

RNF series Thick Film Anti-Surge Chip Resistor

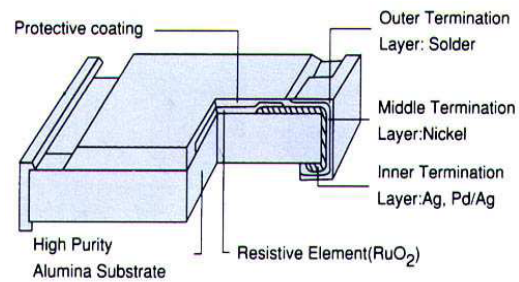
◆ Features

- » Small size and lightweight with size range per int'l standard
- » Highly stable in auto-placement surface mounting application
- » Suitable for withstanding circuit for surge voltage
- » RoHS compliant & Halogen Free

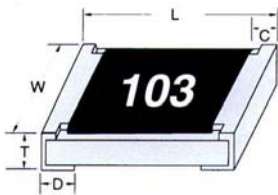
◆ Applications

- » CD-ROM
- » Power Supply
- » Automotive Industry
- » Measurement instrument
- » Medical Equipment
- » Electronic watch and camera

◆ Configuration



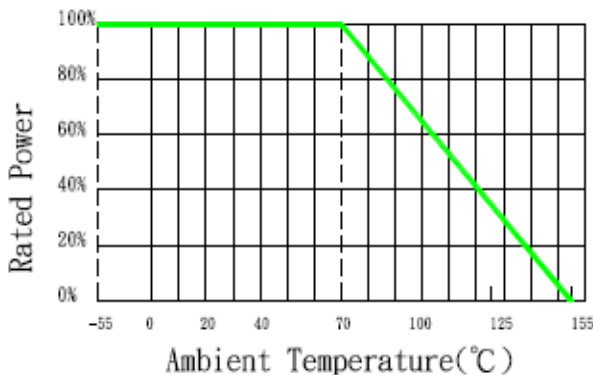
◆ Dimensions



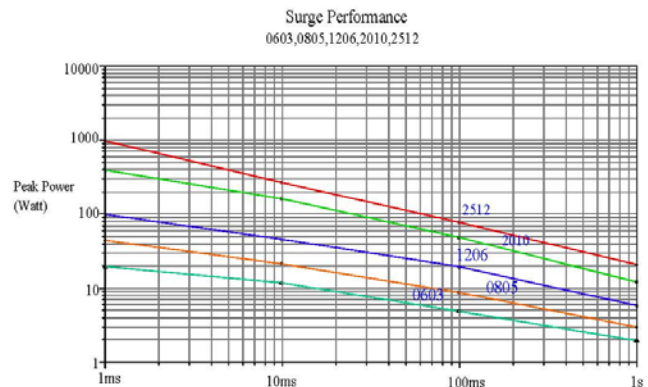
Size	L	W	C	D	T
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
2512	6.40±0.20	3.20±0.20	0.60±0.25	0.90±0.25	0.60±0.15

Unit: mm

◆ Power Derating Curve



◆ Surge Performance



◆ Rating

Type	Power Rating at 70 °C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient (ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
RNF0603	1/10W	50V	100V	± 10% (K) ± 5% (J) ± 15% (L) ± 20% (M)	± 100	1 Ω	1M Ω	E-24
RNF0805	1/8W	150V	300V					
RNF1206	1/4W	200V	400V					
RNF2010	1/2W	200V	400V					
RNF2512	1W	200V	400V					

$E = (P \times R) / 2$ E : Working Voltage(V) , P : Rated Power (W), R: Resistance Value (Ω)

1Ω ~ 10Ω: Temperature Coefficient of Resistance for 0603, 0805, 1206 = -200 ~ +400

Temperature Coefficient of Resistance for 2010, 2512 = ± 300

◆ Part Number

RNF	0805	K	47K	□	□□
Type	Size	Tolerance	R Value	Reel Size	Package quantity
RNF	0603	J: ± 5%	0Ω = 0R	Blank = 7"	(Standard Package As below)
	0805	K: ± 10%	10KΩ = 10K	B= 13"	10= 10K per reel
	1206	L: ± 15%	2.2MΩ = 2M2	C= 10"	20= 20K per reel
	2010	M: ± 20%			08= 8K per reel
	2512				16= 16K per reel

» Standard Package Q'ty for each size is as following.

