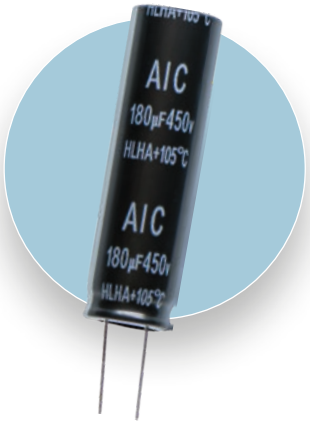
HLHA · Radial · 14000 h/105 °C

Compact Design · Very Long Life

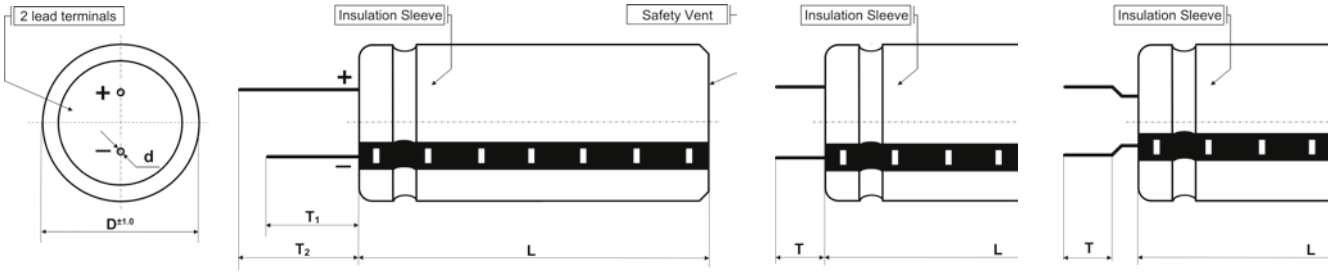
› Specifications · Spezifikationen

Items	Characteristics
Temperature range	-40 °C ~ + 105 °C
Capacitance tolerance (at 20 °C)	Standard +/- 20 % at 20 °C
Surge voltage	Repetitive max. 30 sec per 6 Minutes, 1000 times
Leakage current max. I_L (20 °C, 1 min)	Refer to the specific item value in product table
Useful life	12 000 hours at 105 °C; I_r, V_r, length L < 25 mm 14 000 hours at 105 °C; I_r, V_r, length L ≥ 25 mm
Shelf life	1000 hours at 105 °C, $I_r = V_r = 0$
Reference standards	IEC 60384-4
Vibration	0.75 mm, 10...55 Hz, 10 g, 3x2 h
Product Compliance	RoHS, REACH, Conflict Minerals a.o. - refer to p. 14–15



› 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 HLHA · 420 V · 120 µF ±20 % · 18x40 mm · 4.5 mm lead · without plate

HLHA	2X	121	M	C	V S5	WPEC

Series name

Capacitance code

The first two digits are significant. The last digit indicates the number of following zeros in µF.

Terminal code

L: long lead
C: cut 4.5 mm
D: cut 4.0 mm
E: cut 3.5 mm
F: cut 3.0 mm
T: Taped

Outer design code

WPEC: PET sleeve without plate (standard)

[with plate available on request]

Rated voltage code

Code	L	Code	L
2C	160V	2G	400V
2K	180V	2P	415V
2D	200V	2X	420V
2E	250V	2W	450V
2V	350V	2H	500V
2J	385V		

Capacitance tolerance

M : ± 20 %
K : ± 10 %
Q : -10 % +30 %
R : -0 % +20 %
L : ± 15 %
V : -10 % +20 %

Dimension

Diameter (mm)		Length (mm)	
R	10	S0	15–19
S	12.5	S1	20–24
U	16	S2	25–29
V	18	S3	30–34
		S4	35–39
		S5	40
		S6	45
		S7	50

