# Anti-Sulfurated Thick Film Chip Resistors


Type: **ERJ S02, S03, S06, S08, S14, S12, S1D, S1T (Au-based inner electrode type)**

Type: **ERJ U01, U02, U03, U06, U08, U14, U12, U1D, U1T, U6S, U6Q (Ag-Pd-based inner electrode type)**

## Features

- High resistance to sulfurization achieved by adopting an Au-based inner electrode (ERJS type) and Ag-Pd-based inner electrode (ERJU type)
- High reliability
  Metal glaze thick film resistive element and three layers of electrodes
- Suitable for both reflow and flow soldering
- Low Resistance type···ERJU6S, U6Q : 0.1 Ω to 1.0 Ω
- Reference Standard···IEC 60115-8, JIS C 5201-8, EIAJ RC-2134B
- AEC-Q200 qualified (Exemption ERJU01)
- RoHS compliant

■ **As for Packaging Methods, Land Pattern, Soldering Conditions and Safety Precautions,** Please see Data Files

## Explanation of Part Numbers

- ERJS0, S1, U0, U1 Type

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | R | J | S | 0 | 6 | F | 1 | 0 | 0 | 2 | V |

**Product Code**
Thick Film Chip Resistors

**Size, Power Rating**

| Code | Inch | Power R. | Code | Inch | Power R. |
|---|---|---|---|---|---|
| U01 | 0201 | 0.05 W | S14<br>U14 | 1210 | 0.5 W |
| S02<br>U02 | 0402 | 0.1 W | S12<br>U12 | 1812 | 0.75 W |
| S03<br>U03 | 0603 | 0.1 W | S1D<br>U1D | 2010 | 0.75 W |
| S06<br>U06 | 0805 | 0.125 W | S1T<br>U1T | 2512 | 1 W |
| S08<br>U08 | 1206 | 0.25 W | | | |

**Resistance Tolerance**

| Code | Tolerance |
|---|---|
| F | ± 1 % |
| J | ± 5 % |
| 0 | Jumper |

**Resistance Value**
The first two or three digits are significant figures of resistance and the third or 4th one denotes number of zeros following. Jumper is expressed by R00.
Three digit type (±5%), four digit type (±1%)
Example: 222→2.2 kΩ, 1002→10 kΩ

**Packaging Methods**

| Code | Packaging | Part No. |
|---|---|---|
| C | Pressed Carrier Taping<br>2 mm pitch, 15,000 pcs. | ERJU01 |
| X | Punched Carrier Taping<br>2 mm pitch, 10,000 pcs. | ERJS02, ERJU02 |
| V | Punched Carrier Taping<br>4 mm pitch, 5,000 pcs. | ERJS03, ERJU03<br>ERJS06, ERJU06<br>ERJS08, ERJU08 |
| U | Embossed Carrier Taping<br>4 mm pitch, 5,000 pcs. | ERJS14, ERJU14<br>ERJS12, ERJU12<br>ERJS1D, ERJU1D |
| | Embossed Carrier Taping<br>4 mm pitch, 4,000 pcs. | ERJS1T, ERJU1T |

- ERJU6S, U6Q Type

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| E | R | J | U | 6 | S | J | R | 2 | 0 | V |

