	9	16.5	16	30	700	AL101M035F090PTDX
	150	8	11.5	35	16	27	850	AL151M035F115PTDX
	150	10	10	52.5	16	23	950	AL151M035G100PTAX
	220	10	12.5	77	16	18	1100	AL221M035G125PTAX
40	56	8	9	22.4	16	30	660	AL560M040F090PTDX
	82	8	11.5	32.8	16	27	800	AL820M040F115PTDX
	100	10	10	40	16	25	920	AL101M040G100PTAX
	120	10	10	48	16	23	920	AL121M040G100PTAX
	180	10	12.5	48	16	20	1040	AL181M040G125PTAX
50	33	8	9	16.5	16	35	620	AL330M050F090PTDX
	47	8	11.5	23.5	16	28	730	AL570M050F115PTDX
	56	10	10	28	16	28	880	AL560M050G100PTAX
	82	10	12.5	41	16	25	1040	AL820M050G125PTAX
63	22	8	9	13.9	16	40	600	AL220M063F090PTDX
	27	8	11.5	17	16	35	700	AL270M063F115PTDX
	33	10	10	20.8	16	30	850	AL330M063G100PTAX
	47	10	10	29.6	16	30	850	AL470M063G100PTAX
	56	10	12.5	35.3	16	25	950	AL560M063G125PTAX
80	8.2	8	9	6.6	16	90	450	AL8R2M080F090PTDX
	12	10	10	9.6	16	70	650	AL120M080G100PTAX
	15	8	11.5	12	16	70	550	AL150M080F115PTDX
	15	10	10	12	16	70	650	AL150M080G100PTAX
	18	10	12.5	14.4	16	50	750	AL180M080G125PTAX

Part number shows taped version with straight leads and Ammo Pack packaging.
See "PACKAGING INFORMATION" for further lead treatment options.

For further information please contact sales@capxon.org

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

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DISCLAIMER

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CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

AM SERIES ▪ HIGH TEMPERATURE TYPE 150°C

KEY FEATURES

AEC-Q 200 · °C HIGH TEMPERATURE

- **HYBRID CONDUCTIVE POLYMER** ▪ THT type
- Endurance: 150°C ▪ 1 000 hours
- Low ESR and high ripple current
- Superior electrical stability over application lifetime
- AEC-Q200 qualified

RoHS & REACH COMPLIANT

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +150°C
Rated Voltage Range	V_R	16 ~ 80V DC
Surge Voltage	V_S	($V_R \leq 100V$): $V_S = 1.25 \cdot V_R$
Capacitance Range	C_R	8.2 ~ 560µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)
Leakage Current (20°C ▪ V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C ▪ 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test		
Endurance 150°C (V_R & I_R applied)	Test	**1 000 hours**
	$\triangle C/C_R$	Within ±30% of the initial value
	tanδ	Less than 200% of the specified value
	ESR	Less than 200% of the specified value
	I_{Leak}	Less than the specified value

DIMENSIONS ▪ All dimensions in mm

ø D	L	ØD±0.5	a	F±0.5	Ød±0.05
8	9	8	1.5	3.5	0.6
8	11.5	8	1.5	3.5	0.6
10	10	10	1.5	5	0.6
10	12.5	10	1.5	5	0.6

