

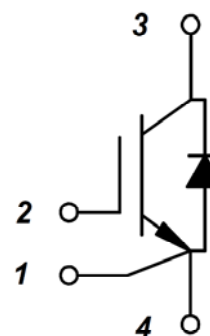
PRODUCT FEATURES

- High Short Circuit Capability
- Free wheeling diodes with fast and soft reverse recovery
- $V_{CE(sat)}$ with positive temperature coefficient
- Ultra Low Loss, High Ruggedness
- Popular SOT-227 Package



APPLICATIONS

- Inverter Convertor
- Welder SMPS and UPS
- Induction Heating



IGBT-inverter

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_J=25^\circ\text{C}$	1200	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C=25^\circ\text{C}$	105	A
		$T_C=80^\circ\text{C}$	75	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	150	
P_{tot}	Power Dissipation Per IGBT		630	W

Diode-inverter

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^\circ\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current	$T_C=25^\circ\text{C}$	75	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	150	
I^2t			$T_J=125^\circ\text{C}, t=10\text{ms}, V_R=0\text{V}$	A^2S

MacMic Science & Technology Co., Ltd.

Add: #18, Hua Shan Zhong Lu, New District, Changzhou City, Jiangsu Province, P. R. of China

MMG75J120U

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	$V_{CE}=V_{GE}, I_C=3\text{mA}$	5.0	6.2	7.0	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=75\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.8	2.4	
		$I_C=75\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		2.0		
I_{CES}	Collector Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			1	mA
		$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$			10	mA
I_{GES}	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 15\text{V}, T_J=25^\circ\text{C}$	-400		400	nA
R_{gint}	Integrated Gate Resistor			3		Ω
Q_g	Gate Charge	$V_{CE}=600\text{V}, I_C=75\text{A}, V_{GE}=\pm 15\text{V}$		0.75		μC
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		5.52		nF
C_{res}	Reverse Transfer Capacitance				260	
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600\text{V}, I_C=75\text{A}$ $R_G=10\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		100	ns
			$T_J=125^\circ\text{C}$		110	ns
t_r	Rise Time		$T_J=25^\circ\text{C}$		60	ns
			$T_J=125^\circ\text{C}$		60	ns
$t_{d(off)}$	Turn off Delay Time	$V_{CC}=600\text{V}, I_C=75\text{A}$ $R_G=10\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		410	ns
			$T_J=125^\circ\text{C}$		450	ns
t_f	Fall Time		$T_J=25^\circ\text{C}$		60	ns
			$T_J=125^\circ\text{C}$		75	ns
E_{on}	Turn on Energy	$V_{CC}=600\text{V}, I_C=75\text{A}$ $R_G=10\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		5.5	mJ
			$T_J=125^\circ\text{C}$		7	mJ
E_{off}	Turn off Energy		$T_J=25^\circ\text{C}$		4.8	mJ
			$T_J=125^\circ\text{C}$		7.0	mJ
I_{SC}	Short Circuit Current	$tp_{sc}\leq 10\mu\text{S}, V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}, V_{CC}=900\text{V}$		420		A
R_{thJC}	Junction to Case Thermal Resistance (Per IGBT)				0.2	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	$I_F=75\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		2.05	2.5	V
		$I_F=75\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		2.00		
t_{rr}	Reverse Recovery Time	$I_F=75\text{A}, V_R=600\text{V}$ $di_F/dt=-1500\text{A}/\mu\text{s}$ $T_J=125^\circ\text{C}$		125		ns
I_{RRM}	Max. Reverse Recovery Current			90		A
Q_{RR}	Reverse Recovery Charge			11		μC
E_{rec}	Reverse Recovery Energy			4.4		mJ
R_{thJCD}	Junction to Case Thermal Resistance (Per Diode)				0.5	K / W

MMG75J120U

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

Symbol	Parameter/Test Conditions	Values	Unit	
T_{Jmax}	Max. Junction Temperature	150	$^{\circ}\text{C}$	
T_{Jop}	Operating Temperature	-40~125		
T_{stg}	Storage Temperature	-40~125		
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	3000	V
Torque	to heatsink	Recommended (M4)	0.7~1.1	Nm
	to terminal	Recommended (M4)	0.7~1.1	Nm
Weight			26.5	g

