

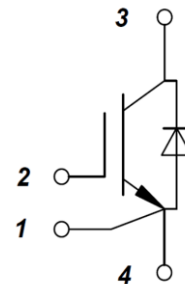
PRODUCT FEATURES

- IGBT³ Chip(Trench+Field Stop technology)
- Low switching losses
- Low saturation voltage and positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- 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	$T_C=25^{\circ}\text{C}, T_{Jmax}=150^{\circ}\text{C}$	105	A
		$T_C=80^{\circ}\text{C}, T_{Jmax}=150^{\circ}\text{C}$	75	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	150	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}\text{C}, T_{Jmax}=150^{\circ}\text{C}$	348	W

Diode

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^{\circ}\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current		75	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	150	
I^2t		$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	1150	A^2S

MMG75J120U6TN

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	$V_{CE}=V_{GE}, I_C=3\text{mA}$	5.0	5.8	6.5	V	
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=75\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.7	2.15		
		$I_C=75\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		1.9			
I_{CES}	Collector Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			1	mA	
		$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$			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			10		Ω	
Q_g	Gate Charge	$V_{CE}=600\text{V}, I_C=75\text{A}, V_{GE}=\pm 15\text{V}$		0.7		μC	
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		5.3		nF	
C_{res}	Reverse Transfer Capacitance				200		pF
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600\text{V}, I_C=75\text{A}$ $R_G=4.7\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		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	$V_{CC}=600\text{V}, I_C=75\text{A}$ $R_G=4.7\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		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	$V_{CC}=600\text{V}, I_C=75\text{A}$ $R_G=4.7\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		6.6		mJ
			$T_J=125^\circ\text{C}$		9.4		mJ
E_{off}	Turn off Energy	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		6.8		mJ
			$T_J=125^\circ\text{C}$		8.0		mJ
I_{SC}	Short Circuit Current	$tp_{sc} \leq 10\mu\text{s}, V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}, V_{CC}=900\text{V}$		300		A	
R_{thJC}	Junction to Case Thermal Resistance (Per IGBT)				0.36	K /W	

Diode

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=75\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.65	2.15	V
		$I_F=75\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		1.65		
t_{rr}	Reverse Recovery Time	$I_F=75\text{A}, V_R=600\text{V}$ $di_F/dt=-2000\text{A}/\mu\text{s}$ $T_J=125^\circ\text{C}$		300		ns
I_{RRM}	Max. Reverse Recovery Current			83		A
Q_{RR}	Reverse Recovery Charge			13		μC
E_{rec}	Reverse Recovery Energy			6.5		mJ
R_{thJCD}	Junction to Case Thermal Resistance (Per Diode)				0.6	K /W

MMG75J120U6TN

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), $t=1$ 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