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

For further information please contact sales@capxon.org

STANDARD RATINGS

V_R (V)	C_R (µF)	ø D (mm)	L (mm)	I_{LEAK} (µA, 2min)	tanδ +20°C ▪ 120Hz (%)	Max. ESR +20°C ▪ 100kHz (mΩ)	I_R ▪ Max. Ripple Current +150°C ▪ 100kHz (mA rms)	CapXon Part Number Automotive Type
16	270	8	9	43.2	16	25	770	AM271M016F090PTDX
	330	8	11.5	52.8	16	23	800	AM331M016F115PTDX
	470	10	10	75.2	16	20	880	AM471M016G100PTAX
	560	10	12.5	89.6	16	16	1010	AM561M016G125PTAX
25	150	8	9	37.5	16	27	750	AM151M025F090PTDX
	220	8	11.5	55.0	16	25	770	AM221M025F115PTDX
	270	10	10	67.5	16	22	850	AM271M025G100PTAX
	330	10	12.5	82.5	16	16	970	AM331M025G125PTAX
35	100	8	9	16.5	16	30	710	AM101M035F090PTDX
	150	8	11.5	35.0	16	27	730	AM151M035F115PTDX
	150	10	10	52.5	16	23	830	AM151M035G100PTAX
	220	10	12.5	77.0	16	18	950	AM221M035G125PTAX
40	56	8	9	22.4	16	30	650	AM560M040F090PTDX
	82	8	11.5	32.8	16	27	660	AM820M040F115PTDX
	100	10	10	40.0	16	25	720	AM101M040G100PTAX
	120	10	10	48.0	16	23	740	AM121M040G100PTAX
	180	10	12.5	48.0	16	20	850	AM181M040G125PTAX
50	33	8	9	16.5	16	35	550	AM330M050F090PTDX
	47	8	11.5	23.5	16	28	620	AM470M050F115PTDX
	56	10	10	28.0	16	28	660	AM560M050G100PTAX
	82	10	12.5	41.0	16	25	720	AM820M050G125PTAX
63	22	8	9	13.9	16	40	520	AM220M063F090PTDX
	27	8	11.5	17.0	16	35	540	AM270M063F115PTDX
	33	10	10	20.8	16	30	570	AM330M063G100PTAX
	47	10	10	29.6	16	30	570	AM470M063G100PTAX
	56	10	12.5	35.3	16	25	620	AM560M063G125PTAX
80	8.2	8	9	6.6	16	90	320	AM8R2M080F090PTDX
	12	10	10	9.6	16	70	440	AM120M080G100PTAX
	15	8	11.5	12.0	16	70	410	AM150M080F115PTDX
	15	10	10	12.0	16	70	440	AM150M080G100PTAX
	18	10	12.5	14.4	16	50	480	AM180M080G125PTAX

Part number shows taped version with straight leads and Ammo Pack packaging.
See "PACKAGING INFORMATION" for further lead treatment options.

For further information please contact sales@capxon.org

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Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

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PRODUCT CODE ▪ RADIAL HYBRID CONDUCTIVE POLYMER CAPACITORS

THT type example:

AT series ▪ 47µF ▪ 50V ▪ ±20% ▪ Ø 8mm ▪ L 11.5mm ▪ P 3.5mm ▪ Tape Ammo ▪ AEC-Q200

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	T	4	7	0	M	0	5	0	F	1	1	5	P	T	D	X	-	-	-
Series		Capacitance			Capacitance tolerance	Voltage			Case Ø (mm)	Height (mm)			Type code	Taping / lead treatment *		Special requirement			

Capacitance

Code	µF
010	1
4R7	4.7
100	10
101	100
102	1000
152	1500

Capacitance tolerance

Code	%
M	±20

Voltage

Code	Volt
016	16
025	25
035	35
040	40
050	50
063	63
080	80
100	100
250	250
400	400

Case Ø (mm)

Code	ØD
E	6.3
F	8
G	10

Height (mm)

Code	H
080	8
090	9
100	10
115	11.5
125	12.5
180	18

Type code

Code	Type
P	Polymer

Taping / lead treatment *

Code	Pitch (mm)
TC	2.5
TD	3.5
TA	5

Special requirement

Code	Special
X	AEC-Q200

See datasheet for reference

* See chapter taping or lead treatment for further information
Please consult CapXon for further assistance

MARKING ▪ RADIAL HYBRID POLYMER CAPACITORS

Hybrid Polymer Capacitor ▪ Radial type

CapXon:	Manufacturer trademark
47:	Nominal capacitance (µF)
50X:	Rated voltage (V) ▪ AEC-Q200 type
▬	(-) polarity (Cathode indicate)
AT:	AT Series
003:	Production datacode year/week (ex. 2020/3rd week)

