

## Thin Film Microwave Resistor



Product may not be to scale

The MIC resistor chips on alumina are designed with low shunt capacitance. Most lower value resistor geometrics are compatible with strip lines, making them ideally suited for microwave circuits.

These chips are manufactured using Vishay Electro-Films (EFI) sophisticated Thin Film equipment and manufacturing technology. The MICs are 100 % electrically tested and visually inspected to MIL-STD-883.

### FEATURES

- Wire bondable
- High frequency
- Small single chip size: 0.020" x 0.040"
- Case: 0402
- Microwave resistance range: 20  $\Omega$  to 1 k $\Omega$
- Overall resistance range: 20  $\Omega$  to 20 k $\Omega$
- Alumina substrate
- Low stray capacitance: < 0.2 pF
- Resistor material: Tantalum nitride, self passivating
- Moisture resistant

### APPLICATIONS

Vishay EFI MIC chip resistors provide excellent high-frequency response and are ideally suited for prototyping.

Typical application areas are:

- Amplifiers
- Oscillators
- Attenuators
- Couplers
- Filters

### TEMPERATURE COEFFICIENT OF RESISTANCE, VALUES, AND TOLERANCES

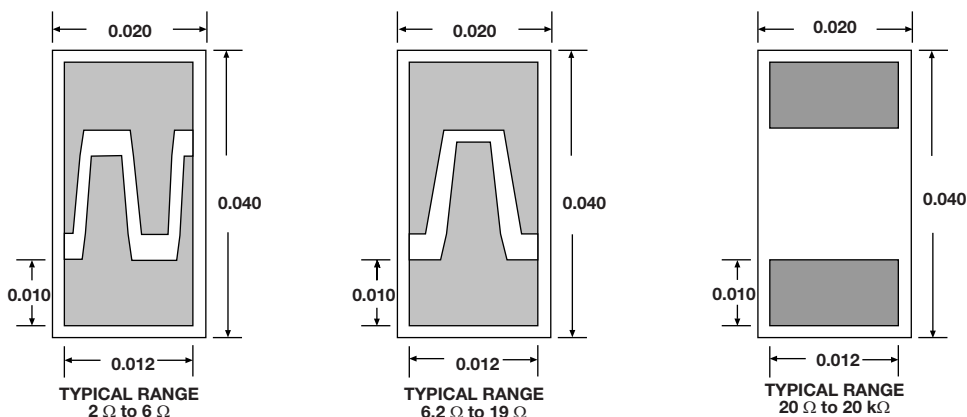
PARAMETER	VALUE	UNIT
Resistance Range	2 to 20K	$\Omega$
Tolerances	$\pm 1$	%
TCR	$\pm 25, \pm 50, \pm 100, \pm 200$	ppm/ $^{\circ}\text{C}$

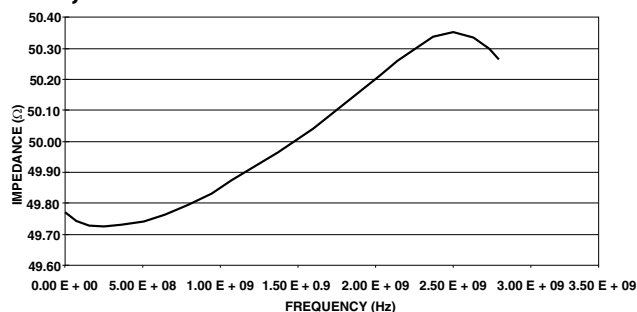
#### Note

- Only 20  $\Omega$  to 1 k $\Omega$  are standard strip line designs for microwave applications

### STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	VALUE	UNIT
Noise, MIL-STD-202, Method 308	- 20 typ.	dB
Moisture Resistance, MIL-STD-202, Method 106	$\pm 0.1$ max. $\Delta R/R$	%
Stability, 1000 h, + 125 $^{\circ}\text{C}$ , 62 mW	$\pm 0.2$ max. $\Delta R/R$	%
Operating Temperature Range	- 55 to + 125	$^{\circ}\text{C}$
Thermal Shock, MIL-STD-202, Method 107, Test Condition F	$\pm 0.1$ max. $\Delta R/R$	%
High Temperature Exposure + 150 $^{\circ}\text{C}$ , 1000 h	$\pm 0.2$ max. $\Delta R/R$	%
Dielectric Voltage Breakdown	400	V
Insulation Resistance	$10^{12}$ min.	$\Omega$
Operating Voltage	100 max.	V
DC Power Rating at + 70 $^{\circ}\text{C}$ (Derated to Zero at 150 $^{\circ}\text{C}$ )	0.125 max.	W
5 x Rated Power Short-Time Overload, + 25 $^{\circ}\text{C}$ , 5 s	$\pm 0.1$ max. $\Delta R/R$	%

**DIMENSIONS** in inches

**SCHEMATIC**

**IMPEDANCE VS. FREQUENCY**  
**50 Ω, 20 mil x 40 mil SIZE**

**MECHANICAL SPECIFICATIONS**

PARAMETER	
Chip Size	0.020" x 0.040" ± 0.003" (0.5 mm x 1.0 mm ± 0.076 mm)
Chip Thickness	0.010" ± 0.002" (0.254 mm ± 0.05 mm)
Chip Substrate Material	99.6 % alumina, 2 μ" to 4 μ" finish
Resistor Material	Tantalum nitride, self-passivating
Bonding Pad Size	0.010" x 0.012" (0.254 mm x 0.30 mm) min.
Number of Pads	2
Pad Material	25 kÅ minimum gold standard
Backing	None

**GLOBAL PART NUMBER INFORMATION**

Global Part Number: MIC5000BKKMSNHWS

Global Part Number Description: MIC 50 10 %, 100 ppm/°C, MIC trim, SnPb termination, no back metal, class H, WS

M	I	C	5	0	0	0	B	K	K	M	S	N	H	W	S
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

MODEL	RESISTANCE	RESISTANCE MULTIPLIER CODE	TOL. CODE (%)	TCR (ppm/°C)	TRIM STYLE	TERMINATION	BACK METAL	VISUAL CLASS	PACKAGING CODE
<b>MIC</b> 20 x 40 size microwave resistor TaN on alumina	First 4 digits are significant figures of resistance	<b>C</b> = 0.001 <b>B</b> = 0.01 <b>A</b> = 0.1 <b>0</b> = 1 <b>1</b> = 10	<b>F</b> = 1.0 <b>G</b> = 2.0 <b>H</b> = 2.5 <b>J</b> = 5.0 <b>K</b> = 10 <b>M</b> = 20	<b>E</b> = ± 25 <b>C</b> = ± 50 <b>K</b> = ± 100 <b>L</b> = ± 200 <b>R</b> = 0/- 250	<b>M</b> = Microwave <b>S</b> = Standard	<b>G</b> = Au <b>S</b> = SnPb <b>A</b> = Al <b>T</b> = Lead (Pb)-free (e1)	<b>G</b> = Au <b>N</b> = None	<b>H</b> = Class H <b>K</b> = Class K	<b>WS</b> = Waffle pack 100 min, 1 mult



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Vishay:

[MIC1000AHKSGNHWS](#)