Data Sheet

Customer：	
Product :	High Frequency(up to 70 GHz)Thin Film Precision Chip Resistor – ARF Series
Size:	0201/0402/0603/0805/1206
Issued Date:	9-Jul-26
Edition :	REV.A6

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)
9-Jul-26	9-Jul-26	9-Jul-26		
Chun	***Ben Chang***	***Ben Chang***		

High Frequency (up to 70GHz) Thin Film Precision Chip Resistor (ARF Series)



Features

- Small standard size 0201 case size
- High Frequency up to 70GHz for 0201
- High Frequency up to 50GHz for 0402、0603
- High purity alumina substrate
- Ohmic range (10Ω~1KΩ)
- Resistor tolerance to ± 0.1%
- Low TCR (down to ± 25ppm/ ∘C)
- RoHS (Pb)-free without exemption

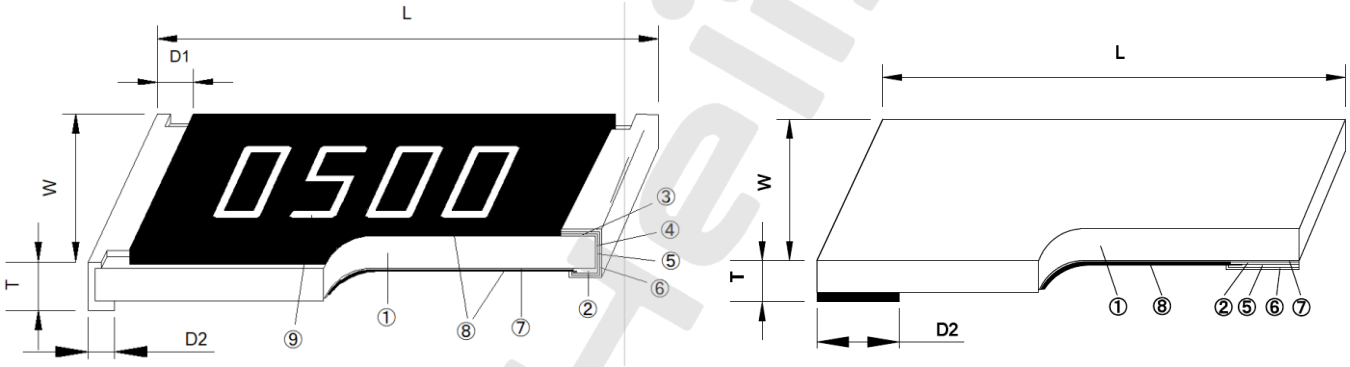
Applications

- Low noise amplifiers
- Attenuation
- Line Termination

Typical Performance

- TCR. 25 ppm/℃
- TOL. 0.1%

Construction



0402/0603/0805/1206 0201

①	High purity 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

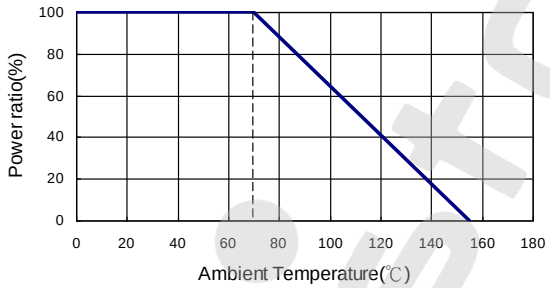
Unit: mm

Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
ARF01	0201	0.58±0.05	0.30±0.05	0.21±0.07	-	0.15±0.10	0.12
ARF02	0402	1.00±0.07	0.50±0.07	0.38±0.15	0.20±0.15	0.20±0.15	0.73
ARF03	0603	1.55±0.10	0.80±0.10	0.45±0.15	0.30±0.20	0.30±0.20	2.08
ARF05	0805	2.00±0.15	1.25±0.15	0.45±0.15	0.30±0.20	0.35±0.20	4.15
ARF06	1206	3.05±0.20	1.55±0.20	0.45±0.15	0.45±0.20	0.35±0.25	7.59

