

► **Specifications / Spezifikationen**

Items	Characteristics
Temperature range	-40°C ~ + 105°C (200VDC - 250VDC) -25°C ~ + 105°C (400VDC - 500VDC)
Capacitance tolerance	+/- 20%
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	6000h at 105°C
Field failure rate	0.5 FIT = $0.5 \cdot 10^{-9}$ Failures/hour
RoHS conform	Directive 2002/95/ECff Annex
Specification / Vibration	JIS C 5101-4 / 0.75mm, 10...55Hz, 10g, 3x2h



► **Outline Drawings / Bauformen**

Refer to page 6 for available terminal shapes and dimensions. / Auf Seite 6 finden Sie die verfügbaren Bauformen und Maße.

► **Ripple Current Multiplier / Wechselstrommultiplikator**

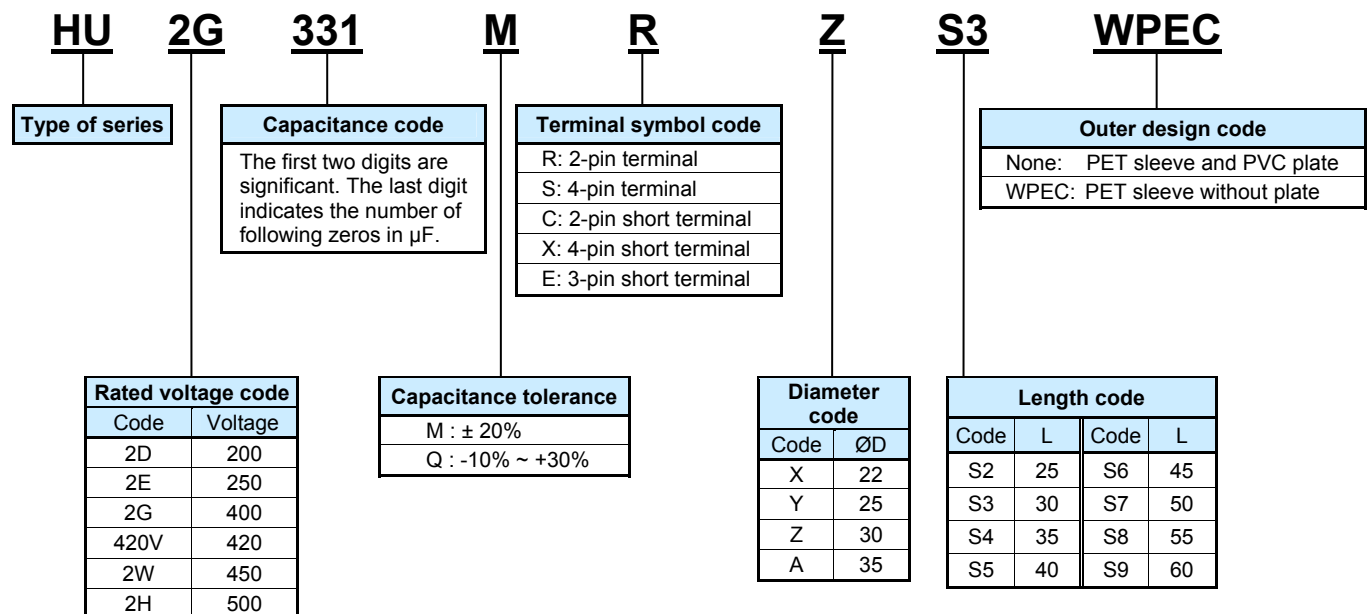
Frequency [Hz]	50/60	120	300	1k	≥ 10k
multiplier	0.70	1.00	1.18	1.34	1.45

