

FEATURES

- IGBT³ CHIP(1700V Trench+Field Stop technology)
- Low turn-off losses, short tail current
- $V_{CE(sat)}$ with positive temperature coefficient
- DIODE CHIP(1700V EMCON 3 technology)
- Free wheeling diodes with fast and soft reverse recovery

APPLICATIONS

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



INVERTER SECTOR

ABSOLUTE MAXIMUM RATINGS

T_c=25°C unless otherwise specified

Symbol	Parameter	Test Conditions	Values	Unit
IGBT				
V_{CES}	Collector - Emitter Voltage	$T_{vj}=25^{\circ}C$	1700	V
V_{GES}	Gate - Emitter Voltage		± 20	V
I_c	DC Collector Current	$T_c=25^{\circ}C$	325	A
		$T_c=80^{\circ}C$	225	A
I_{CM}	Repetitive Peak Collector Current	$t_p=1ms$	450	A
P_{tot}	Power Dissipation Per IGBT		1400	W
Diode				
V_{RRM}	Repetitive Reverse Voltage	$T_{vj}=25^{\circ}C$	1700	V
$I_{F(AV)}$	Average Forward Current	$T_c=25^{\circ}C$	225	A
		$T_c=80^{\circ}C$	160	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1ms$	450	A
I^2t		$T_{vj} =125^{\circ}C, t=10ms, V_R=0V$	8200	A ² s

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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	$V_{CE}=V_{GE}, I_C=9\text{mA}$	5.0	5.8	6.4	V
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	$I_C=225\text{A}, V_{GE}=15\text{V}, T_{Vj}=25^{\circ}\text{C}$		2.0	2.45	V
		$I_C=225\text{A}, V_{GE}=15\text{V}, T_{Vj}=125^{\circ}\text{C}$		2.4		V
I_{CES}	Collector Leakage Current	$V_{CE}=1700\text{V}, V_{GE}=0\text{V}, T_{Vj}=25^{\circ}\text{C}$			3	mA
		$V_{CE}=1700\text{V}, V_{GE}=0\text{V}, T_{Vj}=125^{\circ}\text{C}$			20	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			2.8		Ω
Q_{ge}	Gate Charge	$V_{CE}=900\text{V}, I_C=225\text{A}, V_{GE} = \pm 15\text{V}$		2.6		μC
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		20.5		nF
C_{res}	Reverse Transfer Capacitance				0.7	
$t_{d(on)}$	Turn - on Delay Time	$V_{CC}=900\text{V}, I_C=225\text{A}, T_{Vj}=25^{\circ}\text{C}$		280		ns
		$R_G = 6.2 \Omega, T_{Vj}=125^{\circ}\text{C}$		300		ns
t_r	Rise Time	$V_{GE} = \pm 15\text{V}, T_{Vj}=25^{\circ}\text{C}$		60		ns
		Inductive Load $T_{Vj}=125^{\circ}\text{C}$		75		ns
$t_{d(off)}$	Turn - off Delay Time	$V_{CC}=900\text{V}, I_C=225\text{A}, T_{Vj}=25^{\circ}\text{C}$		810		ns
		$R_G = 6.2 \Omega, T_{Vj}=125^{\circ}\text{C}$		1000		ns
t_f	Fall Time	$V_{GE} = \pm 15\text{V}, T_{Vj}=25^{\circ}\text{C}$		180		ns
		Inductive Load $T_{Vj}=125^{\circ}\text{C}$		300		ns
E_{on}	Turn - on Energy	$V_{CC}=900\text{V}, I_C=225\text{A}, T_{Vj}=25^{\circ}\text{C}$		49.5		mJ
		$R_G = 6.2 \Omega, T_{Vj}=125^{\circ}\text{C}$		71.5		mJ
E_{off}	Turn - off Energy	$V_{GE} = \pm 15\text{V}, T_{Vj}=25^{\circ}\text{C}$		48		mJ
		Inductive Load $T_{Vj}=125^{\circ}\text{C}$		70.5		mJ
I_{sc}	Short Circuit Current	$t_{psc} \leq 10\mu\text{S}, V_{GE}=15\text{V}$ $T_{Vj}=125^{\circ}\text{C}, V_{CC}=1000\text{V}$		900		A
R_{thJC}	Junction-to-Case Thermal Resistance (Per IGBT)				0.09	K/W
Diode						
V_F	Forward Voltage	$I_F=225\text{A}, V_{GE}=0\text{V}, T_{Vj}=25^{\circ}\text{C}$		1.8	2.2	V
		$I_F=225\text{A}, V_{GE}=0\text{V}, T_{Vj}=125^{\circ}\text{C}$		1.9		V
I_{RRM}	Max. Reverse Recovery Current	$I_F=225\text{A}, V_R=900\text{V}$		285		A
Q_{rr}	Reverse Recovery Charge	$di_F/dt=-2900\text{A}/\mu\text{s}$		98		μC
E_{rec}	Reverse Recovery Energy	$T_{Vj}=125^{\circ}\text{C}$		54		mJ
R_{thJCD}	Junction-to-Case Thermal Resistance (Per Diode)				0.16	K/W

