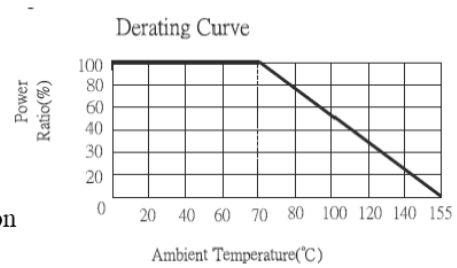
Current Sensing Chip Resistor
CS series

1. SCOPE

This specification applies to all sizes of rectangular-type fixed chip resistors with metal paste as material.

2. DIMENSION

- 3W Rating in 1W size, 1225 Package
- Low TCR from ±100 PPM ~±600 PPM/℃
- Resistance Values from 1 to 3000 mΩ
- High Purity Alumina Substrate for High Power Dissipation

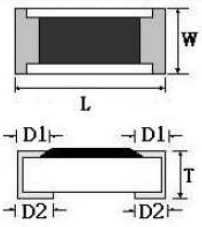


3. APPLICATION

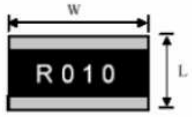
- Power Management Applications
- Switching Power Supply
- Over Current Protection in Audio Application
- Voltage Regulation Module (VRM)
- DC-DC Converter, Battery Pack, Charger, Adaptor
- Automotive Engine Control
- Disk Driver
- Portable Devices (PDA, Cell phone)

4. DIMENSION

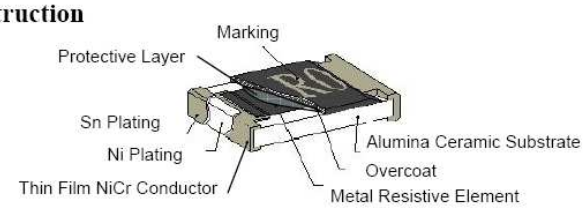
0402/0603/0805/1206/2010/2512



1225/3720/7520



4-1. Construction



Size	L/mm	W/mm	T/mm	D1/mm	D2/mm
0402	1.00±0.05	0.50±0.05	0.32±0.10	0.25±0.10	0.20±0.10
0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
0805	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.40±0.25
1206	3.05±0.15	1.55±0.15	0.55±0.10	0.50±0.30	0.40±0.25
2010	5.00±0.20	2.45±0.15	0.60±0.15	0.60±0.30	0.50±0.25
2512	6.35±0.20	3.15±0.15	0.60±0.10	0.60±0.30	0.55±0.25
1225	3.10±0.15	6.30±0.15	0.90±0.15	0.60±0.30	0.55±0.25
3720	2.00±0.20	3.75±0.20	0.60±0.10	0.40±0.20	0.40±0.20
7520	2.00±0.20	7.50±0.30	0.60±0.10	0.40±0.20	0.40±0.20

5. PRODUCT IDENTIFICATION

5.1 Part Number

CS	0402	J	Y	R010	F
Product series	**Size Code**	**Tolerance**	**Power Rating**	**Resistance Value**	**TCR Code**
CS: Current Sensing	0402 0603 0805 1206 2010 2512 1225 3720 7520	F: ±1% G: ±2% H: ±3% J: ±5%	R= 3W S= 2W A= 1.5W T= 1W Q= 3/4W U= 1/2W V= 1/4W W= 1/8W X= 1/10W Y= 1/16W Z= 1/32W	R010=0.010Ω R100=0.100Ω 1R00=1.000Ω	E=100ppm K=150ppm F=200ppm G=300ppm H=400ppm I=500ppm J=600ppm

5.2 Resistance codes example

0603 3 digits marking for example:

Resistance	1.00Ω	0.10Ω	0.15Ω	0.01Ω	0.101Ω	0.035Ω
Codes	1R0	R10	R15	R01	101	035

0805~2512 4 digits marking for example:

