

IGBT Modules



V_{RRM} 1200V

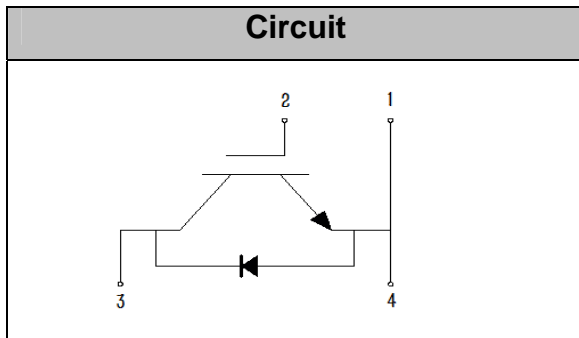
I_{FAV} 75 A

Applications

- Inverter
- Uninterruptible Power Supply (UPS)
- Converter
- Welder
- SMPS
- Converter

Features

- Ultra Low Loss
- Positive Temperature Coefficient
- High Ruggedness
- Fully isolated package
- High Short Circuit Capability
- Popular SOT-227 Package



Absolute Maximum Ratings (T_C = 25°C unless otherwise specified)

Symbol	Description	Values	Units
V _{CES}	Collector - Emitter Voltage	1200	V
V _{GES}	Gate-Emitter Voltage	±20	V
I _C	DC Collector Current	T _C =25°C	100 A
		T _C =80°C	75 A
I _{CM}	Pulsed collector current	T _J = 80°C	150 A
I _F	Diode Continuous Forward Current	T _J = 25°C	100 A
		T _J = 80°C	75 A
P _D	Maximum Power Dissipation (IGBT)	T _C = 25°C, T _{Jmax} =150°C	420 W
T _{Jmax}	Maximum Junction Temperature		150 °C
T _{JOP}	Operating Temperature		-40 ~ +125 °C
T _{stg}	Storage Temperature		-40 ~ +125 °C
Visol	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1min	3000 V
Weight	Weight Of Module		27 g
Mounting Torque	Module-to-Sink:M4		0.7~1.2 N*m
	Module Electrodes:M4		0.7~1.1 N*m



Electrical Characteristics of IGBT ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Item	Conditions	Values			Units
			Min.	Typ.	Max.	
OFF Characteristics						
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 1mA$	1200			V
I_{CES}	Collector Leakage Current	$V_{CE}=V_{CES}, V_{GE}=0V,$			100	μA
		$V_{CE}=V_{CES}, V_{GE}=0V,$ $T_J=125^\circ C$			1	mA
I_{GES}	Gate Leakage Current	$V_{CE}=0V, V_{GE}=\pm 20V$	-400		400	nA
ON Characteristics						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=3mA$	5	5.5	6.5	V
$V_{CE(sat)}$	Collector – Emitter Saturation Voltage	$I_C=75A, V_{GE}=15V$		2.1	2.3	V
		$I_C=75A, V_{GE}=15V,$ $T_J=125^\circ C$		2.25	2.5	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	$V_{CE} = 25V, V_{GE} = 0V,$ $f = 1MHz$		5.5		nF
C_{oes}	Output Capacitance			0.4		nF
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600V, I_C = 75A,$ $R_G = 15\Omega, V_{GE} = \pm 15V,$ Inductive Load, $T_J = 25^\circ C$		80		ns
t_r	Rise Time			70		ns
$t_{d(off)}$	Turn-off Delay Time			248		ns
T_f	Fall Time			290		ns
E_{on}	Turn-on Switching Loss			7.45		mJ
E_{off}	Turn-off Switching Loss			4.9		mJ
$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600V, I_C = 75A,$ $R_G = 15\Omega, V_{GE} = \pm 15V,$ Inductive Load, $T_J = 125^\circ C$		95		ns
t_r	Rise Time			85		ns
$t_{d(off)}$	Turn-off Delay Time			262		ns
T_f	Fall Time			320		ns
E_{on}	Turn-on Switching Loss			10.3		mJ
E_{off}	Turn-off Switching Loss			7.8		mJ
Q_{ge}	Gate Charge	$V_{CC}=600V, I_C=75A,$ $V_{GE}=\pm 15V$		780		nC
RBSOA	Reverse Bias Safe Operating Area	$I_C = 75A, V_{CC} = 600V,$ $V_p = 1200V, R_g = 22\Omega,$ $V_{GE} = +15V \text{ to } 0V,$ $L = 500\mu H, T_J = 150^\circ C$	Trapezoid			
SCSOA	Short Circuit Safe Operating Area	$V_{CC} = 600V, V_{GE} = 15V,$ $T_J = 150^\circ C$	10			μs



