

ARF-Series

High Frequency Thin Film Precision Chip Resistor

Sizes: 0402, 0603, 0805, 1206



Features

- Small standard size 0402 case size
- High purity alumina substrate
- Ohmic range (10Ω~1KΩ)
- Small internal reactance(<10mΩ)
- Resistor tolerance to $\pm 0.1\%$
- Low TCR (down to $\pm 25\text{ppm}/^\circ\text{C}$)
- Low voltage coefficient <0.1 ppm/V
- Nickel-barrier / matte Tin terminations

up to 40 GHz



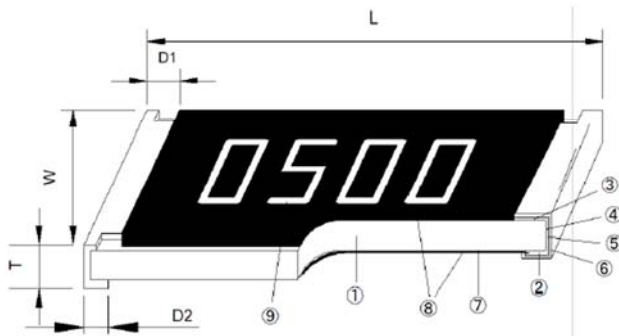
Applications

- Low noise amplifiers
- Attenuation
- Line Termination

Typical Performance

- TCR. 25 ppm/°C
- TOL. 0.1 %

Construction



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)
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	0.50±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

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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
	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	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

Standard Electrical Specifications

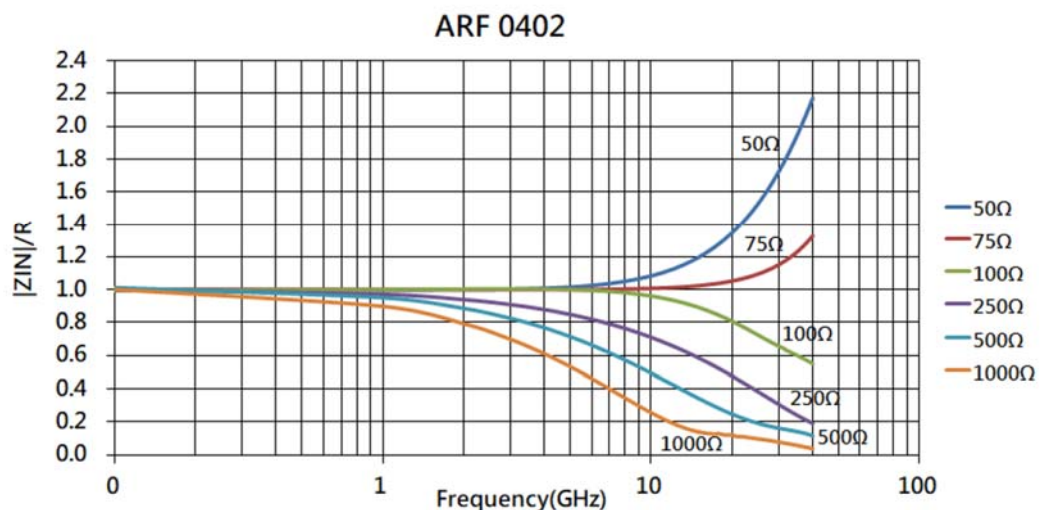
Item Type	Power Rating at 70°C	Operating Temp. Range	Max Operating Voltage	Max Overload Voltage	Resistance Range				TCR (PPM/°C)
					±0.1%	±0.25%	±0.5%	±1%	
ARF02 (0402)	1/20W	-55°C ~ +155°C	30V	60V	10Ω~1KΩ				±25 ±50
ARF03 (0603)	1/8W	-55°C ~ +155°C	50V	100V	10Ω~1KΩ				±25 ±50
ARF05 (0805)	1/5W	-55°C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

Operating Voltage= $\sqrt{(P \cdot R)}$ 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.

