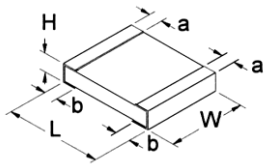
## Features:

- Metal element current sensing resistor
- High power current sense resistor
- TCR of ±50 ppm/°C
- Resistances down to 0.0005 (1/2mΩ)
- Current handling up to 63 amps
- Non-standard resistance values available
- RoHS compliant, lead free and halogen free
- REACH compliant


## Electrical Specifications

| Type / Code | Power Rating (W) | Dielectric Withstanding Voltage (V) | TCR (ppm/ºC) | Ohmic Range (Ω) and Tolerance 1%, 5% |
|---|---|---|---|---|
| CSNL1206 | 1 @ 80ºC | 200 | ± 50 | 0.001 - 0.05 |
| CSNL2010 | 1.5 @ 80ºC | | | 0.0005 - 0.1 |
| CSNL2512 | 2 @ 70ºC | | | 0.0005 - 0.01 |

## Mechanical Specifications

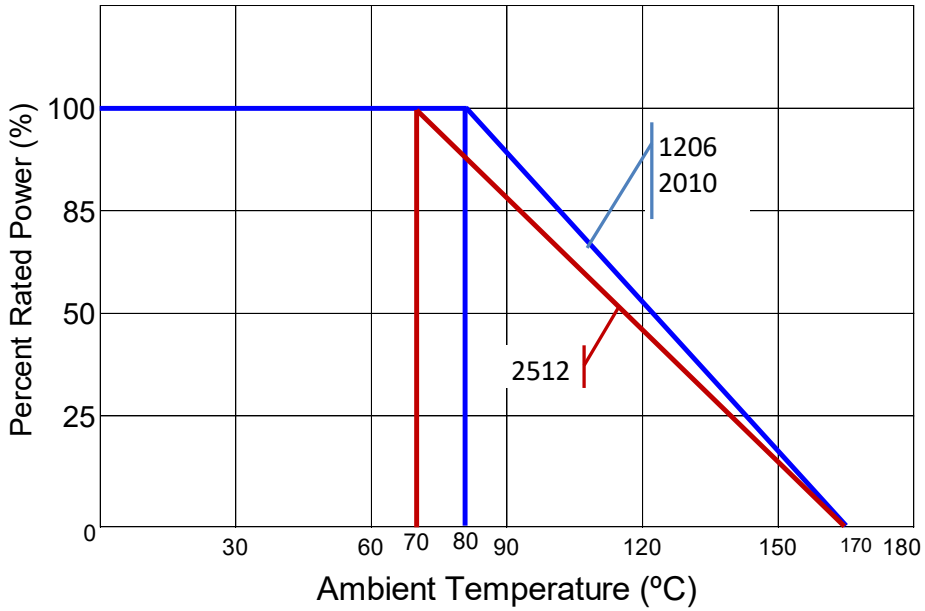



| Type / Code | Resistance Range (Ω) | H Body Height | a Top Termination | b Bottom Termination | L Body Length | W Body Width | Unit |
|---|---|---|---|---|---|---|---|
| CSNL1206 | 0.001 - 0.05 | 0.025 ± 0.010<br>0.65 ± 0.25 | 0.020 ± 0.010<br>0.51 ± 0.25 | 0.020 ± 0.010<br>0.51 ± 0.25 | 0.126 ± 0.010<br>3.20 ± 0.25 | 0.063 ± 0.010<br>1.60 ± 0.25 | inches<br>mm |
| CSNL2010 | ≤ 0.003 | 0.031 ± 0.010<br>0.79 ± 0.25 | 0.051 ± 0.010<br>1.30 ± 0.25 | 0.051 ± 0.010<br>1.30 ± 0.25 | 0.200 ± 0.010<br>5.08 ± 0.25 | 0.100 ± 0.010<br>2.54 ± 0.25 | inches<br>mm |
| | ≥ 0.0031 | 0.025 ± 0.010<br>0.65 ± 0.25 | 0.031 ± 0.010<br>0.79 ± 0.25 | 0.031 ± 0.010<br>0.79 ± 0.25 | 0.200 ± 0.010<br>5.08 ± 0.25 | 0.100 ± 0.010<br>2.54 ± 0.25 | inches<br>mm |
| CSNL2512 | 0.0005 | 0.049 ± 0.008<br>1.25 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.00075 | 0.030 ± 0.008<br>0.75 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.001 | 0.026 ± 0.008<br>0.65 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.0015 | 0.018 ± 0.008<br>0.45 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.002 | 0.014 ± 0.008<br>0.35 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.0025 | 0.026 ± 0.008<br>0.65 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.003 | 0.022 ± 0.008<br>0.55 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.004 | 0.018 ± 0.008<br>0.45 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.005 | 0.014 ± 0.008<br>0.35 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.006 | 0.013 ± 0.008<br>0.32 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.0065 | 0.012 ± 0.008<br>0.30 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.007 | 0.011 ± 0.008<br>0.27 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |
| | 0.01 | 0.010 ± 0.008<br>0.25 ± 0.20 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.051 ± 0.015<br>1.30 ± 0.38 | 0.250 ± 0.010<br>6.35 ± 0.25 | 0.125 ± 0.010<br>3.18 ± 0.25 | inches<br>mm |

