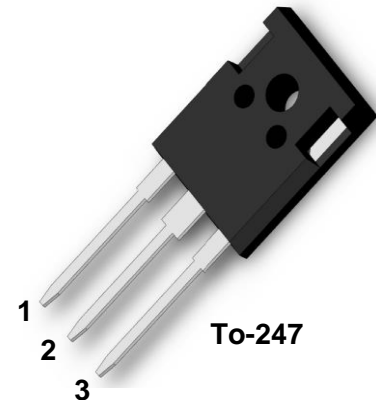


## PRODUCT FEATURES

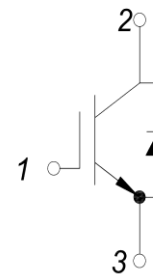
- IGBT chip in trench FS-technology
- Low switching losses
- $V_{CE(sat)}$  with positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recov



## APPLICATIONS

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

1.Gate  
2.Collector  
3.Emmitter



Type	$V_{CES}$	$I_C$	$V_{CE(sat)}$ $T_J=25^\circ C$	$T_{Jmax}$	Marking	Package
MM15GT120B	1200V	15A	1.85V	175°C	MM15GT120B	TO-247

## ABSOLUTE MAXIMUM RATINGS

$T_C=25^\circ C$  unless otherwise specified

Symbol	Parameter/Test Conditions	Values	t	
$V_{CES}$	Collector Emitter Voltage	$T_J=25^\circ C$	1200	V
$V_{GES}$	Gate Emitter Voltage		$\pm 20$	
$I_C$	DC Collector Current	$T_C=25^\circ C$	20	A
		$T_C=100^\circ C$	15	
$I_{Cpuls}$	Pulsed collector current, tp limited by		30	
$P_{tot}$	Power Dissipation Per IGBT		230	W
$V_{RRM}$	Repetitive Reverse Voltage	$T_J=25^\circ C$	1200	V
$I_{F(AV)}$	Average Forward Current	$T_C=110^\circ C$	15	A
$I_{Fpuls}$	Diode pulsed current, tp limited by $T_{Jmax}$		30	
$T_{Jmax}$	Max. Junction Temperature		175	°C
$T_{Jop}$	Operating Temperature		-40~150	
$T_{stg}$	Storage Temperature		-55~125	
<b>Torque</b>	to heatsink	Recommended (M3)	1.1	Nm
<b>Weight</b>			6	g

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	t
$V_{GE(th)}$	Gate Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=0.6\text{mA}$	5.0	5.8	6.5	
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=15\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.85	2.3	V
		$I_C=15\text{A}, V_{GE}=15\text{V}, T_J=150^\circ\text{C}$		2.25		
$I_{CES}$	Collector Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			100	$\mu\text{A}$
		$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$			1	mA
$I_{GES}$	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 15\text{V}, T_J=25^\circ\text{C}$	-200		200	nA
$Q_g$	Gate Charge	$V_{CE}=600\text{V}, I_C=15\text{A}, V_{GE}=15\text{V}$		91.5		nC
$C_{ies}$	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		2.5		nF
$C_{res}$	Reverse Transfer Capacitance			30		pF
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600\text{V}, I_C=15\text{A}$ $R_G=33\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		35	ns
			$T_J=150^\circ\text{C}$		45	ns
$t_r$	Rise Time	Inductive Load	$T_J=25^\circ\text{C}$		40	ns
			$T_J=150^\circ\text{C}$		50	ns
$t_{d(off)}$	Turn off Delay Time	$V_{CC}=600\text{V}, I_C=15\text{A}$ $R_G=33\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		140	ns
			$T_J=150^\circ\text{C}$		150	ns
$t_f$	Fall Time	Inductive Load	$T_J=25^\circ\text{C}$		160	ns
			$T_J=150^\circ\text{C}$		300	ns
$E_{on}$	Turn on Energy	$V_{CC}=600\text{V}, I_C=15\text{A}$ $R_G=33\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		1	mJ
			$T_J=150^\circ\text{C}$		1.25	mJ
$E_{off}$	Turn off Energy	Inductive Load	$T_J=25^\circ\text{C}$		0.9	mJ
			$T_J=150^\circ\text{C}$		1.15	mJ
$I_{sc}$	Short Circuit Current	$t_{psc} \leq 10\mu\text{s}, V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}, V_{CC}=600\text{V}$		60		A
$R_{thJC}$	Junction to Case Thermal Resistance ( Per IGBT )				0.65	K/W

