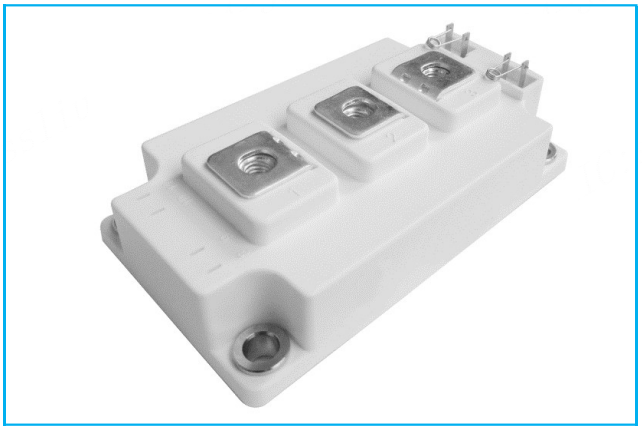
MMG200D170B6TC

1700V 200A IGBT Module

April 2025 Version 01 RoHS Compliant

PRODUCT FEATURES

- ☐ IGBT CHIP(1700V Trench+Field Stop technology)
- ☐ Low turn-off losses, short tail current
- ☐ $V_{CE(sat)}$ with positive temperature coefficient
- ☐ Ultra Low Loss,High Ruggedness
- ☐ Free wheeling diodes with fast and soft reverse recovery



APPLICATIONS

- ☐ AC motor control
- ☐ Motion/servo control
- ☐ Inverter and power supplies
- ☐ Photovoltaic/Fuel cell

IGBT-ABSOLUTE MAXIMUM RATINGS(T_C =25°C unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	T_J=25℃	1700	V
V_{GES}	Gate Emitter Voltage		±20	
I_C	DC Collector Current	T_C=100℃, T_{Jmax}=175℃	200	A
I_{CM}	Repetitive Peak Collector Current	tp=1ms	400	
P_{tot}	Power Dissipation Per IGBT	T_C=25℃, T_{Jmax}=175℃	1363	W

Diode-ABSOLUTE MAXIMUM RATINGS (T_C =25°C unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	T_J=25℃	1700	V
$I_{F(AV)}$	Average Forward Current		200	A
I_{FRM}	Repetitive Peak Forward Current	tp=1ms	400	
I^2t		T_J=150℃, t=10ms, V_R=0V	10800	A^2s

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IGBT-inverter

ELECTRICAL CHARACTERISTICS *(T_C =25°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=6mA		5.7	6.4	7.1	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	I_C=200A, V_{GE}=15V, T_J=25℃			1.95	2.40	
		I_C=200A, V_{GE}=15V, T_J=125℃			2.40		
		I_C=200A, V_{GE}=15V, T_J=150℃			2.45		
I_{CES}	Collector Leakage Current	V_{CE}=1700V, V_{GE}=0V, T_J=25℃				100	μA
I_{GES}	Gate Leakage Current	V_{CE}=0V,V_{GE}=±20V, T_J=25℃		-400		400	nA
R_{Gint}	Integrated Gate Resistor				3.7		Ω
Q_G	Gate Charge	V_{GE}=0V...15V			1.3		μC
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f =100kHz			29		nF
C_{oes}	Output Capacitance				1.3		nF
C_{res}	Reverse Transfer Capacitance				0.34		nF
$t_{d(on)}$	Turn on Delay Time	V_{CC}=900V,I_C=200A R_G =3.6Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		395		ns
			T_J=125℃		480		ns
			T_J=150℃		490		ns
t_r	Rise Time		T_J=25℃		60		ns
			T_J=125℃		70		ns
			T_J=150℃		70		ns
$t_{d(off)}$	Turn off Delay Time	V_{CC}=900V,I_C=200A R_G =3.6Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		650		ns
			T_J=125℃		730		ns
			T_J=150℃		735		ns
t_f	Fall Time		T_J=25℃		395		ns
			T_J=125℃		585		ns
			T_J=150℃		620		ns
E_{on}	Turn on Energy	V_{CC}=900V,I_C=200A R_G =3.6Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		44.0		mJ
			T_J=125℃		79.0		mJ
			T_J=150℃		88.0		mJ
E_{off}	Turn off Energy		T_J=25℃		42.5		mJ
			T_J=125℃		63.0		mJ
			T_J=150℃		69.5		mJ
I_{SC}	Short Circuit Current	tpsc≤10μs , V_{GE}=15V T_J=150℃,V_{CC}=1000V			550		A
R_{thJC}	Junction to Case Thermal Resistance （ Per IGBT）					0.11	K /W

