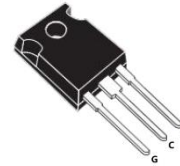


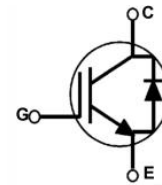
## Features

- High Current Capability
- Low Saturation Voltage:  
VCE(sat) = 1.30 V @ IC = 50 A
- High Input Impedance
- RoHS Compliant



## Applications

- PDP TV



## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit	
Collector to Emitter Voltage	V <sub>CES</sub>	330	V	
Gate to Emitter Voltage	V <sub>GES</sub>	±30		
Collector Current	I <sub>C</sub>	T <sub>C</sub> =25°C	100	A
		T <sub>C</sub> =100°C	50	
Pulsed Collector Current TC=25°C	I <sub>CM</sub>	180		
Diode forward current @ TC= 100°C	I <sub>F</sub>	30	A	
Maximum Power Dissipation TC=25°C	P <sub>D</sub>	328	W	
Maximum Power Dissipation TC=100°C		130		
Operating Junction Temperature	T <sub>J</sub>	-55 to 150	°C	
Storage Temperature Range	T <sub>stg</sub>	-55 to 150		
Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds	T <sub>L</sub>	300		

## Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub> (IGBT)		0.38	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub> (Diode)		1.1	

## Package Marking and Ordering Information

Device Marking	Device	Package	MOQ
MSG50N350FH	MSG50N350FH	TO-247	

**Electrical Characteristics of the IGBT**  $T_C = 25^\circ\text{C}$  unless otherwise noted

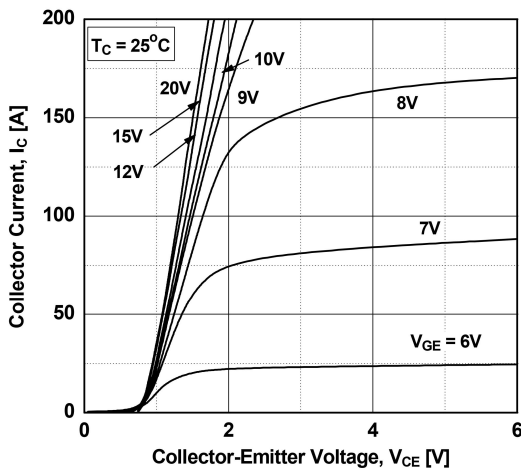
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>On/off Characteristics</b>						
G-E Threshold Voltage	$V_{GE(th)}$	$I_C = 250\mu\text{A}, V_{CE} = V_{GE}$	2.5	4	5.5	
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 30\text{A}, V_{GE} = 15\text{V}$	-	1.15	-	V
		$I_C = 50\text{A}, V_{GE} = 15\text{V}$	-	1.30	-	
		$I_C = 50\text{A}, V_{GE} = 15\text{V}$ $T_C = 125^\circ\text{C}$	-	1.52	-	
Collector to Emitter Breakdown Voltage	$B_{VCE}$	$V_{GE} = 0\text{V}, I_C = 400\mu$	330	-	-	
Collector Cut-Off Current	$I_{CE}$	$V_{CE} = V_{CES}, V_{GE} = 0$	-	-	100	$\mu\text{A}$
G-E Leakage Current	$I_{GE}$	$V_{GE} = V_{GES}, V_{CE} = 0\text{V}$	-	-	$\pm 1$	nA
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{ies}$	$V_{CE} = 30\text{V}, V_{GE} = 0\text{V}$ $f = 1\text{MHz}$	-	4700	-	pF
Output Capacitance	$C_{oes}$		-	198	-	
Reverse Transfer Capacitance	$C_{res}$		-	83	-	
<b>Switching Characteristics</b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 200\text{V}, I_C = 40\text{A},$ $R_G = 5\Omega, V_{GE} = 15\text{V},$ Resistive Load, $T_C = 25^\circ\text{C}$	-	63	-	nS
Rise Time	$t_r$		-	81	-	
Turn-Off Delay Time	$t_{d(off)}$		-	142	-	
Total Gate Charge	$Q_g$	$V_{CE} = 200\text{V}, I_C = 40\text{A},$ $V_{GE} = 15\text{V}$	-	175	-	nC

