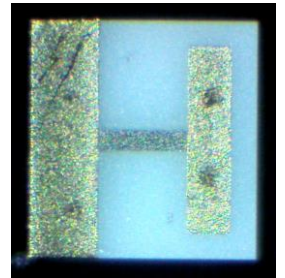




Microwave Edge Wrapped Chip Resistors

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

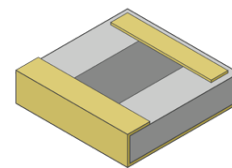


Product Specifications

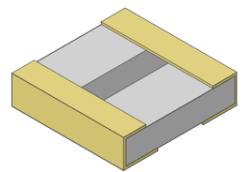
Resistance Range 2 Ω to 5kΩ

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

Half Wrap

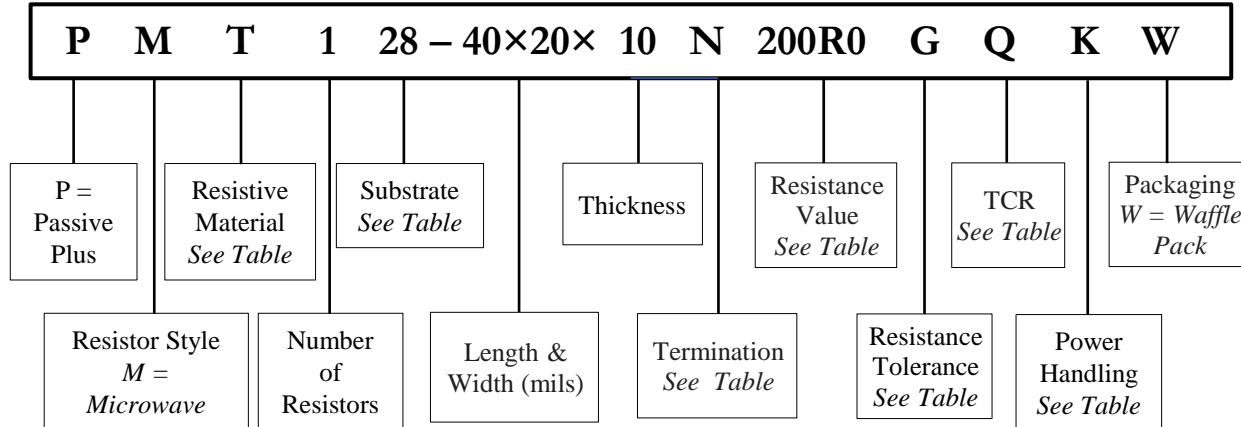


Full Wrap



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 ₂ O ₅	5 to 270	From ±0.01%	From ±0.01%
N	NiChrome (NiCr)	SiO ₂	5 to 250	From ±0.01%	From ±0.01%

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

All parts are supplied in waffle packs. Other packaging may be available. Contact PPI for additional packaging options.



Microwave Edge Wrapped Chip Resistors

Substrate Materials

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

Resistance Tolerance Codes

Tolerance	B	D	F	G	H	J	K	L	M	Q	S
Code	± 0.1%	± 0.5%	± 1%	± 2%	± 3%	± 5%	± 10%	± 15%	± 20%	± 0.05%	± 0.01%

Terminations

Metallization	Application	Code
1 Side Wrap	Epoxy or Au/Sn	H
1 Side Wrap	Epoxy, Au/Sn, or Sn Solder	M
1 Side Wrap	Sn Solder Ball	S
2 Side Wrap	Epoxy or Au/Sn	J
2 Side Wrap	Epoxy, Au/Sn, or Sn Solder	N
2 Side Wrap	Sn Solder Ball	T

Temperature Coefficient of Resistance

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

Power Handling Codes

Watts	Code	Watts	Code	Watts	Code
10 mW	A	350 mW	M	4.0 W	P
20 mW	B	400 mW	R	5.0 W	Q
50 mW	C	500 mW	H	6.0 W	Z
75 mW	D	750 mW	J	10 W	S
100 mW	E	1.0 W	K	15 W	T
125 mW	I	1.4 W	U	20 W	V
150 mW	F	2.0 W	L	25 W	W
200 mW	O	2.8 W	Y	30 W	Z
250 mW	G	3.0 W	N	50 W	X
				40 W	1



