Data Sheet

Customer：	
Product :	Automotive Grade High Power Thin Film Chip Resistor – ARP Series
Size:	0603/0805/1206/2512
Issued Date:	27-Jul-26
Edition :	REV.A4

RoHS Compliant

HONG KONG HELISTO INDUSTRIAL LIMITED
香港海利斯特实业有限公司

SHENZHEN HELISTO TECHNOLOGYCOLTD
深圳市海利斯特科技有限公司

ADD:5/F., A Block, Hongdu Industrial Park, Fanshen Road, 45 Area, Baoan, Shenzhen, China
TEL:+86-755-29741555 29749555
FAX:+86-755-29742111
E-mail:donnyhai@helisto.com
www.Helisto.com

Produced by (QC)	Checked (QC)	Approved by (QC)	Prepared by (Sales)	Accepted by (Customer)
27-Jul-26	27-Jul-26	27-Jul-26		
Chun	***Ben Chang***	***Ben Chang***		

Automotive Grade High Power Thin Film Chip Resistor (ARP Series)



Features

- Wider bottom terminal enabling higher power capability (short side terminal)
- High Purity Ceramic substrate
- Power rating up to 2.5W
- Resistance 10Ω ~ 100KΩ(1206 only)
- AEC-Q200 Qualified
- Advanced sulfur resistance verified according to ASTM B 809
- Total Lead(Pb)-free without RoHS exemptions

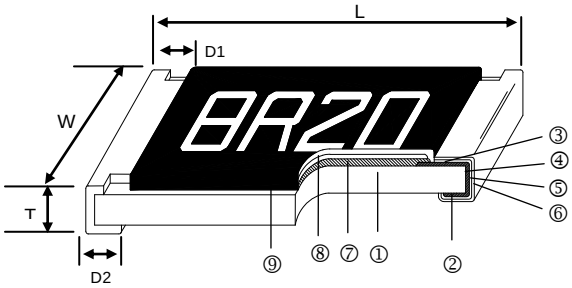
Applications

- Automotive
- Power supplies、Power source related devises
- Power Switching、DC motors、Inverters
- Braking System、Robotics、Industrial control system
- Test and measurement equipment

Typical Performance

- TCR. 25 ppm/℃
- TOL. 0.1 %

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

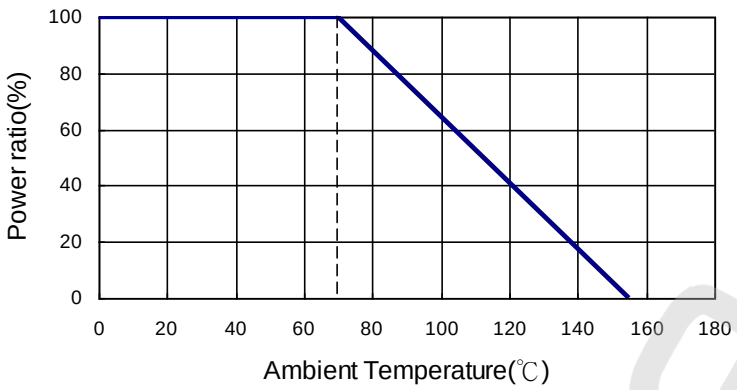
Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
ARP03	0603	1.55±0.10	0.80±0.10	0.45±0.10	0.25±0.20	0.50±0.20	1.95
ARP05	0805	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.60±0.20	4.84
ARP06	1206	3.05±0.15	1.55±0.15	0.55±0.10	0.42±0.20	1.10±0.20	9.43
ARP12	2512	6.30±0.15	3.10±0.15	0.55±0.10	0.60±0.40	1.60±0.25	41.72

