

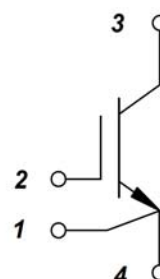
PRODUCT FEATURES

- IGBT³ Chip(Trench+Field Stop technology)
- Low switching losses
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast switching and short tail current
- Popular SOT-227 Package



APPLICATIONS

- AC motor control
- Motion/servo control
- Inverter and power supplies



IGBT

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_J=25^{\circ}\text{C}$	1200	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C=25^{\circ}\text{C}, T_{Jmax}=150^{\circ}\text{C}$	200	A
		$T_C=80^{\circ}\text{C}, T_{Jmax}=150^{\circ}\text{C}$	150	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	300	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}\text{C}, T_{Jmax}=150^{\circ}\text{C}$	690	W

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

Symbol	Parameter/Test Conditions		Values	Unit
T_{Jmax}	Max. Junction Temperature		150	$^{\circ}\text{C}$
T_{Jop}	Operating Temperature		-40~125	
T_{stg}	Storage Temperature		-40~125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), $t=1\text{minute}$	3000	V
Torque	to heatsink	Recommended (M4)	0.7~1.1	Nm
	to terminal	Recommended (M4)	0.7~1.1	Nm
Weight			26.5	g

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

MMG150J120UZ6TN

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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	$V_{CE}=V_{GE}, I_C=6\text{mA}$	5	5.8	6.5	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=150\text{A}, V_{GE}=15\text{V}, T_J=25^{\circ}\text{C}$		1.7	2.15	
		$I_C=150\text{A}, V_{GE}=15\text{V}, T_J=125^{\circ}\text{C}$		1.9		
I_{CES}	Collector Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^{\circ}\text{C}$			100	μA
		$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=125^{\circ}\text{C}$			1	mA
I_{GES}	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 15\text{V}, T_J=25^{\circ}\text{C}$	-400		400	nA
R_{gint}	Integrated Gate Resistor			5		Ω
Q_g	Gate Charge	$V_{CE}=600\text{V}, I_C=150\text{A}, V_{GE}=\pm 15\text{V}$		1.4		μC
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		10.5		nF
C_{res}	Reverse Transfer Capacitance				0.4	
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600\text{V}, I_C=150\text{A}$ $R_G=2.4\Omega,$	$T_J=25^{\circ}\text{C}$		260	ns
			$T_J=125^{\circ}\text{C}$		290	ns
t_r	Rise Time	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^{\circ}\text{C}$		30	ns
			$T_J=125^{\circ}\text{C}$		50	ns
$t_{d(off)}$	Turn off Delay Time	$V_{CC}=600\text{V}, I_C=150\text{A}$ $R_G=2.4\Omega,$	$T_J=25^{\circ}\text{C}$		420	ns
			$T_J=125^{\circ}\text{C}$		520	ns
t_f	Fall Time	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^{\circ}\text{C}$		70	ns
			$T_J=125^{\circ}\text{C}$		90	ns
E_{on}	Turn on Energy	$V_{CC}=600\text{V}, I_C=150\text{A}$ $R_G=2.4\Omega,$	$T_J=25^{\circ}\text{C}$		12	mJ
			$T_J=125^{\circ}\text{C}$		16	mJ
E_{off}	Turn off Energy	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^{\circ}\text{C}$		11	mJ
			$T_J=125^{\circ}\text{C}$		14.5	mJ
I_{SC}	Short Circuit Current	$t_{psc}\leq 10\mu\text{s}, V_{GE}=15\text{V}$ $T_J=125^{\circ}\text{C}, V_{CC}=600\text{V}$		600		A
R_{thJC}	Junction to Case Thermal Resistance (Per IGBT)				0.18	K/W