**Product Code**
Thick Film Chip Resistors

**Size, Power Rating**

| Code | Inch | Power R. |
|---|---|---|
| U6 | 0805 | 0.25 W |

**Resistance Value**

| Code | Res. Value |
|---|---|
| S | 0.1 Ω to 0.2 Ω |
| Q | 0.22 Ω to 1 Ω |

**Resistance Tolerance**

| Code | Tolerance |
|---|---|
| F | ±1 % |
| G | ±2 % |
| J | ±5 % |

**Resistance Value**
Shown by 3 digits or letters.
(Example)
R20 : 0.20 Ω=200 mΩ
1R0 : 1.00 Ω=1000 mΩ

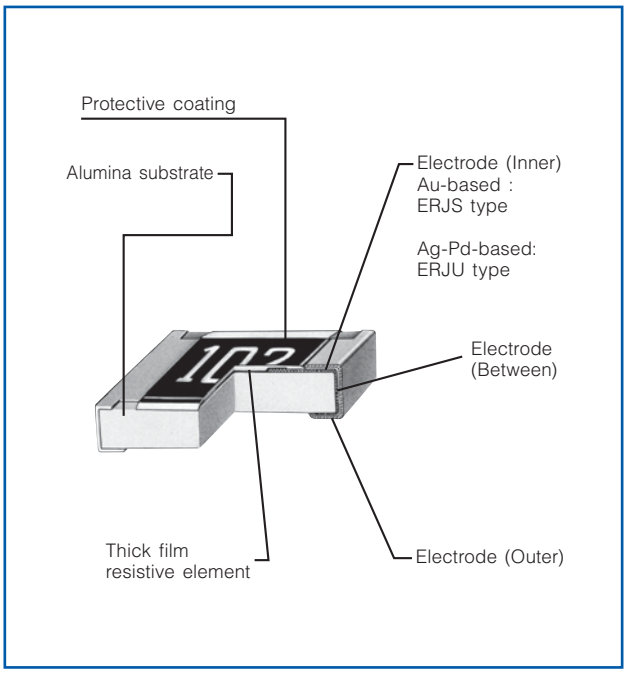
**Packaging Methods**

| Code | Packaging | Part No. |
|---|---|---|
| V | Punched Carrier Taping<br>4 mm pitch, 5,000 pcs. | ERJU6S<br>ERJU6Q |

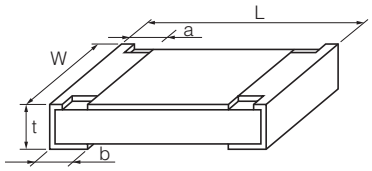
Panasonic

# Anti-Sulfurated Thick Film Chip Resistors

## Construction




## Dimensions in mm (not to scale)




| Part No. (inch size) | Dimensions (mm) | | | | | Mass (Weight) [g/1000 pcs.] |
|---|---|---|---|---|---|---|
| | L | W | a | b | t | |
| ERJU01 (0201) | $0.60^{\pm0.03}$ | $0.30^{\pm0.03}$ | $0.10^{\pm0.05}$ | $0.15^{\pm0.05}$ | $0.23^{\pm0.03}$ | 0.15 |
| ERJS02 ERJU02 (0402) | $1.00^{\pm0.05}$ | $0.50^{\pm0.05}$ | $0.20^{\pm0.10}$ | $0.25^{\pm0.10}$ | $0.35^{\pm0.05}$ | 0.8 |
| ERJS03 ERJU03 (0603) | $1.60^{\pm0.15}$ | $0.80^{+0.15}_{-0.05}$ | $0.30^{\pm0.20}$ | $0.30^{\pm0.15}$ | $0.45^{\pm0.10}$ | 2 |
| ERJS06 ERJU06 (0805) | $2.00^{\pm0.20}$ | $1.25^{\pm0.10}$ | $0.40^{\pm0.20}$ | $0.40^{\pm0.20}$ | $0.60^{\pm0.10}$ | 4 |
| ERJU6□ (0805) | $2.00^{\pm0.20}$ | $1.25^{\pm0.10}$ | $0.45^{\pm0.20}$ | $0.45^{\pm0.20}$ | $0.55^{\pm0.10}$ | 6 |
| ERJS08 ERJU08 (1206) | $3.20^{+0.05}_{-0.20}$ | $1.60^{+0.05}_{-0.15}$ | $0.50^{\pm0.20}$ | $0.50^{\pm0.20}$ | $0.60^{\pm0.10}$ | 10 |
| ERJS14 ERJU14 (1210) | $3.20^{\pm0.20}$ | $2.50^{\pm0.20}$ | $0.50^{\pm0.20}$ | $0.50^{\pm0.20}$ | $0.60^{\pm0.10}$ | 16 |
| ERJS12 ERJU12 (1812) | $4.50^{\pm0.20}$ | $3.20^{\pm0.20}$ | $0.50^{\pm0.20}$ | $0.50^{\pm0.20}$ | $0.60^{\pm0.10}$ | 27 |
| ERJS1D ERJU1D (2010) | $5.00^{\pm0.20}$ | $2.50^{\pm0.20}$ | $0.60^{\pm0.20}$ | $0.60^{\pm0.20}$ | $0.60^{\pm0.10}$ | 27 |
| ERJS1T ERJU1T (2512) | $6.40^{\pm0.20}$ | $3.20^{\pm0.20}$ | $0.65^{\pm0.20}$ | $0.60^{\pm0.20}$ | $0.60^{\pm0.10}$ | 45 |

