Data Sheet

Customer:	
Product:	Current Sensing Chip Resistor – CS Series
Size:	0201/0402/0603/0805/1206/1210/2010/2512 1225/3720/7520/0612
Issued Date:	01-Dec-25
Edition:	REV.E4

RoHS Compliant

HONG KONG HELISTO INDUSTRIAL LIMITED
香港海利斯特实业有限公司

SHENZHEN HELISTO TECHNOLOGYCOLTD
深圳市海利斯特科技有限公司

ADD:5/F., A Block, Hongdu Industrial Park, Fanshen Road, 45 Area, Baoan, Shenzhen, China
TEL:+86-755-29741555 29749555
FAX:+86-755-29742111
E-mail:donnyhai@helisto.com
www.Helisto.com

Produced by (QC)	Checked (QC)	Approved by (QC)	Prepared by (Sales)	Accepted by (Customer)
01-Dec-25	01-Dec-25	01-Dec-25		
Alice Hsiao	***Susan Huang***	***Susan Huang***		

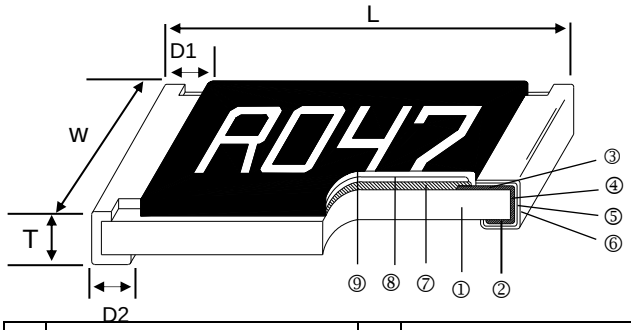
Current Sensing Chip Resistor



Features

- 3 Watts power rating in 1 Watt size, 1225 package
- Low TCR of ±100 PPM/°C
- Resistance values from 1m to 1 ohm
- High purity alumina substrate for high power dissipation
- Long side terminations with higher power rating
- RoHS Compliance
- MSL: Level 1

Construction



①	Alumina Substrate	④	Edge Electrode	⑦	Resistor Layer
②	Bottom Electrode	⑤	Barrier Layer	⑧	Primary Overcoat
③	Top Electrode	⑥	External Electrode	⑨	Secondary Overcoat

Applications

- Power Management Applications
- Switching Power Supply
- Over Current Protection in Audio Applications
- Voltage Regulation Module (VRM)
- DC-DC Converter, Battery Pack, Charger, Adaptor
- Disk Driver

Dimensions

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)	Weight(g) (1000pcs)
CS01	0201	0.60±0.03	0.30±0.03	0.23±0.05	0.12±0.05	0.15±0.05	0.18
CS02	0402	1.00±0.05	0.50±0.05	0.32±0.10	0.25±0.10	0.25±0.10	0.7
CS03	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20	1.99
CS05	0805	2.00±0.10	1.25±0.10	0.55±0.10	0.30±0.20	0.40±0.25	5.3
CS06	1206	3.10±0.10	1.55±0.10	0.55±0.10	0.50±0.30	0.40±0.25	8.82
CS06 (1W)	1206 (102 - 1000mΩ)	3.15±0.10	1.60±0.15	0.65±0.10	0.80±0.20	0.80±0.20	12.15
CS13	1210	3.10±0.10	2.60±0.15	0.55±0.10	0.50±0.30	0.50±0.25	15.5
CS10	2010	5.00±0.10	2.50±0.15	0.60±0.15	0.60±0.30	0.50±0.25	27.03
CS12	2512	6.35±0.10	3.10±0.15	0.60±0.10	0.60±0.30	0.55±0.25	43.08
CS12 (2W)	2512 (10 - 99mΩ)	6.35±0.20	3.15±0.15	0.74±0.10	0.60±0.30	0.55±0.25	53.08
CS12 (2W)	2512 (100 - 1000mΩ)	6.35±0.20	3.15±0.15	0.74±0.10	0.60±0.30	2.10±0.10	53.08
CS25	1225	3.20±0.15	6.45±0.15	0.90±0.15	0.60±0.30	0.80±0.25	64.88
CS37	3720	2.00±0.20	3.75±0.20	0.60±0.10	0.40±0.20	0.40±0.20	19.96
CS75	7520	2.00±0.20	7.50±0.30	0.60±0.10	0.40±0.20	0.40±0.20	35.71
CS62	0612	1.55±0.10	3.10±0.15	0.55±0.10	0.30±0.15	0.45±0.15	10.19
CS12 (2W) (±100ppm/℃)	2512 (100mΩ)	6.35±0.20	3.15±0.15	0.74±0.10	0.60±0.30	0.55±0.25	53.08

