

Data Sheet

Customer :

Product : Thin Film Precision Chip Resistor - AR Series

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

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22-May-24	22-May-24	22-May-24	22-May-24	
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Thin Film Precision Chip Resistor (AR Series)



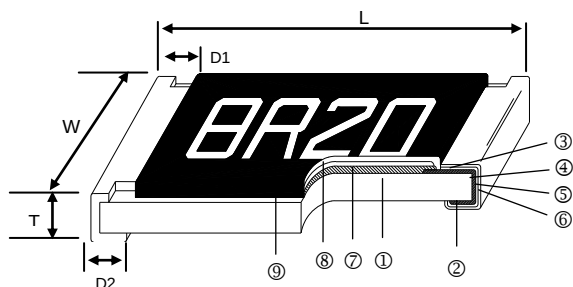
■ Features

- 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 1ohm ~ 3Mega ohm
- Miniature size 0201 available
- AEC-Q200 Compliance (0201 product is excluded)
- Test proven immunity to Biased humidity($85^{\circ}\text{C} / 85\% \text{RH}$)

■ Applications

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

■ Construction



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

■ Dimensions

Unit: mm

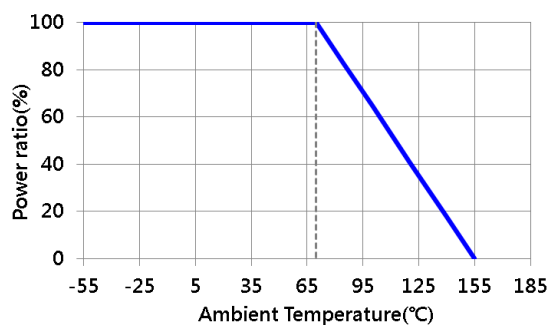
Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
AR01	0201	0.58 $\pm$ 0.05	0.29 $\pm$ 0.05	0.23 $\pm$ 0.05	0.12 $\pm$ 0.05	0.15 $\pm$ 0.05	0.14
AR02	0402	1.00 $\pm$ 0.05	0.50 $\pm$ 0.05	0.30 $\pm$ 0.05	0.20 $\pm$ 0.15	0.20 $\pm$ 0.10	0.54
AR03	0603	1.55 $\pm$ 0.10	0.80 $\pm$ 0.10	0.45 $\pm$ 0.10	0.30 $\pm$ 0.25	0.30 $\pm$ 0.20	1.83
AR05	0805	2.00 $\pm$ 0.15	1.25 $\pm$ 0.15	0.55 $\pm$ 0.10	0.30 $\pm$ 0.25	0.40 $\pm$ 0.20	4.71
AR06	1206	3.05 $\pm$ 0.15	1.55 $\pm$ 0.15	0.55 $\pm$ 0.10	0.42 $\pm$ 0.30	0.35 $\pm$ 0.25	9.02
AR13	1210	3.10 $\pm$ 0.15	2.40 $\pm$ 0.15	0.55 $\pm$ 0.10	0.40 $\pm$ 0.30	0.55 $\pm$ 0.25	10
AR10	2010	4.90 $\pm$ 0.15	2.40 $\pm$ 0.15	0.55 $\pm$ 0.10	0.60 $\pm$ 0.40	0.50 $\pm$ 0.25	23.61
AR10(1/2W)	2010(1/2W)	4.90 $\pm$ 0.15	2.40 $\pm$ 0.15	0.55 $\pm$ 0.10	0.60 $\pm$ 0.40	2.20 $\pm$ 0.25	26.68
AR12	2512	6.30 $\pm$ 0.15	3.10 $\pm$ 0.15	0.55 $\pm$ 0.10	0.60 $\pm$ 0.40	0.50 $\pm$ 0.25	38.06
AR12(1W)1~100 Ω	2512(1W)	6.30 $\pm$ 0.15	3.10 $\pm$ 0.15	0.55 $\pm$ 0.10	0.60 $\pm$ 0.40	0.50 $\pm$ 0.25	44.65
AR12(1W)101 Ω above	2512(1W)	6.30 $\pm$ 0.15	3.10 $\pm$ 0.15	0.55 $\pm$ 0.10	0.60 $\pm$ 0.40	2.50 $\pm$ 0.25	44.65

