

HU · Snap-In · 6000h/105 °C

Standard Performances · Most Compact Design

> Specifications · Spezifikationen

| Items | Characteristics |
|---|--|
| Temperature range | -40°C ~ + 105°C (200VDC - 250VDC) -25°C ~ + 105°C (400VDC - 550VDC) |
| 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 • C • V _r [μA] or 3 mA, which is smaller. |
| Useful life | 6000h at 105°C |
| Field failure rate | 0.5 FIT = 0.5 • 10 ⁻⁹ Failures/hour |
| Reference standards | IEC 60384-4, JIS C 5101-4, AEC-Q200 qualified |
| Vibration | 0.75mm, 10...55Hz, 10g, 3x2h |
| Sleeve withstanding voltage | 3000 Vac/1 min between terminals bundled and plate* |
| Product Compliance | RoHS, REACH, Conflict Minerals a.o. - refer to p. 12-13 |



* Typical value using sleeve which is free from any scratches and damages

> 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 HU · 400 V · 330 μF ±20 % · 30x30 mm · 2-pin terminal · without plate

| HU | | 2G | | 331 | | M | | R | | Z | | S3 | | WPEC | |
|----------------|--|--|--|--|--|--|--|------------------------------|--|--|--|--|--|------|--|
| Type of series | | Capacitance code | | Terminal symbol code | | Rated voltage code | | Capacitance tolerance | | Diameter code | | Length code | | | |
| | | The first two digits are significant. The last digit indicates the number of following zeros in μF. | | R: 2-claw 6.3 mm S: 4-claw 6.3 mm C: 2-claw short 4.0 mm X: 4-claw short 4.0 mm E: 3-claw short 4.0 mm T: 2-lugs 4.5 mm | | Code Voltage | | M : ± 20% Q : -10% ~ +30% | | Code ØD | | Code L Code L | | | |
| | | | | | | 2D 200 2E 250 2V 350 2G 400 420V 420 2W 450 2H 500 2L 550 | | | | W 20 X 22 Y 25 Z 30 A 35 B 40 H 46 C 50 | | S1 20 S10 65 S2 25 S11 70 S3 30 S12 75 S4 35 S13 80 S5 40 S14 85 S6 45 S15 90 S7 50 S16 95 S8 55 S17 100 S9 60 S18 105 | | | |
| | | | | | | | | | | | | None: PET sleeve and PVC plate WPEC: PET sleeve without plate Others on request | | | |

| 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 terminal code in the product code |
|--|------------------------------------|---|---|--|---|-------------|---|
| 200 VDC Code: 2D Surge Voltage 250 VDC | 330 | 1.20 | 2.76 | 330 | 0.15 | 20x35 | HU2D331M#WS4 |
| | | 1.07 | 2.46 | 330 | 0.15 | 22x25 | HU2D331M#XS2 |
| | 390 | 1.24 | 2.85 | 280 | 0.15 | 22x30 | HU2D391M#XS3 |
| | 470 | 1.31 | 3.01 | 240 | 0.15 | 25x25 | HU2D471M#YS2 |
| | 560 | 1.58 | 3.63 | 200 | 0.15 | 22x35 | HU2D561M#XS4 |
| | | 1.52 | 3.50 | 200 | 0.15 | 25x30 | HU2D561M#YS3 |
| | 680 | 1.83 | 4.21 | 160 | 0.15 | 22x40 | HU2D681M#XS5 |
| | | 1.77 | 4.07 | 160 | 0.15 | 25x35 | HU2D681M#YS4 |
| | | 1.60 | 3.68 | 160 | 0.15 | 30x25 | HU2D681M#ZS2 |
| | 820 | 2.20 | 5.06 | 140 | 0.15 | 22x50 | HU2D821M#XS7 |
| | | 2.05 | 4.72 | 140 | 0.15 | 25x40 | HU2D821M#YS5 |
| | | 1.86 | 4.28 | 140 | 0.15 | 30x30 | HU2D821M#ZS3 |
| | | 1.52 | 3.50 | 140 | 0.15 | 35x25 | HU2D821M#AS2 |
| | 1 000 | 2.37 | 5.45 | 110 | 0.15 | 25x45 | HU2D102M#YS6 |
| | | 2.17 | 4.99 | 110 | 0.15 | 30x35 | HU2D102M#ZS4 |
| | 1 200 | 2.70 | 6.21 | 100 | 0.15 | 25x50 | HU2D122M#YS7 |
| | | 2.49 | 5.73 | 100 | 0.15 | 30x40 | HU2D122M#ZS5 |
| | | 1.94 | 4.46 | 100 | 0.15 | 35x30 | HU2D122M#AS3 |
| | 1 500 | 2.91 | 6.69 | 80 | 0.15 | 30x45 | HU2D152M#ZS6 |
| | | 2.29 | 5.27 | 80 | 0.15 | 35x35 | HU2D152M#AS4 |
| | 1 800 | 3.32 | 7.64 | 70 | 0.15 | 30x50 | HU2D182M#ZS7 |
| | | 2.62 | 6.03 | 70 | 0.15 | 35x40 | HU2D182M#AS5 |
| | 2 200 | 3.02 | 6.95 | 50 | 0.15 | 35x45 | HU2D222M#AS6 |
| | 2 700 | 3.86 | 8.88 | 50 | 0.15 | 35x50 | HU2D272M#AS7 |
| 250 VDC Code: 2E Surge Voltage 300 VDC | 220 | 0.95 | 2.19 | 440 | 0.15 | 22x25 | HU2E221M#XS2 |
| | 330 | 1.30 | 2.99 | 290 | 0.15 | 20x35 | HU2E331M#WS4 |
| | | 1.24 | 2.85 | 290 | 0.15 | 22x30 | HU2E331M#XS3 |
| | 390 | 1.19 | 2.74 | 290 | 0.15 | 25x25 | HU2E331M#YS2 |
| | | 1.42 | 3.27 | 250 | 0.15 | 22x35 | HU2E391M#XS4 |
| | 470 | 1.37 | 3.15 | 250 | 0.15 | 25x30 | HU2E391M#YS3 |
| | | 1.65 | 3.80 | 210 | 0.15 | 22x40 | HU2E471M#XS5 |
| | 560 | 1.42 | 3.27 | 210 | 0.15 | 30x25 | HU2E471M#ZS2 |
| | | 1.88 | 4.32 | 180 | 0.15 | 22x45 | HU2E561M#XS6 |
| | 680 | 1.74 | 4.00 | 180 | 0.15 | 25x35 | HU2E561M#YS4 |
| | | 2.16 | 4.97 | 150 | 0.15 | 22x50 | HU2E681M#XS7 |
| | | 2.01 | 4.62 | 150 | 0.15 | 25x40 | HU2E681M#YS5 |
| | 820 | 2.11 | 4.85 | 150 | 0.15 | 25x45 | HU2E681M#YS6 |
| | | 1.82 | 4.19 | 150 | 0.15 | 30x30 | HU2E681M#ZS3 |
| | | 1.52 | 3.50 | 150 | 0.15 | 35x25 | HU2E681M#AS2 |
| | 1 000 | 2.41 | 5.54 | 120 | 0.15 | 25x50 | HU2E821M#YS7 |
| | | 2.10 | 4.83 | 120 | 0.15 | 30x35 | HU2E821M#ZS4 |
| | | 1.76 | 4.05 | 120 | 0.15 | 35x30 | HU2E821M#AS3 |
| | 1 200 | 2.43 | 5.59 | 100 | 0.15 | 30x40 | HU2E102M#ZS5 |
| | | 2.04 | 4.69 | 100 | 0.15 | 35x35 | HU2E102M#AS4 |
| | 1 500 | 2.89 | 6.65 | 80 | 0.15 | 30x50 | HU2E122M#ZS7 |
| | | 2.34 | 5.38 | 80 | 0.15 | 35x40 | HU2E122M#AS5 |
| | 1 800 | 2.73 | 6.28 | 70 | 0.15 | 35x45 | HU2E152M#AS6 |
| | 1 800 | 3.11 | 7.15 | 60 | 0.15 | 35x50 | HU2E182M#AS7 |

