

# HLHT · Radial · 6000 h/125 °C

High Temperature Design · High Voltage

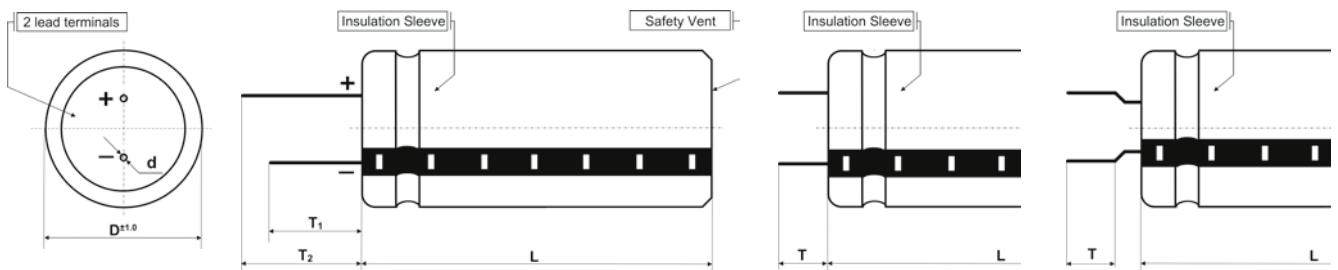
## > Specifications · Spezifikationen

Items	Characteristics
Temperature range	-40 °C ~ + 125 °C for rated voltage 160–250V -25 °C ~ + 125 °C for rated voltage 350–450V
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	6000 hours at 125 °C; $I_r = V_r = 0$
Shelf life	500 hours at 125 °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 HLHT · 350 V · 100 µF ± 10 % · 18x31.5 mm · 4 mm lead · without plate

HLHT		2V		101		K		D		V S3		WPEC			
Series name		Rated voltage code		Capacitance code		Capacitance tolerance		Terminal code		Dimension		Outer design code			
Code	L	Code	L	The first two digits are significant. The last digit indicates the number of following zeros in µF.		M: ± 20 % K: ± 10 % Q: -10 % +30 % R: -0 % +20 % L: ± 15 % V: -10 % +20 %		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	Diameter (mm)		Length (mm)		WPEC: PET sleeve without plate (standard) [with plate available on request]		
2C	160V	2G	400V						R	10	S0	≤ 16			
2K	180V	2P	415V						S	12.5	S1	20			
2D	200V	2X	420V						U	16	S2	25			
2E	250V	2W	450V						V	18	S3	31.5			
2V	350V	2H	500V								S4	36			
2J	385V														