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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
$T_{Vj\max}$	Max. Junction Temperature				150	$^\circ\text{C}$
$T_{Vj\text{op}}$	Operating Temperature		-40		125	$^\circ\text{C}$
T_{stg}	Storage Temperature		-40		125	$^\circ\text{C}$
V_{isol}	Insulation Test Voltage	AC, $t=1\text{min}$		3500		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

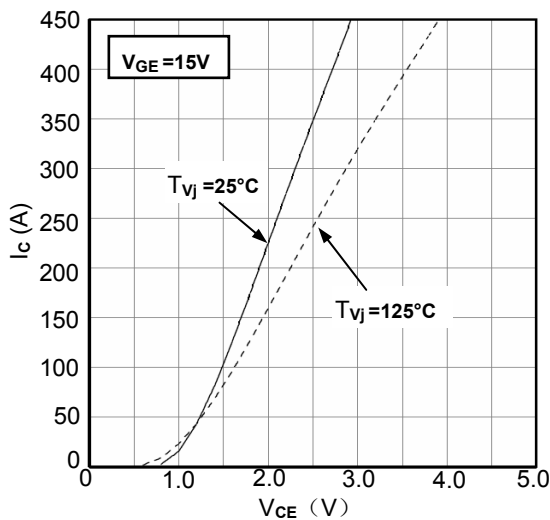


Figure1. Typical Output Characteristics IGBT-inverter

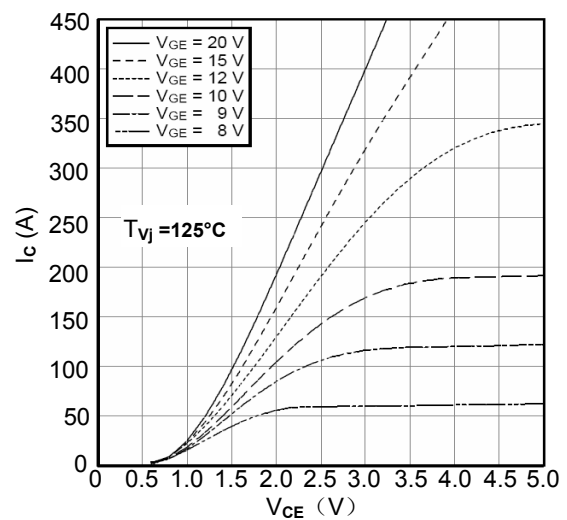


Figure2. Typical Output Characteristics IGBT-inverter

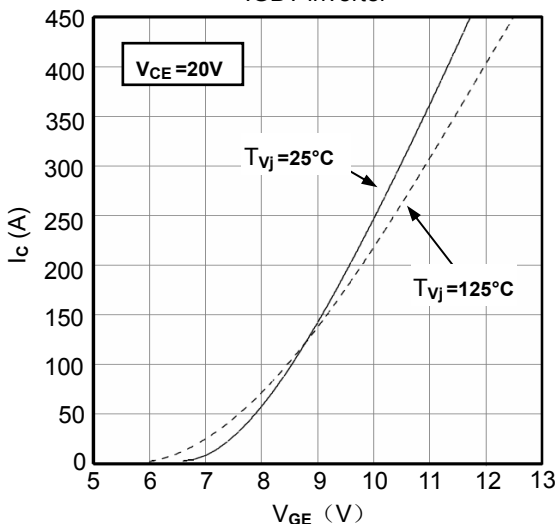


Figure3. Typical Transfer characteristics IGBT-inverter

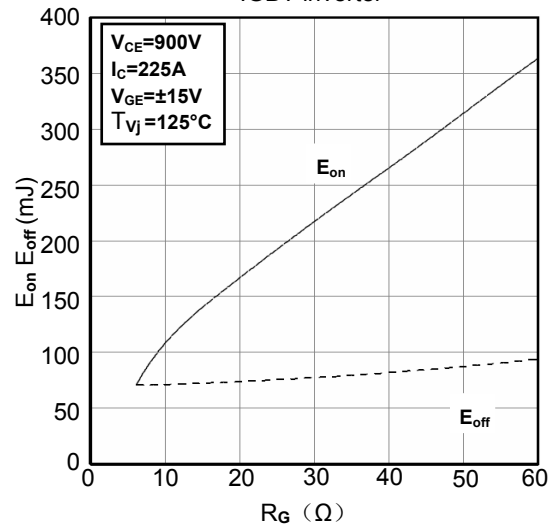


Figure4. Switching Energy vs. Gate Resistor IGBT-inverter

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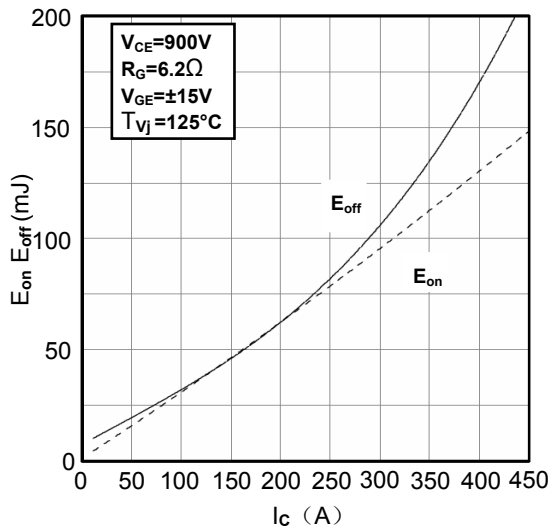


