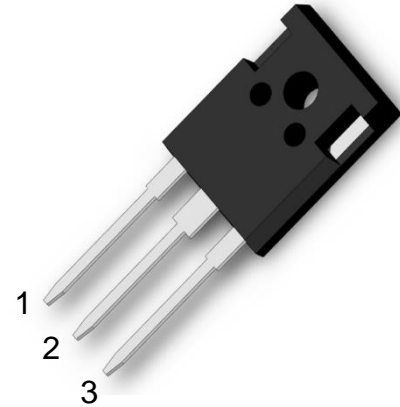


PRODUCT FEATURES

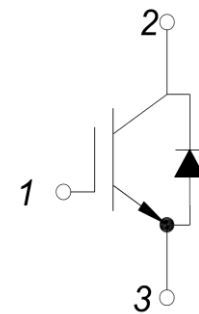
- 1350V IGBT chip in trench FS-technology
- Low switching losses
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery



APPLICATIONS

- Induction Heating
- Soft Switching Application
- Inverter

1.Gate
2.Collector
3.Emitter



Type	V_{CES}	I_C	$V_{CE(sat)}$ $T_J=25^\circ C$	T_{Jmax}	Marking	Package
MM20G3T135B	1350V	20A	1.65V	175°C	MM20G3T135B	TO-247

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

Symbol	Parameter/Test Conditions	Values	Unit	
V_{CES}	Collector Emitter Voltage	$T_J=25^\circ C$	V	
V_{GES}	Gate Emitter Voltage			
I_C	DC Collector Current	$T_C=25^\circ C$	A	
		$T_C=100^\circ C$		
I_{Cpuls}	Pulsed collector current, tp limited by T_{Jmax}	60		
P_{tot}	Power Dissipation Per IGBT	268	W	
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^\circ C$	V	
$I_{F(AV)}$	Average Forward Current	$T_C=100^\circ C$	A	
T_{Jmax}	Max. Junction Temperature	175	°C	
T_{Jop}	Operating Temperature	-40~175		
T_{stg}	Storage Temperature	-55~150		
Torque	to heatsink	Recommended (M3)	1.1	Nm
Weight			8	g

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MM20G3T135B

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	$V_{CE}=V_{GE}, I_C=0.8\text{mA}$	5.0	5.6	6.5	V	
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=20\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.65	2.1		
		$I_C=20\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		1.9			
		$I_C=20\text{A}, V_{GE}=15\text{V}, T_J=150^\circ\text{C}$		1.95			
I_{CES}	Collector Leakage Current	$V_{CE}=1350\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			1	mA	
I_{GES}	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 20\text{V}, T_J=25^\circ\text{C}$	-200		200	nA	
Q_g	Gate Charge	$V_{CE}=600\text{V}, I_C=20\text{A}, V_{GE}=15\text{V}$		160		nC	
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		1.9		nF	
C_{res}	Reverse Transfer Capacitance				50		pF
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600\text{V}, I_C=20\text{A}$ $R_G=20\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		24		ns
			$T_J=125^\circ\text{C}$		26		ns
			$T_J=150^\circ\text{C}$		28		ns
t_r	Rise Time		$T_J=25^\circ\text{C}$		18		ns
			$T_J=125^\circ\text{C}$		20		ns
			$T_J=150^\circ\text{C}$		20		ns
$t_{d(off)}$	Turn off Delay Time	$T_J=25^\circ\text{C}$		200		ns	
		$T_J=125^\circ\text{C}$		225		ns	
		$T_J=150^\circ\text{C}$		230		ns	
t_f	Fall Time	$T_J=25^\circ\text{C}$		100		ns	
		$T_J=125^\circ\text{C}$		150		ns	
		$T_J=150^\circ\text{C}$		160		ns	
E_{on}	Turn on Energy	$T_J=25^\circ\text{C}$		1.2		mJ	
		$T_J=125^\circ\text{C}$		1.75		mJ	
		$T_J=150^\circ\text{C}$		1.85		mJ	
E_{off}	Turn off Energy	$T_J=25^\circ\text{C}$		1.1		mJ	
		$T_J=125^\circ\text{C}$		1.3		mJ	
		$T_J=150^\circ\text{C}$		1.4		mJ	
R_{thJC}	Junction to Case Thermal Resistance (Per IGBT)				0.56	K/W	

