

## 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
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### APPLICATIONS

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

Typical application areas are:

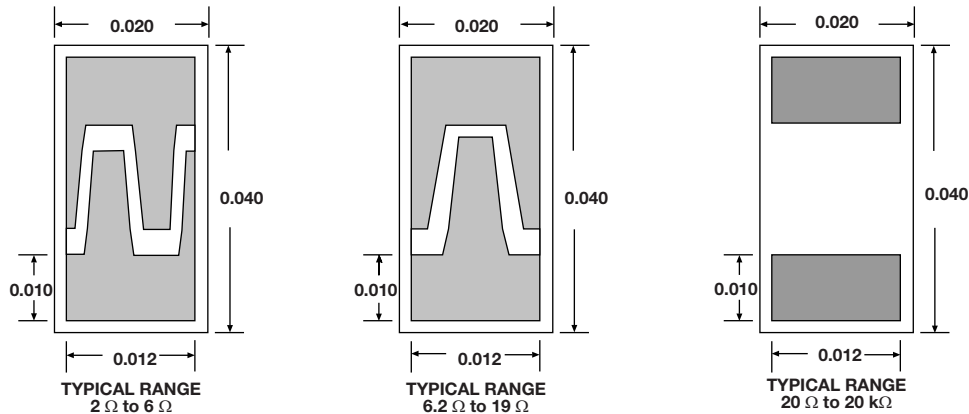
- Amplifiers
- Oscillators
- Attenuators
- Couplers
- Filters

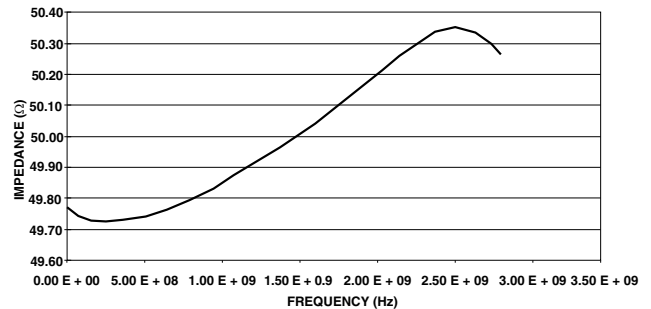
TEMPERATURE COEFFICIENT OF RESISTANCE, VALUES, AND TOLERANCES		
PARAMETER	VALUE	UNIT
Resistance Range	2 to 20K	$\Omega$
Tolerances	$\pm 1$	%
TCR	$\pm 25, \pm 50, \pm 100, \pm 200$	ppm/ $^{\circ}$ C

#### 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 $^{\circ}$ C, 62 mW	$\pm 0.2$ max. $\Delta R/R$	%
Operating Temperature Range	- 55 to + 125	$^{\circ}$ C
Thermal Shock, MIL-STD-202, Method 107, Test Condition F	$\pm 0.1$ max. $\Delta R/R$	%
High Temperature Exposure + 150 $^{\circ}$ 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 $^{\circ}$ C (Derated to Zero at 150 $^{\circ}$ C)	0.125 max.	W
5 x Rated Power Short-Time Overload, + 25 $^{\circ}$ 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									
<div style="display: flex; justify-content: space-around; font-weight: bold; font-size: 1.2em;"> <span>M</span><span>I</span><span>C</span><span>5</span><span>0</span><span>0</span><span>0</span><span>B</span><span>K</span><span>K</span><span>M</span><span>S</span><span>N</span><span>H</span><span>W</span><span>S</span> </div>									
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



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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А