Data Sheet

Customer:	
Product:	Current Sensing Chip Resistor (Wide Terminal) – CSW Series
Size:	0508/0612/1020/1225
Issued Date:	13-Sep-22
Edition:	REV.A2

RoHS Compliant

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13-Sep-22	13-Sep-22	13-Sep-22		
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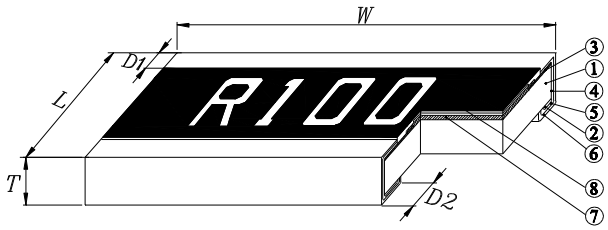
Current Sensing Chip Resistor (Wide Terminal)



■Features

- Highly reliable multilayer electrode construction
- Reduced size of final equipment reliability
- 3 Watts power rating in 1 Watt size, 1225 package
- Resistance values from 10m to 750mΩ
- High purity alumina substrate for high power dissipation
- Long side terminations with higher power rating
- RoHS Compliance

■Construction



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

■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

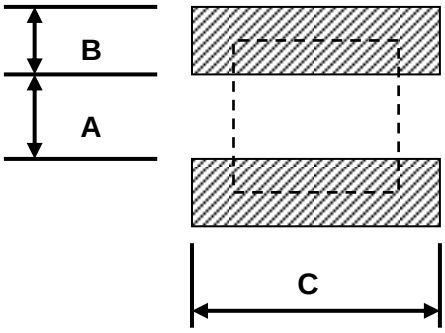
■Dimensions

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)	Weight (g) (1000pcs)
CSW08	0508	1.25±0.15	2.00±0.15	0.60±0.10	0.30±0.20	0.35±0.15	6
CSW62	0612	1.60±0.15	3.20±0.15	0.60±0.10	0.30±0.20	0.45±0.15	12
CSW20	1020	2.50±0.15	5.00±0.15	0.60±0.10	0.40±0.20	0.75±0.15	35
CSW25	1225	3.10±0.15	6.30±0.15	0.60±0.10	0.45±0.20	0.75±0.15	48

■Part Numbering

CSW	25	F	T	F	R	R100	
Product Type	Dimensions (L×W)	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking
	08: 0508 62: 0612 20: 1020 25: 1225	F: ±1% J: ±5%	T: Taping Reel	E: ±100 F: ±200 J: ±600	U: 1/2W Q: 3/4W T: 1W A: 1.5W S: 2W R: 3W	R010: 0.01Ω R100: 0.1Ω	N: No Marking

