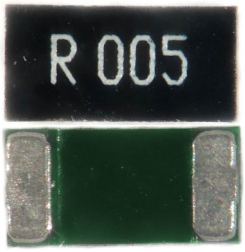
Thin Film Technology Corp.

Product Family: 2-Terminal Current Sensing Power Resistor

Part Number Series: MPC Series

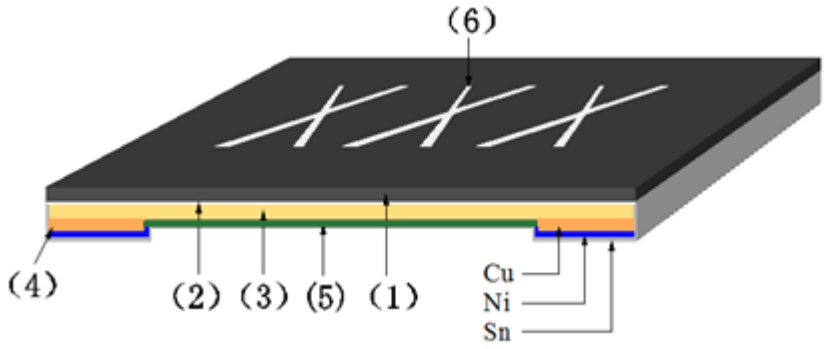


Construction:
- Metal foil resistive element
- Epoxy-resin overcoat
- Non-wrapped electrodes
- Inherently anti-sulfur
- 100% matte tin over Ni terminations
- RoHS compliant and Pb free

Features:
- 0201, 0402, 0603, 0805 and 1206 English case sizes
- Resistances from 1mΩ~50mΩ
- TCR down to ±50ppm/°C
- Tolerance down to ±0.5%
- Thicknesses down to 0.35mm maximum

Description:
These low resistance, metal foil, current sensing chip resistors exhibit excellent performance with a very low height profile. They are useful in many current sensing applications. High volume production suitable for commercial and special applications.

Product Construction:

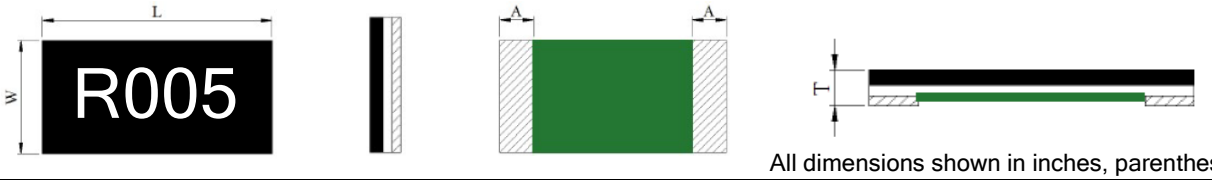


Number	Description
1	Substrate (Glass Epoxy)
2	Adhesive (Epoxy Resin)
3	Resistor Element (Cu-Alloy)
4	Terminals (100% Matte Sn)
5	Protective Coating (Epoxy Resin)
6	Marking

Part Numbering: Ex: MPC1206QR005FF-T5

Series Name	English Size (Metric Size)	Temp. Coefficient of Resistance (TCR)	Resistance Value	Resistance Tolerance	Internal Code	T&R Packaging Quantity
MPC	**0201** (0603) **0402** (1005) **0603** (1608) **0805** (2012) **1206** (3216)	**Q** = ±50ppm/°C **D** = ±75ppm/°C **R** = ±100ppm/°C **G** = ±150ppm/°C **S** = ±200ppm/°C	Ex. **R005** = 0.005Ω **2M50** = 0.0025Ω (4 digits)	**D** = ±0.5% **F** = ±1.0%	**F** = Face Down	**-T5** = 5,000 **-T10** = 10,000

Product Dimensions:



All dimensions shown in inches, parentheses in mm.

