

## Data Sheet

Customer:

Product: Current Sensing Metal Chip Resistor (Wide Terminal) –  
CSMW Series

Size: 0306/0508/0612/1020/1225

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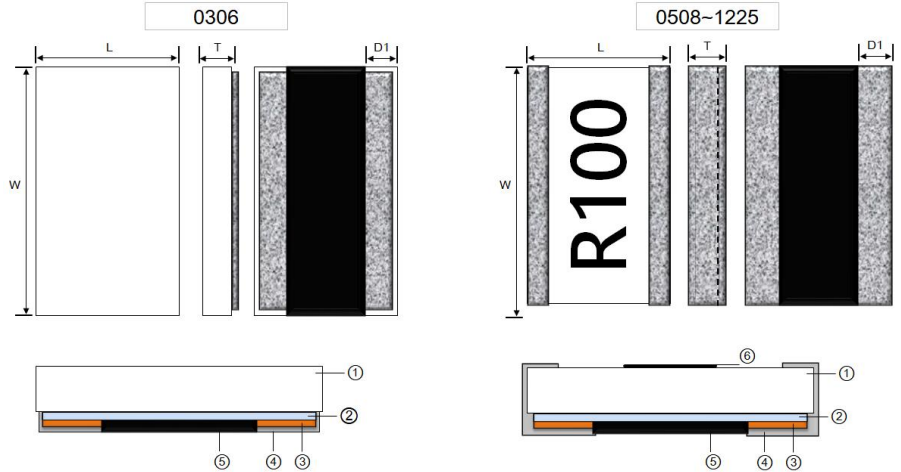
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**Construction**



① Alumina Substrate	④ External Electrode
② Resistor Layer	⑤ Primary Overcoat
③ Bottom Electrode	⑥ Marking

**Features**

- SMD Type designed for automatic insertion
- Low resistance resistor for current detection
- Metal foil construction ensures high reliability and performance with very low and stable TCR
- Designed for current sense circuits in power electronic systems
- Pb-Free to meet RoHS requirements
- AEC-Q200 Compliance
- Inherently Anti-Sulfur

**Dimensions**

Type	Size (Inch)	Resistance Range (mΩ)	L	W	T	D1	Weight (g) (1000pcs)
CSMW36	0306	5 – 19	0.85±0.20	1.60±0.20	0.55±0.20	0.25±0.15	2.626
		20 – 100	0.85±0.20	1.60±0.20	0.55±0.20	0.25±0.15	2.448
CSMW08	0508	3 – 19	1.35±0.20	2.00±0.20	0.60±0.20	0.30±0.20	6.671
		20 – 100	1.35±0.20	2.00±0.20	0.60±0.20	0.30±0.20	5.884
CSMW62	0612	3 – 19	1.65±0.20	3.20±0.20	0.60±0.20	0.30±0.20	13.237
		20 – 100	1.65±0.20	3.20±0.20	0.60±0.20	0.30±0.20	12.094
CSMW20	1020	3 – 19	2.60±0.30	5.00±0.20	0.60±0.20	0.55±0.30	33.246
		20 – 100	2.60±0.30	5.00±0.20	0.60±0.20	0.55±0.30	31.873
CSMW25	1225	3 – 19	3.20±0.30	6.40±0.20	0.60±0.20	0.60±0.30	51.846
		20 – 100	3.20±0.30	6.40±0.20	0.60±0.20	0.60±0.30	50.015

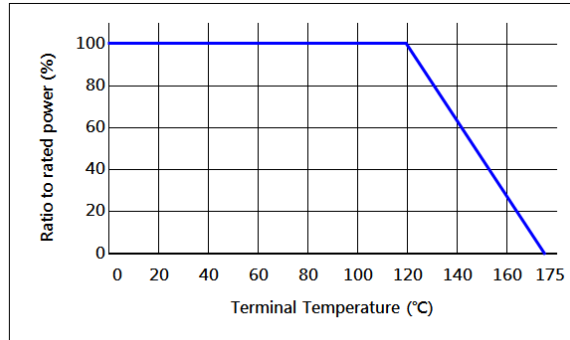
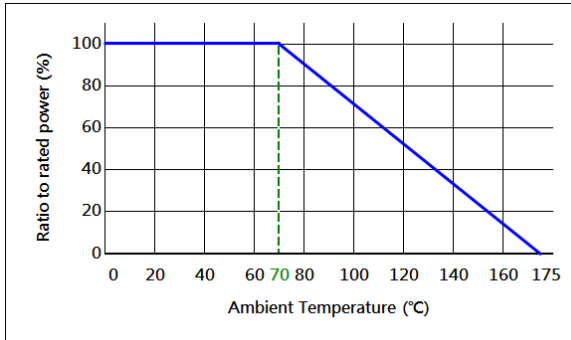
**Applications**

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

**Part Numbering**

CSMW	36	F	T	D	U	R100	
Product Type	Dimensions (LxW)	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking
	36: 0306 08: 0508 62: 0612 20: 1020 25: 1225	F: ±1% G: ±2% J: ±5%	T: Taping Reel	D: ±50 E: ±100 K: ±150	U: 1/2W T: 1W A: 1.5W S: 2W R: 3W	R003: 0.003Ω R010: 0.01Ω R100: 0.1Ω	: Standard N: No Marking

