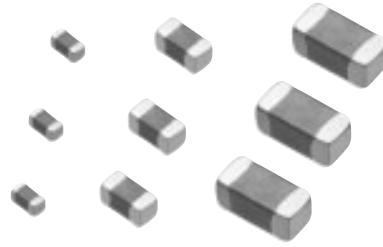


### Multilayer NTC Thermistors

Series: **ERTJ**



#### ■ Features

- Surface Mount Device (0201, 0402, 0603)
- Highly reliable multilayer / monolithic structure
- Wide temperature operating range (-40 to 125 °C)
- Environmentally-friendly lead-free

#### ■ Recommended Applications

- Mobile Phone
  - Temperature compensation for crystal oscillator
  - Temperature compensation for semiconductor devices
- Personal Computer
  - Temperature detection for CPU and memory device
  - Temperature compensation for ink-viscosity (Inkjet Printer)
- Battery Pack
  - Temperature detection of battery cells
- Liquid Crystal Display
  - Temperature compensation of display contrast
  - Temperature compensation of display backlighting (CCFL)

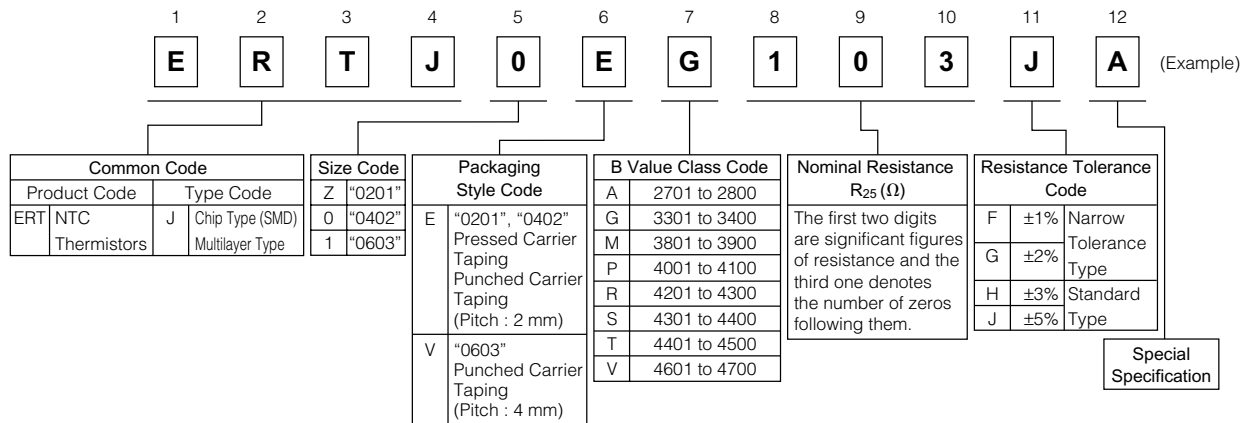
#### ■ Handling Precautions

Please see Pages 371 to 375

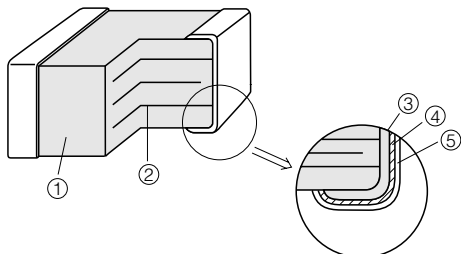
#### ■ Packaging Methods

Please see Page 364

#### ■ Explanation of Part Numbers



#### ■ Construction

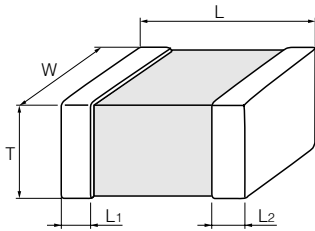


| No | Name                    |                        |
|----|-------------------------|------------------------|
| ①  | Semiconductive Ceramics |                        |
| ②  | Internal electrode      |                        |
| ③  | Terminal electrode      | Substrate electrode    |
| ④  |                         | Intermediate electrode |
| ⑤  |                         | External electrode     |

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.

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### ■ Dimensions in mm (not to scale)



| Size Code (EIA) | L         | W         | T         | L <sub>1</sub> , L <sub>2</sub> |
|-----------------|-----------|-----------|-----------|---------------------------------|
| Z(0201)         | 0.60±0.03 | 0.30±0.03 | 0.30±0.03 | 0.15±0.05                       |
| 0(0402)         | 1.0±0.1   | 0.50±0.05 | 0.50±0.05 | 0.25±0.15                       |
| 1(0603)         | 1.60±0.15 | 0.8±0.1   | 0.8±0.1   | 0.3±0.2                         |

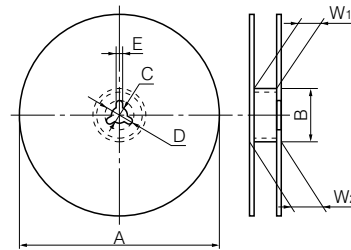
(Unit : mm)

