

### KL SERIES ▪ HIGH VOLTAGE, AUTOMOTIVE 105°C TYPE

#### KEY FEATURES



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



#### 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	$V_S$	$(V_R \leq 315V): V_S = 1.15 \cdot V_R$				$(V_R > 315V): V_S = 1.10 \cdot V_R$			
Capacitance Range	$C_R$	3.3 ~ 330 $\mu$ F				2.2 ~ 180 $\mu$ F			
Cap. Tolerance	$\Delta C$	$\pm 20\%$ (120Hz ▪ 20°C)							
Leakage Current (20°C ▪ $V_R$ applied)	$I_{LEAK}$	$C_R \cdot V_R \leq 1000$				$\leq 0.1 \cdot C_R \cdot V_R + 40\mu A$ (After 1 minute)			
		$C_R \cdot V_R > 1000$				$\leq 0.04 \cdot C_R \cdot V_R + 100\mu A$ (After 1 minute)			
		[ $I_{LEAK}$ ( $\mu A$ ) ; $C_R$ ( $\mu F$ ) ; $V_R$ (V) ]							
Dissipation Factor % (20°C ▪ 120Hz)	$\tan \delta$	$V_R$ (V DC)	160	200	250	350	400	450	500
		$\tan \delta$ (%)	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	<b>5 000 hours</b>	
	$\Delta C/C_R$	$\leq \pm 20\%$ of initial measured value	
	$\tan \delta$	$\leq 200\%$ of initial specified value	
	$I_{Leak}$	$\leq$ the initial specified value	
Shelf Life 105°C ( $V_R = 0$ )	Test	<b>1 000 hours</b>	
	$\Delta C/C_R$	$\leq \pm 20\%$ of initial measured value	
	$\tan \delta$	$\leq 200\%$ of initial specified value	
	$I_{Leak}$	$\leq$ the initial specified value	
Before measurement: Restore capacitor to 20°C, apply $V_R$ for 30 min according JIS-C-5101-4			

## STANDARD RATINGS

Part number shows bulk version with straight leads

V <sub>R</sub> (V)	C <sub>R</sub> (μF)	ø D (mm)	L (mm)	I <sub>R</sub> - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
160	3.3	10	12.5	52	KL3R3M160G125A ☐
	4.7	10	12.5	60	KL4R7M160G125A ☐
	10	10	12.5	104	KL100M160G125A ☐
	10	10	16	115	KL100M160G160A ☐
	15	10	16	150	KL150M160G160A ☐
	22	10	16	190	KL220M160G160A ☐
	22	10	20	210	KL220M160G200A ☐
	33	10	16	235	KL330M160G160A ☐
	33	10	20	258	KL330M160G200A ☐
	33	13	20	300	KL330M160I200A ☐
	47	10	20	270	KL470M160G200A ☐
	47	13	20	310	KL470M160I200A ☐
	68	13	20	430	KL680M160I200A ☐
	68	13	25	470	KL680M160I250A ☐
	100	13	25	540	KL101M160I250A ☐
	100	16	20	540	KL101M160J200A ☐
	100	16	25	590	KL101M160J250A ☐
	120	16	20	560	KL121M160J200A ☐
	150	16	25	650	KL151M160J250A ☐
	180	16	31.5	750	KL181M160J315A ☐
	220	16	31.5	820	KL221M160J315A ☐
	220	18	25	710	KL221M160K250A ☐
	270	18	31.5	880	KL271M160K315A ☐
330	18	31.5	930	KL331M160K315A ☐	
330	18	40	1000	KL331M160K400A ☐	
200	3.3	10	12.5	52	KL3R3M200G125A ☐
	4.7	10	12.5	60	KL4R7M200G125A ☐
	6.8	10	12.5	70	KL6R8M200G125A ☐
	10	10	12.5	104	KL100M200G125A ☐
	10	10	16	115	KL100M200G160A ☐
	10	10	20	125	KL100M200G200A ☐
	15	10	16	150	KL150M200G160A ☐
	22	10	16	210	KL220M200G160A ☐
	22	10	20	230	KL220M200G200A ☐
	33	10	20	290	KL330M200G200A ☐
	33	13	20	350	KL330M200I200A ☐
	47	13	20	380	KL470M200I200A ☐
	68	13	25	530	KL680M200I250A ☐
	68	16	20	530	KL680M200J200A ☐
	100	16	20	570	KL101M200J200A ☐
	100	16	25	610	KL101M200J250A ☐
	120	16	25	700	KL121M200J250A ☐
150	16	25	700	KL151M200J250A ☐	

☐: Enter **blank** for Standard version

☒: Enter **X** for AEC-Q200 version

See "PACKAGING INFORMATION" to taped or formed products.

