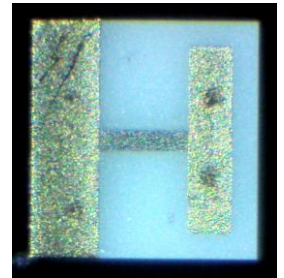


# Microwave Edge Wrapped Chip Resistors

## Product Features

- Edge Wrap similar in construction to our standard surface mount wrap resistors, with half wrap and full wrap styles available.
- The addition of a microwave design allows for operation at frequencies up to 60 GHz.
- Can be used in Non-Magnetic Applications

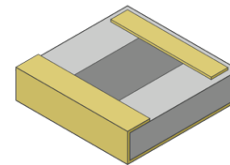


## Product Specifications

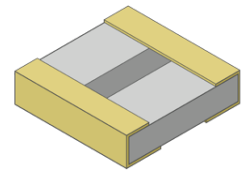
**Resistance Range** 2 Ω to 5kΩ

**Resistance Tolerance** ±0.5% to ±20%, value dependent

Half Wrap

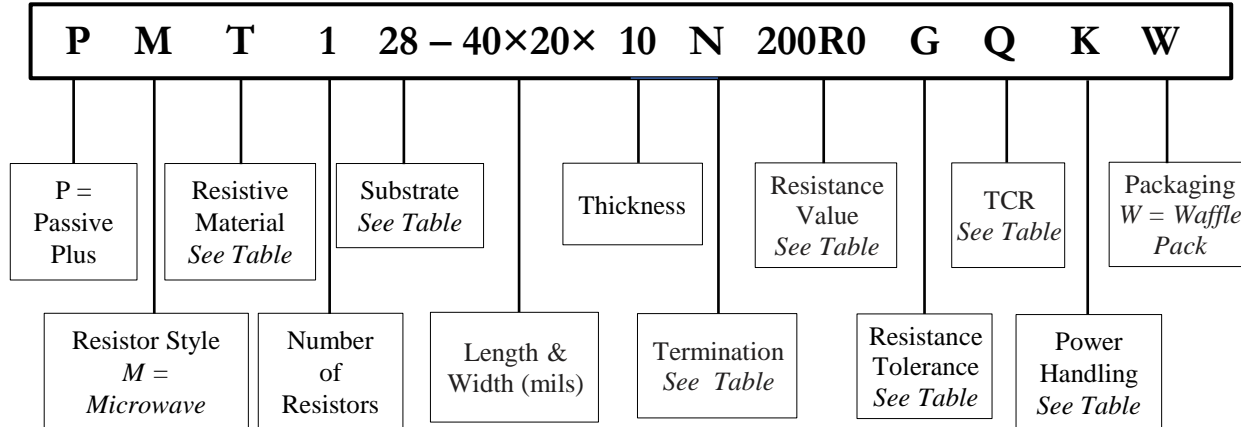


Full Wrap



## Part Numbering

Example shown below: Microwave Resistor, TaN resistive element, AlN substrate, case size 0.040" × 0.020" × 0.010", dual edge wrap, resistance 200 Ω ± 2%, 150 ppm TCR, 1.0 W max power handling.



## Resistive Materials

Code	Material	Passivation	Sheet Resistivity (Ω/ Sq)	Abs. Tolerance	Ratio Tolerance
T	Tantalum Nitride (TaN)	Self Passivating Ta <sub>2</sub> O <sub>5</sub>	5 to 270	From ±0.01%	From ±0.01%
N	NiChrome (NiCr)	SiO <sub>2</sub>	5 to 250	From ±0.01%	From ±0.01%

## Packaging

Code	Style
W	Waffle Pack (Standard)

Contact PPI for additional packaging options.

The standard dimensional tolerance for length and width is ± 2 mils. The standard dimensional tolerance for thickness is ± 1 mil.