### ■ Packaging Methods

#### ● Standard Packing Quantities

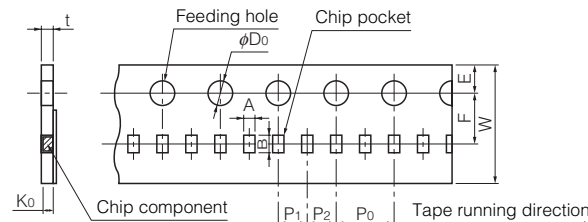
| Size Code | Thickness (mm) | Kind of Taping         | Pitch (mm) | Quantity (pcs./reel) |
|-----------|----------------|------------------------|------------|----------------------|
| Z(0201)   | 0.3            | Pressed Carrier Taping | 2          | 15,000               |
| 0(0402)   | 0.5            | Punched Carrier Taping | 2          | 10,000               |
| 1(0603)   | 0.8            |                        | 4          | 4,000                |

#### ● Reel for Taping



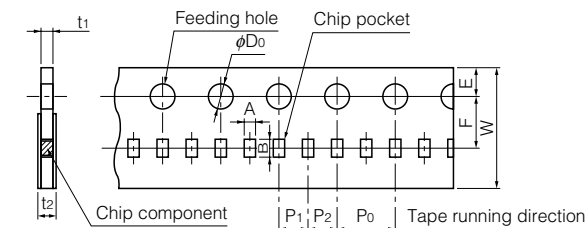
| Symbol    | φA                             | φB                                | C        | D        | E       | W <sub>1</sub>                   | W <sub>2</sub> |
|-----------|--------------------------------|-----------------------------------|----------|----------|---------|----------------------------------|----------------|
| Dim. (mm) | 180 <sup>0</sup> <sub>-3</sub> | 60.0 <sup>+1.0</sup> <sub>0</sub> | 13.0±0.5 | 21.0±0.8 | 2.0±0.5 | 9.0 <sup>+1.0</sup> <sub>0</sub> | 11.4±1.0       |

#### ● Pitch 2 mm (Pressed Carrier Taping) : Size 0201



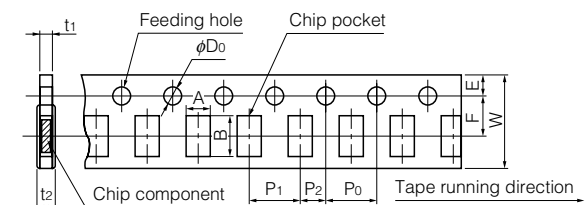
| Symbol    | A         | B         | W       | F         | E         | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | φD <sub>0</sub>                  | t         | K <sub>0</sub> |
|-----------|-----------|-----------|---------|-----------|-----------|----------------|----------------|----------------|----------------------------------|-----------|----------------|
| Dim. (mm) | 0.36±0.03 | 0.66±0.03 | 8.0±0.2 | 3.50±0.05 | 1.75±0.10 | 2.00±0.05      | 2.00±0.05      | 4.0±0.1        | 1.5 <sup>+0.1</sup> <sub>0</sub> | 0.55 max. | 0.36±0.03      |

#### ● Pitch 2 mm (Punched Carrier Taping) : Size 0402



| Symbol    | A         | B         | W       | F         | E         | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | φD <sub>0</sub>                  | t <sub>1</sub> | t <sub>2</sub> |
|-----------|-----------|-----------|---------|-----------|-----------|----------------|----------------|----------------|----------------------------------|----------------|----------------|
| Dim. (mm) | 0.62±0.05 | 1.12±0.05 | 8.0±0.2 | 3.50±0.05 | 1.75±0.10 | 2.00±0.05      | 2.00±0.05      | 4.0±0.1        | 1.5 <sup>+0.1</sup> <sub>0</sub> | 0.7 max.       | 1.0 max.       |

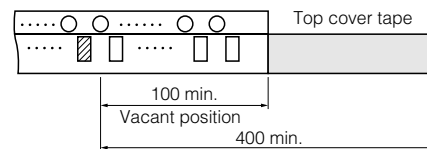
#### ● Pitch 4 mm (Punched Carrier Taping) : Size 0603



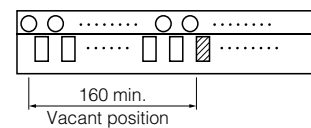
| Symbol    | A       | B       | W       | F         | E         | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | φD <sub>0</sub>                  | t <sub>1</sub> | t <sub>2</sub> |
|-----------|---------|---------|---------|-----------|-----------|----------------|----------------|----------------|----------------------------------|----------------|----------------|
| Dim. (mm) | 1.0±0.1 | 1.8±0.1 | 8.0±0.2 | 3.50±0.05 | 1.75±0.10 | 4.0±0.1        | 2.00±0.05      | 4.0±0.1        | 1.5 <sup>+0.1</sup> <sub>0</sub> | 1.1 max.       | 1.4 max.       |

#### ● Leader Part and Taped End

##### Leader part



##### Taped end



(Unit : mm)

### ■ Minimum Quantity / Packing Unit

| Part Number (Size) | Minimum Quantity / Packing Unit | Packing Quantity in Carton | Carton L×W×H (mm) |
|--------------------|---------------------------------|----------------------------|-------------------|
| ERTJZ (0201)       | 15,000                          | 300,000                    | 250×200×200       |
| ERTJ0 (0402)       | 10,000                          | 200,000                    | 250×200×200       |
| ERTJ1 (0603)       | 4,000                           | 80,000                     | 250×200×200       |

Part No., quantity and country of origin are designated on outer packages in English.

