



# Metal thin film chip resistors (Ultra-precision)

■ RG series (This series now includes the former RGH series.)

## Features

- Ultimate chip resistors: the result of all of our thin film technology expertise including inorganic passivation
- Resistance drift: less than +/-0.1% after 10000 hour accelerated reliability test
- +/-0.02% of resistance tolerance and +/-5ppm/°C of temperature coefficient of resistance
- Excellent tolerance to power surges

## Applications

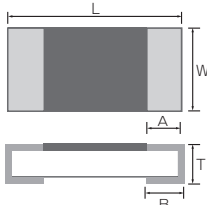
- Any applications that require precision resistors such as automotive electronics, industrial test and measurement equipment, and consumer electronics

## Specifications

\* Standard stock item: E-24 series with TCR P, Q, and R grades, as well as tolerance D and B grades. Other E-24 grades and E-96 series are made to order

unit : mm

### Dimensions



| Dimension (inch) | RG1005 (0402)<br><small>OLD:RGH1005 included</small> | RG1608 (0603)<br><small>OLD:RGH1608 included</small> | RG2012 (0805)<br><small>OLD:RGH2012 included</small> | RG3216 (1206) |
|------------------|--|--|--|---------------|
| L                | 1.0±0.05   | 1.6±0.2  | 2.0±0.2  | 3.2±0.2       |
| W                | 0.5±0.05   | 0.8±0.2  | 1.25±0.2   | 1.6±0.2       |
| A                | 0.2±0.10   | 0.3±0.2  | 0.4±0.2  | 0.5±0.25      |
| B                | 0.25±0.05  | 0.3±0.2  | 0.4±0.2  | 0.5±0.2       |
| T                | 0.35±0.05  | 0.4±0.1  | 0.4±0.1  | 0.4±0.1       |

**NOTE** Obsolete : RGH1005 (0402) RGH:1608-2C (0603) RGH2012 (0805)  
Alternative P/N : RG1005 (0402) RG1608(0603) RG2012 (0805)

### Electrical characteristics

| Series name                                    |                           | RG1005                  |         |           |         | RG1608                  |         |           |           |          |          |
|--|---------------------------|-------------------------|---------|-----------|---------|-------------------------|---------|-----------|-----------|----------|----------|
| Rated power*1                                  | High power application    | 1/8W (OLD : RGH1005-2B) |         |           |         | 1/6W (OLD : RGH1608-2C) |         |           |           |          |          |
|  | Regular power application | 1/16W                   |         |           |         | 1/10W                   |         |           |           |          |          |
|  | High precision            | 1/32W                   |         |           |         | 1/16W                   |         |           |           |          |          |
| E series offered                               |                           | E-24, E-96              |         |           |         |                         |         |           |           |          |          |
| Resistance range (Ω)                           |                           | 10~46.4                 | 47~97.6 | 100~2.94k | 3k~100k | 10~46.4                 | 47~97.6 | 100~4.99k | 5.1k~270k | 274~332k | 340~360k |
| Resistance tolerance (%)                       | ±0.02% (P)                | —                       | —       | ○         | —       | —                       | —       | ○         | —         | —        | —        |
|  | ±0.05% (W)                | —                       | ○       | ○         | ○       | —                       | ○       | ○         | ○         | —        | —        |
|  | ±0.1% (B)                 | —                       | ○       | ○         | ○       | —                       | ○       | ○         | ○         | ○        | —        |
|  | ±0.25% (C)                | —                       | ○       | ○         | ○       | —                       | ○       | ○         | ○         | ○        | —        |
|  | ±0.5% (D)                 | ○                       | ○       | ○         | ○       | ○                       | ○       | ○         | ○         | ○        | ○        |
| Temperature coefficient of resistance (ppm/°C) | ±5 (V)                    | —                       | —       | ○         | —       | —                       | —       | ○         | —         | —        | —        |
|  | ±10 (N)                   | —                       | ○       | ○         | ○       | —                       | ○       | ○         | ○         | —        | —        |
|  | ±25 (P)                   | —                       | ○       | ○         | ○       | —                       | ○       | ○         | ○         | ○        | ○        |
|  | ±50 (Q)                   | —                       | —       | —         | —       | ○                       | —       | —         | —         | —        | —        |
|  | ±100 (R)                  | ○                       | —       | —         | —       | —                       | —       | —         | —         | —        | —        |
| Maximum voltage                                |                           | 25V                     |         |           |         | 75V                     |         |           |           |          |          |
| Operating temperature                          |                           | -55°C~155°C             |         |           |         | -55°C~155°C             |         |           |           |          |          |
| Packaging                                      | 5,000pcs                  | CodeT5                  |         |           |         | CodeT5                  |         |           |           |          |          |
|  | 10,000pcs                 | CodeT10                 |         |           |         | —                       |         |           |           |          |          |

