

**PCR**

Chip Type, High Reliability



- High reliability, High voltage (to 80V).
- Low ESR, High ripple current.
- Long life of 4000 hours at 125°C.
- SMD type : Lead free reflow soldering condition at 260°C peak complete correspondence.
- Compliant to the RoHS directive (2011/65/EU,(EU)2015/863).
- ESR after Endurance at -40°C.
- AEC-Q200 compliant. Please contact us for details.



■ Specifications

| Item  | Performance Characteristics  |                       |   |
|---|--|-----------------------|---|
| Category Temperature Range                        | -55 to +125°C  |                       |   |
| Rated Voltage Range                               | 16 to 80V  |                       |   |
| Rated Capacitance Range                           | 22 to 1000μF   |                       |   |
| 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)                             | After 2 minutes' application of rated voltage, leakage current is not more than 0.03CV or 3(μA), whichever is greater.   |                       |   |
| Temperature Characteristics (Max.Impedance Ratio) | Z+125°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 4000 hours at 125°C.   | Capacitance change    | Within ± 20% of initial capacitance value (※ 3)     |
|   |  | tan δ                 | 150% or less of the initial specified value         |
|   |  | ESR (※ 1)             | 200% or less of the initial specified value         |
|   |  | Leakage current (※ 2) | Less than or equal to the initial specified value   |
| Shelf Life  | After storing the capacitors under no load at 125°C for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they shall meet the specified values for the endurance characteristics listed above.  |                       |   |
| ESR after Endurance (※ 1)                         | Less than or equal to the specified value at 100kHz, -40°C   |                       |   |
| 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 85°C, 85% RH.  | Capacitance change    | Within ± 20% of initial capacitance value (※ 3)     |
|   |  | tan δ                 | 150% or less of the initial specified value         |
|   |  | ESR (※ 1)             | 200% or less of 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.<br>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.<br>In case peak temperature is 260°C or less, reflow soldering shall be two times maximum.<br>Measurement for solder temperature profile shall be made at the capacitor top. | 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 [Standard]



[Vibration Resistance]



Type numbering system (Example : 35V 150μF)



| Standard (mm) |            |            |            |            |            | Vibration Resistance (mm) |      |            |            |            |
|---------------|------------|------------|------------|------------|------------|---------------------------|------|------------|------------|------------|
| Size          | φ8×7L      | φ8×10L     | φ8×12L     | φ10×8L     | φ10×10L    | φ10×12.7L                 | Size | φ8×10.5L   | φ10×10.5L  | φ10×13.2L  |
| φD            | 8.0        | 8.0        | 8.0        | 10.0       | 10.0       | 10.0                      | φD   | 8.0        | 10.0       | 10.0       |
| L             | 6.9        | 9.9        | 11.9       | 7.9        | 9.9        | 12.6                      | L    | 10.0       | 10.0       | 12.7       |
| A             | 9.0        | 9.0        | 9.0        | 11.0       | 11.0       | 11.0                      | A    | 9.0        | 11.0       | 11.0       |
| B             | 8.3        | 8.3        | 8.3        | 10.3       | 10.3       | 10.3                      | B    | 8.3        | 10.3       | 10.3       |
| C             | 8.3        | 8.3        | 8.3        | 10.3       | 10.3       | 10.3                      | C    | 8.3        | 10.3       | 10.3       |
| E             | 3.2        | 3.2        | 3.2        | 4.6        | 4.6        | 4.6                       | E    | 3.1        | 4.6        | 4.6        |
| H             | 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 | 0.8 to 1.1                | H    | 1.1 to 1.5 | 1.1 to 1.5 | 1.1 to 1.5 |

| Voltage |    |    |    |    |    |    | Frequency coefficient of rated ripple current |             |       |      |       |                |
|---------|----|----|----|----|----|----|---|-------------|-------|------|-------|----------------|
| V       | 16 | 20 | 25 | 35 | 50 | 63 | 80  | Frequency   | 120Hz | 1kHz | 10kHz | 100kHz or more |
| Code    | C  | D  | E  | V  | H  | J  | K   | Coefficient | 0.05  | 0.30 | 0.70  | 1.00           |

※ φ8×10L(φ8×10.5L), φ10×10L(φ10×10.5L), φ10×12.7L(φ10×13.2L) : The vibration structure-resistant product is also available upon request, please ask for details.  
( ) : Size of the vibration structure-resistant product.

● Dimension table in next page.



