

Special charge-discharge proof design available upon request.

Auf Anfrage spezielles Design für Lade-, Entladeanwendungen erhältlich.

► **Specifications / Spezifikationen**

Items	Characteristics
Temperature range	-40°C ~ + 85°C
Capacitance tolerance	+/- 20%
Surge voltage	Repetitive max. 30 sec per 6 Minutes
Leakage current max. I _L (20°C, 5 min)	0.01 • C • V _r [μA] or 3 mA, which is smaller.
Useful life	12000 h at 85°C
Field failure rate	0.5 FIT = 0.5 • 10 ⁻⁹ Failures/hour
RoHS conform	Directive 2002/95/ECff Annex
Specification / Vibration	JIS C 5101-4 / 0.75mm, 10...55Hz, 10g, 3x2h



► **Outline Drawings / Bauformen**

Shape: B (ØD = 51-101)
(for Bolt – Mounting, M12x16, stud bolt is not isolated)

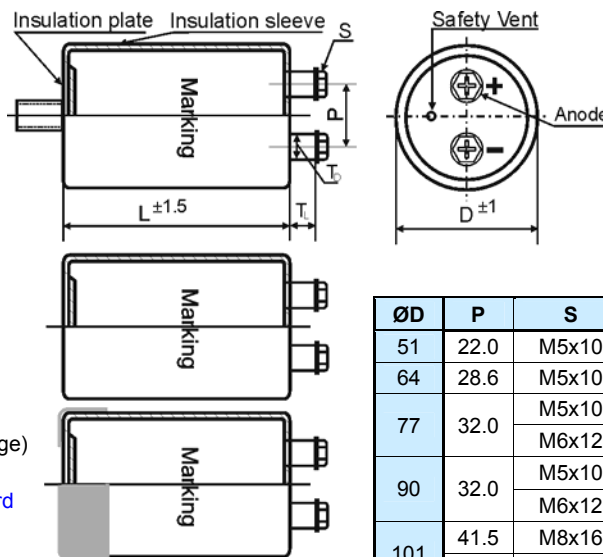
Form: B (ØD = 51-101)
(für Bolzenbefestigung, M12x16, Bolzen nicht isoliert)

Shape: N (for PBT-Holder ØD = 77-101 and Press Ring ØD = 64-90)

Form: N (für PBT-Halter ØD = 77-101 und Einpressring ØD = 64-90)

Shape: Y (ØD = 51-101)
(double sleeve, bracket free of charge)

Form: Y (ØD = 51-101)
(mit doppelter Isolierung, Schelle wird kostenlos mitgeliefert)



ØD	P	S	T _L	T _D	Cap material
51	22.0	M5x10	5.5	10	PH
64	28.6	M5x10	5.5	10	PH
77	32.0	M5x10	5.0	10	PH
		M6x12	5.0	16	PPS
90	32.0	M5x10	5.0	10	PH
		M6x12	4.0	16	PPS
101	41.5	M8x16	11.0	14	PH
		M6x12	3.0	14	PPS

Size in mm. First listed terminal is standard.

► **Ripple Current Multiplier / Wechselstrommultiplikator**

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

Forced cooling [m/sec]	v < 1.0	v ≥ 1.0
multiplier	1.0	1.1

► **Product Code / Bestellbezeichnung**

Example: FX2 4700μF 400V D=64mm L=130mm with Y-Bracket

FX2 **2G** **472** **Y** **D** **130** **()**

Type of series

Capacitance code
The first two digits are significant. The last digit indicates the number of following zeros in μF.

