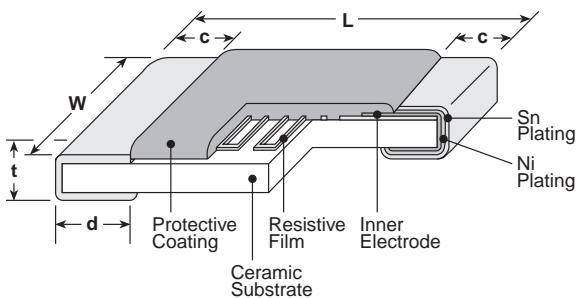


## features

- High reliability with  $\Delta R$  of  $\pm 0.1\% \sim \pm 0.25\%$  in the long-term reliability test
- Endurance at 85°C (1,000h):  $\Delta R$  of  $\pm 0.1\%$  in Standard Mode
- Operating temperature range  $\sim 155^\circ\text{C}$
- Rated ambient temperature: 85°C
- High precision type  $\pm 0.05\%$  is also available
- Low current noise
- Improved moisture resistance by high humidity protective coating
- Suitable for control circuits in various industrial equipment
- Sulfur resistance verified according to ASTM B 809-95
- Products meet EU RoHS requirements
- AEC-Q200 Qualified

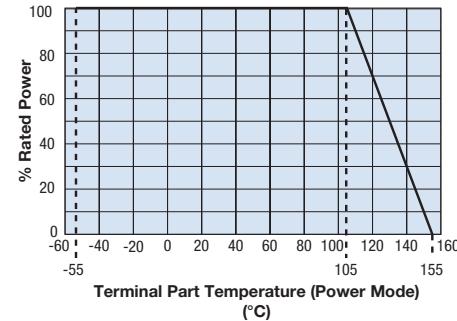
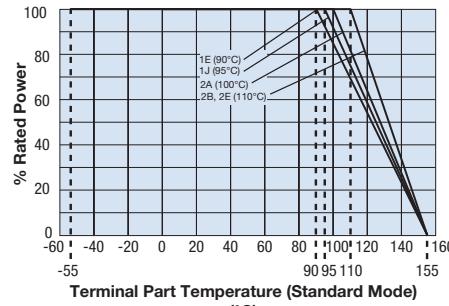
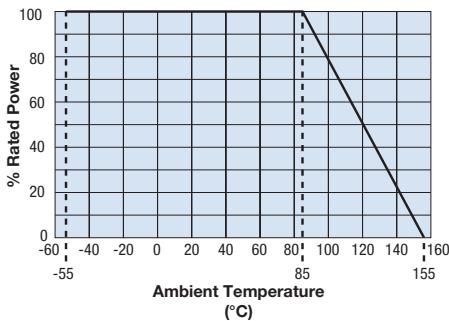