Electrical Characteristics of FWD ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Item	Conditions	Min.	Typ.	Max.	Units	
V_{FM}	Forward Voltage	$I_F = 75\text{A}, V_{GE} = 0\text{V}$	$T_J = 25^\circ\text{C}$		2.1	2.4	V
			$T_J = 125^\circ\text{C}$		2.0	2.3	
t_{rr}	Reverse Recovery Time	$I_F = 75\text{A},$ $di/dt = 200\text{A}/\mu\text{s},$ $V_{rr} = 600\text{V},$ $V_{GE} = -15\text{V}$	$T_J = 25^\circ\text{C}$		160		ns
			$T_J = 125^\circ\text{C}$		200		
I_{rr}	Peak Reverse Recovery Current		$T_J = 25^\circ\text{C}$		55		A
			$T_J = 125^\circ\text{C}$		70		
Q_{rr}	Reverse Recovery Charge		$T_J = 25^\circ\text{C}$		5.3		μC
			$T_J = 125^\circ\text{C}$		8.2		

Thermal Resistance Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-To-Case (IGBT Part)			0.2	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Junction-To-Case (Diode Part, Per Leg)			0.5	$^\circ\text{C}/\text{W}$
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)		0.05		$^\circ\text{C}/\text{W}$

Performance Curves

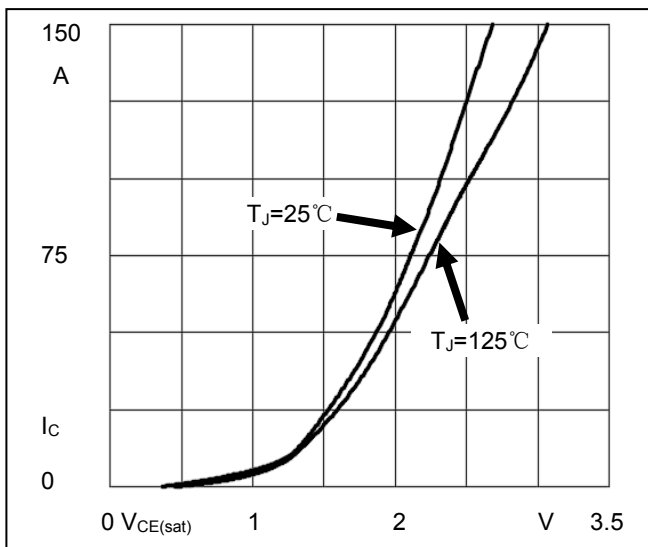


Fig1. Typical Output Characteristics

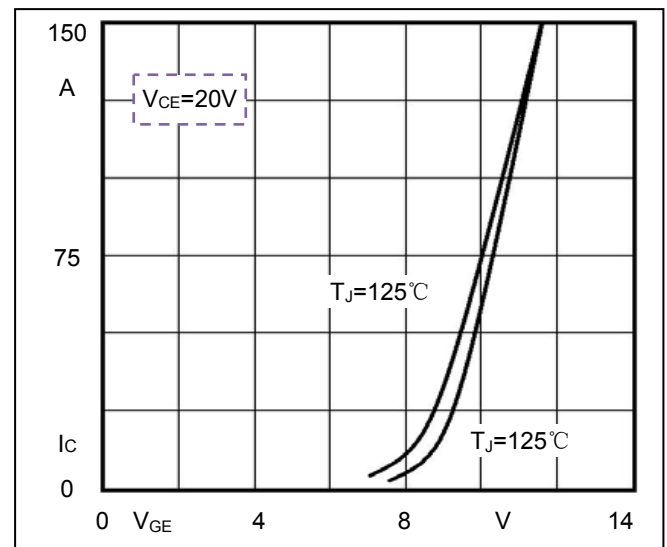


Fig2. Typical Transfer Characteristics

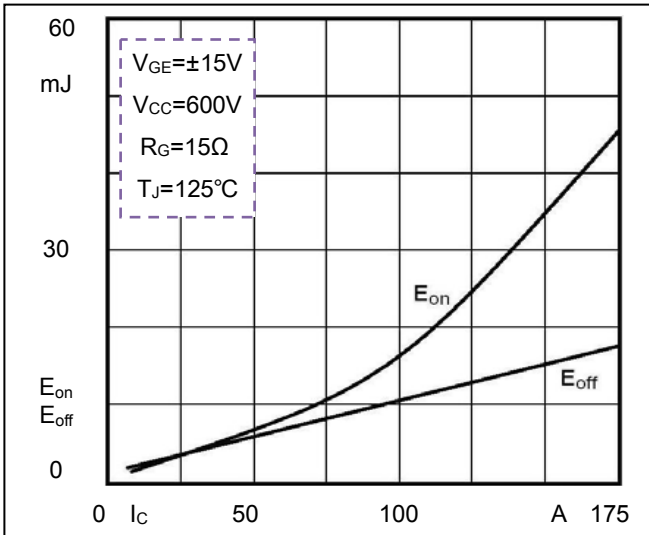


Fig3. Switching Energy vs. Collector Current