Top view
AEC-Q200 type

0 03
→ Production week
→ Last digit of the year

For further information please contact sales@capxon.org

TAPING ▪ RADIAL HYBRID POLYMER CAPACITORS ▪ AMMO PACK

Taping ▪ ØD ≥6.3mm ▪ standard lead spacing

Example

A S	2 2 1	M	0 2 5	F	1 1 5	P	T D	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

All dimensions in mm

	D	L	d	P	P0	P1	P2	F	W	W0	W1	W2	H	D0	Δh	Δp	T	Code
Tol	±0.5	-	±0.02	±1.0	±0.2	±0.7	±1.3	+0.4 -0.2	±0.5	±0.5	±0.5	Max	+0.75 -0.5	±0.2	Max	Max	Max	
Item	6.3	8 (±1.5)	0.6	12.7	12.7	5.1	6.35	**2.5**	18	11	9	2	18.5	4	1	1	1.5	**TC**
	8	9 (±1.5) 11.5 (±1.5)	0.6	12.7	12.7	4.6	6.35	**3.5**	18	11	9	2	18.5	4	1	1	1	**TD**
	10	10 (±1.5) 12.5 (±1.5) 18 (±2)	0.6	12.7	12.7	3.85	6.35	**5**	18	11	9	2	18.5	4	1	1	1.5	**TA**

For further information please contact sales@capxon.org

TAPING ▪ RADIAL HYBRID POLYMER CAPACITORS ▪ AMMO PACK

Ø D (mm)	Length L (mm)	Inner box quantity (pcs)	Inner box size L x W x H (mm)	Outer box quantity (pcs)	Outer box size L x W x H (mm)	Country of origin	Tariff number
6.3	8	1500	331 x 227 x 51	15000	474 x 343 x 285	China	85322200
8	9 to 11.5	800	331 x 227 x 51	8000	474 x 343 x 285	China	85322200
10	10 to 12.5	600	331 x 227 x 51	6000	474 x 343 x 285	China	85322200
	18	500	331 x 227 x 51	5000	474 x 343 x 285	China	85322200

For further information please contact sales@capxon.org

TAPING ▪ RADIAL HYBRID POLYMER CAPACITORS ▪ REEL PACK

Taping ▪ ØD ≥6.3mm ▪ standard lead spacing

Example

A S	2 2 1	M	0 2 5	F	1 1 5	P	R D	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

All dimensions in mm

	D	L	d	P	P0	P1	P2	F	W	W0	W1	W2	H	D0	Δh	Δp	T	Code
Tol	±0.5	-	±0.02	±1.0	±0.2	±0.7	±1.3	+0.4 -0.2	±0.5	±0.5	±0.5	Max	+0.75 -0.5	±0.2	Max	Max	Max	
Item	6.3	8 (±1.5)	0.6	12.7	12.7	5.1	6.35	**2.5**	18	11	9	2	18.5	4	1	1	1.5	**RC**
	8	9 (±1.5) 11.5 (±1.5)	0.6	12.7	12.7	4.6	6.35	**3.5**	18	11	9	2	18.5	4	1	1	1	**RD**
	10	10 (±1.5) 12.5 (±1.5) 18 (±2)	0.6	12.7	12.7	3.85	6.35	**5**	18	11	9	2	18.5	4	1	1	1.5	**RA**

For further information please contact sales@capxon.org

TAPING ▪ RADIAL HYBRID POLYMER CAPACITORS ▪ REEL PACK

Ø D (mm)	Length L (mm)	A (mm)	Inner box quantity (pcs)	Inner box size L x W x H (mm)	Outer box quantity (pcs)	Outer box size L x W x H (mm)	Country of origin	Tariff number
6.3	8	45	1000	350 x 350 x 105	6000	375 x 375 x 343	China	85322200
8	9 to 11.5	45	800	350 x 350 x 105	4800	375 x 375 x 343	China	85322200
10	10 to 12.5	45	600	350 x 350 x 105	3600	375 x 375 x 343	China	85322200
	18	55	600	349 x 349 x 121	3600	375 x 375 x 385	China	85322200

