

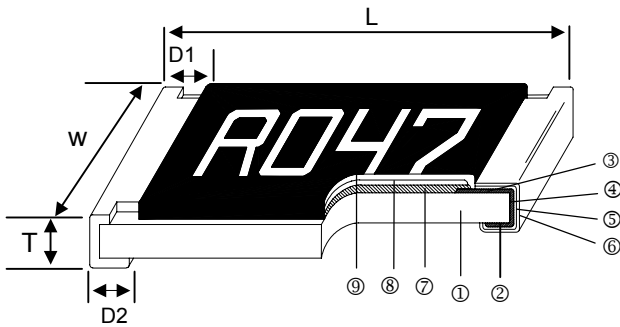
系列号	HoCS
修订日期	2020-03-06
版本号	Ho-A0



Features

- 3 Watts power rating in 1 Watt size, 1225 package
- Low TCR of ± 100 PPM/ $^{\circ}$ 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

Construction



Applications

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

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

Dimensions

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)	Weight (g) (1000pcs)
CS	0201	0.60 \pm 0.03	0.30 \pm 0.03	0.23 \pm 0.05	0.12 \pm 0.05	0.15 \pm 0.05	0.18
CS	0402	1.00 \pm 0.05	0.50 \pm 0.05	0.32 \pm 0.10	0.25 \pm 0.10	0.20 \pm 0.10	0.7
CS	0603	1.60 \pm 0.10	0.80 \pm 0.10	0.45 \pm 0.10	0.30 \pm 0.20	0.30 \pm 0.20	1.99
CS	0805	2.00 \pm 0.10	1.25 \pm 0.10	0.55 \pm 0.10	0.30 \pm 0.20	0.40 \pm 0.25	5.3
CS	1206	3.10 \pm 0.10	1.55 \pm 0.10	0.55 \pm 0.10	0.50 \pm 0.30	0.40 \pm 0.25	8.82
CS	1210	3.10 \pm 0.10	2.60 \pm 0.15	0.55 \pm 0.10	0.50 \pm 0.30	0.50 \pm 0.25	15.5
CS	2010	5.00 \pm 0.10	2.50 \pm 0.15	0.60 \pm 0.15	0.60 \pm 0.30	0.50 \pm 0.25	27.03
CS	2512	6.35 \pm 0.10	3.10 \pm 0.15	0.60 \pm 0.10	0.60 \pm 0.30	0.55 \pm 0.25	43.08
CS (2W)	2512 (10 - 99m Ω)	6.35 \pm 0.20	3.15 \pm 0.15	0.74 \pm 0.10	0.60 \pm 0.30	0.55 \pm 0.25	53.08
CS (2W)	2512 (100 - 1000m Ω)	6.35 \pm 0.20	3.15 \pm 0.15	0.74 \pm 0.10	0.60 \pm 0.30	2.10 \pm 0.10	53.08
CS	1225	3.10 \pm 0.15	6.30 \pm 0.15	0.90 \pm 0.15	0.60 \pm 0.30	0.80 \pm 0.25	64.88
CS	3720	2.00 \pm 0.20	3.75 \pm 0.20	0.60 \pm 0.10	0.40 \pm 0.20	0.40 \pm 0.20	19.96
CS	7520	2.00 \pm 0.20	7.50 \pm 0.30	0.60 \pm 0.10	0.40 \pm 0.20	0.40 \pm 0.20	35.71
CS	0612	1.55 \pm 0.10	3.10 \pm 0.15	0.55 \pm 0.10	0.30 \pm 0.15	0.45 \pm 0.15	10.19