## Ratings

| Part No. (inch size) | PowerRating at 70 °C (W) | Limiting Element Voltage(1) (V) | Maximum Overload Voltage(2) (V) | Resistance Tolerance (%) | Resistance Range (Ω) | T.C.R. (×10$^{-6}$/°C ) | Category Temperature Range (°C) |
|---|---|---|---|---|---|---|---|
| ERJU01 (0201) | 0.05 | 25 | 50 | ±1 | 10 to 1 M (E24, E96) | <10 Ω: –100 to +600<br>10 Ω to 1 MΩ: ±200(±5%) ±100(±1%)*<br>*ERJU01, ERJS02, ERJU02 : ±200<br>1 MΩ<: –400 to +150 | -55 to +125 |
| | | | | ±5 | 1 to 1 M (E24) | | |
| ERJS02 ERJU02 (0402) | 0.1 | 50 | 100 | ±1 | 10 to 1 M (E24, E96) | | -55 to +155 |
| | | | | ±5 | 1 to 3.3 M (E24) | | |
| ERJS03 ERJU03 (0603) | 0.1 | 75 | 150 | ±1 | 10 to 1 M (E24, E96) | | -55 to +155 |
| | | | | ±5 | 1 to 10 M (E24) | | |
| ERJS06 ERJU06 (0805) | 0.125 | 150 | 200 | ±1 | 10 to 1 M (E24, E96) | | -55 to +155 |
| | | | | ±5 | 1 to 10 M (E24) | | |
| ERJS08 ERJU08 (1206) | 0.25 | 200 | 400 | ±1 | 10 to 1 M (E24, E96) | | -55 to +155 |
| | | | | ±5 | 1 to 10 M (E24) | | |
| ERJS14 ERJU14 (1210) | 0.5 | 200 | 400 | ±1 | 10 to 1 M (E24, E96) | | -55 to +155 |
| | | | | ±5 | 1 to 10 M (E24) | | |
| ERJS12 ERJU12 (1812) | 0.75 | 200 | 500 | ±1 | 10 to 1 M (E24, E96) | | -55 to +155 |
| | | | | ±5 | 1 to 10 M (E24) | | |
| ERJS1D ERJU1D (2010) | 0.75 | 200 | 500 | ±1 | 10 to 1 M (E24, E96) | | -55 to +155 |
| | | | | ±5 | 1 to 10 M (E24) | | |
| ERJS1T ERJU1T (2512) | 1.0 | 200 | 500 | ±1 | 10 to 1 M (E24, E96) | | -55 to +155 |
| | | | | ±5 | 1 to 10 M (E24) | | |

(1) Rated Continuous Working Voltage (RCWV) shall be determined from RCWV=$\sqrt{\text{Power Rating} \times \text{Resistance Values}}$, or Limiting Element Voltage listed above, whichever less.
(2) Overload (Short-time Overload) Test Voltage (SOTV) shall be determined from SOTV=2.5 × RCWV or max. Overload Voltage listed above whichever less.

### [Low Resistance type]

| Part No. (inch size) | PowerRating at 70 °C (W) | Resistance Tolerance (%) | Resistance Range (Ω) | T.C.R. (×10$^{-6}$/°C ) | Category Temperature Range (°C) |
|---|---|---|---|---|---|
| ERJU6S (0805) | 0.25 | ±1, ±2, ±5 | 0.1 to 0.2 (E24) | ±150 | -55 to +155 |
| ERJU6Q (0805) | | | 0.22 to 1 (E24) | | |

[For Jumper]

| Part No. (inch size) | Rated Current (A) | Maximum Overload Current (A) |
|---|---|---|
| ERJU01 (0201) | 0.5 | 1 |
| ERJS02 ERJU02 (0402) | 1 | 2 |
| ERJS03 ERJU03 (0603) | | |
| ERJS06 ERJU06 (0805) | 2 | 4 |
| ERJS08 ERJU08 (1206) | | |
| ERJS14 ERJU14 (1210) | | |
| ERJS12 ERJU12 (1812) | | |
| ERJS1D ERJU1D (2012) | | |
| ERJS1T ERJU1T (2512) | | |

## Power Derating Curve

For resistors operated in ambient temperatures above 70 °C, power rating shall be derated in accordance with the figure below.