

# ThermaWick® Thermal Jumper Surface Mount Chip

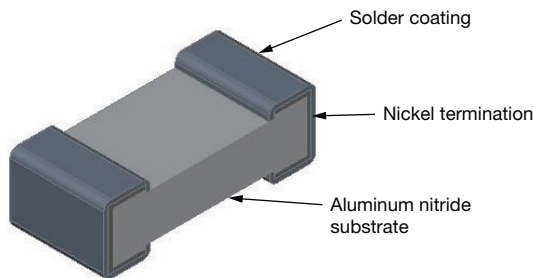


## LINKS TO ADDITIONAL RESOURCES



THJP surface mount chips are designed to provide an electrically isolated thermal conductive pathway to a ground plane or heat sink while maintaining the electrical isolation of the device. The devices are constructed with aluminum nitride substrates in both SnPb and Pb-free wraparound termination styles. The low capacitance of the device makes them an excellent choice for high frequency and thermal ladder applications. Custom sizes available.

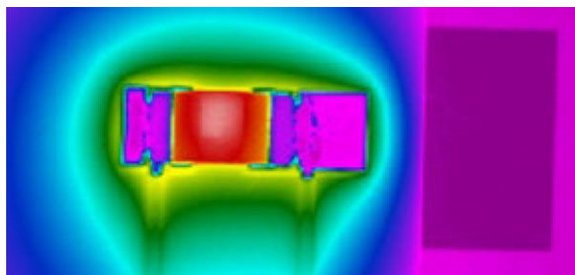
## CONSTRUCTION



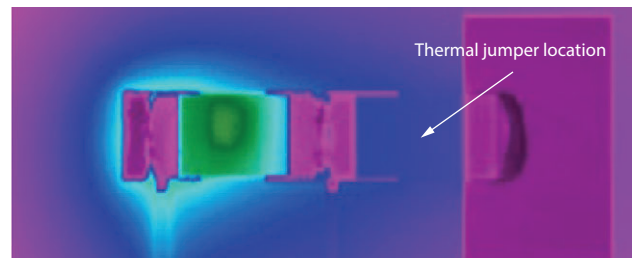
## HEAT TRANSFER DEMONSTRATION

Chip surface temperature was measured using a FLIR SC645 thermal imaging system under ambient conditions. The devices were mounted to an FR4 test card designed with a 25 mm x 19 mm copper heat sink. Power was supplied to device to cause the surface temperature to stabilize at 150 °C. The device was then retested at the same power level with the thermal jumper connecting the device to the heat sink.

### Example THJP 1206 Thermal Jumper Showing 36 % Surface Temperature Reduction



Ceramic Resistor Chip Without Thermal Jumper (149.8 °C)



Ceramic Chip Resistor With Thermal Jumper (95.5 °C)

## FEATURES

- Electrically isolated thermal conductor
- High thermal conductivity AlN substrate (170 W/mK)
- Electrically isolated terminations (> 999 MΩ)
- Low capacitance
- Available with SnPb or lead (Pb)-free wrap terminations
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

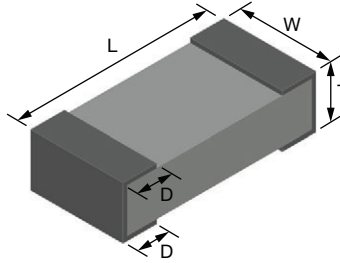


## APPLICATIONS

- Power supplies and converters
- RF amplifiers
- Synthesizers
- Switch mode power supplies
- Pin and laser diodes
- Filters

## FUNCTIONAL APPLICATIONS / CONNECTION OPTIONS

- Component to heat sink
- Component to case
- Component to ground plane
- Pad to pad
- Pad to via
- Pad to trace

**DIMENSIONS** in inches


| CASE SIZE | L             | W             | T             | D             |
|-----------|---------------|---------------|---------------|---------------|
| 0603      | 0.061 ± 0.005 | 0.033 ± 0.005 | 0.030 ± 0.005 | 0.015 ± 0.005 |
| 0612      | 0.063 ± 0.005 | 0.126 ± 0.005 | 0.030 ± 0.005 | 0.015 ± 0.005 |
| 0805      | 0.079 ± 0.005 | 0.047 ± 0.005 | 0.030 ± 0.005 | 0.020 ± 0.005 |
| 1206      | 0.126 ± 0.005 | 0.063 ± 0.005 | 0.030 ± 0.005 | 0.020 ± 0.005 |
| 1225      | 0.126 ± 0.005 | 0.252 ± 0.005 | 0.030 ± 0.005 | 0.020 ± 0.005 |
| 2512      | 0.252 ± 0.005 | 0.126 ± 0.005 | 0.030 ± 0.005 | 0.020 ± 0.005 |

