

### Features:

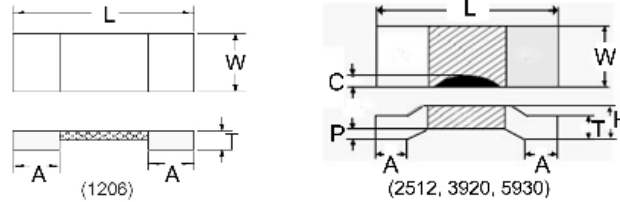
- Available in up to 15 W (70°C) power rating
- Elevated resistive element for lower thermal stress on PCB
- High temperature capability with operation up to 170°C
- High pulse capability
- Excellent long-term stability
- RoHS compliant, REACH compliant, lead free, and halogen free
- AEC-Q200 compliant



| Electrical Specifications |                                 |                                |              |                               |
|---------------------------|---------------------------------|--------------------------------|--------------|-------------------------------|
| Type/Code                 | Power Rating (W)<br>@ 100°C (*) | Power Rating (W)<br>@ 70°C (*) | TCR (ppm/°C) | Ohmic Range (Ω) and Tolerance |
|                           |                                 |                                |              | 1% and 5%                     |
| HCS1206                   | 2                               | 5                              | ±300         | 0.0003                        |
|                           |                                 |                                | ±200         | 0.0005                        |
|                           |                                 | 4                              | ±150         | 0.001                         |
| HCS2512                   | 9                               | 10                             | ±300         | 0.00025                       |
|                           |                                 |                                | ±200         | 0.0003                        |
|                           |                                 |                                | ±115         | 0.0005                        |
|                           | 4                               | 6                              | ±115         | 0.00075                       |
|                           |                                 |                                | ±100         | 0.001                         |
|                           |                                 |                                | ±50          | 0.002                         |
|                           |                                 |                                |              |                               |
|                           | 3                               | 4                              | ±50          | 0.003                         |
| HCS3920                   | 5                               | 12                             | ±150         | 0.0002                        |
|                           |                                 | 10                             | ±150         | 0.0003                        |
|                           |                                 | 9                              | ±70          | 0.0005                        |
|                           |                                 | 8                              | ±60          | 0.0007                        |
|                           |                                 | 7                              | ±50          | 0.001                         |
|                           | 4                               | 6                              | ±50          | 0.002                         |
|                           | 3                               | 5                              | ±50          | 0.003                         |
|                           | 2.5                             | 4                              | ±50          | 0.004                         |
|                           | 2                               | 3                              | ±50          | 0.005                         |
| HCS5930                   | 10                              | 15                             | ±250         | 0.0001                        |
|                           |                                 |                                | ±100         | 0.0002                        |
|                           | 7                               | 10                             | ±100         | 0.0003                        |
|                           | 6                               | 8                              | ±75          | 0.0005                        |
|                           |                                 | 9                              | ±50          | 0.001                         |
|                           | 4                               | 7                              | ±50          | 0.002                         |
|                           | 3                               | -                              | ±50          | 0.003                         |

(\*) Power ratings based on terminal temperature limits; higher terminal temperatures require power derating per derating curve.

