

# DH · Snap-In · 6000h/105 °C

## Permanent Charge-Discharge application Design

These capacitors have been developed especially for deep and frequent charge – discharge applications such as AC servo motors, lamp flash, X-ray, etc.

Diese Kondensatoren wurden speziell für Anwendungen mit häufigen und tiefen Lade-/Entladevorgängen entwickelt wie z.B. AC Motoren, Blitzlampen, Röntgengeräte usw.

### > Specifications · Spezifikationen

Items	Characteristics
Temperature range	-25°C ~ + 105°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 <sub>l</sub> (20°C, 5 min)	0.02 • C • V <sub>r</sub> [μA] or 3 mA, which is smaller.
Useful life	6000 hours at 105°C
Field failure rate	0.5 FIT = 0.5 • 10 <sup>-9</sup> Failures/hour
Reference standards	IEC 60384-4, JIS C 5101-4, AEC-Q200 qualified
Vibration	0.75mm, 10...55Hz, 10g, 3x2h
Charge – Discharge	ΔV = 150VDC, f = 6Hz life ≥ 200 Mio cycles at 40°C
Sleeve withstanding voltage	3000 Vac/1 min between terminals bundled and plate*
Product Compliance	RoHS, REACH, Conflict Minerals a.o. - refer to p. 12–13



\* Typical value using sleeve which is free from any scratches and damages

### > Outline Drawings · Bauformen

Refer to page 7 for available terminal shapes and dimensions. · Auf Seite 7 finden Sie die verfügbaren Bauformen und Maße.

### > Product Code · Bestellbezeichnung

**Example:** Series DH · 400 V · 100 µF ± 20 % · 22x25 mm · 2-Pin · without plate

DH		2G		101		M		R		X		S2		WPEC	
Type of series		Capacitance code		Terminal symbol code		Rated voltage code		Capacitance tolerance		Diameter Code		Length Code			
		The first two digits are significant. The last digit indicates the number of following zeros in µF.		R: 2-claw 6.3 mm S: 4-claw 6.3 mm C: 2-claw short 4.0 mm X: 4-claw short 4.0 mm E: 3-claw short 4.0 mm T: 2-lugs 4.5 mm		Code   Voltage		M : ± 20%		Code   ØD		Code   L   Code   L			
						2G   400 2W   450				X   22 Y   25 Z   30 A   35		S2   25   S6   45 S3   30   S7   50 S4   35   S13   80 S5   40			
												Others on request			

