

► 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)	$0.01 \cdot C \cdot V_r$ [μ A] or 3 mA, which is smaller.
Useful life	10000 h at 85°C
Field failure rate	0.5 FIT = $0.5 \cdot 10^{-9}$ 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 = 51-90)
(for Bolt – Mounting, M12x16, stud bolt is not isolated)

Form: B (ØD = 51-90)
(für Bolzenbefestigung, M12x16, Bolzen nicht isoliert)

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

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

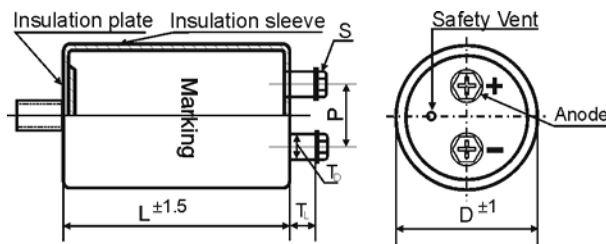
Shape: I (ØD = 36)

Shape: Y (ØD = 51-90)
(double sleeve, bracket free of charge)

Form: I (ØD = 36)

Form: Y (ØD = 51-90)

(doppelte Isolierung, Schelle wird kostenlos mitgeliefert)



ØD	P	S	T _L	T _D	Cap material
36	12.7	M5x10	7.0	8	PPS
51	22.0	M5x10	4.5	10	PPS
64	28.6	M5x10	4.5	10	PPS
77	32.0	M5x10	4.5	10	PPS
		M6x12	5.0	16	PPS
90	32.0	M5x10	4.0	10	PPS
		M6x12	4.0	16	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: 2700µF 400V D=64mm L=96mm with Y-Bracket

HCGF5X **2G** **272** **Y** **D** **096** **()**

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
N : No double sleeve (PBT-Safety-holder or press ring)
Y : 3 Stoppers Bracket ØD = 51 - 90
I : 2 Stoppers Bracket ØD = 36
refer to pages 113 – 119

Case code diameter

ØD	Code
36	A
51	C
64	D
77	E
90	F

Customers' specification

Rated Voltage Code

Code	Voltage
2V	350
2G	400
2W	450

Case Code length
Length in mm (3 digits)