### Mechanical Specifications

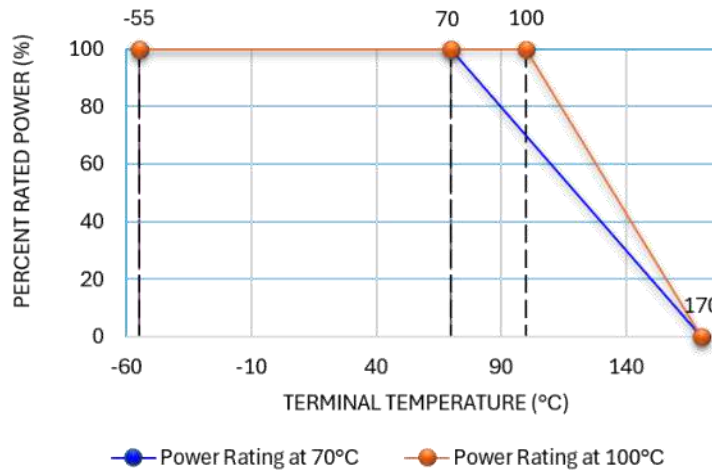


| Type/Code      | L                             | W                            | H                            | T                            | A                            | C (max.)      | P                            | Unit         |
|----------------|-------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|---------------|------------------------------|--------------|
| HCS1206...L300 | 0.126 ± 0.008<br>3.20 ± 0.20  | 0.065 ± 0.008<br>1.65 ± 0.20 | NA                           | 0.047 ± 0.006<br>1.20 ± 0.15 | 0.031 ± 0.008<br>0.80 ± 0.20 | NA            | NA                           | inches<br>mm |
| HCS1206...L500 | 0.126 ± 0.008<br>3.20 ± 0.20  | 0.065 ± 0.008<br>1.65 ± 0.20 | NA                           | 0.035 ± 0.006<br>0.90 ± 0.15 | 0.031 ± 0.008<br>0.80 ± 0.20 | NA            | NA                           | inches<br>mm |
| HCS1206...1L00 | 0.126 ± 0.008<br>3.20 ± 0.20  | 0.065 ± 0.008<br>1.65 ± 0.20 | NA                           | 0.035 ± 0.006<br>0.90 ± 0.15 | 0.031 ± 0.008<br>0.80 ± 0.20 | NA            | NA                           | inches<br>mm |
| HCS2512...L250 | 0.256 ± 0.008<br>6.50 ± 0.20  | 0.128 ± 0.008<br>3.25 ± 0.20 | 0.053 ± 0.006<br>1.35 ± 0.15 | 0.039 ± 0.006<br>1.00 ± 0.15 | 0.035 ± 0.008<br>0.90 ± 0.20 | 0.016<br>0.40 | 0.014 ± 0.004<br>0.35 ± 0.10 | inches<br>mm |
| HCS2512...L300 | 0.256 ± 0.008<br>6.50 ± 0.20  | 0.128 ± 0.008<br>3.25 ± 0.20 | 0.049 ± 0.006<br>1.24 ± 0.15 | 0.035 ± 0.006<br>0.89 ± 0.15 | 0.035 ± 0.008<br>0.90 ± 0.20 | 0.016<br>0.40 | 0.014 ± 0.004<br>0.35 ± 0.10 | inches<br>mm |
| HCS2512...L500 | 0.256 ± 0.008<br>6.50 ± 0.20  | 0.128 ± 0.008<br>3.25 ± 0.20 | 0.042 ± 0.006<br>1.07 ± 0.15 | 0.028 ± 0.006<br>0.72 ± 0.15 | 0.035 ± 0.008<br>0.90 ± 0.20 | 0.016<br>0.40 | 0.014 ± 0.004<br>0.35 ± 0.10 | inches<br>mm |
| HCS2512...L750 | 0.256 ± 0.008<br>6.50 ± 0.20  | 0.128 ± 0.008<br>3.25 ± 0.20 | 0.037 ± 0.006<br>0.95 ± 0.15 | 0.024 ± 0.006<br>0.60 ± 0.15 | 0.035 ± 0.008<br>0.90 ± 0.20 | 0.016<br>0.40 | 0.014 ± 0.004<br>0.35 ± 0.10 | inches<br>mm |
| HCS2512...1L00 | 0.256 ± 0.008<br>6.50 ± 0.20  | 0.128 ± 0.008<br>3.25 ± 0.20 | 0.029 ± 0.006<br>0.73 ± 0.15 | 0.015 ± 0.006<br>0.38 ± 0.15 | 0.035 ± 0.008<br>0.90 ± 0.20 | 0.016<br>0.40 | 0.014 ± 0.004<br>0.35 ± 0.10 | inches<br>mm |
| HCS2512...2L00 | 0.256 ± 0.008<br>6.50 ± 0.20  | 0.128 ± 0.008<br>3.25 ± 0.20 | 0.038 ± 0.006<br>0.96 ± 0.15 | 0.024 ± 0.006<br>0.61 ± 0.15 | 0.035 ± 0.008<br>0.90 ± 0.20 | 0.016<br>0.40 | 0.014 ± 0.004<br>0.35 ± 0.10 | inches<br>mm |
| HCS2512...3L00 | 0.256 ± 0.008<br>6.50 ± 0.20  | 0.128 ± 0.008<br>3.25 ± 0.20 | 0.030 ± 0.006<br>0.77 ± 0.15 | 0.017 ± 0.006<br>0.42 ± 0.15 | 0.035 ± 0.008<br>0.90 ± 0.20 | 0.016<br>0.40 | 0.014 ± 0.004<br>0.35 ± 0.10 | inches<br>mm |
| HCS2512...4L00 | 0.256 ± 0.008<br>6.50 ± 0.20  | 0.128 ± 0.008<br>3.25 ± 0.20 | 0.028 ± 0.006<br>0.70 ± 0.15 | 0.014 ± 0.006<br>0.35 ± 0.15 | 0.035 ± 0.008<br>0.90 ± 0.20 | 0.016<br>0.40 | 0.014 ± 0.004<br>0.35 ± 0.10 | inches<br>mm |
| HCS2512...5L00 | 0.256 ± 0.008<br>6.50 ± 0.20  | 0.128 ± 0.008<br>3.25 ± 0.20 | 0.028 ± 0.006<br>0.70 ± 0.15 | 0.014 ± 0.006<br>0.35 ± 0.15 | 0.035 ± 0.008<br>0.90 ± 0.20 | 0.016<br>0.40 | 0.014 ± 0.004<br>0.35 ± 0.10 | inches<br>mm |
| HCS3920...L200 | 0.402 ± 0.008<br>10.20 ± 0.20 | 0.205 ± 0.008<br>5.20 ± 0.20 | 0.078 ± 0.006<br>1.98 ± 0.15 | 0.058 ± 0.006<br>1.48 ± 0.15 | 0.071 ± 0.012<br>1.80 ± 0.30 | 0.024<br>0.60 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS3920...L300 | 0.402 ± 0.008<br>10.20 ± 0.20 | 0.205 ± 0.008<br>5.20 ± 0.20 | 0.076 ± 0.006<br>1.92 ± 0.15 | 0.056 ± 0.006<br>1.42 ± 0.15 | 0.071 ± 0.012<br>1.80 ± 0.30 | 0.024<br>0.60 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS3920...L500 | 0.402 ± 0.008<br>10.20 ± 0.20 | 0.205 ± 0.008<br>5.20 ± 0.20 | 0.054 ± 0.006<br>1.36 ± 0.15 | 0.034 ± 0.006<br>0.86 ± 0.15 | 0.071 ± 0.012<br>1.80 ± 0.30 | 0.024<br>0.60 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS3920...L700 | 0.402 ± 0.008<br>10.20 ± 0.20 | 0.205 ± 0.008<br>5.20 ± 0.20 | 0.047 ± 0.006<br>1.20 ± 0.15 | 0.028 ± 0.006<br>0.70 ± 0.15 | 0.071 ± 0.012<br>1.80 ± 0.30 | 0.024<br>0.60 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS3920...1L00 | 0.402 ± 0.008<br>10.20 ± 0.20 | 0.205 ± 0.008<br>5.20 ± 0.20 | 0.036 ± 0.006<br>0.92 ± 0.15 | 0.017 ± 0.006<br>0.42 ± 0.15 | 0.071 ± 0.012<br>1.80 ± 0.30 | 0.024<br>0.60 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS3920...2L00 | 0.402 ± 0.008<br>10.20 ± 0.20 | 0.205 ± 0.008<br>5.20 ± 0.20 | 0.047 ± 0.006<br>1.19 ± 0.15 | 0.027 ± 0.006<br>0.69 ± 0.15 | 0.071 ± 0.012<br>1.80 ± 0.30 | 0.024<br>0.60 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |

**Mechanical Specifications (cont.)**

| Type/Code      | L                             | W                            | H                            | T                            | A                            | C (max.)      | P                            | Unit         |
|----------------|-------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|---------------|------------------------------|--------------|
| HCS3920...3L00 | 0.402 ± 0.008<br>10.20 ± 0.20 | 0.205 ± 0.008<br>5.20 ± 0.20 | 0.037 ± 0.006<br>0.95 ± 0.15 | 0.018 ± 0.006<br>0.45 ± 0.15 | 0.071 ± 0.012<br>1.80 ± 0.30 | 0.024<br>0.60 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS3920...4L00 | 0.402 ± 0.008<br>10.20 ± 0.20 | 0.205 ± 0.008<br>5.20 ± 0.20 | 0.033 ± 0.006<br>0.85 ± 0.15 | 0.014 ± 0.006<br>0.35 ± 0.15 | 0.071 ± 0.012<br>1.80 ± 0.30 | 0.024<br>0.60 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS3920...5L00 | 0.402 ± 0.008<br>10.20 ± 0.20 | 0.205 ± 0.008<br>5.20 ± 0.20 | 0.033 ± 0.006<br>0.85 ± 0.15 | 0.014 ± 0.006<br>0.35 ± 0.15 | 0.071 ± 0.012<br>1.80 ± 0.30 | 0.024<br>0.60 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS5930...L100 | 0.591 ± 0.008<br>15.00 ± 0.20 | 0.305 ± 0.008<br>7.75 ± 0.20 | 0.076 ± 0.006<br>1.92 ± 0.15 | 0.056 ± 0.006<br>1.42 ± 0.15 | 0.165 ± 0.008<br>4.20 ± 0.20 | 0.039<br>1.00 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS5930...L200 | 0.591 ± 0.008<br>15.00 ± 0.20 | 0.305 ± 0.008<br>7.75 ± 0.20 | 0.076 ± 0.006<br>1.92 ± 0.15 | 0.056 ± 0.006<br>1.42 ± 0.15 | 0.165 ± 0.008<br>4.20 ± 0.20 | 0.039<br>1.00 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS5930...L300 | 0.591 ± 0.008<br>15.00 ± 0.20 | 0.305 ± 0.008<br>7.75 ± 0.20 | 0.057 ± 0.006<br>1.44 ± 0.15 | 0.037 ± 0.006<br>0.94 ± 0.15 | 0.165 ± 0.008<br>4.20 ± 0.20 | 0.039<br>1.00 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS5930...L500 | 0.591 ± 0.008<br>15.00 ± 0.20 | 0.305 ± 0.008<br>7.75 ± 0.20 | 0.043 ± 0.006<br>1.08 ± 0.15 | 0.023 ± 0.006<br>0.58 ± 0.15 | 0.165 ± 0.008<br>4.20 ± 0.20 | 0.039<br>1.00 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS5930...1L00 | 0.591 ± 0.008<br>15.00 ± 0.20 | 0.305 ± 0.008<br>7.75 ± 0.20 | 0.054 ± 0.006<br>1.37 ± 0.15 | 0.034 ± 0.006<br>0.87 ± 0.15 | 0.165 ± 0.008<br>4.20 ± 0.20 | 0.039<br>1.00 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS5930...2L00 | 0.591 ± 0.008<br>15.00 ± 0.20 | 0.305 ± 0.008<br>7.75 ± 0.20 | 0.037 ± 0.006<br>0.95 ± 0.15 | 0.018 ± 0.006<br>0.46 ± 0.15 | 0.165 ± 0.008<br>4.20 ± 0.20 | 0.039<br>1.00 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |
| HCS5930...3L00 | 0.591 ± 0.008<br>15.00 ± 0.20 | 0.305 ± 0.008<br>7.75 ± 0.20 | 0.035 ± 0.006<br>0.90 ± 0.15 | 0.016 ± 0.006<br>0.40 ± 0.15 | 0.165 ± 0.008<br>4.20 ± 0.20 | 0.039<br>1.00 | 0.020 ± 0.004<br>0.50 ± 0.10 | inches<br>mm |