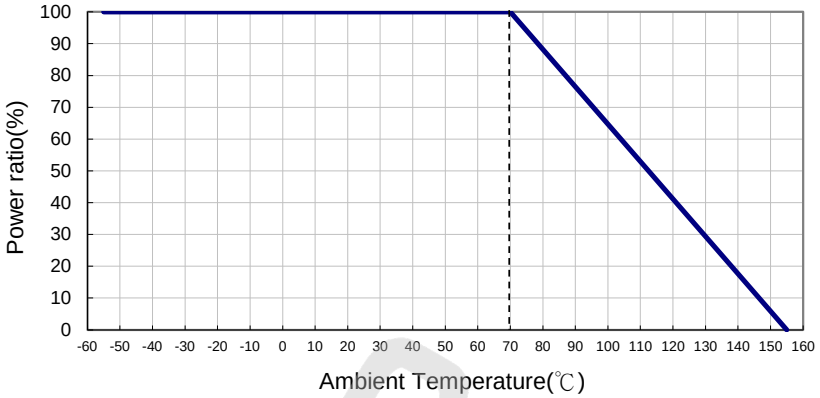
■Recommend Land Pattern



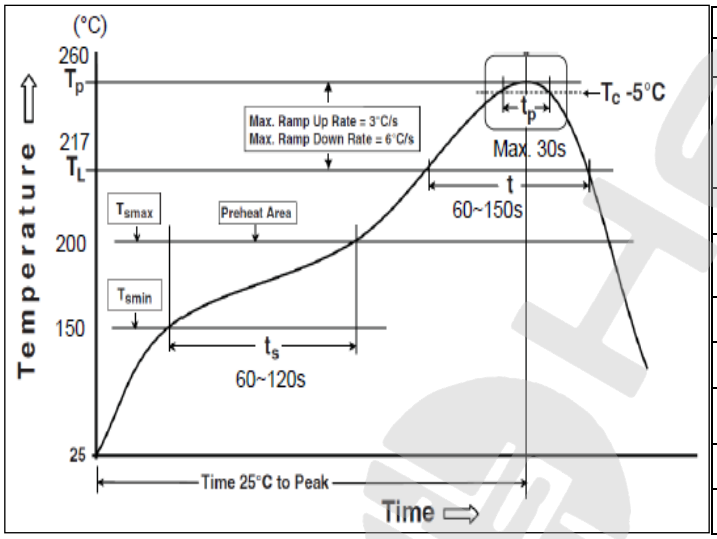
Pad Layout

Type	A (mm)	B (mm)	C (mm)
CSW08	0.55	0.90	2.00
CSW62	0.70	0.80	3.20
CSW20	1.00	1.30	5.00
CSW25	1.60	1.20	6.40

■Derating Curve



■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% (E24、E96)	Resistance Range (mΩ) ±5% (E24)	TCR (PPM/°C)
CSW08 (0508)	1/2W	-55 ~ +155°C	7.07A	10-27(E24)		±600
				30- 510		±200
CSW62 (0612)	3/4W		8.66A	10-27(E24)		±600
				30- 510		±200
CSW20 (1020)	1W		10A	10-27(E24)		±600
				30- 750		±200
CSW25 (1225)	1.5W		12.24A	10-27(E24)		±600
				30- 750		±200

■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% (E24、E96)	±5% (E24)	
CSW08 (0508)	1W	-55~+155℃	10.0A	10 - 27(E24)		±600
				30 - 510		±200
CSW62 (0612)	1.5W		12.2A	10 - 27(E24)		±600
				30 - 510		±200
CSW20 (1020)	2W		14.1A	10 - 27(E24)		±600
				30 - 750		±200
CSW25 (1225)	3W		17.3A	10 - 27(E24)		±600
				30 - 750		±200

■High Power Rating & Low TCR Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Current	Resistance Range (mΩ)	TCR (PPM/°C)
				±1% (E24、E96)	
CSW08 (0508)	1W	-55~+155℃	3.16A	100 - 510	±100
CSW62 (0612)	1.5W		7.07A	30 - 510	±100
CSW20 (1020)	2W		8.16A	30 - 750	±100
CSW25 (1225)	3W		10.0A	30 - 750	±100

Operating Voltage=$\sqrt{(P*R)}$; Overload Voltage=2.5*$\sqrt{(P*R)}$; 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	±(2.0%+0.05Ω)	**JIS C 5201-1 4.13** **IEC 60115-1 4.13** RCWV*2 for 5 seconds
Insulation Resistance	≧10G	**JIS C 5201-1 4.6** **IEC 60115-1 4.6** Max. Overload Voltage for 1 minute
Endurance	±(2.0%+0.05Ω)	**JIS-C-5201-1 4.25** **IEC-60115-1 4.25.1** 70℃±2℃,RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Damp Heat with Load	±(2.0%+0.05Ω)	**JIS-C-5201-1 4.24** **IEC-60115-1 4.24** 40±2℃,90~95% R.H.,RCWV for 1000hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Dry Heat	±(1.0%+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 60 seconds with 3mm

Item	Requirement	Test Method
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	±(1.0%+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 CSW08:300V CSW62/20/25:400V
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 (30 minutes) / +125°C (30 minutes) , 5 cycles

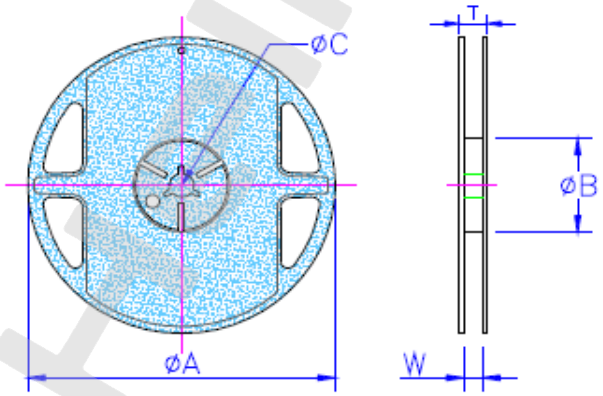
RCWV(Rated Continuous Working Voltage)=√(P*R) or Max. Operating Voltage whichever is lower.