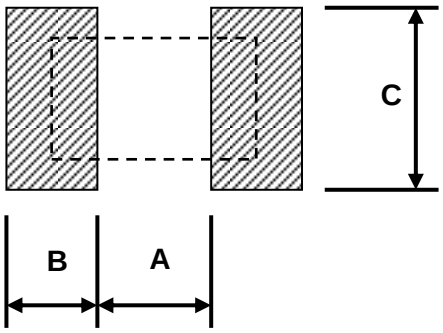
Part Numbering

Part Number：CS06FTFR100
Part Number：CS06FTETR200N　(CS06 1W No Marking)

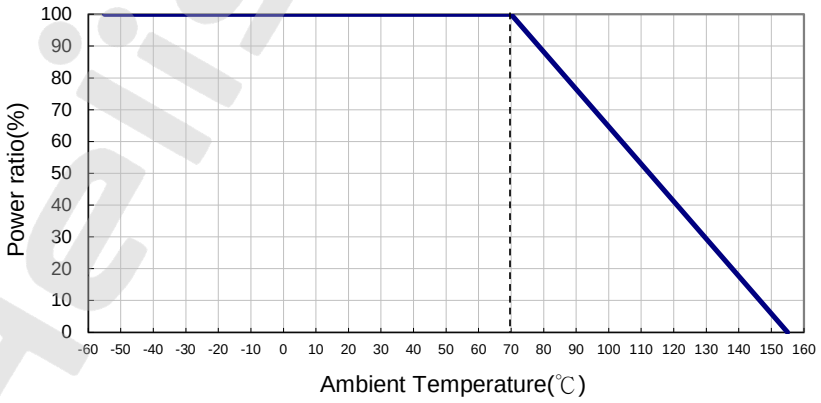
CS	06	F	T	G	U	R100	
Product Type	Dimensions (L×W)	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking
	01: 0201 02: 0402 03: 0603 05: 0805 06: 1206 13: 1210 10: 2010 12: 2512 25: 1225 37: 3720 75: 7520 62: 0612	F: ±1% G: ±2% J: ±5%	T: Taping Reel V:10"Taping Reel W:13"Taping Reel	E: ±100 F: ±200 G: ±300 H: ±400 J: ±600 K: ±150 R: ±1000	: Standard* (See Remark) S: 2W A: 1.5W T: 1W Q: 3/4W U: 1/2W V: 1/4W P: 1/5W W: 1/8W	R010: 0.01Ω R100: 0.1Ω 1R00: 1Ω	: Standard N: No Marking

*Remark: Standard part no need for power rating code.

Recommend Land Pattern



Derating Curve



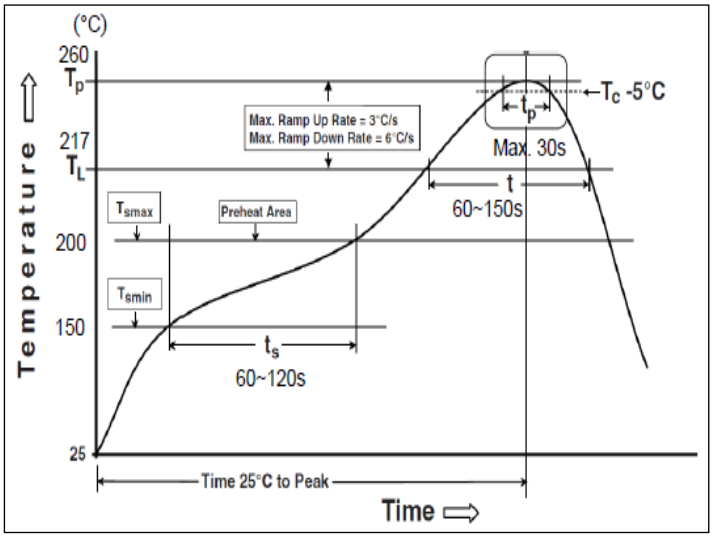
Pad Layout (Except For CS12:Ultra High Power Rating Series)

