

CF Chip Type, Standard series



- Low ESR, High ripple current.
- Load life of 2000 hours at 105°C.
- SMD type : Lead free reflow soldering condition at 260°C peak correspondence.
- Compliant to the RoHS directive (2002/95/EC).



■ Specifications

| Item | Performance Characteristics | | |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------|
| Category Temperature Range | -55 to +105°C | | |
| Rated Voltage Range | 2.5 to 25V | | |
| Rated Capacitance Range | 3.3 to 1500µF | | |
| Capacitance Tolerance | ±20% at 120Hz, 20°C | | |
| Tangent of loss angle (tan δ) | Less than or equal to the specified value at 120Hz, 20°C | | |
| ESR (※ 1) | Less than or equal to the specified value at 100kHz, 20°C | | |
| Leakage Current (※ 2) | Less than or equal to the specified value. After 2 minutes' application of rated voltage at 20°C | | |
| Temperature Characteristics (Max.Impedance Ratio) | Z+105°C / Z+20°C ≤ 1.25 (100kHz) Z-55°C / Z+20°C ≤ 1.25 | | |
| Endurance | The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 105°C | Capacitance change | Within ± 20% of the initial capacitance value (※ 3) |
| | | tan δ | 150% or less than the initial specified value |
| | | ESR (※ 1) | 150% or less than the initial specified value |
| | | Leakage current (※ 2) | Less than or equal to the initial specified value |
| Damp Heat (Steady State) | The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH. | Capacitance change | Within ± 20% of the initial capacitance value (※ 3) |
| | | tan δ | 150% or less than the initial specified value |
| | | ESR (※ 1) | 150% or less than the initial specified value |
| | | Leakage current (※ 2) | Less than or equal to the initial specified value |
| Resistance to Soldering Heat | After soldering the capacitor under the soldering conditions prescribed here, the capacitor shall meet the specifications listed at right, provided that its temperature profile is measured at the capacitor top and the terminal. Pre-heating shall be done at 150 to 200°C and for 60 to 180 sec. The duration for over +230°C temperature at capacitor surface shall not exceed 60 seconds. In the case of peak temp, less than 250°C, reflow soldering shall be two times maximum. In the case of peak temp, less than 260°C, reflow soldering shall be once. Measurement for solder temperature profile shall be made at the capacitor top and the terminal. | Capacitance change | Within ± 10% of the initial capacitance value (※ 3) |
| | | tan δ | 130% or less than the initial specified value |
| | | ESR (※ 1) | 130% or less than the initial specified value |
| | | Leakage current (※ 2) | Less than or equal to the initial specified value |
| Marking | Navy blue print on the case top | | |

- ※ 1 ESR should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform.
- ※ 2 Conditioning : If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
- ※ 3 Initial value : The value before test of examination of resistance to soldering.

■ Dimensions



Type numbering system (Example : 6.3V 150µF)



| φD | Code |
|-----------------|------|
| 4 to 6.3 (5.5L) | GB |
| 5 to 10 (L ≥ 6) | GS |

| Size | φ4 × 5.5L | φ5 × 6L | φ6.3 × 5.5L | φ6.3 × 6L | φ8 × 7L | φ8 × 12L | φ10 × 8L | φ10 × 10L | φ10 × 12.7L |
|------|------------|------------|-------------|------------|------------|------------|------------|------------|-------------|
| φD | 4.0 | 5.0 | 6.3 | 6.3 | 8.0 | 8.0 | 10.0 | 10.0 | 10.0 |
| L | 5.4 | 5.9 | 5.4 | 5.9 | 6.9 | 11.9 | 7.9 | 9.9 | 12.6 |
| A | 5.0 | 6.0 | 7.3 | 7.3 | 9.0 | 9.0 | 11.0 | 11.0 | 11.0 |
| B | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 8.3 | 10.3 | 10.3 | 10.3 |
| C | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 8.3 | 10.3 | 10.3 | 10.3 |
| E | 1.0 | 1.6 | 2.1 | 2.1 | 3.2 | 3.2 | 4.6 | 4.6 | 4.6 |
| H | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.8 to 1.1 | 0.8 to 1.1 | 0.8 to 1.1 | 0.8 to 1.1 | 0.8 to 1.1 |

Voltage

| V | 2.5 | 4 | 6.3 | 10 | 16 | 20 | 25 |
|------|-----|---|-----|----|----|----|----|
| Code | e | g | j | A | C | D | E |

● Dimension table in next page.