Resistance	1.00Ω	0.10Ω	0.05Ω	0.015Ω	0.010Ω
Codes	1R00	R100	R050	R015	R010

6. ELECTRICAL CHARACTERISTICS

6.1 Standard product

Size	Power Rating at 70^{0}C	Operating Temperature Range	Resistance Tolerance	Resistance Range	TCR ppm/^{0}C
0402	1/16W	-55^{0}C ~ +155^{0}C	±1% ±2% ±5%	50mΩ-100mΩ 101 mΩ-500mΩ 501mΩ-1000mΩ	±400 ±300 ±200
0603	1/10W			20mΩ-50mΩ 51mΩ-100mΩ 101mΩ-500mΩ 501mΩ-1000mΩ	±600 ±400 ±300 ±200
0805	1/8W			20mΩ-50mΩ 51mΩ-100mΩ 101mΩ-500mΩ 501mΩ-1000mΩ	±600 ±400 ±300 ±200
1206	1/4W			10mΩ-20mΩ 21mΩ-50mΩ 51mΩ-500mΩ 501mΩ-1000mΩ	±600 ±400 ±300 ±200
2010	3/4W				
2512	1W				
1225	3W			3mΩ-5mΩ 6mΩ-20mΩ 21mΩ-30mΩ 31mΩ-3000mΩ	±300 ±200 ±150 ±100
3720	1W			10mΩ-19mΩ 20mΩ-500mΩ	±300 ±150
7520	2W		±2% ±5%	1mΩ-4mΩ	±300
			±1% ±2% ±5%	5mΩ-10mΩ 11mΩ-350mΩ	±200 ±150

6.2 High power rating product

Part No	Power Rating at 70^{0}C	Operating Temperatur e Range	Resistance Tolerance	Resistance Range
CS0805□V□□□□□	1/4W	-55~+155^{0}C	±1% ±2% ±5%	100mΩ-1000mΩ
CS1206□U□□□□□	1/2W			
CS2010□T□□□□□	1W			
CS2512□A□□□□□	1.5W			

6.3 Low TCR product

Part No	Power Rating at 70^{0}C	Operating Temp Range	Resistance Tolerance	Resistance Range	TCR ppm/^{0}C
CS1206□V□□□□E	1/4W	-55^{0}C ~ +155^{0}C	±1% ±2% ±5%	100mΩ-1000mΩ	±100
CS2010□Q□□□□E	3/4W				
CS2512□T□□□□E	1W				
CS7520□S□□□□E	2W			1mΩ-5mΩ	

Operating Current I=√(P/R), Operating Voltage V=√(P*R)

