

ZLR · Snap-In · 8000 h/105 °C

High Ripple · 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)	$0.02 \cdot C \cdot V_r$ [μ A] or 3 mA, which is smaller.
Useful life	8 000 hours at 105°C
Field failure rate	0.5 FIT = $0.5 \cdot 10^{-9}$ Failures/hour
RoHS conform	Directive 2011/65/EU & (EU)2015/863
Specifications	JIS C 5101-4, AEC-Q200 qualified
Vibration	0.75mm, 10...55Hz, 10g, 3x2h



> Outline Drawings · Bauformen

Refer to page 8 for available terminal shapes and dimensions. · Auf Seite 8 finden Sie die verfügbaren Bauformen und Maße.

> Product Code · Bestellbezeichnung

Example: Series ZLR · 450 V · 560 μ F \pm 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 μ F.

Terminal symbol code

R: 2-pin terminal
S: 4-pin terminal
C: 2-pin short terminal
X: 4-pin short terminal
E: 3-pin short terminal

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 : \pm 20%
Q : -10% ~ +30%

Length code

Code	L
S2	25
S3	30
S4	35
S5	40
S6	45
S7	50

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 fixing code in the product code
400 VDC Code: 2G Surge Voltage 450 VDC	100	0.83	1.99	430	0.20	22x25	ZLR2G820M#XS2
	120	0.94	2.26	350	0.20	22x30	ZLR2G121M#XS3
		0.95	2.28	350	0.20	25x25	ZLR2G121M#YS2
	150	1.09	2.62	275	0.20	22x35	ZLR2G151M#XS4
		1.22	2.93	225	0.20	22x40	ZLR2G181M#XS5
	180	1.21	2.90	225	0.20	25x30	ZLR2G181M#YS3
		1.26	3.02	225	0.20	30x25	ZLR2G181M#ZS2
		1.37	3.29	180	0.20	22x45	ZLR2G221M#XS6
	220	1.38	3.31	180	0.20	25x35	ZLR2G221M#YS4
		1.44	3.46	180	0.20	30x30	ZLR2G221M#ZS3
		1.54	3.70	145	0.20	22x50	ZLR2G271M#XS7
	270	1.56	3.74	145	0.20	25x40	ZLR2G271M#YS6
		1.65	3.96	145	0.20	30x35	ZLR2G271M#ZS4
		1.61	3.86	145	0.20	35x25	ZLR2G271M#AS2
	330	1.77	4.25	115	0.20	25x50	ZLR2G331M#YS7
		1.85	4.44	115	0.20	30x40	ZLR2G331M#ZS5
		1.83	4.39	115	0.20	35x30	ZLR2G331M#AS3
	390	2.05	4.92	95	0.20	30x45	ZLR2G391M#ZS6
		2.05	4.92	95	0.20	35x35	ZLR2G391M#AS4
	470	2.27	5.45	80	0.20	30x50	ZLR2G471M#ZS7
2.29		5.50	80	0.20	35x40	ZLR2G471M#AS5	
560	2.54	6.10	65	0.20	35x45	ZLR2G561M#AS6	
680	2.82	6.77	50	0.20	35x50	ZLR2G681M#AS7	
450 VDC Code: 2W Surge Voltage 500 VDC	68	0.66	1.58	675	0.20	22x25	ZLR2W680M#XS2
	100	0.83	1.99	450	0.20	22x30	ZLR2W101M#XS3
		0.84	2.02	450	0.20	25x25	ZLR2W101M#YS2
	120	0.94	2.26	365	0.20	22x35	ZLR2W121M#XS4
		0.95	2.28	365	0.20	25x30	ZLR2W121M#YS3
	150	1.07	2.57	285	0.20	22x40	ZLR2W151M#XS5
		1.10	2.64	285	0.20	25x35	ZLR2W151M#YS4
		1.11	2.66	285	0.20	30x25	ZLR2W151M#ZS2
	180	1.19	2.86	235	0.20	22x45	ZLR2W181M#XS6
		1.23	2.95	235	0.20	25x40	ZLR2W181M#YS5
		1.26	3.02	235	0.20	30x30	ZLR2W181M#ZS3
	220	1.34	3.22	190	0.20	22x50	ZLR2W221M#XS7
		1.38	3.31	190	0.20	25x45	ZLR2W221M#YS6
		1.43	3.43	190	0.20	30x35	ZLR2W221M#ZS4
		1.42	3.41	190	0.20	35x25	ZLR2W221M#AS2
	270	1.54	3.70	150	0.20	25x50	ZLR2W271M#YS7
		1.62	3.89	150	0.20	30x40	ZLR2W271M#ZS5
		1.63	3.91	150	0.20	35x30	ZLR2W271M#AS3
	330	1.81	4.34	115	0.20	30x45	ZLR2W331M#ZS6
		1.84	4.42	115	0.20	35x35	ZLR2W331M#AS4
	390	1.99	4.78	95	0.20	30x50	ZLR2W391M#ZS7
		2.04	4.90	95	0.20	35x40	ZLR2W391M#AS5
	470	2.27	5.45	75	0.20	35x45	ZLR2W471M#AS6
	560	2.50	6.00	65	0.20	35x50	ZLR2W561M#AS7

