

# HCGF6 · Screw-Terminal · 6000 h/85 °C

## Standard Performances

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

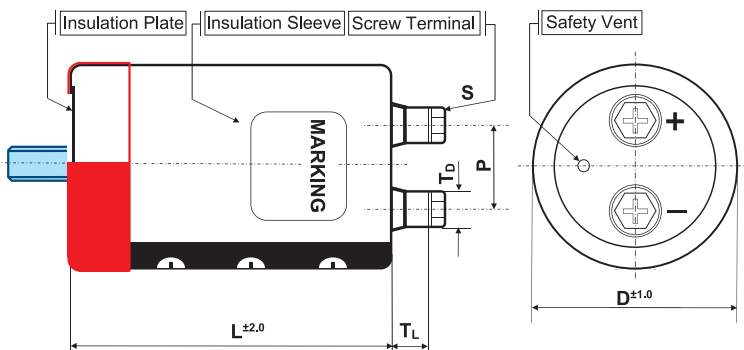
Items	Characteristics
Temperature range	-25°C ~ +85°C
Capacitance tolerance (at 20°C)	Standard +/- 20%, -10/+30% on request
Surge voltage	Repetitive max. 30 sec per 6 Minutes
Leakage current max. $I_L$ (20°C, 5 min)	0.01 • C • V <sub>r</sub> [µA] or 3 mA, which is smaller.
Useful life	6 000 hours at 85°C
Field failure rate	0.5 FIT = 0.5 • 10 <sup>-9</sup> Failures/hour
RoHS conform	Directive 2011/65/EU & (EU)2015/863
Specification / Vibration	JIS C 5101-4/0.75mm, 10...55Hz, 10g, 3x2h
Outer materials	UL94-V0/UL224-VW1 certified (cap/sleeve)
Sleeve withstanding voltage	4000 Vac/1min between terminals bundled and plate*

\* Typical value



## > Shape designation · Formbezeichnung

- for details refer to p. 8–9 · technische Details siehe S. 8–9
- for mounting options refer to p. 149ff · Montageoptionen siehe S. 149ff



	B	I/Y	N
outer sleeve	•	•	•
insulation plate	•	•	•
stud bolt	•		
bottom double sleeve		•	

ØD	available shape	P	S	T <sub>L</sub>	T <sub>D</sub>	Cap material
51	B, N, I, Y	22.0	M5x10	5.5	10	PH
64	B, N, I, Y	28.6	M5x10	5.5	10	PH
77	B, N, I, Y	31.5	M5x10	5.0	10	PH
			M6x12	4.5	17.2	PH
90	B, N, I, Y	31.5	M5x10	5.0	10	PH
			M6x12	5.0	17.2	PH
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																							
<b>Type of series</b>		<b>Capacitance code</b>		<b>Rated voltage code</b>		<b>Fixing symbol code</b>		<b>Case code diameter</b>		<b>Specific features (e.g. M6 ...)</b>		<b>Case Code length</b>																							
		The first two digits are significant. The last digit indicates the number of following zeros in µF.		<table border="1"> <thead> <tr> <th>Code</th> <th>Voltage</th> <th>Code</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>2V</td> <td>350</td> <td>2W</td> <td>450</td> </tr> <tr> <td>2G</td> <td>400</td> <td>2H</td> <td>500</td> </tr> </tbody> </table>		Code	Voltage	Code	Voltage	2V	350	2W	450	2G	400	2H	500	B : Bolt N : single outer sleeve I : 2 Stoppers Bracket Y : 3 Stoppers Bracket		<table border="1"> <thead> <tr> <th>ØD</th> <th>Code</th> </tr> </thead> <tbody> <tr> <td>51</td> <td>C</td> </tr> <tr> <td>64</td> <td>D</td> </tr> <tr> <td>77</td> <td>E</td> </tr> <tr> <td>90</td> <td>F</td> </tr> <tr> <td>101</td> <td>G</td> </tr> </tbody> </table>		ØD	Code	51	C	64	D	77	E	90	F	101	G	Length in mm (3 digits)	
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# HCGF6 · Screw-Terminal · 6000 h/85 °C

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
<b>350 VDC</b> 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	
<b>400 VDC</b> 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	
<b>450 VDC</b> 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	

Additional designs on request · Weitere Designs auf Anfrage

Rated VoltageCode (Surge Voltage) $V_r$ [V DC]	Capacitance $C_r$ [ $\mu$ F]	Ripple Current at 85°C/120Hz $I_r$ [A RMS]	Ripple Current at 40°C/120Hz [A RMS]	ESR (typ) at 20°C/100Hz [m $\Omega$ ]	Zmax at 20°C/10kHz [m $\Omega$ ]	ESL (typ) [nH]	Dissipation Factor at 20°C/120Hz Tan $\delta$	DxL [mm]	Product Code  # = variable value, see fixing code in the product code
<b>450 VDC</b> Code: 2W  Surge Voltage 500 VDC	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
	10 000		17.6	47.5	21	23	20	0.20	90x131
		12 000	23.2	62.6	17	19	20	0.20	77x220
	14 000		21.5	58.0	17	19	20	0.20	90x171
		15 000	25.0	67.4	16	18	20	0.20	90x196
	16 000		24.3	65.5	16	18	29	0.20	101x175*
		18 000	27.9	75.3	17	20	20	0.20	90x196
	20 000		28.5	77.0	15	17	20	0.20	90x196
		22 000	30.1	81.4	15	17	20	0.20	90x236
			30.3	81.8	16	18	20	0.20	90x221
			33.4	90.2	14	16	29	0.20	90x236
	34.4		92.9	13	15	29	0.20	101x222*	HCGF62W203#G222PH
		38.8	104.8**	12	14	29	0.20	101x250*	HCGF62W223#G250PH
<b>500 VDC</b> Code: 2H  Surge Voltage 550 VDC		1 200	5.2	14.0	112	120	17	0.20	51x115
	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 9

