

ZR · Snap-In · 8000 h/105 °C

Higher Ripple Current · ULTRA low ESR · Compact Design

> Specifications · Spezifikationen

Items	Characteristics
Temperature range	-40°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 _L (20°C, 5 min)	0.02 · C · V _r [μA] or 3 mA, which is smaller.
Useful life	8000 hours at 105°C
Field failure rate	0.5 FIT = 0.5 · 10 ⁻⁹ Failures/hour
Reference standards	IEC 60384-4, JIS C 5101-4
Vibration	0.75mm, 10...55Hz, 10g, 3x2h
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 ZR · 400 V · 560 μF ±20 % · 35x45 mm · 2-pin short · without plate

ZR	2G	561	M	C	A	S6	WPEC
Type of series	Capacitance code The first two digits are significant. The last digit indicates the number of following zeros in μF.		Terminal symbol code 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		Diameter code		Outer design code None: PET sleeve and PVC plate WPEC: PET sleeve without plate
Rated voltage code		Capacitance tolerance		Length Code			
Code	Voltage	M : ± 20%		Code	L	Code	L
2G	400	Q : -10% ~ +30%		S2	25	S6	45
2W	450			S3	30	S7	50
				S4	35	S8	55
				S5	40	S9	60

Rated VoltageCode (Surge Voltage) V_r [V DC]	Capacitance C_r [μ 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 Ω]	Dissipation Factor at 20°C/100Hz Tan δ	DxL [mm]	Product Code # = variable value, see terminal code in the product code
400 VDC Code: 2G Surge Voltage 450 VDC	180	1.50	3.60	215	0.20	30x25	ZR2G181M#ZS2
	220	1.82	4.37	180	0.20	30x30	ZR2G221M#ZS3
	270	2.11	5.06	145	0.20	30x35	ZR2G271M#ZS4
		2.02	4.85	145	0.20	35x25	ZR2G271M#AS2
	330	2.43	5.83	115	0.20	30x40	ZR2G331M#ZS5
		2.35	5.64	115	0.20	35x30	ZR2G331M#AS3
	390	2.73	6.55	95	0.20	30x45	ZR2G391M#ZS6
		2.67	6.41	95	0.20	35x35	ZR2G391M#AS4
	470	3.09	7.41	80	0.20	30x50	ZR2G471M#ZS7
		3.04	7.30	80	0.20	35x40	ZR2G471M#AS5
	560	3.43	8.23	65	0.20	35x45	ZR2G561M#AS6
	680	3.90	9.36	60	0.20	35x50	ZR2G681M#AS7
820	4.49	10.78	50	0.20	35x60	ZR2G821M#AS9	
450 VDC Code: 2W Surge Voltage 500 VDC	150	1.25	3.00	285	0.20	30x25	ZR2W151M#ZS2
	180	1.50	3.60	235	0.20	30x30	ZR2W181M#ZS3
	220	1.83	4.40	190	0.20	30x35	ZR2W221M#ZS4
		1.83	4.40	190	0.20	35x25	ZR2W221M#AS2
	270	2.21	5.30	150	0.20	30x40	ZR2W271M#ZS5
		2.14	5.14	150	0.20	35x30	ZR2W271M#AS3
	330	2.52	6.05	120	0.20	30x45	ZR2W331M#ZS6
		2.47	5.93	120	0.20	35x35	ZR2W331M#AS4
	390	2.83	6.80	95	0.20	30x50	ZR2W391M#ZS7
		2.78	6.67	95	0.20	35x40	ZR2W391M#AS5
	470	3.16	7.58	80	0.20	35x45	ZR2W471M#AS6
	560	3.55	8.52	70	0.20	35x50	ZR2W561M#AS7
680	4.08	9.80	60	0.20	35x56	ZR2W681M#AS8	

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		1.30		1.50		1.80	

Ta (°C)	40	45	50	55	60	65	70	75	80	85	90	95	100	105
Multiplier	2.4	2.4	2.3	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.2	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