**Anti-Parallel Diode  
ELECTRICAL CHARACTERISTICS**
 $T_C=25^\circ\text{C}$  unless otherwise specified

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	t
$V_F$	Forward Voltage	$I_F=15\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.9	2.4	V
		$I_F=15\text{A}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$		1.65		
$t_{rr}$	Reverse Recovery Time	$I_F=15\text{A}, V_R=600\text{V}$		320		ns
$I_{RRM}$	Max. Reverse Recovery Current	$di_F/dt=-600\text{A}/\mu\text{s}$		16		A
$Q_{RR}$	Reverse Recovery Charge	$T_J=150^\circ\text{C}$		2.4		$\mu\text{C}$
$E_{rec}$	Reverse Recovery Energy			0.8		mJ
$R_{thJCD}$	Junction to Case Thermal Resistance ( Per Diode )				1.2	K/W

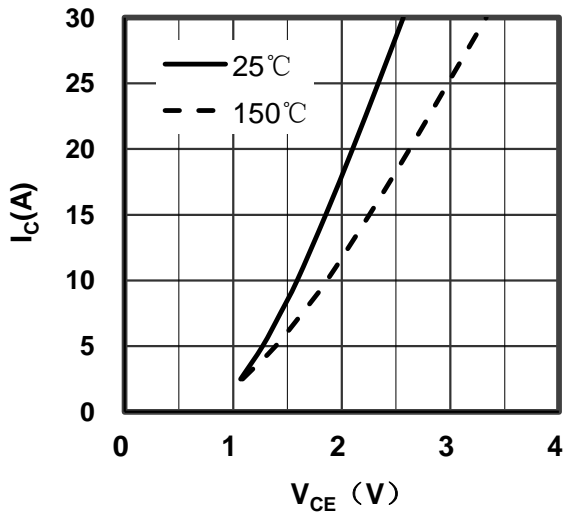


Figure 1. Typical Output Characteristics IGBT

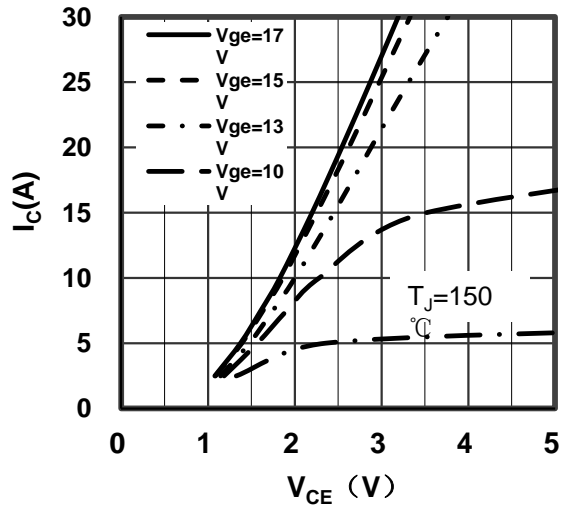


Figure 2. Typical Output Characteristics IGBT

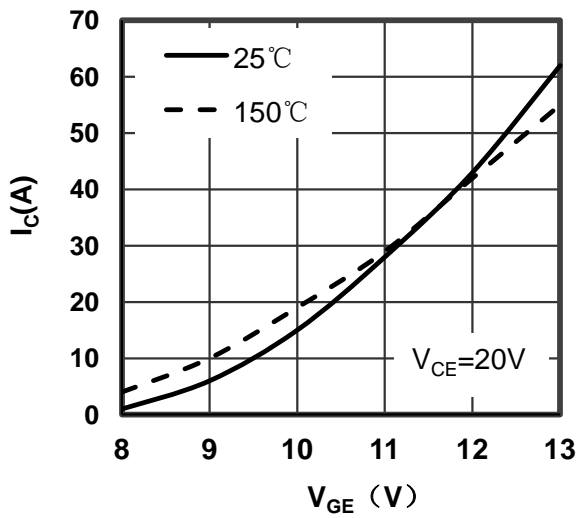


Figure 3. Typical Transfer characteristics IGBT