## dimensions and construction



| Type<br>(Inch Size Code) | Dimensions inches (mm)  |  |   |   |   |
|--------------------------|---|--|---|---|---|
|                          | L   | W  | c   | d   | t   |
| 1E<br>(0402)             | .039 <sup>+.004</sup> <sub>-.002</sub><br>(1.0 <sup>+.1</sup> <sub>-.05</sub> ) | .020 <sup>+.002</sup> <sub>-.002</sub><br>(0.5 <sup>+.05</sup> <sub>-.05</sub> ) | .010 <sup>+.004</sup> <sub>-.004</sub><br>(0.25 <sup>+.05</sup> <sub>-.05</sub> ) | .010 <sup>+.002</sup> <sub>-.004</sub><br>(0.25 <sup>+.05</sup> <sub>-.05</sub> ) | .014 <sup>+.002</sup> <sub>-.002</sub><br>(0.35 <sup>+.05</sup> <sub>-.05</sub> ) |
| 1J<br>(0603)             | .063 <sup>+.008</sup> <sub>-.008</sub><br>(1.6 <sup>+.2</sup> <sub>-.2</sub> )  | .031 <sup>+.004</sup> <sub>-.004</sub><br>(0.8 <sup>+.1</sup> <sub>-.1</sub> )   | .012 <sup>+.004</sup> <sub>-.004</sub><br>(0.3 <sup>+.1</sup> <sub>-.1</sub> )    | .012 <sup>+.004</sup> <sub>-.004</sub><br>(0.3 <sup>+.1</sup> <sub>-.1</sub> )    | .018 <sup>+.004</sup> <sub>-.004</sub><br>(0.45 <sup>+.1</sup> <sub>-.1</sub> )   |
| 2A<br>(0805)             | .079 <sup>+.008</sup> <sub>-.008</sub><br>(2.0 <sup>+.2</sup> <sub>-.2</sub> )  | .049 <sup>+.008</sup> <sub>-.008</sub><br>(1.25 <sup>+.2</sup> <sub>-.2</sub> )  | .016 <sup>+.008</sup> <sub>-.008</sub><br>(0.4 <sup>+.2</sup> <sub>-.2</sub> )    | .012 <sup>+.004</sup> <sub>-.004</sub><br>(0.3 <sup>+.1</sup> <sub>-.1</sub> )    | .02 <sup>+.004</sup> <sub>-.004</sub><br>(0.5 <sup>+.1</sup> <sub>-.1</sub> )     |
| 2B<br>(1206)             | .126 <sup>+.008</sup> <sub>-.008</sub><br>(3.2 <sup>+.2</sup> <sub>-.2</sub> )  | .063 <sup>+.008</sup> <sub>-.008</sub><br>(1.6 <sup>+.2</sup> <sub>-.2</sub> )   | .02 <sup>+.012</sup> <sub>-.012</sub><br>(0.5 <sup>+.3</sup> <sub>-.3</sub> )     | .016 <sup>+.008</sup> <sub>-.008</sub><br>(0.4 <sup>+.1</sup> <sub>-.1</sub> )    | .024 <sup>+.004</sup> <sub>-.004</sub><br>(0.6 <sup>+.1</sup> <sub>-.1</sub> )    |
| 2E<br>(1210)             | .126 <sup>+.008</sup> <sub>-.008</sub><br>(3.2 <sup>+.2</sup> <sub>-.2</sub> )  | .098 <sup>+.008</sup> <sub>-.008</sub><br>(2.5 <sup>+.2</sup> <sub>-.2</sub> )   | .02 <sup>+.012</sup> <sub>-.012</sub><br>(0.5 <sup>+.3</sup> <sub>-.3</sub> )     | .016 <sup>+.008</sup> <sub>-.008</sub><br>(0.4 <sup>+.1</sup> <sub>-.1</sub> )    | .024 <sup>+.004</sup> <sub>-.004</sub><br>(0.6 <sup>+.1</sup> <sub>-.1</sub> )    |

## Derating Curve



For resistors operated at an ambient temperature of 85°C or above, a power rating shall be derated in accordance with the above derating curve.

When the terminal part temperature of the resistor exceeds the rated terminal part temperature shown above, the power shall be derated according to the derating curve. Please refer to "Introduction of the derating curves based on the terminal part temperature" on the beginning of our catalog before use.

## ordering information

| RN73R | 2B   | T                    | TD   | 1002   | B  | 25                          |
|-------|------|----------------------|--|--|--|-----------------------------|
| Type  | Size | Termination Material | Packaging  | Nominal Resistance   | Resistance Tolerance   | T.C.R. (ppm/°C)             |
| 1E    | 1E   | T: Sn                | TP: 2mm pitch punched paper<br>TD: 4mm pitch punched paper<br>TE: 4mm pitch plastic embossed<br>For further information on packaging, please refer to Appendix A | 3 significant figures + 1 multiplier<br>"R" indicates decimal on value $< 100\Omega$ | A: $\pm 0.05\%$<br>B: $\pm 0.1\%$<br>C: $\pm 0.25\%$<br>D: $\pm 0.5\%$<br>F: $\pm 1.0\%$ | 05<br>10<br>25<br>50<br>100 |
| 1J    |      |                      |  |  |  |                             |
| 2A    |      |                      |  |  |  |                             |
| 2B    |      |                      |  |  |  |                             |
| 2E    |      |                      |  |  |  |                             |

