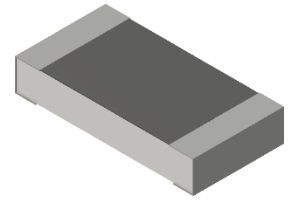


**Features:**

- 0201 to 1225 sizes available
- Power ratings to 3 W
- Available in E24 and other common values
- E96 and other values may be available upon request
- RoHS compliant, REACH compliant, lead free and halogen free



| Electrical Specifications |                            |                      |                               |
|---------------------------|----------------------------|----------------------|-------------------------------|
| Type/Code                 | Power Rating (W)<br>@ 70°C | TCR (ppm/°C)         | Ohmic Range (Ω) and Tolerance |
|                           |                            |                      | 1%, 2%, 5%                    |
| CSR0201                   | 0.05                       | ± 1000               | 0.1 - 0.13                    |
|                           |                            | ± 600                | 0.15 - 0.5                    |
|                           |                            | ± 300                | 0.51 - 1                      |
| CSR0402                   | 0.125                      | ± 200 <sup>(1)</sup> | 0.05 - 1                      |
| CSR0603                   | 0.125                      | ± 300 <sup>(3)</sup> | 0.02 - 0.3                    |
|                           |                            | ± 200 <sup>(2)</sup> | 0.33 - 1                      |
| CSR0603-HP                | 0.2                        | ± 400                | 0.051 - 0.1                   |
|                           |                            | ± 300                | 0.11 - 0.5                    |
|                           |                            | ± 200                | 0.51 - 1                      |
| CSR0805                   | 0.25                       | ± 200 <sup>(3)</sup> | 0.02 - 1                      |
| CSR0805-HP                | 0.5                        | ± 400                | 0.051 - 0.1                   |
|                           |                            | ± 300                | 0.102 - 0.5                   |
|                           |                            | ± 200                | 0.51 - 1                      |
| CSR1206                   | 0.5                        | ± 100 <sup>(2)</sup> | 0.01 - 1                      |
| CSR1210                   | 0.5                        | ± 600                | 0.01 - 0.02                   |
|                           |                            | ± 400                | 0.022 - 0.051                 |
|                           |                            | ± 300                | 0.056 - 0.091                 |
|                           |                            | ± 200                | 0.1 - 1                       |
| CSR1210-HP                | 0.75                       | ± 600                | 0.01 - 0.02                   |
|                           |                            | ± 400                | 0.022 - 0.05                  |
|                           |                            | ± 300                | 0.051 - 0.091                 |
|                           |                            | ± 200                | 0.1 - 1                       |
| CSR2010                   | 1                          | ± 200 <sup>(3)</sup> | 0.01 - 1                      |
| CSRN2010                  | 1                          | ± 200                | 0.01 - 1                      |
| CSR2512                   | 2                          | ± 200 <sup>(3)</sup> | 0.01 - 1                      |
| CSRN2512 <sup>(*)</sup>   | 2                          | ± 200                | 0.01 - 1                      |
| CSR1225                   | 3                          | ± 300                | 0.003 - 0.004                 |
|                           |                            | ± 200                | 0.005 - 0.02                  |
|                           |                            | ± 150                | 0.022 - 0.03                  |
|                           |                            | ± 100                | 0.033 - 7.5                   |

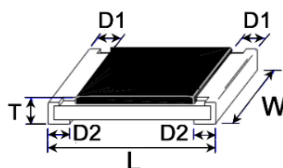
\* AEC-Q200 Compliant

(1) Contact Stackpole for TCR below 500mΩ

(2) Contact Stackpole for TCR below 150mΩ

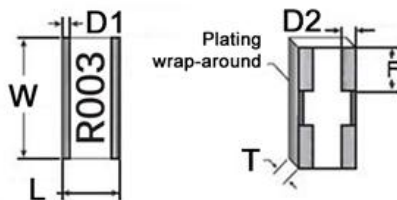
(3) Contact Stackpole for TCR below 100mΩ