■Part Numbering

ARF	02	B	T	C	N	0500	N
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	B: ±0.1% C: ±0.25% D: ±0.5% F: ±1%	T: Taping Reel B: Bulk	C: ±25 D: ±50	Z : 1/32W N : 1/20W W : 1/8W P : 1/5W O : 1/3W	0500: 50Ω 1000: 100Ω 1500: 150Ω 1001: 1KΩ	:Standard Marking N: No Marking

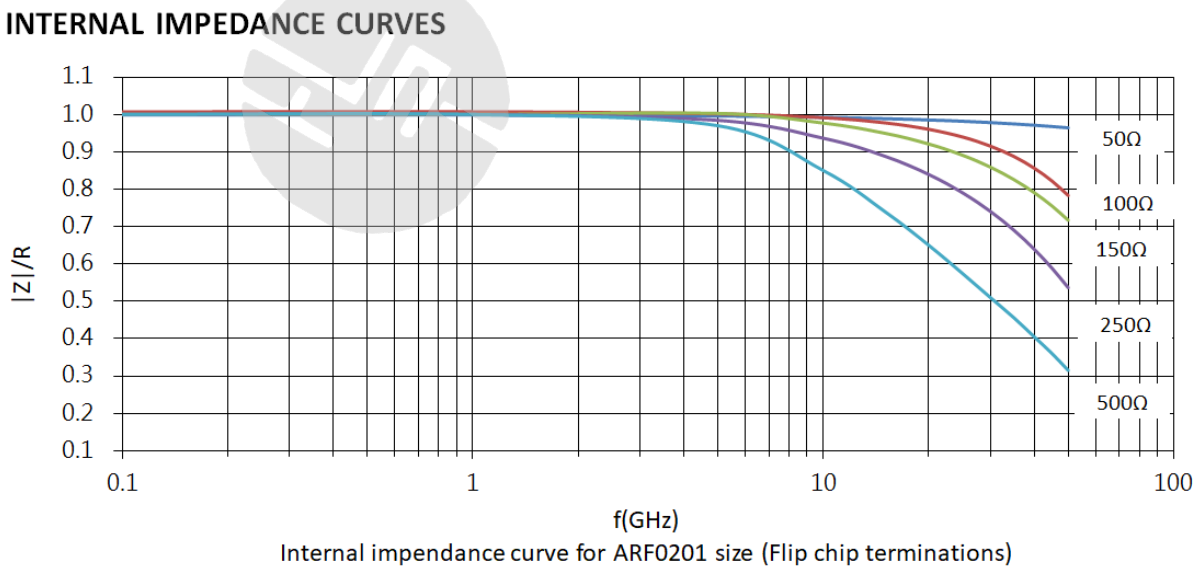
■Derating Curve



■Standard Electrical Specifications

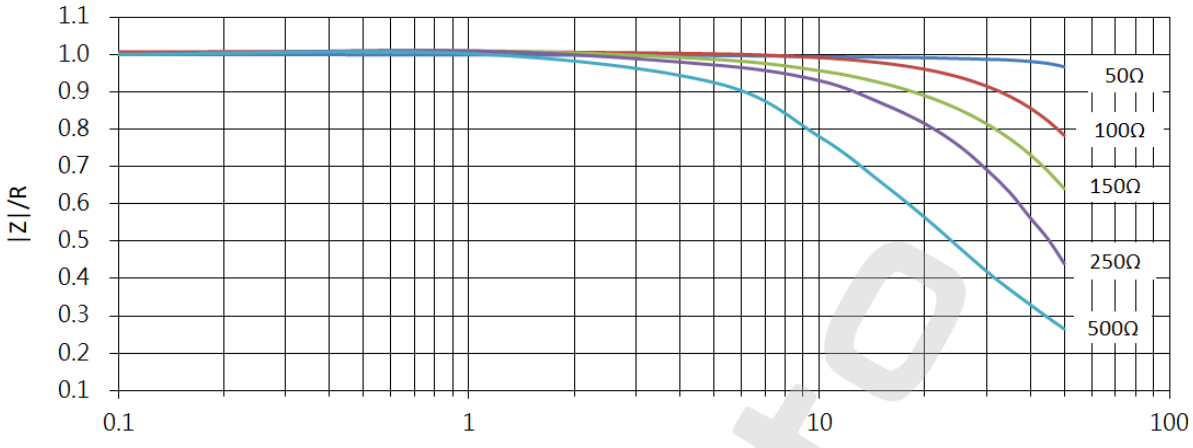
Item / Type	Power Rating at 70°C	Operating Temp. Range	Max Operating Voltage	Max Overload Voltage	Resistance Range				TCR (PPM/°C)
					±0.1%	±0.25%	±0.5%	±1%	
ARF01 (0201)	1/32W	-55°C ~ +155°C	15V	30V	20Ω~500Ω				±25 ±50