Rated Voltage (Surge Voltage) V_r [V DC]	Capacitance C_r [µF]	Ripple Current at 105°C/100Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [Ω]	ESR max at 20°C/100Hz [Ω]	Dissipation Factor at 20°C/100Hz Tan δ	Leakage current after 1min at 20°C I_{leak} [mA]	DxL [mm]	Product Code # = variable value, see terminal code in the product code
160 VDC Code: 2C Surge Voltage 200 VDC	**47**	0.65	1.69	4.23	0.15	0.40	10x16	HLHA2C470M#RS0WPEC
	68	0.80	1.17	2.93	0.15	0.54	10x20	HLHA2C680M#RS1WPEC
	82	1.04	0.97	2.43	0.15	0.62	10x25	HLHA2C820M#RS2WPEC
	100	1.19	0.80	1.99	0.15	0.74	10x30	HLHA2C101M#RS3WPEC
		1.35	0.80	1.99	0.15	0.74	12.5x20	HLHA2C101M#SS1WPEC
	120	1.40	0.66	1.66	0.15	0.87	10x35	HLHA2C121M#RS4WPEC
	150	1.58	0.53	1.33	0.15	1.06	10x40	HLHA2C151M#RS5WPEC
		1.64	0.53	1.33	0.15	1.06	12.5x25	HLHA2C151M#SS2WPEC
	180	1.80	0.44	1.11	0.15	1.25	10x50	HLHA2C181M#RS7WPEC
		1.96	0.44	1.11	0.15	1.25	12.5x30	HLHA2C181M#SS3WPEC
		1.80	0.44	1.11	0.15	1.25	16x20	HLHA2C181M#US1WPEC
	220	2.25	0.36	0.90	0.15	1.51	12.5x35	HLHA2C221M#SS4WPEC
		2.25	0.36	0.90	0.15	1.51	16x25.5	HLHA2C221M#US2WPEC
		2.23	0.36	0.90	0.15	1.51	18x20.5	HLHA2C221M#VS1WPEC
	270	2.24	0.29	0.74	0.15	1.83	12.5x40	HLHA2C271M#SS5WPEC
		2.42	0.29	0.74	0.15	1.83	16x31.5	HLHA2C271M#US3WPEC
	330	2.80	0.24	0.60	0.15	2.21	12.5x50	HLHA2C331M#SS7WPEC
		2.70	0.24	0.60	0.15	2.21	16x31.5	HLHA2C331M#US3WPEC
		2.36	0.24	0.60	0.15	2.21	18x25.5	HLHA2C331M#VS2WPEC
	390	2.76	0.20	0.51	0.15	2.60	16x36	HLHA2C391M#US4WPEC
	470	3.10	0.17	0.42	0.15	3.11	16x40	HLHA2C471M#US5WPEC
		3.10	0.17	0.42	0.15	3.11	18x31.5	HLHA2C471M#VS3WPEC
	560	3.72	0.14	0.36	0.15	3.68	16x50	HLHA2C561M#US7WPEC
		3.68	0.14	0.36	0.15	3.68	18x40	HLHA2C561M#VS5WPEC
	680	4.26	0.12	0.29	0.15	4.45	18x45	HLHA2C681M#VS6WPEC
	820	4.46	0.10	0.24	0.15	5.35	18x50	HLHA2C821M#VS7WPEC
200 VDC Code: 2D Surge Voltage 250 VDC	**33**	0.65	2.41	6.03	0.15	0.36	10x16	HLHA2D330M#RS0WPEC
	47	0.80	1.69	4.23	0.15	0.48	10x20	HLHA2D470M#RS1WPEC
	56	1.04	1.42	3.55	0.15	0.55	10x25	HLHA2D560M#RS2WPEC
	68	1.08	1.17	2.93	0.15	0.64	10x25	HLHA2D680M#RS2WPEC
		1.35	1.17	2.93	0.15	0.64	12.5x20	HLHA2D680M#SS1WPEC
	82	1.25	0.97	2.43	0.15	0.76	10x30	HLHA2D820M#RS3WPEC
	100	1.44	0.80	1.99	0.15	0.90	10x35	HLHA2D101M#RS4WPEC
	120	1.67	0.66	1.66	0.15	1.06	10x40	HLHA2D121M#RS5WPEC
		1.63	0.66	1.66	0.15	1.06	12.5x30	HLHA2D121M#SS3WPEC
		1.56	0.66	1.66	0.15	1.06	16x20	HLHA2D121M#US1WPEC
	150	1.76	0.53	1.33	0.15	1.30	10x45	HLHA2D151M#RS6WPEC
		1.80	0.53	1.33	0.15	1.30	12.5x35	HLHA2D151M#SS4WPEC
	180	2.07	0.44	1.11	0.15	1.54	12.5x35	HLHA2D181M#SS4WPEC
		2.03	0.44	1.11	0.15	1.54	16x25.5	HLHA2D181M#US2WPEC
		2.00	0.44	1.11	0.15	1.54	18x20.5	HLHA2D181M#VS1WPEC

