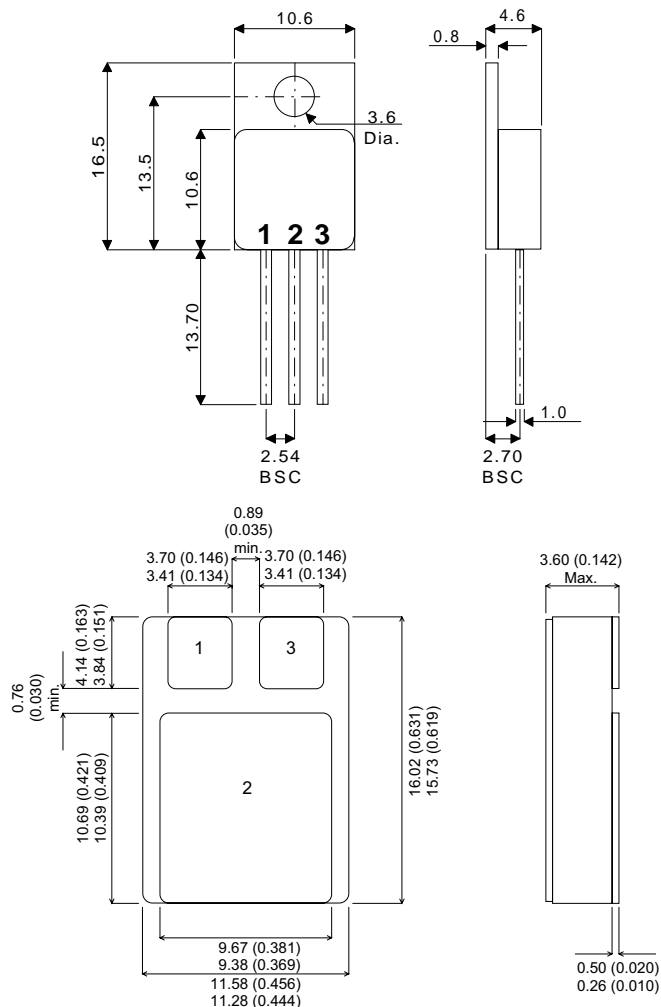


**MECHANICAL DATA**

Dimensions in mm



**SILICON NPN  
 EPITAXIAL BASE IN  
 TO220 METAL AND  
 SMD1 CERAMIC SURFACE  
 MOUNT PACKAGES**

**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

**TO220M** - TO220 Metal Package - Isolated  
**SMD1** - Ceramic Surface Mount Package

**Pin 1** – Base      **Pin 2** – Collector      **Pin 3** – Emitter

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{case}=25^{\circ}C$ 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 $T_{case} \leq 75^{\circ}C$		90W	
$T_{stg}$	Storage Temperature		-65 to 200°C	
$T_j$	Junction Temperature		200°C	

**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	mA
	<b>BDS11</b> $V_{CE} = 40V$			1	
	<b>BDS12</b> $V_{CE} = 50V$			1	
$I_{EBO}$ Emitter cut-off current ( $I_C = 0$ )	$V_{EB} = 5V$			1	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	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	$I_C = 0.5A$ $V_{CE} = 4V$	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	$I_C = 4A$ $V_{CC} = 30V$ $I_{B1} = -I_{B2} = 0.4A$	1.0	$\mu s$
$t_r$ Fall Time		0.8	$\mu s$

**THERMAL DATA**

$R_{THj-case}$	Thermal resistance junction - case	Max. 1.4°C/W
$R_{THcase-sink}$	Thermal resistance case - heatsink **	Typ. 1.0°C/W
$R_{THj-a}$	Thermal resistance junction - ambient	Max. 80°C/W

\*\* Smooth flat surface using thermal grease.