Type	A (mm)	B (mm)	C (mm)
CS01	0.25	0.30	0.40±0.2
CS02	0.50	0.50	0.60±0.2
CS03	0.80	1.00	0.90±0.2
CS05	1.00	1.00	1.35±0.2
CS06	2.00	1.15	1.70±0.2
CS06 (1W)	0.90	1.70	1.70±0.2
CS13	2.00	1.15	2.50±0.2
CS10	3.60	1.40	2.50±0.2
CS12	4.90	1.60	3.20±0.2
CS25	1.20	2.00	7.00±0.2
CS37	1.00	1.80	3.90±0.2
CS75	1.00	1.80	7.60±0.2
CS62	0.60	1.00	3.20±0.2

Pad Layout (For CS12: Ultra High Power Rating Series)

Type	Resistance Range	A (mm)	B (mm)	C (mm)
CS12	10~99mΩ	4.9	1.60	3.2±0.2
CS12	100~1000mΩ	1.0	3.55	3.2±0.2
CS12 (±100ppm/℃)	100mΩ	4.9	1.60	3.2±0.2

■Soldering Condition (Ref. IPC/JEDEC J-STD-020 & J-STD-002)



Reflow Profiles	
Profile Feature	**Pb-Free Assembly**
Preheat Min. Temperature (Tsmin) Max Temperature (Tsmax) Preheating time (ts) from (Tsmin to Tsmax)	 150 °C 200 °C 60-120 seconds
Ramp-up rate (T_L to Tp)	3 °C/second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	217 °C 60-150 seconds
Min. Peak temperature (Tp min)	235°C
Max. Peak temperature (Tp max)	260°C
Time (tp) within 5 °C of the specified classification temperature (Tc)	30 seconds max.
Ramp-down rate (Tp to T_L)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

■Standard Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Current	Resistance Range (mΩ) ±1%	Resistance Range (mΩ) ±2%	Resistance Range (mΩ) ±5%	TCR (PPM/°C)
CS01 (0201)	1/20W	-55 ~ +155°C	0.70A	100 - 147 150 - 500 510 - 1000			±1000 ±600 ±300
CS02 (0402)	1/16W	-55 ~ +155°C	1.11A	50 - 100 102 - 500 510 - 1000			±400 ±300 ±200
CS03 (0603)	1/10W	-55 ~ +155°C	2.23A	20 - 50 51 - 100 102 - 300 301 - 1000			±600 ±400 ±300 ±200
CS05 (0805)	1/8W	-55 ~ +155°C	2.50A	20 - 50 51 - 100 102 -196 200 - 1000			±600 ±400 ±300 ±200
CS06 (1206)	1/4W	-55 ~ +155°C	5.00A	10 - 20 21 - 50 51 - 91 100 - 1000			±600 ±400 ±300 ±200
CS13 (1210)	1/2W		7.07A				
CS10 (2010)	3/4W		8.66A				
CS12 (2512)	1W		10.0A				
CS25 (1225)	3W	-55 ~ +155°C	31.6A	3 - 5 6 - 20 21 - 30 33 - 8000			±300 ±200 ±150 ±100
CS37 (3720)	1W	-55 ~ +155°C	10.0A	10 - 18 20 - 500			±300 ±150
CS75 (7520)	2W	-55 ~ +155°C	44.7A	—	1 - 4		±300
				5 - 10 11 - 350			±200 ±150
CS62 (0612)	1W	-55 ~ +155°C	10.0A	10 - 27 30 - 91 100 – 499 500 - 1000			±600 ±300 ±200 ±100