Additional designs on request · Weitere Designs auf Anfrage

Rated Voltage (Surge Voltage) V_r [V DC]	Capacitance C_r [µF]	Ripple Current at 105°C/100Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [Ω]	ESR max at 20°C/100Hz [Ω]	Dissipation Factor at 20°C/100Hz Tan δ	Leakage current after 1min at 20°C I_{leak} [mA]	DxL [mm]	Product Code # = variable value, see terminal code in the product code
200 VDC Code: 2D Surge Voltage 250 VDC	**220**	2.26	0.36	0.90	0.15	1.86	12.5x45	HLHA2D221M#SS6WPEC
		2.43	0.36	0.90	0.15	1.86	16x31.5	HLHA2D221M#US3WPEC
	270	2.52	0.29	0.74	0.15	2.26	12.5x50	HLHA2D271M#SS7WPEC
		2.36	0.29	0.74	0.15	2.26	16x31.5	HLHA2D271M#US3WPEC
		2.20	0.29	0.74	0.15	2.26	18x25.5	HLHA2D271M#VS2WPEC
	330	2.86	0.24	0.60	0.15	2.74	16x40	HLHA2D331M#US5WPEC
		2.60	0.24	0.60	0.15	2.74	18x31.5	HLHA2D331M#VS3WPEC
	390	3.10	0.20	0.51	0.15	3.22	16x45	HLHA2D391M#US6WPEC
		2.86	0.20	0.51	0.15	3.22	18x36	HLHA2D391M#VS4WPEC
	470	3.36	0.17	0.42	0.15	3.86	16x50	HLHA2D471M#US7WPEC
		3.24	0.17	0.42	0.15	3.86	18x40	HLHA2D471M#VS5WPEC
	560	3.54	0.14	0.36	0.15	4.58	18x45	HLHA2D561M#VS6WPEC
250 VDC Code: 2E Surge Voltage 300 VDC	**33**	0.80	2.41	6.03	0.15	0.43	10x20	HLHA2E330M#RS1WPEC
	47	0.98	1.69	4.23	0.15	0.57	10x25	HLHA2E470M#RS2WPEC
		1.10	1.69	4.23	0.15	0.57	10x30	HLHA2E470M#RS3WPEC
	56	1.35	1.42	3.55	0.15	0.66	12.5x20	HLHA2E560M#SS1WPEC
	68	1.25	1.17	2.93	0.15	0.78	10x35	HLHA2E680M#RS4WPEC
	82	1.43	0.97	2.43	0.15	0.92	10x40	HLHA2E820M#RS5WPEC
		1.43	0.97	2.43	0.15	0.92	12.5x25	HLHA2E820M#SS2WPEC
	100	1.62	0.80	1.99	0.15	1.10	10x45	HLHA2E101M#RS6WPEC
		1.55	0.80	1.99	0.15	1.10	12.5x30	HLHA2E101M#SS3WPEC
		1.43	0.80	1.99	0.15	1.10	16x20	HLHA2E101M#US1WPEC
	120	1.76	0.66	1.66	0.15	1.30	10x50	HLHA2E121M#RS7WPEC
		1.78	0.66	1.66	0.15	1.30	12.5x35	HLHA2E121M#SS4WPEC
		1.64	0.66	1.66	0.15	1.30	18x20.5	HLHA2E121M#VS1WPEC
	150	2.07	0.53	1.33	0.15	1.60	12.5x40	HLHA2E151M#SS5WPEC
		1.96	0.53	1.33	0.15	1.60	16x31.5	HLHA2E151M#US3WPEC
	180	2.18	0.44	1.11	0.15	1.90	12.5x50	HLHA2E181M#SS7WPEC
		2.14	0.44	1.11	0.15	1.90	16x31.5	HLHA2E181M#US3WPEC
		2.07	0.44	1.11	0.15	1.90	18x25.5	HLHA2E181M#VS2WPEC
	220	2.48	0.36	0.90	0.15	2.30	16x36	HLHA2E221M#US4WPEC
		2.48	0.36	0.90	0.15	2.30	18x31.5	HLHA2E221M#VS3WPEC
	270	2.54	0.29	0.74	0.15	2.80	16x40	HLHA2E271M#US5WPEC
		2.52	0.29	0.74	0.15	2.80	18x36	HLHA2E271M#VS4WPEC
	330	2.96	0.24	0.60	0.15	3.40	16x50	HLHA2E331M#US7WPEC
		2.90	0.24	0.60	0.15	3.40	18x40	HLHA2E331M#VS5WPEC
	390	3.18	0.20	0.51	0.15	4.00	18x45	HLHA2E391M#VS6WPEC
	470	3.66	0.17	0.42	0.15	4.80	18x50	HLHA2E471M#VS7WPEC
350 VDC Code: 2V Surge Voltage 400 VDC	**12**	0.34	6.63	22.10	0.20	0.27	10x16	HLHA2V120M#RS0WPEC
	22	0.50	3.62	12.06	0.20	0.31	10x20	HLHA2V220M#RS1WPEC
	27	0.78	2.95	9.82	0.20	0.48	10x25	HLHA2V270M#RS2WPEC
	33	0.83	2.41	8.04	0.20	0.56	10x30	HLHA2V330M#RS3WPEC

