

HCGF6 · Screw-Terminal · 6000 h/85 °C

Standard Performances · Smaller Size
Suited for optional permanent Charge-Discharge Design

Special charge-discharge proof design available upon request.

Auf Anfrage spezielles Design für Lade-, Entladeanwendungen erhältlich.

> Specifications · Spezifikationen

| Items | Characteristics |
|---|---|
| Temperature range | -25°C ~ + 85°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 _L (20°C, 5 min) | 0.01 • C • V _r [μA] or 3 mA, which is smaller. |
| Useful life | 6 000 hours at 85°C |
| Field failure rate | 0.5 FIT = 0.5 • 10 ⁻⁹ Failures/hour |
| RoHS conform | Directive 2011/65/EU & (EU)2015/863 |
| Specification / Vibration | JIS C 5101-4 / 0.75mm, 10...55Hz, 10g, 3x2h |



> Outline Drawings · Bauformen

Shape: B (ØD = 51-101)
(for Bolt - Mounting, M12x16, stud bolt is not isolated)

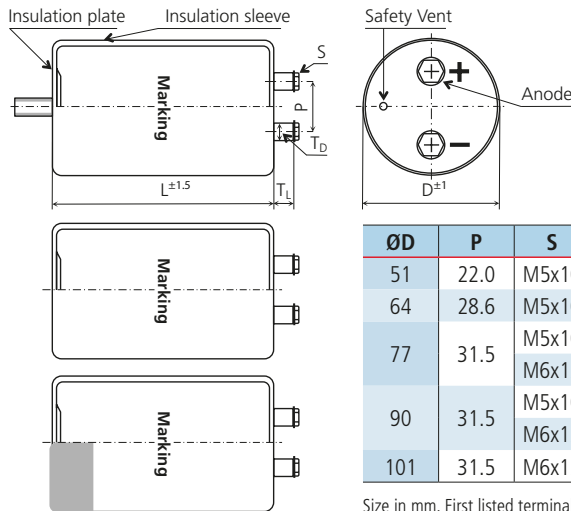
Form: B (ØD = 51-101)
(für Bolzenbefestigung, M12x16, Bolzen ist nicht isoliert)

Shape: N (for PBT-Holder ØD = 77-90 and Press Ring ØD = 64-90)

Form: N (für PBT-Halter ØD = 77-90 und Einpressring ØD = 64-90)

Shape: Y (ØD = 51-101)
(double sleeve, Y-bracket free of charge)

Form: Y (ØD = 51-101)
(mit doppelter Isolierung, Y-Schelle wird kostenlos mitgeliefert)



| ØD | P | S | T _L | T _D | Cap material |
|-----|------|-------|----------------|----------------|--------------|
| 51 | 22.0 | M5x10 | 5.5 | 10 | PH |
| 64 | 28.6 | M5x10 | 5.5 | 10 | PH |
| 77 | 31.5 | M5x10 | 5.0 | 10 | PH |
| | | M6x12 | 4.5 | 17 | PH |
| 90 | 31.5 | M5x10 | 5.0 | 10 | PH |
| | | M6x12 | 5.0 | 17 | PH |
| 101 | 31.5 | M6x12 | 3.0 | 14 | PPS |

Size in mm. First listed terminal is standard.

> Product Code · Bestellbezeichnung

Example: Series HCGF6 · 500 V · 12000 μF +/- 20 % · D=90 mm · L=236 mm with Y-Bracket

