

# ANTREX Electronics

Electronic Components Sourcing Information

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## Product Reference Information

**Part Number:** VS-12TTS08SPBF  
**Manufacturer:** Vishay General Semiconductor - Diodes Division  
**Package:** TO-263AB (D2PAK)  
**Availability:** Please confirm with sales

### Product Page:

<https://antrexco.com/product/details/vishay-general-semiconductor-diodes-division-vs-12tts08spbf.html>

### Request a Quote:

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## Contact Information

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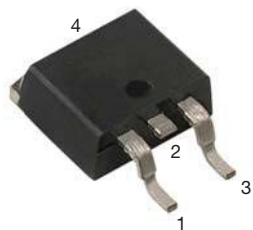
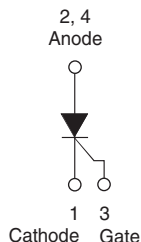
### Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

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## Thyristor Surface Mount, Phase Control SCR, 8 A


**TO-263AB (D²PAK)**


### FEATURES

- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Designed and qualified according JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### APPLICATIONS

- Input rectification and crow-bar (soft start)
- Vishay input diodes, switches and output rectifiers which are available in identical package outlines

### DESCRIPTION

The VS-12TTS08SPbF High Voltage Series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications. The glass passivation technology used has reliable operation up to 125 °C junction temperature.

### PRODUCT SUMMARY

|                   |                  |
|-------------------|------------------|
| Package           | TO-263AB (D²PAK) |
| Diode variation   | Single SCR       |
| $I_{T(AV)}$       | 8 A              |
| $V_{DRM}/V_{RRM}$ | 800 V            |
| $V_{TM}$          | 1.2 V            |
| $I_{GT}$          | 15 mA            |
| $T_J$             | -40 to +125 °C   |

### OUTPUT CURRENT IN TYPICAL APPLICATIONS

| APPLICATIONS                                                                     | SINGLE-PHASE BRIDGE | THREE-PHASE BRIDGE | UNITS |
|----------------------------------------------------------------------------------|---------------------|--------------------|-------|
| Capacitive input filter $T_A = 55$ °C, $T_J = 125$ °C, common heatsink of 1 °C/W | 13.5                | 17                 | A     |

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER         | TEST CONDITIONS     | VALUES      | UNITS |
|-------------------|---------------------|-------------|-------|
| $I_{T(AV)}$       | Sinusoidal waveform | 8           | A     |
| $I_{T(RMS)}$      |                     | 12.5        |       |
| $V_{RRM}/V_{DRM}$ |                     | 800         | V     |
| $I_{TSM}$         |                     | 110         | A     |
| $V_T$             | 8 A, $T_J = 25$ °C  | 1.2         | V     |
| $dV/dt$           |                     | 150         | V/μs  |
| $dI/dt$           |                     | 100         | A/μs  |
| $T_J$             | Range               | -40 to +125 | °C    |

### VOLTAGE RATINGS

| PART NUMBER    | $V_{RRM}$ , MAXIMUM PEAK REVERSE VOLTAGE<br>V | $V_{DRM}$ , MAXIMUM PEAK DIRECT VOLTAGE<br>V | $I_{RRM}/I_{DRM}$<br>AT 125 °C<br>mA |
|----------------|-----------------------------------------------|----------------------------------------------|--------------------------------------|
| VS-12TTS08SPbF | 800                                           | 800                                          | 1.0                                  |