Forced cooling [m/sec]	v < 1.0	v ≥ 1.0
multiplier	1.0	1.1

Temperature [°C]	40	60	70	85	105
multiplier	2.3	1.9	1.7	1.4	1.0

► **Product Code / Bestellbezeichnung**

Example: HU 400V 330µF ±20% 30x30mm Shape „R“



Rated Voltage Code (Surge Voltage) V_f [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current	Ripple Current	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code
			at 40°C/120Hz [A RMS]	at 105°C/120Hz I_r [A RMS]			
200 2D (250)	330	0.15	2.46	1.07	330	22x25	HU2D331M□XS2
	390	0.15	2.85	1.24	280	22x30	HU2D391M□XS3
	470	0.15	3.01	1.31	240	25x25	HU2D471M□YS2
	560	0.15	3.63	1.58	200	22x35	HU2D561M□XS4
		0.15	3.50	1.52	200	25x30	HU2D561M□YS3
	680	0.15	4.21	1.83	160	22x40	HU2D681M□XS5
		0.15	4.07	1.77	160	25x35	HU2D681M□YS4
		0.15	3.68	1.60	160	30x25	HU2D681M□ZS2
	820	0.15	5.06	2.20	140	22x50	HU2D821M□XS7
		0.15	4.72	2.05	140	25x40	HU2D821M□YS5
		0.15	4.28	1.86	140	30x30	HU2D821M□ZS3
		0.15	3.50	1.52	140	35x25	HU2D821M□AS2
	1 000	0.15	5.45	2.37	110	25x45	HU2D102M□YS6
		0.15	4.99	2.17	110	30x35	HU2D102M□ZS4
	1 200	0.15	6.21	2.70	100	25x50	HU2D122M□YS7
		0.15	5.73	2.49	100	30x40	HU2D122M□ZS5
0.15		4.46	1.94	100	35x30	HU2D122M□AS3	
1 500	0.15	6.69	2.91	80	30x45	HU2D152M□ZS6	
	0.15	5.27	2.29	80	35x35	HU2D152M□AS4	
1 800	0.15	7.64	3.32	70	30x50	HU2D182M□ZS7	
	0.15	6.03	2.62	70	35x40	HU2D182M□AS5	
2 200	0.15	6.95	3.02	50	35x45	HU2D222M□AS6	
250 2E (300)	220	0.15	2.19	0.95	440	22x25	HU2E221M□XS2
	330	0.15	2.99	1.30	290	20x35	HU2E331M□WS4
		0.15	2.85	1.24	290	22x30	HU2E331M□XS3
		0.15	2.74	1.19	290	25x25	HU2E331M□YS2
	390	0.15	3.27	1.42	250	22x35	HU2E391M□XS4
		0.15	3.15	1.37	250	25x30	HU2E391M□YS3
	470	0.15	3.80	1.65	210	22x40	HU2E471M□XS5
		0.15	3.27	1.42	210	30x25	HU2E471M□ZS2
	560	0.15	4.32	1.88	180	22x45	HU2E561M□XS6
		0.15	4.00	1.74	180	25x35	HU2E561M□YS4
	680	0.15	4.85	2.11	150	25x45	HU2E681M□YS6
		0.15	4.19	1.82	150	30x30	HU2E681M□ZS3
		0.15	3.50	1.52	150	35x25	HU2E681M□AS2
	820	0.15	5.54	2.41	120	25x50	HU2E821M□YS7
		0.15	4.83	2.10	120	30x35	HU2E821M□ZS4
		0.15	4.05	1.76	120	35x30	HU2E821M□AS3
1 000	0.15	5.59	2.43	100	30x40	HU2E102M□ZS5	
	0.15	4.69	2.04	100	35x35	HU2E102M□AS4	
1 200	0.15	6.65	2.89	80	30x50	HU2E122M□ZS7	
	0.15	5.38	2.34	80	35x40	HU2E122M□AS5	
1 500	0.15	6.28	2.73	70	35x45	HU2E152M□AS6	
1 800	0.15	7.15	3.11	60	35x50	HU2E182M□AS7	
400 2G (450)	120	0.20	1.77	0.77	800	22x25	HU2G121M□XS2
	150	0.20	2.12	0.92	640	22x30	HU2G151M□XS3
	180	0.20	2.42	1.05	540	22x35	HU2G181M□XS4
		0.20	2.28	0.99	540	25x25	HU2G181M□YS2
	220	0.20	2.81	1.22	440	22x40	HU2G221M□XS5
		0.20	2.67	1.16	440	25x30	HU2G221M□YS3
	270	0.20	3.22	1.40	360	22x45	HU2G271M□XS6
		0.20	3.11	1.35	360	25x35	HU2G271M□YS4
		0.20	2.94	1.28	360	30x25	HU2G271M□ZS2
	330	0.20	3.66	1.59	290	22x50	HU2G331M□XS7
		0.20	3.57	1.55	290	25x40	HU2G331M□YS5
0.20		3.43	1.49	290	30x30	HU2G331M□ZS3	
0.20		3.36	1.46	290	35x25	HU2G331M□AS2	

