

FXR · Screw-Terminal · 12 000 h/85 °C

High Ripple Current · Long Life · Bottom cooling design

> Specifications · Spezifikationen

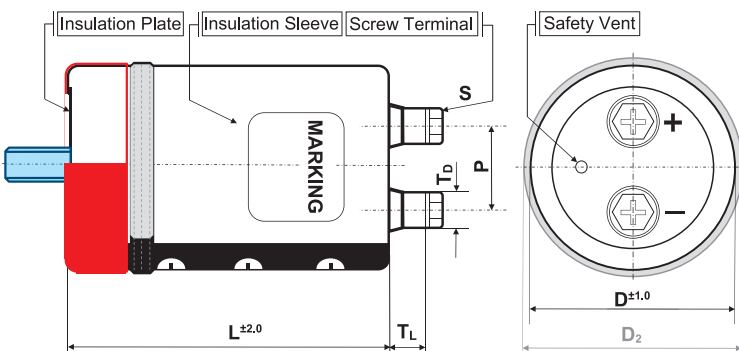
Items	Characteristics
Temperature range	-40°C ~ + 85°C
Capacitance tolerance (at 20°C)	Standard +/- 20%, -10/+30% on request
Surge voltage	Repetitive max. 30 sec per 6 Minutes
Leakage current max. I_L (20°C, 5 min)	$0.01 \cdot C \cdot V_r$ [μ A] or 3 mA, which is smaller.
Useful life	12 000 hours at 85°C
Field failure rate	0.5 FIT = $0.5 \cdot 10^{-9}$ Failures/hour
RoHS conform	Directive 2011/65/EU & (EU)2015/863
Specification / Vibration	JIS C 5101-4/0.75mm, 10...55Hz, 10g, 3x2h
Outer materials	UL94-V0/UL224-VW1 certified (cap/sleeve)
Sleeve withstanding voltage	4000 Vac / 1min between terminals bundled and plate*

* Typical value



> Shape designation · Formbezeichnung

- for details refer to p. 8–9 · technische Details siehe S. 8–9
- for mounting options refer to p. 149 ff · Montageoptionen siehe S. 149 ff



	B	I/Y	N	N+WC
outer sleeve	•	•	•	•
insulation plate	•	•	•	
stud bolt	•			
bottom double sleeve		•		
integrated seating ring				•

ØD	available shape	P	S	T _L	T _D	Cap material
64	B, N, I, Y	28.6	M5x10	4.5	10	PPS
77	B, N, I, Y, WC	31.5	M6x12	3.0	16	PPS
90	B, N, I, Y, WC	31.5	M6x12	3.0	16	PPS

Size in mm

> Product Code · Bestellbezeichnung

Example: Series FXR · 3900 µF +/- 20 % · 500 V · D=77 mm · L=161 mm with Y-Bracket

FXR	2H	392	Y	E	161																				
Type of series	Capacitance code The first two digits are significant. The last digit indicates the number of following zeros in µF	Rated voltage code	Fixing symbol code B : Bolt N : single outer sleeve I : 2 Stoppers Bracket Y : 3 Stoppers Bracket N+ suffix WC: blank bottom + seating ring	Case code diameter	Specific features Case Code length Length in mm (3 digits)																				
		<table border="1"> <thead> <tr> <th>Code</th> <th>Voltage</th> <th>Code</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>2V</td> <td>350</td> <td>2W</td> <td>450</td> </tr> <tr> <td>2G</td> <td>400</td> <td>2H</td> <td>500</td> </tr> </tbody> </table>	Code	Voltage	Code	Voltage	2V	350	2W	450	2G	400	2H	500		<table border="1"> <thead> <tr> <th>ØD</th> <th>Code</th> </tr> </thead> <tbody> <tr> <td>64</td> <td>D</td> </tr> <tr> <td>77</td> <td>E</td> </tr> <tr> <td>90</td> <td>F</td> </tr> </tbody> </table>	ØD	Code	64	D	77	E	90	F	
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FXR · Screw-Terminal · 12 000 h/85 °C