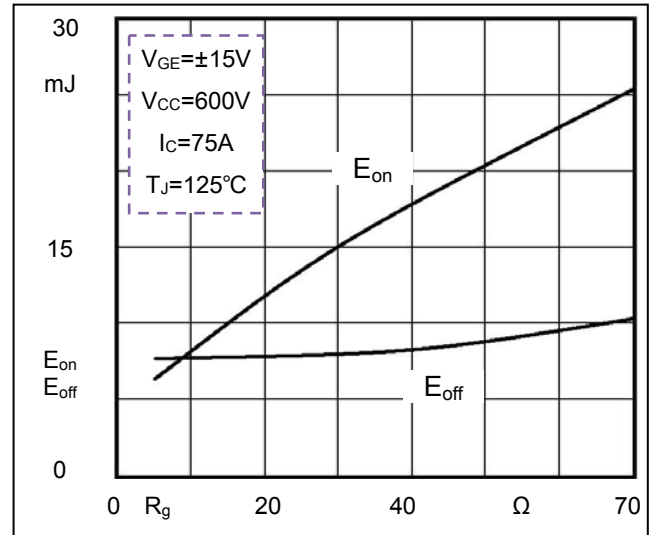


Fig4. Switching Energy vs. Gate Resistor

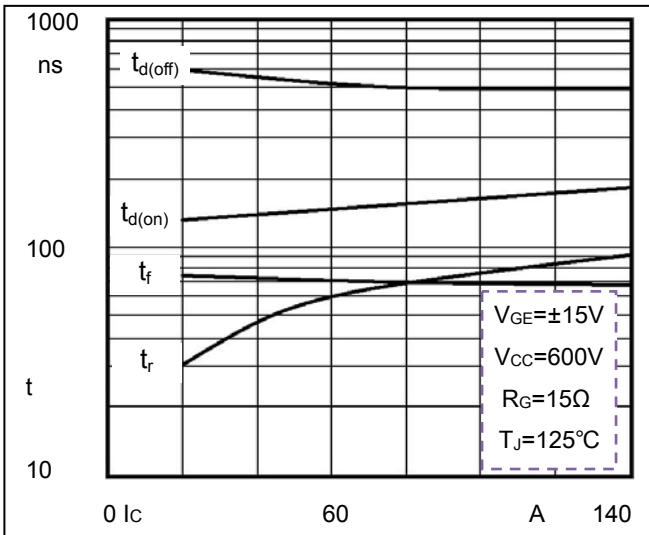


Fig5. Switching Times vs. Collector Current

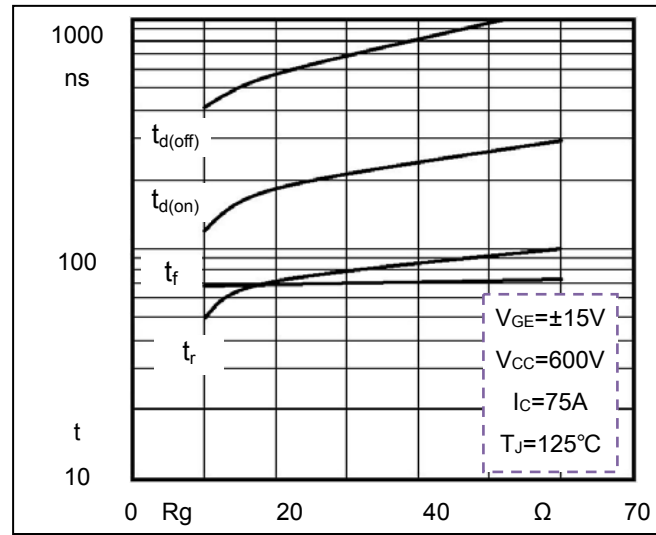


Fig6. Switching Times vs. Gate Resistor

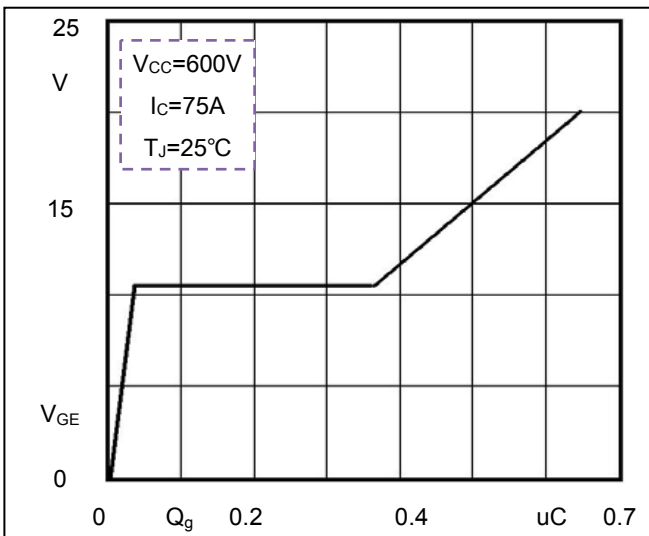


Fig7. Gate Charge characteristics

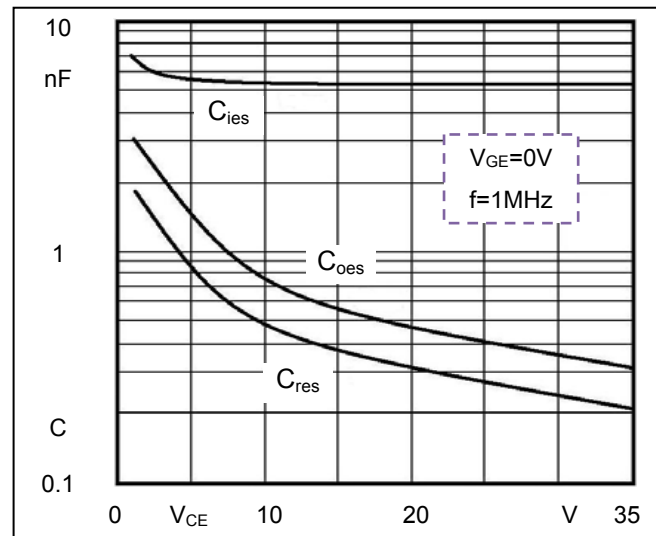


Fig8. Typical Capacitances vs. V_{CE}

