

FEATURES

- High short circuit capability, self limiting short circuit current
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Low switching losses

APPLICATIONS

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



INVERTER SECTOR

ABSOLUTE MAXIMUM RATINGS

$T_C=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Values	Unit
IGBT				
V_{CES}	Collector - Emitter Voltage	$T_{vj}=25^{\circ}\text{C}$	1200	V
V_{GES}	Gate - Emitter Voltage		± 20	V
I_c	DC Collector Current	$T_C=25^{\circ}\text{C}$	700	A
		$T_C=50^{\circ}\text{C}$	600	A
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	1200	A
P_{tot}	Power Dissipation Per IGBT		1500	W
Diode				
V_{RRM}	Repetitive Reverse Voltage	$T_{vj}=25^{\circ}\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current	$T_C=25^{\circ}\text{C}$	700	A
		$T_C=50^{\circ}\text{C}$	600	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	1200	A
I^2t		$T_{vj}=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	17000	A^2s

INVERTER SECTOR

ELECTRICAL AND THERMAL CHARACTERISTICS

 $T_C=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
IGBT						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=9.6\text{mA}$	4.9	5.8	6.5	V
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	$I_C=600\text{A}, V_{GE}=15\text{V}, T_{Vj}=25^{\circ}\text{C}$		1.45		V
		$I_C=600\text{A}, V_{GE}=15\text{V}, T_{Vj}=125^{\circ}\text{C}$		1.6		V
I_{CES}	Collector Leakage Current	$V_{CE}=600\text{V}, V_{GE}=0\text{V}, T_{Vj}=25^{\circ}\text{C}$			1	mA
		$V_{CE}=600\text{V}, V_{GE}=0\text{V}, T_{Vj}=125^{\circ}\text{C}$			5	mA
I_{GES}	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE} \pm 15\text{V}, T_{Vj}=125^{\circ}\text{C}$	-400		400	nA
R_{Gint}	Integrated Gate Resistor			0.68		Ω
Q_{ge}	Gate Charge	$V_{CE}=300\text{V}, I_C=600\text{A}, V_{GE} = \pm 15\text{V}$		6.5		μC
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		39		nF
C_{res}	Reverse Transfer Capacitance			1.15		nF
$t_{d(on)}$	Turn - on Delay Time	$V_{CC}=300\text{V}, I_C=600\text{A}, T_{Vj}=25^{\circ}\text{C}$		100		ns
		$R_G = 2.4 \Omega, T_{Vj}=125^{\circ}\text{C}$		110		ns
t_r	Rise Time	$V_{GE} = \pm 15\text{V}, T_{Vj}=25^{\circ}\text{C}$		90		ns
		Inductive Load $T_{Vj}=125^{\circ}\text{C}$		95		ns
$t_{d(off)}$	Turn - off Delay Time	$V_{CC}=300\text{V}, I_C=600\text{A}, T_{Vj}=25^{\circ}\text{C}$		670		ns
		$R_G = 2.4 \Omega, T_{Vj}=125^{\circ}\text{C}$		710		ns
t_f	Fall Time	$V_{GE} = \pm 15\text{V}, T_{Vj}=25^{\circ}\text{C}$		70		ns
		Inductive Load $T_{Vj}=125^{\circ}\text{C}$		75		ns
E_{on}	Turn - on Energy	$V_{CC}=300\text{V}, I_C=600\text{A}, T_{Vj}=25^{\circ}\text{C}$		8.9		mJ
		$R_G = 2.4 \Omega, T_{Vj}=125^{\circ}\text{C}$		9.9		mJ
E_{off}	Turn - off Energy	$V_{GE} = \pm 15\text{V}, T_{Vj}=25^{\circ}\text{C}$		21.5		mJ
		Inductive Load $T_{Vj}=125^{\circ}\text{C}$		25		mJ
I_{sc}	Short Circuit Current	$t_{psc} \leq 6\mu\text{S}, V_{GE}=15\text{V}$ $T_{Vj}=125^{\circ}\text{C}, V_{CC}=360\text{V}$		3000		A
R_{thJC}	Junction-to-Case Thermal Resistance (Per IGBT)				0.10	K/W
Diode						
V_F	Forward Voltage	$I_F=600\text{A}, V_{GE}=0\text{V}, T_{Vj}=25^{\circ}\text{C}$		1.55		V
		$I_F=600\text{A}, V_{GE}=0\text{V}, T_{Vj}=125^{\circ}\text{C}$		1.5		V
t_{rr}	Reverse Recovery Time	$I_F=600\text{A}, V_R=300\text{V}$		400		ns
I_{RRM}	Max. Reverse Recovery Current	$di_F/dt=-6000\text{A}/\mu\text{s}$		300		A
E_{rec}	Reverse Recovery Charge	$T_{Vj}=125^{\circ}\text{C}$		9.3		mJ
R_{thJCD}	Junction-to-Case Thermal Resistance (Per Diode)				0.16	K/W