Part Numbering

AR	03	B	T	B	X	1001	
Product Type	Dimensions (L×W)	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking Code
	01: 0201 02: 0402 03: 0603 05: 0805 06: 1206 13: 1210 10: 2010 12: 2512	T: ±0.01% A: ±0.05% B: ±0.1% C: ±0.25% D: ±0.5% F: ±1%	T: Taping Reel B: Bulk	5: ±1 X: ±2 O: ±3 S: ±5 B: ±10 N: ±15 C: ±25 D: ±50	: Standard (see Remark) 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	0010: 1Ω 4R70: 4.7Ω 1001: 1KΩ 1004: 1MΩ	: Standard Marking for E96 / E24 N: No Marking

*Remark: Standard part no need for power rating code.

Derating Curve



Standard Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)
					±0.05%	±0.1%	±0.25%	±0.5%	±1%	
AR01 (0201)	1/32W	-55 ~ +155°C	15V	30V	—	22Ω - 75KΩ				±25,±50
AR02 (0402)	1/16W	-55 ~ +155°C	50V	100V	49.9Ω - 12KΩ	4Ω - 511KΩ				±25,±50
AR03 (0603)	1/16W	-55 ~ +155°C	50V	100V	4.7Ω - 332KΩ	1Ω - 1MΩ				±25,±50
AR05 (0805)	1/10W	-55 ~ +155°C	100V	200V	4.7Ω - 1MΩ	1Ω - 2MΩ				±25,±50
AR06 (1206)	1/8W	-55 ~ +155°C	150V	300V	4.7Ω - 1MΩ	1Ω - 3MΩ				±25,±50
AR13 (1210)	1/4W									
AR10 (2010)	1/4W									
AR12 (2512)	1/2W	-55 ~ +155°C	150V	300V	4.7Ω - 1MΩ	1Ω - 3MΩ				±25,±50

■ Lower Resistance: 1~10Ω

Special Electrical Specifications

Type	Item	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%	
AR02 (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	
AR03 (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	
AR05 (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		
AR06 (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		
AR13 (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		
AR10 (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		
AR12 (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		

High Power Rating Electrical Specifications

Item Type	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%	
AR01 (0201)	1/20W	-55 ~ +155°C	25V	50V	—			22Ω - 75KΩ			±25,±50
AR02 (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	
AR03 (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
AR05 (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

AR06 (1206)	1/4W	-55 ~ +155℃	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℃	200V	400V	—	10Ω ~1MΩ			±25,±50	
AR13 (1210)	1/3W	-55 ~ +155℃	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	
AR10(2010)	1/3W	-55 ~ +155℃	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	
	1/2W(Ultra)	-55 ~ +155℃	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	
AR12(2512)	3/4W	-55 ~ +155℃	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℃	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)

