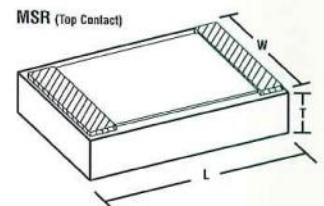
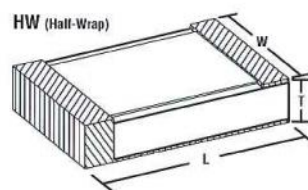
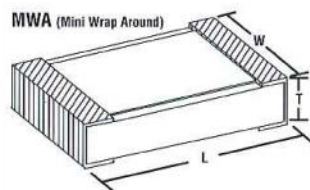
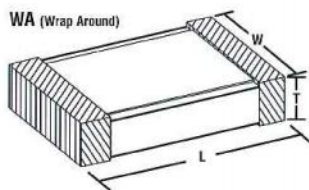


Ordering MSI Thick Film Parts



PART NUMBER DESIGNATION

EXAMPLE: WA81PG-1001F-NS62TR

Wrap Around, 0502 case size, Platinum Gold base metal, 1K Ω 1% tol., Nickel Barrier, Sn62 Solder, Tape & Reel, Std TCR

Style: WA

WA = Wrap Around
MWA = Mini Wrap Around
HW = Half Wrap
MHW = Mini Half Wrap
MSR = Top Contact

Type: 81

See Table to right

Termination: PG Material Base Metal

G = Gold for wire bonding (MSR only)
PG = Platinum Gold
PS = Palladium Silver
SM = Surface Mount
Base metal determined by value and TCR (Nickel Barrier required)

Value: 1001 Resistance Value

Four digits (xxxx) with provisions for five digits (xxxxx) if necessary. The first three digits represent significant figures. The last digit represents the number of zeros to follow. When fractional values of an ohm are required, the letter "R" is used as a decimal point.

Tolerance: F

B = 0.10% H = 3% P = 25%
C = 0.25% J = 5% N = 30%
E = 0.50% K = 10% Y = Max
F = 1% L = 15% Z = Special
G = 2% M = 20%

Metal Options: N

B = Back Metal (MSR only)
N = Nickel Barrier
Blank = No Metal Options

Termination: S62 Finish

S60 = Sn60 Lead Free Options
S62 = Sn62 S96 = Sn96
S63 = Sn63 S305 = SAC 305
U = Untinned No Solder
NU = Nickel, Gold Plate

Option: TR

TR = Tape and Reel (Heat seal std)
Pressure seal & Paper tape available
Packaged in chip trays if not specified
TL = Trimless
P = Optimum TCR otherwise std.
X = Special Requirements Code

Style	Type	Case Size	Power (Watts)	Voltage (Volts DC)
	96	0201	0.015	20
MWA	84	0202	0.020	25
MHW	66	0203	0.040	30
MSR	98	0302	0.040	30
	91	0303	0.040	40
	10	0404	0.050	45

Style	Type	Case Size	Power (Watts)	Voltage (Volts DC)
	20	0402	0.040	40
WA	81	0502	0.100	50
HW	56	0503	0.125	80
MSR	19	0504	0.100	70
	82	0505	0.125	80
	93	0603	0.090	90
	61	0604	0.125	65
	86	0805	0.200	125
	5	1002	0.100	175
	83	1005	0.250	180
	90	1010	0.500	160
	87	1206	0.250	190
	94	1210	0.550	230
	97	1218	1.500	185
	80	1505	0.300	300
	88	2010	0.800	350
	85	2307	0.500	380
	89	2512	2.000	475
	68	3939	5.000	750
	30	5024	4.000	1000
	28	6632	8.000	1400
	26	6645	8.000	1400