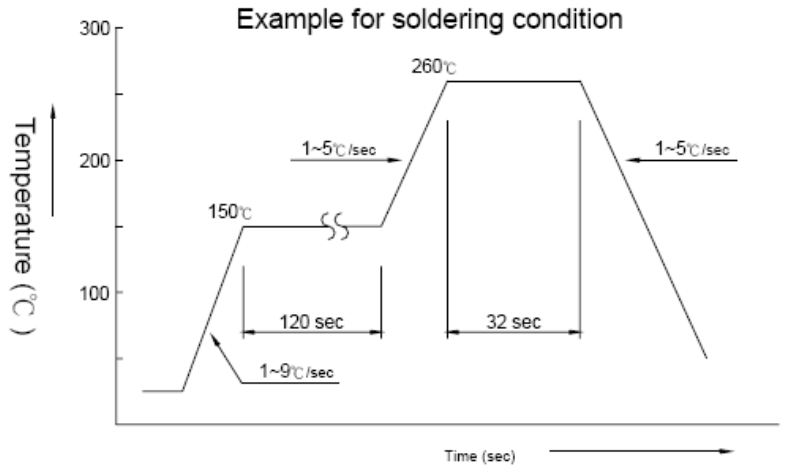
7. TEST CHARACTERISTICS

	Item	Specification	Test Method
1	Temperature Coefficient of Resistance	As Spec	**MIL-STD-202F Method 304** +25/-55/+25/+125/+25℃
2	Short Time Overload	±0.5%	**JIS-C-5202-5.5** RCWV*2.5 or Max Overloading Voltage 5 seconds
3	Dielectric Withstand Voltage	by Type	**MIL-STD-202F Method 301** Apply Max Overload Voltage for 1 minute
4	Insulation Resistance	>1000MΩ	**MIL-STD-202F Method 302** Apply 100VDC for 1minute
5	Thermal Shock	±0.5%	**MIL-STD-202F Method 107G** -55℃～150℃,100cycles
6	Load Life	±1%	**MIL-STD-202F Method 108A** RCWV, 70℃,1.5 hours on,0.5 hours off Total 1000~1048 hours
7	Humidity (Steady State)	±0.5%	**MIL-STD-202F Method 103B** 40℃ , 90~95%RH , RCWV 1.5 hours ON , 0.5 hours OFF , total 1000 ~ 1048 hours
8	Resistance to Dry Heat	±0.5%	**JIS-C-5202-7.2** 96hours @ +155℃ without load
9	Low Temperature Operation	±0.5%	**JIS-C-5202-7.1** 1hour,-65℃followed by 45 minutes of RCWV
10	Bending Strength	AS SPEC.	**JIS-C-5202-6.1.4** Bending Amplitude 3mm for 10 seconds
11	Solderability	95%min coverage	**MIL-STD-202F Method 208H** 245℃±5℃,5±0.5 (sec)
12	Resistance to Soldering Heat	±0.5%	**MIL-STD-202F Method 210E** 260±5℃,10±1 seconds

＊Storage Temperature :25±3℃; Humidity <80%RH

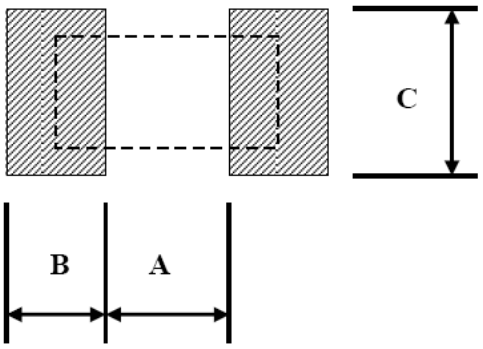
8. RECOMMENDED SOLDERING PROFILE

8. Reflow



Solder : Sn96.5/Ag3/Cu0.5

9. RECOMMENDED SOLDERING FOOTPRINT

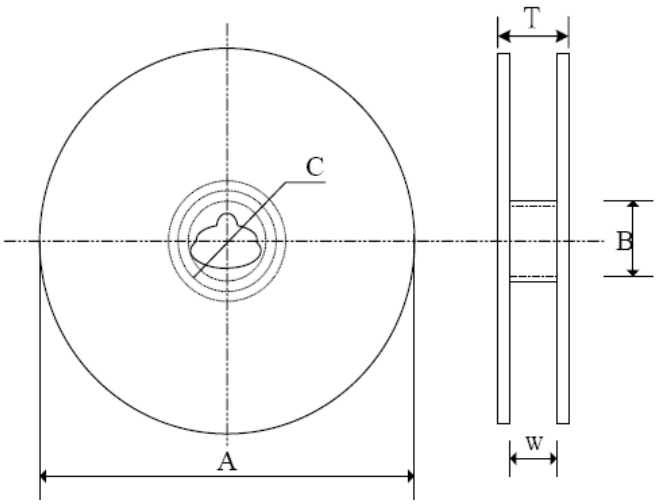


Unit：mm

Codes	A	B	C
0402	0.50	0.50	0.60±0.2
0603	0.80	1.00	0.90±0.2
0805	1.00	1.00	1.35±0.2
1206	2.00	1.15	1.70±0.2
2010	3.60	1.40	2.50±0.2
2512	4.90	1.60	3.10±0.2
1225	2.00	2.00	6.40±0.2
3720	1.00	1.80	3.90±0.2
7520	1.20	2.00	7.60±0.2

