

PRODUCT FEATURES

- ☐ High short circuit capability, self limiting short circuit current
- ☐ IGBT CHIP(Highly rugged SPT+ design)
- ☐ $V_{CE(sat)}$ 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-inverter

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_J=25^{\circ}C$	1700	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C=25^{\circ}C, T_{Jmax}=175^{\circ}C$	450	A
		$T_C=100^{\circ}C, T_{Jmax}=175^{\circ}C$	300	
I_{CM}	Repetitive Peak Collector Current	$t_p=1ms$	600	
P_{tot}	Power Dissipation Per IGBT	$T_C=25^{\circ}C, T_{Jmax}=175^{\circ}C$	1875	W

Diode-inverter

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^{\circ}C$	1700	V
$I_{F(AV)}$	Average Forward Current		300	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1ms$	600	
I^2t		$T_J=150^{\circ}C, t=10ms, V_R=0V$	11250	A^2S

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MMG300D170B

IGBT-inverter

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 =12mA	5.4	6.2	7.4	V
V _{CE(sat)}	Collector Emitter Saturation Voltage	I _C =300A, V _{GE} =15V, T _J =25℃		2.3	2.7	
		I _C =300A, V _{GE} =15V, T _J =125℃		2.65		
		I _C =300A, V _{GE} =15V, T _J =150℃		2.7		
I _{CES}	Collector Leakage Current	V _{CE} =1700V, V _{GE} =0V, T _J =25℃			1	mA
		V _{CE} =1700V, V _{GE} =0V, T _J =150℃			10	mA
I _{GES}	Gate Leakage Current	V _{CE} =0V,V _{GE} =±15V, T _J =25℃	-500		500	nA
Q _g	Gate Charge	V _{CE} =900V, I _C =300A , V _{GE} =±15V		2.1		μC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		18.5		nF
C _{res}	Reverse Transfer Capacitance			0.72		nF
t _{d(on)}	Turn on Delay Time	V _{CC} =900V,I _C =300A R _G =4.7Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		190	ns
			T _J =150℃		230	ns
t _r	Rise Time		T _J =25℃		160	ns
			T _J =150℃		170	ns
t _{d(off)}	Turn off Delay Time	V _{CC} =900V,I _C =300A R _G =4.7Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		560	ns
			T _J =150℃		680	ns
t _f	Fall Time		T _J =25℃		170	ns
			T _J =150℃		310	ns
E _{on}	Turn on Energy	V _{CC} =900V,I _C =300A R _G =4.7Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		126	mJ
			T _J =125℃		160	mJ
			T _J =150℃		173	mJ
E _{off}	Turn off Energy		T _J =25℃		67	mJ
			T _J =125℃		93	mJ
			T _J =150℃		100	mJ
I _{SC}	Short Circuit Current	tpsc≤10μS , V _{GE} =15V T _J =150℃,V _{CC} =1000V		960		A
R _{thJC}	Junction to Case Thermal Resistance （Per IGBT）				0.08	K /W

Diode-inverter

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 =300A , V _{GE} =0V, T _J =25℃		1.75	2.3	V
		I _F =300A , V _{GE} =0V, T _J =125℃		1.85		
		I _F =300A , V _{GE} =0V, T _J =150℃		1.9		
t _{rr}	Reverse Recovery Time	I _F =300A , V _R =900V dI _F /dt=-1800A/μs T _J =150℃		750		ns
I _{RRM}	Max. Reverse Recovery Current			250		A
Q _{RR}	Reverse Recovery Charge			117		μC
E _{rec}	Reverse Recovery Energy			87.5		mJ
R _{thJCD}	Junction to Case Thermal Resistance （Per Diode）				0.14	K /W

MMG300D170B

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=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

