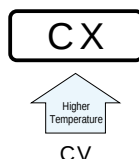


**CX** series Chip Type, High Voltage / Long Life



- High reliability, High voltage (to 50V).
- Low ESR, High ripple current.
- Long life of 1500 to 3000 hours at 125°C.
- SMD type : Lead free reflow soldering condition at 260°C peak complete correspondence.
- Adapted to the RoHS directive (2002/95/EC).



## Specifications

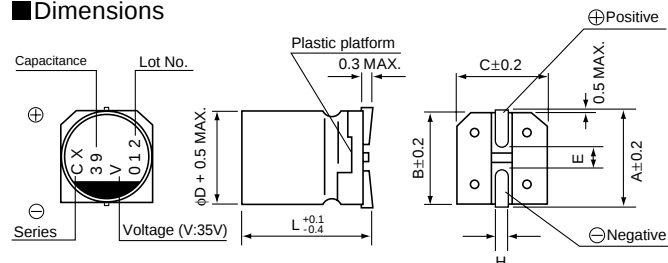
| Item                                              | Performance Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Category Temperature Range                        | -55 to +125°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| Rated Voltage Range                               | 16 to 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Rated Capacitance Range                           | 5.6 to 390μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| 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) | $Z+125^{\circ}\text{C} / Z+20^{\circ}\text{C} \leq 1.25$ (100kHz)<br>$Z-55^{\circ}\text{C} / Z+20^{\circ}\text{C} \leq 1.25$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| Endurance                                         | The specifications listed at below shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 3000 hours (φD = 6.3:1500hours) at 125°C.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Capacitance change    |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | tan δ                 |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ESR (※ 1)             |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Leakage current (※ 2) |
| Damp Heat (Steady State)                          | The specifications listed at below 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    |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | tan δ                 |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ESR (※ 1)             |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Leakage current (※ 2) |
| 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 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. 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    |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | tan δ                 |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ESR (※ 1)             |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Leakage current (※ 2) |
| 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.

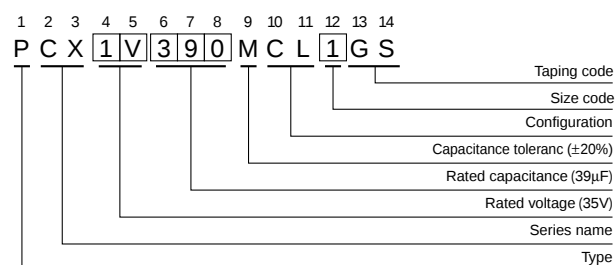
※ 2 Conditioning : If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.

※ 3 Initial value : The value before test of examination of resistance to soldering.

## Dimensions



## Type numbering system (Example : 35V 39μF)



|      | (mm)       |            |            |            |            |            |            |
|------|------------|------------|------------|------------|------------|------------|------------|
| Size | φ6.3×6L    | φ8×7L      | φ8×10L     | φ8×12L     | φ10×8L     | φ10×10L    | φ10×12.7L  |
| φD   | 6.3        | 8.0        | 8.0        | 8.0        | 10.0       | 10.0       | 10.0       |
| L    | 5.9        | 6.9        | 9.9        | 11.9       | 7.9        | 9.9        | 12.6       |
| A    | 7.3        | 9.0        | 9.0        | 9.0        | 11.0       | 11.0       | 11.0       |
| B    | 6.6        | 8.3        | 8.3        | 8.3        | 10.3       | 10.3       | 10.3       |
| C    | 6.6        | 8.3        | 8.3        | 8.3        | 10.3       | 10.3       | 10.3       |
| E    | 2.1        | 3.2        | 3.2        | 3.2        | 4.6        | 4.6        | 4.6        |
| H    | 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 | 0.8 to 1.1 |

### Voltage

|      |    |    |    |    |    |
|------|----|----|----|----|----|
| V    | 16 | 20 | 25 | 35 | 50 |
| Code | C  | D  | E  | V  | H  |

● Dimension table in next page.