RESISTANCE RANGE IN OHMS

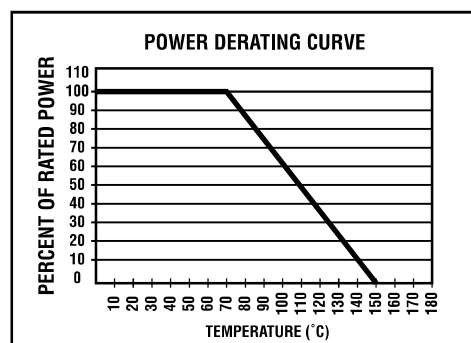
Type	0.1 to < 1	1 to < 5	5 to < 10	10 to < 1 M	1M to < 10M	10M to < 100M	100M to < 250M	250M to < 500M	500M to < 750M	750M to < 1G
96	400	300	200	100	200	200	300	300	400	400
84	300	100	100	100	200	200	300	300	400	400
66	300	100	100	100	200	200	300	300	400	400
98	300	100	100	100	100	200	300	300	400	400
91	100	100	100	100	100	100	150	200	300	300
10	100	100	100	100	100	200	200	200	300	300
20	300	100	100	100	100	100	300	300	400	400
81	100	100	100	100	100	100	200	200	300	300
56	100	100	100	100	100	100	200	200	300	300
19	100	100	100	100	100	100	150	200	300	300
82	100	100	100	100	100	100	150	200	300	300
93	100	100	100	100	100	100	150	200	300	300
61	100	100	100	100	100	100	150	200	300	300
86	100	100	100	100	100	100	300	200	300	300
5	500	200	200	100	100	200	200	200	200	200
83	100	100	100	100	100	100	150	200	300	300
90	100	100	100	100	100	100	200	300	400	400
87	100	100	100	100	100	100	150	200	300	300
94	100	100	100	100	100	100	200	300	400	400
97	200	100	100	100	100	200	200	300	400	400
80	500	300	100	100	100	100	100	100	200	200
88	100	100	100	100	100	100	150	200	300	300
85	500	300	100	100	100	100	100	100	200	200
89	100	100	100	100	100	100	150	200	300	300
68	100	100	100	100	100	100	200	300	400	400
30	200	100	100	100	100	100	150	200	300	300
28	200	100	100	100	100	100	150	200	300	300
26	200	100	100	100	100	100	150	200	300	300

1. Table list optimal TCR's, add 200 for standard TCR's. 2. Optimal TCR's valid for SM termination, may not be available for all other terminations.

Electrical Performance Characteristics

MIL-PRF-55342 Test	MIL-PRF-55342 Requirement	MSI Typical
Short Term Overload	±0.25%	±0.03%
High Temperature Exposure	±0.50%	±0.05%
Thermal Shock	±0.50%	±0.07%
Low Temperature Operation	±0.25%	±0.05%
Resistance to Bonding Exposure / Soldering Heat	±0.25%	±0.09%
Moisture Resistance	±0.50%	±0.06%
Stability (Life 70°C 2,000Hrs)	±0.50%	±0.04%
Stability (Life 70°C 10,000Hrs)	±2.00%	±0.07%

Operating temperature range from -55°C to +150°C



Power rating at 70°C derated linearly to 0% power at 150°C.
($P = E^2/R$)

Mini WA Series Resistors



Style	Type	Case Size	Length Inches (mm)	Width Inches (mm)	Thickness Inches (mm)	Pad Width Inches (mm)
MWA	96	0201	0.024 ±0.002 (0.610 ±0.051)	0.012 ±0.002 (0.305 ±0.051)	0.008 ±0.002 (0.203 ±0.051)	0.007 ±0.002 (0.178 ±0.051)
	84	0202	0.024 ±0.002 (0.610 ±0.051)	0.021 ±0.002 (0.533 ±0.051)	0.008 ±0.002 (0.203 ±0.051)	0.007 ±0.002 (0.178 ±0.051)
	66	0203	0.027 ±0.002 (0.686 ±0.051)	0.031 ±0.002 (0.787 ±0.051)	0.012 ±0.003 (0.305 ±0.076)	0.008 ±0.002 (0.203 ±0.051)
	98	0302	0.032 ±0.003 (0.813 ±0.076)	0.020 ±0.003 (0.508 ±0.076)	0.012 ±0.003 (0.305 ±0.076)	0.008 ±0.003 ¹ (0.203 ±0.076)
	91	0303	0.030 ±0.003 (0.762 ±0.076)	0.030 ±0.003 (0.762 ±0.076)	0.012 ±0.003 (0.305 ±0.076)	0.008 ±0.003 ¹ (0.203 ±0.076)
	10	0404	0.037 ±0.003 (0.940 ±0.076)	0.035 ±0.003 (0.889 ±0.076)	0.012 ±0.003 (0.305 ±0.076)	0.012 ±0.004 (0.305 ±0.102)

¹ Dimensions are for back termination only.

