

WELLCOMP TECHNOLOGY CO., LTD

APPROVAL SHEET

Model Name	Metal Strip Current Sensing Resistor
Part Number	WMCSS Series
Customer Name	
Customer P/N	
Issued Date	

Customer		Maker		
Approved	Checked	Inspector	Checked	Prepared



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Features

- ◆ 5W up to 129A at 0.3mΩ
- ◆ Resistance value from 0.2mΩ to 5mΩ
- ◆ Lead free, RoHS compliant for global applications and halogen free
- ◆ Excellent long term stability

Application

- ◆ Power modules
- ◆ Frequency converters
- ◆ Current sensor for power hybrid sources
- ◆ High current for automotive

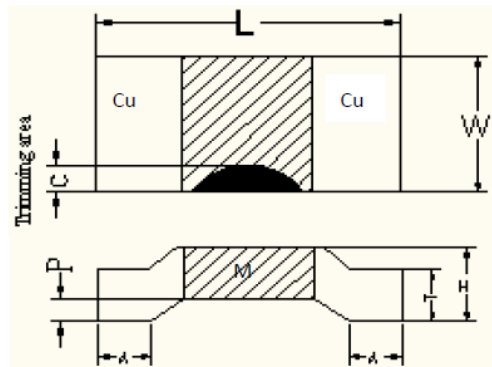
Part Numbering System

WMCSS 3920 0R20 E I E A

(1) (2) (3) (4) (5) (6) (7)

- (1) Series Code
- (2) Size (EIA): Length x Width
- (3) Resistance: R001=1mΩ, 0R50=0.5mΩ
- (4) Tolerance: F=+/-1%, G=+/-2%, J=+/-5%
- (5) Power Rating: S=1/2W, C=1W, D=1.5W, E=2W, H=3W, P=4W, I=5W
- (6) Packaging: T- Embossed paper tape, 7" reel
E-Embossed plastic tape, 7" reel
- (7) Factory Code, A=Taiwan Factory

Dimension



Type (inch size)	Resistance (mΩ)	Dimensions(mm)							M (material)
		L	W	H	T	A	C(Max.)	P	
MCSS2512	0.25	6.5±0.2	3.25±0.2	1.30±0.15	0.82±0.15	0.90±0.2	0.4	0.35±0.1	MnCuSn
MCSS2512	0.3	6.5±0.2	3.25±0.2	1.17±0.15	0.82±0.15	0.90±0.2	0.4	0.35±0.1	MnCuSn
MCSS2512	0.4	6.5±0.2	3.25±0.2	1.17±0.15	0.70±0.15	0.90±0.2	0.4	0.35±0.1	MnCuSn
MCSS2512	0.5	6.5±0.2	3.25±0.2	1.07±0.15	0.72±0.15	0.90±0.2	0.4	0.35±0.1	MnCu
MCSS2512	0.75	6.5±0.2	3.25±0.2	1.07±0.15	0.72±0.1	0.90±0.2	0.4	0.35±0.1	MnCu
MCSS2512	1.0	6.5±0.2	3.25±0.2	0.73±0.15	0.38±0.15	0.90±0.2	0.4	0.35±0.1	MnCu

●All Specifications are subject to change without notice.

Type (inch size)	Resistance (mΩ)	Dimensions(mm)							M (material)
		L	W	H	T	A	C(Max.)	P	
WMCSS2512	2.0	6.5±0.2	3.25±0.2	0.96±0.15	0.61±0.15	0.90±0.2	0.4	0.35±0.1	FeCrAl
WMCSS2512	3	6.50±0.2	3.25±0.2	0.76±0.15	0.41±0.15	0.90±0.2	0.4	0.35±0.1	FeCrAl
WMCSS2512	4	6.50±0.2	3.25±0.2	0.66±0.15	0.31±0.15	0.90±0.2	0.4	0.35±0.1	FeCrAl
WMCSS2512	5	6.50±0.2	3.25±0.2	0.66±0.15	0.31±0.15	0.90±0.2	0.4	0.35±0.1	FeCrAl
WMCSS3290	0.2	10.0±0.2	5.20±0.2	1.92±0.15	1.42±0.15	1.8±0.3	0.6	0.50±0.1	MnCu
WMCSS3920	0.3	10.0±0.2	5.20±0.2	1.92±0.15	1.42±0.15	1.8±0.3	0.6	0.50±0.1	MnCu
WMCSS3920	0.5	10.0±0.2	5.20±0.2	1.36±0.15	0.86±0.15	1.8±0.3	0.6	0.50±0.1	MnCu
WMCSS3920	1	10.0±0.2	5.20±0.2	0.92±0.15	0.42±0.15	1.8±0.3	0.6	0.50±0.1	MnCu
WMCSS3920	1.5	10.0±0.2	5.20±0.2	0.92±0.15	0.42±0.15	1.8±0.3	0.6	0.50±0.1	MnCu
WMCSS3920	2	10.0±0.2	5.20±0.2	1.19±0.15	0.69±0.15	1.8±0.3	0.6	0.50±0.1	FeCrAl
WMCSS3920	3	10.0±0.2	5.20±0.2	0.94±0.15	0.44±0.15	1.8±0.3	0.6	0.50±0.1	FeCrAl
WMCSS3920	4	10.0±0.2	5.20±0.2	0.85±0.15	0.35±0.15	1.8±0.3	0.6	0.50±0.1	FeCrAl
WMCSS3920	5	10.0±0.2	5.20±0.2	0.85±0.15	0.35±0.15	1.8±0.3	0.6	0.50±0.1	FeCrAl