Part Numbering

ARP	06	B	T	C		1001	N
Product Type	Dimensions (L×W)	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking Code
	03: 0603 05: 0805 06: 1206 12: 2512	B: ±0.1% C: ±0.25% D: ±0.5% F: ±1%	T: Taping Reel B: Bulk	C: ±25 D: ±50	: Standard* (See Remark)	0100: 10Ω 10R2: 10.2Ω 1000:100Ω 1001: 1KΩ 1003: 100KΩ	: 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)
					±0.1%	±0.25%	±0.5%	±1%	
ARP03 (0603)	3/8W (1)	-55°C~+155°C	75V	150V	10Ω ~ 30.1KΩ				±25 ±50
ARP05 (0805)	5/8W (1)	-55°C~+155°C	100V	200V	10Ω ~ 30.1KΩ				±25 ±50
ARP06 (1206)	1.0W (1)	-55°C~+155°C	200V	400V	10Ω ~ 100KΩ				±25 ±50
ARP12 (2512)	2.5W (1)	-55°C~+155°C	200V	400V	10Ω ~ 30.1KΩ				±25 ±50

(1) Dependant on component mounting by user.
Operating Voltage=√(P*R) or Max. operating voltage listed above, whichever is lower.
■Viking is capable of manufacturing the optional spec based on customer's requirement.

■Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	**JIS-C-5201-1 4.8** **IEC-60115-1 4.8** -55°C~+125°C, 25°C is the reference temperature
Short Time Overload	ΔR ± 0.1 %	**JIS-C-5201-1 4.13** ■0603/0805/1206: RCWV*2.5 or Max.overload voltage whichever is lower for 5 seconds ■2512: RCWV*2.0 or Max.overload voltage whichever is lower for 5 seconds (Actual power handling capability is limited by the end user)
Insulation Resistance	>1000 MΩ	**JIS-C-5201-1 4.6** **IEC-60115-1 4.6** Apply 100V_{DC} for 1 minute
Operational Life	ΔR±0.2%	**MIL-STD-202 Method 108** Condition D Steady State T_A=125°C at derated power. Measurement at 24±4 hours after test conclusion
Biased Humidity	ΔR±0.1%	**MIL-STD-202 Method 103** 1000 hrs 85°C/85%RH 10% of operating power.
High Temperature Exposure	<12KΩ △R±0.1% ≧12KΩ △R±0.2%	**MIL-STD-202 Method 108** at +155°C for 1000 hrs
Temperature Cycling	ΔR±0.1%	**JESD22 Method JA-104** -55°C to +125°C, 1000 cycles

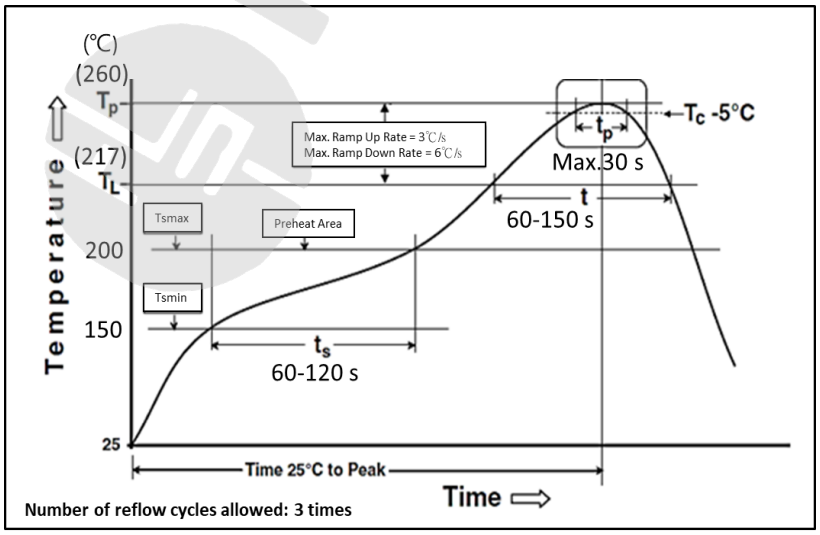
Item	Requirement	Test Method
Bending Strength (Board Flex)	ΔR±0.1%	**JIS-C-5201-1 4.33** Bending once for 60 seconds Bending displacement: 2512 sizes: 2 mm Other sizes: 3 mm
Solderability	95% min. coverage	**MIL-STD-202 Method 208** 245±5°C for 3 seconds
Resistance to Soldering Heat	ΔR±0.05%	**JIS-C-5201-1 4.18** **IEC-60115-1 4.18** 260±5°C for 10 seconds
Terminal strength	No broken	**AEC-Q200-006** Force of 1.8kg for 60 seconds.
Mechanical Shock	ΔR±0.1%	**MIL-STD-202 Method 213** Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	ΔR±0.1%	**MIL-STD-202 Method 204** 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	ΔR±0.5%	**AEC-Q200-002** **Human body model** 0603 1.0KV ; 0805 1.5KV ; 1206、2512 2KV
Resistance to solvents	Marking Unsmeared	**MIL-STD-202 Method 215** Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Sulfur Test	ΔR±1%	**ASTM-B-809-95 Modified** 105±2 °C no power rating for 1000 hrs.
Flammability	No ignition of the tissue paper or scorching or the pinewood board	**UL-94** V-0 or V-1 are acceptable. Electrical test not required.

