

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 version available



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·V _R | | | | | | |
| Capacitance Range | C _R | 1 ~ 1500μF | | | | | | |
| Cap. Tolerance | ΔC | ±20% (120Hz ▪ 20°C) | | | | | | |
| Leakage Current (20°C ▪ V _R applied) | I _{LEAK} | ≤ 0.01·C _R ·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 | | | | | | |
| | ΔC/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 | | | | | | |
| | ΔC/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 | | | | | | | |
| | ΔC/C _R | Within ±10% of initial value | | | | | | |
| | tanδ | Less than specified value | | | | | | |
| | I _{Leak} | Less than specified value | | | | | | |

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 |
|-----------------------|----------|-----------------|------------------------|-------------|-----------|---|---------------------|
| 6.3 | • | | 22 | 4.0 | 5.5 | 22 | EV220M6R3B055ETR □□ |
| | • | | 33 | 4.0 | 5.5 | 30 | EV330M6R3B055ETR □□ |
| | • | | 47 | 4.0 | 5.5 | 36 | EV470M6R3B055ETR □□ |
| | • | | 100 | 5.0 | 5.5 | 60 | EV101M6R3C055ETR □□ |
| | • | | 150 | 6.3 | 5.5 | 86 | EV151M6R3E055ETR □□ |
| | • | | 220 | 6.3 | 5.5 | 89 | EV221M6R3E055ETR □□ |
| | • | • | 220 | 6.3 | 7.7 | 102 | EV221M6R3E077ETR □□ |
| | • | | 220 | 8.0 | 6.5 | 102 | EV221M6R3F065ETR □□ |
| | • | • | 330 | 6.3 | 7.7 | 105 | EV331M6R3E077ETR □□ |
| | • | | 330 | 8.0 | 6.5 | 105 | EV331M6R3F065ETR □□ |
| | • | • | 470 | 8.0 | 10.5 | 210 | EV471M6R3F105ETR □□ |
| | • | • | 1000 | 8.0 | 10.5 | 202 | EV102M6R3F105ETR □□ |
| | • | • | 1000 | 10.0 | 10.5 | 230 | EV102M6R3G105ETR □□ |
| | • | • | 1500 | 10.0 | 10.5 | 310 | EV152M6R3G105ETR □□ |
| 10 | • | | 22 | 4.0 | 5.5 | 27 | EV220M010B055ETR □□ |
| | • | | 33 | 4.0 | 5.5 | 25 | EV330M010B055ETR □□ |
| | • | | 33 | 5.0 | 5.5 | 40 | EV330M010C055ETR □□ |
| | • | | 47 | 5.0 | 5.5 | 46 | EV470M010C055ETR □□ |
| | • | | 100 | 5.0 | 5.5 | 52 | EV101M010C055ETR □□ |
| | • | | 100 | 6.3 | 5.5 | 60 | EV101M010E055ETR □□ |
| | • | | 150 | 6.3 | 5.5 | 86 | EV151M010E055ETR □□ |
| | • | • | 220 | 6.3 | 7.7 | 105 | EV221M010E077ETR □□ |
| | • | | 220 | 8.0 | 6.5 | 105 | EV221M010F065ETR □□ |
| | • | • | 330 | 8.0 | 10.5 | 195 | EV331M010F105ETR □□ |
| | • | • | 470 | 8.0 | 10.5 | 210 | EV471M010F105ETR □□ |
| | • | • | 1000 | 10.0 | 10.5 | 310 | EV102M010G105ETR □□ |
| 16 | • | | 10 | 4.0 | 5.5 | 18 | EV100M016B055ETR □□ |
| | • | | 22 | 4.0 | 5.5 | 30 | EV220M016B055ETR □□ |
| | • | | 33 | 5.0 | 5.5 | 40 | EV330M016C055ETR □□ |
| | • | | 47 | 5.0 | 5.5 | 51 | EV470M016C055ETR □□ |
| | • | | 100 | 6.3 | 5.5 | 60 | EV101M016E055ETR □□ |
| | • | • | 150 | 6.3 | 7.7 | 95 | EV151M016E077ETR □□ |
| | • | | 150 | 8.0 | 6.5 | 95 | EV151M016F065ETR □□ |
| | • | • | 220 | 6.3 | 7.7 | 105 | EV221M016E077ETR □□ |
| | • | • | 330 | 8.0 | 10.5 | 195 | EV331M016F105ETR □□ |
| | • | • | 470 | 8.0 | 10.5 | 210 | EV471M016F105ETR □□ |
| 25 | • | | 4.7 | 4.0 | 5.5 | 16 | EV470M025B055ETR □□ |
| | • | | 10 | 4.0 | 5.5 | 26 | EV100M025B055ETR □□ |
| | • | | 22 | 5.0 | 5.5 | 38 | EV220M025C055ETR □□ |
| | • | | 33 | 5.0 | 5.5 | 48 | EV330M025C055ETR □□ |
| | • | | 47 | 6.3 | 5.5 | 63 | EV470M025E055ETR □□ |
| | • | • | 100 | 6.3 | 7.7 | 91 | EV101M025E077ETR □□ |
| | • | | 100 | 8.0 | 6.5 | 91 | EV101M025F065ETR □□ |
| | • | • | 150 | 8.0 | 10.5 | 140 | EV151M025F105ETR □□ |