### Mechanical Specifications



| Type/Code             | Typical Unit Weight (mg) | L<br>Body Length             | W<br>Body Width              | T<br>Body Height             | D1<br>Top Termination        | D2<br>Bottom Termination     | Unit         |
|-----------------------|--------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|--------------|
| CSR0201               | 0.18                     | 0.024 ± 0.001<br>0.60 ± 0.03 | 0.012 ± 0.001<br>0.30 ± 0.03 | 0.009 ± 0.002<br>0.23 ± 0.05 | 0.005 ± 0.002<br>0.12 ± 0.05 | 0.006 ± 0.002<br>0.15 ± 0.05 | inches<br>mm |
| CSR0402               | 0.7                      | 0.039 ± 0.002<br>1.00 ± 0.05 | 0.020 ± 0.002<br>0.50 ± 0.05 | 0.013 ± 0.004<br>0.32 ± 0.10 | 0.010 ± 0.004<br>0.25 ± 0.10 | 0.010 ± 0.004<br>0.25 ± 0.10 | inches<br>mm |
| CSR0603               | 2.0                      | 0.063 ± 0.004<br>1.60 ± 0.10 | 0.031 ± 0.004<br>0.80 ± 0.10 | 0.018 ± 0.004<br>0.45 ± 0.10 | 0.012 ± 0.008<br>0.30 ± 0.20 | 0.012 ± 0.008<br>0.30 ± 0.20 | inches<br>mm |
| CSR0805<br>CSR0805-HP | 4.6                      | 0.079 ± 0.006<br>2.00 ± 0.15 | 0.049 ± 0.006<br>1.25 ± 0.15 | 0.022 ± 0.004<br>0.55 ± 0.10 | 0.012 ± 0.008<br>0.30 ± 0.20 | 0.016 ± 0.010<br>0.40 ± 0.25 | inches<br>mm |
| CSR1206               | 8.7                      | 0.120 ± 0.006<br>3.05 ± 0.15 | 0.061 ± 0.006<br>1.55 ± 0.15 | 0.022 ± 0.004<br>0.55 ± 0.10 | 0.020 ± 0.012<br>0.50 ± 0.30 | 0.016 ± 0.010<br>0.40 ± 0.25 | inches<br>mm |
| CSR1210               | 16.0                     | 0.122 ± 0.004<br>3.10 ± 0.10 | 0.102 ± 0.006<br>2.60 ± 0.15 | 0.022 ± 0.004<br>0.55 ± 0.10 | 0.020 ± 0.012<br>0.50 ± 0.30 | 0.020 ± 0.010<br>0.50 ± 0.25 | inches<br>mm |
| CSR2010               | 27.0                     | 0.197 ± 0.008<br>5.00 ± 0.20 | 0.096 ± 0.006<br>2.45 ± 0.15 | 0.024 ± 0.006<br>0.60 ± 0.15 | 0.024 ± 0.012<br>0.60 ± 0.30 | 0.067 ± 0.010<br>1.70 ± 0.25 | inches<br>mm |
| CSRN2010              | 23.7                     | 0.197 ± 0.004<br>5.00 ± 0.10 | 0.098 ± 0.006<br>2.50 ± 0.15 | 0.024 ± 0.006<br>0.60 ± 0.15 | 0.024 ± 0.012<br>0.60 ± 0.30 | 0.020 ± 0.010<br>0.50 ± 0.25 | inches<br>mm |
| CSR2512               | 53.6                     | 0.250 ± 0.004<br>6.35 ± 0.10 | 0.122 ± 0.006<br>3.10 ± 0.15 | 0.024 ± 0.004<br>0.60 ± 0.10 | 0.024 ± 0.012<br>0.60 ± 0.30 | 0.083 ± 0.004<br>2.10 ± 0.10 | inches<br>mm |
| CSRN2512              | 40.0                     | 0.250 ± 0.004<br>6.35 ± 0.10 | 0.122 ± 0.006<br>3.10 ± 0.15 | 0.024 ± 0.004<br>0.60 ± 0.10 | 0.024 ± 0.012<br>0.60 ± 0.30 | 0.022 ± 0.010<br>0.55 ± 0.25 | inches<br>mm |