Electrical Specification

Item	Power Rating	Resistance Range(mΩ)	Operation Temp. Range	TCR (PPM/°C)
MCSS2512	3W	0.25	-55~+170°C	±150
	3W	0.3		±150
	3W	0.5		±100
	3W	0.75		±100
	3W	1		±100
	3W	2		±50
	3W	3		±50
	3W	4		±50
	3W	5		±50
MCSS3920	5W	0.2		±150
	5W	0.3		±150
	5W	0.5		±70
	5W	1 & 1.5		±50
	5W	2		±50
	5W	3		±50
	5W	4	±50	
	5W	5	±50	

Note: Power Rating is guaranteed for use an aluminum substrate (MCPCB). Please check with Wellcomp

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Rated Voltage

The Rated Voltage is calculated by the following formula:

$$E = \sqrt{P * R}$$

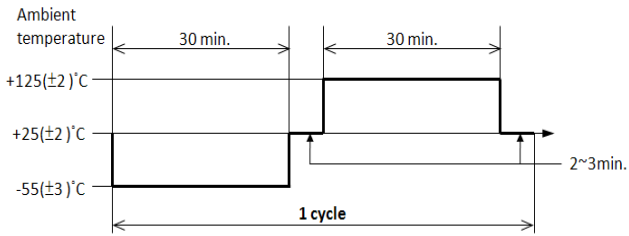
E=Rated Voltage(V)

P=Rated Power(W)

R=Resistance Value(Ω)

Performances

Environmental Performance

No.	Item	Test Condition	Specification
1	Short Time Overload	Loading 5 times rated power for 5 sec.	$\Delta R: \pm(1\%+0.0005\Omega)$
2	Temperature Coefficient of Resistance (T.C.R.)	+25°C /+125°C. (JIS-C5202-5.2) $TCR \text{ (ppm/}^\circ\text{C)} = \frac{\Delta R}{R \times \Delta t} \times 10^6$	Refer to Electrical Specification
3	Moisture Resistance	The specimens shall be placed in a chamber and subjected to a relative humidity of 90~95% percent and a temperature of 25°C/65°C 10 cycles. (MIL-STD-202, Method 106)	$\Delta R: \pm(1\%+0.0005\Omega)$
4	High Temperature Exposure	The chip (mounted on board) is exposed in the heat chamber 125°C for 1000 hrs. (JIS-C5202-7.2)	$\Delta R: \pm(1\%+0.0005\Omega)$
5	Load Life	Apply rated power for 1000 hours with 1.5 hours ON and 0.5 hour OFF. (JIS-C5202-7.10)	$\Delta R: \pm(1\%+0.0005\Omega)$
6	Thermal Shock	-55°C to +155°C, 1000 cycles, 15 min at each extreme	$\Delta R: \pm(1\%+0.0005\Omega)$
7	Vibration	5 g's for 20 min., 12 cycles each of 3 orientations.	$\Delta R: \pm(0.5\%+0.0005\Omega)$
8	Rapid change of temperature	The chip (mounted on board) is exposed, -55 \pm 3°C (30min.)/+125 \pm 2°C (30min.) for 5 cycles. The following conditions as the following figure. (JIS-C5202-7.4) 	$\Delta R: \pm(1\%+0.0005\Omega)$