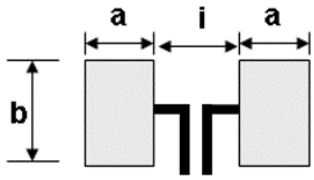
| Performance Characteristics | | | |
|---|---|---|---|
| Test | Test Method | Test Specification | Typical |
| Load Life | MIL-STD-502F-Method 108A<br>RCWV at 70°C; 1.5 hour ON; 0.5 hour OFF<br>Total 1024 ± 24 hours | ± 1% | ≤ 0.5% |
| Resistance to Soldering Heat | MIL-STD-202F-Method 210E<br>260 ± 5°C for 10 ± 1 seconds | ± 0.5% | ≤ 0.25% |
| Solderability | MIL-STD-202F-Method 208H<br>245 ± 5°C for 2 ± 0.5 seconds | minimum 95% coverage | > 95% |
| Thermal Shock | MIL-STD-202F-Method 107G<br>-55°C to 150°C, 100 cycles | ± 0.5% | ≤ 0.5% |
| Short Time Overload | JIS-C-5202-5.5<br>5x rated power for 5 seconds | ± 0.5% | ≤ 0.5% |
| Temperature Cycling | JIS-C-5202-7.4<br>-55°C: 30 minutes 25°C: 2 to 3 minutes<br>155°C: 30 minutes 25°C: 2 to 3 minutes | ± 0.5% | ≤ 0.5% |
| Moisture Resistance | MIL- STD-202F-Method 106G | ± 0.5% | ≤ 0.5% |
| Insulation Resistance | MIL-STD-202F-Method 302<br>Apply 100 Vdc for 1 minute | 1M Ω minimum | ≥ 1M Ω |
| Leach Resistance | - | 90 seconds minimum | ≥ 90 seconds |

Operating temperature range is -55°C to +170°C

Power Derating Curve:



## Recommended Pad Layout




| Type / Code | Resistance Range (Ω) | a | b | i | Unit |
|---|---|---|---|---|---|
| CSNL1206 | 0.001 - 0.05 | 0.063<br>1.60 | 0.086<br>2.18 | 0.039<br>1.00 | inches<br>mm |
| CSNL2010 | ≤ 0.003 | 0.114<br>2.89 | 0.115<br>2.92 | 0.048<br>1.22 | inches<br>mm |
| | ≥ 0.0031 | 0.090<br>2.29 | 0.115<br>2.92 | 0.095<br>2.41 | inches<br>mm |
| CSNL2512 | 0.0005 | 0.123<br>3.13 | 0.134<br>3.40 | 0.020<br>0.52 | inches<br>mm |
| | 0.00075 | 0.115<br>2.93 | 0.134<br>3.40 | 0.037<br>0.94 | inches<br>mm |
| | 0.001 | 0.094<br>2.38 | 0.134<br>3.40 | 0.080<br>2.04 | inches<br>mm |
| | 0.0015 | 0.074<br>1.88 | 0.134<br>3.40 | 0.120<br>3.04 | inches<br>mm |
| | 0.002 - 0.0035 | 0.064<br>1.63 | 0.134<br>3.40 | 0.139<br>3.54 | inches<br>mm |
| | 0.004 - 0.0045 | 0.104<br>2.63 | 0.134<br>3.40 | 0.061<br>1.54 | inches<br>mm |
| | 0.005 - 0.006 | 0.094<br>2.38 | 0.134<br>3.40 | 0.080<br>2.04 | inches<br>mm |
| | 0.0065 - 0.007 | 0.074<br>1.88 | 0.134<br>3.40 | 0.120<br>3.04 | inches<br>mm |
| | 0.008 - 0.01 | 0.064<br>1.63 | 0.134<br>3.40 | 0.139<br>3.54 | inches<br>mm |