Rated VoltageCode (Surge Voltage) $V_r$ [V DC]	Capacitance $C_r$ [ $\mu$ F]	Ripple Current at 105°C/120Hz $I_r$ [A RMS]	Ripple Current at 40°C/120Hz [A RMS]	ESR (typ) at 20°C/100Hz [m $\Omega$ ]	Dissipation Factor at 20°C/100Hz Tan $\delta$	DxL [mm]	Product Code  # = variable value, see terminal code in the product code
<b>400 VDC</b> Code: 2G  Surge Voltage 450 VDC	100	0.70	1.61	1100	0.20	22x25	DH2G101M#XS2
	120	0.82	1.89	920	0.20	22x30	DH2G121M#XS3
		0.81	1.86	920	0.20	25x25	DH2G121M#YS2
	150	0.96	2.21	730	0.20	22x35	DH2G151M#XS4
	180	1.09	2.51	610	0.20	22x40	DH2G181M#XS5
		1.04	2.39	610	0.20	25x30	DH2G181M#YS3
	220	1.25	2.88	500	0.20	22x45	DH2G221M#XS6
		1.21	2.78	500	0.20	25x35	DH2G221M#YS4
		1.15	2.65	500	0.20	30x25	DH2G221M#ZS2
	270	1.44	3.31	410	0.20	22x50	DH2G271M#XS7
		1.39	3.20	410	0.20	25x40	DH2G271M#YS5
		1.34	3.08	410	0.20	30x30	DH2G271M#ZS3
		1.32	3.04	410	0.20	35x25	DH2G271M#AS2
	330	1.60	3.68	330	0.20	25x45	DH2G331M#YS6
		1.55	3.57	330	0.20	30x35	DH2G331M#ZS4
		1.68	3.86	330	0.20	35x30	DH2G331M#AS3
	390	1.76	4.05	280	0.20	30x40	DH2G391M#ZS5
		1.67	3.84	280	0.20	35x30	DH2G391M#AS3
	470	2.00	4.60	230	0.20	30x45	DH2G471M#ZS6
		1.91	4.39	230	0.20	35x35	DH2G471M#AS4
560	2.25	5.18	200	0.20	30x50	DH2G561M#ZS7	
	2.17	4.99	200	0.20	35x40	DH2G561M#AS5	
680	2.47	5.68	160	0.20	35x45	DH2G681M#AS6	
1 500	4.99	11.48	55	0.20	35x80	DH2G152M#AS132PCC	
<b>450 VDC</b> Code: 2W  Surge Voltage 500 VDC	82	0.64	1.47	1220	0.20	22x25	DH2W820M#XS2
	100	0.75	1.73	1000	0.20	22x30	DH2W101M#XS3
		0.74	1.70	1000	0.20	25x25	DH2W101M#YS2
	120	0.86	1.98	830	0.20	22x35	DH2W121M#XS4
		0.85	1.96	830	0.20	25x30	DH2W121M#YS3
	150	1.00	2.30	660	0.20	22x40	DH2W151M#XS5
		1.00	2.30	660	0.20	25x35	DH2W151M#YS4
		0.95	2.19	660	0.20	30x25	DH2W151M#ZS2
	180	1.13	2.60	550	0.20	22x45	DH2W181M#XS6
		1.09	2.51	550	0.20	25x35	DH2W181M#YS4
	220	1.30	2.99	450	0.20	25x45	DH2W221M#YS6
		1.21	2.78	450	0.20	30x30	DH2W221M#ZS3
		1.19	2.74	450	0.20	35x25	DH2W221M#AS2
	270	1.49	3.43	370	0.20	25x50	DH2W271M#YS7
		1.41	3.24	370	0.20	30x35	DH2W271M#ZS4
		1.39	3.20	370	0.20	35x30	DH2W271M#AS3
	300	1.48	3.40	323	0,20	35x30	DH2W301M#AS3
	330	1.62	3.73	300	0.20	30x40	DH2W331M#ZS5
		1.60	3.68	300	0.20	35x35	DH2W331M#AS4
	390	1.88	4.32	260	0.20	30x50	DH2W391M#ZS7
1.81		4.16	260	0.20	35x40	DH2W391M#AS5	
470	2.05	4.72	210	0.20	35x45	DH2W471M#AS6	
500	2.11	4.85	198	0.20	35x45	DH2W501M#AS6	
560	2.31	5.31	180	0.20	35x50	DH2W561M#AS7	

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	90	95	100	105
Multiplier	2.3	2.1	2.0	2.0	1.9	1.8	1.7	1.6	1.4	1.4	1.2	1.1	1.1	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

