

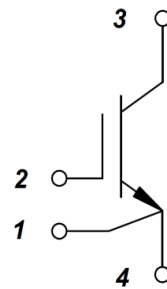
## PRODUCT FEATURES

- IGBT CHIP(Trench+Field Stop technology)
- Low switching losses
- Low saturation voltage and positive temperature coefficient
- Fast switching and short tail current
- Popular SOT-227 Package
- $T_{Jmax}=175^{\circ}C$



## APPLICATIONS

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



## IGBT

### 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		$\pm 20$	
$I_C$	DC Collector Current	$T_C=25^{\circ}C, T_{Jmax}=175^{\circ}C$	76	A
		$T_C=100^{\circ}C, T_{Jmax}=175^{\circ}C$	50	
$I_{CM}$	Repetitive Peak Collector Current	$t_p=1ms$	100	
$P_{tot}$	Power Dissipation Per IGBT	$T_C=25^{\circ}C, T_{Jmax}=175^{\circ}C$	278	W

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

Symbol	Parameter/Test Conditions		Values	Unit
$T_{Jmax}$	Max. Junction Temperature		175	$^{\circ}C$
$T_{Jop}$	Operating Temperature		-40~150	
$T_{stg}$	Storage Temperature		-40~125	
$V_{isol}$	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), $t=1minute$	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

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# MMG50J120UZ6TC

## 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	$V_{CE}=V_{GE}, I_C=2\text{mA}$	5.0	6.0	6.5	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=50\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.85	2.25	
		$I_C=50\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		2.10		
		$I_C=50\text{A}, V_{GE}=15\text{V}, T_J=150^\circ\text{C}$		2.15		
$I_{CES}$	Collector Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			1	mA
		$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$			10	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	nA
$R_{gint}$	Integrated Gate Resistor			3		$\Omega$
$Q_g$	Gate Charge	$V_{CE}=600\text{V}, I_C=50\text{A}, V_{GE}=15\text{V}$		0.27		$\mu\text{C}$
$C_{ies}$	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		3.5		nF
$C_{res}$	Reverse Transfer Capacitance				160	
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600\text{V}, I_C=50\text{A}$ $R_G=15\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	30		ns
			$T_J=150^\circ\text{C}$	35		ns
$t_r$	Rise Time		$T_J=25^\circ\text{C}$	38		ns
			$T_J=150^\circ\text{C}$	40		ns
$t_{d(off)}$	Turn off Delay Time	$T_J=25^\circ\text{C}$	270		ns	
		$T_J=150^\circ\text{C}$	330		ns	
$t_f$	Fall Time	$T_J=25^\circ\text{C}$	100		ns	
		$T_J=150^\circ\text{C}$	200		ns	
$E_{on}$	Turn on Energy	$T_J=25^\circ\text{C}$		6.2		mJ
		$T_J=150^\circ\text{C}$		8.4		mJ
$E_{off}$	Turn off Energy	$T_J=25^\circ\text{C}$		2.7		mJ
		$T_J=150^\circ\text{C}$		4.4		mJ
$I_{SC}$	Short Circuit Current	$tp_{sc} \leq 10\mu\text{s}, V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}, V_{CC}=800\text{V}$		215		A
$R_{thJC}$	Junction to Case Thermal Resistance ( Per IGBT )				0.54	K/W

