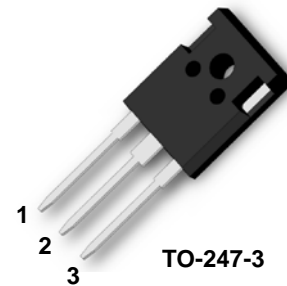


**FEATURES**

- Low switching losses
- Low EMI
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Low switching losses


**APPLICATIONS**

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


**ABSOLUTE MAXIMUM RATINGS**
*T<sub>C</sub>=25°C unless otherwise specified*

Symbol	Parameter	Test Conditions	Values	Unit
<b>IGBT</b>				
V <sub>CES</sub>	Collector - Emitter Voltage	T <sub>j</sub> =25°C	600	V
V <sub>GES</sub>	Gate - Emitter Voltage		±20	V
I <sub>C</sub>	DC Collector Current	T <sub>C</sub> =25°C	80	A
		T <sub>C</sub> =80°C	60	A
I <sub>Cpuls</sub>	Pulsed collector current, tp limited by T <sub>jmax</sub>		120	A
P <sub>tot</sub>	Power Dissipation		290	W
<b>Anti-Parallel Diode</b>				
V <sub>RRM</sub>	Repetitive Reverse Voltage	T <sub>j</sub> =25°C	600	V
I <sub>F(AV)</sub>	Average Forward Current	T <sub>C</sub> =25°C	80	A
		T <sub>C</sub> =80°C	60	A
I <sub>Fpuls</sub>	Diode pulsed current, tp limited by T <sub>jmax</sub>		120	A
T <sub>jmax</sub>	Max. Junction Temperature		-40 to +150	°C
T <sub>jop</sub>	Operating Temperature		-40 to +150	°C
T <sub>stg</sub>	Storage Temperature		-40 to +125	°C
Torque	Module-to-Sink	Recommended (M3)	1.1	N·m
Weight			8.0	g

# MM60G60B

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>IGBT</b>						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=1\text{mA}$	3.8	4.5	5.5	V
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	$I_C=60\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		2.75	3.0	V
		$I_C=60\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		2.60		V
$I_{CES}$	Collector Leakage Current	$V_{CE}=600\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			1	mA
		$V_{CE}=600\text{V}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$			5	mA
$I_{GES}$	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 15\text{V}, T_J=125^\circ\text{C}$	-200		200	nA
$Q_g$	Gate Charge	$V_{CE}=300\text{V}, I_C=60\text{A}, V_{GE}=15\text{V}$		0.19		$\mu\text{C}$
$C_{ies}$	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		2.48		nF
$C_{res}$	Reverse Transfer Capacitance			0.08		nF
$t_{d(on)}$	Turn - on Delay Time	$V_{CC}=300\text{V}, I_C=60\text{A}, T_J=25^\circ\text{C}$		40		ns
		$R_G=5.1\ \Omega, T_J=125^\circ\text{C}$		45		ns
$t_r$	Rise Time	$V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		35		ns
		Inductive Load $T_J=125^\circ\text{C}$		40		ns
$t_{d(off)}$	Turn - off Delay Time	$V_{CC}=300\text{V}, I_C=60\text{A}, T_J=25^\circ\text{C}$		150		ns
		$R_G=5.1\ \Omega, T_J=125^\circ\text{C}$		180		ns
$t_f$	Fall Time	$V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		60		ns
		Inductive Load $T_J=125^\circ\text{C}$		70		ns
$E_{on}$	Turn - on Energy	$V_{CC}=300\text{V}, I_C=60\text{A}, T_J=25^\circ\text{C}$		0.8		mJ
		$R_G=5.1\ \Omega, T_J=125^\circ\text{C}$		1.0		mJ
$E_{off}$	Turn - off Energy	$V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		0.75		mJ
		Inductive Load $T_J=125^\circ\text{C}$		0.95		mJ
$I_{sc}$	Short Circuit Current	$t_{psc}\leq 5\ \mu\text{s}, V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}, V_{CC}=300\text{V}$		240		A
$R_{thJC}$	Junction-to-Case Thermal Resistance				0.42	K/W
<b>Anti-Parallel Diode</b>						
$V_F$	Forward Voltage	$I_F=60\text{A}, V_{GE}=0\text{V}, T_{Vj}=25^\circ\text{C}$		1.42	1.65	V
		$I_F=60\text{A}, V_{GE}=0\text{V}, T_{Vj}=125^\circ\text{C}$		1.36		V
$I_{RRM}$	Max. Reverse Recovery Current	$I_F=60\text{A}, V_R=300\text{V}$		36		A
$Q_{rr}$	Reverse Recovery Charge	$di_F/dt=-1250\text{A}/\mu\text{s}$		1.9		$\mu\text{C}$
$E_{rec}$	Reverse Recovery Energy	$T_{Vj}=125^\circ\text{C}$		0.75		mJ
$R_{thJCD}$	Junction-to-Case Thermal Resistance				0.85	K/W