Additional designs on request · Weitere Designs auf Anfrage

| Rated VoltageCode (Surge Voltage) V_r [V DC] | Capacitance C_r [μ F] | Ripple Current | Ripple Current | ESR (typ) | Dissipation | DxL [mm] | Product Code # = variable value, see terminal code in the product code |
|---|------------------------------------|---------------------------------------|-----------------------------|-----------------------------------|--|--------------|---|
| | | at 105°C/120Hz I_r [A RMS] | at 40°C/120Hz [A RMS] | at 20°C/100Hz [m Ω] | Factor at 20°C/100Hz Tan δ | | |
| 400 VDC Code: 2G Surge Voltage 450 VDC | 82 | 0.63 | 1.45 | 1170 | 0.20 | 22x25 | HU2G820M#XS2 |
| | 120 | 0.77 | 1.77 | 800 | 0.20 | 22x25 | HU2G121M#XS2 |
| | 150 | 0.87 | 2.00 | 640 | 0.20 | 22x26 | HU2G151M#XS2 |
| | | 0.92 | 2.12 | 640 | 0.20 | 22x30 | HU2G151M#XS3 |
| | 180 | 1.01 | 2.32 | 540 | 0.20 | 22x30 | HU2G181M#XS3 |
| | | 1.05 | 2.42 | 540 | 0.20 | 22x35 | HU2G181M#XS4 |
| | | 0.99 | 2.28 | 540 | 0.20 | 25x25 | HU2G181M#YS2 |
| | 220 | 1.11 | 2.55 | 440 | 0.20 | 22x30 | HU2G221M#XS3 |
| | | 1.22 | 2.81 | 440 | 0.20 | 22x40 | HU2G221M#XS5 |
| | | 1.10 | 2.53 | 440 | 0.20 | 25x25 | HU2G221M#YS2 |
| | | 1.16 | 2.67 | 440 | 0.20 | 25x30 | HU2G221M#YS3 |
| | 270 | 1.29 | 2.97 | 360 | 0.20 | 22x35 | HU2G271M#XS4 |
| | | 1.40 | 3.22 | 360 | 0.20 | 22x45 | HU2G271M#XS6 |
| | | 1.28 | 3.46 | 360 | 0.20 | 25x30 | HU2G271M#YS3 |
| | | 1.35 | 3.11 | 360 | 0.20 | 25x35 | HU2G271M#YS4 |
| | | 1.28 | 2.94 | 360 | 0.20 | 30x25 | HU2G271M#ZS2 |
| | 330 | 1.54 | 3.54 | 290 | 0.20 | 22x45 | HU2G331M#XS6 |
| | | 1.59 | 3.66 | 290 | 0.20 | 22x50 | HU2G331M#XS7 |
| | | 1.49 | 3.43 | 290 | 0.20 | 25x35 | HU2G331M#YS4 |
| | | 1.55 | 3.57 | 290 | 0.20 | 25x40 | HU2G331M#YS5 |
| | | 1.41 | 3.24 | 290 | 0.20 | 30x25 | HU2G331M#ZS2 |
| | | 1.49 | 3.43 | 290 | 0.20 | 30x30 | HU2G331M#ZS3 |
| | 390 | 1.46 | 3.36 | 290 | 0.20 | 35x25 | HU2G331M#AS2 |
| | | 1.73 | 3.98 | 250 | 0.20 | 22x50 | HU2G391M#XS7 |
| | | 1.68 | 3.86 | 250 | 0.20 | 25x40 | HU2G391M#YS5 |
| | | 1.74 | 4.00 | 250 | 0.20 | 25x45 | HU2G391M#YS6 |
| | | 1.62 | 3.72 | 250 | 0.20 | 30x30 | HU2G391M#ZS3 |
| | | 1.70 | 3.91 | 250 | 0.20 | 30x35 | HU2G391M#ZS4 |
| | | 1.59 | 3.66 | 250 | 0.20 | 35x25 | HU2G391M#AS2 |
| | 460 | 1.87 | 4.30 | 250 | 0.20 | 35x30 | HU2G391M#AS3 |
| | | 1.72 | 3.96 | 215 | 0.20 | 35x25 | HU2G461M#AS2 |
| | 470 | 1.92 | 4.41 | 210 | 0.20 | 25x45 | HU2G471M#YS6 |
| | | 1.98 | 4.55 | 210 | 0.20 | 25x50 | HU2G471M#YS7 |
| | | 1.86 | 4.28 | 210 | 0.20 | 30x35 | HU2G471M#ZS4 |
| | | 1.94 | 4.46 | 210 | 0.20 | 30x40 | HU2G471M#ZS5 |
| | | 1.84 | 4.23 | 210 | 0.20 | 35x30 | HU2G471M#AS3 |
| | 560 | 2.16 | 4.97 | 180 | 0.20 | 25x51 | HU2G561M#YL51 |
| | | 2.11 | 4.85 | 180 | 0.20 | 30x40 | HU2G561M#ZS5 |
| | | 2.19 | 5.04 | 180 | 0.20 | 30x45 | HU2G561M#ZS6 |
| | | 2.01 | 4.62 | 180 | 0.20 | 35x30 | HU2G561M#AS3 |
| | | 2.09 | 4.81 | 180 | 0.20 | 35x35 | HU2G561M#AS4 |
| | 680 | 2.51 | 5.77 | 150 | 0.20 | 25x61 | HU2G681M#YS9 |
| 2.41 | | 5.54 | 150 | 0.20 | 30x45 | HU2G681M#ZS6 | |
| 2.48 | | 5.70 | 150 | 0.20 | 30x50 | HU2G681M#ZS7 | |