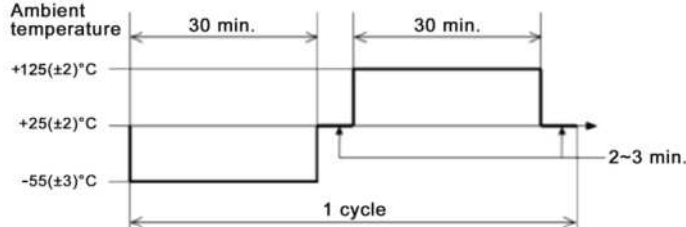
**Power Derating Curve:**



**Performance Characteristics**

| Test                                        | Test Method    | Test Specification                 | Test Condition                                                                                    |
|---------------------------------------------|----------------|------------------------------------|---------------------------------------------------------------------------------------------------|
| Temperature Coefficient of Resistance (TCR) | JIS-C-5202 5.2 | Refer to Electrical Specifications | +25°C / +125°C (JIS-C5202-5.2)<br>$TCR (ppm/°C) = \frac{\Delta R}{R \times \Delta t} \times 10^6$ |
| Short Time Overload                         | JIS-C-5202 5.5 | $\Delta R: \pm 1\%$                | 5 times rated power for 5 seconds                                                                 |

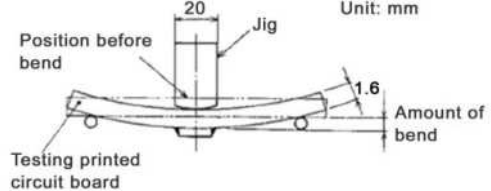
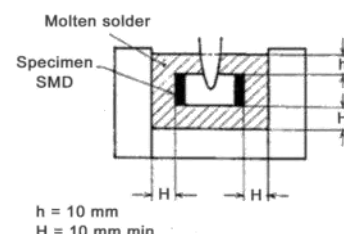
### Performance Characteristics (cont.)

| Test                        | Test Method            | Test Specification  | Test Condition                                                                                                                                                                                                                                                    |
|-----------------------------|------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Moisture Resistance         | MIL-STD-202 Method 106 | $\Delta R: \pm 1\%$ | The specimens shall be placed in a chamber and subjected to a relative humidity of 90 ~ 98% and a temperature of 25°C / 65°C, 10 cycles.                                                                                                                          |
| High Temperature Exposure   | JIS-C-5202 7.2         | $\Delta R: \pm 1\%$ | The chip (mounted on board) is exposed in the heat chamber, 125°C for 1000 hours                                                                                                                                                                                  |
| Load Life                   | JIS-C-5202 7.10        | $\Delta R: \pm 1\%$ | Apply rated power for 1000 hours with 1.5 hours ON and 0.5 hour OFF.                                                                                                                                                                                              |
| Rapid Change of Temperature | JIS-C-5202 7.4         | $\Delta R: \pm 1\%$ | <p>The chip (mounted on board) is exposed, -55 <math>\pm</math> 3°C (30 min) / +125 <math>\pm</math> 2°C (30 minutes) for 5 cycles. The following conditions as the figure</p>  |

Operating temperature range is -55 to +170°C

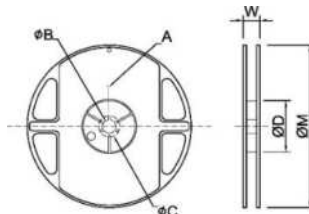
Recommended storage condition is 22 to 28°C, humidity is of 40% to 75%.

