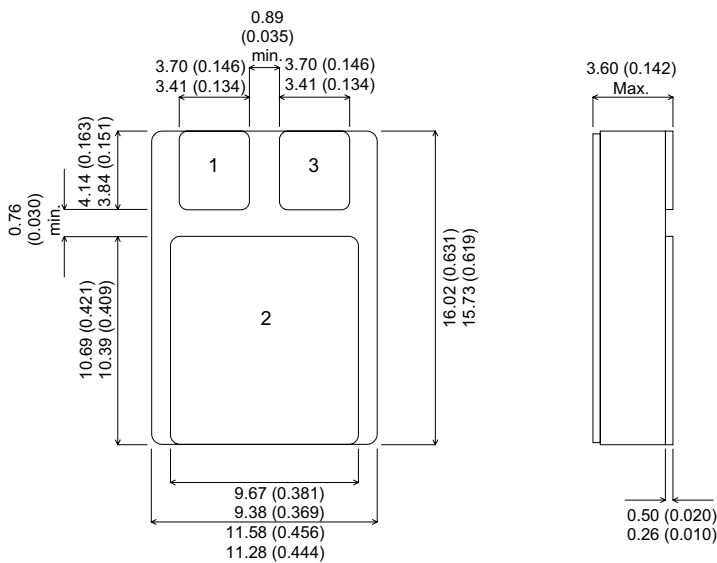


**MECHANICAL DATA**

Dimensions in mm



**SMD1 Package**

Pad 1 – Base    Pad 2 – Collector    Pad 3 – Emitter

**ADVANCED  
DISTRIBUTED BASE DESIGN  
HIGH VOLTAGE  
HIGH SPEED NPN  
SILICON POWER TRANSISTOR**

- SEMEFAB DESIGNED AND DIFFUSED DIE
- HIGH VOLTAGE
- FAST SWITCHING ( $t_f = 40\text{ns}$ )
- EXCEPTIONAL HIGH TEMPERATURE PERFORMANCE
- HIGH ENERGY RATING
- EFFICIENT POWER SWITCHING
- MILITARY AND HI-REL OPTIONS

**FEATURES**

- Multi-base design for efficient energy distribution across the chip resulting in significantly improved switching and energy ratings across full temperature range.
- Ion implant and high accuracy masking for tight control of characteristics from batch to batch.
- Triple Guard Rings for improved control of high voltages.

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

$V_{\text{CBO}}$	Collector – Base Voltage	1000V
$V_{\text{CEO}}$	Collector – Emitter Voltage ( $I_B = 0$ )	500V
$V_{\text{EBO}}$	Emitter – Base Voltage	10V
$I_C$	Collector Current	2A
$I_{\text{C(PK)}}$	Peak Collector Current	4A
$I_B$	Base Current	0.8A
$P_{\text{tot}}$	Total Dissipation at $T_{\text{case}} = 25^\circ\text{C}$	35W
	Derate above $25^\circ\text{C}$ when used on efficient heatsink	0.2W/ $^\circ\text{C}$
$T_{\text{stg}}$	Operating and Storage Temperature Range	$-65$ to $200^\circ\text{C}$
$R_{\text{th}}$	Thermal Resistance Junction – Case	3.5 $^\circ\text{C}/\text{W}$

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

Parameter	Test Conditions	Min.	Typ.	Max.	Unit	
<b>ELECTRICAL CHARACTERISTICS</b>						
$V_{\text{CEO(sus)}}^*$	Collector – Emitter Sustaining Voltage	$I_{\text{C}} = 100\text{mA}$	500		V	
$V_{(\text{BR})\text{CBO}}^*$	Collector – Base Breakdown Voltage	$I_{\text{C}} = 1\text{mA}$	1000			
$V_{(\text{BR})\text{EBO}}^*$	Emitter – Base Breakdown Voltage	$I_{\text{E}} = 1\text{mA}$ $I_{\text{C}} = 0$	10			
$I_{\text{CEO}}^*$	Collector – Emitter Cut-Off Current	$I_{\text{B}} = 0$ $V_{\text{CC}} = 500\text{V}$		100	$\mu\text{A}$	
$I_{\text{CBO}}^*$	Collector – Base Cut-Off Current	$I_{\text{E}} = 0$ $V_{\text{CB}} = 1000\text{V}$		10	$\mu\text{A}$	
			$T_{\text{C}} = 125^{\circ}\text{C}$			100
$I_{\text{EBO}}^*$	Emitter Cut-Off Current	$I_{\text{C}} = 0$ $V_{\text{EB}} = 5\text{V}$		10	$\mu\text{A}$	
			$T_{\text{C}} = 125^{\circ}\text{C}$			100
$h_{\text{FE}}^*$	DC Current Gain	$I_{\text{C}} = 100\text{mA}$ $V_{\text{CE}} = 4\text{V}$	20	40	—	
		$I_{\text{C}} = 500\text{mA}$ $V_{\text{CE}} = 4\text{V}$	12	18		
		$I_{\text{C}} = 1\text{A}$ $V_{\text{CE}} = 4\text{V}$	5	8		
		$T_{\text{C}} = 125^{\circ}\text{C}$	4	7		
$V_{\text{CE(sat)}}^*$	Collector – Emitter Saturation Voltage	$I_{\text{C}} = 100\text{mA}$ $I_{\text{B}} = 20\text{mA}$		0.05	0.1	V
		$I_{\text{C}} = 500\text{mA}$ $I_{\text{B}} = 100\text{mA}$		0.15	0.2	
		$I_{\text{C}} = 1\text{A}$ $I_{\text{B}} = 200\text{mA}$		0.3	0.5	
$V_{\text{BE(sat)}}^*$	Base – Emitter Saturation Voltage	$I_{\text{C}} = 500\text{mA}$ $I_{\text{B}} = 100\text{mA}$		0.8	1.0	V
		$I_{\text{C}} = 1\text{A}$ $I_{\text{B}} = 200\text{mA}$		0.9	1.1	
$V_{\text{BE(on)}}^*$	Base – Emitter On Voltage	$I_{\text{C}} = 500\text{mA}$ $V_{\text{CE}} = 4\text{V}$		0.8	1.0	V
<b>DYNAMIC CHARACTERISTICS</b>						
$f_{\text{T}}$	Transition Frequency	$I_{\text{C}} = 100\mu\text{A}$ $V_{\text{CE}} = 4\text{V}$ $f = 10\text{MHz}$		20		MHz
$C_{\text{ob}}$	Output Capacitance	$V_{\text{CB}} = 20\text{V}$ $f = 1\text{MHz}$ $I_{\text{E}} = 0$		20	35	pF
<b>SECOND BREAKDOWN</b>						
$I_{\text{S/B}}$	Second Breakdown Collector Current	$V_{\text{CE}} = 50\text{V}$ $t = 1\text{s}$	0.8			A
<b>SWITCHING CHARACTERISTICS (resistive load)</b>						
$t_{\text{on}}$	On Time	$V_{\text{CC}} = 150\text{V}$ $I_{\text{C}} = 1\text{A}$ $I_{\text{B1}} = 0.2\text{A}$ $I_{\text{B2}} = -0.4\text{A}$		0.08	0.2	$\mu\text{s}$
$t_{\text{s}}$	Storage Time			2	4	
$t_{\text{f}}$	Fall Time			0.04	0.1	

\* Pulse test  $t_{\text{p}} = 300\mu\text{s}$ ,  $\delta \leq 2\%$



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