Additional designs on request · Weitere Designs auf Anfrage

| 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 terminal code in the product code |
|---|------------------------------------|---|---|--|---|-------------|---|
| 400 VDC Code: 2G Surge Voltage 450 VDC | 680 | 2.31 | 5.31 | 150 | 0.20 | 35x35 | HU2G681M#AS4 |
| | | 2.40 | 5.52 | 150 | 0.20 | 35x40 | HU2G681M#AS5 |
| | 750 | 2.67 | 6.14 | 135 | 0.20 | 35x50 | HU2G751M#AS7 |
| | | 770 | 2.51 | 5.77 | 132 | 0.20 | 35x50 |
| | 820 | 2.65 | 6.10 | 120 | 0.20 | 30x51 | HU2G821M#ZS7 |
| | | 2.81 | 6.46 | 120 | 0.20 | 30x55 | HU2G821M#ZS8 |
| | | 2.63 | 6.05 | 120 | 0.20 | 35x40 | HU2G821M#AS5 |
| | | 2.72 | 6.26 | 120 | 0.20 | 35x45 | HU2G821M#AS6 |
| | | 2.78 | 6.39 | 120 | 0.20 | 35x50 | HU2G821M#AS7 |
| | 950 | 4.00 | 9.20 | 75 | 0.20 | 35x55 | HU2G951S#AS82PCC |
| | | 4.25 | 9.78 | 105 | 0.20 | 35x60 | HU2G951M#AS92PCC |
| | 1 000 | 3.17 | 7.29 | 100 | 0.20 | 30x61 | HU2G102M#ZS9 |
| | | 3.09 | 7.11 | 100 | 0.20 | 35x50 | HU2G102M#AL51 |
| | | 2.86 | 6.58 | 120 | 0.20 | 35x60 | HU2G102M#AS9 |
| | 1 200 | 3.38 | 7.77 | 80 | 0.20 | 35x56 | HU2G122M#AS8 |
| | | 3.44 | 7.91 | 80 | 0.20 | 35x75 | HU2G122M#AS12 |
| | 1 300 | 3.61 | 8.30 | 80 | 0.20 | 35x80 | HU2G132M#AS13 |
| | 1 500 | 3.93 | 9.04 | 80 | 0.20 | 35x100 | HU2G152M#AS17 |
| | | 3.99 | 9.18 | 80 | 0.20 | 40x76 | HU2G152M#BS12 |
| | 1 700 | 6.00 | 13.80 | 45 | 0.20 | 40x90 | HU2G172Q#BS15CC |
| | 1 800 | 4.47 | 10.28 | 60 | 0.20 | 40x101 | HU2G182M#BS17 |
| | 2 100 | 5.43 | 12.49 | 50 | 0.20 | 40x101 | HU2G212M#BS17CC |
| 420 VDC Code: 420V Surge Voltage 470 VDC | 100 | 0.71 | 1.63 | 1020 | 0.20 | 22x25 | HU420V101M#XS2 |
| | | 120 | 0.77 | 1.77 | 850 | 0.20 | 22x25 |
| | 150 | 0.87 | 2.00 | 680 | 0.20 | 22x25 | HU420V151M#XS2 |
| | | 0.92 | 2.12 | 680 | 0.20 | 22x30 | HU420V151M#XS3 |
| | | 0.90 | 2.07 | 680 | 0.20 | 25x25 | HU420V151M#YS2 |
| | 180 | 1.01 | 2.32 | 570 | 0.20 | 22x30 | HU420V181M#XS3 |
| | | 1.05 | 2.42 | 570 | 0.20 | 22x35 | HU420V181M#XS4 |
| | | 1.05 | 2.42 | 570 | 0.20 | 25x30 | HU420V181M#YS3 |
| | 220 | 1.17 | 2.69 | 470 | 0.20 | 22x35 | HU420V221M#XS4 |
| | | 1.22 | 2.81 | 470 | 0.20 | 22x40 | HU420V221M#XS5 |
| | | 1.21 | 2.78 | 470 | 0.20 | 25x35 | HU420V221M#YS4 |
| | | 1.15 | 2.65 | 470 | 0.20 | 30x25 | HU420V221M#ZS2 |
| | 270 | 1.35 | 3.11 | 380 | 0.20 | 22x40 | HU420V271M#XS5 |
| | | 1.40 | 3.22 | 380 | 0.20 | 22x45 | HU420V271M#XS6 |
| | | 1.35 | 3.11 | 380 | 0.20 | 25x35 | HU420V271M#YS4 |
| | | 1.28 | 2.94 | 380 | 0.20 | 30x25 | HU420V271M#ZS2 |
| | | 1.38 | 3.17 | 380 | 0.20 | 35x25 | HU420V271M#AS2 |
| | 330 | 1.54 | 3.54 | 310 | 0.20 | 22x45 | HU420V331M#XS6 |
| | | 1.59 | 3.66 | 310 | 0.20 | 22x50 | HU420V331M#XS7 |
| | | 1.45 | 3.34 | 310 | 0.20 | 25x36 | HU420V331M#YS4 |
| | | 1.55 | 3.57 | 310 | 0.20 | 25x40 | HU420V331M#YS5 |
| | | 1.61 | 3.70 | 310 | 0.20 | 25x45 | HU420V331M#YS6 |
| 1.49 | 3.43 | 310 | 0.20 | 30x30 | HU420V331M#ZS3 | | |