### Function Performance Characteristics

| Test             | Test Method     | Test Specification                                   | Test Condition                                                                                                                                                                                                                                                                                                                           |
|------------------|-----------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bending Strength | JIS-C-5202 6.1  | $\Delta R: \pm 1\%$                                  | <p>Mount the chip to test 90 mm (L)*40 mm (W) FR4 printed circuit board substrate. Apply pressure in direction of arrow unit band width reaches 2 mm (+0.2 / -0 mm) illustrated in the picture below and hold for 10 <math>\pm</math> 1 seconds</p>  |
| Solderability    | JIS-C-5202 6.11 | Solder shall cover 95% or more of the electrode area | <p>The part shall be immersed into the flux specified in the solder bath 235 <math>\pm</math> 5°C for 2 seconds <math>\pm</math> 0.5 seconds. It shall be immersed to a point 10 mm from its root. (Sn96.5/Ag3.0/Cu0.5)</p>                          |

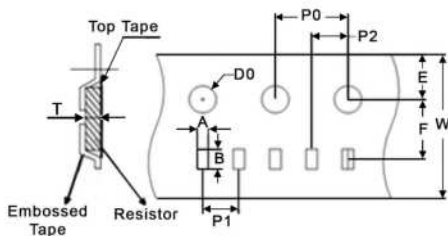
Note: The terminal temperature of component should be below 100°C.

### Reel Specifications



| Type/Code | A                            | B                             | C                             | D                             | W                             | M                               | Unit         |
|-----------|------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------------------------|--------------|
| HCS1206   | 0.079 ± 0.020<br>2.00 ± 0.50 | 0.512 ± 0.020<br>13.00 ± 0.50 | 0.697 ± 0.020<br>17.70 ± 0.50 | 2.362 ± 0.020<br>60.00 ± 0.50 | 0.472 ± 0.020<br>12.00 ± 0.50 | 7.008 ± 0.039<br>178.00 ± 1.00  | inches<br>mm |
| HCS2512   | 0.079 ± 0.020<br>2.00 ± 0.50 | 0.512 ± 0.020<br>13.00 ± 0.50 | 0.697 ± 0.020<br>17.70 ± 0.50 | 2.441 ± 0.020<br>62.00 ± 0.50 | 0.650 ± 0.020<br>16.50 ± 0.50 | 9.843 ± 0.039<br>250.00 ± 1.00  | inches<br>mm |
| HCS3920   | 0.098 ± 0.020<br>2.50 ± 0.50 | 0.531 ± 0.020<br>13.50 ± 0.50 | 0.697 ± 0.020<br>17.70 ± 0.50 | 3.898 ± 0.020<br>99.00 ± 0.50 | 0.815 ± 0.020<br>20.70 ± 0.50 | 12.992 ± 0.039<br>330.00 ± 1.00 | inches<br>mm |
| HCS5930   | 0.098 ± 0.020<br>2.50 ± 0.50 | 0.531 ± 0.020<br>13.50 ± 0.50 | 0.697 ± 0.020<br>17.70 ± 0.50 | 3.898 ± 0.020<br>99.00 ± 0.50 | 1.157 ± 0.020<br>29.40 ± 0.50 | 12.992 ± 0.039<br>330.00 ± 1.00 | inches<br>mm |

