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.

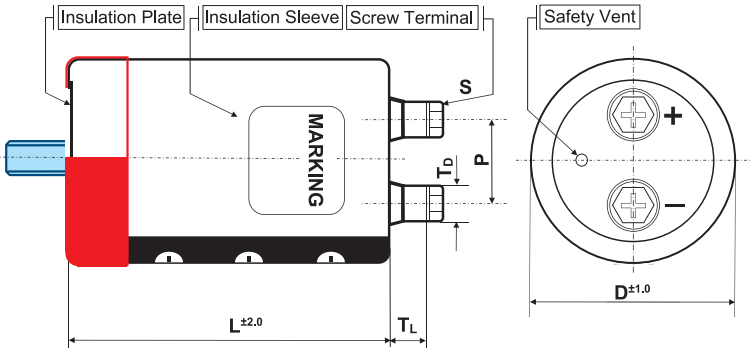
› Specifications · Spezifikationen

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_r [µA] or 7 mA, which is smaller.
Useful life	6 000 hours at 85°C
Field failure rate	0.5 FIT = 0.5 • 10^{-9} 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. 149 ff · Montageoptionen siehe S. 149 ff



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

ØD	available shape	P	S	T_L	T_D	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
121	N, X	41.5	M6x12	3.0	14	PPS

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**

Type of series

Capacitance code

The first two digits are significant. The last digit indicates the number of following zeros in µF.

Rated voltage code

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

Fixing symbol code

B : Bolt
N : single outer sleeve
I : 2 Stoppers Bracket
Y : 3 Stoppers Bracket
X : 4 Stoppers Bracket

Capacitance tolerance

Ø : ± 20 %
Q : -10 % ~ + 30 %

Case code diameter

ØD	Code
51	C
64	D
77	E
90	F
101	G
121	K

Specific features (e.g. M6 ...)

Case Code length

Length in mm (3 digits)

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
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
	38 000	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	10	12	32	0.70	101x283*	HCGW2V443#G283PH
	57 000	40.7	101.8**	7	8	3	0.70	121x283	HCGW2V573XK283
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	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	HCGW2G503XK283
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

Additional designs on request · Weitere Designs auf Anfrage

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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	**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	HCGW2W423XK283
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
	14 000	16.7	41.8	29	30	22	0.70	90x236	HCGW2H143#F236
		16.0	40.0	29	30	32	0.70	101x195*	HCGW2H143#G195PH
	16 000	19.3	48.3	25	27	22	0.70	90x283	HCGW2H163#F283
		18.6	46.5	25	26	32	0.70	101x237*	HCGW2H163#G237PH
	18 000	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, lenght 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	≥ 10k
Multiplier	0.70	1.00	1.18	1.34	1.45

Forced cooling [m/sec]	v < 1.0	v ≥ 1.0
Multiplier	1.0	1.1

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

› Life Time Table · Brauchbarkeitsdauer – Tabelle

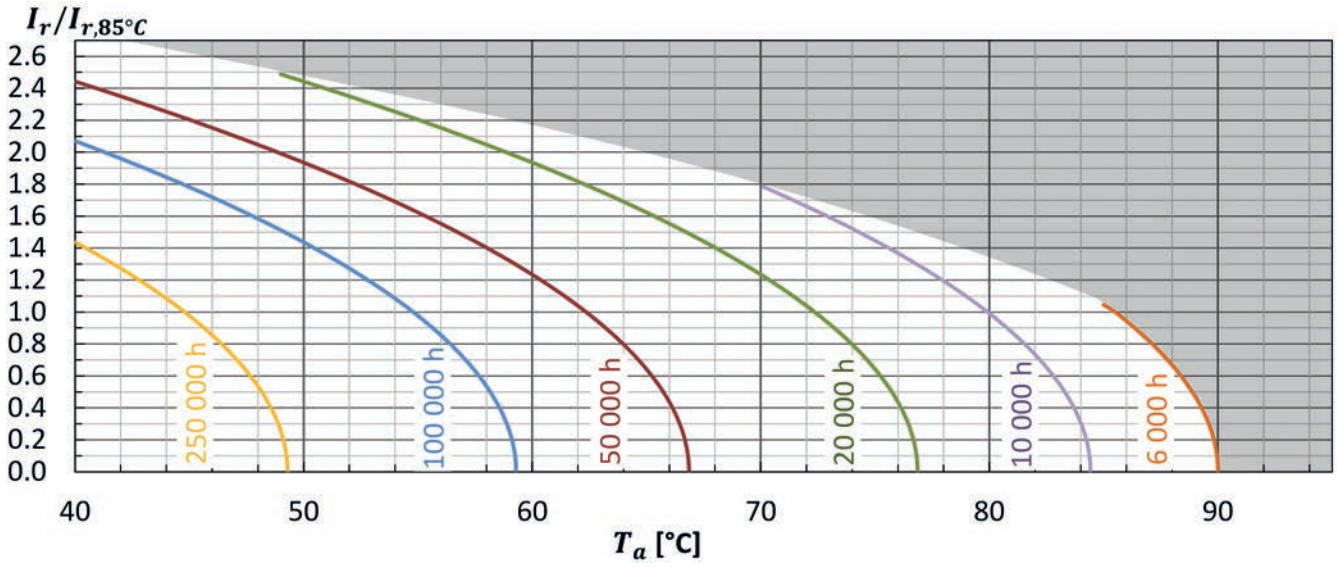
HCGW	Useful life as function of ambient temperature and ripple current											
I_r at 85°C	x 1.0	x 1.2	x 1.4	x 1.6	x 1.8	x 1.9	x 2.0	x 2.1	x 2.2	x 2.3	x 2.4	x 2.5
T_a = 40°C	250	250	250	203	154	132	112	95	79	66	54	44
T_a = 45°C	245	204	165	128	97	83	71	60	50	41	34	
T_a = 50°C	155	129	104	81	61	52	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 $I_{r,\ 85°C,120Hz}$



› 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