

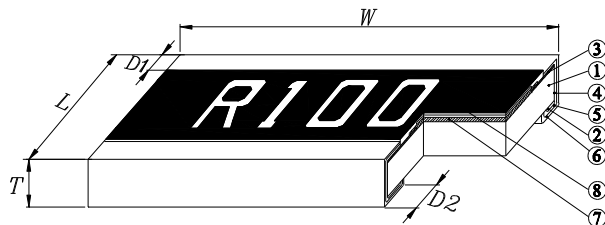
Current Sensing Chip Resistor (Wide Terminal)

■ 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



■ 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

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

■ Dimensions

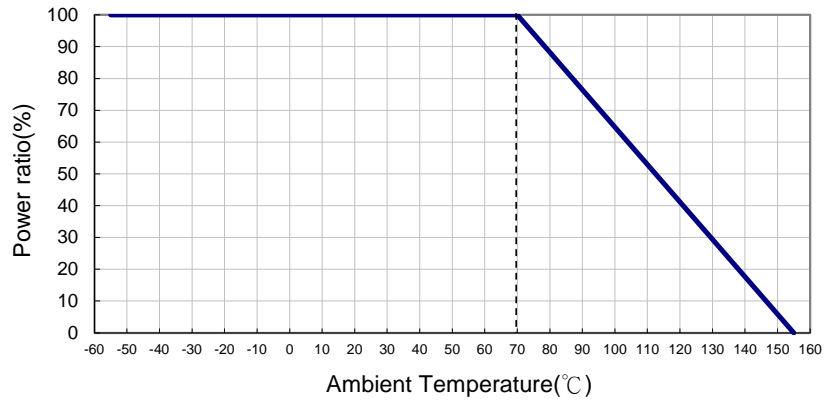
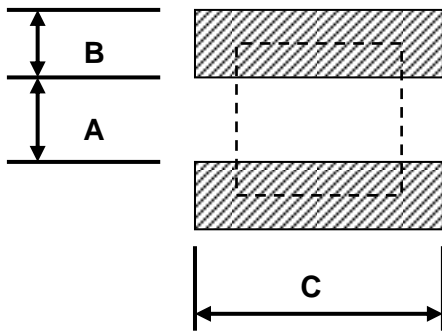
| Type | Size (Inch) | L (mm) | W (mm) | T (mm) | D1 (mm) | D2 (mm) | Weight (g) (1000pcs) |
|-------|-------------|-----------|-----------|-----------|-----------|-----------|----------------------|
| CSW08 | 0508 | 1.25±0.15 | 2.00±0.15 | 0.60±0.10 | 0.30±0.20 | 0.35±0.15 | 6 |
| CSW62 | 0612 | 1.60±0.15 | 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 (LxW) | 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

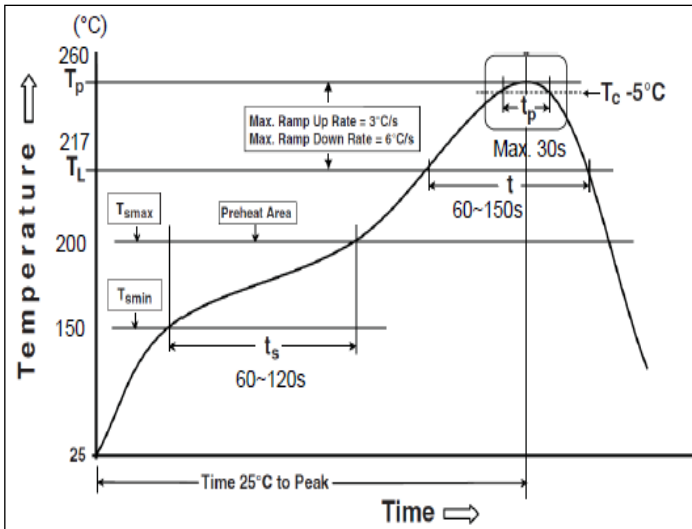
Derating Curve



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 |

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



| Reflow Profiles | |
|--|------------------|
| Profile Feature | Pb-Free Assembly |
| Preheat | |
| Min. Temperature (T _{min}) | 150 °C |
| Max Temperature (T _{max}) | 200 °C |
| Preheating time (t _s) from (T _{min} to T _{max}) | 60-120 seconds |
| Ramp-up rate (T _L to T _p) | 3 °C/second max. |
| Liquidous temperature (T _L) | 217 °C |
| Time (t _L) maintained above T _L | 60-150 seconds |
| Min. Peak temperature (T _p min) | 235°C |
| Max. Peak temperature (T _p max) | 260°C |
| Time (t _p) within 5 °C of the specified classification temperature (T _c) | 30 seconds max. |
| Ramp-down rate (T _p to T _L) | 6 °C/second max. |
| Time 25 °C to peak temperature | 8 minutes max. |

