

Data Sheet

Customer : _____

Product : Thin Film Precision Chip Resistor - RAR Series

Size : 0201/0402/0603/0805/1206/1210/2010/2512

Issued Date : 08-Sep.-2026

Edition : Ver. 4

Record of change

Date	Ver.	Description	Page
17-Aug.-2023	1		
04-Oct.-2023	2	Revise Recommend Land Pattern	2
23-Nov.-2023	3	Revise Resistance Range / Add Reflow Profiles	3,4,6
08-Sep.-2026	4	Revise Feature & Standard Electrical Specifications	1,3
		Revise High Power Rating Electrical Specifications & Environmental Characteristics	4,5

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08-Sep.-2026	08-Sep.-2026	08-Sep.-2026	
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Thin Film Precision Chip Resistor

RAR Series

■ Feature

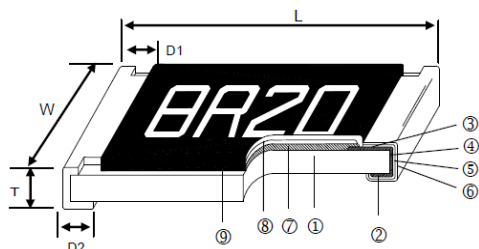
- Advanced thin film technology
- Very tight tolerance down to $\pm 0.01\%$
- Extremely low TCR down to $\pm 1\text{ppm}/^\circ\text{C}$
- Wide resistance range $1\Omega \sim 3\text{M}\Omega$
- Miniature size 0201 available
- Best proven immunity to Biased humidity ($85^\circ\text{C}/ 85\% \text{RH}$)
- RoHS (Pb)-free without exemption



■ Applications

- Medical Equipment
- Testing / Measurement Equipment
- Printer Equipment
- Automatic Equipment Controller
- Converters
- Communication Device, Cell Phone, GPS, PDA

■ Construction & Dimensions



① Alumina Substrate	④ Edge Electrode	⑦ Resistor Layer
② Bottom Electrode	⑤ Barrier Layer	⑧ Overcoat
③ Top Electrode	⑥ External Electrode	⑨ Marking

Size	L	W	T	D1	D2
0201	0.58 ± 0.05	0.29 ± 0.05	0.23 ± 0.05	0.12 ± 0.05	0.15 ± 0.05
0402	1.00 ± 0.05	0.50 ± 0.05	0.30 ± 0.05	0.20 ± 0.10	0.20 ± 0.10
0603	1.55 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.30 ± 0.20	0.40 ± 0.20
1206	3.05 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.42 ± 0.20	0.35 ± 0.25
1210	3.10 ± 0.15	2.40 ± 0.15	0.55 ± 0.10	0.40 ± 0.20	0.55 ± 0.25
2010	4.90 ± 0.15	2.40 ± 0.15	0.55 ± 0.10	0.60 ± 0.30	0.50 ± 0.25
2010 (1/2W)	4.90 ± 0.15	2.40 ± 0.15	0.55 ± 0.10	0.60 ± 0.30	2.20 ± 0.25
2512	6.30 ± 0.15	3.10 ± 0.15	0.55 ± 0.10	0.60 ± 0.30	0.50 ± 0.25
2512 (1W) $1\Omega \sim 100\Omega$	6.30 ± 0.15	3.10 ± 0.15	0.55 ± 0.10	0.60 ± 0.30	0.50 ± 0.25
2512 (1W) 101 Ω above	6.30 ± 0.15	3.10 ± 0.15	0.55 ± 0.10	0.60 ± 0.30	2.50 ± 0.25

(Unit:mm)

