

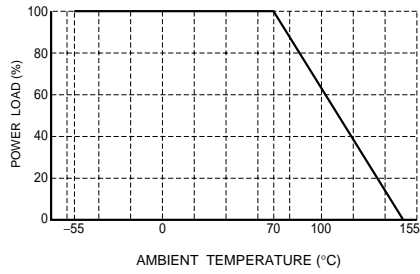
# Thick film rectangular

## MCR18 (3216 size: 1 / 4W)

### ●Features

- 1) Power rating of 1 / 4W
- 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) Leading the world in development and mass production.  
Since start of production in 1976 (first in the world), this component has established a solid reputation as a general-purpose chip resistor.
- 5) ROHM resistors have approved ISO-9001 certification.  
Design and specifications are subject to change without notice. Carefully check the specification sheet before using or ordering it.

### ●Ratings

| Item                  | Conditions                                                                                                                                                                                                                                                                                     | Specifications            |      |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------|
| Rated power           | Power must be derated according to the power derating curve in Figure 1 when ambient temperature exceeds 70°C.<br><br>Fig.1                                                                                 | 0.25W (1 / 4W)<br>at 70°C |      |
| Rated voltage         | 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.<br>$E = \sqrt{P \times R}$<br>E: Rated voltage (V)<br>P: Rated power (W)<br>R: Nominal resistance (Ω) | Limiting element voltage  | 200V |
| Nominal resistance    | See Table 1.                                                                                                                                                                                                                                                                                   |                           |      |
| Operating temperature |                                                                                                                                                                                                                                                                                                | -55°C to +155°C           |      |

## Resistors

Jumper type

|                       |                 |
|-----------------------|-----------------|
| Resistance            | Max. 50mΩ       |
| Rated current         | 2A              |
| Operating temperature | -55°C to +155°C |

Table 1

| Resistance tolerance | Resistance range (Ω)   | Resistance temperature coefficient (ppm / °C) |
|----------------------|------------------------|-----------------------------------------------|
| F (±1%)              | 0.1 ≤ R < 0.15 (E24)   | 400±200                                       |
|                      | 0.15 ≤ R < 10 (E24)    | ±250                                          |
|                      | 10 ≤ R ≤ 2.2M (E24,96) | ±100                                          |
| J (±5%)              | 0.1 ≤ R < 0.15 (E24)   | 400±200                                       |
|                      | 0.15 ≤ R < 1 (E24)     | ±250                                          |
|                      | 1.0 ≤ R < 2.2 (E24)    | 500±350                                       |
|                      | 2.2 ≤ R < 10 (E24)     | ±500                                          |
|                      | 10 ≤ R ≤ 10M (E24)     | ±200                                          |

- 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>F : ±1%                                                                             | Max. 50mΩ   | JIS C 5201-1 4.5                                                                                                 |
| Variation of resistance with temperature | See Table.1                                                                                    |             | JIS C 5201-1 4.8<br>Measurement : -55 / +25 / +125°C                                                             |
| Overload                                 | ± (2.0%+0.1Ω)                                                                                  | Max. 50mΩ   | JIS C 5201-1 4.13<br>Rated voltage (current) ×2.5, 2s.<br>Limiting Element Voltage×2 : 400V                      |
| 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~+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~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~1,048h      |
| Endurance                                | ± (3.0%+0.1Ω)                                                                                  | Max. 100mΩ  | JIS C 5201-1 4.25.3<br>155°C<br>Test time : 1,000h~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                                                                                                |

Resistors

● External dimensions (Units : mm)

