

# Compact Thick Film Chip Resistors

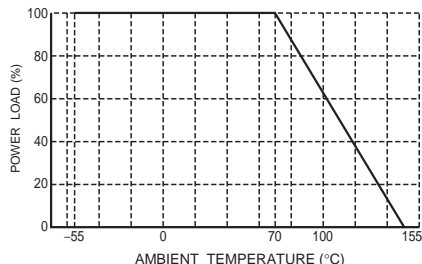
## MCR03 (0603 size)

### ●Features

- 1) Power rating of 1 / 10W
- 2) Highly reliable chip resistor  
Ruthenium oxide dielectric offers superior resistance to the elements.
- 3) Electrodes not corroded by soldering  
Thick film makes the electrodes very strong.
- 4) Resin protective coating absorbs impact, facilitates mounting.
- 5) ROHM resistors have approved ISO9001- / ISO/TS 16949- certification.

### ●Ratings

Design and specifications are subject to change without notice. Carefully check the specification sheet supplied with the product before using or ordering it.

| Item                     | Conditions  | Specifications  |                          |     |
|--------------------------|---|---|--------------------------|-----|
| Rated power              | <p>Power must be derated according to the power derating curve in Figure 1 when ambient temperature exceeds 70°C.</p>  <p style="text-align: center;">Fig.1</p>   | 0.10W (1 / 10W)<br>at 70°C  |                          |     |
| Rated voltage            | <p>The voltage rating is calculated by the following equation.<br/>If the value obtained exceeds the limiting element voltage, the voltage rating is equal to the maximum operating voltage.</p> $E = \sqrt{P \times R}$ <p>E: Rated voltage (V) P: Rated power (W)<br/>R: Nominal resistance (Ω)</p> | <table border="1"> <tr> <td>Limiting element voltage</td> <td>50V</td> </tr> </table> | Limiting element voltage | 50V |
| Limiting element voltage | 50V   |   |                          |     |
| Nominal resistance       | See Table 1.  |   |                          |     |
| Operating temperature    |   | -55°C to +155°C   |                          |     |

## Jumper type

|                       |                 |
|-----------------------|-----------------|
| Resistance            | Max. 50mΩ       |
| Rated current         | 1A              |
| Operating temperature | -55°C to +155°C |

Table 1

| Resistance tolerance | Resistance range (Ω) | Resistance temperature coefficient (ppm/°C) |
|----------------------|----------------------|---|
| J (±5%)              | 1.0 to 9.1 (E24)     | ±400  |
|                      | 10 to 10M (E24)      | ±200  |
| FX (±1%)             | 10 to 10M (E24,96)   | ±100  |
| D (±0.5%)            | 10 to 91 (E24)       | ±100  |
|                      | 100 to 1M (E24)      | ±50   |

- Before using components in circuits where they will be exposed to transients such as pulse loads (short-duration, high-level loads), be certain to evaluate the component in the mounted state. In addition, the reliability and performance of this component cannot be guaranteed if it is used with a steady state voltage that is greater than its rated voltage.

## ● Characteristics

| Item                                     | Guaranteed value   |             | Test conditions (JIS C 5201-1)   |
|--|--|-------------|--|
|  | Resistor type  | Jumper type |  |
| Resistance                               | J : ±5%<br>FX : ±1%<br>D : ±0.5%   | Max. 50mΩ   | JIS C 5201-1 4.5   |
| Variation of resistance with temperature | See Table.1  |             | JIS C 5201-1 4.8<br>Measurement : +25 / +125°C   |
| Overload                                 | ± (2.0%+0.1Ω)  | Max. 50mΩ   | JIS C 5201-1 4.13<br>Rated voltage (current) ×2.5, 2s.<br>Maximum overload voltage : 100V                        |
| Solderability                            | A new uniform coating of minimum of 95% of the surface being immersed and no soldering damage. |             | JIS C 5201-1 4.17<br>Rosin-Ethanol (25%WT)<br>Soldering condition : 235±5°C<br>Duration of immersion : 2.0±0.5s. |
| Resistance to soldering heat             | ± (1.0%+0.05Ω)<br>No remarkable abnormality on the appearance.                                 | Max. 50mΩ   | JIS C 5201-1 4.18<br>Soldering condition : 260±5°C<br>Duration of immersion : 10±1s.                             |
| Rapid change of temperature              | ± (1.0%+0.05Ω)   | Max. 50mΩ   | JIS C 5201-1 4.19<br>Test temp. : -55°C to +125°C 5cyc   |
| Damp heat, steady state                  | ± (3.0%+0.1Ω)  | Max. 100mΩ  | JIS C 5201-1 4.24<br>40°C, 93%RH<br>Test time : 1,000h to 1,048h   |
| Endurance at 70°C                        | ± (3.0%+0.1Ω)  | Max. 100mΩ  | JIS C 5201-1 4.25.1<br>Rated voltage (current), 70°C<br>1.5h : ON - 0.5h : OFF<br>Test time : 1,000h to 1,048h   |
| Endurance                                | ± (3.0%+0.1Ω)  | Max. 100mΩ  | JIS C 5201-1 4.25.3<br>155°C<br>Test time : 1,000h to 1,048h   |
| Resistance to solvent                    | ± (1.0%+0.05Ω)   | Max. 50mΩ   | JIS C 5201-1 4.29<br>23±5°C, Immersion cleaning, 5±0.5min.<br>Solvent : 2-propanol                               |
| Bend strength of the end face plating    | ± (1.0%+0.05Ω)<br>Without mechanical damage such as breaks.                                    | Max. 50mΩ   | JIS C 5201-1 4.33  |