Diode-inverter

ELECTRICAL CHARACTERISTICS *(T_C=25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=200A , V_{GE}=0V, T_J=25℃		1.58		V
		I_F=200A , V_{GE}=0V, T_J=125℃		1.68		
		I_F=200A , V_{GE}=0V, T_J=150℃		1.67		
t_{rr}	Reverse Recovery Time	I_F=200A , V_R=900V dI_F/dt=-5250A/μs T_J =150℃		437		ns
Q_{RR}	Reverse Recovery Charge			378		μC
I_{RRM}	Max. Reverse Recovery Current			61		A
E_{rec}	Reverse Recovery Energy			67		mJ
R_{thJCD}	Junction to Case Thermal Resistance （Per Diode）				0.2	K /W

MODULE CHARACTERISTICS *(T_C=25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions		Values	Unit
T_{Jmax}	Max. Junction Temperature		175	℃
T_{Jop}	Operating Temperature		-40~150	
T_{stg}	Storage Temperature		-40~125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	4000	V
CTI	Comparative Tracking Index		＞225	
Torque	to heatsink	Recommended（M6）	3~5	Nm
	to terminal	Recommended（M6）	2.5~5	Nm
Weight			300	g

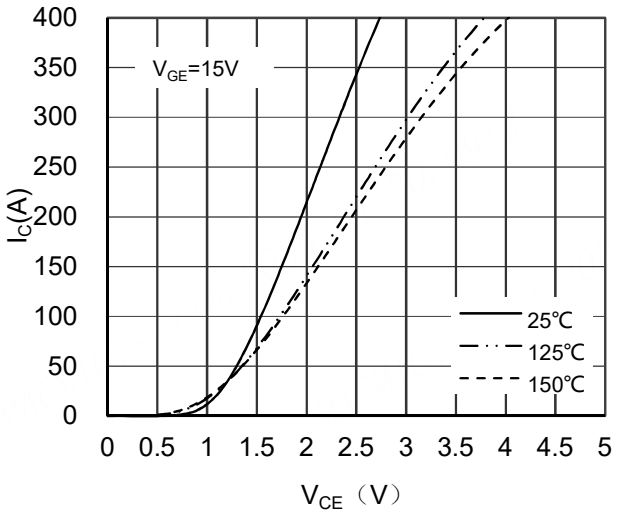


Figure 1. Typical Output Characteristics IGBT

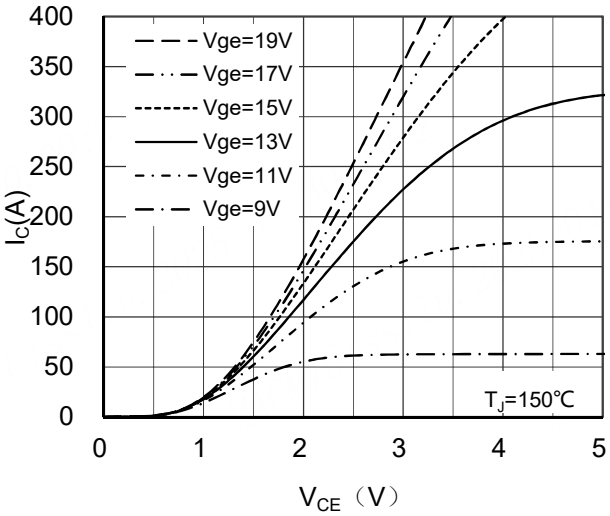