Additional designs on request · Weitere Designs auf Anfrage

Rated Voltage (Surge Voltage) V_r [V DC]	Capacitance C_r [µF]	Ripple Current at 105°C/100Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [Ω]	ESR max at 20°C/100Hz [Ω]	Dissipation Factor at 20°C/100Hz Tan δ	Leakage current after 1min at 20°C I_{leak} [mA]	DxL [mm]	Product Code # = variable value, see terminal code in the product code
350 VDC Code: 2V Surge Voltage 400 VDC	**33**	0.85	2.41	8.04	0.20	0.56	12.5x20	HLHA2V330M#SS1WPEC
	39	0.98	2.04	6.80	0.20	0.65	10x35	HLHA2V390M#RS4WPEC
	47	1.13	1.69	5.64	0.20	0.76	10x40	HLHA2V470M#RS5WPEC
		1.13	1.69	5.64	0.20	0.76	12.5x25	HLHA2V470M#SS2WPEC
	56	1.30	1.42	4.74	0.20	0.88	10x45	HLHA2V560M#RS6WPEC
		1.38	1.42	4.74	0.20	0.88	12.5x30	HLHA2V560M#SS3WPEC
		1.20	1.42	4.74	0.20	0.88	16x20	HLHA2V560M#US1WPEC
	68	1.50	1.17	3.90	0.20	1.05	10x50	HLHA2V680M#RS7WPEC
		1.53	1.17	3.90	0.20	1.05	12.5x35	HLHA2V680M#SS4WPEC
	82	1.78	0.97	3.23	0.20	1.25	12.5x40	HLHA2V820M#SS5WPEC
		1.63	0.97	3.23	0.20	1.25	16x25.5	HLHA2V820M#US2WPEC
	100	1.78	0.80	2.65	0.20	1.50	12.5x45	HLHA2V101M#SS6WPEC
		1.73	0.80	2.65	0.20	1.50	16x31.5	HLHA2V101M#US3WPEC
		1.71	0.80	2.65	0.20	1.50	18x25.5	HLHA2V101M#VS2WPEC
	120	1.91	0.66	2.21	0.20	1.78	12.5x50	HLHA2V121M#SS7WPEC
		2.00	0.66	2.21	0.20	1.78	16x36	HLHA2V121M#US4WPEC
	150	2.25	0.53	1.77	0.20	2.20	16x40	HLHA2V151M#US5WPEC
		2.03	0.53	1.77	0.20	2.20	18x31.5	HLHA2V151M#VS3WPEC
	180	2.52	0.44	1.47	0.20	2.62	16x50	HLHA2V181M#US7WPEC
		2.34	0.44	1.47	0.20	2.62	18x40	HLHA2V181M#VS5WPEC
	220	2.70	0.36	1.21	0.20	3.18	18x45	HLHA2V221M#VS6WPEC
	270	2.80	0.29	0.98	0.20	3.88	18x50	HLHA2V271M#VS7WPEC
400 VDC Code: 2G Surge Voltage 450 VDC	**10**	0.31	7.96	26.53	0.20	0.26	10x16	HLHA2G100M#RS0WPEC
	18	0.55	4.42	14.74	0.20	0.39	10x20	HLHA2G180M#RS1WPEC
	22	0.60	3.62	12.06	0.20	0.45	10x25	HLHA2G220M#RS2WPEC
	27	0.85	2.95	9.82	0.20	0.53	12.5x20	HLHA2G270M#SS1WPEC
	33	0.85	2.41	8.04	0.20	0.63	10x30	HLHA2G330M#RS3WPEC
	39	0.98	2.04	6.80	0.20	0.72	10x35	HLHA2G390M#RS4WPEC
		0.98	2.04	6.80	0.20	0.72	12.5x25	HLHA2G390M#SS2WPEC
	47	1.10	1.69	5.64	0.20	0.85	10x40	HLHA2G470M#RS5WPEC
		1.14	1.69	5.64	0.20	0.85	12.5x30	HLHA2G470M#SS3WPEC
		1.18	1.69	5.64	0.20	0.85	16x20	HLHA2G470M#US1WPEC
	56	1.31	1.42	4.74	0.20	1.00	12.5x35	HLHA2G560M#SS4WPEC
		1.25	1.42	4.74	0.20	1.00	18x20.5	HLHA2G560M#VS1WPEC
	68	1.50	1.17	3.90	0.20	1.19	12.5x40	HLHA2G680M#SS5WPEC
		1.43	1.17	3.90	0.20	1.19	16x25.5	HLHA2G680M#US2WPEC
	82	1.70	0.97	3.23	0.20	1.41	12.5x45	HLHA2G820M#SS6WPEC
		1.68	0.97	3.23	0.20	1.41	16x31.5	HLHA2G820M#US3WPEC
		1.60	0.97	3.23	0.20	1.41	18x25.5	HLHA2G820M#VS2WPEC
	100	1.71	0.80	2.65	0.20	1.70	12.5x50	HLHA2G101M#SS7WPEC
		1.71	0.80	2.65	0.20	1.70	16x36	HLHA2G101M#US4WPEC

