

**CG** series Chip Type, Higher Capacitance



For SMD



High Ripple Current



Low Impedance



For High Frequency



Anti-Solvent Feature

- Higher Capacitance, 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).

**CG**



CF



## Specifications

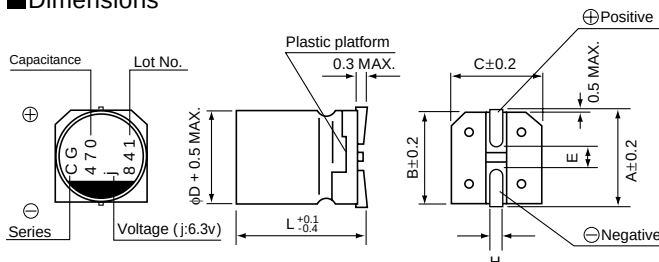
| Item                                                 | Performance Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |                                                     |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------|
| Category Temperature Range                           | -55 to +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                                                     |
| Rated Voltage Range                                  | 2.5 to 16V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                                                     |
| Rated Capacitance Range                              | 47 to 4700μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |                                                     |
| 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<br>(Max.Impedance Ratio) | Z+105°C / Z+20°C ≦ 1.25 (100kHz)<br>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<br>(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<br>Soldering Heat                      | After soldering the capacitor under the soldering conditions prescribed here, the capacitor shall meet the specifications listed at right, provided that it's temperature profile is measured at the capacitor top and the terminal.<br>Pre-heating shall be done at 150 to 200°C and for 60 to 180 sec.<br>The duration for over +230°C temperature at capacitor surface shall not exceed 60 seconds.<br>In the case of peak temp, less than 250°C, reflow soldering shall be two times maximum.<br>In the case of peak temp, less than 260°C, reflow soldering shall be once.<br>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



|      | (mm)       |            |            |            |            |             |
|------|------------|------------|------------|------------|------------|-------------|
| Size | φ5 × 6L    | φ6.3 × 6L  | φ8 × 7L    | φ10 × 8L   | φ10 × 10L  | φ10 × 12.7L |
| φD   | 5.0        | 6.3        | 8.0        | 10.0       | 10.0       | 10.0        |
| L    | 5.9        | 5.9        | 6.9        | 7.9        | 9.9        | 12.6        |
| A    | 6.0        | 7.3        | 9.0        | 11.0       | 11.0       | 11.0        |
| B    | 5.3        | 6.6        | 8.3        | 10.3       | 10.3       | 10.3        |
| C    | 5.3        | 6.6        | 8.3        | 10.3       | 10.3       | 10.3        |
| E    | 1.6        | 2.1        | 3.2        | 4.6        | 4.6        | 4.6         |
| H    | 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  |

## Type numbering system (Example : 6.3V 470μF)

| 1    | 2 | 3 | 4 | 5 | 6           | 7 | 8                    | 9                         | 10                          | 11 | 12            | 13 | 14          |
|------|---|---|---|---|-------------|---|----------------------|---------------------------|-----------------------------|----|---------------|----|-------------|
| P    | C | G | 0 | J | 4           | 7 | 1                    | M                         | C                           | L  | 1             | G  | S           |
|      |   |   |   |   |             |   |                      |                           |                             |    |               |    | Taping code |
|      |   |   |   |   |             |   |                      |                           |                             |    | Configuration |    |             |
|      |   |   |   |   |             |   |                      |                           | Capacitance toleranc (±20%) |    |               |    |             |
|      |   |   |   |   |             |   |                      | Rated capacitance (470μF) |                             |    |               |    |             |
|      |   |   |   |   |             |   | Rated voltage (6.3V) |                           |                             |    |               |    |             |
|      |   |   |   |   | Series name |   |                      |                           |                             |    |               |    |             |
| Type |   |   |   |   |             |   |                      |                           |                             |    |               |    |             |