| HCGF6 | | 2H | | 123 | | Y | | F | | 236 (PHM6) | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|---------|---|---------|--|--|--------------------|---------|--------------------|---------|--|-----|----|-----|----|-----|----|-----|---|--|---|--|----|------|----|---|----|---|----|---|----|---|-----|---|---|--|
| Type of series | | Capacitance code | | Rated voltage code | | Fixing symbol code | | Case code diameter | | Customers' Specification (e.g. M6 ...) | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | The first two digits are significant. The last digit indicates the number of following zeros in μF. | | <table border="1"> <thead> <tr> <th>Code</th> <th>Voltage</th> <th>Code</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>2V</td> <td>350</td> <td>2W</td> <td>450</td> </tr> <tr> <td>2G</td> <td>400</td> <td>2H</td> <td>500</td> </tr> </tbody> </table> | | Code | Voltage | Code | Voltage | 2V | 350 | 2W | 450 | 2G | 400 | 2H | 500 | B : Bolt ØD = 51 - 90 N : No double sleeve (PBT-Safety-holder or press ring) Y : 3 Stoppers Bracket ØD = 51 - 101 | | <table border="1"> <thead> <tr> <th>ØD</th> <th>Code</th> </tr> </thead> <tbody> <tr> <td>51</td> <td>C</td> </tr> <tr> <td>64</td> <td>D</td> </tr> <tr> <td>77</td> <td>E</td> </tr> <tr> <td>90</td> <td>F</td> </tr> <tr> <td>101</td> <td>G</td> </tr> </tbody> </table> | | ØD | Code | 51 | C | 64 | D | 77 | E | 90 | F | 101 | G | Case Code length Length in mm (3 digits) | |
| Code | Voltage | Code | Voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2V | 350 | 2W | 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2G | 400 | 2H | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ØD | Code | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51 | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64 | D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77 | E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90 | F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101 | G | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Rated VoltageCode (Surge Voltage) V_r [V DC] | Capacitance C_r [μ F] | Ripple Current at 85°C/120Hz I_r [A RMS] | Ripple Current at 40°C/120Hz [A RMS] | ESR (typ) at 20°C/100Hz [m Ω] | Zmax at 20°C/10kHz [m Ω] | ESL (typ) [nH] | Dissipation Factor at 20°C/120Hz Tan δ | DxL [mm] | Product Code # = variable value, see fixing code in the product code |
|---|------------------------------------|--|---|--|---|----------------------|---|-------------------|---|
| 350 VDC Code: 2V Surge Voltage 400 VDC | 2 700 | 7.7 | 20.8 | 48 | 50 | 17 | 0.2 | 51x115 | HCGF62V272#C115PH |
| | 3 300 | 9.0 | 24.3 | 39 | 40 | 17 | 0.2 | 51x130 | HCGF62V332#C130PH |
| | 3 900 | 9.5 | 25.6 | 33 | 35 | 18 | 0.2 | 64x96 | HCGF62V392#D096PH |
| | 4 700 | 11.3 | 30.5 | 27 | 30 | 18 | 0.2 | 64x115 | HCGF62V472#D115PH |
| | 5 600 | 12.8 | 34.6 | 25 | 28 | 18 | 0.2 | 64x130 | HCGF62V562#D130PH |
| | 6 800 | 14.3 | 38.6 | 21 | 24 | 20 | 0.2 | 77x115 | HCGF62V682#E115PH |