### Mechanical Specifications - Four Terminals



| Type/Code | Typical Unit Weight (mg) | L                            | W                            | T                            | D1                           | D2                           | F                            | Unit         |
|-----------|--------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|--------------|
| CSR1225   | 64.9                     | 0.126 ± 0.006<br>3.20 ± 0.15 | 0.254 ± 0.006<br>6.45 ± 0.15 | 0.035 ± 0.006<br>0.90 ± 0.15 | 0.024 ± 0.012<br>0.60 ± 0.30 | 0.031 ± 0.010<br>0.80 ± 0.25 | 0.090 ± 0.005<br>2.29 ± 0.13 | inches<br>mm |

### Performance Characteristics

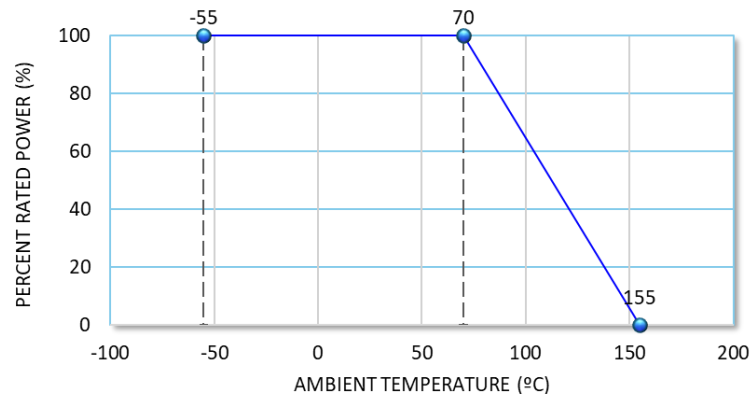
| Test                                        | Test Method                               | Test Specification                                                       | Typical | Test Condition                                                                                                                                       |
|---------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature Coefficient of Resistance (TCR) | JIS-C-5201-1 4.8<br>IEC-60115-1 4.8       | As per specification                                                     | Pass    | At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature.                                                                                    |
| Short Time Overload                         | JIS-C-5201-1 4.13<br>IEC 60115-1 4.13     | $\pm(1\% + 0.05\Omega)$                                                  | Pass    | RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds                                                                                   |
| Insulation Resistance                       | JIS-C-5201-1 4.6<br>IEC-60115-1 4.6       | $\geq 10G$                                                               | Pass    | Max. Overload voltage for 1 minute                                                                                                                   |
| Endurance                                   | JIS-C-5201-1 4.25<br>IEC-60115-1 4.25.1   | 0201~0603 $\pm(1\% + 0.05\Omega)$<br>0805~2512 $\pm(2\% + 0.05\Omega)$   | Pass    | 70 $\pm$ 2°C, RCWV for 1000 hours with 1.5 hours "ON" and 0.5 hour "OFF"                                                                             |
| Damp Heat with Load                         | JIS-C-5201-1 4.24<br>IEC-60115-1 4.24     | 0201~0603 $\pm(0.5\% + 0.05\Omega)$<br>0805~2512 $\pm(1\% + 0.05\Omega)$ | Pass    | 40 $\pm$ 2°C, 90~95% R.H., RCWV for 1000 hours with 1.5 hours "ON" and 0.5 hour "OFF"                                                                |
| Dry Heat                                    | JIS-C-5201-1 4.23<br>IEC-60115-1 4.23.2   | 0201~0603 $\pm(0.5\% + 0.05\Omega)$<br>0805~2512 $\pm(2\% + 0.05\Omega)$ | Pass    | at 155°C for 1000 hours                                                                                                                              |
| Bending Strength                            | JIS-C-5201-1 4.33<br>IEC-60115-1 4.33     | $\pm(1\% + 0.05\Omega)$                                                  | Pass    | Bending once for 60 seconds with 3 mm Sizes 2010 and 2512: 2 mm                                                                                      |
| Solderability                               | JIS-C-5201-1 4.17<br>IEC-60115-1 4.17     | 95% min. coverage                                                        | Pass    | 245 $\pm$ 5°C for 3 seconds                                                                                                                          |
| Resistance to Soldering Heat                | JIS-C-5201-1 4.18<br>IEC-60115-1 4.18     | $\pm(0.5\% + 0.05\Omega)$                                                | Pass    | 260 $\pm$ 5°C for 10 seconds                                                                                                                         |
| Voltage Proof                               | JIS-C-5201-1 4.7<br>IEC-60115-1 4.7       | No breakdown or flashover                                                | Pass    | 1.42 times Max. Operating Voltage for 1 minute.<br>0201: 50 V; 0402: 100 V; 0603: 150 V;<br>0805: 300 V<br>1206/1210/2010/1225: 400 V<br>2512: 500 V |
| Leaching                                    | JIS-C-5201-1 4.18<br>IEC-60068-2-58 8.2.1 | Individual leaching area $\leq 5\%$<br>Total leaching area $\leq 10\%$   | Pass    | 260 $\pm$ 5°C for 30 seconds                                                                                                                         |
| Rapid Change of Temperature                 | JIS-C-5201-1 4.19<br>IEC-60115-1 4.19     | $\pm(0.5\% + 0.05\Omega)$                                                | Pass    | -55°C (30 minutes)/+125°C (30 minutes, 5 cycles)                                                                                                     |