Figure 5. Switching Energy vs. Collector Current IGBT-inverter

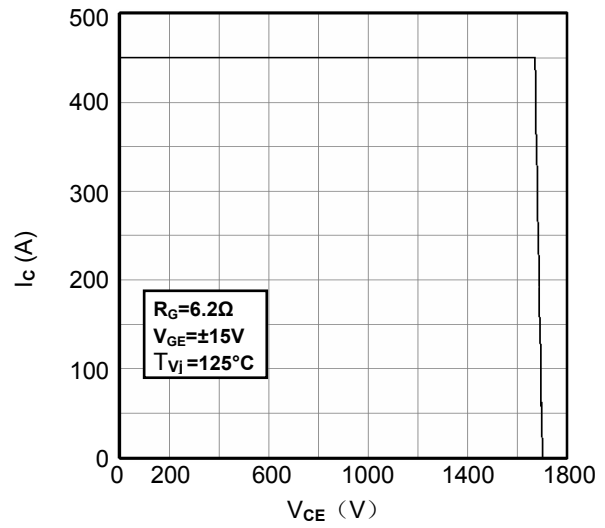


Figure 6. Reverse Biased Safe Operating Area IGBT-inverter

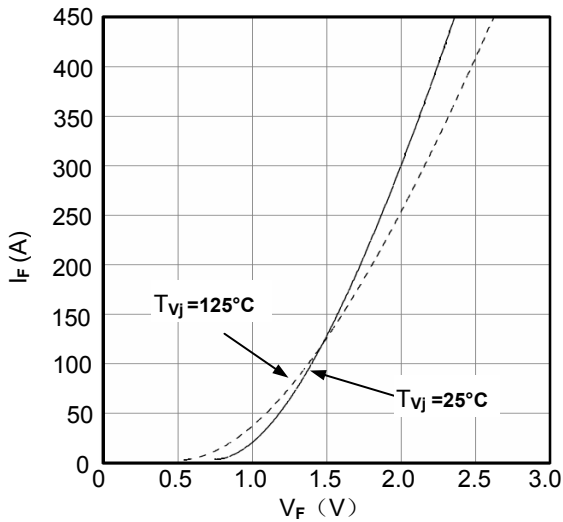


Figure 7. Diode Forward Characteristics Diode -inverter

