IGBT Module

Features：

- Short Circuit Rated 10μs
- Low Saturation Voltage: $V_{CE\ (sat)}$ = 1.50V @ I_C = 400A , T_C=25℃
- Low Switching Loss
- 100% RBSOA Tested（2×Ic）
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Applications：

- Welding Machine、Cutting Machine
- Plating Power Supply、Induction Heating
- SMPS、UPS

IGBT, Inverter
Maximum Rated Values(T_C=25℃ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		650	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C = 80℃,	400	A
		T_C = 25℃	800	A
I_{CM}	Repetitive Peak Collector Current	T_J = 175℃	800	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C = 25℃ T_{Jmax}=175℃	1190	W

Electrical Characteristics of IGBT (T_C=25℃ unless otherwise specified)

Static characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C = 1 mA, V_{CE} = V_{GE}		5.0	5.5	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 400A, V_{GE} = 15V	T_J = 25℃		1.50	1.70	V
			T_J = 125℃		1.70		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE} = 0V, V_{CE} = V_{CES}, T_J = 25℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = ±20V, V_{CE} = 0V, T_J = 25℃				200	nA
C_{ies}	Input Capacitance	V_{CE} = 25V, V_{GE} = 0V , f = 1MHz			34.0		nF
C_{oes}	Output capacitance				1.4		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 350V,I_C = 400A, R = 15 ,V_{GE} = ±15V, Inductive Load	T_J = 25℃		1300		ns
			T_J = 125℃		1310		
t_r	Rise Time		T_J = 25℃		500		ns
			T_J = 125℃		510		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		1290		ns
			T_J = 125℃		1320		
t_f	Fall Time		T_J = 25℃		140		ns
			T_J = 125℃		150		
E_{on}	Turn-on Switching Loss		T_J = 25℃		34.2		mJ
			T_J = 125℃		39.6		
E_{off}	Turn-off Switching Loss		T_J = 25℃		23.2		mJ
			T_J = 125℃		25.0		
Q_g	Total Gate Charge		T_J = 25℃		2960		nC
RBSOA	Reverse Bias Safe Operation Area	I_C=400A,V_{CC}=480V,Vp=600V, Rg = 15Ω, V_{GE}=+15V to 0V, T_J =150°C		Trapezoid			
SCSOA	Short Circuit Safe Operation Area	V_{CC} = 300V, V_{GE} = 15V, T_J = 150℃		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.13		℃/W

Diode, Inverter
Maximum Rated Values (T_C=25℃ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	600	V
I_F	Diode Continuous Forward Current	400	A
I_{FM}	Diode Maximum Forward Current	800	A

Electrical Characteristics of FWD (T_C=25℃ unless otherwise specified)

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	IF = 400A , V_{GE} = 0V	T_J = 25℃		1.70		V
			T_J = 125℃		1.90		
I_{rr}	Peak Reverse Recovery Current	I_F = 400A, di/dt =800A/ s, V_{rr} = 350V, V_{GE} = -15V	T_J = 25℃		100		A
			T_J = 125℃		130		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		13.8		μC
			T_J = 125℃		25.3		
E_{rec}	Reverse Recovery Energy		T_J = 25℃		2.6		mJ
			T_J = 125℃		5.0		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.246		℃/W

Module

Symbol	Description		Min	Typ	Max	Unit
V_{iso}	Isolation Voltage(All Terminals Shorted)	f = 50Hz, 1minute			2500	V
T_J	Maximum Junction Temperature				175	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)			0.1		℃/W
T	Power Terminals Screw:M5		3.0		5.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			200		g