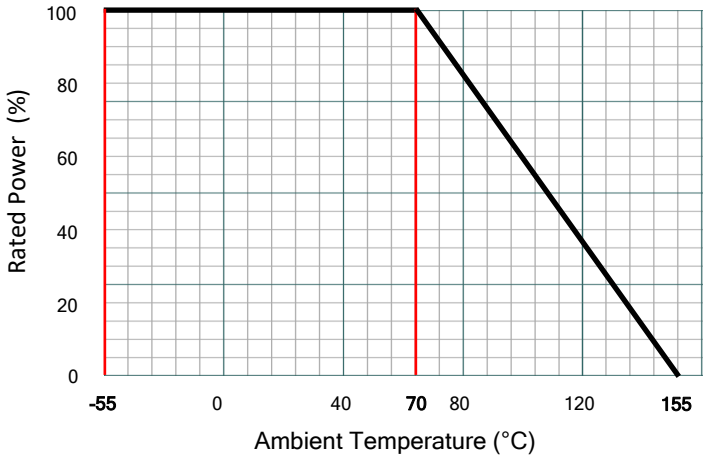
Dimension (Metric)	Resistance Range	L	W	T	A
MPC0201 (0603)	10mΩ, 20mΩ	0.024 ±0.004 (0.60 ±0.10)	0.012 ±0.004 (0.30 ±0.10)	0.010 +0.004/-0.002 (0.25+0.10/-0.05)	0.006 ±0.004 (0.15 ±0.10)
MPC0402 (1005)	2.5mΩ~3mΩ	0.039 ±0.004 (1.00 ±0.10)	0.022 ±0.004 (0.55 ±0.10)	0.012 ±0.002 (0.30 ±0.05)	0.012 ±0.04 (0.30 ±0.10)
	5mΩ~50mΩ				0.009 ±0.04 (0.23 ±0.10)
MPC0603 (1608)	2mΩ	0.063 ±0.010 (1.60 ±0.25)	0.031 ±0.010 (0.80 ±0.25)	0.014 ±0.08 (0.35 ±0.20)	0.018 ±0.008 (0.45 ±0.20)
	2.5mΩ~3mΩ				0.014 ±0.008 (0.35 ±0.20)
	4mΩ~20mΩ				0.012 ±0.008 (0.30 ±0.20)
MPC0805 (2012)	1mΩ~1.5mΩ	0.079 ±0.010 (2.00 ±0.25)	0.050 ±0.010 (1.25 ±0.25)	0.016 ±0.08 (0.40 ±0.20)	0.028 ±0.008 (0.70 ±0.20)
	2mΩ~2.5mΩ				0.024 ±0.008 (0.60 ±0.20)
	3mΩ~20mΩ				0.016 ±0.008 (0.40 ±0.20)
MPC1206 (3216)	1mΩ~1.5mΩ	0.126 ±0.009 (3.20 ±0.25)	0.063 ±0.009 (1.60 ±0.25)	0.016 ±0.08 (0.40 ±0.20)	0.050 ±0.012 (1.25 ±0.30)
	2mΩ				0.041 ±0.012 (1.05 ±0.30)
	3mΩ				0.031 ±0.012 (0.80 ±0.30)
	4mΩ~20mΩ				0.024 ±0.012 (0.60 ±0.30)

Electrical Specifications:

Type	MPC0201		MPC0402					MPC0603			
Metric Size	0603		1005					1608			
Power Rating	1/4W		1/3W				1/4W	1/3W			
Resistance Range (mΩ)	10	20	2.5~3	5~19	20	21~25	40~50	2	2.5~4	5	6~20
Resistance Tolerance (code)	±1.0% (F)	±0.5% (D) ±1.0% (F)	±1.0% (F)		±0.5% (D) ±1.0% (F)	±1.0% (F)		±1.0% (F)		±0.5% (D) ±1.0% (F)	±1.0% (F)
TCR ppm/°C (code)	±200 (S)	±100 (R)	±150 (G)	±100 (R)				±150 (G)	±100 (R)		±75 (D)
Rated Voltage	√(Power x Resistance)										
Operating Temp. Range	-55°C~+155°C										
Packaging (code)	10,000 pcs/reel (-T10)							5,000 pcs/reel (-T5)			