### Taping Specifications - Plastic Tape

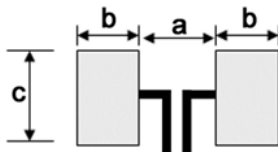


| Type / Code               | A                            | B                             | E                            | F                             | W                             | Unit         |
|---------------------------|------------------------------|-------------------------------|------------------------------|-------------------------------|-------------------------------|--------------|
| HCS1206                   | 0.074 ± 0.004<br>1.88 ± 0.10 | 0.140 ± 0.004<br>3.56 ± 0.10  | 0.069 ± 0.004<br>1.75 ± 0.10 | 0.138 ± 0.002<br>3.50 ± 0.05  | 0.315 ± 0.004<br>8.00 ± 0.10  | inches<br>mm |
| HCS2512<br>(all Ω ranges) | 0.140 ± 0.004<br>3.55 ± 0.10 | 0.266 ± 0.004<br>6.75 ± 0.10  | 0.069 ± 0.004<br>1.75 ± 0.10 | 0.217 ± 0.002<br>5.50 ± 0.05  | 0.472 ± 0.008<br>12.00 ± 0.20 | inches<br>mm |
| HCS3920<br>(all Ω ranges) | 0.217 ± 0.004<br>5.50 ± 0.10 | 0.425 ± 0.004<br>10.80 ± 0.10 | 0.069 ± 0.004<br>1.75 ± 0.10 | 0.295 ± 0.002<br>7.50 ± 0.05  | 0.630 ± 0.008<br>16.00 ± 0.20 | inches<br>mm |
| HCS5930<br>(all Ω ranges) | 0.327 ± 0.004<br>8.30 ± 0.10 | 0.606 ± 0.004<br>15.40 ± 0.10 | 0.069 ± 0.004<br>1.75 ± 0.10 | 0.453 ± 0.004<br>11.50 ± 0.10 | 0.945 ± 0.012<br>24.00 ± 0.30 | inches<br>mm |

## Taping Specifications - Plastic Tape (cont.)

| Type / Code                                                | P0                           | P1                            | P2                           | D0                           | T                            | Unit         |
|------------------------------------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|--------------|
| HCS1206                                                    | 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<br>1.55 ± 0.05 | 0.055 ± 0.004<br>1.40 ± 0.10 | inches<br>mm |
| HCS2512<br>(0.00025, 0.0003, 0.0005, 0.00075, 0.002)       | 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<br>1.50 ± 0.10 | 0.055 ± 0.004<br>1.40 ± 0.10 | inches<br>mm |
| HCS2512<br>(0.001, 0.003)                                  | 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<br>1.50 ± 0.10 | 0.043 ± 0.004<br>1.10 ± 0.10 | inches<br>mm |
| HCS2512<br>(0.004, 0.005)                                  | 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<br>1.50 ± 0.10 | 0.031 ± 0.004<br>0.80 ± 0.10 | inches<br>mm |
| HCS3920<br>(0.0002, 0.0003, 0.0004, 0.0005, 0.0007, 0.002) | 0.157 ± 0.002<br>4.00 ± 0.05 | 0.315 ± 0.004<br>8.00 ± 0.10  | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.059 ± 0.004<br>1.50 ± 0.10 | 0.078 ± 0.004<br>1.97 ± 0.10 | inches<br>mm |
| HCS3920<br>(0.001, 0.003, 0.004, 0.005)                    | 0.157 ± 0.002<br>4.00 ± 0.05 | 0.315 ± 0.004<br>8.00 ± 0.10  | 0.079 ± 0.002<br>2.00 ± 0.05 | 0.059 ± 0.004<br>1.50 ± 0.10 | 0.049 ± 0.004<br>1.25 ± 0.10 | inches<br>mm |
| HCS5930<br>(0.0001, 0.0002, 0.0003, 0.001)                 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.472 ± 0.004<br>12.00 ± 0.10 | 0.079 ± 0.004<br>2.00 ± 0.10 | 0.059 ± 0.004<br>1.50 ± 0.10 | 0.091 ± 0.004<br>2.30 ± 0.10 | inches<br>mm |
| HCS5930<br>(0.0005, 0.002, 0.003)                          | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.472 ± 0.004<br>12.00 ± 0.10 | 0.079 ± 0.004<br>2.00 ± 0.10 | 0.059 ± 0.004<br>1.50 ± 0.10 | 0.055 ± 0.004<br>1.40 ± 0.10 | inches<br>mm |

## Recommended Solder Pad



| Type/Code | a             | b             | c             | Unit         |
|-----------|---------------|---------------|---------------|--------------|
| 1206      | 0.055<br>1.40 | 0.067<br>1.70 | 0.071<br>1.80 | inches<br>mm |
| 2512      | 0.150<br>3.80 | 0.071<br>1.80 | 0.134<br>3.40 | inches<br>mm |
| 3920      | 0.220<br>5.60 | 0.106<br>2.70 | 0.244<br>6.20 | inches<br>mm |
| 5930      | 0.220<br>5.60 | 0.205<br>5.20 | 0.344<br>8.75 | 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% Copper

