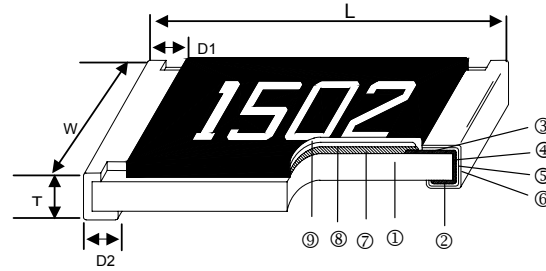


Surge Withstanding Chip Resistor – SWR Series

Construction



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

Features

- High power rating
- Excellent surge withstanding & pulse withstanding performance
- Improved working voltage ratings
- Standard package sizes of 0603~2512

Applications

- Metering (Testing/Measurement)
- Medical Devices
- Automotive
- Power supply
- Charger
- Inverter
- LCD Video Monitors

Dimensions

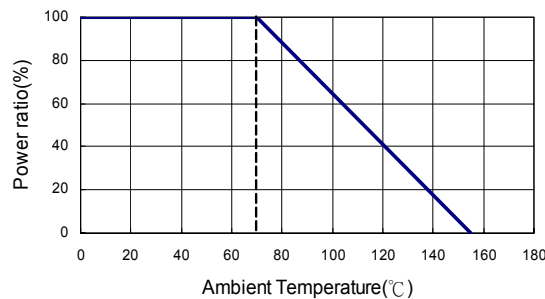
Unit: mm

Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
SWR03	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20	2.042
SWR05	0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.40±0.20	4.368
SWR06	1206	3.10±0.10	1.55±0.10	0.55±0.10	0.50±0.25	0.50±0.20	8.947
SWR13	1210	3.20±0.10	2.60±0.15	0.55±0.10	0.50±0.25	0.50±0.20	15.959
SWR10	2010	5.00±0.20	2.50±0.15	0.55±0.10	0.60±0.25	0.50±0.20	24.241
SWR12	2512	6.35±0.20	3.20±0.15	0.55±0.10	0.60±0.25	0.50±0.20	39.448

Part Numbering

SWR	12	J	T	E	A	1001	N
Product Type	Dimensions	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking
	03: 0603 05: 0805 06: 1206 13: 1210 10: 2010 12: 2512	J: ±5% K: ±10% M: ±20%	T: Taping Reel B: Bulk	E: ±100 F: ±200	A: 1.5W O: 1/3W Q: 3/4W U: 1/2W V: 1/4W W: 1/8W	1001: 1KΩ 1004: 1MΩ 1005: 10MΩ	: Standard Marking N: No Marking

Derating Curve



Standard Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Resistance Range			TCR (PPM/°C)
				±5%	±10%	±20%	
SWR03 (0603)	1/8W	-55 ~ +155°C	50V	10Ω - 299Ω			±200
				300Ω - 1MΩ			±100
SWR05 (0805)	1/4W	-55 ~ +155°C	150V	1Ω - 299Ω			±200
				300Ω - 20MΩ			±100
SWR06 (1206)	1/3W	-55 ~ +155°C	200V	1Ω - 20Ω			±200
				20.1Ω - 20MΩ			±100
SWR13 (1210)	1/2W	-55 ~ +155°C	200V	1Ω - 20Ω			±200
				20.1Ω - 20MΩ			±100
SWR10 (2010)	3/4W	-55 ~ +155°C	400V	1Ω - 20Ω			±200
				20.1Ω - 20MΩ			±100
SWR12 (2512)	1.5W	-55 ~ +155°C	500V	1Ω - 20Ω			±200
				20.1Ω - 20MΩ			±100

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

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

Environmental Characteristics

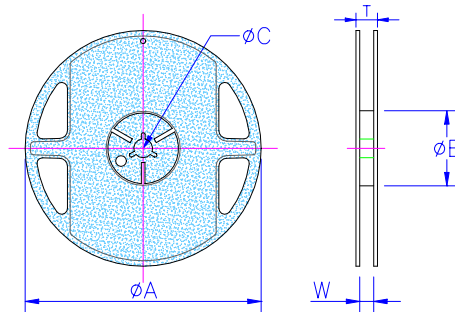
Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	+25/-55/+25/+125/+25°C
Short Time Overload	±1%	RCWV*2.5 or Max. overload voltage for 5 seconds
Insulation Resistance	>1000MΩ	Apply 100V _{DC} for 1 minute
Endurance	±3%	70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	±3%	40±2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Dry Heat	±3%	at +155°C for 1000 hrs
Bending Strength	±1%	Bending amplitude 3mm for 10 seconds
Solderability	95% min. coverage	245±5°C for 3 seconds
Resistance to Soldering Heat	±1%	260±5°C for 10 seconds
Thermal Shock	±1%	-55°C ~150°C, 100 cycles

