

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

#### KEY FEATURES



- ALUMINUM ELECTROLYTIC CAPACITOR ▪ THT type
- Endurance: 105°C ▪ 6000 hours up to 8000 hours
- High voltage 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 ~ 450V DC				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	$C_R$	1 ~ 330 $\mu$ F				4.7 ~ 120 $\mu$ 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
		$\tan \delta$ (%)	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	$\phi$ D 6.3 ~ 8 mm
		6 000 hours	$\phi$ D 10 x L 9 mm
		8 000 hours	$\phi$ D 10 x L 12.5 mm
		8 000 hours	$\phi$ D > 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 <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)	I <sub>R</sub> • Max. Ripple Current +105°C • 100kHz (mA rms)	CapXon Part Number
160	1	6.3	11	20.4	51	FK010M160E110A <input type="checkbox"/>
	1	6.3	9	18.4	46	FK010M160E090A <input type="checkbox"/>
	1.5	6.3	11	22.4	56	FK1R5M160E110A <input type="checkbox"/>
	1.5	6.3	9	20.4	51	FK1R5M160E090A <input type="checkbox"/>
	2.2	6.3	11	28.4	71	FK2R2M160E110A <input type="checkbox"/>
	2.2	6.3	9	26	65	FK2R2M160E090A <input type="checkbox"/>
	3.3	6.3	11	32.4	81	FK3R3M160E110A <input type="checkbox"/>
	3.3	6.3	9	29.2	73	FK3R3M160E090A <input type="checkbox"/>
	4.7	6.3	11	36.4	91	FK4R7M160E110A <input type="checkbox"/>
	4.7	6.3	9	34.4	86	FK4R7M160E090A <input type="checkbox"/>
	5.6	6.3	11	38.4	96	FK5R6M160E110A <input type="checkbox"/>
	5.6	6.3	9	36.4	91	FK5R6M160E090A <input type="checkbox"/>
	5.6	8	11.5	44	110	FK5R6M160F115A <input type="checkbox"/>
	6.8	6.3	11	44	110	FK6R8M160E110A <input type="checkbox"/>
	6.8	8	11.5	52	130	FK6R8M160F115A <input type="checkbox"/>
	6.8	8	9	44	110	FK6R8M160F090A <input type="checkbox"/>
	8.2	8	11.5	60	150	FK8R2M160F115A <input type="checkbox"/>
	8.2	8	9	56	140	FK8R2M160F090A <input type="checkbox"/>
	10	8	11.5	96	240	FK100M160F115A <input type="checkbox"/>
	10	8	16	110	275	FK100M160F160A <input type="checkbox"/>
	10	8	9	88	220	FK100M160F090A <input type="checkbox"/>
	10	10	12.5	120	300	FK100M160G125A <input type="checkbox"/>
	15	8	16	110	275	FK150M160F160A <input type="checkbox"/>
	15	10	9	100	250	FK150M160G090A <input type="checkbox"/>
	22	8	20	180	450	FK220M160F200A <input type="checkbox"/>
	22	10	12.5	160	400	FK220M160G125A <input type="checkbox"/>
	22	10	16	180	450	FK220M160G160A <input type="checkbox"/>
	33	10	16	230	575	FK330M160G160A <input type="checkbox"/>
	33	10	20	250	625	FK330M160G200A <input type="checkbox"/>
	47	10	16	300	750	FK470M160G160A <input type="checkbox"/>
	47	10	20	300	750	FK470M160G200A <input type="checkbox"/>
	68	13	20	470	1175	FK680M160I200A <input type="checkbox"/>
	82	13	20	520	1300	FK820M160I200A <input type="checkbox"/>
100	13	25	620	1395	FK101M160I250A <input type="checkbox"/>	
100	16	20	630	1418	FK101M160J200A <input type="checkbox"/>	
150	16	25	840	1890	FK151M160J250A <input type="checkbox"/>	
220	18	25	1090	2453	FK221M160K250A <input type="checkbox"/>	
270	16	31.5	1260	2835	FK271M160J315A <input type="checkbox"/>	
330	18	31.5	1400	3150	FK331M160K315A <input type="checkbox"/>	

: Enter **blank** for Standard version

: Enter **X** for AEC-Q200 version

See "PACKAGING INFORMATION" to taped or formed products.

