

HCGF6 · Screw-Terminal · 6000 h/85 °C

Standard Performances · Compact

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

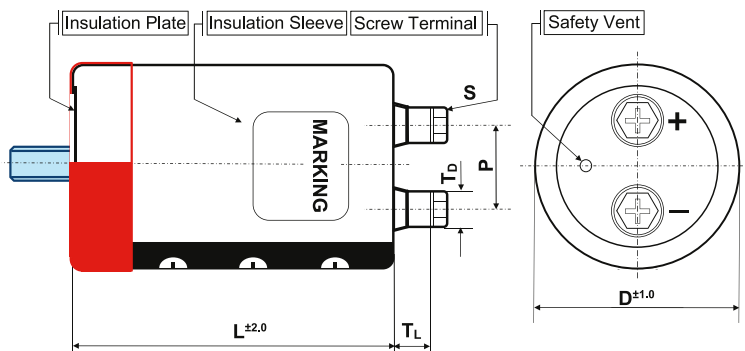
Items	Characteristics
Temperature range	-25°C ~ + 85°C
Capacitance tolerance (at 20°C)	Standard +/- 20%, -10/+30% on request
Surge voltage	Repetitive max. 30 sec per 6 Minutes
Leakage current max. I_L (20°C, 5 min)	$0.01 \cdot C \cdot V_L$ [μA] or 3 mA, which is smaller.
Useful life	6000 hours at 85°C
Field failure rate	0.5 FIT = $0.5 \cdot 10^{-9}$ 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	TL	TD	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 M6x12	5.0 4.5	10 17.2	PH PH
F	90	B, N, I, Y	31.5	M5x10 M6x12	5.0 5.0	10 17.2	PH PH
G	101	B, N, Y	31.5	M6x12	3.0	14	PH

Size in mm. First listed terminal is standard.

> Product Code · Bestellbezeichnung

Example: Series HCGF6 · 500 V · 12000 µF +/- 20 % · D=90 mm · L=236 mm with Y-Bracket

HCGF6		2H		123		Y		F		236		PH	
Series name		Capacitance code		Shape code				Diameter code		Capacitance tolerance		Specific features (e.g. M6 ...)	
										Ø : ± 20 % Q : -10 % ~ + 30 %			
Rated voltage code													
Code		Voltage		Code		Voltage							
2V		350		2W		450							
2G		400		2H		500							
										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
350 VDC Code: 2V Surge Voltage 400 VDC	2 700	7.7	20.8	48	50	17	0.20	51x115	HCGF62V272#C115PH
	3 300	9.0	24.3	39	40	17	0.20	51x130	HCGF62V332#C130PH
	3 900	9.5	25.6	33	35	18	0.20	64x96	HCGF62V392#D096PH
	4 700	11.3	30.5	27	30	18	0.20	64x115	HCGF62V472#D115PH
	5 600	12.8	34.6	25	28	18	0.20	64x130	HCGF62V562#D130PH
	6 800	14.3	38.6	21	24	20	0.20	77x115	HCGF62V682#E115PH
	8 200	16.3	44.1	17	21	20	0.20	77x130	HCGF62V822#E130PH
	10 000	19.4	52.4	14	17	20	0.20	77x155	HCGF62V103#E155PH
	12 000	22.1	59.6	12	15	20	0.20	77x171	HCGF62V123#E171PH
		21.3	57.5	12	15	20	0.20	90x131	HCGF62V123#F131PH
	15 000	25.5	68.8	10	13	20	0.20	90x157	HCGF62V153#F157PH
	18 000	30.4	82.0	9	15	20	0.20	90x196	HCGF62V183#F196PH
	20 000	32.0	86.4	8	11	20	0.20	90x196	HCGF62V203#F196PH
	22 000	36.3	98.0	8	10	20	0.20	90x221	HCGF62V223#F221PH
		32.9	88.8	8	11	29	0.20	101x175*	HCGF62V223#G175PH
	27 000	40.9	110.4**	7	8	29	0.20	101x237*	HCGF62V273#G237PH
400 VDC Code: 2G Surge Voltage 450 VDC	2 200	6.6	17.8	58	60	17	0.20	51x100	HCGF62G222#C100PH
	2 700	7.9	21.4	48	50	18	0.20	64x96	HCGF62G272#D096PH
		7.9	24.4	48	50	17	0.20	51x115	HCGF62G272#C115PH
	3 300	8.7	23.6	39	40	18	0.20	64x96	HCGF62G332#D096PH
	3 900	10.2	27.5	33	35	18	0.20	64x115	HCGF62G392#D115PH
	4 700	11.7	31.7	27	30	18	0.20	64x130	HCGF62G472#D130PH
	5 600	13.0	35.1	25	28	20	0.20	77x115	HCGF62G562#E115PH
	6 800	15.0	40.4	21	24	20	0.20	77x130	HCGF62G682#E130PH
	8 200	17.3	16.6	18	20	20	0.20	77x145	HCGF62G822#E145PH
	10 000	20.4	55.1	17	20	20	0.20	77x171	HCGF62G103#E171PH
		19.4	52.5	14	17	20	0.20	90x131	HCGF62G103#F131PH
	12 000	22.9	61.8	12	15	20	0.20	90x157	HCGF62G123#F157PH
	15 000	27.9	75.3	10	13	20	0.20	90x196	HCGF62G153#F196PH
	18 000	32.2	86.9	9	12	20	0.20	90x221	HCGF62G183#F221PH
		29.7	80.1	9	12	29	0.20	101x175*	HCGF62G183#G175PH
	20 000	34.9	94.2	9	12	20	0.20	90x236	HCGF62G203#F236PH
	22 000	36.9	99.6	8	11	29	0.20	101x237*	HCGF62G223#G237PH
	24 000	41.2	111.2**	8	10	20	0.20	90x283	HCGF62G243#F283PH
	25 000	41.3	111.5**	8	10	20	0.20	101x250*	HCGF62G253#G250PH
	27 000	44.1	119.0**	7	10	29	0.20	101x283*	HCGF62G273#G283PH