**ABSOLUTE MAXIMUM RATINGS**

| PARAMETER                                           | SYMBOL          | TEST CONDITIONS                                                                                     | VALUES | UNITS                       |
|-----------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------|--------|-----------------------------|
| Maximum average on-state current                    | $I_{T(AV)}$     | $T_C = 108\text{ }^{\circ}\text{C}$ , 180° conduction, half sine wave                               | 8      | A                           |
| Maximum RMS on-state current                        | $I_{T(RMS)}$    |                                                                                                     | 12.5   |                             |
| Maximum peak one-cycle non-repetitive surge current | $I_{TSM}$       | 10 ms sine pulse, rated $V_{RRM}$ applied, $T_J = 125\text{ }^{\circ}\text{C}$                      | 95     |                             |
|                                                     |                 | 10 ms sine pulse, no voltage reapplied, $T_J = 125\text{ }^{\circ}\text{C}$                         | 110    |                             |
| Maximum $I^2t$ for fusing                           | $I^2t$          | 10 ms sine pulse, rated $V_{RRM}$ applied, $T_J = 125\text{ }^{\circ}\text{C}$                      | 45     | $\text{A}^2\text{s}$        |
|                                                     |                 | 10 ms sine pulse, no voltage reapplied, $T_J = 125\text{ }^{\circ}\text{C}$                         | 64     |                             |
| Maximum $I^2\sqrt{t}$ for fusing                    | $I^2\sqrt{t}$   | $t = 0.1\text{ ms to } 10\text{ ms}$ , no voltage reapplied, $T_J = 125\text{ }^{\circ}\text{C}$    | 640    | $\text{A}^2\sqrt{\text{s}}$ |
| Maximum on-state voltage drop                       | $V_{TM}$        | 8 A, $T_J = 25\text{ }^{\circ}\text{C}$                                                             | 1.2    | V                           |
| On-state slope resistance                           | $r_t$           | $T_J = 125\text{ }^{\circ}\text{C}$                                                                 | 16.2   | $\text{m}\Omega$            |
| Threshold voltage                                   | $V_{T(TO)}$     |                                                                                                     | 0.87   | V                           |
| Maximum reverse and direct leakage current          | $I_{RM}/I_{DM}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                                                  | 0.05   | mA                          |
|                                                     |                 | $T_J = 125\text{ }^{\circ}\text{C}$                                                                 | 1.0    |                             |
| Typical holding current                             | $I_H$           | Anode supply = 6 V, resistive load, initial $I_T = 1\text{ A}$ , $T_J = 25\text{ }^{\circ}\text{C}$ | 30     |                             |
| Maximum latching current                            | $I_L$           | Anode supply = 6 V, resistive load, $T_J = 25\text{ }^{\circ}\text{C}$                              | 50     |                             |
| Maximum rate of rise of off-state voltage           | $dV/dt$         | $T_J = T_J\text{ max.}$ , linear to 80 %, $V_{DRM} = R_g - k = \text{Open}$                         | 150    | $\text{V}/\mu\text{s}$      |
| Maximum rate of rise of turned-on current           | $dI/dt$         |                                                                                                     | 100    | $\text{A}/\mu\text{s}$      |

**TRIGGERING**

| PARAMETER                                   | SYMBOL      | TEST CONDITIONS                                                         | VALUES | UNITS |
|---------------------------------------------|-------------|-------------------------------------------------------------------------|--------|-------|
| Maximum peak gate power                     | $P_{GM}$    |                                                                         | 8.0    | W     |
| Maximum average gate power                  | $P_{G(AV)}$ |                                                                         | 2.0    |       |
| Maximum peak positive gate current          | $+I_{GM}$   |                                                                         | 1.5    | A     |
| Maximum peak negative gate voltage          | $-V_{GM}$   |                                                                         | 10     | V     |
| Maximum required DC gate current to trigger | $I_{GT}$    | Anode supply = 6 V, resistive load, $T_J = -65\text{ }^{\circ}\text{C}$ | 20     | mA    |
|                                             |             | Anode supply = 6 V, resistive load, $T_J = 25\text{ }^{\circ}\text{C}$  | 15     |       |
|                                             |             | Anode supply = 6 V, resistive load, $T_J = 125\text{ }^{\circ}\text{C}$ | 10     |       |
| Maximum required DC gate voltage to trigger | $V_{GT}$    | Anode supply = 6 V, resistive load, $T_J = -65\text{ }^{\circ}\text{C}$ | 1.2    | V     |
|                                             |             | Anode supply = 6 V, resistive load, $T_J = 25\text{ }^{\circ}\text{C}$  | 1      |       |
|                                             |             | Anode supply = 6 V, resistive load, $T_J = 125\text{ }^{\circ}\text{C}$ | 0.7    |       |
| Maximum DC gate voltage not to trigger      | $V_{GD}$    | $T_J = 125\text{ }^{\circ}\text{C}$ , $V_{DRM} = \text{Rated value}$    | 0.2    | mA    |
| Maximum DC gate current not to trigger      | $I_{GD}$    |                                                                         | 0.1    |       |

