ZLR · Snap-In · 8000 h/105 °C

High Ripple Current · ULTRA low ESR · Compact Design

› 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_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, AEC-Q200 qualified
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 ZLR · 450 V · 560 µF ±20 % · 35x50 mm · 2-pin short · without plate

ZLR **2W** **561** **M** **C** **A** **S7** **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

Code	ØD
X	22
Y	25
Z	30
A	35

Outer design code

None: PET sleeve and PVC plate
WPEC: PET sleeve without plate

Rated voltage code

Code	Voltage
2G	400
2W	450

Capacitance tolerance

M : ± 20%
Q : -10% ~ +30%

Length Code

Code	L	Code	L
S2	25	S6	45
S3	30	S7	50
S4	35	S8	55
S5	40	S9	60

Rated VoltageCode (Surge Voltage) V_r [V DC]	Capacitance C_r [µF]	Ripple Current at 105°C/120Hz I_r [A RMS]	Ripple Current at 40°C/120Hz [A RMS]	ESR (typ) at 20°C/100Hz [mΩ]	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	**100**	0.83	2.08	470	0.20	22x25	ZLR2G101M#XS2
	120	0.94	2.35	385	0.20	22x30	ZLR2G121M#XS3
		0.95	2.38	385	0.20	25x25	ZLR2G121M#YS2
	150	1.09	2.73	335	0.20	22x35	ZLR2G151M#XS4
	180	1.22	3.05	285	0.20	22x40	ZLR2G181M#XS5
		1.21	3.03	285	0.20	25x30	ZLR2G181M#YS3
		1.26	3.15	215	0.20	30x25	ZLR2G181M#ZS2
	220	1.37	3.43	230	0.20	22x45	ZLR2G221M#XS6
		1.38	3.45	230	0.20	25x35	ZLR2G221M#YS4
		1.44	3.60	180	0.20	30x30	ZLR2G221M#ZS3
	270	1.54	3.85	185	0.20	22x50	ZLR2G271M#XS7
		1.56	3.90	185	0.20	25x40	ZLR2G271M#YS5
		1.65	4.13	145	0.20	30x35	ZLR2G271M#ZS4
		1.61	4.03	145	0.20	35x25	ZLR2G271M#AS2
	330	1.77	4.43	145	0.20	25x50	ZLR2G331M#YS7
		1.85	4.63	115	0.20	30x40	ZLR2G331M#ZS5
		2.42	5.81	100	0.20	30x50	ZLR2G331Q#ZS7CC
		1.83	4.58	115	0.20	35x30	ZLR2G331M#AS3
	390	2.05	5.13	95	0.20	30x45	ZLR2G391M#ZS6
		2.05	5.13	95	0.20	35x35	ZLR2G391M#AS4
	470	2.27	5.68	80	0.20	30x50	ZLR2G471M#ZS7
		2.29	5.73	80	0.20	35x40	ZLR2G471M#AS5
	560	2.54	6.35	65	0.20	35x45	ZLR2G561M#AS6
		3.16	7.90	55	0.20	35x60	ZLR2G561Q#AS9CCR
	680	2.82	7.05	60	0.20	35x50	ZLR2G681M#AS7
		3.49	8.73	50	0.20	35x60	ZLR2G681Q#AS9CCR
	820	3.25	8.13	45	0.20	35x60	ZLR2G821M#AS9
450 VDC Code: 2W Surge Voltage 500 VDC	**68**	0.66	1.65	720	0.20	22x25	ZLR2W680M#XS2
	100	0.83	2.08	490	0.20	22x30	ZLR2W101M#XS3
		0.84	2.10	490	0.20	25x25	ZLR2W101M#YS2
	120	0.94	2.35	420	0.20	22x35	ZLR2W121M#XS4
		0.95	2.38	420	0.20	25x30	ZLR2W121M#YS3
	150	1.07	2.68	350	0.20	22x40	ZLR2W151M#XS5
		1.10	2.75	350	0.20	25x35	ZLR2W151M#YS4
		1.11	2.78	285	0.20	30x25	ZLR2W151M#ZS2
	180	1.19	2.98	300	0.20	22x45	ZLR2W181M#XS6
		1.23	3.08	300	0.20	25x40	ZLR2W181M#YS5
		1.26	3.15	235	0.20	30x30	ZLR2W181M#ZS3
	220	1.34	3.35	245	0.20	22x50	ZLR2W221M#XS7
		1.38	3.45	245	0.20	25x45	ZLR2W221M#YS6
		1.43	3.58	190	0.20	30x35	ZLR2W221M#ZS4
		1.42	3.55	190	0.20	35x25	ZLR2W221M#AS2
	270	1.54	3.85	195	0.20	25x50	ZLR2W271M#YS7
		1.62	4.05	150	0.20	30x40	ZLR2W271M#ZS5
		1.63	4.08	150	0.20	35x30	ZLR2W271M#AS3