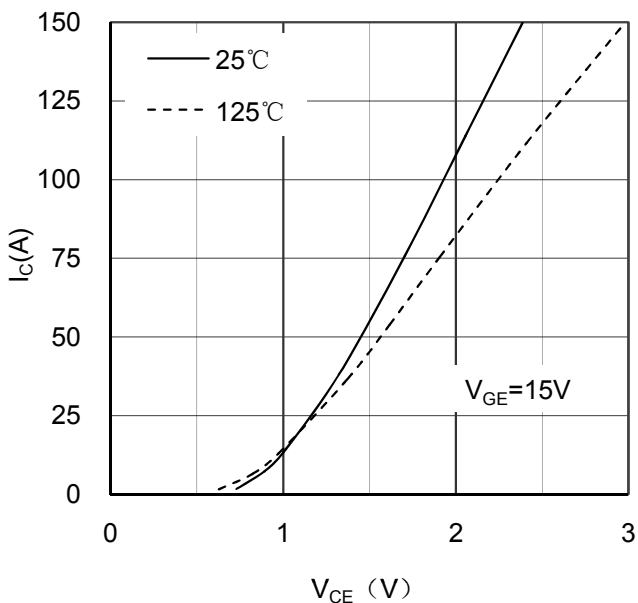


Figure 1. Typical Output Characteristics IGBT

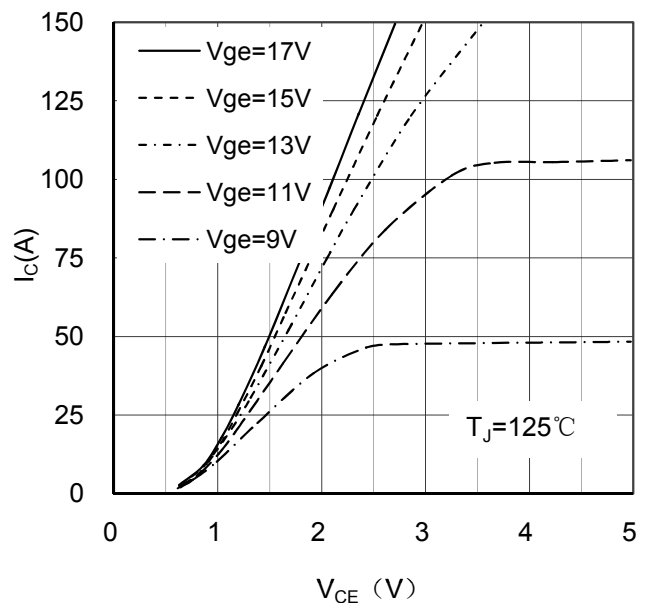


Figure 2. Typical Output Characteristics IGBT

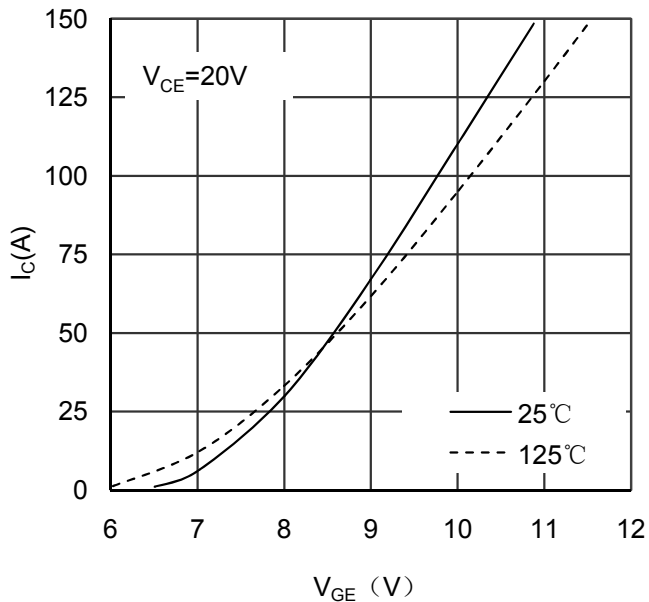


Figure 3. Typical Transfer characteristics IGBT

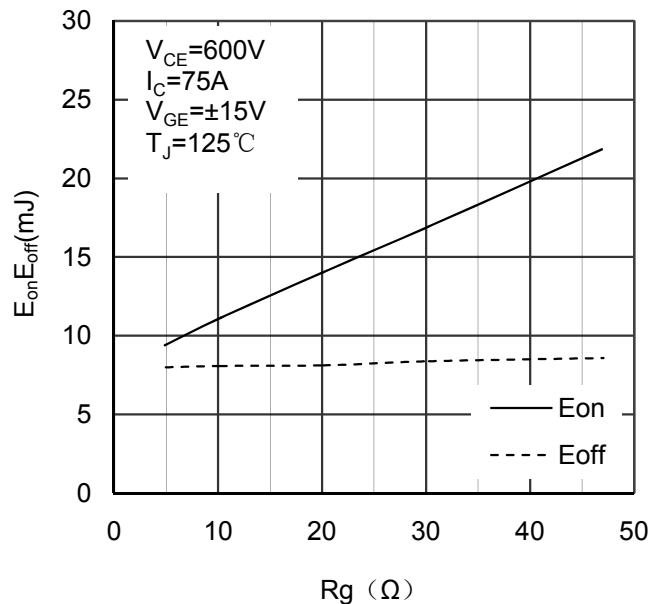