□□ see description at end of standard ratings

STANDARD RATINGS

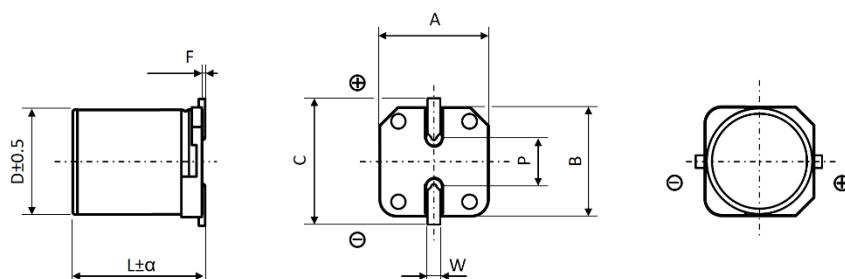
Part number shows blister tape on paper reel

| 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 |
|-----------------------|----------|-----------------|------------------------|-------------|-----------|---|---------------------|
| 25 | • | • | 220 | 8.0 | 10.5 | 155 | EV221M025F105ETR □□ |
| | • | • | 330 | 8.0 | 10.5 | 175 | EV331M025F105ETR □□ |
| | • | • | 330 | 10.0 | 10.5 | 198 | EV331M025G105ETR □□ |
| | • | • | 470 | 10.0 | 10.5 | 300 | EV471M025G105ETR □□ |
| 35 | • | | 4.7 | 4.0 | 5.5 | 16 | EV4R7M035B055ETR □□ |
| | • | | 10 | 4.0 | 5.5 | 27 | EV100M035B055ETR □□ |
| | • | | 22 | 5.0 | 5.5 | 37 | EV220M035C055ETR □□ |
| | • | | 22 | 6.3 | 5.5 | 42 | EV220M035E055ETR □□ |
| | • | | 33 | 6.3 | 5.5 | 50 | EV330M035E055ETR □□ |
| | • | • | 33 | 6.3 | 7.7 | 58 | EV330M035E077ETR □□ |
| | • | | 47 | 6.3 | 5.5 | 58 | EV470M035E055ETR □□ |
| | • | • | 47 | 6.3 | 7.7 | 66 | EV470M035E077ETR □□ |
| | • | • | 100 | 6.3 | 7.7 | 84 | EV101M035E077ETR □□ |
| | • | | 100 | 8.0 | 6.5 | 84 | EV101M035F065ETR □□ |
| | • | • | 150 | 8.0 | 10.5 | 155 | EV151M035F105ETR □□ |
| | • | • | 220 | 8.0 | 10.5 | 167 | EV221M035F105ETR □□ |
| | • | • | 220 | 10.0 | 10.5 | 190 | EV221M035G105ETR □□ |
| | • | • | 330 | 10.0 | 10.5 | 300 | EV331M035G105ETR □□ |
| 50 | • | | 1 | 4.0 | 5.5 | 6.3 | EV010M050B055ETR □□ |
| | • | | 2.2 | 4.0 | 5.5 | 11 | EV2R2M050B055ETR □□ |
| | • | | 3.3 | 4.0 | 5.5 | 14 | EV3R3M050B055ETR □□ |
| | • | | 4.7 | 4.0 | 5.5 | 19 | EV4R7M050B055ETR □□ |
| | • | | 4.7 | 5.0 | 5.5 | 22 | EV4R7M050C055ETR □□ |
| | • | | 10 | 5.0 | 5.5 | 29 | EV100M050C055ETR □□ |
| | • | | 10 | 6.3 | 5.5 | 33 | EV100M050E055ETR □□ |
| | • | | 22 | 6.3 | 5.5 | 51 | EV220M050E055ETR □□ |
| | • | • | 33 | 6.3 | 7.7 | 60 | EV330M050E077ETR □□ |
| | • | | 33 | 8.0 | 6.5 | 60 | EV330M050F065ETR □□ |
| | • | | 47 | 6.3 | 7.7 | 66 | EV470M050E077ETR □□ |
| | • | | 47 | 8.0 | 6.5 | 66 | EV470M050F065ETR □□ |
| | • | • | 100 | 8.0 | 10.5 | 140 | EV101M050F105ETR □□ |
| | • | • | 150 | 10.0 | 10.5 | 180 | EV151M050G105ETR □□ |
| | • | • | 220 | 10.0 | 10.5 | 220 | EV221M050G105ETR □□ |

