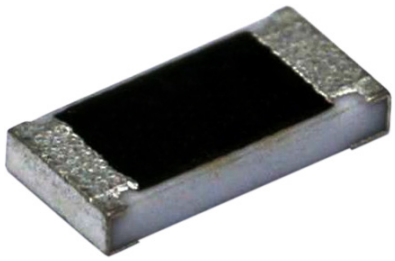
Chip Resistors
Pulse Withstanding



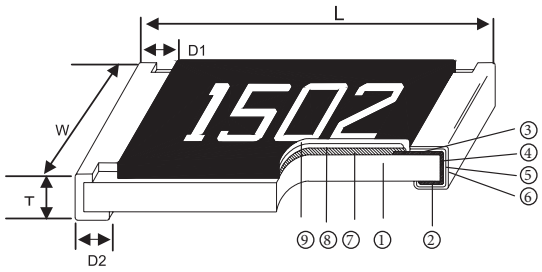
Features:

- Tolerance from ±0.5% to 5%
- High power rating
- Excellent pulse withstanding performance
- Improved working voltage ratings
- Standard package sizes of 0603 to 2512

Applications:

- Metering (Testing/Measurement)
- Diagnostic Equipment
- Medical Devices
- Industrial Controls
- Plasma
- LCD Video Monitors

Construction:



①	Alumina Substrate
②	Bottom Electrode (Ag)
③	Top Electrode (Ag-Pd)
④	Edge Electrode (NiCr)
⑤	Barrier Layer (Ni)
⑥	External Electrode (Sn)
⑦	Resistor Layer (RuO_2 / Ag)
⑧	Primary Overcoat (Glass)
⑨	Secondary Overcoat (Epoxy)

Dimensions:

Part Number	Size (Inch)	L	W	T	D1	D2	Weight (g) (1,000 pieces)
MCPWR05	0805	2 ±0.1	1.25 ±0.1	0.5 ±0.1	0.35 ±0.2	0.4 ±0.2	4.368
MCPWR06	1206	3.1 ±0.1	1.55 ±0.1	0.55 ±0.1	0.5 ±0.25	0.5 ±0.2	8.947
MCPWR10	2010	5 ±0.1	2.5 ±0.15		0.6 ±0.25		24.241
MCPWR12	2512	6.35 ±0.1	3.1 ±0.15				39.448

Dimensions : Millimetres

Chip Resistors
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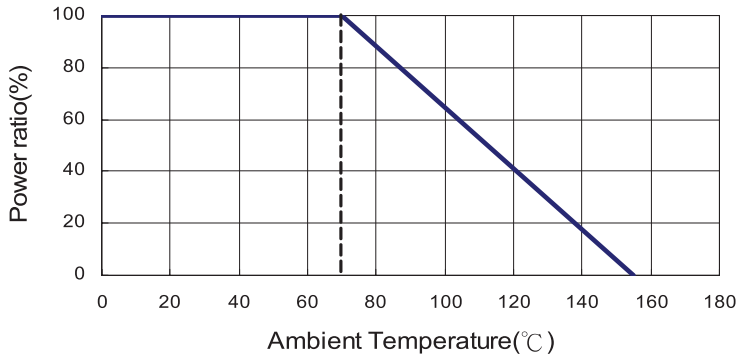
Derating Curve:



Standard Electrical Specifications:

Item / Type	Power Rating at 70°C	Operating Temperature Range	Maximum Operating Voltage	Resistance Range					TCR (PPM/°C)
				±0.5%	±1%	±2%	±3%	±5%	
MCPWR05 (0805)	1/8W	-55 to +155°C	150V	10Ω - 299Ω	1Ω - 299Ω				±200
				300Ω - 20MΩ					±100
MCPWR06 (1206)	1/3W		200V	10Ω - 20Ω	1Ω - 20Ω				±200
				20.1Ω - 20MΩ					±100
MCPWR10 (2010)	3/4W		400V	10Ω - 20Ω	1Ω - 20Ω				±200
				20.1Ω - 20MΩ					±100
MCPWR12 (2512)	1.5W		500V	10Ω - 20Ω	1Ω - 20Ω				±200
				20.1Ω - 20 MΩ					±100