**Derating Curve**



**Standard Electrical Specifications**

Type	Item	Power Rating	Operating Temp. Range	Resistance Range (mΩ)			TCR (ppm/°C)
				±1%	±2%	±5%	
CSMW36 (0306)	1/2W			5 – 19			±150
				20 – 100			±100
CSMW08 (0508)	1W			3 – 19			±100
				20 – 100			±50
CSMW62 (0612)	1.5W		-55 ~ +175°C	3 – 19			±100
				20 – 100			±50
CSMW20 (1020)	2W			3 – 19			±100
				20 – 100			±50
CSMW25 (1225)	3W			3 – 19			±100
				20 – 100			±50

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.	<b>JIS-C-5201-1 4.8</b> <b>IEC-60115-1 4.8</b> 25°C~+125°C, 25°C is the reference temperature
Short Time Overload	$\Delta R \leq \pm 1\%R$	<b>JIS-C-5201-1 4.13</b> <b>IEC-60115-1 4.13</b> 2.5X Rated Power for 5 seconds
Insulation Resistance	$\geq 1000M\Omega$	<b>JIS-C-5201-1 4.6</b> <b>IEC-60115-1 4.6</b> Max. Overload Voltage for 1 minute
Operational Life	$\Delta R \leq \pm 1\%R$	<b>MIL-STD-202 Method 108</b> Condition D Steady State $T_A=125^\circ\text{C}$ at derated power. Measurement at 24±4 hours after test conclusion
Biased Humidity	$\Delta R \leq \pm 1\%R$	<b>MIL-STD-202 Method 103</b> 85°C/85RH., 1000 hrs, apply 10% of operating power (current) or limiting element current whichever is lower
High Temperature Exposure	$\Delta R \leq \pm 1\%R$	<b>MIL-STD-202 Method 108</b> at +155°C for 1000 hrs
Temperature Cycling	$\Delta R \leq \pm 1\%R$ $\Delta R \leq \pm 2\%R$	<b>JESD22 Method JA-104</b> -55°C to +155°C, 100 cycles -55°C to +155°C, 1000 cycles
Bending Strength (Board Flex)	$\Delta R \leq \pm 1\%R$	<b>JIS-C-5201-1 4.33</b> Bending once for 60 seconds Bending displacement:2mm
Solderability	95% min. coverage	<b>JIS-C-5201-1 4.17</b> <b>IEC-60115-1 4.17</b> 245±5°C for 3 seconds

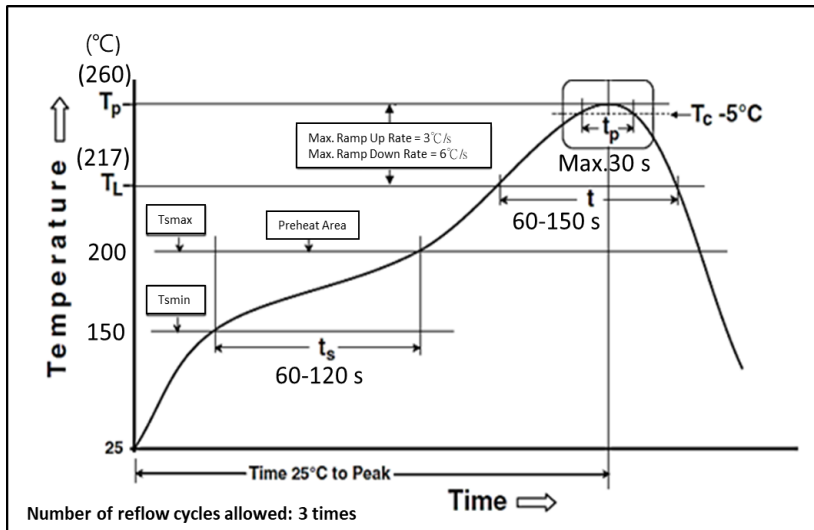
**Current Sensing Metal Chip Resistor (Wide Terminal)**

Resistance to Soldering Heat	$\Delta R \leq \pm 1\%R$	<b>JIS-C-5201-1 4.18</b> <b>IEC-60115-1 4.18</b> 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover	<b>JIS-C-5201-1 4.7</b> <b>IEC-60115-1 4.7</b> 1.42 times Max. Operating Voltage for 1 minute
Resistance to solvents	Marking Unsmearred	<b>MIL-STD-202 Method 215</b> Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Mechanical Shock	$\Delta R \leq \pm 1\%R$	<b>MIL-STD-202 Method 213</b> Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	$\Delta R \leq \pm 1\%R$	<b>MIL-STD-202 Method 204</b> 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	$\Delta R \leq \pm 1\%R$	<b>AEC-Q200-002</b> Human body model 0306 sizes: 1KV Other sizes: 2KV
Flammability	No ignition of the tissue paper or scorching or the pinewood board	<b>UL-94</b> V-0 or V-1 are acceptable. Electrical test not required.
Terminal strength	No broken	<b>AEC-Q200-006</b> Force of 1.8kg for 60 seconds