**Electrical Characteristics of the Diode**  $T_C = 25^\circ\text{C}$  unless otherwise noted

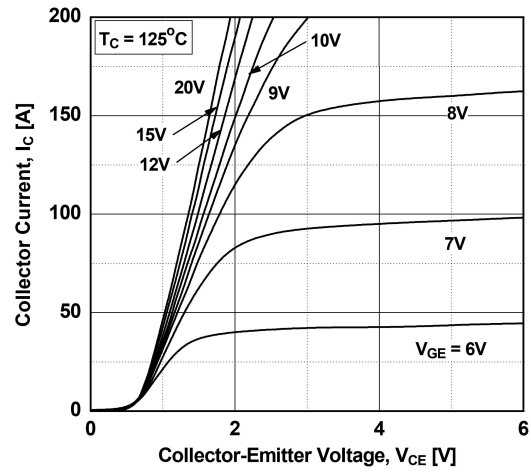
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Diode Forward Voltage	$V_{FM}$	$I_F = 20\text{A}$	$T_C = 25^\circ\text{C}$	-	1.15	1.4	V
			$T_C = 125^\circ\text{C}$	-	1	-	
Diode Reverse Recovery Time	$t_{rr}$	$I_F = 20\text{A},$ $di_F/dt = 200\text{A}/\mu\text{s}$	$T_C = 25^\circ\text{C}$	-	35	-	ns
			$T_C = 125^\circ\text{C}$	-	53	-	
Diode Peak Reverse Recovery Current	$I_{rr}$	$I_F = 20\text{A},$ $di_F/dt = 200\text{A}/\mu\text{s}$	$T_C = 25^\circ\text{C}$	-	4	-	A
			$T_C = 125^\circ\text{C}$	-	6	-	
Diode Reverse Recovery Charge	$Q_{rr}$	$I_F = 20\text{A},$ $di_F/dt = 200\text{A}/\mu\text{s}$	$T_C = 25^\circ\text{C}$	-	50	-	nC
			$T_C = 125^\circ\text{C}$	-	120	-	

## Typical Performance Characteristics

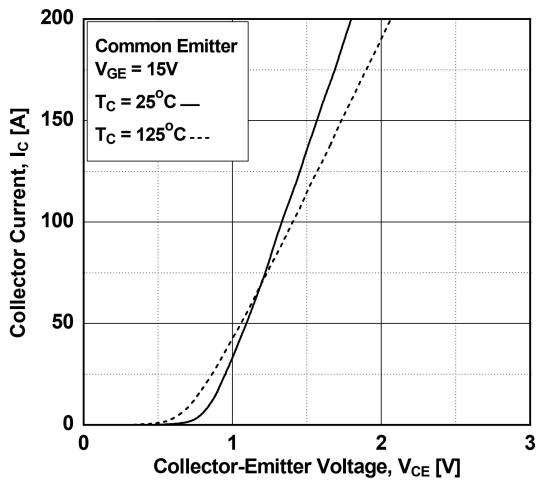
Typical Output Characteristics



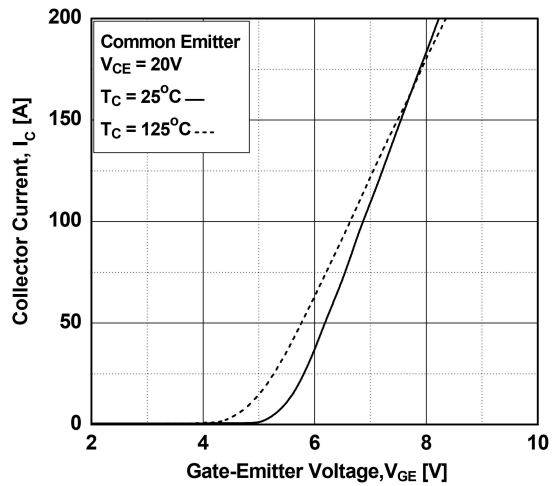
Typical Output Characteristics



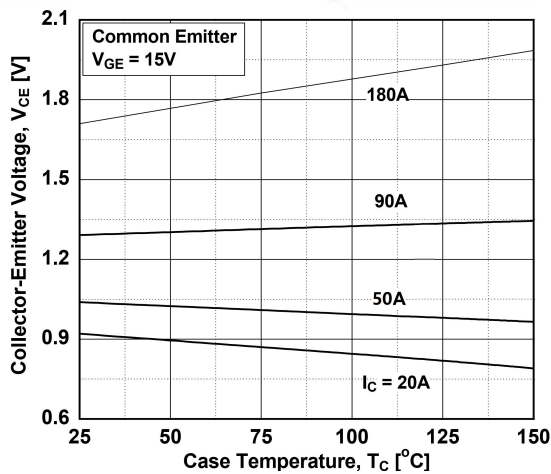
Typical Saturation Voltage Characteristics