**SWITCHING**

| PARAMETER                     | SYMBOL   | TEST CONDITIONS                     | VALUES | UNITS         |
|-------------------------------|----------|-------------------------------------|--------|---------------|
| Typical turn-on time          | $t_{gt}$ | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.8    | $\mu\text{s}$ |
| Typical reverse recovery time | $t_{rr}$ | $T_J = 125\text{ }^{\circ}\text{C}$ | 3      |               |
| Typical turn-off time         | $t_q$    |                                     | 100    |               |


**THERMAL AND MECHANICAL SPECIFICATIONS**

| PARAMETER                                       | SYMBOL                            | TEST CONDITIONS                         | VALUES      | UNITS                  |
|-------------------------------------------------|-----------------------------------|-----------------------------------------|-------------|------------------------|
| Maximum junction and storage temperature range  | T <sub>J</sub> , T <sub>Stg</sub> |                                         | -40 to +125 | °C                     |
| Maximum thermal resistance, junction to case    | R <sub>thJC</sub>                 | DC operation                            | 1.5         | °C/W                   |
| Maximum thermal resistance, junction to ambient | R <sub>thJA</sub>                 |                                         | 62          |                        |
| Typical thermal resistance, case to heatsink    | R <sub>thCS</sub>                 | Mounting surface, smooth and greased    | 0.5         |                        |
| Approximate weight                              |                                   |                                         | 2           | g                      |
|                                                 |                                   |                                         | 0.07        | oz.                    |
| Mounting torque                                 | minimum                           |                                         | 6 (5)       | kgf · cm<br>(lbf · in) |
|                                                 | maximum                           |                                         | 12 (10)     |                        |
| Marking device                                  |                                   | Case style D <sup>2</sup> PAK (SMD-220) | 12TTS08S    |                        |