Additional designs on request · Weitere Designs auf Anfrage

Rated VoltageCode (Surge Voltage) V_r [V DC]	Capacitance C_r [µF]	Ripple Current at 105°C/120Hz I_r [A RMS]	Ripple Current at 40°C/120Hz [A RMS]	ESR (typ) at 20°C/100Hz [mΩ]	Dissipation Factor at 20°C/100Hz Tan δ	DxL [mm]	Product Code # = variable value, see terminal code in the product code
450 VDC Code: 2W Surge Voltage 500 VDC	**330**	1.81	4.53	120	0.20	30x45	ZLR2W331M#ZS6
		1.84	4.60	120	0.20	35x35	ZLR2W331M#AS4
	390	1.99	4.98	95	0.20	30x50	ZLR2W391M#ZS7
		2.04	5.10	95	0.20	35x40	ZLR2W391M#AS5
	470	2.27	5.68	80	0.20	35x45	ZLR2W471M#AS6
	560	2.50	6.25	70	0.20	35x50	ZLR2W561M#AS7
	680	2.87	7.18	60	0.20	35x55	ZLR2W681M#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	2.5	2.4	2.3	2.2	2.1	2.0	1.9	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

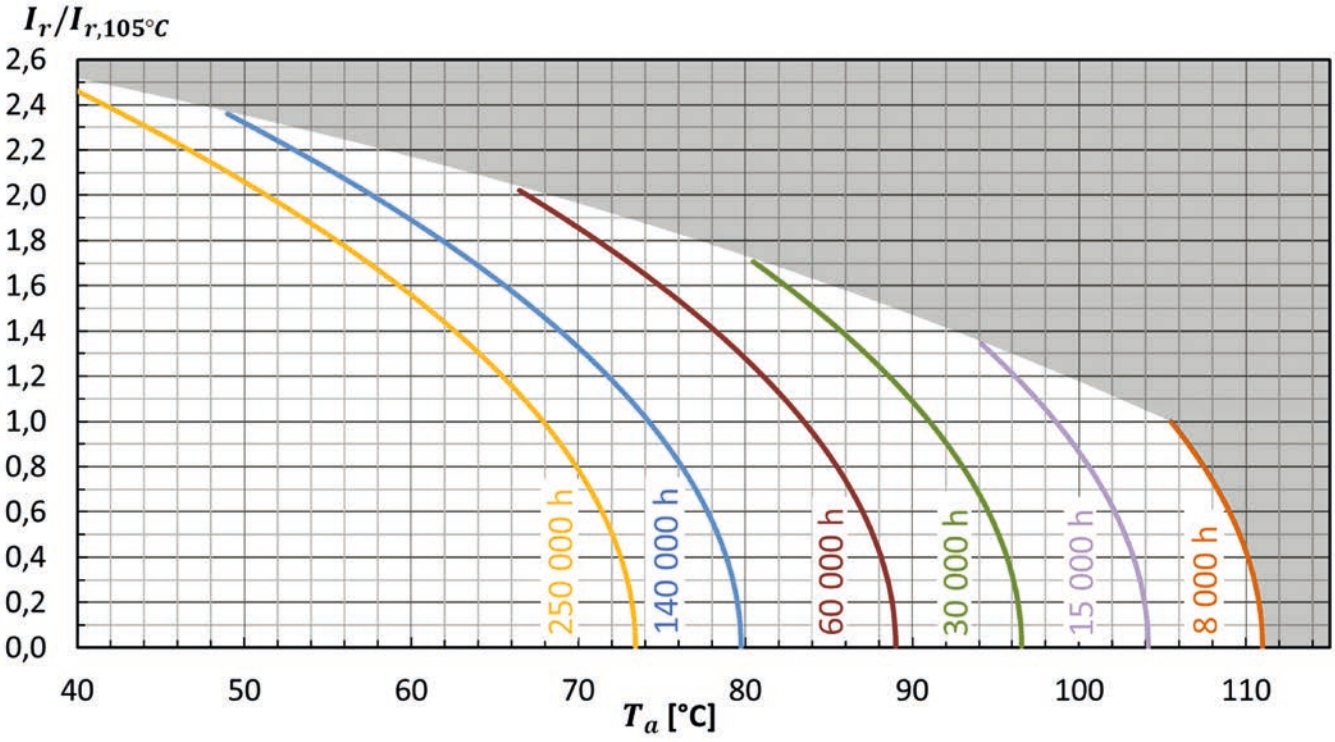
ZLR	Ripple Current Multiplier													
T_a	1.0	1.1	1.2	1.4	1.5	1.6	1.7	1.9	2.0	2.1	2.2	2.3	2.4	2.5
40°C	250	250	250	250	250	250	250	250	250	250	250	250	250	227
45°C	250	250	250	250	250	250	250	250	250	250	250	233	184	
50°C	250	250	250	250	250	250	250	250	250	230	185	147		
55°C	250	250	250	250	250	250	250	218	179	145	117			
60°C	250	250	250	250	250	235	198	138	113	92				
65°C	250	250	250	201	174	148	126	87	72					
70°C	207	186	165	127	110	94	79	55						
75°C	131	117	105	80	69	59	50							
80°C	83	74	66	51	44	38								
85°C	52	47	42	32	28									
90°C	33	30	26	20										
95°C	21	19	17											
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 $I_{r,\ 105°C,120Hz}$

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



› Life Time Tests and Requirements · Anforderungen Brauchbarkeitsdauer

Life time test	Test procedure	Life time criteria
Endurance test	T_a = 105°C; V_r, I_r applied 5000 hours	ΔC/C ≤ 20% (of initial value) Tanδ ≤ 200% (of specified value) I_L ≤ specified value
Useful life	T_a = 105°C; V_r, I_r applied 8000 hours	ΔC/C ≤ 30% (of initial value) Tanδ < 300% (of specified value) I_L ≤ specified value

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