

## ► Specifications / Spezifikationen

Items	Characteristics
Temperature range	-10°C ~ + 85°C
Capacitance tolerance	+/- 20%
Surge voltage	Repetitive max. 30 sec per 6 Minutes
Leakage current max. $I_L$ (20°C, 5 min)	$0.01 \cdot C \cdot V_r$ [ $\mu A$ ] or 7 mA, which is smaller.
Useful life	6000 h at 85°C
Field failure rate	0.5 FIT = $0.5 \cdot 10^{-9}$ Failures/hour
RoHS conform	Directive 2002/95/ECff Annex
Specification / Vibration	JIS C 5101-4 / 0.75mm, 10...55Hz, 10g, 3x2h



## ► Outline Drawings / Bauformen

Shape: B (ØD = 77-90)  
(for Bolt – Mounting, M12x16, stud bolt is not isolated)

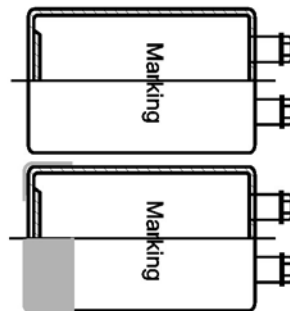
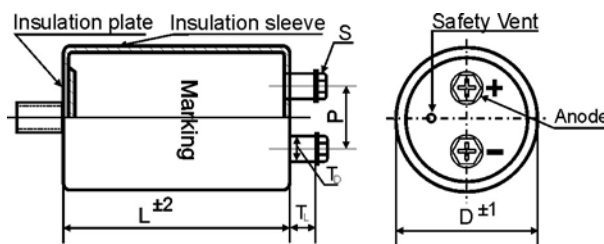
Form: B (ØD = 77-90)  
(für Bolzenbefestigung, M12x16, Bolzen nicht isoliert)

Shape: N, (for PBT-Holder ØD = 77-90 and Press Ring ØD = 77-90)

Form: N, (für PBT-Halter ØD = 77-90 und Einpressring ØD = 77-90)

Shape: Y (ØD = 77-90)  
(double sleeve, bracket free of charge)

Form: Y (ØD = 77-90)  
(mit doppelter Isolierung, Y-Schelle wird kostenlos mitgeliefert)



ØD	P	S	T <sub>L</sub>	T <sub>D</sub>	Cap material
77	31.5	M6x12	9.0	12	PH
		M5x10	8.0	11	PH
90	31.5	M6x12	8.0	12	PH

Size in mm. First listed terminal is standard.

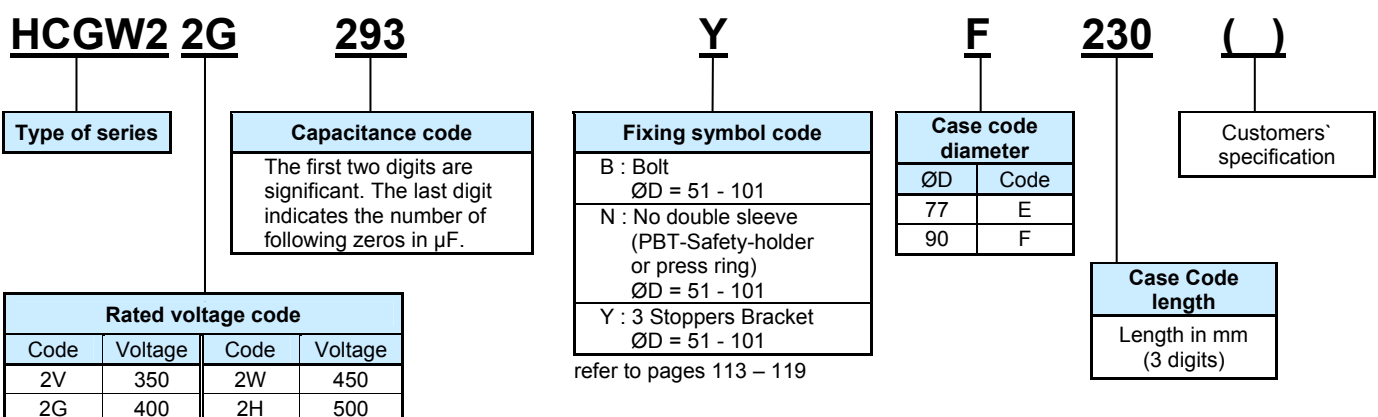
## ► Ripple Current Multiplier / Wechselstrommultiplikator