Additional designs on request · Weitere Designs auf Anfrage

| 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 terminal code in the product code |
|---|------------------------------------|---|---|--|---|-----------------|---|
| 420 VDC Code: 420V Surge Voltage 470 VDC | 330 | 1.56 | 3.59 | 310 | 0.20 | 30x35 | HU420V331M#ZS4 |
| | | 1.46 | 3.36 | 310 | 0.20 | 35x25 | HU420V331M#AS2 |
| | 390 | 1.64 | 3.77 | 270 | 0.20 | 25x41 | HU420V391M#YS5 |
| | | 1.74 | 4.00 | 270 | 0.20 | 25x45 | HU420V391M#YS6 |
| | | 1.80 | 4.14 | 270 | 0.20 | 25x50 | HU420V391M#YS7 |
| | | 1.62 | 3.73 | 270 | 0.20 | 30x30 | HU420V391M#ZS3 |
| | | 1.70 | 3.91 | 270 | 0.20 | 30x35 | HU420V391M#ZS4 |
| | | 1.76 | 4.05 | 270 | 0.20 | 30x40 | HU420V391M#ZS5 |
| | | 1.59 | 3.66 | 270 | 0.20 | 35x25 | HU420V391M#AS2 |
| | | 1.67 | 3.84 | 270 | 0.20 | 35x30 | HU420V391M#AS3 |
| | 470 | 1.98 | 4.55 | 220 | 0.20 | 25x50 | HU420V471M#YS7 |
| | | 1.86 | 4.28 | 220 | 0.20 | 30x35 | HU420V471M#ZS4 |
| | | 1.94 | 4.46 | 220 | 0.20 | 30x40 | HU420V471M#ZS5 |
| | | 2.00 | 4.60 | 220 | 0.20 | 30x45 | HU420V471M#ZS6 |
| | | 1.84 | 4.23 | 220 | 0.20 | 35x30 | HU420V471M#AS3 |
| | | 1.92 | 4.42 | 220 | 0.20 | 35x35 | HU420V471M#AS4 |
| | 500 | 1.89 | 4.35 | 200 | 0.20 | 35x31 | HU420V501M#AL31 |
| | 520 | 2.18 | 5.01 | 190 | 0.20 | 30x45 | HU420V521M#ZS6 |
| | | 2.16 | 4.97 | 190 | 0.20 | 25x56 | HU420V561M#YS8 |
| | 560 | 2.27 | 5.22 | 190 | 0.20 | 25x60 | HU420V561M#YS9 |
| | | 2.11 | 4.85 | 190 | 0.20 | 30x40 | HU420V561M#ZS5 |
| | | 2.25 | 5.18 | 190 | 0.20 | 30x50 | HU420V561M#ZS7 |
| | | 2.09 | 4.81 | 190 | 0.20 | 35x35 | HU420V561M#AS4 |
| | | 2.18 | 5.01 | 190 | 0.20 | 35x40 | HU420V561M#AS5 |
| | 680 | 2.48 | 5.70 | 150 | 0.20 | 30x50 | HU420V681M#ZS7 |
| | | 2.40 | 5.52 | 150 | 0.20 | 35x40 | HU420V681M#AS5 |
| | | 2.48 | 5.70 | 150 | 0.20 | 35x45 | HU420V681M#AS6 |
| | | 2.56 | 5.89 | 150 | 0.20 | 35x50 | HU420V681M#AS7 |
| | 720 | 2.55 | 5.86 | 140 | 0.20 | 35x45 | HU420V721M#AS6 |
| | 820 | 2.81 | 6.46 | 130 | 0.20 | 30x55 | HU420V821M#ZS8 |
| | | 2.72 | 6.26 | 130 | 0.20 | 35x45 | HU420V821M#AS6 |
| | | 2.80 | 6.44 | 130 | 0.20 | 35x50 | HU420V821M#AS7 |
| | 920 | 2.96 | 6.81 | 120 | 0.20 | 35x60 | HU420V921M#AS9 |
| 1000 | 3.18 | 7.31 | 110 | 0.20 | 35x56 | HU420V102M#AS8 | |
| | 3.25 | 7.48 | 110 | 0.20 | 35x60 | HU420V102M#AS9 | |
| | 3.30 | 7.59 | 110 | 0.20 | 40x56 | HU420V102M#BS8 | |
| 1200 | 3.46 | 7.96 | 90 | 0.20 | 35x80 | HU420V122M#AS13 | |
| | 3.57 | 8.21 | 90 | 0.20 | 40x76 | HU420V122M#BS12 | |
| 1500 | 4.07 | 9.36 | 70 | 0.20 | 40x101 | HU420V152M#BS17 | |
| 1600 | 4.20 | 9.66 | 70 | 0.20 | 40x101 | HU420V162M#BS17 | |
| 1800 | 4.45 | 10.24 | 67 | 0.20 | 40x101 | HU420V182M#BS17 | |
| 450 VDC Code: 2W Surge Voltage 500 VDC | 68 | 0.54 | 1.24 | 1500 | 0.20 | 22x20 | HU2W680M#XS1 |
| | | 0.71 | 1.63 | 1020 | 0.20 | 20x30 | HU2W101M#WS3 |
| | 100 | 0.71 | 1.63 | 1020 | 0.20 | 22x25 | HU2W101M#XS2 |
| | | 0.75 | 1.73 | 1020 | 0.20 | 22x30 | HU2W101M#XS3 |
| | | 0.72 | 1.66 | 1020 | 0.20 | 30x20 | HU2W101M#ZS1 |