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.

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### ■ Ratings

| Size code (EIA)                   | Z(0201)               | 0(0402)               | 1(0603)               |
|-----------------------------------|-----------------------|-----------------------|-----------------------|
| Operating Temperature Range       | -40 to 125 °C         |                       |                       |
| Rated Maximum Power Dissipation*1 | 33 mW                 | 66 mW                 | 100 mW                |
| Dissipation Factor*2              | approximately 1 mW/°C | approximately 2 mW/°C | approximately 3 mW/°C |

\*1 Rated Maximum Power Dissipation : The maximum power that can be continuously applied at the rated ambient temperature.  
 · The Maximum Power Dissipation under ambient temperature 25 °C or less is the same with the rated maximum power dissipation, and Maximum power dissipation beyond 25 °C depends on the Decreased power dissipation curve.  
 · Please see "Operating Power" for details paging 371.

\*2 Dissipation factor : The constant amount power required to raise the temperature of the Thermistor 1 °C through self heat generation under stable temperatures.  
 · Dissipation factor is the reference value when mounted on a glass epoxy board (1.6 mmT).

### ● Resistance ratios to R<sub>25</sub> at each temperature/Reference values

(for obtaining resistance at each temperature by using R<sub>25</sub> shown in part number)

|                    | ERTJ□□A~ |          | ERTJ□□G~ | ERTJ□□M~ | ERTJ□□P~ | ERTJ□□R~ | ERTJ0ES~ | ERTJ1VS~ | ERTJ□□T~ | ERTJ0ET104□ | ERTJ□□V~ |
|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------|----------|
| B <sub>25/50</sub> | 2750 K   | 2800 K   | (3375 K) | 3900 K   | 4050 K   | 4250K    | 4330K    | (4330K)  | 4500K    | 4500K       | 4700K    |
| B <sub>25/85</sub> | (2700 K) | (2750 K) | 3435 K   | (3970 K) | (4100 K) | (4300K)  | (4390K)  | 4390K    | (4450K)  | (4580K)     | (4750K)  |
| T(°C)              |          |          |          |          |          |          |          |          | *1       | *2          |          |
| -40                | 13.05    | 13.28    | 20.52    | 32.11    | 33.10    | 43.10    | 45.67    | 45.53    | 63.30    | 47.07       | 59.76    |
| -35                | 10.21    | 10.40    | 15.48    | 23.29    | 24.03    | 30.45    | 32.08    | 31.99    | 42.92    | 33.31       | 41.10    |
| -30                | 8.061    | 8.214    | 11.79    | 17.08    | 17.63    | 21.76    | 22.80    | 22.74    | 29.50    | 23.80       | 28.61    |
| -25                | 6.427    | 6.547    | 9.069    | 12.65    | 13.06    | 15.73    | 16.39    | 16.35    | 20.53    | 17.16       | 20.14    |
| -20                | 5.168    | 5.261    | 7.037    | 9.465    | 9.761    | 11.48    | 11.91    | 11.89    | 14.46    | 12.49       | 14.33    |
| -15                | 4.191    | 4.261    | 5.507    | 7.147    | 7.362    | 8.466    | 8.743    | 8.727    | 10.30    | 9.159       | 10.31    |
| -10                | 3.424    | 3.476    | 4.344    | 5.444    | 5.599    | 6.300    | 6.479    | 6.469    | 7.407    | 6.772       | 7.482    |
| -5                 | 2.819    | 2.856    | 3.453    | 4.181    | 4.291    | 4.730    | 4.845    | 4.839    | 5.388    | 5.046       | 5.481    |
| 0                  | 2.336    | 2.362    | 2.764    | 3.237    | 3.312    | 3.582    | 3.654    | 3.650    | 3.966    | 3.789       | 4.050    |
| 5                  | 1.948    | 1.966    | 2.227    | 2.524    | 2.574    | 2.734    | 2.778    | 2.776    | 2.953    | 2.864       | 3.015    |
| 10                 | 1.635    | 1.646    | 1.806    | 1.981    | 2.013    | 2.102    | 2.128    | 2.126    | 2.221    | 2.179       | 2.262    |