TYPE	Standard Package Q'ty
RNF0603	5K per-reel
RNF0805	5K per-reel
RNF1206	5K per-reel
RNF2010	4K per-reel
RNF2512	4K per-reel

◆ Resistance Marking E – 24 SERIES



3 digit marking
Examples : **473** $47 \times 10^3 = 47K\Omega$

◆ Specification

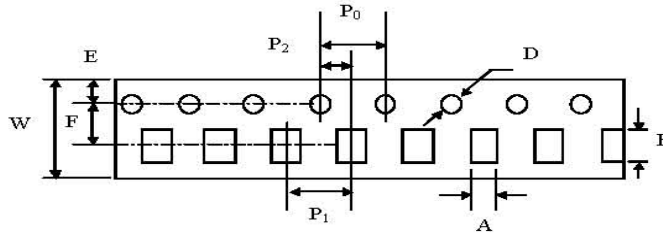
Specification and Test Method

TEST	SPECIFICATION	TEST METHOD
DC Resistance	J : ±5% , K : ±10% , L : ±15% , M : ±20%	IEC 60115-1 / JIS C 5201-1 , Clause 4.5 Measure the resistance Value.
Short Time Overload	$\Delta R \leq \pm (2\% + 0.1\Omega)$	IEC 60115-1 / JIS C 5201-1 , Clause 4.13 2.5 × Rated voltage or Max. Overload Voltage for 5 sec. measure resistance after 30 minutes
Solderability	Over 95% of termination must be covered with solder	IEC 60115-1 / JIS C 5201-1, Clause 4.17 After immersing flux, dip in the $245 \pm 2^\circ\text{C}$ molten solder bath for 3 ± 0.5 sec.
Resistance to solder Heat	$\Delta R \leq \pm (1\% + 0.1\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.18 With $260 \pm 5^\circ\text{C}$ for 10 ± 1 sec
Load Life Humidity	$\Delta R \leq \pm (3\% + 0.1\Omega)$	IEC 60115-1 / JIS C 5201-1 , Clause 4.24 Maintain the temperature of the resistor at $40 \pm 2^\circ\text{C}$ and 90% ~ 95% R.H. with the rated voltage applied. Cycle ON for 1.5 hours and OFF for 0.5 hour for 1000+48/-0 hours. After 1 ~ 4 hours, measure the resistance value.
Temperature Coefficient of Resistance (TCR)	± 100 ppm/°C	IEC 60115-1 / JIS C 5201-1 , Clause 4.8 Test temperature : $25^\circ\text{C}(T1) \rightarrow -55^\circ\text{C}(T2)$ $25^\circ\text{C}(T1) \rightarrow +155^\circ\text{C}(T2)$ $\text{TCR (ppm/}^\circ\text{C)} = \frac{R2 - R1}{R1} \times \frac{1}{T2 - T1} \times 10^6$ T1: 25°C T2: Test temperature R1: Resistance at reference temperature (T1) T2: Resistance at test temperature (T2)
Load Life	$\Delta R \leq \pm(3\% + 0.1\Omega)$	IEC 60115-1 / JIS C 5201-1 , Clause 4.25 Permanent resistance change after 1000+48/-0 hours (1.5 hours ON, 0.5 hour OFF) at RCWV or Max. Keep the resistor at $70 \pm 2^\circ\text{C}$ ambient.
Temperature Cycle	$\Delta R \leq \pm(1\% + 0.1\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.19 Repeat 5 cycles as follows -55°C (30min.) $\rightarrow +25^\circ\text{C}$ (2~3min.) $\rightarrow +155^\circ\text{C}$ (30min.) $\rightarrow +25^\circ\text{C}$ (2~3min.)
Insulation Resistance	Between termination and coating must be over 1000MΩ	IEC 60115-1 / JIS C 5201-1 , Clause 4.6 Test voltage : $100 \pm 15\text{V}$
Bending strength	$\Delta R \leq \pm(1\% + 0.1\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.33 Resistance changes after bended on the 90mm PCB. Bend : 3mm for 0603, 0805, 2mm for 1206, 2010, 2512