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current	Ripple Current	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code	
			at 40°C/120Hz [A RMS]	at 105°C/120Hz I_r [A RMS]				
400 2G (450)	390	0.20	4.00	1.74	250	25x45	HU2G391M□YS6	
		0.20	3.91	1.70	250	30x35	HU2G391M□ZS4	
	470	0.20	4.46	1.94	210	30x40	HU2G471M□ZS5	
		0.20	4.23	1.84	210	35x30	HU2G471M□AS3	
	560	0.20	5.04	2.19	180	30x45	HU2G561M□ZS6	
		0.20	4.81	2.09	180	35x35	HU2G561M□AS4	
	680	0.20	5.70	2.48	150	30x50	HU2G681M□ZS7	
		0.20	5.52	2.40	150	35x40	HU2G681M□AS5	
	820	0.20	6.26	2.72	120	35x45	HU2G821M□AS6	
		0.20	6.39	2.78	120	35x50	HU2G821M□AS7	
	1 000	0.20	6.58	2.86	120	35x60	HU2G102M□AS9	
	420 420V (470)	100	0.20	1.63	0.71	1020	22x25	HU420V101M□XS2
			0.20	2.12	0.92	680	22x30	HU420V151M□XS3
		150	0.20	2.07	0.90	680	25x25	HU420V151M□YS2
0.20			2.42	1.05	570	22x35	HU420V181M□XS4	
180		0.20	2.42	1.05	570	25x30	HU420V181M□YS3	
		0.20	2.81	1.22	470	22x40	HU420V221M□XS5	
220		0.20	2.78	1.21	470	25x35	HU420V221M□YS4	
		0.20	2.65	1.15	470	30x25	HU420V221M□ZS2	
270		0.20	3.31	1.44	380	22x50	HU420V271M□XS7	
		0.20	3.22	1.40	380	25x40	HU420V271M□YS5	
		0.20	3.11	1.35	380	30x30	HU420V271M□ZS3	
		0.20	3.17	1.38	380	35x25	HU420V271M□AS2	
330		0.20	3.70	1.61	310	25x45	HU420V331M□YS6	
		0.20	3.59	1.56	310	30x35	HU420V331M□ZS4	
390		0.20	4.14	1.80	270	25x50	HU420V391M□YS7	
		0.20	4.05	1.76	270	30x40	HU420V391M□ZS5	
		0.20	3.84	1.67	270	35x30	HU420V391M□AS3	
470		0.20	4.60	2.00	220	30x45	HU420V471M□ZS6	
		0.20	4.42	1.92	220	35x35	HU420V471M□AS4	
560		0.20	5.18	2.25	190	30x50	HU420V561M□ZS7	
		0.20	5.01	2.18	190	35x40	HU420V561M□AS5	
680		0.20	5.70	2.48	150	35x45	HU420V681M□AS6	
820		0.20	6.44	2.80	130	35x50	HU420V821M□AS7	
450 2W (500)		100	0.20	1.63	0.71	1020	22x25	HU2W101M□XS2
	0.20		1.73	0.75	1020	22x30	HU2W101M□XS3	
	120	0.20	1.89	0.82	850	22x30	HU2W121M□XS3	
		0.20	1.86	0.81	850	25x25	HU2W121M□YS2	
	150	0.20	2.12	0.92	680	22x30	HU2W151M□XS3	
		0.20	2.21	0.96	680	22x35	HU2W151M□XS4	
		0.20	2.07	0.90	680	25x25	HU2W151M□YS2	
	180	0.20	2.42	1.05	570	22x35	HU2W181M□XS4	
		0.20	2.51	1.09	570	22x40	HU2W181M□XS5	
		0.20	2.42	1.05	570	25x30	HU2W181M□YS3	
		0.20	2.51	1.09	570	25x35	HU2W181M□YS4	
		0.20	2.39	1.04	570	30x25	HU2W181M□ZS2	
	220	0.20	2.81	1.22	470	22x40	HU2W221M□XS5	
		0.20	2.88	1.25	470	22x45	HU2W221M□XS6	
		0.20	2.78	1.21	470	25x35	HU2W221M□YS4	
		0.20	2.65	1.15	470	30x25	HU2W221M□ZS2	
	270	0.20	3.31	1.44	380	22x50	HU2W271M□XS7	
		0.20	3.22	1.40	380	25x40	HU2W271M□YS5	
		0.20	3.11	1.35	380	30x30	HU2W271M□ZS3	
		0.20	3.17	1.38	380	35x25	HU2W271M□AS2	
	330	0.20	3.70	1.61	310	25x45	HU2W331M□YS6	
		0.20	3.80	1.65	310	25x50	HU2W331M□YS7	
		0.20	3.59	1.56	310	30x35	HU2W331M□ZS4	
		0.20	3.52	1.53	310	35x30	HU2W331M□AS3	
	390	0.20	4.14	1.80	270	25x50	HU2W391M□YS7	
		0.20	4.05	1.76	270	30x40	HU2W391M□ZS5	
		0.20	3.84	1.67	270	35x30	HU2W391M□AS3	
	470	0.20	4.60	2.00	220	30x45	HU2W471M□ZS6	
		0.20	4.78	2.08	220	30x50	HU2W471M□ZS7	
		0.20	4.42	1.92	220	35x35	HU2W471M□AS4	