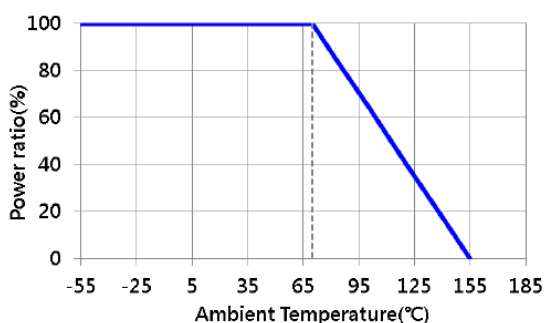
Thin Film Precision Chip Resistor

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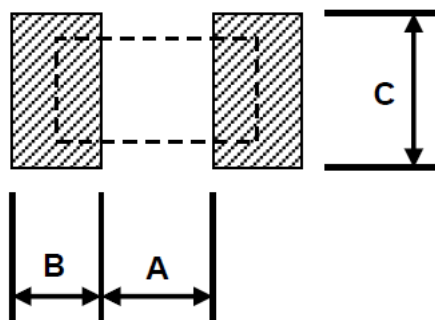
■ Part Numbering

RAR	0805	B	R	C	S	-	100R
Series	Size	Tolerance	Packing Style	TCR (ppm/°C)	Power Rated	Packing Code	Resistance Value
	0201 0402 0603 0805 1206 1210 2010 2512	T : ±0.01% A : ±0.05% B : ±0.1% C : ±0.25% D : ±0.5% F : ±1%	R = Paper K = Embossed Plastic (2010 / 2512)	5 : ±1 X : ±2 O : ±3 A : ±5 B : ±10 C : ±15 D : ±25 E : ±50	S : Standard N : 1/20W Y : 1/16W X : 1/10W W : 1/8W M : 1/6W P : 1/5W V : 1/4W O : 1/3W U : 1/2W Q : 3/4W T : 1W	- = 7 inch Reel (Standard) V = 13 inch Reel	for example : 1R 4R99 10R 100R 499R 1KR 10KR 49K9R 1MR 4M7R

■ Derating Curve



■ Recommend Land Pattern



Size	A	B	C
0201	0.25	0.30	0.40±0.2
0402	0.50	0.50	0.60±0.2
0603	0.80	1.00	0.90±0.2
0805	1.00	1.00	1.35±0.2
1206	2.00	1.15	1.70±0.2
1210	2.00	1.15	2.50±0.2
2010	3.60	1.40	2.50±0.2
2010 (1/2W)	1.00	2.70	2.50±0.2
2512	4.90	1.60	3.10±0.2
2512 (1W) 1Ω ~ 100Ω	4.90	1.60	3.10±0.2
2512 (1W) 101Ω above	1.00	3.55	3.10±0.2

(Unit:mm)

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◆ Standard Electrical Specifications

Item Size	Power Rating at 70°C	Operating Temperature Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)
					±0.05 %	±0.1%	±0.25%	±0.5%	±1%	
0201	1/32W	-55~+155°C	15V	30V	--	22Ω ~ 75KΩ				±25, ±50
0402	1/16W	-55~+155°C	50V	100V	49.9Ω ~ 12KΩ	4Ω ~ 511KΩ				±25, ±50
0603	1/16W	-55~+155°C	50V	100V	4.7Ω ~ 332KΩ	1Ω ~ 1MΩ				±25, ±50
0805	1/10W	-55~+155°C	100V	200V	4.7Ω ~ 1MΩ	1Ω ~ 2MΩ				±25, ±50
1206	1/8W	-55~+155°C	150V	300V	1Ω ~ 1MΩ	1Ω ~ 3MΩ				±25, ±50
1210	1/4W	-55~+155°C	150V	300V	1Ω ~ 1MΩ	1Ω ~ 3MΩ				±25, ±50
2010	1/4W	-55~+155°C	150V	300V	1Ω ~ 1MΩ	1Ω ~ 3MΩ				±25, ±50
2512	1/2W	-55~+155°C	150V	300V	4.7Ω ~ 1MΩ	1Ω ~ 3MΩ				±25, ±50