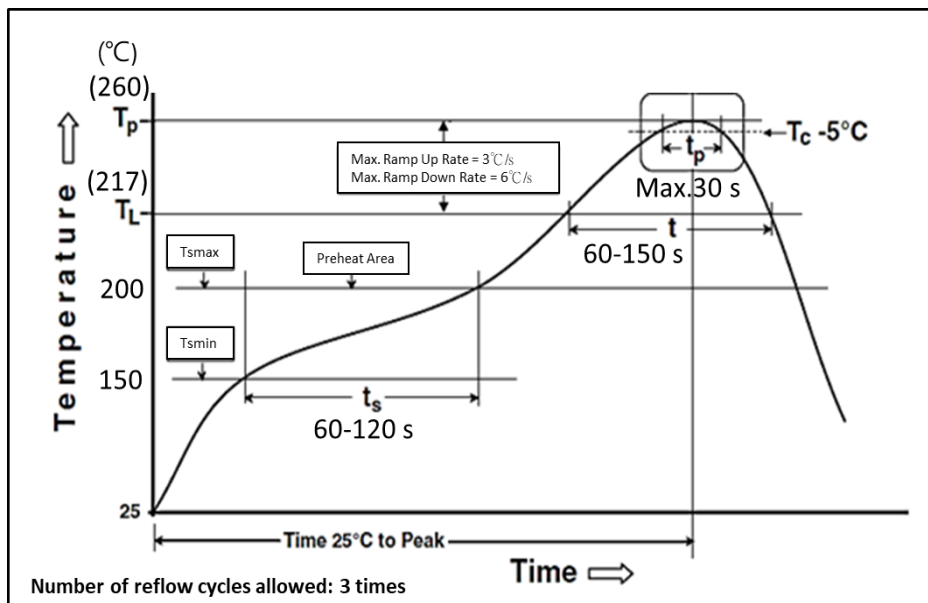
■ Environmental Characteristics

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 AR02 AR03 200V AR05 AR06 1000V AR10 、AR12 、AR13 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)= $\sqrt{P \cdot R}$ or Max. Operating voltage whichever is lower

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

■ Shelf Life: 2 years from production date.

■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.

■ Marking

0603 3digit marking



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

Example: 101=100Ω 102=1KΩ

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

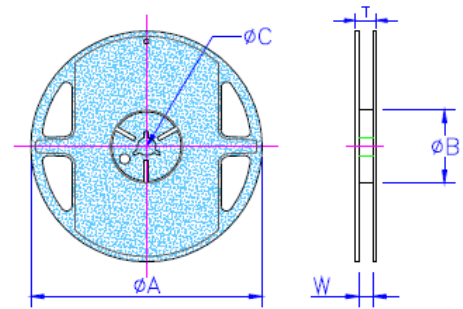
Resistance	100Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ
marking	1000	2201	1002	4992	1003

Packaging

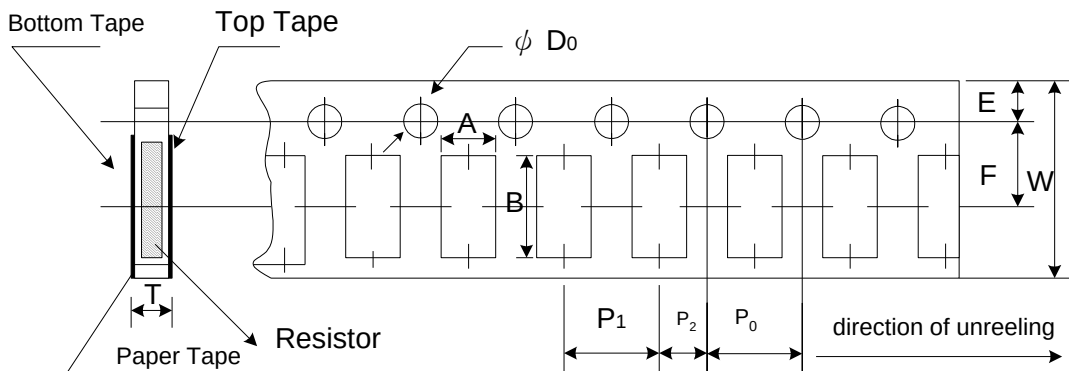
Packing Quantity & Reel Specifications

Unit : mm

Type	ØA	ØB	ØC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
AR01	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
AR02	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
AR03	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
AR05	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
AR06	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
AR13	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
AR10	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
AR12	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000