Anti-Parallel Diode

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=20\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.8	2.4	V
		$I_F=20\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		1.7		
		$I_F=20\text{A}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$		1.65		
t_{rr}	Reverse Recovery Time	$I_F=20\text{A}, V_R=600\text{V}$ $di_F/dt=-770\text{A}/\mu\text{s}$ $T_J=150^\circ\text{C}$		300		ns
I_{RRM}	Max. Reverse Recovery Current			30		A
Q_{RR}	Reverse Recovery Charge			4.7		μC
E_{rec}	Reverse Recovery Energy			1.8		mJ
R_{thJCD}	Junction to Case Thermal Resistance (Per Diode)				2.8	K/W

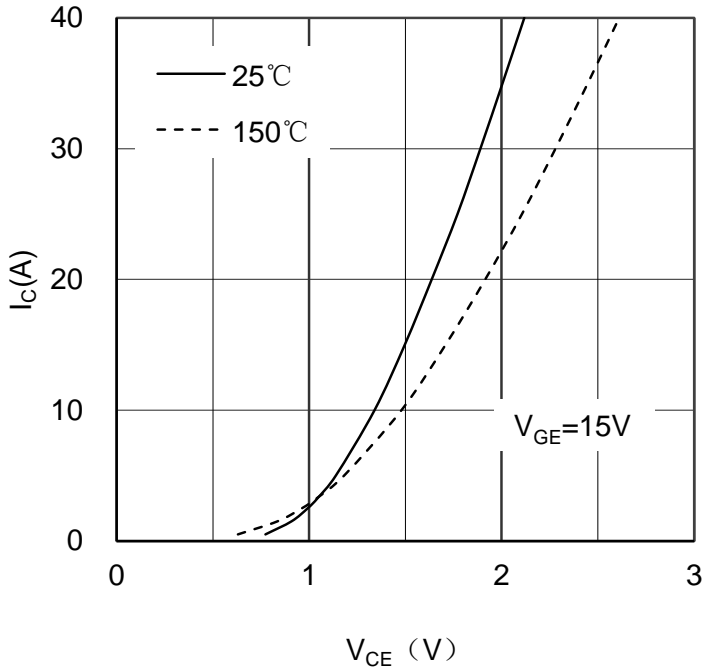


Figure 1. Typical Output Characteristics IGBT

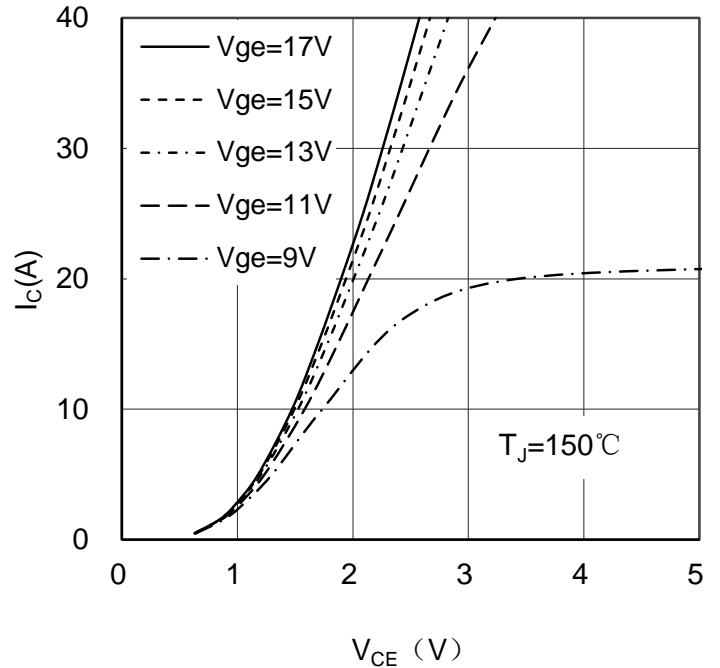


Figure 2. Typical Output Characteristics IGBT

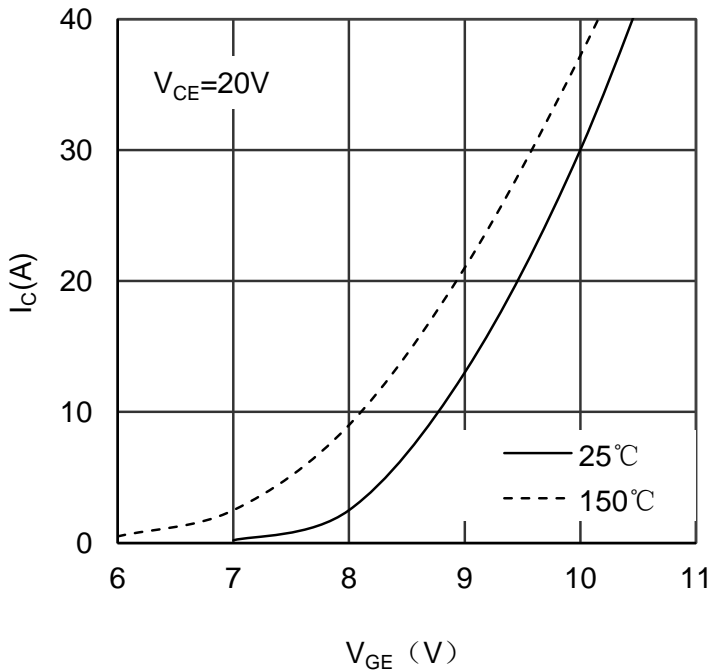


Figure 3. Typical Transfer characteristics IGBT

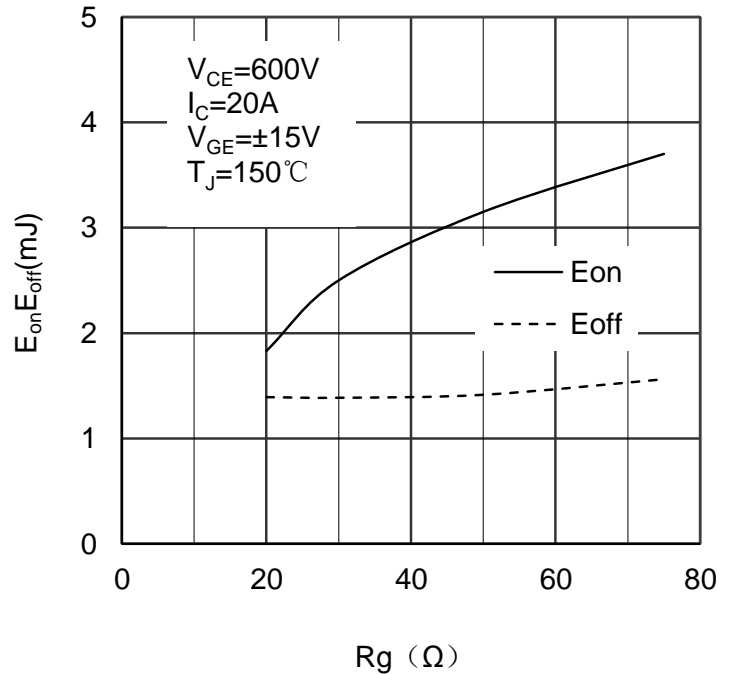


