

# 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)

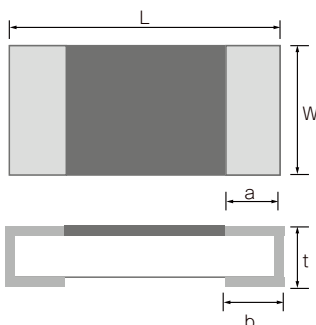
Resistance tolerance

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					10 ≤ R < 47	
				±100 (R)		—	—					
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)	±(0.01%)
Life (biased)	70°C, rated voltage, *1 90min on 30min off, 1000hours	±(0.25%+0.05Ω)	±(0.1%+0.01Ω)	±(0.5%+0.05Ω)	±(0.25%+0.05Ω)	—	±(0.5%+0.01Ω)	±(0.01%)
High temperature high humidity	85°C, 85%RH, 1/10 of rated power, 90min on 30min off, 1000hours	±(0.25%+0.05Ω)	±(0.1%+0.01Ω)	±(0.5%+0.05Ω)	±(0.25%+0.05Ω)	—	±(0.5%+0.01Ω)	±(0.05%)
Temperature shock	-55°C (30min) ~ 125°C (30min) 1000cycles	±(0.25%+0.05Ω)	±(0.1%+0.01Ω)	±(0.25%+0.05Ω)	±(0.1%+0.01Ω)	—	±(0.1%+0.01Ω)	±(0.01%)
High temperature exposure	155°C, no bias, 1000hours	±(0.25%+0.05Ω)	±(0.1%+0.01Ω)	±(0.25%+0.05Ω)	±(0.1%+0.01Ω)	—	±(0.1%+0.01Ω)	±(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)	±(0.01%)

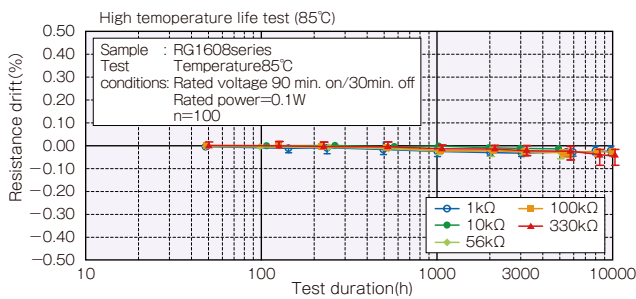
\*1 Rated voltage is given by  $E = \sqrt{R \times P}$  E= rated voltage (V), R=nominal resistance value(Ω), P=rated power(W)  
If rated voltage exceeds maximum voltage /element, maximum voltage/element is the rated voltage.

Thin film surface mount resistors

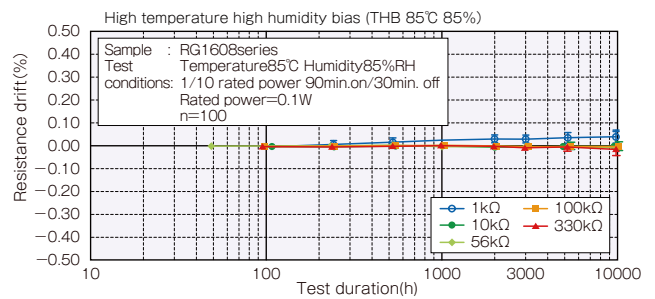
RG series

### ◆ 10000 hour reliability test data

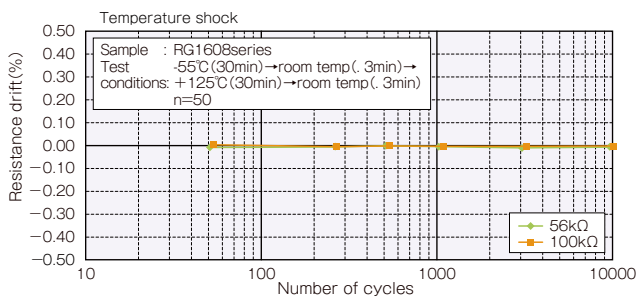
#### ○ Biased life test



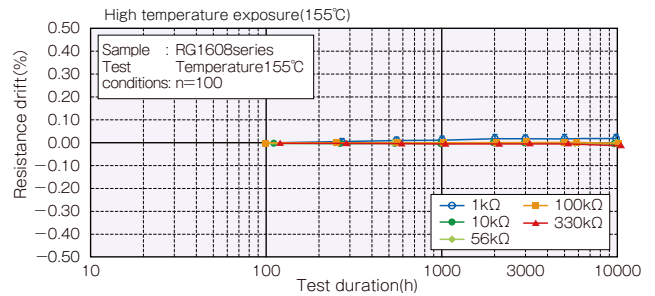
#### ○ High temperature high humidity (biased)



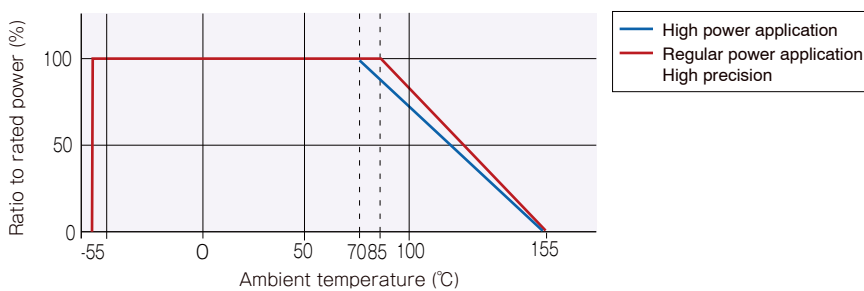
#### ○ Temperature shock



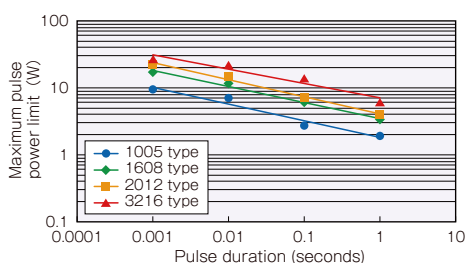
#### ○ High temperature exposure



### ◆ 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.