

## Features

- EB welded metal strip
- High power up to 5 W
- Excellent long term stability
- Four terminals for high accuracy
- RoHS compliant\* and halogen free\*\*
- AEC-Q200 compliant

## Applications

- Current sensing
- Voltage division
- Battery management systems
- Power modules
- Frequency converters
- Industrial

## Model CSS4C-1216 Current Sense Resistor

### Specifications

Characteristic	Model CSS4C-		
	1216T-L300	1216T-L500	1216C-1L00
Power Rating @ 100 °C	5 W	5 W	3 W
Resistance Range	0.3 mΩ	0.5 mΩ	1 mΩ
TCR (20~60 °C)	±100 PPM/°C	±50 PPM/°C	±50 PPM/°C
Tolerance	±1 % / ±5 %		
Inductance	<2 nH		
Max. Working Voltage	$V = \sqrt{P \times R}$		

### Additional Information

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### Environmental Characteristics

Operating Temperature

..... -65 °C to +170 °C

Storage Conditions

Temperature ..... +5 °C to +35 °C

Humidity ..... 40 % to 75 %

Moisture Sensitivity Level..... 1

### Performance Characteristics

Test	Conditions	Test Condition	
		Reference	Limit
Short Time Overload	5X rated power for 5 sec.	IEC 60115-1 4.13	$\Delta R < \pm 0.5 \%$
Low Temperature Storage	-65 °C for 24 hrs.	IEC 60115-1-4.23.4 JIS-C5201-4.23.4	$\Delta R < \pm 1 \%$
High Temperature Exposure	1000 hours @ +170 °C	AEC-Q200-REV E-Test 3 MIL-STD-202 Method 108	$\Delta R < \pm 1 \%$
Temperature Cycling	1000 cycles (-55 °C to +150 °C)	AEC-Q200-REV E-Test 4 JESD22 Method JA-104	$\Delta R < \pm 0.5 \%$
Bias Humidity	+ 85 °C, 85 % RH, 10 % bias, 1000 hours	AEC-Q200-REV E-Test 7 MIL-STD-202 Method 103	$\Delta R < \pm 0.5 \%$
Mechanical Shock	100 g for 6 ms, half sine shock pulse	AEC-Q200-REV E-Test 13 MIL-STD-202 Method 213	$\Delta R < \pm 0.2 \%$
Vibration	5 g's for 20 min, 10-2 kHz 12 cycles	AEC-Q200-REV E-Test 14 MIL-STD-202 Method 204	$\Delta R < \pm 0.2 \%$
Operational Life	1000 hours at rated power at +125 °C	AEC-Q200-REV E-Test 8 MIL-STD-202 Method 108	$\Delta R < \pm 1 \%$
Resistance to Soldering Heat	+260 ±5 °C, 10 ±1 second dwell	AEC-Q200-REV E-Test 15 MIL-STD-202 Method 210	$\Delta R < \pm 0.5 \%$
Solderability	235 ±3 °C dipping time: 3 ±0.5 seconds	AEC-Q200-REV E-Test 18 J-STD-002	>95 % tin coverage



**CALIFORNIA WARNING:** Can expose you to lead, a carcinogen and reproductive toxicant.

See [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

\* RoHS Directive 2015/863, Mar 31, 2015 and Annex.

\*\*Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

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# Model CSS4C-1216 Current Sense Resistor