Additional designs on request · Weitere Designs auf Anfrage

## > Ripple Current Multiplier · Wechselstrommultiplikator

Frequency [Hz]	50/60	120	300	1k	$\geq 10k$	Forced cooling [m/sec]	$v < 1.0$	$v \geq 1.0$
Multiplier	0.80	1.00	1.18	1.34	1.45	Multiplier	1.0	1.1

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

> Life Time Table · Brauchbarkeitsdauer – Tabelle

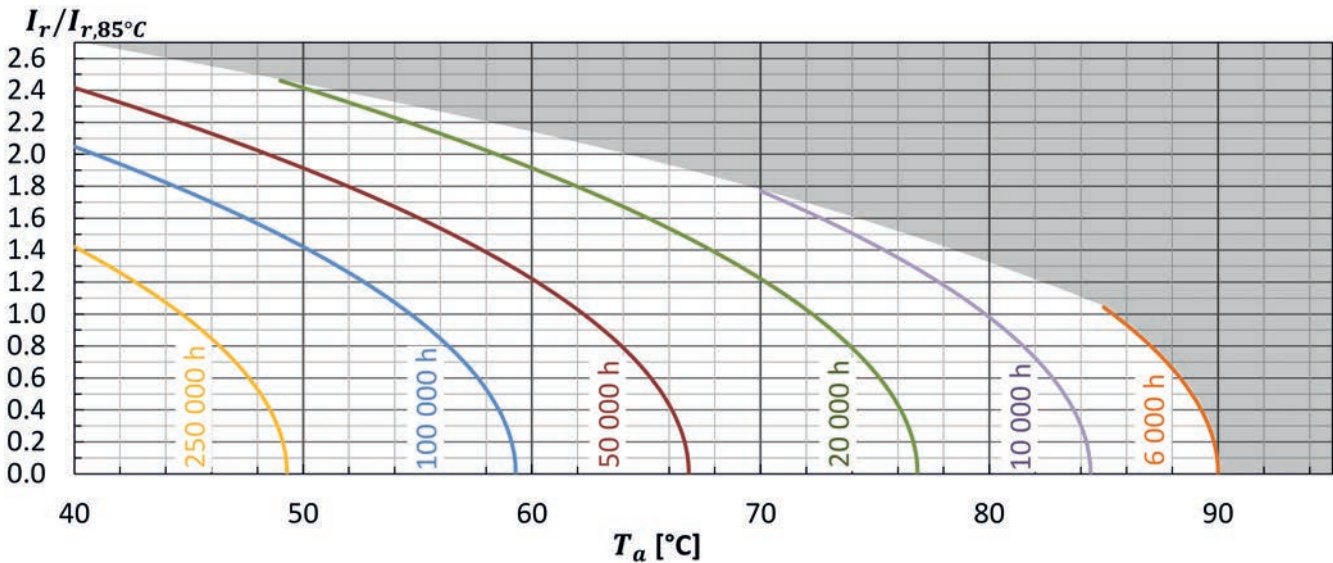
HCGF6 I <sub>r</sub> at 85°C	Useful life as function of ambient temperature and ripple current												
	x 1.0	x 1.2	x 1.4	x 1.6	x 1.8	x 2.0	x 2.1	x 2.2	x 2.3	x 2.4	x 2.5	x 2.6	x 2.7
T <sub>a</sub> = 40°C	250	250	250	199	149	108	91	76	63	51	42	33	27
T <sub>a</sub> = 45°C	243	201	162	125	94	68	57	48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

khrs      Max. value limited to 250 000 hours.

> Life Time Graph · Brauchbarkeitsdauer – Diagramm

Useful life depending on ambient temperature T<sub>a</sub> and ripple current operating conditions I<sub>r</sub> versus rated ripple current at the upper category temperature I<sub>r, 85°C, 120Hz</sub>

Brauchbarkeitsdauer in Abhängigkeit von Umgebungstemperatur T<sub>a</sub> und Wechselstrombelastung I<sub>r</sub> im Verhältnis zur max. Wechselstrombelastung bei oberer Kategorietemperatur I<sub>r, 85°C, 120Hz</sub>



> Life Time Tests and Requirements · Anforderungen Brauchbarkeitsdauer

Life time test	Test procedure	Life time criteria
Endurance test	T <sub>a</sub> = 85°C; V <sub>r</sub> , I <sub>r</sub> applied 4000 hours	ΔC/C ≤ 10% (of initial value) Tanδ ≤ 175% (of specified value) I <sub>L</sub> ≤ specified value
Useful life	T <sub>a</sub> = 85°C; V <sub>r</sub> , I <sub>r</sub> applied 6000 hours	ΔC/C ≤ 15% (of initial value) Tanδ < 200% (of specified value) I <sub>L</sub> ≤ specified value

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