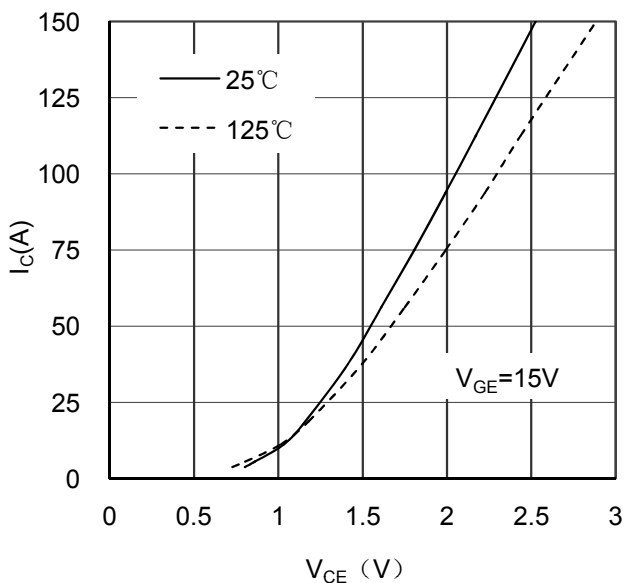


Figure 1. Typical Output Characteristics IGBT-inverter

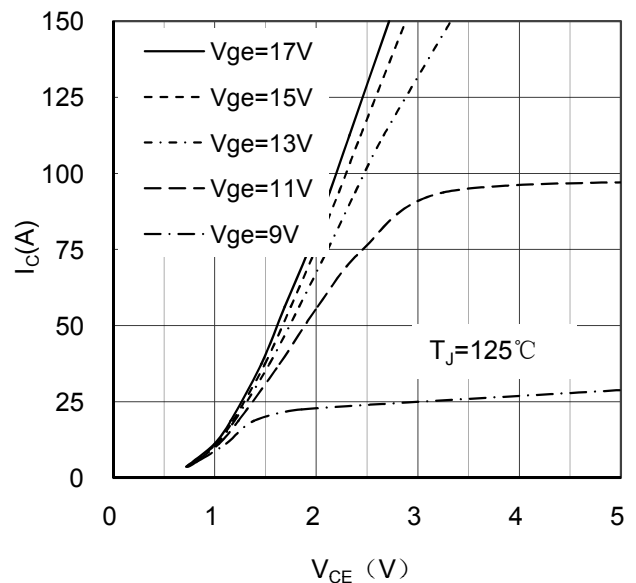


Figure 2. Typical Output Characteristics IGBT-inverter

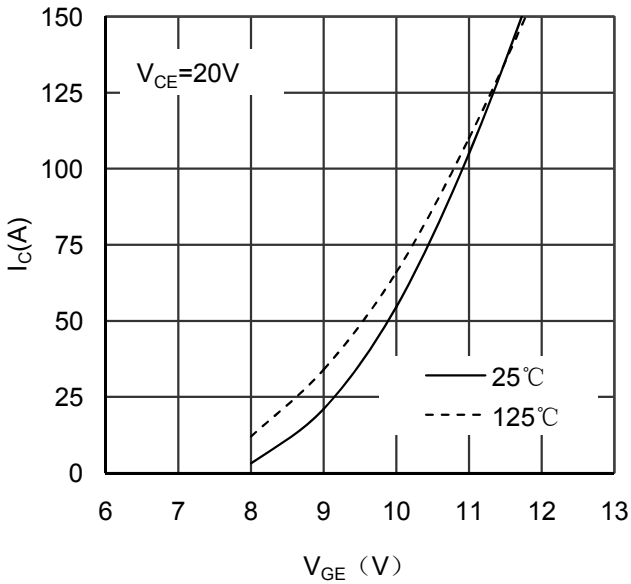


Figure 3. Typical Transfer characteristics IGBT-inverter

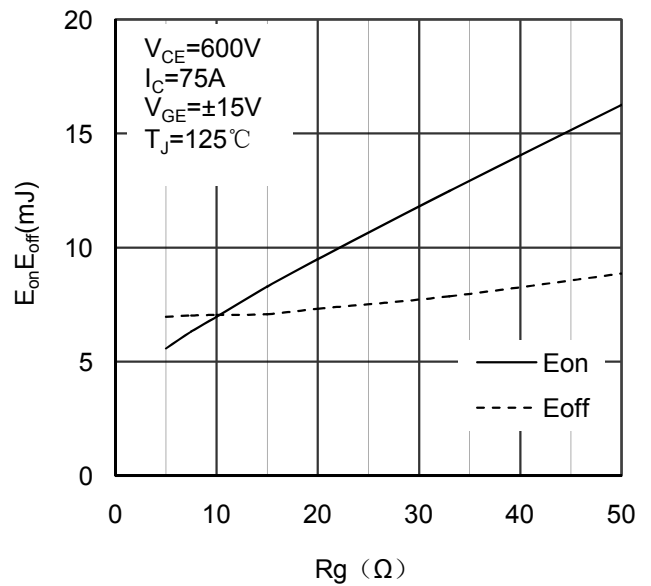


