

### \*Features

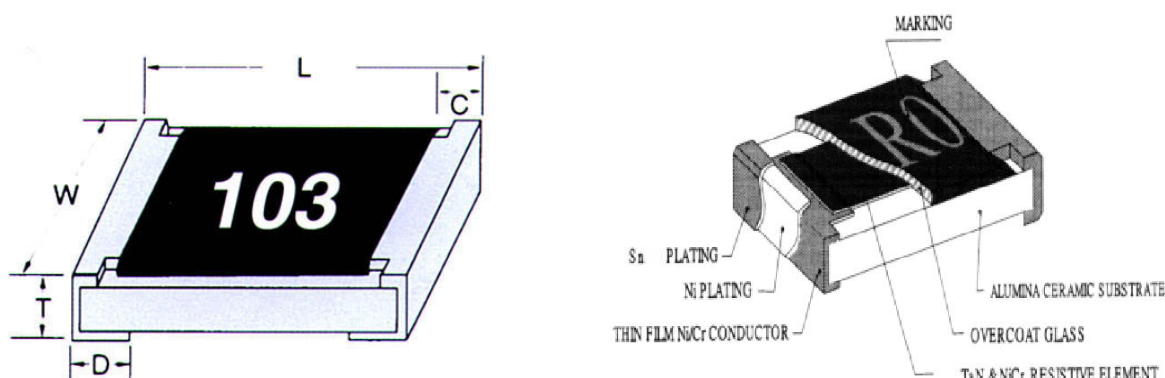
Thin film TaN & Ni/Cr Resistive element

Tolerance 1%, 0.5%, 0.1%, 0.05%

Compatible with both flow soldering and reflow soldering

Suitable for Lead Free soldering.

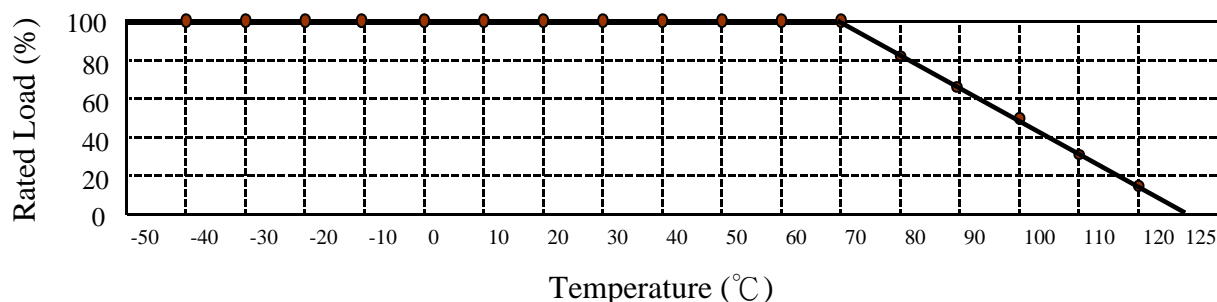
### \*Configuration & Dimensions



TYPE	L	W	C	D	T
0402	1.00+/-0.05	0.50+/-0.05	0.35+/-0.05	0.25+/-0.10	0.20+/-0.10
0603	1.60+/-0.10	0.80+/-0.10	0.45+/-0.15	0.30+/-0.20	0.30+/-0.20
0805	2.00+/-0.10	1.25+/-0.10	0.50+/-0.15	0.40+/-0.20	0.40+/-0.20
1206	3.10+/-0.10	1.60+/-0.10	0.60+/-0.15	0.45+/-0.20	0.50+/-0.20

(unit: mm)

### ■ Power Derating Curve



For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve below.