Figure 4. Switching Energy vs Gate Resistor IGBT

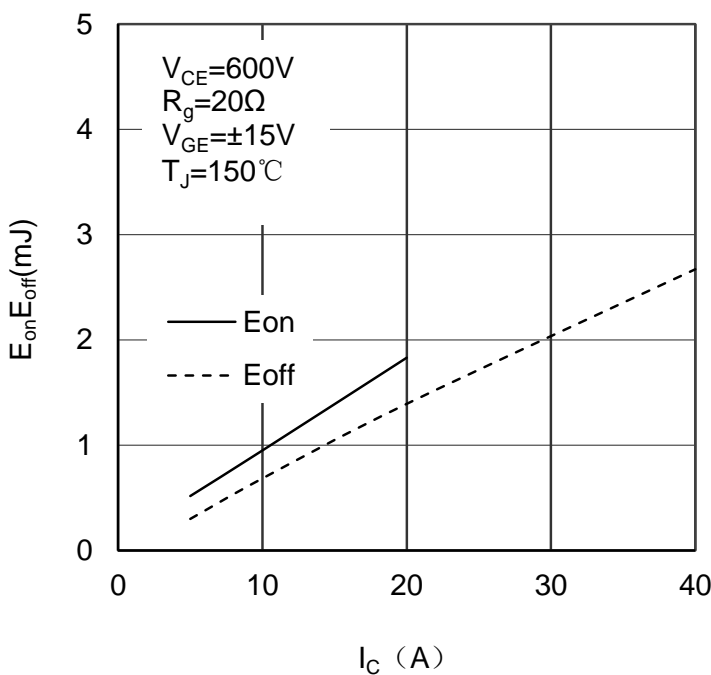


Figure 5. Switching Energy vs Collector Current IGBT

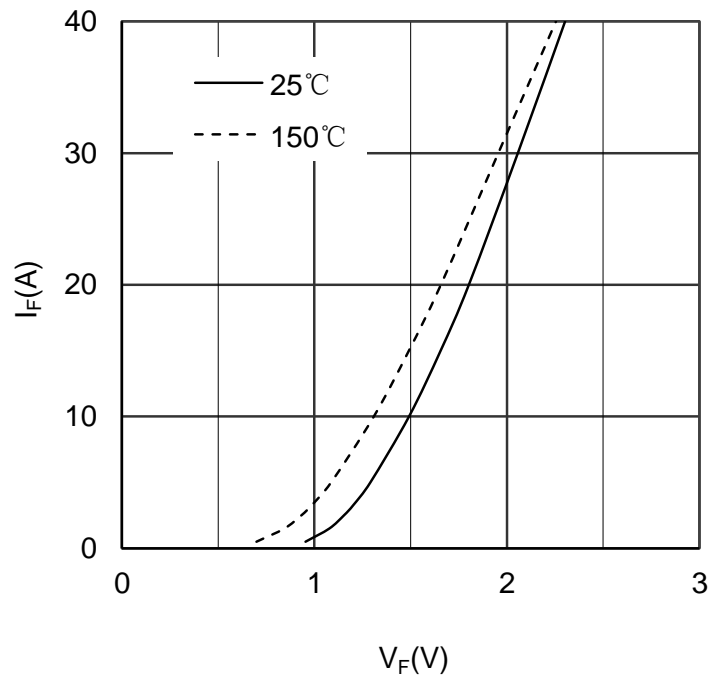


Figure 6. Diode Forward Characteristics Diode

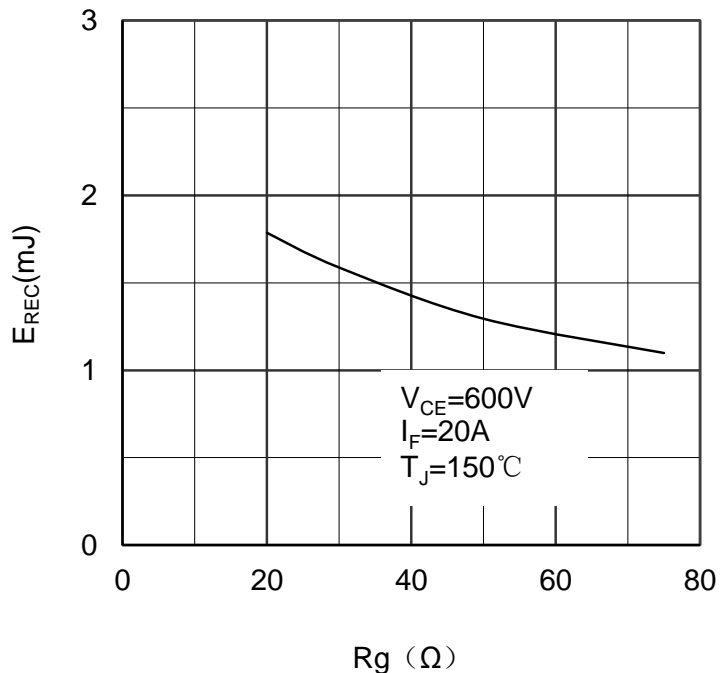


