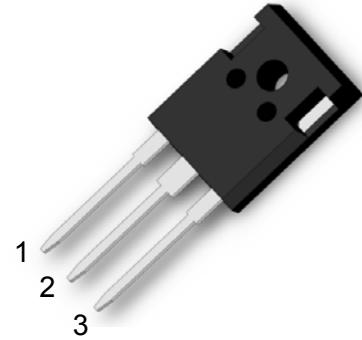


## PRODUCT FEATURES

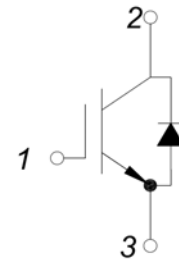
- IGBT chip in trench FS-technology
- Low switching losses
- $V_{CE(sat)}$  with positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Pb-free lead plating,RoHS compliant



## APPLICATIONS

- High frequency switching application
- Medical applications
- Motion/servo control
- UPS systems

1.Gate  
2.Collector  
3.Emitter



Type	$V_{CES}$	$I_C$	$V_{CE(sat)}$ $T_J=25^\circ C$	$T_{Jmax}$	Marking	Package
MM25G3T120B	1200V	25A	1.8V	175°C	MM25G3T120B	TO-247

## ABSOLUTE MAXIMUM RATINGS( $T_C=25^\circ C$ unless otherwise specified)

Symbol	Parameter/Test Conditions	Values	Unit	
$V_{CES}$	Collector Emitter Voltage $T_J=25^\circ C$	1200	V	
$V_{GES}$	Gate Emitter Voltage	$\pm 20$		
	Transient Gate Emitter Voltage ( $t_p \leq 10\mu s, D < 0.01$ )	$\pm 30$		
$I_C$	DC Collector Current	$T_C=25^\circ C$	40	A
		$T_C=110^\circ C$	25	
$I_{Cpuls}$	Pulsed collector current, $t_p$ limited by $T_{Jmax}$	100		
$P_{tot}$	Power Dissipation Per IGBT	385	W	
$V_{RRM}$	Repetitive Reverse Voltage $T_J=25^\circ C$	1200	V	
$I_{F(AV)}$	Average Forward Current $T_C=100^\circ C$	20	A	
$I_{Fpuls}$	Diode pulsed current, $t_p$ limited by $T_{Jmax}$	100		
$T_{Jmax}$	Max. Junction Temperature	175	°C	
$T_{Jop}$	Operating Temperature	-40~175		
$T_{stg}$	Storage Temperature	-55~150		
	Soldering temperature, 1.6mm from case for 10s Wavesoldering only, temperature on leads only	260		
Torque	to heatsink Recommended (M3)	1.1	Nm	

MacMic Science & Technology Co., Ltd.

Add: #18, Hua Shan Zhong Lu, New District, Changzhou City, Jiangsu Province, P. R. of China

Tel.: +86-519-85163708 Fax: +86-519-85162291 Post Code: 213022 Website: www.macmicst.com