Additional designs on request · Weitere Designs auf Anfrage

Rated Voltage (Surge Voltage) V_r [V DC]	Capacitance C_r [µF]	Ripple Current at 105°C/100Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [Ω]	ESR max at 20°C/100Hz [Ω]	Dissipation Factor at 20°C/100Hz Tan δ	Leakage current after 1min at 20°C I_{leak} [mA]	DxL [mm]	Product Code # = variable value, see terminal code in the product code
400 VDC Code: 2G Surge Voltage 450 VDC	**100**	1.60	0.80	2.65	0.20	1.70	18x31.5	HLHA2G101M#VS3WPEC
	120	1.94	0.66	2.21	0.20	2.02	16x40	HLHA2G121M#US5WPEC
		1.89	0.66	2.21	0.20	2.02	18x31.5	HLHA2G121M#VS3WPEC
		1.96	0.66	2.21	0.20	2.02	18x36	HLHA2G121M#VS4WPEC
	150	2.22	0.53	1.77	0.20	2.50	18x40	HLHA2G151M#VS5WPEC
	180	2.46	0.44	1.47	0.20	2.98	18x45	HLHA2G181M#VS6WPEC
	220	2.75	0.36	1.21	0.20	3.62	18x50	HLHA2G221M#VS7WPEC
420 VDC Code: 2X Surge Voltage 470 VDC	**15**	0.48	5.31	17.68	0.20	0.35	10x20	HLHA2X150M#RS1WPEC
	18	0.58	4.42	14.74	0.20	0.40	10x25	HLHA2X180M#RS2WPEC
	22	0.63	3.62	12.06	0.20	0.47	10x25	HLHA2X220M#RS2WPEC
	27	0.73	2.95	9.82	0.20	0.55	10x30	HLHA2X270M#RS3WPEC
		0.75	2.95	9.82	0.20	0.55	12.5x20	HLHA2X270M#SS1WPEC
		0.85	2.95	9.82	0.20	0.55	12.5x25	HLHA2X270M#SS2WPEC
	33	0.85	2.41	8.04	0.20	0.65	10x35	HLHA2X330M#RS4WPEC
		0.88	2.41	8.04	0.20	0.65	12.5x25	HLHA2X330M#SS2WPEC
		1.00	2.41	8.04	0.20	0.65	12.5x30	HLHA2X330M#SS3WPEC
	39	0.98	2.04	6.80	0.20	0.76	10x40	HLHA2X390M#RS5WPEC
		1.00	2.04	6.80	0.20	0.76	16x20	HLHA2X390M#US1WPEC
	47	1.10	1.69	5.64	0.20	0.89	10x45	HLHA2X470M#RS6WPEC
		1.10	1.69	5.64	0.20	0.89	12.5x30	HLHA2X470M#SS3WPEC
		1.26	1.69	5.64	0.20	0.89	12.5x35	HLHA2X470M#SS4WPEC
		1.10	1.69	5.64	0.20	0.89	16x25.5	HLHA2X470M#US2WPEC
	56	1.28	1.42	4.74	0.20	1.04	12.5x35	HLHA2X560M#SS4WPEC
		1.43	1.42	4.74	0.20	1.04	12.5x40	HLHA2X560M#SS5WPEC
		1.28	1.42	4.74	0.20	1.04	16x25.5	HLHA2X560M#US2WPEC
		1.20	1.42	4.74	0.20	1.04	18x20.5	HLHA2X560M#VS1WPEC
	68	1.50	1.17	3.90	0.20	1.24	12.5x45	HLHA2X680M#SS6WPEC
		1.68	1.17	3.90	0.20	1.24	12.5x50	HLHA2X680M#SS7WPEC
		1.40	1.17	3.90	0.20	1.24	16x31.5	HLHA2X680M#US3WPEC
		1.54	1.17	3.90	0.20	1.24	18x25.5	HLHA2X680M#VS2WPEC
	82	1.73	0.97	3.23	0.20	1.48	12.5x50	HLHA2X820M#SS7WPEC
		1.60	0.97	3.23	0.20	1.48	16x31.5	HLHA2X820M#US3WPEC
		1.73	0.97	3.23	0.20	1.48	16x36	HLHA2X820M#US4WPEC
		1.60	0.97	3.23	0.20	1.48	18x25.5	HLHA2X820M#VS2WPEC
		1.83	0.97	3.23	0.20	1.48	18x31.5	HLHA2X820M#VS3WPEC
	100	1.80	0.80	2.65	0.20	1.78	16x40	HLHA2X101M#US5WPEC
		1.76	0.80	2.65	0.20	1.78	18x31.5	HLHA2X101M#VS3WPEC
		1.88	0.80	2.65	0.20	1.78	18x36	HLHA2X101M#VS4WPEC
	120	2.07	0.66	2.21	0.20	2.12	16x45	HLHA2X121M#US6WPEC
		1.91	0.66	2.21	0.20	2.12	18x36	HLHA2X121M#VS4WPEC