Type	MPC0805				MPC1206	
Metric Size	2012				3216	
Power Rating	1/2W				1W	
Resistance Range (mΩ)	1	1.5	2~5	6~20	1~4	5~20
Resistance Tolerance (code)	±1.0% (F)					
TCR ppm/°C (code)	±150 (G)	±100 (R)	±75 (D)	±50 (Q)	±75 (D)	±50 (Q)
Rated Voltage	√(Power x Resistance)					
Operating Temp. Range	-55°C~+155°C					
Packaging (code)	5,000 pcs/reel (-T5)					

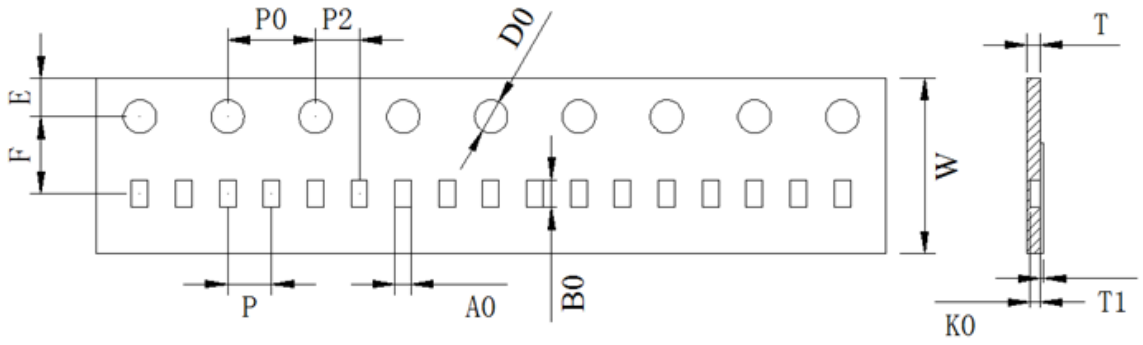
Power Derating Curve:



Reliability Specifications:

Test	Procedure	Specifications
Short Time Over Load IEC60115-1 4.13	P= 2.5Pr; T=25 ±2°C, t= 5sec.	±(1.0% +0.5mΩ)
High Temp. Exposure IEC60115-1 4.25	T = +155 ±2°C ; t = 1000h	±(1.0% +0.5mΩ)
Low Temp. Storage IEC60115-1 4.25	T = -55 ±2°C ; t = 1000h	±(1.0% +0.5mΩ)
Moisture Load Life IEC60115-1 4.25	Vtest = Vmax ; T = 60 ±2°C ; RH = 95% ; t = 90min ON , 30min OFF , 1000h	±(2.0% +0.5mΩ)
Temperature Humidity IEC60115-1 4.25	0201: T = 40 ±2°C; RH = 90%; t = 1000h	±(1.0% +0.5mΩ)
Thermal Shock IEC60115-1 4.19	0201: -55°C 30min. → R.T. 1min. → +155°C 30min. → R.T. 1min., 1000 cycles 0402-1206: -55°C 30min. → R.T. 3min. → +150°C 30min. → R.T. 3min., 100 Cycles	±(1.0% +0.5mΩ)
Load Life at 70°C IEC60115-1 4.25	Vtest = Vmax ; T=70 ±2°C ; t = 90min ON , 30min OFF,1000h 0201: Vtest = Vmax ; T=70 ±2°C ; t = 90min ON , 30min OFF,1000h	0201: ±(1.0% +0.5mΩ) 0402-1206: ±(2.0% +0.5mΩ)
Solderability IEC60115-1 4.17	Dip into solder at T = 245 ±5°C , t = 3sec.	>95% coverage with new solder
Resistance to Solder Heat IEC60115-1 4.18	Through Reflow. Parts are subjected to 3 reflow cycles	±(1.0% +0.5mΩ)
Mechanical Shock IEC60115-1 4.21	0201: F = 50 ±5G, t = 11 ±1ms. 0402-1206: a = 100G, t = 11ms, 5 times shock	±(1.0% +0.5mΩ)
Substrate Bending IEC60115-1 4.33	Span between fulcrums = 90mm Bend width = 2mm Test board = Glass-epoxy board Thickness = 1.6mm Duration = 10 sec.	±(1.0% +0.5mΩ)
Terminal Strength	0201: F = 3.4N; t = 60 ±1sec	±(1.0% +0.5mΩ)
Highly Accelerated Stress Test	0201: T = 121 ±2°C, p = 30PSIA, t=48h	±(1.0% +0.5mΩ)
Vibration	0201: f = 10~2,000Hz, a = 15G ±1.5G, t = 20min, 12 cycles	±(1.0% +0.5mΩ)