RCWV(Rated continuous working voltage)= √(P*R) or Max. Operating voltage whichever is lower

■ **Storage Temperature: 15~28℃; Humidity < 80%RH**

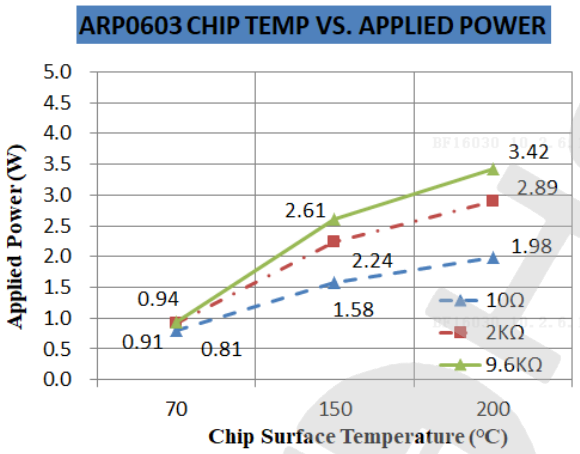
■ **Shelf Life: 2 years from production date.**

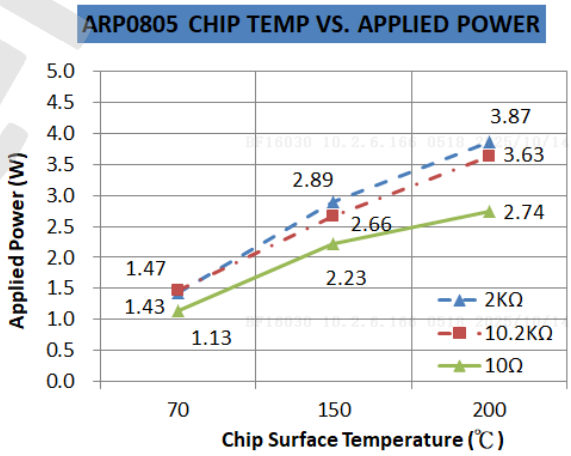
■Soldering Condition(IPC/JEDEC J-STD-020)