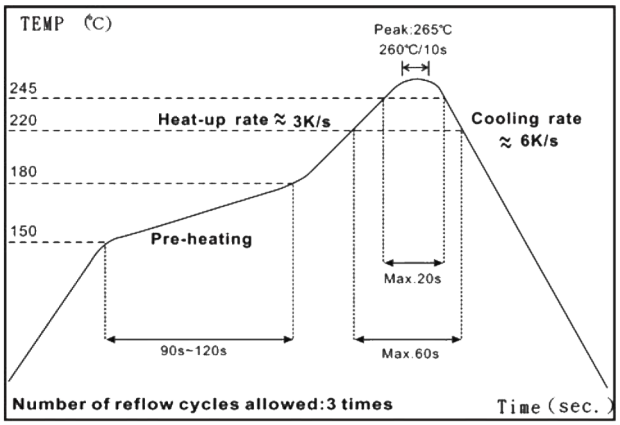
High Power Rating Electrical Specifications:

Item / Type	Power Rating at 70°C	Operating Temperature Range	Maximum Operating Voltage	Resistance Range		TCR (PPM/°C)
				±1%	±5%	
MCPWR05 (0805)	1/4W	-55 to +155°C	150V	1Ω - 299Ω		±200
				300Ω - 20MΩ		±100
MCPWR06 (1206)	1/2W		200V	1Ω - 20Ω		±200
				20.1Ω - 20MΩ		±100
MCPWR10 (2010)	1W		400V	1Ω - 20Ω		±200
				20.1Ω - 20MΩ		±100

Operating voltage = √ (P × R) or maximum operating voltage listed above, whichever is lower.
Overload voltage = 2.5 × √ (P × R) or maximum overload voltage listed above, whichever is lower.

Soldering Condition:

Pulse Withstanding Chip Resistor



IR Reflow Soldering

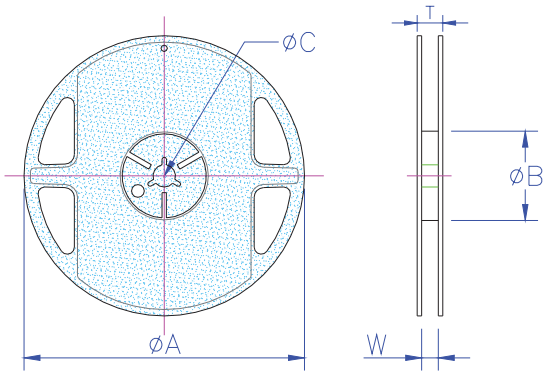
(1) Time of IR reflow soldering at maximum temperature point 260°C : 10s

Environmental Characteristics:

Item	Requirement	Test Method
Temperature Coefficient of Resistance (TCR)	As specification	+25 / -55 / +25 / +125 / +25°C
Short Time Overload	±1%	RCWV × 2.5 or maximum overload voltage for 5s
Insulation Resistance	> 1,000MΩ	Apply 100V DC for 1mins
Endurance	±1%	70 ±2°C, maximum working voltage for 1,000hrs with 1.5hrs “ON” and 0.5hrs “OFF”
Damp Heat with Load	±0.5%	40 ±2°C, 90 to 95% R H maximum working voltage for 1,000hrs with 1.5hrs “ON” and 0.5hrs “OFF”
Dry Heat	±0.5%	at +155°C for 1,000hrs
Bending Strength	±1%	Bending amplitude 3mm for 10s
Solderability	95% minimum coverage	245 ±5°C for 3s
Resistance to Soldering Heat	±0.5%	260 ±5°C for 10s
Thermal Shock		-55°C to 150°C, 100 cycles
Low Temperature Operation		1hr, -65°C followed by 45mins of RCWV