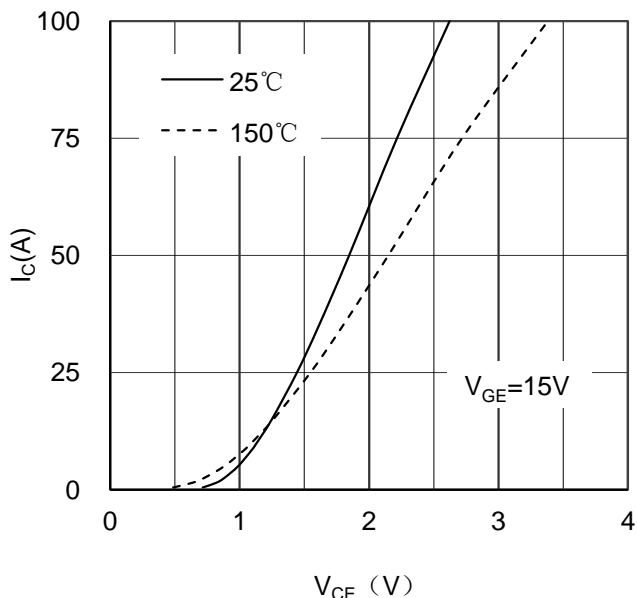


Figure 1. Typical Output Characteristics IGBT

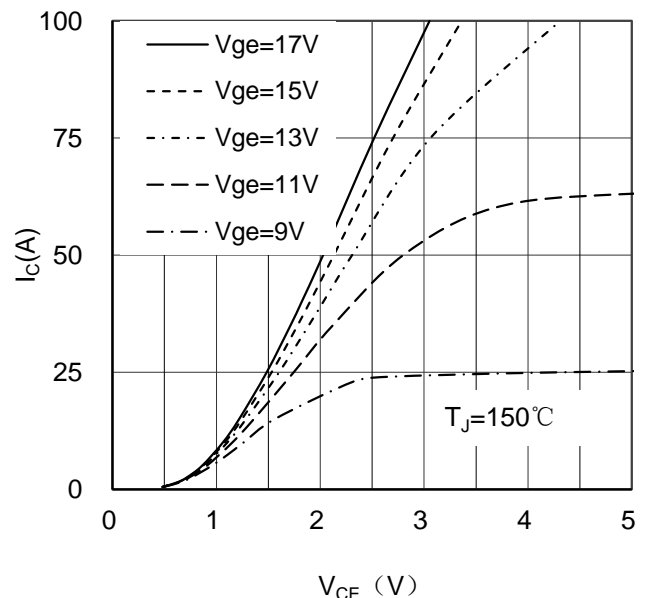


Figure 2. Typical Output Characteristics IGBT

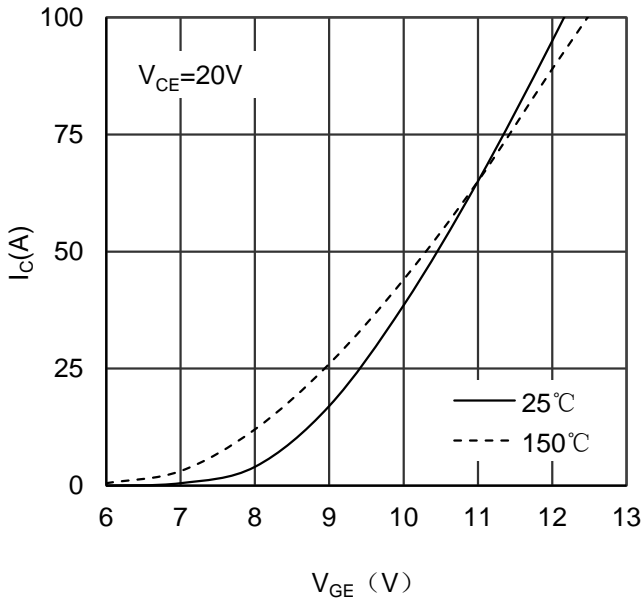


Figure 3. Typical Transfer characteristics IGBT