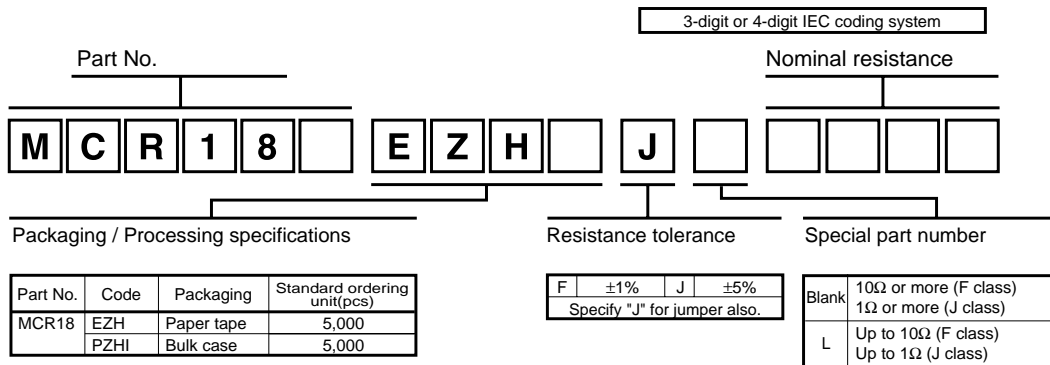
| No. | Material                                   |
|-----|--------------------------------------------|
| ①   | Resistive element (Oxide metal thick film) |
| ②   | Silver palladium thick film electrode      |
| ③   | Nickel electrode                           |
| ④   | Sn/Pb or Sn electrode      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

● Packaging

| Reel                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Taping                                                             |                                                     |                                                            |                                                            |                                                          |                                                         |                                                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |   |   |                |                |               |                |                |                                                            |                                                            |                |                |                |                |                |                                                            |               |               |                |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|----------------|----------------|---------------|----------------|----------------|------------------------------------------------------------|------------------------------------------------------------|----------------|----------------|----------------|----------------|----------------|------------------------------------------------------------|---------------|---------------|----------------|----------|
| <p>EIAJ ET-7200A compliant</p> <p>(Units: 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>Heat crimp cover/Tape<br/>Thick paper mount (Underside paper tape)<br/>Chip resistor<br/>Square punchout hole</p> <p>(Units: mm)</p> <table border="1"> <thead> <tr> <th>W</th> <th>F</th> <th>E</th> <th>A<sub>2</sub></th> <th>B<sub>2</sub></th> </tr> </thead> <tbody> <tr> <td><math>8.0 \pm 0.3</math></td> <td><math>3.5 \pm 0.05</math></td> <td><math>1.75 \pm 0.1</math></td> <td><math>1.95 \begin{smallmatrix} +0.1 \\ -0.05 \end{smallmatrix}</math></td> <td><math>3.5 \begin{smallmatrix} +0.15 \\ -0.05 \end{smallmatrix}</math></td> </tr> <tr> <th>D<sub>2</sub></th> <th>P<sub>2</sub></th> <th>P<sub>2</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><math>4.0 \pm 0.1</math></td> <td><math>4.0 \pm 0.1</math></td> <td><math>2.0 \pm 0.05</math></td> <td>Max. 1.1</td> </tr> </tbody> </table> | W | F | E | A <sub>2</sub> | B <sub>2</sub> | $8.0 \pm 0.3$ | $3.5 \pm 0.05$ | $1.75 \pm 0.1$ | $1.95 \begin{smallmatrix} +0.1 \\ -0.05 \end{smallmatrix}$ | $3.5 \begin{smallmatrix} +0.15 \\ -0.05 \end{smallmatrix}$ | D <sub>2</sub> | P <sub>2</sub> | P <sub>2</sub> | P <sub>2</sub> | T <sub>2</sub> | $\phi 1.5 \begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}$ | $4.0 \pm 0.1$ | $4.0 \pm 0.1$ | $2.0 \pm 0.05$ | 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>2</sub>                                             | B <sub>2</sub>                                             |                                                          |                                                         |                                                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |   |   |                |                |               |                |                |                                                            |                                                            |                |                |                |                |                |                                                            |               |               |                |          |
| $8.0 \pm 0.3$                                                                                                                                                                                                                                                                                                                                                                                                                                            | $3.5 \pm 0.05$                                                     | $1.75 \pm 0.1$                                      | $1.95 \begin{smallmatrix} +0.1 \\ -0.05 \end{smallmatrix}$ | $3.5 \begin{smallmatrix} +0.15 \\ -0.05 \end{smallmatrix}$ |                                                          |                                                         |                                                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |   |   |                |                |               |                |                |                                                            |                                                            |                |                |                |                |                |                                                            |               |               |                |          |
| D <sub>2</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                           | P <sub>2</sub>                                                     | P <sub>2</sub>                                      | P <sub>2</sub>                                             | T <sub>2</sub>                                             |                                                          |                                                         |                                                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |   |   |                |                |               |                |                |                                                            |                                                            |                |                |                |                |                |                                                            |               |               |                |          |
| $\phi 1.5 \begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}$                                                                                                                                                                                                                                                                                                                                                                                               | $4.0 \pm 0.1$                                                      | $4.0 \pm 0.1$                                       | $2.0 \pm 0.05$                                             | Max. 1.1                                                   |                                                          |                                                         |                                                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |   |   |                |                |               |                |                |                                                            |                                                            |                |                |                |                |                |                                                            |               |               |                |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>Bulk case</p> <p>EIAJ ET-7201A compliant</p> <p>(Units: mm)</p> |                                                     |                                                            |                                                            |                                                          |                                                         |                                                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |   |   |                |                |               |                |                |                                                            |                                                            |                |                |                |                |                |                                                            |               |               |                |          |