## Recommended Solder Profile

This information is intended as a reference for solder profiles for Stackpole resistive components. These profiles should be compatible with most soldering processes. These are only recommendations. Actual numbers will depend on board density, geometry, packages used, etc., especially those cells labeled with "*".

## 100% Matte Tin / RoHS Compliant Terminations

Soldering iron recommended temperatures: 330°C to 350°C with minimum duration.
Maximum number of reflow cycles: 3.

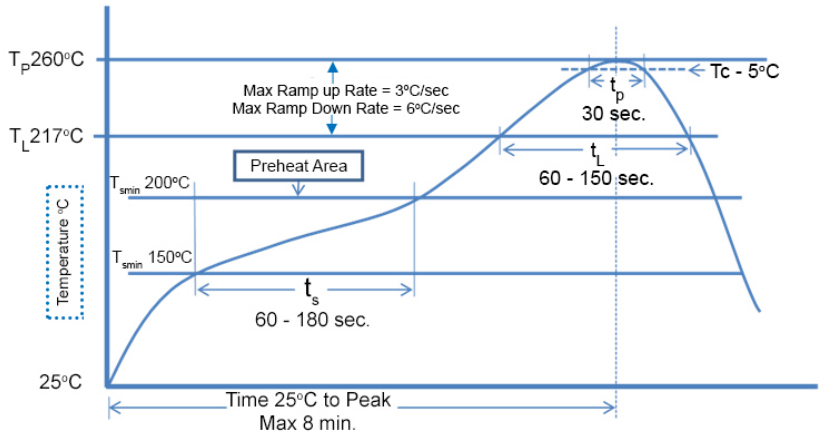
### Wave Soldering

| Description | Maximum | Recommended | Minimum |
|---|---|---|---|
| Preheat Time | 80 seconds | 70 seconds | 60 seconds |
| Temperature Diff. | 140°C | 120°C | 100°C |
| Solder Temp. | 260°C | 250°C | 240°C |
| Dwell Time at Max. | 10 seconds | 5 seconds | * |
| Ramp DN (°C/sec) | N/A | N/A | N/A |

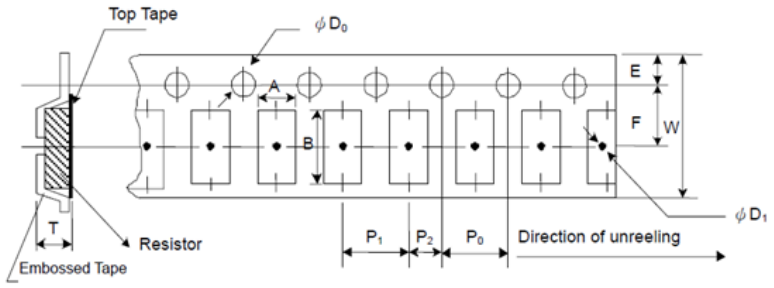
Temperature Diff. = Defference between final preheat stage and soldering stage.

| Convection IR Reflow | | | |
|---|---|---|---|
| Description | Maximum | Recommended | Minimum |
| Ramp Up (°C/sec) | 3°C/sec | 2°C/sec | * |
| Dwell Time > 217°C | 150 seconds | 90 seconds | 60 seconds |
| Solder Temp. | 260°C | 245°C | * |
| Dwell Time at Max. | 30 seconds | 15 seconds | 10 seconds |
| Ramp DN (°C/sec) | 6°C/sec | 3°C/sec | * |