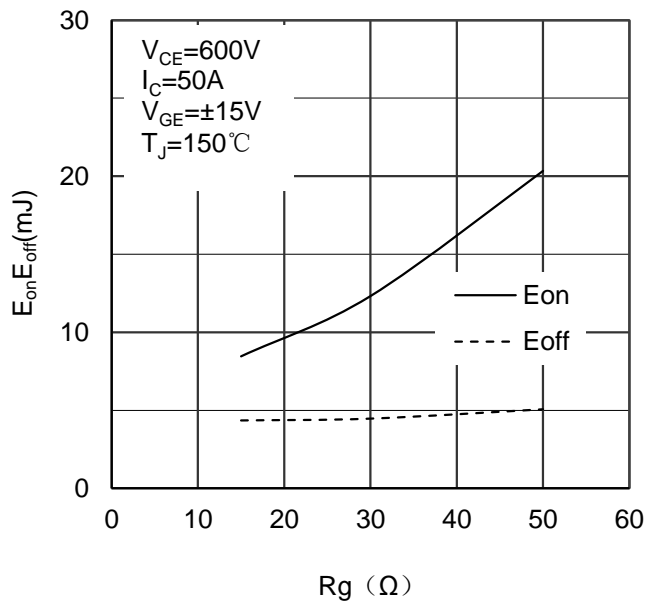


Figure 4. Switching Energy vs Gate Resistor IGBT

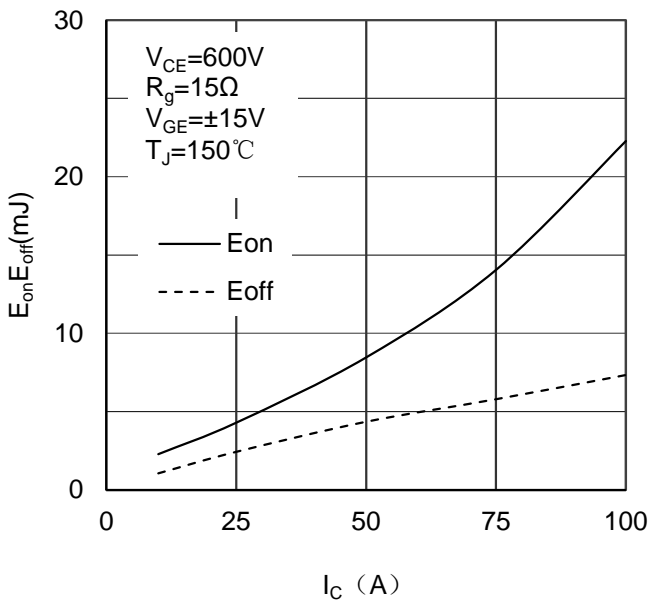


Figure 5. Switching Energy vs Collector Current IGBT

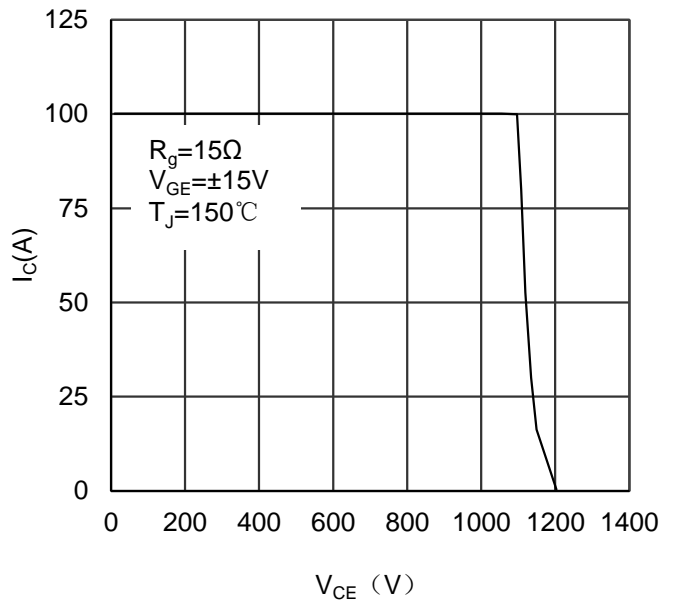


Figure 6. Reverse Biased Safe Operating Area IGBT