| 15                 | 1.380    | 1.386    | 1.474    | 1.567    | 1.584    | 1.629    | 1.642    | 1.641    | 1.687    | 1.669       | 1.710    |
| 20                 | 1.171    | 1.174    | 1.211    | 1.247    | 1.255    | 1.272    | 1.277    | 1.276    | 1.293    | 1.287       | 1.303    |
| 25                 | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1           | 1        |
| 30                 | 0.8585   | 0.8565   | 0.8309   | 0.8072   | 0.8016   | 0.7921   | 0.7888   | 0.7890   | 0.7799   | 0.7823      | 0.7734   |
| 35                 | 0.7407   | 0.7372   | 0.6941   | 0.6556   | 0.6461   | 0.6315   | 0.6263   | 0.6266   | 0.6131   | 0.6158      | 0.6023   |
| 40                 | 0.6422   | 0.6376   | 0.5828   | 0.5356   | 0.5235   | 0.5067   | 0.5004   | 0.5007   | 0.4856   | 0.4876      | 0.4721   |
| 45                 | 0.5595   | 0.5541   | 0.4916   | 0.4401   | 0.4266   | 0.4090   | 0.4022   | 0.4025   | 0.3874   | 0.3884      | 0.3723   |
| 50                 | 0.4899   | 0.4836   | 0.4165   | 0.3635   | 0.3496   | 0.3319   | 0.3251   | 0.3254   | 0.3111   | 0.3111      | 0.2954   |
| 55                 | 0.4309   | 0.4238   | 0.3543   | 0.3018   | 0.2881   | 0.2709   | 0.2642   | 0.2645   | 0.2513   | 0.2504      | 0.2356   |
| 60                 | 0.3806   | 0.3730   | 0.3027   | 0.2518   | 0.2386   | 0.2222   | 0.2158   | 0.2161   | 0.2042   | 0.2026      | 0.1889   |
| 65                 | 0.3376   | 0.3295   | 0.2595   | 0.2111   | 0.1985   | 0.1832   | 0.1772   | 0.1774   | 0.1670   | 0.1648      | 0.1523   |
| 70                 | 0.3008   | 0.2922   | 0.2233   | 0.1777   | 0.1659   | 0.1518   | 0.1463   | 0.1465   | 0.1377   | 0.1348      | 0.1236   |
| 75                 | 0.2691   | 0.2600   | 0.1929   | 0.1504   | 0.1393   | 0.1264   | 0.1213   | 0.1215   | 0.1144   | 0.1108      | 0.1009   |
| 80                 | 0.2417   | 0.2322   | 0.1672   | 0.1278   | 0.1174   | 0.1057   | 0.1011   | 0.1013   | 0.09560  | 0.09162     | 0.08284  |
| 85                 | 0.2180   | 0.2081   | 0.1451   | 0.1090   | 0.09937  | 0.08873  | 0.08469  | 0.08486  | 0.08033  | 0.07609     | 0.06834  |
| 90                 | 0.1974   | 0.1871   | 0.1261   | 0.09310  | 0.08442  | 0.07468  | 0.07122  | 0.07138  | 0.06782  | 0.06345     | 0.05662  |
| 95                 | 0.1793   | 0.1688   | 0.1097   | 0.07980  | 0.07200  | 0.06307  | 0.06014  | 0.06028  | 0.05753  | 0.05314     | 0.04712  |
| 100                | 0.1636   | 0.1528   | 0.09563  | 0.06871  | 0.06166  | 0.05353  | 0.05099  | 0.05112  | 0.04903  | 0.04472     | 0.03939  |
| 105                | 0.1498   | 0.1387   | 0.08357  | 0.05947  | 0.05306  | 0.04568  | 0.04340  | 0.04351  | 0.04198  | 0.03784     | 0.03308  |
| 110                | 0.1377   | 0.1263   | 0.07317  | 0.05170  | 0.04587  | 0.03918  | 0.03708  | 0.03718  | 0.03609  | 0.03218     | 0.02791  |
| 115                | 0.1270   | 0.1153   | 0.06421  | 0.04512  | 0.03979  | 0.03374  | 0.03179  | 0.03188  | 0.03117  | 0.02748     | 0.02364  |
| 120                | 0.1175   | 0.1056   | 0.05650  | 0.03951  | 0.03460  | 0.02916  | 0.02734  | 0.02742  | 0.02702  | 0.02352     | 0.02009  |
| 125                | 0.1091   | 0.09695  | 0.04986  | 0.03470  | 0.03013  | 0.02527  | 0.02359  | 0.02367  | 0.02351  | 0.02017     | 0.01712  |

\*1 Other than ERTJ0ET104□ in B<sub>25/50</sub> = 4500K.

\*2 ERTJ0ET104□ only.

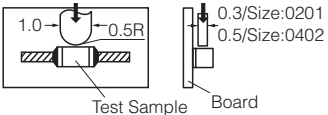
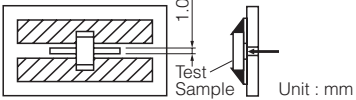
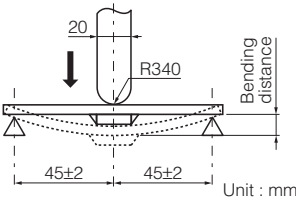
$$B_{25/50} = \frac{\ln(R_{25}/R_{50})}{1/298.15 - 1/323.15}$$

$$B_{25/85} = \frac{\ln(R_{25}/R_{85})}{1/298.15 - 1/358.15}$$

R<sub>25</sub>=Resistance at 25.0±0.1 °C  
 R<sub>50</sub>=Resistance at 50.0±0.1 °C  
 R<sub>85</sub>=Resistance at 85.0±0.1 °C

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.