## STANDARD RATINGS

Part number shows bulk version with straight leads

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)	I <sub>R</sub> • Max. Ripple Current +105°C • 100kHz (mA rms)	CapXon Part Number
200	1	6.3	11	22.8	57	FK010M200E110A <input type="checkbox"/>
	1	6.3	9	21.2	53	FK010M200E090A <input type="checkbox"/>
	1.5	6.3	11	24.4	61	FK1R5M200E110A <input type="checkbox"/>
	1.5	6.3	9	22.8	57	FK1R5M200E090A <input type="checkbox"/>
	2.2	6.3	11	30	75	FK2R2M200E110A <input type="checkbox"/>
	2.2	6.3	9	27.6	69	FK2R2M200E090A <input type="checkbox"/>
	3.3	6.3	11	38.8	97	FK3R3M200E110A <input type="checkbox"/>
	3.3	6.3	9	34.8	87	FK3R3M200E090A <input type="checkbox"/>
	4.7	6.3	11	52	130	FK4R7M200E110A <input type="checkbox"/>
	4.7	8	9	52	130	FK4R7M200F090A <input type="checkbox"/>
	5.6	6.3	11	56	140	FK5R6M200E110A <input type="checkbox"/>
	5.6	8	11.5	64	160	FK5R6M200F115A <input type="checkbox"/>
	5.6	8	9	56	140	FK5R6M200F090A <input type="checkbox"/>
	6.8	8	11.5	76	190	FK6R8M200F115A <input type="checkbox"/>
	6.8	8	9	64	160	FK6R8M200F090A <input type="checkbox"/>
	8.2	8	11.5	84	210	FK8R2M200F115A <input type="checkbox"/>
	10	8	11.5	110	275	FK100M200F115A <input type="checkbox"/>
	10	8	16	120	300	FK100M200F160A <input type="checkbox"/>
	10	10	12.5	130	325	FK100M200G125A <input type="checkbox"/>
	10	10	9	110	275	FK100M200G090A <input type="checkbox"/>
	22	8	20	220	550	FK220M200F200A <input type="checkbox"/>
	22	10	16	220	550	FK220M200G160A <input type="checkbox"/>
22	10	20	250	625	FK220M200G200A <input type="checkbox"/>	
33	10	16	260	650	FK330M200G160A <input type="checkbox"/>	
33	10	20	280	700	FK330M200G200A <input type="checkbox"/>	
47	13	16	360	900	FK470M200I160A <input type="checkbox"/>	
47	13	20	390	975	FK470M200I200A <input type="checkbox"/>	
68	13	20	470	1175	FK680M200I200A <input type="checkbox"/>	
68	13	25	520	1300	FK680M200I250A <input type="checkbox"/>	
100	13	25	630	1418	FK101M200I250A <input type="checkbox"/>	
100	16	25	680	1530	FK101M200J250A <input type="checkbox"/>	
150	18	25	900	2025	FK151M200K250A <input type="checkbox"/>	
220	16	31.5	1090	2453	FK221M200J315A <input type="checkbox"/>	
250	1	6.3	11	23.6	59	FK010M250E110A <input type="checkbox"/>
	1	6.3	9	21.2	53	FK010M250E090A <input type="checkbox"/>
	1.5	6.3	11	24.4	61	FK1R5M250E110A <input type="checkbox"/>
	1.5	6.3	9	22.8	57	FK1R5M250E090A <input type="checkbox"/>
	2.2	6.3	11	30.4	76	FK2R2M250E110A <input type="checkbox"/>
	2.2	6.3	9	27.6	69	FK2R2M250E090A <input type="checkbox"/>
	2.2	8	11.5	38	95	FK2R2M250F115A <input type="checkbox"/>
	3.3	6.3	11	40	100	FK3R3M250E110A <input type="checkbox"/>
	3.3	6.3	9	34.8	87	FK3R3M250E090A <input type="checkbox"/>

