

## PRODUCT FEATURES

- IGBT CHIP(1700V Trench+Field stop technology )
- Low switching losses
- $V_{CE(sat)}$  with positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery



## APPLICATIONS

- AC motor control
- Motion/servo control
- Inverter and power supplies

## IGBT

### ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter/Test Conditions		Values	Unit
$V_{CES}$	Collector Emitter Voltage	$T_J=25^{\circ}\text{C}$	1700	V
$V_{GES}$	Gate Emitter Voltage		$\pm 20$	
$I_C$	DC Collector Current	$T_C=25^{\circ}\text{C}$	800	A
		$T_C=80^{\circ}\text{C}$	600	
$I_{CM}$	Repetitive Peak Collector Current	$t_p=1\text{ms}$	1200	
$P_{tot}$	Power Dissipation Per IGBT		3480	W

## Diode

### ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter/Test Conditions		Values	Unit
$V_{RRM}$	Repetitive Reverse Voltage	$T_J=25^{\circ}\text{C}$	1700	V
$I_{F(AV)}$	Average Forward Current	$T_C=25^{\circ}\text{C}$	600	A
$I_{FRM}$	Repetitive Peak Forward Current	$t_p=1\text{ms}$	1200	
$I^2t$		$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	58	$\text{KA}^2\text{S}$

## IGBT 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	$V_{CE}=V_{GE}, I_C=24\text{mA}$	5.2	5.8	6.4	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=600\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		2.0	2.45	
		$I_C=600\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		2.4		
$I_{CES}$	Collector Leakage Current	$V_{CE}=1700\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			3	mA
		$V_{CE}=1700\text{V}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$			20	mA
$I_{GES}$	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 20\text{V}, T_J=25^\circ\text{C}$		2		mA
$R_{Gint}$	Integrated Gate Resistor			1.3		$\Omega$
$Q_g$	Gate Charge	$V_{CE}=900\text{V}, I_C=600\text{A}, V_{GE}=\pm 15\text{V}$		7.2		$\mu\text{C}$
$C_{ies}$	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		55		nF
$C_{res}$	Reverse Transfer Capacitance			1.9		nF
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=900\text{V}, I_C=600\text{A}$ $R_G=2.4\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		360	ns
			$T_J=125^\circ\text{C}$		400	ns
$t_r$	Rise Time	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		100	ns
			$T_J=125^\circ\text{C}$		120	ns
$t_{d(off)}$	Turn off Delay Time	$V_{CC}=900\text{V}, I_C=600\text{A}$ $R_G=2.4\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		1000	ns
			$T_J=125^\circ\text{C}$		1200	ns
$t_f$	Fall Time	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		180	ns
			$T_J=125^\circ\text{C}$		300	ns
$E_{on}$	Turn on Energy	$V_{CC}=900\text{V}, I_C=600\text{A}$ $R_G=2.4\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		142	mJ
			$T_J=125^\circ\text{C}$		210	mJ
$E_{off}$	Turn off Energy	$V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		128	mJ
			$T_J=125^\circ\text{C}$		188	mJ
$I_{sc}$	Short Circuit Current	$tp_{sc}\leq 10\mu\text{S}, V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}, V_{CC}=1000\text{V}$		1200		A
$R_{thJC}$	Junction to Case Thermal Resistance ( Per IGBT )				0.043	K/W

## Diode ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$V_F$	Forward Voltage	$I_F=600\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.8	2.2	V
		$I_F=600\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		1.9		
$I_{RRM}$	Max. Reverse Recovery Current	$I_F=600\text{A}, V_R=900\text{V}$		650		A
$Q_{RR}$	Reverse Recovery Charge	$di_F/dt=-5000\text{A}/\mu\text{s}$ $T_J=125^\circ\text{C}$		230		$\mu\text{C}$
$E_{rec}$	Reverse Recovery Energy			144		mJ
$R_{thJCD}$	Junction to Case Thermal Resistance ( Per Diode )				0.07	K/W

MODULE CHARACTERISTICS

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

Symbol	Parameter/Test Conditions		Values	Unit
$T_{Jmax}$	Max. Junction Temperature		175	°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	4000	V
Torque	to heatsink	Recommended (M6)	3~5	Nm
	to terminal	Recommended (M6)	2.5~5	Nm
	to terminal	Recommended (M4)	0.7~1.1	Nm
Weight			330	g