| | 8 200 | 16.3 | 44.1 | 17 | 21 | 20 | 0.2 | 77x130 | HCGF62V822#E130PH |
| | 10 000 | 19.4 | 52.4 | 14 | 17 | 20 | 0.2 | 77x155 | HCGF62V103#E155PH |
| | 12 000 | 21.3 | 57.5 | 12 | 15 | 20 | 0.2 | 90x131 | HCGF62V123#F131PH |
| | | 22.1 | 59.6 | 12 | 15 | 20 | 0.2 | 77x171 | HCGF62V123#E171PH |
| | 15 000 | 25.5 | 68.8 | 10 | 13 | 20 | 0.2 | 90x157 | HCGF62V153#F157PH |
| | 18 000 | 30.4 | 82.0 | 9 | 15 | 20 | 0.2 | 90x196 | HCGF62V183#F196PH |
| | 20 000 | 32.0 | 86.4 | 8 | 11 | 20 | 0.2 | 90x196 | HCGF62V203#F196PH |
| | 22 000 | 32.9 | 88.8 | 8 | 11 | 29 | 0.2 | 101x175* | HCGF62V223#G175 |
| | | 36.3 | 98.0 | 8 | 10 | 20 | 0.2 | 90x221 | HCGF62V223#F221PH |
| 27 000 | 40.9 | 110.4** | 7 | 8 | 29 | 0.2 | 101x237* | HCGF62V273#G237 | |
| 400 VDC Code: 2G Surge Voltage 450 VDC | 2 200 | 6.6 | 17.8 | 58 | 60 | 17 | 0.2 | 51x100 | HCGF62G222#C100PH |
| | 2 700 | 7.9 | 21.4 | 48 | 50 | 18 | 0.2 | 64x96 | HCGF62G272#D096PH |
| | | 7.9 | 24.4 | 48 | 50 | 17 | 0.2 | 51x115 | HCGF62G272#C115PH |
| | 3 300 | 8.7 | 23.6 | 39 | 40 | 18 | 0.2 | 64x96 | HCGF62G332#D096PH |
| | 3 900 | 10.2 | 27.5 | 33 | 35 | 18 | 0.2 | 64x115 | HCGF62G392#D115PH |
| | 4 700 | 11.7 | 31.7 | 27 | 30 | 18 | 0.2 | 64x130 | HCGF62G472#D130PH |
| | 5 600 | 13.0 | 35.1 | 25 | 28 | 20 | 0.2 | 77x115 | HCGF62G562#E115PH |
| | 6 800 | 15.0 | 40.4 | 21 | 24 | 20 | 0.2 | 77x130 | HCGF62G682#E130PH |
| | 8 200 | 17.3 | 16.6 | 18 | 20 | 20 | 0.2 | 77x145 | HCGF62G822#E145PH |
| | 10 000 | 19.4 | 52.5 | 14 | 17 | 20 | 0.2 | 90x131 | HCGF62G103#F131PH |
| | | 20.4 | 55.1 | 17 | 20 | 20 | 0.2 | 77x171 | HCGF62G103#E171PH |
| | 12 000 | 22.9 | 61.8 | 12 | 15 | 20 | 0.2 | 90x157 | HCGF62G123#F157PH |
| | 15 000 | 27.9 | 75.3 | 10 | 13 | 20 | 0.2 | 90x196 | HCGF62G153#F196PH |
| | 18 000 | 29.7 | 80.1 | 9 | 12 | 29 | 0.2 | 101x175* | HCGF62G183#G175 |
| | | 32.2 | 86.9 | 9 | 12 | 20 | 0.2 | 90x221 | HCGF62G183#F221PH |
| | 20 000 | 34.9 | 94.2 | 9 | 12 | 20 | 0.2 | 90x236 | HCGF62G203#F236PH |
| | 22 000 | 36.9 | 99.6 | 8 | 11 | 29 | 0.2 | 101x237* | HCGF62G223#G237 |
| 24 000 | 41.2 | 111.2** | 8 | 10 | 20 | 0.2 | 90x283 | HCGF62G243#F283PH | |
| 25 000 | 41.3 | 111.5** | 8 | 10 | 20 | 0.2 | 101x250* | HCGF62G253#G250 | |
| 27 000 | 44.1 | 119.0** | 7 | 10 | 29 | 0.2 | 101x283 | HCGF62G273#G283 | |
| 450 VDC Code: 2W Surge Voltage 500 VDC | 1 800 | 6.3 | 17.0 | 77 | 80 | 17 | 0.2 | 51x115 | HCGF62W182#C115PH |
| | 2 200 | 7.2 | 19.5 | 63 | 65 | 18 | 0.2 | 64x96 | HCGF62W222#D096PH |
| | | 7.4 | 19.9 | 63 | 65 | 17 | 0.2 | 51x130 | HCGF62W222#C130PH |
| | 2 700 | 7.9 | 21.3 | 52 | 54 | 18 | 0.2 | 64x96 | HCGF62W272#D096PH |
| | 3 300 | 9.3 | 25.2 | 42 | 44 | 20 | 0.2 | 77x96 | HCGF62W332#E096PH |
| | | 9.4 | 25.4 | 42 | 44 | 18 | 0.2 | 64x115 | HCGF62W332#D115PH |
| | 3 900 | 10.7 | 28.9 | 38 | 40 | 18 | 0.2 | 64x130 | HCGF62W392#D130PH |
| | 4 700 | 11.2 | 30.2 | 34 | 36 | 20 | 0.2 | 77x96 | HCGF62W472#E096PH |
| 11.8 | | 32.0 | 34 | 36 | 20 | 0.2 | 77x115 | HCGF62W472#E115PH | |