Additional designs on request · Weitere Designs auf Anfrage

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
450 VDC Code: 2W Surge Voltage 500 VDC	1 800	6.3	17.0	77	80	17	0.20	51x115	HCGF62W182#C115PH
	2 200	7.4	19.9	63	65	17	0.20	51x130	HCGF62W222#C130PH
		7.2	19.5	63	65	18	0.20	64x96	HCGF62W222#D096PH
	2 700	7.9	21.3	52	54	18	0.20	64x96	HCGF62W272#D096PH
	3 300	9.4	25.4	42	44	18	0.20	64x115	HCGF62W332#D115PH
		9.3	25.2	42	44	20	0.20	77x96	HCGF62W332#E096PH
	3 900	10.7	28.9	38	40	18	0.20	64x130	HCGF62W392#D130PH
	4 700	11.2	30.2	34	36	20	0.20	77x96	HCGF62W472#E096PH
		11.8	32.0	34	36	20	0.20	77x115	HCGF62W472#E115PH
	5 600	13.1	35.4	32	34	20	0.20	90x96	HCGF62W562#F096PH
		13.6	36.6	31	33	20	0.20	77x130	HCGF62W562#E130PH
	6 800	16.1	43.5	25	27	20	0.20	77x155	HCGF62W682#E155PH
	8 200	19.4	52.5	21	23	20	0.20	77x195	HCGF62W822#E195PH
		17.6	47.5	21	23	20	0.20	90x131	HCGF62W822#F131PH
	10 000	23.2	62.6	17	19	20	0.20	77x220	HCGF62W103#E220PH
		21.5	58.0	17	19	20	0.20	90x171	HCGF62W103#F171PH
	12 000	25.0	67.4	16	18	20	0.20	90x196	HCGF62W123#F196PH
		24.3	65.5	16	18	29	0.20	101x175*	HCGF62W123#G175PH
	14 000	27.9	75.3	17	20	20	0.20	90x196	HCGF62W143#F196PH
	15 000	28.5	77.0	15	17	20	0.20	90x196	HCGF62W153#F196PH
		30.1	81.4	15	17	20	0.20	90x236	HCGF62W153#F236PH
	16 000	30.3	81.8	16	18	20	0.20	90x221	HCGF62W163#F221PH
	18 000	33.4	90.2	14	16	29	0.20	90x236	HCGF62W183#F236PH
	20 000	34.4	92.9	13	15	29	0.20	101x222*	HCGF62W203#G222PH
	22 000	38.8	104.8**	12	14	29	0.20	101x250*	HCGF62W223#G250PH
500 VDC Code: 2H Surge Voltage 550 VDC	1 200	5.2	14.0	112	120	17	0.20	51x115	HCGF62H122#C115PH
		5.3	14.3	112	120	18	0.20	64x96	HCGF62H122#D096PH
	1 500	6.0	16.2	90	96	17	0.20	51x119	HCGF62H152#C119PH
		5.9	15.8	90	96	18	0.20	64x96	HCGF62H152#D096PH
	1 800	6.9	18.6	75	80	18	0.20	64x115	HCGF62H182#D115PH
	2 200	7.1	19.2	61	65	18	0.20	64x96	HCGF62H222#D096PH
	2 700	9.1	24.6	50	53	20	0.20	77x115	HCGF62H272#E115PH
	3 300	10.5	28.4	45	48	20	0.20	77x130	HCGF62H332#E130PH
	3 900	12.2	32.9	38	41	20	0.20	77x155	HCGF62H392#E155PH
	4 700	13.9	37.6	34	37	20	0.20	77x171	HCGF62H472#E171PH
		13.3	36.0	34	37	20	0.20	90x131	HCGF62H472#F131PH
	5 600	16.0	43.1	28	31	20	0.20	77x195	HCGF62H562#E195PH
		15.5	41.9	28	31	20	0.20	90x157	HCGF62H562#F157PH
	6 800	17.7	47.8	23	25	20	0.20	90x171	HCGF62H682#F171PH
	8 200	20.6	55.6	21	23	20	0.20	90x196	HCGF62H822#F196PH
		20.0	54.0	21	23	29	0.20	101x175*	HCGF62H822#G175PH
	10 000	24.0	64.8	17	19	20	0.20	90x221	HCGF62H103#F221PH
		23.0	62.1	17	19	29	0.20	101x195*	HCGF62H103#G195PH
	12 000	27.0	72.9	16	18	20	0.20	90x236	HCGF62H123#F236PH
	15 000	30.5	82.4	14	16	29	0.20	101x237*	HCGF62H153#G237PH

