

### KH SERIES ▪ HIGH VOLTAGE, LONG LIFE 105°C TYPE

#### KEY FEATURES



- ALUMINUM ELECTROLYTIC CAPACITOR ▪ THT type
- Endurance: 105°C ▪ 5 000 hours up to 10 000 hours
- High ripple current
- High reliability
- Wide voltage range



#### SPECIFICATIONS

Items		Performance Characteristics											
Operating Temperature Range		-40 ~ +105°C					-25 ~ +105°C						
Rated Voltage Range	$V_R$	10 ~ 400V DC					450V 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	$C_R$	6.8 ~ 3300 $\mu$ F					6.8 ~ 100 $\mu$ F						
Cap. Tolerance	$\Delta C$	$\pm 20\%$ (120Hz ▪ 20°C)											
Leakage Current (20°C ▪ $V_R$ applied)	$I_{LEAK}$	10 ~ 100V					$\leq 0.01 \cdot C_R \cdot V_R$ or 3 $\mu$ A (After 2 min.)						
		160 ~ 450V					$\leq 0.04 \cdot C_R \cdot V_R + 100\mu$ A (After 1 min.)						
		[ $I_{LEAK}$ ( $\mu$ A) ; $C_R$ ( $\mu$ F) ; $V_R$ (V) ]											
Dissipation Factor % (20°C ▪ 120Hz)	$\tan\delta$	$V_R$ (V DC)	10	16	25	35	50	160	200	250	350	400	450
		$\tan\delta$ (%)	19	16	14	12	10	15	15	15	20	20	20
		For $C_R \geq 1000\mu$ F, add 2% per every multiple 1000 $\mu$ F of rated capacitance value											
Low Temperature Characteristics at 120Hz	Z ratio max.	$V_R$ (V DC)	10	16	25	35	50	160	200	250	350	400	450
		Z-25°C/Z+20°C	4	3	2	2	2	3	3	3	6	6	6
		Z-40°C/Z+20°C	6	4	3	3	3	6	6	6	6	6	-
		For capacitance > 1000 $\mu$ F											
		Z-25°C/Z+20°C	Add 0.5 for every multiple 1000 $\mu$ F of rated capacitance value										
Z-40°C/Z+20°C	Add 1 for every multiple 1000 $\mu$ F of rated capacitance value												
Lifetime Test													
Endurance 105°C ( $V_R$ & $I_R$ applied)	Test	5 000 hours					$\phi$ D < 8 mm						
		8 000 hours					$\phi$ D = 8 mm						
		10 000 hours					$\phi$ D $\geq$ 10 mm						
	$\Delta C/C_R$	$\leq \pm 20\%$ 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	1 000 hours											
	$\Delta C/C_R$	$\leq \pm 20\%$ 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

$V_R$ (V)	$C_R$ ( $\mu F$ )	$\phi D$ (mm)	L (mm)	$I_R$ - Max. Ripple Current +105°C - 100kHz (mA rms)	CapXon Part Number
10	47	5	11	100	KH470M010C110A
	68	5	11	130	KH680M010C110A
	100	6.3	11	190	KH101M010E110A
	150	6.3	11	220	KH151M010E110A
	220	6.3	11	270	KH221M010E110A
	330	6.3	11	334	KH331M010E110A
	330	8	11.5	390	KH331M010F115A
	470	8	11.5	458	KH471M010F115A
	470	10	12.5	540	KH471M010G125A
	1000	8	20	877	KH102M010F200A
	1000	10	12.5	810	KH102M010G125A
	1000	10	16	900	KH102M010G160A
	2200	13	16	1401	KH222M010I160A
	2200	13	20	1540	KH222M010I200A
	3300	13	20	1533	KH332M010I200A
3300	16	25	1900	KH332M010J250A	
16	33	5	11	115	KH330M016C110A
	47	5	11	145	KH470M016C110A
	68	6.3	11	200	KH680M016E110A
	100	6.3	11	209	KH101M016E110A
	100	8	11.5	245	KH101M016F115A
	150	6.3	11	256	KH151M016E110A
	150	8	11.5	300	KH151M016F115A
	220	6.3	11	359	KH221M016E110A
	220	8	11.5	420	KH221M016F115A
	220	10	12.5	495	KH221M016G125A
	330	8	11.5	433	KH331M016F115A
	330	8	16	500	KH331M016F160A
	470	8	11.5	557	KH471M016F115A
	470	10	12.5	657	KH471M016G125A
	470	10	16	730	KH471M016G160A
	1000	10	20	1012	KH102M016G200A
	1000	13	20	1173	KH102M016I200A
	2200	13	20	1689	KH222M016I200A
2200	13	25	1862	KH222M016I250A	
2200	16	25	2093	KH222M016J250A	
25	22	5	11	100	KH220M025C110A
	33	5	11	130	KH330M025C110A
	47	6.3	11	160	KH470M025E110A
	68	6.3	11	196	KH680M025E110A
	68	8	11.5	230	KH680M025F115A
	100	6.3	11	280	KH101M025E110A
	100	8	11.5	327	KH101M025F115A