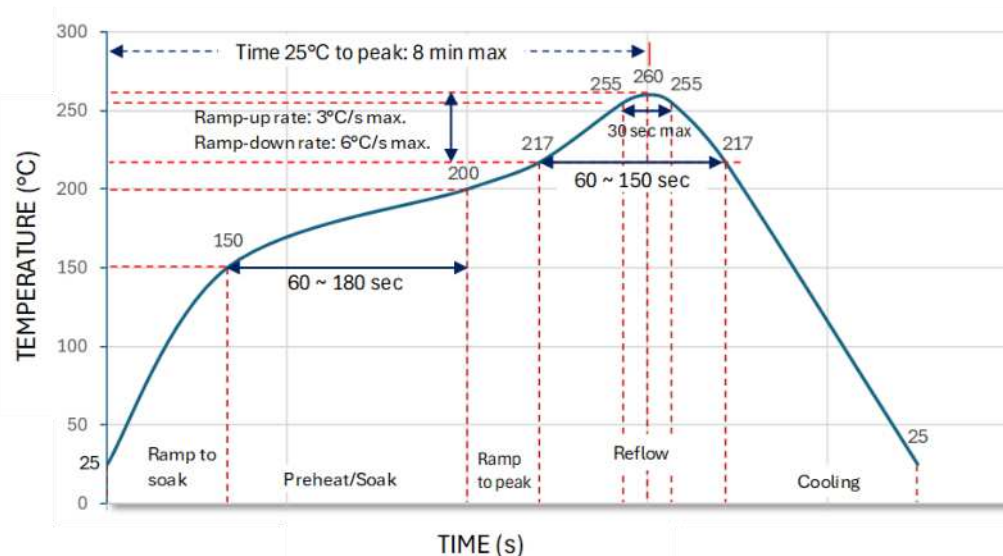
Soldering iron recommended temperatures: 330 to 350°C with minimum duration.  
Maximum number of reflow cycles: 3.

| 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        |

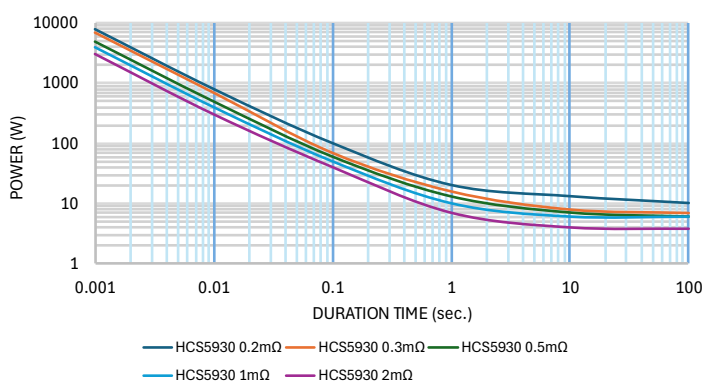
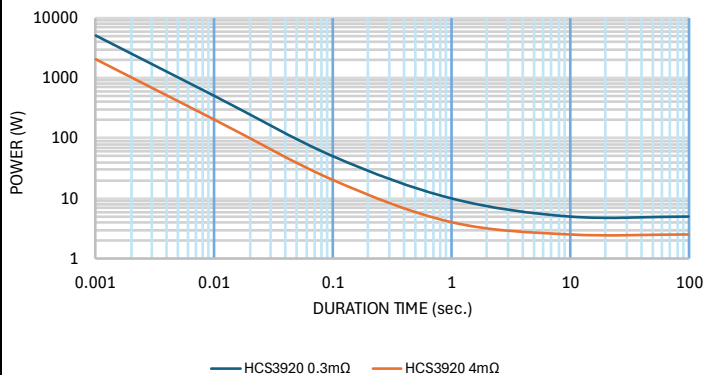
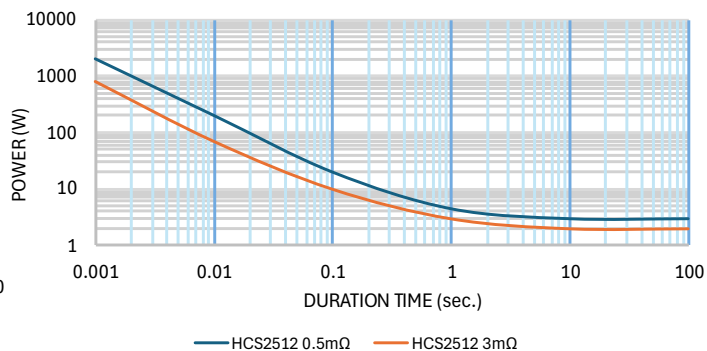
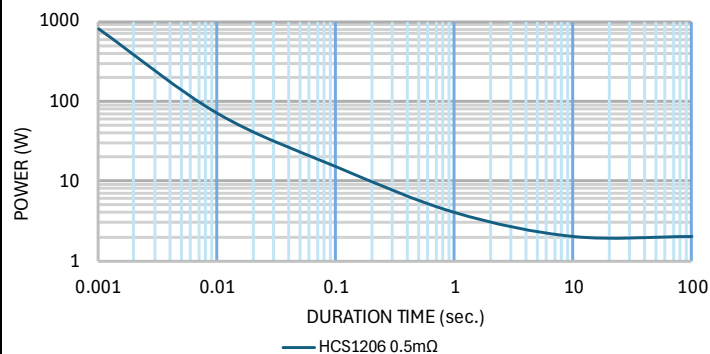
Temperature Diff. = Difference between final preheat stage and soldering stage.

