

HCGW · Screw-Terminal · 6000 h/85 °C

High 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

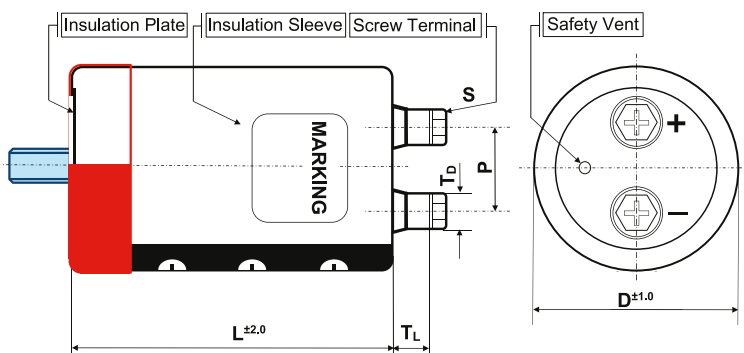
Items	Characteristics
Temperature range	-10°C ~ + 85°C
Capacitance tolerance (at 20°C)	Standard +/- 20%, -10/+30% on request
Surge voltage	Repetitive max. 30 sec per 6 Minutes
Leakage current max. I _L (20°C, 5 min)	0.01 • C • V, [µA] or 7 mA, which is smaller.
Useful life	6000 hours at 85°C
Field failure 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/X double sleeve for 2/3/4 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
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
K	121	N, X	41.5	M6x12	3.0	14	PH

Size in mm. First listed terminal is standard.

> Product Code · Bestellbezeichnung

Example: Series HCGW · 32000 µF +/- 20 % · 400 V · D=101 mm · L=237 mm with Y-Bracket

HCGW	2G	323	Y	G	237	PH
Series name	Capacitance code	Shape code	Diameter code	Capacitance tolerance	Specific features (e.g. M6 ...)	
Rated voltage code				Case length code – length in mm (3 digits)		
Code	Voltage	Code	Voltage	Ø : ± 20 % Q : -10 % ~ +30 %		
2V	350	2W	450			
2G	400	2H	500			

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]	Z _{max} 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	13 000	12.8	32.0	25	26	22	0.70	77x155	HCGW2V133#E155
	17 000	15.6	39.0	19	20	22	0.70	90x157	HCGW2V173#F157
	18 000	16.6	41.5	18	20	22	0.70	77x195	HCGW2V183#E195
	22 000	19.8	49.5	17	18	22	0.70	77x235	HCGW2V223#E235
	24 000	19.9	49.8	16	18	32	0.70	101x175*	HCGW2V243#G175PH
	25 000	20.7	51.8	15	16	22	0.70	90x196	HCGW2V253#F196
	31 000	24.9	62.3	12	13	22	0.70	90x236	HCGW2V313#F236
		23.9	59.8	12	13	32	0.70	101x195*	HCGW2V313#G195PH
	34 000	26.0	65.0	12	13	22	0.70	90x236	HCGW2V343#F236W2
	36 000	26.8	67.0	11	12	22	0.70	90x236	HCGW2V363#F236W2
		29.0	72.5	11	13	22	0.70	90x283	HCGW2V363#F283
		29.7	74.3	11	12	22	0.70	90x283	HCGW2V383#F283W2
	39 000	29.0	72.5	10	12	32	0.70	101x237*	HCGW2V393#G237PH
	44 000	33.2	83.0	9	11	32	0.70	101x283*	HCGW2V443#G283PH
57 000	40.7	101.8**	7	8	32	0.70	121x283	HCGW2V573#K283PH	
400 VDC Code: 2G Surge Voltage 450 VDC	11 000	11.8	29.5	31	32	22	0.70	77x155	HCGW2G113#E155
	14 000	14.6	36.5	24	25	22	0.70	77x195	HCGW2G143#E195
	15 000	15.8	39.5	23	24	22	0.70	77x220	HCGW2G153#E220
	16 000	16.9	42.3	21	22	22	0.70	77x235	HCGW2G163#E235
		15.2	38.0	21	22	22	0.70	90x157	HCGW2G163#F157
	20 000	18.5	46.3	20	21	22	0.70	90x196	HCGW2G203#F196
	22 000	19.3	48.3	18	19	32	0.70	101x175*	HCGW2G223#G175PH
	25 000	22.4	56.0	16	18	22	0.70	90x236	HCGW2G253#F236
		21.4	53.5	16	18	32	0.70	101x195*	HCGW2G253#G195PH
	27 000	23.8	59.5	15	17	22	0.70	90x221	HCGW2G273#F221
	28 000	23.7	59.3	15	15	22	0.70	90x236	HCGW2G283#F236W2
	29 000	25.3	63.3	14	16	22	0.70	90x236	HCGW2G293#F236
	30 000	24.9	62.3	14	16	32	0.70	101x222*	HCGW2G303#G222PH
	32 000	27.3	68.3	12	13	22	0.70	90x283	HCGW2G323#F283
		26.3	65.8	12	13	32	0.70	101x237*	HCGW2G323#G237PH
	34 000	27.8	69.5	11	13	32	0.70	101x250*	HCGW2G343#G250PH
38 000	30.8	77.0	10	11	32	0.70	101x283*	HCGW2G383#G283PH	
50 000	38.1	95.3	9	11	32	0.70	121x283	HCGW2G503#K283PH	

