

# 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

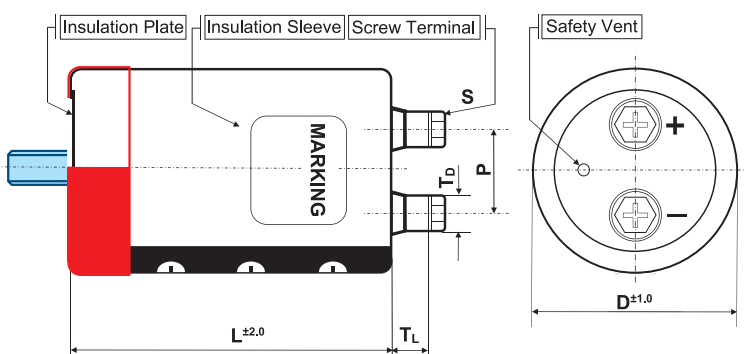
Items	Characteristics
Temperature range	-10°C ~ +85°C
Capacitance tolerance (at 20°C)	Standard +/- 20%, -10/+30% on request
Surge voltage	Repetitive max. 30 sec per 6 Minutes
Leakage current max. $I_L$ (20°C, 5 min)	$0.01 \cdot C \cdot V_r$ [µA] or 7 mA, which is smaller.
Useful life	6 000 hours at 85°C
Field failure rate	0.5 FIT = $0.5 \cdot 10^{-9}$ 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	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
77	B, N, I, Y	31.5	M6x12	9.0	12	PH
			M5x10	8.0	11	PH
90	B, N, I, Y	31.5	M6x12	8.0	12	PH

Size in mm. First listed terminal is standard.

### > Product Code · Bestellbezeichnung

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

**HCGW2**

Type of series

**2G**

**293**

Capacitance code

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

**Y**

Fixing symbol code

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

**F**

Case code diameter

ØD	Code
77	E
90	F

Capacitance tolerance

- Ø : ± 20 %
- Q : -10 % ~ +30 %

**230**

Specific features (e.g. M5 ...)

Case Code length

Length in mm (3 digits)

Rated voltage code

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

# HCGW2 · Screw-Terminal · 6000 h/85 °C

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>400 VDC</b> 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
<b>450 VDC</b> 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	
<b>500 VDC</b> 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

Additional designs on request · Weitere Designs auf Anfrage

## > Ripple Current Multiplier · Wechselstrommultiplikator

Frequency [Hz]	50/60	120	300	1k	≥ 10k	Forced cooling [m/sec]	v < 1.0	v ≥ 1.0
Multiplier	0.70	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	2.5	2.4	2.3	2.2	2.0	1.8	1.6	1.4	1.2	1.0

## > Life Time Table · Brauchbarkeitsdauer – Tabelle

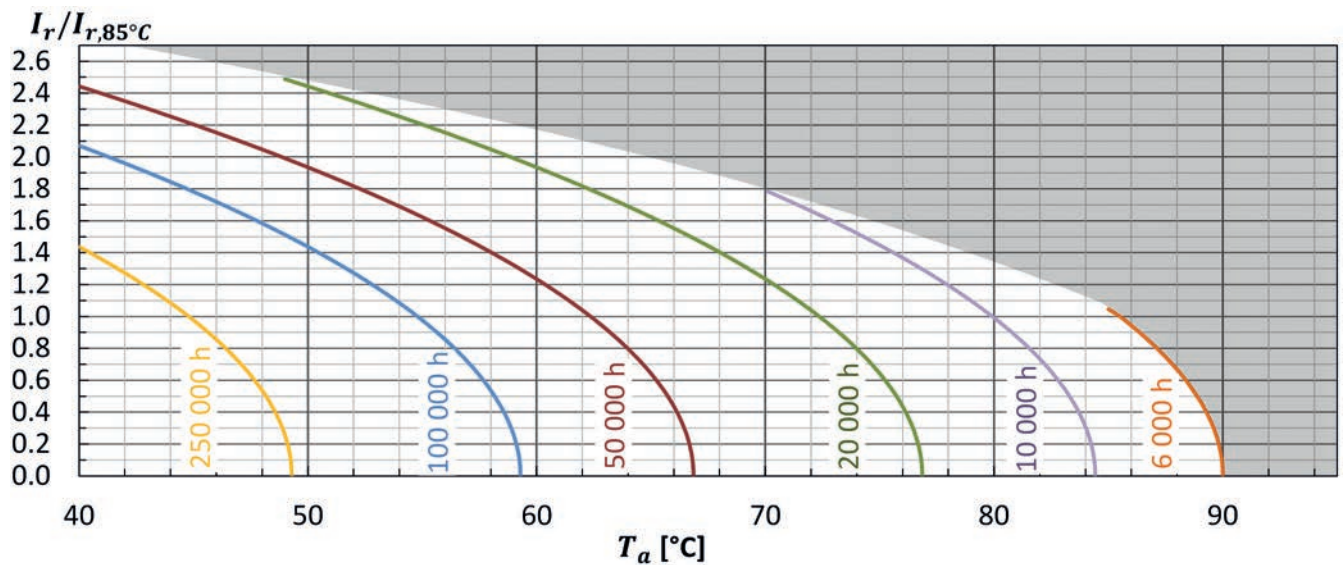
HCGW2 $I_r$ at 85°C	Useful life as function of ambient temperature and ripple current											
	x 1.0	x 1.2	x 1.4	x 1.6	x 1.8	x 1.9	x 2.0	x 2.1	x 2.2	x 2.3	x 2.4	x 2.5
$T_a = 40°C$	250	250	250	203	154	132	112	95	79	66	54	44
$T_a = 45°C$	245	204	165	128	97	83	71	60	50	41	34	
$T_a = 50°C$	155	129	104	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