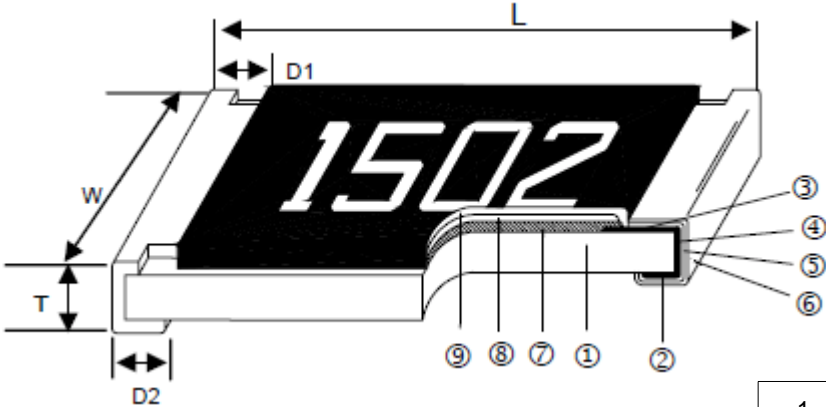


Pulse Withstanding Chip Resistors



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)

Features:

- Tolerance from ±0.5% to 5%.
- High power rating.
- Excellent pulse withstanding performance.
- Improved working voltage ratings.
- Standard package sizes of 0805 to 2512.

Applications:

- Metering (testing / measurement).
- Diagnostic equipment.
- Medical devices.
- Industrial controls.
- Plasma.
- LCD video monitors.

Dimensions

Unit: mm

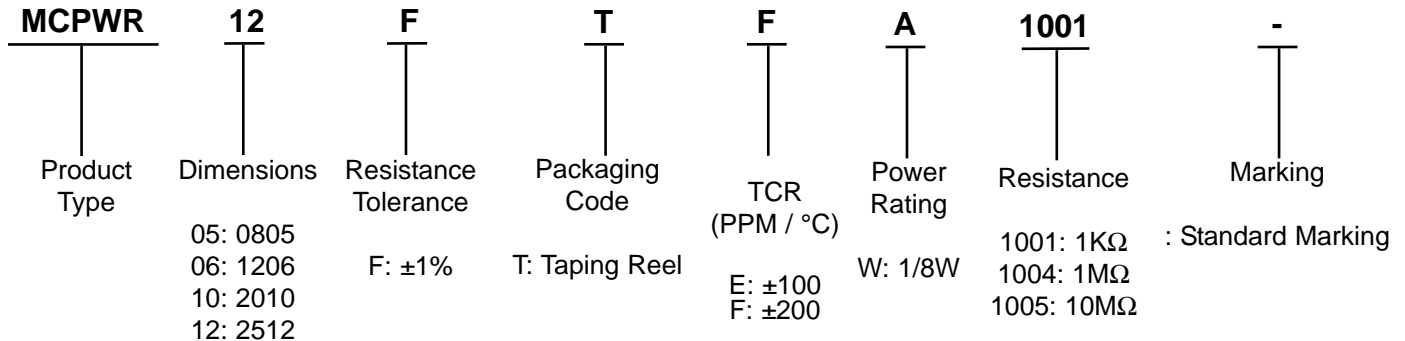
Type	Size (Inch)	L	W	T	D1	D2
MCPWR05	0805	2 ±0.1	1.25 ±0.1	0.5 ±0.1	0.35 ±0.2	0.4 ±0.2
MCPWR06	1206	3.1 ±0.1	1.55 ±0.1	0.55 ±0.1	0.5 ±0.25	0.5 ±0.2
MCPWR10	2010	5 ±0.1	2.5 ±0.1		0.6 ±0.25	
MCPWR12	2512	6.35 ±0.1	3.1 ±0.1			



