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RFPR

RF AlN substrate Thick Film Resistors

Typical resistance	50Ω, 100Ω
Operating frequency	DC 2.5G-7.2GHz
High power dissipation	up to 180 W



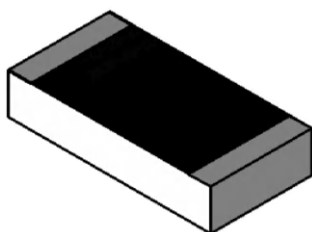
Applications

Mobile Networks
Broadcast and Television
Satellite Communications
Medical Devices
RF Amplifiers

**Better Solution for Sustainable
High End Manufacturing**

RF Aluminum Nitride (AlN) substrate Thick Film Resistors

High power dissipation, operating frequency up to 7.2 Ghz



Introduction

1.High Thermal Conductivity in Compact Design, High power dissipation (up to 180 W) Ideal for high-power, space-constrained applications requiring efficient heat dissipation. Aluminum Nitride (AlN) substrate offers 170 W/(m·K) thermal conductivity — 7x better than alumina (Al₂O₃), enabling 50% smaller package size vs. traditional high-power resistors.

2.RF-Friendly Performance Up to 7+ Ghz
Low parasitic inductance and capacitance ensure stable impedance in RF/microwave applications (5G, satellite communication, radar). Proprietary thick film technology minimizes skin effect losses at 6+ GHz, outperforming standard thick film resistors (limited to <2 GHz).

3.No toxic beryllium (RoHS/REACH compliant), lower cost than thin-film RF resistors.

Electrical Parameters

Model	Frequency	Power	R value Ω	TCR ppm/°C	Tolerance %	Return loss dB	VSWR	Operating temp
RFPR0402J50R0S001W9	DC-6GHz	1W	50	150	±5	/	/	-55 to +150°C
RFPR0603J50R0K002W9	DC-7.2GHz	2W	50	250	±5	/	≤1.35:1	-55 to +150°C
RFPR0805J50R0S003E9	DC-6GHz	3W	50	250	±5	≥18(DC-5GHz) ≥15(5-6GHz)	/	-55 to +150°C
RFPR1005J50R0S005E9	DC-6GHz	5W	50	150	±5	/	≤1.25:1	-55 to +150°C
RFPR1005J50R0S018P9	DC-6GHz	18W	50	150	±5	/	≤1.3:1	-55 to +150°C
RFPR1206J50R0S012E9	DC-6GHz	12W	50	250	±5	≥20(DC-4GHz) ≥18(4-6GHz)	/	-55 to +150°C
RFPR1206G50R0S008E9	DC-6GHz	8W	50	250	±2	≥20(DC-4GHz) ≥15(4-6GHz)	/	-55 to +150°C
RFPR2010J50R0M010E9	DC-3GHz	10W	50	300	±5	/	≤1.25:1	-55 to +150°C
RFPR2010G50R0S030E9	DC-6GHz	30W	50	200	±2	≥20(DC-3GHz) ≥15(3-6GHz)	/	-55 to +150°C
RFPR2010G100R0S025C9	DC-6GHz	25W	100	200	±2	≥6(DC-6GH)	/	-55 to +150°C
RFPR2010J50R0S025E9	DC-6GHz	25W	50	200	±5	≥20(DC-4GHz) ≥18(4-6GHz)	/	-55 to +150°C
RFPR3522J50R0L150S9	DC-2.5GHz	150W	50	150	±5	/	≤1.20:1	-55 to +150°C
RFPR3722J50R0L180S9	DC-2.7GHz	180W	50	150	±5	/	≤1.25:1	-55 to +150°C

