HCGF5 · Screw-Terminal · 6000 h/85 °C

Standard Performances · Small Diameter Design

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.

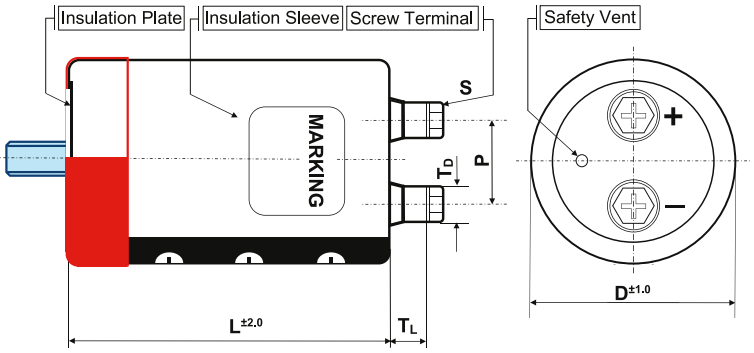
› Specifications · Spezifikationen

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_r [µA] or 3 mA, which is smaller.
Useful life	6000 hours at 85°C
Field failure rate	0.5 FIT = 0.5 • 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	T_L	T_D	Cap material
A	36	N, I	12.7	M5x10	6.5	8	PH
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	5.0	10	PH
				M6x12	4.5	17.2	PH
F	90	B, N, I, Y	31.5	M5x10	5.0	10	PH
				M6x12	5.0	17.2	PH
G	101	B, N, Y	31.5	M6x12	3.0	14	PH

Size in mm. First listed terminal is standard.

AIC EUROPE GmbH · Sales & Marketing in Europe of AIC Components · Telefon: +49 (0)2151-4943-5 · E-Mail: info@aic-europe.com · www.aic-europe.com

› Product Code · Bestellbezeichnung

Example: Series HCGF5 · 4700 µF +/- 20 % · 200 V · D = 51 mm · L = 96 mm with Y-Bracket

HCGF5 **2D** **472** **Y** **C** **096** **PH**

- **HCGF5** – Series name
- **2D** – Rated voltage code

Code	Voltage	Code	Voltage	Code	Voltage
2C	160	2D	200	2E	250

- **472** – Capacitance code
- **Y** – Shape code
- **C** – Diameter code
- **096** – Case length code – length in mm (3 digits)
- **PH** – Specific features (e.g. M6 …)
- Capacitance tolerance: Ø : ± 20 % / Q : -10 % ~ + 30 %

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
160 VDC Code: 2C Surge Voltage 200 VD	**3 300**	6.0	16.2	40	35	15	0.25	36x121	HCGF52C332#A121PH
	3 900	6.1	16.5	37	28	17	0.25	51x75	HCGF52C392#C075PH
	4 700	6.7	18.1	30	25	17	0.25	51x75	HCGF52C472#C075PH
	5 600	8.0	21.6	26	23	17	0.25	51x96	HCGF52C562#C096PH
	6 800	9.0	24.3	22	22	17	0.25	51x96	HCGF52C682#C096PH
	8 200	10.5	28.4	18	19	17	0.25	51x115	HCGF52C822#C115PH
	10 000	12.2	32.9	15	16	17	0.25	51x130	HCGF52C103#C130PH
		12.0	32.4	14	17	18	0.25	64x96	HCGF52C103#D096PH
	12 000	13.0	35.1	12	15	18	0.25	64x96	HCGF52C123#D096PH
	15 000	16.4	44.3	11	12	18	0.25	64x130	HCGF52C153#D130PH
	18 000	17.9	48.3	9	11	18	0.25	64x130	HCGF52C183#D130PH
	22 000	21.0	56.7	8	8	20	0.25	77x130	HCGF52C223#E130PH
	27 000	23.2	62.6	7	8	20	0.25	77x130	HCGF52C273#E130PH
	33 000	27.4	74.0	6	7	20	0.25	90x131	HCGF52C333#F131PH
	39 000	32.1	86.7	5	7	20	0.25	90x157	HCGF52C393#F157PH
	47 000	37.1	100.2**	5	7	20	0.25	77x195	HCGF52C473#E195PH
	50 000	39.2	105.8**	5	7	20	0.25	77x220	HCGF52C503#E220PH
	52 000	40.0	108.0**	5	6	20	0.25	77x220	HCGF52C523#E220PH
		40.3	108.8**	5	6	20	0.25	90x196	HCGF52C523#F196PH
	68 000	42.6	115.0**	4	6	20	0.25	90x203	HCGF52C683#F203PH
	100 000	55.7	150.4**	4	6	29	0.25	101x250*	HCGF52C104#G250PH
200 VDC Code: 2D Surge Voltage 250 VD	**2 200**	4.5	12.2	68	60	15	0.25	36x100	HCGF52D222#A100PH
	2 700	5.4	14.6	48	39	15	0.25	36x121	HCGF52D272#A121PH
	3 300	5.6	15.1	43	35	17	0.25	51x75	HCGF52D332#C075PH
	3 900	6.1	16.5	37	30	17	0.25	51x75	HCGF52D392#C075PH
	4 700	7.4	20.0	30	27	17	0.25	51x96	HCGF52D472#C096PH
	5 600	8.6	23.2	26	25	17	0.25	51x115	HCGF52D562#C115PH
	6 800	10.1	27.3	21	20	17	0.25	51x130	HCGF52D682#C130PH
	8 200	10.8	29.2	17	18	18	0.25	64x96	HCGF52D822#D096PH
	10 000	12.0	32.4	14	14	18	0.25	64x96	HCGF52D103#D096PH
	12 000	13.9	37.5	12	14	20	0.25	77x96	HCGF52D123#E096PH
	15 000	16.6	44.8	10	13	20	0.25	77x96	HCGF52D153#E096PH
	18 000	19.0	51.3	8	12	20	0.25	77x130	HCGF52D183#E130PH