### ■ Specification and Test Method

| Item   | Specification   | Test Method   |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
|--|---|---|------------------|----------------|------------------------|--------------------|--------------|----------------|--------------------|--------------|---|------|-----------|------------|---|-----------|------------|---|------------|------------|
| Rated Zero-power Resistance (R <sub>25</sub> ) | Within the specified tolerance.   | The value of the d.c. resistance shall be measured at the rated ambient temperature of 25.0 ±0.1 °C under the power less than 0.1mW which is negligible self heat generation.   |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| B Value  | Within the specified tolerance.<br>* Individual Specification shall specify B <sub>25/50</sub> or B <sub>25/85</sub> .  | The Zero-power resistances; R <sub>1</sub> and R <sub>2</sub> , shall be measured respectively at T <sub>1</sub> (°C) and T <sub>2</sub> (°C). The B value is calculated by the following equation.<br>$B_{T_1/T_2} = \frac{\ln(R_1) - \ln(R_2)}{1/(T_1 + 273.15) - 1/(T_2 + 273.15)}$ <table border="1"> <thead> <tr> <th></th> <th>T<sub>1</sub></th> <th>T<sub>2</sub></th> </tr> </thead> <tbody> <tr> <td>B<sub>25/50</sub></td> <td>25.0 ±0.1 °C</td> <td>50.0 ±0.1 °C</td> </tr> <tr> <td>B<sub>25/85</sub></td> <td>25.0 ±0.1 °C</td> <td>85.0 ±0.1 °C</td> </tr> </tbody> </table> |                  | T <sub>1</sub> | T <sub>2</sub>         | B <sub>25/50</sub> | 25.0 ±0.1 °C | 50.0 ±0.1 °C   | B <sub>25/85</sub> | 25.0 ±0.1 °C | 85.0 ±0.1 °C  |      |           |            |   |           |            |   |            |            |
|  | T <sub>1</sub>  | T <sub>2</sub>  |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| B <sub>25/50</sub>                             | 25.0 ±0.1 °C  | 50.0 ±0.1 °C  |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| B <sub>25/85</sub>                             | 25.0 ±0.1 °C  | 85.0 ±0.1 °C  |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| Adhesion                                       | The terminal electrode shall be free from peeling or signs of peeling.  | Applied force :<br>Size 0201 : 2 N<br>Size 0402, 0603 : 5 N<br>Duration : 10 s<br><br>Size : 0201, 0402<br><br>Size : 0603<br><br>Unit : mm  |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| Bending Strength                               | There shall be no cracks and other mechanical damage.<br>R <sub>25</sub> change : within ±5 %   | Bending distance : 1 mm<br>Bending speed : 1 mm/s<br><br>Unit : mm  |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| Resistance to Soldering Heat                   | There shall be no cracks and other mechanical damage.<br><table border="1"> <thead> <tr> <th></th> <th>Narrow Tol. type</th> <th>Standard type</th> </tr> </thead> <tbody> <tr> <td>R<sub>25</sub> change</td> <td>: within ±2 %</td> <td>within ±3 %</td> </tr> <tr> <td>B Value change</td> <td>: within ±1 %</td> <td>within ±2 %</td> </tr> </tbody> </table> |   | Narrow Tol. type | Standard type  | R <sub>25</sub> change | : within ±2 %      | within ±3 %  | B Value change | : within ±1 %      | within ±2 %  | Soldering bath method<br>Solder temperature : 270 ±5 °C<br>Dipping period : 3.0 ±0.5 s<br>Preheat condition :<br><table border="1"> <thead> <tr> <th>Step</th> <th>Temp (°C)</th> <th>Period (s)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>80 to 100</td> <td>120 to 180</td> </tr> <tr> <td>2</td> <td>150 to 200</td> <td>120 to 180</td> </tr> </tbody> </table> | Step | Temp (°C) | Period (s) | 1 | 80 to 100 | 120 to 180 | 2 | 150 to 200 | 120 to 180 |
|  | Narrow Tol. type  | Standard type   |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| R <sub>25</sub> change                         | : within ±2 %   | within ±3 %   |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| B Value change                                 | : within ±1 %   | within ±2 %   |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| Step   | Temp (°C)   | Period (s)  |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| 1  | 80 to 100   | 120 to 180  |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| 2  | 150 to 200  | 120 to 180  |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |
| Solderability                                  | More than 75 % of the soldered area of both terminal electrodes shall be covered with fresh solder.   | Soldering bath method<br>Solder temperature : 230 ±5 °C<br>Dipping period : 4 ±1 s<br>Solder : H63A (JIS-Z-3282)  |                  |                |                        |                    |              |                |                    |              |   |      |           |            |   |           |            |   |            |            |