Additional designs on request · Weitere Designs auf Anfrage

| 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 terminal code in the product code |
|--|------------------------------------|---|---|--|---|-------------|---|
| 450 VDC Code: 2W Surge Voltage 500 VDC | 120 | 0.77 | 1.77 | 850 | 0.20 | 22x26 | HU2W121M#XS2 |
| | | 0.82 | 1.89 | 850 | 0.20 | 22x30 | HU2W121M#XS3 |
| | | 0.81 | 1.86 | 850 | 0.20 | 25x25 | HU2W121M#YS2 |
| | 150 | 0.92 | 2.12 | 680 | 0.20 | 22x30 | HU2W151M#XS3 |
| | | 0.96 | 2.21 | 680 | 0.20 | 22x35 | HU2W151M#XS4 |
| | | 0.90 | 2.07 | 680 | 0.20 | 25x25 | HU2W151M#YS2 |
| | 180 | 1.01 | 2.32 | 570 | 0.20 | 22x30 | HU2W181M#XS3 |
| | | 1.05 | 2.42 | 570 | 0.20 | 22x35 | HU2W181M#XS4 |
| | | 1.09 | 2.51 | 570 | 0.20 | 22x40 | HU2W181M#XS5 |
| | | 0.99 | 2.28 | 570 | 0.20 | 25x25 | HU2W181M#YS2 |
| | | 1.05 | 2.42 | 570 | 0.20 | 25x30 | HU2W181M#YS3 |
| | | 1.09 | 2.51 | 570 | 0.20 | 25x35 | HU2W181M#YS4 |
| | | 1.04 | 2.39 | 570 | 0.20 | 30x25 | HU2W181M#ZS2 |
| | 220 | 1.17 | 2.69 | 470 | 0.20 | 22x35 | HU2W221M#XS4 |
| | | 1.22 | 2.81 | 470 | 0.20 | 22x40 | HU2W221M#XS5 |
| | | 1.25 | 2.88 | 470 | 0.20 | 22x45 | HU2W221M#XS6 |
| | | 1.16 | 2.67 | 470 | 0.20 | 25x30 | HU2W221M#YS3 |
| | | 1.21 | 2.78 | 470 | 0.20 | 25x35 | HU2W221M#YS4 |
| | | 1.15 | 2.65 | 470 | 0.20 | 30x25 | HU2W221M#ZS2 |
| | 270 | 1.31 | 3.01 | 380 | 0.20 | 22x41 | HU2W271M#XS5 |
| | | 1.40 | 3.22 | 380 | 0.20 | 22x45 | HU2W271M#XS6 |
| | | 1.44 | 3.31 | 380 | 0.20 | 22x50 | HU2W271M#XS7 |
| | | 1.35 | 3.11 | 380 | 0.20 | 25x35 | HU2W271M#YS4 |
| | | 1.40 | 3.22 | 380 | 0.20 | 25x40 | HU2W271M#YS5 |
| | | 1.28 | 2.94 | 380 | 0.20 | 30x25 | HU2W271M#ZS2 |
| | | 1.35 | 3.11 | 380 | 0.20 | 30x30 | HU2W271M#ZS3 |
| | | 1.38 | 3.17 | 380 | 0.20 | 35x25 | HU2W271M#AS2 |
| | 330 | 1.59 | 3.66 | 310 | 0.20 | 22x50 | HU2W331M#XS7 |
| | | 1.49 | 3.43 | 310 | 0.20 | 25x35 | HU2W331M#YS4 |
| | | 1.55 | 3.57 | 310 | 0.20 | 25x40 | HU2W331M#YS5 |
| | | 1.61 | 3.70 | 310 | 0.20 | 25x45 | HU2W331M#YS6 |
| | | 1.65 | 3.80 | 310 | 0.20 | 25x50 | HU2W331M#YS7 |
| | | 1.49 | 3.43 | 310 | 0.20 | 30x30 | HU2W331M#ZS3 |
| | | 1.56 | 3.59 | 310 | 0.20 | 30x35 | HU2W331M#ZS4 |
| | | 1.46 | 3.36 | 310 | 0.20 | 35x25 | HU2W331M#AS2 |
| | | 1.53 | 3.52 | 310 | 0.20 | 35x30 | HU2W331M#AS3 |
| | 390 | 1.74 | 4.00 | 270 | 0.20 | 25x45 | HU2W391M#YS6 |
| | | 1.80 | 4.14 | 270 | 0.20 | 25x50 | HU2W391M#YS7 |
| | | 1.70 | 3.91 | 270 | 0.20 | 30x35 | HU2W391M#ZS4 |
| | | 1.76 | 4.05 | 270 | 0.20 | 30x40 | HU2W391M#ZS5 |
| | | 1.67 | 3.84 | 270 | 0.20 | 35x30 | HU2W391M#AS3 |
| | 470 | 2.04 | 4.69 | 220 | 0.20 | 25x55 | HU2W471M#YS8 |
| | | 2.29 | 5.27 | 220 | 0.20 | 25x60 | HU2W471M#YS9 |
| | | 1.94 | 4.46 | 220 | 0.20 | 30x40 | HU2W471M#ZS5 |
| | | 2.00 | 4.60 | 220 | 0.20 | 30x45 | HU2W471M#ZS6 |