■ Reference Standards: MIL-STD-202, JIS-C 5201-1

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

■ Packaging

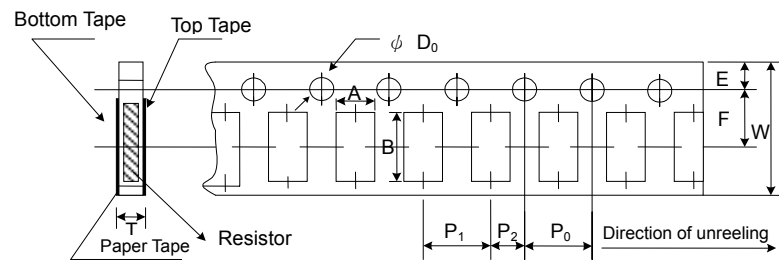
Reel Specifications & Packaging Quantity



Unit: mm

Type	Packaging Quantity	Tape Width	Reel Diameter	ΦA	ΦB	ΦC	W	T
SWR03	Paper	5K	7 inch	178.5±1.5	60 ^{+1/-0}	13.0±0.2	9.0±0.5	12.5±0.5
SWR05		10K	10 inch	254±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
SWR06		20K	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
SWR13			7 inch	178.5±1.5	60 ^{+1/-0}	13.0±0.2	9.5±0.5	13.5±0.5
SWR10	Embossed	4K	7 inch	178.5±1.5	60 ^{+1/-0}	13.0±0.5	13.0±0.5	15.5±0.5
SWR12		8K	10 inch	250±1.0	62±0.5	13.0±0.5	12.5±0.5	16.5±0.5

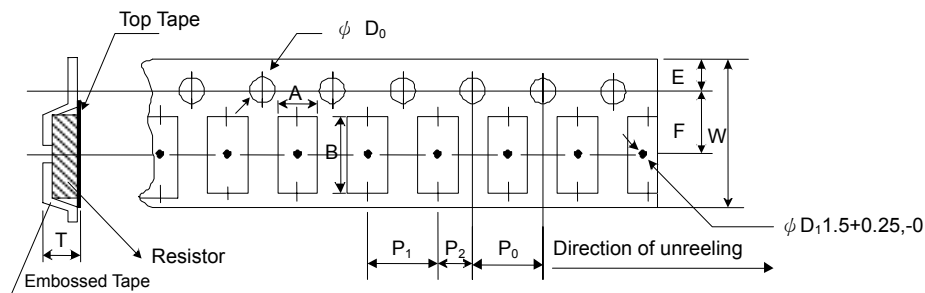
Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
SWR03	1.10±0.10	1.90±0.10	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.70±0.10
SWR05	1.60±0.10	2.40±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10
SWR06	1.90±0.10	3.50±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10
SWR13	2.80±0.10	3.50±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10

Embossed Plastic Tape Specifications



Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
SWR10	2.8±0.20	5.5±0.20	12.0±0.30	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1,-0	1.2 ⁺⁰
SWR12	3.5±0.20	6.7±0.20	12.0±0.30	1.75±0.10	5.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1,-0	1.2 ⁺⁰

■ Marking

0805~2512 4 digits marking for Example

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

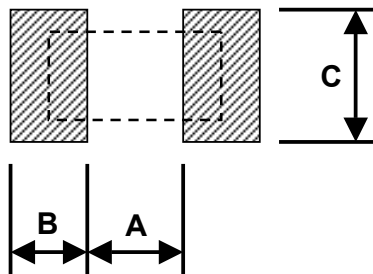
0603: 3 digits marking in E24

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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■ Recommend Land Pattern

Unit: mm



Type	A	B	C
SWR03	0.90	0.60	0.90
SWR05	1.20	0.70	1.30
SWR06	2.00	0.90	1.60
SWR13	2.00	0.90	2.80
SWR10	3.80	0.90	2.80
SWR12	3.80	1.60	3.50