Figure 2. Typical Output Characteristics IGBT

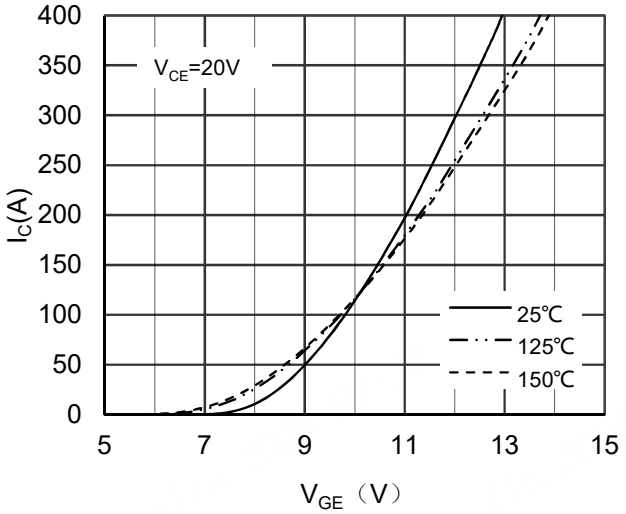


Figure 3. Typical Transfer characteristics IGBT

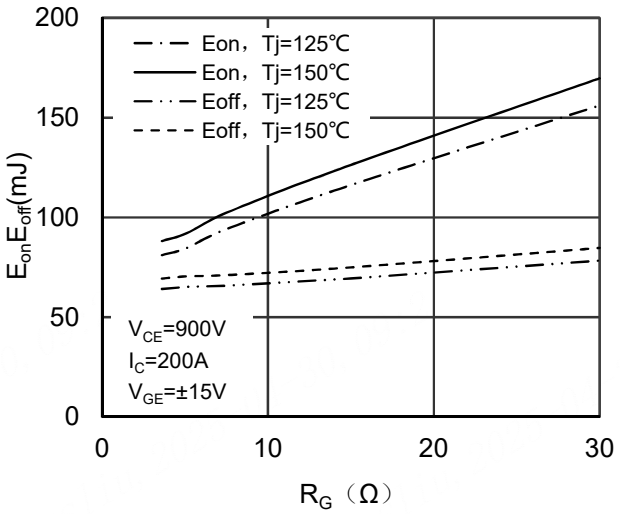


Figure 4. Switching Energy vs Gate Resistor IGBT

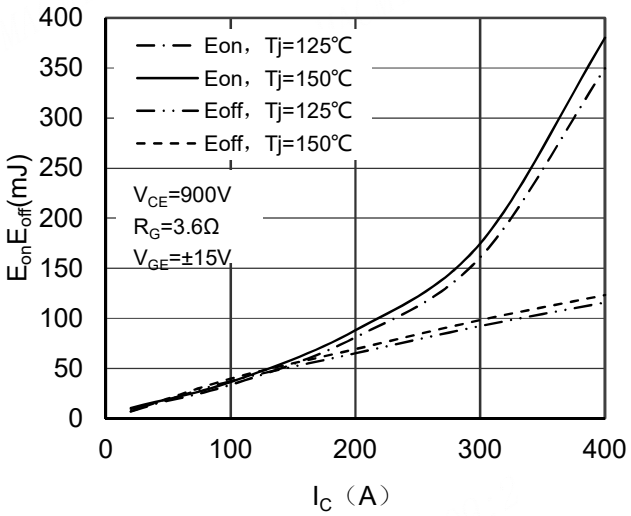


Figure 5. Switching Energy vs Collector Current IGBT

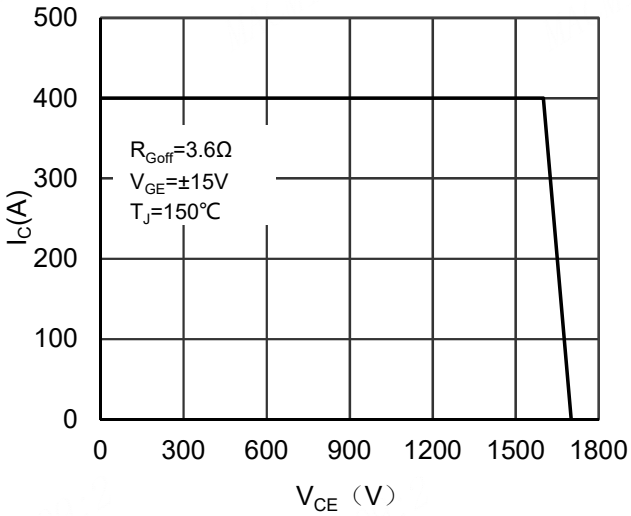


Figure 6. Reverse Biased Safe Operating Area IGBT

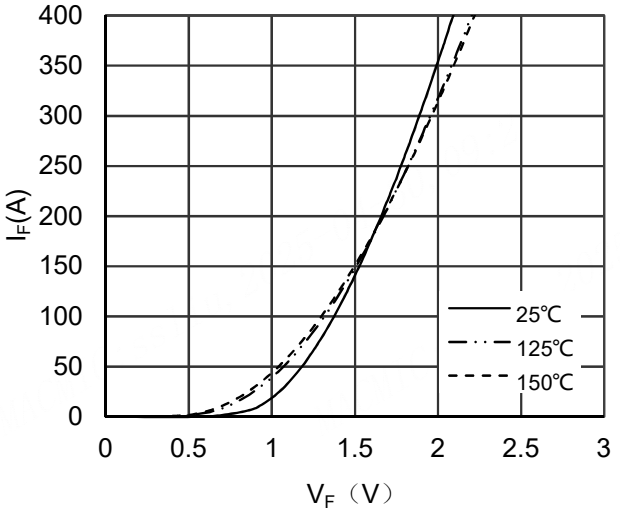


Figure 7. Diode Forward Characteristics Diode