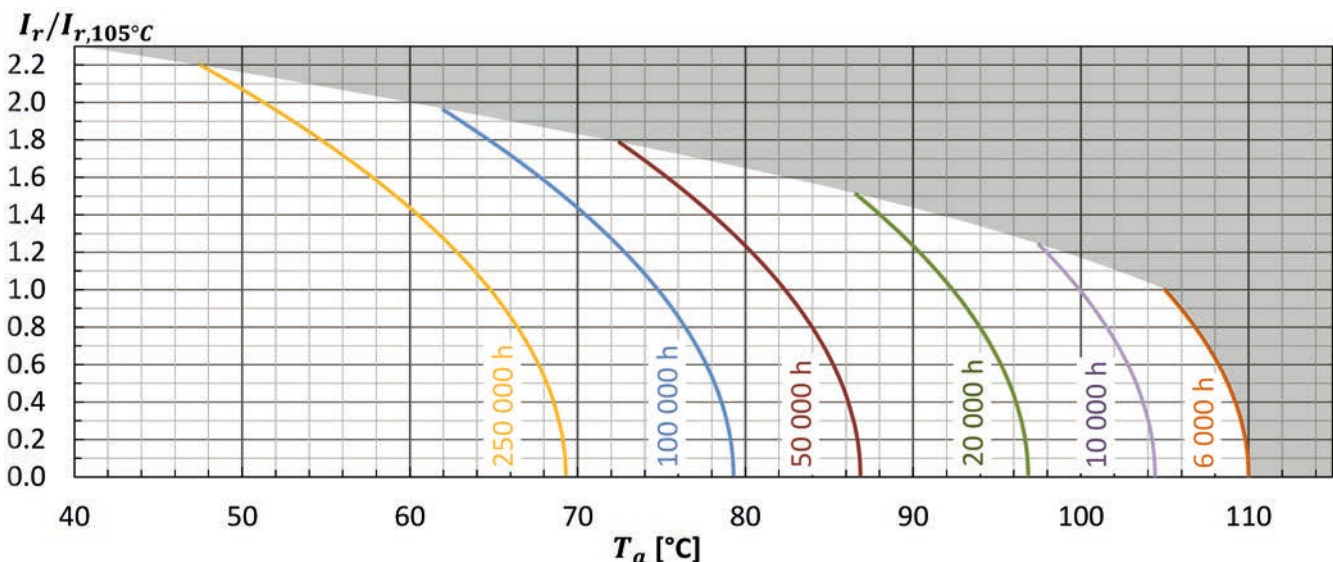
DH	Useful life as function of ambient temperature and ripple current														
	$I_r$ at 105°C	x 1.0	x 1.1	x 1.2	x 1.3	x 1.4	x 1.5	x 1.6	x 1.7	x 1.8	x 1.9	x 2.0	x 2.1	x 2.2	x 2.3
$T_a = 40°C$	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
$T_a = 45°C$	250	250	250	250	250	250	250	250	250	250	250	250	250		
$T_a = 50°C$	250	250	250	250	250	250	250	250	250	250	250	250			
$T_a = 55°C$	250	250	250	250	250	250	250	250	250	243	209	178			
$T_a = 60°C$	250	250	250	250	250	231	203	177	154	132					
$T_a = 65°C$	245	225	204	184	165	146	128	112	97						
$T_a = 70°C$	155	142	129	116	104	92	81	71							
$T_a = 75°C$	98	90	81	73	66	58	51								
$T_a = 80°C$	62	56	51	46	41										
$T_a = 85°C$	39	36	32	29	26										
$T_a = 90°C$	24	22	20												
$T_a = 95°C$	15	14													
$T_a = 100°C$	9	9													
$T_a = 105°C$	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  $I_{r, 105°C, 120Hz}$

Brauchbarkeitsdauer in Abhängigkeit von Umgebungstemperatur  $T_a$  und Wechselstrombelastung  $I_r$  im Verhältnis zur max. Wechselstrombelastung bei oberer Kategorie-temperatur  $I_{r, 105°C, 120Hz}$



> Life Time Tests and Requirements · Anforderungen Brauchbarkeitsdauer

Life time test	Test procedure	Life time criteria
Endurance test	$T_a = 105^\circ\text{C}$ ; $V_r, I_r$ applied 5000 hours	$\Delta C/C \leq 20\%$ (of initial value) $\text{Tan}\delta \leq 200\%$ (of specified value) $I_L \leq$ specified value
	$f = 6\text{Hz} \geq 100$ Mio cycles at $40^\circ\text{C}$	
Useful life	$T_a = 105^\circ\text{C}$ ; $V_r, I_r$ applied 6000 hours	$\Delta C/C \leq 30\%$ (of initial value) $\text{Tan}\delta < 300\%$ (of specified value) $I_L \leq$ specified value
	$f = 6\text{Hz} \geq 150$ Mio cycles at $40^\circ\text{C}$	

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