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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)	I <sub>R</sub> • Max. Ripple Current +105°C • 100kHz (mA rms)	CapXon Part Number
250	3.3	8	11.5	56	140	FK3R3M250F115A ☐
	4.7	8	11.5	64	160	FK4R7M250F115A ☐
	4.7	8	16	72	180	FK4R7M250F160A ☐
	4.7	8	9	52	130	FK4R7M250F090A ☐
	4.7	10	12.5	76	190	FK4R7M250G125A ☐
	5.6	8	11.5	72	180	FK5R6M250F115A ☐
	5.6	8	9	64	160	FK5R6M250F090A ☐
	6.8	8	11.5	80	200	FK6R8M250F115A ☐
	6.8	8	16	92	230	FK6R8M250F160A ☐
	6.8	10	12.5	100	250	FK6R8M250G125A ☐
	8.2	8	16	88	220	FK8R2M250F160A ☐
	8.2	10	9	80	200	FK8R2M250G090A ☐
	10	8	16	120	300	FK100M250F160A ☐
	10	10	12.5	120	300	FK100M250G125A ☐
	15	10	16	130	325	FK150M250G160A ☐
	22	10	16	180	450	FK220M250G160A ☐
	22	10	20	200	500	FK220M250G200A ☐
	33	10	20	270	675	FK330M250G200A ☐
	33	13	16	270	675	FK330M250I160A ☐
	33	13	20	320	800	FK330M250I200A ☐
	47	13	20	400	1000	FK470M250I200A ☐
	47	13	25	430	1075	FK470M250I250A ☐
	56	13	25	500	1250	FK560M250I250A ☐
68	16	25	560	1400	FK680M250J250A ☐	
100	16	25	680	1530	FK101M250J250A ☐	
150	16	31.5	900	2025	FK151M250J315A ☐	
220	18	31.5	1130	2543	FK221M250K315A ☐	
350	1	6.3	11	26.4	66	FK010M350E110A ☐
	1	6.3	9	21.2	53	FK010M350E090A ☐
	1	8	11.5	30.8	77	FK010M350F115A ☐
	1.5	6.3	11	30	75	FK1R5M350E110A ☐
	1.5	6.3	9	26.4	66	FK1R5M350E090A ☐
	2.2	6.3	11	38	95	FK2R2M350E110A ☐
	2.2	8	11.5	48	120	FK2R2M350F115A ☐
	2.2	8	9	35.2	88	FK2R2M350F090A ☐
	3.3	8	11.5	56	140	FK3R3M350F115A ☐
	3.3	8	9	48	120	FK3R3M350F090A ☐
	3.3	10	12.5	64	160	FK3R3M350G125A ☐
	4.7	8	16	72	180	FK4R7M350F160A ☐
	4.7	10	12.5	76	190	FK4R7M350G125A ☐
	4.7	10	9	64	160	FK4R7M350G090A ☐
	5.6	8	16	84	210	FK5R6M350F160A ☐