●Dimensions (Unit : mm)

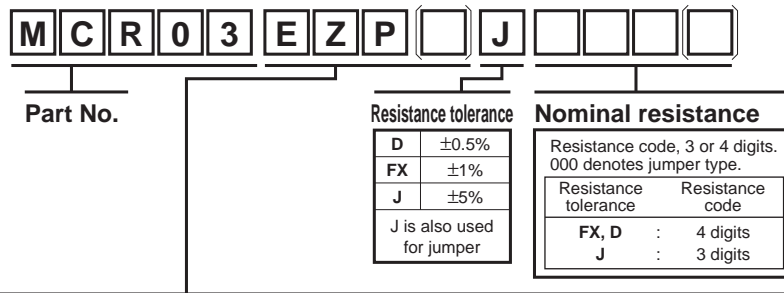
① 0.3±0.2  
② 0.3±0.2  
③ 1.6±0.1  
④ 0.45±0.1  
⑤ 0.8±0.1  
⑥

| No. | Material                                   |
|-----|--|
| ①   | Resistive element (Oxide metal thick film) |
| ②   | Silver thick film electrode                |
| ③   | Nickel electrode                           |
| ④   | Sn electrode                               |
| ⑤   | Alumina substrate                          |
| ⑥   | Overcoating (Resin)                        |