ARF02 (0402)	1/20W	-55°C ~ +155°C	30V	60V	10Ω~1KΩ				±25 ±50
ARF03 (0603)	1/8W	-55°C ~ +155°C	50V	100V	10Ω~1KΩ				±25 ±50
ARF05 (0805)	1/5W	-55°C ~ +155°C	50V	100V	10Ω~1KΩ				±25 ±50
ARF06 (1206)	1/3W	-55°C ~ +155°C	75V	150V	10Ω~1KΩ				±25 ±50

Operating Voltage=√(P*R) or Max. operating voltage listed above, whichever is lower.
Overload Voltage=2.5*√(P*R) or Max. overload voltage listed above, whichever is lower.
■Viking is capable of manufacturing the optional spec based on customer's requirement.



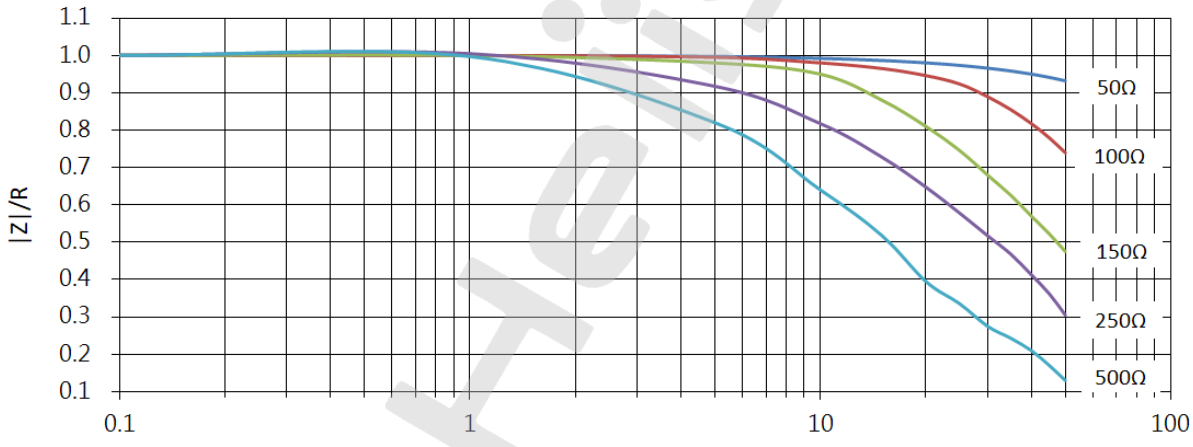
Internal impendance curve for ARF0201 size (Flip chip terminations)