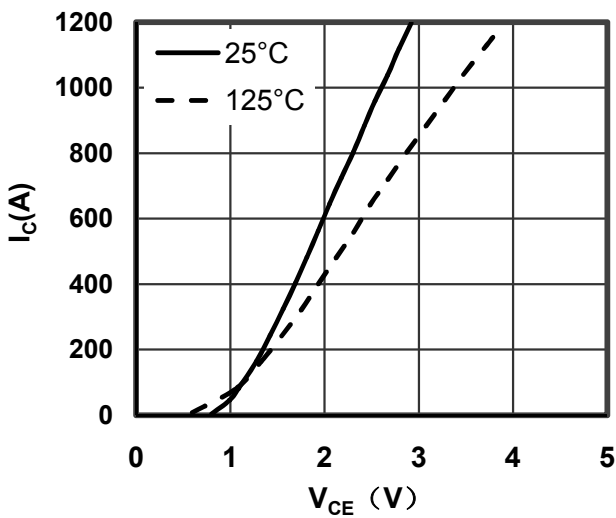


Figure 1. Typical Output Characteristics IGBT

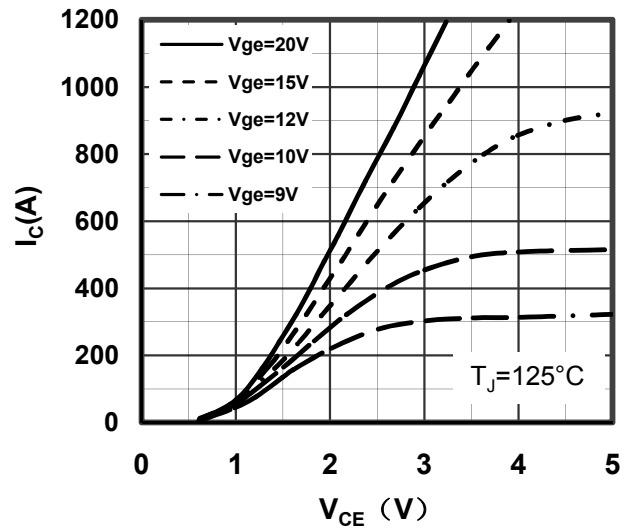


Figure 2. Typical Output Characteristics IGBT

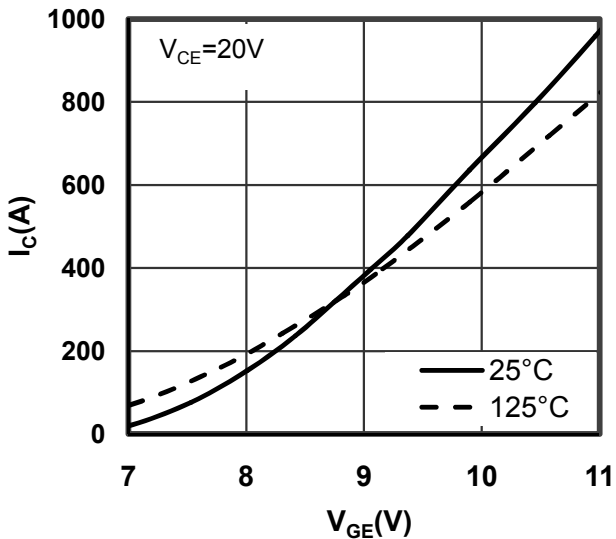


Figure 3. Typical Transfer characteristics IGBT

