

FX3 · Screw-Terminal · 10 000 h/85 °C

Compact Design · Long Life

Optional design for permanent and deep charge-discharge application with high voltage hub and pulsed operation mode upon request.

Spezielles Design für häufige und tiefe Lade-, Entladeanwendungen mit hohem Spannungshub und Impulsbetrieb auf Anfrage erhältlich.

> Specifications · Spezifikationen

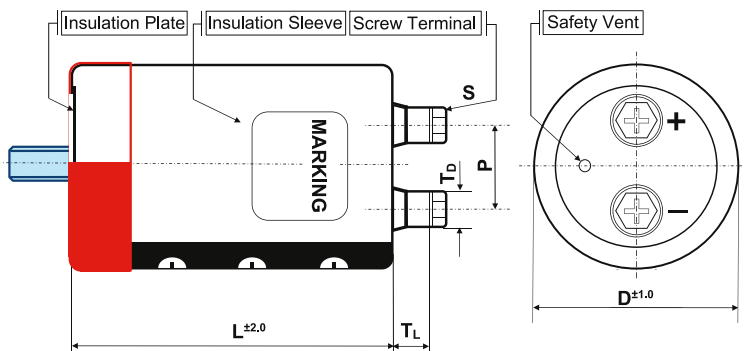
Items	Characteristics
Temperature range	-40°C ~ + 85°C
Capacitance tolerance (at 20°C)	Standard +/- 20%, -10/+30% on request
Surge voltage	Repetitive max. 30 sec per 6 Minutes
Leakage current max. I _L (20°C, 5 min)	0.01 • C • V, [μA] or 3 mA, which is smaller.
Useful life	10 000 hours at 85°C
Field failure rate	0.5 FIT = 0.5 • 10 ⁻⁹ Failures/hour
Reference standards	IEC 60384-4, JIS C 5101-4
Vibration	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*
Product Compliance	RoHS, REACH, Conflict Minerals a.o. – refer to p. 12–13

* Typical value



> Shape designation · Formbezeichnung

- additional information on p. 10–11 · Zusatzinformationen auf S. 10–11
- mounting accessories from p. 189 · Montagezubehör ab S. 189



Shape code Features	B Bolt	I/Y double sleeve for 2/3 points metal Bracket	N standard
outer insulation sleeve	•	•	•
insulation plate	•	•	•
stud bolt	•		
bottom double sleeve		•	

diameter code	ØD	available shape	P	S	T _L	T _D	Cap material
C	51	B, N, I, Y	22.0	M5x10	5.5	10	PH
D	64	B, N, I, Y	28.6	M5x10	5.5	10	PH
E	77	B, N, I, Y	31.5	M5x10	5.0	10	PH
				M6x12	4.5	17.2	PH
F	90	B, N, I, Y	31.5	M5x10	5.0	10	PH
				M6x12	5.0	17.2	PH

Size in mm. First listed terminal is standard.

> Product Code · Bestellbezeichnung

Example: Series FX3 · 8200 µF +/- 20 % · 400 V · D=77 mm · L=130 mm with Y-Bracket

FX3	2G	822	Y	E	130	PHM6
Series name	Capacitance code		Shape code	Diameter code	Capacitance tolerance	Specific features (e.g. M6 ...)
Rated voltage code						
Code	Voltage	Code	Voltage	Code	Voltage	
2G	400	2W	450	2H	500	
					∅ : ± 20 %	
					Q : -10 % ~ +30 %	
					Case length code – length in mm (3 digits)	