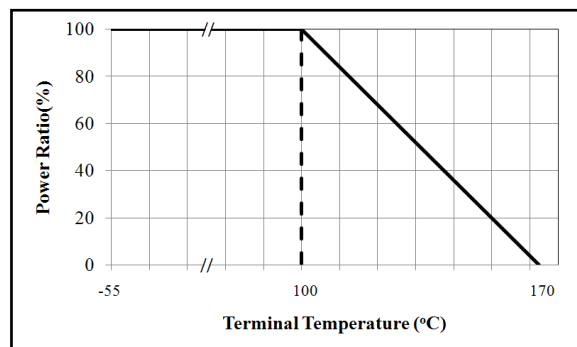
Function Performance

No.	Item	Test Condition	Specification
1	Bending Strength	<p>Mount the chip to test 90mm(L)*40mm(W) FR4 printed circuit board substrate. Apply pressure in direction of arrow unit band width reaches 2mm(+0.2/-0mm) illustrated in the figure below and hold for 10±1 sec. (JIS-C5202-6.1)</p> <p style="text-align: center;">Unit: mm</p>	$\Delta R: \pm(1\%+0.0005\Omega)$
2	Solderability	<p>The specimen chip shall be immersed into the flux specified in the solder bath 235±5°C for 2±0.5 sec. It shall be immersed to a point 10mm from its root. (Sn96.5/Ag3.0/Cu0.5) (JIS-C5 202-6.11)</p> <p style="text-align: center;">$h = 10 \text{ mm}$ $H = 10 \text{ mm min.}$</p>	<p>Solder shall be covered 95% or more of the electrode area.</p>

Remark;

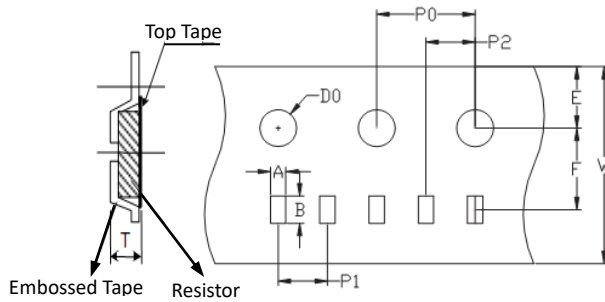
- a. The terminal electron temperature of component should below 100°C.

Derating Curve



Tape Packaging Specifications

◆ Embossed Plastic Tape Specifications



Unit:mm

Type	Carrier Dimensions (mm)									
	A	B	E	F	W	P0	P1	P2	D0	T
2512	3.55±0.1	6.75±0.1	1.75±0.1	5.5±0.05	12.0±0.2	4.0±0.05	4.0±0.1	2.0±0.05	1.5±0.1	1.2±0.2
3920	5.5±0.1	10.8±0.1	1.75±0.1	7.5±0.05	16.0±0.2	4.0±0.05	8.0±0.1	2.0±0.1	1.5±0.1	1.65±0.2

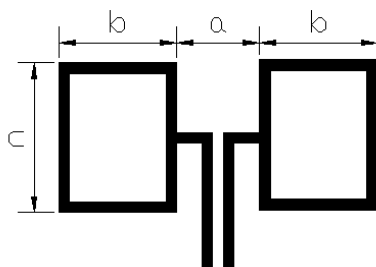
Packaging

Size EIA (EIAJ)	2512	3920
Standard Packing Quantity (pcs /reel)	4,000	3,000

Storage Conditions

Temperature : 22~28°C, Humidity : 40~75%

Recommended Solder Pad Layout

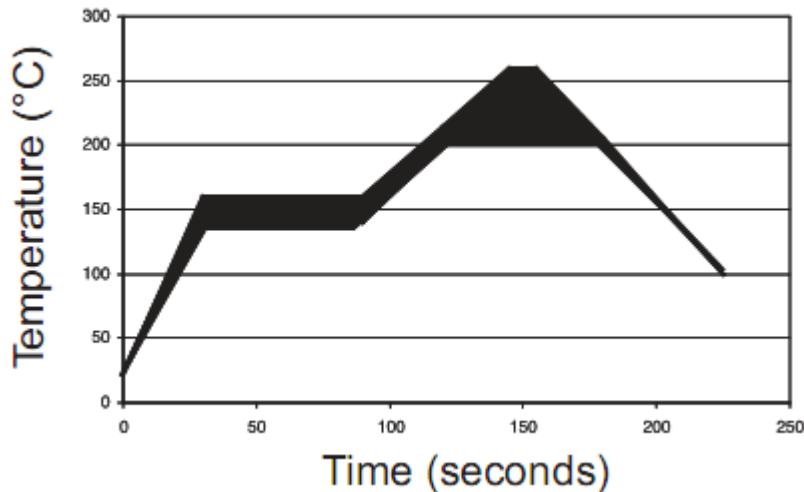


Type	Pad Layout Dimension (mm)		
	a	b	c
2512	3.80	1.80	3.40
3920	5.60	2.70	6.20

Note: Pad layout will be influence of resistance value. Please follow it.

Soldering Recommendations

- ◆ Peak reflow temperatures and durations :
 - IR Reflow Peak = 260°C max for 10 sec
 - Not suitable for wave soldering
- ◆ Recommended IR Reflow Profile :



ECN

Engineering Change Notice : The customer will be informed with ECN if there is significant modification on the characteristics and materials described in Approval Sheet.

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WMCSS Series

Metal Type Current Shunt Resistor

Document No: 20191017001

Issued Date: 2019/10/17

Version: A09

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