| Series name                                    |                           | RG2012                  |         |         |            | RG3216      |         |         |           |        |
|--|---------------------------|-------------------------|---------|---------|------------|-------------|---------|---------|-----------|--------|
| Rated power*1                                  | High power application    | 1/4W (OLD : RGH2012-2E) |         |         |            | —           |         |         |           |        |
|  | Regular power application | 1/8W                    |         |         |            | 1/4W        |         |         |           |        |
|  | High precision            | 1/10W                   |         |         |            | 1/8W        |         |         |           |        |
| E series offered                               |                           | E-24, E-96              |         |         |            |             |         |         |           |        |
| Resistance range (Ω)                           |                           | 10~46.4                 | 47~97.6 | 100~10k | 10.2k~475k | 487k~1M     | 10~46.4 | 47~97.6 | 100~33.2k | 34k~1M |
| Resistance tolerance (%)                       | ±0.02% (P)                | —                       | —       | ○       | —          | —           | —       | —       | ○         | —      |
|  | ±0.05% (W)                | —                       | ○       | ○       | ○          | —           | —       | ○       | ○         | ○      |
|  | ±0.1% (B)                 | —                       | ○       | ○       | ○          | ○           | —       | ○       | ○         | ○      |
|  | ±0.25% (C)                | —                       | ○       | ○       | ○          | ○           | —       | ○       | ○         | ○      |
|  | ±0.5% (D)                 | ○                       | ○       | ○       | ○          | ○           | ○       | ○       | ○         | ○      |
| Temperature coefficient of resistance (ppm/°C) | ±5 (V)                    | —                       | —       | ○       | —          | —           | —       | —       | ○         | —      |
|  | ±10 (N)                   | —                       | ○       | ○       | ○          | —           | —       | ○       | ○         | ○      |
|  | ±25 (P)                   | —                       | ○       | ○       | ○          | ○           | —       | ○       | ○         | ○      |
|  | ±50 (Q)                   | —                       | —       | —       | —          | —           | ○       | —       | —         | —      |
|  | ±100 (R)                  | ○                       | —       | —       | —          | —           | ○       | —       | —         | —      |
| Maximum voltage                                |                           | 100V                    |         |         |            | 150V        |         |         |           |        |
| Operating temperature                          |                           | -55°C~155°C             |         |         |            | -55°C~155°C |         |         |           |        |
| Packaging                                      | 5,000pcs                  | CodeT5                  |         |         |            | CodeT5      |         |         |           |        |

\*1 Depending on customer's reliability requirements, power rating between high power and regular power can be selected.  
· Contact us for RG3225 with 1/2W rated power.

Thin film surface mount resistors

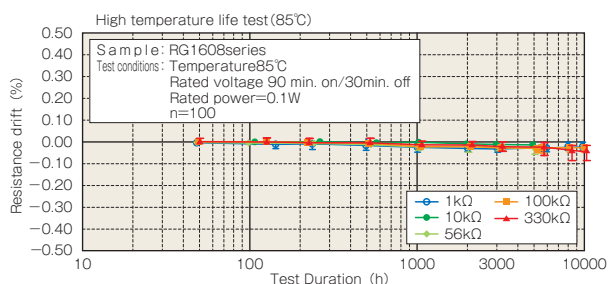
RG series (This series now includes the former RGH series.)