** Lower Resistance : 1Ω ~ 10Ω

◆ Standard Electrical Specifications

Item Size	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range						TCR (PPM/°C)
					±0.01%	±0.05%	±0.1%	±0.25%	±0.5%	±1%	
0201	1/32W	-55 ~ +155°C	15V	30V	—		22Ω - 7KΩ				±10, ±15
					—		7.01KΩ - 75KΩ				±10*, ±15
0402	1/16W	-55 ~ +155°C	50V	100V	49.9Ω - 4.99KΩ			—			±1, ±2, ±3
					49.9Ω - 20KΩ						±5
					49.9Ω - 20KΩ		49.9Ω - 100KΩ				±10, ±15
0603	1/16W	-55 ~ +155°C	50V	100V	24.9Ω - 15KΩ			—			±1, ±2, ±3
					24.9Ω - 60KΩ						±5
					24.9Ω - 100KΩ	4.7Ω- 332KΩ	4.7Ω - 511KΩ				±10, ±15
0805	1/10W	-55 ~ +155°C	100V	200V	24.9Ω - 30KΩ			—			±1, ±2, ±3
					24.9Ω - 150KΩ						±5
					24.9Ω - 200KΩ	4.7Ω – 1MΩ				±10, ±15	
1206	1/8W	-55 ~ +155°C	150V	300V	24.9Ω - 49.9KΩ			—			±1, ±2, ±3
					24.9Ω - 300KΩ						±5
					24.9Ω - 499KΩ	4.7Ω – 1.5MΩ				±10, ±15	
1210	1/ 4W	-55 ~ +155°C	150V	300V	24.9Ω - 49.9KΩ			—			±1, ±2, ±3
					24.9Ω - 300KΩ						±5
					24.9Ω - 499KΩ	4.7Ω - 1MΩ				±10, ±15	
2010	1/4W	-55 ~ +155°C	150V	300V	24.9Ω - 100KΩ			—			±1, ±2, ±3
					24.9Ω - 300KΩ						±5
					24.9Ω - 499KΩ	4.7Ω - 1MΩ				±10, ±15	
2512	1/2W	-55 ~ +155°C	150V	300V	24.9Ω - 100KΩ			—			±1, ±2, ±3
					24.9Ω - 300KΩ						±5
					24.9Ω - 499KΩ	4.7Ω - 1MΩ				±10, ±15	

*TCR(25°C/-55°C) : -15 ~ +10 PPM/°C

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◆ High Power Rating Electrical Specifications

Item Size	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range						TCR (PPM/°C)
					±0.01%	±0.05%	±0.1%	±0.25%	±0.5%	±1%	
0201	1/20W	-55 ~ +155°C	25V	50V	—		22Ω - 7KΩ				±10, ±15 ±25, ±50
							7.01KΩ - 75KΩ				±10*, ±15 ±25, ±50
0402	1/10W	-55 ~ +155°C	50V	100V	49.9Ω - 4.99KΩ			—			±1, ±2, ±3
					49.9Ω - 20KΩ						±5
					49.9Ω - 12KΩ		49.9Ω - 100KΩ				±10, ±15
					—	49.9Ω - 12KΩ	4.7Ω~255KΩ				±25, ±50
0603	1/10W	-55 ~ +155°C	75V	150V	24.9Ω - 15KΩ			—			±1, ±2, ±3
					24.9Ω - 60KΩ						±5
					24.9Ω - 100KΩ	4.7Ω - 332KΩ	4.7Ω - 511KΩ				±10, ±15
							1Ω -1MΩ				±25, ±50
	1/6W(Ultra)	-55 ~ +155°C	100V	150V	—	10Ω - 332KΩ					±25, ±50
0805	1/8W	-55 ~ +155°C	150V	300V	24.9Ω - 30KΩ			—			±1, ±2, ±3
					24.9Ω -150KΩ						±5
					24.9Ω - 200KΩ	4.7Ω -511KΩ	4.7Ω -1MΩ				±10, ±15
							1Ω - 2MΩ				±25, ±50
	1/4W(Ultra)	-55 ~ +155°C	150V	300V	—	10Ω - 499KΩ					±25, ±50
1206	1/4W	-55 ~ +155°C	200V	400V	24.9Ω - 49.9KΩ			—			±1, ±2, ±3
					24.9Ω - 300KΩ						±5
					24.9Ω - 499KΩ	4.7Ω - 1MΩ				±10, ±15	
						1Ω - 1MΩ	1Ω - 3MΩ				±25, ±50
	1/3W(Ultra)	-55 ~ +155°C	200V	400V	—	10Ω ~1MΩ					±25, ±50
1210	1/3W	-55 ~ +155°C	200V	400V	24.9Ω – 49.9KΩ			—			±1, ±2, ±3
					24.9Ω - 300KΩ						±5
					24.9Ω - 499KΩ	4.7Ω - 1MΩ				±10, ±15	
						1Ω - 1MΩ	1Ω - 3MΩ				±25, ±50
	2010	1/3W	-55 ~ +155°C	200V	400V	24.9Ω - 49.9KΩ			—		
24.9Ω - 300KΩ						±5					
24.9Ω - 499KΩ						4.7Ω - 1MΩ				±10, ±15	
						1Ω - 1MΩ	1Ω - 3MΩ				±25, ±50
1/2W(Ultra)		-55 ~ +155°C	200V	400V	24.9Ω - 2KΩ	4.7Ω –1MΩ		1Ω –1MΩ			±10, ±15
					24.9Ω - 2KΩ	4.7Ω –1MΩ	4.7Ω – 3MΩ	1Ω –3MΩ		±25, ±50	
2512	3/4W	-55 ~ +155°C	200V	400V	24.9Ω - 2KΩ	4.7Ω – 2KΩ		1Ω – 2KΩ			±10, ±15
					24.9Ω - 2KΩ	4.7Ω – 2KΩ	4.7Ω – 3MΩ	1Ω – 3MΩ		±25, ±50	
	1W(Ultra)	-55 ~ +155°C	200V	400V	24.9Ω - 2KΩ	4.7Ω –1MΩ		1Ω –1MΩ			±10, ±15
					24.9Ω - 2KΩ	4.7Ω –1MΩ	4.7Ω – 3MΩ	1Ω – 3MΩ		±25, ±50	

