

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



Thin film surface mount resistors



NRG series

◆ 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

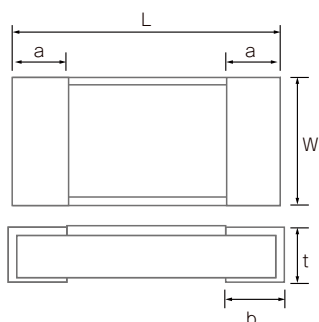
Nominal resistance value
(E-24: 3 digit, E-96: 4 digit, NRG3216: all 4 digit)

◆ Electrical Specification

Type	Power ratings	Temperature coefficient of resistance (ppm/ $^\circ\text{C}$)	Resistance range(Ω) 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	± 5 (V)	$100 \leq R \leq 3k$		—	75V	E-24, E-96	$-55^\circ\text{C} \sim 155^\circ\text{C}$	T5 T10*1
		± 10 (N)	$47 \leq R \leq 100k$						
		± 25 (P)	$47 \leq R \leq 150k$						
		± 100 (R)	—	$10 \leq R \leq 47$					
NRG1608	1/10W	± 5 (V)	$100 \leq R < 5.1k$		100V	E-24, E-96	$-55^\circ\text{C} \sim 155^\circ\text{C}$	T5	
		± 10 (N)	$47 \leq R \leq 270k$						
		± 25 (P)	$47 \leq R \leq 270k$	$47 \leq R \leq 332k$					$47 \leq R \leq 360k$
		± 50 (Q)	—	—					$10 \leq R < 47$
NRG2012	1/8W	± 5 (V)	$100 \leq R < 10.2k$		150V	E-24, E-96	$-55^\circ\text{C} \sim 155^\circ\text{C}$	T5	
		± 10 (N)	$47 \leq R \leq 475k$						
		± 25 (P)	$47 \leq R \leq 475k$	$47 \leq R \leq 1M$					
		± 50 (Q)	—	—					$10 \leq R < 47$
NRG3216	1/4W	± 5 (V)	$100 \leq R < 33.2k$		200V	E-24, E-96	$-55^\circ\text{C} \sim 155^\circ\text{C}$	T5	
		± 10 (N)	$47 \leq R \leq 1M$						
		± 25 (P)	$47 \leq R \leq 1M$						
		± 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 ± 0.05	0.50 ± 0.05	0.20 ± 0.10	0.25 ± 0.05	0.35 ± 0.05
NRG1608	0603	1.60 ± 0.20	$0.80 + 0.25 / - 0.20$	0.30 ± 0.20	0.30 ± 0.20	$0.40 + 0.15 / - 0.10$
NRG2012	0805	2.00 ± 0.20	$1.25 + 0.25 / - 0.20$	0.40 ± 0.20	0.40 ± 0.20	$0.40 + 0.15 / - 0.10$
NRG3216	1206	3.20 ± 0.20	1.60 ± 0.25	0.50 ± 0.25	0.50 ± 0.20	$0.40 + 0.15 / - 0.10$

(unit : mm)

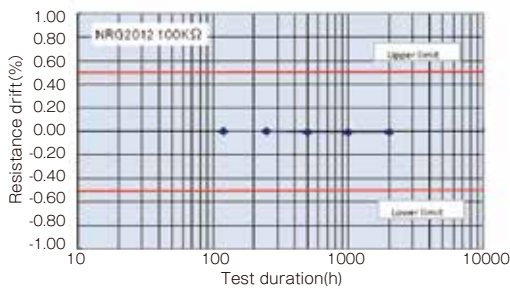
◆ Reliability specification

Test items	Condition (test methods (MIL-PRF-55342/JIS C5201-1))	Standard
Short time overload	2.5 x rated voltage, ^{*1} 5seconds	±(0.5%+0.01Ω)
Life (biased)	70°C, rated voltage, ^{*1} 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)

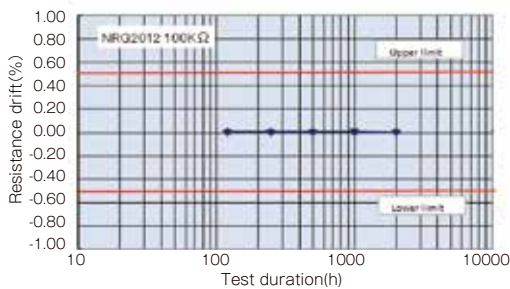
*1 Rated voltage is given by $E = \sqrt{R \times P}$ E= rated voltage (V), R=nominal resistance value(Ω), P=rated power(W)
If rated voltage exceeds maximum voltage /element, maximum voltage/element is the rated voltage.

◆ Reliability test data

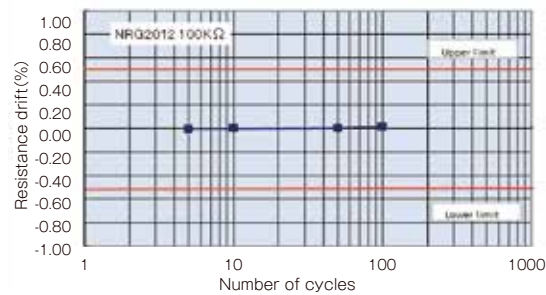
○ Biased life test



○ High temperature high humidity (biased)



○ Temperature shock



◆ Derating Curve