## ■ Specification and Test Method

| Item                | Specification                        |               |  | Test Method  |
|---------------------|--------------------------------------|---------------|--|--|
| Temperature Cycling | Narrow Tol. type                     | Standard type |  | Conditions of one cycle<br>Step 1 : -40 °C, 30±3 min<br>Step 2 : Room temp., 3 min max.<br>Step 3 : 125 °C, 30±3 min.<br>Step 4 : Room temp., 3 min max.<br>Number of cycles: 100 cycles |
|                     | R <sub>25</sub> change : within ±2 % | within ±3 %   |  |  |
|                     | B Value change : within ±1 %         | within ±2 %   |  |  |
| Moisture Resistance | Narrow Tol. type                     | Standard type |  | Temperature : 85 ±2 °C<br>Relative humidity : 85 ±5 %<br>Test period : 1000 +48/0 h  |
|                     | R <sub>25</sub> change : within ±2 % | within ±3 %   |  |  |
|                     | B Value change : within ±1 %         | within ±2 %   |  |  |
| Damp Heat Load      | Narrow Tol. type                     | Standard type |  | Temperature : 85 ±2 °C<br>Relative humidity : 85 ±5 %<br>Applied power : 10 mW<br>Test period : 500 +24/0 h  |
|                     | R <sub>25</sub> change : within ±2 % | within ±3 %   |  |  |
|                     | B Value change : within ±1 %         | within ±2 %   |  |  |
| Cold Resistance     | Narrow Tol. type                     | Standard type |  | Temperature : -40 ±3 °C<br>Test period : 1000 +48/0 h  |
|                     | R <sub>25</sub> change : within ±2 % | within ±3 %   |  |  |
|                     | B Value change : within ±1 %         | within ±2 %   |  |  |
| Dry Heat Resistance | Narrow Tol. type                     | Standard type |  | Temperature : 125 ±3 °C<br>Test period : 1000 +48/0 h  |
|                     | R <sub>25</sub> change : within ±2 % | within ±3 %   |  |  |
|                     | B Value change : within ±1 %         | within ±2 %   |  |  |

## ■ Part Number List of Narrow Tolerance Type (Resistance Tolerance : ±2 %, ±1 %)

### ● 0201(EIA)

| Nominal Resistance at 25 °C | Resistance Tolerance       | B value class code                      |  | G                      | P                      | V                      |
|-----------------------------|----------------------------|---|--|------------------------|------------------------|------------------------|
|                             |                            | Nominal B value<br>*( ) Reference value | B <sub>25/50</sub><br>B <sub>25/85</sub> | (3375 K)<br>3435 K±1 % | 4050 K±1 %<br>(4100 K) | 4700 K±1 %<br>(4750 K) |
| 10 kΩ                       | ±1 % (F)<br>or<br>±2 % (G) |   |  | ERTJZEG103□A           |                        |                        |
| 47 kΩ                       |                            |   |  |                        | ERTJZEP473□            |                        |
| 100 kΩ                      |                            |   |  |                        |                        | ERTJZEV104□            |

□ : Resistance Tolerance Code  
Avoid flow soldering.

### ● 0402(EIA)

| Nominal Resistance at 25 °C | Resistance Tolerance       | B value class code                      |  | G                      | P                      | S                      | V                      |
|-----------------------------|----------------------------|---|--|------------------------|------------------------|------------------------|------------------------|
|                             |                            | Nominal B value<br>*( ) Reference value | B <sub>25/50</sub><br>B <sub>25/85</sub> | (3375 K)<br>3435 K±1 % | 4050 K±1 %<br>(4100 K) | 4330 K±1 %<br>(4390 K) | 4700 K±1 %<br>(4750 K) |
| 10 kΩ                       | ±1 % (F)<br>or<br>±2 % (G) |   |  | ERTJ0EG103□A           |                        |                        |                        |
| 47 kΩ                       |                            |   |  |                        | ERTJ0EP473□            |                        |                        |
| 100 kΩ                      |                            |   |  |                        |                        | ERTJ0ES104□            | ERTJ0EV104□            |

□ : Resistance Tolerance Code  
Avoid flow soldering.

### ● 0603(EIA)

| Nominal Resistance at 25 °C | Resistance Tolerance       | B value class code                      |  | G                      | S                      |
|-----------------------------|----------------------------|---|--|------------------------|------------------------|
|                             |                            | Nominal B value<br>*( ) Reference value | B <sub>25/50</sub><br>B <sub>25/85</sub> | (3375 K)<br>3435 K±1 % | (4330 K)<br>4390 K±1 % |
| 10 kΩ                       | ±1 % (F)<br>or<br>±2 % (G) |   |  | ERTJ1VG103□A           |                        |
| 100 kΩ                      |                            |   |  |                        | ERTJ1VS104□A           |

□ : Resistance Tolerance Code  
Avoid flow soldering.

### ■ Part Number List of Standard Type (Resistance Tolerance : ±5 %, ±3 %)

#### ● 0201(EIA)

| Nominal Resistance at 25 °C | Resistance Tolerance       | B value class code                      |  | G                      | P                      | T                      | V                      |
|-----------------------------|----------------------------|---|--|------------------------|------------------------|------------------------|------------------------|
|                             |                            | Nominal B value<br>*( ) Reference value | B <sub>25/50</sub><br>B <sub>25/85</sub> | (3375 K)<br>3435 K±2 % | 4050 K±3 %<br>(4100 K) | 4500 K±2 %<br>(4450 K) | 4700 K±2 %<br>(4750 K) |
| 2.0 kΩ                      | ±3 % (H)<br>or<br>±5 % (J) |   |  |                        |                        | ERTJZET202□            |                        |
| 3.0 kΩ                      |                            |   |  |                        |                        | ERTJZET302□            |                        |
| 4.7 kΩ                      |                            |   |  |                        |                        | ERTJZET472□            |                        |
| 10 kΩ                       |                            |   |  |                        | ERTJZEG103□A           |                        |                        |
| 47 kΩ                       |                            |   |  |                        |                        | ERTJZEP473□            |                        |
| 100 kΩ                      |                            |   |  |                        |                        |                        | ERTJZEV104□            |

□ : Resistance Tolerance Code  
Avoid flow soldering.