# Standard Ratings

| Rated Voltage<br>(V)(code) | Surge Voltage<br>(V) | Rated Capacitance<br>(μF) | Case Size<br>φD × L (mm) | tan δ | Leakage Current<br>(μA) | ESR (mΩ)<br>(at 100kHz 20°C) | Rated Ripple<br>(mArms) | Part Number    |
|----------------------------|----------------------|---------------------------|--------------------------|-------|-------------------------|------------------------------|-------------------------|----------------|
| 2.5<br>(0E)                | 2.8                  | 220                       | 5 × 6                    | 0.12  | 110                     | 30                           | 2100                    | PCG0E221MCL1GS |
|                            |                      | 330                       | 5 × 6                    | 0.12  | 500                     | 30                           | 2200                    | PCG0E331MCL1GS |
|                            |                      | 330                       | 5 × 6                    | 0.12  | 500                     | 10                           | 3300                    | PCG0E331MCO1GS |
|                            |                      | 470                       | 6.3 × 6                  | 0.12  | 235                     | 20                           | 2900                    | PCG0E471MCL1GS |
|                            |                      | 560                       | 6.3 × 6                  | 0.12  | 280                     | 20                           | 3000                    | PCG0E561MCL1GS |
|                            |                      | 820                       | 8 × 7                    | 0.12  | 410                     | 20                           | 3300                    | PCG0E821MCL1GS |
|                            |                      | 1500                      | 10 × 8                   | 0.12  | 750                     | 17                           | 4100                    | PCG0E152MCL1GS |
|                            |                      | 2700                      | 10 × 10                  | 0.12  | 1350                    | 12                           | 4700                    | PCG0E272MCL1GS |
|                            |                      | 3300                      | 10 × 12.7                | 0.12  | 1650                    | 10                           | 5500                    | PCG0E332MCL1GS |
|                            |                      | 4700                      | 10 × 12.7                | 0.12  | 2350                    | 10                           | 5600                    | PCG0E472MCL1GS |
| 4<br>(0G)                  | 4.6                  | 180                       | 5 × 6                    | 0.12  | 144                     | 32                           | 1900                    | PCG0G181MCL1GS |
|                            |                      | 220                       | 5 × 6                    | 0.12  | 300                     | 32                           | 2000                    | PCG0G221MCL1GS |
|                            |                      | 220                       | 5 × 6                    | 0.12  | 300                     | 15                           | 2900                    | PCG0G221MCO1GS |
|                            |                      | 390                       | 6.3 × 6                  | 0.12  | 312                     | 22                           | 2700                    | PCG0G391MCL1GS |
|                            |                      | 680                       | 8 × 7                    | 0.12  | 544                     | 21                           | 3200                    | PCG0G681MCL1GS |
|                            |                      | 1200                      | 10 × 8                   | 0.12  | 960                     | 17                           | 4000                    | PCG0G122MCL1GS |
|                            |                      | 2200                      | 10 × 10                  | 0.12  | 1760                    | 13                           | 4600                    | PCG0G222MCL1GS |
|                            |                      | 2700                      | 10 × 12.7                | 0.12  | 2160                    | 11                           | 5300                    | PCG0G272MCL1GS |
|                            |                      | 3300                      | 10 × 12.7                | 0.12  | 2640                    | 11                           | 5400                    | PCG0G332MCL1GS |
|                            |                      |                           |                          |       |                         |                              |                         |                |
| 6.3<br>(0J)                | 7.2                  | 150                       | 5 × 6                    | 0.12  | 189                     | 33                           | 1800                    | PCG0J151MCL1GS |
|                            |                      | 180                       | 5 × 6                    | 0.12  | 500                     | 33                           | 1900                    | PCG0J181MCL1GS |
|                            |                      | 180                       | 5 × 6                    | 0.12  | 500                     | 17                           | 3000                    | PCG0J181MCO1GS |
|                            |                      | 270                       | 6.3 × 6                  | 0.12  | 340                     | 23                           | 2600                    | PCG0J271MCL1GS |