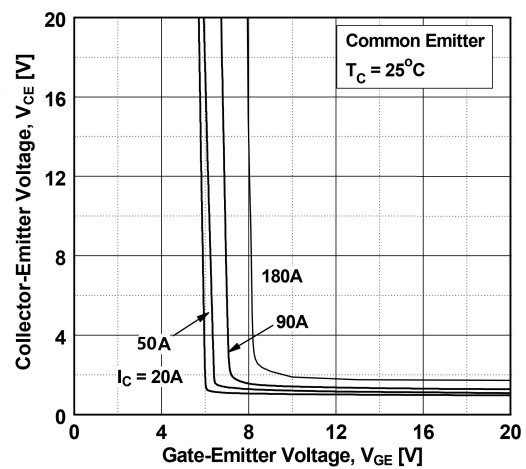
Transfer Characteristics



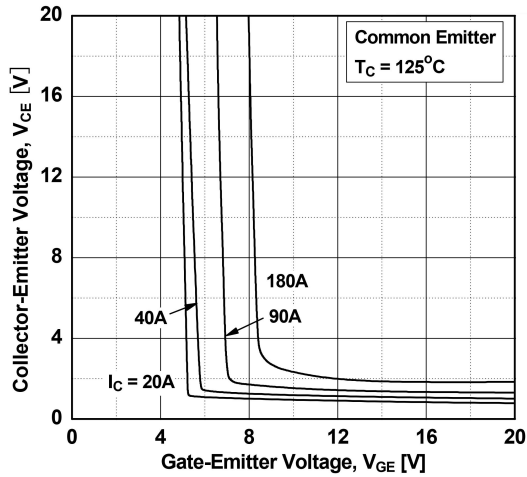
Saturation Voltage vs. Case Temperature at Variant Current Level