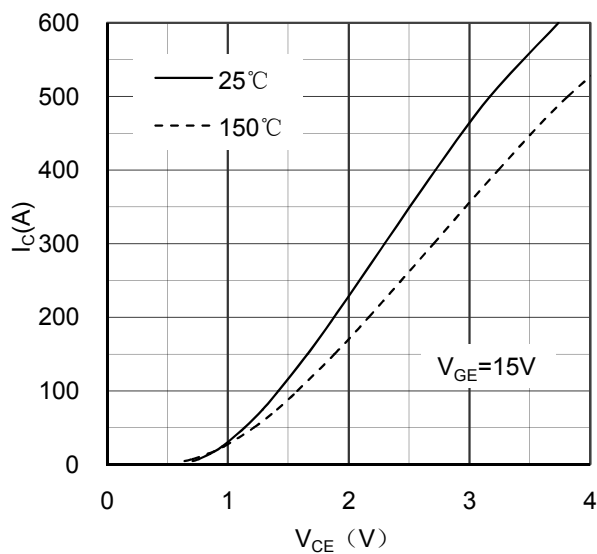


Figure 1. Typical Output Characteristics IGBT-inverter

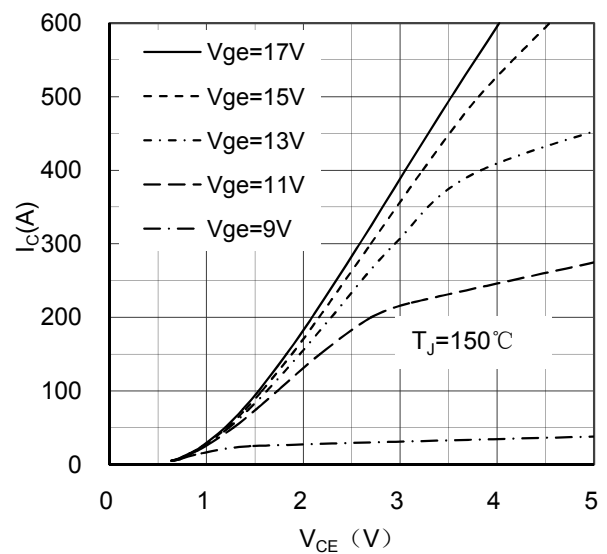


Figure 2. Typical Output Characteristics IGBT-inverter

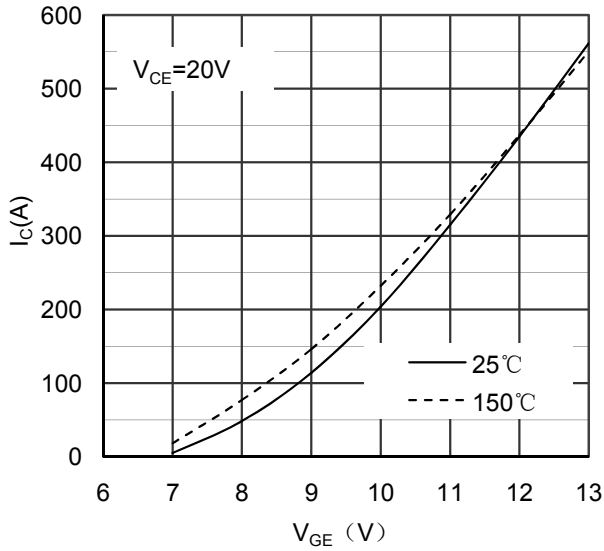


Figure 3. Typical Transfer characteristics IGBT-inverter

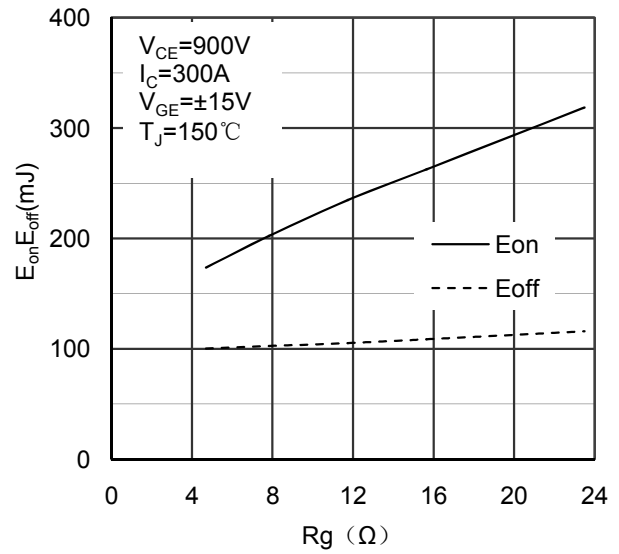