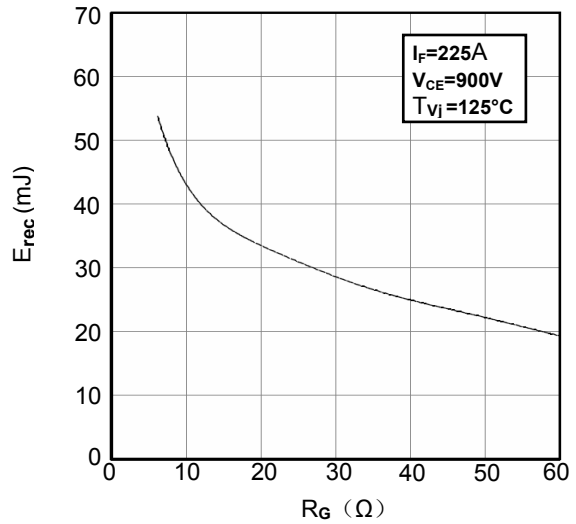


Figure 8. Switching Energy vs. Gate Resistor Diode -inverter

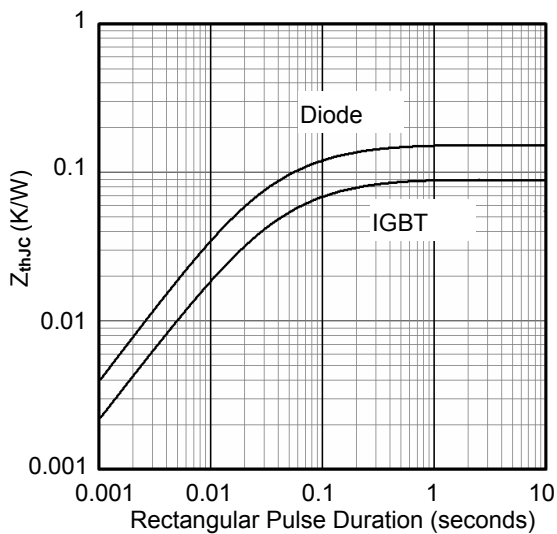


Figure 9. Transient Thermal Impedance of Diode and IGBT-inverter

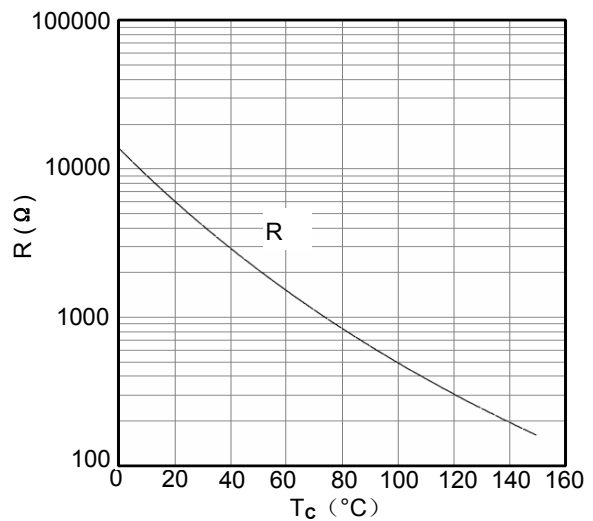