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

- **Storage Temperature: 15~28°C; Humidity < 80%RH**
- **Shelf Life: 2 years from production date.**

**■ Soldering Condition(IPC/JEDEC J-STD-020)**



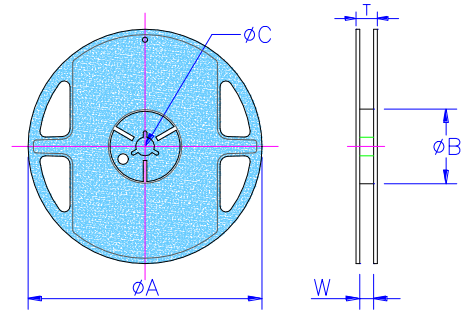
Reflow Profiles	
Profile Feature	Pb-Free Assembly
<b>Preheat</b> Min. Temperature (T <sub>min</sub> ) Max Temperature (T <sub>max</sub> ) Preheating time (t <sub>s</sub> ) from (T <sub>min</sub> to T <sub>max</sub> )	150 °C 200 °C 60-120 seconds
Ramp-up rate (T <sub>L</sub> to T <sub>p</sub> )	3 °C/second max.
Liquidous temperature (T <sub>L</sub> ) Time (t <sub>L</sub> ) maintained above T <sub>L</sub>	217 °C 60-150 seconds
Min. Peak temperature (T <sub>p</sub> min)	235°C
Max. Peak temperature (T <sub>p</sub> max)	260°C
Time (t <sub>p</sub> ) within 5 °C of the specified classification temperature (T <sub>c</sub> )	30 seconds max.
Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

**■Packaging**

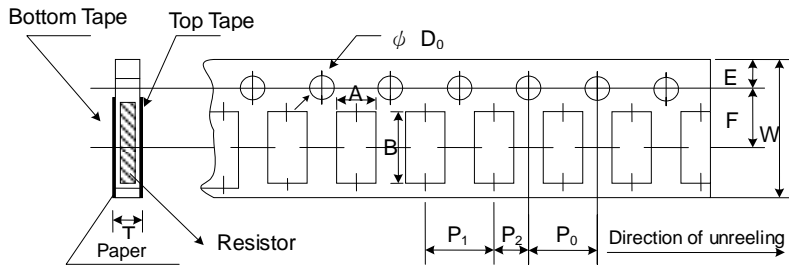
Packaging Quantity & Reel Specifications

Unit: mm

Type	ΦA	ΦB	ΦC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
CSMW36	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CSMW08	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CSMW62	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CSMW20	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
CSMW25	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000



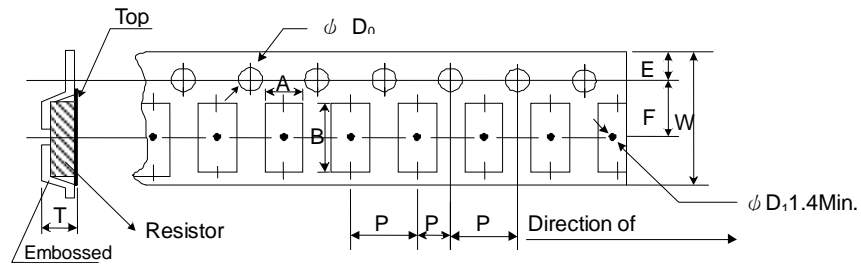
Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ΦD <sub>0</sub>	T
CSMW36	1.10±0.10	1.85±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	1.55±0.05	0.60±0.05
CSMW08	1.60±0.10	2.37±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	1.55±0.05	0.75±0.05
CSMW62	2.00±0.10	3.55±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	1.55±0.05	0.75±0.05

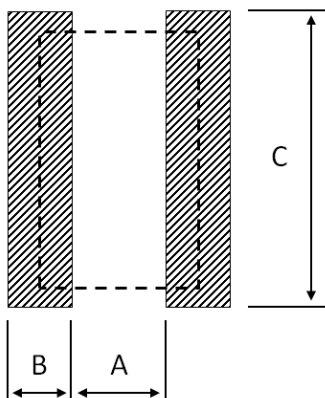
Embossed Plastic Tape Specifications



Unit: mm

Type	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ΦD <sub>0</sub>	T
CSMW20	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
CSMW25	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

**■Recommend Land Pattern**



Pad Layout

Type	Resistance Range	A (mm)	B (mm)	C (mm)	t (μm)
CSMW36	5 – 100mΩ	0.25	0.68	1.70	35
CSMW08	3 – 100mΩ	0.60	0.70	2.20	35
CSMW62	3 – 100mΩ	0.60	0.90	3.40	35
CSMW20	3 – 100mΩ	1.20	1.40	5.20	100
CSMW25	3 – 100mΩ	2.20	1.00	6.60	100

t : copper foil minimum thickness of PCB

**■ Marking**

No Marking for 0306

**For 0508-1225**

Type	Code
R100	0.100Ω
R050	0.050Ω
R003	0.003Ω