CF series

■Standard Ratings

| Rated Voltage (V)(code) | Surge Voltage (V) | Rated Capacitance (μF) | Case Size φD × L (mm) | tan δ | Leakage Current (μA) | ESR (mΩ) (at 100kHz 20°C) | Rated Ripple (mArms) | Part Number |
|-------------------------|-------------------|------------------------|-----------------------|-------|----------------------|---------------------------|----------------------|----------------|
| 2.5 (0E) | 2.8 | 100 | 6.3 × 6 | 0.12 | 100 | 22 | 2600 | PCF0E101MCL1GS |
| | | 220 | ■ 6.3 × 5.5 | 0.12 | 110 | 20 | 2800 | PCF0E221MCL4GB |
| | | 220 | 6.3 × 6 | 0.12 | 110 | 20 | 2800 | PCF0E221MCL1GS |
| | | 470 | 8 × 7 | 0.12 | 235 | 20 | 3300 | PCF0E471MCL1GS |
| | | 820 | 10 × 8 | 0.12 | 410 | 17 | 4400 | PCF0E821MCL1GS |
| | | 1500 | 10 × 10 | 0.12 | 750 | 13 | 4700 | PCF0E152MCL1GS |
| | | 1500 | ● 10 × 12.7 | 0.12 | 750 | 12 | 5440 | PCF0E152MCL9GS |
| 4 (0G) | 4.6 | 33 | 4 × 5.5 | 0.12 | 100 | 200 | 700 | PCF0G330MCL1GB |
| | | 100 | ■ 6.3 × 5.5 | 0.12 | 100 | 22 | 2600 | PCF0G101MCL4GB |
| | | 100 | 6.3 × 6 | 0.12 | 80 | 22 | 2600 | PCF0G101MCL1GS |
| | | 150 | ■ 6.3 × 5.5 | 0.12 | 120 | 22 | 2800 | PCF0G151MCL4GB |
| | | 150 | ▲ 5 × 6 | 0.12 | 300 | 30 | 2000 | PCF0G151MCL6GS |
| | | 150 | 6.3 × 6 | 0.12 | 120 | 22 | 2800 | PCF0G151MCL1GS |
| | | 220 | 8 × 7 | 0.12 | 176 | 21 | 3200 | PCF0G221MCL1GS |
| | | 330 | 8 × 7 | 0.12 | 264 | 21 | 3400 | PCF0G331MCL1GS |
| | | 470 | 10 × 8 | 0.12 | 376 | 17 | 4200 | PCF0G471MCL1GS |
| | | 560 | ■ 8 × 12 | 0.12 | 448 | 13 | 4520 | PCF0G561MCL4GS |
| | | 680 | 10 × 8 | 0.12 | 544 | 17 | 4400 | PCF0G681MCL1GS |
| | | 820 | 10 × 10 | 0.12 | 656 | 13 | 4800 | PCF0G821MCL1GS |
| | | 1200 | 10 × 12.7 | 0.12 | 960 | 10 | 5500 | PCF0G122MCL1GS |
| | | 6.3 (0J) | 7.2 | 22 | 4 × 5.5 | 0.12 | 100 | 200 |
| 47 | 5 × 6 | | | 0.12 | 148 | 35 | 1600 | PCF0J470MCL1GS |
| 82 | ■ 6.3 × 5.5 | | | 0.12 | 103 | 23 | 2600 | PCF0J820MCL4GB |
| 82 | 6.3 × 6 | | | 0.12 | 103 | 23 | 2600 | PCF0J820MCL1GS |
| 100 | ■ 6.3 × 5.5 | | | 0.12 | 126 | 23 | 2800 | PCF0J101MCL4GB |