Additional designs on request · Weitere Designs auf Anfrage

| Rated VoltageCode (Surge Voltage) V_r [V DC] | Capacitance C_r [μF] | Ripple Current at 105°C/120Hz I_r [A RMS] | Ripple Current at 40°C/120Hz [A RMS] | ESR (typ) at 20°C/100Hz [mΩ] | Dissipation Factor at 20°C/100Hz Tan δ | DxL [mm] | Product Code # = variable value, see terminal code in the product code | |
|--|--|---|---|---------------------------------------|--|-------------|---|---------------|
| 450 VDC Code: 2W Surge Voltage 500 VDC | 470 | 2.08 | 4.78 | 220 | 0.20 | 30x50 | HU2W471M#ZS7 | |
| | | 1.84 | 4.23 | 220 | 0.20 | 35x30 | HU2W471M#AS3 | |
| | | 1.92 | 4.42 | 220 | 0.20 | 35x35 | HU2W471M#AS4 | |
| | | 1.99 | 4.58 | 220 | 0.20 | 35x40 | HU2W471M#AS5 | |
| | 560 | 2.27 | 5.22 | 190 | 0.20 | 25x60 | HU2W561M#YS9 | |
| | | 2.19 | 5.04 | 190 | 0.20 | 30x46 | HU2W561M#ZS6 | |
| | | 2.25 | 5.18 | 190 | 0.20 | 30x50 | HU2W561M#ZS7 | |
| | | 2.09 | 4.81 | 190 | 0.20 | 35x35 | HU2W561M#AS4 | |
| | | 2.18 | 5.01 | 190 | 0.20 | 35x40 | HU2W561M#AS5 | |
| | | 2.26 | 5.20 | 190 | 0.20 | 35x45 | HU2W561M#AS6 | |
| | | 680 | 2.48 | 5.70 | 150 | 0.20 | 25x70 | HU2W681M#YS11 |
| | | | 2.48 | 5.70 | 150 | 0.20 | 30x51 | HU2W681M#ZS7 |
| | 2.56 | | 5.89 | 150 | 0.20 | 30x55 | HU2W681M#ZS8 | |
| | 2.30 | | 5.29 | 150 | 0.20 | 35x36 | HU2W681M#AS4 | |
| | 2.40 | | 5.52 | 150 | 0.20 | 35x41 | HU2W681M#AS5 | |
| | 2.48 | | 5.70 | 150 | 0.20 | 35x45 | HU2W681M#AS6 | |
| | 2.55 | | 5.87 | 150 | 0.20 | 35x50 | HU2W681M#AS7 | |
| | 820 | 2.75 | 6.33 | 130 | 0.20 | 25x80 | HU2W821M#YS13 | |
| | | 2.87 | 6.60 | 130 | 0.20 | 30x60 | HU2W821M#ZS9 | |
| | | 2.64 | 6.07 | 130 | 0.20 | 35x46 | HU2W821M#AS6 | |
| | | 2.80 | 6.44 | 130 | 0.20 | 35x50 | HU2W821M#AS7 | |
| | 950 | 3.70 | 8.51 | 115 | 0.20 | 35x60 | HU2W951M#AS92P | |
| | | 1000 | 3.18 | 7.31 | 110 | 0.20 | 35x55 | HU2W102M#AS8 |
| | | | 3.25 | 7.48 | 110 | 0.20 | 35x60 | HU2W102M#AS9 |
| | 3.15 | | 7.25 | 110 | 0.20 | 35x70 | HU2W102M#AS11 | |
| | 1200 | 4.01 | 9.22 | 90 | 0.20 | 35x82 | HU2W122M#AS13CC | |
| | | 3.51 | 8.05 | 90 | 0.20 | 35x100 | HU2W122M#AS17 | |
| | | 3.57 | 8.21 | 90 | 0.20 | 40x75 | HU2W122M#BS12 | |
| | | 4.01 | 9.22 | 90 | 0.20 | 40x90 | HU2W122M#BS15 | |
| | 1500 | 4.29 | 9.87 | 70 | 0.20 | 35x90 | HU2W152M#AS15CC | |
| | | 4.02 | 9.25 | 70 | 0.20 | 40x81 | HU2W152M#BS13 | |
| | | 4.07 | 9.36 | 70 | 0.20 | 40x100 | HU2W152M#BS17 | |
| | | 4.00 | 9.20 | 70 | 0.20 | 46x97 | HU2W152M#HL97 | |
| | 2200 | 5.33 | 12.26 | 50 | 0.20 | 46x100 | HU2W222M#HS17 | |
| | 500 VDC Code: 2H Surge Voltage 550 VDC | 56 | 0.42 | 0.97 | 1710 | 0.20 | 22x25 | HU2H560M#XS2 |
| | | | 0.45 | 1.04 | 1410 | 0.20 | 22x25 | HU2H680M#XS2 |
| | | 68 | 0.48 | 1.10 | 1410 | 0.20 | 22x30 | HU2H680M#XS3 |
| | | | 0.55 | 1.27 | 1410 | 0.20 | 25x25 | HU2H680M#YS2 |
| | | 82 | 0.50 | 1.15 | 1170 | 0.20 | 22x26 | HU2H820M#XS2 |
| | | | 0.53 | 1.22 | 1170 | 0.20 | 22x30 | HU2H820M#XS3 |
| | | | 0.54 | 1.24 | 1170 | 0.20 | 25x25 | HU2H820M#YS2 |
| | | | 0.57 | 1.31 | 1170 | 0.20 | 25x30 | HU2H820M#YS3 |
| | | 100 | 0.59 | 1.36 | 960 | 0.20 | 22x30 | HU2H101M#XS3 |
| | | | 0.62 | 1.43 | 960 | 0.20 | 22x35 | HU2H101M#XS4 |
| 0.65 | | | 1.50 | 960 | 0.20 | 22x40 | HU2H101M#XS5 | |