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# Microwave Edge Wrapped Chip Resistors

## Substrate Materials

Code	Material	Thickness	Surface Finish	Dielectric Constant (@ 1MHz)	Coefficient of Thermal Expansion (x 10 <sup>6</sup> /°C)	Thermal Conductivity (W/m <sup>2</sup> *K)
35	Alumina (Al <sub>2</sub> O <sub>3</sub> )	0.005" - 0.010"	2μ" - 3μ"	9.9	7 (25°C to < 300°C)	26.9
28	Aluminum Nitride (AlN)	0.005" - 0.010"	6μ" - 8μ"	8.0 - 9.1	4.6 - 5.7 (25°C to < 1000°C)	170
25	Beryllium Oxide (BeO)	0.005" - 0.010"	<5μ"	6.76	9 (25°C to < 1000°C)	285

## Resistance Tolerance Codes

Code	D	F	G	H	J	K	L	M
Tolerance	± 0.5%	± 1%	± 2%	± 3%	± 5%	± 10%	± 15%	± 20%

## Standard Thickness

L x W	Thickness
12 x 09	5 mils
All other Sizes	10 mils

\*For other thickness requirements, please contact PPI

## Terminations

Code	Metallization	Description	Attachement Options
H	Ta/Pd/Au	1 Side Wrap	Wirebond, Non-Cond. Epoxy
M	TiW/Ni/Au	1 Side Wrap	Wirebond, Cond. Epoxy, Non-Cond. Epoxy, Eutectic Attach Solder
S	TiW/Ni/Au - Solder Dipped	1 Side Wrap	Sn Solder Ball
J	Ta/Pd/Au	2 Side Wrap	Wirebond, Non-Cond. Epoxy
N	TiW/Ni/Au	2 Side Wrap	Wirebond, Cond. Epoxy, Non-Cond. Epoxy, Eutectic Attach Solder
T	TiW/Ni/Au - Solder Dipped	2 Side Wrap	Sn Solder Ball

## Temperature Coefficient of Resistance

Code	TCC	Material	
		Tantallum Nitride (TaN)	NiChrome (NiCr)
Q	±150 PPM/°C	Standard	---
V	±100 PPM/°C	Yes	---
W	±50 PPM/°C	Yes	Yes
X	±25 PPM/°C	---	Standard
Y	±10 PPM/°C	---	Yes
Z	±5 PPM/°C	---	Yes

## Power Handling Codes

Code	Watts	Code	Watts	Code	Watts	Code	Watts
A	10 mW	F	150 mW	J	750 mW	P	4.0 W
B	20 mW	O	200 mW	K	1.0 W	Q	5.0 W
C	50 mW	G	250 mW	U	1.4 W	Z	6.0 W
D	75 mW	M	350 mW	L	2.0 W	S	10 W
E	100 mW	R	400 mW	Y	2.8 W		
I	125 mW	H	500 mW	N	3.0 W		



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# Microwave Edge Wrapped Chip Resistors