INTERNAL IMPEDANCE CURVES



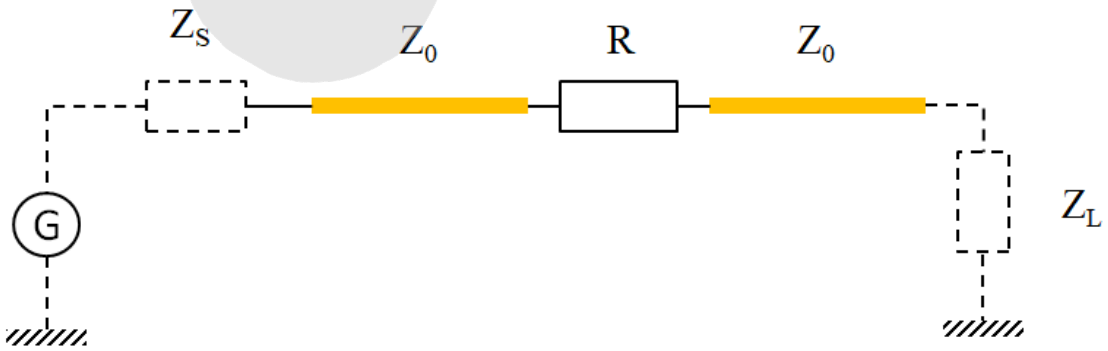
Internal impendance curve for ARF0402 size (Flip chip terminations)

INTERNAL IMPEDANCE CURVES

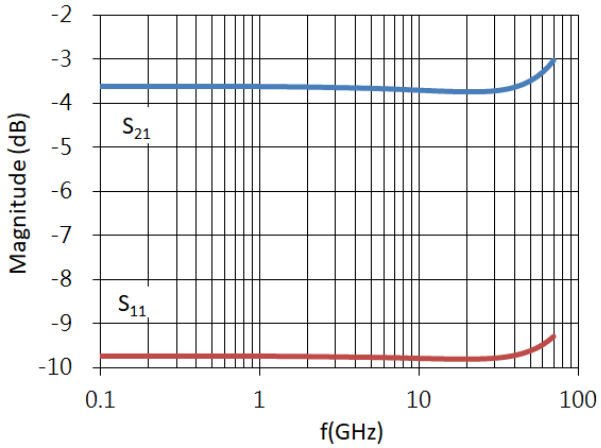


Internal impendance curve for ARF0603 size (Flip chip terminations)

■Equivalent circuit for S-parameters:

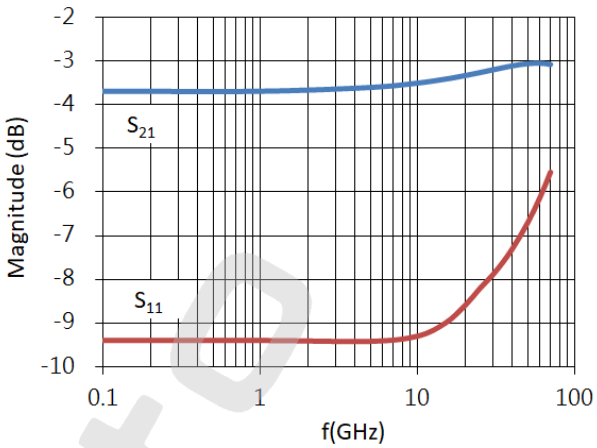


S-PARAMETER
ARF0201 (Flip Chip Termination)



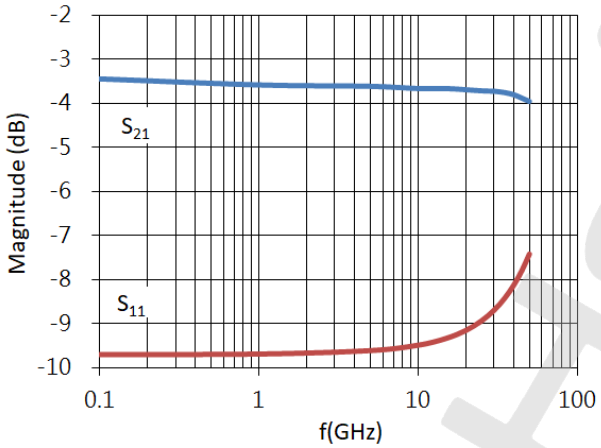
ARF0201 flip chip (Z0 = ZI = ZS = R = 50Ω)