INTERNAL IMPEDANCE

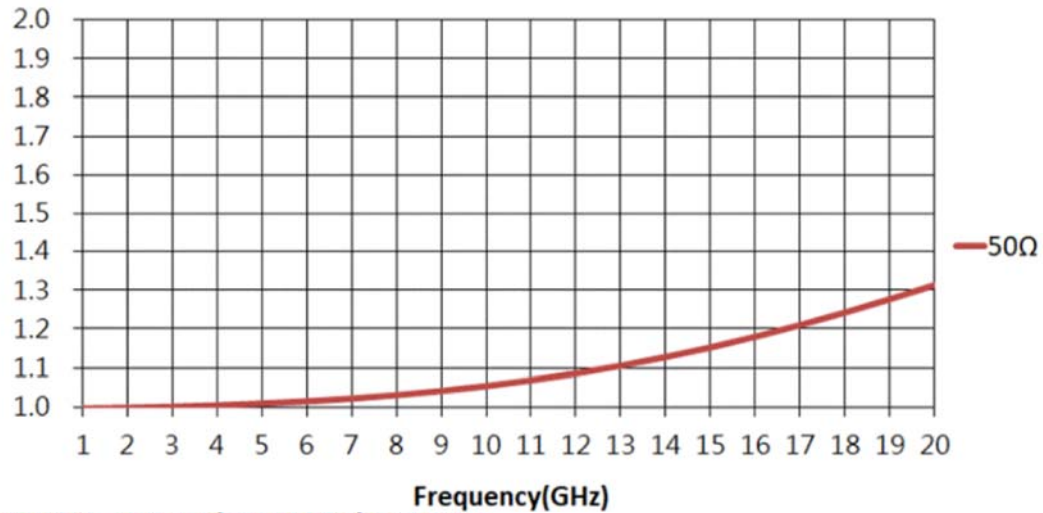


ARF-Series

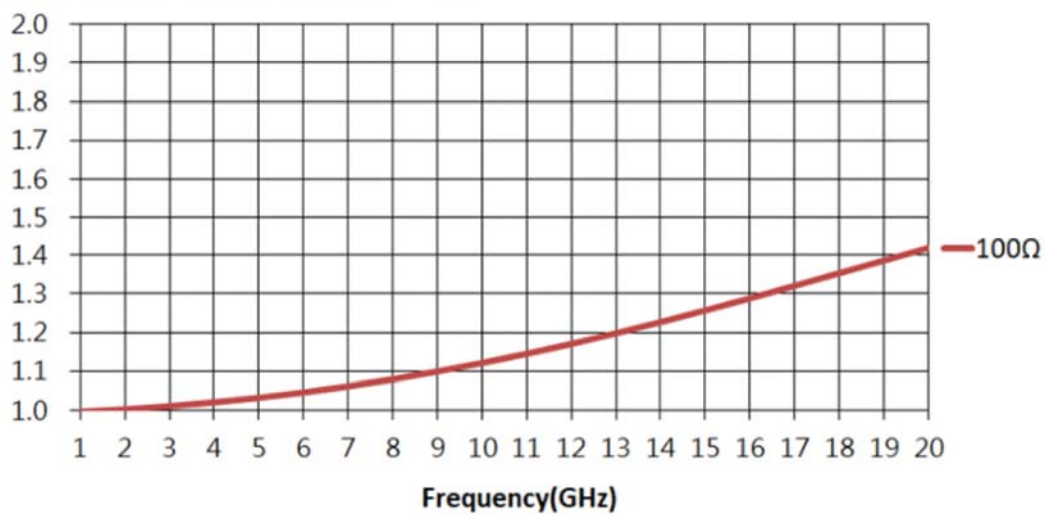
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VSWR ARF Series 0402 size 50Ω



VSWR ARF Series 0402 size 100Ω



$$Z_{in} = Z_0 \frac{1 + \Gamma}{1 - \Gamma}$$

$$VSWR = \frac{V_{max}}{V_{min}} = \frac{1 + |\Gamma|}{1 - |\Gamma|}$$

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■ Environmental Characteristics