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

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**applications and ratings**

| Part Designation                    | Power Rating @ 85°C | Rated Ambient Temp. | Rated Terminal Part Temp. | T.C.R. (x10 <sup>-3</sup> /K) | Resistance Range (Ω)<br>E-24, E-96, E-192* |          |           |          |          | Maximum Working Voltage | Maximum Overload Voltage |
|-------------------------------------|---------------------|---------------------|---------------------------|-------------------------------|--|----------|-----------|----------|----------|-------------------------|--------------------------|
|                                     |                     |                     |                           |                               | (A±0.05%)                                  | (B±0.1%) | (C±0.25%) | (D±0.5%) | (F±1.0%) |                         |                          |
| RN73R1E<br>(0402)<br><b>NEW&gt;</b> | 0.063W              | 85°C                | 90°C                      | ±10                           | —  | 47~10k   | 47~10k    | 47~10k   | 47~10k   | 50V                     | 100V                     |
|                                     |                     |                     |                           | ±25                           | —  | 47~300k  | 47~300k   | 10~300k  | 10~300k  |                         |                          |
|                                     |                     |                     |                           | ±50                           | —  | 47~300k  | 47~300k   | 10~300k  | 10~300k  |                         |                          |
|                                     | 0.1W <sup>†</sup>   | 85°C                | 105°C                     | ±10                           | —  | 47~10k   | 47~10k    | 47~10k   | 47~10k   | 50V                     | 100V                     |
|                                     |                     |                     |                           | ±25                           | —  | 47~300k  | 47~300k   | 47~300k  | 47~300k  |                         |                          |
|                                     |                     |                     |                           | ±50                           | —  | 47~300k  | 47~300k   | 47~300k  | 47~300k  |                         |                          |
| RN73R1J<br>(0603)<br><b>NEW&gt;</b> | 0.1W                | 85°C                | 95°C                      | ±5                            | 100~59k                                    | 100~59k  | —         | —        | —        | 75V                     | 150V                     |
|                                     |                     |                     |                           | ±10                           | 47~59k                                     | 47~59k   | 47~59k    | 47~59k   | 47~59k   |                         |                          |
|                                     |                     |                     |                           | ±25                           | 47~59k                                     | 15~1M    | 15~1M     | 10~1M    | 10~1M    |                         |                          |
|                                     |                     |                     |                           | ±50                           | —  | 15~1M    | 15~1M     | 10~1M    | 10~1M    |                         |                          |
|                                     |                     |                     |                           | ±100                          | —  | —        | —         | 10~1M    | 10~1M    |                         |                          |
|                                     | 0.125W <sup>†</sup> | 85°C                | 105°C                     | ±5                            | 100~59k                                    | 100~59k  | —         | —        | —        | 75V                     | 150V                     |
|                                     |                     |                     |                           | ±10                           | 47~59k                                     | 47~59k   | 47~59k    | 47~59k   | 47~59k   |                         |                          |
|                                     |                     |                     |                           | ±25                           | 47~59k                                     | 47~1M    | 47~1M     | 47~1M    | 47~1M    |                         |                          |
|                                     |                     |                     |                           | ±50                           | —  | 47~1M    | 47~1M     | 47~1M    | 47~1M    |                         |                          |
|                                     |                     |                     |                           | ±100                          | —  | —        | —         | 47~1M    | 47~1M    |                         |                          |
| RN73R2A<br>(0805)<br><b>NEW&gt;</b> | 0.125W              | 85°C                | 100°C                     | ±5                            | 100~100k                                   | 100~100k | —         | —        | —        | 150V                    | 300V                     |
|                                     |                     |                     |                           | ±10                           | 47~100k                                    | 47~100k  | 47~100k   | 47~100k  | 47~100k  |                         |                          |