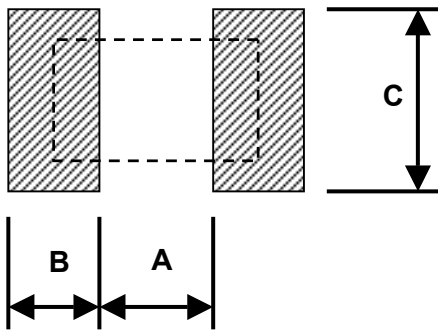
地址：深圳市龙华新区观澜大布头路南通邦高新产业园 A 栋 8 楼

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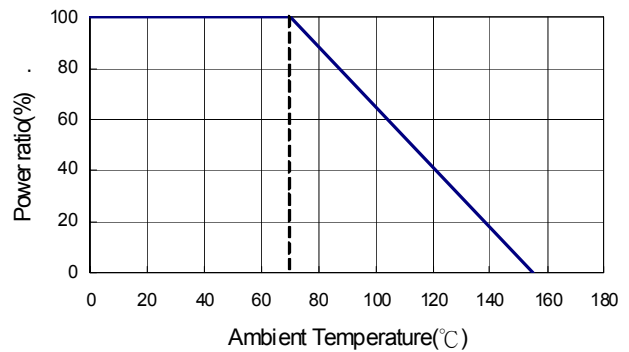
Part Numbering

CS	0603	1/4W	R100	1%	±100
Product Type	Dimensions (L×W)	Power Rating	Resistance	Resistance Tolerance	TCR (PPM/°C)
	0201 0402 0603 0805 1206 1210 2010 2512 1225 3720 7520 0612	2W 1.5W 1W 3/4W 1/2W 1/4W 1/5W 1/8W	R010: 0.01Ω R100: 0.1Ω 1R00: 1Ω	±0.5% ±1% ±2% ±5%	±100 ±200 ±300 ±400 ±600 ±150 ±1000

Recommend Land Pattern



Derating Curve



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

Type	A (mm)	B (mm)	C (mm)
CS0201	0.25	0.30	0.40±0.2
CS0402	0.50	0.50	0.60±0.2
CS0603	0.80	1.00	0.90±0.2
CS0805	1.00	1.00	1.35±0.2
CS1206	2.00	1.15	1.70±0.2
CS1210	2.00	1.15	2.50±0.2
CS2110	3.60	1.40	2.50±0.2
CS2512	4.90	1.60	3.20±0.2
CS1225	1.20	2.00	7.00±0.2
CS3720	1.00	1.80	3.90±0.2
CS7520	1.00	1.80	7.60±0.2
CS0612	0.60	1.00	3.20±0.2

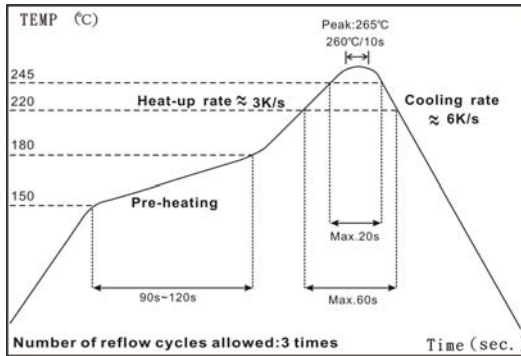
Marking for 0603

Type	Code
1R0	1.000Ω
R10	0.100Ω
R01	0.010Ω
<u>102</u>	0.102Ω
<u>024</u>	0.024Ω

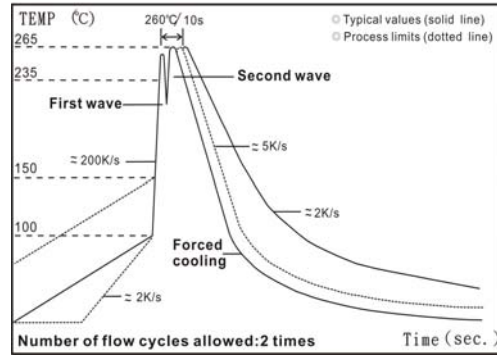
Pad Layout (For CS12: Ultra High Power Rating Series)

Type	Resistance Range	A (mm)	B (mm)	C (mm)
CS2512	10~99 mΩ	4.9	1.6	3.2±0.2
CS2512	100~1000mΩ	1.0	3.55	3.2±0.2

Soldering Condition



IR Reflow Soldering



Wave Soldering (Flow Soldering)

- (1) Time of IR reflow soldering at maximum temperature point 260°C : 10s
- (2) Time of wave soldering at maximum temperature point 260°C : 10s
- (3) Time of soldering iron at maximum temperature point 410°C : 5s