S-PARAMETER
ARF0201 (Flip Chip Termination)



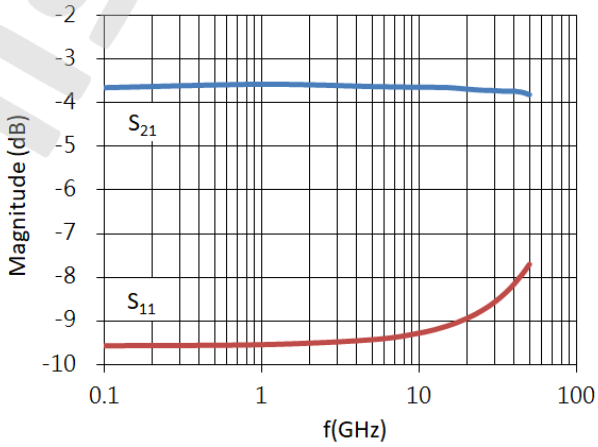
ARF0201 flip chip (Z0 = ZI = ZS = R = 100Ω)

S-PARAMETER
ARF0402 (Flip Chip Termination)



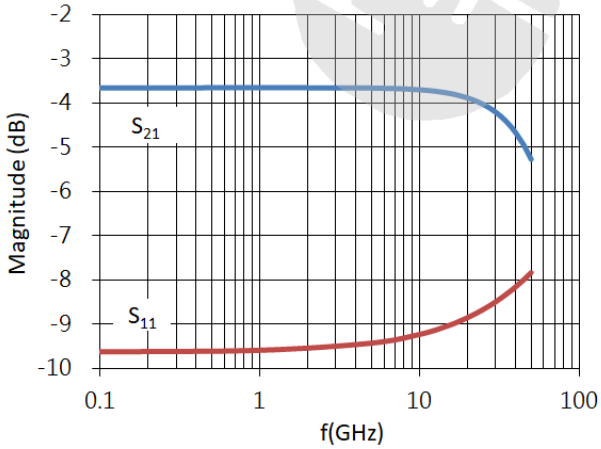
ARF0402 flip chip (Z0 = ZI = ZS = R = 50Ω)

S-PARAMETER
ARF0402 (Flip Chip Termination)



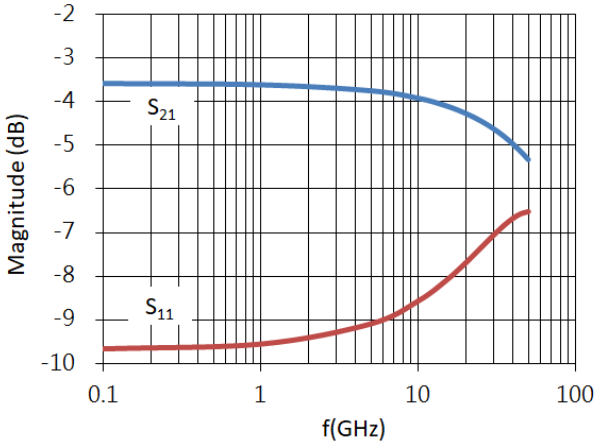
ARF0402 flip chip (Z0 = ZI = ZS = R = 100Ω)

S-PARAMETER
ARF0603 (Flip Chip Termination)



ARF0603 flip chip (Z0 = ZI = ZS = R = 50Ω)

S-PARAMETER
ARF0603 (Flip Chip Termination)



ARF0603 flip chip (Z0 = ZI = ZS = R = 100Ω)