□□: Enter **blank** for Standard package
 □□: Enter **W** for Vibration proof version

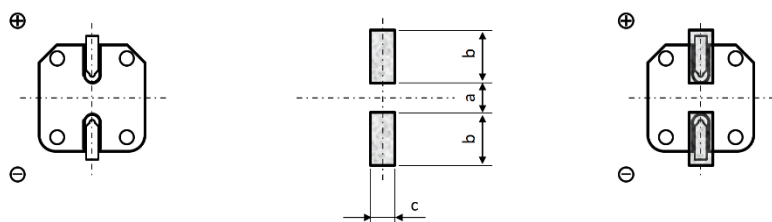
□□: Enter **X** for AEC-Q200
 □□: Enter **XW** for AEC-Q200 and Vibration proof version

DIMENSIONS STANDARD PACKAGE ▀ All dimensions in mm



| ∅ D | L | α | A ± 0.2 | B ± 0.2 | C ± 0.2 | F | P ± 0.2 | W |
|------|------|-----|---------|---------|---------|----------|---------|------------|
| 4.0 | 5.5 | Max | 4.3 | 4.3 | 4.9 | 0.3 max. | 1.0 | 0.5 to 0.8 |
| 5.0 | 5.5 | Max | 5.3 | 5.3 | 5.9 | 0.3 max. | 1.4 | 0.5 to 0.8 |
| 6.3 | 5.5 | 0.2 | 6.6 | 6.6 | 7.2 | 0.3 max. | 2.2 | 0.5 to 0.8 |
| 6.3 | 7.7 | Max | 6.6 | 6.6 | 7.2 | 0.3 max. | 2.2 | 0.5 to 0.8 |
| 8.0 | 6.5 | Max | 8.3 | 8.3 | 9.0 | 0.3 max. | 2.3 | 0.5 to 0.8 |
| 8.0 | 10.5 | Max | 8.3 | 8.3 | 9.0 | 0.3 max. | 3.1 | 0.7 to 1.1 |
| 10.0 | 10.5 | Max | 10.3 | 10.3 | 11.0 | 0.3 max. | 4.5 | 0.7 to 1.1 |