## Power Handling & Standard Resistance Ranges by Material and Case Size

Case Size	Alumina (35)			AlN (28)		BeO (25)		High Power Resistor				
	Min (Ω)	Max (Ω)	Power Handling	Max (Ω)	Power Handling	Max (Ω)	Power Handling	Resistance Range		Power Handling		
mils (inches)								Min (Ω)	Max (Ω)	Alumina (35)	AlN (28)	BeO (25)
12 x 9 (0.012 x 0.009)	1-3	25K	50 mW	25K	200 mW	25K	400 mW	-	-	-	-	-
14 x 12 (0.014 x 0.012)	1-3	40K	100 mW	40K	400 mW	40K	750 mW	-	-	-	-	-
20 x 10 (0.020 x 0.010)	1-3	60K	100 mW	60K	400 mW	60K	750 mW	2	1000	250 mW	1.0 W	2.0 W
15 x 15 (0.015 x 0.015)	1-2	70K	100 mW	70K	400 mW	70K	750 mW	2	1000	250 mW	1.0 W	2.0 W
20 x 20 (0.020 x 0.020)	1-2	125K	250 mW	125K	1.0 W	125K	2.0 W	2	1000	500 mW	2.0 W	4.0 W
30 x 20 (0.030 x 0.020)	1-2	200K	250 mW	200K	1.0 W	200K	2.0 W	2	1000	500 mW	2.0 W	4.0 W
40 x 20 (0.040 x 0.020)	1-2	250K	250 mW	250K	1.0 W	250K	2.0 W	2	1000	750 mW	3.0 W	6.0 W
30 x 30 (0.030 x 0.030)	1-2	275K	250 mW	275K	1.0 W	275K	2.0 W	2	1000	750 mW	2.0 W	6.0 W
35 x 35 (0.035 x 0.035)	1-2	300K	250 mW	300K	1.0 W	300K	2.0 W	2	1000	1.0 W	4.0 W	6.0 W
40 x 40 (0.040 x 0.040)	1-2	500K	350 mW	500K	1.4 W	500K	2.8 W	2	1000	1.0 W	4.0 W	6.0 W
50 x 25 (0.050 x 0.025)	1-2	300K	350 mW	300K	1.4 W	300K	2.8 W	2	1000	1.0 W	4.0 W	6.0 W
60 x 30 (0.060 x 0.030)	1-2	500K	500 mW	500K	2.0 W	500K	4.0 W	2	1000	1.4 W	5.0 W	10.0 W
50 x 50 (0.050 x 0.050)	1-2	700K	500 mW	700K	2.0 W	700K	4.0 W	2	1000	1.4 W	5.0 W	10.0 W
60 x 60 (0.060 x 0.060)	1-2	2M	500 mW	2M	2.0 W	2M	4.0 W	2	1000	1.4 W	5.0 W	10.0 W
80 x 50 (0.080 x 0.050)	1-2	2M	500 mW	2M	2.0 W	2M	4.0 W	2	1000	2.8 W	10.0 W	15.0 W
100 x 50 (0.100 x 0.050)	1-2	2.5M	500 mW	2.5M	2.0 W	2.5M	4.0 W	2	1000	2.8 W	10.0 W	15.0 W
120 x 60 (0.120 x 0.060)	1-2	3M	750 mW	3M	3.0 W	3M	6.0 W	2	1000	2.8 W	10.0 W	15.0 W
100 x 100 (0.100 x 0.100)	1-2	3.5M	750 mW	3.5M	3.0 W	3.5M	6.0 W	2	1000	2.8 W	10.0 W	15.0 W

Typical PPI commercial testing includes 100% visual inspection, 100% electrical testing with short time overload, and TCR sampling.

Our parts meet or exceed additional MIL-PRF-55342 and MIL-STD-202 requirements.

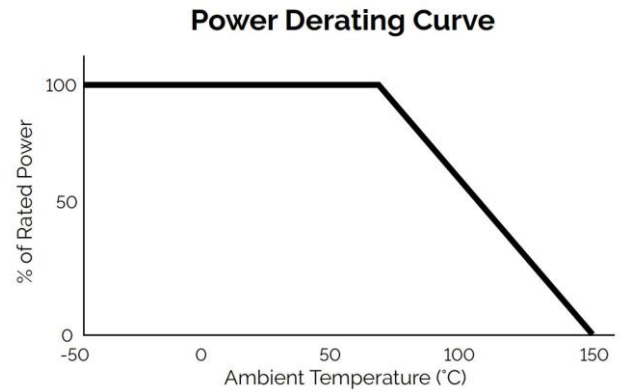


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# Microwave Edge Wrapped Chip Resistors

## General Properties

Operating Temperature	-55°C to +150°C
Storage Temperature	-65°C to +150°C
Operating Frequency	DC to 60 GHz
Voltage Rating	100V maximum
Power Derating (See Chart at Right)	Full power up to 70°C Derated linearly to zero power at 150°C



## Testing

Testing Performed	Specification / Standard
Visual Inspection	MIL-PRF-55342 MIL-STD-883
Mechanical Inspection	MIL-PRF-55342
DC Resistance	MIL-PRF-55342 MIL-STD-202
Resistance Temperature Characteristics (TCR)	MIL-PRF-55342
Short Time Overload	MIL-PRF-55342
High Temperature Exposure	MIL-PRF-55342
Thermal Shock	MIL-PRF-55342 MIL-STD-202
Resistance to Bonding Exposure	MIL-PRF-55342
Wire Bonding Integrity	MIL-PRF-55342
Life Test	MIL-PRF-55342 MIL-STD-202

## Performance Specifications

Higher power ratings, additional sizes, and custom resistors available. Please contact sales@passiveplus.com.