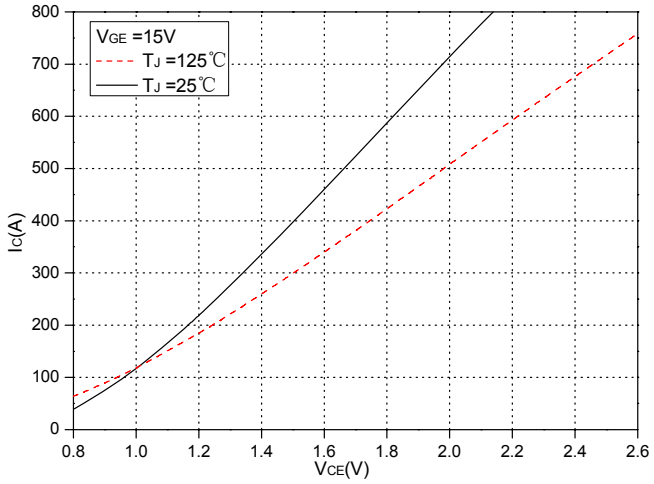


Fig.1 Typical Saturation Voltage Characteristics

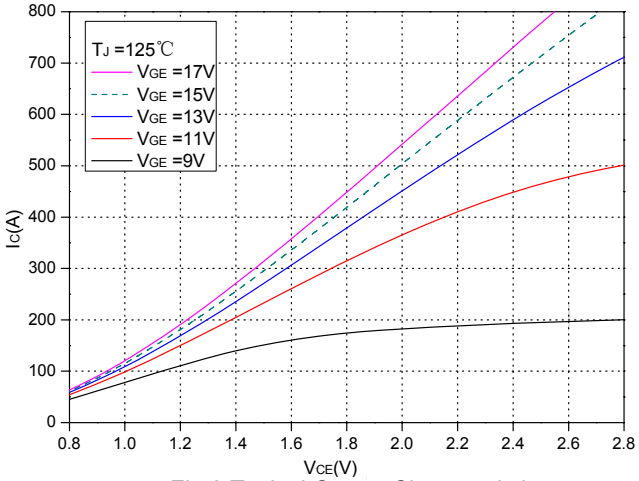


Fig.2 Typical Output Characteristics

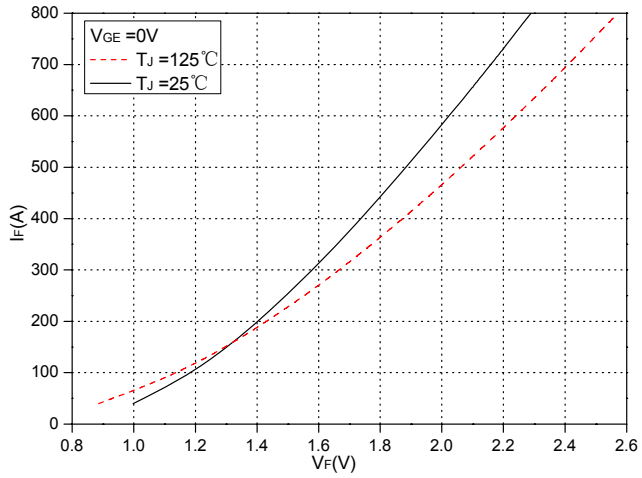


Fig.3 Forward Characteristics of FWD

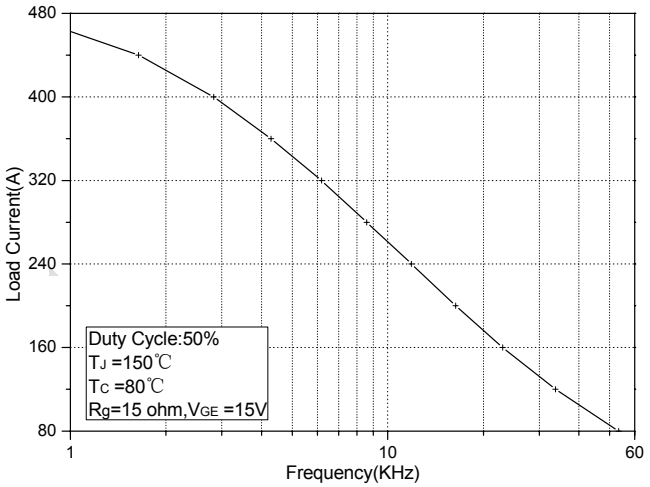


Fig.4 Typical Load Current vs. Frequency

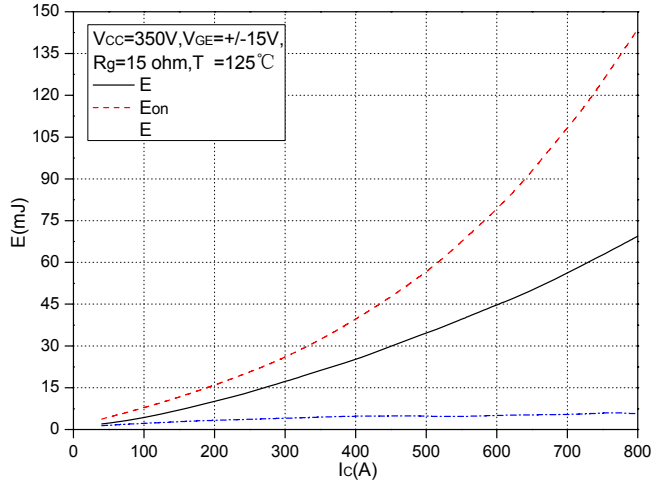


Fig.5 Typical Switching Losses vs. Collector Current

