

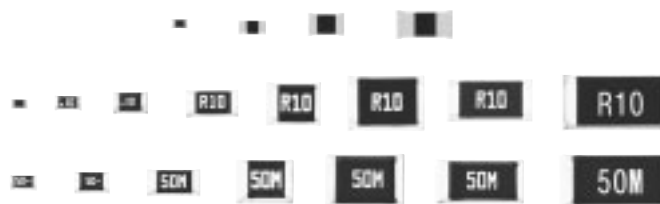
### Thick Film Chip Resistors / Low Resistance Type

ERJ R, B : 0402, 0603, 0805, 1206, 1210, 1812, 2010, 2512

ERJ BW : 0402, 0603, 0805, 1206

ERJ L : 0603, 0805, 1206, 1210, 1812, 2010, 2512

Type: ERJ 2B, 3B, 6B, 8B, 14B, 3R,  
6R, 8R, 14R, 12R, 12Z, 1TR  
ERJ 2BW, 3BW, 6BW, 8BW  
ERJ L03, L06, L08, L14, L12,  
L1D, L1W



#### Features

- Small size and lightweight
- High reliability : Metal glaze thick film resistive element and three layers of electrodes
- Suitable for both reflow and flow soldering
- Improved high-power/resistance to pulse characteristics by double-sided resistive elements structure : ERJ2BW, 3BW, 6BW, 8BW Type
- Low Resistance Value
  - ERJ2BS, 2BQ : 0.1  $\Omega$  to 1.0  $\Omega$
  - ERJ3BS/Q, 6BS/Q, 8BS/Q, 14BS/Q, 3R, 6R, 8R, 14R, 12R, 12Z, 1TR : 0.1  $\Omega$  to 9.1  $\Omega$
  - ERJ2BW : 47 m $\Omega$  to 100 m $\Omega$ , ERJ3BW : 20 m $\Omega$  to 100 m $\Omega$ , ERJ6BW, 8BW : 10 m $\Omega$  to 100 m $\Omega$
  - ERJL03, L06, L08 : 47 m $\Omega$  to 100 m $\Omega$ , ERJL14, L12 : 20 m $\Omega$  to 100 m $\Omega$ , ERJL1D, L1W : 40 m $\Omega$  to 100 m $\Omega$
- Reference Standards : IEC 60115-8, JIS C 5201-8, JEITA RC-2144
- RoHS compliant

#### Packaging Methods

Please see Pages 40 to 43

#### Recommended Land Pattern

Please see Pages 44 to 45

#### Recommended Soldering Conditions

Please see Page 46

#### Safety Precautions

Please see Page 47

#### Explanation of Part Numbers

- ERJ2BS/2BQ, 3BS/3BQ, 6BS/6BQ, 8BS/8BQ, 14BS/14BQ, 3R, 6R, 8R, 14R, 12R, 12Z, 1TR Series High power type/Standard type