Figure 10. NTC Characteristics

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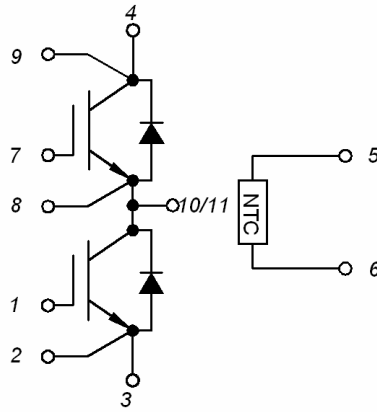
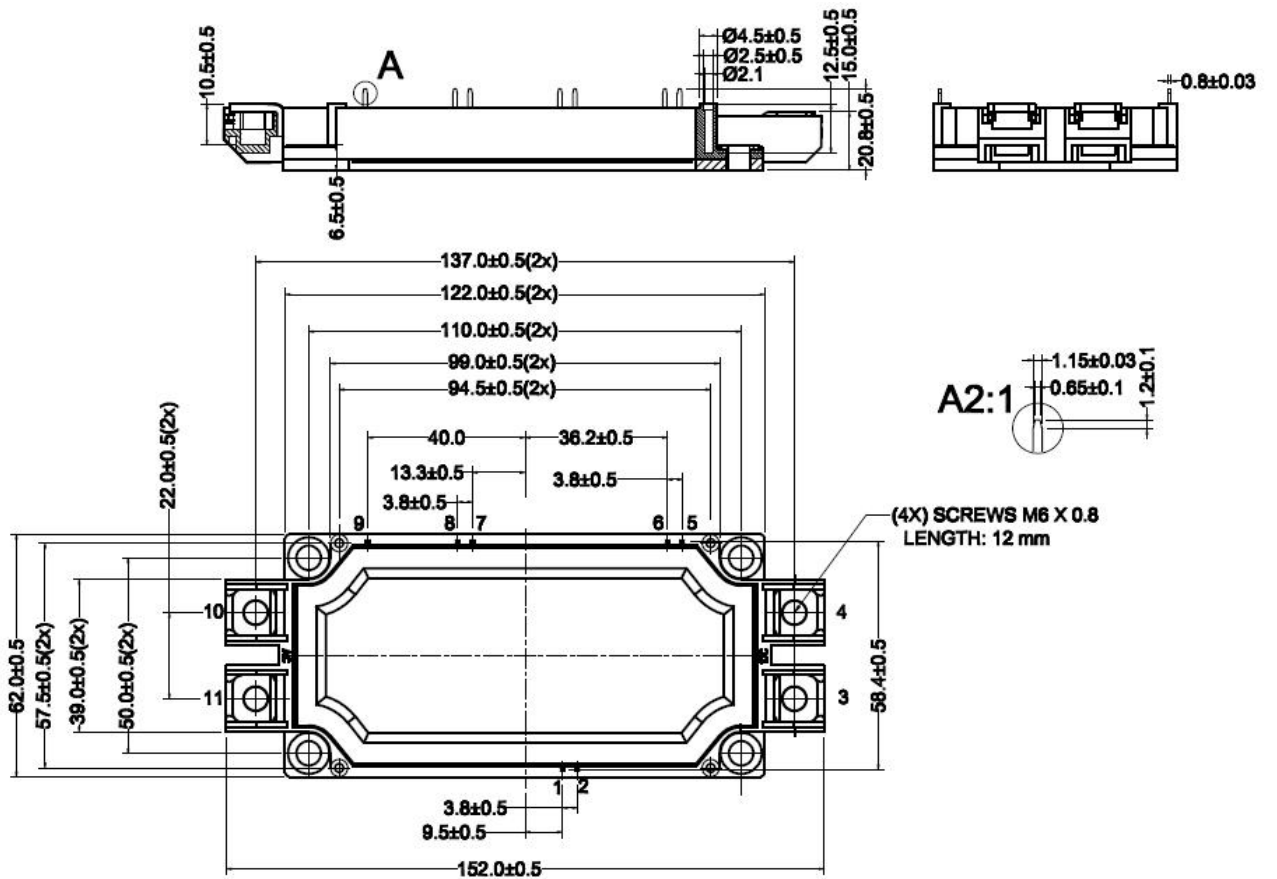


Figure11. Circuit Diagram



Dimensions (mm)
Figure12. Package Outline