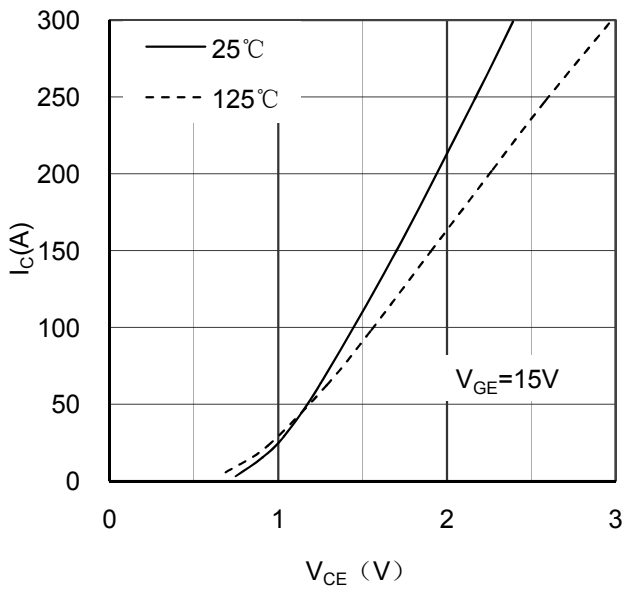


Figure 1. Typical Output Characteristics IGBT

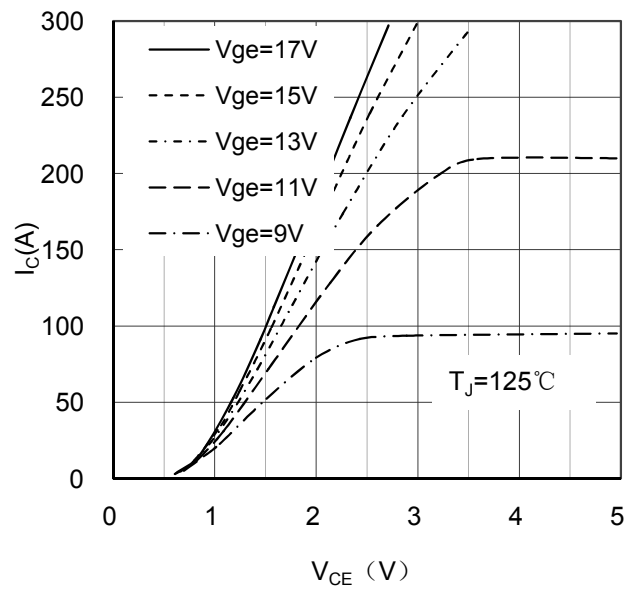


Figure 2. Typical Output Characteristics IGBT

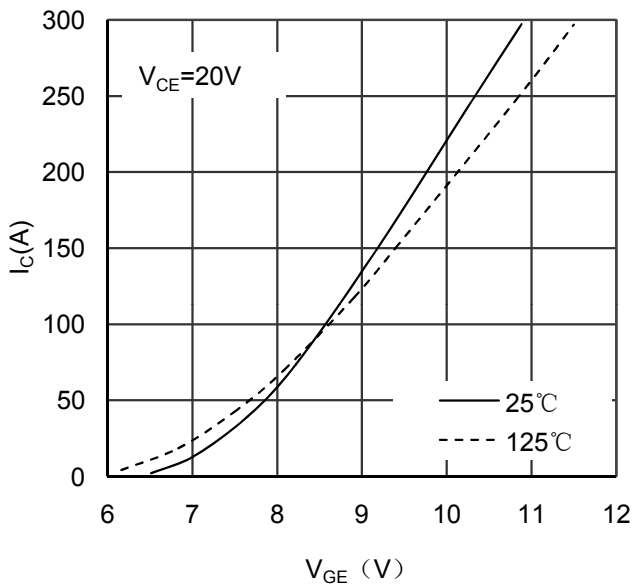


Figure 3. Typical Transfer characteristics IGBT

