

► Specifications / Spezifikationen

Items	Characteristics
Temperature range	-40°C ~ + 85°C
Rated voltage V_r	350 VDC - 575 VDC
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.
Capacitance tolerance	+/- 20%
Useful life	12000 h at 85°C
Field failure rate	0.5 FIT = $0.5 \cdot 10^{-9}$ Failures/hour
Failure rate	Less than 0.1% within the useful life



► Outline Drawing / Bauformen

Shape: B (ØD = 51-101)
(for Bolt – Mounting, M12x16)

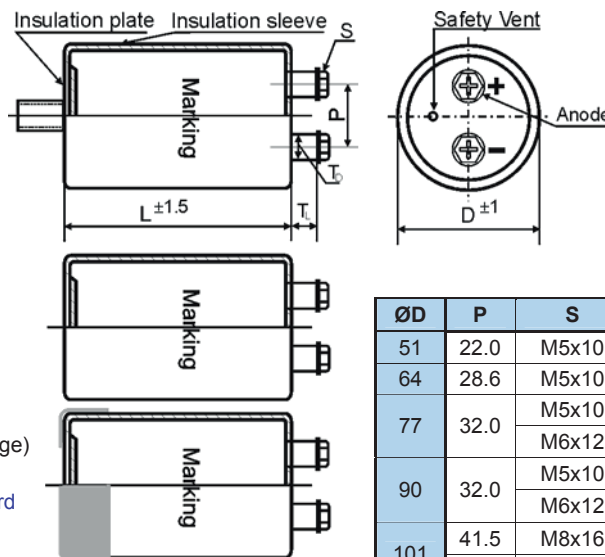
Form: B (ØD = 51-101)
(für Bolzenbefestigung, M12x16)

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	Phenol
	32.0	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: 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	Case code diameter ØD Code 51 C 64 D 77 E 90 F 101 G	Case Code length Length in mm (3 digits)	
Rated voltage code Code Voltage Code Voltage 2V 350 2H 500 2G 400 2L 550 2W 450 575V 575						

refer to pages 89 – 96

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μF]	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [mΩ]	Zmax at 20°C/10kHz [mΩ]	ESL (typ) [nH]	DxL [mm]	Product Code
350 2V (400)	2 700	23.5	11.2	25	25	20	51x115	FX22V272 C115
	3 300	27.3	13.0	22	22	20	51x130	FX22V332 C130
	3 900	29.0	13.8	19	21	20	64x96	FX22V392 D096
	4 700	33.8	16.1	16	20	20	64x115	FX22V472 D115
	5 600	38.8	18.5	14	18	20	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	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	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	20	51x75	FX22G112 C075
	1 800	16.2	7.7	34	37	20	51x96	FX22G182 C096
		18.1	8.6	34	37	20	51x100	FX22G182 C100
	2 200	20.4	9.7	46	48	17	51x105	FX22G222 C105
		21.2	10.1	28	28	20	51x115	FX22G222 C115
	2 700	24.2	11.5	38	40	17	51x115	FX22G272 SC115
		24.6	11.7	24	25	20	51x130	FX22G272 C130
	3 300	26.5	12.6	21	22	20	64x96	FX22G332 D096
	3 900	30.9	14.7	18	20	20	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	20	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	20	51x75	FX22W112 C075
	1 500	16.2	7.7	67	70	17	51x105	FX22W152 C105
		16.6	7.9	62	60	20	51x96	FX22W152 C096
	1 800	18.3	8.7	51	56	20	51x115	FX22W182 C115
	2 000	22.2	10.6	50	52	17	51x115	FX22W202 C115
	2 200	21.2	10.1	42	45	20	51x130	FX22W222 C130
	2 700	22.9	10.9	38	40	20	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	20	64x115	FX22W332 D115
	3 900	30.9	14.7	27	32	20	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
	6 600	46.4	22.1	18	19	20	77x143	FX22W662 E143

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μF]	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [mΩ]	Zmax at 20°C/10kHz [mΩ]	ESL (typ) [nH]	DxL [mm]	Product Code
450 2W (500)	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
		58.4	27.8	14	17	20	77x220	FX22W822 E220
	8 800	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	FX22W183 G237
500 2H (550)	22 000	116.4	55.4	6	9	29	101x283	FX22W223 G283
	23 000	113.0	53.8	5	9	29	101x250	FX22W233 G250
	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	20	51x115	FX22H122 C115
		15.1	7.2	93	100	20	64x96	FX22H122 D096
	1 500	17.2	8.2	74	80	20	64x96	FX22H152 D096
		17.6	8.4	74	80	20	51x130	FX22H152 C130
	1 800	19.8	9.4	53	50	20	77x96	FX22H182 E096
		20.0	9.5	53	50	20	64x115	FX22H182 D115
	2 200	21.7	10.4	40	35	20	77x96	FX22H222 E096
		23.1	11.0	40	35	20	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	FX22H123 G237
550 2L (600)	680	10.7	5.1	165	177	17	51x105	FX22L681 C105
	1 000	14.3	6.8	112	120	20	51x130	FX22L102 C130
	1 200	16.4	7.8	93	100	20	64x115	FX22L122 D115
	1 500	19.3	9.2	74	80	20	64x130	FX22L152 D130
	1 800	21.0	10.0	74	50	20	77x115	FX22L182 E115
	2 200	24.4	11.6	53	50	20	77x130	FX22L222 E130
		27.0	12.9	40	35	20	77x130	FX22L272 E130
	2 700	29.0	13.8	40	35	20	77x155	FX22L272 E155
		32.1	15.3	38	32	20	77x155	FX22L332 E155
	3 300	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