Additional designs on request · Weitere Designs auf Anfrage

HCGF6 · Screw-Terminal · 6000 h/85 °C

| Rated VoltageCode (Surge Voltage) V_r [V DC] | Capacitance C_r [μF] | Ripple Current at 85°C/120Hz I_r [A RMS] | Ripple Current at 40°C/120Hz [A RMS] | ESR (typ) at 20°C/100Hz [mΩ] | Zmax at 20°C/10kHz [mΩ] | ESL (typ) [nH] | Dissipation Factor at 20°C/120Hz Tan δ | DxL [mm] | Product Code # = variable value, see fixing code in the product code |
|--|------------------------------|--|---|---------------------------------------|----------------------------------|-------------------|--|-------------------|---|
| 450 VDC Code: 2W Surge Voltage 500 VDC | 5 600 | 13.1 | 35.4 | 32 | 34 | 20 | 0.2 | 90x96 | HCGF62W562#F096PH |
| | 5 600 | 13.6 | 36.6 | 31 | 33 | 20 | 0.2 | 77x130 | HCGF62W562#E130PH |
| | 6 800 | 16.1 | 43.5 | 25 | 27 | 20 | 0.2 | 77x155 | HCGF62W682#E155PH |
| | 8 200 | 17.6 | 47.5 | 21 | 23 | 20 | 0.2 | 90x131 | HCGF62W822#F131PH |
| | | 19.4 | 52.5 | 21 | 23 | 20 | 0.2 | 77x195 | HCGF62W822#E195PH |
| | 10 000 | 23.2 | 62.6 | 17 | 19 | 20 | 0.2 | 77x220 | HCGF62W103#E220PH |
| | | 21.5 | 58.0 | 17 | 19 | 20 | 0.2 | 90x171 | HCGF62W103#F171PH |
| | 12 000 | 24.3 | 65.5 | 16 | 18 | 29 | 0.2 | 101x175* | HCGF62W123#G175 |
| | | 25.0 | 67.4 | 16 | 18 | 20 | 0.2 | 90x196 | HCGF62W123#F196PH |
| | 14 000 | 27.9 | 75.3 | 17 | 20 | 20 | 0.2 | 90x196 | HCGF62W143#F196PH |
| | 15 000 | 28.5 | 77.0 | 15 | 17 | 20 | 0.2 | 90x196 | HCGF62W153#F196PH |
| | | 30.1 | 81.4 | 15 | 17 | 20 | 0.2 | 90x236 | HCGF62W153#F236PH |
| | 16 000 | 30.3 | 81.8 | 16 | 18 | 20 | 0.2 | 90x221 | HCGF62W163#F221PH |
| | 18 000 | 33.4 | 90.2 | 14 | 16 | 29 | 0.2 | 90x236 | HCGF62W183#F236PH |
| 20 000 | 34.4 | 92.9 | 13 | 15 | 29 | 0.2 | 101x222* | HCGF62W203#G222 | |
| 22 000 | 38.8 | 104.8** | 12 | 14 | 29 | 0.2 | 101x250* | HCGF62W223#G250 | |
| 500 VDC Code: 2H Surge Voltage 550 VDC | 1 200 | 5.2 | 14.0 | 112 | 120 | 17 | 0.2 | 51x115 | HCGF62H122#C115PH |
| | | 5.3 | 14.3 | 112 | 120 | 18 | 0.2 | 64x96 | HCGF62H122#D096PH |
| | 1 500 | 5.9 | 15.8 | 90 | 96 | 18 | 0.2 | 64x96 | HCGF62H152#D096PH |
| | | 6.0 | 16.2 | 90 | 96 | 17 | 0.2 | 51x119 | HCGF62H152#C119PH |
| | 1 800 | 6.9 | 18.6 | 75 | 80 | 18 | 0.2 | 64x115 | HCGF62H182#D115PH |
| | 2 200 | 7.1 | 19.2 | 61 | 65 | 18 | 0.2 | 64x96 | HCGF62H222#D096PH |
| | 2 700 | 9.1 | 24.6 | 50 | 53 | 20 | 0.2 | 77x115 | HCGF62H272#E115PH |
| | 3 300 | 10.5 | 28.4 | 45 | 48 | 20 | 0.2 | 77x130 | HCGF62H332#E130PH |
| | 3 900 | 12.2 | 32.9 | 38 | 41 | 20 | 0.2 | 77x155 | HCGF62H392#E155PH |
| | 4 700 | 13.3 | 36.0 | 34 | 37 | 20 | 0.2 | 90x131 | HCGF62H472#F131PH |
| | | 13.9 | 37.6 | 34 | 37 | 20 | 0.2 | 77x171 | HCGF62H472#E171PH |
| | 5 600 | 15.5 | 41.9 | 28 | 31 | 20 | 0.2 | 90x157 | HCGF62H562#F157PH |
| | | 16.0 | 43.1 | 28 | 31 | 20 | 0.2 | 77x195 | HCGF62H562#E195PH |
| | 6 800 | 17.7 | 47.8 | 23 | 25 | 20 | 0.2 | 90x171 | HCGF62H682#F171PH |
| | | 20.0 | 54.0 | 21 | 23 | 29 | 0.2 | 101x175* | HCGF62H822#G175 |
| | 8 200 | 20.6 | 55.6 | 21 | 23 | 20 | 0.2 | 90x196 | HCGF62H822#F196PH |
| | | 23.0 | 62.1 | 17 | 19 | 29 | 0.2 | 101x195* | HCGF62H103#G195 |
| | 10 000 | 24.0 | 64.8 | 17 | 19 | 20 | 0.2 | 90x221 | HCGF62H103#F221PH |
| 27.0 | | 72.9 | 16 | 18 | 20 | 0.2 | 90x236 | HCGF62H123#F236PH | |
| 15 000 | 30.5 | 82.4 | 14 | 16 | 29 | 0.2 | 101x237* | HCGF62H153#G237 | |