■High Power & Ultra High Power Rating Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Current	Resistance Range (mΩ)			TCR (PPM/°C)
				±1%	±2%	±5%	
CS02 (0402)	1/8W	-55 ~ +155°C	1.56A	51 - 100 102 - 500 510 - 1000			±400 ±300 ±200
CS03 (0603)	1/8W 1/5W		1.98A				
CS05 (0805)	1/4W 1/2W		2.21A				
CS06 (1206)	1/2W	-55 ~ +155°C	7.07A	10 - 20 21 - 50 51 - 91 100 - 1000			±600 ±400 ±300 ±200
CS13 (1210)	3/4W		8.66A				
CS10 (2010)	1W		10.0A				
CS12 (2512)	1.5W		12.2A				
CS12 (2512)	*2W		14.1A				
CS06 (1206)	*1W	-55 ~ +155°C	3.13A	102-1000			±100

*: Ultra High Power

■CS06 1W: double side printed resistor element without marking.

■Low TCR Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Current	Resistance Range (mΩ)			TCR (PPM/°C)
				±1%	±2%	±5%	
CS05 (0805)	1/8W	-55 ~ +155°C	1.11A	100 - 1000			±100
CS06 (1206)	1/4W		1.58A	100 - 1000			±100
CS13 (1210)	1/2W		2.58A	75 - 1000			±100
CS10 (2010)	3/4W		3.87A	50 - 1000			±100
CS12 (2512)	1W		7.07A	20 - 1000			±100
CS12 (2512)	*2W		6.32A	50 - 1000			±100
CS37 (3720)	1W		3.16A	100 - 500			±100
CS75 (7520)	2W		6.32A	50 - 350			±100

*: Ultra High Power

Operating Current=$\sqrt{}$(P/R)

■ Viking is capable of manufacturing the optional spec based on customer's requirement.

■Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	**JIS-C-5201-1 4.8** **IEC-60115-1 4.8** At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	±(0.5%+0.05Ω)	**JIS C 5201-1 4.13** **IEC 60115-1 4.13** RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds CS06 1W: 5*rated power for 5 seconds
	±(1.0%+0.05Ω) For High power rating	
Insulation Resistance	≧10G	**JIS-C-5201-1 4.6** **IEC-60115-1 4.6** Max. Overload Voltage for 1 minute
Endurance	±(1.0%+0.05Ω)	**JIS-C-5201-1 4.25** **IEC-60115-1 4.25.1** 70±2°C, RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hr “OFF”
Damp Heat with Load	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.24** **IEC-60115-1 4.24** 40±2°C, 90~95% R.H., RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hr “OFF”
	CS06 1W : ±(1.0%+0.05Ω)	
Dry Heat	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.23** **IEC-60115-1 4.23.2** at +155°C for 1000 hrs
	CS06 1W : ±(1.0%+0.05Ω)	
Bending Strength	±(1.0%+0.05Ω)	**JIS-C-5201-1 4.33** **IEC-60115-1 4.33** Bending once for 60 seconds with 3mm 2010, 2512 sizes: 2mm
Solderability	95% min. coverage	**JIS-C-5201-1 4.17** **IEC-60115-1 4.17** 245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.18** **IEC-60115-1 4.18** 260±5°C for 10 seconds
	CS06 1W : ±(1.0%+0.05Ω)	
Voltage Proof	No breakdown or flashover	**JIS-C-5201-1 4.7** **IEC-60115-1 4.7** 1.42 times Max. Operating Voltage for 1 minute CS01:50V; CS02:100V; CS03:150V; CS05:300V CS06/13/10/25/37/75/62:400V; CS12:500V
Leaching	Individual leaching area ≦5% Total leaching area ≦10%	**JIS-C-5201-1 4.18** **IEC-60068-2-58 8.2.1** 260±5°C for 30 seconds
Rapid Change of Temperature	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.19** **IEC-60115-1 4.19** -55°C to +155°C, 5 cycles
	CS06 1W : ±(1.0%+0.05Ω)	

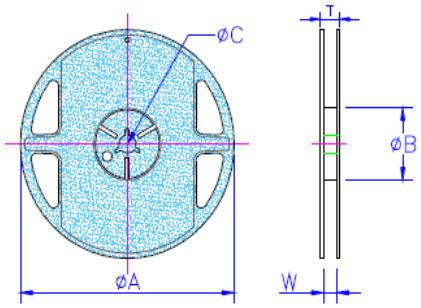
RCWV(Rated Continuous Working Voltage)=√(P*R) or Max. Operating Voltage whichever is lower.