## Reliability characteristics

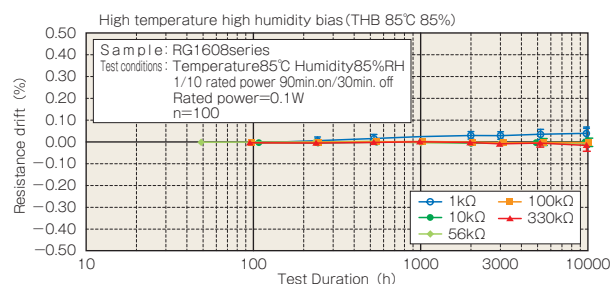
| Item                      | Test Method  | Specification: drift limits for each power rating |        |         |        |      |       | (Typical) |
|---------------------------|--|---|--------|---------|--------|------|-------|-----------|
|                           |  | Low   |        | Regular |        | High |       |           |
|                           |  | ≤47Ω  | ≥47Ω   | ≤47Ω    | ≥47Ω   | ≤47Ω | ≥47Ω  |           |
| Short time Overload       | Applied voltage : 2.5Xrated voltage or 2 X Maximum operating voltage which ever is less test duration: 5 seconds                       | ±0.1%   | ±0.05% | ±0.1%   | ±0.05% | -    | ±0.1% | ±(0.01%)  |
| Load Life                 | Test Temperature : 85°C Applied voltage: rated voltage<br>Test period : repeat 1000 cycle as follow : 90 min./30 min. off cycled       | ±0.25%  | ±0.1%  | ±0.5%   | ±0.25% | -    | ±0.5% | ±(0.01%)  |
| Moisture load life        | Test condition : 85°C 85% RH Applied power: 1/10 rated Power<br>Test period : repeat 1000 cycle as follow : 90 min./30 min. off cycled | ±0.25%  | ±0.1%  | ±0.5%   | ±0.25% | -    | ±0.5% | ±(0.05%)  |
| Temperature Cycle         | Repeat 1000 cycle as follow :<br>-55°C (30 min.)/Room Temp.(2 min.) / +125°C (30min.)/Room Temp.(2min.)                                | ±0.25%  | ±0.1%  | ±0.25%  | ±0.1%  | -    | ±0.1% | ±(0.01%)  |
| High temperature Exposure | +155°C for 1000 hours with no load   | ±0.25%  | ±0.1%  | ±0.25%  | ±0.1%  | -    | ±0.1% | ±(0.01%)  |

## 10000 hour reliability test data

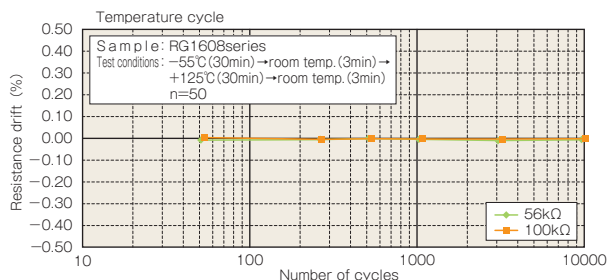
### Life test



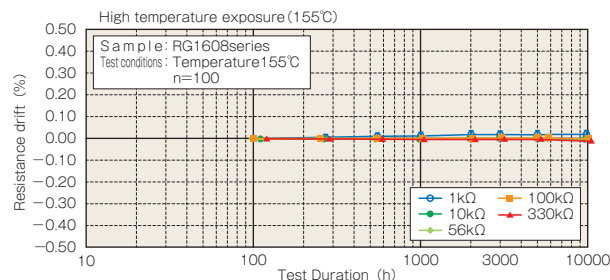
### High temperature high humidity bias test



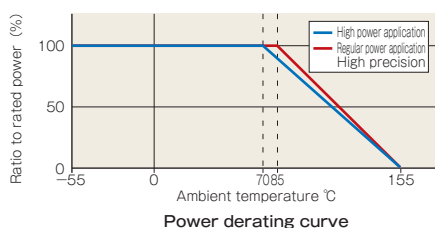
### Temperature cycle test



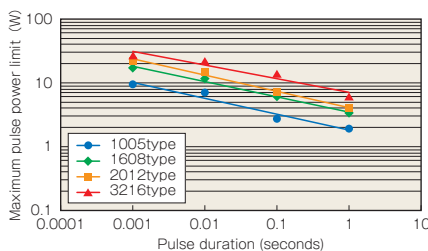
### High temperature exposure test



## Power derating characteristics



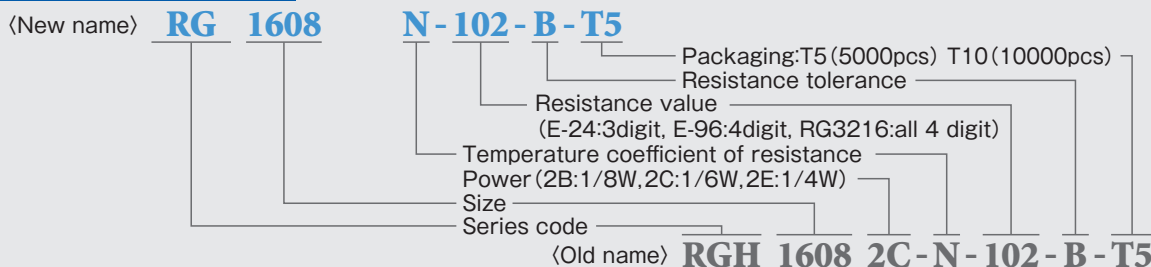
## Maximum pulse power limit



### Test procedure

Voltage pulse is applied to the test samples mounted on the test board. After each pulse, resistance drift is measured. Pulse voltage is increased until the drift exceeds +/-0.5%. The power at that voltage is defined as the maximum pulse power.

## Part numbering system



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