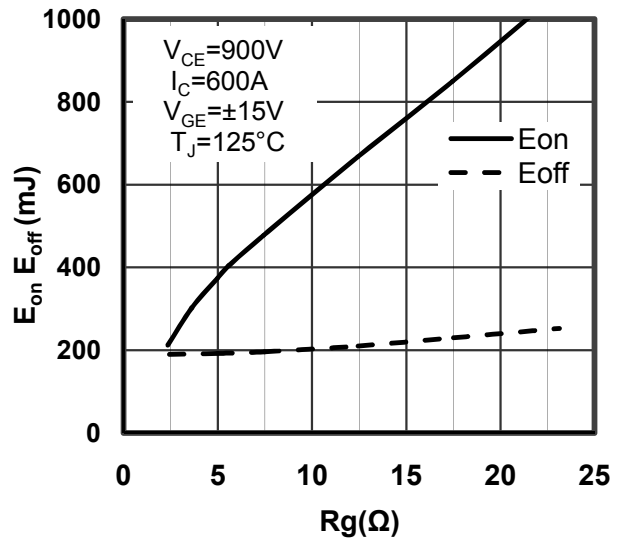


Figure 4. Switching Energy vs. Gate Resistor IGBT

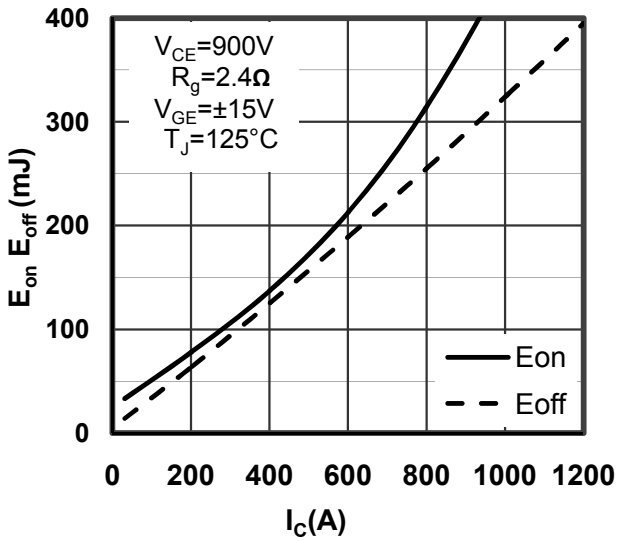


Figure 5. Switching Energy vs Collector Current IGBT

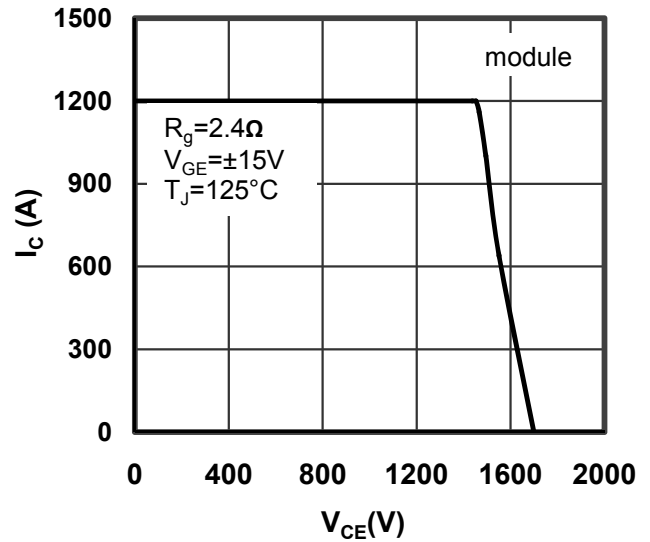


Figure 6. Reverse Biased Safe Operating Area IGBT