Packaging:

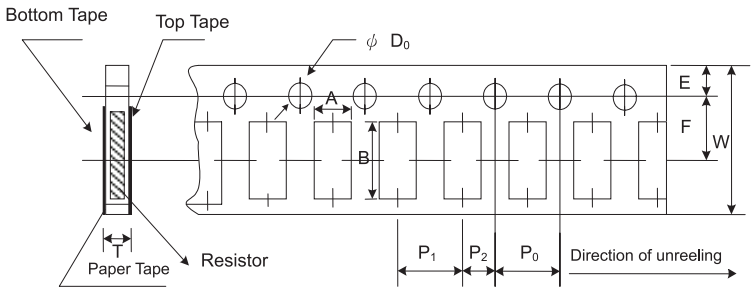
Reel Specifications & Packaging Quantity



Part Number	Packaging	Quantity	Tape Width	Reel Diameter (Inches)	ØA	ØB	ØC	W	T
MCPWR05 MCPWR06	Paper	10K	8mm	10	254 ±1	100 ±0.5	13 ±0.2	9.5 ±0.5	13.5 ±0.5
MCPWR10	Embossed	4K	12mm	7	178.5 ±1.5	60+1/-0	13 ±0.5	13 ±0.5	15.5 ±0.5
MCPWR12		8K		10	250 ±1	62 ±0.5		12.5 ±0.5	16.5 ±0.5

Dimensions : Millimetres

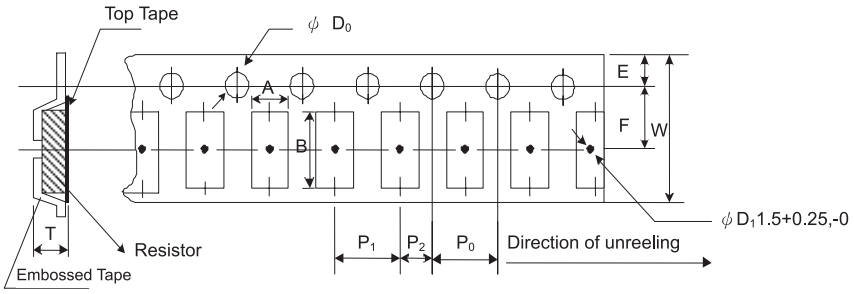
Paper Tape Specifications



Part Number	A	B	W	E	F	P_0	P_1	P_2	$ØD_0$	T
MCPWR05	1.6 ±0.1	2.4 ±0.2	8 ±0.2	1.75 ±0.1	3.5 ±0.05	4 ±0.1	4 ±0.05	2 ±0.05	1.5+0.1,-0	0.85 ±0.1
MCPWR06	1.9 ±0.1	3.5 ±0.2								

Dimensions : Millimetres

Embossed Plastic Tape Specifications



Part Number	A	B	W	E	F	P_0	P_1	P_2	$ØD_0$	T
MCPWR10	2.8 ±0.1	5.5 ±0.1	12 ±0.3	1.75 ±0.1	5.5 ±0.05	4 ±0.1	4 ±0.1	2 ±0.05	1.5+0.1,-0	1.2+0
MCPWR12	3.5 ±0.1	6.7 ±0.1								

Dimensions : Millimetres

Marking:

0805 to 2512 4 Digits Marking For Example

Resistance	100Ω	2.2kΩ	10kΩ	49.9kΩ	100kΩ
Marking	1,000	2,201	1,002	4,992	1,003

3 Digits Marking in E24
Example: 101 = 100Ω 102 = 1kΩ (1st and 2nd are E24 code and 3rd code is multiplier)

E24 Code	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91

1% for 0603: 3 Digits Marking in E96 (E96 Series Except E24 Series)