Operating temperature range is -55 to +155°C

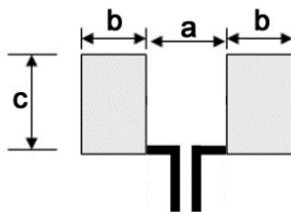
RCWV (Rated Continuous Working Voltage) =  $\sqrt{P \cdot R}$  or Max. Operating Voltage whichever is lower.

Recommended storage temperature is 15 to 28°C. Humidity < 80% R.H.

### Power Derating Curve:



### Recommended Pad Layout



| Type/Code | a             | b             | c                            | Unit         |
|-----------|---------------|---------------|------------------------------|--------------|
| CSR0201   | 0.010<br>0.25 | 0.012<br>0.30 | 0.016 ± 0.008<br>0.40 ± 0.20 | inches<br>mm |
| CSR0402   | 0.020<br>0.50 | 0.020<br>0.50 | 0.024 ± 0.008<br>0.60 ± 0.20 | inches<br>mm |
| CSR0603   | 0.031<br>0.80 | 0.039<br>1.00 | 0.035 ± 0.008<br>0.90 ± 0.20 | inches<br>mm |
| CSR0805   | 0.039<br>1.00 | 0.039<br>1.00 | 0.053 ± 0.008<br>1.35 ± 0.20 | inches<br>mm |
| CSR1206   | 0.079<br>2.00 | 0.045<br>1.15 | 0.067 ± 0.008<br>1.70 ± 0.20 | inches<br>mm |
| CSR1210   | 0.079<br>2.00 | 0.045<br>1.15 | 0.098 ± 0.008<br>2.50 ± 0.20 | inches<br>mm |
| CSR2010   | 0.055<br>1.40 | 0.094<br>2.40 | 0.110 ± 0.008<br>2.80 ± 0.20 | inches<br>mm |
| CSRN2010  | 0.142<br>3.60 | 0.055<br>1.40 | 0.098 ± 0.008<br>2.50 ± 0.20 | inches<br>mm |
| CSR2512   | 0.039<br>1.00 | 0.140<br>3.55 | 0.126 ± 0.008<br>3.20 ± 0.20 | inches<br>mm |
| CSRN2512  | 0.193<br>4.90 | 0.063<br>1.60 | 0.126 ± 0.008<br>3.20 ± 0.20 | inches<br>mm |
| CSR1225   | 0.047<br>1.20 | 0.079<br>2.00 | 0.276 ± 0.008<br>7.00 ± 0.20 | 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 to 350°C with minimum duration.

Maximum number of reflow cycles: 3.