Operating Voltage= $\sqrt{P \cdot R}$ or Max. operating voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$ or Max. overload voltage listed above, whichever is

lower. ■Viking is capable of manufacturing the optional spec based on customer's

requirement. (Lower Resistance: 1~10Ω ; High Power Rating)

*TCR(25°C/-55°C) : -15 ~ +10 PPM/°C

Thin Film Precision Chip Resistor

RAR Series

■ Environmental Characteristics

Item	Requirement		Test Method
	Tol. ≤ 0.05%	Tol. > 0.05%	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		MIL-STD-202 Method 304 +25/-55/+25/+125/+25°C
Short Time Overload	ΔR±0.05%	ΔR±0.1% ΔR ± 0.2% for 0201	JIS-C-5201-1 4.13 RCWV*2.5 or Max. overload voltage whichever is lower for 5 seconds
	ΔR±0.2% for Ultra high power rating		
Insulation Resistance	>9999 MΩ		MIL-STD-202 Method 302 Apply 100V _{DC} for 1 minute
Endurance	ΔR±0.05%	ΔR±0.1%	MIL-STD-202 Method 108A 70±2°C, RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
	ΔR±0.5% for Ultra high power rating		
	0201 : >7kΩ →ΔR±0.5% ≤ 7kΩ→ΔR±0.2%		
Bending Strength	ΔR±0.05%	ΔR±0.1%	JIS-C-5201-1 4.33 Bending amplitude 3 mm for 60 seconds 2010 2512 sizes : 2 mm Other sizes : 3 mm
Damp Heat with Load(for 0201 size)	ΔR±0.3%		MIL-STD-202 Method 103B 40±2°C, 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
Solderability	95% min. coverage		MIL-STD-202 Method 208H 245±5°C for 3 seconds
Resistance to Soldering Heat	ΔR±0.05%	ΔR±0.1%	MIL-STD-202 Method 210E 260±5°C for 10 seconds
Dielectric Withstand Voltage	By Type		MIL-STD-202 Method 301 Max. overload voltage for 1 minute
Low Temperature Operation	ΔR±0.05%	ΔR±0.2%	JIS-C-5201-1 4.36 1 hour, -65°C, followed by 45 minutes of RCWV
	ΔR±0.5% for high power & Ultra Power rating		
High Temperature Exposure	ΔR±0.5% 0402 ≥ 255.01K 0603 ≥ 402.01K 0805 ≥ 1.01M 1206 ≥ 1.01M 1210 ≥ 1.01M 2010 ≥ 1.01M 2512 ≥ 1.01M ΔR±0.2% for the other		MIL-STD-202 Method 108 at +155°C for 1000 hrs
Temperature Cycling	ΔR±0.2% (0201 product is excluded)		JESD22 Method JA-104 -55°C to +125°C, 1000 cycles
ESD	ΔR±0.5% (0201 product is excluded)		AEC-Q200-002 Human body model RAR02 RAR03 200V RAR05 RAR06 1000V RAR10 、RAR12 、RAR13 2000V
Sulfur Test	ΔR±2% (0201 product is excluded)		ASTM-B-809-95 Modified 105±2 °C no power rating for 1000 hrs.
Biased Humidity	ΔR±0.1% (0201 product is excluded)		MIL-STD-202 Method 103 1000 hrs 85°C/85%RH 10% of operating power.