Figure 4. Switching Energy vs Gate Resistor IGBT

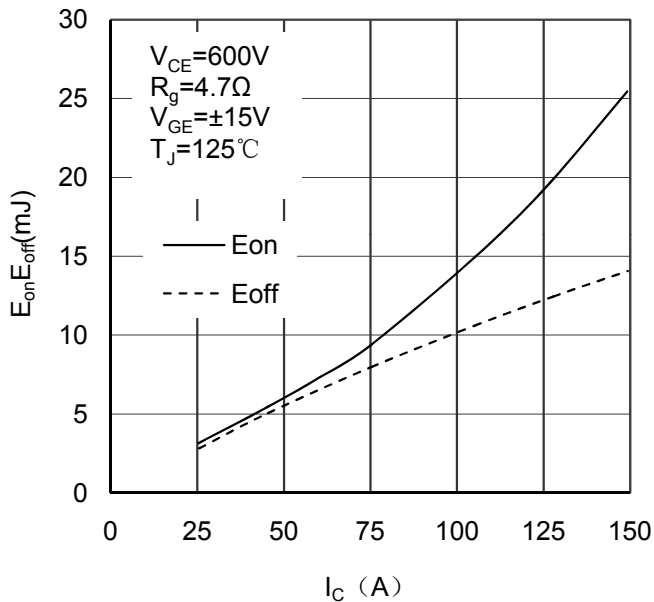


Figure 5. Switching Energy vs Collector Current IGBT

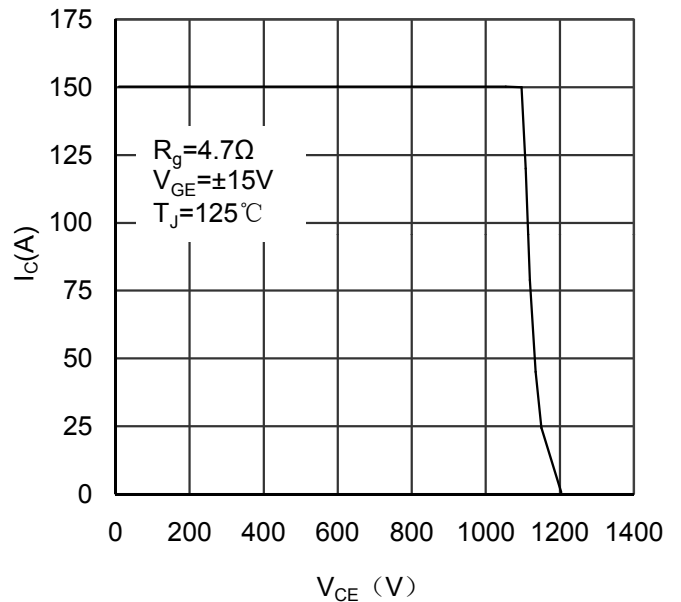


Figure 6. Reverse Biased Safe Operating Area IGBT

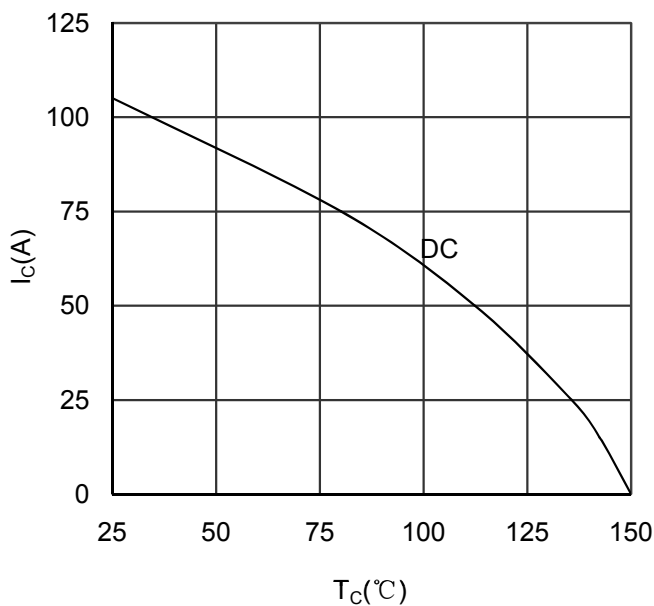