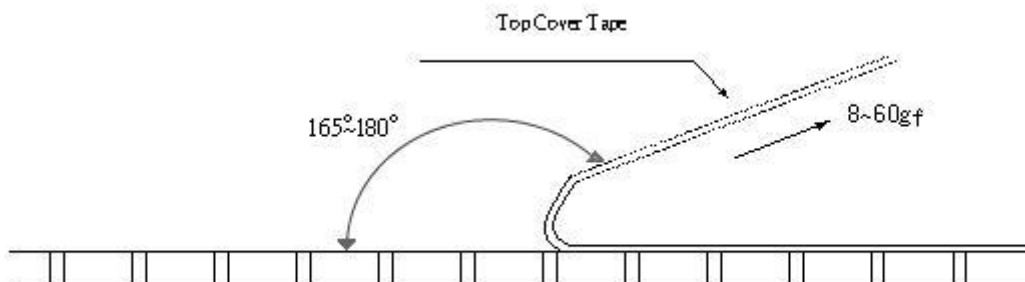
Paper Tape Specifications



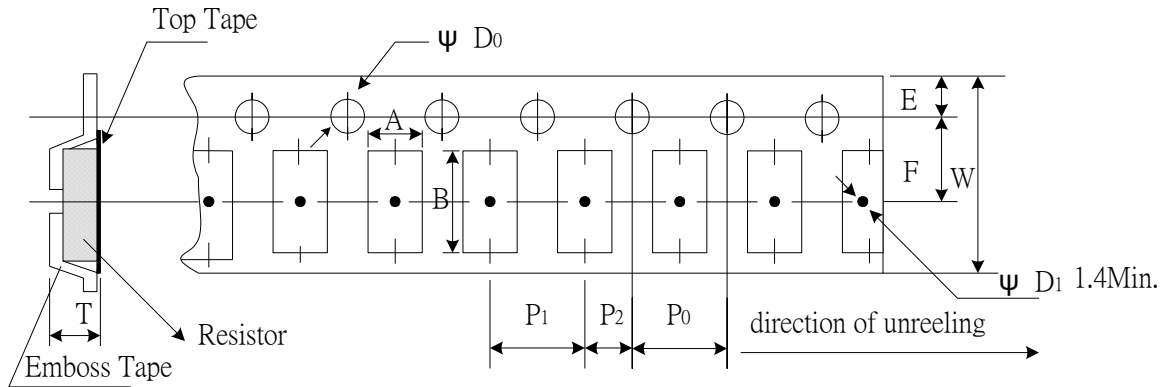
Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
AR01	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
AR02	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
AR03	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
AR05	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
AR06	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
AR13	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



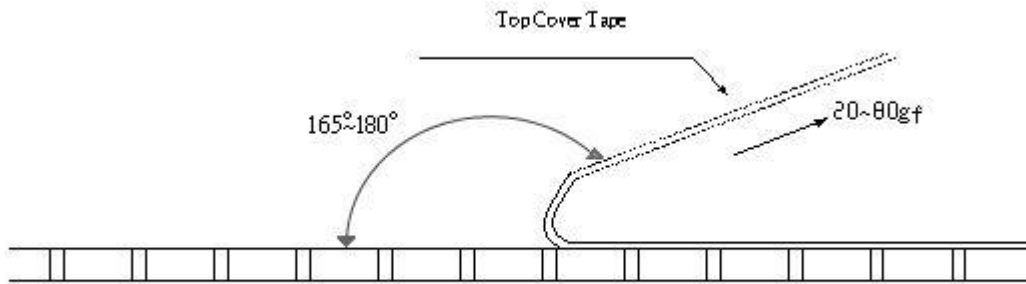
Emboss Plastic Tape Specifications



Unit: mm

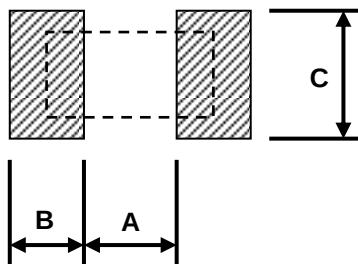
Type	A	B	W	E	F	P ₀	P ₁	P ₂	ØD ₀	T
AR10	2.85±0.10	5.45±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.20
AR12	3.40±0.10	6.65±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.20

- 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



■ Recommend Land Pattern

Unit: mm



Type	A	B	C
AR01	0.25	0.30	0.40±0.2
AR02	0.50	0.50	0.60±0.2
AR03	0.80	1.00	0.90±0.2
AR05	1.00	1.00	1.35±0.2
AR06	2.00	1.15	1.70±0.2
AR13	2.00	1.15	2.50±0.2
AR10	3.60	1.40	2.50±0.2
AR10(1/2W)	1.00	2.70	2.50±0.2
AR12	4.90	1.60	3.10±0.2
AR12(1W) 1~100Ω	4.90	1.60	3.10±0.2
AR12(1W) 101Ω above	1.00	3.55	3.10±0.2