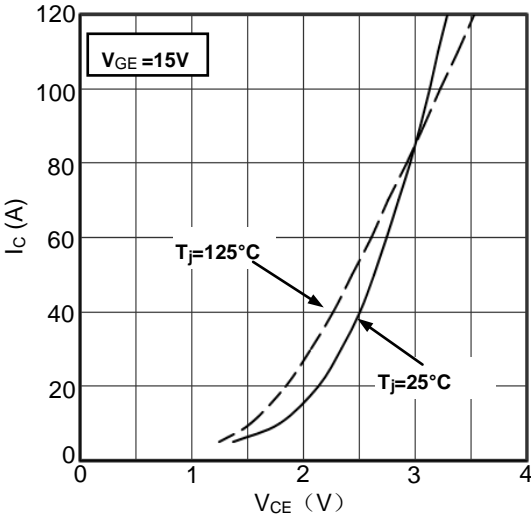


Figure1. Typical Output characteristics

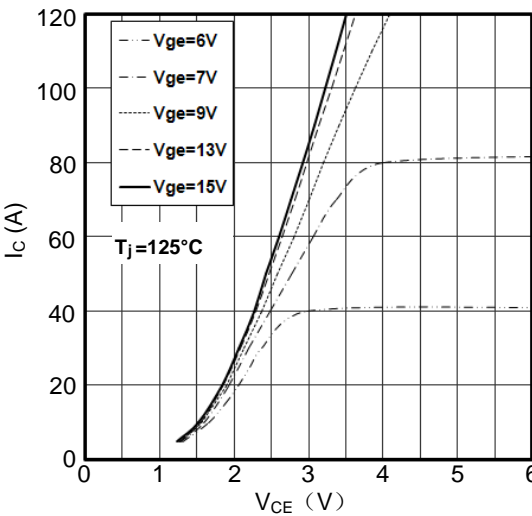


Figure2. Typical Output characteristics

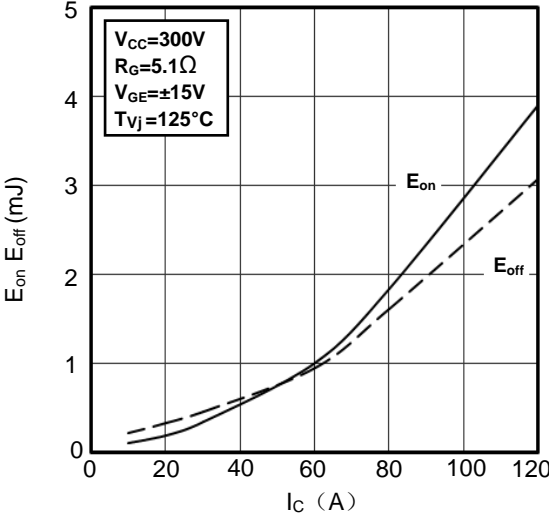


Figure3. Switching Energy vs. Collector Current