### Wave Soldering

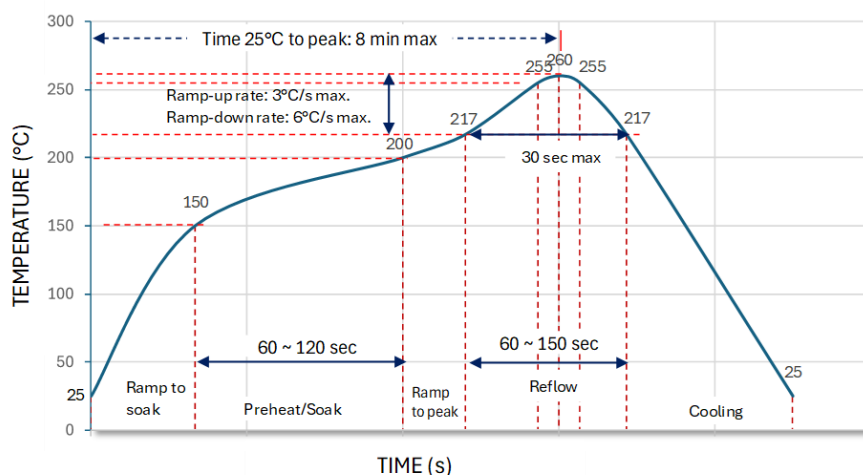
| Description        | Maximum    | Recommended | Minimum    |
|--------------------|------------|-------------|------------|
| Preheat Time       | 80 seconds | 70 seconds  | 60 seconds |
| Temperature Diff.  | 140°C      | 120°C       | 100°C      |
| Solder Temp.       | 260°C      | 250°C       |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

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

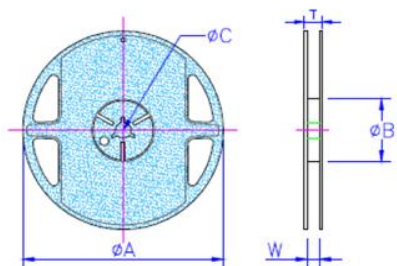
### Convection IR Reflow

| 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 Reflow Profile

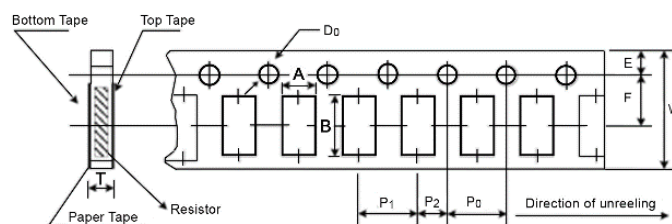


## Reel Specifications



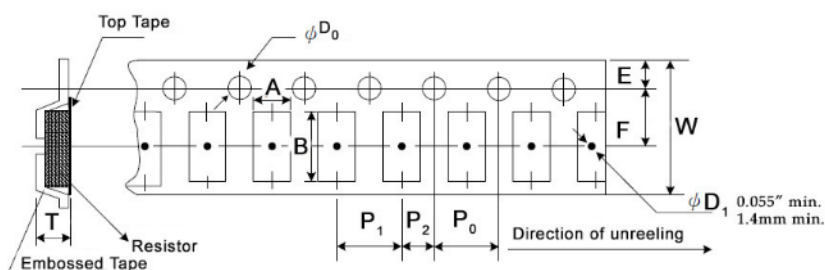
| Type/Code | A                              | B                             | C                             | W                             | T                             | Unit         |
|-----------|--------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------|
| 0201      | 7.008 ± 0.039<br>178.00 ± 1.00 | 2.362 ± 0.039<br>60.00 ± 1.00 | 0.531 ± 0.028<br>13.50 ± 0.70 | 0.374 ± 0.004<br>9.50 ± 0.10  | 0.453 ± 0.039<br>11.50 ± 1.00 | inches<br>mm |
| 0402      | 7.008 ± 0.039<br>178.00 ± 1.00 | 2.362 ± 0.039<br>60.00 ± 1.00 | 0.531 ± 0.028<br>13.50 ± 0.70 | 0.374 ± 0.004<br>9.50 ± 0.10  | 0.453 ± 0.039<br>11.50 ± 1.00 | inches<br>mm |
| 0603      | 7.008 ± 0.039<br>178.00 ± 1.00 | 2.362 ± 0.039<br>60.00 ± 1.00 | 0.531 ± 0.028<br>13.50 ± 0.70 | 0.374 ± 0.004<br>9.50 ± 0.10  | 0.453 ± 0.039<br>11.50 ± 1.00 | inches<br>mm |
| 0805      | 7.008 ± 0.039<br>178.00 ± 1.00 | 2.362 ± 0.039<br>60.00 ± 1.00 | 0.531 ± 0.028<br>13.50 ± 0.70 | 0.374 ± 0.004<br>9.50 ± 0.10  | 0.453 ± 0.039<br>11.50 ± 1.00 | inches<br>mm |
| 1206      | 7.008 ± 0.039<br>178.00 ± 1.00 | 2.362 ± 0.039<br>60.00 ± 1.00 | 0.531 ± 0.028<br>13.50 ± 0.70 | 0.374 ± 0.004<br>9.50 ± 0.10  | 0.453 ± 0.039<br>11.50 ± 1.00 | inches<br>mm |
| 1210      | 7.008 ± 0.039<br>178.00 ± 1.00 | 2.362 ± 0.039<br>60.00 ± 1.00 | 0.531 ± 0.028<br>13.50 ± 0.70 | 0.374 ± 0.004<br>9.50 ± 0.10  | 0.453 ± 0.039<br>11.50 ± 1.00 | inches<br>mm |
| 2010      | 7.008 ± 0.039<br>178.00 ± 1.00 | 2.362 ± 0.039<br>60.00 ± 1.00 | 0.531 ± 0.028<br>13.50 ± 0.70 | 0.531 ± 0.039<br>13.50 ± 1.00 | 0.610 ± 0.039<br>15.50 ± 1.00 | inches<br>mm |
| 2512      | 7.008 ± 0.039<br>178.00 ± 1.00 | 2.362 ± 0.039<br>60.00 ± 1.00 | 0.531 ± 0.028<br>13.50 ± 0.70 | 0.531 ± 0.039<br>13.50 ± 1.00 | 0.610 ± 0.039<br>15.50 ± 1.00 | inches<br>mm |
| 1225      | 7.008 ± 0.039<br>178.00 ± 1.00 | 2.362 ± 0.039<br>60.00 ± 1.00 | 0.531 ± 0.028<br>13.50 ± 0.70 | 0.531 ± 0.039<br>13.50 ± 1.00 | 0.610 ± 0.039<br>15.50 ± 1.00 | inches<br>mm |