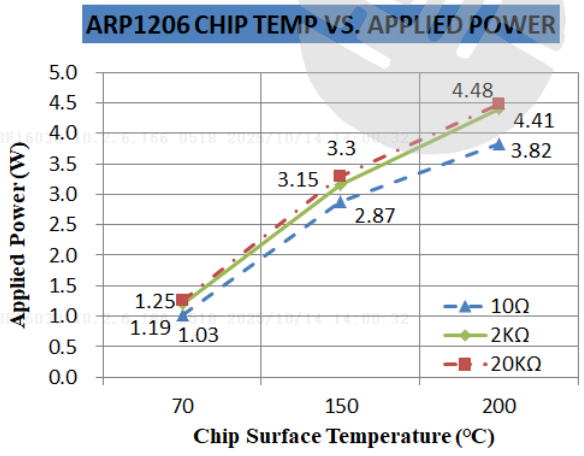


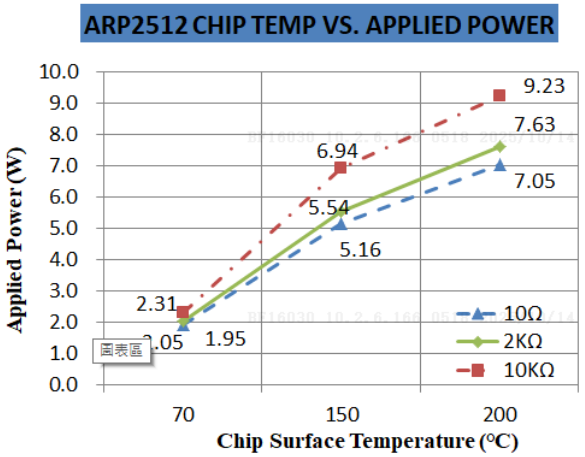
Reflow Profiles	
Profile Feature	**Pb-Free Assembly**
Preheat Min. Temperature (Tsmin) Max Temperature (Tsmax) Preheating time (ts) from (Tsmin to Tsmax)	 150 °C 200 °C 60-120 seconds
Ramp-up rate (T_L to Tp)	3 °C/second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	217 °C 60-150 seconds
Min. Peak temperature (Tp min)	235°C
Max. Peak temperature (Tp max)	260°C
Time (tp) within 5 °C of the specified classification temperature (Tc)	30 seconds max.
Ramp-down rate (Tp to T_L)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