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550 2L (600)	6 000	51.4	24.5	19	17	20	77x235	FX22L602 E235
	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	FX22L822 G237
575 575V (625)	1 200	16.2	7.7	121	125	20	64x96	FX2575V122 D096
	1 300	19.3	9.2	112	115	20	64x103	FX2575V132 D103
	1 500	19.5	9.3	97	100	20	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
	4 700	44.1	21.0	31	32	20	90x157	FX2575V472 F157

► Life Time Table / Brauchbarkeitsdauer – Tabelle

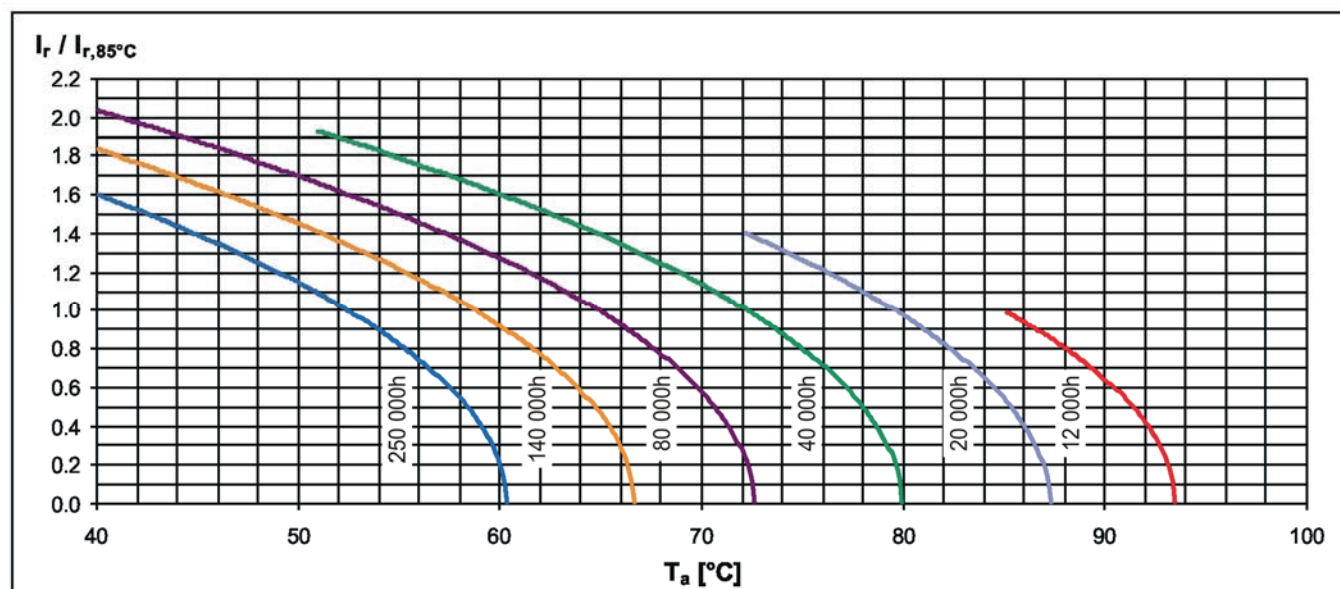
FX2	Useful life as function of ambient temperature and ripple current											
I_r at 85°C	x 1.0	x 1.1	x 1.2	x 1.3	x 1.4	x 1.5	x 1.6	x 1.7	x 1.8	x 1.9	x 2.0	x 2.1
$T_a = 40^\circ\text{C}$	250	250	250	250	250	250	250	199	155	118	89	66
$T_a = 45^\circ\text{C}$	250	250	250	250	247	200	160	126	98	75	56	
$T_a = 50^\circ\text{C}$	250	250	228	190	156	127	101	80	62	47		
$T_a = 55^\circ\text{C}$	198	170	144	120	99	80	64	50	39			
$T_a = 60^\circ\text{C}$	125	108	91	76	63	51	41	32				
$T_a = 65^\circ\text{C}$	79	68	58	48	40	32						
$T_a = 70^\circ\text{C}$	49	43	36	30	25							
$T_a = 75^\circ\text{C}$	31	27	23	19								
$T_a = 80^\circ\text{C}$	19	17										
$T_a = 85^\circ\text{C}$	12											

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_u und Wechselstrombelastung I_r im Verhältnis zur max. Wechselstrombelastung bei oberer Kategorietemperatur $I_{r,85^\circ\text{C},120\text{Hz}}$



► Life Time Tests and Requirements / Anforderungen Brauchbarkeitsdauer

Life time test	Reference	Test procedure	Life time criteria
Endurance test	JIS-C-5101-4 JIS-C-5102 IEC 60384-4	$T_a = 85^\circ\text{C}$; V_r , I_r applied 8000 hours	$\Delta C/C < 15\%$ $\tan\delta < 175\%$ (of initial value) $I_L = \text{spec. value}$
Useful life	JIS-C-5104-4 IEC 60384-4	$T_a = 85^\circ\text{C}$; V_r , I_r applied 12000 hours	$\Delta C/C < 20\%$ $\tan\delta < 200\%$ (of initial value) $I_L = \text{spec. value}$