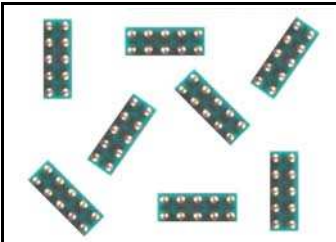




**Product Family:** [Thin Film SMT Resistor Networks](#)

**Part Number Series:** [Miniature BGA Series](#)



**Construction:**

- High Purity Alumina Oxide Substrate
- Ni alloy thin-film resistive element
- Ball Grid Array (BGA) electrodes
- RoHS compliant (Sn96.5, Ag3.0, Cu0.5, SAC solder)

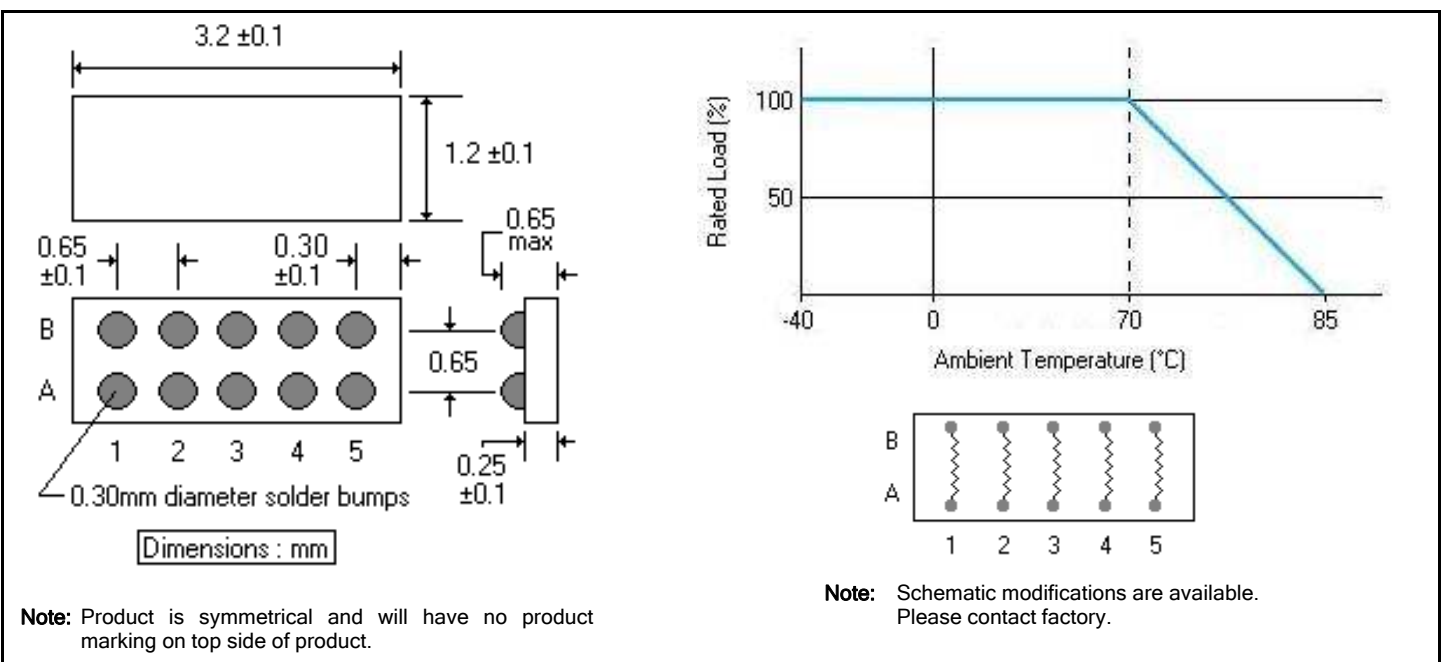
**Features:**

- 5 resistors/package
- Resistance tolerances of  $\pm 0.25$  to 5.0%
- TCR of  $\pm 10$  to  $\pm 100$  ppm/ $^{\circ}\text{C}$
- Ratio tracking available
- TCR tracking available

**Description:**

These surface mount resistor networks feature ball grid array electrodes and thin film resistive elements. Because all of the resistors are fabricated together using thin film processing, these networks exhibit tight ratio tracking and TCR tracking tolerances that are difficult to achieve by using individual discrete resistors. The BGA design allows for very low parasitic capacitance and inductance leading to improved frequency performance and reduced ground bounce.