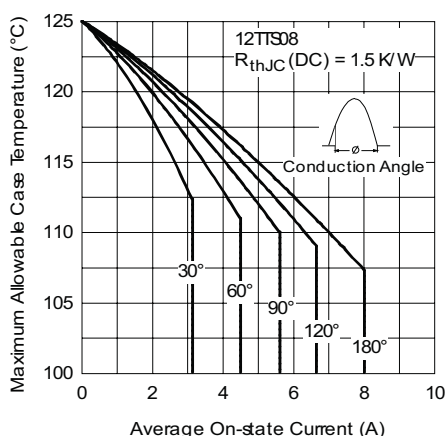


Fig. 1 - Current Rating Characteristics

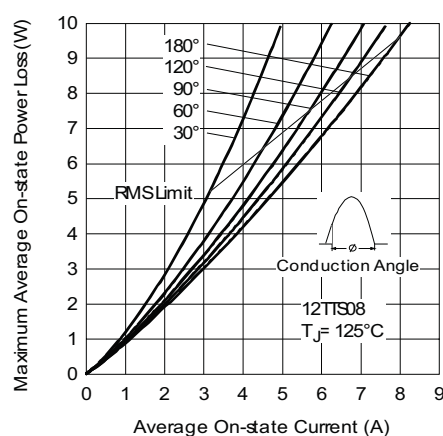


Fig. 3 - On-State Power Loss Characteristics

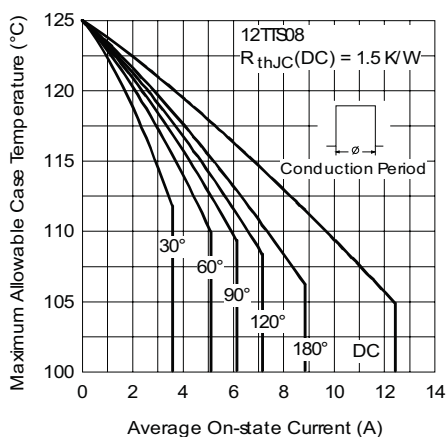


Fig. 2 - Current Rating Characteristics

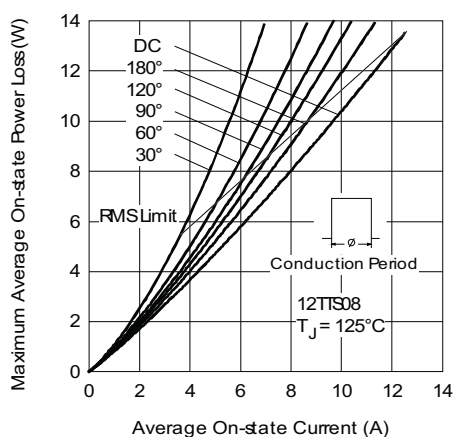


Fig. 4 - On-State Power Loss Characteristics

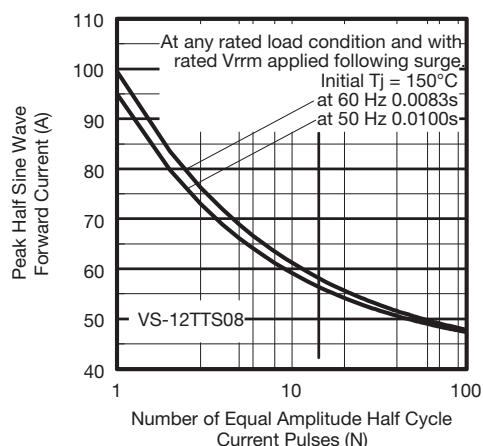


Fig. 5 - Maximum Non-Repetitive Surge Current

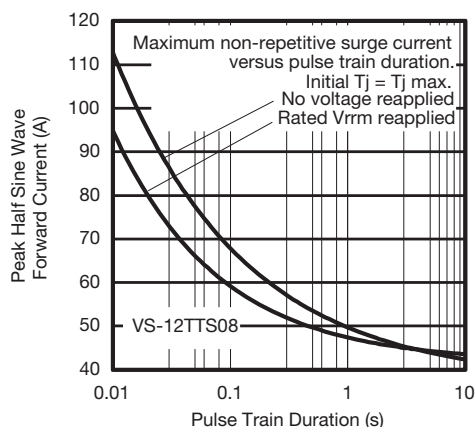


Fig. 6 - Maximum Non-Repetitive Surge Current

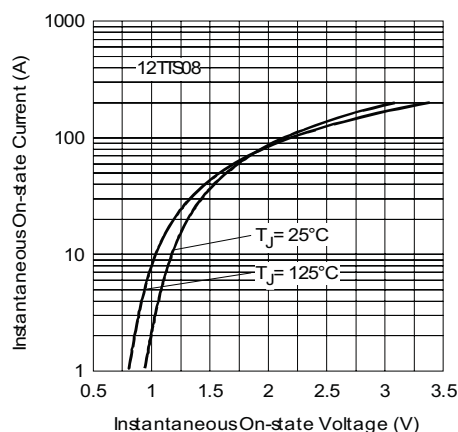


Fig. 7 - On-State Voltage Drop Characteristics

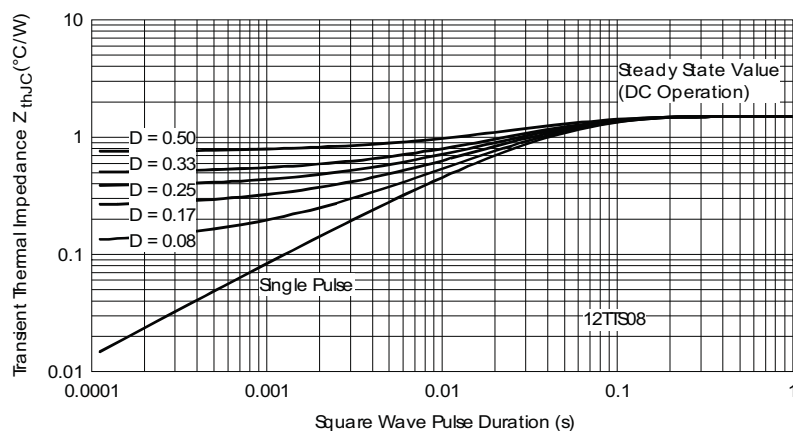


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

|            |           |          |          |          |           |          |            |            |
|------------|-----------|----------|----------|----------|-----------|----------|------------|------------|
| <b>VS-</b> | <b>12</b> | <b>T</b> | <b>T</b> | <b>S</b> | <b>08</b> | <b>S</b> | <b>TRL</b> | <b>PbF</b> |
| 1          | 2         | 3        | 4        | 5        | 6         | 7        | 8          | 9          |