# MM25G3T120B

## IGBT

### ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$V_{GE(th)}$	Gate Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=1\text{mA}$	5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=25\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.8	2.25	
		$I_C=25\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		2.1		
		$I_C=25\text{A}, V_{GE}=15\text{V}, T_J=150^\circ\text{C}$		2.2		
$I_{CES}$	Collector Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			100	$\mu\text{A}$
		$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$			10	$\text{mA}$
$I_{GES}$	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 20\text{V}, T_J=25^\circ\text{C}$	-400		400	$\text{nA}$
$Q_g$	Gate Charge	$V_{CE}=600\text{V}, I_C=25\text{A}, V_{GE}=15\text{V}$		150		$\text{nC}$
$C_{ies}$	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		1.9		$\text{nF}$
$C_{res}$	Reverse Transfer Capacitance				85	$\text{pF}$
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600\text{V}, I_C=25\text{A}$ $R_G=30\Omega,$	$T_J=25^\circ\text{C}$		35	$\text{ns}$
			$T_J=125^\circ\text{C}$		40	$\text{ns}$
			$T_J=150^\circ\text{C}$		45	$\text{ns}$
$t_r$	Rise Time	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		35	$\text{ns}$
			$T_J=125^\circ\text{C}$		40	$\text{ns}$
			$T_J=150^\circ\text{C}$		40	$\text{ns}$
$t_{d(off)}$	Turn off Delay Time	$V_{CC}=600\text{V}, I_C=25\text{A}$ $R_G=30\Omega,$	$T_J=25^\circ\text{C}$		210	$\text{ns}$
			$T_J=125^\circ\text{C}$		250	$\text{ns}$
			$T_J=150^\circ\text{C}$		270	$\text{ns}$
$t_f$	Fall Time	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		100	$\text{ns}$
			$T_J=125^\circ\text{C}$		150	$\text{ns}$
			$T_J=150^\circ\text{C}$		180	$\text{ns}$
$E_{on}$	Turn on Energy	$V_{CC}=600\text{V}, I_C=25\text{A}$ $R_G=30\Omega,$	$T_J=125^\circ\text{C}$		3.4	$\text{mJ}$
			$T_J=150^\circ\text{C}$		3.6	$\text{mJ}$
$E_{off}$	Turn off Energy	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=125^\circ\text{C}$		2.4	$\text{mJ}$
			$T_J=150^\circ\text{C}$		2.55	$\text{mJ}$
$I_{SC}$	Short Circuit Current	$t_{psc}\leq 10\mu\text{s}, V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}, V_{CC}=600\text{V}$		100		A
$R_{thJC}$	Junction to Case Thermal Resistance ( Per IGBT )				0.39	$\text{K/W}$

## Anti-Parallel Diode

### ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$V_F$	Forward Voltage	$I_F=20\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.75	2.15	V
		$I_F=20\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		1.6		
		$I_F=20\text{A}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$		1.55		
$t_{rr}$	Reverse Recovery Time	$I_F=20\text{A}, V_R=600\text{V}$ $dI_F/dt=-500\text{A}/\mu\text{s}$ $T_J=150^\circ\text{C}$		450		$\text{ns}$
$I_{RRM}$	Max. Reverse Recovery Current			21		A
$Q_{RR}$	Reverse Recovery Charge			4.6		$\mu\text{C}$
$E_{rec}$	Reverse Recovery Energy			1.35		$\text{mJ}$
$R_{thJCD}$	Junction to Case Thermal Resistance ( Per Diode )				1.0	$\text{K/W}$