Microwave Edge Wrapped Chip Resistors

Power Handling & Standard Resistance Ranges by Material and Case Size

Standard Power Handling							High Power Resistor Range				
Case Size mils (inches)	Alumina (C35)	AlN (C-28)	BeO (C-25)	Quartz (C-20)	Min (Ω)	Max (Ω)	Min (Ω)	Max (Ω)	Max (Ω) Alumina (C-35)	Max (Ω) AlN (C-28)	Max (Ω) BeO (C-25)
12 x 9 (0.012 x 0.009)	50 mW	200 mW	400 mW	10 mW	4	500	---	---	---	---	---
14 x 12 (0.014 x 0.012)	100 mW	400 mW	750 mW	20 mW	3	750	---	---	---	---	---
20 x 10 (0.020 x 0.010)	100 mW	400 mW	750 mW	20 mW	3	1000	2	1000	250 mW	1.0 W	2.0 W
15 x 15 (0.015 x 0.015)	100 mW	400 mW	750 mW	20 mW	4	1000	2	1000	250 mW	1.0 W	2.0 W
20 x 20 (0.020 x 0.020)	250 mW	1.0 W	2.0 W	50 mW	2	1250	2	1000	500 mW	2.0 W	4.0 W
30 x 20 (0.030 x 0.020)	250 mW	1.0 W	2.0 W	50 mW	2	2500	2	1000	500 mW	2.0 W	4.0 W
40 x 20 (0.040 x 0.020)	250 mW	1.0 W	2.0 W	50 mW	2	3750	2	1000	750 mW	3.0 W	6.0 W
30 x 30 (0.030 x 0.030)	250 mW	1.0 W	2.0 W	50 mW	2	2500	2	1000	750 mW	2.0 W	6.0 W
35 x 35 (0.035 x 0.035)	250 mW	1.0 W	2.0 W	50 mW	2	3000	2	1000	1.0 W	4.0 W	6.0 W
40 x 40 (0.040 x 0.040)	350 mW	1.4 W	2.8 W	70 mW	2	3750	2	1000	1.0 W	4.0 W	6.0 W
50 x 25 (0.050 x 0.025)	350 mW	1.4 W	2.8 W	70 mW	3	5000	2	1000	1.0 W	4.0 W	6.0 W
60 x 30 (0.060 x 0.030)	500 mW	2.0 W	4.0 W	100 mW	3	5000	2	1000	1.4 W	5.0 W	10.0 W
50 x 50 (0.050 x 0.050)	500 mW	2.0 W	4.0 W	100 mW	2	5000	2	1000	1.4 W	5.0 W	10.0 W
60 x 60 (0.060 x 0.060)	500 mW	2.0 W	4.0 W	100 mW	2	5000	2	1000	1.4 W	5.0 W	10.0 W
80 x 50 (0.080 x 0.050)	500 mW	2.0 W	4.0 W	100 mW	2	5000	2	1000	2.8 W	10.0 W	15.0 W
100 x 50 (0.100 x 0.050)	500 mW	2.0 W	4.0 W	100 mW	2	5000	2	1000	2.8 W	10.0 W	15.0 W
120 x 60 (0.120 x 0.060)	750 mW	3.0 W	6.0 W	125 mW	2	5000	2	1000	2.8 W	10.0 W	15.0 W
100 x 100 (0.100 x 0.100)	750 mW	3.0 W	6.0 W	125 mW	2	5000	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.

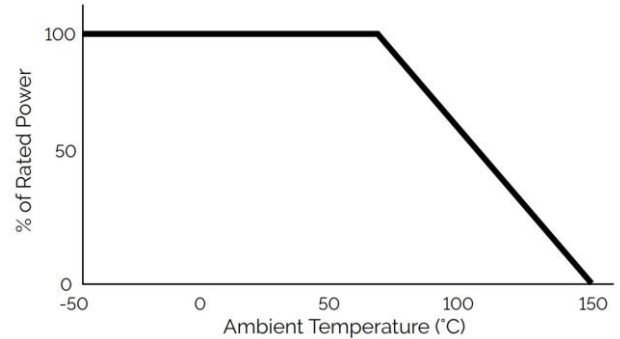


Microwave Edge Wrapped Chip Resistors

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

Power Derating Curve



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.

Packaging

ESD waffle packs are standard. Film rings and gel pack packaging are available upon request.