Fixing symbol code
B : Bolt
ØD = 51 - 101
N : No double sleeve (PBT-Safety-holder or press ring)
Y : 3 Stoppers Bracket
ØD = 51 - 101
refer to pages 113 – 119

Case code diameter

ØD	Code
51	C
64	D
77	E
90	F
101	G

Case Code length
Length in mm (3 digits)

Customers' specification

Rated voltage code

Code	Voltage	Code	Voltage
2V	350	2H	500
2G	400	2L	550
2W	450	575V	575

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [m Ω]	Zmax at 20°C/10kHz [m Ω]	ESL (typ) [nH]	DxL [mm]	Product Code
350 2V (400)	2 700	23.5	11.2	25	25	17	51x115	FX22V272□C115
	3 300	27.3	13.0	22	22	17	51x130	FX22V332□C130
	3 900	29.0	13.8	19	21	18	64x96	FX22V392□D096
	4 700	33.8	16.1	16	20	18	64x115	FX22V472□D115
	5 600	38.8	18.5	14	18	18	64x130	FX22V562□D130
	6 800	43.3	20.6	12	15	20	77x115	FX22V682□E115
	8 200	49.8	23.7	12	15	20	77x130	FX22V822□E130
		53.3	25.4	12	15	20	77x145	FX22V822□SE145
	10 000	56.7	27.0	11	15	20	77x143	FX22V103□E143
		59.0	28.1	11	15	20	77x155	FX22V103□E155
	12 000	64.5	30.7	8	13	20	90x131	FX22V123□F131
		67.4	32.1	8	13	20	77x171	FX22V123□E171
	15 000	83.2	39.6	6	10	20	77x220	FX22V153□E220
		77.1	36.7	6	10	20	90x157	FX22V153□F157
18 000	92.0	43.8	5	9	20	90x196	FX22V183□F196	
22 000	109.8	52.3	5	8	20	90x236	FX22V223□F236	
27 000	125.6	59.8	5	8	29	101x237 ^{*)}	FX22V273□G237	
400 2G (450)	1 100	12.6	6.0	60	40	17	51x75	FX22G112□C075
	1 800	16.2	7.7	34	37	17	51x96	FX22G182□C096
		18.1	8.6	34	37	17	51x100	FX22G182□C100
	2 200	20.4	9.7	46	48	17	51x105	FX22G222□C105
		21.2	10.1	28	28	17	51x115	FX22G222□C115
	2 700	24.2	11.5	38	40	17	51x115	FX22G272□SC115
		24.6	11.7	24	25	17	51x130	FX22G272□C130
	3 300	26.5	12.6	21	22	18	64x96	FX22G332□D096
	3 900	30.9	14.7	18	20	18	64x115	FX22G392□D115
	4 400	31.9	15.2	23	25	18	64x106	FX22G442□D106
	4 700	33.6	16.0	16	20	20	77x96	FX22G472□E096
		35.7	17.0	16	20	18	64x130	FX22G472□D130
	5 600	39.1	18.6	14	18	20	77x115	FX22G562□E115
	6 800	45.2	21.5	12	15	20	77x130	FX22G682□E130
	8 200	51.7	24.6	12	15	20	77x145	FX22G822□E145
		53.1	25.3	12	15	20	77x155	FX22G822□E155
	10 000	58.4	27.8	10	15	20	90x131	FX22G103□F131
		61.1	29.1	10	15	20	77x171	FX22G103□E171
		64.5	30.7	10	15	20	77x195	FX22G103□E195
	12 000	68.9	32.8	8	13	20	90x157	FX22G123□F157
15 000	84.0	40.0	6	10	20	90x196	FX22G153□F196	
18 000	99.5	47.4	5	9	20	90x236	FX22G183□F236	
22 000	113.4	54.0	5	8	29	101x237 ^{*)}	FX22G223□G237	
25 000	123.6	58.9	5	8	29	101x250	FX22G253□G250	
27 000	135.2	64.4	5	7	29	101x283	FX22G273□G283	
450 2W (500)	1 100	12.2	5.8	80	70	17	51x75	FX22W112□C075
	1 500	16.2	7.7	67	70	17	51x105	FX22W152□C105
		16.6	7.9	62	60	17	51x96	FX22W152□C096
	1 800	18.3	8.7	51	56	17	51x115	FX22W182□C115
	2 000	22.2	10.6	50	52	17	51x115	FX22W202□C115
	2 200	21.2	10.1	42	45	17	51x130	FX22W222□C130
	2 700	22.9	10.9	38	40	18	64x96	FX22W272□D096
		25.1	12.0	38	40	18	64x106	FX22W272□D106
	3 300	25.4	12.1	30	35	20	77x96	FX22W332□E096
		27.1	12.9	30	35	18	64x115	FX22W332□D115
	3 900	30.9	14.7	27	32	18	64x130	FX22W392□D130
4 700	34.0	16.2	20	21	20	77x115	FX22W472□E115	
5 600	39.1	18.6	20	20	20	77x130	FX22W562□E130	