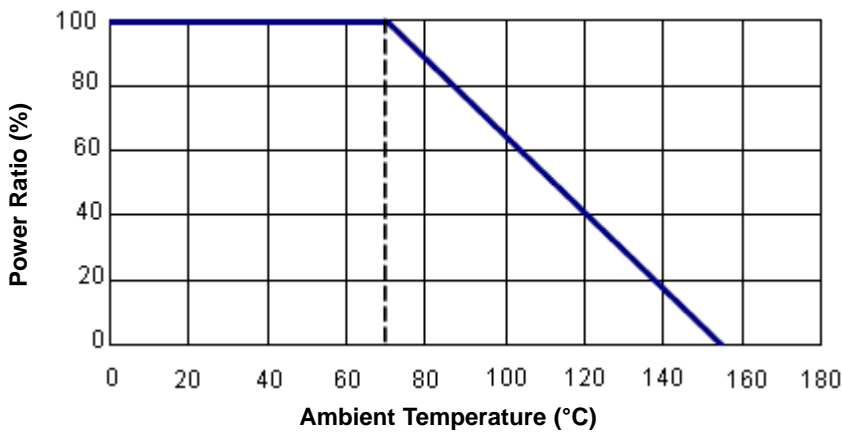
Pulse Withstanding Chip Resistors



Part Number Explanation:



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 - 20MΩ			±100		

Pulse Withstanding Chip Resistors



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 = $\sqrt{P \cdot R}$ or maximum operating voltage listed above, whichever is lower.

Overload voltage = $2.5 \cdot \sqrt{P \cdot R}$ or maximum operating voltage listed above, whichever is lower.

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 Max. overload voltage for 5 seconds
Insulation Resistance	>1000MΩ	Apply 100V _{DC} for 1 minute
Endurance	±1%	70 ±2°C, Max. working voltage for 1,000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	±0.5%	40 ±2°C, 90 to 95% R.H. Max. working voltage for 1,000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Dry Heat	±0.5%	at +155°C for 1,000 hrs
Bending Strength	±1%	Bending amplitude 3mm for 10 seconds
Solderability	95% min. coverage	245 ±5°C for 3 seconds
Resistance to Soldering Heat	±0.5%	260 ±5°C for 10 seconds
Thermal Shock	±0.5%	-55°C to 150°C, 100 cycles
Low Temperature Operation	±0.5%	1 hrs, -65°C followed by 45 minutes of RCWV

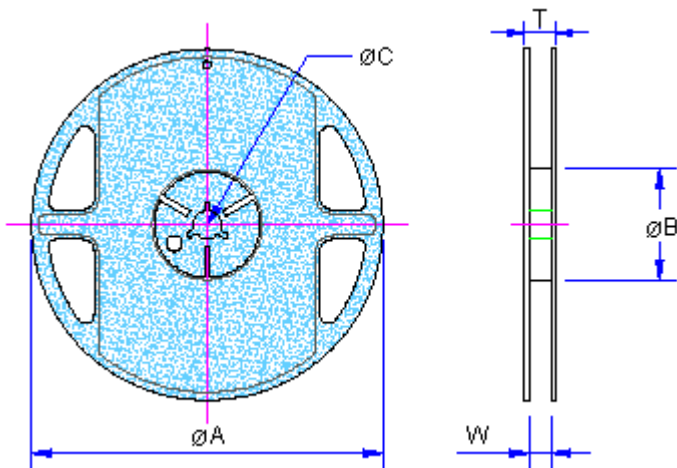
Reference standards: MIL-STD-202, JIS-C 5201-1

Storage Temperature: 25 ±3°C; Humidity < 80%RH.