◆ Packing

Tape Packaging Dimensions

Taping specs are according to EIA RS-481



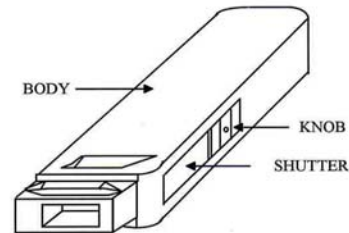
Accumulated dimensional tolerance $40\pm 0.2\text{mm}$

Size	A	B	W	F	E	P1	P2	P0	D
0603	1.10 ± 0.20	1.90 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50+0.10/-0$
0805	1.65 ± 0.20	2.40 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50+0.10/-0$
1206	2.00 ± 0.20	3.60 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50+0.10/-0$
2010	2.80 ± 0.20	5.50 ± 0.20	12.00 ± 0.30	5.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50+0.10/-0$
2512	3.50 ± 0.20	6.70 ± 0.20	12.00 ± 0.30	5.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50+0.10/-0$

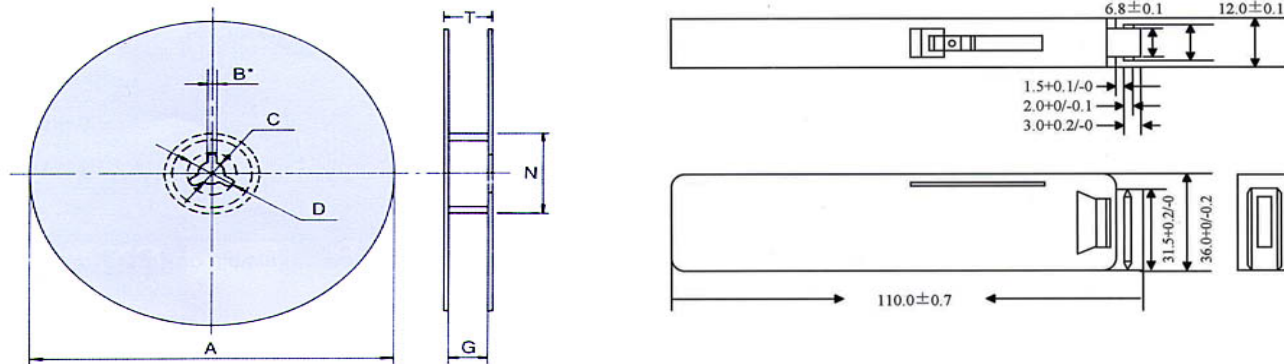
Unit: mm

Bulk Configuration

Size	Packaging Q'ty
0805	10Kpcs / Case
0603	25Kpcs / Case



Reel Dimensions



Size	Packing Q'ty	A	N	C	D	B	G	T
0603	5kpcs/Reel	178.0 ± 2.0	60.0 ± 0.5	13.0 ± 0.5	20(Min.)	2.0 ± 0.5	10.0 ± 1.5	14.9max.
0805	10kpcs/Reel	254.0 ± 2.0	100.0 ± 1.0	13.5 ± 0.5	20(Min.)	2.0 ± 0.5	10.0 ± 1.5	14.9max.
1206	20kpcs/Reel	330.0 ± 2.0	100.0 ± 1.0	13.5 ± 0.5	20(Min.)	2.0 ± 0.5	10.0 ± 1.5	14.9max.
2010	4kpcs/Reel	178.0 ± 2.0	60.0 ± 0.5	13.0 ± 0.5	20(Min.)	2.0 ± 0.5	13.8 ± 1.5	16.7max.
2512	8kpcs/Reel	254.0 ± 2.0	100.0 ± 1.0	13.5 ± 0.5	20(Min.)	2.0 ± 0.5	13.8 ± 1.5	20.0max.
	16kpcs/Reel	330.0 ± 2.0	100.0 ± 1.0	13.5 ± 0.5	20(Min.)	2.0 ± 0.5	13.8 ± 1.5	20.0max.

Unit: mm