See "PACKAGING INFORMATION" to taped or formed products.

**STANDARD RATINGS**

Part number shows bulk version with straight leads

$V_R$ (V)	$C_R$ ( $\mu F$ )	$\phi D$ (mm)	L (mm)	$I_R$ - Max. Ripple Current +105°C - 100kHz (mA rms)	CapXon Part Number
25	150	8	11.5	390	KH151M025F115A
	150	10	12.5	460	KH151M025G125A
	220	8	11.5	443	KH221M025F115A
	220	10	16	580	KH221M025G160A
	330	8	16	644	KH331M025F160A
	330	10	12.5	657	KH331M025G125A
	330	10	16	729	KH331M025G160A
	330	10	20	805	KH331M025G200A
	470	10	16	861	KH471M025G160A
	470	10	20	950	KH471M025G200A
	1000	13	20	1407	KH102M025I200A
	1000	13	25	1552	KH102M025I250A
	2200	16	25	2169	KH222M025J250A
	2200	16	31.5	2400	KH222M025J315A
35	10	5	11	65	KH100M035C110A
	22	5	11	125	KH220M035C110A
	33	5	11	160	KH330M035C110A
	33	6.3	11	178	KH330M035E110A
	47	5	11	180	KH470M035C110A
	47	6.3	11	205	KH470M035E110A
	47	8	11.5	240	KH470M035F115A
	68	6.3	11	231	KH680M035E110A
	68	8	11.5	270	KH680M035F115A
	100	8	11.5	330	KH101M035F115A
	100	10	12.5	390	KH101M035G125A
	150	8	11.5	482	KH151M035F115A
	150	8	16	557	KH151M035F160A
	150	10	16	632	KH151M035G160A
	220	8	16	610	KH221M035F160A
	220	10	16	689	KH221M035G160A
	220	10	20	760	KH221M035G200A
	330	10	16	809	KH331M035G160A
	330	10	20	892	KH331M035G200A
	330	13	20	1035	KH331M035I200A
	470	10	16	780	KH471M035G160A
	470	10	20	860	KH471M035G200A
	470	13	20	997	KH471M035I200A
	470	13	25	1100	KH471M035I250A
	820	10	25	1300	KH821M035G250A
	1000	13	20	1409	KH102M035I200A
	1000	13	25	1553	KH102M035I250A
	1000	16	25	1746	KH102M035J250A
1000	16	31.5	1932	KH102M035J315A	