Pulse Withstanding Chip Resistors

Packaging

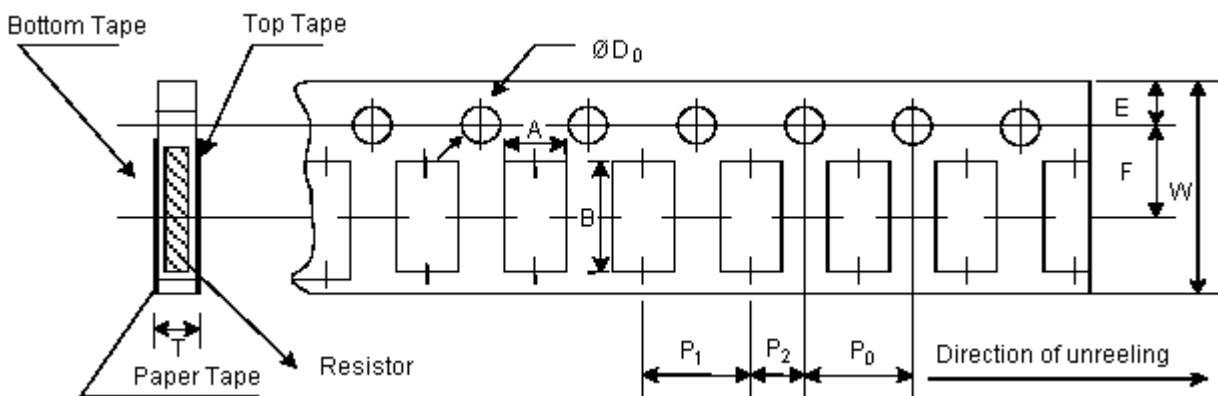
Reel Specifications and Packaging Quantity



Unit: mm

Type	Packaging Quantity		Tape Width	Reel Diameter	ØA	ØB	ØC	W	T
MCPWR05 MCPWR06	Paper	10K	8mm	10 inch	254 ±1	100 ±0.5	13 ±0.2	9.5 ±0.5	13.5 ±0.5
MCPWR10 MCPWR12		4K							
		8K		10 inch	250 ±1	62 ±0.5	13 ±0.5	12.5 ±0.5	16.5 ±0.5

Paper Tape Specifications



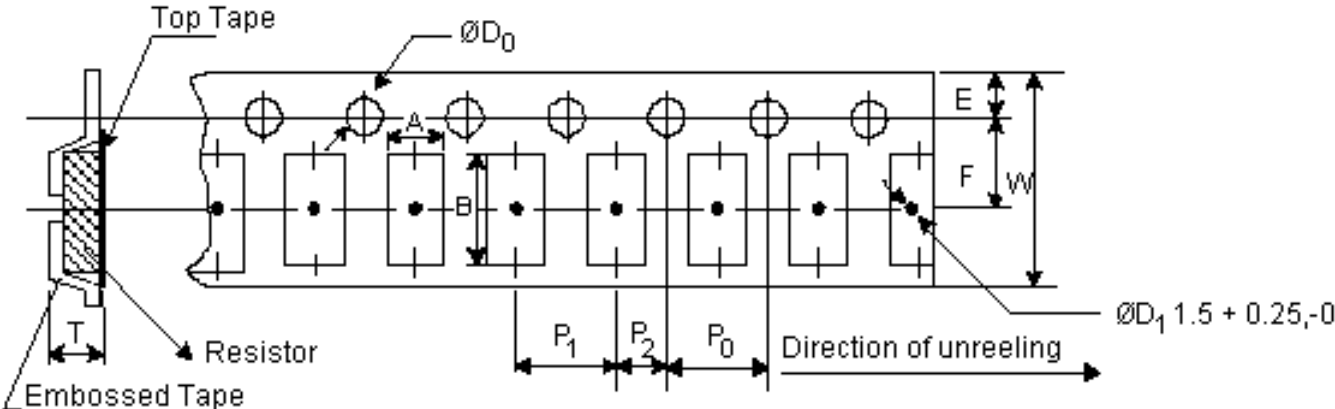
Unit: mm

Type	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								

Pulse Withstanding Chip Resistors



Embossed Plastic Tape Specifications



Type	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								

Marking

0805 to 2512 4 Digits Marking for Example

Resistance	100Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ
marking	1000	2201	1002	4992	1003

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
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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



Pulse Withstanding Chip Resistors



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