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

## ► Product Code / Bestellbezeichnung

Example: 29000µF 400V D=90mm L=230mm with Y-Bracket



Rated Voltage Code (Surge Voltage) $V_r$ [V DC]	Capacitance $C_r$ [ $\mu$ F]	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz $I_r$ [A RMS]	ESR (typ) at 20°C/100Hz [m $\Omega$ ]	Zmax at 20°C/10kHz [m $\Omega$ ]	ESL (typ) [nH]	DxL [mm]	Product Code
400 2G (450)	13 000	26.6	9.8	26	27	20	77x148	HCGW22G133□E148
	14 000	28.8	10.7	24	25	20	77x165	HCGW22G143□E165
	16 000	31.7	11.7	21	22	20	77x188	HCGW22G163□E188
	18 000	33.4	12.4	19	20	20	90x150	HCGW22G183□F150
	19 000	35.8	13.2	18	20	20	90x167	HCGW22G193□F167
	20 000	38.4	14.2	17	18	20	77x228	HCGW22G203□E228
	23 000	40.4	14.9	15	16	20	90x190	HCGW22G233□F190
	29 000	48.9	18.1	12	13	20	90x230	HCGW22G293□F230
450 2W (500)	10 000	22.3	8.3	40	42	20	77x148	HCGW22W103□E148
	12 000	25.5	9.4	33	35	20	77x165	HCGW22W123□E165
	14 000	28.2	10.4	29	30	20	77x188	HCGW22W143□E188
	15 000	29.0	10.7	27	29	20	90x150	HCGW22W153□F150
	17 000	32.2	11.9	24	26	20	90x167	HCGW22W173□F167
	18 000	34.7	12.8	22	23	20	77x228	HCGW22W183□E228
	20 000	35.8	13.2	20	21	20	90x190	HCGW22W203□F190
	25 000	43.2	16.0	16	17	20	90x230	HCGW22W253□F230
500 2H (550)	7 500	19.4	7.2	47	48	20	77x148	HCGW22H752□E148
	9 000	22.1	8.2	40	41	20	77x165	HCGW22H902□E165
	10 000	23.9	8.8	36	38	20	77x188	HCGW22H103□E188
	11 000	25.0	9.3	33	34	20	90x150	HCGW22H113□F150
	13 000	29.5	10.9	28	29	20	77x228	HCGW22H133□E228
		28.3	10.5	28	29	20	90x167	HCGW22H133□F167
	15 000	31.0	11.5	24	25	20	90x190	HCGW22H153□F190
	18 000	36.8	13.6	20	21	20	90x230	HCGW22H183□F230

► Life Time Table / Brauchbarkeitsdauer – Tabelle

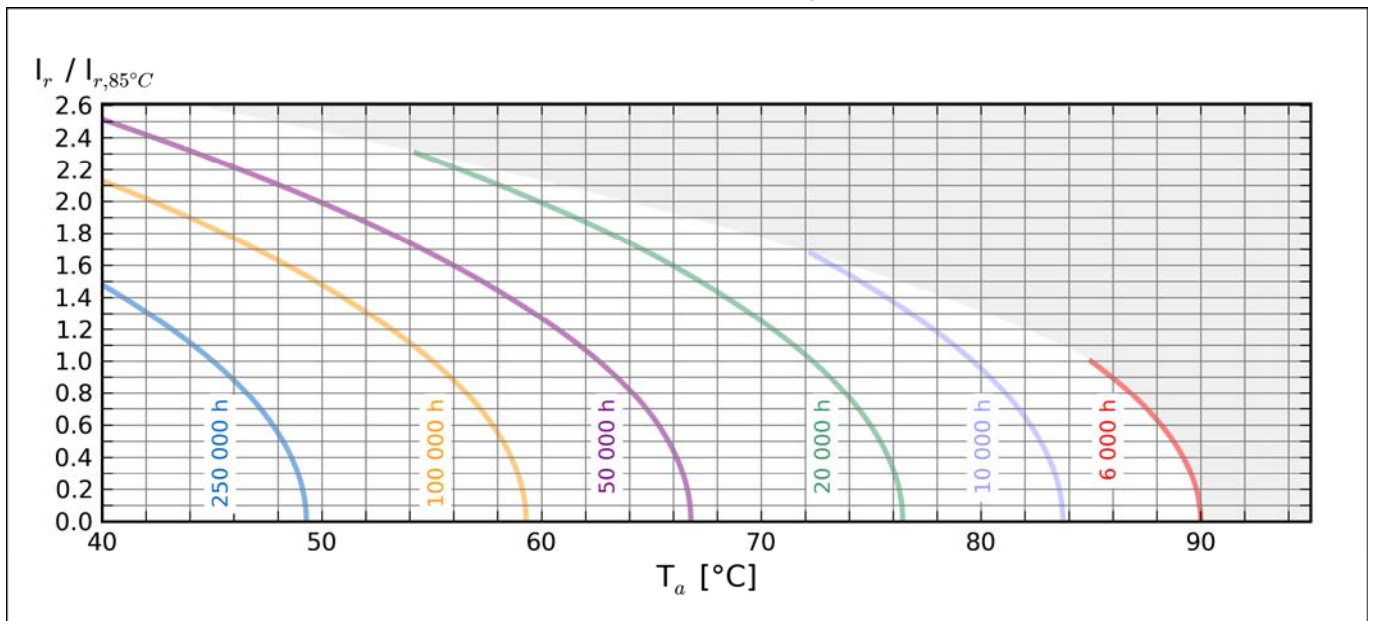
HCGW2	Useful life as function of ambient temperature and ripple current												
$I_r$ at 85°C	x 1.0	x 1.2	x 1.4	x 1.6	x 1.8	x 2.0	x 2.1	x 2.2	x 2.3	x 2.4	x 2.5	x 2.6	x 2.7
$T_a = 40^\circ\text{C}$	250	250	250	216	165	123	105	88	74	62	51	42	34
$T_a = 45^\circ\text{C}$	250	211	172	136	104	78	66	56	47	39	32	26	
$T_a = 50^\circ\text{C}$	158	133	109	86	66	49	42	35	29	24			
$T_a = 55^\circ\text{C}$	100	84	69	54	41	31	26	22					
$T_a = 60^\circ\text{C}$	63	53	43	34	26	19							
$T_a = 65^\circ\text{C}$	40	33	27	21	16								
$T_a = 70^\circ\text{C}$	25	21	17	13									
$T_a = 75^\circ\text{C}$	16	13	11										
$T_a = 80^\circ\text{C}$	10	8											
$T_a = 85^\circ\text{C}$	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  $I_{r,85^\circ\text{C},120\text{Hz}}$

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



► 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