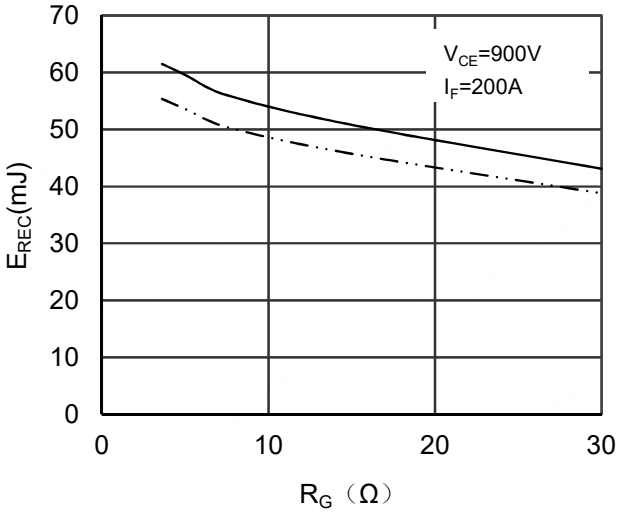


Figure 8. Switching Energy vs Gate Resistor Diode

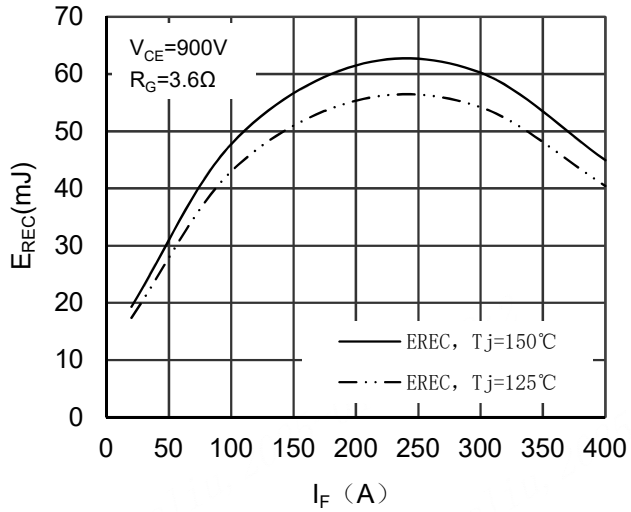


Figure 9. Switching Energy vs Forward Current Diode

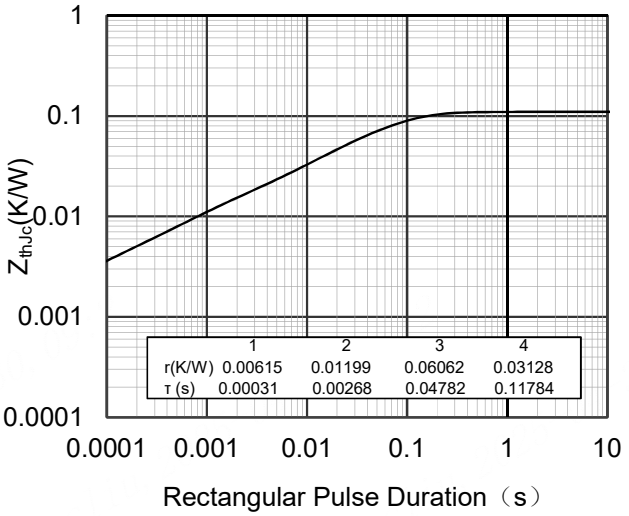


Figure 10. Transient Thermal Impedance of IGBT

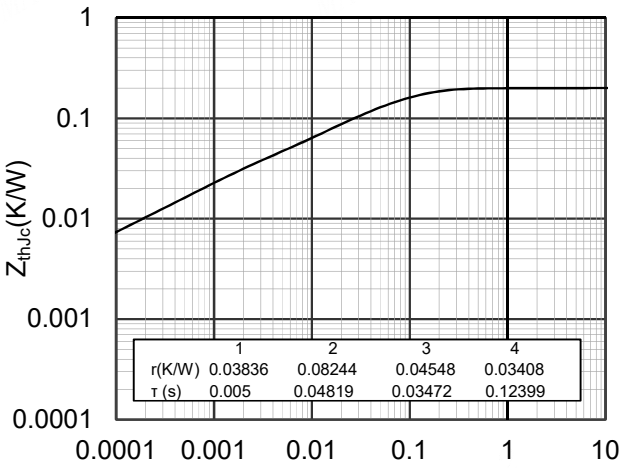


Figure 11. Transient Thermal Impedance of Diode

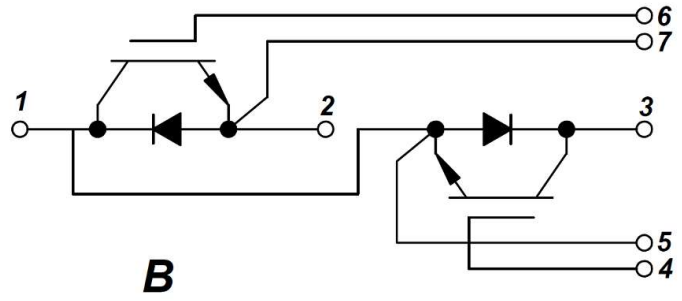
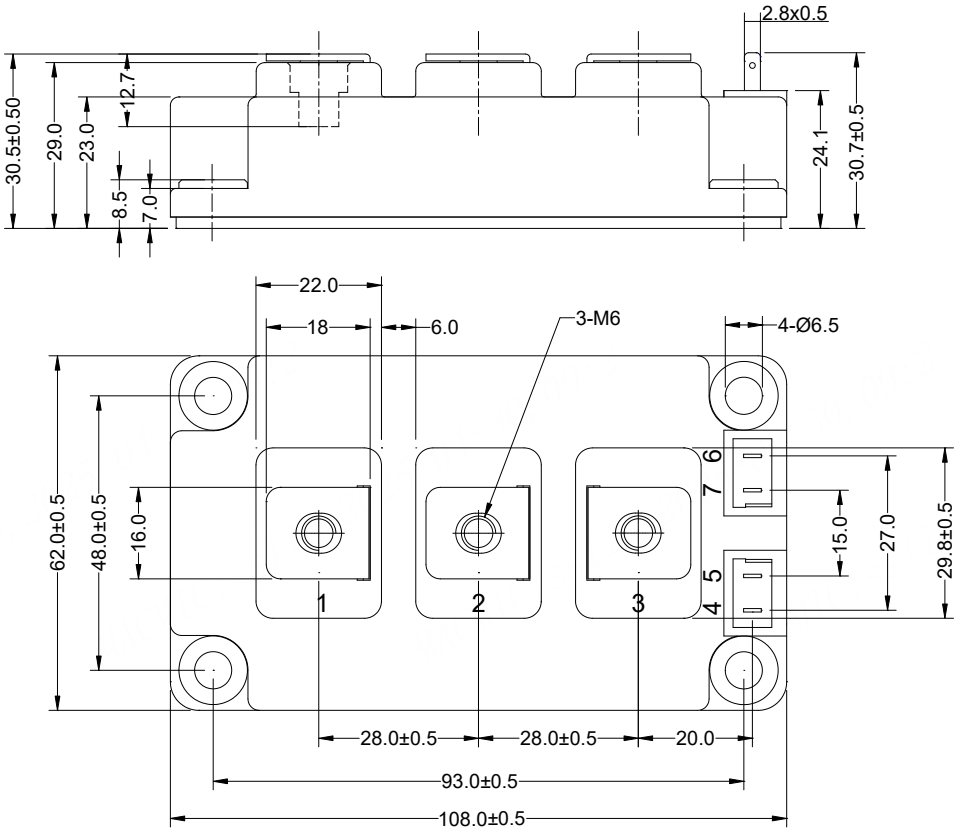


Figure 11. Circuit Diagram



Dimensions in (mm)

Figure 12. Package Outline