### Packaging Specifications - Paper Tape



| Size | A                            | B                            | W                            | E                                | F                            | Unit         |
|------|------------------------------|------------------------------|------------------------------|----------------------------------|------------------------------|--------------|
| 0201 | 0.015 ± 0.002<br>0.38 ± 0.05 | 0.027 ± 0.002<br>0.68 ± 0.05 | 0.315 ± 0.004<br>8.00 ± 0.10 | 0.069 ± 0.002<br>1.75 ± 0.05     | 0.138 ± 0.002<br>3.50 ± 0.05 | inches<br>mm |
| 0402 | 0.026 ± 0.004<br>0.65 ± 0.10 | 0.045 ± 0.004<br>1.15 ± 0.10 | 0.315 ± 0.008<br>8.00 ± 0.20 | 0.069 ± 0.004<br>1.75 ± 0.10     | 0.138 ± 0.002<br>3.50 ± 0.05 | inches<br>mm |
| 0603 | 0.043 ± 0.004<br>1.10 ± 0.10 | 0.075 ± 0.004<br>1.90 ± 0.10 | 0.315 ± 0.008<br>8.00 ± 0.20 | 0.069 ± 0.004<br>1.75 ± 0.10     | 0.138 ± 0.002<br>3.50 ± 0.05 | inches<br>mm |
| 0805 | 0.063 ± 0.004<br>1.60 ± 0.10 | 0.094 ± 0.008<br>2.40 ± 0.20 | 0.315 ± 0.008<br>8.00 ± 0.20 | 0.069 ± 0.004<br>1.75 ± 0.10     | 0.138 ± 0.002<br>3.50 ± 0.05 | inches<br>mm |
| 1206 | 0.075 ± 0.004<br>1.90 ± 0.10 | 0.138 ± 0.008<br>3.50 ± 0.20 | 0.315 ± 0.008<br>8.00 ± 0.20 | 0.069 ± 0.004<br>1.75 ± 0.10     | 0.138 ± 0.002<br>3.50 ± 0.05 | inches<br>mm |
| 1210 | 0.114 ± 0.004<br>2.90 ± 0.10 | 0.138 ± 0.008<br>3.50 ± 0.20 | 0.315 ± 0.008<br>8.00 ± 0.20 | 0.069 ± 0.004<br>1.75 ± 0.10     | 0.138 ± 0.002<br>3.50 ± 0.05 | inches<br>mm |
| Size | P0                           | P1                           | P2                           | D0                               | T                            | Unit         |
| 0201 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.079 ± 0.004<br>2.00 ± 0.10 | 0.059 +0.004/-0<br>1.50 +0.10/-0 | 0.017 ± 0.008<br>0.42 ± 0.20 | inches<br>mm |
| 0402 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.059 +0.004/-0<br>1.50 +0.10/-0 | 0.018 ± 0.004<br>0.45 ± 0.10 | inches<br>mm |
| 0603 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.157 ± 0.002<br>4.00 ± 0.05 | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.059 +0.004/-0<br>1.50 +0.10/-0 | 0.028 ± 0.004<br>0.70 ± 0.10 | inches<br>mm |
| 0805 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.157 ± 0.002<br>4.00 ± 0.05 | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.059 +0.004/-0<br>1.50 +0.10/-0 | 0.033 ± 0.004<br>0.85 ± 0.10 | inches<br>mm |
| 1206 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.157 ± 0.002<br>4.00 ± 0.05 | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.059 +0.004/-0<br>1.50 +0.10/-0 | 0.033 ± 0.004<br>0.85 ± 0.10 | inches<br>mm |
| 1210 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.157 ± 0.002<br>4.00 ± 0.05 | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.059 +0.004/-0<br>1.50 +0.10/-0 | 0.033 ± 0.004<br>0.85 ± 0.10 | inches<br>mm |