■ **Storage Temperature: 15~28°C; Humidity < 80%RH**

■ **Shelf Life: 2 years from production date.**

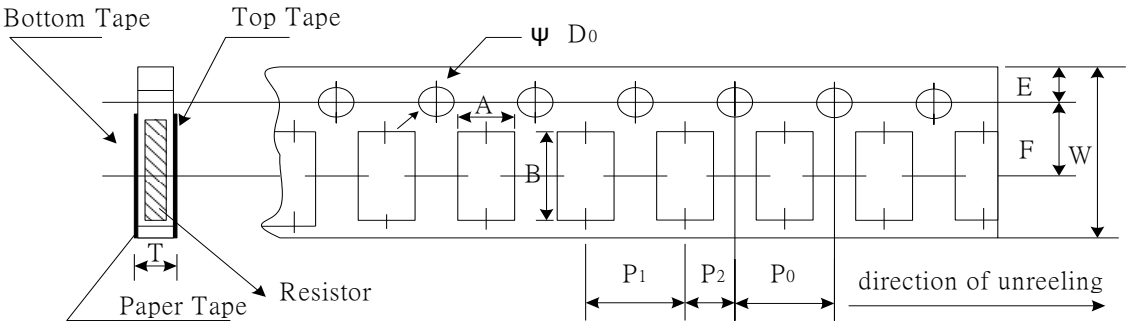
■Packaging

Packaging Quantity & Reel Specifications



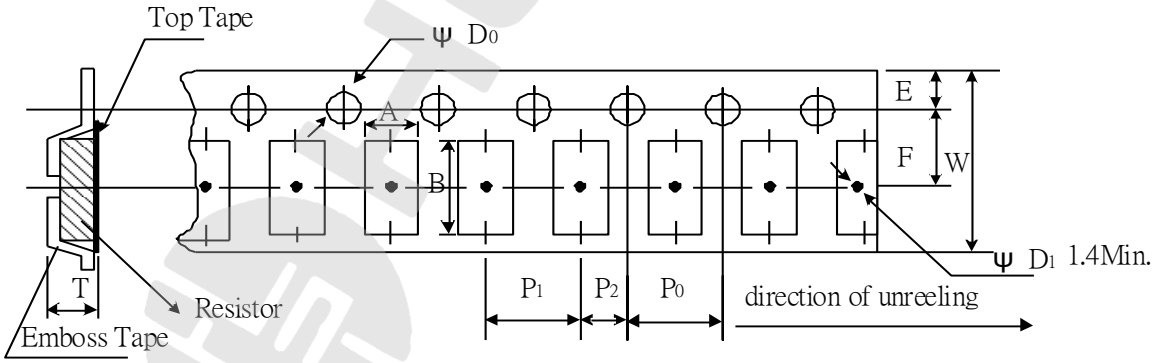
Type	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)	Paper Tape (EA)	Emboss Plastic Tape (EA)
CS01	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	10,000	-
	10 inch	254.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	20,000	-
	13 inch	330.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	40,000	-
CS02	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	10,000	-
	10 inch	254.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	20,000	-
	13 inch	330.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	40,000	-
CS03	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
	10 inch	254.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	10,000	-
	13 inch	330.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	20,000	-
CS05	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
	10 inch	254.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	10,000	-
	13 inch	330.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	20,000	-
CS06	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
	10 inch	254.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	10,000	-
	13 inch	330.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	20,000	-
CS13	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
	10 inch	254.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	10,000	-
	13 inch	330.0±1.0	100.0±0.5	13.0±0.2	9.5±0.5	13.5±0.5	20,000	-
CS10	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
	10 inch	250.0±1.0	62.0±0.5	13.0±0.5	12.5±0.5	16.5±0.5	-	8,000
CS12	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
	10 inch	250.0±1.0	62.0±0.5	13.0±0.5	12.5±0.5	16.5±0.5	-	8,000
CS12(2W)	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	2,000
CS25	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	2,000
CS37	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	2,000
CS75	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	17.5±1.0	19.5±1.0	-	2,000
CS62	7 inch	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-

