

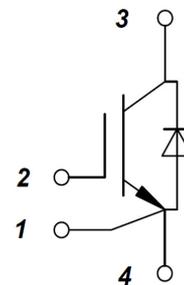
PRODUCT FEATURES

- IGBT⁴ 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	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	150	A
		$T_C=100^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	100	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	200	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	555	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		100	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	200	
I^2t		$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	1900	A^2S

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MMG100J120U6T4N

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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	$V_{CE}=V_{GE}, I_C=3.8\text{mA}$	5.2	5.8	6.4	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=100\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.75	2.15	
		$I_C=100\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		2.05		
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			7.5		Ω
Q_g	Gate Charge	$V_{CE}=600\text{V}, I_C=100\text{A}, V_{GE}=\pm 15\text{V}$		0.8		μC
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		6.3		nF
C_{res}	Reverse Transfer Capacitance			0.27		nF
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600\text{V}, I_C=100\text{A}$ $R_G=1.6\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	130		ns
			$T_J=125^\circ\text{C}$	150		ns
t_r	Rise Time		$T_J=25^\circ\text{C}$	20		ns
			$T_J=125^\circ\text{C}$	30		ns
$t_{d(off)}$	Turn off Delay Time	$V_{CC}=600\text{V}, I_C=100\text{A}$ $R_G=1.6\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	300		ns
			$T_J=125^\circ\text{C}$	380		ns
t_f	Fall Time		$T_J=25^\circ\text{C}$	45		ns
			$T_J=125^\circ\text{C}$	80		ns
E_{on}	Turn on Energy	$V_{CC}=600\text{V}, I_C=100\text{A}$ $R_G=1.6\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	6.5		mJ
			$T_J=125^\circ\text{C}$	9.5		mJ
E_{off}	Turn off Energy		$T_J=25^\circ\text{C}$	6.0		mJ
			$T_J=125^\circ\text{C}$	9.0		mJ
I_{SC}	Short Circuit Current	$tp_{sc} \leq 10\mu\text{s}, V_{GE}=15\text{V}$ $T_J=150^\circ\text{C}, V_{CC}=800\text{V}$		400		A
R_{thJC}	Junction to Case Thermal Resistance (Per IGBT)				0.27	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	$I_F=100\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.75	2.15	V
		$I_F=100\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		1.65		
I_{RRM}	Max. Reverse Recovery Current	$I_F=100\text{A}, V_R=600\text{V}$		105		A
Q_{RR}	Reverse Recovery Charge	$dI_F/dt=-2800\text{A}/\mu\text{s}$		17		μC
E_{rec}	Reverse Recovery Energy	$T_J=125^\circ\text{C}$		6		mJ
R_{thJCD}	Junction to Case Thermal Resistance (Per Diode)				0.48	K/W

MMG100J120U6T4N

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

Symbol	Parameter/Test Conditions		Values	Unit
T_{Jmax}	Max. Junction Temperature		175	$^\circ\text{C}$
T_{Jop}	Operating Temperature		-40~150	
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