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current	Ripple Current	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code
			at 40°C/120Hz [A RMS]	at 105°C/120Hz I_r [A RMS]			
450 2W (500)	560	0.20	5.18	2.25	190	30x50	HU2W561M□ZS7
		0.20	5.01	2.18	190	35x40	HU2W561M□AS5
		0.20	5.20	2.26	190	35x45	HU2W561M□AS6
	680	0.20	5.70	2.48	150	35x45	HU2W681M□AS6
		0.20	5.87	2.55	150	35x50	HU2W681M□AS7
	820	0.20	6.44	2.80	130	35x50	HU2W821M□AS7
500 2H (550)	56	0.20	1.10	0.48	1710	22x25	HU2H560M□XS2
	68	0.20	1.29	0.56	1410	22x30	HU2H680M□XS3
		0.20	1.27	0.55	1410	25x25	HU2H680M□YS2
	82	0.20	1.47	0.64	1170	22x35	HU2H820M□XS4
		0.20	1.47	0.64	1170	25x30	HU2H820M□YS3
	100	0.20	1.70	0.74	960	22x40	HU2H101M□XS5
		0.20	1.52	0.66	960	30x25	HU2H101M□ZS3
	120	0.20	1.93	0.84	800	22x45	HU2H121M□XS6
		0.20	1.86	0.81	800	25x35	HU2H121M□YS4
	150	0.20	2.23	0.97	640	25x45	HU2H151M□YS6
		0.20	1.96	0.85	640	30x30	HU2H151M□ZS3
		0.20	1.86	0.81	640	35x25	HU2H151M□AS2
	180	0.20	2.53	1.10	540	25x50	HU2H181M□YS7
		0.20	2.25	0.98	540	30x35	HU2H181M□ZS4
		0.20	2.14	0.93	540	35x30	HU2H181M□AS3
	220	0.20	2.58	1.12	440	30x40	HU2H221M□ZS5
		0.20	2.46	1.07	440	35x35	HU2H221M□AS4
	270	0.20	3.06	1.33	360	30x50	HU2H271M□ZS7
		0.20	2.83	1.23	360	35x40	HU2H271M□AS5
	330	0.20	3.24	1.41	290	35x45	HU2H331M□AS6
390	0.20	3.63	1.58	250	35x50	HU2H391M□AS7	
470	0.20	4.88	2.12	210	35x60	HU2H471M□AS9	