Additional designs on request · Weitere Designs auf Anfrage

HCGW · 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
450 VDC Code: 2W Surge Voltage 500 VDC	3 300	5.2	13.0	114	118	19	0.70	51x130	HCGW2W332#C130
	5 600	7.5	18.8	67	70	20	0.70	64x130	HCGW2W562#D130
	9 500	10.9	27.3	36	37	22	0.70	77x155	HCGW2W952#E155
	10 000	11.8	27.5	34	35	22	0.70	90x145	HCGW2W103#F145
	12 000	13.5	33.8	28	29	22	0.70	77x195	HCGW2W123#E195
	13 000	13.7	34.3	26	27	22	0.70	90x157	HCGW2W133#F157
	15 000	16.4	41.0	24	27	22	0.70	77x235	HCGW2W153#E235
	17 000	17.1	42.8	21	22	22	0.70	90x196	HCGW2W173#F196
	18 000	17.0	42.5	20	21	32	0.70	101x175*	HCGW2W183#G175PH
		17.9	44.8	20	21	22	0.70	90x196	HCGW2W183#F196
	22 000	20.1	50.3	18	19	32	0.70	101x195*	HCGW2W223#G195PH
		21.0	52.5	18	19	22	0.70	90x236	HCGW2W223#F236
	24 000	22.6	56.5	17	18	22	0.70	90x236	HCGW2W243#F236
	25 000	22.3	55.8	16	17	22	0.70	90x236	HCGW2W253#F236W2
	27 000	25.1	62.8	15	17	22	0.70	90x283	HCGW2W273#F283
		24.1	60.3	15	17	32	0.70	101x237*	HCGW2W273#G237PH
29 000	25.6	64.0	14	16	32	0.70	101x237*	HCGW2W293#G237PH	
33 000	28.7	71.8	13	15	32	0.70	101x283*	HCGW2W333#G283PH	
42 000	34.9	87.3	10	12	32	0.70	121x283	HCGW2W423#K283PH	
500 VDC Code: 2H Surge Voltage 550 VDC	5 600	8.4	21.0	60	62	22	0.70	77x155	HCGW2H562#E155
	8 200	11.2	28.0	41	43	22	0.70	77x195	HCGW2H822#E195
		10.8	27.0	41	43	22	0.70	90x157	HCGW2H822#F157
	9 500	13.0	32.5	36	37	22	0.70	77x235	HCGW2H952#E235
	11 000	13.7	34.3	32	33	22	0.70	90x196	HCGW2H113#F196
	12 000	13.5	33.8	30	33	32	0.70	101x175*	HCGW2H123#G175PH
		16.7	41.8	29	30	22	0.70	90x236	HCGW2H143#F236
	14 000	16.0	40.0	29	30	32	0.70	101x195*	HCGW2H143#G195PH
		19.3	48.3	25	27	22	0.70	90x283	HCGW2H163#F283
	16 000	18.6	46.5	25	26	32	0.70	101x237*	HCGW2H163#G237PH
18.9		47.3	23	23	22	0.70	90x236	HCGW2H183#F236W2	
20 000	21.5	53.8	20	20	22	0.70	90x283	HCGW2H203#F283W2	