■Environmental Characteristics

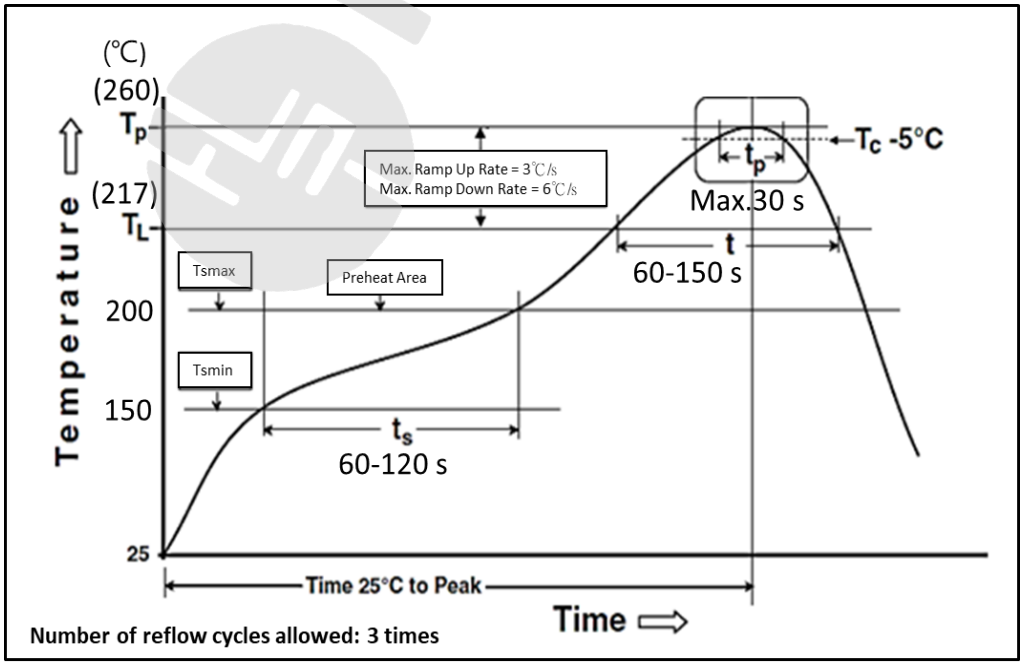
Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	**MIL-STD-202 Method 304** +25/-55/+25/+125/+25°C
Short Time Overload	ΔR±0.2%	**JIS-C-5201-1 4.13** RCWV*2.5 or Max. overload voltage whichever is lower for 5 seconds
Insulation Resistance	>9999 MΩ	**MIL-STD-202 Method 302** Apply 100V_{DC} for 1 minute
Endurance	ΔR±0.5%	**MIL-STD-202 Method 108** 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	ΔR±0.5%	**MIL-STD-202 Method 103** 40±2°C, 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Bending Strength	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
Solderability	95% min. coverage 0201: except	**MIL-STD-202 Method 208** 245±5°C for 3 seconds
Resistance to Soldering Heat	ΔR±0.1% 0201: except	**MIL-STD-202 Method 210** 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±0.2%	**JIS-C-5201-1 4.36** 1 hour, -65°C, followed by 45 minutes of RCWV
High Temperature Exposure	ΔR±0.5%	**MIL-STD-202 Method 108** at +155°C for 1000 hrs

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 (T_{smin}) Max Temperature (T_{smax}) Preheating time (t_s) from (T_{smin} to T_{smax})	 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.

■Marking

0603 3digit marking in E96



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

68B=4K99Ω 68X=49.9Ω

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

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}

0805~1206 4digit marking

Example

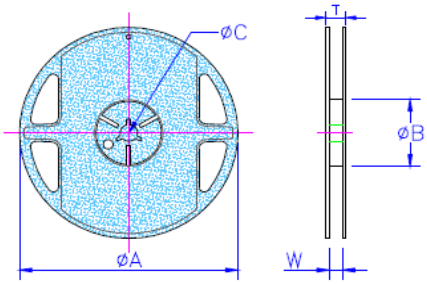
Resistance	500Ω	2.2KΩ	10KΩ	12.5KΩ
marking	5000	2201	1002	1252