► Life Time Table / Brauchbarkeitsdauer – Tabelle

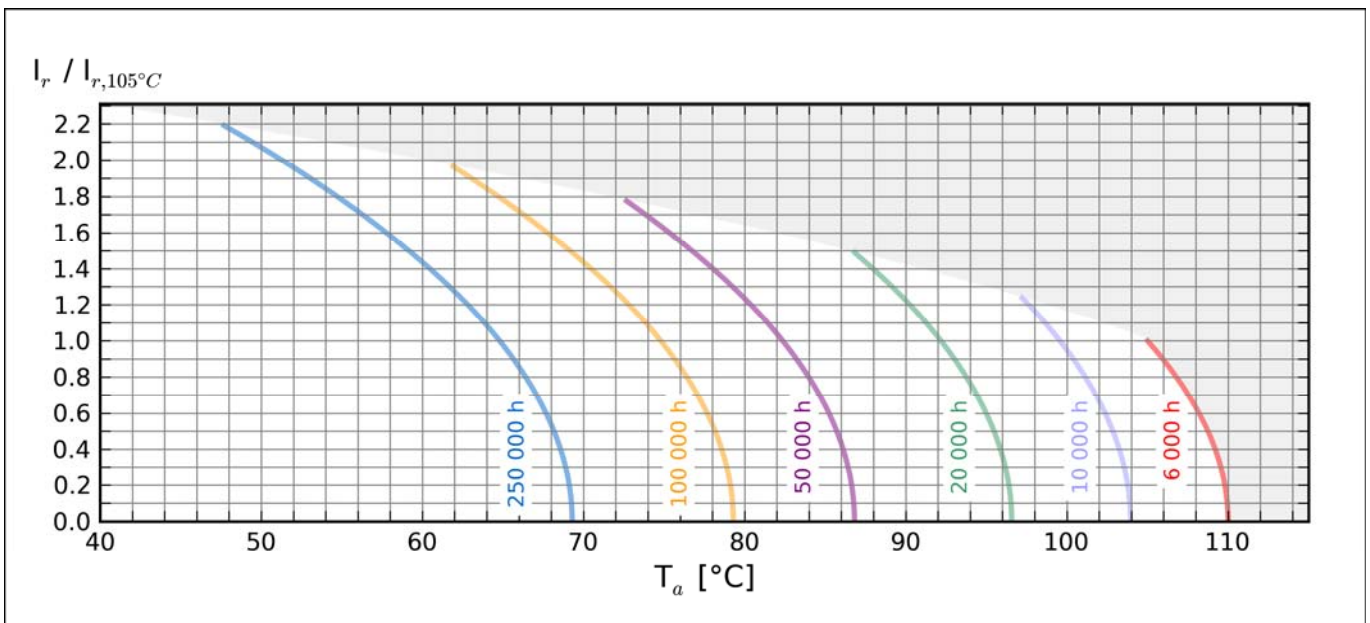
HU	Useful life as function of ambient temperature and ripple current														
	I_r at 105°C	x 1.0	x 1.1	x 1.2	x 1.3	x 1.4	x 1.5	x 1.6	x 1.7	x 1.8	x 1.9	x 2.0	x 2.1	x 2.2	x 2.3
$T_a = 40^\circ\text{C}$	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
$T_a = 45^\circ\text{C}$	250	250	250	250	250	250	250	250	250	250	250	250	250	250	
$T_a = 50^\circ\text{C}$	250	250	250	250	250	250	250	250	250	250	250	250			
$T_a = 55^\circ\text{C}$	250	250	250	250	250	250	250	250	243	209	178				
$T_a = 60^\circ\text{C}$	250	250	250	250	250	231	203	177	154	132					
$T_a = 65^\circ\text{C}$	245	225	204	184	165	146	128	112	97						
$T_a = 70^\circ\text{C}$	155	142	129	116	104	92	81	71							
$T_a = 75^\circ\text{C}$	98	90	81	73	66	58	51								
$T_a = 80^\circ\text{C}$	62	56	51	46	41										
$T_a = 85^\circ\text{C}$	39	36	32	29	26										
$T_a = 90^\circ\text{C}$	24	22	20												
$T_a = 95^\circ\text{C}$	15	14													
$T_a = 100^\circ\text{C}$	9	9													
$T_a = 105^\circ\text{C}$	6														

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



► 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 4000 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 6000 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