- 1 - Vishay Semiconductors product
- 2 - Current rating (12.5 A)
- 3 - Circuit configuration:  
T = single thyristor
- 4 - Package:  
T = TO-220AC
- 5 - Type of silicon:  
S = standard recovery rectifier
- 6 - Voltage rating (08 = 800 V)
- 7 - S = TO-220 D<sup>2</sup>PAK (SMD-220) version
- 8 - • None = tube  
• TRL = tape and reel (left oriented)  
• TRR = tape and reel (right oriented)
- 9 - PbF = lead (Pb)-free

### ORDERING INFORMATION (Example)

| PREFERRED P/N     | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION    |
|-------------------|------------------|------------------------|--------------------------|
| VS-12TTS08SPbF    | 50               | 1000                   | Antistatic plastic tubes |
| VS-12TTS08STRRPbF | 800              | 800                    | 13" diameter reel        |
| VS-12TTS08STRLPbF | 800              | 800                    | 13" diameter reel        |

## LINKS TO RELATED DOCUMENTS

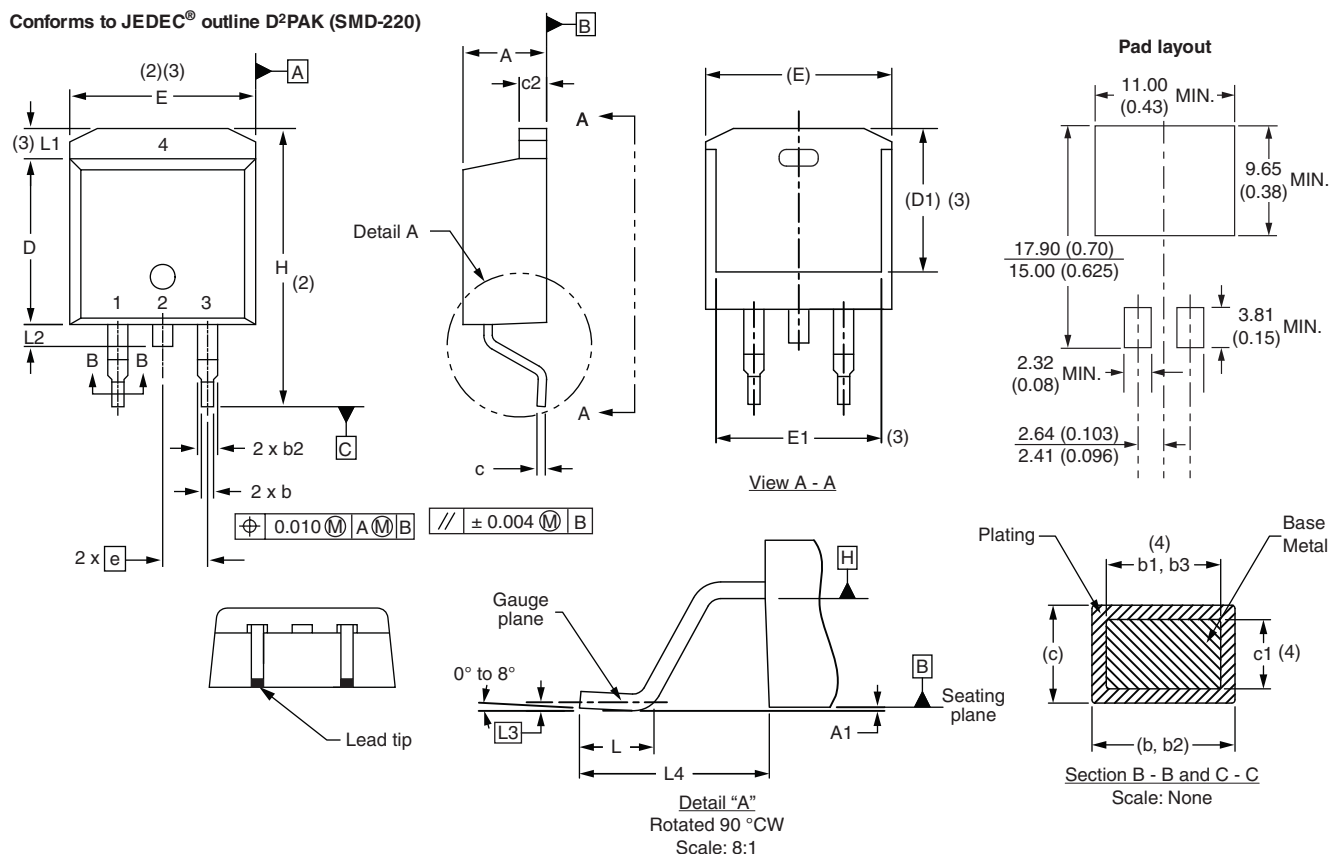
|                          |                                                                        |
|--------------------------|------------------------------------------------------------------------|
| Dimensions               | <a href="http://www.vishay.com/doc?95046">www.vishay.com/doc?95046</a> |
| Part marking information | <a href="http://www.vishay.com/doc?95054">www.vishay.com/doc?95054</a> |
| Packaging information    | <a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a> |