Electrical Parameters

Model	L*W*H	Size inches	Substrate	Style	Plating
RFPR0402J50R0S001W9	1*0.5*0.25mm	0402	AlN	WA	Ni+Sn
RFPR0603J50R0K002W9	1.6*0.8*0.38mm	0603	AlN	WA	Ni+Sn
RFPR0805J50R0S003E9	2*1.27*0.3mm	0805	AlN	EW	Ni+Ag
RFPR1005J50R0S005E9	2.54*1.27*0.4mm	1005	AlN	EW	Ni+Ag
RFPR1005J50R0S018P9	2.54*1.27*0.4mm	1005	AlN	PW	Ni+Ag
RFPR1206J50R0S012E9	3*1.5*0.38mm	1206	AlN	EW	Ni+Ag
RFPR1206G50R0S008E9	3*1.5*0.38mm	1206	AlN	EW	Ni+Ag
RFPR2010J50R0M010E9	5*2.5*0.635mm	2010	AlN	EW	Ni+Sn
RFPR2010G50R0S030E9	5*2.5*0.8mm	2010	AlN	EW	Ni+Sn
RFPR2010G100R0S025C9	5*2.5*1mm	2010	AlN	CS	Ni+Sn
RFPR2010J50R0S025E9	5*2.5*0.9mm	2010	AlN	EW	Ni+Sn
RFPR3522J50R0L150S9	8.9*5.7*1mm	3522	AlN	SZ(E)	Ni+Ag
RFPR3722J50R0L180S9	9.5*5.7*1mm	3722	AlN	SZ(E)	Ni+Ag

Part Number Information

Example: RFPR0402J50R0S001W9 (RFPR 0402 $\pm 5\%$ 50 Ω 6GHz 1W Wraparound Standard)

Series	Size	Tolerance	Resistance	Frequency	Power rating	Style	Code
RFPR	0402 0603 0805 1005 1206 2010 3522 3722	G = $\pm 2.0\%$ J = $\pm 5.0\%$	50R0=50 Ω 100R=100 Ω	K=7GHz S=6GHz M=3GHz L=2.5GHz	001=1W 010=10W 180=180W	W= Wraparound C= Center pad E= Extended wrap	9=Standard

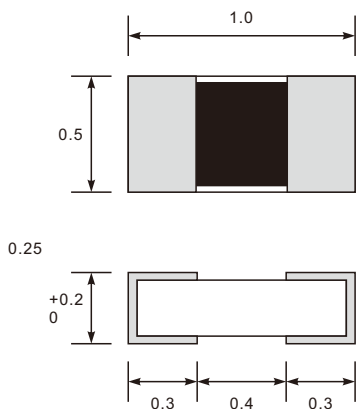
Dimensions

Resistor

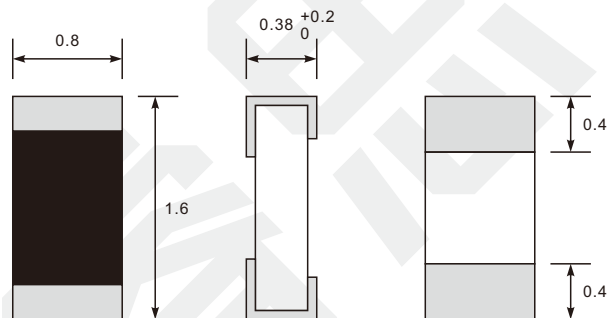
Unit:mm

Unremarked dimension's tolerance
Equal or smaller than 1206 size: $\pm 0.15\text{mm}$
Larger than 1206 size: $\pm 0.25\text{mm}$