MMG600WB060B6EN

NTC CHARACTERISTIC VALUES

$T_C=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R_{25}	Resistance	$T_C=25^{\circ}\text{C}$		5		$\text{K}\Omega$
$B_{25/50}$				3375		K

MODULE CHARACTERISTICS

$T_C=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$T_{Vj\text{max}}$	Max. Junction Temperature				175	$^{\circ}\text{C}$
$T_{Vj\text{op}}$	Operating Temperature		-40		150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature		-40		125	$^{\circ}\text{C}$
V_{isol}	Insulation Test Voltage	AC, $t=1\text{min}$		3000		V
CTI	Comparative Tracking Index		250			
Torque	Module-to-Sink	Recommended (M5)	2.5		5	$\text{N}\cdot\text{m}$
Torque	Module Electrodes	Recommended (M6)	3		5	$\text{N}\cdot\text{m}$
Weight				350		g

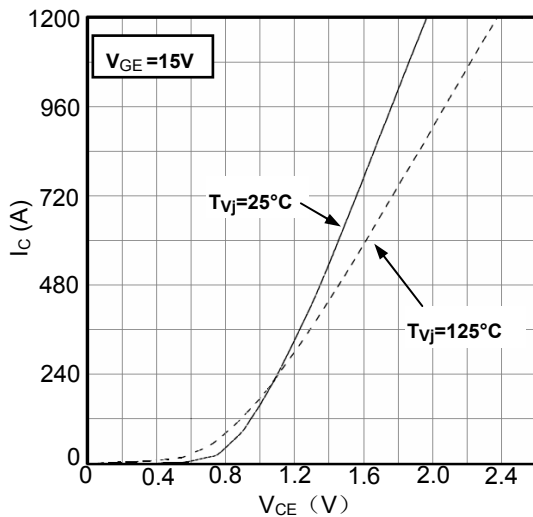


Figure1. Typical Output characteristics IGBT-inverter

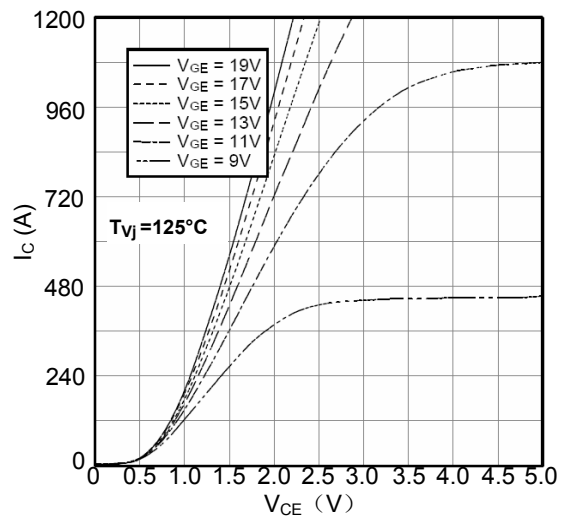


Figure2. Typical Output characteristics IGBT-inverter

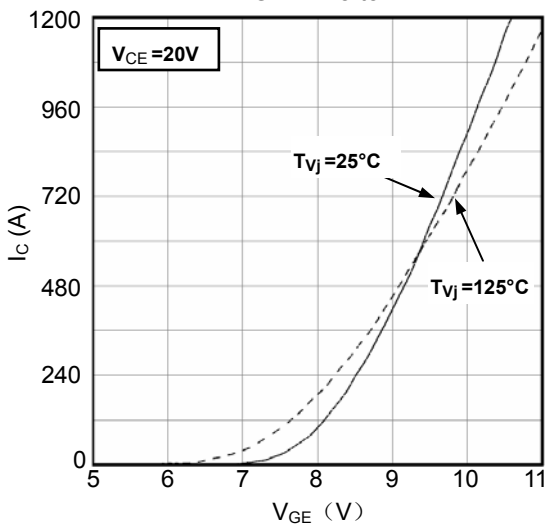


Figure3. Typical Transfer characteristics IGBT-inverter

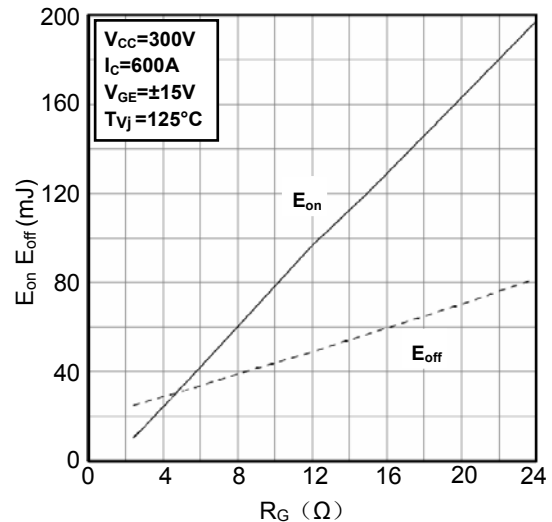


Figure4. Switching Energy vs. Gate Resistor IGBT-inverter

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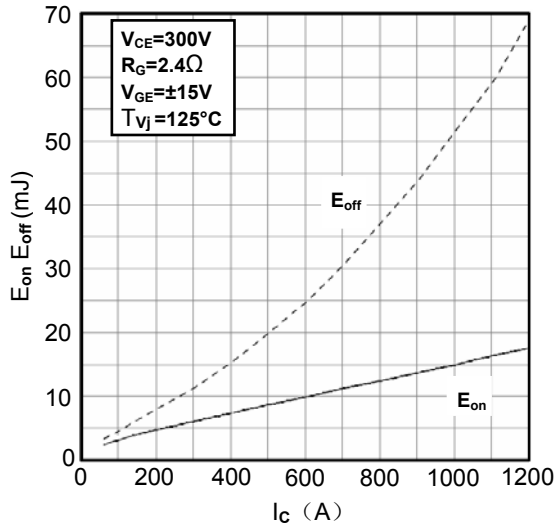