RCWV(Rated continuous working voltage)= $\sqrt{P \times R}$ or Max. Operating voltage whichever is lower

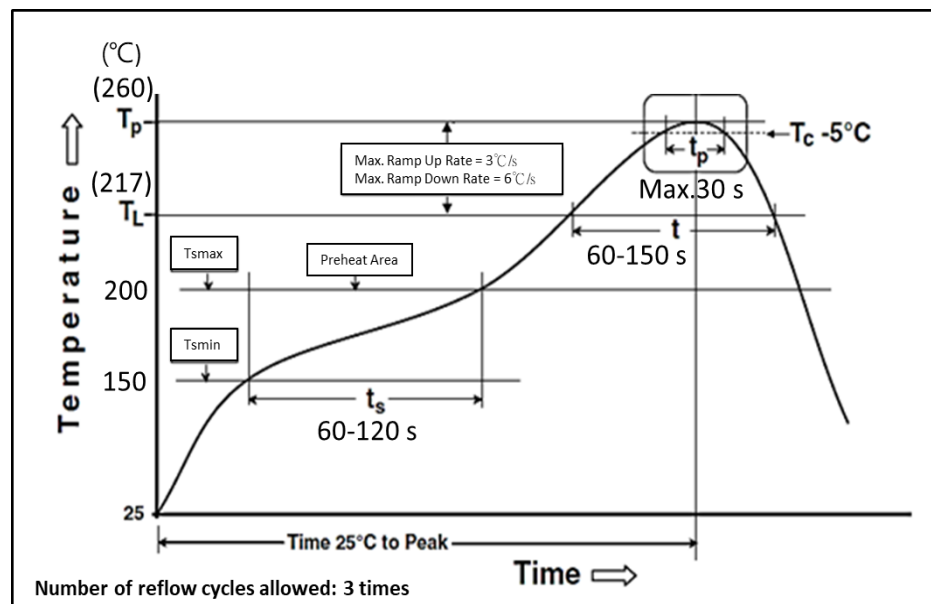
■ Storage Temperature : 15~28°C; Humidity < 80%RH

■ Shelf Life : 2 years from production date.

Thin Film Precision Chip Resistor

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■ Soldering Condition (IPC/JEDEC J-STD-020)



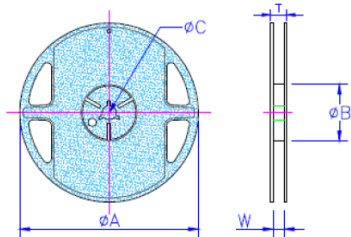
Reflow Profiles	
Profile Feature	Pb-Free Assembly
Preheat	
Min. Temperature (T_{smin})	150 °C
Max Temperature (T_{smax})	200 °C
Preheating time (t_s) from (T_{smin} to T_{smax})	60-120 seconds
Ramp-up rate (T_L to T_p)	3 °C/second max.
Liquidous temperature (T_L)	217 °C
Time (t_L) maintained above T_L	60-150 seconds
Min. Peak temperature (T_p min)	235°C
Max. Peak temperature (T_p max)	260°C
Time (t_p) within 5 °C of the specified classification temperature (T_c)	30 seconds max.
Ramp-down rate (T_p to T_L)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