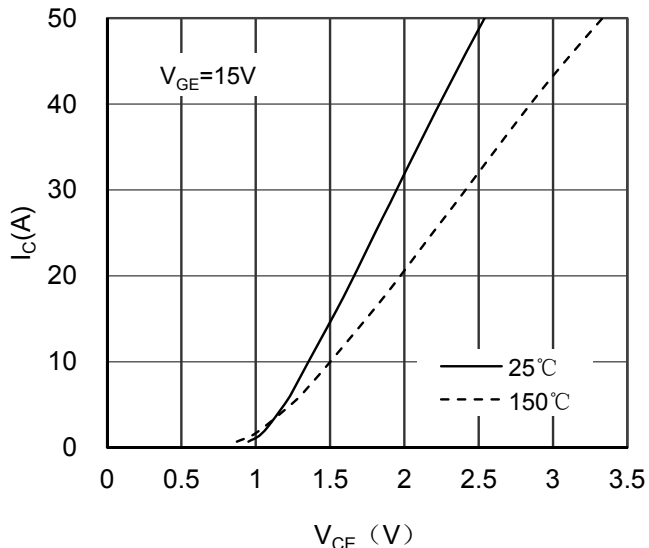


Figure 1. Typical Output Characteristics IGBT

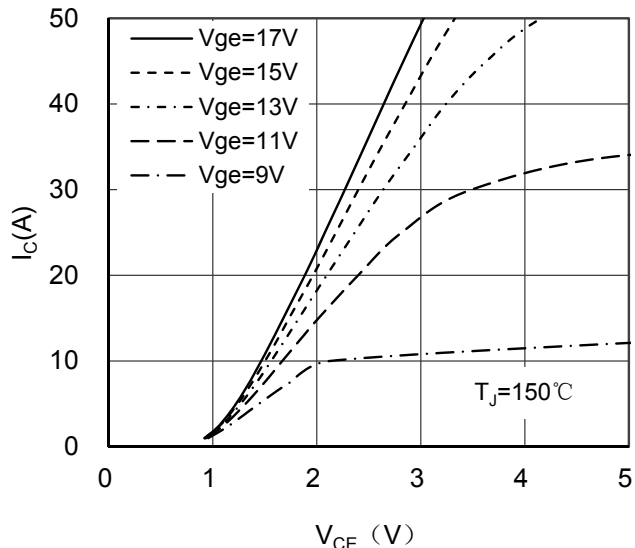


Figure 2. Typical Output Characteristics IGBT

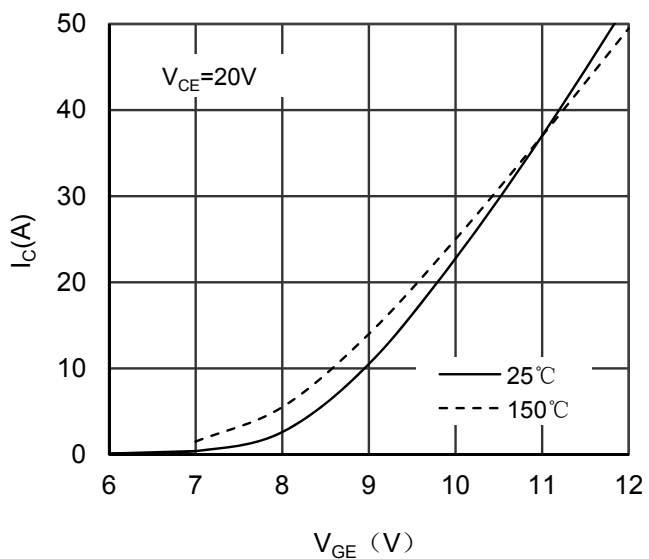


Figure 3. Typical Transfer characteristics IGBT

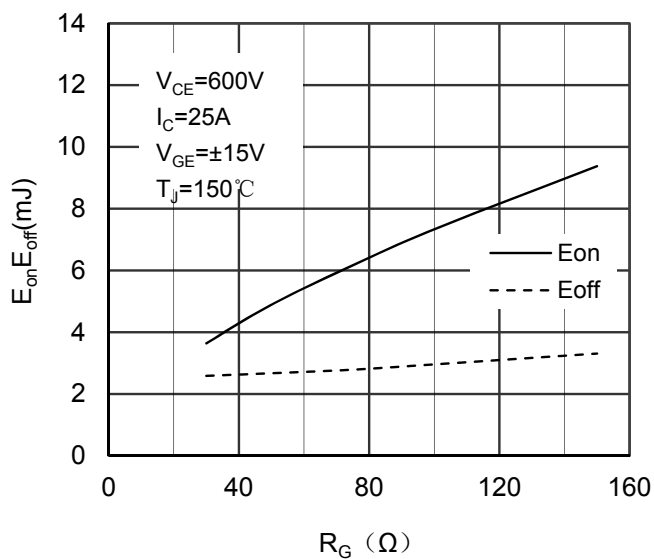


Figure 4. Switching Energy vs Gate Resistor IGBT

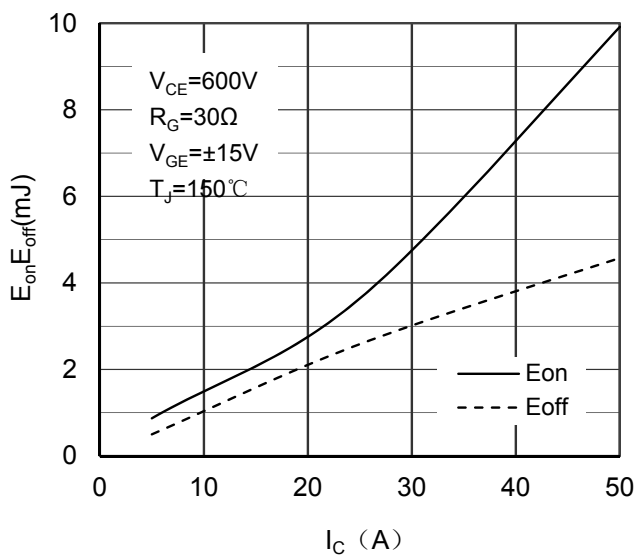