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [µF]	Ripple Current at 85°C/120Hz I_r [A RMS]	Ripple Current at 40°C/120Hz [A RMS]	ESR (typ) at 20°C/100Hz [mΩ]	Zmax at 20°C/10kHz [mΩ]	ESL (typ) [nH]	Dissipation Factor at 20°C/120Hz Tan δ	DxL [mm]	Product Code # = variable value, see fixing code in the product code	
400 VDC Code: 2G Surge Voltage 450 VDC	2 200	9.7	20.3	46	48	17	0.20	51x96	FX32G222#C096	
	2 700	11.5	24.2	38	40	17	0.20	51x115	FX32G272#C115	
	3 000	12.1	25.4	34	36	17	0.20	51x115	FX32G302#C115	
	3 300	13.3	28.0	30	32	17	0.20	51x130	FX32G332#C130	
	3 900	14.1	29.7	26	28	18	0.20	64x96	FX32G392#D096	
	4 700	16.7	35.0	21	22	18	0.20	64x115	FX32G472#D115	
	5 600	19.1	40.1	18	19	18	0.20	64x130	FX32G562#D130	
	6 800		22.7	47.6	15	15	18	0.20	64x155	FX32G682#D155
			21.3	44.7	15	15	20	0.20	77x115	FX32G682#E115
	8 200	24.4	51.2	12	15	20	0.20	77x130	FX32G822#E130	
	8 400	25.6	53.9	12	14	20	0.20	77x143	FX32G842#E143	
	10 000	28.9	60.6	10	15	20	0.20	77x155	FX32G103#E155	
	12 000	34.8	73.2	8	13	20	0.20	77x195	FX32G123#E195	
	15 000	39.1	82.1	8	10	20	0.20	90x171	FX32G153#F171	
18 000	45.3	95.2	6	9	20	0.20	90x196	FX32G183#F196		
22 000	54.1	113.5*	6	8	20	0.20	90x236	FX32G223#F236		
450 VDC Code: 2W Surge Voltage 500 VDC	1 800	8.3	17.4	71	73	17	0.20	51x96	FX32W182#C096	
	2 200	9.9	20.8	58	60	17	0.20	51x115	FX32W222#C115	
	2 700	11.6	24.4	47	49	17	0.20	51x130	FX32W272#C130	
	3 300	12.4	26.1	39	41	18	0.20	64x96	FX32W332#D096	
	3 900	14.5	30.4	33	35	18	0.20	64x115	FX32W392#D115	
	4 700		16.8	35.3	27	29	18	0.20	64x130	FX32W472#D130
			19.7	41.3	23	25	18	0.20	64x155	FX32W562#D155
	6 800		18.4	38.6	23	25	20	0.20	77x115	FX32W562#E115
			21.3	44.7	19	21	20	0.20	77x130	FX32W682#E130
	8 200		25.1	52.6	16	18	20	0.20	77x155	FX32W822#E155
			26.1	54.8	16	18	20	0.20	77x170	FX32W822#E170
	10 000	29.6	62.1	13	15	20	0.20	90x157	FX32W103#F157	
	12 000	33.5	70.3	11	13	20	0.20	90x171	FX32W123#F171	
	15 000	39.6	83.1	9	11	20	0.20	90x196	FX32W153#F196	
18 000	46.8	98.3	8	10	20	0.20	90x236	FX32W183#F236		

Additional designs on request · Weitere Designs auf Anfrage

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Rated VoltageCode (Surge Voltage) V_r [V DC]	Capacitance C_r [μF]	Ripple Current at 85°C/120Hz I_r [A RMS]	Ripple Current at 40°C/120Hz [A RMS]	ESR (typ) at 20°C/100Hz [mΩ]	Zmax at 20°C/10kHz [mΩ]	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	1 200	7.2	15.2	92	100	17	0.20	51x96	FX32H122#C096
	1 500	8.7	18.4	74	80	17	0.20	51x115	FX32H152#C115
	1 800	10.0	21.0	53	50	17	0.20	51x130	FX32H182#C130
	2 200	10.8	22.7	40	35	18	0.20	64x96	FX32H222#D096
	2 700	13.5	28.3	37	33	18	0.20	64x130	FX32H272#D130
	3 300	16.0	33.6	36	32	18	0.20	64x155	FX32H332#D155
		15.1	31.6	36	32	20	0.20	77x115	FX32H332#E115
	3 900	17.1	36.0	27	29	20	0.20	77x130	FX32H392#E130
	4 700	19.6	41.2	25	27	20	0.20	77x144	FX32H472#E144
	5 600	22.9	48.1	23	21	20	0.20	77x171	FX32H562#E171
		22.0	46.1	23	21	20	0.20	90x131	FX32H562#F131
	6 800	26.7	56.0	20	18	20	0.20	77x195	FX32H682#E195
		25.9	54.3	20	18	20	0.20	90x157	FX32H682#F157
	8 200	29.4	61.8	17	16	20	0.20	90x171	FX32H822#F171
10 000	34.4	72.2	15	14	20	0.20	90x196	FX32H103#F196	
12 000	40.6	85.2	13	12	20	0.20	90x236	FX32H123#F236	

*Please contact us if load condition exceeds terminals related $I_{r,max}$ referred on page 11

