

### Multilayer Ceramic Capacitors (4 Array Type)

Series: **ECJR, ECJT**



#### ■ Features

- 4 miniature capacitors built within 0805 and 1206 case sizes
- Improved placement time on mounting machines
- Low self-inductance and excellent frequency characteristics
- RoHS compliant

#### ■ Recommended Applications

- Input/Output circuit for computer motherboards
  - Serial port
  - Video port
  - Parallel port

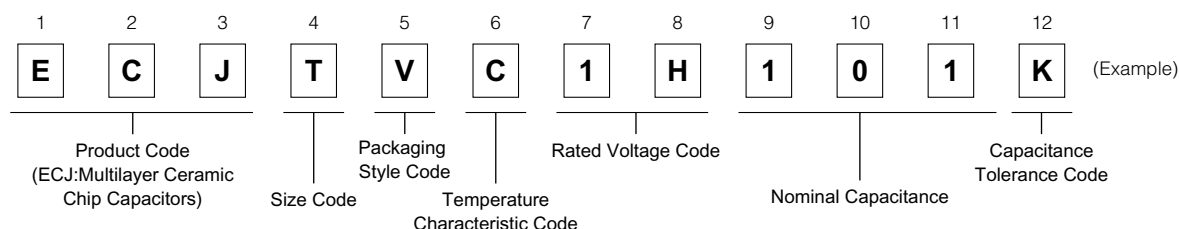
#### ■ Handling Precautions

See Page 48 to 53

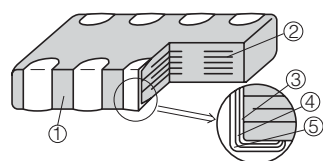
#### ■ Packaging Specifications

See Page 45, 46, 56

#### ■ Explanation of Part Numbers

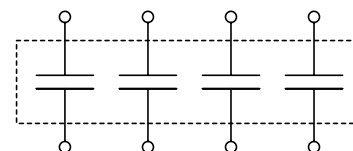


#### ■ Construction

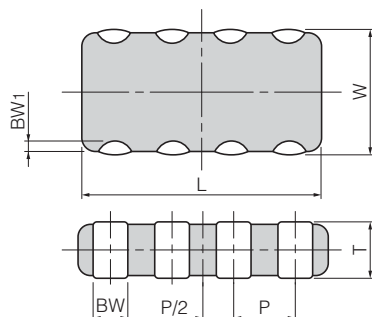


| No | Name               |                        |
|----|--------------------|------------------------|
| ①  | Ceramic dielectric |                        |
| ②  | Internal electrode |                        |
| ③  | Terminal electrode | Substrate electrode    |
| ④  |                    | Intermediate electrode |
| ⑤  |                    | External electrode     |

Schematic



#### ■ Dimensions in mm (not to scale)



| Size Code | Size (EIA) | L         | W         | T         | BW        | BW <sub>1</sub>                     | P        |
|-----------|------------|-----------|-----------|-----------|-----------|-------------------------------------|----------|
| T         | 0805       | 2.00±0.15 | 1.25±0.15 | 0.85±0.10 | 0.25±0.10 | 0.2 <sup>+0.3</sup> <sub>-0.1</sub> | 0.5±0.1  |
| R         | 1206       | 3.2±0.2   | 1.6±0.2   | 0.85±0.10 | 0.40±0.15 | 0.2 <sup>+0.3</sup> <sub>-0.1</sub> | 0.80±0.1 |

#### ■ Packaging Styles and Standard Packaging Quantity

Quantity: pcs./reel

| Packaging Style Code | Packaging Styles |                                | Size | 0805  | 1206 |
|----------------------|------------------|--------------------------------|------|-------|------|
| V                    | φ180 reel        | Paper taping<br>(Pitch : 4 mm) |      | 4,000 |      |

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Sep. 2008

## ■ Temperature Characteristics

### ● Class 1

| Temperature<br>Characteristic Code | Temperature<br>Characteristics | Temp. Coeff.<br>(ppm/°C) | Rate of Capacitance change at each Temp. (%) |       |       |       |
|------------------------------------|--------------------------------|--------------------------|----------------------------------------------|-------|-------|-------|
|                                    |                                |                          | -25 °C                                       |       | 85 °C |       |
|                                    |                                |                          | max.                                         | min.  | max.  | min.  |
| C                                  | CH                             | 0 ± 60                   | 0.49                                         | -0.27 | 0.39  | -0.39 |