Figure 5. Switching Energy vs Collector Current IGBT

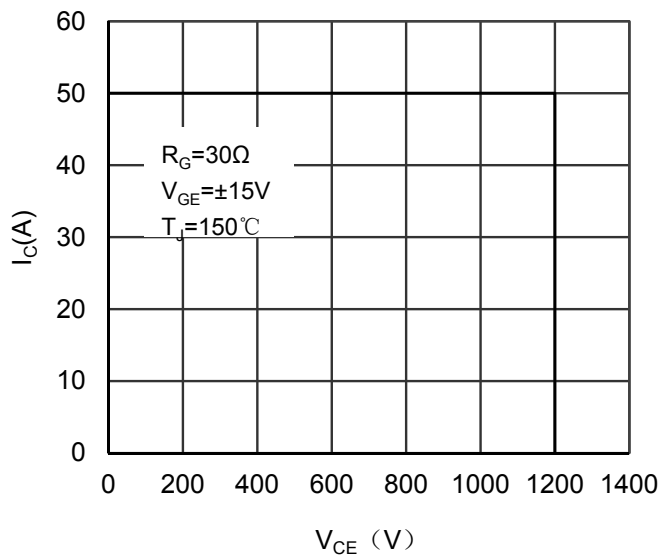


Figure 6. Reverse Biased Safe Operating Area IGBT

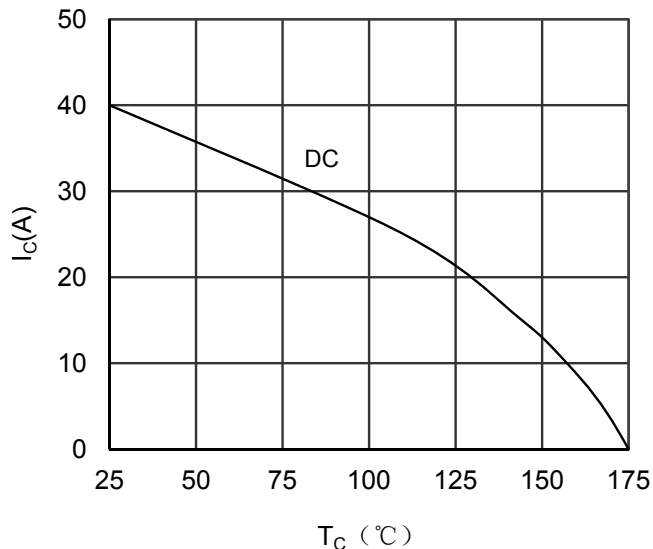


Figure 7. Collector Current vs Case temperature IGBT

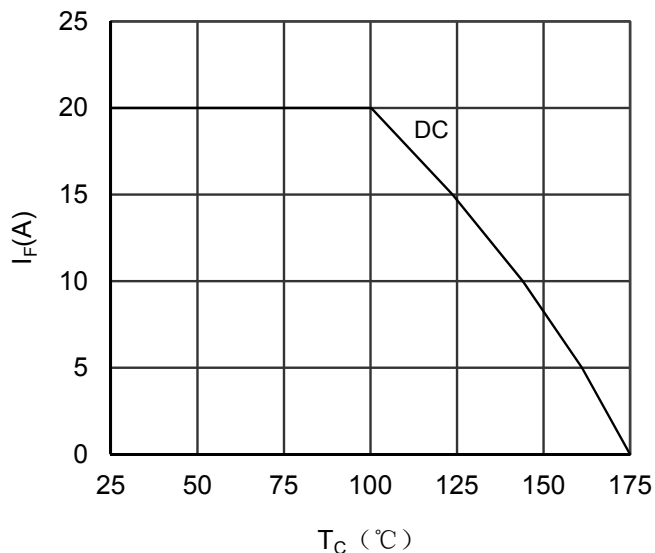


Figure 8. Forward current vs Case temperature Diode

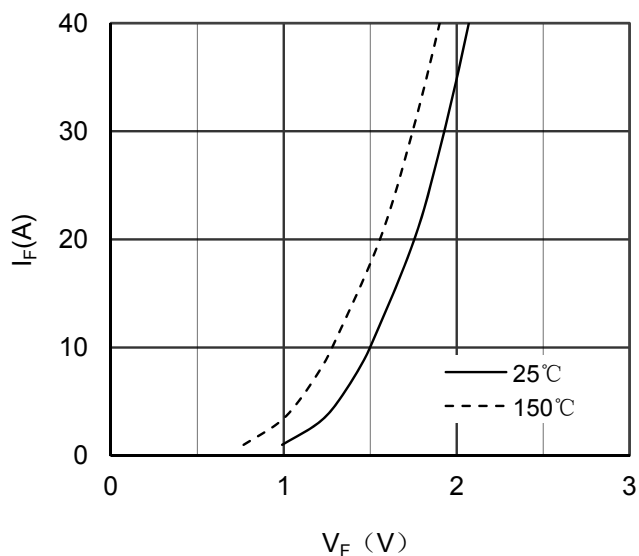