## Packaging Specifications - Plastic Tape



| Size | A                            | B                            | W                             | E                                 | F                            | Unit         |
|------|------------------------------|------------------------------|-------------------------------|-----------------------------------|------------------------------|--------------|
| 2010 | 0.110 ± 0.004<br>2.80 ± 0.10 | 0.217 ± 0.004<br>5.50 ± 0.10 | 0.472 ± 0.012<br>12.00 ± 0.30 | 0.069 ± 0.004<br>1.75 ± 0.10      | 0.217 ± 0.002<br>5.50 ± 0.05 | inches<br>mm |
| 2512 | 0.133 ± 0.004<br>3.38 ± 0.10 | 0.263 ± 0.004<br>6.68 ± 0.10 | 0.472 ± 0.012<br>12.00 ± 0.30 | 0.069 ± 0.004<br>1.75 ± 0.10      | 0.217 ± 0.004<br>5.50 ± 0.10 | inches<br>mm |
| 1225 | 0.133 ± 0.004<br>3.38 ± 0.10 | 0.263 ± 0.004<br>6.68 ± 0.10 | 0.472 ± 0.012<br>12.00 ± 0.30 | 0.069 ± 0.004<br>1.75 ± 0.10      | 0.217 ± 0.004<br>5.50 ± 0.10 | inches<br>mm |
| Size | P0                           | P1                           | P2                            | D0                                | T                            | Unit         |
| 2010 | 0.157 ± 0.002<br>4.00 ± 0.05 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.002<br>2.00 ± 0.05  | 0.059 +0.004/-0<br>1.50 +0.10, -0 | 0.039 ± 0.008<br>1.00 ± 0.20 | inches<br>mm |
| 2512 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.002<br>2.00 ± 0.05  | 0.061 +0.002/-0<br>1.55 +0.05, -0 | 0.057 ± 0.008<br>1.45 ± 0.20 | inches<br>mm |
| 1225 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.002<br>2.00 ± 0.05  | 0.061 +0.002/-0<br>1.55 +0.05, -0 | 0.057 ± 0.008<br>1.45 ± 0.20 | inches<br>mm |

## Marking Instructions

0201 and 0402 sizes are not marked.

0603 size has three-character marking with examples shown in the table below.