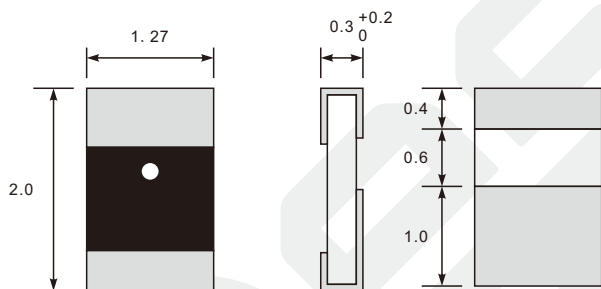
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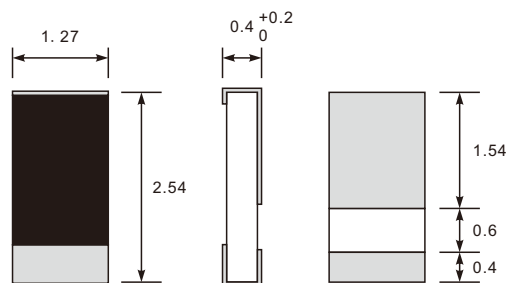
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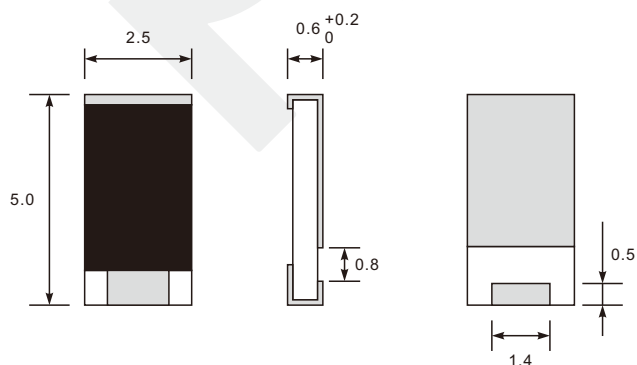
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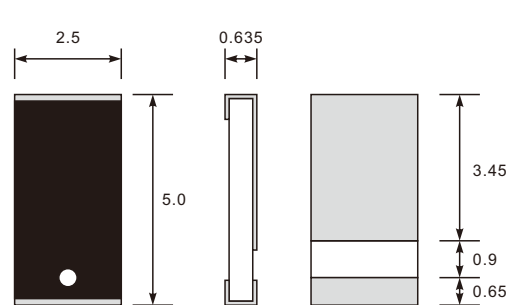
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RFPR2010J50R0M010E9



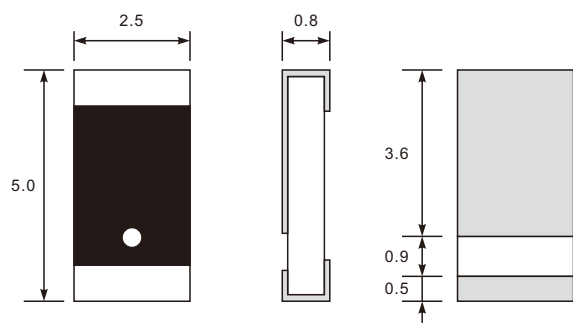
Dimensions

Resistor

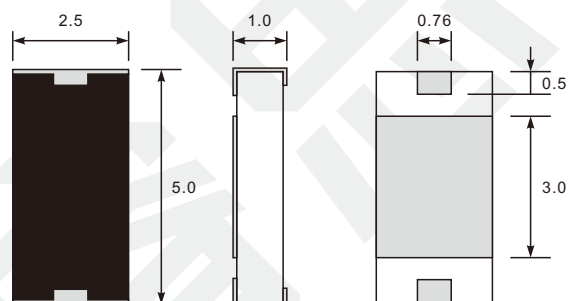
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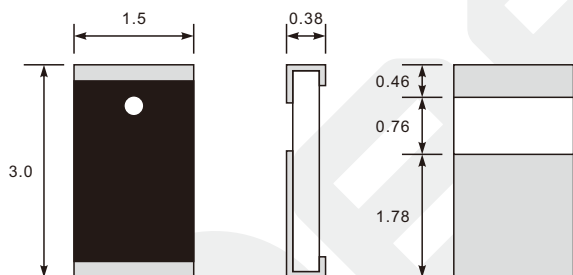
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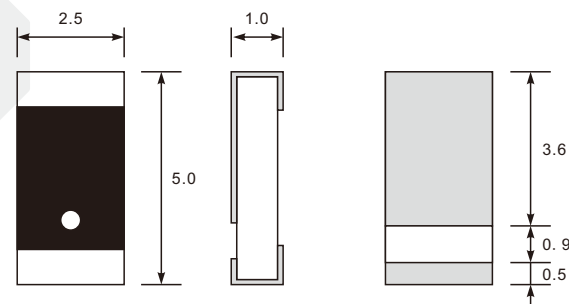
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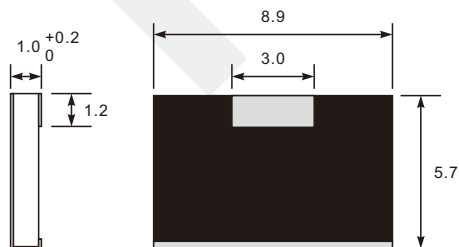
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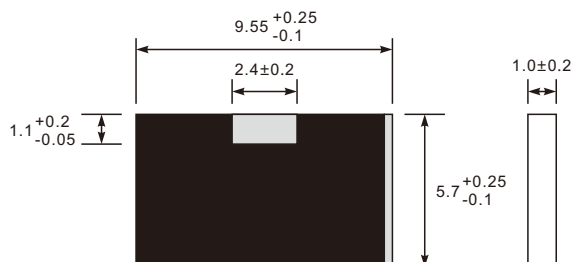
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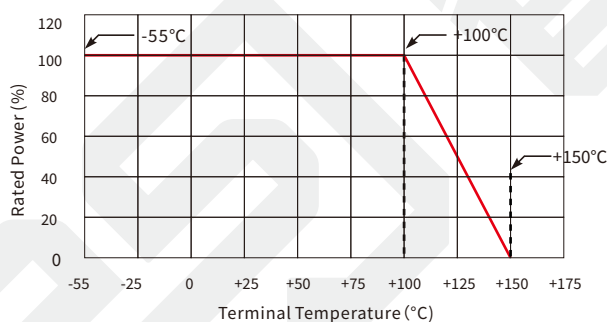
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Performance