Figure 7. Switching Energy vs Gate Resistor Diode

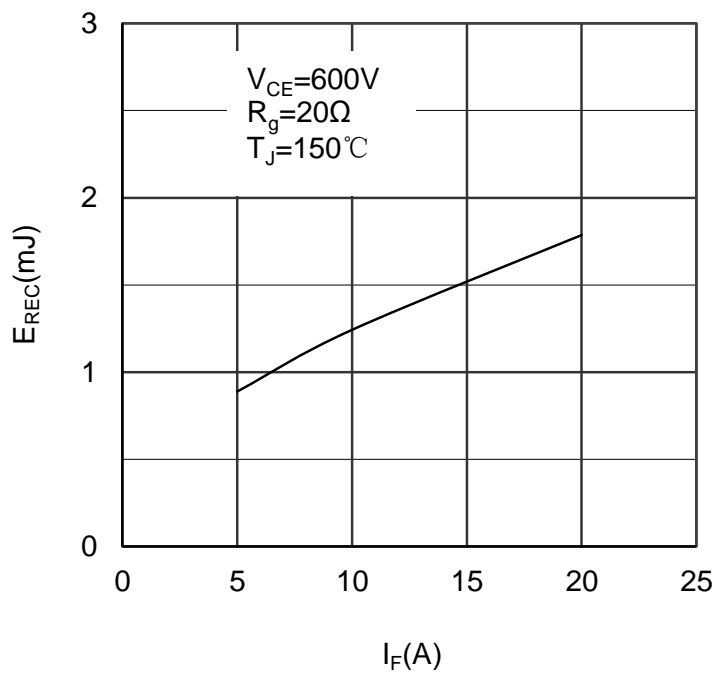


Figure 8. Switching Energy vs Forward Current Diode

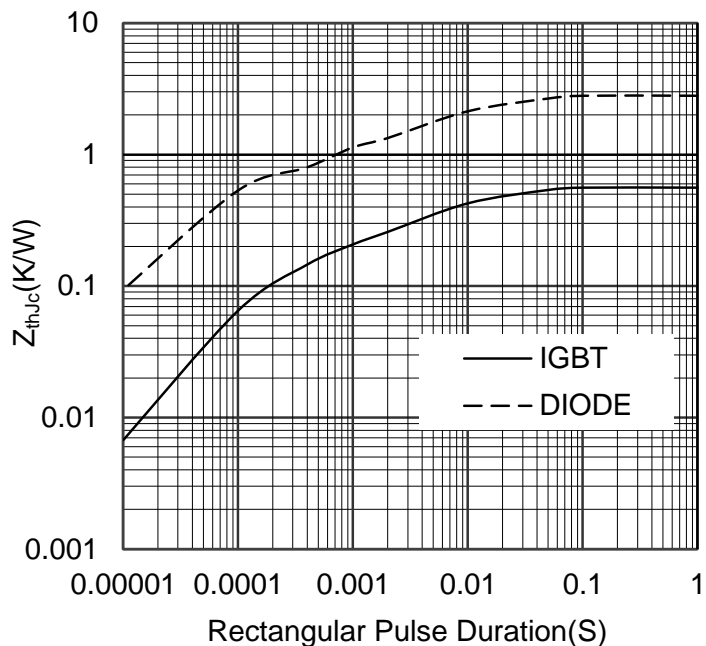
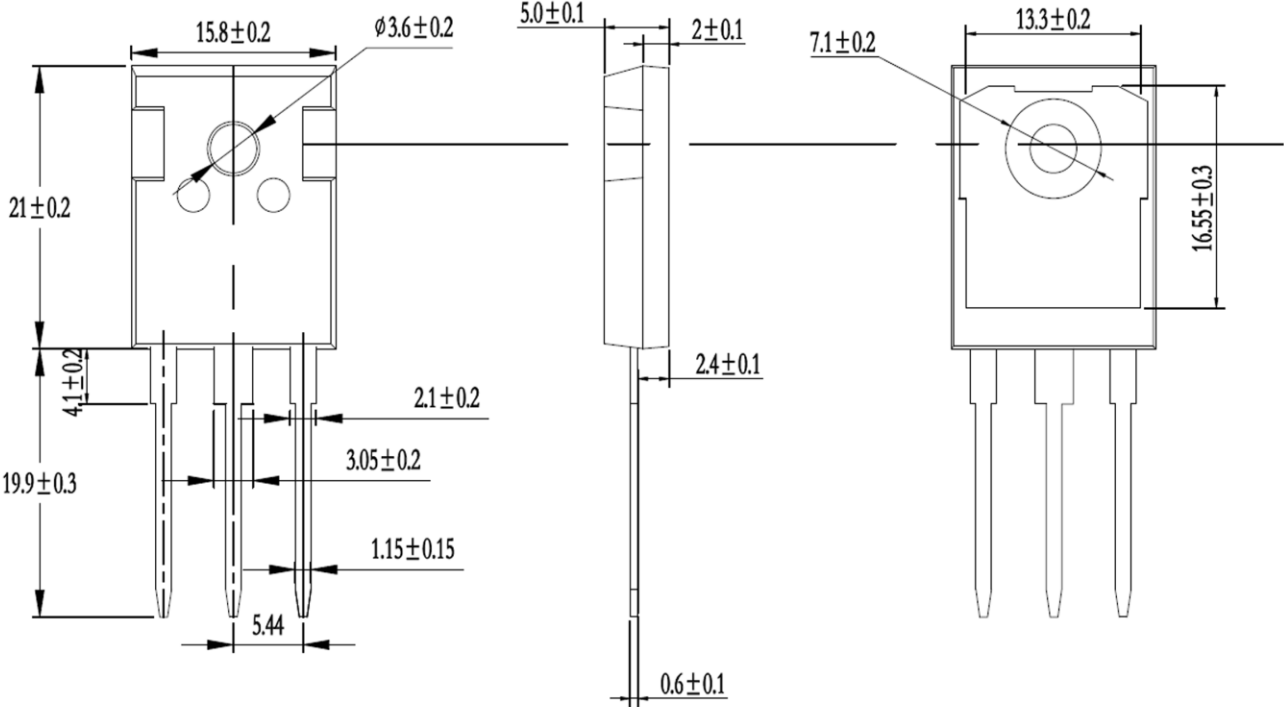


Figure 9. Transient Thermal Impedance of Diode and IGBT



Dimensions in (mm)
Figure 10. Package Outline