Figure 7. Collector Current vs Case temperature IGBT

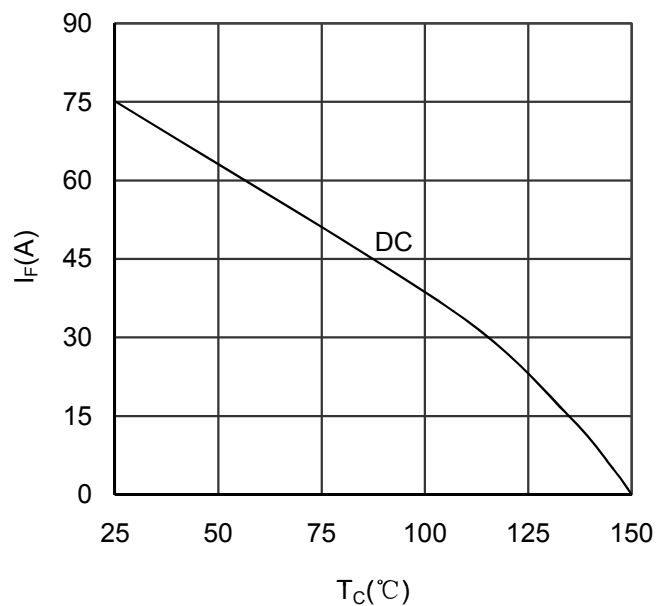


Figure 8. Forward current vs Case temperature Diode

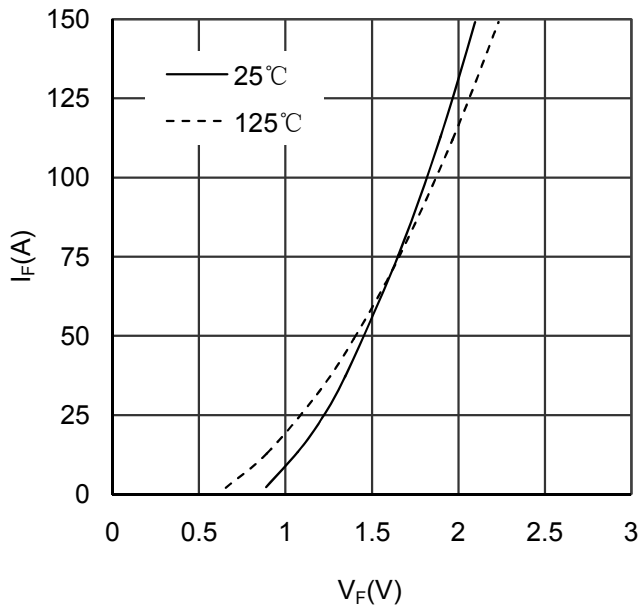


Figure 9. Diode Forward Characteristics Diode

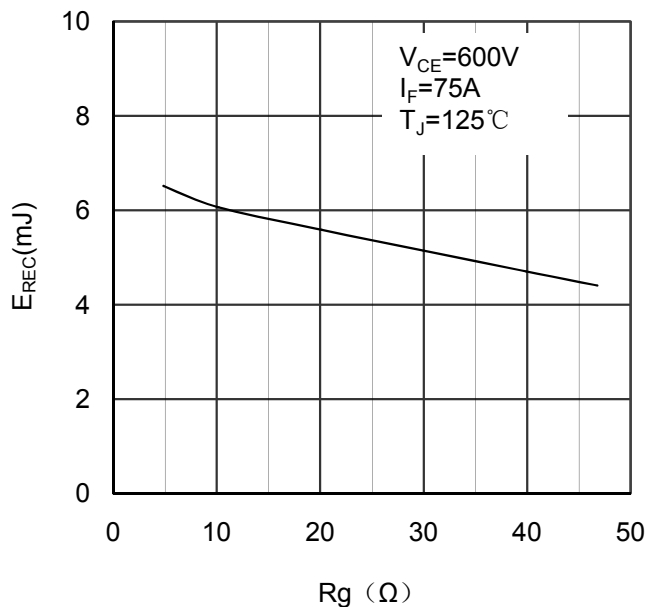


Figure 10. Switching Energy vs Gate Resistor Diode