Standard Electrical Specifications

Type	Item	Power Rating at 70°C	Operating Temp. Range	Max. Operating Current	Resistance Range (mΩ)				TCR (PPM/°C)
					±0.5%	±1%	±2%	±5%	
CS0201		1/20W	-55 ~ +155°C	0.70A	100 - 147	150 - 500	510 - 1000	±1000 ±600 ±300	
CS0402		1/16W		1.11A	50 - 100	102 - 500	510 - 1000	±400 ±300 ±200	
CS0603		1/10W		2.23A	20 - 50	51 - 100	102 - 500	510 - 1000	±600 ±400 ±300 ±200
CS0805		1/8W		2.50A	20 - 50	51 - 100	102 - 196	200 - 1000	±600 ±400 ±300 ±200
CS1206		1/4W		5.00A	10 - 20	21 - 50	51 - 91	100 - 1000	±600
CS1210		1/2W		7.07A	10 - 20	21 - 50			±400
CS2010		3/4W		8.66A	10 - 20	21 - 50			±300
CS12512		1W		10.0A	10 - 20	21 - 50			±200
CS1225		3W		31.6A	3 - 5	6 - 20	21 - 30	33 - 8000	±300 ±200 ±150 ±100
CS3720		1W		10.0A	10 - 18	20 - 500			±300 ±150
CS7520		2W		44.7A	—	1 - 4			±300
CS0612		1W		10.0A	10 - 27	30 - 91	100 - 499	500 - 1000	±600 ±300 ±200 ±100

High Power & Ultra High Power Rating Electrical Specifications

Type \ Item	Power Rating at 70°C	Operating Temp. Range	Max. Operating Current	Resistance Range (mΩ)				TCR (PPM/°C)
				±0.5%	±1%	±2%	±5%	
CS0402	1/8W	-55 ~ +155°C	1.56A	51 - 100 102 - 500 510 - 1000	±400 ±300 ±200			
CS0603	1/8W 1/5W		1.98A					
CS0805	1/4W		2.21A					
CS1206	1/2W		7.07A	10 - 20 21 - 50 51 - 91 100 - 1000	±600 ±400 ±300 ±200			
CS1210	3/4W		8.66A					
CS2010	1W		10.0A					
CS2512	1.5W		12.2A					
CS2512	*2W		14.1A					

*: Ultra High Power

Low TCR Electrical Specifications

Type \ Item	Power Rating at 70°C	Operating Temp. Range	Max. Operating Current	Resistance Range (mΩ)				TCR (PPM/°C)
				±0.5%	±1%	±2%	±5%	
CS0805	1/8W	-55 ~ +155°C	1.11A	100 - 1000				±100
CS1206	1/4W		1.58A	100 - 1000				±100
CS1210	1/2W		2.58A	75 - 1000				±100
CS2010	3/4W		3.87A	50 - 1000				±100
CS2512	1W		7.07A	20 - 1000				±100
CS2512	*2W		6.32A	50 - 1000				±100
CS3720	1W		3.16A	100 - 500				±100
CS7520	2W		6.32A	50 - 350				±100

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

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 -55°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
	±(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"
Dry Heat	±(0.5%+0.05Ω)	JIS-C-5201-1 4.23 IEC-60115-1 4.23.2 at +155°C for 1000 hrs
Bending Strength	±(1.0%+0.05Ω)	JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending once for 5 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
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
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

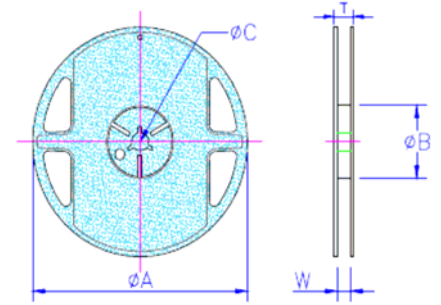
RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$ or Max. Operating Voltage whichever is lower.