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version D3	Jan. 14, 2013	-	- Add resistance range for Special Electrical and High Power Rating Electrical Specifications. - Adjust the mockup.
Version D4	Apr. 10, 2013	-	- Add "RCWV" description in Environment Characteristic Test Method.
Version D5	Oct. 16, 2013	-	- Increase the resistance range of AR05, TCR15 product.
Version D6	Oct. 17, 2014	-	- Correct the specification of top cover tape peel force. - Update the resistance range of AR05 (Standard) to 4.7Ω -1MΩ
Version D7	Apr. 28, 2015	-	- Add TCR ±2ppm and ±3ppm products specification. - Increase the resistance range of the products below: • AR02 and AR03 of Standard Electrical Specifications. • AR02, AR03 and AR05 of Special Electrical Specifications. - Correct the element of Top Electrode.
Version D8	May. 02, 2016	-	- Modify Storage Temperature.
Version D9	Aug.04, 2016	-	- Update items and requirements of Environmental Characteristics. - Increase the resistance range of Special Electrical Specifications products.
Version E	Dec.14, 2016	-	- Add AR02 High Power Rating Electrical Specifications.
Version E1	Feb. 23, 2017	-	- Increase the resistance range of AR02 Standard Electrical Specifications.
Version E2	Apr. 05, 2017	-	- Add TCR ±1ppm and products specification.
Version E3	Nov.10, 2017	-	- Correct the reference standard in Environmental Characteristics.
Version E4	Dec.26, 2017	-	- Correct the reference standard in Environmental Characteristics.

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version E5	Feb. 06, 2018	-	- Correct the reference standard in Environmental Characteristics.
Version E6	Jul. 24, 2018	-	- Update Environment Characteristics item.
Version E7	May. 02, 2019	-	- Increase the AR01 0.1% & 0.25% Precision resistance.
Version E8	Oct. 29, 2019	-	- Increase the resistance range of Standard, Special and High Power Rating Electrical Specifications.
Version E9	Jan. 07, 2020	-	- Define the Dimensions specifications for AR10(1/2W) and AR12(1W). - Add the part number code "N" for 1/20W Power rating. - Extend the resistance range of AR01 (Standard Electrical Specifications). - Add products specifications for AR01(1/20W) and AR10(1/2W). - Update products specifications for AR12(1W). - Define the Recommend Land Pattern for AR10(1/2W) and AR12(1W).
Version F	Apr. 27, 2020	-	- Modify the Max. Operating Voltage of AR02 from 25V to 50V. - Modify the Max. Overload Voltage of AR02 from 50V to 100V. - Correct Recommend Land Pattern Dimension A/B of AR10(1/2W) from 0.5mm/2.8mm to 1.00mm/2.70mm.
Version F1	Dec. 08, 2020	-	- Extend the resistance range of AR01 Standard and High Power Rating Electrical Specifications. - Modify the test time of Bending Strength.
Version F2	Jan. 22, 2022	-	- Correct the dimension specifications of D2 and land pattern for AR12. - Modify IR reflow profile to comply IPC/JEDEC J-STD-020. - Add shelf life description.

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version F3	Feb. 10,2022	-	- Modify the temperature (low temperature) of Derating Curve from 0°C to -55°C.
Version F4	Nov. 10,2023	-	- Resistance range of Standard Electrical: AR06/AR13 0.1%~1% up to 3MΩ. - Resistance range of High Power Electrical: AR05 TCR25/50 0.1%~1% up to 2MΩ. - Resistance range of High Power Electrical: AR06~AR12 TCR25/50 0.1%~1% up to 3MΩ. - Update Reflow Profiles.
Version F5	May. 22,2024	-	- Add AEC-Q200 Compliance and Biased humidity descriptions in Features. -Modify the tolerance of dimension D1 for AR02~AR12. -Add "Ultra" description for AR03~AR12. -Update Environmental Characteristics: • Add the requirement of Ultra high power rating product for Short Time Overload and Endurance Tests. • Only keep AR01 requirement for Damp Heat with Load Test. • Add High Temperature Exposure, Temperature Cycling, ESD, Sulfur and Biased Humidity Tests.