## STANDARD RATINGS

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V <sub>R</sub> (V)	C <sub>R</sub> (μF)	∅ D (mm)	L (mm)	I <sub>R</sub> - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
200	150	16	31.5	750	KL151M200J315A <input type="checkbox"/>
	180	18	31.5	830	KL181M200K315A <input type="checkbox"/>
	220	18	31.5	970	KL221M200K315A <input type="checkbox"/>
	270	18	40	1100	KL271M200K400A <input type="checkbox"/>
	330	18	45	1250	KL331M200K450A <input type="checkbox"/>
250	4.7	10	12.5	60	KL4R7M250G125A <input type="checkbox"/>
	6.8	10	12.5	75	KL6R8M250G125A <input type="checkbox"/>
	10	10	16	160	KL100M250G160A <input type="checkbox"/>
	10	10	20	170	KL100M250G200A <input type="checkbox"/>
	15	10	16	180	KL150M250G160A <input type="checkbox"/>
	22	10	20	250	KL220M250G200A <input type="checkbox"/>
	22	13	20	290	KL220M250I200A <input type="checkbox"/>
	33	13	20	360	KL330M250I200A <input type="checkbox"/>
	33	13	25	380	KL330M250I250A <input type="checkbox"/>
	47	13	25	430	KL470M250I250A <input type="checkbox"/>
	68	16	20	530	KL680M250J200A <input type="checkbox"/>
	68	16	25	550	KL680M250J250A <input type="checkbox"/>
	68	18	20	550	KL680M250K200A <input type="checkbox"/>
	100	16	25	630	KL101M250J250A <input type="checkbox"/>
	100	16	31.5	700	KL101M250J315A <input type="checkbox"/>
	100	18	25	680	KL101M250K250A <input type="checkbox"/>
	100	18	31.5	750	KL101M250K315A <input type="checkbox"/>
	120	18	31.5	790	KL121M250K315A <input type="checkbox"/>
	150	18	31.5	840	KL151M250K315A <input type="checkbox"/>
	150	18	35.5	880	KL151M250K355A <input type="checkbox"/>
	180	18	40	980	KL181M250K400A <input type="checkbox"/>
	220	18	35.5	960	KL221M250K355A <input type="checkbox"/>
	220	18	40	1020	KL221M250K400A <input type="checkbox"/>
350	4.7	10	12.5	65	KL4R7M350G125A <input type="checkbox"/>
	6.8	10	16	100	KL6R8M350G160A <input type="checkbox"/>
	10	10	20	170	KL100M350G200A <input type="checkbox"/>
	10	13	20	180	KL100M350I200A <input type="checkbox"/>
	15	13	20	200	KL150M350I200A <input type="checkbox"/>
	22	13	20	290	KL220M350I200A <input type="checkbox"/>
	33	13	25	320	KL330M350I250A <input type="checkbox"/>
	33	16	20	320	KL330M350J200A <input type="checkbox"/>
	47	16	25	430	KL470M350J250A <input type="checkbox"/>
	47	16	31.5	440	KL470M350J315A <input type="checkbox"/>
	68	16	35.5	550	KL680M350J355A <input type="checkbox"/>
	100	18	31.5	750	KL101M350K315A <input type="checkbox"/>
	100	18	35.5	780	KL101M350K355A <input type="checkbox"/>
	400	3.3	10	12.5	55
4.7		10	16	100	KL4R7M400G160A <input type="checkbox"/>