Figure5. Switching Energy vs. Collector Current IGBT-inverter

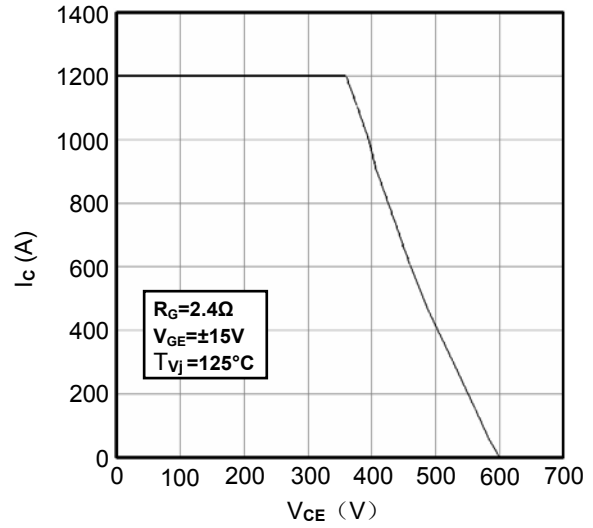


Figure6. Reverse Biased Safe Operating Area IGBT-inverter

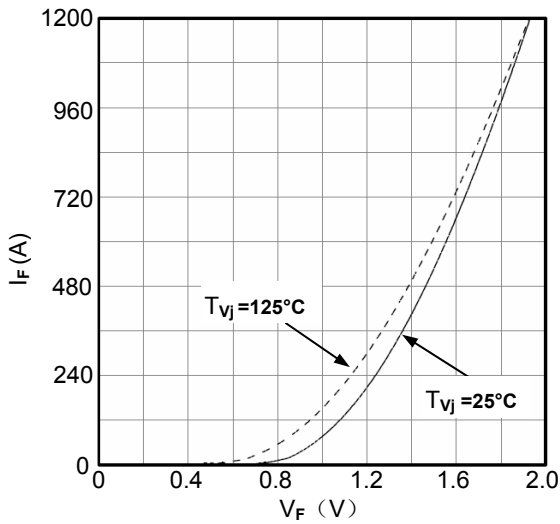


Figure7. Diode Forward Characteristics Diode -inverter

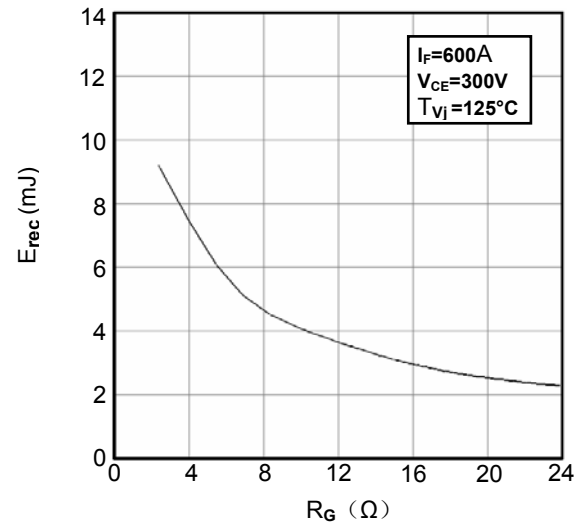


Figure8. Switching Energy vs. Gate Resistor Diode -inverter