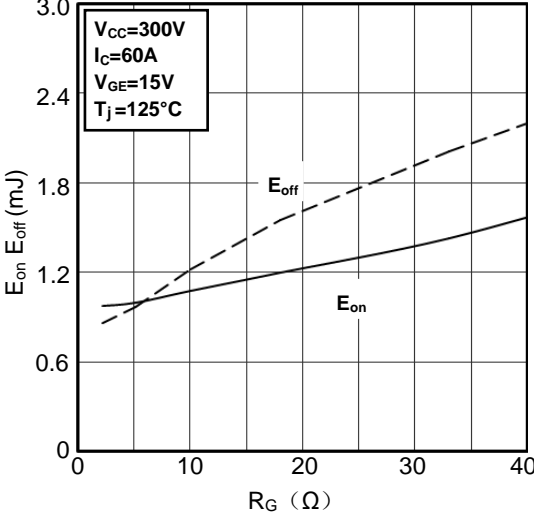


Figure4. Switching Energy vs. Gate Resistor

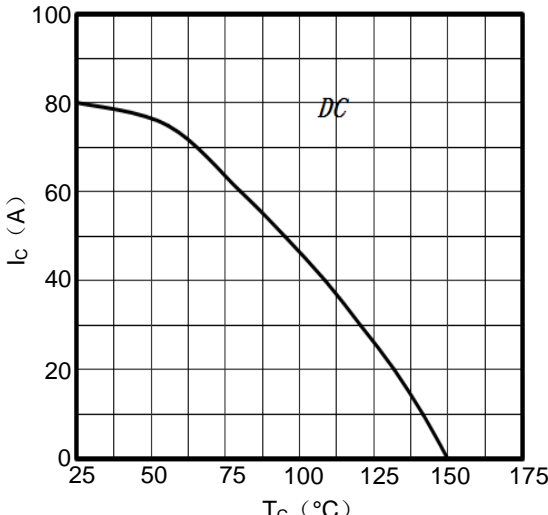


Figure5. IGBT Tc vs. Collector Current

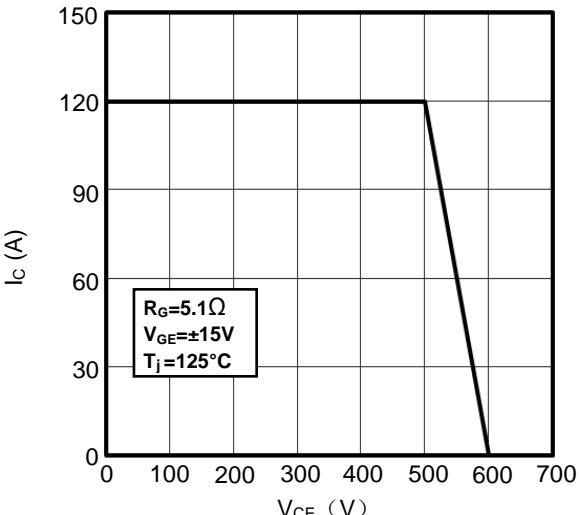


Figure6. Reverse Biased Safe Operating Area