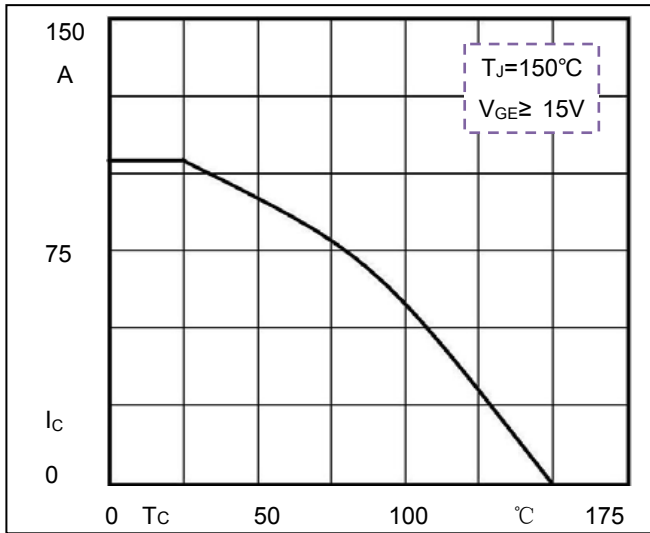


Fig9. Rated Current vs. T_c

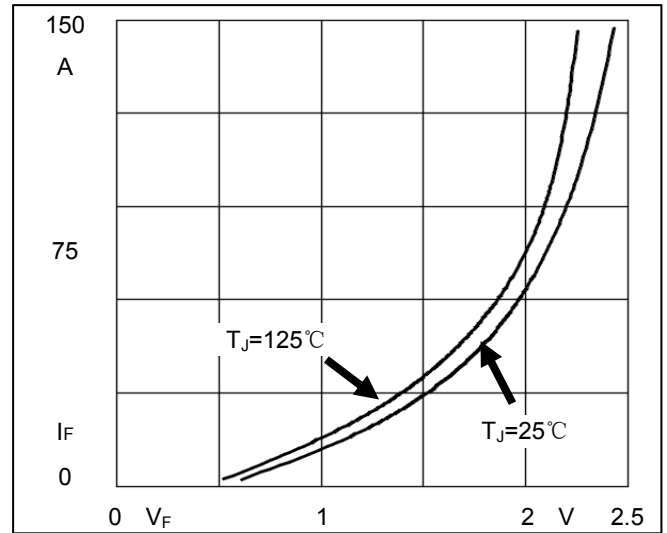


Fig10. Diode Forward Characteristics

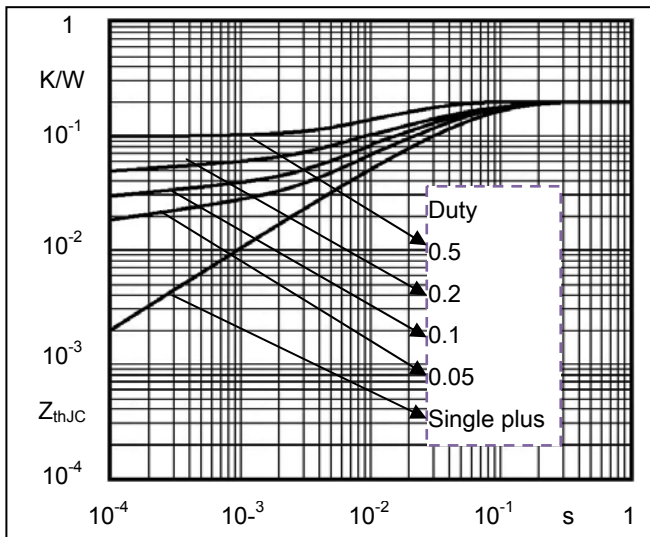


Fig11. Transient Thermal Impedance of IGBT

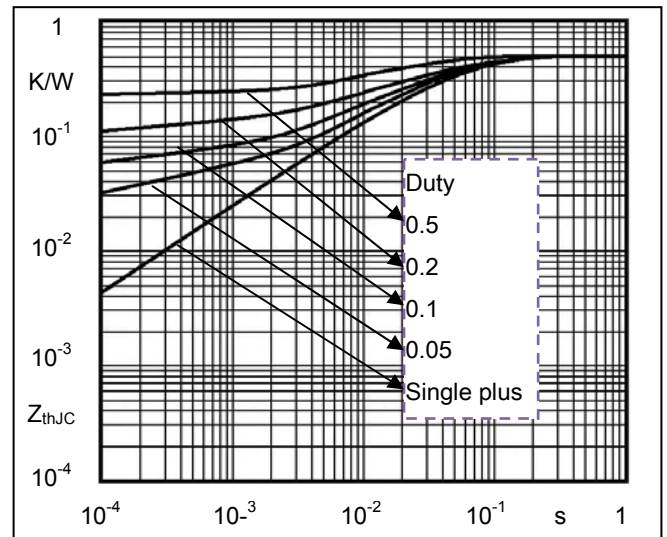
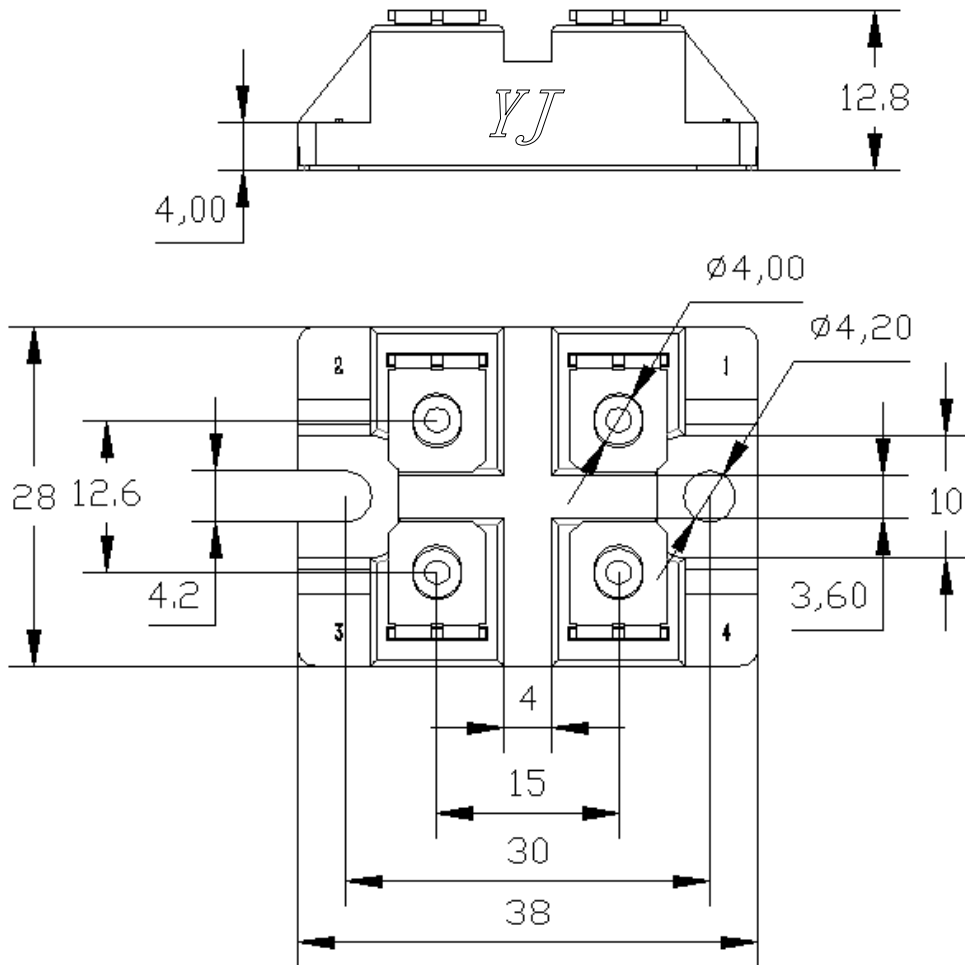


Fig12. Transient Thermal Impedance of Diode

Package Outline Information

CASE: GJ



Dimensions in mm