

Metal thin film chip resistors (the highest precision)

■ RG series

AEC-Q200 Compliant

Features

- Long term stability with inorganic passivation
- Less than $\pm 0.1\%$ drift after 10000 hours of reliability test
- High precision resistance tolerance: $\pm 0.05\%$, very small TCR: $\pm 5\text{ppm}/^\circ\text{C}$
- Thin film structure enabling low noise and anti-sulfur

Applications

- Automotive electronics
- Industrial measurement instrumentation, industrial machines
- Various sensors, medical electronics

Thin film surface mount resistors



◆ Part numbering system

RG 1608 N - 102 - B - T5

Series code

Size: RG0603, RG1005, RG1608, RG2012, RG3216

Temperature coefficient of resistance

Packaging quantity:
T5(5,000pcs), T10(10,000pcs)

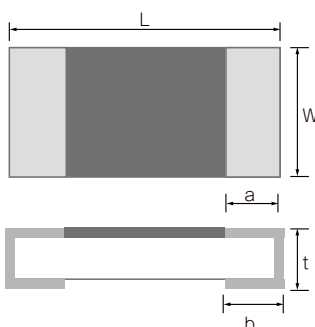
Resistance tolerance

Nominal resistance value
(E-24: 3 digit, E-96: 4 digit, RG3216: all 4 digit)

◆ Electrical Specification

| Type | Power ratings | | | Temperature coefficient of resistance (ppm/°C) | Resistance range (Ω) Resistance tolerance (%) | | | Maximum voltage | Resistance value series | Operating temperature | Pakaging quantity | |
|--------|---------------|---------|------|--|---|-----------------|---------------|-----------------|-------------------------|-----------------------|-------------------|-------------|
| | Low | Regular | High | | ±0.05% (W) | ±0.1% (B) | ±0.5% (D) | | | | | |
| RG0603 | 1/20W | 1/16W | — | ±10 (N) | — | 100 ≤ R < 22k | | 30V | E-24, E-96 | -55°C ~ 155°C | T10 | |
| | | | | ±25 (P) | | — | 47 ≤ R ≤ 56k | | | | | |
| | | | | ±50 (Q) | | | | | | | | 10 ≤ R < 47 |
| | | | | ±100 (R) | | | | | | | | |
| RG1005 | 1/32W | 1/16W | 1/8W | ±5 (V) | — | 100 ≤ R < 3k | | 75V | E-24, E-96 | -55°C ~ 155°C | T5 | |
| | | | | ±10 (N) | | 47 ≤ R ≤ 100k | | | | | | |
| | | | | ±25 (P) | | 47 ≤ R ≤ 150k | | | | | T10 | |
| | | | | ±100 (R) | | — | — | | | | | 10 ≤ R < 47 |
| RG1608 | 1/16W | 1/10W | 1/6W | ±5 (V) | — | 100 ≤ R < 5.1k | | 100V | E-24, E-96 | -55°C ~ 155°C | T5 | |
| | | | | ±10 (N) | | 47 ≤ R ≤ 274k | | | | | | |
| | | | | ±25 (P) | | 47 ≤ R ≤ 274k | 47 ≤ R ≤ 1M | | | | | |
| | | | | ±50 (Q) | | — | — | | | | | 10 ≤ R < 47 |
| RG2012 | 1/10W | 1/8W | 1/4W | ±5 (V) | — | 100 ≤ R < 10.2k | | 150V | E-24, E-96 | -55°C ~ 155°C | T5 | |
| | | | | ±10 (N) | | 47 ≤ R ≤ 475k | | | | | | |
| | | | | ±25 (P) | | 47 ≤ R ≤ 475k | 47 ≤ R ≤ 2.7M | | | | | |
| | | | | ±50 (Q) | | — | — | | | | | 10 ≤ R < 47 |
| RG3216 | 1/8W | 1/4W | — | ±5 (V) | — | 100 ≤ R ≤ 33.2k | | 200V | E-24, E-96 | -55°C ~ 155°C | T5 | |
| | | | | ±10 (N) | | 47 ≤ R ≤ 1M | | | | | | |
| | | | | ±25 (P) | | 47 ≤ R ≤ 5.1M | | | | | | |
| | | | | ±50 (Q) | | — | — | | | | | 10 ≤ R < 47 |

◆ Dimensions



| Type | Size (inch) | L | W | a | b | t |
|--------|-------------|-----------|-----------|-----------|-----------|-----------|
| RG0603 | 0201 | 0.60±0.05 | 0.30±0.05 | 0.13±0.05 | 0.15±0.05 | 0.23±0.03 |
| RG1005 | 0402 | 1.0±0.05 | 0.50±0.05 | 0.20±0.10 | 0.25±0.05 | 0.35±0.05 |
| RG1608 | 0603 | 1.60±0.20 | 0.80±0.20 | 0.30±0.20 | 0.30±0.20 | 0.40±0.10 |
| RG2012 | 0805 | 2.00±0.20 | 1.25±0.20 | 0.40±0.20 | 0.40±0.20 | 0.40±0.10 |
| RG3216 | 1206 | 3.20±0.20 | 1.60±0.20 | 0.50±0.25 | 0.50±0.20 | 0.40±0.10 |

(unit : mm)