* For Bolt - Mounting length dimensions are plus 5mm (101x180, 101x200, 101x227, 101x242mm or 101x255).

** Please contact us if load condition exceeds 100A RMS

> Ripple Current Multiplier · Wechselstrommultiplikator

| Frequency [Hz] | 50/60 | 120 | 300 | 1k | ≥ 10k | Forced cooling [m/sec] | v < 1.0 | v ≥ 1.0 |
|----------------|-------|------|------|------|-------|------------------------|---------|---------|
| Multiplier | 0.80 | 1.00 | 1.18 | 1.34 | 1.45 | Multiplier | 1.0 | 1.1 |

| Temperature (°C) | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Multiplier | 2.7 | 2.6 | 2.4 | 2.2 | 2.0 | 1.8 | 1.6 | 1.4 | 1.2 | 1.0 |

Additional designs on request · Weitere Designs auf Anfrage

> Life Time Table · Brauchbarkeitsdauer – Tabelle

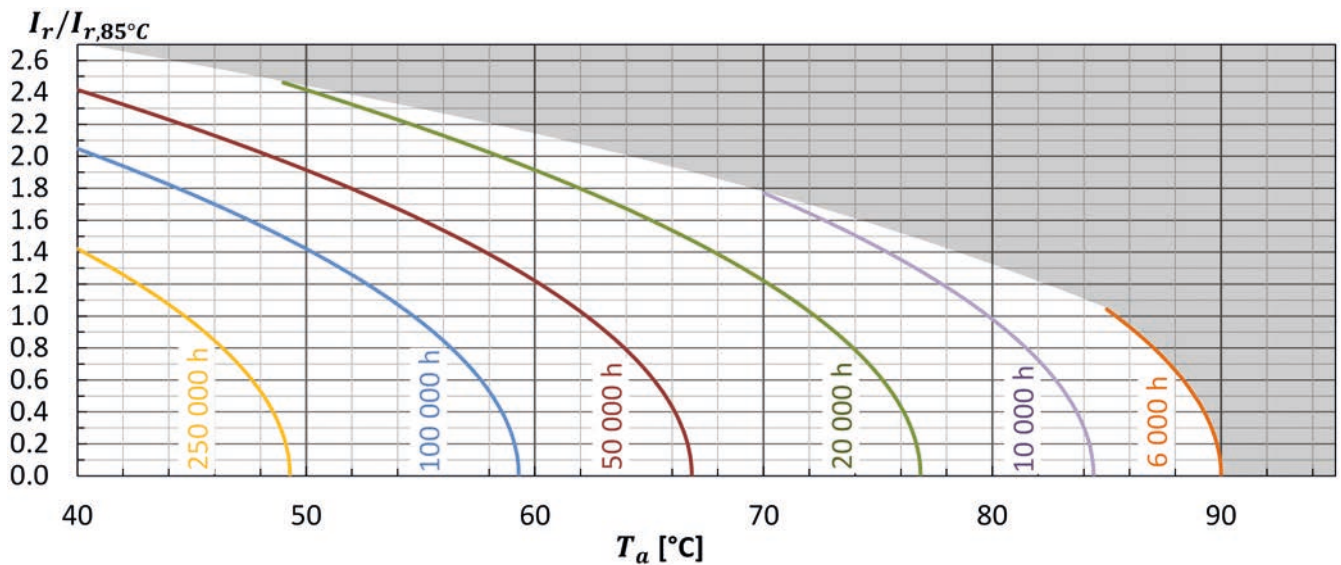
| HCGF6 I_r at 85°C | Useful life as function of ambient temperature and ripple current | | | | | | | | | | | | |
|------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | x 1.0 | x 1.2 | x 1.4 | x 1.6 | x 1.8 | x 2.0 | x 2.1 | x 2.2 | x 2.3 | x 2.4 | x 2.5 | x 2.6 | x 2.7 |
| $T_a = 40°C$ | 250 | 250 | 250 | 199 | 149 | 108 | 91 | 76 | 63 | 51 | 42 | 33 | 27 |
| $T_a = 45°C$ | 243 | 201 | 162 | 125 | 94 | 68 | 57 | 48 | 39 | 32 | 26 | 21 | |
