HCGW2 · Screw-Terminal · 6000 h/85 °C

Higher capacitance · Ultra 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.

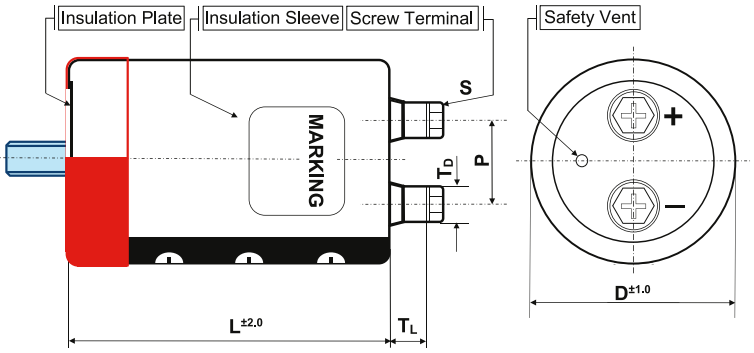
› Specifications · Spezifikationen

Items	Characteristics
Temperature range	-10°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 7 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
E	77	B, N, I, Y	31.5	M6x12	9.0	12	PH
				M5x10	8.0	11	PH
F	90	B, N, I, Y	31.5	M6x12	8.0	12	PH
				M5x10	7.0	11	PH

Size in mm. First listed terminal is standard.

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› Product Code · Bestellbezeichnung

Example: Series HCGW2 · 29000 µF · +/- 20 % · 400 V · D=90 mm · L=230 mm with Y-Bracket

HCGW2 **2G** **293** **Y** **F** **230**

- **HCGW2** — Series name
- **2G** — Rated voltage code

Code	Voltage	Code	Voltage
2V	350	2W	450
2G	400	2H	500

- **293** — Capacitance code
- **Y** — Shape code
- **F** — Diameter code
- **230** — Case length code – length in mm (3 digits)
- Capacitance tolerance: Ø : ± 20 % / Q : -10 % ~ + 30 %
- Specific features (e.g. M5 …)

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
400 VDC Code: 2G Surge Voltage 450 VDC	**13 000**	13.0	32.5	26	27	20	0.70	77x148	HCGW22G133#E148
	14 000	13.4	33.5	24	25	20	0.70	77x148	HCGW22G143#E148
	16 000	15.5	38.8	21	22	20	0.70	77x188	HCGW22G163#E188
	18 000	16.4	41.0	19	20	20	0.70	90x150	HCGW22G183#F150
	19 000	17.5	43.8	18	20	20	0.70	90x167	HCGW22G193#F167
	20 000	18.8	47.0	17	18	20	0.70	77x228	HCGW22G203#E228
	23 000	19.8	49.5	15	16	20	0.70	90x190	HCGW22G233#F190
	29 000	23.9	59.8	12	13	20	0.70	90x230	HCGW22G293#F230
	33 000	27.5	68.8	10	11	20	0.70	90x268	HCGW22G333#F268
450 VDC Code: 2W Surge Voltage 500 VDC	**7 000**	8.4	21.0	56	52	20	0.70	77x108	HCGW22W702#E108
	10 000	10.9	27.3	40	42	20	0.70	77x148	HCGW22W103#E148
	12 000	12.5	31.3	33	35	20	0.70	77x165	HCGW22W123#E165
	14 000	13.8	34.5	29	30	20	0.70	77x188	HCGW22W143#E188
	15 000	14.3	35.8	27	29	20	0.70	90x150	HCGW22W153#F150
	17 000	15.8	39.5	24	26	20	0.70	90x167	HCGW22W173#F167
	18 000	17.0	42.5	22	23	20	0.70	77x228	HCGW22W183#E228
	20 000	17.6	44.0	20	21	20	0.70	90x190	HCGW22W203#F190
	22 000	19.8	49.5	18	19	20	0.70	90x230	HCGW22W223#F230
	25 000	21.2	53.0	16	17	20	0.70	90x230	HCGW22W253#F230
	30 000	24.9	62.3	13	14	20	0.70	90x268	HCGW22W303#F268
500 VDC Code: 2H Surge Voltage 550 VDC	**7 500**	9.5	23.8	47	48	20	0.70	77x148	HCGW22H752#E148
	9 000	10.9	27.3	40	41	20	0.70	77x165	HCGW22H902#E165
	10 000	11.7	29.3	36	38	20	0.70	77x188	HCGW22H103#E188
	11 000	12.2	30.5	33	34	20	0.70	90x150	HCGW22H113#F150
	13 000	14.5	36.3	28	29	20	0.70	77x228	HCGW22H133#E228
		14.0	35.0	28	29	20	0.70	90x167	HCGW22H133#F167
	15 000	15.3	38.3	24	25	20	0.70	90x190	HCGW22H153#F190
	18 000	18.1	45.3	20	21	20	0.70	90x230	HCGW22H183#F230
	19 000	18.5	46.3	19	20	20	0.70	90x230	HCGW22H193#F230
	22 000	21.3	53.3	16	17	20	0.70	90x268	HCGW22H223#F268

