

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

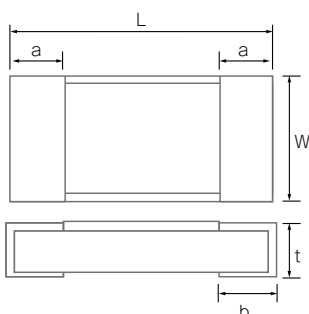
Nominal resistance value
(E-24: 3 digit, E-96: 4 digit, NRG3216: all 4 digit)

◆ Electrical Specification

| Type | Power ratings | Temperature coefficient of resistance (ppm/°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°C ~ 155°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°C ~ 155°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°C ~ 155°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°C ~ 155°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 \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,*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) |

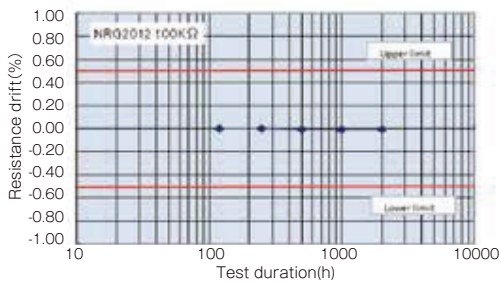
*1 Rated voltage is given by $E = \sqrt{R \times P}$ E= rated voltage (V), R=nominal resistance value(Ω), P=rated power(W)
If rated voltage exceeds maximum voltage /element, maximum voltage/element is the rated voltage.

Thin film surface mount resistors

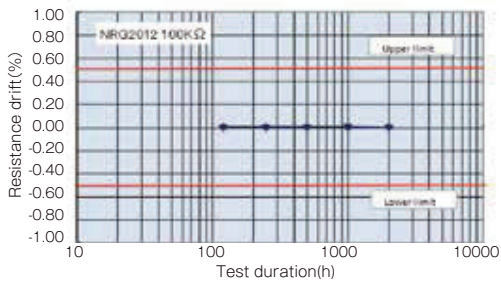
NRG series

◆ Reliability test data

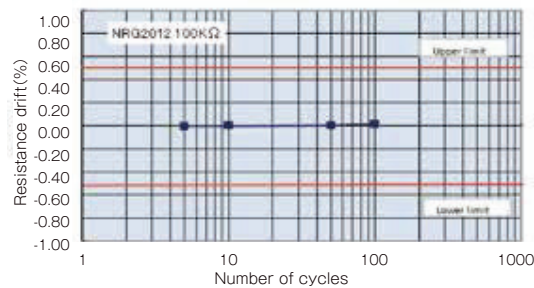
○ Biased life test



○ High temperature high humidity (biased)



○ Temperature shock



◆ Derating Curve