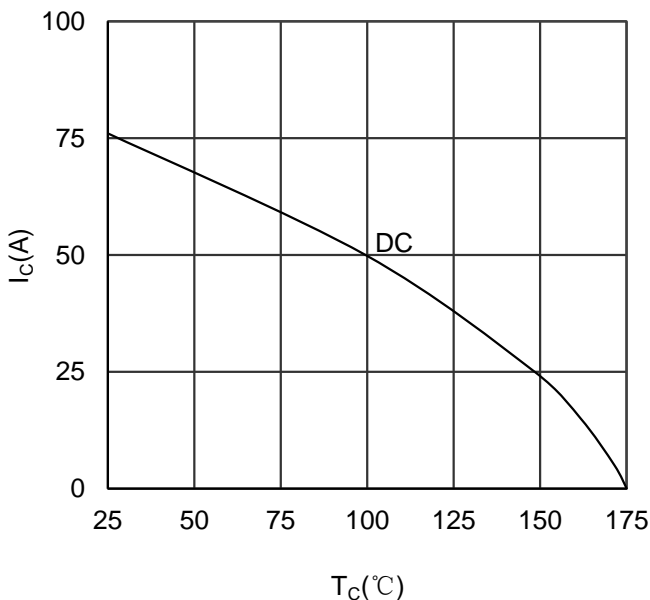


Figure 7. Collector Current vs Case temperature IGBT

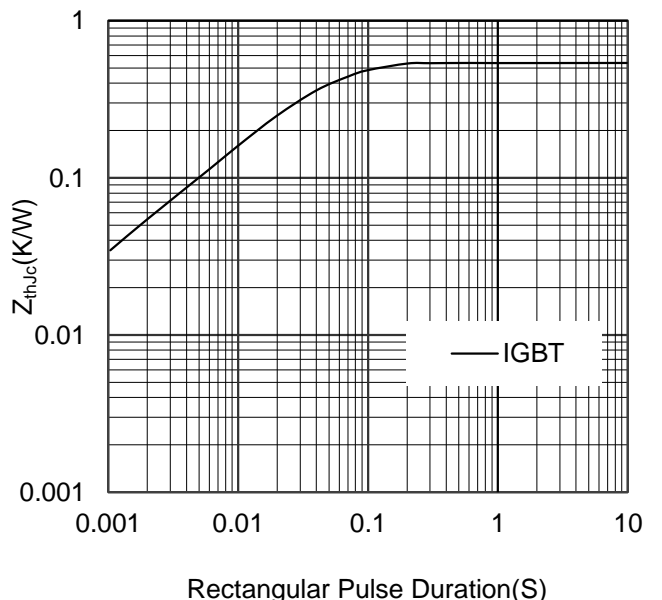
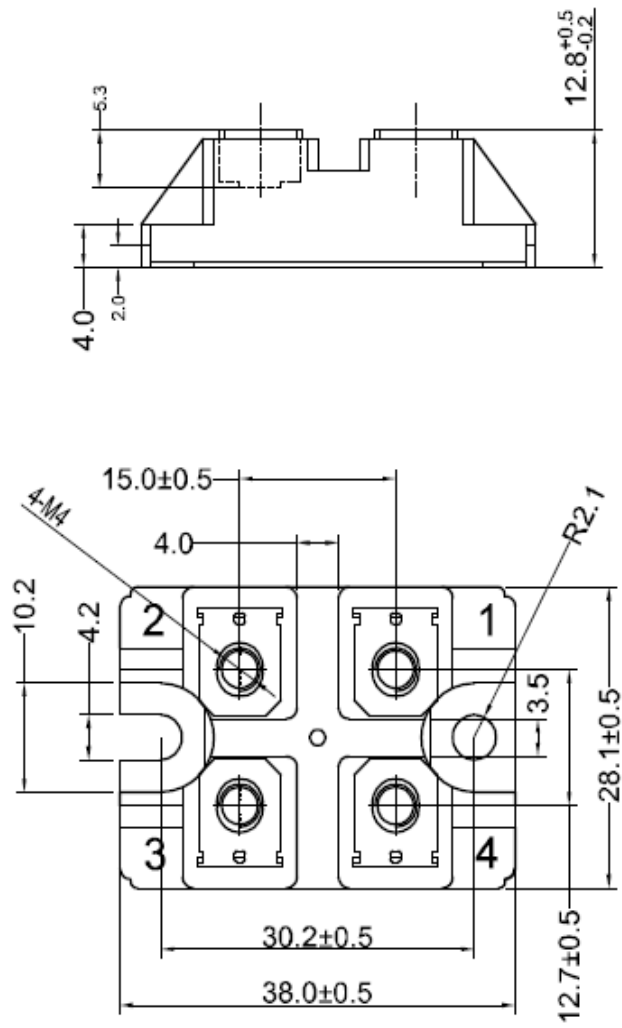


Figure 8. Transient Thermal Impedance of IGBT



Dimensions in (mm)  
Figure 9. Package Outline