PACKAGING ▪ RADIAL HYBRID POLYMER CAPACITORS
STRAIGHT LEADS ▪ BULK PACK

Ø D (mm)	Length L (mm)	Inner bag / Inner row (pcs)	Inner box quantity (pcs)	Inner box size L x W x H (mm)	Outer box quantity (pcs)	Outer box size L x W x H (mm)	Country of origin	Tariff number
6.3	8	600/bag	7200	293 x 181 x 223	7200	293 x 181 x 223	China	85322200
8	9	450/bag	5400	293 x 181 x 223	5400	293 x 181 x 223	China	85322200
	11.5	300/bag	3600	293 x 181 x 223	3600	293 x 181 x 223	China	85322200
10	10	300/bag	3600	293 x 181 x 223	3600	293 x 181 x 223	China	85322200
	12.5	200/bag	2400	293 x 181 x 223	2400	293 x 181 x 223	China	85322200
	18	200/bag	2400	293 x 181 x 223	2400	293 x 181 x 223	China	85322200

For further information please contact sales@capxon.org

PACKAGING ▪ RADIAL HYBRID POLYMER CAPACITORS
CUTTED LEADS ▪ BULK PACK

Ø D (mm)	Length L (mm)	Inner bag / Inner row (pcs)	Inner box quantity (pcs)	Cutting height (mm)	Outer box quantity (pcs)	Outer carton quantity (pcs)	Country of origin	Tariff number
6.3	5.2	1200/bag	1200/box	≤ 7	14400	14400	China	85322200
8	9	600/bag	600/box	≤ 7	7200	7200	China	85322200
	11.5	500/bag	500/box	≤ 7	6000	6000	China	85322200
10	10	400/bag	400/box	≤ 7	4800	4800	China	85322200
	12.5	300/bag	300/box	≤ 7	3600	3600	China	85322200
	18	200/bag	200/box	≤ 7	2400	2400	China	85322200

For further information please contact sales@capxon.org

AVAILABLE LEAD TREATMENTS ▪ RADIAL HYBRID POLYMER CAPACITORS

Radial type ▪ standard lead spacing (all dimensions in mm)

Ø D (mm)	L (mm)	a (mm)	F (mm)	Ø d (mm)
6.3	8	1	2.5	0.6
8	9	1.5	3.5	0.6
8	11.5	1.5	3.5	0.6
10	10	1.5	5	0.6
10	12.5	1.5	5	0.6
10	18	2	5	0.6

Radial type ▪ CA version ▪ cutted leads ▪ standard lead spacing

Example

Length „H“ customized. See product code table customized lead length for further reference.

Ø D (mm)	6.3	8	10
F (mm)	2.5	3.5	5

A S	2 2 1	M	0 2 5	F	1 1 5	P	C A	X - - -
Series	Capacitance	Tolerance	Voltage	ØD (mm)	Height (mm)	Type code	Lead treatment	Special requirement

For further information please contact sales@capxon.org

PRODUCT CODE TABLE ▪ CUSTOMIZED LEAD LENGTH

THT type example:

AS series ▪ 220µF ▪ 25V ▪ ±20% ▪ Ø 8mm ▪ L 11.5mm ▪ CA version, cutted leads ▪ P 3.5mm ▪ H 6.0mm ▪ AEC-Q200

Product code 17th digit	H (mm)
A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
I	9

Product code 18st digit	H (mm)
0	0.0
1	0.1
2	0.2
3	0.3
4	0.4
5	0.5
6	0.6
7	0.7
8	0.8
9	0.9

Example H (mm)	Product code Automotive
4.0	**XD0**
4.5	**XD5**
5.2	**XE2**
6.0	**XF0**

The 18th digit is according basic ordering of the Latin alphabet and shows the measure "H" in front of the decimal separator. The 19th digit follows the numbering from 0 to 9 and shows the measure "H" after the decimal separator.

For further information please contact sales@capxon.org

PRECAUTIONS & GUIDELINES ▪ AUTOMOTIVE PRODUCTS ▪

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For further information please contact sales@capxon.org

1. PRECAUTIONS & GUIDELINES ▪ AUTOMOTIVE PRODUCTS ▪

In the following Precautions and Guidelines, CapXon provides instructions and requirements to assure a proper handling and desired performance of capacitors. This version is an abbreviation of the full General Precautions and Guidelines, which is available on our webpage.