●Packaging

| Reel   | Taping  |   |                   |                |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
|--|---|---|-------------------|----------------|--|---|---|-------------------|---|---|---|---|----------------|----------------|---------|----------|----------|---------|---------|----------------|----------------|----------------|----------------|----------------|--|---------|---------|----------|----------|---|---|---|----------------|----------------|---------|----------|----------|---------|---------|----------------|----------------|----------------|----------------|----------------|--|---------|---------|----------|----------|
| <p>EIAJ ET-7200B compliant</p> <p>(Unit : mm)</p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td><math>\phi 180 \begin{smallmatrix} 0 \\ -3 \end{smallmatrix}</math></td> <td><math>\phi 60 \begin{smallmatrix} +1 \\ 0 \end{smallmatrix}</math></td> <td><math>9 \begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}</math></td> <td><math>\phi 13 \pm 0.2</math></td> </tr> </tbody> </table> | A   | B   | C                 | D              | $\phi 180 \begin{smallmatrix} 0 \\ -3 \end{smallmatrix}$ | $\phi 60 \begin{smallmatrix} +1 \\ 0 \end{smallmatrix}$ | $9 \begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$ | $\phi 13 \pm 0.2$ | <p>(Unit : mm)</p> <table border="1"> <thead> <tr> <th>W</th> <th>F</th> <th>E</th> <th>A<sub>0</sub></th> <th>B<sub>0</sub></th> </tr> </thead> <tbody> <tr> <td>8.0±0.3</td> <td>3.5±0.05</td> <td>1.75±0.1</td> <td>1.1±0.1</td> <td>1.9±0.1</td> </tr> <tr> <th>D<sub>0</sub></th> <th>P<sub>0</sub></th> <th>P<sub>1</sub></th> <th>P<sub>2</sub></th> <th>T<sub>2</sub></th> </tr> <tr> <td><math>\phi 1.5 \begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}</math></td> <td>4.0±0.1</td> <td>4.0±0.1</td> <td>2.0±0.05</td> <td>Max. 1.1</td> </tr> </tbody> </table> <p>Narrow pitch (2mm pitch) version</p> <p>(Unit : mm)</p> <table border="1"> <thead> <tr> <th>W</th> <th>F</th> <th>E</th> <th>A<sub>0</sub></th> <th>B<sub>0</sub></th> </tr> </thead> <tbody> <tr> <td>8.0±0.3</td> <td>3.5±0.05</td> <td>1.75±0.1</td> <td>1.1±0.1</td> <td>1.9±0.1</td> </tr> <tr> <th>D<sub>0</sub></th> <th>P<sub>0</sub></th> <th>P<sub>1</sub></th> <th>P<sub>2</sub></th> <th>T<sub>2</sub></th> </tr> <tr> <td><math>\phi 1.5 \begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}</math></td> <td>4.0±0.1</td> <td>2.0±0.5</td> <td>2.0±0.05</td> <td>Max. 1.1</td> </tr> </tbody> </table> | W | F | E | A <sub>0</sub> | B <sub>0</sub> | 8.0±0.3 | 3.5±0.05 | 1.75±0.1 | 1.1±0.1 | 1.9±0.1 | D <sub>0</sub> | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | T <sub>2</sub> | $\phi 1.5 \begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}$ | 4.0±0.1 | 4.0±0.1 | 2.0±0.05 | Max. 1.1 | W | F | E | A <sub>0</sub> | B <sub>0</sub> | 8.0±0.3 | 3.5±0.05 | 1.75±0.1 | 1.1±0.1 | 1.9±0.1 | D <sub>0</sub> | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | T <sub>2</sub> | $\phi 1.5 \begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}$ | 4.0±0.1 | 2.0±0.5 | 2.0±0.05 | Max. 1.1 |
| A  | B   | C   | D                 |                |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
| $\phi 180 \begin{smallmatrix} 0 \\ -3 \end{smallmatrix}$   | $\phi 60 \begin{smallmatrix} +1 \\ 0 \end{smallmatrix}$ | $9 \begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$ | $\phi 13 \pm 0.2$ |                |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
| W  | F   | E   | A <sub>0</sub>    | B <sub>0</sub> |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
| 8.0±0.3  | 3.5±0.05  | 1.75±0.1  | 1.1±0.1           | 1.9±0.1        |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
| D <sub>0</sub>   | P <sub>0</sub>  | P <sub>1</sub>                                      | P <sub>2</sub>    | T <sub>2</sub> |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
| $\phi 1.5 \begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}$   | 4.0±0.1   | 4.0±0.1   | 2.0±0.05          | Max. 1.1       |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
| W  | F   | E   | A <sub>0</sub>    | B <sub>0</sub> |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
| 8.0±0.3  | 3.5±0.05  | 1.75±0.1  | 1.1±0.1           | 1.9±0.1        |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
| D <sub>0</sub>   | P <sub>0</sub>  | P <sub>1</sub>                                      | P <sub>2</sub>    | T <sub>2</sub> |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
| $\phi 1.5 \begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}$   | 4.0±0.1   | 2.0±0.5   | 2.0±0.05          | Max. 1.1       |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |
| <p>Bulk case</p> <p>EIAJ ET-7200B compliant</p> <p>(Unit : mm)</p>   |   |   |                   |                |  |   |   |                   |   |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |   |   |   |                |                |         |          |          |         |         |                |                |                |                |                |  |         |         |          |          |

●Part No. Explanation



Packaging Specifications Code

| Part No. | Code | Resistance tolerance |         |          | Packaging specifications | Reel           | Basic ordering unit (pcs) | Remarks           |
|----------|------|----------------------|---------|----------|--------------------------|----------------|---------------------------|-------------------|
|          |      | J(±5%)               | FX(±1%) | D(±0.5%) |                          |                |                           |                   |
| MCR03    | EZP  | ◎                    | ◎       | ◎        | Paper tape (4mm Pitch)   | φ180mm (7inch) | 5,000                     | —                 |
| MCR03    | MZP  | ◎                    | ◎       | —        | Paper tape (2mm Pitch)   | φ180mm (7inch) | 10,000                    | Narrow pitch type |
| MCR03    | PZPI | ◎                    | ◎       | —        | Bulkcase                 | —              | 25,000                    | —                 |

Reel (φ180mm) : Compatible with JEITA standard "EIAJ ET-7200B"  
 ◎ : Standard product

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