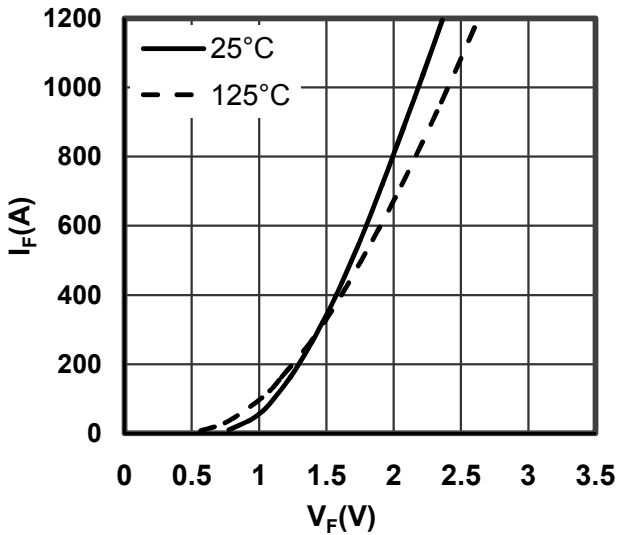


Figure 7. Diode Forward Characteristics Diode

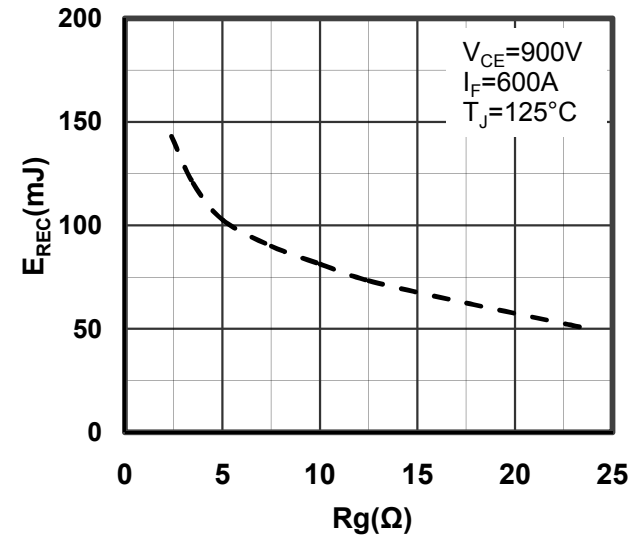


Figure 8. Switching Energy vs. Gate Resistor Diode

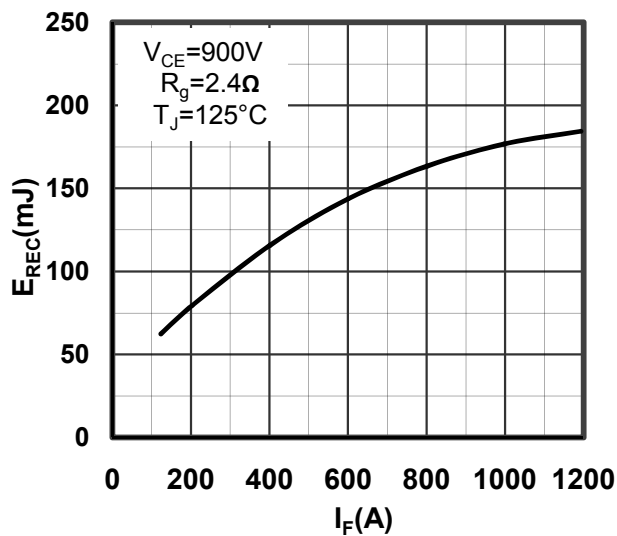


Figure 9. Switching Energy vs Forward Current Diode