■ Chip Temp Vs. Applied Power



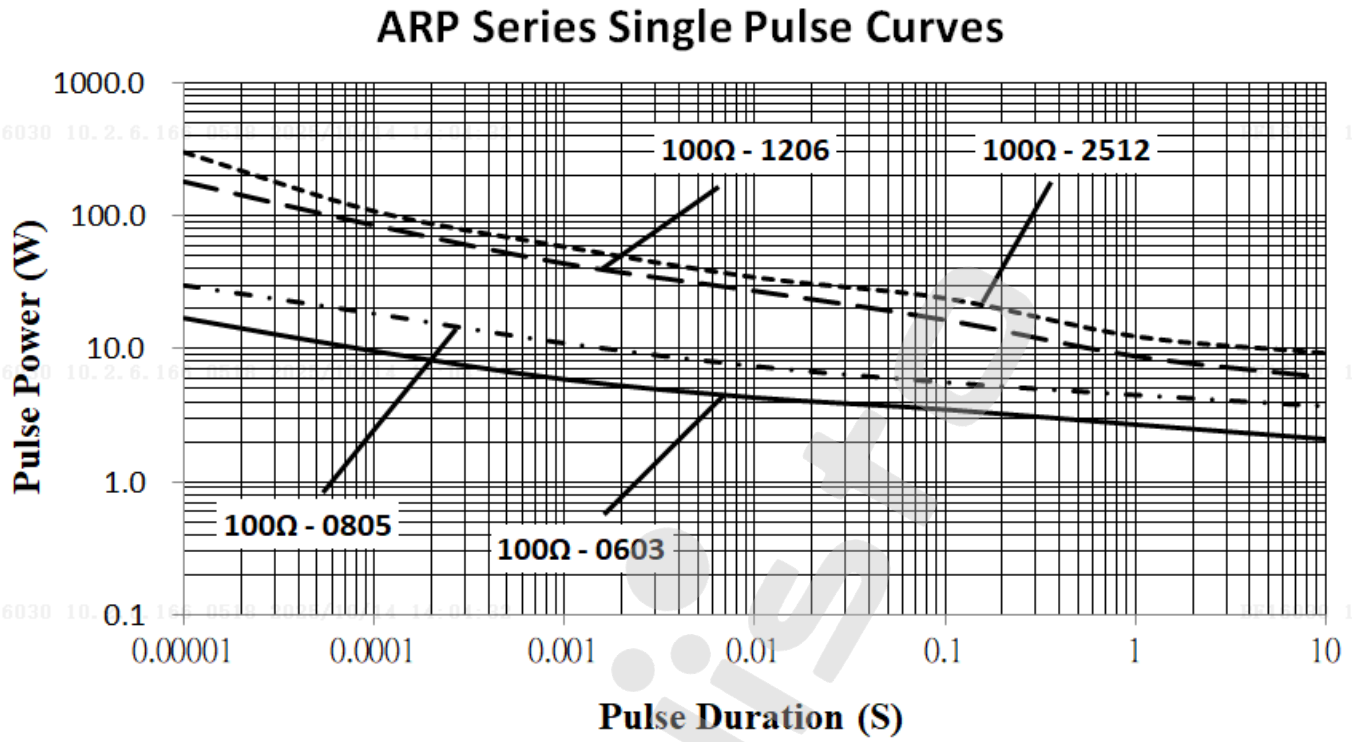






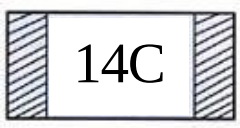
(2) Chip surface temperature measured using FLIR ETS-320 thermal imaging system with an approximate test card surface temperature

■ Single Pulse Curve



■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

0805~2512 4digit marking

Example

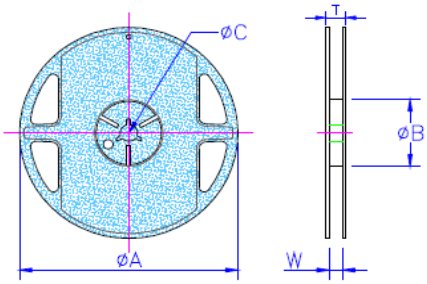
Resistance	100Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ
marking	1000	2201	1002	4992	1003

■Packaging

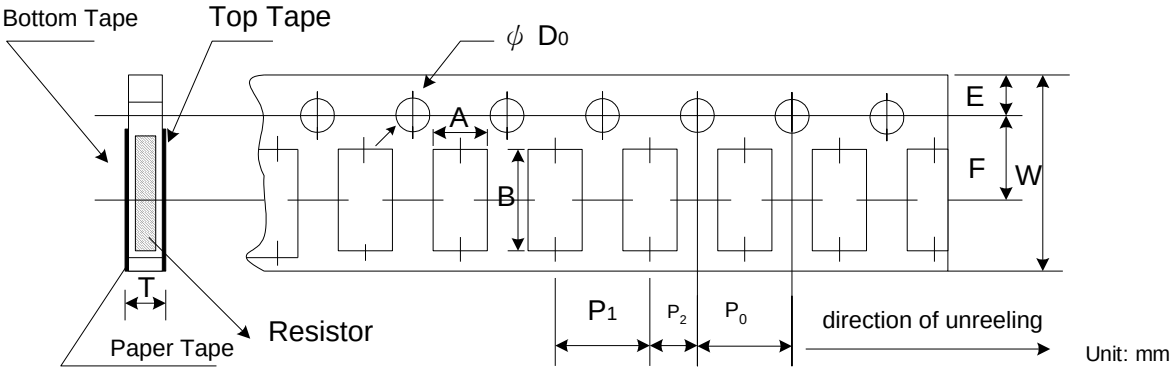
Packing Quantity & Reel Specifications

Unit :mm

Type	**ØA**	**ØB**	**ØC**	**W**	**T**	**Paper Tape (EA)**	**Emboss Plastic Tape (EA)**
ARP03	178.0±1.0	60.0+1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARP05	178.0±1.0	60.0+1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARP06	178.0±1.0	60.0+1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARP12	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000