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V <sub>R</sub> (V)	C <sub>R</sub> (μF)	ø D (mm)	L (mm)	I <sub>R</sub> - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
400	6.8	10	16	120	KL6R8M400G160A ☐
	6.8	10	20	125	KL6R8M400G200A ☐
	10	10	16	156	KL100M400G160A ☐
	10	10	20	170	KL100M400G200A ☐
	10	13	20	200	KL100M400J200A ☐
	15	10	16	156	KL150M400G160A ☐
	15	13	20	200	KL150M400J200A ☐
	22	13	25	320	KL220M400J250A ☐
	22	16	20	320	KL220M400J200A ☐
	33	16	20	400	KL330M400J200A ☐
	33	16	25	430	KL330M400J250A ☐
	47	16	20	420	KL470M400J200A ☐
	47	16	25	450	KL470M400J250A ☐
	47	16	31.5	530	KL470M400J315A ☐
	68	16	25	480	KL680M400J250A ☐
	68	16	31.5	530	KL680M400J315A ☐
	82	16	31.5	580	KL820M400J315A ☐
	100	16	31.5	710	KL101M400J315A ☐
	100	18	35.5	750	KL101M400K355A ☐
	120	16	35.5	800	KL121M400J355A ☐
	120	18	31.5	800	KL121M400K315A ☐
	150	16	40	920	KL151M400J400A ☐
150	18	31.5	890	KL151M400K315A ☐	
180	18	40	1060	KL181M400K400A ☐	
220	18	45	1200	KL221M400K450A ☐	
450	2.2	10	12.5	45	KL2R2M450G125A ☐
	3.3	10	16	65	KL3R3M450G160A ☐
	4.7	10	12.5	95	KL4R7M450G125A ☐
	4.7	10	16	105	KL4R7M450G160A ☐
	6.8	10	16	125	KL6R8M450G160A ☐
	6.8	10	20	140	KL6R8M450G200A ☐
	10	10	20	170	KL100M450G200A ☐
	10	13	20	190	KL100M450J200A ☐
	10	13	25	220	KL100M450J250A ☐
	15	16	20	270	KL150M450J200A ☐
	22	13	20	280	KL220M450J200A ☐
	22	16	20	320	KL220M450J200A ☐
	22	16	25	360	KL220M450J250A ☐
	33	16	25	440	KL330M450J250A ☐
	33	18	25	460	KL330M450K250A ☐
	47	16	31.5	480	KL470M450J315A ☐
	47	18	25	450	KL470M450K250A ☐
56	16	31.5	530	KL560M450J315A ☐	

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## STANDARD RATINGS

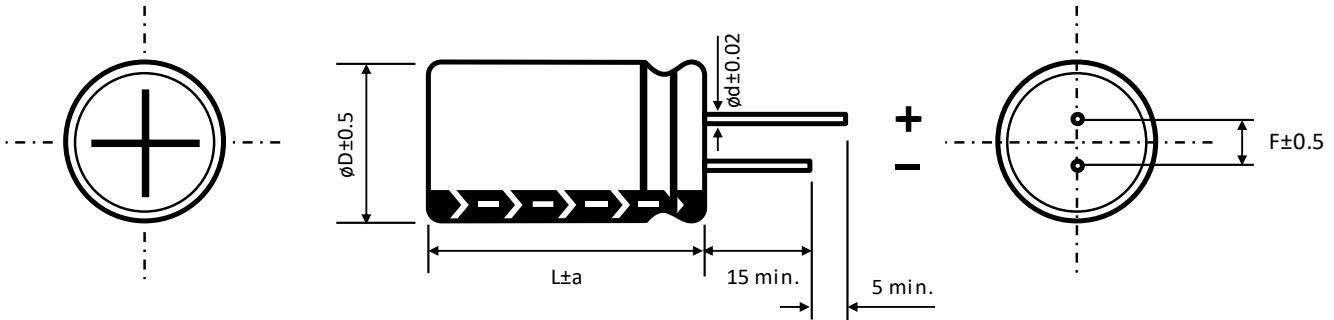
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V <sub>R</sub> (V)	C <sub>R</sub> (μF)	∅ D (mm)	L (mm)	I <sub>R</sub> • Max. Ripple Current +105°C • 120Hz (mA rms)	CapXon Part Number
450	68	16	35.5	600	KL680M450J355A □
	68	18	25	580	KL680M450K250A □
	68	18	31.5	620	KL680M450K315A □
	82	16	35.5	680	KL820M450J355A □
	100	16	35.5	750	KL101M450J355A □
	120	18	35.5	840	KL121M450K355A □
	150	18	40	970	KL151M450K400A □
	180	18	45	1090	KL181M450K450A □
500	4.7	13	20	82	KL4R7M500I200A □
	6.8	13	20	96	KL6R8M500I200A □
	10	13	25	130	KL100M500I250A □
	22	16	25	210	KL220M500J250A □
	33	16	31.5	280	KL330M500J315A □
	47	16	35.5	360	KL470M500J355A □
	47	18	31.5	360	KL470M500K315A □
	56	16	40	420	KL560M500J400A □
	56	18	31.5	400	KL560M500K315A □
	68	16	45	480	KL680M500J450A □
	68	18	35.5	460	KL680M500K355A □
	68	18	40	490	KL680M500K400A □
	82	18	40	540	KL820M500K400A □
	100	18	45	630	KL101M500K450A □
	100	20	40	660	KL101M500L400A □
120	22	45	800	KL121M500M450A □	

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**DIMENSIONS** ▪ All dimensions in mm