| 1                                            | 2                  | 3                | 4                                    | 5                               | 6                    | 7         | 8                 | 9                                                 | 10                               | 11 |
|----------------------------------------------|--------------------|------------------|--------------------------------------|---------------------------------|----------------------|-----------|-------------------|---------------------------------------------------|----------------------------------|----|
| E                                            | R                  | J                | 8                                    | R                               | Q                    | F         | R                 | 2                                                 | 2                                | V  |
| Product Code<br>Thick Film<br>Chip Resistors | Size, Power Rating |                  | Resistance Value                     |                                 | Resistance Tolerance |           | Packaging Methods |                                                   |                                  |    |
|                                              | Type: inch         | Power R.         | Code                                 | Res. Value                      | Code                 | Tolerance | Code              | Packaging                                         | Type                             |    |
|                                              | 2B : 0402          | 0.125 W(0.166 W) | S                                    | 0.1 $\Omega$ to 0.2 $\Omega$    | F                    | $\pm 1\%$ | X                 | Punched Carrier Taping<br>2 mm pitch, 10,000 pcs. | ERJ2B                            |    |
|                                              | 3R : 0603          | 0.1 W            | Q                                    | 0.22 $\Omega$ to 9.1 $\Omega$ * | G                    | $\pm 2\%$ | V                 | Punched Carrier Taping<br>4 mm pitch, 5,000 pcs.  | ERJ3R/3B<br>ERJ6R/6B<br>ERJ8R/8B |    |
|                                              | 3B : 0603          | 0.2 W(0.25 W)    | * 2B : 0.22 $\Omega$ to 1.0 $\Omega$ |                                 | J                    | $\pm 5\%$ | U                 | Embossed Carrier Taping<br>4 mm pitch, 5,000 pcs. | ERJ14R/14B<br>ERJ12R<br>ERJ12Z   |    |
|                                              | 6R : 0805          | 0.125 W          |                                      |                                 |                      |           |                   | Embossed Carrier Taping<br>4 mm pitch, 4,000 pcs. | ERJ1TR                           |    |
|                                              | 6B : 0805          | 0.25 W(0.33 W)   |                                      |                                 |                      |           |                   |                                                   |                                  |    |
|                                              | 8R : 1206          | 0.25 W           |                                      |                                 |                      |           |                   |                                                   |                                  |    |
|                                              | 8B : 1206          | 0.33 W(0.5 W)    |                                      |                                 |                      |           |                   |                                                   |                                  |    |
|                                              | 14R : 1210         | 0.25 W           |                                      |                                 |                      |           |                   |                                                   |                                  |    |
|                                              | 14B : 1210         | 0.5 W            |                                      |                                 |                      |           |                   |                                                   |                                  |    |
|                                              | 12R : 1812         | 0.5 W            |                                      |                                 |                      |           |                   |                                                   |                                  |    |
|                                              | 12Z : 2010         | 0.5 W            |                                      |                                 |                      |           |                   |                                                   |                                  |    |
|                                              | 1TR : 2512         | 1 W              |                                      |                                 |                      |           |                   |                                                   |                                  |    |

- ERJ2BW, 3BW, 6BW, 8BW Series <High power (double-sided resistive elements structure) type>

| 1                                            | 2    | 3         | 4                  | 5                               | 6                    | 7         | 8                                                                           | 9 | 10                | 11                                                | 12                         |
|----------------------------------------------|------|-----------|--------------------|---------------------------------|----------------------|-----------|-----------------------------------------------------------------------------|---|-------------------|---------------------------------------------------|----------------------------|
| E                                            | R    | J         | 2                  | B                               | W                    | G         | R                                                                           | 0 | 4                 | 7                                                 | X                          |
| Product Code<br>Thick Film<br>Chip Resistors | Code | Size:inch | Power Rating       | Resistance Value                | Resistance Tolerance |           | Resistance Value                                                            |   | Packaging Methods |                                                   |                            |
|                                              | 2BW  | 0402      | 0.125 W<br>(0.25W) | 47 m $\Omega$ to 100 m $\Omega$ | Code                 | Tolerance | Shown by 4 digits or letters.<br>(Ex.) R047 : 0.047 $\Omega$ =47 m $\Omega$ |   | Code              | Packaging                                         | Type                       |
|                                              | 3BW  | 0603      | 0.25 W             | 20 m $\Omega$ to 100 m $\Omega$ | F                    | $\pm 1\%$ |                                                                             |   | X                 | Pressed Carrier Taping<br>2 mm pitch, 10,000 pcs. | ERJ2BW                     |
|                                              | 6BW  | 0805      | 0.33 W             | 10 m $\Omega$ to 100 m $\Omega$ | G                    | $\pm 2\%$ |                                                                             |   | V                 | Punched Carrier Taping<br>4 mm pitch, 5,000 pcs.  | ERJ3BW<br>ERJ6BW<br>ERJ8BW |
|                                              | 8BW  | 1206      | 0.5 W<br>(1W)      | 10 m $\Omega$ to 100 m $\Omega$ | J                    | $\pm 5\%$ |                                                                             |   |                   |                                                   |                            |

### ● ERJL03, L06, L08, L14, L12, L1D, L1W Series Low TCR type

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|
| E | R | J | L | 1 | 4 | K | J | 5 | 0  | M  | U  |