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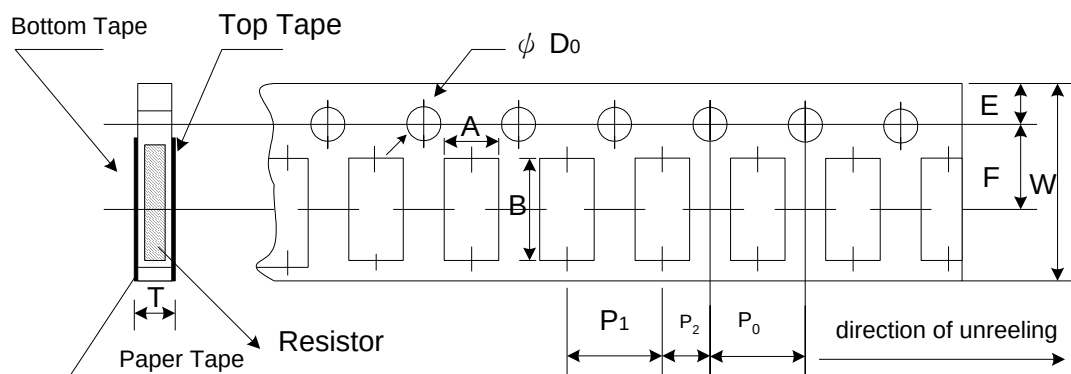
■ Packaging

Packing Quantity & Reel Specifications : (Unit : mm)



Size	øA	øB	øC	W	T	Paper Tape(EA)	Emboss Plastic(EA)
0201	178±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
0402	178±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
0603	178±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
0805	178±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
1206	178±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
1210	178±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
2010	178±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
2512	178±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000

Paper Tape Specifications : (Unit : mm)

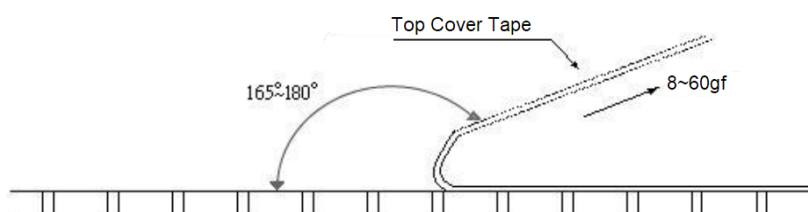


Size	A	B	W	E	F	P ₀	P ₁	P ₂	øD ₀	T
0201	0.40±0.05	0.70±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.55±0.03	0.42±0.02
0402	0.70±0.05	1.16±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.55±0.05	0.40±0.03
0603	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.60±0.03
0805	1.60±0.05	2.37±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
1206	2.00±0.05	3.55±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
1210	2.75±0.05	3.40±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.60±0.10	0.75±0.05

*Peel force of top cover tape

*The peel speed shall be about 300mm/min±5%

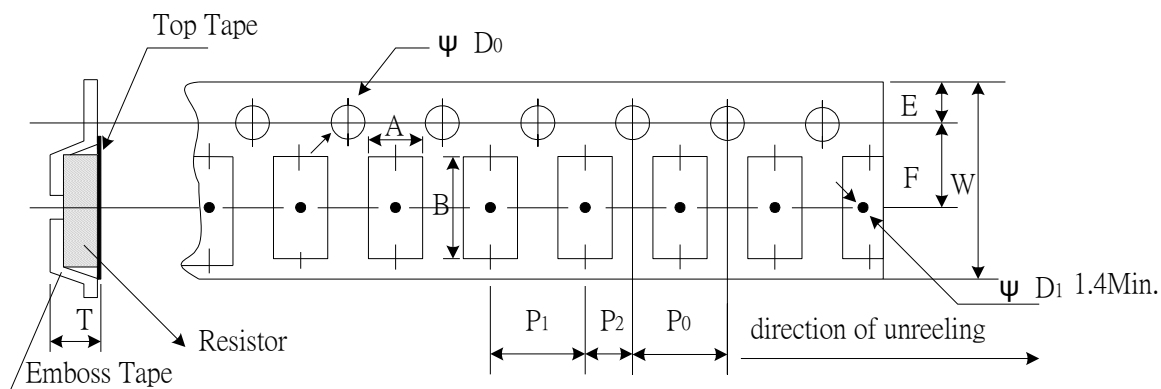
*The peel force of top cover tape shall be between 8gf to 60gf



