

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

High capacitance · Ultra compact · Double Anode Technology  
Suited for optional permanent Charge-Discharge Design

Special charge-discharge proof design available upon request.

Auf Anfrage spezielles Design für Lade-, Entladeanwendungen 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 <sup>-9</sup> Failures/hour
RoHS conform	Directive 2011/65/EU & (EU)2015/863
Specification / Vibration	JIS C 5101-4 / 0.75mm, 10...55Hz, 10g, 3x2h



## > Outline Drawings · Bauformen

Shape: B (ØD = 51-101)

(for Bolt – Mounting, M12x16, stud bolt is not isolated)

Form: B (ØD = 51-101)

(für Bolzenbefestigung, M12x16, Bolzen nicht isoliert)

Shape: N, X (ØD = 121)

(for PBT-Holder ØD = 77-101 and Press Ring ØD = 64-90)

Form: N, X (ØD = 121)

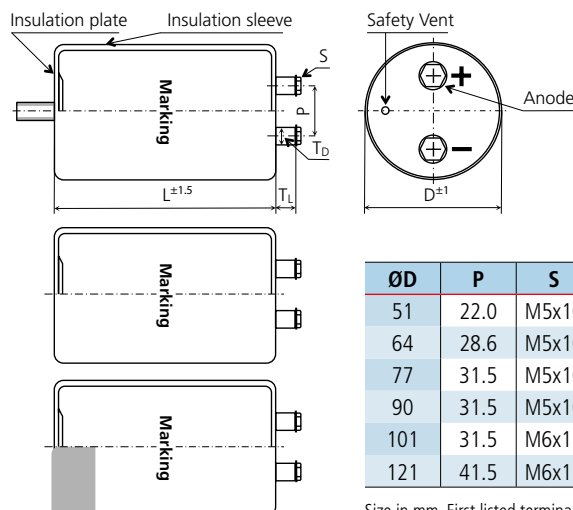
(für PBT-Halter ØD = 77-101 und Einpressring ØD = 64-90)

Shape: Y (ØD = 51-101)

(double sleeve, Y-bracket free of charge)

Form: Y (ØD = 51-101)

(mit doppelter Isolierung, Y-Schelle wird kostenlos mitgeliefert)



Size in mm. First listed terminal is standard.