Standard Electrical Specifications

| Type \ Item | Power Rating at 70°C | Operating Temp. Range | Max. Operating Current | Resistance Range (mΩ) | | TCR (PPM/°C) |
|--------------|----------------------|-----------------------|------------------------|-----------------------|-----------|--------------|
| | | | | ±1% (E24 · E96) | ±5% (E24) | |
| 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

| Type \ Item | 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°C | 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

| Type \ Item | 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°C | 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= $\sqrt{P \cdot R}$; Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$; 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°C±2°C,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°C,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 |

Current Sensing Chip Resistor (Wide Terminal)

| 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 |

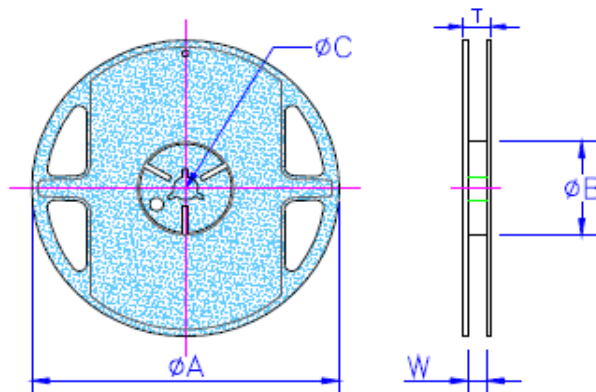
RCWV(Rated Continuous Working Voltage)=√(P*R) or Max. Operating Voltage whichever is lower.

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

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

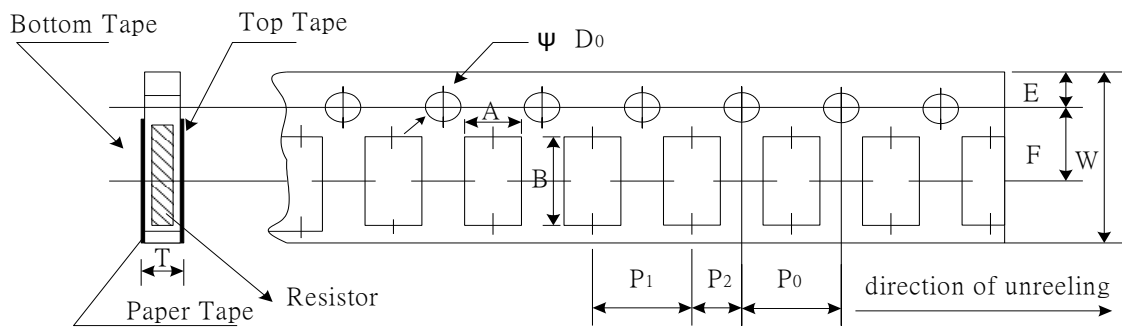
■ **Packaging**

Packaging Quantity & Reel Specifications



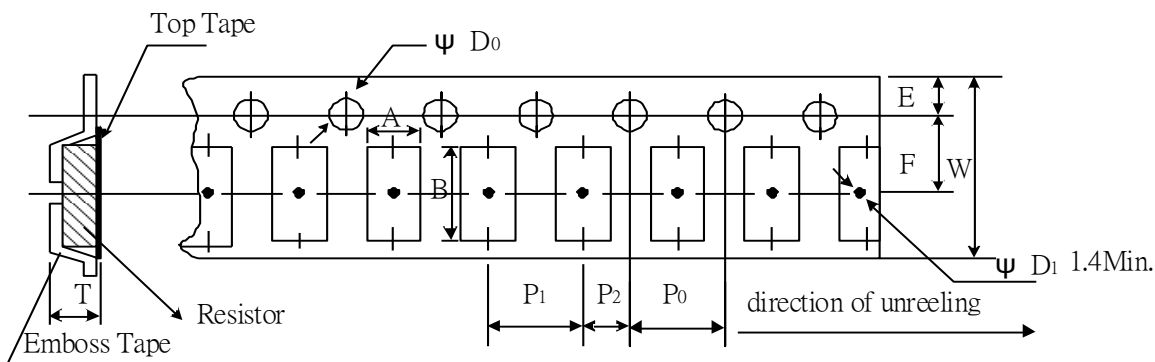
| Type | ΦA (mm) | ΦB (mm) | ΦC (mm) | W (mm) | T (mm) | Paper Tape (EA) | Emboss Plastic Tape (EA) |
|-------|-----------|----------|----------|----------|----------|-----------------|--------------------------|
| CSW08 | 178.0±1.0 | 60.0+1.0 | 13.5±0.7 | 9.5±0.1 | 11.5±1.0 | 5,000 | - |
| CSW62 | 178.0±1.0 | 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) | ΦD ₀ (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 |