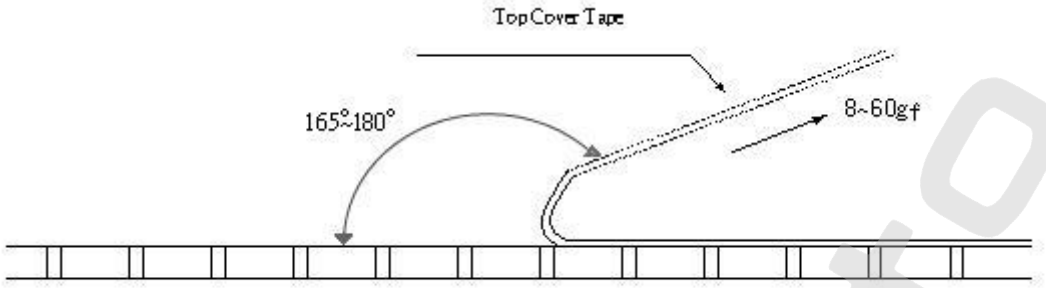


Paper Tape Specifications

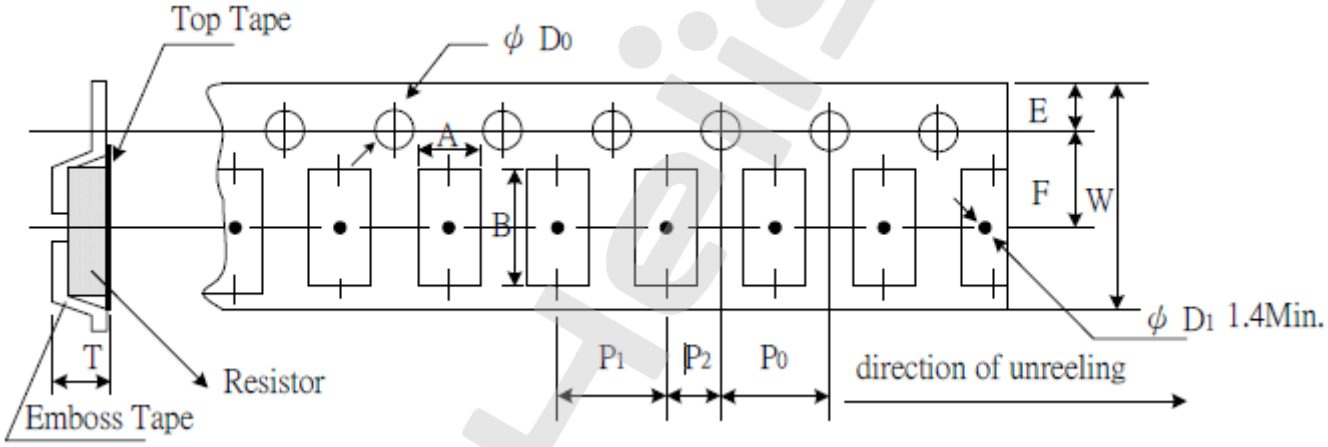


Type	A	B	W	E	F	P_0	P_1	P_2	ΦD_0	T
ARP03	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.60±0.03
ARP05	1.60±0.05	2.37±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
ARP06	2.00±0.05	3.55±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05