1.1. GENERAL - ALL TYPES -

1.1.1. POLARITY

All conventional Electrolytic Capacitors have a polarity due to the internal construction. This polarity is marked on the component by printing on the top of component or on the sleeve of Aluminum Electrolytic Capacitors, including Radial, Snap-In and Screw types.

Any reverse voltage can cause short circuit breakdown of capacitor or leakage of electrolyte. Electrolytic Capacitors isn't designed for AC-voltage supply and only meant for DC-voltage applications.

For an application where polarity in circuit can be reversed or unknown, specific bi-polar aluminium electrolytic capacitors shall be used. We offer such components within our product range.

1.1.2. OVERVOLTAGE

Overvoltage can damage the capacitor and can cause a drastic increase in leakage current, which possibly shortens the lifetime of the capacitor. In a worst case, short circuit failure mode can happen. As a result, do not apply any continuous or temporary overvoltage.

The applied operating voltage, which is applied to the capacitor, should not exceed the rated voltage of the capacitor.

1.1.3. OPERATING TEMPERATURE

Only operate the capacitor within the limits of allowed temperature range, which is specified by datasheet. Be aware that the sum of thermal stress by ambient condition plus electrical stress is the main driving factor for aging. As the thermal stress level gets higher, the expected capacitor lifetime would be lower.

A drop in applied temperature, ambient condition or cooling within application can enlarge the expected lifetime of the capacitor. For details, please see further documentation of lifetime estimation.

1.1.4. RIPPLE CURRENT

The applied ripple current shall not exceed the stated max. ripple current I_R on the datasheet at the specific frequency.

When capacitors are overstressed by ripple, it can generate massive heat inside the capacitor, which can result in deterioration, vent operation or capacitor breakage.

1.1.5. CHARGE AND DISCHARGING

Frequent and quick charge / discharge generates heat inside the capacitor and can cause possible increase of leakage current, reduction of the expected lifetime, decrease of capacitance, vent operation or breakage.

For such applications please see design rules or consult our technical support for assistance.

1.1.6. SOLDERING CONDITIONS

For recommended reflow solder profile, please see additional information at Section 2. Soldering Instructions.

Soldering by vapor phase for SMD types or any hand soldering are not recommended. No permission is released by CapXon side either. In case of such a usage, customer need to validate solder result and applied component stress within their own manufacturing process.

1.1.7. MSL – MOISTURE SENSITIVE LEVEL (ONLY FOR SMD TYPES)

Our Automotive SMD components are rated according to JEDEC J-STD020 with MSL1. Construction of this part does not include hygroscopic critical materials and are not prone to delamination or popcorn effects.

1.1.8. RESISTANCE TO CHEMICALS AND SOLVENTS FOR WASHING, GLUING, FILLING AND COATING

Due to the wide variety of suppliers and different chemical formulas of washing, gluing, filling and coating materials, the individually used material and appliance process need to be validated by customer itself. It is not possible to provide any global material usage approval from our side. CapXon can provide additional information, including combination of chemicals which could be critical to the component behavior and can support measurements of component performance after appliance of washing, gluing, filling or coating martials. For specific support, please kindly contact our technical support for further advices.

1.1.9. CLEANING AND WASHING

Do not wash the assembled capacitors with the following cleaning agents:

For further information please contact sales@capxon.org

- **Xylene**
  - can cause deterioration of the rubber seal material
- **Halogenated solvents**
  - can cause corrosion and electrical failure modes
- **Petroleum based solvents**
  - can cause degeneration of the rubber seal material
- **Alkali based solvents**
  - can cause corrosion and dissolving of aluminum can
- **Acetone**
  - component marking possibly dissolve

After finishing cleaning and washing, the below points need to be verified by customer:

Dry all solvents properly from PCB as well as capacitor surface sufficiently and apply air blower or air knife, with temperatures within the temperature range of the product specification, if needed.