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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 - 100kHz (mA rms)	CapXon Part Number
50	6.8	5	11	75	KH6R8M050C110A
	10	5	11	97	KH100M050C110A
	22	6.3	11	130	KH220M050E110A
	33	6.3	11	210	KH330M050E110A
	33	8	11.5	241	KH330M050F115A
	47	6.3	11	245	KH470M050E110A
	47	8	11.5	287	KH470M050F115A
	47	10	12.5	300	KH470M050G125A
	68	8	11.5	302	KH680M050F115A
	68	10	12.5	356	KH680M050G125A
	100	8	11.5	382	KH101M050F115A
	100	10	16	500	KH101M050G160A
	150	10	12.5	609	KH151M050G125A
	150	10	16	677	KH151M050G160A
	150	10	20	747	KH151M050G200A
	220	10	16	764	KH221M050G160A
	220	10	20	842	KH221M050G200A
	220	13	20	977	KH221M050I200A
	330	13	20	1043	KH331M050I200A
	330	13	25	1150	KH331M050I250A
	470	13	20	1252	KH471M050I200A
	470	16	20	1440	KH471M050J200A
	470	16	25	1552	KH471M050J250A
1000	16	25	1771	KH102M050J250A	
1000	16	31.5	1959	KH102M050J315A	
1000	18	31.5	2093	KH102M050K315A	
160	10	10	16	330	KH100M160G160A
	22	10	20	510	KH220M160G200A
	33	10	20	660	KH330M160G200A
	33	13	20	760	KH330M160I200A
	47	10	20	760	KH470M160G200A
	47	13	20	870	KH470M160I200A
	68	13	20	1190	KH680M160I200A
	68	13	25	1350	KH680M160I250A
	82	13	20	1280	KH820M160I200A
	100	13	25	1430	KH101M160I250A
	100	16	20	1430	KH101M160J200A
	100	18	20	1530	KH101M160K200A
	150	16	20	1900	KH151M160J200A
	150	18	25	2180	KH151M160K250A
	220	16	25	2380	KH221M160J250A
	220	18	25	2540	KH221M160K250A
	330	18	31.5	3140	KH331M160K315A

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$V_R$ (V)	$C_R$ ( $\mu F$ )	$\phi D$ (mm)	L (mm)	$I_R$ - Max. Ripple Current +105°C - 100kHz (mA rms)	CapXon Part Number
200	10	10	16	330	KH100M200G160A
	10	10	20	360	KH100M200G200A
	22	10	20	510	KH220M200G200A
	33	10	20	660	KH330M200G200A
	33	13	20	760	KH330M200I200A
	47	13	20	990	KH470M200I200A
	68	13	20	1310	KH680M200I200A
	82	16	20	1390	KH820M200J200A
	100	16	20	1430	KH101M200J200A
	100	18	20	1530	KH101M200K200A
	150	16	25	1900	KH151M200J250A
	150	18	25	2030	KH151M200K250A
	220	18	25	2370	KH221M200K250A
	220	18	31.5	2620	KH221M200K315A
	330	18	35.5	3230	KH331M200K355A
250	10	10	20	360	KH100M250G200A
	22	10	20	510	KH220M250G200A
	22	13	20	590	KH220M250I200A
	33	13	20	810	KH330M250I200A
	33	13	25	890	KH330M250I250A
	47	13	20	990	KH470M250I200A
	47	16	20	1130	KH470M250J200A
	68	16	20	1310	KH680M250J200A
	68	18	20	1400	KH680M250K200A
	82	16	20	1390	KH820M250J200A
	100	16	25	1540	KH101M250J250A
	100	18	25	1640	KH101M250K250A
	150	18	25	1950	KH151M250K250A
	150	18	31.5	2150	KH151M250K315A
	220	18	31.5	3140	KH221M250K315A
350	6.8	10	16	290	KH6R8M350G160A
	6.8	10	20	310	KH6R8M350G200A
	10	10	20	360	KH100M350G200A
	10	13	20	410	KH100M350I200A
	22	13	20	660	KH220M350I200A
	22	13	25	720	KH220M350I250A
	33	16	20	910	KH330M350J200A
	47	16	20	1090	KH470M350J200A
	47	18	20	1160	KH470M350K200A
	68	16	25	1410	KH680M350J250A
	68	18	20	1380	KH680M350K200A
	68	18	25	1480	KH680M350K250A
	82	18	25	1540	KH820M350K250A