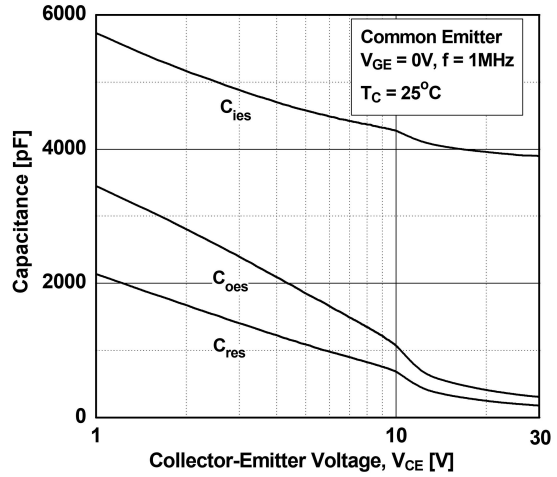
Saturation Voltage vs.  $V_{GE}$



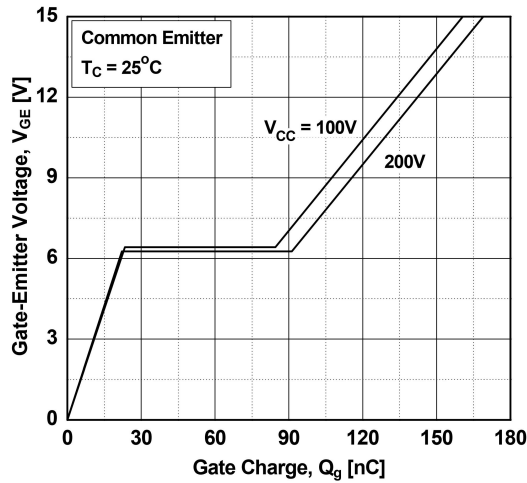
**Saturation Voltage vs.  $V_{GE}$**



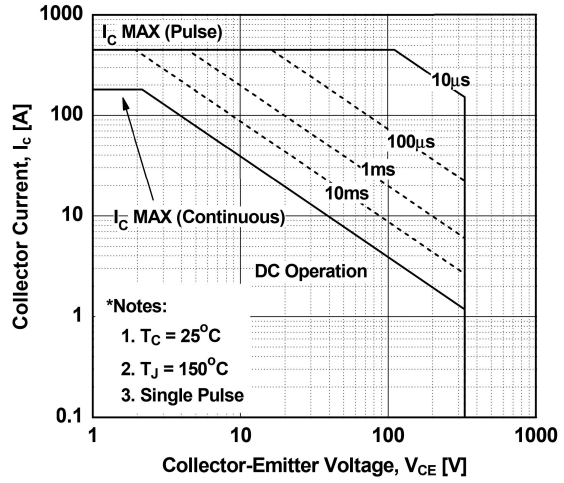
**Capacitance Characteristics**



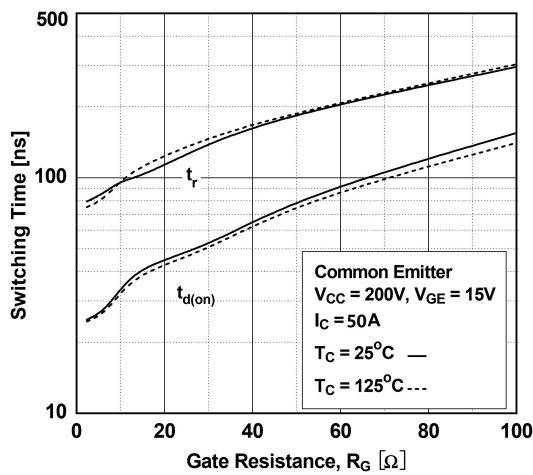
**Gate charge Characteristics**



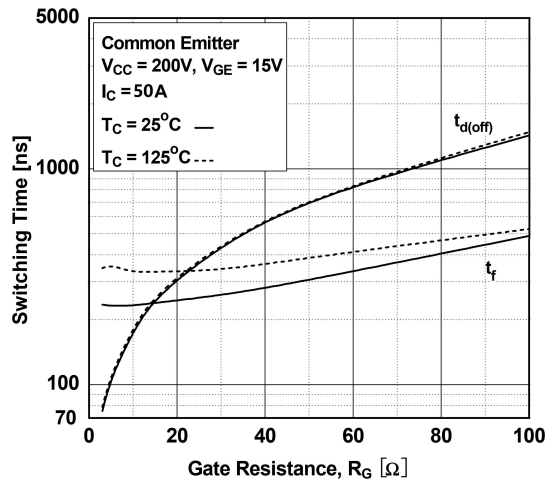