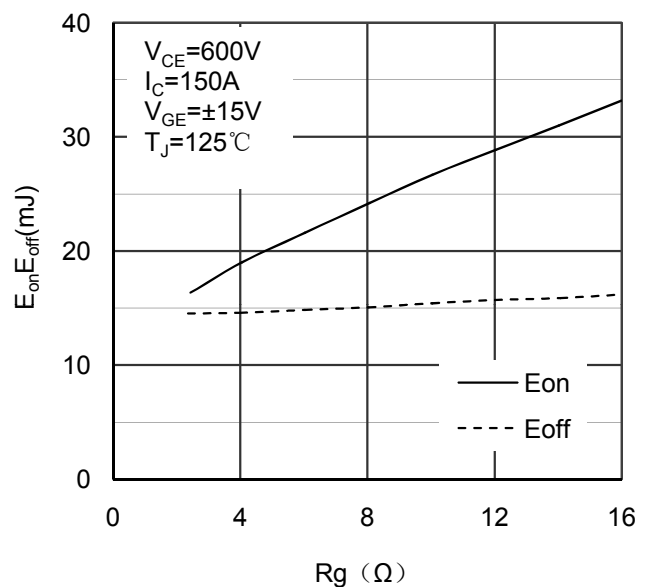


Figure 4. Switching Energy vs Gate Resistor IGBT

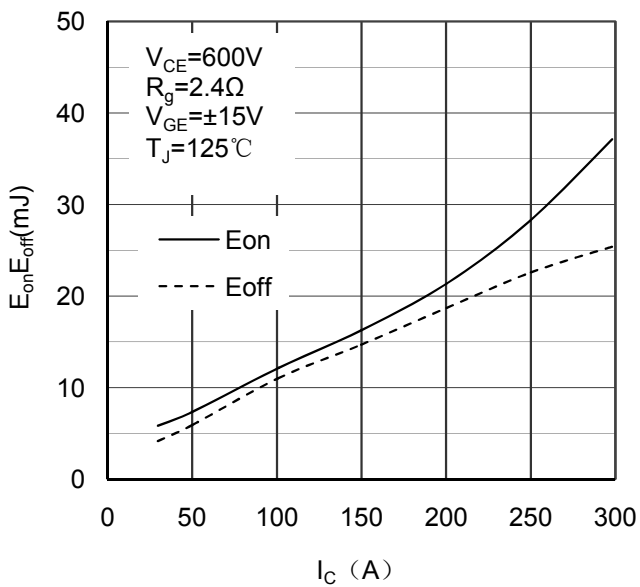


Figure 5. Switching Energy vs Collector Current IGBT

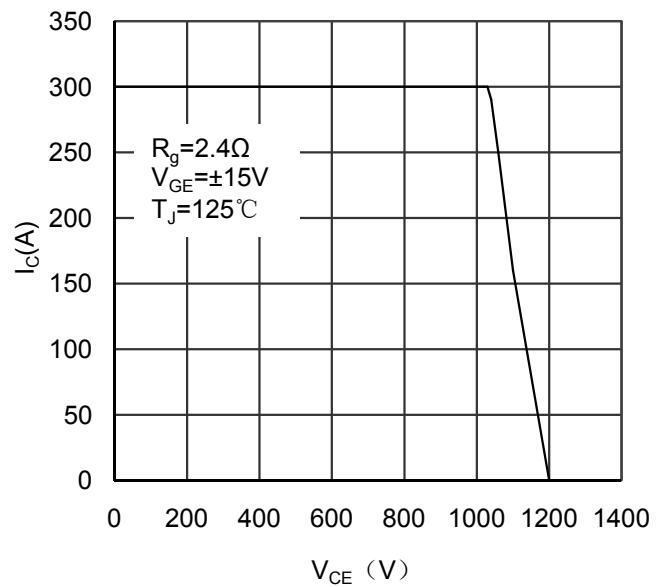


Figure 6. Reverse Biased Safe Operating Area IGBT

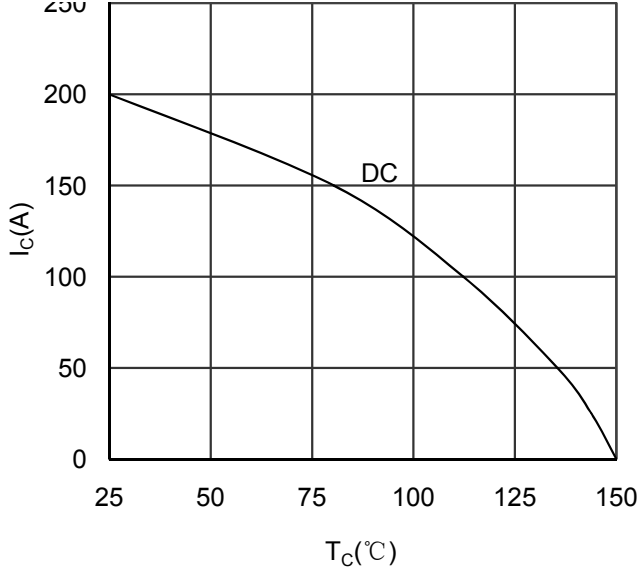