WA Series Resistors

Style	Type	Case Size	Length Inches (mm)	Width Inches (mm)	Thickness Inches (mm)	Pad Width Inches (mm)
WA	20	0402	0.044 ±0.004 (1.118 ±0.102)	0.022 ±0.003 (0.559 ±0.076)	0.013 ±0.003 (0.330 ±0.076)	0.011 ±0.004 (0.279 ±0.102)
	81	0502	0.054 ±0.005 (1.372 ±0.127)	0.025 ±0.003 (0.635 ±0.076)	0.013 ±0.003 (0.330 ±0.076)	0.015 ±0.005 ¹ (0.381 ±0.127)
	56	0503	0.050 ±0.005 (1.270 ±0.127)	0.032 ±0.003 (0.813 ±0.076)	0.013 ±0.003 (0.330 ±0.076)	0.015 ±0.005 (0.381 ±0.127)
	19	0504	0.055 ±0.005 (1.397 ±0.127)	0.042 ±0.003 (1.067 ±0.076)	0.013 ±0.003 (0.330 ±0.076)	0.015 ±0.005 ¹ (0.381 ±0.127)
	82	0505	0.054 ±0.005 (1.372 ±0.127)	0.050 ±0.003 (1.270 ±0.076)	0.013 ±0.003 (0.330 ±0.076)	0.015 ±0.005 ¹ (0.381 ±0.127)
	93	0603	0.065 ±0.005 (1.651 ±0.127)	0.032 ±0.003 (0.813 ±0.076)	0.013 ±0.003 (0.330 ±0.076)	0.015 ±0.005 ¹ (0.381 ±0.127)
	61	0604	0.065 ±0.005 (1.651 ±0.127)	0.042 ±0.003 (1.067 ±0.076)	0.018 ±0.003 (0.457 ±0.076)	0.017 ±0.005 (0.432 ±0.127)

¹ Dimensions are for back termination only.

Style	Type	Case Size	Length Inches (mm)	Width Inches (mm)	Thickness Inches (mm)	Pad Width Inches (mm)
WA	86	0805	0.080 ±0.006 (2.032 ±0.152)	0.050 ±0.003 (1.270 ±0.076)	0.018 ±0.003 (0.457 ±0.076)	0.015 ±0.005 (0.381 ±0.127)
	5	1002	0.105 ±0.005 (2.667 ±0.127)	0.027 ±0.003 (0.686 ±0.076)	0.013 ±0.003 (0.330 ±0.076)	0.020 ±0.005 (0.508 ±0.127)
	83	1005	0.104 ±0.006 (2.642 ±0.152)	0.050 ±0.003 (1.270 ±0.076)	0.018 ±0.004 (0.457 ±0.102)	0.015 ±0.005 (0.381 ±0.127)
	90	1010	0.104 ±0.006 (2.642 ±0.152)	0.100 ±0.003 (2.540 ±0.076)	0.018 ±0.004 (0.457 ±0.102)	0.015 ±0.005 (0.381 ±0.127)
	87	1206	0.127 ±0.006 (3.226 ±0.152)	0.063 ±0.003 (1.600 ±0.076)	0.018 ±0.004 (0.457 ±0.102)	0.019 ±0.005 ¹ (0.483 ±0.127)
	94	1210	0.125 ±0.005 (3.175 ±0.127)	0.100 ±0.003 (2.540 ±0.076)	0.018 ±0.004 (0.457 ±0.102)	0.019 ±0.005 (0.483 ±0.127)
	97	1218	0.120 ±0.005 (3.048 ±0.127)	0.180 ±0.003 (4.572 ±0.076)	0.030 ±0.005 (0.762 ±0.127)	0.025 ±0.005 (0.635 ±0.127)
	80	1505	0.155 ±0.005 (3.937 ±0.127)	0.050 ±0.003 (1.270 ±0.076)	0.018 ±0.004 (0.457 ±0.102)	0.015 ±0.005 (0.381 ±0.127)
	88	2010	0.210 ±0.006 (5.334 ±0.152)	0.098 ±0.003 (2.489 ±0.076)	0.018 ±0.004 (0.457 ±0.102)	0.020 ±0.005 (0.508 ±0.127)
	85	2307	0.228 ±0.005 (5.791 ±0.127)	0.075 ±0.003 (1.905 ±0.076)	0.018 ±0.004 (0.457 ±0.102)	0.020 ±0.005 (0.508 ±0.127)
	89	2512	0.256 ±0.006 (6.502 ±0.152)	0.124 ±0.003 (3.150 ±0.076)	0.030 ±0.005 (0.762 ±0.127)	0.020 ±0.005 (0.508 ±0.127)
	68	3939	0.394 ±0.008 (10.008 ±0.203)	0.390 ±0.005 (9.906 ±0.127)	0.030 ±0.005 (0.762 ±0.127)	0.043 ±0.005 (1.092 ±0.127)
	30	5024	0.501 ±0.008 (12.725 ±0.203)	0.246 ±0.004 (6.248 ±0.102)	0.030 ±0.005 (0.762 ±0.127)	0.058 ±0.005 (1.473 ±0.127)
	28	6632	0.674 ±0.008 (17.120 ±0.203)	0.332 ±0.005 (8.433 ±0.127)	0.030 ±0.005 (0.762 ±0.127)	0.067 ±0.006 ¹ (1.702 ±0.152)
	26	6645	0.675 ±0.009 (17.145 ±0.229)	0.499 ±0.005 (12.675 ±0.127)	0.030 ±0.005 (0.762 ±0.127)	0.067 ±0.006 ¹ (1.702 ±0.152)

¹ Dimensions are for back termination only.