**Product Dimensions, Schematic and Derating Curve (All dimensions in millimeters):**



**Part Numbering:** Ex: BRJZ4701/4701RZ\*-C

Package Type	Absolute Resistance Tolerance	Resistance Ratio Tolerance	Resistance Values	Absolute TCR Tolerance	TCR Tracking Tolerance	Tape and Reel Qty	RoHS Indicator
BR	C= $\pm 0.25\%$ , D= $\pm 0.50\%$ , F= $\pm 1.0\%$ , G= $\pm 2.0\%$ , J= $\pm 5.0\%$	C= $\pm 0.25\%$ , D= $\pm 0.50\%$ , F= $\pm 1.0\%$ , Z = None	<b>4701/4701</b> The first 3 digits are significant figures. The last digit specifies the number of zeros. For values $< 100\Omega$ , "R" is used to designate the decimal position. Multiple values are separated by a slash (/). e.g. 4701 = 4,700 $\Omega$ 75R0 = 75.0 $\Omega$ 4701/4701 = 4,700/4,700 $\Omega$	Y = $\pm 10$ ppm/ $^{\circ}\text{C}$ , E = $\pm 25$ ppm/ $^{\circ}\text{C}$ Q = $\pm 50$ ppm/ $^{\circ}\text{C}$ R = $\pm 100$ ppm/ $^{\circ}\text{C}$	R = $\pm 2$ ppm/ $^{\circ}\text{C}$ , M = $\pm 5$ ppm/ $^{\circ}\text{C}$ , Z = None	1 = 1,000/reel 5 = 5,000/reel	-C

**Note:** Refer to Electrical Specification table on following page for specific offerings

**Electrical Specifications:**

Package Type	Miniature BGA Series		
Dimensions in mm (L x W x H)	3.20 x 1.20 x 0.65		
Dimensions in inches (L x W x H)	0.126 x 0.047 x 0.026		
Resistance Range ( $\Omega$ )	10 <sup>~</sup> 4.7K (E-96 values)		
	10 <sup>~</sup> <20	20 <sup>~</sup> <100	100 <sup>~</sup> max
Absolute Resistance Tolerance (code)	2.0%(G), 5.0%(J)	1.0%(F), 2.0%(G), 5.0%(J)	0.25(C), 0.50%(D), 1.0%(F), 2.0%(G), 5.0%(J)
Resistance ratio (code)	NONE(Z)	1.0%(F), NONE(Z)	0.25(C), 0.50%(D), 1.0%(F), NONE(Z)
Absolute TCR (code)	$\pm 50$ ppm/ $^{\circ}$ C (Q), $\pm 100$ ppm/ $^{\circ}$ C (R),	$\pm 25$ ppm/ $^{\circ}$ C (E), $\pm 50$ ppm/ $^{\circ}$ C (Q), $\pm 100$ ppm/ $^{\circ}$ C (R),	$\pm 10$ ppm/ $^{\circ}$ C (Y), $\pm 25$ ppm/ $^{\circ}$ C (E), $\pm 50$ ppm/ $^{\circ}$ C (Q), $\pm 100$ ppm/ $^{\circ}$ C (R),
Tracking TCR (code)	NONE (Z)	$\pm 5$ ppm/ $^{\circ}$ C (M) NONE (Z)	$\pm 2$ ppm/ $^{\circ}$ C (R), $\pm 5$ ppm/ $^{\circ}$ C (M), NONE (Z)
Power Rating / Package	0.6 watts @70 $^{\circ}$ C (Refer to derating curve)		
Operating Temp Range	-40 $^{\circ}$ C~85 $^{\circ}$ C (Refer to derating curve)		
Packaging	1,000 or 5,000 pcs/reel		

**Note:** Consult factory if you require tighter tolerances than listed above

**Reliability Specifications:**

Test	Test Method	Specification
Load Life	Test Temperature: 70 $^{\circ}$ C Applied voltage: rated power Test period: 1000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF,	$\pm 0.05\%$ +0.05 $\Omega$
Moisture Load Life	Test Condition: 85 $^{\circ}$ C/85% RH Applied voltage: 1/10 rated power Test period: 1000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF	$\pm 0.05\%$ +0.05 $\Omega$
Air Thermal Shock	Repeat 25 cycles as follows: -55 $^{\circ}$ C (15 min.) / +125 $^{\circ}$ C (15 min.) Transfer Time: <10 seconds	$\pm 0.05\%$ +0.05 $\Omega$
High Temperature Exposure	Test Temperature: 125 $^{\circ}$ C Test period: 1000 hours	$\pm 0.05\%$ +0.05 $\Omega$
Short Time Overload	Applied voltage: 2.5X rated voltage or 2X maximum operating voltage, whichever is less. Test duration: 5 seconds	$\pm 0.05\%$ +0.05 $\Omega$
Resistance to Soldering Heat	Subject products to 3 cycles of recommended soldering reflow profile as detailed in JEDEC 020 standard	$\pm 0.05\%$ +0.05 $\Omega$