Test	Test Method	Standards	Test Limits
Thermal Shock	-55°C to +125°C 30 Minutes Dwell, 100 Cycles	MIL-STD-202 Method 107	$\Delta R \leq \pm 5.0\% + 0.05\Omega$
Short Time Overload	Apply 2x Rated Power for 5 Seconds. room temperature	IEC 60115-1 4.13	$\Delta R \leq \pm 5.0\% + 0.05\Omega$
Bias Humidity	85°C, 85%RH, 96h, $\geq 50W$, applied 1% rated power <50W, applied 10% rated power	MIL-STD-202 Method 103	$\Delta R \leq \pm 5.0\% + 0.05\Omega$
Resistance to Soldering Heat	+260°C tin bath for 10s	MIL-STD-202 Method 210 Test Condition "J"	$\Delta R \leq \pm 5.0\% + 0.05\Omega$
Substrate Bending	Pre stress: 3 times reflow on PCB. Applied forces on chips mounted on PCB, bending for $60 \pm 5s$ for 2mm	IEC 60115-1 4.33	$\Delta R \leq \pm 5.0\% + 0.05\Omega$
Solderability	+245°C tin bath for 3s	AEC-Q200 TEST 18 / IEC 60115-1 4.17	>95% Covered
High Temperature Storage	150°C $\pm 2^\circ C$ for 500 Hours	MIL-STD-202 Method 108	$\Delta R \leq \pm 5.0\% + 0.05\Omega$
Load life	70°C $\pm 2^\circ C$, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle	MIL-STD-202 Method 108	$\Delta R \leq \pm 3.0\% + 0.05\Omega$

Derating Curve



Reflow Soldering Profile

Resistor Surface Temperature:

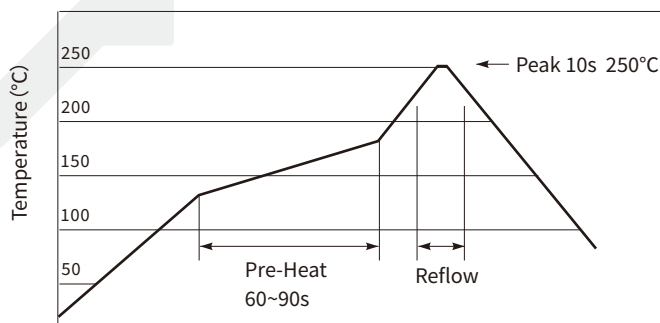
Pre-Heat: +130°C~+180°C, 60~90sec.

Reflow: Above +220°C, 30~90sec.

Max. Temperature: +240°C~+250°C, within 10sec.

Applicable Solder Composition: Sn-Ag-Cu solder

Cycles: limited to 2 (cooling between the first and second reflow)



Revision

Version	Revised Content	Date	Approver
V0	Initial Issue	2025.3.25	CFD

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