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
200 VDC Code: 2D Surge Voltage 250 VD	**20 000**	21.0	56.7	8	8	20	0.25	77x145	HCGF52D203#E145PH
	22 000	22.5	60.8	7	7	20	0.25	77x155	HCGF52D223#E155PH
	27 000	28.9	78.0	6	7	20	0.25	77x220	HCGF52D273#E220PH
		24.8	67.0	6	7	20	0.25	90x131	HCGF52D273#F131PH
	33 000	29.3	79.1	5	7	20	0.25	90x157	HCGF52D333#F157PH
	39 000	34.7	93.7	5	7	20	0.25	77x220	HCGF52D393#E220PH
	40 000	32.3	87.2	5	7	20	0.25	90x157	HCGF52D403#F157PH
	52 000	40.3	108.8**	5	7	20	0.25	90x196	HCGF52D523#F196PH
250 VDC Code: 2E Surge Voltage 300 VD	**1 500**	3.7	10.0	56	50	15	0.25	36x100	HCGF52E152#A100PH
	1 800	4.0	10.8	52	44	15	0.25	36x100	HCGF52E182#A100PH
	2 200	4.6	12.4	50	40	17	0.25	51x75	HCGF52E222#C075PH
	2 700	5.1	13.8	41	36	17	0.25	51x75	HCGF52E272#C075PH
	3 300	6.2	16.7	36	35	17	0.25	51x96	HCGF52E332#C096PH
	3 900	7.2	19.4	31	30	17	0.25	51x115	HCGF52E392#C115PH
	4 700	8.2	22.1	25	23	18	0.25	64x96	HCGF52E472#D096PH
	5 600	9.0	24.3	21	21	18	0.25	64x96	HCGF52E562#D096PH
	6 800	10.5	28.4	18	18	18	0.25	64x115	HCGF52E682#D115PH
	8 200	11.5	31.0	15	16	18	0.25	64x115	HCGF52E822#D115PH
	10 000	13.5	36.4	12	14	18	0.25	64x130	HCGF52E103#D130PH
		14.7	39.7	12	13	20	0.25	77x148	HCGF52E103#E148PH
	12 000	14.8	40.0	10	11	20	0.25	77x115	HCGF52E123#E115PH
	15 000	17.4	47.0	8	11	20	0.25	77x130	HCGF52E153#E130PH
	18 000	20.4	55.1	7	10	20	0.25	77x155	HCGF52E183#E155PH
	22 000	24.0	64.8	6	8	20	0.25	90x157	HCGF52E223#F157PH
	26 000	26.8	72.4	6	7	20	0.25	77x220	HCGF52E263#E220PH