Figure 4. Switching Energy vs Gate Resistor IGBT-inverter

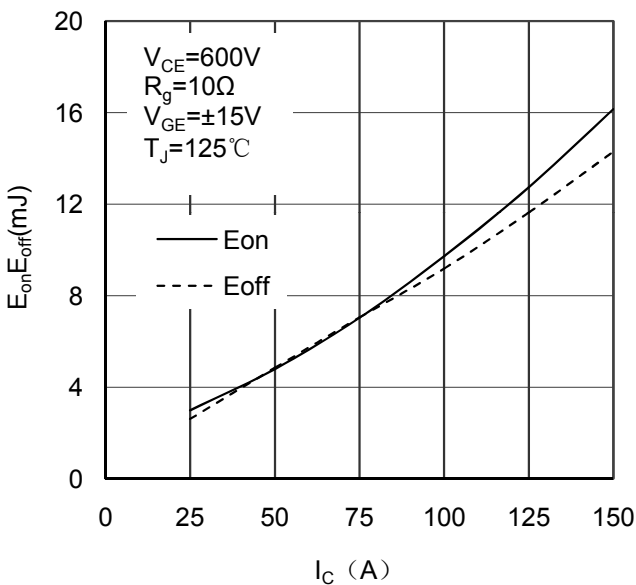


Figure 5. Switching Energy vs Collector Current IGBT-inverter

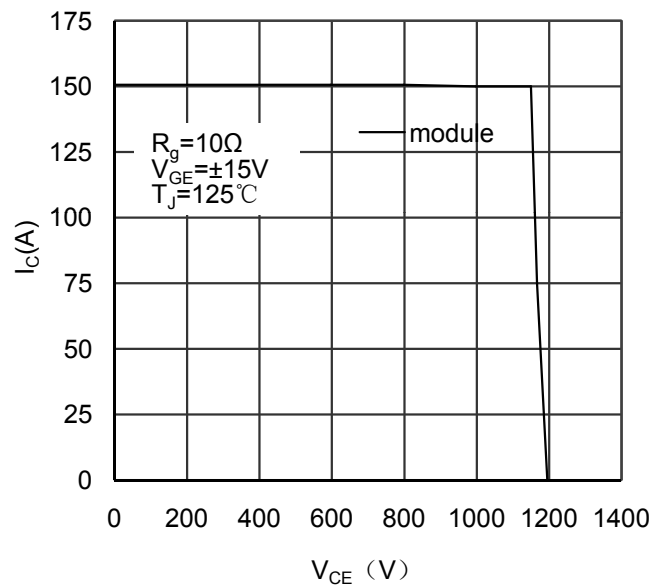


Figure 6. Reverse Biased Safe Operating Area IGBT-inverter

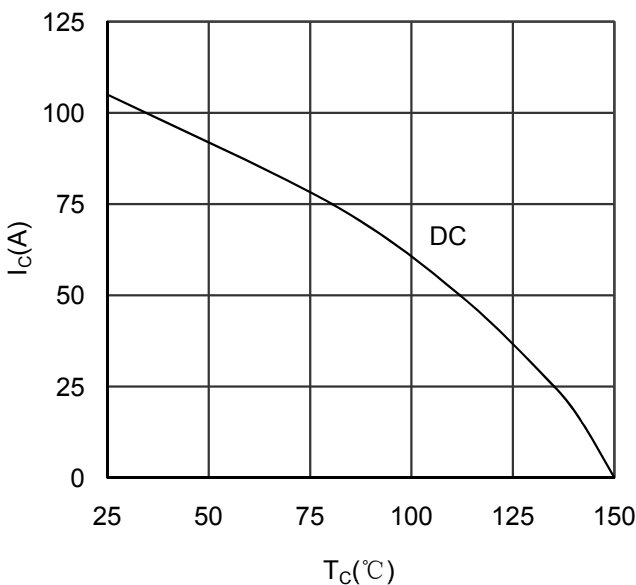