PAD LAYOUT STANDARD PACKAGE ▀ All dimensions in mm



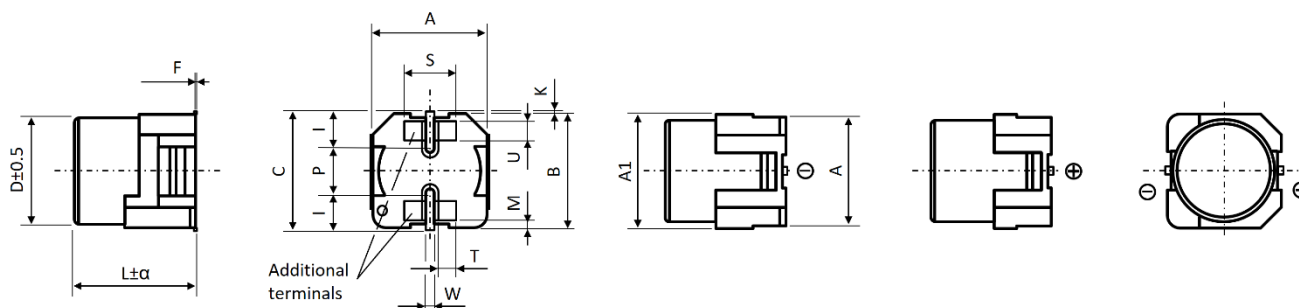
Bottom view

Recommended land patterns

Capacitor mounted on pads

| ∅ D | L | a | b | c |
|------|------|-----|-----|-----|
| 4.0 | 5.5 | 1.0 | 2.6 | 1.6 |
| 5.0 | 5.5 | 1.4 | 3.0 | 1.6 |
| 6.3 | 5.5 | 2.1 | 3.5 | 1.6 |
| 6.3 | 7.7 | 2.1 | 3.5 | 1.6 |
| 8.0 | 6.5 | 2.1 | 4.5 | 1.6 |
| 8.0 | 10.5 | 2.8 | 4.2 | 1.9 |
| 10.0 | 10.5 | 4.3 | 4.4 | 1.9 |

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) Ø D6.3 ▀ All dimensions in mm

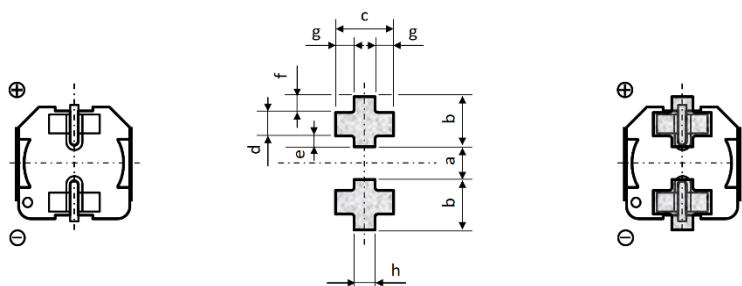


Note: Additional terminals electrical connected to anode or cathode terminal.

| ϕD | L | α | $A \pm 0.2$ | A1 (max.) | $B \pm 0.2$ | C (max.) | F | K |
|----------|-----|----------|-------------|-----------|-------------|----------|-----------|--------------------|
| 6.3 | 8.0 | 0.3 | 6.6 | 7.1 | 6.6 | 7.8 | 0 to 0.15 | 0.35 +0.15/-0.2 |

| ϕD | L | $I \pm 0.1$ | $M \pm 0.1$ | $P \pm 0.2$ | $S \pm 0.1$ | $T \pm 0.1$ | $U \pm 0.1$ | $W \pm 0.1$ |
|----------|-----|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 6.3 | 8.0 | 2.5 | 0.35 | 2.2 | 3.2 | 1.1 | 0.7 | 0.65 |