#### ● 0402(EIA)

| Nominal Resistance at 25 °C | Resistance Tolerance       | B value class code                      |  | A                      |                        |
|-----------------------------|----------------------------|---|--|------------------------|------------------------|
|                             |                            | Nominal B value<br>*( ) Reference value | B <sub>25/50</sub><br>B <sub>25/85</sub> | 2750 K±3 %<br>(2700 K) | 2800 K±3 %<br>(2750 K) |
| 22 Ω                        | ±3 % (H)<br>or<br>±5 % (J) |   |  | ERTJ0EA220□            |                        |
| 33 Ω                        |                            |   |  | ERTJ0EA330□            |                        |
| 40 Ω                        |                            |   |  | ERTJ0EA400□            |                        |
| 47 Ω                        |                            |   |  | ERTJ0EA470□            |                        |
| 68 Ω                        |                            |   |  |                        | ERTJ0EA680□            |
| 100 Ω                       |                            |   |  |                        | ERTJ0EA101□            |
| 150 Ω                       |                            |   |  | ERTJ0EA151□            |                        |

| Nominal Resistance at 25 °C | Resistance Tolerance       | B value class code                      |  | G                      | M                      | P                      | R                      |
|-----------------------------|----------------------------|---|--|------------------------|------------------------|------------------------|------------------------|
|                             |                            | Nominal B value<br>*( ) Reference value | B <sub>25/50</sub><br>B <sub>25/85</sub> | (3375 K)<br>3435 K±1 % | 3900 K±2 %<br>(3970 K) | 4050 K±2 %<br>(4100 K) | 4250 K±2 %<br>(4300 K) |
| 3.3 kΩ                      | ±3 % (H)<br>or<br>±5 % (J) |   |  |                        |                        |                        | ERTJ0ER332□            |
| 4.7 kΩ                      |                            |   |  |                        |                        |                        | ERTJ0ER472□            |
| 6.8 kΩ                      |                            |   |  |                        |                        |                        | ERTJ0ER682□            |
| 10 kΩ                       |                            |   |  | ERTJ0EG103□A           | ERTJ0EM103□            |                        | ERTJ0ER103□            |
| 15 kΩ                       |                            |   |  |                        |                        |                        | ERTJ0ER153□            |
| 22 kΩ                       |                            |   |  |                        |                        |                        | ERTJ0ER223□            |
| 33 kΩ                       |                            |   |  |                        |                        |                        | ERTJ0EP333□            |
| 47 kΩ                       |                            |   |  |                        |                        |                        | ERTJ0EP473□            |
| 100 kΩ                      |                            |   |  |                        |                        |                        | ERTJ0EP104□            |

| Nominal Resistance at 25 °C | Resistance Tolerance       | B value class code                      |  | S                      | T                              | V                      |
|-----------------------------|----------------------------|---|--|------------------------|--------------------------------|------------------------|
|                             |                            | Nominal B value<br>*( ) Reference value | B <sub>25/50</sub><br>B <sub>25/85</sub> | 4330 K±2 %<br>(4390 K) | 4500 K±2 %<br>(4450 K, 4580 K) | 4700 K±2 %<br>(4750 K) |
| 1.0 kΩ                      | ±3 % (H)<br>or<br>±5 % (J) |   |  |                        | ERTJ0ET102□                    |                        |
| 1.5 kΩ                      |                            |   |  |                        | ERTJ0ET152□                    |                        |
| 2.0 kΩ                      |                            |   |  |                        | ERTJ0ET202□                    |                        |
| 2.2 kΩ                      |                            |   |  |                        | ERTJ0ET222□                    |                        |
| 3.0 kΩ                      |                            |   |  |                        | ERTJ0ET302□                    |                        |
| 3.3 kΩ                      |                            |   |  |                        | ERTJ0ET332□                    |                        |
| 4.7 kΩ                      |                            |   |  |                        | ERTJ0ET472□                    |                        |
| 47 kΩ                       |                            |   |  |                        |                                | ERTJ0EV473□            |
| 68 kΩ                       |                            |   |  |                        |                                | ERTJ0EV683□            |
| 100 kΩ                      |                            |   |  | ERTJ0ES104□            | ERTJ0ET104□                    | ERTJ0EV104□            |
| 150 kΩ                      |                            |   |  |                        | ERTJ0ET154□                    | ERTJ0EV154□            |
| 220 kΩ                      |                            |   |  |                        |                                | ERTJ0EV224□            |
| 330 kΩ                      |                            |   |  |                        |                                | ERTJ0EV334□            |
| 470 kΩ                      |                            |   |  |                        |                                | ERTJ0EV474□            |

□ : Resistance Tolerance Code  
Avoid flow soldering.

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.