| 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     | *          |

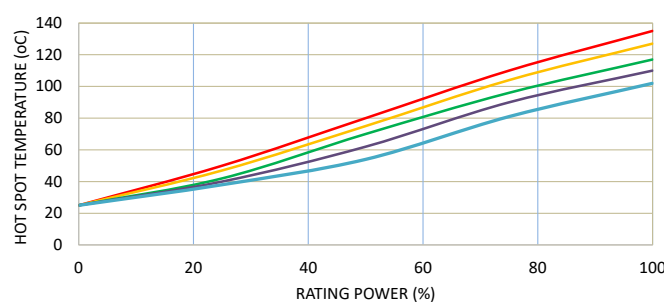
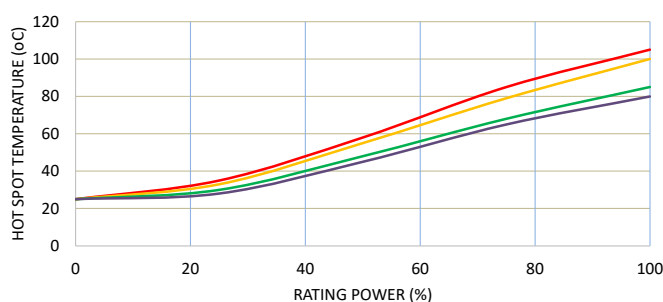
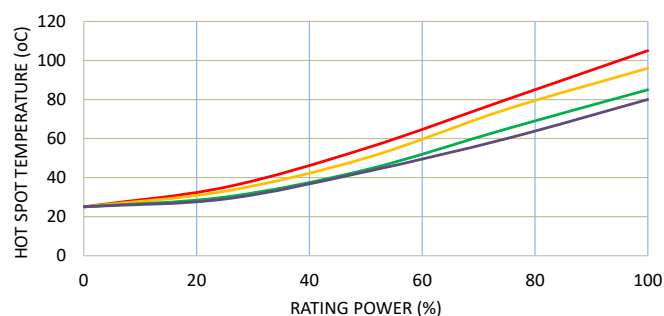
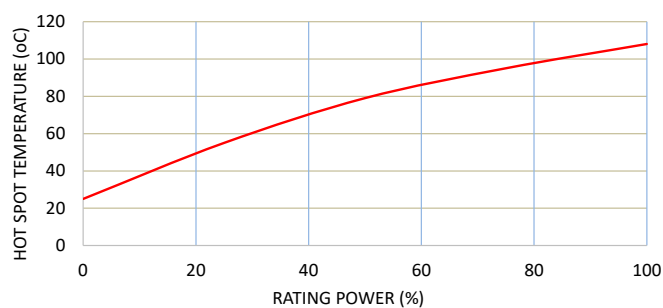
## Recommended Resistor Reflow Profile



## Pulse Power Characteristics



### Rated Power vs. Surface Temperature



Temperature rise test boards. Use aluminum substrate (MCPCB).

### 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 |
|-------------------------|-----------------------------------------|----------------------------|--------------------------------|-----------------------------------|
| HCS                     | High Current Metal Alloy Shunt Resistor | SMD                        | YES                            | 100% Copper                       |

### "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

|                |          |           |          |           |                         |          |          |                                                                                                                                                                                     |          |          |          |          |
|----------------|----------|-----------|----------|-----------|-------------------------|----------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|
| <b>H</b>       | <b>C</b> | <b>S</b>  | <b>3</b> | <b>9</b>  | <b>2</b>                | <b>0</b> | <b>F</b> | <b>T</b>                                                                                                                                                                            | <b>L</b> | <b>3</b> | <b>0</b> | <b>0</b> |
| Product Series | Size     | Tolerance |          | Packaging |                         |          |          | Resistance Value                                                                                                                                                                    |          |          |          |          |
| HCS            | 1206     | Code      | Tol      | Code      | Description             | Size     | Quantity | Four characters with "L" used as multiplier of 10 <sup>-3</sup> for any value under 0.1 ohm<br><br>0.0003 ohm = L300<br>0.0005 ohm = L500<br>0.00075 ohm = L750<br>0.001 ohm = 1L00 |          |          |          |          |
|                | 2512     | F         | 1%       | T         | 7" Reel - Plastic Tape  | 1206     | 2000     |                                                                                                                                                                                     |          |          |          |          |
|                | 3920     | J         | 5%       |           | 10" Reel - Plastic Tape | 2512     | 4000     |                                                                                                                                                                                     |          |          |          |          |
|                | 5930     |           |          |           | 13" Reel - Plastic Tape | 3920     | 3000     |                                                                                                                                                                                     |          |          |          |          |
|                |          |           |          |           |                         | 5930     | 2000     |                                                                                                                                                                                     |          |          |          |          |