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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)	I <sub>R</sub> • Max. Ripple Current +105°C • 100kHz (mA rms)	CapXon Part Number
350	5.6	10	12.5	88	220	FK5R6M350G125A
	6.8	8	20	110	275	FK6R8M350F200A
	6.8	10	16	110	275	FK6R8M350G160A
	8.2	8	20	130	325	FK8R2M350F200A
	10	8	20	130	325	FK100M350F200A
	10	10	16	130	325	FK100M350G160A
	15	10	20	150	375	FK150M350G200A
	22	13	20	260	650	FK220M350I200A
	33	13	25	380	950	FK330M350I250A
	47	16	20	430	1075	FK470M350J200A
	47	16	25	460	1150	FK470M350J250A
	68	18	20	560	1400	FK680M350K200A
	68	18	25	600	1500	FK680M350K250A
	82	18	25	610	1525	FK820M350K250A
	100	16	31.5	720	1620	FK101M350J315A
150	18	35.5	960	2160	FK151M350K355A	
400	1	6.3	11	30.4	76	FK010M400E110A
	1	6.3	9	25.2	63	FK010M400E090A
	1.5	6.3	9	30.4	76	FK1R5M400E090A
	1.5	8	11.5	36.4	91	FK1R5M400F115A
	2.2	6.3	11	44	110	FK2R2M400E110A
	2.2	8	11.5	48	120	FK2R2M400F115A
	2.2	8	9	40	100	FK2R2M400F090A
	3.3	8	11.5	60	150	FK3R3M400F115A
	3.3	8	9	52	130	FK3R3M400F090A
	4.7	8	11.5	80	200	FK4R7M400F115A
	4.7	8	16	88	220	FK4R7M400F160A
	4.7	10	12.5	92	230	FK4R7M400G125A
	4.7	10	9	72	180	FK4R7M400G090A
	5.6	8	16	88	220	FK5R6M400F160A
	5.6	10	12.5	100	250	FK5R6M400G125A
	6.8	8	16	110	275	FK6R8M400F160A
	6.8	10	12.5	110	275	FK6R8M400G125A
	8.2	8	16	110	275	FK8R2M400F160A
	8.2	10	12.5	120	300	FK8R2M400G125A
	8.2	10	16	130	325	FK8R2M400G160A
	10	8	20	140	350	FK100M400F200A
	10	10	16	140	350	FK100M400G160A
10	10	20	160	400	FK100M400G200A	
15	10	20	190	475	FK150M400G200A	
15	13	16	200	500	FK150M400I160A	
22	13	20	260	650	FK220M400I200A	

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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)	I <sub>R</sub> • Max. Ripple Current +105°C • 100kHz (mA rms)	CapXon Part Number
400	33	13	25	360	900	FK330M400I250A <input type="checkbox"/>
	33	16	20	360	900	FK330M400J200A <input type="checkbox"/>
	47	16	25	470	1175	FK470M400J250A <input type="checkbox"/>
	56	18	25	560	1400	FK560M400K250A <input type="checkbox"/>
	68	18	25	590	1475	FK680M400K250A <input type="checkbox"/>
	82	16	31.5	630	1575	FK820M400J315A <input type="checkbox"/>
	100	18	31.5	770	1733	FK101M400K315A <input type="checkbox"/>
	120	18	31.5	830	1868	FK121M400K315A <input type="checkbox"/>
450	150	18	35.5	930	2093	FK151M400K355A <input type="checkbox"/>
	1	6.3	11	30.4	76	FK010M450E110A <input type="checkbox"/>
	1	6.3	9	25.2	63	FK010M450E090A <input type="checkbox"/>
	1.5	8	11.5	36.4	91	FK1R5M450F115A <input type="checkbox"/>
	2.2	8	11.5	48	120	FK2R2M450F115A <input type="checkbox"/>
	2.2	8	16	56	140	FK2R2M450F160A <input type="checkbox"/>
	2.2	8	9	40	100	FK2R2M450F090A <input type="checkbox"/>
	2.2	10	12.5	60	150	FK2R2M450G125A <input type="checkbox"/>
	3.3	8	11.5	64	160	FK3R3M450F115A <input type="checkbox"/>
	3.3	10	12.5	80	200	FK3R3M450G125A <input type="checkbox"/>
	3.3	10	9	68	170	FK3R3M450G090A <input type="checkbox"/>
	4.7	8	16	100	250	FK4R7M450F160A <input type="checkbox"/>
	4.7	10	12.5	100	250	FK4R7M450G125A <input type="checkbox"/>
	4.7	10	16	110	275	FK4R7M450G160A <input type="checkbox"/>
	5.6	10	16	110	275	FK5R6M450G160A <input type="checkbox"/>
	6.8	8	20	120	300	FK6R8M450F200A <input type="checkbox"/>
	6.8	10	16	130	325	FK6R8M450G160A <input type="checkbox"/>
	6.8	10	20	140	350	FK6R8M450G200A <input type="checkbox"/>
	8.2	10	20	140	350	FK8R2M450G200A <input type="checkbox"/>
	10	10	20	160	400	FK100M450G200A <input type="checkbox"/>
	15	13	20	220	550	FK150M450I200A <input type="checkbox"/>
	22	13	25	290	725	FK220M450I250A <input type="checkbox"/>
	22	16	20	290	725	FK220M450J200A <input type="checkbox"/>
	33	13	25	360	900	FK330M450I250A <input type="checkbox"/>
	33	16	25	390	975	FK330M450J250A <input type="checkbox"/>
	47	16	25	470	1175	FK470M450J250A <input type="checkbox"/>
	47	18	25	500	1250	FK470M450K250A <input type="checkbox"/>
	68	16	31.5	630	1575	FK680M450J315A <input type="checkbox"/>
	68	18	25	590	1475	FK680M450K250A <input type="checkbox"/>
	82	18	31.5	680	1700	FK820M450K315A <input type="checkbox"/>
	100	18	35.5	800	1800	FK101M450K355A <input type="checkbox"/>