■ 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

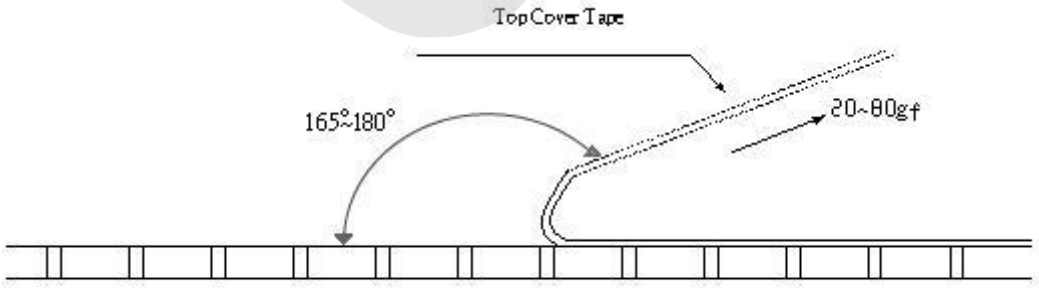


Emboss Plastic Tape Specifications



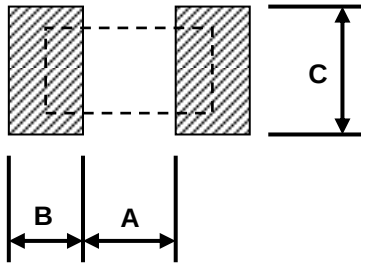
Type	A	B	W	E	F	P_0	P_1	P_2	ΦD_0	T
ARP12	3.40±0.10	6.65±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.20

■ 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
ARP03	0.37	0.99	0.86±0.1
ARP05	0.50	1.08	1.32±0.1
ARP06	0.60	1.90	1.80±0.2
ARP12	2.77	2.31	3.20±0.2

■Please design the land pattern considering heat dissipation to the board so that the terminal temperature will not exceed 155℃.

■Use a board with a copper thickness of two ounces

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A1	Jan. 26, 2022	-	- Add shelf life description. - Modify IR reflow profile to comply IPC/JEDEC J-STD-020.
Version A2	Apr. 30, 2026	-	**-Add Reflow Profiles.** **-Add product Sizes: 0603, 0805, 2512.** **•Update Features:** - High Purity Ceramic substrate. -Power rating up to 2.5W. -Remove “Significantly larger power handling capability than existing same size resistors.” -AEC-Q200 Qualified. **•Update Applications**: -Automotive, Power supplies, Power Switching, Braking System, Test and measurement equipment **•Update Typical Performance:** -TCR. 25 ppm/℃ -TOL. 0.1 % **•Expand size offering to include 0603, 0805, and 2512 footprints. The unit weight for the 1206 size has been revised from 9.02 mg to 9.43 mg.** **•Update the Part Numbering to include 0603, 0805, and 2512 size codes. Added tolerance code “C” to represent ±0.25% tolerance.** **•Update ”Standard Electrical Secifications”** -Add 0.25% tolerance for 0603/0805/2512 size specifications. -Revise the Resistance Range for the 1206 size. **• Update Environmental Characteristics:** -Change TCR test conditions from MIL-STD-202 Method 304 +25/-55/+25/+125/+25° to JIS-C-5201-1 4.8 IEC-60115-1 4.8 -55°C~+125°C, 25°C

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
			is the reference temperature. - Change Short Time Overload Test requirements for <47Ω △R±0.4% ; ≧47Ω △R±0.2% to ΔR ± 0.1 %. - Update Insulation Resistance test standard from MIL-STD-202 Method 302 to JIS-C-5201-1 4.6 IEC-60115-1 4.6 - Add Operational Life Test and removed Endurance test. - Change High Temperature Exposure test conditions and requirement. - Revise Temperature Cycling specification for <47Ω △R±0.25% ; ≧47Ω △R±0.1% to ΔR ± 0.1 % -Revise Solderability test standard from JIS-C-5201-1 4.17 / IEC-60115-1 4.17 to MIL-STD-202 Method 208. - Revised Resistance to Soldering Heat specification from <47Ω △R±0.25% ; ≧47Ω △R±0.1% to ΔR ± 0.05%. -Add ESD test conditions and requirements for 0603, 0805, and 2512 sizes. -Revise Sulfur Test duration from 750 hours to 1000 hours. **•Added Chip Temperature vs. Applied Power curve and Single Pulse Curve.** **•Added packaging specifications for 0603, 0805, and 2512 sizes.** **•Recommend Land Pattern**: Add specifications for 0603, 0805, and 2512 sizes; included requirement for 2 oz copper thickness PCBA.
Version A3	Jun 01,2026	-	- Add new rule for 0603 3digit marking: When E24 and E96 share the same resistance, E96 marking shall take priority.

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A4	Jul 27,2026	-	- Add “Automotive Grade” to product title. - Add new description “Total Lead(Pb)-free without RoHS exemptions” to Features.