Monitor pH value, conductivity, specific gravity and water content of cleaning solvents to be sure of possible contaminations and pollution. Contaminations can negatively affect the performance of the capacitor.

1.1.10. GLUING, FILLING OR COATING

It is not allowed to use any gluing (adhesives), filling or coating materials, which contains halogenated solvents. Halogen ions are critical, because they can diffuse or creep in the capacitor through rubber sealing and can possibly damage the internal capacitor element /structure result in serious failure modes for the capacitor.

Additionally, please pay attention to the following points:

- Make sure that the surface of capacitor and the area between component bottom / rubber sealant is dry and clean before appliance of gluing, filling or coating material. It is important to avoid any contamination with chemical residues (e.g. flux residues, cleaning).
- Please follow and meet the stated gluing, coating, filling, heating and curing instructions from manufacturer or supplier of such materials. Be aware of possible shrinkage of such materials. Verify that the hardening was properly done and that no solvents / agents do remain.
- There should be no excessive heat nor mechanical pressure /stress at any stages from the production on customer side. Be aware of the possible material shrinkage of used material. High material shrinkage which leads to damage on capacitor is not CapXon's responsibility.
- The used materials of gluing, coating or filling can possibly react with the marking of component and this can change optical appearance such as the appearance and legibility.
- If the rubber seal surface is fully covered by gluing, filling or coating material, it is no longer possible to have a natural diffusion of gas between the inside of the capacitor and the ambient. So, to avoid such situation, it's strongly recommended to block maximum 80% of the sealed section on the bottom side of the capacitor.

Please find the example below of how gluing could be applied on Radial and Snap-In types.

Gluing reference example of a Snap-In capacitor

1.1.11. OPERATION AND ENVIRONMENT

As long as the application is powered, in operation and cap is not discharged, the user is never permitted to touch the electric terminals of the capacitor directly or to bridge the terminals by hand or any other conductive liquid or solid material. Otherwise, a short circuit of terminals can happen and a hard discharge can damage capacitor / application as well as it can harm the operator.

Within operation, please avoid the following environmental conditions to assure proper capacitor operation:

- high vibration, shocks or mechanical stress. For tested and allowed conditions, please see available references or contact us for details
- avoid direct sunlight, ozone and any kind of radiation or ultraviolet rays
- corrosive or toxic gases (e.g. ammonium, chlorine and compounds, bromine and compounds, hydrogen sulfide, sulfuric acid)
- ambient with high amount of damp condensation, water or types of oil

1.1.12. MECHANICAL STRESS

Best possible, avoid mechanical stress for the capacitor and do not apply any excessive mechanical stress to the lead wire pins or terminal.

After mounting, do not lift nor carry the PCB assembly by just grabbing the capacitor to pick up the board.

For further information please contact sales@capxon.org

1.1.13. STORAGE

In case of long-term storage without applying voltage to the capacitor, leakage current tends to increase.

By applying the rated voltage before usage, the dielectric layer of aluminium oxide and leakage current can be stabilized.

If the capacitor is for more than 12 months, it is recommended to apply the DC rated voltage V_R for 30 minutes through 1kΩ protective series resistor.

The storage conditions for storage on customer side should be monitored and controlled to a temperature of 5°C up to 35°C and less than 75% rel. humidity.

1.1.14. DISPOSAL

Please follow your local governmental and organizational restrictions for disposal and if needed, contact your local responsible for correct handling.

In case of incineration, punch holes in the aluminum can in advanced to avoid explosion of capacitor and then burn with at least 800°, otherwise it can result toxic gas.

1.2. ALUMINUM ELECTROLYTIC & HYBRID CONDUCTIVE POLYMER CAPACITORS - ALL MOUNTING STYLES -

1.2.1. VENT & VENT OPERATION AT EMERGENCY

As a safety feature, most our regular electrolytic capacitors have a so-called vent, which is a pre-determined breaking point. In case of overstressed component, it can lead to internal gassing and due to this an internal overpressure will result in vent operation. So, the vent will open to release such pressure and gas can become visible. If user detects vent operation or gassing out of the capacitor when operating, disconnect the application immediately from power supply to turn it off directly. If it can't be turned off, the capacitor or the conductive liquid / gas of electrolyte can result in short-circuits, which can dramatically damage the application.