**SOA Characteristics**



**Turn-on Characteristics vs. Gate Resistance**

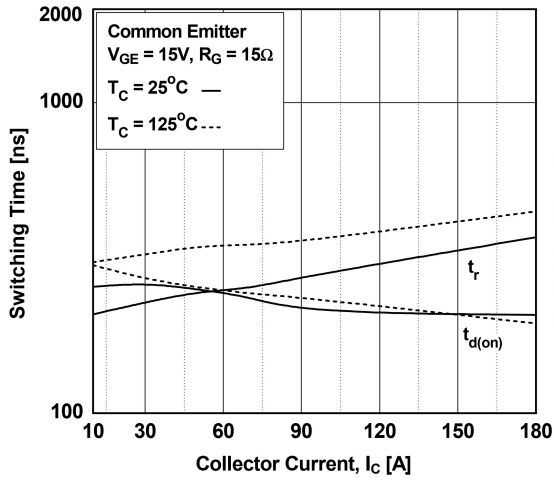


**Turn-off Characteristics vs Gate Resistance**

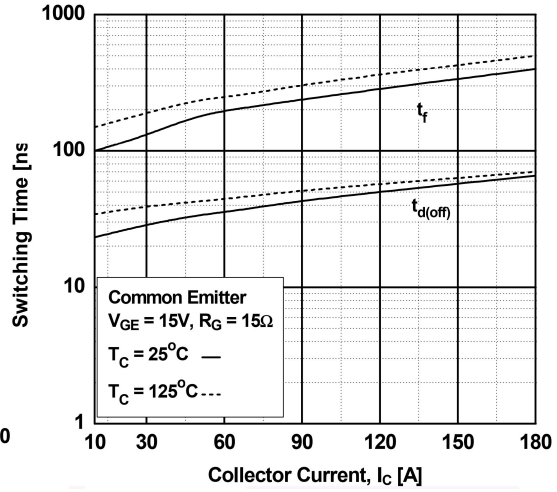




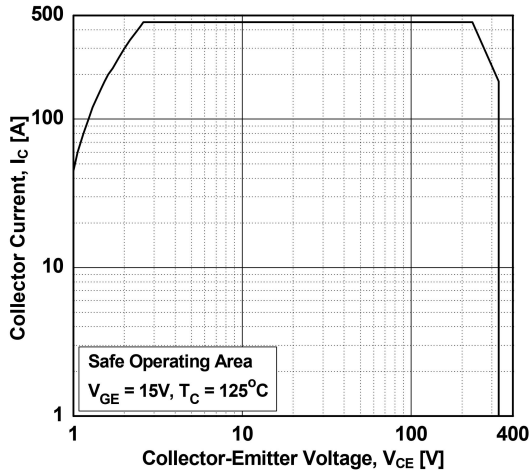
Turn-on Characteristics vs. Collector Current



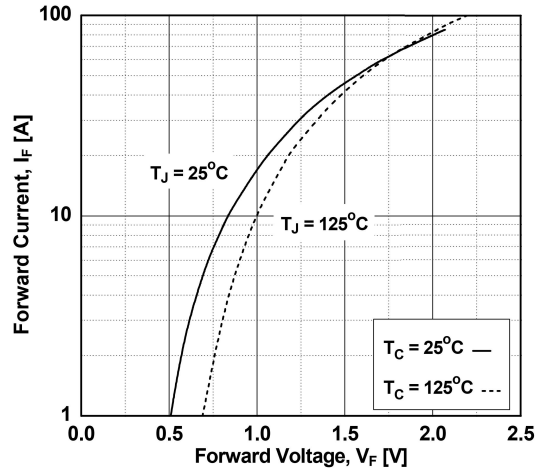
Turn-off Characteristics v Collector Current