Rated Voltage (Surge Voltage) $V_r$ [V DC]	Capacitance $C_r$ [ $\mu$ F]	Ripple Current at 125°C/100Hz $I_r$ [A RMS]	ESR (typ) at 20°C/100Hz [ $\Omega$ ]	ESR max at 20°C/100Hz [ $\Omega$ ]	Dissipation Factor at 20°C/100Hz Tan $\delta$	Leakage current after 1min at 20°C $I_{leak}$ [mA]	DxL [mm]	Product Code  # = variable value, see terminal code in the product code
<b>160 VDC</b> Code: 2C  Surge Voltage 200 VDC	10	0.06	8.00	15.90	0.20	0.12	10x16	HLHT2C100M#RS0WPEC
	22	0.10	3.60	7.20	0.20	0.18	10x20	HLHT2C220M#RS1WPEC
	33	0.14	2.40	4.80	0.20	0.23	12.5x20	HLHT2C330M#SS1WPEC
	47	0.17	1.70	3.40	0.20	0.30	12.5x20	HLHT2C470M#SS1WPEC
	100	0.30	0.80	1.60	0.20	0.55	16x25	HLHT2C101M#US2WPEC
	220	0.51	0.40	0.70	0.20	1.13	18x31.5	HLHT2C221M#VS3WPEC
	330	0.67	0.20	0.50	0.20	1.65	18x36	HLHT2C331M#VS4WPEC
<b>200 VDC</b> Code: 2D  Surge Voltage 250 VDC	10	0.06	8.00	15.90	0.20	0.13	10x16	HLHT2D100M#RS0WPEC
	22	0.10	3.60	7.20	0.20	0.20	10x20	HLHT2D220M#RS1WPEC
	33	0.14	2.40	4.80	0.20	0.27	12.5x20	HLHT2D330M#SS1WPEC
	47	0.17	1.70	3.40	0.20	0.35	12.5x20	HLHT2D470M#SS1WPEC
	100	0.30	0.80	1.60	0.20	0.67	16x25	HLHT2D101M#US2WPEC
	220	0.51	0.40	0.70	0.20	1.39	18x31.5	HLHT2D221M#VS3WPEC
	330	0.67	0.20	0.50	0.20	2.05	18x36	HLHT2D331M#VS4WPEC
<b>250 VDC</b> Code: 2E  Surge Voltage 300 VDC	4.7	0.04	16.90	33.90	0.20	0.11	10x16	HLHT2E4R7M#RS0WPEC
	6.8	0.05	11.70	23.40	0.20	0.12	10x16	HLHT2E6R8M#RS0WPEC
	10	0.07	8.00	15.90	0.20	0.15	10x20	HLHT2E100M#RS1WPEC
	22	0.11	3.60	7.20	0.20	0.24	12.5x20	HLHT2E220M#SS1WPEC
	33	0.15	2.40	4.80	0.20	0.32	12.5x25	HLHT2E330M#SS2WPEC
	47	0.21	1.70	3.40	0.20	0.42	16x25	HLHT2E470M#US2WPEC
	100	0.35	0.80	1.60	0.20	0.82	18x31.5	HLHT2E101M#VS3WPEC
	220	0.55	0.40	0.70	0.20	1.72	18x36	HLHT2E221M#VS4WPEC
<b>350 VDC</b> Code: 2V  Surge Voltage 400 VDC	2.2	0.03	36.20	90.50	0.15	0.09	10x16	HLHT2V2R2M#RS0WPEC
	3.3	0.03	24.10	60.30	0.15	0.10	10x16	HLHT2V3R3M#RS0WPEC
	4.7	0.04	16.90	42.30	0.15	0.12	10x20	HLHT2V4R7M#RS1WPEC
	5.6	0.05	14.20	35.50	0.15	0.13	10x20	HLHT2V5R6M#RS1WPEC
	6.8	0.06	11.70	29.30	0.15	0.14	12.5x20	HLHT2V6R8M#SS1WPEC
	10	0.07	8.00	19.90	0.15	0.18	12.5x20	HLHT2V100M#SS1WPEC
	22	0.11	3.60	9.00	0.15	0.30	12.5x25	HLHT2V220M#SS2WPEC
	33	0.16	2.40	6.00	0.15	0.42	16x25	HLHT2V330M#US2WPEC
	47	0.20	1.70	4.20	0.15	0.56	16x31.5	HLHT2V470M#US3WPEC
<b>400 VDC</b> Code: 2G  Surge Voltage 450 VDC	2.2	0.03	36.20	90.50	0.15	0.10	10x16	HLHT2G2R2M#RS0WPEC
	3.3	0.03	24.10	60.30	0.15	0.11	10x16	HLHT2G3R3M#RS0WPEC
	4.7	0.04	16.90	42.30	0.15	0.13	10x20	HLHT2G4R7M#RS1WPEC
	5.6	0.05	14.20	35.50	0.15	0.14	10x20	HLHT2G5R6M#RS1WPEC
	6.8	0.06	11.70	29.30	0.15	0.15	12.5x20	HLHT2G6R8M#SS1WPEC
	10	0.07	8.00	19.90	0.15	0.19	12.5x20	HLHT2G100M#SS1WPEC
	22	0.11	3.60	9.00	0.15	0.33	12.5x25	HLHT2G220M#SS2WPEC
	33	0.16	2.40	6.00	0.15	0.47	16x25	HLHT2G330M#US2WPEC
	47	0.20	1.70	4.20	0.15	0.63	16x31.5	HLHT2G470M#US3WPEC
<b>450 VDC</b> Code: 2W  Surge Voltage 500 VDC	2.2	0.03	36.20	90.50	0.15	0.10	10x16	HLHT2W2R2M#RS0WPEC
	3.3	0.03	24.10	60.30	0.15	0.11	10x16	HLHT2W3R3M#RS0WPEC
	4.7	0.04	16.90	42.30	0.15	0.13	10x20	HLHT2W4R7M#RS1WPEC
	5.6	0.05	14.20	35.50	0.15	0.15	12.5x20	HLHT2W5R6M#SS1WPEC