Please notice to avoid being near with body or face above or in direction of capacitors vent when powered. When the running application is overstressed, gas leakage by vent is possible. By this gas with temperatures higher than 100°C can occur and can hurt human body and face. In such an event, if contact with skin, wash it immediately with plenty of water and soap. If contact with eyes, rinse immediately (e.g. eye shower) with plenty of water. If gas is inhaled, gargle right away with plenty of water. For all three cases, please consult a doctor for medical advices.

For proper operation of vent, consider space between the vent and covering surfaces (e.g. housing) as stated at the table below, it is strongly recommended for your mechanical construction / build-up of your product:

Minimum distance to be observed for the safe operation of the capacitor

Case diameter Ø	Clearance distance Cl
6.3mm to 16mm	Min. 2mm
18mm to 35mm	Min. 3mm
≥ 40mm	Min. 5mm

Recommended minimum clearance distance between topside capacitor and device case

If such a space is not provided, the vent will not operate completely or even cannot open in case of overpressure.

Case sizes which are smaller than 6.3mm in diameter have no vent on top, for these no space need to be considered.

1.2.2. SLEEVE MATERIAL (NOT FOR SMD)

The standard sleeve material for the majority of our Radial, Snap-In and Screw mounting capacitors is PET and for some series PVC is used as sleeve material. When sleeve is exposed to xylene, toluene or similar and afterwards exposed to high heat, the sleeve may be cracked or damaged.

The sleeve is not used as insulating material or layer and does not insulate capacitor to surroundings. For needed insulation, further actions need to be considered by customer and please follow our recommended design rules.

Sleeves are applied for all Aluminum Electrolytic Capacitors with Radial, Snap-In or Screw mounting and if desired for further customized solutions.

For further information please contact sales@capxon.org

1.3. ALUMINUM ELECTROLYTIC - RADIAL TYPE -

1.3.1. PIN CUTTING & BENDING

Please take absolute care when cutting or bending pins, that the pin is fixed mechanically in direction of rubber sealant. It is necessary that the mechanical force while cutting and bending, which results in pulling or pressing force on pin, does not stress the inner construction of capacitor element or to damage the rubber sealant. Excessive pulling or pressing force on the pin with missing fixation can result in damage of internal pin to capacitor element connection and also the sealing can be weakened. So, please take care to assure appropriate cutting and bending. Do not pre-damage the capacitors and shorten their lifetime performance by incorrect handling.

1.3.2. SOLDERING

For recommended wave solder profile, please see additional solder instruction at section 2.3.

Improper soldering conditions may shrink or break the sleeve. Additionally, excessive heat can damage the internal capacitor element as terminals and lead wires conduct heat into the capacitor.

It may not damage capacitors directly, but an electrolyte leakage may happen, if installed by other mounting method in horizontal direction.

2. SOLDERING INSTRUCTIONS

In the following sections CapXon's leadfree solder profiles are stated in detail.

2.1. REFLOW SOLDERING ▪ SMD – ALUMINUM ELECTROLYTIC CAPACITORS

Recommended reflow soldering conditions

Classification of reflow soldering profile

Profile Features		Value
Preheat temperature min.	$T_{s\,min}$	150 °C
Preheat temperature max.	$T_{s\,max}$	180 °C
Preheat time t_s from $T_{s\,min}$ to $T_{s\,max}$	t_s	120 seconds
Ramp-up rate (T_L to T_p)		max. 3 °C/second
Liquidous temperature	T_L	217 °C
Time t_L maintained above T_L	t_L	See reference table below for Ø Diameter / Rated Voltage V_R combination
Peak package body temperature	T_p	See reference table below for Ø Diameter / Rated Voltage V_R combination
Timeframe of within 5°C below and up to max actual peak body temperature	t_p	See reference table below for Ø Diameter / Rated Voltage V_R combination
Ramp-down rate (T_L to T_p)		max. 6 °C/second
Time 25°C to peak temperature		max. 8 minutes