## ■ 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    |
|----------------------------|----------------------|---------------------------|--------------------------|-------|-------------------------|------------------------------|-------------------------|---------------------|----------------|
|                            |                      |                           |                          |       |                         |                              | ≤105°C (*3)             | 105°C < ≤125°C (*3) |                |
| 16<br>(1C)                 | 18.4                 | 47                        | 6.3 × 6                  | 0.12  | 150                     | 55                           | 1000                    | 390                 | PCX1C470MCL1GS |
|                            |                      | 82                        | 8 × 7                    | 0.12  | 262                     | 45                           | 1300                    | 530                 | PCX1C820MCL1GS |
|                            |                      | 150                       | ▲ 8 × 10                 | 0.12  | 480                     | 28                           | 2000                    | 780                 | PCX1C151MCL6GS |
|                            |                      | 150                       | 10 × 8                   | 0.12  | 480                     | 33                           | 1900                    | 830                 | PCX1C151MCL1GS |
|                            |                      | 220                       | 8 × 12                   | 0.12  | 704                     | 27                           | 2300                    | 870                 | PCX1C221MCL1GS |
|                            |                      | 270                       | 10 × 10                  | 0.12  | 864                     | 27                           | 2300                    | 830                 | PCX1C271MCL1GS |
| 20<br>(1D)                 | 23.0                 | 390                       | 10 × 12.7                | 0.12  | 1248                    | 26                           | 2700                    | 1040                | PCX1C391MCL1GS |
|                            |                      | 33                        | 6.3 × 6                  | 0.12  | 132                     | 60                           | 900                     | 380                 | PCX1D330MCL1GS |
|                            |                      | 56                        | 8 × 7                    | 0.12  | 224                     | 50                           | 1300                    | 500                 | PCX1D560MCL1GS |
|                            |                      | 120                       | ▲ 8 × 10                 | 0.12  | 480                     | 29                           | 1900                    | 770                 | PCX1D121MCL6GS |
|                            |                      | 120                       | 10 × 8                   | 0.12  | 480                     | 35                           | 1800                    | 810                 | PCX1D121MCL1GS |
|                            |                      | 150                       | 8 × 12                   | 0.12  | 600                     | 28                           | 2200                    | 860                 | PCX1D151MCL1GS |
| 25<br>(1E)                 | 28.7                 | 180                       | 10 × 10                  | 0.12  | 720                     | 28                           | 2300                    | 800                 | PCX1D181MCL1GS |
|                            |                      | 270                       | 10 × 12.7                | 0.12  | 1080                    | 27                           | 2700                    | 1020                | PCX1D271MCL1GS |
|                            |                      | 22                        | 6.3 × 6                  | 0.12  | 110                     | 65                           | 900                     | 360                 | PCX1E220MCL1GS |
|                            |                      | 39                        | 8 × 7                    | 0.12  | 195                     | 55                           | 1200                    | 480                 | PCX1E390MCL1GS |
|                            |                      | 82                        | ▲ 8 × 10                 | 0.12  | 410                     | 30                           | 1900                    | 760                 | PCX1E820MCL6GS |
|                            |                      | 82                        | 10 × 8                   | 0.12  | 410                     | 36                           | 1800                    | 800                 | PCX1E820MCL1GS |
| 35<br>(1V)                 | 40.2                 | 120                       | ▲ 8 × 12                 | 0.12  | 600                     | 29                           | 2200                    | 850                 | PCX1E121MCL6GS |
|                            |                      | 120                       | 10 × 10                  | 0.12  | 600                     | 29                           | 2200                    | 790                 | PCX1E121MCL1GS |
|                            |                      | 180                       | 10 × 12.7                | 0.12  | 900                     | 28                           | 2600                    | 1010                | PCX1E181MCL1GS |
|                            |                      | 10                        | 6.3 × 6                  | 0.12  | 70                      | 85                           | 800                     | 310                 | PCX1V100MCL1GS |
|                            |                      | 18                        | 8 × 7                    | 0.12  | 126                     | 60                           | 1100                    | 450                 | PCX1V180MCL1GS |
|                            |                      | 39                        | ▲ 8 × 10                 | 0.12  | 273                     | 35                           | 1800                    | 700                 | PCX1V390MCL6GS |
| 50<br>(1H)                 | 57.5                 | 39                        | 10 × 8                   | 0.12  | 273                     | 41                           | 1700                    | 750                 | PCX1V390MCL1GS |
|                            |                      | 56                        | 8 × 12                   | 0.12  | 392                     | 33                           | 2000                    | 780                 | PCX1V560MCL1GS |
|                            |                      | 68                        | 10 × 10                  | 0.12  | 476                     | 30                           | 2200                    | 740                 | PCX1V680MCL1GS |
|                            |                      | 100                       | 10 × 12.7                | 0.12  | 700                     | 29                           | 2600                    | 990                 | PCX1V101MCL1GS |
|                            |                      | 5.6                       | 6.3 × 6                  | 0.12  | 56                      | 105                          | 700                     | 280                 | PCX1H5R6MCL1GS |
|                            |                      | 10                        | 8 × 7                    | 0.12  | 100                     | 75                           | 1000                    | 410                 | PCX1H100MCL1GS |
|                            |                      | 22                        | ▲ 8 × 10                 | 0.12  | 220                     | 37                           | 1700                    | 680                 | PCX1H220MCL6GS |
|                            |                      | 22                        | 10 × 8                   | 0.12  | 220                     | 56                           | 1400                    | 730                 | PCX1H220MCL1GS |
|                            |                      | 27                        | 8 × 12                   | 0.12  | 270                     | 35                           | 2000                    | 760                 | PCX1H270MCL1GS |
|                            |                      | 33                        | 10 × 10                  | 0.12  | 330                     | 31                           | 2200                    | 630                 | PCX1H330MCL1GS |
|                            |                      | 47                        | 10 × 12.7                | 0.12  | 470                     | 30                           | 2500                    | 970                 | PCX1H470MCL1GS |

(\*3) Ambient temperature of a capacitor

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

No marked, [1] 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.

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