## > Product Code · Bestellbezeichnung

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

HCGW		2G		323		Y		G		237 ( )																																	
Type of series		Capacitance code		Rated voltage code		Fixing symbol code		Case code diameter		Customers' specification																																	
		The first two digits are significant. The last digit indicates the number of following zeros in μF.				B : Bolt, ØD = 51 - 101 N : No double sleeve (PBT-Safety-holder or press ring) ØD = 51 - 101 Y : 3 Stoppers Bracket ØD = 51 - 101 X : Plastic Isolation Casing ØD = 121		<table border="1"> <thead> <tr> <th>ØD</th> <th>Code</th> </tr> </thead> <tbody> <tr><td>51</td><td>C</td></tr> <tr><td>64</td><td>D</td></tr> <tr><td>77</td><td>E</td></tr> <tr><td>90</td><td>F</td></tr> <tr><td>101</td><td>G</td></tr> <tr><td>121</td><td>K</td></tr> </tbody> </table>		ØD	Code	51	C	64	D	77	E	90	F	101	G	121	K	<table border="1"> <thead> <tr> <th>Code</th> <th>Voltage</th> <th>Code</th> <th>Voltage</th> </tr> </thead> <tbody> <tr><td>2V</td><td>350</td><td>2W</td><td>450</td></tr> <tr><td>2G</td><td>400</td><td>2H</td><td>500</td></tr> </tbody> </table>		Code	Voltage	Code	Voltage	2V	350	2W	450	2G	400	2H	500	<table border="1"> <thead> <tr> <th colspan="2">Case Code length</th> </tr> </thead> <tbody> <tr> <td colspan="2">Length in mm (3 digits)</td> </tr> </tbody> </table>		Case Code length		Length in mm (3 digits)	
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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>350 VDC</b> Code: 2V  Surge Voltage 400 VDC	13 000	12.8	32.0	25	26	22	0.2	77x155	HCGW2V133#E155
	17 000	15.6	39.0	19	20	22	0.2	90x157	HCGW2V173#F157
	18 000	16.6	41.5	18	20	22	0.2	77x195	HCGW2V183#E195
	22 000	19.8	49.5	17	18	22	0.2	77x235	HCGW2V223#E235
	24 000	19.9	49.8	16	18	32	0.2	101x175	HCGW2V243#G175
	25 000	20.7	51.8	15	16	22	0.2	90x196	HCGW2V253#F196
	31 000	24.9	62.3	12	13	22	0.2	90x236	HCGW2V313#F236
		23.9	59.8	12	13	32	0.2	101x195	HCGW2V313#G195
	36 000	29.0	72.5	12	13	22	0.2	90x283	HCGW2V363#F283
	39 000	29.0	72.5	10	12	32	0.2	101x237*	HCGW2V393#G237
	44 000	33.2	83.0	10	12	32	0.2	101x283	HCGW2V443#G283
57 000	40.7	101.8	7	8	3	0.2	121x283	HCGW2V573XK283	
<b>400 VDC</b> Code: 2G  Surge Voltage 450 VDC	11 000	11.8	29.5	31	32	22	0.2	77x155	HCGW2G113#E155
	14 000	14.6	36.5	24	25	22	0.2	77x195	HCGW2G143#E195
	15 000	15.8	39.5	23	24	22	0.2	77x220	HCGW2G153#E220
	16 000	16.9	42.3	21	22	22	0.2	77x235	HCGW2G163#E235
		15.2	38.0	21	22	22	0.2	90x157	HCGW2G163#F157
	20 000	18.5	46.3	20	21	22	0.2	90x196	HCGW2G203#F196
	22 000	19.3	48.3	18	19	32	0.2	101x175	HCGW2G223#G175
	25 000	21.4	53.5	16	18	32	0.2	101x195	HCGW2G253#G195
	27 000	23.8	59.5	15	17	22	0.2	90x221	HCGW2G273#F221
	29 000	25.3	63.3	14	16	22	0.2	90x236	HCGW2G293#F236
	30 000	24.9	62.3	14	16	32	0.2	101x222	HCGW2G303#G222
	32 000	27.3	68.3	12	13	22	0.2	90x283	HCGW2G323#F283
		26.3	65.8	12	13	32	0.2	101x237*	HCGW2G323#G237
	34 000	27.8	69.5	11	13	32	0.2	101x250*	HCGW2G343#G250
38 000	30.8	77.0	10	11	32	0.2	101x283	HCGW2G383#G283	
50 000	38.1	95.3	9	11	32	0.2	121x283	HCGW2G503XK283	
<b>450 VDC</b> Code: 2W  Surge Voltage 500 VDC	3 300	5.2	13.0	114	118	19	0.2	51x130	HCGW2W332#C130
	5 600	7.5	18.8	67	70	20	0.2	64x130	HCGW2W562#D130
	9 500	10.9	27.3	36	37	22	0.2	77x155	HCGW2W952#E155
	10 000	11.8	27.5	34	35	22	0.2	90x145	HCGW2W103#F145
	12 000	13.5	33.8	28	29	22	0.2	77x195	HCGW2W123#E195
	13 000	13.7	34.3	26	27	22	0.2	90x157	HCGW2W133#F157
	15 000	16.4	41.0	24	27	22	0.2	77x235	HCGW2W153#E235
	17 000	17.1	42.8	21	22	22	0.2	90x196	HCGW2W173#F196
	18 000	17.0	42.5	20	21	32	0.2	101x175	HCGW2W183#G175
		17.9	44.8	20	21	22	0.2	90x196	HCGW2W183#F196
	22 000	20.1	50.3	18	19	32	0.2	101x195	HCGW2W223#G195
		21.0	52.5	18	19	22	0.2	90x236	HCGW2W223#F236
	24 000	22.6	56.5	17	18	22	0.2	90x236	HCGW2W243#F236
	27 000	25.1	62.8	15	17	22	0.2	90x283	HCGW2W273#F283
		24.1	60.3	15	17	32	0.2	101x237*	HCGW2W273#G237
29 000	25.6	64.0	14	16	32	0.2	101x237*	HCGW2W293#G237	
33 000	28.7	71.8	13	15	32	0.2	101x283	HCGW2W333#G283	
42 000	34.9	87.3	10	12	32	0.2	121x283	HCGW2W423XK283	

Additional designs on request · Weitere Designs auf Anfrage

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

Rated VoltageCode (Surge Voltage) $V_r$ [V DC]	Capacitance $C_r$ [ $\mu$ 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>500 VDC</b> Code: 2H  Surge Voltage 550 VDC	5 600	8.4	21.0	60	62	22	0.2	77x155	HCGW2H562#E155
	8 200	11.2	28.0	41	43	22	0.2	77x195	HCGW2H822#E195
		10.8	27.0	41	43	22	0.2	90x157	HCGW2H822#F157
	9 500	13.0	32.5	36	37	22	0.2	77x235	HCGW2H952#E235
	11 000	13.7	34.3	32	33	22	0.2	90x196	HCGW2H113#F196
	12 000	13.5	33.8	30	33	32	0.2	101x175	HCGW2H123#G175
	14 000	16.7	41.8	29	30	22	0.2	90x236	HCGW2H143#F236
		16.0	40.0	29	30	32	0.2	101x195	HCGW2H143#G195
	16 000	19.3	48.3	25	27	22	0.2	90x283	HCGW2H163#F283
		18.6	46.5	25	26	32	0.2	101x237*	HCGW2H163#G237