Figure 9. Diode Forward Characteristics Diode

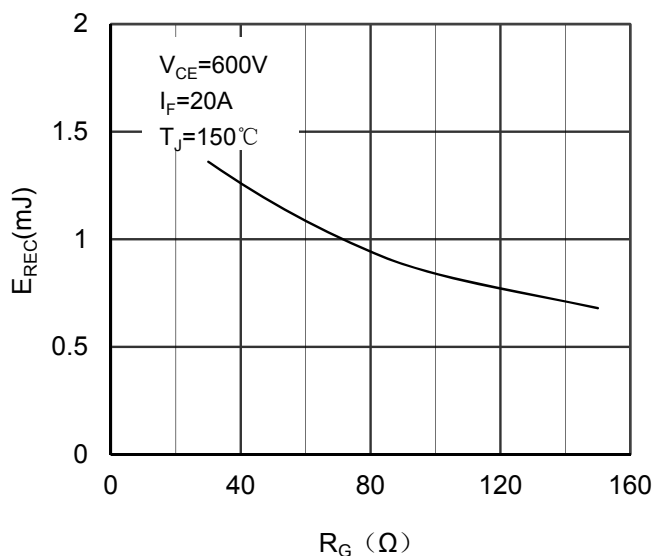


Figure 10. Switching Energy vs Gate Resistor Diode

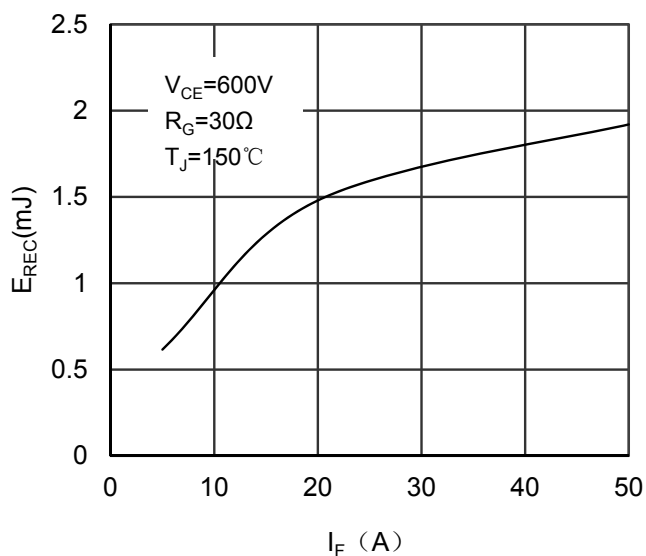


Figure 11. Switching Energy vs Forward Current Diode

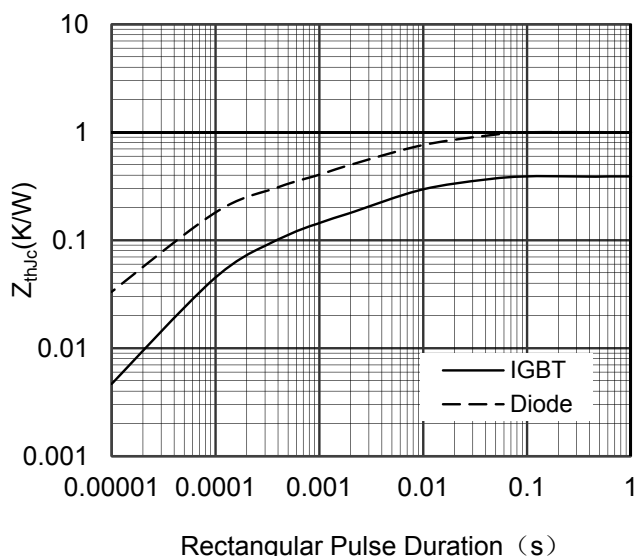
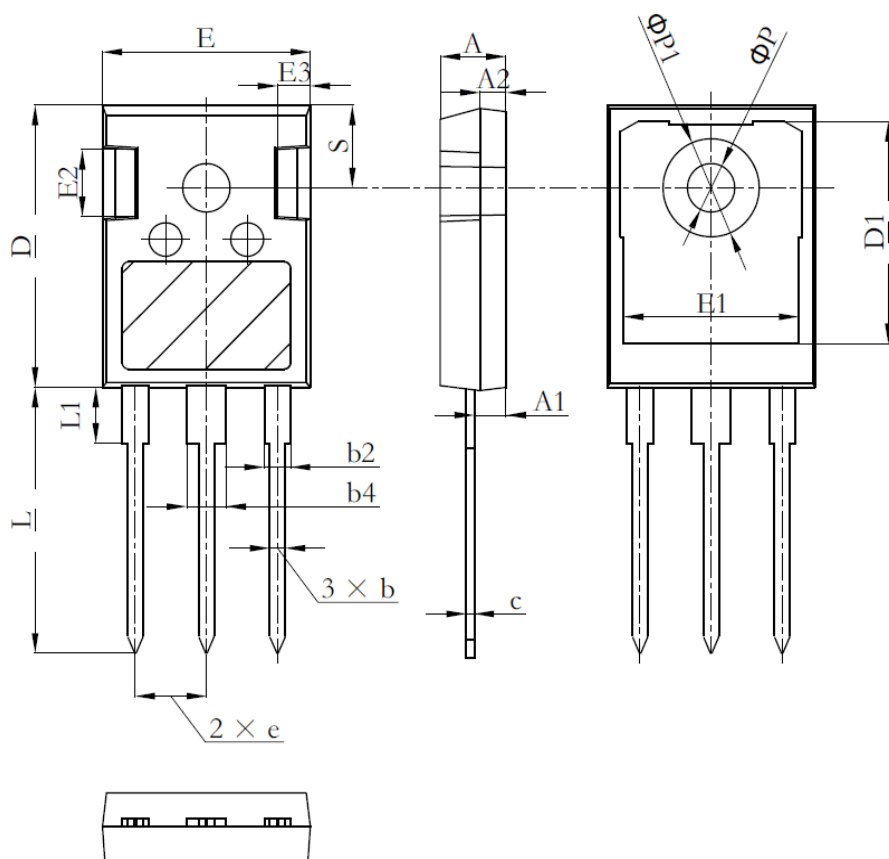


Figure 12. Transient Thermal Impedance of Diode and IGBT



Symbol	Min	Nom	Max
A	4.80	5.00	5.21
A1	2.21	2.41	2.61
A2	1.85	2.00	2.16
b	1.07	1.23	1.36
b2	1.90	2.05	2.41
b4	2.87	3.05	3.38
c	0.50	0.60	0.75
e	5.44BSC		
E	15.50	15.80	16.13
E1	12.38	13.30	13.60
E2	3.68	-	5.20
E3	1.00	-	2.70
D	20.70	21.00	21.30
D1	16.25	-	17.65
L	19.60	19.91	20.32
L1	-	-	4.40
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15BSC		

技术要求:

1. 单位: mm
2. 成品需符合RoHS2.0要求.

Figure 14. Package Outline