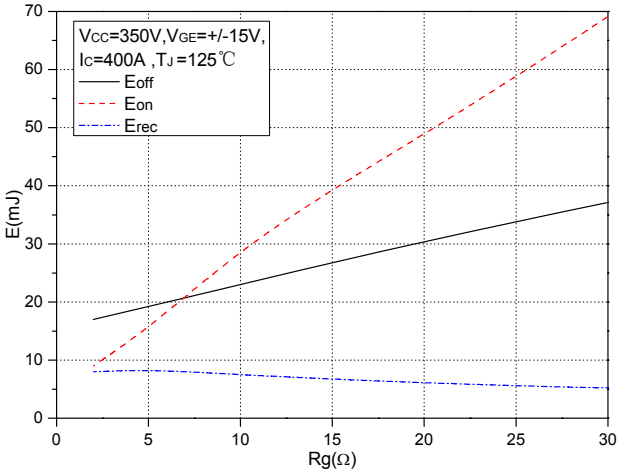


Fig.6 Typical Switching Losses vs. Gate Resistance

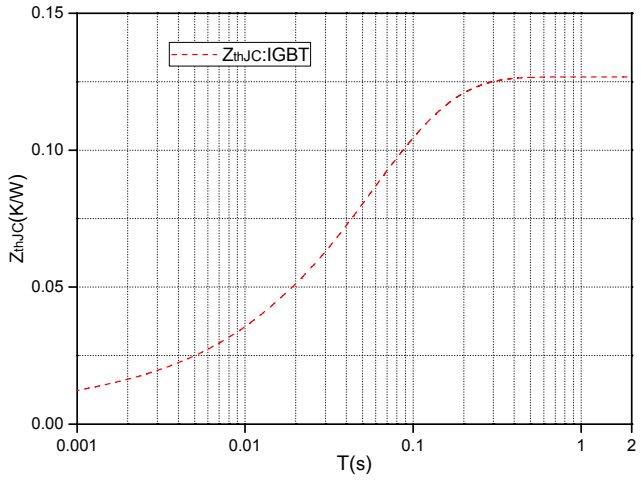


Fig.7 Transient thermal impedance (IGBT)

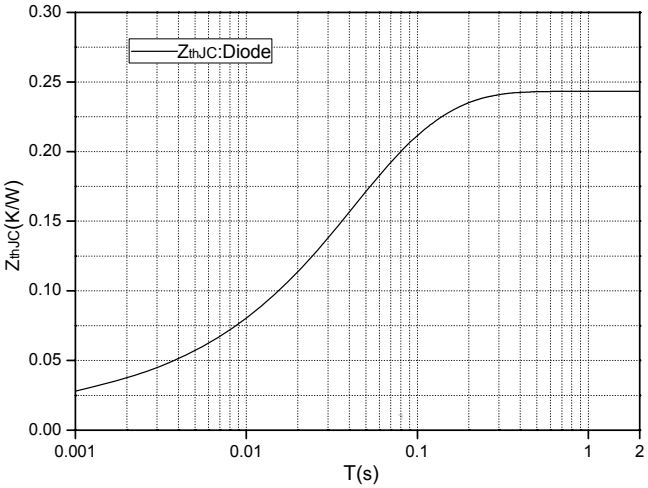


Fig.8 Transient thermal impedance (Diode)

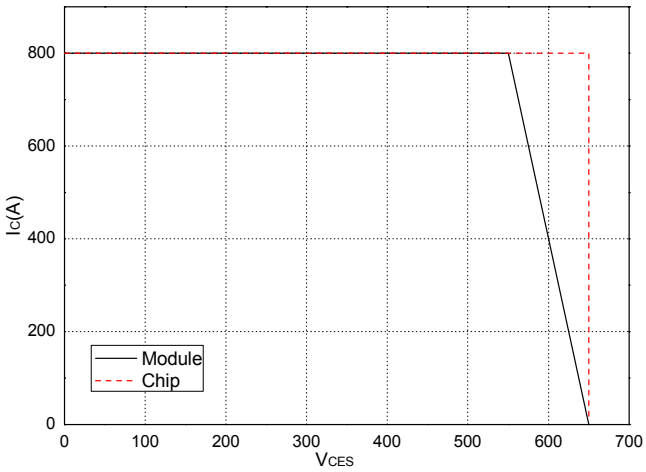
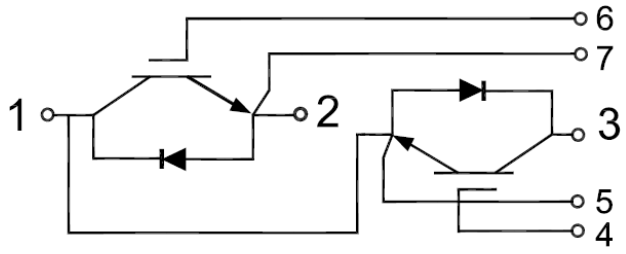


Fig.9 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit:



Package Outline (Unit: mm):