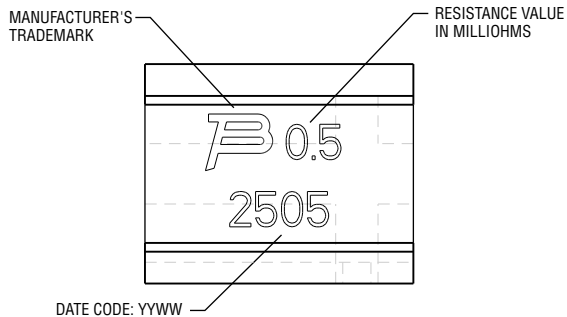
**BOURNS®**

## How To Order

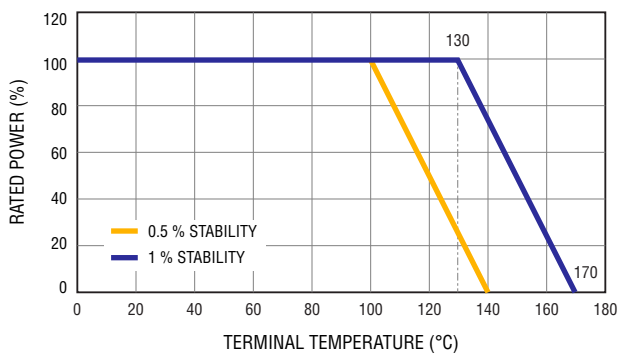
**CSS 4C - 1216 T - L500 F**

Model \_\_\_\_\_  
 CSS = Current Sense Shunt  
 Number of Terminals and Style \_\_\_\_\_  
 4C = 4 terminals  
 Package Size \_\_\_\_\_  
 1216 = 1216 in. (3038 mm)  
 Material \_\_\_\_\_  
 T = Copper Manganese Tin Alloy  
 C = Copper Manganese Alloy  
 Resistance Value \_\_\_\_\_  
 "L" represents decimal point in mΩ  
 (example: L500 = 0.0005 Ω, 1L00 = 0.001Ω)  
 Resistance Tolerance \_\_\_\_\_  
 F = ±1 %  
 J = ±5 %  
 Packaging Type \_\_\_\_\_  
 (blank) = 3,000 pcs. / 13-inch reel

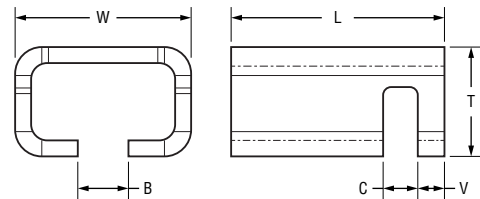
## Typical Part Marking



## Derating Curve



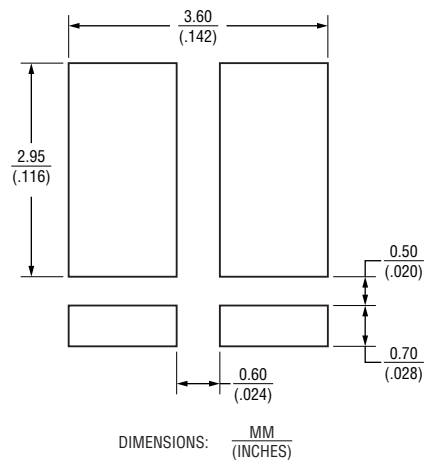
## Product Dimensions



Dim.	Model CSS4C-		
	1216T-L300	1216T-L500	1216C-1L00
L	$\frac{3.80 \pm 0.20}{(.150 \pm .008)}$		
W	$\frac{3.10 \pm 0.20}{(.122 \pm .008)}$		
T	$\frac{2.0 +0/-0.35}{(.079 +0/-0.014)}$	$\frac{1.90 +0/-0.35}{(.075 +0/-0.014)}$	
B	$\frac{0.85 \pm 0.20}{(.033 \pm .008)}$		
V	$\frac{0.50 \pm 0.10}{(.020 \pm .004)}$		
C	$\frac{0.60 \pm 0.15}{(.024 \pm .006)}$		

DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

## Recommended Layout



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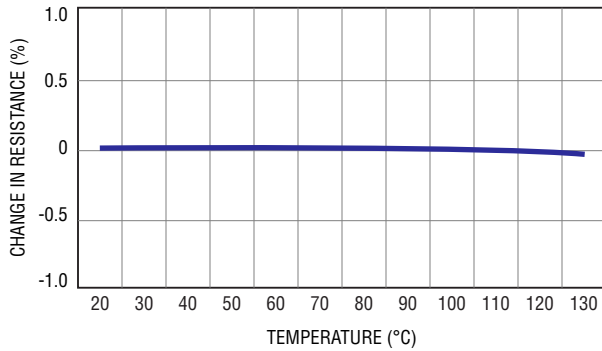
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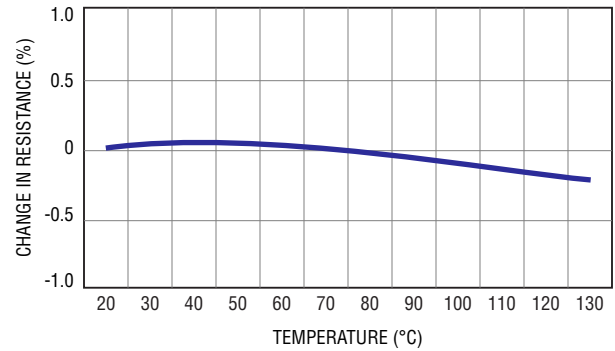
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### TCR Curve