PAD LAYOUT VP PACKAGE (VIBRATION-PROOF) Ø D6.3 ▀ All dimensions in mm



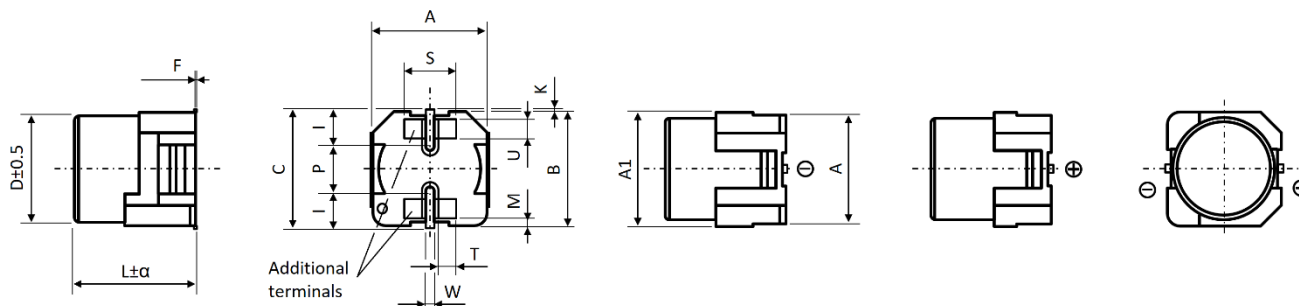
Bottom view

Recommended land patterns

Capacitor mounted on pads

| ϕD | L | a | b | c | d | e | f | g | h |
|----------|-----|-----|-----|-----|-----|------|------|-----|-----|
| 6.3 | 8.0 | 1.2 | 3.6 | 3.2 | 2.0 | 0.95 | 0.65 | 1.0 | 1.2 |

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) Ø D8 and D10 ▪ All dimensions in mm

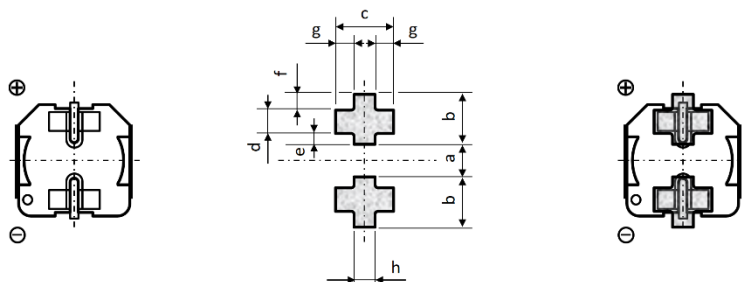


Note: Additional terminals electrical connected to anode or cathode terminal.

| ϕD | L | α | $A \pm 0.2$ | $A1 \text{ (max.)}$ | $B \pm 0.2$ | $C \text{ (max.)}$ | F | $K \pm 0.2$ |
|----------|------|----------|-------------|---------------------|-------------|--------------------|-----------|-------------|
| 8.0 | 10.5 | 0.5 | 8.3 | 8.8 | 8.3 | 10.0 | 0 to 0.15 | 0.7 |
| 10.0 | 10.5 | 0.5 | 10.3 | 10.8 | 10.3 | 12.0 | 0 to 0.15 | 0.7 |

| ϕD | L | $I \pm 0.1$ | $M \pm 0.1$ | $P \pm 0.2$ | $S \pm 0.1$ | $T \pm 0.1$ | $U \pm 0.1$ | $W \pm 0.1$ |
|----------|------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 8.0 | 10.5 | 3.3 | 0.75 | 3.1 | 3.3 | 0.9 | 0.8 | 1.2 |
| 10.0 | 10.5 | 3.5 | 0.9 | 4.6 | 3.3 | 0.9 | 0.8 | 1.2 |

PAD LAYOUT VP PACKAGE (VIBRATION-PROOF) Ø D8 and D10 ▪ All dimensions in mm



Bottom view

Recommended land patterns

Capacitor mounted on pads




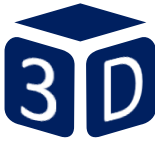

| ϕD | L | a | b | c | d | e | f | g | h |
|----------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 8.0 | 10.5 | 2.7 | 4.0 | 4.7 | 1.3 | 1.0 | 1.7 | 1.1 | 2.5 |
| 10.0 | 10.5 | 3.9 | 4.4 | 4.7 | 1.3 | 1.2 | 1.9 | 1.1 | 2.5 |

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

| C_R (μF) / Frequency (Hz) | 50/60 | 100/120 | 500 | 1k | $\geq 10k$ |
|------------------------------------|-------|---------|-----|------|------------|
| $1 \leq C_R \leq 100$ | 0.8 | 1 | 1.2 | 1.3 | 1.5 |
| $100 < C_R \leq 1500$ | 0.8 | 1 | 1.1 | 1.15 | 1.2 |

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION

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 & Guidelines | Packaging Information | Vibration Test Profiles | 3D Models | Reliability Tests |

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.

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GROUP CHART