|                            |                      | 330                       | 6.3 × 6                  | 0.12  | 416                     | 23                           | 2700                    | PCG0J331MCL1GS |
|                            |                      | 470                       | 8 × 7                    | 0.12  | 592                     | 22                           | 3100                    | PCG0J471MCL1GS |
|                            |                      | 1000                      | 10 × 8                   | 0.12  | 1260                    | 18                           | 3800                    | PCG0J102MCL1GS |
|                            |                      | 1800                      | 10 × 10                  | 0.12  | 2268                    | 14                           | 4400                    | PCG0J182MCL1GS |
|                            |                      | 2200                      | 10 × 12.7                | 0.12  | 2772                    | 12                           | 5000                    | PCG0J222MCL1GS |
|                            |                      | 2700                      | 10 × 12.7                | 0.12  | 3402                    | 12                           | 5100                    | PCG0J272MCL1GS |
| 10<br>(1A)                 | 11.5                 | 82                        | 5 × 6                    | 0.12  | 164                     | 35                           | 1700                    | PCG1A820MCL1GS |
|                            |                      | 100                       | 5 × 6                    | 0.12  | 250                     | 35                           | 1800                    | PCG1A101MCL1GS |
|                            |                      | 150                       | 6.3 × 6                  | 0.12  | 300                     | 25                           | 2500                    | PCG1A151MCL1GS |
|                            |                      | 180                       | 6.3 × 6                  | 0.12  | 360                     | 25                           | 2600                    | PCG1A181MCL1GS |
|                            |                      | 330                       | 8 × 7                    | 0.12  | 660                     | 23                           | 3100                    | PCG1A331MCL1GS |
|                            |                      | 560                       | 10 × 8                   | 0.12  | 1120                    | 20                           | 3600                    | PCG1A561MCL1GS |
|                            |                      | 820                       | 10 × 10                  | 0.12  | 1640                    | 15                           | 4300                    | PCG1A821MCL1GS |
|                            |                      | 1000                      | 10 × 12.7                | 0.12  | 2000                    | 13                           | 4800                    | PCG1A102MCL1GS |
|                            |                      | 1500                      | 10 × 12.7                | 0.12  | 3000                    | 13                           | 4900                    | PCG1A152MCL1GS |
|                            |                      |                           |                          |       |                         |                              |                         |                |
| 16<br>(1C)                 | 18.4                 | 47                        | 5 × 6                    | 0.12  | 150                     | 40                           | 1500                    | PCG1C470MCL1GS |
|                            |                      | 56                        | 5 × 6                    | 0.12  | 240                     | 40                           | 1600                    | PCG1C560MCL1GS |
|                            |                      | 82                        | 6.3 × 6                  | 0.12  | 262                     | 30                           | 2300                    | PCG1C820MCL1GS |
|                            |                      | 100                       | 6.3 × 6                  | 0.12  | 320                     | 30                           | 2400                    | PCG1C101MCL1GS |
|                            |                      | 150                       | 8 × 7                    | 0.12  | 480                     | 28                           | 2800                    | PCG1C151MCL1GS |
|                            |                      | 270                       | 10 × 8                   | 0.12  | 864                     | 25                           | 3300                    | PCG1C271MCL1GS |
|                            |                      | 470                       | 10 × 10                  | 0.12  | 1504                    | 20                           | 3700                    | PCG1C471MCL1GS |
|                            |                      | 680                       | 10 × 12.7                | 0.12  | 2176                    | 18                           | 4100                    | PCG1C681MCL1GS |
|                            |                      | 820                       | 10 × 12.7                | 0.12  | 2624                    | 18                           | 4200                    | PCG1C821MCL1GS |
|                            |                      |                           |                          |       |                         |                              |                         |                |

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.

CAT.8100B

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