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450 2W (500)	6 600	46.4	22.1	18	19	20	77x143	FX22W662□E143
	6 800	46.2	22.0	15	18	20	77x155	FX22W682□E155
	8 200	50.8	24.2	14	17	20	90x131	FX22W822□F131
		55.4	26.4	13	16	20	77x195	FX22W822□E195
	8 800	58.4	27.8	14	17	20	77x220	FX22W822□E220
		54.6	26.0	12	16	20	77x171	FX22W882□E171
	10 000	62.2	29.6	10	15	20	90x171	FX22W103□F171
	12 000	70.8	33.7	7	12	29	101x175	FX22W123□G175
		71.8	34.2	7	12	20	90x196	FX22W123□F196
	15 000	82.5	39.3	7	10	29	101x195	FX22W153□G195
		86.7	41.3	7	10	20	90x236	FX22W153□F236
	18 000	95.2	45.3	6	10	20	90x236	FX22W183□F236
97.9		46.6	6	10	29	101x237 ¹⁾	FX22W183□G237	
23 000	113.0	53.8	5	9	29	101x250	FX22W233□G250	
500 2H (550)	720	9.9	4.7	155	166	17	51x75	FX22H721□C075
	820	10.3	4.9	140	151	17	51x75	FX22H821□C075
	1 200	14.9	7.1	93	100	17	51x115	FX22H122□C115
		15.1	7.2	93	100	18	64x96	FX22H122□D096
	1 500	17.2	8.2	74	80	18	64x96	FX22H152□D096
		17.6	8.4	74	80	17	51x130	FX22H152□C130
	1 800	19.8	9.4	53	50	20	77x96	FX22H182□E096
		20.0	9.5	53	50	18	64x115	FX22H182□D115
	2 200	21.7	10.4	40	35	20	77x96	FX22H222□E096
		23.1	11.0	40	35	18	64x130	FX22H222□D130
	2 700	25.8	12.3	37	33	20	77x115	FX22H272□E115
	3 300	30.0	14.3	36	32	20	77x130	FX22H332□E130
	3 900	33.8	16.1	27	29	20	77x145	FX22H392□E145
		34.9	16.6	27	29	20	77x155	FX22H392□E155
	4 700	38.2	18.2	25	25	20	90x131	FX22H472□F131
		39.9	19.0	25	25	20	77x171	FX22H472□E171
	5 600	44.9	21.4	23	21	20	90x157	FX22H562□F157
		45.8	21.8	23	21	20	77x195	FX22H562□E195
	6 800	51.2	24.4	20	18	20	90x171	FX22H682□F171
	8 200	58.4	27.8	14	13	29	101x175	FX22H822□G175
59.2		28.2	14	13	20	90x196	FX22H822□F196	
9 400	63.2	30.1	14	12	20	90x196	FX22H942□F196	
10 000	67.4	32.1	12	12	29	101x195	FX22H103□G195	
	70.8	33.7	12	12	20	90x236	FX22H103□F236	
12 000	80.0	38.1	11	11	29	101x237 ¹⁾	FX22H123□G237	
550 2L (600)	680	10.7	5.1	165	177	17	51x105	FX22L681□C105
	1 000	14.3	6.8	112	120	17	51x130	FX22L102□C130
	1 200	16.4	7.8	93	100	18	64x115	FX22L122□D115
	1 500	19.3	9.2	74	80	18	64x130	FX22L152□D130
	1 800	21.0	10.0	74	50	20	77x115	FX22L182□E115
	2 200	24.4	11.6	45	40	20	77x130	FX22L222□E130
	2 700	27.0	12.9	40	35	20	77x130	FX22L272□E130
		29.0	13.8	40	35	20	77x155	FX22L272□E155
	3 300	32.1	15.3	38	32	20	77x155	FX22L332□E155
	3 900	37.4	17.8	30	27	20	90x157	FX22L392□F157
	4 200	37.6	17.9	30	27	20	77x171	FX22L422□E171
	4 700	42.4	20.2	25	20	20	90x171	FX22L472□F171
		42.8	20.4	25	20	20	77x203	FX22L472□E203
	5 000	47.0	22.4	24	20	20	77x235	FX22L502□E235
	5 600	48.9	23.3	20	17	20	90x196	FX22L562□F196
	6 000	51.4	24.5	19	17	20	77x235	FX22L602□E235