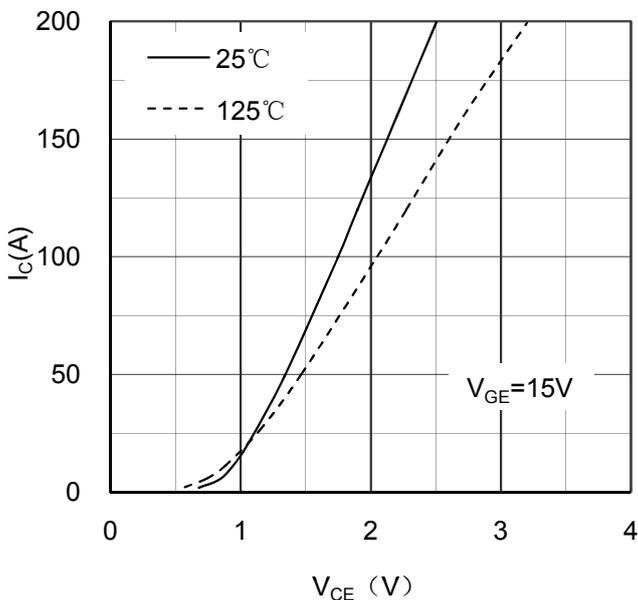


Figure 1. Typical Output Characteristics IGBT

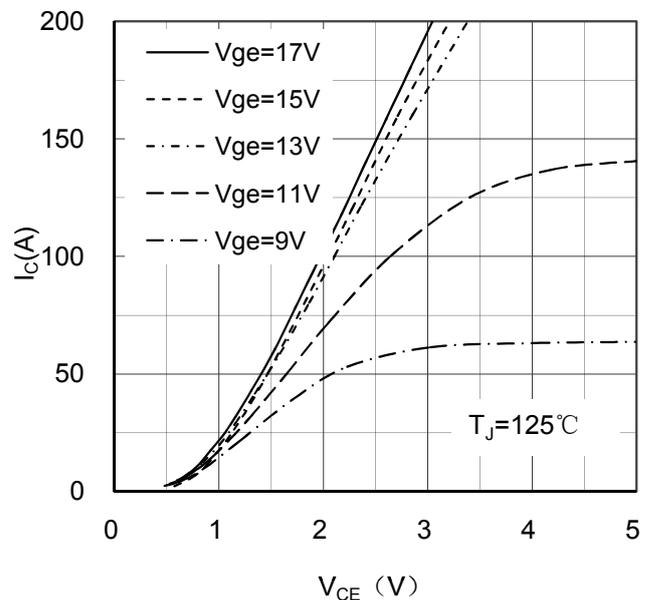


Figure 2. Typical Output Characteristics IGBT

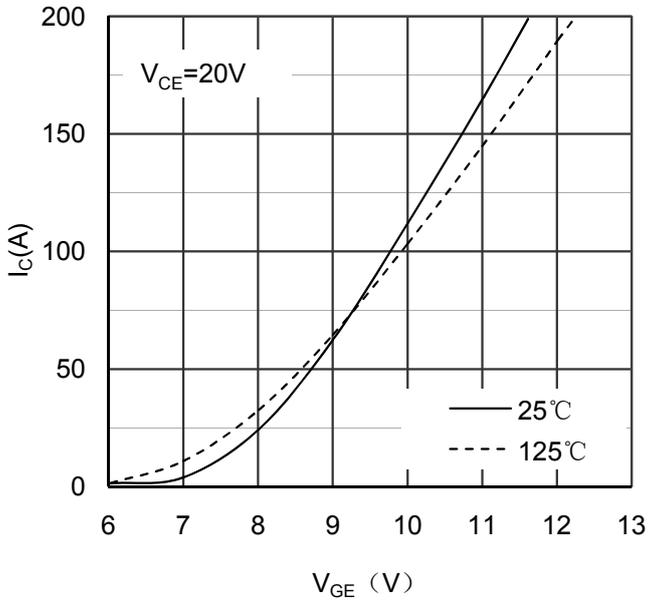


Figure 3. Typical Transfer characteristics IGBT

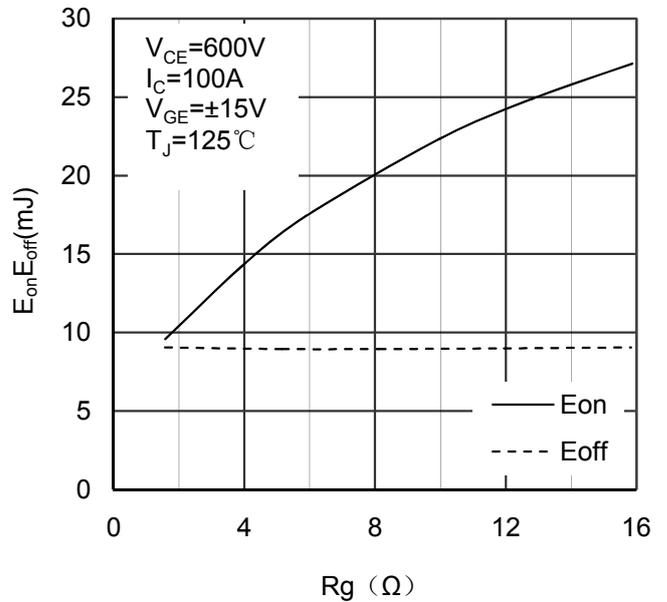