* For Bolt mounting, lenght 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 ≥ 0.25	v ≥ 0.5	v ≥ 1.0	v ≥ 2.0	v ≥ 3.0
Multiplier	1.00	1.05	1.10	1.15	1.20	1.25

› Life Time Table · Brauchbarkeitsdauer – Tabelle

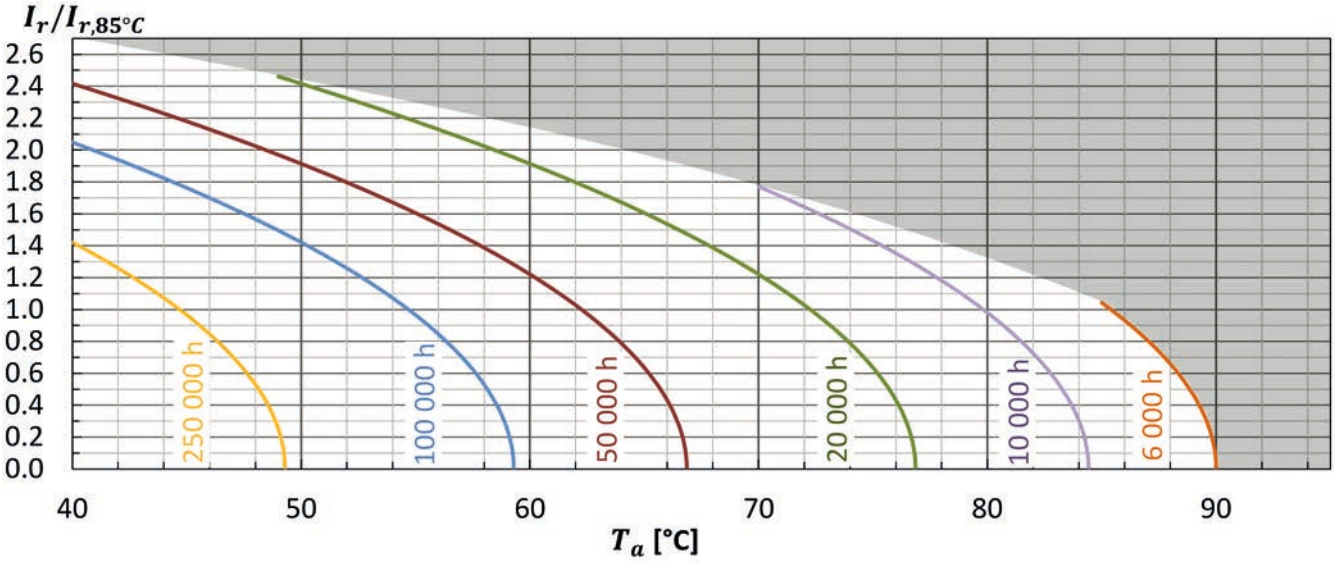
HCGF5	Useful life as function of ambient temperature and ripple current												
I_r at 85°C	x 1.0	x 1.2	x 1.4	x 1.6	x 1.8	x 2.0	x 2.1	x 2.2	x 2.3	x 2.4	x 2.5	x 2.6	x 2.7
T_a = 40°C	250	250	250	199	149	108	91	76	63	51	42	33	27
T_a = 45°C	243	201	162	125	94	68	57	48	39	32	26	21	
T_a = 50°C	153	127	102	79	59	43	36	30	25	20			
T_a = 55°C	97	80	64	50	37	27	23	19					
T_a = 60°C	61	51	41	31	23	17							
T_a = 65°C	38	32	25	20	15								
T_a = 70°C	24	20	16	12									
T_a = 75°C	15	12	10										
T_a = 80°C	9	8											
T_a = 85°C	6												

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 Kategorietemperatur $I_{r,\ 85°C,120Hz}$



› 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 4000 hours	ΔC/C ≤ 10% (of initial value) Tanδ ≤ 175% (of specified value) I_L ≤ specified value
Useful life	T_a = 85°C; V_r, I_r applied 6000 hours	ΔC/C ≤ 15% (of initial value) Tanδ < 200% (of specified value) I_L ≤ specified value

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