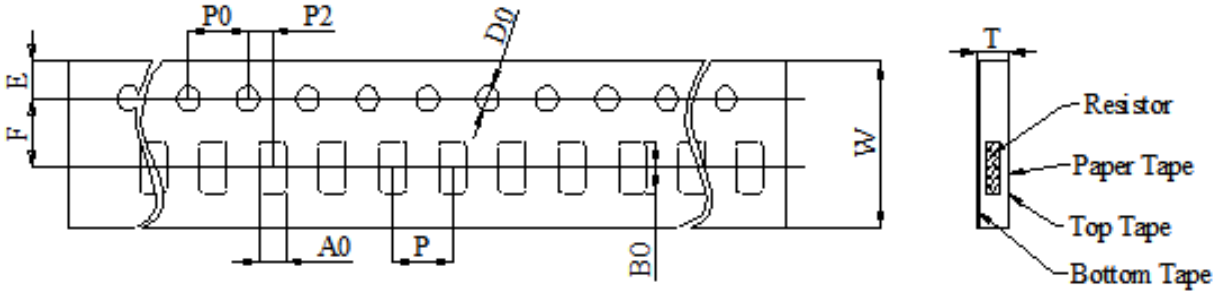
Plastic Tape Dimensions:



All dimensions in mm.

Size	W	P0	P1	P2	A0	B0	D0	F	E	T	T1	K0
0201	8.00 ±0.20	4.00 ±0.10	2.00 ±0.10	2.00 ±0.10	0.38 ±0.10	0.68 ±0.10	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.45 ±0.05	Max 0.10	0.30 ±0.05

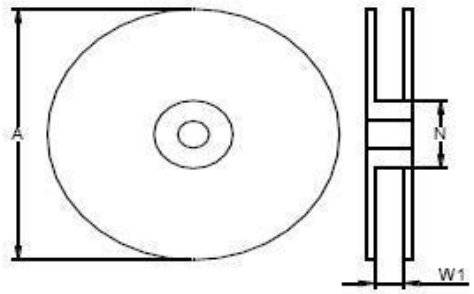
Paper Tape Dimensions:



All dimensions in mm.

Size	W	P0	P	P2	A0	B0	D0	F	E	T
0402	8.00 ±0.30	4.00 ±0.10	2.00 ±0.10	2.00 ±0.10	0.65 ±0.10	1.10 ±0.10	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.42 ±0.05
0603	8.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	0.98 ±0.10	1.85 ±0.10	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.60 ±0.05
0805	8.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	1.55 ±0.10	2.30 ±0.10	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.75 ±0.10
1206	8.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.05 ±0.20	3.65 ±0.20	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.75 ±0.10

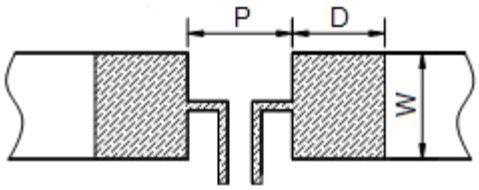
Reel Dimensions:



All dimensions in mm.