Additional designs on request · Weitere Designs auf Anfrage

HLHA · Radial · 14000 h/105 °C

Rated Voltage (Surge Voltage) V_r [V DC]	Capacitance C_r [µF]	Ripple Current at 105°C/100Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [Ω]	ESR max at 20°C/100Hz [Ω]	Dissipation Factor at 20°C/100Hz Tan δ	Leakage current after 1min at 20°C I_{leak} [mA]	DxL [mm]	Product Code # = variable value, see terminal code in the product code
420 VDC Code: 2X Surge Voltage 470 VDC	**120**	2.09	0.66	2.21	0.20	2.12	18x40	HLHA2X121M#VS5WPEC
	150	2.12	0.53	1.77	0.20	2.62	16x50	HLHA2X151M#US7WPEC
		2.39	0.53	1.77	0.20	2.62	18x45	HLHA2X151M#VS6WPEC
	180	2.48	0.44	1.47	0.20	3.12	18x50	HLHA2X181M#VS7WPEC
450 VDC Code: 2W Surge Voltage 500 VDC	**10**	0.33	7.96	26.53	0.20	0.28	10x16	HLHA2W100M#RS0WPEC
	15	0.48	5.31	17.68	0.20	0.37	10x20	HLHA2W150M#RS1WPEC
		0.53	5.31	17.68	0.20	0.37	10x25	HLHA2W150M#RS2WPEC
	18	0.58	4.42	14.74	0.20	0.42	10x25	HLHA2W180M#RS2WPEC
	22	0.68	3.62	12.06	0.20	0.50	10x30	HLHA2W220M#RS3WPEC
		0.70	3.62	12.06	0.20	0.50	12.5x20	HLHA2W220M#SS1WPEC
	27	0.80	2.95	9.82	0.20	0.59	10x35	HLHA2W270M#RS4WPEC
		0.73	2.95	9.82	0.20	0.59	12.5x20	HLHA2W270M#SS1WPEC
		0.85	2.95	9.82	0.20	0.59	12.5x25	HLHA2W270M#SS2WPEC
	33	0.88	2.41	8.04	0.20	0.69	10x35	HLHA2W330M#RS4WPEC
		0.90	2.41	8.04	0.20	0.69	12.5x25	HLHA2W330M#SS2WPEC
		1.00	2.41	8.04	0.20	0.69	12.5x30	HLHA2W330M#SS3WPEC
		0.90	2.41	8.04	0.20	0.69	16x20	HLHA2W330M#US1WPEC
	39	1.00	2.04	6.80	0.20	0.80	10x40	HLHA2W390M#RS5WPEC
		1.08	2.04	6.80	0.20	0.80	12.5x30	HLHA2W390M#SS3WPEC
		1.15	2.04	6.80	0.20	0.80	12.5x35	HLHA2W390M#SS4WPEC
		1.00	2.04	6.80	0.20	0.80	16x20	HLHA2W390M#US1WPEC
	47	1.20	1.69	5.64	0.20	0.95	10x50	HLHA2W470M#RS7WPEC
		1.10	1.69	5.64	0.20	0.95	12.5x30	HLHA2W470M#SS3WPEC
		1.20	1.69	5.64	0.20	0.95	12.5x35	HLHA2W470M#SS4WPEC
		1.20	1.69	5.64	0.20	0.95	12.5x35	HLHA2W470M#SS4WPEC
		1.25	1.69	5.64	0.20	0.95	16x25.5	HLHA2W470M#US2WPEC
		1.15	1.69	5.64	0.20	0.95	18x20.5	HLHA2W470M#VS1WPEC
	56	1.25	1.42	4.74	0.20	1.11	12.5x35	HLHA2W560M#SS4WPEC
		1.35	1.42	4.74	0.20	1.11	12.5x40	HLHA2W560M#SS5WPEC
		1.46	1.42	4.74	0.20	1.11	16x25.5	HLHA2W560M#US2WPEC
		1.25	1.42	4.74	0.20	1.11	18x20.5	HLHA2W560M#VS1WPEC
	68	1.45	1.17	3.90	0.20	1.32	12.5x40	HLHA2W680M#SS5WPEC
		1.53	1.17	3.90	0.20	1.32	16x31.5	HLHA2W680M#US3WPEC
		1.65	1.17	3.90	0.20	1.32	16x36	HLHA2W680M#US4WPEC
		1.53	1.17	3.90	0.20	1.32	18x25.5	HLHA2W680M#VS2WPEC
	82	1.65	0.97	3.23	0.20	1.58	12.5x45	HLHA2W820M#SS6WPEC
		1.75	0.97	3.23	0.20	1.58	12.5x50	HLHA2W820M#SS7WPEC
		1.63	0.97	3.23	0.20	1.58	16x31.5	HLHA2W820M#US3WPEC
		1.60	0.97	3.23	0.20	1.58	18x25.5	HLHA2W820M#VS2WPEC
		1.83	0.97	3.23	0.20	1.58	18x31.5	HLHA2W820M#VS3WPEC
	100	1.64	0.80	2.65	0.20	1.90	16x36	HLHA2W101M#US4WPEC