$\phi D$	10	13	16	18	22
F	5	5	7.5	7.5	10
$\phi d$	0.6		0.8		

a	$\phi D < 16$	$\phi D = 16$		$\phi D = 18$		$\phi D > 18$
	1.5	L = 25 to 35.5	L < 25 and L $\geq$ 40	L = 25 to 31.5	L < 25 and L $\geq$ 35.5	2
		1.5	2	1.5	2	

**MULTIPLIER  $K_f$  for RIPPLE CURRENT vs. FREQUENCY**

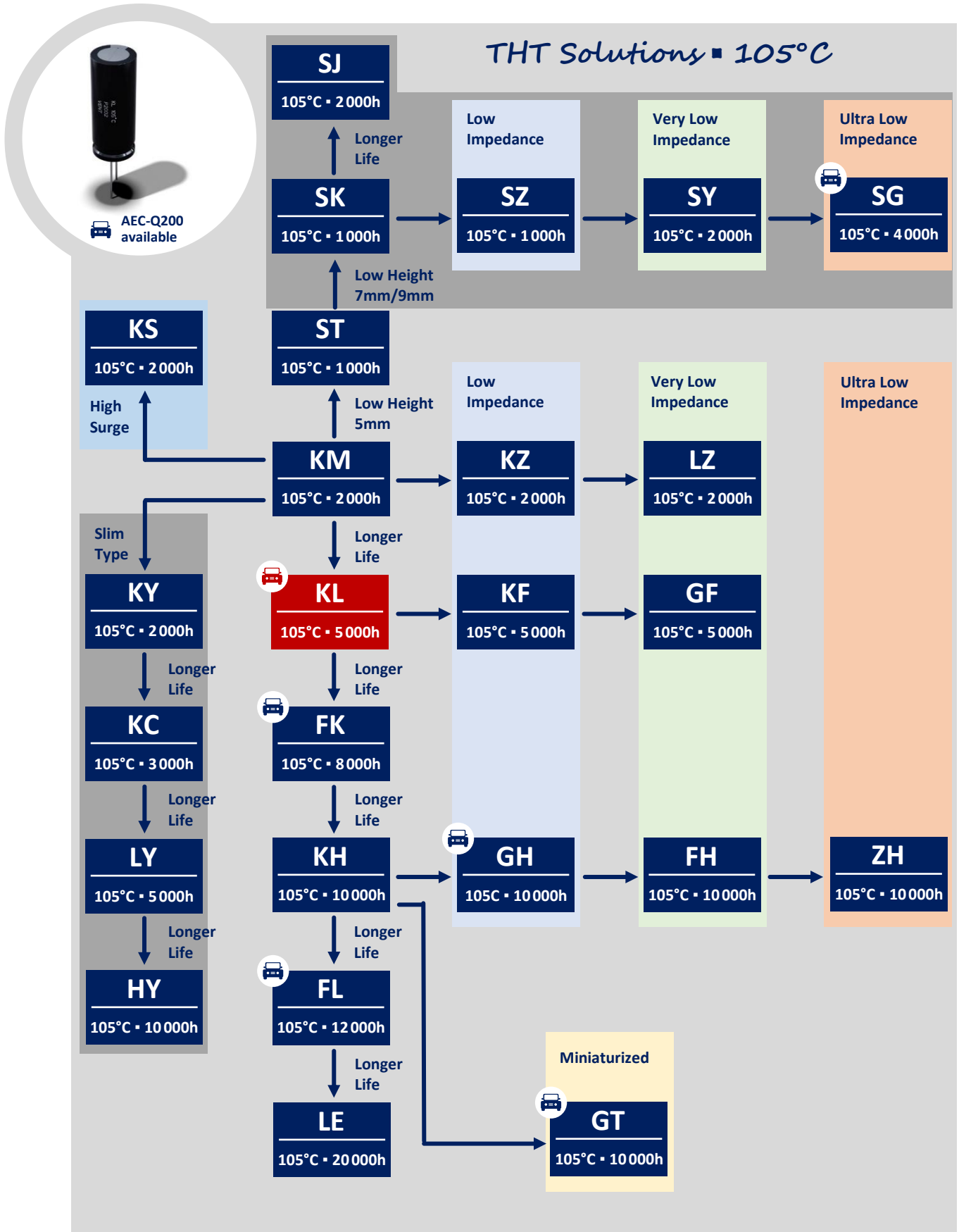
$C_R$ ( $\mu F$ ) / Frequency (Hz)	100/120	1k	10k	$\geq 50k$
$3.3 < C_R \leq 330$	1	1.5	1.7	1.9

**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.

<a href="#">General Precautions &amp; Guidelines</a>	<a href="#">Packaging Information</a>	<a href="#">3D Models</a>	<a href="#">Reliability Tests</a>

### GROUP CHART





### 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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