Rated VoltageCode (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Ripple Current at 85°C/120Hz I_r [A RMS]	Ripple Current at 40°C/120Hz [A RMS]	ESR (typ) at 20°C/100Hz [m Ω]	Zmax at 20°C/10kHz [m Ω]	ESL (typ) [nH]	Dissipation Factor at 20°C/120Hz Tan δ	DxL [mm]	Product Code # = variable value, see fixing code in the product code
350 VDC Code: 2V Surge Voltage 400 VDC	3 900	16.8	33.6	23	25	18	0.20	64x115	FXR2V392#D115
	4 700	19.4	38.8	18	20	18	0.20	64x131	FXR2V472#D131
	5 600	22.8	45.6	15	16	18	0.20	64x155	FXR2V562#D155
		24.8	49.6	15	16	19	0.20	77x121	FXR2V562#E121
		25.6	51.2	15	16	19	0.20	90x106	FXR2V562#F106
	6 800	28.8	57.6	12	13	19	0.20	77x137	FXR2V682#E137
		30.1	60.2	12	13	19	0.20	90x121	FXR2V682#F121
	8 200	33.7	67.4	10	10	19	0.20	77x161	FXR2V822#E161
		34.6	69.2	10	10	19	0.20	90x137	FXR2V822#F137
	10 000	41.1	82.2	8	9	19	0.20	90x161	FXR2V103#F161
12 000	45.0	90.0	7	7	19	0.20	90x161	FXR2V123#F161	
14 000	50.5	101.0*	7	7	19	0.20	90x178	FXR2V143#F178	
400 VDC Code: 2G Surge Voltage 450 VDC	2 700	13.2	26.4	34	36	18	0.20	64x100	FXR2G272#D100
	3 300	16.3	32.6	27	29	18	0.20	64x131	FXR2G332#D131
	3 900	19.0	38.0	23	25	18	0.20	64x155	FXR2G392#D155
		20.7	41.4	23	25	19	0.20	77x121	FXR2G392#E121
	4 700	20.8	41.6	18	20	18	0.20	64x155	FXR2G472#D155
		23.6	47.2	18	20	19	0.20	90x106	FXR2G472#F106
		23.9	47.8	18	20	19	0.20	77x137	FXR2G472#E137
	5 600	26.1	52.2	16	17	19	0.20	77x137	FXR2G562#E137
		27.4	54.8	16	17	19	0.20	90x121	FXR2G562#F121
	6 800	30.6	61.2	13	14	19	0.20	77x161	FXR2G682#E161
31.5		63.0	13	14	19	0.20	90x137	FXR2G682#F137	
8 200	37.0	74.0	10	10	19	0.20	90x161	FXR2G822#F161	
10 000	41.1	82.2	9	9	19	0.20	90x161	FXR2G103#F161	
450 VDC Code: 2W Surge Voltage 500 VDC	2 200	12.0	24.0	42	45	18	0.20	64x100	FXR2W222#D100
		14.4	28.8	46	48	19	0.20	77x96	FXR2W222#E096
	2 700	14.7	29.4	35	37	18	0.20	64x131	FXR2W272#D131
		17.5	35.0	28	30	18	0.20	64x155	FXR2W332#D155
	3 300	17.7	35.4	28	30	19	0.20	77x121	FXR2W332#E121
		19.0	38.0	25	27	18	0.20	64x155	FXR2W392#D155
		20.7	41.4	25	27	19	0.20	77x121	FXR2W392#E121
	3 900	21.4	42.8	25	27	19	0.20	90x106	FXR2W392#F106
		23.9	47.8	18	20	19	0.20	77x137	FXR2W472#E137
		25.1	50.2	18	20	19	0.20	90x121	FXR2W472#F121
5 600	27.8	55.6	16	18	19	0.20	77x161	FXR2W562#E161	
	28.6	57.2	16	18	19	0.20	90x137	FXR2W562#F137	
6 800	33.8	67.6	13	14	19	0.20	90x161	FXR2W682#F161	
8 200	37.0	74.0	10	10	19	0.20	90x161	FXR2W822#F161	
10 000	42.4	84.8	9	9	19	0.20	90x178	FXR2W103#F178	
500 VDC Code: 2H Surge Voltage 550 VDC	1 500	9.9	19.8	74	78	18	0.20	64x115	FXR2H152#D115
	1 800	11.5	23.0	62	65	18	0.20	64x131	FXR2H182#D131
	2 200	13.5	27.0	51	54	18	0.20	64x155	FXR2H222#D155
	2 700	17.2	34.4	39	41	19	0.20	77x121	FXR2H272#E121
	3 000	16.4	32.8	35	37	18	0.20	64x155	FXR2H302#D155R