- 1% and 5% marking is the same
- E96 values are only available in 1% tolerance
- If the value has two significant digits, the marking is "R" plus the two significant digits (e.g. R10 = 100 mΩ)
- If the value has three significant digits, the marking is the three significant digits underlined (e.g. 047 = 47 mΩ)

0805 and larger sizes have four-character marking for both 1% and 5% tolerances.

| Size               | Ohmic Value |       |            |        |            |        |
|--------------------|-------------|-------|------------|--------|------------|--------|
|                    | 5 mΩ        | 20 mΩ | 25 mΩ      | 100 mΩ | 221 mΩ     | 250 mΩ |
| 0201/0402          | No marking  |       |            |        |            |        |
| 0603 1%            | NA          | R02   | <u>025</u> | R10    | <u>221</u> | R25    |
| 0603 5%            | NA          | R02   | <u>025</u> | R10    | NA         | R25    |
| 0805 and larger 1% | R005        | R020  | R025       | R100   | R221       | R250   |
| 0805 and larger 5% | R005        | R020  | R025       | R100   | NA         | R250   |

## 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) |
| CSR                     | Thick Film Current Sensing Surface Mount Chip Resistor         | SMD                        | YES                            | 100% Matte Sn over Ni             | May-04                                             | 04/18                                 |
| CSRN                    | Thick Film Current Sensing Surface Mount Chip Resistor, Narrow | 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

| C              | S                   | R       | 1     | 2         | 0   | 6                | F                    | T                | 1        | 0                                                                                                                                                                                                    | L | 0 | -       | H           | P |  |  |
|----------------|---------------------|---------|-------|-----------|-----|------------------|----------------------|------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---------|-------------|---|--|--|
| Product Series |                     | Size    |       | Tolerance |     | Packaging        |                      |                  |          | Resistance Value                                                                                                                                                                                     |   |   | Special |             |   |  |  |
| Code           | Description         | Code    | W     | Code      | Tol | Code             | Description          | Size             | Quantity | Four characters with the multiplier used as the decimal holder.<br>"L" used as multiplier of 10 <sup>-3</sup> for any value under 0.1 ohm<br><br>0.051 ohm = 51L0<br>0.35 ohm = R350<br>1 ohm = 1R00 |   |   | Code    | Description |   |  |  |
| CSR            | Standard            | 0201    | 0.05  | F         | 1%  | T                | 7" Reel Paper Tape   | 0201, 0402       | 10000    |                                                                                                                                                                                                      |   |   | blank   | Standard    |   |  |  |
| CSRN           | Narrow Terminations | 0402    | 0.125 | G         | 2%  |                  |                      | 0603, 0805       | 5000     |                                                                                                                                                                                                      |   |   | -HP     | High Power  |   |  |  |
|                |                     | 0603    | 0.125 | J         | 5%  | T                | 7" Reel Plastic Tape | 1206, 1210       | 5000     |                                                                                                                                                                                                      |   |   |         |             |   |  |  |
|                |                     | 0603-HP | 0.2   |           |     |                  |                      | 2010, 2512       | 4000     |                                                                                                                                                                                                      |   |   |         |             |   |  |  |
|                |                     | 0805    | 0.25  |           |     | K <sup>(1)</sup> | 7" Reel Paper Tape   | 1225             | 2000     |                                                                                                                                                                                                      |   |   |         |             |   |  |  |
|                |                     | 0805-HP | 0.5   |           |     |                  |                      | 0402, 0603       | 1000     |                                                                                                                                                                                                      |   |   |         |             |   |  |  |
|                |                     | 1206    | 0.5   |           |     |                  |                      | 0805, 1206       |          |                                                                                                                                                                                                      |   |   |         |             |   |  |  |
|                |                     | 1210    | 0.5   |           |     |                  | 7" Reel Plastic Tape | 2010, 2512, 1225 |          |                                                                                                                                                                                                      |   |   |         |             |   |  |  |
|                |                     | 1210-HP | 0.75  |           |     |                  |                      |                  |          |                                                                                                                                                                                                      |   |   |         |             |   |  |  |
|                |                     | 2010    | 1     |           |     |                  |                      |                  |          |                                                                                                                                                                                                      |   |   |         |             |   |  |  |
|                |                     | 2512    | 2     |           |     |                  |                      |                  |          |                                                                                                                                                                                                      |   |   |         |             |   |  |  |
|                |                     | 1225    | 3     |           |     |                  |                      |                  |          |                                                                                                                                                                                                      |   |   |         |             |   |  |  |

(1) MOQ for K packaging is 5000 pieces

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