\* For Bolt mounting, length dimensions increase by +3 mm for M6/PPS items and by +2 mm for M8/PH items

## > 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

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
$T_a = 40^\circ\text{C}$	250	250	250	203	154	132	112	95	79	66	54	44	
$T_a = 45^\circ\text{C}$	245	204	165	128	97	83	71	60	50	41	34		
$T_a = 50^\circ\text{C}$	155	129	104	81	61	52	45	38	31	26			
$T_a = 55^\circ\text{C}$	98	81	66	51	38	33	28	24	20				
$T_a = 60^\circ\text{C}$	62	51	41	32	24	21	18						
$T_a = 65^\circ\text{C}$	39	32	26	20	15								
$T_a = 70^\circ\text{C}$	24	20	16	13									
$T_a = 75^\circ\text{C}$	15	13	10										
$T_a = 80^\circ\text{C}$	9	8											
$T_a = 85^\circ\text{C}$	6												

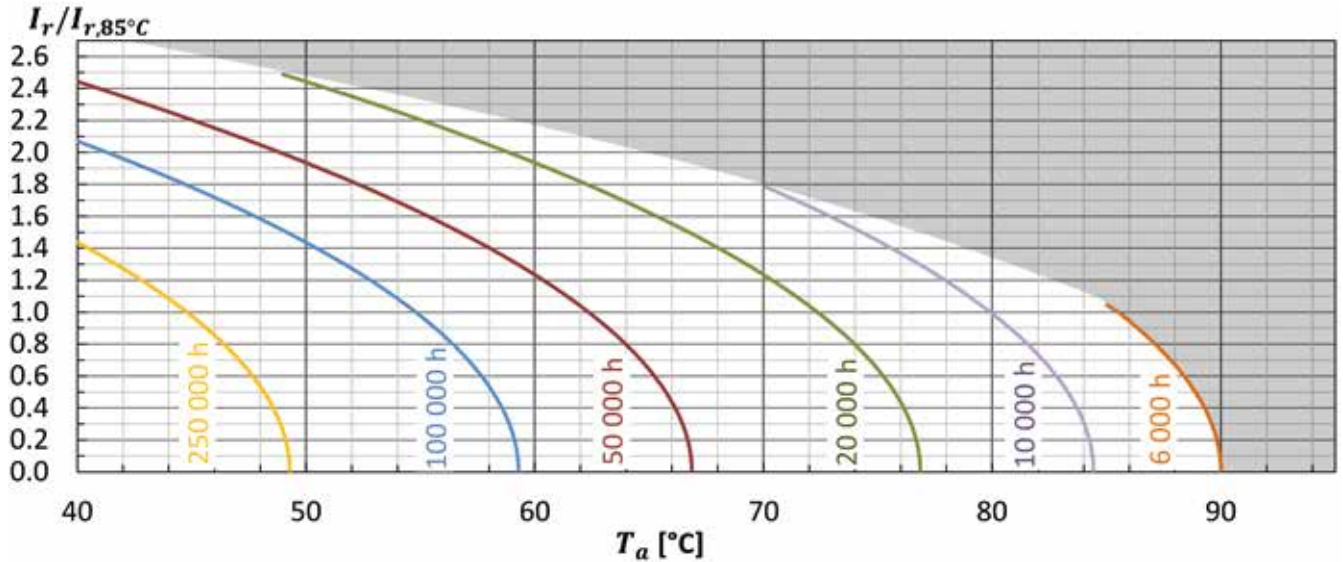
Max. value limited to 250 000 hours.

Additional designs on request · Weitere Designs auf Anfrage

> 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  $I_{r, 85^\circ\text{C}, 120\text{Hz}}$

Brauchbarkeitsdauer in Abhängigkeit von Umgebungstemperatur  $T_a$  und Wechselstrombelastung  $I_r$ , im Verhältnis zur max. Wechselstrombelastung bei oberer Kategorie-temperatur  $I_{r, 85^\circ\text{C}, 120\text{Hz}}$



> Life Time Tests and Requirements · Anforderungen Brauchbarkeitsdauer

Life time test	Test procedure	Life time criteria
Endurance test	$T_a = 85^\circ\text{C}$ ; $V_r$ , $I_r$ applied 4000 hours	$\Delta C/C \leq 15\%$ (of initial value) $\text{Tan}\delta \leq 175\%$ (of specified value) $I_L \leq$ specified value
Useful life	$T_a = 85^\circ\text{C}$ ; $V_r$ , $I_r$ applied 6000 hours	$\Delta C/C \leq 20\%$ (of initial value) $\text{Tan}\delta < 200\%$ (of specified value) $I_L \leq$ specified value

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