Resistors

● Makeup of the part number



● Dimensions

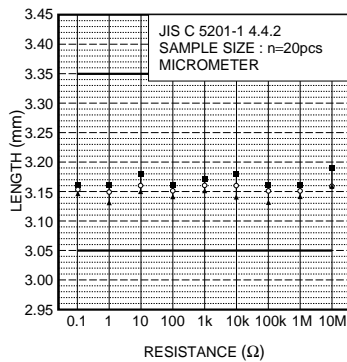


Fig.2 Dimensions (length)

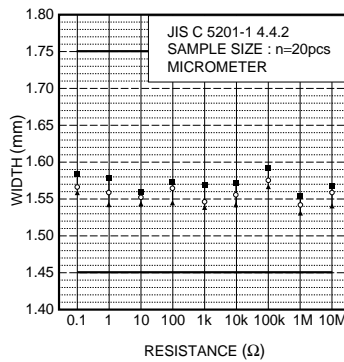


Fig.3 Dimensions (width)

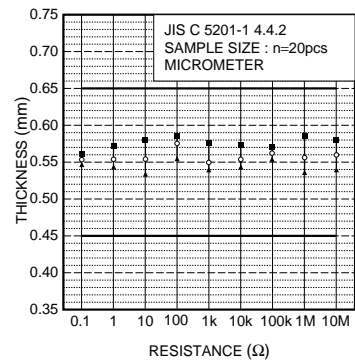


Fig.4 Dimensions (thickness)

