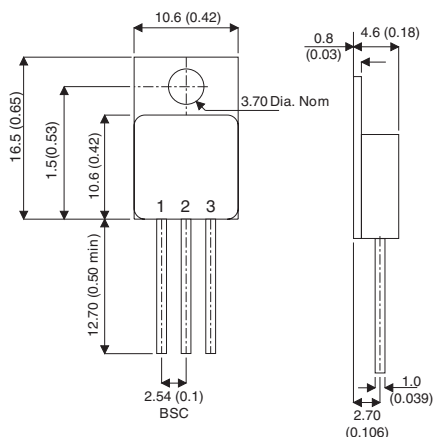


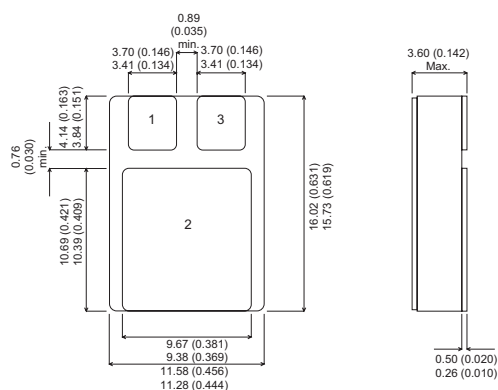
## SILICON NPN EPITAXIAL BASE IN TO220 METAL AND CERAMIC SURFACE MOUNT PACKAGES

### MECHANICAL DATA

Dimensions in mm(inches)



**TO220M** - TO220 Metal Package - Isolated (TO-257AB)



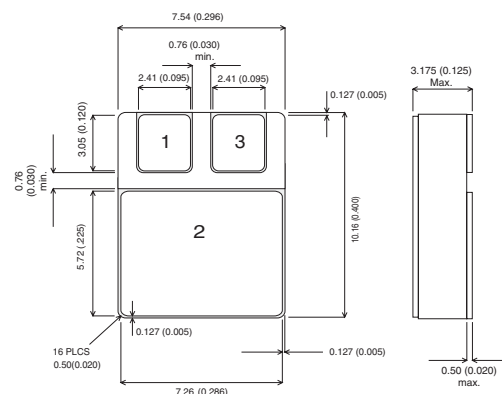
**SMD1** - Ceramic Surface Mount Package (TO-276AB)

### FEATURES

- HERMETIC METAL OR CERAMIC PACKAGES
- HIGH RELIABILITY
- MILITARY AND SPACE OPTIONS
- SCREENING TO CECC LEVELS
- FULLY ISOLATED (METAL VERSION)

### APPLICATIONS

- POWER LINEAR AND SWITCHING APPLICATIONS
- GENERAL PURPOSE POWER



**SMD05** - Ceramic Surface Mount Package (TO-276AA)

**Pin 1** – Base

**Pin 2** – Collector

**Pin 3** – Emitter

### ABSOLUTE MAXIMUM RATINGS ( $T_{case}=25^{\circ}C$ unless otherwise stated)

|            |                                                     | <b>BDS10</b> | <b>BDS11</b> | <b>BDS12</b> |
|------------|-----------------------------------------------------|--------------|--------------|--------------|
| $V_{CBO}$  | Collector - Base voltage ( $I_E = 0$ )              | 60V          | 80V          | 100V         |
| $V_{CEO}$  | Collector - Emitter voltage ( $I_B = 0$ )           | 60V          | 80V          | 100V         |
| $V_{EBO}$  | Emitter - Base voltage ( $I_C = 0$ )                |              | 5V           |              |
| $I_E, I_C$ | Emitter, Collector current                          |              | 15A          |              |
| $I_B$      | Base current                                        |              | 5A           |              |
| $P_{tot}$  | Total power dissipation at $T_{case} = 25^{\circ}C$ |              | 43.75W       |              |
| $T_{stg}$  | Storage Temperature                                 |              | -65 to 200°C |              |
| $T_j$      | Junction Temperature                                |              | 200°C        |              |

Semelab Plc reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.