Additional designs on request · Weitere Designs auf Anfrage

› Ripple Current Multiplier · Wechselstrommultiplikator

Frequency [Hz]	50/60	120	300	1k	≥ 10k
Multiplier	0.70	1.00	1.18	1.34	1.45

Temperature (°C)	40	45	50	55	60	65	70	75	80	85
Multiplier	2.5	2.4	2.3	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

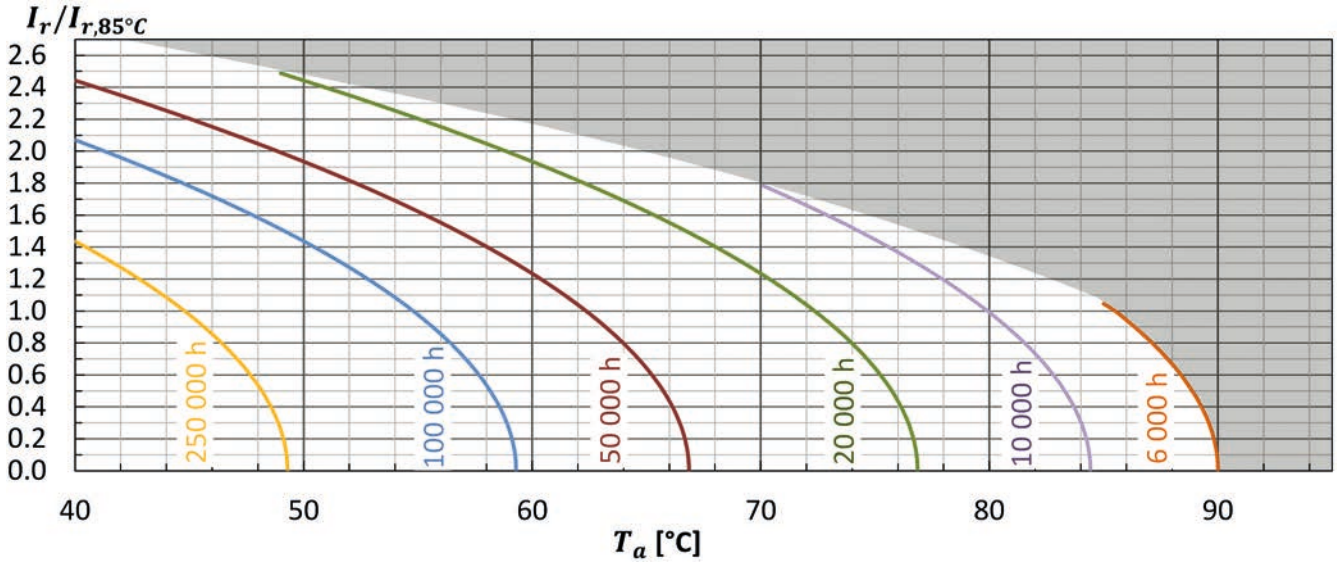
› Life Time Table · Brauchbarkeitsdauer – Tabelle

HCGW2	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 1.9	x 2.0	x 2.1	x 2.2	x 2.3	x 2.4	x 2.5
T_a = 40°C	250	250	250	203	154	132	112	95	79	66	54	44
T_a = 45°C	245	204	165	128	97	83	71	60	50	41	34	
T_a = 50°C	155	129	104	81	61	52	45	38	31	26		
T_a = 55°C	98	81	66	51	38	33	28	24	20			
T_a = 60°C	62	51	41	32	24	21	18					
T_a = 65°C	39	32	26	20	15							
T_a = 70°C	24	20	16	13								
T_a = 75°C	15	13	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 $I_{r,\,85°C,120Hz}$



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› 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