Additional designs on request · Weitere Designs auf Anfrage

| 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 terminal code in the product code |
|---|------------------------------------|---|---|--|---|--------------|---|
| 500 VDC Code: 2H Surge Voltage 550 VDC | 100 | 0.61 | 1.40 | 960 | 0.20 | 25x25 | HU2H101M#YS3 |
| | | 0.64 | 1.47 | 960 | 0.20 | 25x30 | HU2H101M#YS4 |
| | | 0.63 | 1.45 | 960 | 0.20 | 30x25 | HU2H101M#ZS3 |
| | 120 | 0.69 | 1.59 | 800 | 0.20 | 22x35 | HU2H121M#XS4 |
| | | 0.72 | 1.66 | 800 | 0.20 | 22x40 | HU2H121M#XS5 |
| | | 0.71 | 1.63 | 800 | 0.20 | 25x30 | HU2H121M#YS3 |
| | | 0.74 | 1.70 | 800 | 0.20 | 25x35 | HU2H121M#YS4 |
| | | 0.75 | 1.73 | 800 | 0.20 | 30x25 | HU2H121M#ZS2 |
| | 150 | 0.82 | 1.89 | 640 | 0.20 | 22x40 | HU2H151M#XS5 |
| | | 0.85 | 1.96 | 640 | 0.20 | 22x45 | HU2H151M#XS6 |
| | | 0.84 | 1.93 | 640 | 0.20 | 25x35 | HU2H151M#YS4 |
| | | 0.88 | 2.02 | 640 | 0.20 | 25x40 | HU2H151M#YS6 |
| | | 0.85 | 1.96 | 640 | 0.20 | 30x25 | HU2H151M#ZS2 |
| | | 0.90 | 2.07 | 640 | 0.20 | 30x30 | HU2H151M#ZS3 |
| | | 0.94 | 2.16 | 640 | 0.20 | 35x25 | HU2H151M#AS2 |
| | 180 | 0.94 | 2.16 | 540 | 0.20 | 22x46 | HU2H181M#XS6 |
| | | 0.97 | 2.23 | 540 | 0.20 | 22x50 | HU2H181M#XS7 |
| | | 0.94 | 2.16 | 540 | 0.20 | 25x36 | HU2H181M#YS4 |
| | | 0.98 | 2.25 | 540 | 0.20 | 25x40 | HU2H181M#YS5 |
| | | 1.01 | 2.32 | 540 | 0.20 | 25x45 | HU2H181M#YS6 |
| | | 0.99 | 2.28 | 540 | 0.20 | 30x30 | HU2H181M#ZS3 |
| | | 1.04 | 2.39 | 540 | 0.20 | 30x35 | HU2H181M#ZS4 |
| | 220 | 1.04 | 2.39 | 540 | 0.20 | 35x25 | HU2H181M#AS2 |
| | | 1.13 | 2.60 | 440 | 0.20 | 25x45 | HU2H221M#YS6 |
| | | 1.17 | 2.69 | 440 | 0.20 | 25x50 | HU2H221M#YS7 |
| | | 1.11 | 2.55 | 440 | 0.20 | 30x31 | HU2H221M#ZS3 |
| | | 1.17 | 2.69 | 440 | 0.20 | 30x35 | HU2H221M#ZS4 |
| | | 1.21 | 2.78 | 440 | 0.20 | 30x40 | HU2H221M#ZS5 |
| | | 1.16 | 2.67 | 440 | 0.20 | 35x26 | HU2H221M#AS2 |
| | 270 | 1.22 | 2.81 | 440 | 0.20 | 35x30 | HU2H221M#AS3 |
| | | 1.31 | 3.01 | 360 | 0.20 | 25x51 | HU2H271M#YS7 |
| | | 1.31 | 3.01 | 360 | 0.20 | 30x36 | HU2H271M#ZS4 |
| | | 1.36 | 3.13 | 360 | 0.20 | 30x40 | HU2H271M#ZS5 |
| | | 1.41 | 3.24 | 360 | 0.20 | 30x45 | HU2H271M#ZS6 |
| | | 1.37 | 3.15 | 360 | 0.20 | 35x30 | HU2H271M#AS3 |
| | 330 | 1.44 | 3.31 | 360 | 0.20 | 35x35 | HU2H271M#AS4 |
| | | 1.58 | 3.63 | 290 | 0.20 | 30x45 | HU2H331M#ZS6 |
| | | 1.63 | 3.75 | 290 | 0.20 | 30x50 | HU2H331M#ZS7 |
| | | 1.82 | 4.19 | 230 | 0.20 | 30x50 | HU2H331M#ZS72P |
| | | 1.61 | 3.70 | 290 | 0.20 | 35x35 | HU2H331M#AS5 |
| | 390 | 1.67 | 3.84 | 290 | 0.20 | 35x40 | HU2H331M#AS5 |
| | | 1.79 | 4.12 | 250 | 0.20 | 30x50 | HU2H391M#ZS7 |
| 1.84 | | 4.23 | 250 | 0.20 | 35x40 | HU2H391M#AS5 | |
| | | 1.90 | 4.37 | 250 | 0.20 | 35x45 | HU2H391M#AS6 |

Additional designs on request · Weitere Designs auf Anfrage

| 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 terminal code in the product code | |
|--|------------------------------------|---|---|--|---|-------------|---|---------------|
| 500 VDC Code: 2H Surge Voltage 550 VDC | 470 | 2.10 | 4.83 | 210 | 0.20 | 30x60 | HU2H471M#ZS9 | |
| | | 2.12 | 4.88 | 210 | 0.20 | 35x45 | HU2H471M#AS6 | |
| | | 2.18 | 5.01 | 210 | 0.20 | 35x50 | HU2H471M#AS7 | |
| | 560 | 2.40 | 5.52 | 180 | 0.20 | 35x51 | HU2H561M#AS7 | |
| | | 2.47 | 5.68 | 180 | 0.20 | 35x55 | HU2H561M#AS8 | |
| | | 2.53 | 5.82 | 180 | 0.20 | 35x60 | HU2H561M#AS9 | |
| | | 680 | 2.40 | 5.52 | 150 | 0.20 | 35x60 | HU2H681M#AS9 |
| | | 820 | 2.53 | 5.82 | 125 | 0.20 | 35x75 | HU2H821M#AS12 |
| 550 VDC Code: 2L Surge Voltage 600 VDC | 82 | 0.59 | 1.18 | 2920 | 0.25 | 30x25 | HU2L820M#ZS2 | |
| | 120 | 0.77 | 1.54 | 1990 | 0.25 | 30x30 | HU2L121M#ZS3 | |
| | | 0.80 | 1.60 | 1990 | 0.25 | 35x25 | HU2L121M#AS2 | |
| | 150 | 0.91 | 1.82 | 1600 | 0.25 | 30x35 | HU2L151M#ZS4 | |
| | | 0.96 | 1.92 | 1600 | 0.25 | 35x30 | HU2L151M#AS3 | |
| | 180 | 1.05 | 2.10 | 1330 | 0.25 | 30x40 | HU2L181M#ZS5 | |
| | | 1.11 | 2.22 | 1330 | 0.25 | 35x35 | HU2L181M#AS4 | |
| | 220 | 1.26 | 2.52 | 1090 | 0.25 | 30x50 | HU2L221M#ZS7 | |
| | | 1.29 | 2.58 | 1090 | 0.25 | 35x40 | HU2L221M#AS5 | |
| | 270 | 1.50 | 3.00 | 890 | 0.25 | 35x45 | HU2L271M#AS6 | |
| | 330 | 1.73 | 3.46 | 730 | 0.25 | 35x50 | HU2L331M#AS7 | |
| | 390 | 2.00 | 4.00 | 620 | 0.25 | 35x60 | HU2L391M#AS9 | |