Additional designs on request · Weitere Designs auf Anfrage

Rated VoltageCode (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Ripple Current at 85°C/120Hz I_r [A RMS]	Ripple Current at 40°C/120Hz [A RMS]	ESR (typ) at 20°C/100Hz [m Ω]	Zmax at 20°C/10kHz [m Ω]	ESL (typ) [nH]	Dissipation Factor at 20°C/120Hz Tan δ	DxL [mm]	Product Code # = variable value, see fixing code in the product code
500 VDC Code: 2H Surge Voltage 550 VDC	3 300	16.9	33.8	32	34	19	0.20	90x106	FXR2H332#F106
		21.3	42.6	32	34	19	0.20	77x161	FXR2H332#E161
	3 900	21.8	43.6	25	28	19	0.20	90x121	FXR2H392#F121
		23.2	46.4	25	28	19	0.20	77x161	FXR2H392#E161
	4 200	23.6	47.2	24	27	19	0.20	77x178	FXR2H422#E178
	4 700	25.1	50.2	22	25	19	0.20	90x137	FXR2H472#F137
	5 600	29.1	58.2	18	20	19	0.20	90x161	FXR2H562#F161
	6 800	33.4	66.8	15	17	19	0.20	90x178	FXR2H682#F178
	7 000	32.5	65.0	15	17	19	0.20	90x161	FXR2H702#F161

* Please contact us if load condition exceeds terminals related I_{rmax} referred on page 9

Additional designs on request · Weitere Designs auf Anfrage

> Ripple Current Multiplier · Wechselstrommultiplikator

Frequency [Hz]	50/60	120	300	1k	$\geq 10k$	Forced cooling [m/sec]	v < 0.5	v ≥ 0.5	v ≥ 1.0	v ≥ 3.0
Multiplier	0.80	1.00	1.18	1.34	1.45	Multiplier	1.0	1.1	1.2	1.3

Temperature (°C)	40	45	50	55	60	65	70	75	80	85
Multiplier	2.0	2.0	1.9	1.8	1.7	1.6	1.5	1.3	1.2	1.0