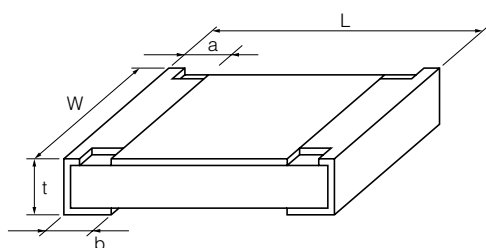
  

| Product Code              | Size, Power Rating          | Code | Res. Value                                                                                                                 | Resistance Tolerance                 | Packaging Methods                                                     |
|---------------------------|-----------------------------|------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------|
| Thick Film Chip Resistors | Type: inch Power R.         | K    | Std. (20 mΩ, 22 mΩ, 33 mΩ, 39 mΩ, 47 mΩ, 50 mΩ, 100 mΩ)<br>* L03, L06, L08 : 47 mΩ to 100 mΩ<br>L1D, L1W : 40 mΩ to 100 mΩ | Code Tolerance<br>F ± 1 %<br>J ± 5 % | Code Packaging Type                                                   |
|                           | L03 : 0603 0.1 W (0.2 W)    | U    | 20 mΩ to 100 mΩ*                                                                                                           |                                      | V Punched Carrier Taping 4 mm pitch, 5,000 pcs. ERJL03 ERJL06 ERJL08  |
|                           | L06 : 0805 0.125 W (0.25 W) |      |                                                                                                                            |                                      | U Embossed Carrier Taping 4 mm pitch, 5,000 pcs. ERJL14 ERJL12 ERJL1D |
|                           | L08 : 1206 0.25 W (0.33 W)  |      |                                                                                                                            |                                      | Embossed Carrier Taping 4 mm pitch, 4,000 pcs. ERJL1W                 |
|                           | L14 : 1210 0.33 W           |      |                                                                                                                            |                                      |                                                                       |
|                           | L12 : 1812 0.5 W            |      |                                                                                                                            |                                      |                                                                       |
|                           | L1D : 2010 0.5 W            |      |                                                                                                                            |                                      |                                                                       |
|                           | L1W : 2512 1 W              |      |                                                                                                                            |                                      |                                                                       |

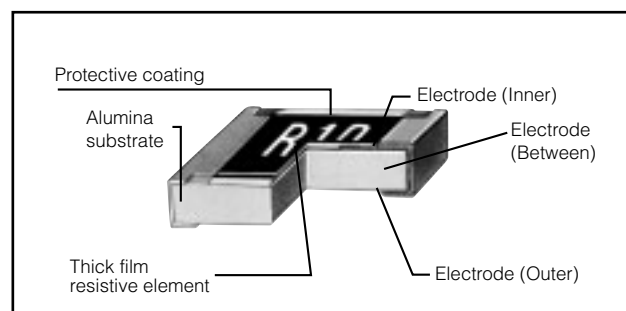
  

| Resistance Value                                               |
|----------------------------------------------------------------|
| Shown by 3 digits or letters.<br>(Ex.) 50 M:50 mΩ, 10 C:100 mΩ |