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

■Shelf Life: 2 years from production date.

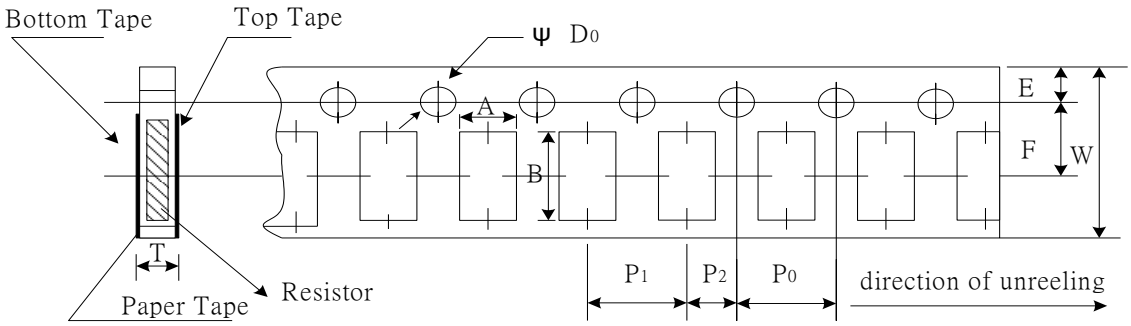
■Packaging

Packaging Quantity & Reel Specifications



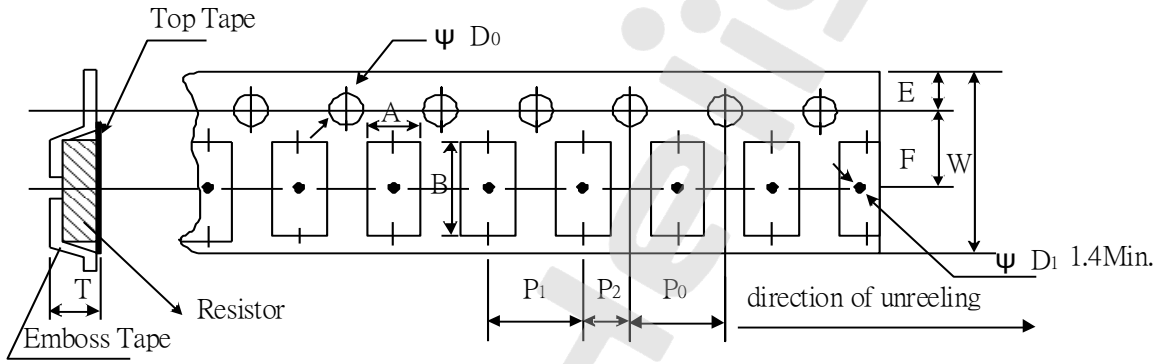
Type	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)	Paper Tape (EA)	Emboss Plastic Tape (EA)
CSW08	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CSW62	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CSW20	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
CSW25	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000

Paper Tape Specifications



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P0 (mm)	P1 (mm)	P2 (mm)	ΦD0 (mm)	T (mm)
CSW08	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
CSW62	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)
CSW20	2.80±0.10	5.40±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	1.00±0.20
CSW25	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	1.50+0.10	1.00±0.20

■Marking

1%, 5% for 0508/0612/1020/1225: 4 digits marking

Example:

Resistance	10mΩ	100mΩ
Marking	R010	R100

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A	Mar 01, 2022	-	- New product release
Version A1	Jun 15, 2022	-	- Modify Soldering Condition
Version A2	Sep 13, 2022		- Add 0508 size and specification - 1020&1225 Expand the resistance range to 750mR - Add High Power Rating & Low TCR Electrical Specifications