### \*Rating

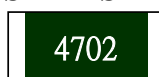
Rating Type	Power Rating at 70°C	Max. RCWV	Max. Overload Voltage	Temperature coefficient of Resistance (ppm/°C)	Resistance Tolerance (%)	Resistance Range (Ω)		Standard Resistance Values
						Min.	Max.	
0402	1/16W	25V	50V	±25 ±50	±0.1%(B) ±0.25%(C) ±0.5%(D) ±1%(F)	10 Ω	100K Ω	E24 E96
				±10 ±15	±0.1%(B)	50Ω	12KΩ	
0603	1/16W	50V	100V	±25 ±50	±0.05%(A)	22Ω	150KΩ	E24 E96
					±0.1%(B) ±0.25%(C) ±0.5%(D) ±1%(F)	10 Ω	330K Ω	
				±10 ±15	±0.1%(B) ±0.05%(A)	25Ω	100KΩ	
					±0.05%(A)	10Ω	500K Ω	E24 E96
0805	1/10W	100V	200V	±25 ±50	±0.1%(B) ±0.25%(C) ±0.5%(D) ±1%(F)	10 Ω	1M Ω	
					±0.1%(B) ±0.05%(A)	25Ω	100KΩ	
1206	1/8W	150V	300V	±25 ±50	±0.05%(A)	10Ω	500K Ω	E24 E96
					±0.1%(B) ±0.25%(C) ±0.5%(D) ±1%(F)	10 Ω	1M Ω	
				±10 ±15	±0.1%(B) ±0.05%(A)	25Ω	100KΩ	

### \*Part Number

TYPE	Products	Size	Tol.	Packing	Marking
F - Flat	AF	02 - 0402	A - ±0.05%	T - Paper tape, 5Kpcs	V - 10PPM
	Thin Film	03 - 0603	B - ±0.1%	V - Paper tape, 10Kpcs	S - 15PPM
	Lead Free	05 - 0805	C - ±0.25%		Q - 25PPM
	Chip R	06 - 1206	D - ±0.5%		P - 50PPM
			F - ± 1%		

### \*Resistance Marking

#### E - 24 SERIES



4 digit marking for 1206 , 0805

no marking for 0402

examples: 4702       $470 \times 10^2 = 47K\Omega$

3 digit marking for 0603

no marking for 0402

examples: 473       $47 \times 10^3 = 47K\Omega$

#### E - 96 SERIES



4 digit marking for 1206 , 0805

no marking for 0402

examples: 4702       $470 \times 10^2 = 47K\Omega$

3 digit included two numbers and one letter for 0603

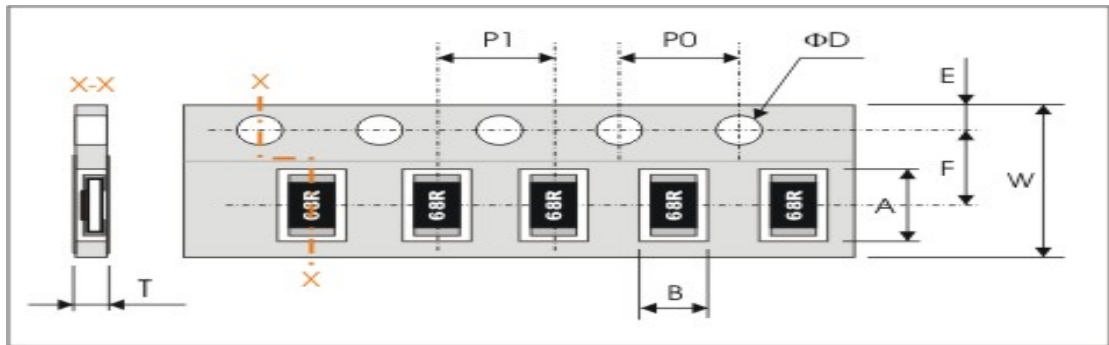
no marking for 0402

examples: 02C       $102 \times 10^2 = 10.2K\Omega$



### *\*Tape And Reel Package*

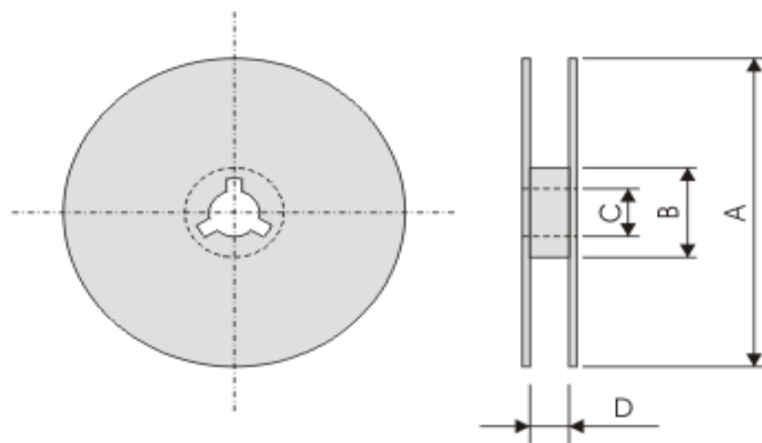
Paper Tape specifications (unit : mm)