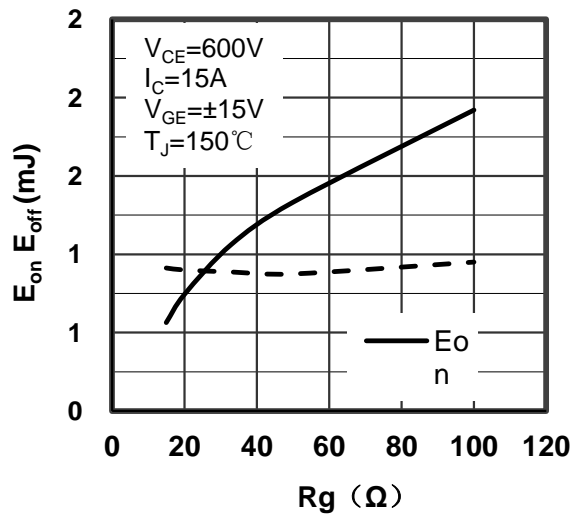


Figure 4. Switching Energy vs Gate Resistor IGBT

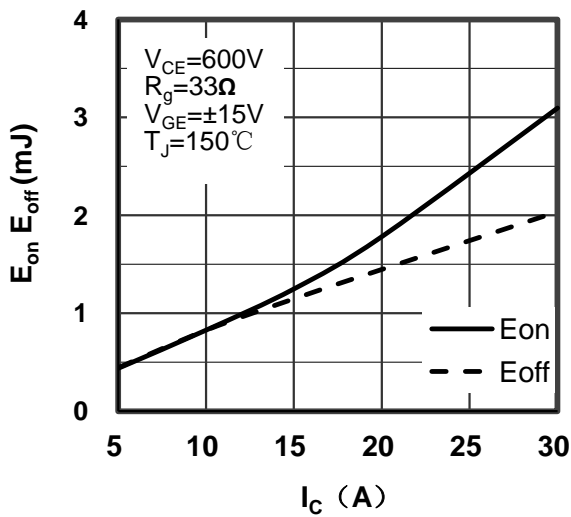


Figure 5. Switching Energy vs Collector Current

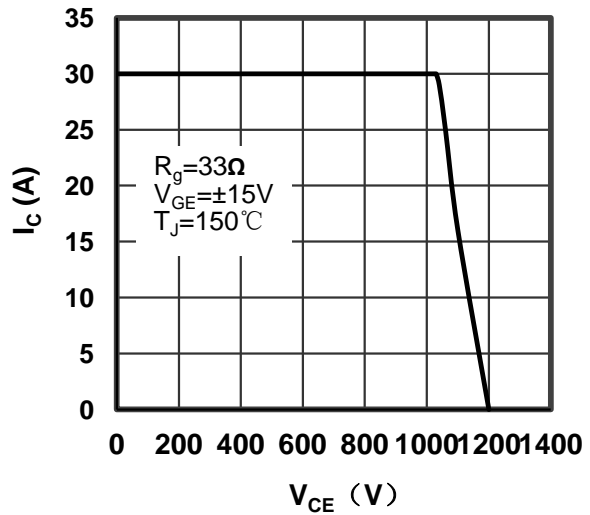


Figure 6. Reverse Biased Safe Operating Area

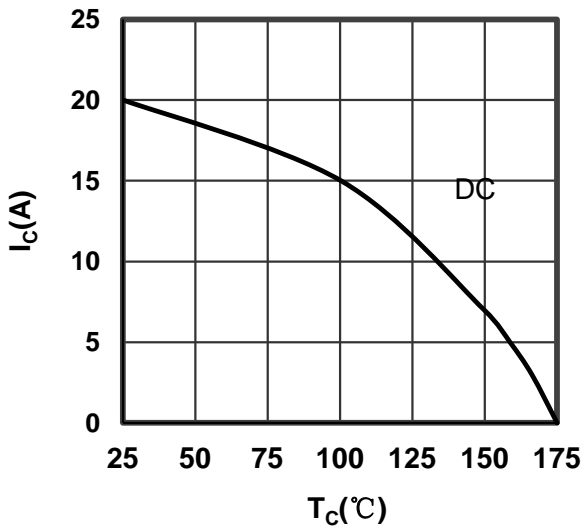


Figure 7. Collector Current vs Case temperature

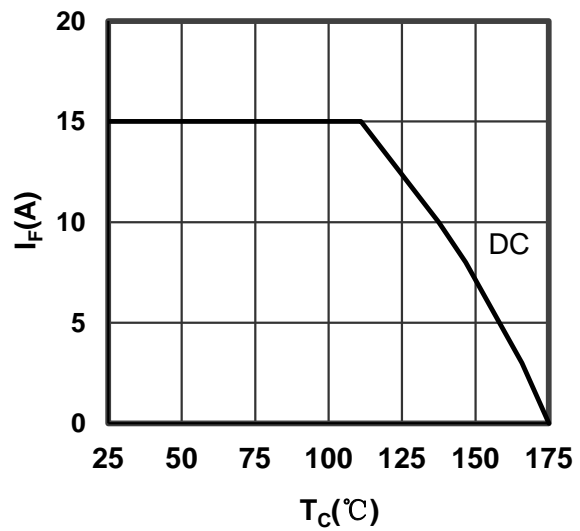


Figure 8. Forward current vs Case temperature