|                                     |                     |                     |                           | ±25                           | 47~100k                                    | 15~1.5M  | 15~1.5M   | 10~1.5M  | 10~1.5M  |                         |                          |
|                                     |                     |                     |                           | ±50                           | —  | 15~1.5M  | 15~1.5M   | 10~1.5M  | 10~1.5M  |                         |                          |
|                                     |                     |                     |                           | ±100                          | —  | —        | —         | 10~1.5M  | 10~1.5M  |                         |                          |
|                                     | 0.25W <sup>†</sup>  | 85°C                | 105°C                     | ±5                            | 100~100k                                   | 100~100k | —         | —        | —        | 150V                    | 300V                     |
|                                     |                     |                     |                           | ±10                           | 47~100k                                    | 47~100k  | 47~100k   | 47~100k  | 47~100k  |                         |                          |
|                                     |                     |                     |                           | ±25                           | 47~100k                                    | 47~1.5M  | 47~1.5M   | 47~1.5M  | 47~1.5M  |                         |                          |
|                                     |                     |                     |                           | ±50                           | —  | 47~1.5M  | 47~1.5M   | 47~1.5M  | 47~1.5M  |                         |                          |
|                                     |                     |                     |                           | ±100                          | —  | —        | —         | 47~1.5M  | 47~1.5M  |                         |                          |
| RN73R2B<br>(1206)<br><b>NEW&gt;</b> | 0.25W               | 85°C                | 110°C                     | ±5                            | 100~300k                                   | 100~300k | —         | —        | —        | 200V                    | 400V                     |
|                                     |                     |                     |                           | ±10                           | 47~300k                                    | 47~300k  | 47~300k   | 47~300k  | 47~300k  |                         |                          |
|                                     |                     |                     |                           | ±25                           | 47~300k                                    | 15~1M    | 15~1M     | 10~1M    | 10~1M    |                         |                          |
|                                     |                     |                     |                           | ±50                           | —  | 15~1M    | 15~1M     | 10~1M    | 10~1M    |                         |                          |
|                                     | 0.4W <sup>†</sup>   | 85°C                | 105°C                     | ±5                            | 100~300k                                   | 100~300k | —         | —        | —        | 200V                    | 400V                     |
|                                     |                     |                     |                           | ±10                           | 47~300k                                    | 47~300k  | 47~300k   | 47~300k  | 47~300k  |                         |                          |
|                                     |                     |                     |                           | ±25                           | 47~300k                                    | 47~1M    | 47~1M     | 47~1M    | 47~1M    |                         |                          |
|                                     |                     |                     |                           | ±50                           | —  | 47~1M    | 47~1M     | 47~1M    | 47~1M    |                         |                          |
| RN73R2E<br>(1210)<br><b>NEW&gt;</b> | 0.25W               | 85°C                | 110°C                     | ±10                           | 100~510k                                   | 100~510k | 100~510k  | 100~510k | 100~510k | 200V                    | 400V                     |
|                                     |                     |                     |                           | ±25                           | 51~510k                                    | 15~1M    | 15~1M     | 10~1M    | 10~1M    |                         |                          |
|                                     |                     |                     |                           | ±50                           | —  | 15~1M    | 15~1M     | 10~1M    | 10~1M    |                         |                          |
|                                     | 0.5W <sup>†</sup>   | 85°C                | 105°C                     | ±10                           | 100~510k                                   | 100~510k | 100~510k  | 100~510k | 100~510k | 200V                    | 400V                     |
|                                     |                     |                     |                           | ±25                           | 51~510k                                    | 47~1M    | 47~1M     | 47~1M    | 47~1M    |                         |                          |
|                                     |                     |                     |                           | ±50                           | —  | 47~1M    | 47~1M     | 47~1M    | 47~1M    |                         |                          |