Additional designs on request · Weitere Designs auf Anfrage

> 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	1.20	1.50	1.70	Multiplier	1.0	1.1

Ta (°C)	40	45	50	55	60	65	70	75	80	85	90	95	100	105
Multiplier	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.2	1.1	1.0

> Life Time Table · Brauchbarkeitsdauer – Tabelle

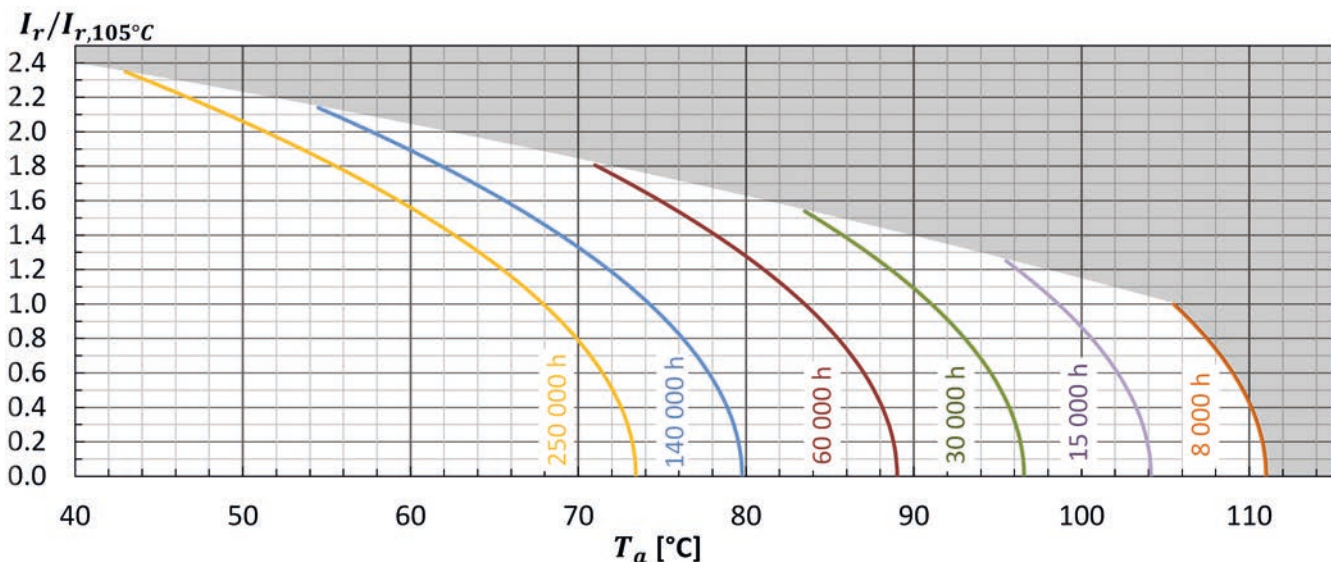
ZLR	Useful life as function of ambient temperature and ripple current													
I _r at 105°C	x 1.0	x 1.1	x 1.2	x 1.4	x 1.5	x 1.6	x 1.7	x 1.8	x 1.9	x 2.0	x 2.1	x 2.2	x 2.3	x 2.4
T _a = 40°C	250	250	250	250	250	250	250	250	250	250	250	250	250	250
T _a = 45°C	250	250	250	250	250	250	250	250	250	250	250	250	250	233
T _a = 50°C	250	250	250	250	250	250	250	250	250	250	230	185		
T _a = 55°C	250	250	250	250	250	250	250	250	218	179	145			
T _a = 60°C	250	250	250	250	250	235	198	166	138	113				
T _a = 65°C	250	250	250	201	174	148	126	105	87					
T _a = 70°C	207	186	165	127	110	94	79	67						
T _a = 75°C	131	117	105	80	69	59	50							
T _a = 80°C	83	74	66	51	44	38								
T _a = 85°C	52	47	42	32	28									
T _a = 90°C	33	30	26	20										
T _a = 95°C	21	19	17											
T _a = 100°C	13	12												
T _a = 105°C	8													

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
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