■Packaging

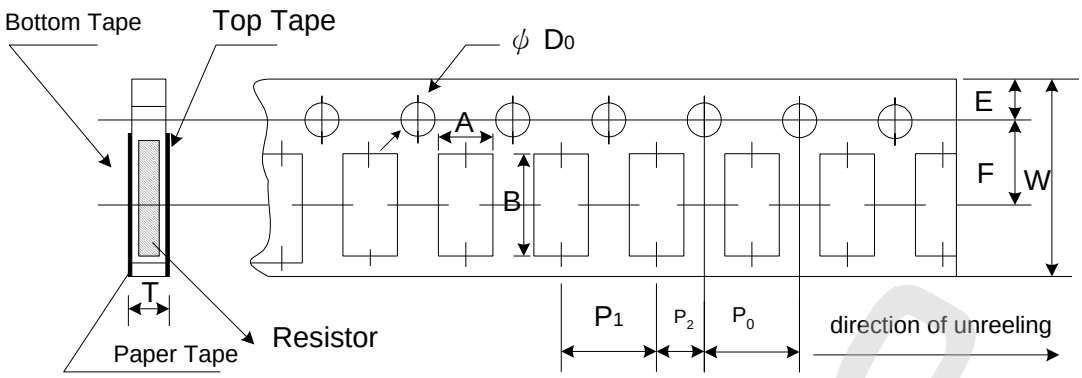
Packing Quantity & Reel Specifications

Unit :mm

Type	ØA	ØB	ØC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
ARF01	178.0±1.0	60.0+1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
ARF02	178.0±1.0	60.0+1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
ARF03	178.0±1.0	60.0+1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARF05	178.0±1.0	60.0+1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARF06	178.0±1.0	60.0+1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-



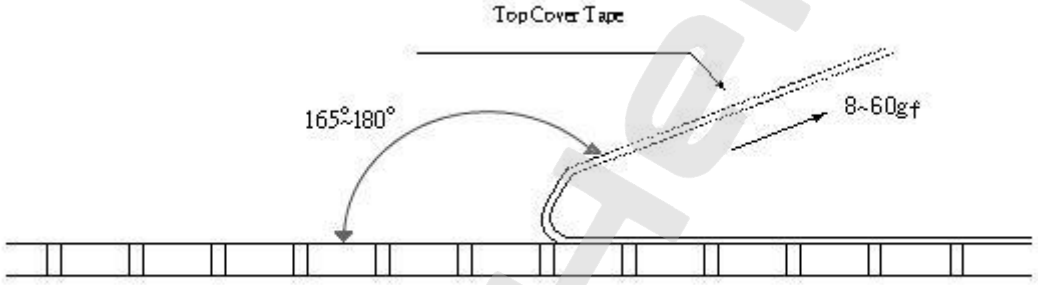
Paper Tape Specifications



Unit: mm

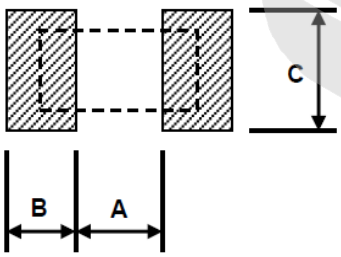
Type	A	B	W	E	F	P_0	P_1	P_2	ΦD_0	T
ARF01	0.40±0.05	0.70±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.55±0.03	0.42±0.02
ARF02	0.66±0.06	1.18±0.06	8.00±0.20	1.75±0.10	3.5±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.55±0.05	0.60±0.03
ARF03	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.60±0.03
ARF05	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
ARF06	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



Recommend Land Pattern

Unit: mm



Type	A	B	C
ARF01	0.25	0.30	0.40±0.2
ARF02	0.50	0.50	0.60±0.2
ARF03	0.80	1.00	0.90±0.2
ARF05	1.00	1.00	1.35±0.2
ARF06	2.00	1.15	1.70±0.2

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A5	Jun. 01,2026	-	- Add new rule for 0603 3digit marking: When E24 and E96 share the same resistance, E96 marking shall take priority.
Version A6	Jul.09,2026	-	- Add new description “RoHS (Pb)-free without exemption” to Features.