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)	390	5.9	2.8	215	219	15	36x53	HCGF5X2V391□A053
	470	7.6	3.6	179	182	15	36x83	HCGF5X2V471□A083
	560	8.2	3.9	162	165	15	36x83	HCGF5X2V561□A083
	680	9.0	4.3	144	147	15	36x83	HCGF5X2V681□A083
	820	10.7	5.1	119	122	15	36x100	HCGF5X2V821□A100
	1 200	13.2	6.3	76	79	17	51x75	HCGF5X2V122□C075
	1 500	14.7	7.0	60	63	17	51x75	HCGF5X2V152□C075
	1 800	17.9	8.5	44	44	17	51x96	HCGF5X2V182□C096
	2 200	19.7	9.4	28	28	17	51x96	HCGF5X2V222□C096
	2 700	24.6	11.7	27	27	17	51x130	HCGF5X2V272□C130
		26.3	12.5	25	27	20	77x105	HCGF5X2V272□E105
	3 300	26.7	12.7	21	22	18	64x96	HCGF5X2V332□D096
		27.3	13.0	21	22	17	51x130	HCGF5X2V332□C130
	3 900	30.9	14.7	18	20	18	64x115	HCGF5X2V392□D115
	4 700	35.7	17.0	16	20	18	64x130	HCGF5X2V472□D130
	5 600	39.3	18.7	14	20	20	77x115	HCGF5X2V562□E115
	6 800	45.4	21.6	14	18	20	77x130	HCGF5X2V682□E130
		47.0	22.4	14	18	20	77x143	HCGF5X2V682□E143
8 200	53.3	25.4	12	15	20	77x155	HCGF5X2V822□E155	
10 000	62.6	29.8	10	15	20	90x157	HCGF5X2V103□F157	
12 000	68.7	32.7	8	13	20	90x157	HCGF5X2V123□F157	
15 000	83.6	39.8	6	10	20	90x196	HCGF5X2V153□F196	
18 000	99.3	47.3	5	10	20	90x236	HCGF5X2V183□F236	
400 2G (450)	330	5.3	2.5	275	279	15	36x53	HCGF5X2G331□A053
	390	6.7	3.2	251	255	15	36x83	HCGF5X2G391□A083
	470	7.6	3.6	208	211	15	36x83	HCGF5X2G471□A083
	560	8.2	3.9	174	177	15	36x83	HCGF5X2G561□A083
	680	9.7	4.6	143	145	15	36x100	HCGF5X2G681□A100
	820	10.7	5.1	119	121	15	36x100	HCGF5X2G821□A100
	1 000	12.2	5.8	102	105	17	51x75	HCGF5X2G102□C075
	1 200	13.2	6.3	69	63	17	51x75	HCGF5X2G122□C075
	1 500	16.2	7.7	50	55	17	51x96	HCGF5X2G152□C096
	1 800	17.9	8.5	40	40	17	51x96	HCGF5X2G182□C096
	2 200	21.4	10.2	30	30	18	64x96	HCGF5X2G222□D096
		22.3	10.6	28	28	17	51x130	HCGF5X2G222□C130
	2 700	23.9	11.4	24	25	18	64x96	HCGF5X2G272□D096
	3 300	28.6	13.6	21	22	18	64x115	HCGF5X2G332□D115
		29.0	13.8	21	22	20	77x105	HCGF5X2G332□E105
		32.6	15.5	20	20	20	77x143	HCGF5X2G332□E143
	3 900	32.6	15.5	18	20	18	64x130	HCGF5X2G392□D130
	4 700	35.9	17.1	14	18	20	77x115	HCGF5X2G472□E115
		39.1	18.6	14	18	20	77x143	HCGF5X2G472□E143
	5 600	41.2	19.6	14	18	20	77x130	HCGF5X2G562□E130
	6 800	47.0	22.4	14	18	20	77x145	HCGF5X2G682□E145
		48.7	23.2	14	18	20	77x155	HCGF5X2G682□E155
	8 200	56.7	27.0	12	15	20	90x157	HCGF5X2G822□F157
10 000	62.6	29.8	10	15	20	90x157	HCGF5X2G103□F157	
12 000	75.0	35.7	8	13	20	90x196	HCGF5X2G123□F196	
15 000	90.5	43.1	6	10	20	90x236	HCGF5X2G153□F236	
450 2W (500)	270	4.8	2.3	362	367	15	36x53	HCGF5X2W271□A053
	330	6.3	3.0	296	301	15	36x83	HCGF5X2W331□A083
	390	6.7	3.2	251	256	15	36x83	HCGF5X2W391□A083
	470	7.6	3.6	208	213	15	36x83	HCGF5X2W471□A083
	560	8.6	4.1	174	178	15	36x100	HCGF5X2W561□A100
	680	9.7	4.6	143	147	15	36x100	HCGF5X2W681□A100
	820	10.9	5.2	118	122	17	51x75	HCGF5X2W821□C075
	1 000	12.2	5.8	95	100	17	51x75	HCGF5X2W102□C075
1 200	14.5	6.9	70	80	17	51x96	HCGF5X2W122□C096	

HCGF5X Series

Screw-Terminal

10 000 h / 85°C

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
450 2W (500)	1 500	17.4	8.3	55	60	17	51x115	HCGF5X2W152□C115
	1 800	20.0	9.5	46	47	17	51x130	HCGF5X2W182□C130
	2 200	21.8	10.4	42	45	18	64x96	HCGF5X2W222□D096
		23.7	11.3	42	45	20	77x103	HCGF5X2W222□E103
	2 700	25.8	12.3	38	40	18	64x115	HCGF5X2W272□D115
	3 300	30.2	14.4	30	35	20	77x115	HCGF5X2W332□E115
		30.0	14.3	30	35	18	64x130	HCGF5X2W332□D130
		32.8	15.6	30	35	20	77x143	HCGF5X2W332□E143
	3 900	32.8	15.6	24	27	20	77x115	HCGF5X2W392□E115
	4 700	37.6	17.9	22	23	20	77x130	HCGF5X2W472□E130
	5 600	44.1	21.0	20	20	20	77x155	HCGF5X2W562□E155
	6 800	50.0	23.8	18	18	20	90x145	HCGF5X2W682□F145
		51.7	24.6	18	18	20	90x157	HCGF5X2W682□F157
	8 200	56.7	27.0	15	17	20	90x157	HCGF5X2W822□F157
	10 000	60.7	28.9	12	15	20	90x145	HCGF5X2W103□F145
68.3		32.5	12	15	20	90x196	HCGF5X2W103□F196	
12 000	81.1	38.6	9	12	20	90x236	HCGF5X2W123□F236	