Additional designs on request · Weitere Designs auf Anfrage

> Ripple Current Multiplier · Wechselstrommultiplikator

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

| Temperature [°C] | | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 |
|------------------|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Multiplier | 200~500V | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 1.8 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 1.1 | 1.0 |
| | 550V | 2.0 | 1.9 | 1.8 | 1.7 | 1.7 | 1.6 | 1.5 | 1.4 | 1.4 | 1.3 | 1.2 | 1.1 | 1.0 | 1.0 |

| Forced cooling – Wind speed [m/sec] | v < 0.25 | v ≥ 0.25 | v ≥ 0.5 | v ≥ 1.0 | v ≥ 2.0 | v ≥ 3.0 |
|-------------------------------------|----------|----------|---------|---------|---------|---------|
| Multiplier | 1.00 | 1.05 | 1.10 | 1.15 | 1.20 | 1.25 |

> Life Time Table · Brauchbarkeitsdauer – Tabelle

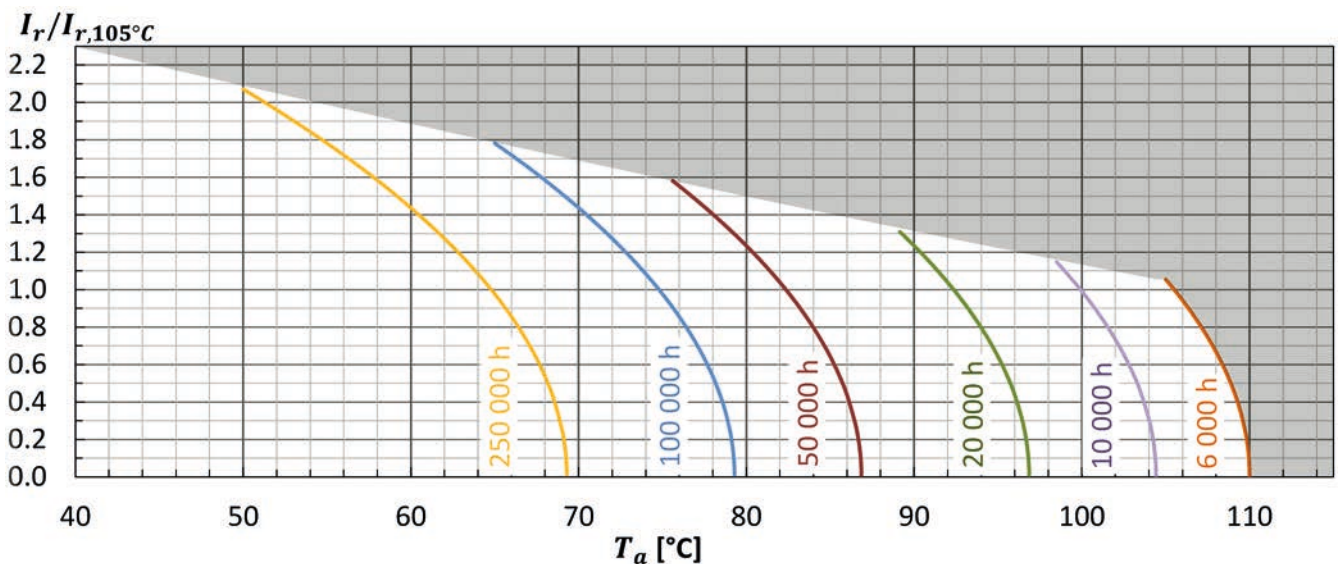
| HU | Useful life as function of ambient temperature and ripple current | | | | | | | | | | | | | | |
|---------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | I_r at 105°C | x 1.0 | x 1.1 | x 1.2 | x 1.3 | x 1.4 | x 1.5 | x 1.6 | x 1.7 | x 1.8 | x 1.9 | x 2.0 | x 2.1 | x 2.2 | x 2.3 |
| $T_a = 40°C$ | 250 | 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 | 250 | |
| $T_a = 50°C$ | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 238 | | |
| $T_a = 55°C$ | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 243 | 209 | 178 | | | | |
| $T_a = 60°C$ | 250 | 250 | 250 | 250 | 250 | 231 | 203 | 177 | 154 | 132 | 113 | | | | |
| $T_a = 65°C$ | 245 | 225 | 204 | 184 | 165 | 146 | 128 | 112 | 97 | 84 | | | | | |
| $T_a = 70°C$ | 155 | 142 | 129 | 116 | 104 | 92 | 81 | 71 | 62 | | | | | | |
| $T_a = 75°C$ | 98 | 90 | 81 | 73 | 66 | 58 | 51 | | | | | | | | |
| $T_a = 80°C$ | 62 | 56 | 51 | 46 | 41 | 37 | | | | | | | | | |
| $T_a = 85°C$ | 39 | 36 | 32 | 29 | 26 | | | | | | | | | | |
| $T_a = 90°C$ | 24 | 22 | 20 | 19 | | | | | | | | | | | |
| $T_a = 95°C$ | 15 | 14 | 13 | | | | | | | | | | | | |
| $T_a = 100°C$ | 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 | $T_a = 105°C$; 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 | $T_a = 105°C$; 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: JIS C 5101-4, JIS C 5102, IEC 60384-4