### ■ Dimensions in mm (not to scale)



### ■ Construction



| Type (inch size) | Dimensions (mm)       |                                        |                       |                       |                       | Mass(Weight) [g/1000pcs.] |
|------------------|-----------------------|----------------------------------------|-----------------------|-----------------------|-----------------------|---------------------------|
|                  | L                     | W                                      | a                     | b                     | t                     |                           |
| ERJ2BW (0402)    | 1.00 <sup>+0.10</sup> | 0.50 <sup>+0.10</sup> <sub>-0.05</sub> | 0.24 <sup>+0.10</sup> | 0.24 <sup>+0.10</sup> | 0.35 <sup>+0.05</sup> | 0.8                       |
| ERJ2BS (0402)    | 1.00 <sup>+0.10</sup> | 0.50 <sup>+0.10</sup> <sub>-0.05</sub> | 0.20 <sup>+0.10</sup> | 0.27 <sup>+0.10</sup> | 0.35 <sup>+0.05</sup> | 0.8                       |
| ERJ2BQ (0402)    | 1.00 <sup>+0.10</sup> | 0.50 <sup>+0.10</sup> <sub>-0.05</sub> | 0.20 <sup>+0.10</sup> | 0.27 <sup>+0.10</sup> | 0.35 <sup>+0.05</sup> | 0.8                       |
| ERJ3BW (0603)    | 1.60 <sup>+0.15</sup> | 0.80 <sup>+0.15</sup>                  | 0.40 <sup>+0.20</sup> | 0.40 <sup>+0.20</sup> | 0.55 <sup>+0.10</sup> | 3                         |
| ERJ3R (0603)     | 1.60 <sup>+0.15</sup> | 0.80 <sup>+0.15</sup> <sub>-0.05</sub> | 0.30 <sup>+0.20</sup> | 0.30 <sup>+0.15</sup> | 0.45 <sup>+0.10</sup> | 2                         |
| ERJL03 (0603)    | 1.60 <sup>+0.15</sup> | 0.80 <sup>+0.15</sup> <sub>-0.05</sub> | 0.30 <sup>+0.20</sup> | 0.30 <sup>+0.15</sup> | 0.45 <sup>+0.10</sup> | 2                         |
| ERJ6BW(0805)     | 2.00 <sup>+0.20</sup> | 1.25 <sup>+0.20</sup>                  | 0.55 <sup>+0.20</sup> | 0.55 <sup>+0.20</sup> | 0.65 <sup>+0.10</sup> | 6                         |
| ERJ6R (0805)     | 2.00 <sup>+0.20</sup> | 1.25 <sup>+0.10</sup>                  | 0.40 <sup>+0.20</sup> | 0.40 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 4                         |
| ERJL06 (0805)    | 2.00 <sup>+0.20</sup> | 1.25 <sup>+0.10</sup>                  | 0.40 <sup>+0.20</sup> | 0.40 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 4                         |
| ERJ8BW(1206)     | 3.20 <sup>+0.20</sup> | 1.60 <sup>+0.20</sup>                  | 1.00 <sup>+0.20</sup> | 1.00 <sup>+0.20</sup> | 0.65 <sup>+0.10</sup> | 13                        |
| ERJ8R (1206)     | 3.20 <sup>+0.20</sup> | 1.60 <sup>+0.20</sup>                  | 0.50 <sup>+0.20</sup> | 0.50 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 10                        |
| ERJL08 (1206)    | 3.20 <sup>+0.20</sup> | 1.60 <sup>+0.20</sup>                  | 0.50 <sup>+0.20</sup> | 0.50 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 10                        |
| ERJ14R (1210)    | 3.20 <sup>+0.20</sup> | 2.50 <sup>+0.20</sup>                  | 0.50 <sup>+0.20</sup> | 0.50 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 16                        |
| ERJL14 (1210)    | 3.20 <sup>+0.20</sup> | 2.50 <sup>+0.20</sup>                  | 0.50 <sup>+0.20</sup> | 0.50 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 16                        |
| ERJ12R (1812)    | 4.50 <sup>+0.20</sup> | 3.20 <sup>+0.20</sup>                  | 0.50 <sup>+0.20</sup> | 0.50 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 27                        |
| ERJL12 (1812)    | 4.50 <sup>+0.20</sup> | 3.20 <sup>+0.20</sup>                  | 0.50 <sup>+0.20</sup> | 0.50 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 27                        |
| ERJ12Z (2010)    | 5.00 <sup>+0.20</sup> | 2.50 <sup>+0.20</sup>                  | 0.60 <sup>+0.20</sup> | 0.60 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 27                        |
| ERJL1D (2010)    | 5.00 <sup>+0.20</sup> | 2.50 <sup>+0.20</sup>                  | 0.60 <sup>+0.20</sup> | 0.60 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 27                        |
| ERJ1TR (2512)    | 6.40 <sup>+0.20</sup> | 3.20 <sup>+0.20</sup>                  | 0.65 <sup>+0.20</sup> | 0.60 <sup>+0.20</sup> | 0.60 <sup>+0.10</sup> | 45                        |
| ERJL1W (2512)    | 6.40 <sup>+0.20</sup> | 3.20 <sup>+0.20</sup>                  | 0.65 <sup>+0.20</sup> | 1.30 <sup>+0.20</sup> | 1.10 <sup>+0.10</sup> | 79                        |