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

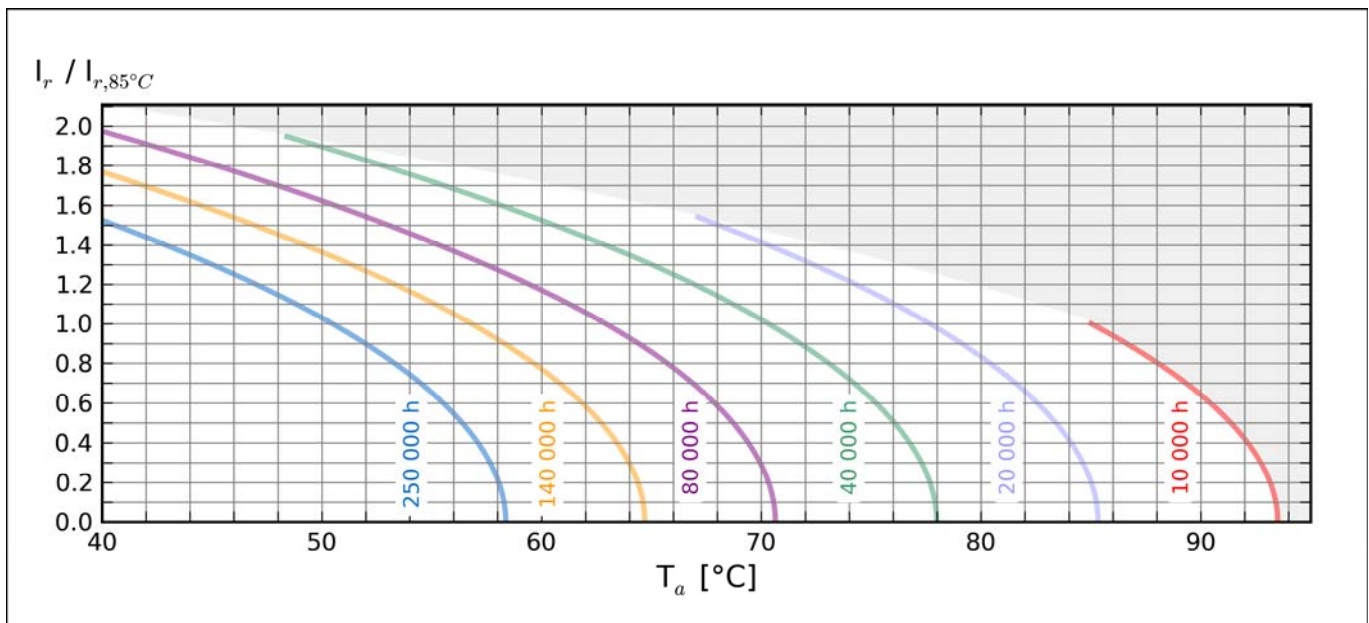
HCGF5X I _r at 85°C	Useful life as function of ambient temperature and ripple current											
	x 1.0	x 1.1	x 1.2	x 1.3	x 1.4	x 1.5	x 1.6	x 1.7	x 1.8	x 1.9	x 2.0	x 2.1
T _a = 40°C	250	250	250	250	250	250	210	166	128	98	74	55
T _a = 45°C	250	250	250	250	205	166	133	105	81	62	47	
T _a = 50°C	250	224	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											

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 6000 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 10000 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