Temperature coefficient: calculated between 20 °C to 85 °C

### ● Class 2

| Temperature<br>Characteristic Code | Temperature<br>Characteristics | Capacitance Change | Measurement<br>Temperature Range | Reference Temperature |
|------------------------------------|--------------------------------|--------------------|----------------------------------|-----------------------|
| B                                  | B                              | ±10 %              | -25 to 85 °C                     | 20 °C                 |
|                                    | X7R                            | ±15 %              | -55 to 125 °C                    | 25 °C                 |
|                                    | X5R                            | ±15 %              | -55 to 85 °C                     | 25 °C                 |
| F                                  | F                              | +30, -80 %         | -25 to 85 °C                     | 20 °C                 |
|                                    | Y5V                            | +22, -82 %         | -30 to 85 °C                     | 25 °C                 |

For applicable "temperature characteristics", see the lists of standard products on page 31 to 32.

## ■ Rated Voltage

| Code          | 1H      | 1E      | 1C      | 1A      | 0J       |
|---------------|---------|---------|---------|---------|----------|
| Rated Voltage | DC 50 V | DC 25 V | DC 16 V | DC 10 V | DC 6.3 V |

## ■ Nominal Capacitance

| Ex.                    | 100   | 101    | 104                    | 105                      |
|------------------------|-------|--------|------------------------|--------------------------|
| Nominal<br>Capacitance | 10 pF | 100 pF | 100,000 pF<br>(0.1 μF) | 1,000,000 pF<br>(1.0 μF) |

## ■ Capacitance tolerance

| Class | Temperature Characteristics |                   | Tolerance Code | Capacitance Tolerance |
|-------|-----------------------------|-------------------|----------------|-----------------------|
| 1     | CH                          | Capacitance range | C=10 pF        | ±1 pF                 |
|       |                             |                   | C>10 pF        | ±10 %                 |
| 2     | B, X7R, X5R                 |                   | M              | ±20 %                 |
|       | F, Y5V                      |                   | Z              | +80, -20 %            |

## ■ Specifications and Testing Methods

| Item                                         | Specifications                                                                                              |                                                                                                                                                     | Test Method                                                                                                                                                                     |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              | Class 1                                                                                                     | Class 2                                                                                                                                             |                                                                                                                                                                                 |
| Operating<br>Temperature<br>Range            | Temp. Char.<br>CH: -55 to 125 °C                                                                            | Temp. Char.<br>B, X7R: -55 to 125 °C<br>X5R: -55 to 85 °C<br>F, Y5V: -30 to 85 °C                                                                   | —                                                                                                                                                                               |
| Dielectric<br>Withstanding<br>Voltage        | No dielectric breakdown and/or damage                                                                       |                                                                                                                                                     | Test voltage:<br>Class 1: Rated voltage × 300 %<br>Class 2: Rated voltage × 250 %<br>Duration: 1 to 5 s<br>Charge/discharge current: 50 mA max.                                 |
| Insulation<br>Resistance (IR)                | 10000 MΩ or 500/C (MΩ) Whichever is less<br>Note: 100/C (MΩ) min. for DC 10 V max.<br>C: Nominal Cap. in μF |                                                                                                                                                     | Measuring voltage: Rated voltage<br>Duration: 60±5 s<br>Charge/discharge current: 50 mA max.                                                                                    |
| Capacitance                                  | Within the specified tolerance                                                                              |                                                                                                                                                     | Measuring temperature: 20±2 °C                                                                                                                                                  |
| Q Factor or<br>Dissipation Factor<br>(tan δ) | Q:<br>C < 30 pF: Q≥400+20 C<br>30 pF≤C≤1000 pF:<br>Q≥1000<br><br>C: Nominal Cap. in pF                      | tan δ:<br>Temp. Char.<br>B, X7R: 0.025 max.<br>X5R: 0.075 max.<br>F, Y5V: 0.125 max.<br><br>Please see the technical<br>specifications for details. | Class 1                                                                                                                                                                         |
|                                              |                                                                                                             |                                                                                                                                                     | Measuring frequency                                                                                                                                                             |
|                                              |                                                                                                             |                                                                                                                                                     | 1 MHz ± 10 %                                                                                                                                                                    |
|                                              |                                                                                                             |                                                                                                                                                     | Measuring voltage                                                                                                                                                               |
|                                              |                                                                                                             |                                                                                                                                                     | 0.5 to 5 Vrms                                                                                                                                                                   |
|                                              |                                                                                                             |                                                                                                                                                     | Class 2                                                                                                                                                                         |
|                                              |                                                                                                             |                                                                                                                                                     | Preconditioning: The capacitors shall be<br>kept in temperature of 150 +0/-10 ± for 1<br>hour and subject to standard conditions*<br>for 48±4 hours before initial measurement. |
|                                              |                                                                                                             |                                                                                                                                                     | Measuring frequency                                                                                                                                                             |
|                                              |                                                                                                             |                                                                                                                                                     | 1 kHz ± 10 %                                                                                                                                                                    |
|                                              |                                                                                                             |                                                                                                                                                     | Measuring voltage                                                                                                                                                               |
|                                              |                                                                                                             |                                                                                                                                                     | 1.0±0.2 Vrms                                                                                                                                                                    |