> Life Time Table · Brauchbarkeitsdauer – Tabelle

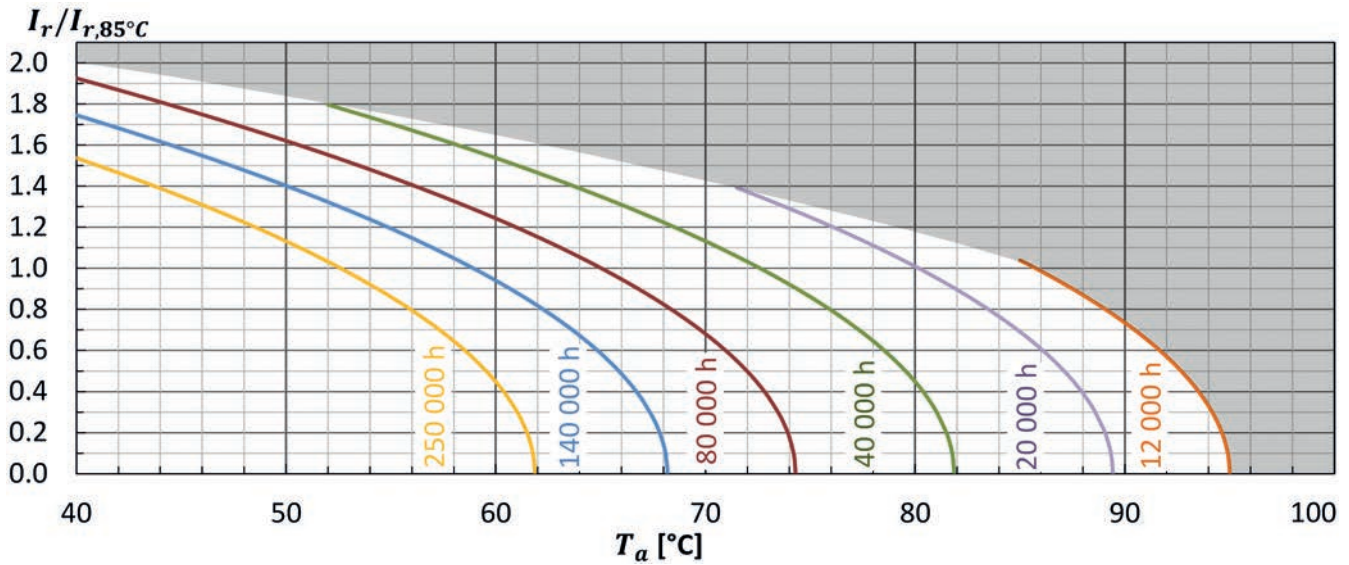
FXR	Useful life as function of ambient temperature and ripple current										
I_r at 85°C	x 1.0	x 1.1	x 1.2	x 1.3	x 1.4	x 1.5	x 1.6	x 1.7	x 1.8	x 1.9	x 2.0
$T_a = 40^\circ\text{C}$	250	250	250	250	250	250	211	159	118	86	62
$T_a = 45^\circ\text{C}$	250	250	250	250	222	174	133	101	75	54	39
$T_a = 50^\circ\text{C}$	250	250	218	176	140	110	84	63	47	34	
$T_a = 55^\circ\text{C}$	200	168	138	111	89	69	53	40	30		
$T_a = 60^\circ\text{C}$	127	106	87	70	56	44	33	25			
$T_a = 65^\circ\text{C}$	80	67	55	44	35	27	21				
$T_a = 70^\circ\text{C}$	50	42	34	28	22	17					
$T_a = 75^\circ\text{C}$	32	26	22	17							
$T_a = 80^\circ\text{C}$	20	17	13								
$T_a = 85^\circ\text{C}$	12										

khrs Max. value limited to 250 000 hours.

> Life Time Graph · Brauchbarkeitsdauer – Diagramm

Useful life depending on ambient temperature T_a and ripple current operating conditions I_r versus rated ripple current at the upper category temperature $I_{r, 85^\circ\text{C}, 120\text{Hz}}$

Brauchbarkeitsdauer in Abhängigkeit von Umgebungstemperatur T_a und Wechselstrombelastung I_r im Verhältnis zur max. Wechselstrombelastung bei oberer Kategorie-temperatur $I_{r, 85^\circ\text{C}, 120\text{Hz}}$



> Life Time Tests and Requirements · Anforderungen Brauchbarkeitsdauer

Life time test	Test procedure	Life time criteria
Endurance test	$T_a = 85^\circ\text{C}$; V_r, I_r applied 8000 hours	$\Delta C/C \leq 10\%$ (of initial value) $\text{Tan}\delta \leq 175\%$ (of specified value) $I_L \leq$ specified value
Useful life	$T_a = 85^\circ\text{C}$; V_r, I_r applied 12000 hours	$\Delta C/C \leq 15\%$ (of initial value) $\text{Tan}\delta < 200\%$ (of specified value) $I_L \leq$ specified value

Reference Specification: JIS C 5101-4, JIS C 5102, IEC 60384-4