● Electrical characteristics

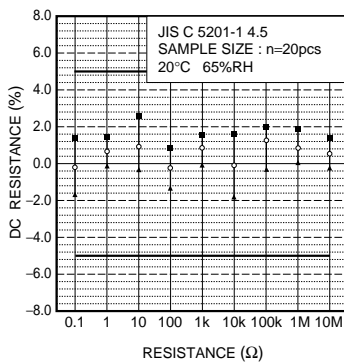


Fig.5 Resistance

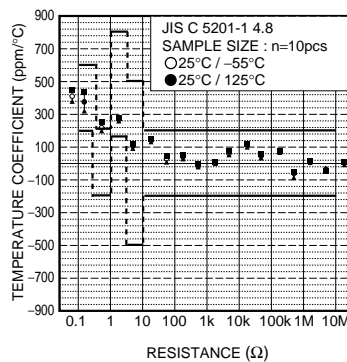


Fig.6 Variation resistance with temperature

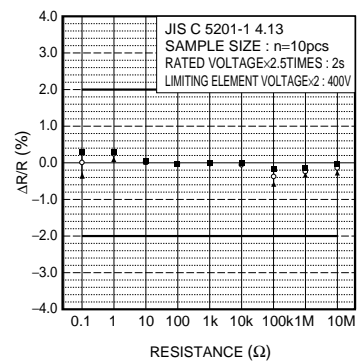


Fig.7 Overload

Resistors

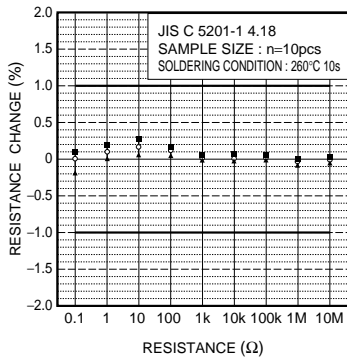


Fig.8 Resistance to soldering heat

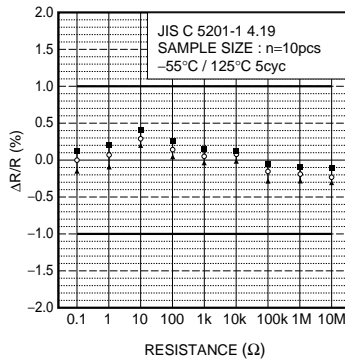


Fig.9 Rapid change of temperature

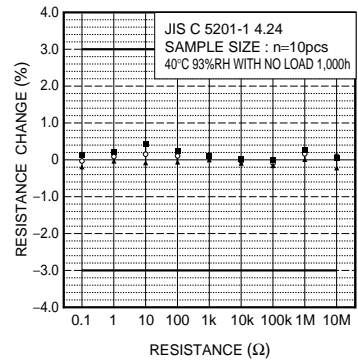


Fig.10 Damp heat, steady state

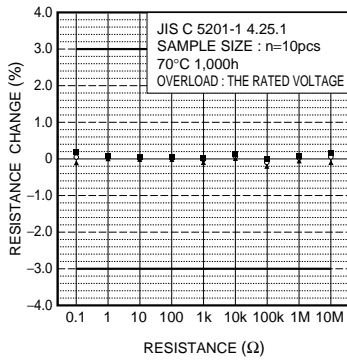


Fig.11 Endurance (at 70°C)

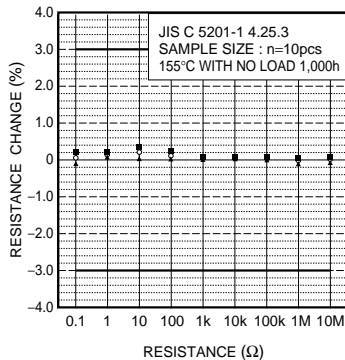


Fig.12 Endurance

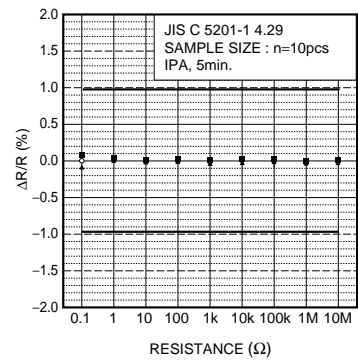


Fig.13 Resistance to solvents

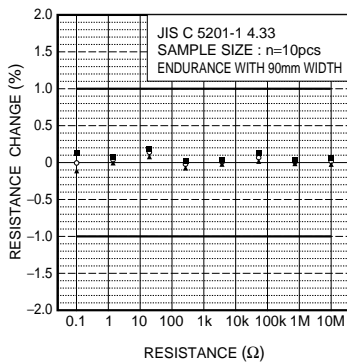


Fig.14 Bend strength of the end face plating