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550 2L (600)	6 800	53.8	25.6	17	17	20	90x196	FX22L682□F196
		58.2	27.7	17	17	20	90x236	FX22L682□F236
	8 200	63.8	30.4	15	15	20	90x236	FX22L822□F236
		65.9	31.4	15	15	29	101x237 ¹⁾	FX22L822□G237
575 575V (625)	1 200	16.2	7.7	121	125	18	64x96	FX2575V122□D096
	1 300	19.3	9.2	112	115	18	64x103	FX2575V132□D103
	1 500	19.5	9.3	97	100	18	64x115	FX2575V152□D115
	1 800	21.2	10.1	81	83	20	77x96	FX2575V182□E096
	2 200	25.2	12.0	66	67	20	77x115	FX2575V222□E115
	2 700	29.2	13.9	54	56	20	77x130	FX2575V272□E130
	3 000	32.8	15.6	49	51	20	77x155	FX2575V302□E155
	3 300	34.4	16.4	44	45	20	90x131	FX2575V332□F131
600 600V (650)	4 700	44.1	21.0	31	32	20	90x157	FX2575V472□F157
	1 000	10.1	4.8	129	133	22	64x96	FX2600V102□D096
	1 200	11.8	5.6	122	125	22	64x115	FX2600V122□D115
	1 500	13.2	6.3	111	114	24	77x96	FX2600V152□E096
	1 800	15.5	7.3	99	102	24	77x115	FX2600V182□E115
	2 200	17.9	8.5	85	87	24	77x130	FX2600V222□E130
	2 700	21.2	10.1	66	68	24	77x155	FX2600V272□E155
	3 300	23.7	11.3	44	45	24	90x131	FX2600V332□F131
3 900	27.5	13.1	22	22	24	90x157	FX2600V392□F157	

¹⁾ For Bolt - Mounting dimensions are 101x242mm.