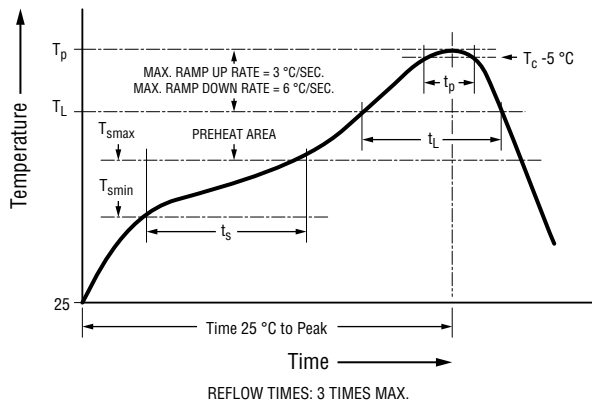
**COPPER MANGANESE TIN ALLOY**



**COPPER MANGANESE ALLOY**



### Soldering Profile



Profile Feature	Pb Free Assembly
Preheat <ul style="list-style-type: none"> <li>- Temperature Min. (<math>T_{smin}</math>)</li> <li>- Temperature Max. (<math>T_{smax}</math>)</li> <li>- Time(<math>t_s</math>) from <math>T_{smin}</math> to <math>T_{smax}</math></li> </ul>	150 °C 200 °C 60-120 seconds
Ramp-up Rate ( $T_L$ to $T_p$ )	3 °C/second max.
Liquidous temperature ( $T_L$ ) Time ( $t_L$ ) maintained above $T_L$	217 °C 60-150 seconds
Peak package body temperature ( $T_p$ )	260 °C
Time ( $t_p$ ) at $T_c - 5 °C$ ( $T_p$ should be equal to or less than $T_c$ )	30 seconds*
Ramp-Down Rate ( $T_p$ to $T_L$ )	6 °C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

\*Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum

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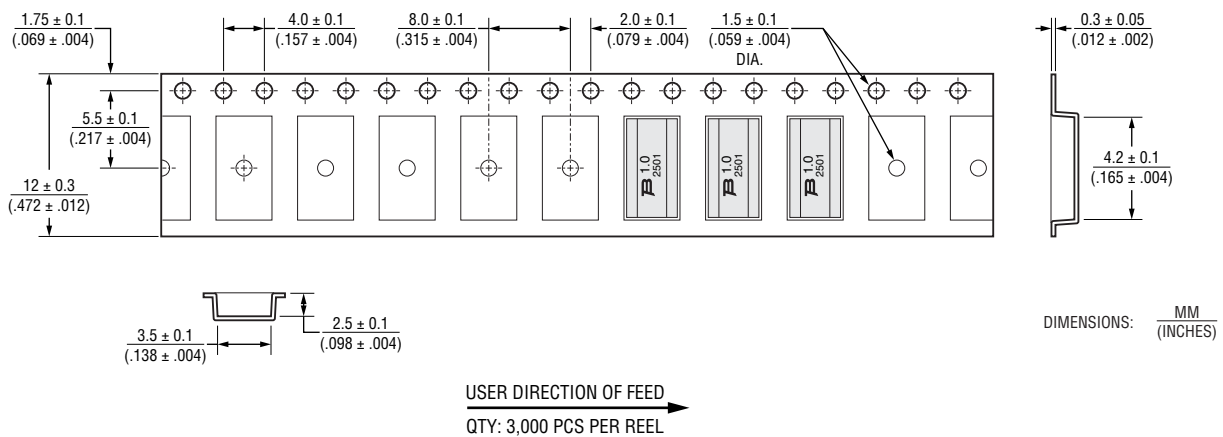
### Packaging Specifications

Components packaged on plastic tape & reel per DIN EN 60286-3.

Standard Reel Size: 13 inches

Tape Width: 12 mm

Quantity: 3,000 pcs. per reel



**BOURNS®**

**Americas:** Tel: +1 951-781-5500 • Email: [americus@bourns.com](mailto:americus@bourns.com)

**Mexico:** Tel: +52-614-478-0400 • Email: [mexicus@bourns.com](mailto:mexicus@bourns.com)

**Asia:** Tel: +886-2-2562-4117 • Email: [asiacus@bourns.com](mailto:asiacus@bourns.com)

**EMEA:** Tel: +36 88 885 877 • Email: [eurocus@bourns.com](mailto:eurocus@bourns.com)

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