Type	A	B	W	D	E	F	P0	ØD	T
0402	1.20±0.10	0.7±0.10	8.00±0.20	3.50±0.05	1.75±0.10	2.00±0.10	4.00±0.10	Ø1.50+0.10/-0	0.40±0.05
0603	1.90±0.20	1.10±0.20	8.00±0.30	3.50±0.20	1.75±0.10	4.00±0.10	0.40±0.10	Ø1.50+0.10/-0	0.65±0.05
0805	2.40±0.20	1.65±0.20	8.00±0.30	3.50±0.20	1.75±0.10	4.00±0.10	4.00±0.10	Ø1.50+0.10/-0	Max. 1.0
1206	3.60±0.20	2.00±0.20	8.00±0.30	3.50±0.20	1.75±0.10	4.00±0.10	4.00±0.10	Ø1.50+0.10/-0	Max. 1.0

(unit: mm)

### Reel dimensions



unit: mm

Symbol	A	B	C	D
0402	178.0±2.0	60.0±0.10	13.0±0.2	9.0±0.5
0603				
0805				
1206				

## Thin Film Lead Free Type High Precision Chip Resistors

### *\*Specification And Test Methods*

ITEM	SPECIFICATION	TEST METHOD
DC Resistance	F: ± 1% D: ±0.5%, C: ±0.25% B: ±0.1%, A: ±0.05%	<b>JIS C 5202 5.1 / IEC 60115-1 4.5</b> Measure the resistance value.
Short time Overload	F · D · C · B · A : $\Delta R \leq \pm(0.1\% + 0.05 \Omega)$	<b>JIS C 5202 5.5 / IEC 60115-1 4.13</b> 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	<b>JIS C 5202 6.5/ IEC 60115-1 4.17</b> After immersing flux, dip in the 245±5°C molten solder bath for 3±1 sec.
Resistance to Solder Heat	F · D · C · B · A : $\Delta R \leq \pm(0.1\% + 0.05 \Omega)$	<b>JIS C 5202 6.4 / IEC 60115-1 4.18</b> With 260±5°C for 10±1 sec.
Temperature Coefficient of Resistance (TCR)	F · D · C · B · A : $\pm 10 \text{ ppm}/^\circ\text{C} \pm 15 \text{ ppm}/^\circ\text{C} \pm 25 \text{ ppm}/^\circ\text{C} \pm 50 \text{ ppm}/^\circ\text{C}$	<b>JIS C 5202 5.2 / IEC 60115-1 4.8.4.2</b> T1 T2 Test temperature: 25°C → -55°C 25C → 125C $\text{TCR}(\text{ppm}/^\circ\text{C}) = \frac{R_2 - R_1}{R_1} \times \frac{1}{T_2 - T_1} \times 10^6$ T1: 25°C T2: Test temperature R1: Resistance at reference temperature (T1) R2: Resistance at test temperature (T2)
Load Life Humidity	F · D · C · B · A : $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$	<b>JIS C 5202 7.9/ IEC 60115-1 4.24.2</b> Maintain the temperature of the resistor at 40±2°C and 90~95% RH 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 hour, measure the resistance value.
Load Life	F · D · C · B · A : $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$	<b>JIS C 5202 7.10/ IEC 60115-1 4.25.1</b> 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±2°C ambient
Temperature Cycle	F · D · C · B · A : $\Delta R \leq \pm(0.1\% + 0.05 \Omega)$	<b>JIS C 5202 7.4 / IEC 60115-1 4.19</b> Repeat 5 cycles as follows 55°C (30 min.)+25°C (2-3 min.) +155°C (30 min.)+25°C (2-3 min.)
Bending Strength	F · D · C · B · A : $\Delta R \leq \pm(0.1\% + 0.05 \Omega)$	<b>IEC 60115-1 4.33</b> Resistance change after bended 3mm on the 90mm PCB.