Figure 4. Switching Energy vs Gate Resistor IGBT-inverter

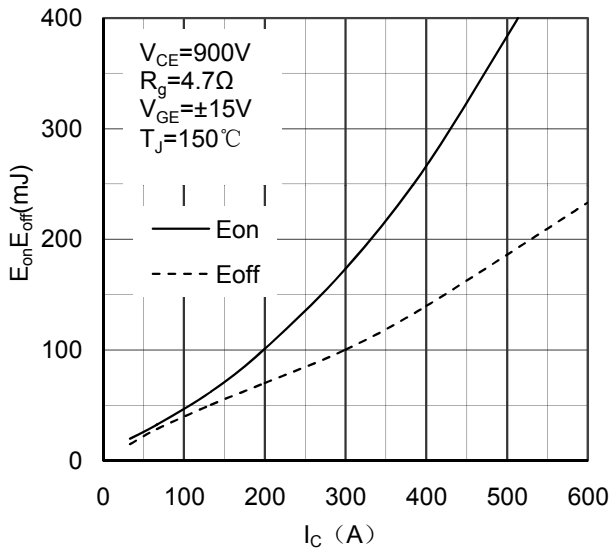


Figure 5. Switching Energy vs Collector Current IGBT-inverter

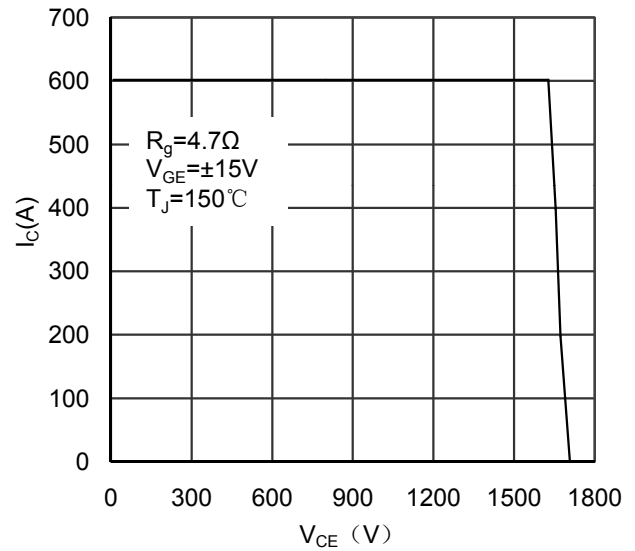


Figure 6. Reverse Biased Safe Operating Area IGBT-inverter

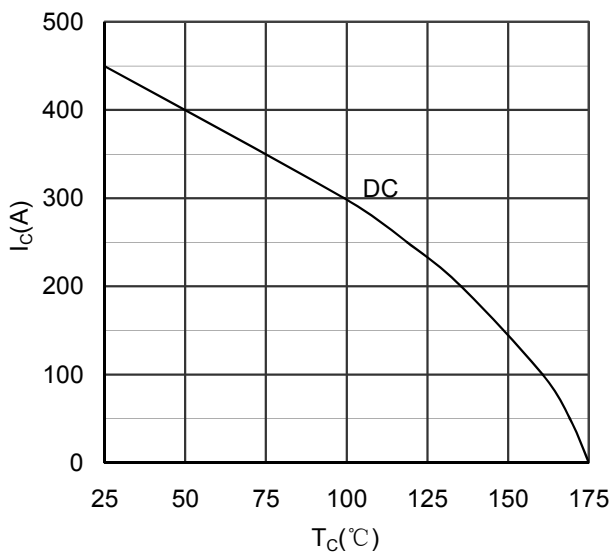


Figure 7. Collector Current vs Case temperature IGBT-inverter