**MM60G60B**

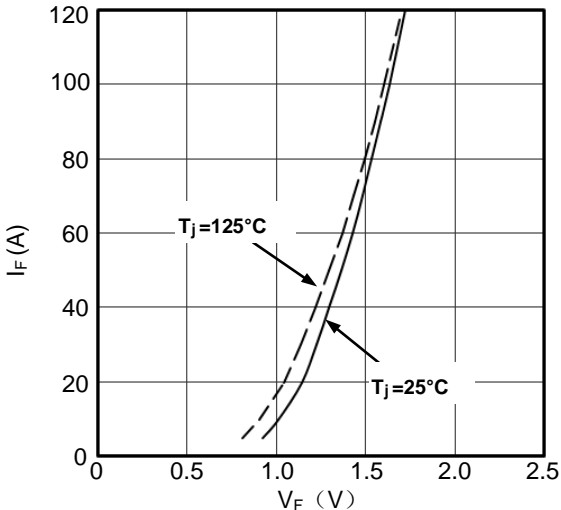


Figure 7. Diode Forward Characteristics

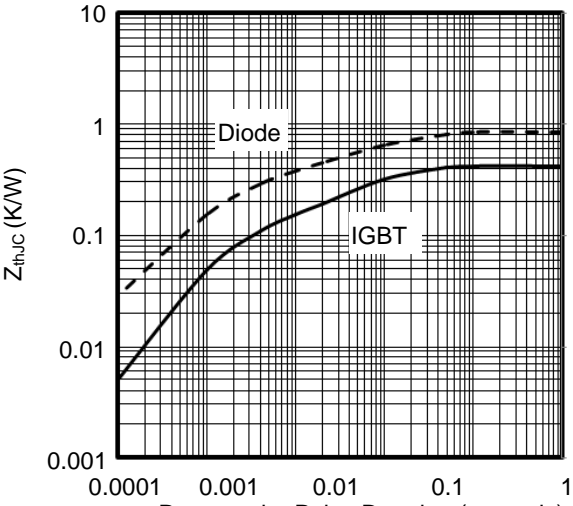
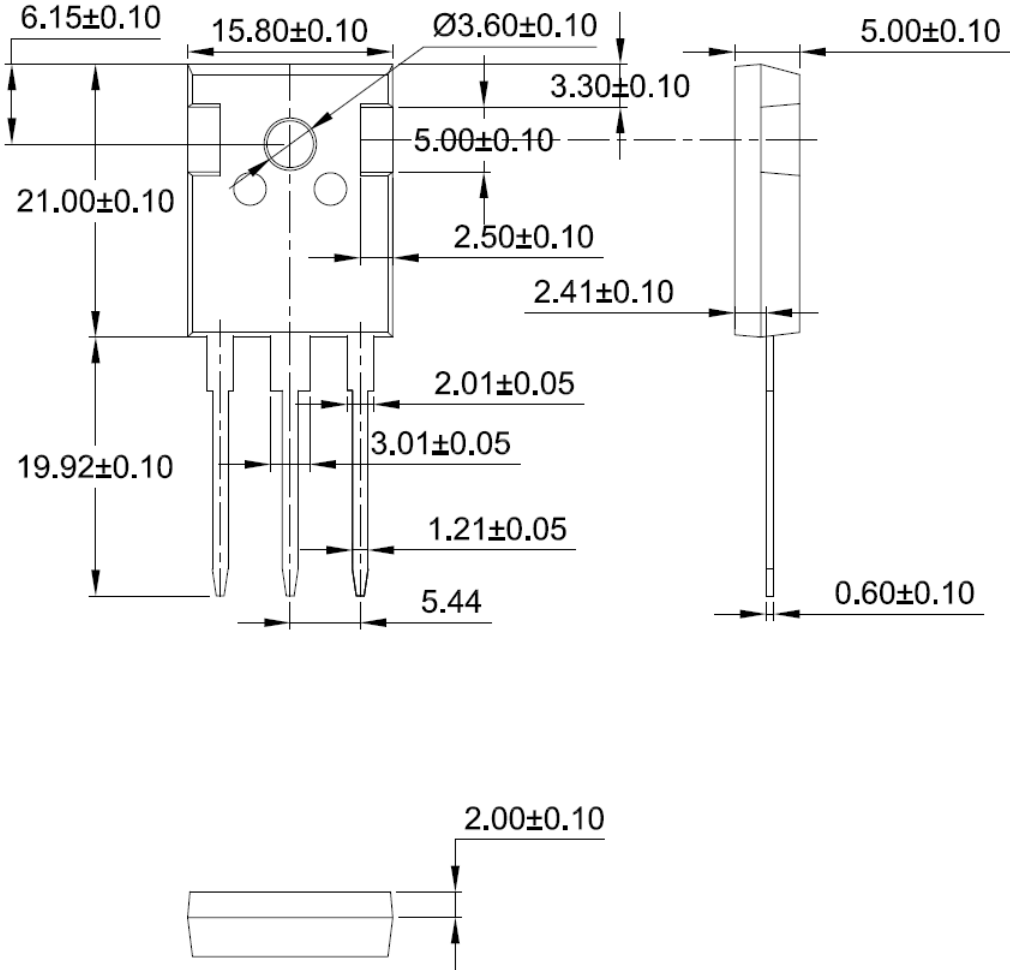


Figure 8. Transient Thermal Impedance



Dimensions in Millimeters  
Figure 9. Package Outline