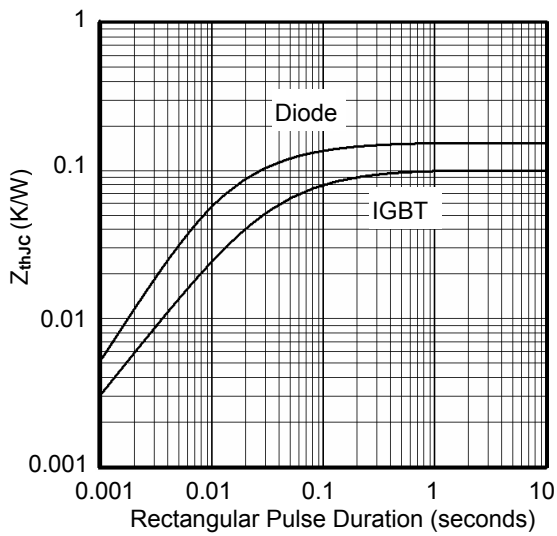


Figure9. Transient Thermal Impedance of Diode and IGBT-inverter

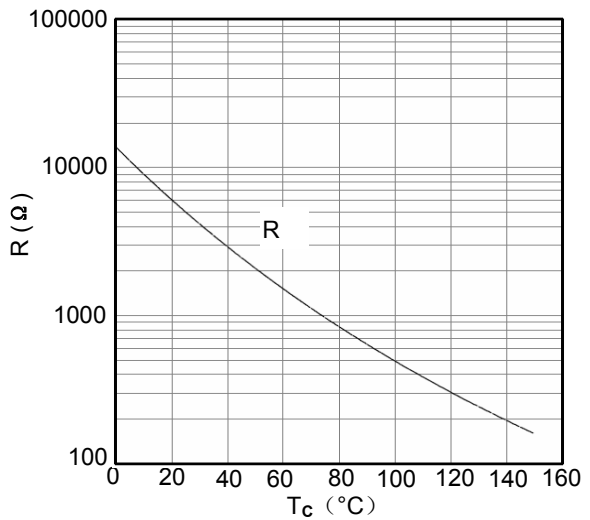


Figure10. NTC Characteristics

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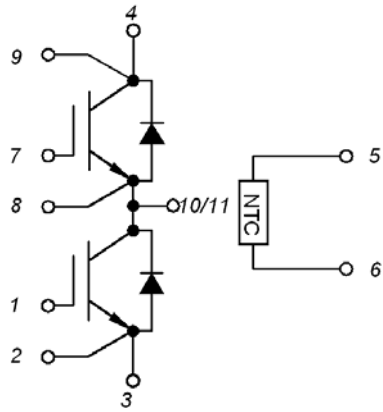
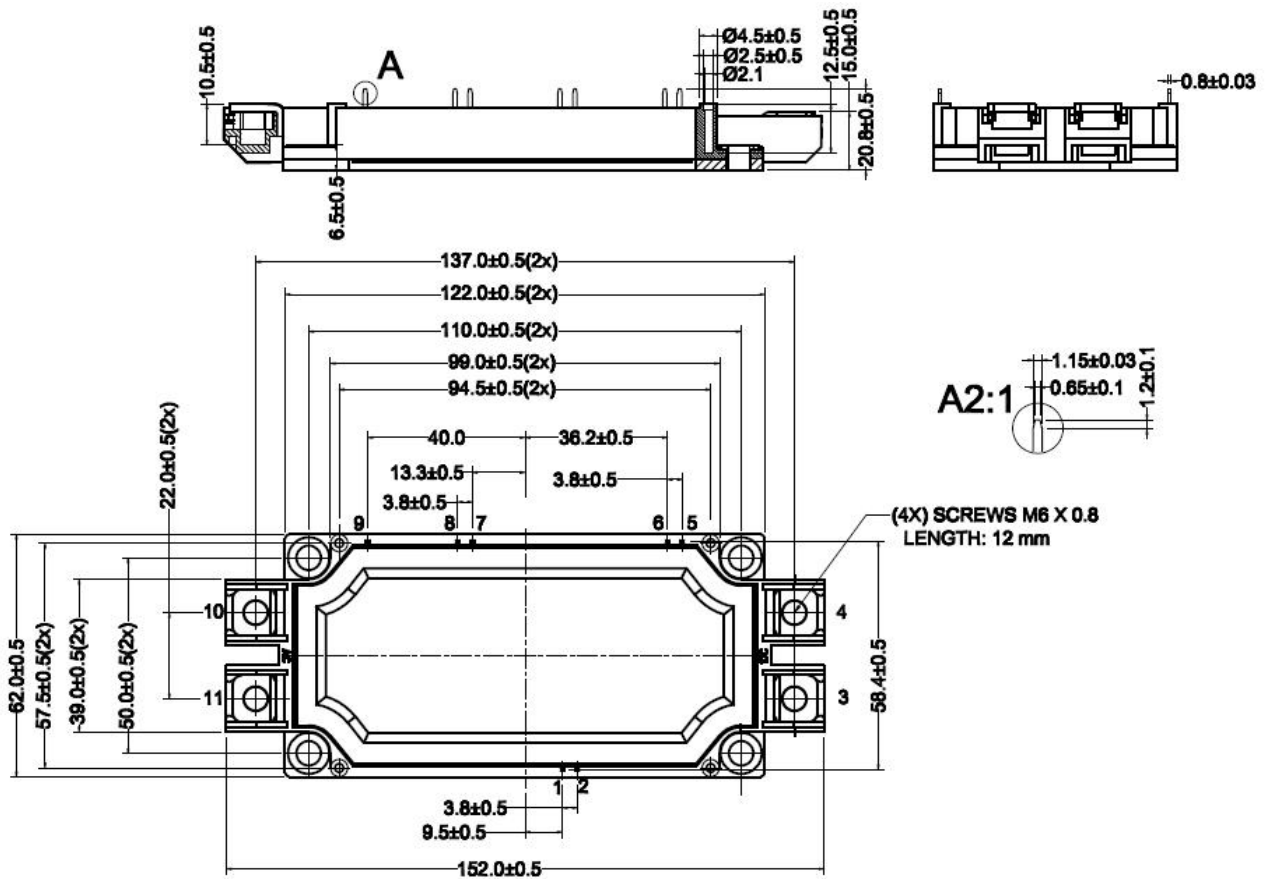


Figure11. Circuit Diagram



Dimensions (mm)
Figure12. Package Outline