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## STANDARD RATINGS

Part number shows bulk version with straight leads

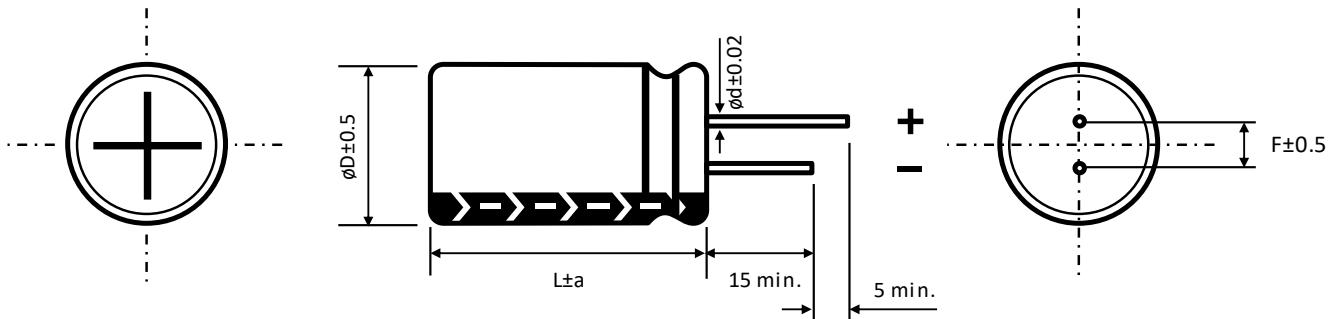
$V_R$ (V)	$C_R$ ( $\mu F$ )	$\phi D$ (mm)	L (mm)	$I_R$ • Max. Ripple Current +105°C • 120Hz (mA rms)	$I_R$ • Max. Ripple Current +105°C • 100kHz (mA rms)	CapXon Part Number
500	4.7	10	20	88	220	FK4R7M500G200A □
	5.6	10	20	92	230	FK5R6M500G200A □
	6.8	10	20	130	325	FK6R8M500G200A □
	8.2	10	20	130	325	FK8R2M500G200A □
	10	13	20	140	350	FK100M500I200A □
	15	13	25	180	450	FK150M500I250A □
	22	16	25	230	575	FK220M500J250A □
	33	18	25	390	975	FK330M500K250A □
	47	16	31.5	500	1250	FK470M500J315A □
	56	18	31.5	570	1425	FK560M500K315A □
	68	18	35.5	630	1575	FK680M500K355A □
	82	18	40	680	1700	FK820M500K400A □
	100	18	45	800	1800	FK101M500K450A □
120	22	45	840	1890	FK121M500M450A □	

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## DIMENSIONS ▪ All dimensions in mm



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



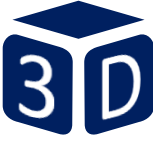

a	$\phi D < 16$	$\phi D = 16$		$\phi D = 18$		$\phi D > 18$
	1.5	L = 25 to 35.5	L < 25 and L ≥ 40	L = 25 to 31.5	L < 25 and L ≥ 35.5	
		1.5	2	1.5	2	
						2

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

$C_R$ ( $\mu$ F) / Frequency (Hz)	100/120	1k	10k	100k
1 ~ 82	1	1.75	2.25	2.5
$\geq 100$	1	1.67	2.05	2.25

**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>

**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](http://www.capxongroup.com) or contact CapXon directly.