### ■ Ratings

#### <High power type>

| Type (inch size) | Power Rating at 70 °C (W) | Resistance Tolerance (%) | Resistance Range (Ω) | T.C.R. (×10 <sup>-6</sup> /°C) | Category Temperature Range (°C) |
|------------------|---------------------------|--------------------------|----------------------|--------------------------------|---------------------------------|
| ERJ2BS (0402)    | 0.125                     | ±2, ±5                   | 0.10 to 0.20 (E24)   | ±300                           | -55 to +125                     |
| ERJ2BQ (0402)    | (0.166) <sup>(1)</sup>    | ±1, ±2, ±5               | 0.22 to 1.0 (E24)    | ±250                           |                                 |
| ERJ3BS (0603)    | 0.2                       | ±1, ±2, ±5               | 0.10 to 0.20 (E24)   | ±300                           | -55 to +125                     |
| ERJ3BQ (0603)    | (0.25) <sup>(1)</sup>     |                          | 0.22 to 0.91 (E24)   | ±200                           |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)     | ±200                           |                                 |
| ERJ6BS (0805)    | 0.25                      | ±1, ±2, ±5               | 0.10 to 0.20 (E24)   | ±250                           | -55 to +125                     |
| ERJ6BQ (0805)    | (0.33) <sup>(1)</sup>     |                          | 0.22 to 0.91 (E24)   | ±200                           |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)     | ±200                           |                                 |
| ERJ8BS (1206)    | 0.33                      | ±1, ±2, ±5               | 0.10 to 0.20 (E24)   | ±250                           | -55 to +125                     |
| ERJ8BQ (1206)    | (0.5) <sup>(1)</sup>      |                          | 0.22 to 0.91 (E24)   | ±200                           |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)     | ±200                           |                                 |
| ERJ14BS (1210)   | 0.5                       | ±1, ±2, ±5               | 0.10 to 0.20 (E24)   | ±200                           | -55 to +125                     |
| ERJ14BQ (1210)   |                           |                          | 0.22 to 0.91 (E24)   | ±100                           |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)     | ±100                           |                                 |

(1) Please contact us when resistors with guaranteed high power are needed.

### ■ Ratings

<High power (double-sided resistive elements structure) type>

| Type (inch size) | Power Rating at 70 °C (W)   | Resistance Tolerance (%) | Resistance Range (Ω) | T.C.R. ( $\times 10^{-6}/^{\circ}\text{C}$ )                                      | Category Temperature Range (°C) |
|------------------|-----------------------------|--------------------------|----------------------|-----------------------------------------------------------------------------------|---------------------------------|
| ERJ2BW (0402)    | 0.125 (0.25) <sup>(1)</sup> | ±2, ±5                   | 47 m to 100 m(E24)   | ±300                                                                              | -55 to +155                     |
| ERJ3BW (0603)    | 0.25                        | ±1, ±2, ±5               | 20 m to 100 m(E24)   | R<39m Ω:±250<br>R≥39m Ω:±150                                                      | -55 to +155                     |
| ERJ6BW (0805)    | 0.33                        | ±1, ±2, ±5               | 10 m to 100 m(E24)   | R<15m Ω:±300<br>R≥15m Ω:±200                                                      | -55 to +155                     |
| ERJ8BW (1206)    | 0.5 (1) <sup>(1)</sup>      | ±1, ±2, ±5               | 10 m to 100 m(E24)   | 10 mΩ ≤ R < 20 mΩ : ±200<br>20 mΩ ≤ R < 47 mΩ : ±150<br>47 mΩ ≤ R ≤ 100 mΩ : ±100 | -55 to +155                     |