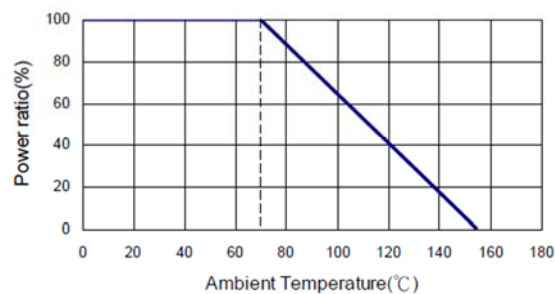
Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	MIL-STD-202 Method 304 +25/-55/+25/+125/+25°C
Short Time Overload	$\Delta R \pm 0.2\%$	JIS-C-5201-1 4.13 RCWV*2.5 or Max. overload voltage whichever is lower for 5 seconds
Insulation Resistance	>9999 MΩ	MIL-STD-202 Method 302 Apply 100V _{DC} for 1 minute
Endurance	$\Delta R \pm 0.5\%$	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	$\Delta R \pm 0.5\%$	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	$\Delta R \pm 0.1\%$	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	MIL-STD-202 Method 208 245±5°C for 3 seconds
Resistance to Soldering Heat	$\Delta R \pm 0.1\%$	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	$\Delta R \pm 0.2\%$	JIS-C-5201-1 4.36 1 hour, -65°C, followed by 45 minutes of RCWV
High Temperature Exposure	$\Delta R \pm 0.5\%$	MIL-STD-202 Method 108 at +155°C for 1000 hrs

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.

■ Derating Curve



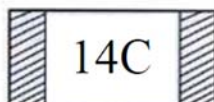
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■ Marking

0603 3digit marking



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

68B=4K99Ω 68X=49.9Ω

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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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

1206 4digit marking

Example

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

Specifications subject to change without notice

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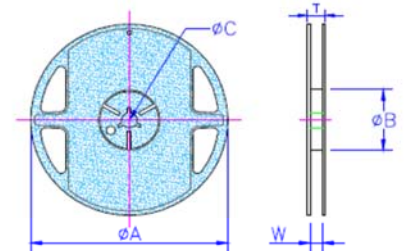
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■ Packaging

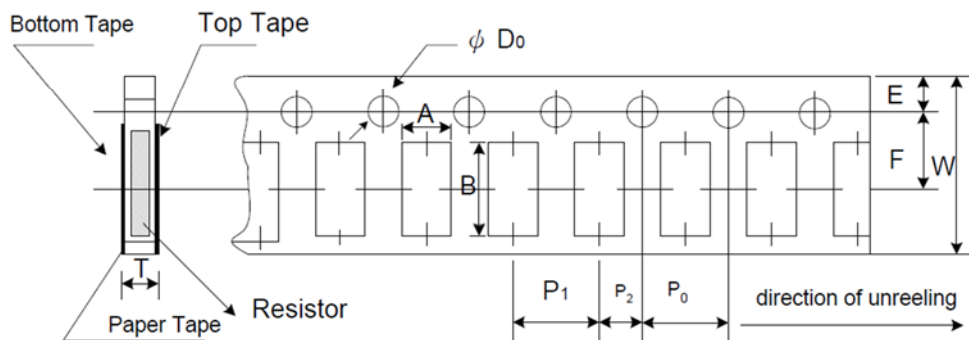
Packing Quantity & Reel Specifications

Unit :mm

Type	ØA	ØB	ØC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
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	-

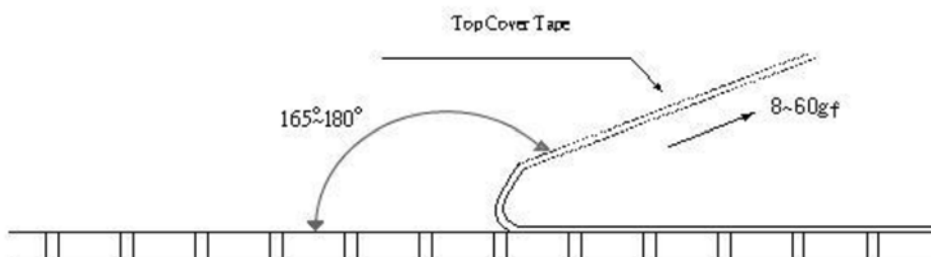


Paper Tape Specifications



Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
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



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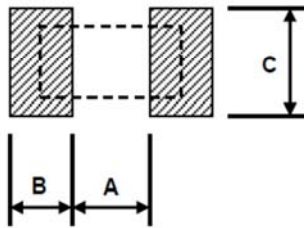
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■ Recommend Land Pattern

Unit: mm



Type	A	B	C
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

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