Additional designs on request · Weitere Designs auf Anfrage

Rated Voltage (Surge Voltage) $V_r$ [V DC]	Capacitance $C_r$ [ $\mu$ F]	Ripple Current at 125°C/100Hz $I_r$ [A RMS]	ESR (typ) at 20°C/100Hz [ $\Omega$ ]	ESR max at 20°C/100Hz [ $\Omega$ ]	Dissipation Factor at 20°C/100Hz $\tan \delta$	Leakage current after 1min at 20°C $I_{leak}$ [mA]	DxL [mm]	Product Code  # = variable value, see terminal code in the product code
<b>450 VDC</b> Code: 2W Surge Voltage 500 VDC	6.8	0.06	11.70	29.30	0.15	0.16	12.5x20	HLHT2W6R8M#SS1WPEC
	10	0.08	8.00	19.90	0.15	0.21	12.5x25	HLHT2W100M#SS2WPEC
	22	0.13	3.60	9.00	0.15	0.37	16x25	HLHT2W220M#US2WPEC
	33	0.17	2.40	6.00	0.15	0.52	16x31.5	HLHT2W330M#US3WPEC
	47	0.21	1.70	4.20	0.15	0.70	18x31.5	HLHT2W470M#VS3WPEC

Additional designs on request · Weitere Designs auf Anfrage

## > Ripple Current Multiplier · Wechselstrommultiplikator

Frequency [Hz]	50/60	100–120	500	1 k	10k	100k
Multiplier	0.8	1.0	1.2	1.3	1.5	1.5

Temperature [°C]	60	65	70	75	80	85	90	95	100	105	110	115	120	125
Multiplier $I_r$ at 100 kHz	2.55	2.48	2.42	2.33	2.23	2.13	2.03	1.90	1.77	1.65	1.50	1.35	1.20	1.00

## > Life Time Tests and Requirements · Anforderungen Brauchbarkeitsdauer

Life time test	Test procedure	Life time criteria
Endurance test	$T_a = 125^\circ\text{C}; V_r, I_r$ applied 4000 hours	$\Delta C/C \leq 20\%$ (of initial value) $\tan \delta \leq 200\%$ (of specified value) $I_l \leq$ specified value
Useful life	$T_a = 125^\circ\text{C}; V_r, I_r$ applied 6000 hours	$\Delta C/C \leq 30\%$ (of initial value) $\tan \delta < 300\%$ (of specified value) $I_l \leq$ specified value

Reference Specification: IEC 60384-4

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

HUHA	Ripple Current Multiplier $I_r$ at 120 Hz														
$T_a$	1.00	1.10	1.20	1.35	1.50	1.65	1.77	1.90	2.03	2.13	2.23	2.33	2.42	2.48	2.55
60°C	200	200	200	200	200	165	124	89	62	47	35	25	19	15	12
65°C	200	200	200	200	161	116	88	63	44	33	24	18	13	11	
70°C	200	200	200	154	114	82	62	44	31	23	17	13	9		
75°C	192	166	142	109	81	58	44	31	22	17	12	9			
80°C	136	117	100	77	57	41	31	22	16	12	9				
85°C	96	83	71	54	40	29	22	16	11	8					
90°C	68	59	50	38	29	21	15	11	8						
95°C	48	41	35	27	20	15	11	8							
100°C	34	29	25	19	14	10	8								
105°C	24	21	18	14	10	7									
110°C	17	15	13	10	7										
115°C	12	10	9	7											
120°C	8	7	6												
125°C	6														

khrs      Max. value limited to 200 000 hours.