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

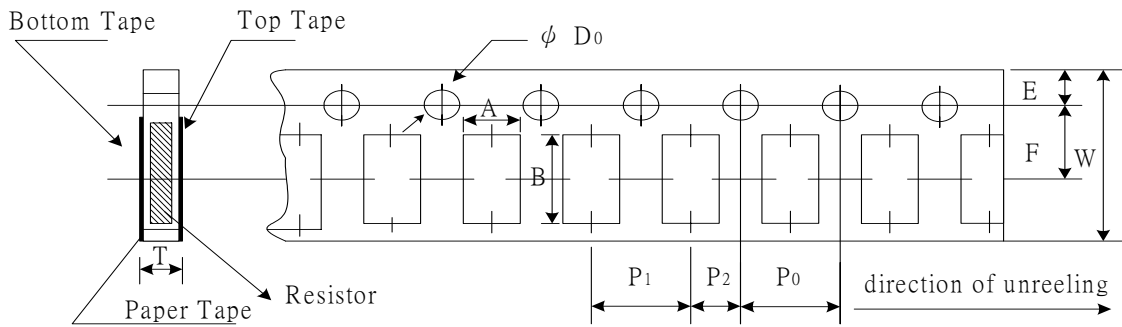
■Packaging

Packaging Quantity & Reel Specifications

Type	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)	Paper Tape (EA)	Embossed Plastic Tape (EA)
CS0201	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	10,000	
CS0402	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	10,000	-
CS0603	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CS0805	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CS1206	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CS1210	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	
CS2010	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
CS2512	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
CS2512 (2W)	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	2,000
CS1225	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	2,000
CS3720	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	2,000
CS7520	178.0±1.0	60.0+1.0	13.5±0.7	17.5±1.0	19.5±1.0	-	2,000
CS0612	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-

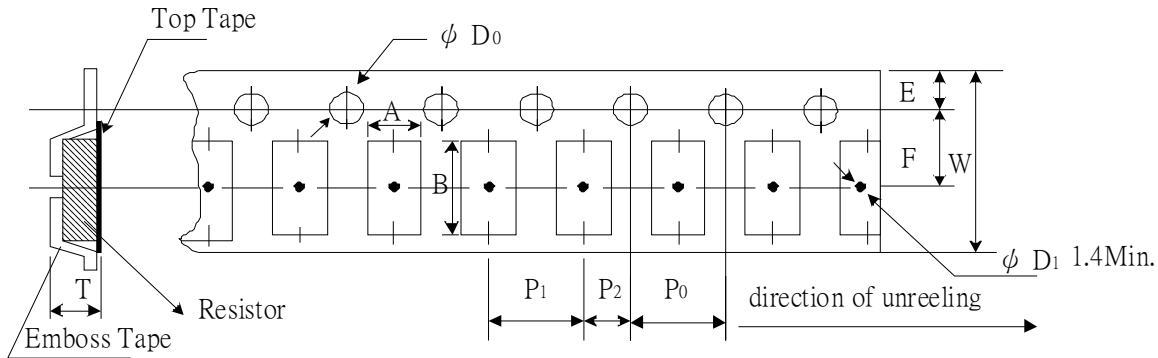


Paper Tape Specifications



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P0 (mm)	P1 (mm)	P2 (mm)	ΦD ₀ (mm)	T (mm)
CS0201	0.38±0.05	0.68±0.05	8.0±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
CS0402	0.65±0.10	1.15±0.10	8.0±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
CS0603	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
CS0805	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
CS1206	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
CS1210	2.90±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
CS0612	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

Emboss Plastic Tape Specifications



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P ₀ (mm)	P ₁ (mm)	P ₂ (mm)	ΦD ₀ (mm)	T (mm)
CS2010	2.80±0.10	5.50±0.10	12.0±0.30	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
CS2512	3.50±0.10	6.70±0.10	12.0±0.30	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
CS2512 (2W)	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
CS1225	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
CS3720	2.50±0.20	4.45±0.20	12.0±0.30	1.75±0.10	5.5±0.05	4.00 ±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.20 ±0.20
CS7520	2.50±0.20	8.30±0.20	16.0±0.30	1.75±0.10	7.8±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.20 ±0.20

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