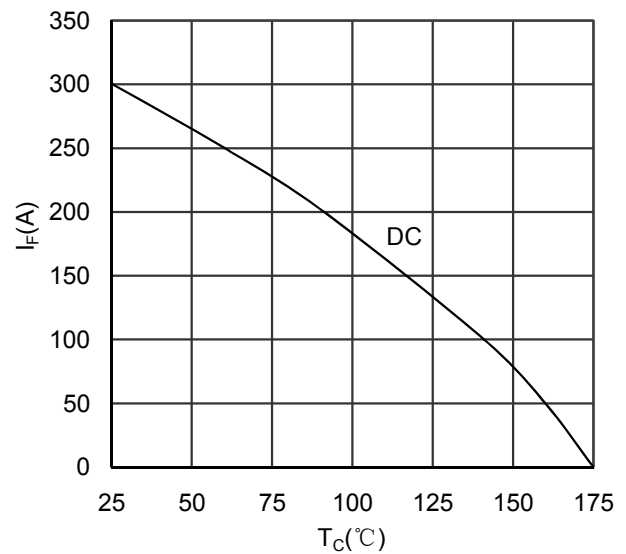


Figure 8. Forward current vs Case temperature Diode-inverter

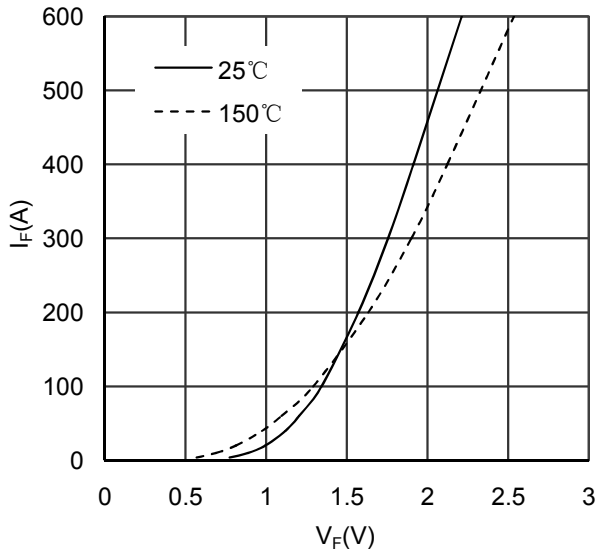


Figure 9. Diode Forward Characteristics Diode -inverter

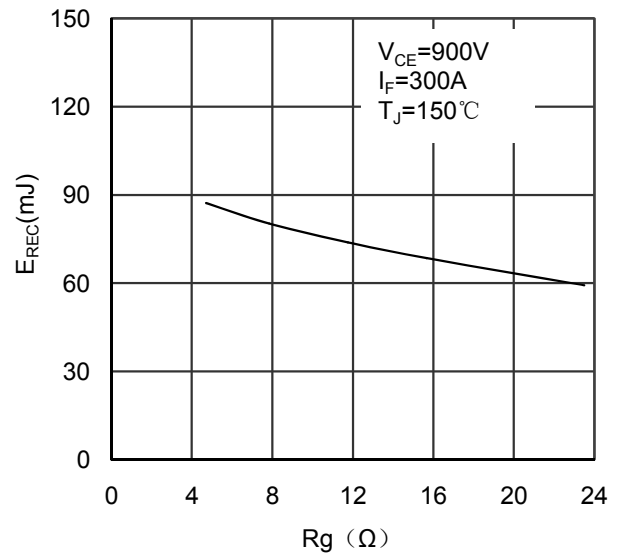


Figure 10. Switching Energy vs Gate Resistor Diode - inverter

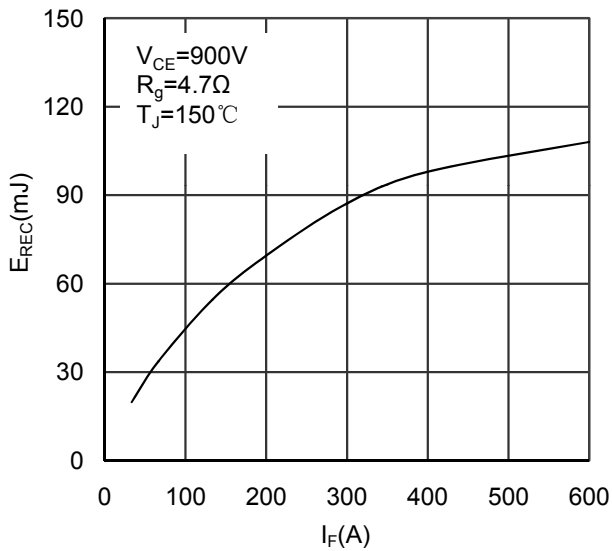