● 0603(EIA)

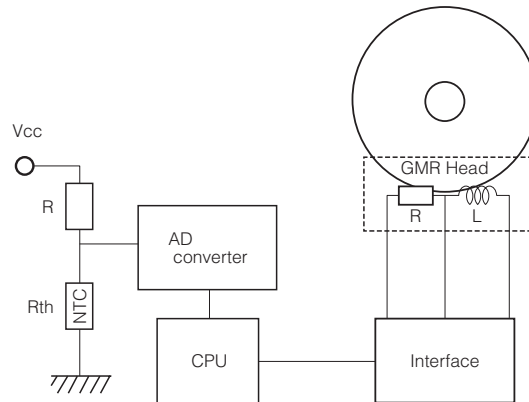
| Nominal Resistance at 25 °C | Resistance Tolerance       | B value class code                      |  | A                      |                        | G                      | P                      |
|-----------------------------|----------------------------|---|--|------------------------|------------------------|------------------------|------------------------|
|                             |                            | Nominal B value<br>*( ) Reference value | B <sub>25/50</sub><br>B <sub>25/85</sub> | 2750 K±3 %<br>(2700 K) | 2800 K±3 %<br>(2750 K) | (3375 K)<br>3435 K±1 % | 4050 K±3 %<br>(4100 K) |
| 22 Ω                        | ±3 % (H)<br>or<br>±5 % (J) |   |  | ERTJ1VA220□            |                        |                        |                        |
| 33 Ω                        |                            |   |  | ERTJ1VA330□            |                        |                        |                        |
| 40 Ω                        |                            |   |  |                        | ERTJ1VA400□            |                        |                        |
| 47 Ω                        |                            |   |  |                        | ERTJ1VA470□            |                        |                        |
| 68 Ω                        |                            |   |  |                        | ERTJ1VA680□            |                        |                        |
| 100 Ω                       |                            |   |  |                        | ERTJ1VA101□            |                        |                        |
| 10 kΩ                       |                            |   |  |                        |                        | ERTJ1VG103□A           |                        |
| 47 kΩ                       |                            |   |  |                        |                        |                        | ERTJ1VP473□            |

| Nominal Resistance at 25 °C | Resistance Tolerance       | B value class code                      |  | R                      | S                      | T                      | V                      |
|-----------------------------|----------------------------|---|--|------------------------|------------------------|------------------------|------------------------|
|                             |                            | Nominal B value<br>*( ) Reference value | B <sub>25/50</sub><br>B <sub>25/85</sub> | 4250 K±2 %<br>(4300 K) | (4330 K)<br>4390 K±1 % | 4500 K±2 %<br>(4450 K) | 4700 K±2 %<br>(4750 K) |
| 1.0 kΩ                      | ±3 % (H)<br>or<br>±5 % (J) |   |  |                        |                        | ERTJ1VT102□            |                        |
| 1.5 kΩ                      |                            |   |  |                        |                        | ERTJ1VT152□            |                        |
| 2.0 kΩ                      |                            |   |  |                        |                        | ERTJ1VT202□            |                        |
| 2.2 kΩ                      |                            |   |  |                        |                        | ERTJ1VT222□            |                        |
| 3.0 kΩ                      |                            |   |  |                        |                        | ERTJ1VT302□            |                        |
| 3.3 kΩ                      |                            |   |  |                        | ERTJ1VR332□            |                        | ERTJ1VT332□            |
| 4.7 kΩ                      |                            |   |  |                        | ERTJ1VR472□            |                        | ERTJ1VT472□            |
| 6.8 kΩ                      |                            |   |  |                        | ERTJ1VR682□            |                        |                        |
| 10 kΩ                       |                            |   |  |                        | ERTJ1VR103□            |                        |                        |
| 15 kΩ                       |                            |   |  |                        | ERTJ1VR153□            |                        |                        |
| 22 kΩ                       |                            |   |  |                        | ERTJ1VR223□            |                        |                        |
| 33 kΩ                       |                            |   |  |                        | ERTJ1VR333□            |                        |                        |
| 47 kΩ                       |                            |   |  |                        | ERTJ1VR473□            |                        | ERTJ1VV473□            |
| 68 kΩ                       |                            |   |  |                        | ERTJ1VR683□            |                        | ERTJ1VV683□            |
| 100 kΩ                      |                            |   |  |                        |                        | ERTJ1VS104□A           | ERTJ1VV104□            |
| 150 kΩ                      |                            |   |  |                        |                        |                        | ERTJ1VV154□            |

□ : Resistance Tolerance Code  
Avoid flow soldering.

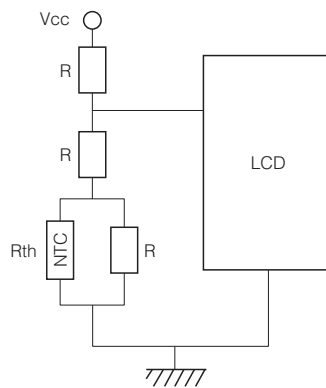
- Typical Application
- Temperature Detection

### Writing current control of HDD



- Temperature Compensation (Pseudo-linearization)

### Contrast level control of LCD



- Temperature Compensation (RF circuit)

### Temperature compensation of TCXO