Additional designs on request · Weitere Designs auf Anfrage

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Rated Voltage (Surge Voltage) V_r [V DC]	Capacitance C_r [µF]	Ripple Current at 105°C/100Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [Ω]	ESR max at 20°C/100Hz [Ω]	Dissipation Factor at 20°C/100Hz Tan δ	Leakage current after 1min at 20°C I_{leak} [mA]	DxL [mm]	Product Code # = variable value, see terminal code in the product code
450 VDC Code: 2W Surge Voltage 500 VDC	**100**	1.88	0.80	2.65	0.20	1.90	16x40	HLHA2W101M#US5WPEC
		1.69	0.80	2.65	0.20	1.90	18x31.5	HLHA2W101M#VS3WPEC
		1.88	0.80	2.65	0.20	1.90	18x36	HLHA2W101M#VS4WPEC
	120	1.94	0.66	2.21	0.20	2.26	18x36	HLHA2W121M#VS4WPEC
		2.09	0.66	2.21	0.20	2.26	18x40	HLHA2W121M#VS5WPEC
	150	2.15	0.53	1.77	0.20	2.80	18x40	HLHA2W151M#VS5WPEC
		2.25	0.53	1.77	0.20	2.80	18x45	HLHA2W151M#VS6WPEC
		2.39	0.53	1.77	0.20	2.80	18x50	HLHA2W151M#VS7WPEC
	180	2.45	0.44	1.47	0.20	3.34	18x50	HLHA2W181M#VS7WPEC

Additional designs on request · Weitere Designs auf Anfrage

› Ripple Current Multiplier · Wechselstrommultiplikator

Frequency [Hz]	50/60	100–120	500	1 k	10 k	100 k
Multiplier for capacitance 10–82 µF	0.32	0.40	0.52	0.60	0.84	1.00
Multiplier for capacitance 100–220 µF	0.36	0.44	0.58	0.67	0.93	1.00
Multiplier for capacitance 270–820 µF	0.40	0.50	0.65	0.75	0.95	1.00

Temperature [°C]	40	45	50	55	60	65	70	75	80	85	90	95	100	105
Multiplier I_r at 100 kHz	2.20	2.20	2.15	2.10	2.05	2.00	2.00	1.95	1.90	1.82	1.75	1.60	1.30	1.00

› Impedance Stability · Impedanz Stabilität

Rated Voltage [V]	160	200	250	350	400	420	450
$Z_{-25°C}$ / $Z_{+20°C}$ at 120 Hz	3		4	6			
$Z_{-40°C}$ / $Z_{+20°C}$ at 120 Hz	6			8			

› Life Time Tests and Requirements · Anforderungen Brauchbarkeitsdauer

Life time test		Test procedure	Life time criteria
Endurance test	Length L < 25.0 mm Length L ≥ 25.0 mm	T_a = 105 °C; V_r, I_r applied 10000 hours T_a = 105 °C; V_r, I_r applied 12000 hours	ΔC/C ≤ 20 % (of initial value) Tanδ ≤ 200 % (of specified value) I_L ≤ specified value
Useful life	Length L < 25.0 mm Length L ≥ 25.0 mm	T_a = 105 °C; V_r, I_r applied 12000 hours T_a = 105 °C; V_r, I_r applied 14000 hours	ΔC/C ≤ 30 % (of initial value) Tanδ < 300 % (of specified value) I_L ≤ specified value