 Operating Temperature: -55°C to +155°C. Rated voltage =  $\sqrt{\text{Power rating} \times \text{resistance value or max. working voltage}}$ , whichever is lower.

At the maximum power in power mode, terminal temperature must be at or below the rated terminal part temperature.

\* No marking on E-192 values. † See the Performance Characteristics table below for use of the resistor in Power Mode

**environmental applications - Performance Characteristics**

| Parameter                   | Requirement $\Delta R \pm (\% + 0.05\Omega)$<br>Limit | Typical | Test Method  |
|-----------------------------|---|---------|--|
| Resistance                  | Within specified tolerance                            | —       | 25°C   |
| T.C.R.                      | Within specified T.C.R.                               | —       | +25°C / +125°C: T.C.R. +5 (x10 <sup>-3</sup> /K); +25°C / -55°C and +25°C / +155°C: others   |
| Overload (Short time)       | Standard Mode: ±0.05%                                 | ±0.01%  | Rated Voltage x 2.5 or Max. overload voltage, whichever is less, for 5 seconds   |
|                             | Power Mode: ±0.05%                                    | ±0.01%  | 1E, 1J, 2E: Rated voltage x 2.0 or Max overload voltage, whichever is less, for 5 seconds<br>2A, 2B, 2E: Rated voltage x 1.5 or Max overload voltage, whichever is less, for 5 seconds |
| Resistance to Solder Heat   | ±0.05%**  | ±0.01%  | 260°C ± 5°C, 10 seconds ± 1 second   |
| Rapid Change of Temperature | ±0.1%**   | ±0.04%  | 1E, 1J, 2A: -55°C (30 minutes) / +155°C (30 minutes), 1000 cycles 2B, 2E: -55°C (30 minutes), +155°C (30 minutes), 500 cycles  |
| Moisture Resistance         | Standard Mode: ±0.25%**                               | ±0.07%  | 85°C ± 2°C, 85% ± 5%RH, 1000 hours, Rated voltage or Max working voltage, whichever is less  |
|                             | Power Mode: ±0.25%**                                  | ±0.06%  | 85°C ± 2°C, 85% ± 5%RH, 1000 hours, Rated power x 0.1 or Max working voltage, whichever is less  |
| Endurance at 85°C           | Standard Mode: 0.1%                                   | ±0.04%  | Rated terminal part temp. ± 2°C or Rated ambient temp. 85°C ± 2°C, 1000 hours 1.5 hr ON, 0.5 hr OFF cycle  |
|                             | Power Mode: ±0.2%                                     | ±0.05%  | Rated terminal part temp. ± 2°C or Rated ambient temp. 85°C ± 2°C, 1000 hours 1.5 hr ON, 0.5 hr OFF cycle  |
| High Temperature Exposure   | ±0.25%**  | ±0.10%  | +155°C, 1000 hours   |

\*\* Depends on resistance value, please contact KOA Speer for details.

- The properly and electrostatically measured taping materials are used for the components, but attention should be paid to the fact that there is some danger the parts absorb on the top tapes to cause a failure in the mounting and the parts are destructed by static electricity (1J, 2A, 2B, 2E: 1kV and more; 1E: 0.5kV and more at Human Body Model 100PF, 1.5kΩ) to change the resistance in the conditions of an excessive dryness or after the parts are given vibration for a long time as they are packaged on the tapes. Similarly, care should be given not to apply the excessive static electricity when mounting on the boards.
- Ionic impurities such as flux etc. that are attached to these products or those mounted onto a PCB, negatively affect their moisture resistance, corrosion resistance, etc. The flux may contain ionic substances like chlorine, acid, etc. while perspiration and saliva include ionic impurities like sodium (Na<sup>+</sup>), chlorine (Cl<sup>-</sup>) etc. Therefore these kinds of ionic substances may induce electrical corrosion when they invade into the products. Either thorough washing or using RMA solder and flux are necessary since lead free solder contains ionic substances. Washing process is needed, before putting on moisture proof material in order to prevent electrical corrosion.
- The upper electrodes could be peeled off when a heat-resistant masking tape is attached to the mounted chip resistors and then detached from them. It is confirmed that the adhesiveness gets stronger due to the exposure to heat under mounting. Accordingly, we recommend the use of masking tape be refrained. If the use of heat-resistant masking tape is unavoidable, please make sure that the adhesives on the tape do not directly come in contact with the product.
- When high-pressure shower cleaning is implemented, there is a possibility of exfoliation of the top electrodes caused by the water pressure stress so please avoid the implementation.
- If the implementation is unavoidable, then please evaluate the products beforehand.

 For Surface Temperature Rise Graph see Environmental Applications. Additional environmental applications can also be found at [www.koaspeer.com](http://www.koaspeer.com)

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

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