*** Limitations of ramp rates to JEDEC-J-STD020E**

Package classification reflow temperature for SMD – Aluminum Electrolytic Capacitors

Ø Diameter (mm)	V_R ▪ Rated Voltage (V)	t_L ▪ Time above 217°C	Time above 230°C	T_P Peak Temperature	t_p Timing (seconds)	Allowed Reflow Runs
4 up to 6.3	4 to 50	90 sec. max.	30 sec. max.	260 °C	10	max. twice
	63 to 100	60 sec. max.	30 sec. max.	255 °C	5	max. twice
8 up to 10	4 to 50	60 sec. max.	30 sec. max.	250 °C	5	max. twice
	63 to 450	40 sec. max.	30 sec. max.	240. °C	5	max. twice
12.5 up to 18	4 to 50	30 sec. max.	20 sec. max.	245 °C	5	max. twice
	63 to 450	20 sec. max.	5 sec. max.	235 °C	5	max. twice

For further information please contact sales@capxon.org

2.2. REFLOW SOLDERING ▪ SMD – HYBRID CONDUCTIVE POLYMER CAPACITORS

Recommended reflow soldering conditions

Classification of reflow soldering profile

Profile Features		Value
Preheat temperature min.	$T_{s\,min}$	160 °C
Preheat temperature max.	$T_{s\,max}$	200 °C
Preheat time t_s from $T_{s\,min}$ to $T_{s\,max}$	t_s	120 seconds
Ramp-up rate (T_L to T_p)		max. 3 °C/second
Liquidous temperature	T_L	217 °C
Time t_L maintained above T_L	t_L	See reference table below for proper Ø Diameter
Peak package body temperature	T_p	See reference table below for proper Ø Diameter
Timeframe of within 5°C below and up to max actual peak body temperature	t_p	See reference table below for proper Ø Diameter
Ramp-down rate (T_L to T_p)		max. 6 °C/second
Time 25°C to peak temperature		max. 8 minutes

*** Limitations of ramp rates to JEDEC-J-STD020E**

Package classification reflow temperature for SMD – Hybrid Conductive Polymer Capacitors

Ø Diameter (mm)	Time above 200°C	t_L Time above 217°C	Time above 230°C	T_P Peak Temperature (°C)	t_p Timing (seconds)	Allowed Reflow Runs
≤ 6.3	70 sec. max	40 sec. max.	30 sec. max.	260	5	max. twice
≥ 8	70 sec. max	40 sec. max.	30 sec. max.	245	10	max. twice
	70 sec. max	40 sec. max.	30 sec. max.	260	5	only once

For further information please contact sales@capxon.org

2.3. WAVE SOLDERING ▪ ALL RADIAL & SNAP-IN CAPACITORS

Recommended wave soldering conditions

Classification wave soldering profile ▪ Refer to EN 61760-1: 2006

Profile Features		Value ▪ Pb-free Assembly	Value ▪ Sn-Pb Assembly
Preheat temperature min.	$T_{s\ min}$	100 °C	100 °C
Preheat temperature typical	$T_{s\ typ}$	120 °C	120 °C
Preheat temperature max.	$T_{s\ max}$	130 °C	130 °C
Preheat time t_s from $T_{s\ min}$ to $T_{s\ max}$	t_s	70 seconds	70 seconds
Peak temperature	T_p	245 °C ~ 260 °C	235 °C ~ 260 °C
Time of actual peak temperature	t_p	Max. 10 seconds Max. 5 second each wave	Max. 10 seconds Max. 5 second each wave
Ramp-down date min.		~ 2 °C/second	~ 2 °C/second
Ramp-down rate typical		~ 3.5 °C/second	~ 3.5 °C/second
Ramp-down rate max.		~ 5 °C/second	~ 5 °C/second
Time 25°C to 25°C		4 minutes	4 minutes

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CapXon

IATF 16949

AEC-Q200

ISO 9001

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