

# CU · Snap-In · 6000 h/105 °C

## High Ripple · Side Vent · Bottom cooling Design

Capacitors of CU series have in average 10 % higher ripple current compared with HU3 series. This is reached by improved heat radiation. The vent is located at the side of the case, vent position is not fixed.

Die CU Serie hat im Durchschnitt eine 10 % höhere Wechselstrombelastbarkeit im Vergleich zur HU3 Serie. Dies wird durch eine optimierte Wärmeabstrahlung erreicht. Das Sicherheitsventil befindet sich seitlich am Becher, die Position ist variabel.

### > 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 <sub>L</sub> (20°C, 5 min)	0.02 • C • V <sub>r</sub> [μA] or 3 mA, which is smaller.
Useful life	6 000 hours at 105°C
Field failure rate	0.5 FIT = 0.5 • 10 <sup>-9</sup> 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 CU · 500 V · 470 μF ± 20 % · 35x61 mm · 2-Pin short · without plate

<b>CU</b>	<b>2H</b>	<b>471</b>	<b>M</b>	<b>C</b>	<b>A</b>	<b>S9</b>	<b>WPEC</b>
<b>Type of series</b>	<b>Capacitance code</b> The first two digits are significant. The last digit indicates the number of following zeros in μF.		<b>Terminal symbol code</b> R: 2-pin terminal S: 4-pin terminal C: 2-pin short terminal X: 4-pin short terminal E: 3-pin short terminal			<b>Outer design code</b> None: PET sleeve and PVC plate WPEC: PET sleeve without plate Others on request	
<b>Rated voltage code</b>		<b>Capacitance tolerance</b>		<b>Diameter Code</b>		<b>Length code</b>	
<b>Code</b>	<b>Voltage</b>	M : ± 20% Q : -10% ~ +30%		<b>Code</b>	<b>ØD</b>	<b>Code</b>	<b>L</b>
2G	400			Z	30	S2	25
2W	450			A	35	S3	30
2H	500			B	40	S4	35
						S5	40
						S6	45
						S7	50

Rated VoltageCode (Surge Voltage) $V_r$ [V DC]	Capacitance $C_r$ [ $\mu$ 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 $\Omega$ ]	Dissipation Factor at 20°C/100Hz Tan $\delta$	DxL [mm]	Product Code  # = variable value, see fixing code in the product code
<b>400 VDC</b> Code: 2G  Surge Voltage 450 VDC	220	1.57	3.77	320	0.20	30x30	CU2G221M#ZS3
	270	1.79	4.30	260	0.20	30x35	CU2G271M#ZS4
		1.85	4.44	260	0.20	35x31	CU2G271M#AS3
	330	2.03	4.87	210	0.20	30x40	CU2G331M#ZS5
		2.10	5.04	210	0.20	35x36	CU2G331M#AS4
	390	2.28	5.47	190	0.20	30x50	CU2G391M#ZS7
		2.33	5.59	190	0.20	35x41	CU2G391M#AS5
	470	2.77	6.65	160	0.20	30x47	CU2G471Q#ZS6
		2.57	6.17	160	0.20	30x60	CU2G471M#ZS9
		2.61	6.26	160	0.20	35x46	CU2G471M#AS6
	560	2.89	6.94	130	0.20	35x51	CU2G561M#AS7
		2.64	6.34	130	0.20	40x40	CU2G561M#BS5
	680	3.25	7.80	110	0.20	35x61	CU2G681M#AS9
		2.95	7.08	110	0.20	40x45	CU2G681M#BS6
	820	3.62	8.69	90	0.20	35x81	CU2G821M#AS13
3.35		8.04	90	0.20	40x61	CU2G821M#BS9	
1 200	4.08	9.79	90	0.20	40x83	CU2G122M#BS13	
<b>450 VDC</b> Code: 2W  Surge Voltage 500 VDC	150	1.30	3.12	490	0.20	30x30	CU2W151M#ZS3
	180	1.46	3.50	420	0.20	30x35	CU2W181M#ZS4
	220	1.66	3.98	340	0.20	30x40	CU2W221M#ZS5
		1.67	4.01	340	0.20	35x31	CU2W221M#AS3
	270	1.90	4.56	380	0.20	35x36	CU2W271M#AS4
	330	2.10	5.04	230	0.20	30x50	CU2W331M#ZS7
		2.15	5.16	230	0.20	35x41	CU2W331M#AS5
	390	2.34	5.62	200	0.20	30x60	CU2W391M#ZS9
		2.37	5.69	200	0.20	35x46	CU2W391M#AS6
	470	2.64	6.34	160	0.20	35x51	CU2W471M#AS7
		2.42	5.81	160	0.20	40x40	CU2W471M#BS5
	560	2.95	7.08	140	0.20	35x61	CU2W561M#AS9
		2.68	6.43	140	0.20	40x45	CU2W561M#BS6
	680	3.30	7.92	110	0.20	35x81	CU2W681M#AS13
		2.98	7.15	110	0.20	40x50	CU2W681M#BS7
1 000	3.72	8.93	90	0.20	40x83	CU2W102M#BS13	
1 500	4.93	11.83	60	0.20	40x101	CU2W152M#BS17	
<b>500 VDC</b> Code: 2H  Surge Voltage 550 VDC	120	1.05	2.52	460	0.20	30x30	CU2H121M#ZS3
	150	1.21	2.90	460	0.20	30x35	CU2H151M#ZS4
	180	1.36	3.26	390	0.20	30x40	CU2H181M#ZS5
		1.40	3.36	390	0.20	35x31	CU2H181M#AS3
	220	1.56	3.74	320	0.20	30x50	CU2H221M#ZS7
		1.59	3.82	320	0.20	35x36	CU2H221M#AS4
	270	1.78	4.27	260	0.20	30x60	CU2H271M#ZS9
		1.80	4.32	260	0.20	35x41	CU2H271M#AS5
	330	2.03	4.87	210	0.20	35x46	CU2H331M#AS6
	390	2.25	5.40	180	0.20	35x51	CU2H391M#AS7
	470	2.52	6.05	160	0.20	35x61	CU2H471M#AS9