10. PACKING METHOD

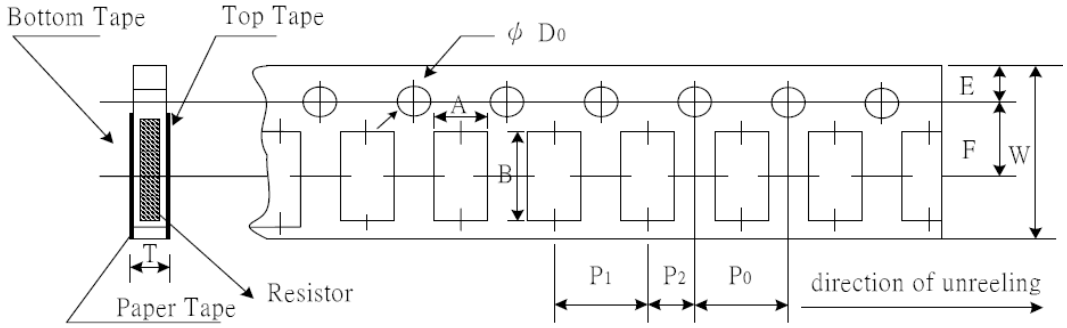
10-1-1 Packaging Quantity & Reel Specifications



Unit :mm

Packaging / Codes	ϕA	ΦB	ϕC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
0402	178±1	60.0+0.5	13.0±0.20	9.00±0.50	12.0±0.15	10,000	-
0603	178±1	60.0+0.5	13.0±0.20	9.00±0.50	12.0±0.15	5,000	-
0805	178±1	60.0+0.5	13.0±0.20	9.00±0.50	12.0±0.15	5,000	-
1206	178±1	60.0+0.5	13.0±0.20	9.00±0.50	12.0±0.15	5,000	-
2010	178±1	60.2±0.5	13.0±0.50	13.2±1.500	16.0±0.20	-	4,000
2512	178±1	60.2±0.5	13.0±0.50	13.2±1.50	16.0±0.20	-	4,000
1225	178±1	60.2±0.5	13.0±0.50	13.2±1.50	16.0±0.20	-	2,000
3720	178±1	60.2±0.5	13.0±0.50	13.2±1.50	16.0±0.20	-	2,000
7520	178±1	60.2±0.5	13.0±0.50	17.0±0.50	19.0±1.00	-	2,000

10-1-2 Paper Tape Specifications



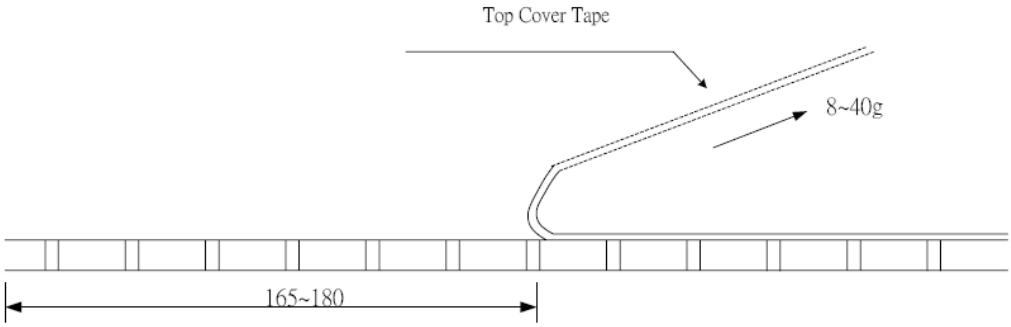
Unit: mm

Codes	A	B	W	E	F	P0	P1	P2	ϕD0	T
0402	0.70±0.05	1.16±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.55±0.05	0.40±0.03
0603	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.60±0.03
0805	1.60±0.05	2.37±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
1206	2.00±0.05	3.55±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05