Figure 7. Collector Current vs Case temperature IGBT

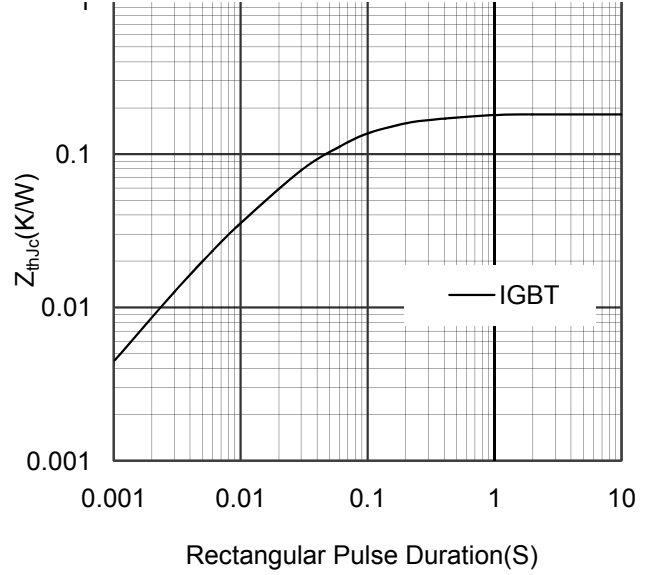
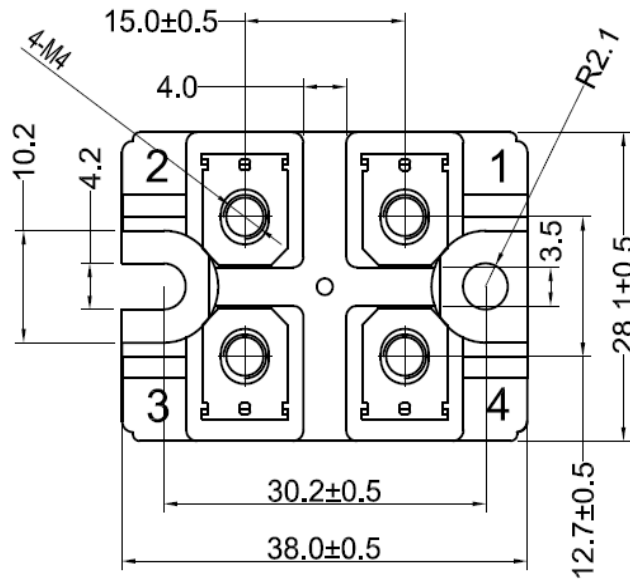
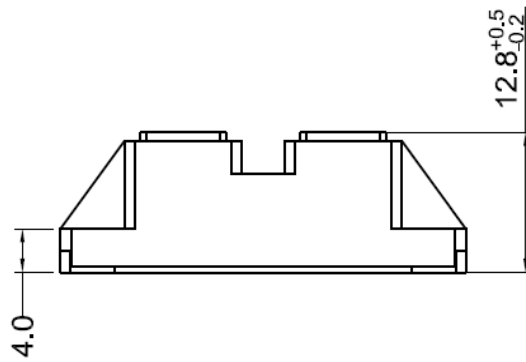


Figure 8. Transient Thermal Impedance of IGBT



Dimensions in (mm)
Figure 9. Package Outline