



# Non-magnetic metal thin film chip resistors

## NRG series

### Features

- Thin film chip resistors using non-magnetic materials
- Long term stability with inorganic passivation
- 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

- Medical electronics, industrial measurement instrumentation
- equipment/devices under magnetic field



## Part numbering system

**NRG 2012 N - 104 - W - T1**

Series code

Size: NRG1005, NRG1608, NRG2012, NRG3216

Temperature coefficient of resistance

Packaging quantity:

T5(5,000pcs) T10(10,000pcs)

Resistance tolerance

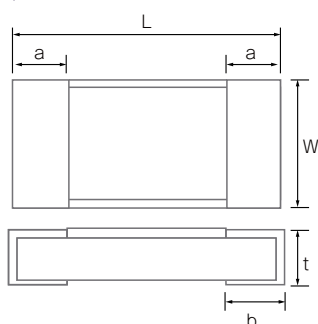
Nominal resistance value  
(E-24: 3 digit, E-96: 4 digit, NRG3216: all 4 digit)

## 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	Packaging quantity
			$\pm 0.05\%$ (W)	$\pm 0.1\%$ (B)	$\pm 0.5\%$ (D)				
NRG1005	1/16W	$\pm 5$ (V)	$100 \leq R \leq 3\text{k}$		—	75V	E-24, E-96	$-55^\circ\text{C} \sim 155^\circ\text{C}$	T5 T10*1
		$\pm 10$ (N)	$47 \leq R \leq 100\text{k}$						
		$\pm 25$ (P)	$47 \leq R \leq 150\text{k}$						
		$\pm 100$ (R)	—	$10 \leq R \leq 47$					
NRG1608	1/10W	$\pm 5$ (V)	$100 \leq R < 5.1\text{k}$		100V	E-24, E-96	$-55^\circ\text{C} \sim 155^\circ\text{C}$	T5	
		$\pm 10$ (N)	$47 \leq R \leq 270\text{k}$						
		$\pm 25$ (P)	$47 \leq R \leq 270\text{k}$	$47 \leq R \leq 332\text{k}$					$47 \leq R \leq 360\text{k}$
		$\pm 50$ (Q)	—	—					$10 \leq R < 47$
NRG2012	1/8W	$\pm 5$ (V)	$100 \leq R < 10.2\text{k}$		150V	E-24, E-96	$-55^\circ\text{C} \sim 155^\circ\text{C}$	T5	
		$\pm 10$ (N)	$47 \leq R \leq 475\text{k}$						
		$\pm 25$ (P)	$47 \leq R \leq 475\text{k}$	$47 \leq R \leq 1\text{M}$					
		$\pm 50$ (Q)	—	—					$10 \leq R < 47$
NRG3216	1/4W	$\pm 5$ (V)	$100 \leq R < 33.2\text{k}$		200V	E-24, E-96	$-55^\circ\text{C} \sim 155^\circ\text{C}$	T5	
		$\pm 10$ (N)	$47 \leq R \leq 1\text{M}$						
		$\pm 25$ (P)	$47 \leq R \leq 1\text{M}$						
		$\pm 50$ (Q)	—	—					$10 \leq R < 47$

\*1 : Resistance tolerance  $\pm 0.5\%$  (D) of NRG1005 is available only at T10

## Dimensions



Type	Size (inch)	L	W	a	b	t
NRG1005	0402	$1.00 \pm 0.05$	$0.50 \pm 0.05$	$0.20 \pm 0.10$	$0.25 \pm 0.05$	$0.35 \pm 0.05$
NRG1608	0603	$1.60 \pm 0.20$	$0.80 + 0.25 / - 0.20$	$0.30 \pm 0.20$	$0.30 \pm 0.20$	$0.40 + 0.15 / - 0.10$
NRG2012	0805	$2.00 \pm 0.20$	$1.25 + 0.25 / - 0.20$	$0.40 \pm 0.20$	$0.40 \pm 0.20$	$0.40 + 0.15 / - 0.10$
NRG3216	1206	$3.20 \pm 0.20$	$1.60 \pm 0.25$	$0.50 \pm 0.25$	$0.50 \pm 0.20$	$0.40 + 0.15 / - 0.10$

(unit : mm)

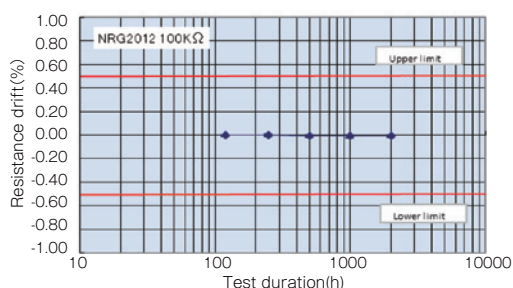
## ◆ Reliability specification

Test items	Condition (test methods (MIL-PRF-55342/JIS C5201-1))	Standard
Short time overload	2.5 x rated voltage, <sup>*1</sup> 5seconds	±(0.5%+0.01Ω)
Life (biased)	70°C, rated voltage, <sup>*1</sup> 90min on 30min off, 1000hours	±(0.5%+0.05Ω)
High temperature high humidity	85°C, 85%RH, 1/10 of rated power, 90min on 30min off, 1000hours	±(0.5%+0.01Ω)
Temperature shock	-55°C (30min) ~ 125°C (30min) 1000 cycles	±(0.5%+0.01Ω)
High temperature exposure	155°C, no bias, 1000hours	±(0.5%+0.01Ω)
Resistance to soldering heat	260±5°C, 10 seconds (reflow)	±(0.05%+0.01Ω)

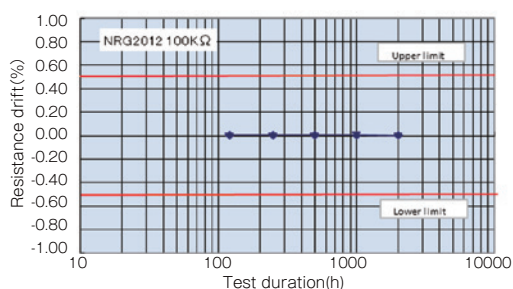
\*1 Rated voltage is given by  $E = \sqrt{R \times P}$  E= rated voltage (V), R=nominal resistance value(Ω), P=rated power(W)  
If rated voltage exceeds maximum voltage /element, maximum voltage/element is the rated voltage.

## ◆ Reliability test data

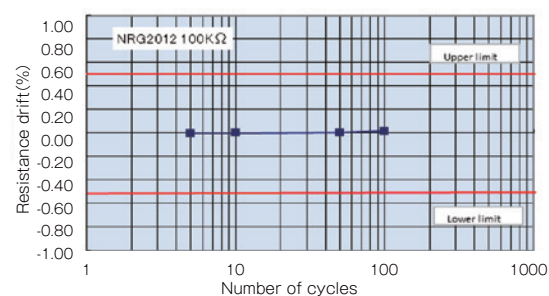
### ○ Biased life test



### ○ High temperature high humidity (biased)



### ○ Temperature shock



## ◆ Derating Curve