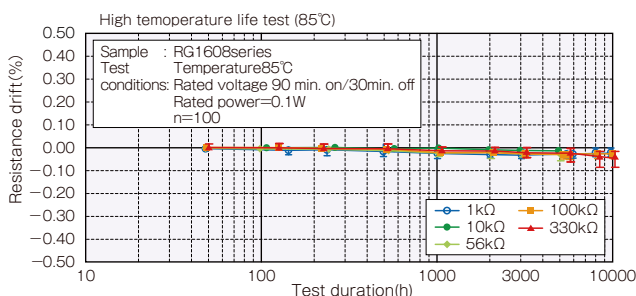
◆ Reliability specification

| Test Items | Condition (test methods) | Low | | Regular | | High | | Typical |
|--------------------------------|---|--------------|--------------|--------------|--------------|------|--------------|--------------|
| | | ≤47Ω | ≥47Ω | ≤47Ω | ≥47Ω | ≤47Ω | ≥47Ω | Low |
| Short time overload | 2.5 x rated voltage, *1 5 seconds | ±0.05%+0.01Ω | ±0.05%+0.01Ω | ±0.05%+0.01Ω | ±0.05%+0.01Ω | — | ±0.05%+0.01Ω | ±0.05%+0.01Ω |
| Life (biased) | 70°C, rated voltage, *1 90min on 30min off, 1000hours | ±0.25% | ±0.10% | ±0.50% | ±0.25% | — | ±0.50% | ±(0.01%) |
| High temperature high humidity | 85°C, 85%RH, 1/10 of rated power, 90min on 30min off, 1000hours | ±0.25% | ±0.10% | ±0.50% | ±0.25% | — | ±0.50% | ±(0.05%) |
| Temperature shock | -55°C (30min) ~ 125°C (30min) 1000cycles | ±0.25% | ±0.10% | ±0.25% | ±0.10% | — | ±0.10% | ±(0.01%) |
| High temperature exposure | 155°C, no bias, 1000hours | ±0.25% | ±0.10% | ±0.25% | ±0.10% | — | ±0.10% | ±(0.01%) |
| Resistance to soldering heat | 260±5°C, 10 seconds (reflow) | ±0.05%+0.01Ω | ±0.05%+0.01Ω | ±0.05%+0.01Ω | ±0.05%+0.01Ω | — | ±0.05%+0.01Ω | ±0.05%+0.01Ω |

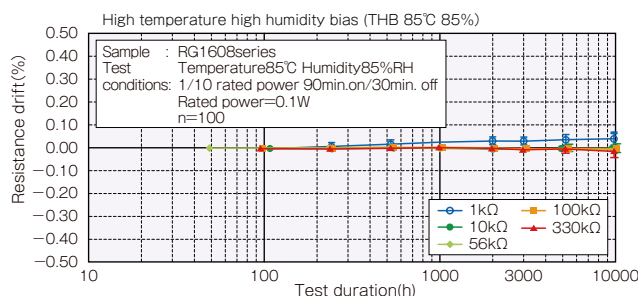
*1 Rated voltage is given by $E = \sqrt{R \times P}$ E= rated voltage (V), R=nominal resistance value(Ω), P=rated power(W)
If rated voltage exceeds maximum voltage /element, maximum voltage/element is the rated voltage.

◆ 10000 hour reliability test data

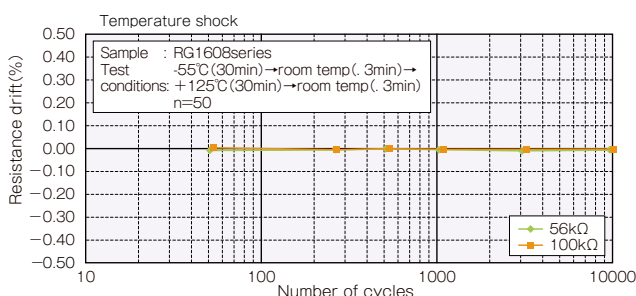
○ Biased life test



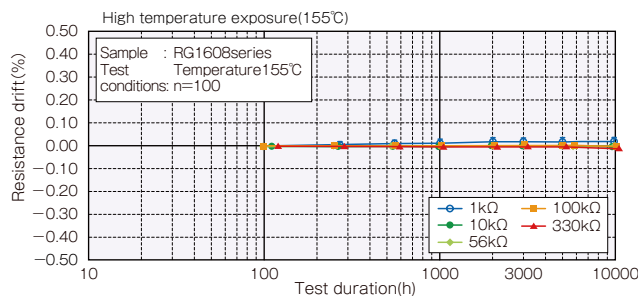
○ High temperature high humidity (biased)



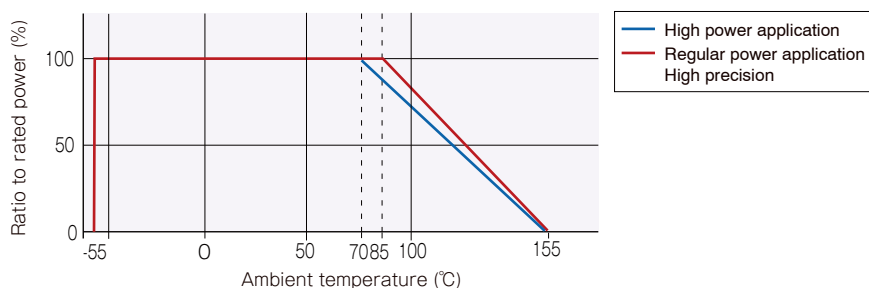
○ Temperature shock



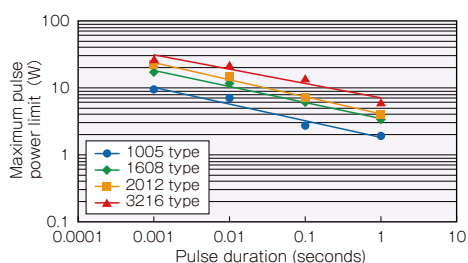
○ High temperature exposure



◆ Derating Curve



◆ 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.