■ Dimensions

| Rated Voltage (V)(code) | Surge Voltage (V) | Rated Capacitance (μF) | Case Size φD × L (mm) | tan δ | Initial ESR (mΩ) (20°C / 100kHz) | Low temp. ESR after Endurance (mΩ) (-40°C / 100kHz) | Rated Ripple (mAmps) (125°C / 100kHz) | Part Number    |
|-------------------------|-------------------|------------------------|-----------------------|-------|----------------------------------|---|---------------------------------------|----------------|
| 16 (1C)                 | 20                | 220                    | 8 × 7                 | 0.08  | 30                               | 60  | 1500                                  | PCR1C221MCL1GS |
|                         |                   | 470                    | ▲ 8 × 10              | 0.08  | 17                               | 34  | 3400                                  | PCR1C471MCL6GS |
|                         |                   | 470                    | 10 × 8                | 0.08  | 32                               | 64  | 2200                                  | PCR1C471MCL1GS |
|                         |                   | 560                    | 8 × 12                | 0.08  | 16                               | 32  | 3800                                  | PCR1C561MCL1GS |
|                         |                   | 680                    | 10 × 10               | 0.08  | 19                               | 38  | 3200                                  | PCR1C681MCL1GS |
|                         |                   | 1000                   | 10 × 12.7             | 0.08  | 13                               | 26  | 4300                                  | PCR1C102MCL1GS |
| 20 (1D)                 | 25                | 150                    | 8 × 7                 | 0.08  | 39                               | 78  | 1200                                  | PCR1D151MCL1GS |
|                         |                   | 330                    | ▲ 8 × 10              | 0.08  | 19                               | 38  | 3300                                  | PCR1D331MCL6GS |
|                         |                   | 330                    | 10 × 8                | 0.08  | 33                               | 66  | 2100                                  | PCR1D331MCL1GS |
|                         |                   | 470                    | 8 × 12                | 0.08  | 18                               | 36  | 3500                                  | PCR1D471MCL1GS |
|                         |                   | 560                    | 10 × 10               | 0.08  | 20                               | 40  | 3100                                  | PCR1D561MCL1GS |
|                         |                   | 680                    | 10 × 12.7             | 0.08  | 14                               | 28  | 4200                                  | PCR1D681MCL1GS |
| 25 (1E)                 | 31                | 100                    | 8 × 7                 | 0.08  | 41                               | 82  | 1200                                  | PCR1E101MCL1GS |
|                         |                   | 220                    | ▲ 8 × 10              | 0.08  | 20                               | 40  | 3200                                  | PCR1E221MCL6GS |
|                         |                   | 220                    | 10 × 8                | 0.08  | 33                               | 66  | 2100                                  | PCR1E221MCL1GS |
|                         |                   | 270                    | 8 × 12                | 0.08  | 19                               | 38  | 3300                                  | PCR1E271MCL1GS |
|                         |                   | 330                    | 10 × 10               | 0.08  | 20                               | 40  | 3100                                  | PCR1E331MCL1GS |
|                         |                   | 470                    | 10 × 12.7             | 0.08  | 15                               | 30  | 4100                                  | PCR1E471MCL1GS |
| 35 (1V)                 | 43                | 68                     | 8 × 7                 | 0.08  | 44                               | 88  | 1200                                  | PCR1V680MCL1GS |
|                         |                   | 150                    | ▲ 8 × 10              | 0.08  | 22                               | 44  | 3100                                  | PCR1V151MCL6GS |
|                         |                   | 150                    | 10 × 8                | 0.08  | 33                               | 66  | 2100                                  | PCR1V151MCL1GS |
|                         |                   | 220                    | 8 × 12                | 0.08  | 21                               | 42  | 3300                                  | PCR1V221MCL1GS |
|                         |                   | 270                    | 10 × 10               | 0.08  | 20                               | 40  | 3100                                  | PCR1V271MCL1GS |
|                         |                   | 330                    | 10 × 12.7             | 0.08  | 16                               | 32  | 3900                                  | PCR1V331MCL1GS |
| 50 (1H)                 | 63                | 39                     | 8 × 7                 | 0.08  | 45                               | 90  | 1300                                  | PCR1H390MCL1GS |
|                         |                   | 82                     | ▲ 8 × 10              | 0.08  | 26                               | 52  | 2900                                  | PCR1H820MCL6GS |
|                         |                   | 82                     | 10 × 8                | 0.08  | 42                               | 84  | 1900                                  | PCR1H820MCL1GS |
|                         |                   | 120                    | △ 8 × 12              | 0.08  | 25                               | 50  | 2900                                  | PCR1H121MCL2GS |
|                         |                   | 120                    | 10 × 10               | 0.08  | 25                               | 50  | 3000                                  | PCR1H121MCL1GS |
|                         |                   | 180                    | 10 × 12.7             | 0.08  | 19                               | 38  | 3500                                  | PCR1H181MCL1GS |
| 63 (1J)                 | 79                | 22                     | 8 × 7                 | 0.08  | 48                               | 96  | 1100                                  | PCR1J220MCL1GS |
|                         |                   | 39                     | 8 × 10                | 0.08  | 28                               | 56  | 2700                                  | PCR1J390MCL1GS |
|                         |                   | 47                     | 10 × 8                | 0.08  | 47                               | 94  | 1800                                  | PCR1J470MCL1GS |
|                         |                   | 56                     | 8 × 12                | 0.08  | 27                               | 54  | 2900                                  | PCR1J560MCL1GS |
|                         |                   | 68                     | 10 × 10               | 0.08  | 28                               | 56  | 2800                                  | PCR1J680MCL1GS |
|                         |                   | 100                    | 10 × 12.7             | 0.08  | 24                               | 48  | 3000                                  | PCR1J101MCL1GS |
| 80 (1K)                 | 100               | 27                     | 8 × 10                | 0.08  | 38                               | 76  | 1400                                  | PCR1K270MCL1GS |
|                         |                   | 39                     | 8 × 12                | 0.08  | 35                               | 70  | 1600                                  | PCR1K390MCL1GS |
|                         |                   | 47                     | 10 × 10               | 0.08  | 33                               | 66  | 1700                                  | PCR1K470MCL1GS |
|                         |                   | 68                     | 10 × 12.7             | 0.08  | 28                               | 56  | 2100                                  | PCR1K680MCL1GS |

Rated ripple current (mAmps) at 125°C 100kHz  
 No marked, [1] will be put at 12th digit of type numbering system.  
 △ : In this case, [2] will be put at 12th digit of type numbering system.  
 ▲ : In this case, [6] will be put at 12th digit of type numbering system.

- 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.