Paper Tape Specifications



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P0 (mm)	P1 (mm)	P2 (mm)	ΦD0 (mm)	T (mm)
CS01	0.38±0.05	0.68±0.05	8.00±0.20	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.50+0.1,-0	0.42±0.20
CS02	0.65±0.10	1.15±0.10	8.00±0.20	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.50+0.1,-0	0.45±0.10
CS03	1.10±0.10	1.90±0.10	8.00±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
CS05	1.60±0.10	2.40±0.20	8.00±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
CS06	1.90±0.10	3.50±0.20	8.00±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
CS13	2.90±0.10	3.50±0.20	8.00±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
CS62	1.90±0.10	3.50±0.20	8.00±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

Emboss Plastic Tape Specifications



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P0 (mm)	P1 (mm)	P2 (mm)	ΦD0 (mm)	T (mm)
CS10	2.80±0.10	5.40±0.20	12.0±0.30	1.75±0.10	5.50±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.00±0.20
CS12	3.50±0.10	6.70±0.10	12.0±0.30	1.75±0.10	5.50±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.00±0.20
CS12 (2W)	3.38±0.10	6.68±0.10	12.0±0.30	1.75±0.10	5.50±0.10	4.00±0.10	4.00±0.10	2.00±0.05	1.55+0.05	1.45±0.20
CS25	3.38±0.10	6.68±0.10	12.0±0.30	1.75±0.10	5.50±0.10	4.00±0.10	4.00±0.10	2.00±0.05	1.55+0.05	1.45±0.20
CS37	2.50±0.20	4.45±0.20	12.0±0.30	1.75±0.10	5.50±0.05	4.00 ±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.20 ±0.20
CS75	2.50±0.20	8.30±0.20	16.0±0.30	1.75±0.10	7.80±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.20 ±0.20

■Marking

No Marking for 0201/0402/1206(1W).

1%, 5% for 0805/1206/1210/2010/2512/1225/3720/7520/0612 : 4 digits marking

Example:

Resistance	47mΩ	75mΩ	15mΩ	750mΩ	820mΩ
Marking	R047	R075	R015	R750	R820

Marking for 0603

E24 Series (<100mΩ): 3 digits marking with under-line

E24 Series (≧100mΩ): 3 digits marking for E24 or R value suffix is zero in E96: R10=100mΩ; R28=280mΩ

E96 Series (≧100mΩ): 3 digits marking with under-line in E96 (non-including E24 series)



3 digits marking for E24 or R value suffix is zero in E96: R10=100mΩ; R28=280mΩ



3 digits marking for E96: 243=243mΩ; 511=511mΩ

Example:

Resistance	1.000Ω	0.100Ω	0.010Ω	0.102Ω	0.024Ω
Marking	1R0	R10	R01	102	024

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version D1	Jun 03, 2014	-	- Electrical Specifications updated - CS25 Pad Layout updated - Environmental Characteristics updated
Version D2	Apr 30, 2015	-	- Increase Product Size 0612
Version D3	Jul 15, 2016	-	- Remove Material Description - Modify Storage Temperature - CS12 Pad Layout updated - CS62 Resistance Range updated
Version D4	Jan 12, 2018	-	- Modify 1225 Dimension L, W
Version D5	Jul 27, 2018	-	- Increase 1206 1W Ultra High Power Electrical Specifications
Version D6	May 20, 2019	-	- Modify TCR Test description - Electrical Specifications updated
Version D7	Mar 23, 2020	-	- Environmental Characteristics : Added test voltage for Voltage Proof
Version D8	Mar 10, 2021	-	- Modify Bending Test description - Modify 2010 Embossed Plastic Tape B Specification - Modify Soldering Condition (IPC/JEDEC J-STD-020)
Version D9	Nov 15, 2021	-	- Increase the shelf life description
Version E	Dec 21, 2021	-	- Added 0805 1/2W high power production range
Version E1	Feb 15, 2022	-	- Derating Curve changes the temperature range
Version E2	Jun 15, 2022	-	- Modify Soldering Condition
Version E3	Sep 01, 2025	-	- Modify the descriptions in the Features - Modify 0402 Dimensions - Added 2512 2W TCR100 100mΩ spec.
Version E4	Dec 01, 2025	-	- Increase large reel packaging code