Figure 11. Switching Energy vs Forward Current Diode-inverter

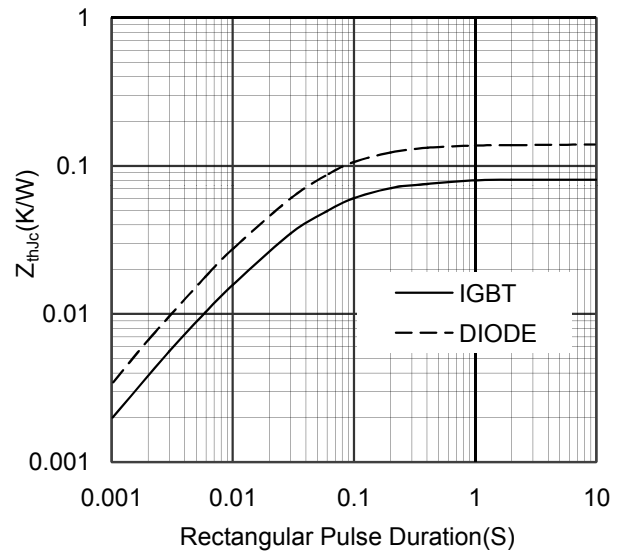


Figure 12. Transient Thermal Impedance of Diode and IGBT-inverter

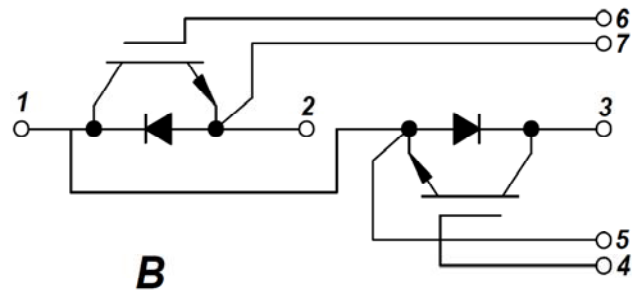
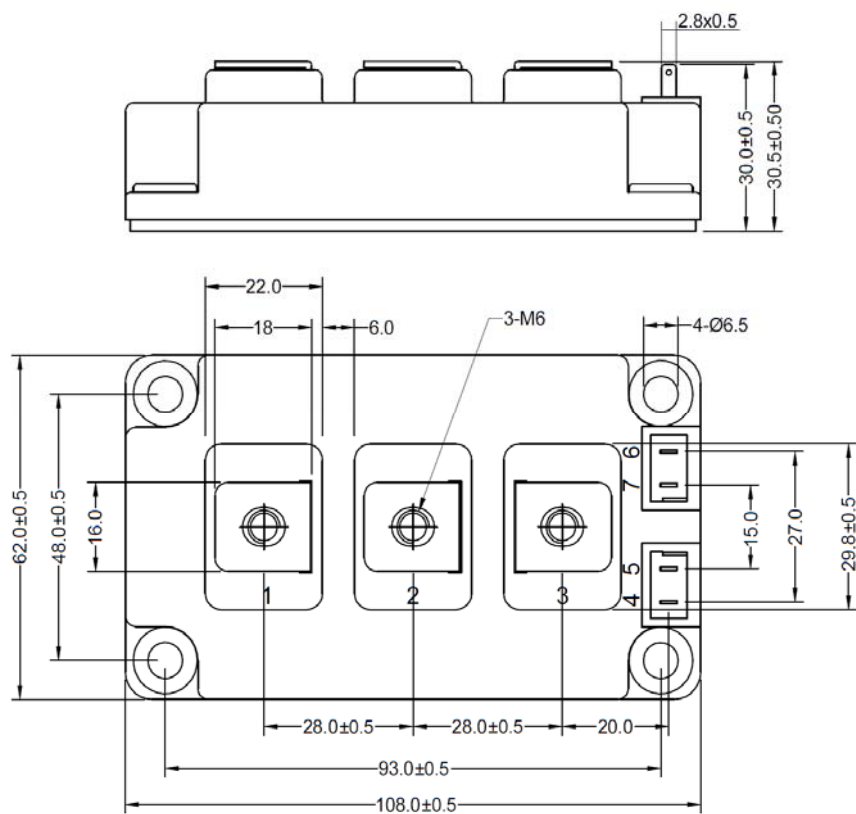


Figure 13. Circuit Diagram



Dimensions in (mm)

Figure 14. Package Outline