Additional designs on request · Weitere Designs auf Anfrage

> Ripple Current Multiplier · Wechselstrommultiplikator

Frequency [Hz]	50/60	120	300	1k	≥ 10k
Multiplier	0.80	1.00	1.18	1.34	1.45

Temperature (°C)	40	45	50	55	60	65	70	75	80	85
Multiplier	2.1	2.0	1.9	1.8	1.7	1.5	1.4	1.3	1.1	1.0

Forced cooling – Wind speed [m/sec]	v < 0.25	v ≥ 0.25	v ≥ 0.5	v ≥ 1.0	v ≥ 2.0	v ≥ 3.0
Multiplier	1.00	1.05	1.10	1.15	1.20	1.25

> Life Time Table · Brauchbarkeitsdauer – Tabelle

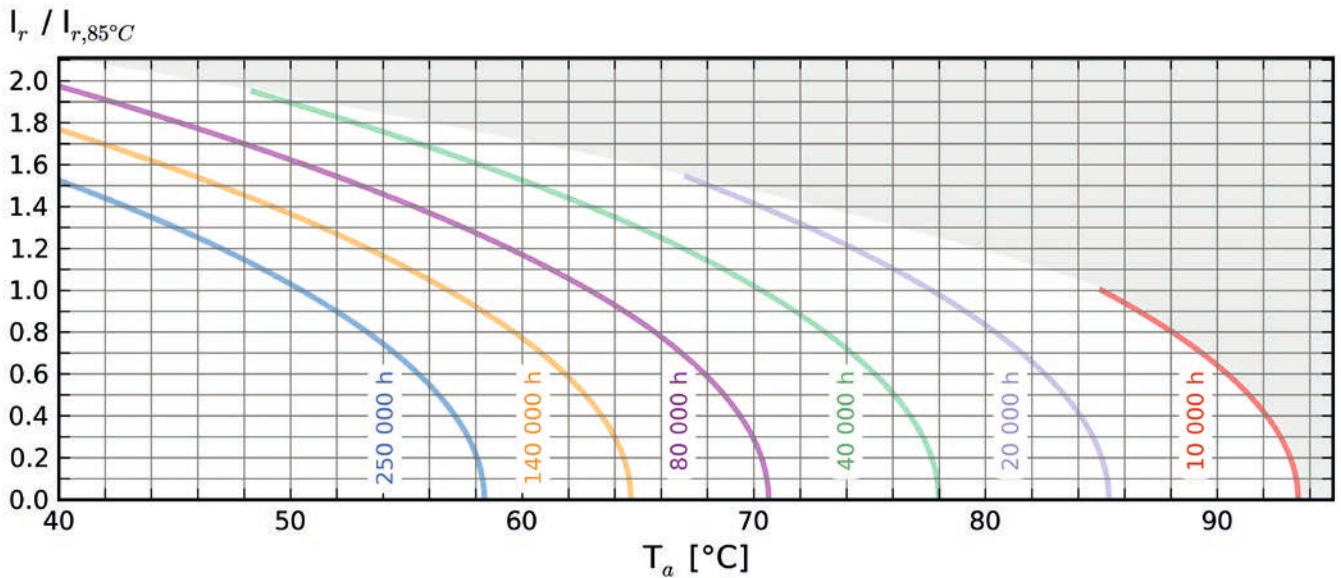
FX3 I_r at 85°C	Useful life as function of ambient temperature and ripple current											
	x 1.0	x 1.1	x 1.2	x 1.3	x 1.4	x 1.5	x 1.6	x 1.7	x 1.8	x 1.9	x 2.0	x 2.1
$T_a = 40°C$	250	250	250	250	250	250	210	166	128	98	74	55
$T_a = 45°C$	250	250	250	250	205	166	133	105	81	62	47	
$T_a = 50°C$	250	224	189	158	130	105	84	66	51	39		
$T_a = 55°C$	165	141	120	100	82	66	53	42	32			
$T_a = 60°C$	104	89	75	63	52	42	33	26				
$T_a = 65°C$	66	56	48	40	32	26						
$T_a = 70°C$	41	35	30	25	20							
$T_a = 75°C$	26	22	19	16								
$T_a = 80°C$	16	14										
$T_a = 85°C$	10											

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) $Tan\delta \leq 175\%$ (of specified value) $I_L \leq$ specified value
Useful life	$T_a = 85^\circ\text{C}$; V_r , I_r applied 10000 hours	$\Delta C/C \leq 15\%$ (of initial value) $Tan\delta < 200\%$ (of specified value) $I_L \leq$ specified value

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