

# ThermaWick® Thermal Jumper Surface Mount Chip



## LINKS TO ADDITIONAL RESOURCES



3D Models



Product Page



Infographics



Videos



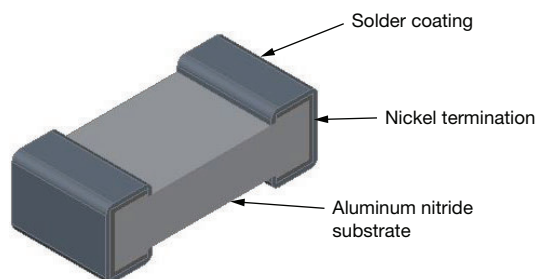
Packages



Footprints

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.

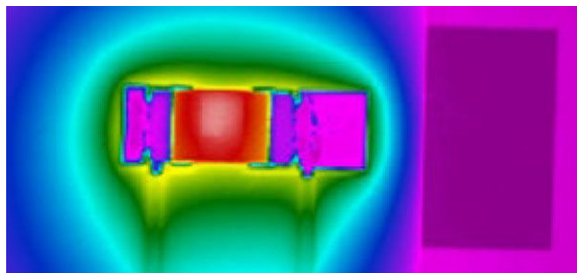
## CONSTRUCTION



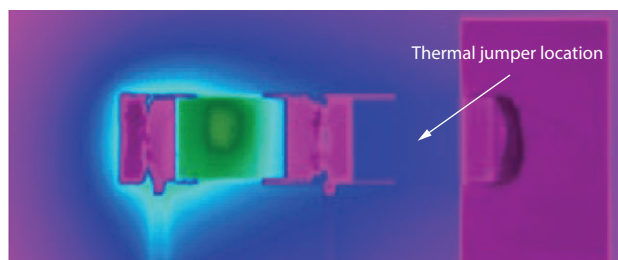
## HEAT TRANSFER DEMONSTRATION

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 54.3 °C 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)


**RoHS\***

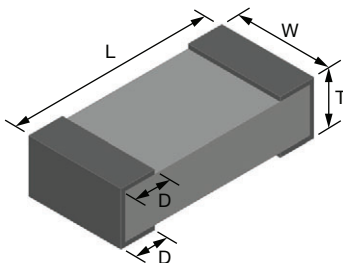
Available  
**HALOGEN**  
**FREE**  
**GREEN**  
(5-2008)  
Available

## 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             | WEIGHT (g) |
|-----------|---------------|---------------|---------------|---------------|------------|
| 0603      | 0.061 ± 0.005 | 0.033 ± 0.005 | 0.030 ± 0.005 | 0.015 ± 0.005 | 0.003      |
| 0612      | 0.063 ± 0.005 | 0.126 ± 0.005 | 0.030 ± 0.005 | 0.015 ± 0.005 | 0.013      |
| 0805      | 0.079 ± 0.005 | 0.047 ± 0.005 | 0.030 ± 0.005 | 0.020 ± 0.005 | 0.006      |
| 1206      | 0.126 ± 0.005 | 0.063 ± 0.005 | 0.030 ± 0.005 | 0.020 ± 0.005 | 0.013      |
| 1225      | 0.126 ± 0.005 | 0.252 ± 0.005 | 0.030 ± 0.005 | 0.020 ± 0.005 | 0.052      |
| 2512      | 0.252 ± 0.005 | 0.126 ± 0.005 | 0.030 ± 0.005 | 0.020 ± 0.005 | 0.052      |

**TYPICAL CHARACTERISTICS**

| CASE SIZE                                               | 0603  | 0612  | 0805  | 1206  | 1225  | 2512  |
|---------------------------------------------------------|-------|-------|-------|-------|-------|-------|
| Thermal resistance (°C/W), $T_R$                        | 14    | 4     | 13    | 15    | 4     | 15    |
| Thermal conductance (mW/°C), $T_C$                      | 70    | 259   | 77    | 65    | 259   | 65    |
| Capacitance (pF)                                        | 0.07  | 0.26  | 0.15  | 0.07  | 0.26  | 0.07  |
| Dielectric withstanding voltage $kV_{AC}$ , RMS (60 Hz) | > 1.5 | > 1.5 | > 1.5 | > 2.5 | > 1.5 | > 3.5 |

**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 %                       |
| Solder mounting integrity | Visual     | MIL-PRF-55342, method par. 4.8.13.1 | Pass / fail                |
| Board flex                | Visual     | AEC-Q200, method 005                | Pass / fail                |



## 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 = wraparound Sn/Pb solder with nickel termination<br>S = wraparound Sn (e3) solder with nickel termination<br>RoHS compliant | BS = BULK 100 min., 1 mult.<br><br>TAPE AND REEL<br>T0 = 100 min., 100 mult.<br>T1 = 1000 min., 1000 mult.<br>T3 = 300 min., 300 mult.<br>T5 = 500 min., 500 mult.<br>TF = full reel<br>TS = 100 min., 1 mult.<br>TI = 100 min., 1 mult.<br>(item single lot date code)<br>TP = 100 min., 1 mult.<br>(package unit single lot date code) |



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