<Standard type>

| Type (inch size) | Power Rating at 70 °C (W) | Resistance Tolerance (%) | Resistance Range <sup>(2)</sup> (Ω) | T.C.R. ( $\times 10^{-6}/^{\circ}\text{C}$ ) | Category Temperature Range (°C) |
|------------------|---------------------------|--------------------------|-------------------------------------|----------------------------------------------|---------------------------------|
| ERJ3RS (0603)    | 0.1                       | ±1, ±2, ±5               | 0.10 to 0.20 (E24)                  | ±300                                         | -55 to +125                     |
| ERJ3RQ (0603)    |                           |                          | 0.22 to 0.91 (E24)                  |                                              |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)                    | ±200                                         |                                 |
| ERJ6RS (0805)    | 0.125                     | ±1, ±2, ±5               | 0.10 to 0.20 (E24)                  | ±250                                         | -55 to +125                     |
| ERJ6RQ (0805)    |                           |                          | 0.22 to 0.91 (E24)                  |                                              |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)                    | ±200                                         |                                 |
| ERJ8RS (1206)    | 0.25                      | ±1, ±2, ±5               | 0.10 to 0.20 (E24)                  | ±250                                         | -55 to +125                     |
| ERJ8RQ (1206)    |                           |                          | 0.22 to 0.91 (E24)                  |                                              |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)                    | ±200                                         |                                 |
| ERJ14RS (1210)   | 0.25                      | ±1, ±2, ±5               | 0.10 to 0.20 (E24)                  | ±200                                         | -55 to +125                     |
| ERJ14RQ (1210)   |                           |                          | 0.22 to 0.91 (E24)                  |                                              |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)                    | ±100                                         |                                 |
| ERJ12RS (1812)   | 0.5                       | ±1, ±2, ±5               | 0.10 to 0.20 (E24)                  | ±200                                         | -55 to +125                     |
| ERJ12RQ (1812)   |                           |                          | 0.22 to 0.91 (E24)                  |                                              |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)                    | ±100                                         |                                 |
| ERJ12ZS (2010)   | 0.5                       | ±1, ±2, ±5               | 0.10 to 0.20 (E24)                  | ±200                                         | -55 ~ +125                      |
| ERJ12ZQ (2010)   |                           |                          | 0.22 to 0.91 (E24)                  |                                              |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)                    | ±100                                         |                                 |
| ERJ1TRS (2512)   | 1                         | ±1, ±2, ±5               | 0.10 to 0.20 (E24)                  | ±200                                         | -55 to +125                     |
| ERJ1TRQ (2512)   |                           |                          | 0.22 to 0.91 (E24)                  |                                              |                                 |
|                  |                           |                          | 1.0 to 9.1 (E24)                    | ±100                                         |                                 |

<Low TCR type>

| Type (inch size) | Power Rating at 70 °C (W)   | Resistance Tolerance (%) | Resistance Range <sup>(2)</sup> (Ω) | T.C.R. ( $\times 10^{-6}/^{\circ}\text{C}$ ) | Category Temperature Range (°C) |
|------------------|-----------------------------|--------------------------|-------------------------------------|----------------------------------------------|---------------------------------|
| ERJL03 (0603)    | 0.1 (0.2) <sup>(1)</sup>    | ±1, ±5                   | 47 m to 100 m                       | ±200                                         | -55 to +125                     |
| ERJL06 (0805)    | 0.125 (0.25) <sup>(1)</sup> | ±1, ±5                   | 47 m to 100 m                       | ±100                                         | -55 to +125                     |
| ERJL08 (1206)    | 0.25 (0.33) <sup>(1)</sup>  | ±1, ±5                   | 47 m to 100 m                       | ±100                                         | -55 to +125                     |
| ERJL14 (1210)    | 0.33                        | ±1, ±5                   | 20 m to 100 m                       | R<47 mΩ:±300<br>R≥47 mΩ:±100                 | -55 to +125                     |
| ERJL12 (1812)    | 0.5                         | ±1, ±5                   | 20 m to 100 m                       |                                              | -55 to +125                     |
| ERJL1D (2010)    | 0.5                         | ±1, ±5                   | 40 m to 100 m                       |                                              | -55 to +125                     |
| ERJL1W (2512)    | 1                           | ±1, ±5                   | 40 m to 100 m                       |                                              | -55 to +125                     |

(1) Please contact us when resistors with guaranteed high power are needed.

(2) Standard R.V. : 20 mΩ, 22 mΩ, 33 mΩ, 39 mΩ, 47 mΩ, 50 mΩ, 100 mΩ, Custom R.V. : Each 1 mΩ within upper range.

### Power Derating Curve

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