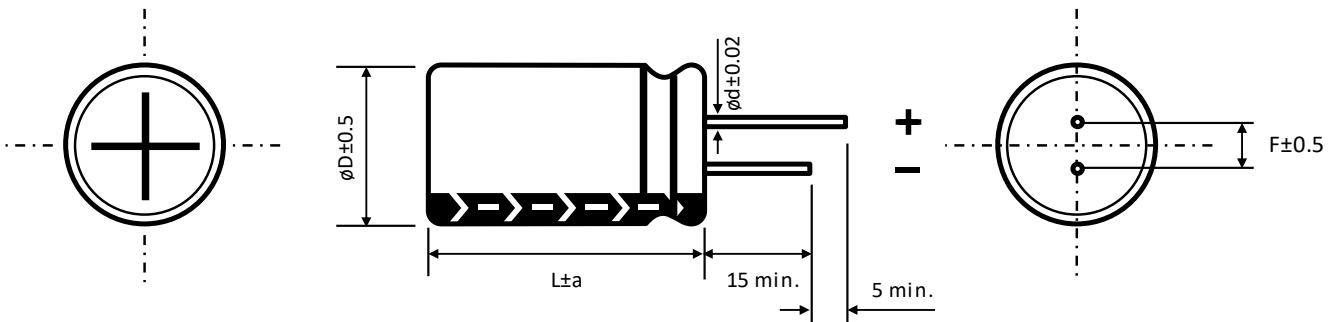
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**STANDARD RATINGS**

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$V_R$ (V)	$C_R$ ( $\mu F$ )	$\phi D$ (mm)	L (mm)	$I_R$ - Max. Ripple Current +105°C - 100kHz (mA rms)	CapXon Part Number
350	100	18	25	1580	KH101M350K250A
	120	18	31.5	1870	KH121M350K315A
	150	18	35.5	2170	KH151M350K355A
400	6.8	10	12.5	260	KH6R8M400G125A
	6.8	10	16	290	KH6R8M400G160A
	6.8	10	20	310	KH6R8M400G200A
	10	10	16	330	KH100M400G160A
	10	10	20	360	KH100M400G200A
	10	13	20	410	KH100M400I200A
	15	13	20	560	KH150M400I200A
	22	13	20	770	KH220M400I200A
	22	16	20	880	KH220M400J200A
	22	16	25	950	KH220M400J250A
	33	16	20	910	KH330M400J200A
	33	18	20	970	KH330M400K200A
	47	16	25	1190	KH470M400J250A
	47	18	20	1190	KH470M400K200A
	47	18	25	1270	KH470M400K250A
	68	18	25	1480	KH680M400K250A
	68	18	31.5	1630	KH680M400K315A
	82	18	25	1530	KH820M400K250A
	100	18	31.5	1730	KH101M400K315A
	120	18	35.5	1950	KH121M400K355A
150	18	40	2220	KH151M400K400A	
450	6.8	10	20	290	KH6R8M450G200A
	6.8	13	20	330	KH6R8M450I200A
	10	13	20	460	KH100M450I200A
	10	13	25	500	KH100M450I250A
	15	13	20	550	KH150M450I200A
	15	13	25	610	KH150M450I250A
	22	13	25	710	KH220M450I250A
	22	16	20	760	KH220M450J200A
	22	16	25	790	KH220M450J250A
	33	16	25	990	KH330M450J250A
	33	18	20	990	KH330M450K200A
	33	18	25	1060	KH330M450K250A
	47	18	25	1210	KH470M450K250A
	47	18	31.5	1330	KH470M450K315A
	68	18	31.5	1580	KH680M450K315A
	82	18	35.5	1790	KH820M450K355A
100	18	40	1810	KH101M450K400A	

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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	1k	10k	100k
6.8 ~ 3300	0.5	0.8	0.85	1

**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>

### 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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