Additional designs on request · Weitere Designs auf Anfrage

> Ripple Current Multiplier · Wechselstrommultiplikator

Frequency [Hz]	120	300	1k	≥ 10k	Forced cooling [m/sec]	v < 0.5	v ≥ 0.5	v ≥ 1.0	v ≥ 2.0
Multiplier	1.00	1.18	1.34	1.45	Multiplier	1.00	1.10	1.20	1.25

Temperature [°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	1.5	1.4	1.3	1.2	1.1	1.0

> Life Time Table · Brauchbarkeitsdauer – Tabelle

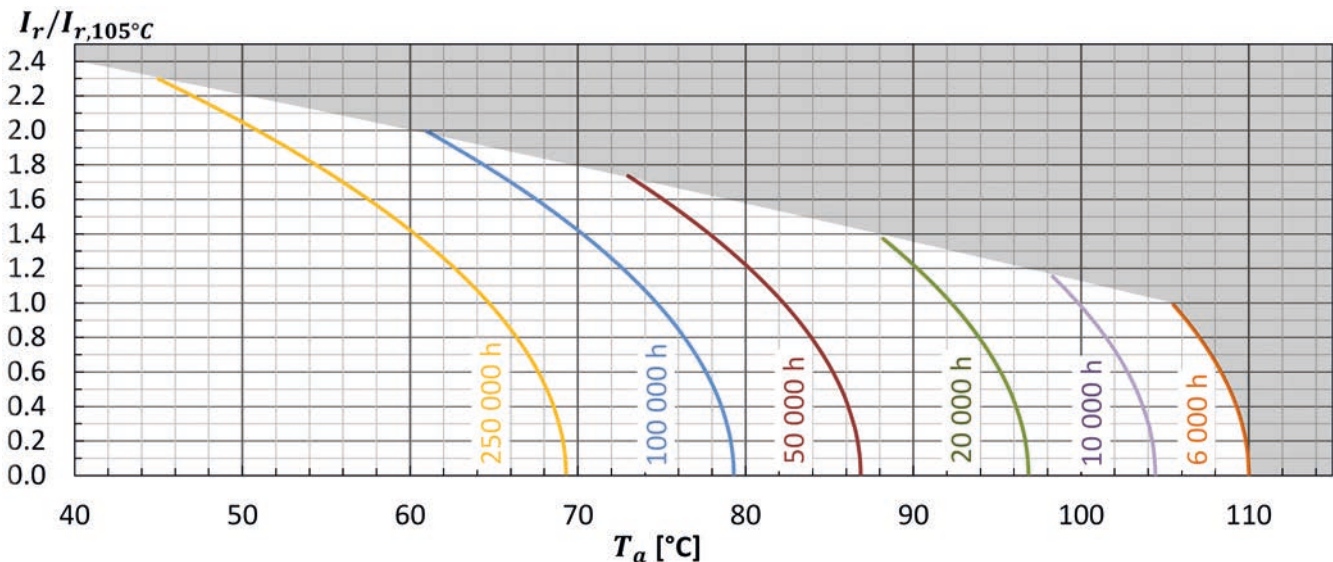
CU	Useful life as function of ambient temperature and ripple current													
$I_r$ at 105°C	1.0	1.1	1.2	1.3	1.4	1.5	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4
$T_a = 40°C$	250	250	250	250	250	250	250	250	250	250	250	250	250	250
$T_a = 45°C$	250	250	250	250	250	250	250	250	250	250	250	250	249	
$T_a = 50°C$	250	250	250	250	250	250	250	250	250	250	228	190		
$T_a = 55°C$	250	250	250	250	250	250	250	236	202	171	144			
$T_a = 60°C$	250	250	250	250	250	226	173	149	127	108				
$T_a = 65°C$	243	222	201	181	162	143	109	94	80					
$T_a = 70°C$	153	140	127	114	102	90	69	59						
$T_a = 75°C$	97	89	80	72	64	57	43							
$T_a = 80°C$	61	56	51	45	41	36								
$T_a = 85°C$	38	35	32	29	25									
$T_a = 90°C$	24	22	20	18										
$T_a = 95°C$	15	14	12	11										
$T_a = 100°C$	9	9												
$T_a = 105°C$	6													

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 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