* For Bolt mounting, length dimensions increase by +3 mm

** 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	2.7	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0

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

> Life Time Table · Brauchbarkeitsdauer – Tabelle

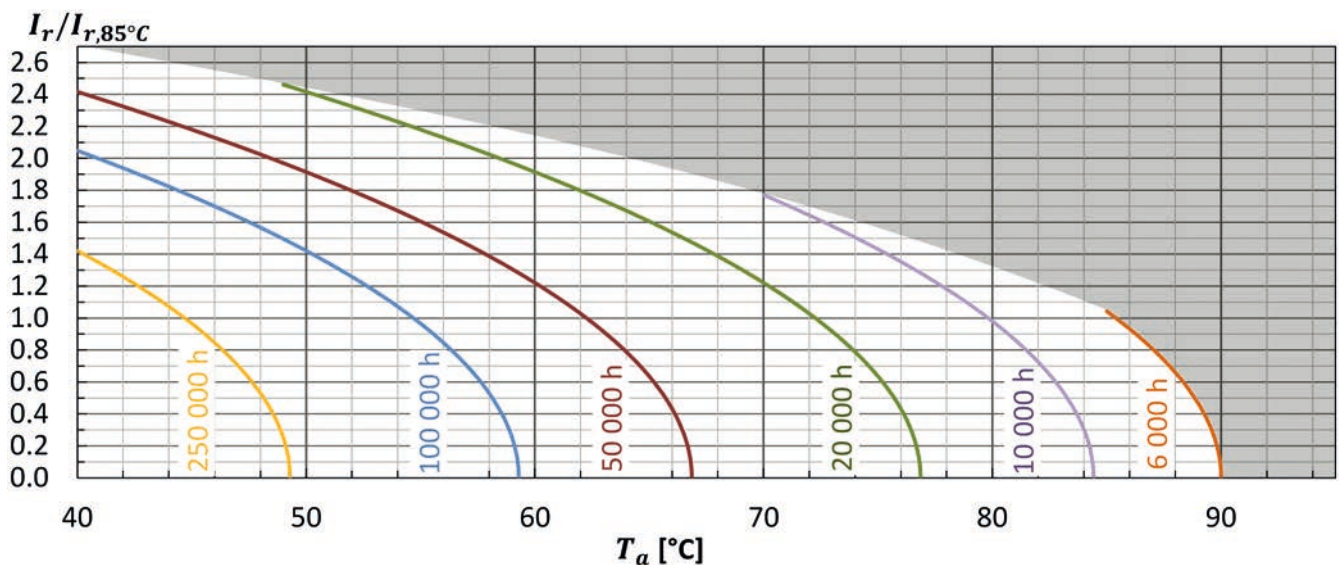
HCGF6	Useful life as function of ambient temperature and ripple current												
I_r at 85°C	x 1.0	x 1.2	x 1.4	x 1.6	x 1.8	x 2.0	x 2.1	x 2.2	x 2.3	x 2.4	x 2.5	x 2.6	x 2.7
$T_a = 40^\circ\text{C}$	250	250	250	199	149	108	91	76	63	51	42	33	27
$T_a = 45^\circ\text{C}$	243	201	162	125	94	68	57	48	39	32	26	21	
$T_a = 50^\circ\text{C}$	153	127	102	79	59	43	36	30	25	20			
$T_a = 55^\circ\text{C}$	97	80	64	50	37	27	23	19					
$T_a = 60^\circ\text{C}$	61	51	41	31	23	17							
$T_a = 65^\circ\text{C}$	38	32	25	20	15								
$T_a = 70^\circ\text{C}$	24	20	16	12									
$T_a = 75^\circ\text{C}$	15	12	10										
$T_a = 80^\circ\text{C}$	9	8											
$T_a = 85^\circ\text{C}$	6												

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 4000 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 6000 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