Figure 7. Collector Current vs Case temperature IGBT-inverter

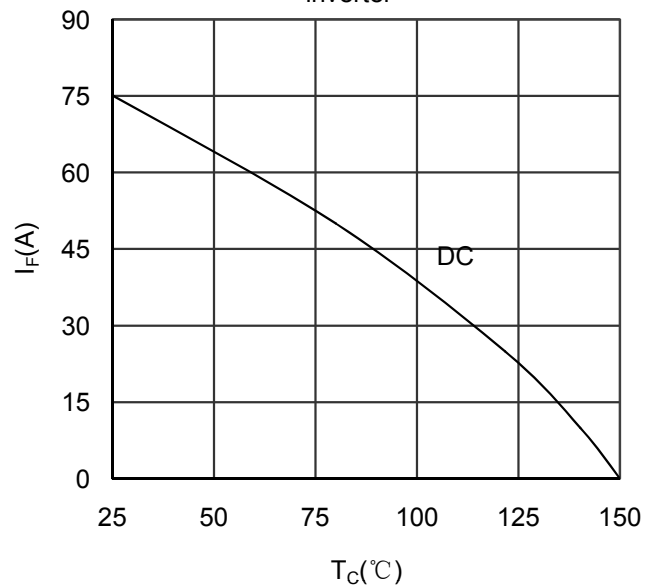


Figure 8. Forward current vs Case temperature Diode-inverter

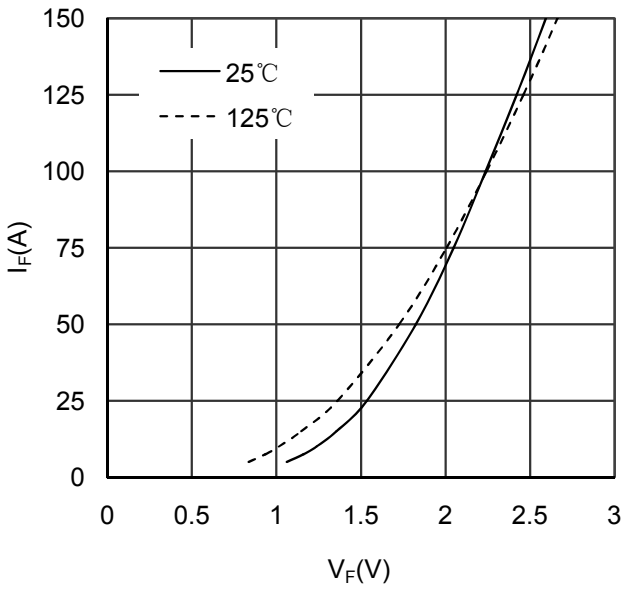


Figure 9. Diode Forward Characteristics Diode-inverter

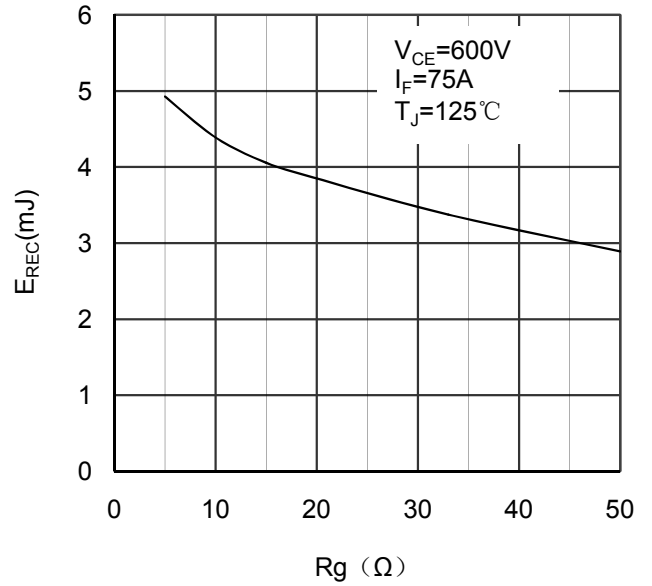


Figure 10. Switching Energy vs Gate Resistor Diode-inverter