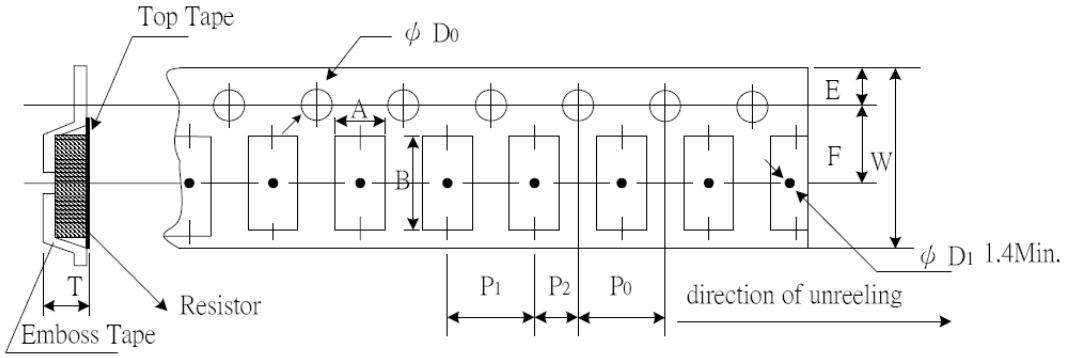
Peel force of top cover tape

The peel speed shall be about 300mm/min±5%

The peel force of top cover tape shall be between 8 and 40g



10-1-3 Emboss Plastic Tape Specifications



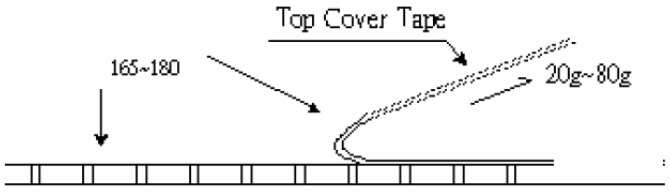
Unit: mm

Codes	A	B	W	E	F	P_0	P_1	P_2	ϕD_0	T
2010	2.85±0.10	5.45±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.00±0.20
2512	3.40±0.10	6.65±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.00±0.20
1225	3.38±0.10	6.68±0.10	12.0±0.30	1.75±0.10	5.5±0.10	4.00±0.10	4.00±0.10	2.00±0.05	1.55+0.05	1.45±0.20

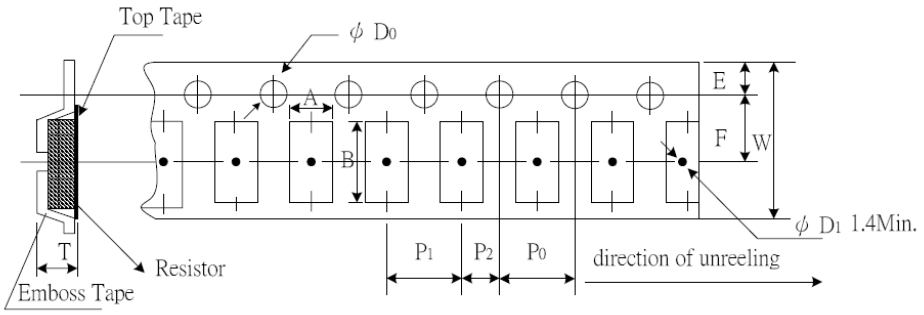
Peel force of top cover tape

The peel speed shall be about 300mm/min±5%

The peel force of top cover tape shall be between 20g and 80g



10-1-4 Emboss Plastic Tape Specifications



Unit: mm

Codes	A	B	W	E	F	P_0	P_1	P_2	ϕD_0	T
3720	2.50±0.20	4.45±0.20	12.0±0.30	1.75±0.01	5.5±0.05	4.00 ±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.50 ±0.10
7520	2.50±0.20	8.30±0.20	16.0±0.30	1.75±0.01	7.8±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.50 ±0.10

Peel force of top cover tape

The peel speed shall be about 300mm/min±5%

The peel force of top cover tape shall be between 20g and 80g