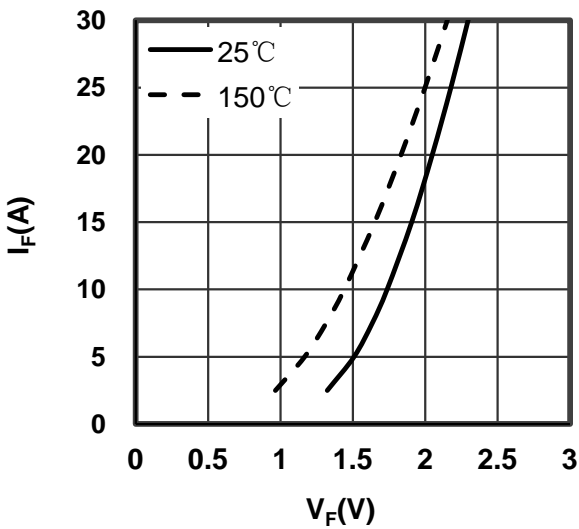


Figure 9. Diode Forward Characteristics Diode

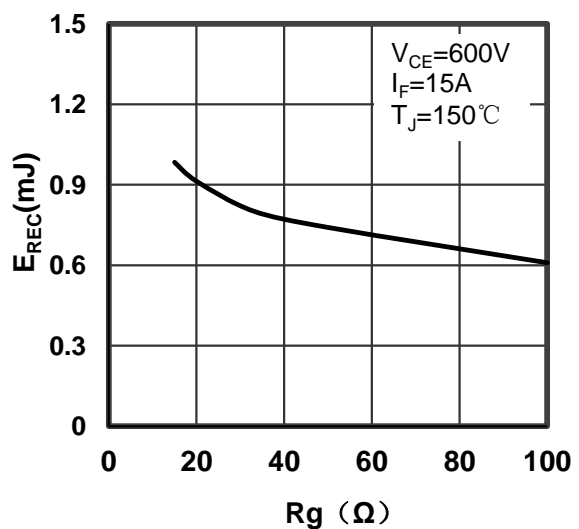


Figure 10. Switching Energy vs Gate Resistor

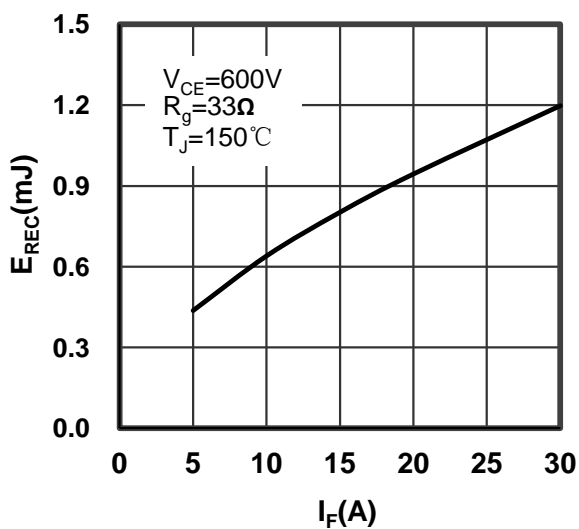


Figure 11. Switching Energy vs Forward Current

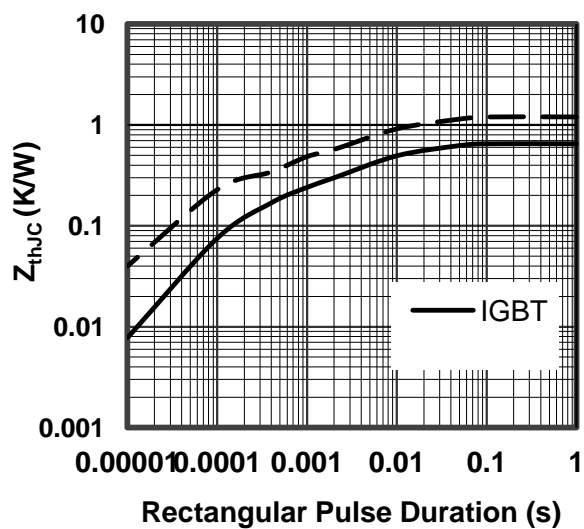
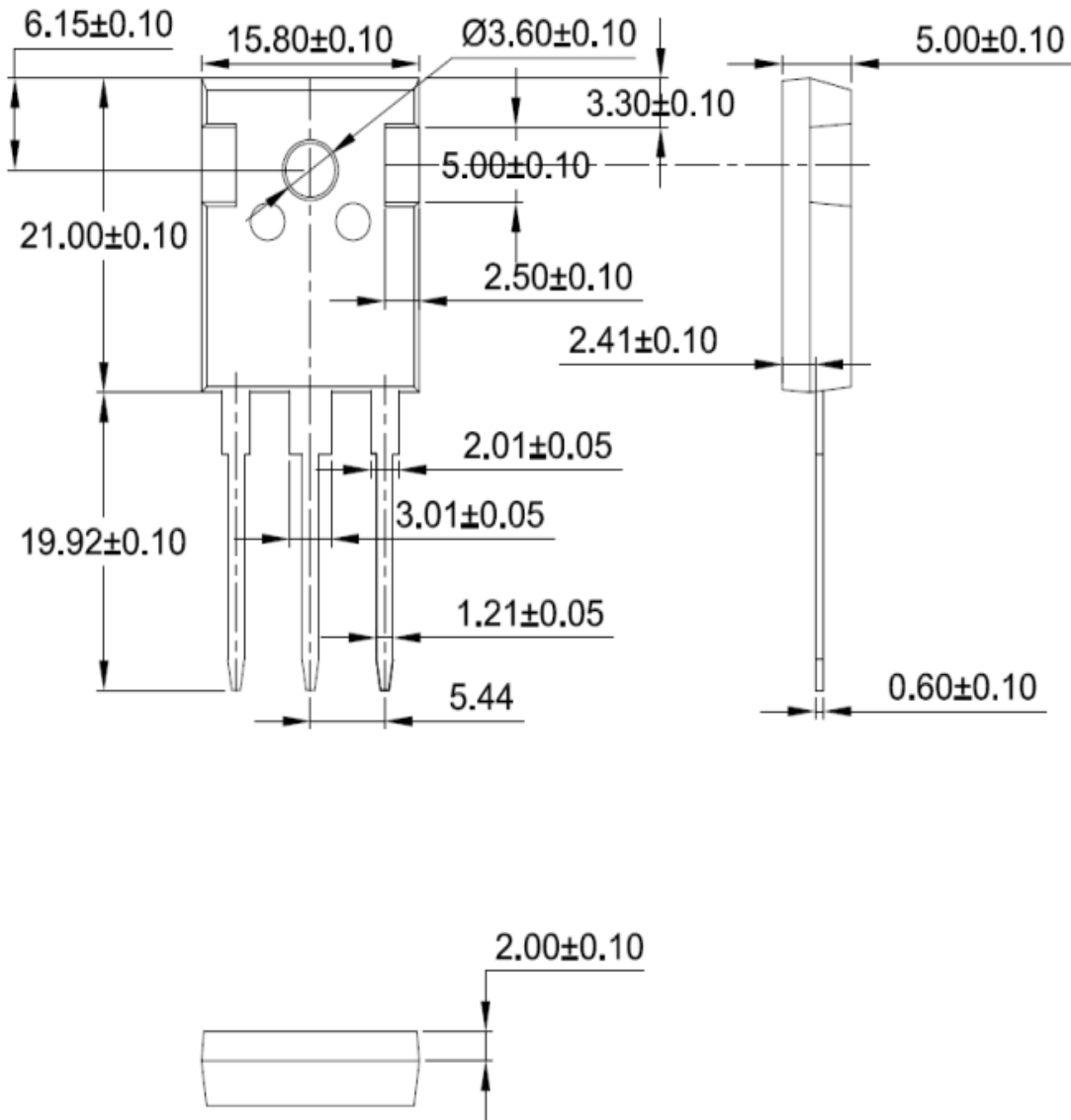


Figure 12. Transient Thermal Impedance of Diode and IGBT



Dimensions in (mm)  
Figure 13. Package Outline