* 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	0.70	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

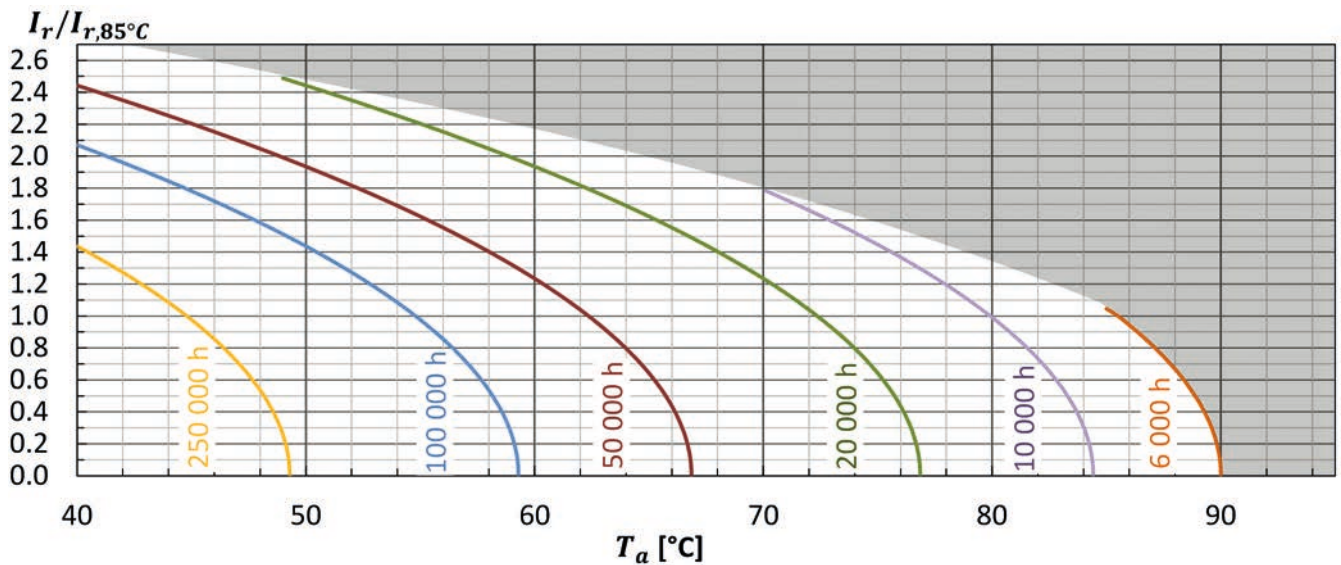
HCGW I_r at 85°C	Useful life as function of ambient temperature and ripple current											
	x 1.0	x 1.2	x 1.4	x 1.6	x 1.8	x 1.9	x 2.0	x 2.1	x 2.2	x 2.3	x 2.4	x 2.5
$T_a = 40°C$	250	250	250	203	154	132	112	95	79	66	54	44
$T_a = 45°C$	245	204	165	128	97	83	71	60	50	41	34	
$T_a = 50°C$	155	129	104	81	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 Kategorie-temperatur $I_r, 85°C, 120Hz$



> 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	$\Delta C/C \leq 10\%$ (of initial value) $\tan\delta \leq 175\%$ (of specified value) $I_L \leq$ specified value
Useful life	$T_a = 85°C$; 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