| $T_a = 50°C$ | 153 | 127 | 102 | 79 | 59 | 43 | 36 | 30 | 25 | 20 | | | |
| $T_a = 55°C$ | 97 | 80 | 64 | 50 | 37 | 27 | 23 | 19 | | | | | |
| $T_a = 60°C$ | 61 | 51 | 41 | 31 | 23 | 17 | | | | | | | |
| $T_a = 65°C$ | 38 | 32 | 25 | 20 | 15 | | | | | | | | |
| $T_a = 70°C$ | 24 | 20 | 16 | 12 | | | | | | | | | |
| $T_a = 75°C$ | 15 | 12 | 10 | | | | | | | | | | |
| $T_a = 80°C$ | 9 | 8 | | | | | | | | | | | |
| $T_a = 85°C$ | 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 $I_r, 85°C, 120Hz$

Brauchbarkeitsdauer in Abhängigkeit von Umgebungstemperatur T_a und Wechselstrombelastung I_r im Verhältnis zur max. Wechselstrombelastung bei oberer Kategorie-temperatur $I_r, 85°C, 120Hz$



> Life Time Tests and Requirements · Anforderungen Brauchbarkeitsdauer

| Life time test | Test procedure | Life time criteria |
|----------------|--|--|
| Endurance test | $T_a = 85°C$; V_r, I_r applied 4000 hours | $\Delta C/C \leq 15\%$ (of initial value) $Tan\delta \leq 175\%$ (of specified value) $I_L \leq$ specified value |
| Useful life | $T_a = 85°C$; V_r, I_r applied 6000 hours | $\Delta C/C \leq 20\%$ (of initial value) $Tan\delta < 200\%$ (of specified value) $I_L \leq$ specified value |

Reference Specification: JIS C 5101-4, JIS C 5102, IEC 60384-4