## Recommended Lead Free Resistor Reflow Profile




## Taping Specifications – Embossed Plastic Tape




| Type / Code | Ohmic Value (Ω) | Quantity | A | B | W | F | E | P0 | Unit |
|---|---|---|---|---|---|---|---|---|---|
| CSNL1206 | 0.001 - 0.05 | 4000 | 0.072 ± 0.004<br>1.83 ± 0.10 | 0.137 ± 0.004<br>3.48 ± 0.10 | 0.315 ± 0.006<br>8.00 ± 0.15 | 0.138 ± 0.004<br>3.50 ± 0.10 | 0.069 ± 0.004<br>1.75 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | inches<br>mm |
| CSNL2010 | 0.0005 - 0.01 | 2000 | 0.114 ± 0.004<br>2.90 ± 0.10 | 0.215 ± 0.004<br>5.45 ± 0.10 | 0.472 ± 0.006<br>12.00 ± 0.15 | 0.217 ± 0.004<br>5.50 ± 0.10 | 0.069 ± 0.004<br>1.75 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | inches<br>mm |
| CSNL2512 | 0.0005 - 0.00075 | 2000 | 0.134 ± 0.004<br>3.40 ± 0.10 | 0.266 ± 0.004<br>6.75 ± 0.10 | 0.472 ± 0.004<br>12.00 ± 0.10 | 0.217 ± 0.002<br>5.50 ± 0.05 | 0.069 ± 0.004<br>1.75 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | inches<br>mm |
| CSNL2512 | 0.001 - 0.01 | 2000 | 0.134 ± 0.004<br>3.40 ± 0.10 | 0.266 ± 0.004<br>6.75 ± 0.10 | 0.472 ± 0.004<br>12.00 ± 0.10 | 0.217 ± 0.002<br>5.50 ± 0.05 | 0.069 ± 0.004<br>1.75 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | inches<br>mm |

| Taping Specifications – Embossed Plastic Tape (cont.) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Type / Code | Ohmic Value (Ω) | Quantity | T | P1 | P2 | ØD0 | ØD1 | Unit |
| CSNL1206 | 0.001 - 0.05 | 4000 | 0.043 ± 0.004<br>1.10 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.004<br>2.00 ± 0.10 | 0.059 ± 0.004<br>1.50 ± 0.10 | - | inches<br>mm |
| CSNL2010 | 0.0005 - 0.01 | 2000 | 0.052 ± 0.004<br>1.33 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.004<br>2.00 ± 0.10 | 0.059 ± 0.004<br>1.50 ± 0.10 | - | inches<br>mm |
| CSNL2512 | 0.0005 - 0.00075 | 2000 | 0.057 ± 0.008<br>1.45 ± 0.20 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.061 ± 0.002<br>1.55 ± 0.05 | 0.055 min.<br>1.40 min. | inches<br>mm |
| CSNL2512 | 0.001 - 0.01 | 2000 | 0.032 ± 0.004<br>0.81 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.061 ± 0.002<br>1.55 ± 0.05 | 0.055 min.<br>1.40 min. | inches<br>mm |

## RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

| RoHS Compliance Status | | | | | | |
|---|---|---|---|---|---|---|
| Standard Product Series | Description | Package / Termination Type | Standard Series RoHS Compliant | Lead-Free Termination Composition | Lead-Free Mfg. Effective Date (Std Product Series) | Lead-Free Effective Date Code (YY/WW) |
| CSNL | Metal Plate Current Sensing Surface Mount Chip Resistor | SMD | YES | 100% Matte Sn over Ni | May-04 | 04/18 |

## "Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

## Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

## Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

## How to Order

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | S | N | L | 1 | 2 | 0 | 6 | F | T | 1 | 0 | L | 0 |

| Product Series | |
|---|---|
| Code | Description |
| CSNL | Metal Plate |

| Size | |
|---|---|
| Code | W |
| 1206 | 1 |
| 2010 | 1.5 |
| 2512 | 2 |

| Tolerance | |
|---|---|
| Code | Tol |
| F | 1% |
| J | 5% |

| Packaging | | | |
|---|---|---|---|
| Code | Description | Size | Quantity |
| T | 7" Reel - Plastic Tape | 1206 | 4000 |
| | | 2010, 2512 | 2000 |

| Resistance Value |
|---|
| Four characters with the multiplier used as the decimal holder. "L" used as multiplier of $10^{-3}$ for any value under 0.1 ohm. |
| 0.0005 ohm = L500<br>0.001 ohm = 1L00<br>0.01 ohm = 10L0<br>0.1 ohm = R100 |