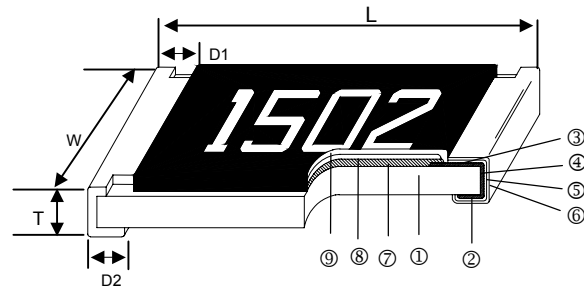




### Construction



① Alumina Substrate	④ Edge Electrode (NiCr)	⑦ Resistor Layer (RuO <sub>2</sub> /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

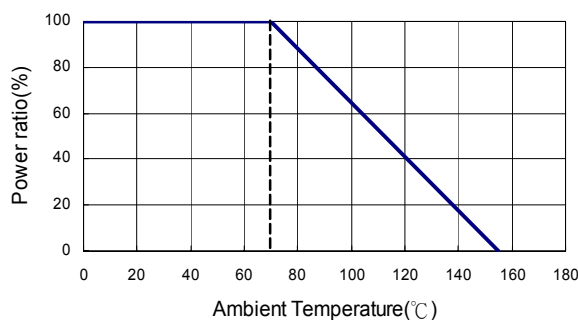
Unit: mm

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

CRSW	0603	A	1001	J	E
Product Type	Dimensions	Power Rating	Resistance	Resistance Tolerance	TCR (PPM/°C)
	0603 0805 1206 1210 2010 2512	A: 1.5W O: 1/3W Q: 3/4W U: 1/2W V: 1/4W W: 1/8W	1001: 1Kohm 1004: 1Mohm 1005: 10Mohm	J: ±5% K: ±10% M: ±20%	E: ±100 F: ±200

### 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%	
CRSW (0603)	1/8W	-55 ~ +155°C	50V	10Ω - 299Ω			±200
				300Ω - 1MΩ			±100
CRSW (0805)	1/4W	-55 ~ +155°C	150V	1Ω - 299Ω			±200
				300Ω - 20MΩ			±100
CRSW (1206)	1/3W	-55 ~ +155°C	200V	1Ω - 20Ω			±200
				20.1Ω - 20MΩ			±100
CRSW (1210)	1/2W	-55 ~ +155°C	200V	1Ω - 20Ω			±200
				20.1Ω - 20MΩ			±100
CRSW (2010)	3/4W	-55 ~ +155°C	400V	1Ω - 20Ω			±200
				20.1Ω - 20MΩ			±100
CRSW (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

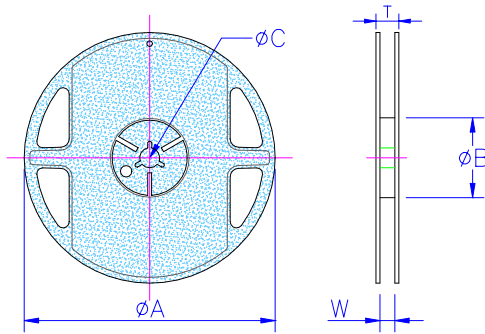
Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	+25/-55/+25/+125/+25°C
Short Time Overload	±1%	RCWV*2.5 or Max. overload voltage for 5 seconds
Insulation Resistance	>1000MΩ	Apply 100V <sub>DC</sub> for 1 minute
Endurance	±3%	70±2°C, Max. working voltage for 1000 hrs 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

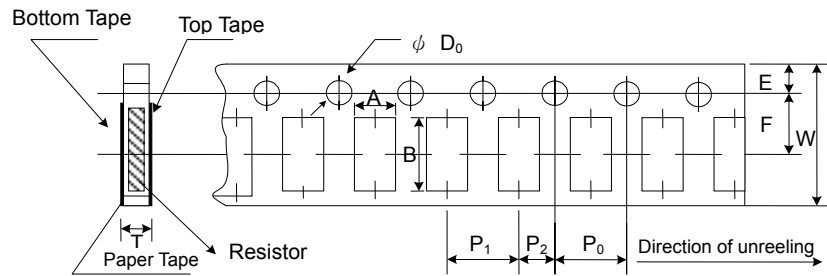
## Reel Specifications & Packaging Quantity



Unit: mm

Size	Packaging Quantity	Tape Width	Reel Diameter	ΦA	ΦB	ΦC	W	T
0603	Paper	5K	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.2	9.0±0.5	12.5±0.5
0805		10K	10 inch	254±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
1206		20K	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
1210			7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.5	13.0±0.5	15.5±0.5
2010	Embossed	4K	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.5	13.0±0.5	15.5±0.5
2512		8K	10 inch	250±1.0	62±0.5	13.0±0.5	12.5±0.5	16.5±0.5

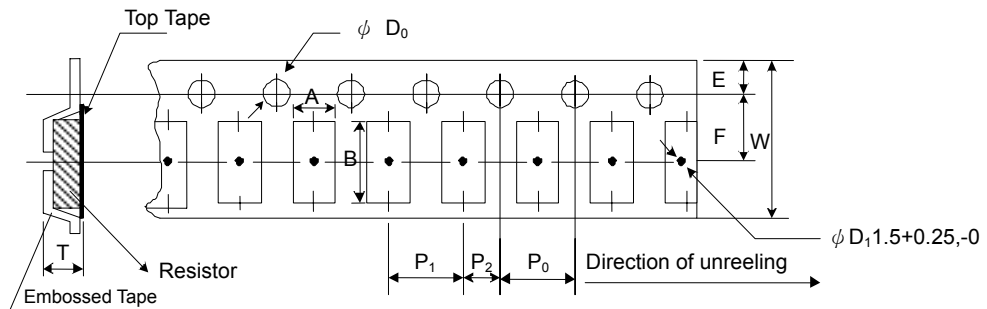
## Paper Tape Specifications



Unit: mm

Size	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ΦD <sub>0</sub>	T
0603	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
0805	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
1206	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
1210	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

Size	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ΦD <sub>0</sub>	T
2010	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 <sup>0</sup>
2512	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 <sup>0</sup>

## ■ Marking

0805~2512 4 digits marking for Example

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

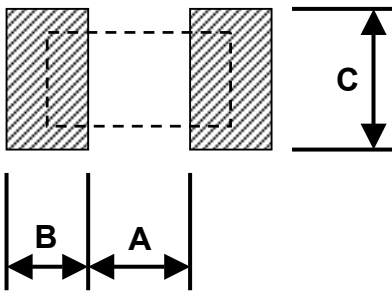
0603: 3 digits marking in E24

Example: 101=100Ω 102=1KΩ (1<sup>st</sup> and 2<sup>nd</sup> are E24 code and 3<sup>rd</sup> 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



Size	A	B	C
0603	0.90	0.60	0.90
0805	1.20	0.70	1.30
1206	2.00	0.90	1.60
1210	2.00	0.90	2.80
2010	3.80	0.90	2.80
2512	3.80	1.60	3.50