\* Standard condition: Temperature 15 to 35 °C, Relative humidity 45 to 75 %.  
For further information, see the technical specifications.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

■ Standard Products for EIA "0805", Taped Version

● Class 1

◆ Temperature Characteristic Code: C (Temperature Characteristics: CH)

| Rated voltage    |                       | DC 50 V     |             |             |
|------------------|-----------------------|-------------|-------------|-------------|
| Capacitance (pF) | Capacitance Tolerance | Part No.    | Dim. T (mm) | Temp. Char. |
| 10               | ±1 pF (F)             | ECJTV1H100F | 0.85        | ○           |
| 22               | ±10 % (K)             | ECJTV1H220K | 0.85        | ○           |
| 47               |                       | ECJTV1H470K | 0.85        | ○           |
| 100              |                       | ECJTV1H101K | 0.85        | ○           |
| 220              |                       | ECJTV1H221K | 0.85        | ○           |

Standard packaging quantity of Packaging Style Code "V" (T = 0.85 mm): 4,000 pcs./reel  
Avoid flow soldering.

● Class 2

◆ Temperature Characteristic Code: B (Temperature Characteristics: B, X7R, X5R)

| Rated voltage    |                       | DC 50 V      |             |             | DC 25 V      |             |             | DC 16 V      |             |             | DC 10 V      |             |             |
|------------------|-----------------------|--------------|-------------|-------------|--------------|-------------|-------------|--------------|-------------|-------------|--------------|-------------|-------------|
| Capacitance (pF) | Capacitance Tolerance | Part No.     | Dim. T (mm) | Temp. Char. | Part No.     | Dim. T (mm) | Temp. Char. | Part No.     | Dim. T (mm) | Temp. Char. | Part No.     | Dim. T (mm) | Temp. Char. |
| 470              | ±20 % (M)             | ECJTVB1H471M | 0.85        | ○ ○         |              |             |             |              |             |             |              |             |             |
| 1000             |                       | ECJTVB1H102M | 0.85        | ○ ○         |              |             |             |              |             |             |              |             |             |
| 2200             |                       | ECJTVB1H222M | 0.85        | ○ ○         |              |             |             |              |             |             |              |             |             |
| 4700             |                       |              |             |             | ECJTVB1E472M | 0.85        | ○ ○         |              |             |             |              |             |             |
| 10000            |                       |              |             |             |              |             |             | ECJTVB1C103M | 0.85        | ○ ○         |              |             |             |
| 47000            |                       |              |             |             |              |             |             |              |             |             | ECJTVB1A473M | 0.85        | ○           |
| 100000           |                       |              |             |             |              |             |             |              |             |             | ECJTVB1A104M | 0.85        | ○           |

| Rated voltage    |                       | DC 6.3 V     |             |             |
|------------------|-----------------------|--------------|-------------|-------------|
| Capacitance (μF) | Capacitance Tolerance | Part No.     | Dim. T (mm) | Temp. Char. |
| 1.0              | ±20 % (M)             | ECJTVB0J105M | 0.85        | ○           |

Standard packaging quantity of Packaging Style Code "V" (T = 0.85 mm): 4,000 pcs./reel  
Avoid flow soldering.

◆ Temperature Characteristics Code: F (Temperature Characteristics: F, Y5V)

| Rated voltage    |                       | DC 16 V      |             |             |
|------------------|-----------------------|--------------|-------------|-------------|
| Capacitance (μF) | Capacitance Tolerance | Part No.     | Dim. T (mm) | Temp. Char. |
| 0.1              | +80, -20 % (Z)        | ECJTVF1C104Z | 0.85        | ○ ○         |

Standard packaging quantity of Packaging Style Code "V" (T = 0.85 mm): 4,000 pcs./reel  
Avoid flow soldering.