Figure 4. Switching Energy vs Gate Resistor IGBT

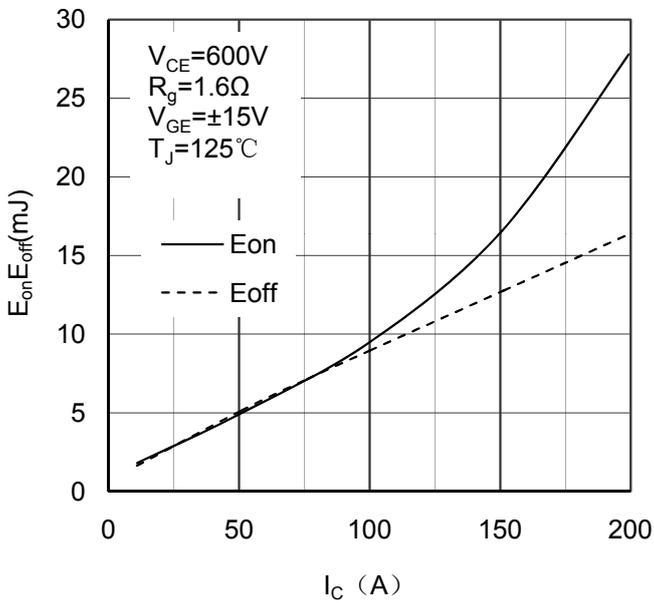


Figure 5. Switching Energy vs Collector Current IGBT

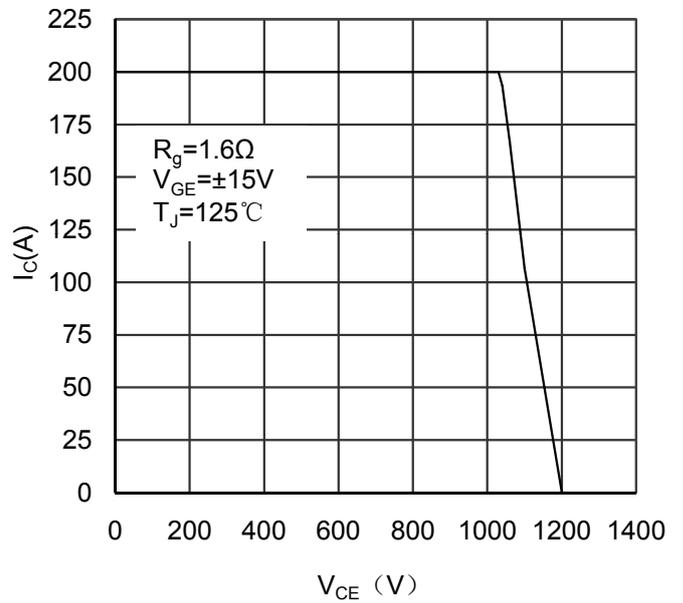


Figure 6. Reverse Biased Safe Operating Area IGBT

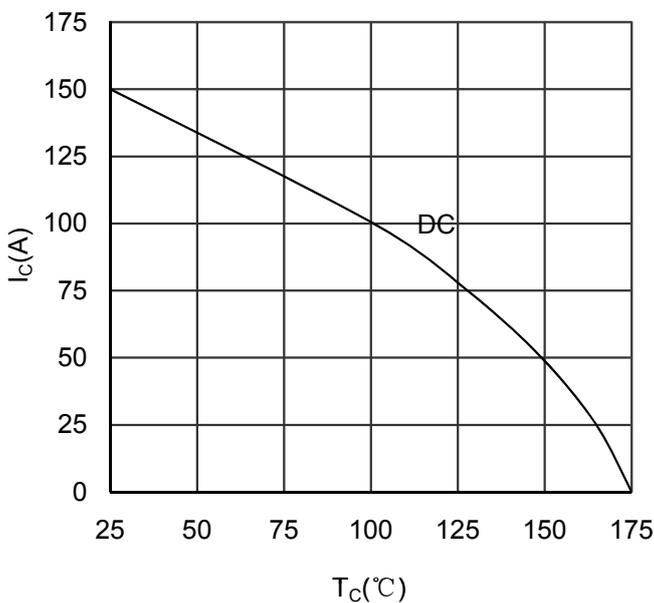