| 100 | ▲ 5 × 6 | | | 0.12 | 315 | 25 | 2200 | PCF0J101MCL6GS |
| 100 | 6.3 × 6 | | | 0.12 | 126 | 23 | 2800 | PCF0J101MCL1GS |
| 120 | 6.3 × 6 | | | 0.12 | 151 | 23 | 3000 | PCF0J121MCL1GS |
| 150 | 8 × 7 | | | 0.12 | 189 | 22 | 3200 | PCF0J151MCL1GS |
| 220 | 8 × 7 | | | 0.12 | 277 | 22 | 3400 | PCF0J221MCL1GS |
| 330 | 10 × 8 | | | 0.12 | 416 | 18 | 4200 | PCF0J331MCL1GS |
| 470 | ■ 8 × 12 | | | 0.12 | 592 | 12 | 5300 | PCF0J471MCL4GS |
| 470 | ▲ 10 × 8 | | | 0.12 | 592 | 18 | 4300 | PCF0J471MCL6GS |
| 470 | 10 × 10 | | | 0.12 | 592 | 16 | 4600 | PCF0J471MCL1GS |
| 680 | 10 × 10 | | | 0.12 | 857 | 14 | 5000 | PCF0J681MCL1GS |
| 680 | ● 10 × 12.7 | | | 0.12 | 857 | 10 | 5500 | PCF0J681MCL9GS |
| 820 | 10 × 12.7 | | | 0.12 | 1033 | 10 | 5800 | PCF0J821MCL1GS |
| 10 (1A) | 11.5 | 4.7 | 4 × 5.5 | 0.12 | 100 | 240 | 670 | PCF1A4R7MCL1GB |
| | | 6.8 | 4 × 5.5 | 0.12 | 100 | 240 | 670 | PCF1A6R8MCL1GB |
| | | 10 | 4 × 5.5 | 0.12 | 100 | 220 | 700 | PCF1A100MCL1GB |
| | | 15 | 4 × 5.5 | 0.12 | 100 | 200 | 700 | PCF1A150MCL1GB |
| | | 33 | 5 × 6 | 0.12 | 165 | 35 | 1500 | PCF1A330MCL1GS |
| | | 47 | ▲ 5 × 6 | 0.12 | 235 | 26 | 2600 | PCF1A470MCL6GS |
| | | 47 | 6.3 × 6 | 0.12 | 94 | 26 | 2600 | PCF1A470MCL1GS |
| | | 56 | ■ 6.3 × 5.5 | 0.12 | 112 | 25 | 2500 | PCF1A560MCL4GB |
| | | 56 | 6.3 × 6 | 0.12 | 112 | 25 | 2500 | PCF1A560MCL1GS |
| | | 120 | 8 × 7 | 0.12 | 240 | 23 | 3000 | PCF1A121MCL1GS |
| | | 150 | ▲ 8 × 7 | 0.12 | 300 | 23 | 3200 | PCF1A151MCL6GS |
| | | 150 | 10 × 8 | 0.12 | 300 | 21 | 3300 | PCF1A151MCL1GS |
| | | 270 | ■ 8 × 12 | 0.12 | 540 | 13 | 4500 | PCF1A271MCL4GS |
| | | 270 | 10 × 8 | 0.12 | 540 | 20 | 3600 | PCF1A271MCL1GS |
| | | 330 | ■ 8 × 12 | 0.12 | 660 | 14 | 4000 | PCF1A331MCL4GS |
| | | 330 | 10 × 8 | 0.12 | 660 | 20 | 3700 | PCF1A331MCL1GS |
| | | 470 | 10 × 10 | 0.12 | 940 | 16 | 4600 | PCF1A471MCL1GS |
| | | 470 | ● 10 × 12.7 | 0.12 | 940 | 12 | 5300 | PCF1A471MCL9GS |
| | | 560 | 10 × 10 | 0.12 | 1120 | 15 | 4800 | PCF1A561MCL1GS |
| | | 560 | ● 10 × 12.7 | 0.12 | 1120 | 13 | 5230 | PCF1A561MCL9GS |