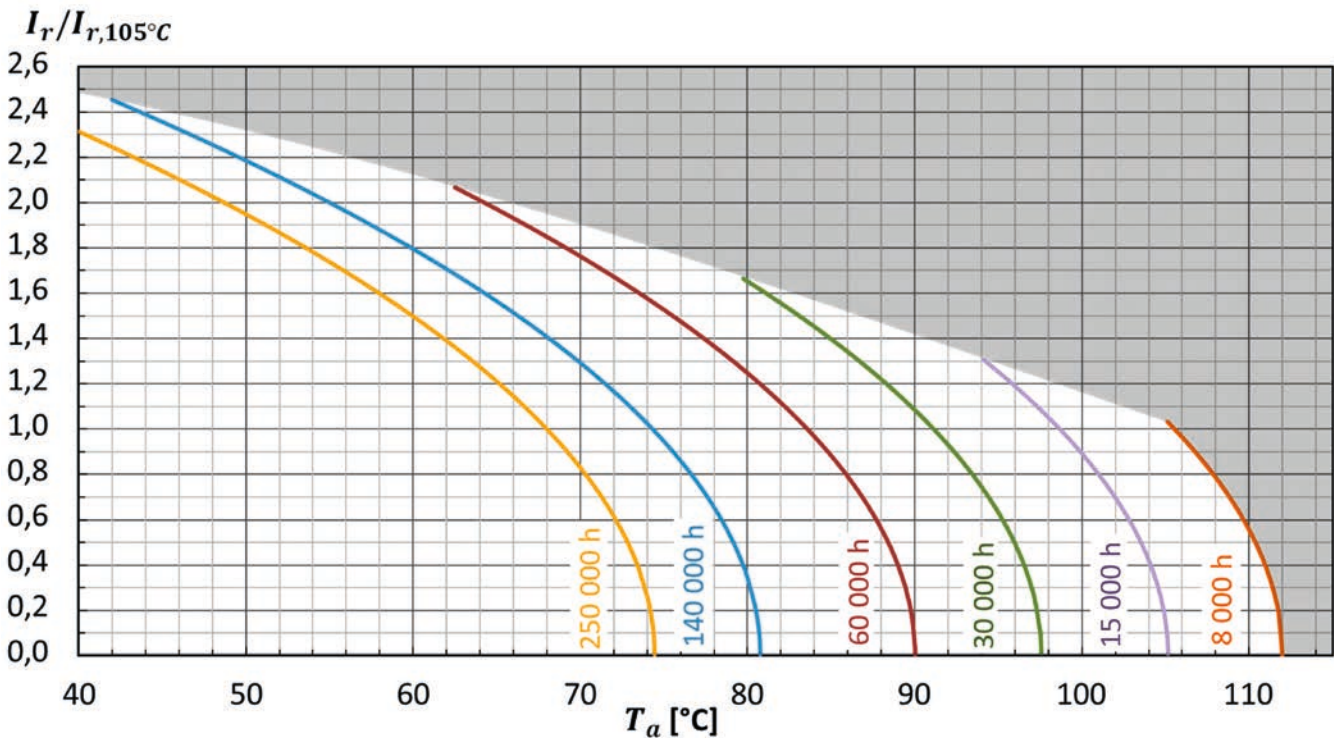
ZR	Ripple Current Multiplier													
	1.0	1.1	1.2	1.4	1.5	1.6	1.7	1.8	2.0	2.1	2.2	2.3	2.4	
40°C	250	250	250	250	250	250	250	250	250	250	250	250	250	196
45°C	250	250	250	250	250	250	250	250	250	250	250	213	164	124
50°C	250	250	250	250	250	250	250	250	221	174	135	103		
55°C	250	250	250	250	250	250	250	219	140	110	85			
60°C	250	250	250	250	249	207	171	139	89	70				
65°C	250	250	250	187	157	131	108	88	56					
70°C	208	184	160	118	99	83	68	55						
75°C	132	116	101	75	63	52	43							
80°C	83	74	64	47	40	33								
85°C	53	46	41	30	25									
90°C	33	29	26	19										
95°C	21	19	16											
100°C	13	12												
105°C	8													

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 $I_{r, 105^\circ\text{C}, 120\text{Hz}}$

Brauchbarkeitsdauer in Abhängigkeit von Umgebungstemperatur T_a und Wechselstrombelastung I_r im Verhältnis zur max. Wechselstrombelastung bei oberer Kategorietemperatur $I_{r, 105^\circ\text{C}, 120\text{Hz}}$



> Life Time Tests and Requirements · Anforderungen Brauchbarkeitsdauer

Life time test	Test procedure	Life time criteria
Endurance test	$T_a = 105^{\circ}\text{C}$; 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
Useful life	$T_a = 105^{\circ}\text{C}$; V_r, I_r applied 8000 hours	$\Delta C/C \leq 30\%$ (of initial value) $\text{Tan}\delta < 300\%$ (of specified value) $I_L \leq$ specified value

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