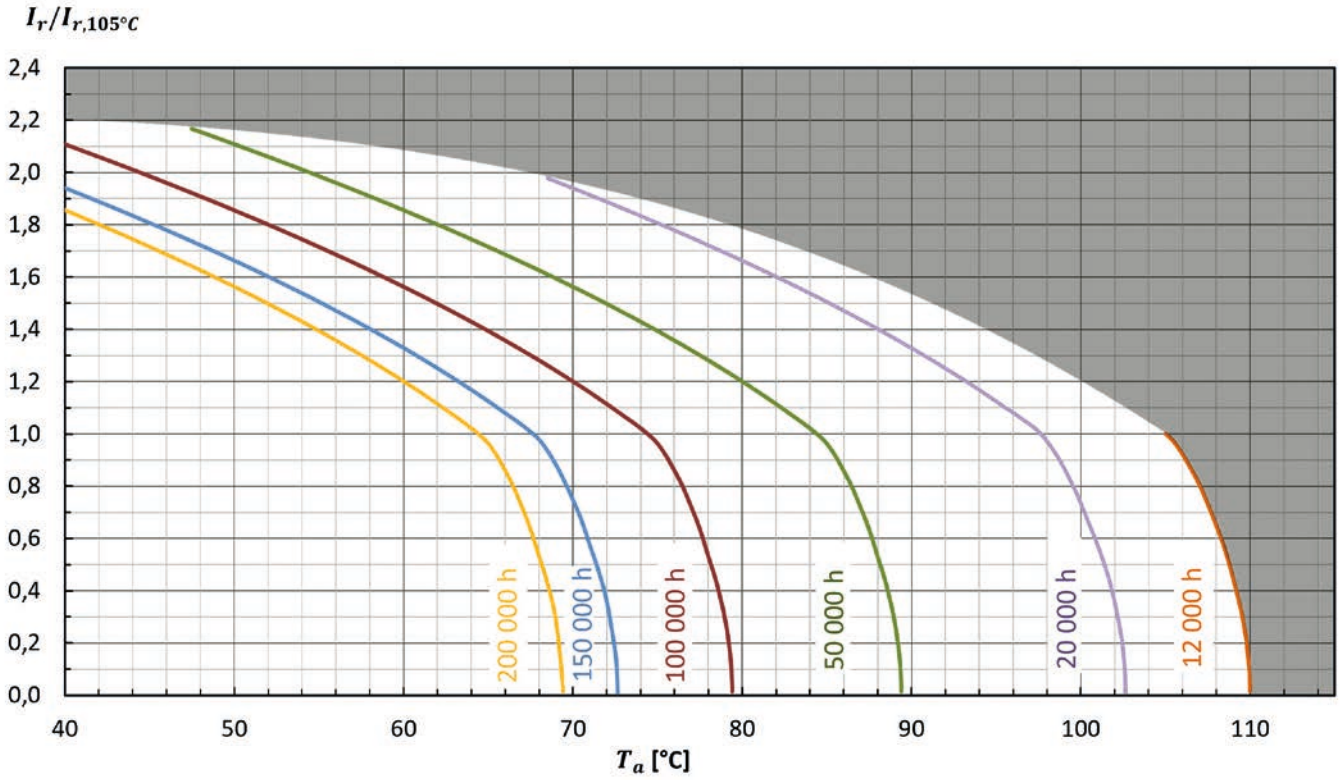
Reference Specification: IEC 60384-4

› Life Time Table and Graph · Brauchbarkeitsdauer – Tabelle und Diagramm

length L < 25.0 mm

HLHA	Ripple Current Multiplier I_r at 100 kHz													
T_a	1.00	1.15	1.30	1.45	1.60	1.75	1.82	1.90	1.95	2.00	2.05	2.10	2.15	2.20
40°C	200	200	200	200	200	200	200	178	156	136	118	101	88	76
45°C	200	200	200	200	200	184	156	126	110	96	83	71	62	54
50°C	200	200	200	200	184	130	110	89	78	68	59	50	44	
55°C	200	200	200	179	130	92	78	63	55	48	42	36		
60°C	200	200	168	126	92	65	55	44	39	34	29			
65°C	192	154	119	89	65	46	39	31	28	24				
70°C	136	109	84	63	46	32	28	22	19	17				
75°C	96	77	60	45	33	23	19	16	14					
80°C	68	54	42	32	23	16	14	11						
85°C	48	38	30	22	16	11	10							
90°C	34	27	21	16	12	8								
95°C	24	19	15	11	8									
100°C	17	14	11											
105°C	12													

khrs Max. value limited to 200 000 hours.



› Life Time Table and Graph · Brauchbarkeitsdauer – Tabelle und Diagramm

length L ≥ 25.0 mm

HLHA	Ripple Current Multiplier I_r at 100 kHz													
T_a	1.00	1.15	1.30	1.45	1.60	1.75	1.82	1.90	1.95	2.00	2.05	2.10	2.15	2.20
40°C	200	200	200	200	200	200	200	200	182	158	138	118	102	88
45°C	200	200	200	200	200	200	182	147	128	112	97	83	72	63
50°C	200	200	200	200	200	152	128	104	91	79	69	59	51	
55°C	200	200	200	200	152	107	91	73	64	56	49	42		
60°C	200	200	196	148	107	76	64	52	45	40	34			
65°C	200	179	139	104	76	54	45	37	32	28				
70°C	158	127	98	74	54	38	32	26	23	20				
75°C	112	90	69	52	38	27	23	18	16					
80°C	79	63	49	37	27	19	16	13						
85°C	56	45	35	26	19	13	11							
90°C	40	32	25	18	13	9								
95°C	28	22	17	13	9									
100°C	20	16	12											
105°C	14													

khrs Max. value limited to 200 000 hours.