



**THE DATASHEET OF  
RG3216P-1302-B-T1**



# 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)

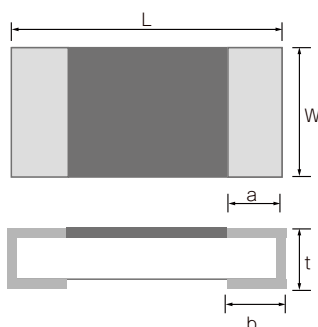
Resistance tolerance

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/ $^\circ\text{C}$ )	Resistance range ( $\Omega$ ) Resistance tolerance (%)			Maximum voltage	Resistance value series	Operating temperature	Pakaging quantity	
	Low	Regular	High		$\pm 0.05\%$ (W)	$\pm 0.1\%$ (B)	$\pm 0.5\%$ (D)					
RG0603	1/20W	1/16W	—	$\pm 10$ (N)	—	100 $\leq$ R $\leq$ 22k		30V	E-24, E-96	-55 $^\circ\text{C}$ ~ 155 $^\circ\text{C}$	T10	
				$\pm 25$ (P)		—	47 $\leq$ R $\leq$ 56k					
				$\pm 50$ (Q)								10 $\leq$ R $<$ 47
				$\pm 100$ (R)								
RG1005	1/32W	1/16W	1/8W	$\pm 5$ (V)	100 $\leq$ R $<$ 3k		75V	E-24, E-96	-55 $^\circ\text{C}$ ~ 155 $^\circ\text{C}$	T5 T10		
				$\pm 10$ (N)	47 $\leq$ R $\leq$ 100k							
				$\pm 25$ (P)	47 $\leq$ R $\leq$ 150k							
				$\pm 100$ (R)	—	—					10 $\leq$ R $<$ 47	
RG1608	1/16W	1/10W	1/6W	$\pm 5$ (V)	100 $\leq$ R $<$ 5.1k		100V	E-24, E-96	-55 $^\circ\text{C}$ ~ 155 $^\circ\text{C}$	T5		
				$\pm 10$ (N)	47 $\leq$ R $\leq$ 274k							
				$\pm 25$ (P)	47 $\leq$ R $\leq$ 274k	47 $\leq$ R $\leq$ 1M						
				$\pm 50$ (Q)	—	—					10 $\leq$ R $<$ 47	
RG2012	1/10W	1/8W	1/4W	$\pm 5$ (V)	100 $\leq$ R $<$ 10.2k		150V	E-24, E-96	-55 $^\circ\text{C}$ ~ 155 $^\circ\text{C}$	T5		
				$\pm 10$ (N)	47 $\leq$ R $\leq$ 475k							
				$\pm 25$ (P)	47 $\leq$ R $\leq$ 475k	47 $\leq$ R $\leq$ 2.7M						
				$\pm 50$ (Q)	—	—					10 $\leq$ R $<$ 47	
RG3216	1/8W	1/4W	—	$\pm 5$ (V)	100 $\leq$ R $\leq$ 33.2k		200V	E-24, E-96	-55 $^\circ\text{C}$ ~ 155 $^\circ\text{C}$	T5		
				$\pm 10$ (N)	47 $\leq$ R $\leq$ 1M							
				$\pm 25$ (P)	47 $\leq$ R $\leq$ 5.1M							
				$\pm 50$ (Q)	—	—					10 $\leq$ R $<$ 47	

## ◆ Dimensions



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

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