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Emboss Plastic Tape Specifications : (Unit : mm)

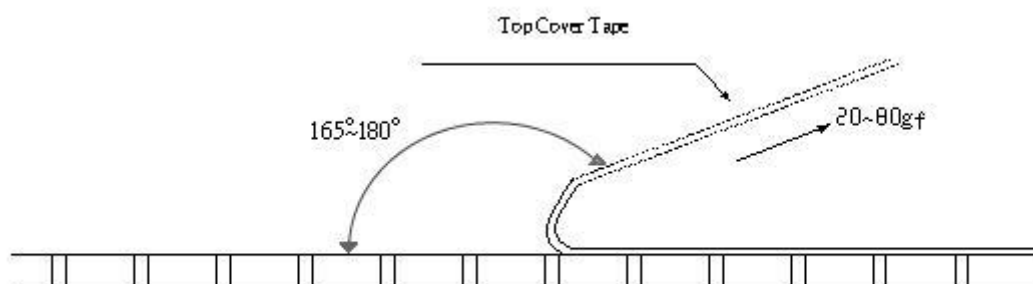


Size	A	B	W	E	F	P ₀	P ₁	P ₂	øD ₀	T
2010	2.85±0.10	5.45±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.02
2512	3.40±0.10	6.65±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.02

*Peel force of top cover tape

*The peel speed shall be about 300mm/min±5%

*The peel force of top cover tape shall be between 20gf to 80gf



Thin Film Precision Chip Resistor

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■ Marking

0603 3digit marking in E96



3digit marking for Example : 14C=13K7Ω 13C=13K3Ω

68B=4K99Ω 68X=49.9Ω

Marking Table

Code	E96		Code	E96		Code	E96		Code	E96	
01	100		25	178		49	316		73	562	
02	102		26	182		50	324		74	576	
03	105		27	187		51	332		75	590	
04	107		28	191		52	340		76	604	
05	110		29	196		53	348		77	619	
06	113		30	200		54	357		78	634	
07	115		31	205		55	365		79	649	
08	118		32	210		56	374		80	665	
09	121		33	215		57	383		81	681	
10	124		34	221		58	392		82	698	
11	127		35	226		59	402		83	715	
12	130		36	232		60	412		84	732	
13	133		37	237		61	422		85	750	
14	137		38	243		62	432		86	768	
15	140		39	249		63	442		87	787	
16	143		40	255		64	453		88	806	
17	147		41	261		65	464		89	825	
18	150		42	267		66	475		90	845	
19	154		43	274		67	487		91	866	
20	158		44	280		68	499		92	887	
21	162		45	287		69	511		93	909	
22	165		46	294		70	523		94	931	
23	169		47	301		71	536		95	953	
24	174		48	309		72	549		96	976	
Code	A	B	C	D	E	F	G	H	X	Y	Z
Multiplier	10 ⁰	10 ¹	10 ²	10 ³	10 ⁴	10 ⁵	10 ⁶	10 ⁷	10 ⁻¹	10 ⁻²	10 ⁻³

0603 3digit marking for E24, but when E24 and E96 share the same resistance, E96 marking shall take priority

Example :

Resistance	100Ω	11KΩ	12KΩ	27KΩ
Marking	01A	05C	123	273

E24	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91
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0805~2512 4digit marking

Example

Resistance	100Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ
marking	1000	2201	1002	4992	1003