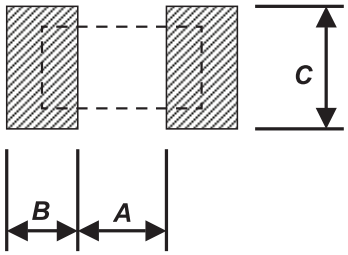
3 Digits Marking for Example: 13C = 13K3Ω 68B = 4K99Ω 68X = 49.9Ω

Marking Table:

Code	E96	Code	E96	Code	E96	Code	E96
02	102	28	191	52	340	75	590
03	105	29	196	53	348	76	604
04	107	31	205	54	357	77	619
06	113	32	210	55	365	78	634
07	115	33	215	56	374	79	649
08	118	34	221	57	383	80	665
09	121	35	226	58	392	81	681
10	124	36	232	59	402	82	698
11	127	37	237	60	412	83	715
13	133	38	243	61	422	84	732
14	137	39	249	62	432	86	768
15	140	40	255	63	442	87	787
16	143	41	261	64	453	88	806
17	147	42	267	65	464	89	825
19	154	43	274	66	475	90	845
20	158	44	280	67	487	91	866
21	162	45	287	68	499	92	887
22	165	46	294	69	511	93	909
23	169	47	301	70	523	94	931
24	174	48	309	71	536	95	953
25	178	49	316	72	549	96	976
26	182	50	324	73	562	-	-
27	187	51	332	74	576	-	-

Code	A	B	C	D	E	F	G	X	Y
Multiplier	10^0	10^1	10^2	10^3	10^4	10^5	10^6	10^{-1}	10^{-2}

Recommend Land Pattern:



Type	A	B	C
MCPWR05	1.2	0.7	1.3
MCPWR06	2	0.9	1.6
MCPWR10	3.8		2.8
MCPWR12		1.6	3.5

Dimensions : Millimetres

Part Number Explanation:

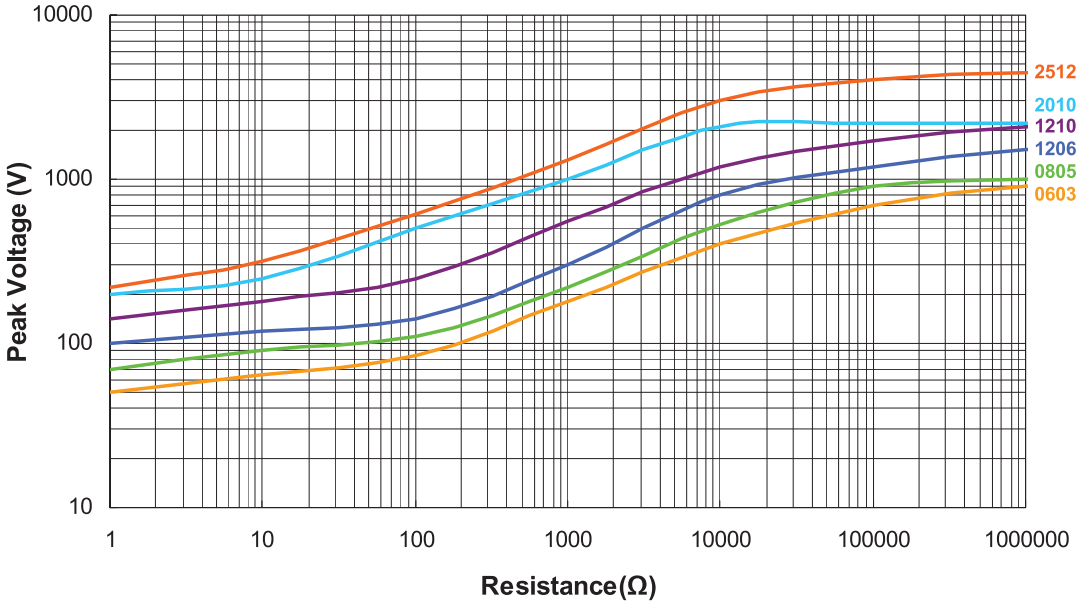
MCPWR	05	F	T	F	W	1001	N
Product Type	Dimensions	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking

Dimensions	: 05 = 0805, 06 = 1206, 10 = 2010 and 12 = 2512
Resistance Tolerance	: F = ±1%
Packaging Code	: T = Taping Reel
TCR (PPM/°C)	: E = ±100, F = ±200
Power Rating	: A = 1.5W, O = 1/3W, Q = 3/4W and W = 1/8W
Resistance	:1001 = 1kΩ, 1004 = 1MΩ and 1005 = 10MΩ
Marking	: Standard Marking, N = No Marking

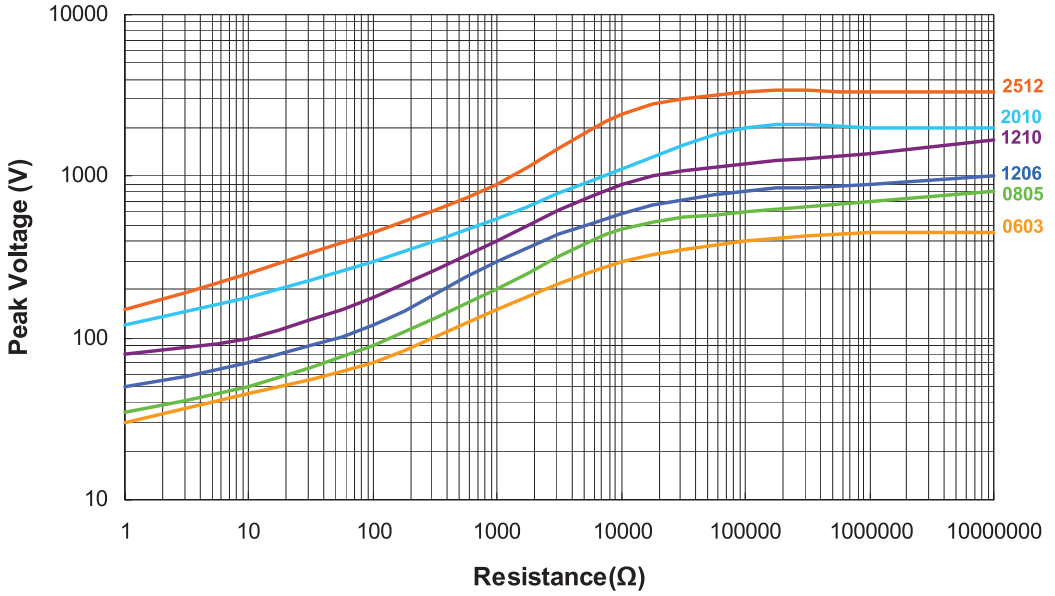
Lightning Surge:

Resistors are tested in accordance with IEC 60 115-1 using both 1.2/50us and 10/700 pulse shapes.
The limit of acceptance is a shift in resistance of less than 1% from the initial value.