Figure 7. Collector Current vs Case temperature IGBT

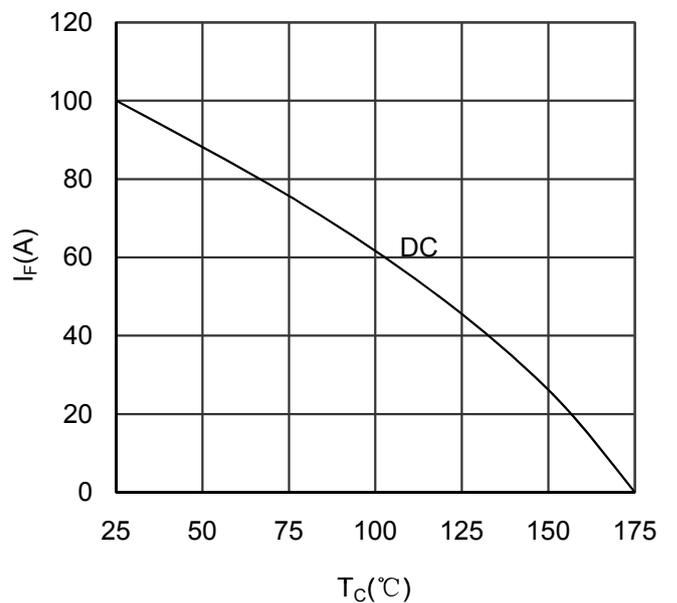


Figure 8. Forward current vs Case temperature Diode

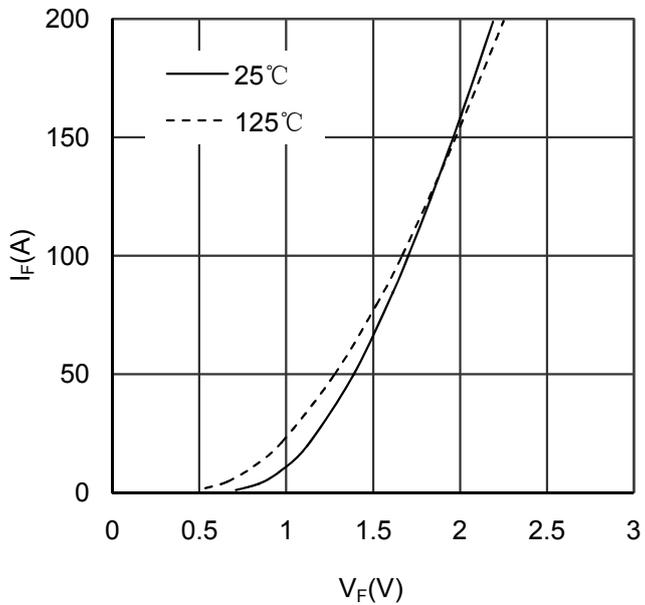


Figure 9. Diode Forward Characteristics Diode

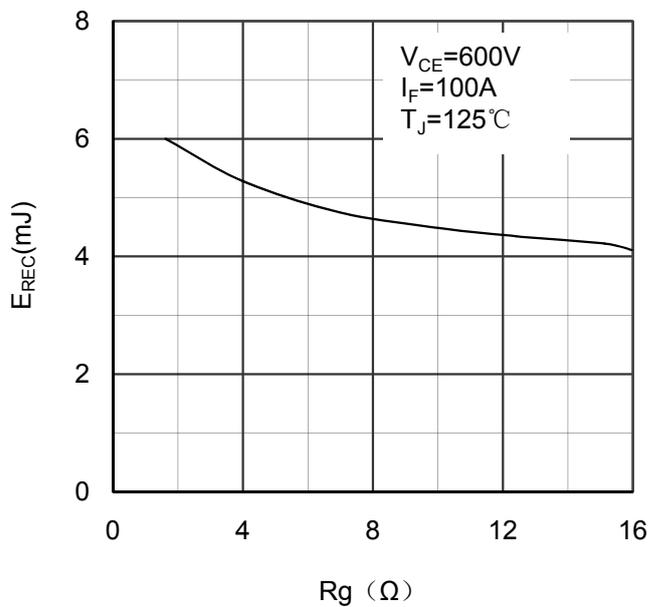


Figure 10. Switching Energy vs Gate Resistor Diode