**ELECTRICAL CHARACTERISTICS** ( $T_{case} = 25^{\circ}C$  unless otherwise stated)

| Parameter                                                             | Test Conditions                          | Min. | Typ. | Max. | Unit    |
|-----------------------------------------------------------------------|------------------------------------------|------|------|------|---------|
| $I_{CBO}$ Collector cut-off current ( $I_E = 0$ )                     | <b>BDS10</b> $V_{CB} = 60V$              |      |      | 500  | $\mu A$ |
|                                                                       | <b>BDS11</b> $V_{CB} = 80V$              |      |      | 500  |         |
|                                                                       | <b>BDS12</b> $V_{CB} = 100V$             |      |      | 500  |         |
| $I_{CEO}$ Collector cut-off current ( $I_B = 0$ )                     | <b>BDS10</b> $V_{CE} = 30V$              |      |      | 1.0  | mA      |
|                                                                       | <b>BDS11</b> $V_{CE} = 40V$              |      |      | 1.0  |         |
|                                                                       | <b>BDS12</b> $V_{CE} = 50V$              |      |      | 1.0  |         |
| $I_{EBO}$ Emitter cut-off current ( $I_C = 0$ )                       | $V_{EB} = 5V$                            |      |      | 1.0  | mA      |
| $V_{CEO(sus)^*}$ Collector - Emitter sustaining voltage ( $I_B = 0$ ) | <b>BDS10</b>                             | 60   |      |      | V       |
|                                                                       | <b>BDS11</b> $I_C = 100mA$               | 80   |      |      |         |
|                                                                       | <b>BDS12</b>                             | 100  |      |      |         |
| $V_{CE(sat)^*}$ Collector - Emitter saturation voltage                | $I_C = 5A$ $I_B = 0.5A$                  |      |      | 1.0  | V       |
|                                                                       | $I_C = 10A$ $I_B = 2.5A$                 |      |      | 3    |         |
| $V_{BE(sat)^*}$ Base - Emitter saturation voltage                     | $I_C = 10A$ $I_B = 2.5A$                 |      |      | 2.5  | V       |
| $V_{BE}^*$ Base - Emitter voltage                                     | $I_C = 5A$ $V_{CE} = 4V$                 |      |      | 1.5  | V       |
| $h_{FE}^*$ DC Current Gain                                            | $I_C = 0.5A$ $V_{CE} = 4V$               | 40   |      | 250  |         |
|                                                                       | $I_C = 5A$ $V_{CE} = 4V$                 | 15   |      | 150  |         |
|                                                                       | $I_C = 10A$ $V_{CE} = 4V$                | 5    |      |      |         |
| $f_T$ Transition frequency                                            | $I_C = 0.5A$ $V_{CE} = 4V$<br>$f = 1MHz$ | 3    |      |      | MHz     |

\*Pulsed : Pulse duration = 300  $\mu s$  , duty cycle = 1.5%

**SWITCHING CHARACTERISTICS**

| Parameter                        | Test Conditions                                        | Max. | Unit    |
|----------------------------------|--------------------------------------------------------|------|---------|
| $t_{on}$ On Time ( $t_d + t_r$ ) | $I_C = 4A$ $V_{CC} = 30V$ $I_{B1} = 0.4A$              | 0.7  | $\mu s$ |
| $t_s$ Storage Time               | $I_C = 4A$ $V_{CC} = 30V$<br>$I_{B1} = -I_{B2} = 0.4A$ | 1.0  | $\mu s$ |
| $t_r$ Fall Time                  |                                                        | 0.8  | $\mu s$ |

**THERMAL CHARACTERISTICS**

| Test Conditions                                      | Max. | Unit          |
|------------------------------------------------------|------|---------------|
| $R_{\theta J-C}$ Thermal Resistance Junction to Case | 4.0  | $^{\circ}C/W$ |

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