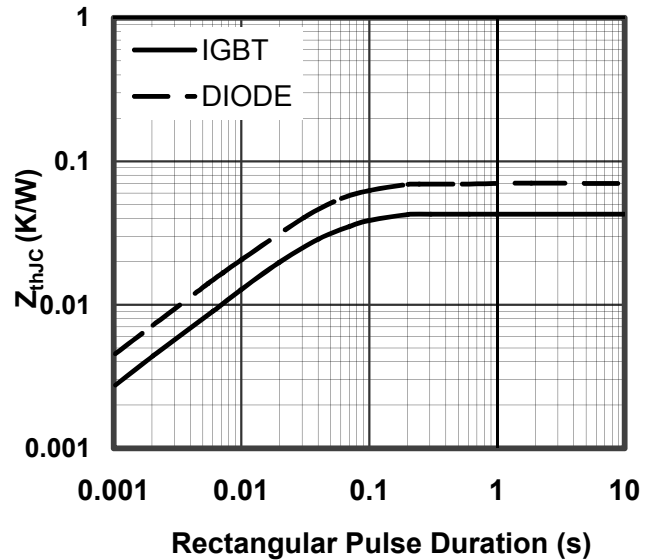


Figure 10. Transient Thermal Impedance of Diode and IGBT

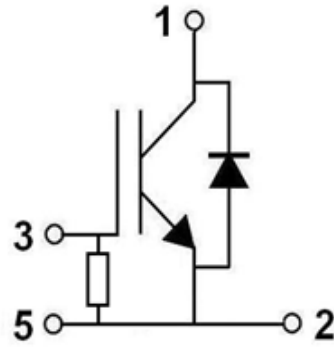
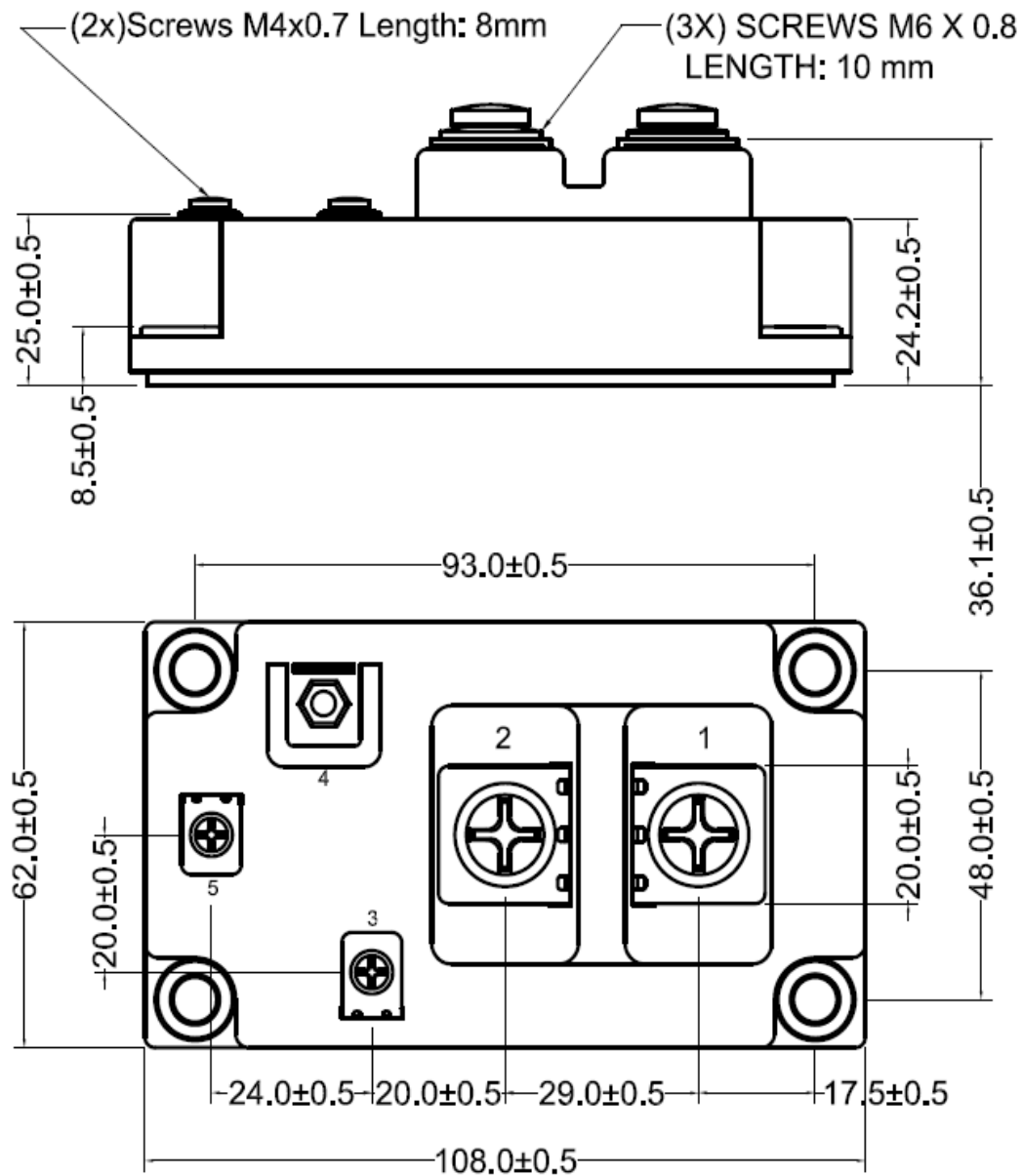


Figure 11. Circuit Diagram



Dimensions in (mm)  
Figure 12. Package Outline