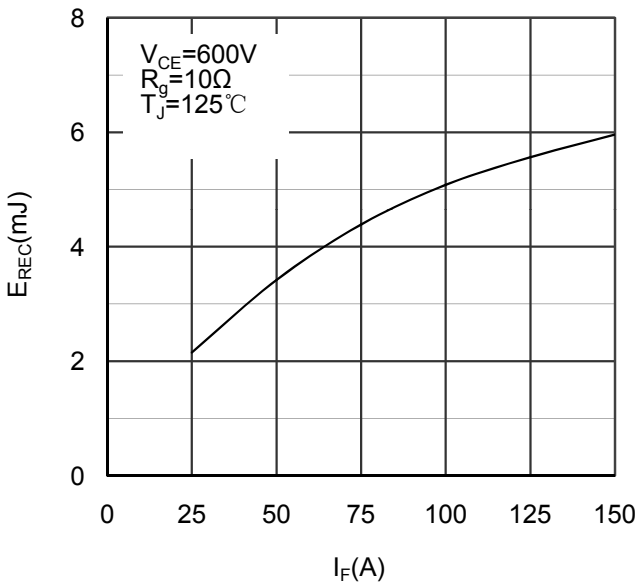


Figure 11. Switching Energy vs Forward Current Diode-inverter

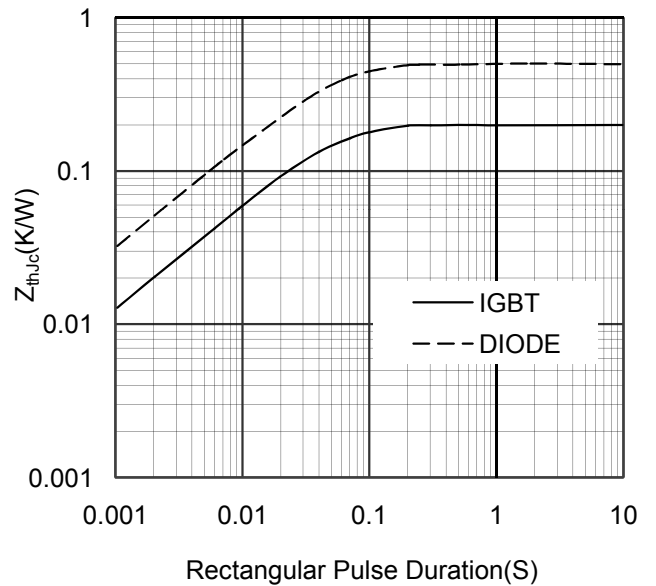
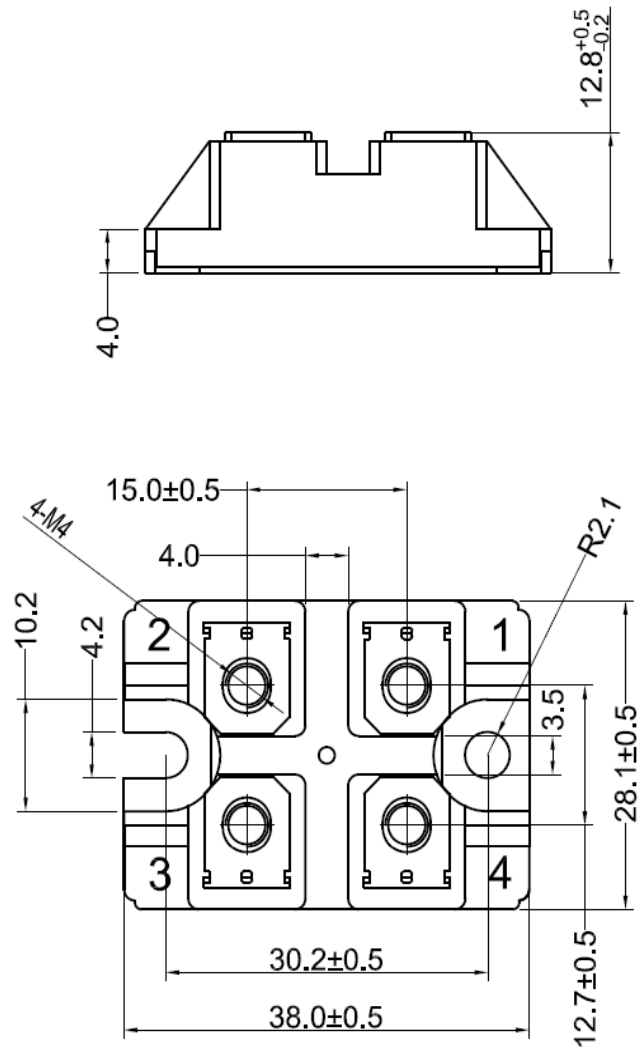


Figure 12. Transient Thermal Impedance of Diode and IGBT-inverter

MMG75J120U



Dimensions in (mm)
Figure 13. Package Outline