PWR Series 1.2/50us Lightning Surge

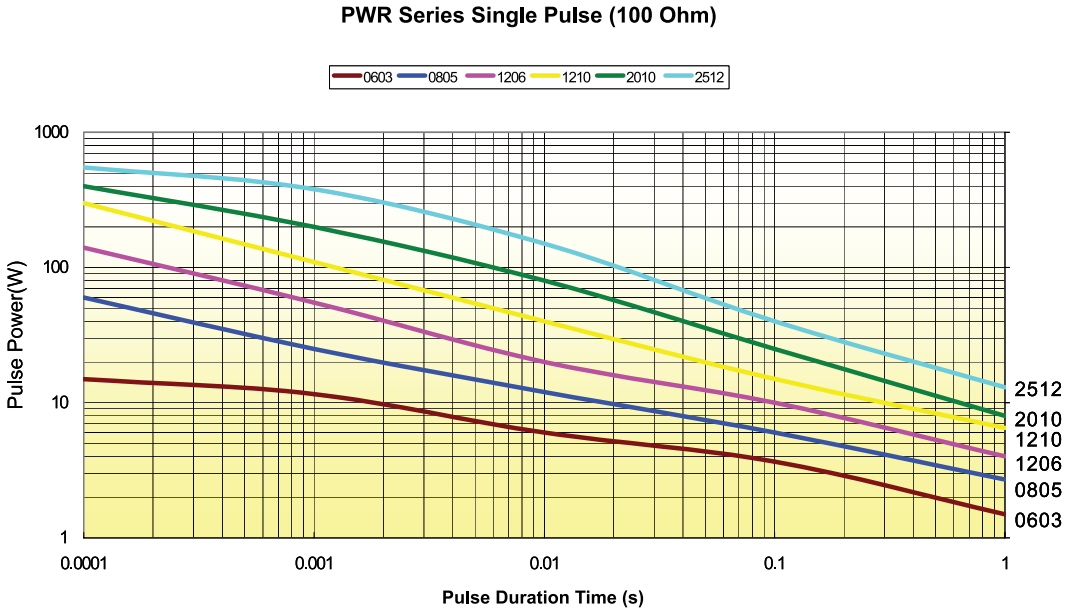


PWR Series 10/700us Lightning Surge



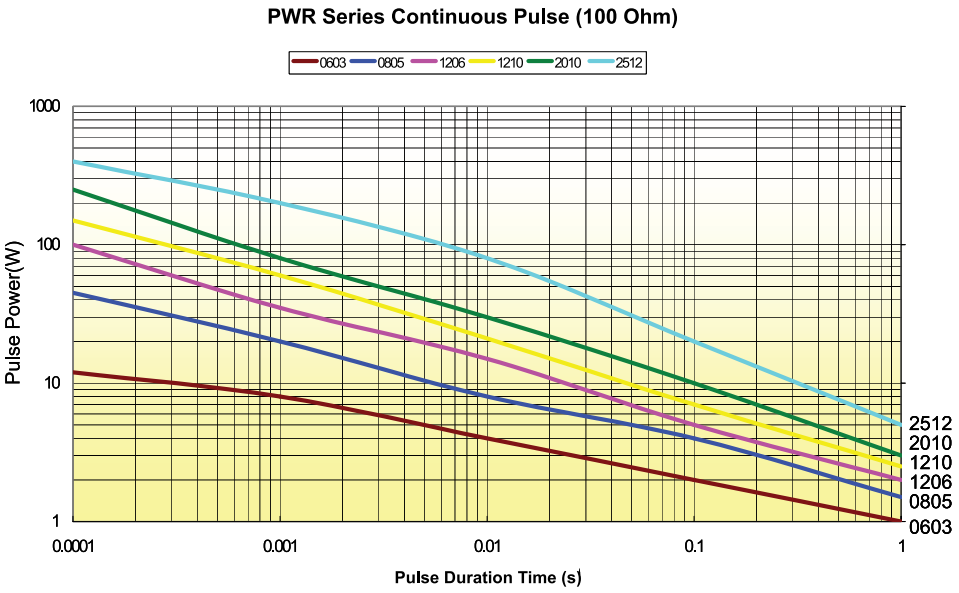
Pulse Withstanding Capacity:

The single impulse graph is the result of 50 impulses of rectangular shape applied at one-minute intervals.
The limit of acceptance was a shift in resistance of less than 1% from the initial value.
The power applied was subject to the restrictions of the maximum permissible impulse voltage graph shown.



Continuous Pulse:

The continuous load graph was obtained by applying repetitive rectangular pulses where the pulse period was adjusted so that the average power dissipated in the resistor was equal to its rated power at 70°C. Again the limit of acceptance was a shift in resistance of less than 1% from the initial value.



PWR Series Pulse Voltage(100 Ohm)