► **Life Time Table / Brauchbarkeitsdauer – Tabelle**

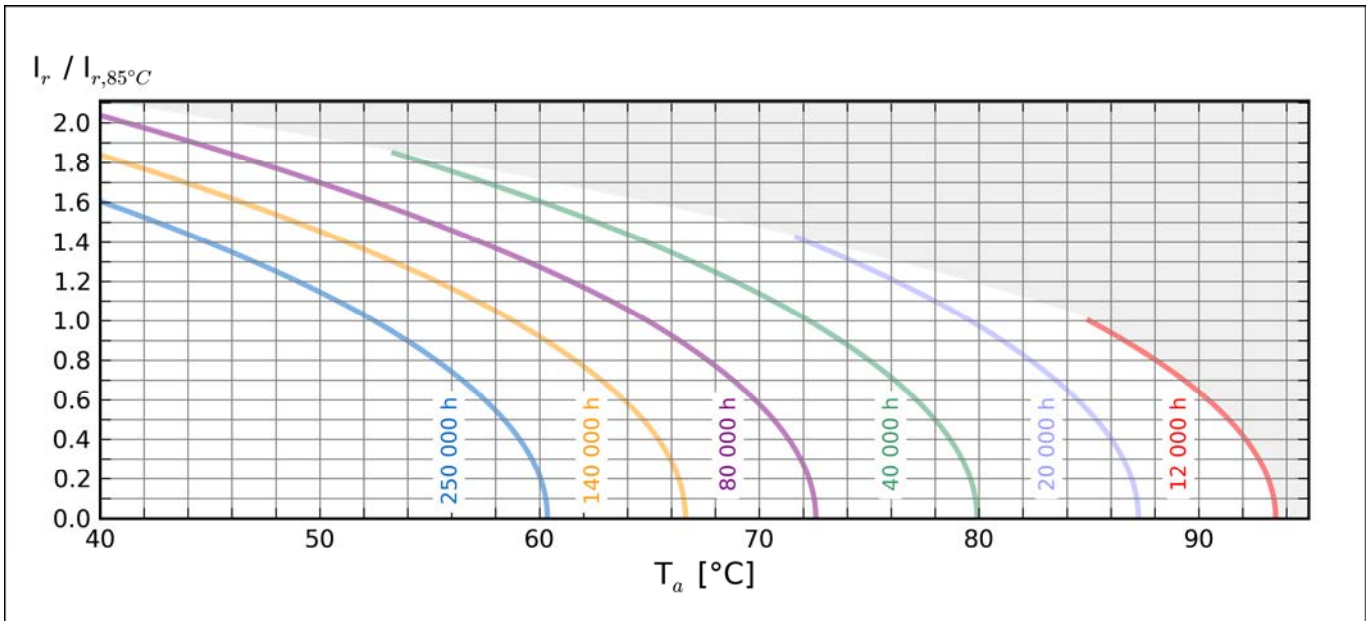
FX2 I _r at 85°C	Useful life as function of ambient temperature and ripple current											
	x 1.0	x 1.1	x 1.2	x 1.3	x 1.4	x 1.5	x 1.6	x 1.7	x 1.8	x 1.9	x 2.0	x 2.1
T _a = 40°C	250	250	250	250	250	250	250	199	154	118	89	66
T _a = 45°C	250	250	250	250	247	200	160	126	97	74	56	
T _a = 50°C	250	250	227	190	156	126	101	79	61	47		
T _a = 55°C	198	170	144	120	98	80	64	50	39			
T _a = 60°C	125	107	91	76	62	50	40	31				
T _a = 65°C	79	68	57	48	39	32						
T _a = 70°C	50	43	36	30	25							
T _a = 75°C	31	27	23	19								
T _a = 80°C	20	17										
T _a = 85°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°C,120Hz}

Brauchbarkeitsdauer in Abhängigkeit von Umgebungstemperatur T_a und Wechselstrombelastung I_r im Verhältnis zur max. Wechselstrombelastung bei oberer Kategoriertemperatur I_{r,85°C,120Hz}



► **Life Time Tests and Requirements / Anforderungen Brauchbarkeitsdauer**

Life time test	Test procedure	Life time criteria
Endurance test	T _a = 85°C; V _r , I _r applied 8000 hours	ΔC/C ≤ 15% (of initial value) Tanδ ≤ 175% (of specified value) I _L ≤ specified value
Useful life	T _a = 85°C; V _r , I _r applied 12000 hours	ΔC/C ≤ 20% (of initial value) Tanδ < 200% (of specified value) I _L ≤ specified value

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