### ■ Standard Products for EIA “1206”, Taped Version

#### ● Class 1

- ◆ Temperature Characteristic Code: C (Temperature Characteristics: CH)

| Rated voltage    |                       | DC 50 V     |             |                |
|------------------|-----------------------|-------------|-------------|----------------|
| Capacitance (pF) | Capacitance Tolerance | Part No.    | Dim. T (mm) | Temp. Char. CH |
| 10               | ±1 pF (F)             | ECJRV1H100F | 0.85        | ○              |
| 15               |                       | ECJRV1H150K | 0.85        | ○              |
| 22               |                       | ECJRV1H220K | 0.85        | ○              |
| 33               |                       | ECJRV1H330K | 0.85        | ○              |
| 47               |                       | ECJRV1H470K | 0.85        | ○              |
| 68               |                       | ECJRV1H680K | 0.85        | ○              |
| 100              | ±10 % (K)             | ECJRV1H101K | 0.85        | ○              |
| 150              |                       | ECJRV1H151K | 0.85        | ○              |
| 220              |                       | ECJRV1H221K | 0.85        | ○              |
| 330              |                       | ECJRV1H331K | 0.85        | ○              |
| 470              |                       | ECJRV1H471K | 0.85        | ○              |

Standard packaging quantity of Packaging Style Code “V” (T = 0.85 mm): 4,000 pcs./reel  
Avoid flow soldering.

#### ● Class 2

- ◆ Temperature Characteristic Code: B (Temperature Characteristics: B, X7R, X5R)

| Rated voltage    |                       | DC 50 V      |             |             |     | DC 16 V  |              |             |     | DC 6.3 V     |             |             |  |
|------------------|-----------------------|--------------|-------------|-------------|-----|----------|--------------|-------------|-----|--------------|-------------|-------------|--|
| Capacitance (pF) | Capacitance Tolerance | Part No.     | Dim. T (mm) | Temp. Char. |     | Part No. | Dim. T (mm)  | Temp. Char. |     | Part No.     | Dim. T (mm) | Temp. Char. |  |
|                  |                       |              |             | B           | X7R |          |              | B           | X7R |              |             | X5R         |  |
| 470              | ±20 % (M)             | ECJRVB1H471M | 0.85        | ○           | ○   |          |              |             |     |              |             |             |  |
| 680              |                       | ECJRVB1H681M | 0.85        | ○           | ○   |          |              |             |     |              |             |             |  |
| 1000             |                       | ECJRVB1H102M | 0.85        | ○           | ○   |          |              |             |     |              |             |             |  |
| 1500             |                       | ECJRVB1H152M | 0.85        | ○           | ○   |          |              |             |     |              |             |             |  |
| 2200             |                       | ECJRVB1H222M | 0.85        | ○           | ○   |          |              |             |     |              |             |             |  |
| 3300             |                       | ECJRVB1H332M | 0.85        | ○           | ○   |          |              |             |     |              |             |             |  |
| 4700             |                       | ECJRVB1H472M | 0.85        | ○           | ○   |          |              |             |     |              |             |             |  |
| 6800             |                       | ECJRVB1H682M | 0.85        | ○           | ○   |          |              |             |     |              |             |             |  |
| 10000            |                       | ECJRVB1H103M | 0.85        | ○           | ○   |          |              |             |     |              |             |             |  |
| 100000           |                       |              |             |             |     |          | ECJRVB1C104M | 0.85        | ○   | ○            |             |             |  |
| 1000000          |                       |              |             |             |     |          |              |             |     | ECJRVB0J105M | 0.85        | ○           |  |

Standard packaging quantity of Packaging Style Code “V” (T = 0.85 mm): 4,000 pcs./reel  
Avoid flow soldering.

- ◆ Temperature Characteristic Code: F (Temperature Characteristics: F, Y5V)

| Rated voltage    |                       | DC 25 V      |             |             |     | DC 10 V      |             |             |     |
|------------------|-----------------------|--------------|-------------|-------------|-----|--------------|-------------|-------------|-----|
| Capacitance (μF) | Capacitance Tolerance | Part No.     | Dim. T (mm) | Temp. Char. |     | Part No.     | Dim. T (mm) | Temp. Char. |     |
|                  |                       |              |             | F           | Y5V |              |             | F           | Y5V |
| 0.1              | +80, -20 %            | ECJRVF1E104Z | 0.85        | ○           | ○   |              |             |             |     |
| 1.0              | (Z)                   |              |             |             |     | ECJRVF1A105Z | 0.85        | ○           | ○   |

Standard packaging quantity of Packaging Style Code “V” (T = 0.85 mm): 4,000 pcs./reel  
Avoid flow soldering.

### ■ Cross talk characteristics [Ex.]

Size: 0805, Temperature Characteristics: CH, 100 pF