### D<sup>2</sup>PAK

#### DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D<sup>2</sup>PAK (SMD-220)



| SYMBOL | MILLIMETERS |       | INCHES |       | NOTES |
|--------|-------------|-------|--------|-------|-------|
|        | MIN.        | MAX.  | MIN.   | MAX.  |       |
| A      | 4.06        | 4.83  | 0.160  | 0.190 |       |
| A1     | 0.00        | 0.254 | 0.000  | 0.010 |       |
| b      | 0.51        | 0.99  | 0.020  | 0.039 |       |
| b1     | 0.51        | 0.89  | 0.020  | 0.035 | 4     |
| b2     | 1.14        | 1.78  | 0.045  | 0.070 |       |
| b3     | 1.14        | 1.73  | 0.045  | 0.068 | 4     |
| c      | 0.38        | 0.74  | 0.015  | 0.029 |       |
| c1     | 0.38        | 0.58  | 0.015  | 0.023 | 4     |
| c2     | 1.14        | 1.65  | 0.045  | 0.065 |       |
| D      | 8.51        | 9.65  | 0.335  | 0.380 | 2     |

| SYMBOL | MILLIMETERS |       | INCHES    |       | NOTES |
|--------|-------------|-------|-----------|-------|-------|
|        | MIN.        | MAX.  | MIN.      | MAX.  |       |
| D1     | 6.86        | 8.00  | 0.270     | 0.315 | 3     |
| E      | 9.65        | 10.67 | 0.380     | 0.420 | 2, 3  |
| E1     | 7.90        | 8.80  | 0.311     | 0.346 | 3     |
| e      | 2.54 BSC    |       | 0.100 BSC |       |       |
| H      | 14.61       | 15.88 | 0.575     | 0.625 |       |
| L      | 1.78        | 2.79  | 0.070     | 0.110 |       |
| L1     | -           | 1.65  | -         | 0.066 | 3     |
| L2     | 1.27        | 1.78  | 0.050     | 0.070 |       |
| L3     | 0.25 BSC    |       | 0.010 BSC |       |       |
| L4     | 4.78        | 5.28  | 0.188     | 0.208 |       |

#### Notes

- Dimensioning and tolerancing per ASME Y14.5 M-1994
- Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- Thermal pad contour optional within dimension E, L1, D1 and E1
- Dimension b1 and c1 apply to base metal only
- Datum A and B to be determined at datum plane H
- Controlling dimension: inch
- Outline conforms to JEDEC® outline TO-263AB



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