**TYPICAL CHARACTERISTICS**

| CASE SIZE  | 0603  | 0612  | 0805  | 1206  | 1225  | 2512  |
|--|-------|-------|-------|-------|-------|-------|
| Thermal resistance (°C/W), T <sub>R</sub>                      | 14    | 4     | 13    | 15    | 4     | 15    |
| Thermal conductance (mW/°C), T <sub>C</sub>                    | 70    | 259   | 77    | 65    | 259   | 65    |
| Capacitance (pF)   | 0.07  | 0.26  | 0.15  | 0.07  | 0.26  | 0.07  |
| Dielectric withstanding voltage kV <sub>AC</sub> , RMS (60 Hz) | > 1.5 | > 1.5 | > 1.5 | > 1.5 | > 1.5 | > 1.5 |

**Note**

$$T_R = \frac{L}{k(T \cdot W)}$$

where k is the thermal conductivity of AlN, 170 W/mK

$$T_C = \frac{1}{T_R}$$

**STANDARD ELECTRICAL SPECIFICATIONS**

| TEST                        | SPECIFICATIONS    |
|-----------------------------|-------------------|
| Operating temperature range | -65 °C to +150 °C |
| Storage temperature range   | -65 °C to +150 °C |

**STANDARD MATERIAL SPECIFICATIONS**

|                              |  |
|------------------------------|--|
| Substrate material           | Aluminum nitride (170 W/mK)                      |
| Termination (tin / lead)     | Electroplate tin / lead over electroplate nickel |
| Termination (lead (Pb)-free) | Electroplate tin (e3) over electroplate nickel   |

**ENVIRONMENTAL TESTS** (Vishay Performance vs. MIL-PRF-55342 / AEC-Q200 Requirements)

| ENVIRONMENTAL TEST        |        | CONDITIONS                          | LIMITS      | TYPICAL VISHAY PERFORMANCE |
|---------------------------|--------|-------------------------------------|-------------|----------------------------|
| Solderability             | Visual | J-STD-002, method B and B1          | 95 %        | Acceptable                 |
| Solder mounting integrity | Visual | MIL-PRF-55342, method par. 4.8.13.1 | Pass / fail | Pass                       |
| Board flex                | Visual | AEC-Q200, method 005                | Pass / fail | Pass                       |



| GLOBAL PART NUMBER INFORMATION          |  |   |            |  |   |   |   |   |   |   |   |   |
|---|--|---|------------|--|---|---|---|---|---|---|---|---|
| New Global Part Numbering: THJP1206AST1 |  |   |            |  |   |   |   |   |   |   |   |   |
|   | T  | H | J          | P  | 1 | 2 | 0 | 6   | A | S | T | 1 |
| GLOBAL MODEL                            | CASE SIZE                                    |   | THICKNESS  | TERMINATION  |   |   |   | PACKAGING   |   |   |   |   |
| THJP                                    | 0603<br>0805<br>0612<br>1206<br>1225<br>2512 |   | A = 0.030" | <b>B</b> = wraparound Sn/Pb solder with nickel termination<br><b>S</b> = wraparound Sn (e3) solder with nickel termination<br>RoHS compliant |   |   |   | <b>BS</b> = BULK 100 min., 1 mult.<br><br>TAPE AND REEL<br><b>T0</b> = 100 min., 100 mult.<br><b>T1</b> = 1000 min., 1000 mult.<br><b>T3</b> = 300 min., 300 mult.<br><b>T5</b> = 500 min., 500 mult.<br><b>TF</b> = full reel<br><b>TS</b> = 100 min., 1 mult.<br><b>TI</b> = 100 min., 1 mult.<br>(item single lot date code)<br><b>TP</b> = 100 min., 1 mult.<br>(package unit single lot date code) |   |   |   |   |



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