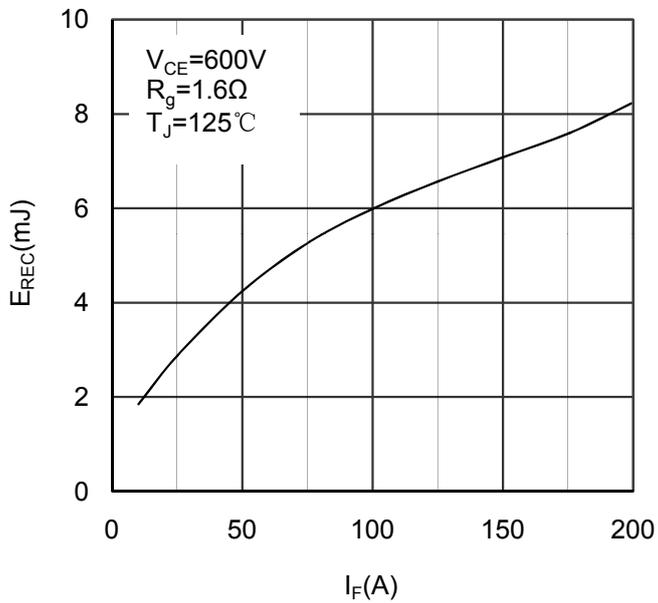


Figure 11. Switching Energy vs Forward Current Diode

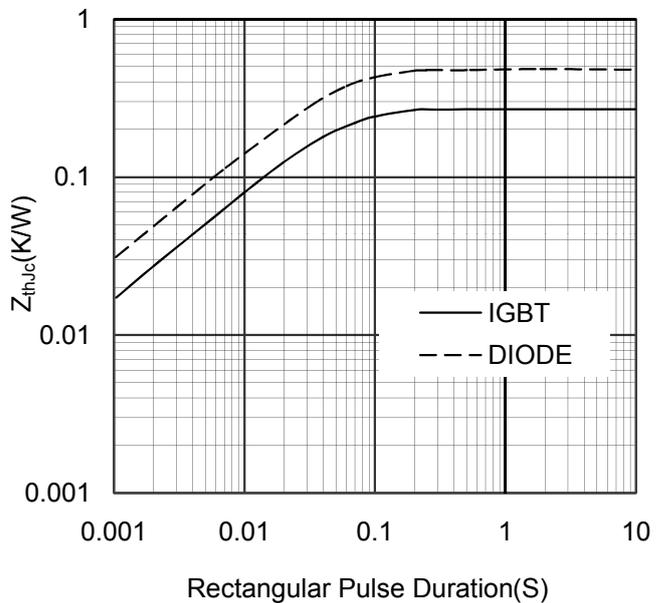
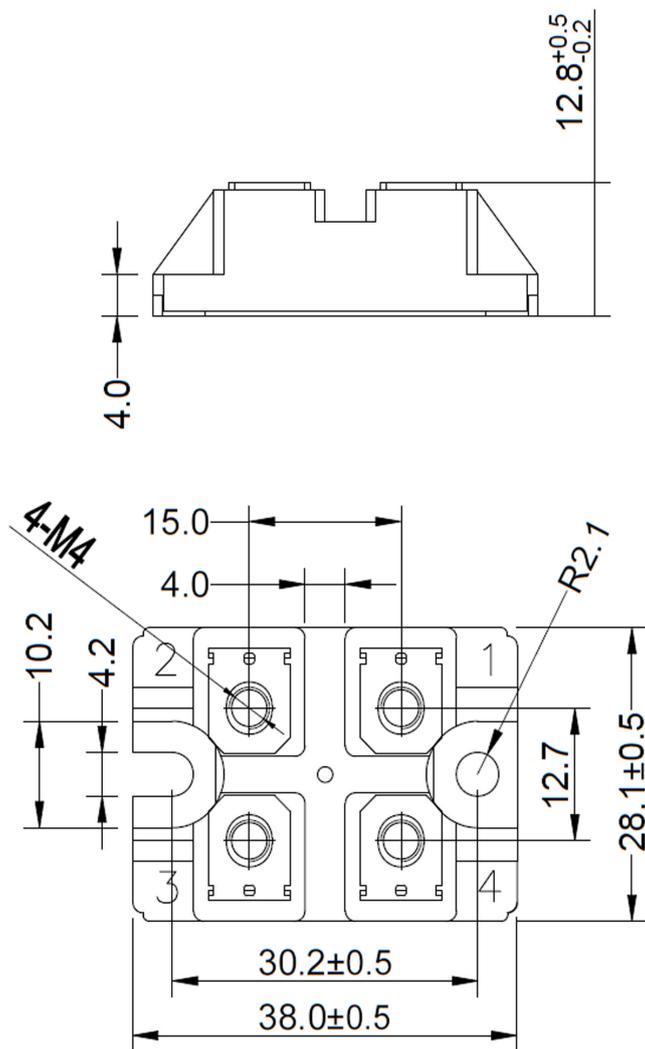


Figure 12. Transient Thermal Impedance of Diode and IGBT



Dimensions in (mm)
Figure 13. Package Outline