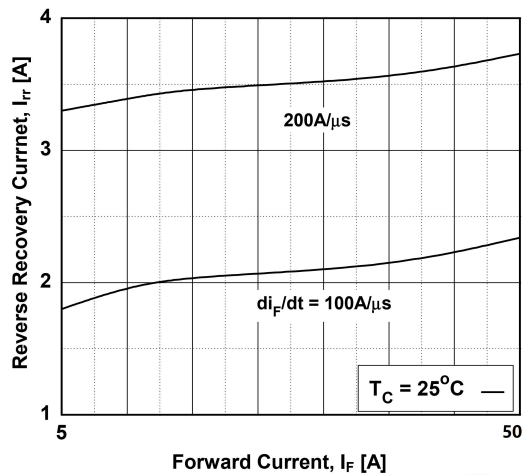
Turn off Switching SOA Characteristics



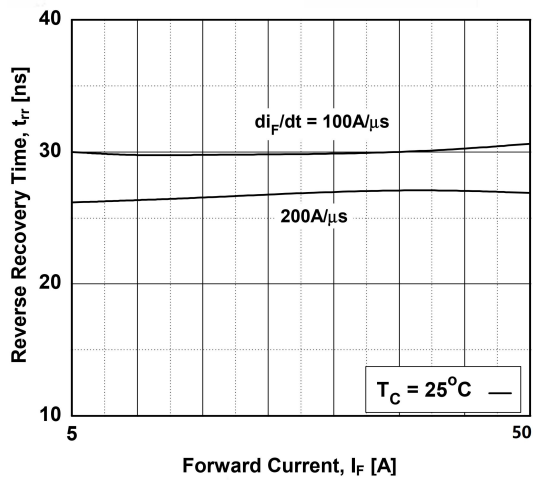
Forward Characteristics



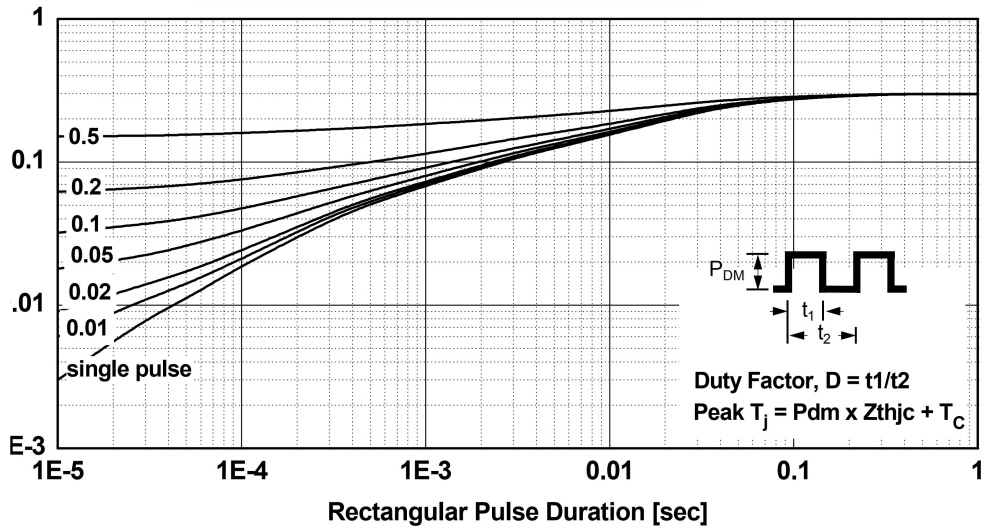
Reverse Recovery Current



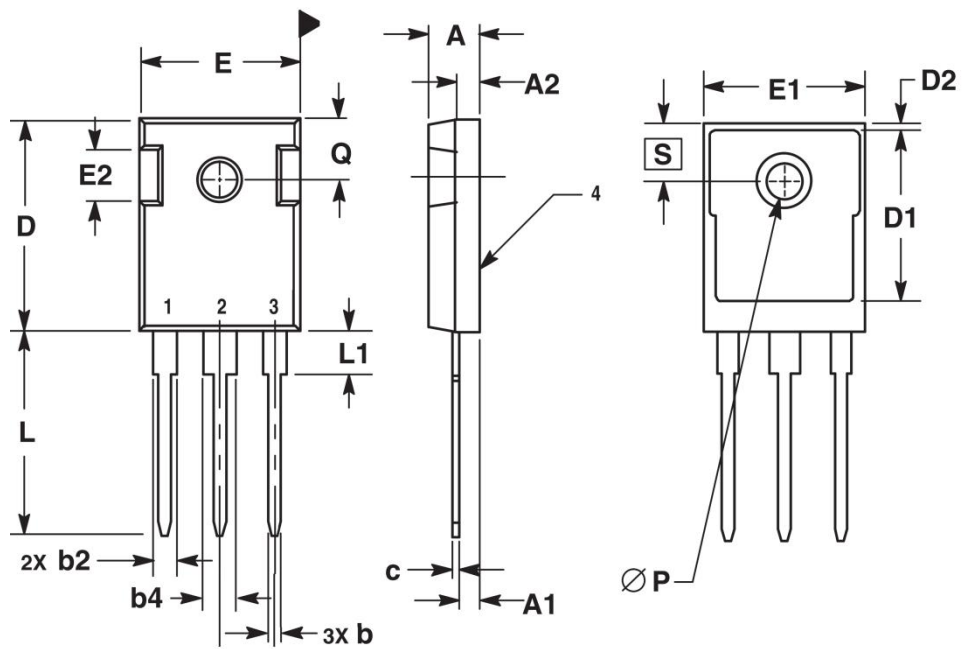
Reverse Recovery Time



### Transient Thermal Impedance of IGBT



### Package outline dimension



Symbol	Min	Max	Unit
A	4.7	5.31	mm
A1	2.21	2.59	
A2	1.5	2.49	
b	1	1.4	
b2	1.65	2.39	
b4	2.59	3.43	



<b>c</b>	<b>0.38</b>	<b>0.89</b>	
<b>D</b>	<b>20.8</b>	<b>21.46</b>	
<b>D1</b>	<b>13.08</b>	<b>-</b>	
<b>D2</b>	<b>0.51</b>	<b>1.35</b>	
<b>E</b>	<b>15.49</b>	<b>16.26</b>	
<b>E1</b>	<b>13.46</b>	<b>-</b>	
<b>E2</b>	<b>4.32</b>	<b>5.49</b>	
<b>e</b>	<b>5.46BSC</b>		
<b>L</b>	<b>19.81</b>	<b>20.32</b>	
<b>L1</b>	<b>-</b>	<b>4.5</b>	
<b>P</b>	<b>3.56</b>	<b>3.66</b>	
<b>Q</b>	<b>5.38</b>	<b>6.2</b>	
<b>S</b>	<b>6.15BSC</b>		