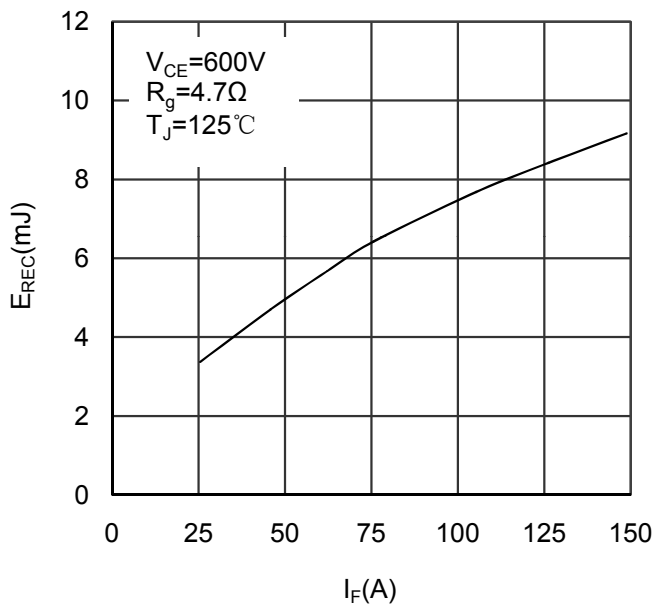


Figure 11. Switching Energy vs Forward Current Diode

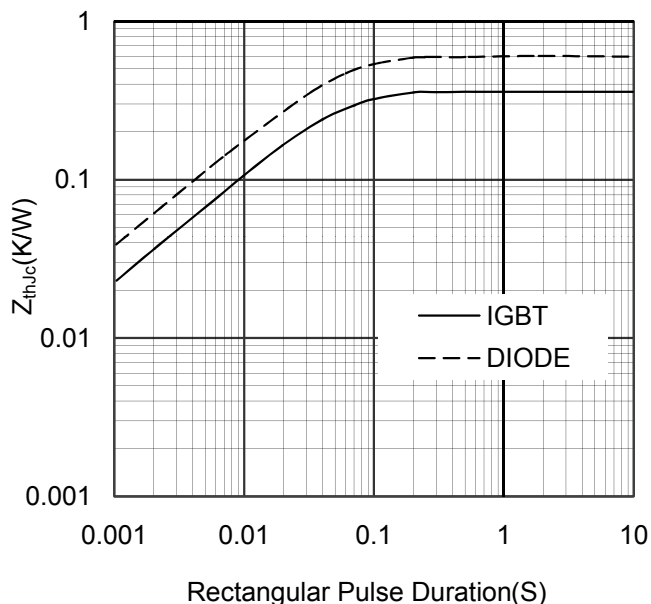
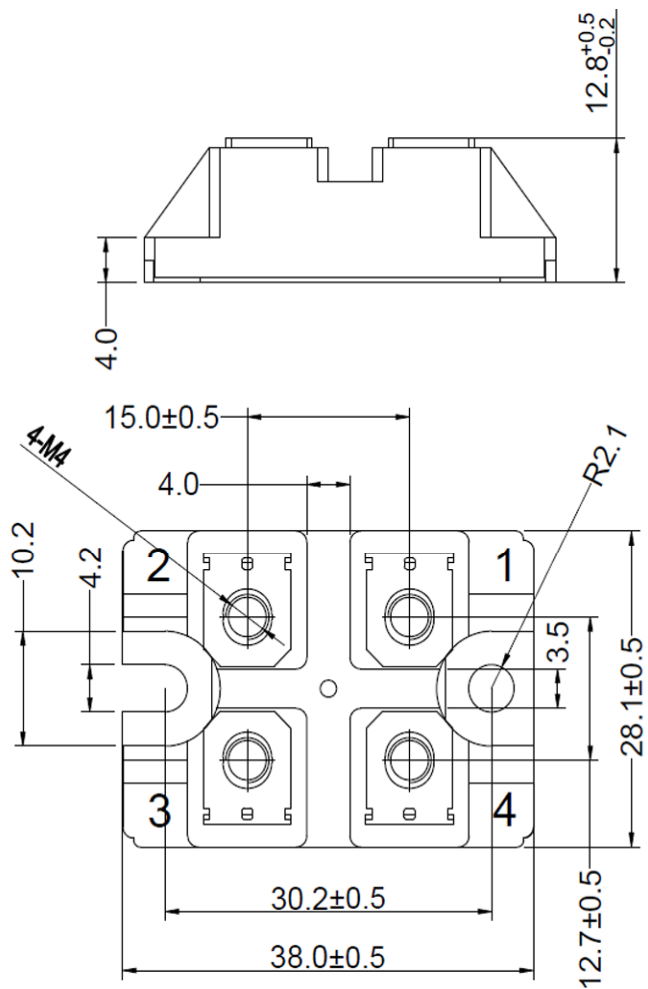


Figure 12. Transient Thermal Impedance of Diode and IGBT



Dimensions in (mm)
Figure 13. Package Outline