Size	Quantity	A	N	W1
0201	10,000 pcs/reel	178 ±5.00	60.0 ±2.00	9.00 ±1.00
0402		178 ±5.00	60.0 ±2.00	9.00 ±1.00
0603	5,000 pcs/reel	178 ±5.00	60.0 ±2.00	9.00 ±1.00
0805		178 ±5.00	60.0 ±2.00	9.00 ±1.00
1206		178 ±5.00	60.0 ±2.00	9.00 ±1.00

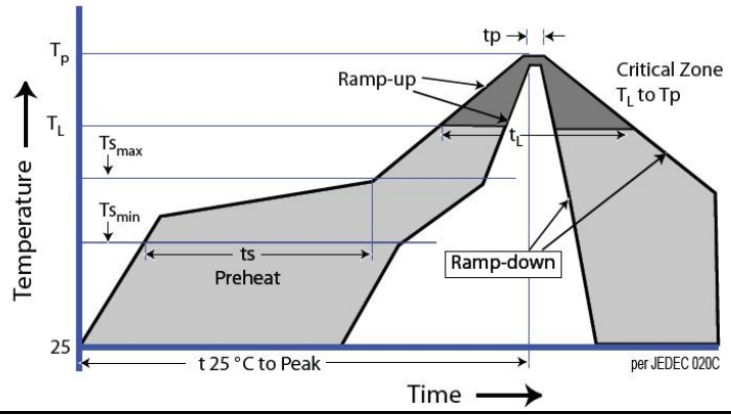
Recommended Land Pattern:



All dimensions in mm.

Size	Resistance Range	P	W	D
0201	10mΩ, 20mΩ	0.25	0.33	0.20
0402	2.5mΩ~3mΩ	0.35	0.60	0.60
	5mΩ~25mΩ, 40mΩ~50mΩ	0.40		
0603	2mΩ	0.38	0.92	1.41
	2.5mΩ~3mΩ	0.50		1.35
	4mΩ~20mΩ	0.60		1.30
0805	1mΩ	0.40	1.44	1.60
	1.5mΩ~2.5mΩ	0.50		1.55
	3mΩ~20mΩ	0.80		1.40
1206	1mΩ~1.5mΩ	0.50	1.84	2.15
	2mΩ	0.60		2.10
	3mΩ~20mΩ	1.20		1.80

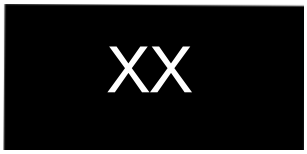
Soldering Profile:



Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts_{max} to Tp)	3 °C/second max.
Preheat	
- Temperature Min (Ts_{min})	150 °C
- Temperature Max (Ts_{max})	200 °C
- Time (ts_{min} to ts_{max})	60-180 seconds
Time maintained above:	
- Temperature (T_L)	217 °C
- Time (t_L)	60-150 seconds
Peak Temperature (T_p)	260 +0 °C
Time within 5 °C of actual Peak Temperature (tp)	20-40 seconds
Ramp-Down Rate	6 °C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

Marking Information:

0201~0402: no marking



0603: 2 digit marking
Ex: 10mΩ = 11

0805: 3 digit marking
Ex: 10mΩ = 100

1206: 4 digit marking
Ex: 10mΩ = 10R0

Storage Conditions:

Environment Conditions:

Products should be stored under the following environmental conditions.

- Temperature: +5 to +35°C
- Humidity: 45 to 85% relative humidity
- Do not keep products in environments where they may be subject to particulate contamination or harmful gases such as sulfuric acid or hydrogen chloride as it may cause oxidization on electrodes, resulting in poor solderability.
- Products should be stored in a space that does not expose it to high temperatures, vibration, or direct sunlight.
- Products should be stored in the original airtight packaging until use.