■ Standard Ratings

| Rated Voltage (V)(code) | Surge Voltage (V) | Rated Capacitance (μF) | Case Size φD × L (mm) | tan δ | Leakage Current (μA) | ESR (mΩ) (at 100kHz 20°C) | Rated Ripple (mArms) | Part Number |
|-------------------------|-------------------|------------------------|-----------------------|-------|----------------------|---------------------------|----------------------|----------------|
| 16 (1C) | 18.4 | 3.3 | 4 × 5.5 | 0.12 | 100 | 260 | 660 | PCF1C3R3MCL1GB |
| | | 22 | 5 × 6 | 0.12 | 176 | 45 | 1210 | PCF1C220MCL1GS |
| | | 33 | 6.3 × 6 | 0.12 | 106 | 31 | 2400 | PCF1C330MCL1GS |
| | | 39 | ■ 6.3 × 5.5 | 0.12 | 125 | 31 | 2400 | PCF1C390MCL4GB |
| | | 39 | 6.3 × 6 | 0.12 | 125 | 31 | 2400 | PCF1C390MCL1GS |
| | | 56 | 8 × 7 | 0.12 | 179 | 30 | 2900 | PCF1C560MCL1GS |
| | | 82 | 8 × 7 | 0.12 | 262 | 28 | 3200 | PCF1C820MCL1GS |
| | | 100 | 10 × 8 | 0.12 | 320 | 27 | 3300 | PCF1C101MCL1GS |
| | | 150 | 10 × 8 | 0.12 | 480 | 25 | 3500 | PCF1C151MCL1GS |
| | | 180 | ■ 8 × 12 | 0.12 | 576 | 16 | 4400 | PCF1C181MCL4GS |
| | | 180 | 10 × 8 | 0.12 | 576 | 25 | 3600 | PCF1C181MCL1GS |
| | | 220 | 10 × 10 | 0.12 | 704 | 20 | 3900 | PCF1C221MCL1GS |
| | | 220 | ● 10 × 12.7 | 0.12 | 704 | 14 | 5050 | PCF1C221MCL9GS |
| | | 330 | 10 × 12.7 | 0.12 | 1056 | 14 | 5000 | PCF1C331MCL1GS |
| 20 (1D) | 23 | 10 | 5 × 6 | 0.12 | 100 | 120 | 900 | PCF1D100MCL1GS |
| | | 22 | ■ 6.3 × 5.5 | 0.12 | 100 | 50 | 1700 | PCF1D220MCL4GB |
| | | 22 | 6.3 × 6 | 0.12 | 88 | 50 | 1700 | PCF1D220MCL1GS |
| | | 39 | 8 × 7 | 0.12 | 156 | 45 | 2000 | PCF1D390MCL1GS |
| | | 47 | 8 × 7 | 0.12 | 188 | 45 | 2000 | PCF1D470MCL1GS |
| | | 56 | 10 × 8 | 0.12 | 224 | 40 | 2400 | PCF1D560MCL1GS |
| | | 68 | 10 × 8 | 0.12 | 272 | 40 | 2600 | PCF1D680MCL1GS |
| | | 82 | 10 × 8 | 0.12 | 328 | 40 | 2600 | PCF1D820MCL1GS |
| | | 100 | 8 × 12 | 0.12 | 400 | 22 | 3200 | PCF1D101MCL1GS |
| | | 120 | 10 × 10 | 0.12 | 480 | 35 | 2800 | PCF1D121MCL1GS |
| 150 | 10 × 12.7 | 0.12 | 600 | 20 | 4320 | PCF1D151MCL1GS | | |
| 25 (1E) | 28.7 | 6.8 | 6.3 × 6 | 0.12 | 85 | 80 | 1200 | PCF1E6R8MCL1GS |
| | | 10 | 8 × 7 | 0.12 | 125 | 60 | 1600 | PCF1E100MCL1GS |
| | | 22 | 10 × 8 | 0.12 | 275 | 50 | 2200 | PCF1E220MCL1GS |
| | | 33 | 8 × 12 | 0.12 | 413 | 30 | 2800 | PCF1E330MCL1GS |
| | | 47 | ■ 8 × 12 | 0.12 | 588 | 30 | 3000 | PCF1E470MCL4GS |
| | | 47 | 10 × 10 | 0.12 | 588 | 45 | 2400 | PCF1E470MCL1GS |
| | | 56 | 10 × 12.7 | 0.12 | 700 | 28 | 3800 | PCF1E560MCL1GS |

Rated ripple current (mArms) at 105°C 100kHz

- Taping specifications are given in page 23.
- Recommended land size, soldering by reflow are given in page 18, 19.
- Please refer to page 3 for the minimum order quantity.

- No marked, 1 will be put at 12th digit of type numbering system.
- : In this case, 4 will be put at 12th digit of type numbering system.
- ▲ : In this case, 6 will be put at 12th digit of type numbering system.
- : In this case, 9 will be put at 12th digit of type numbering system.

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JONHON

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