

IGBT Module

Features:

- Short Circuit Rated 10 μ s
- Low Saturation Voltage: $V_{CE(sat)} = 2.30V @ I_C = 150A, T_C=25^\circ C$
- Low Switching Loss
- 100% RBSOA Tested (2 \times I_C)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- Industrial Inverters
- Motor Drives

IGBT, Inverter

Maximum Rated Values($T_C=25^\circ C$ Unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1700	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Continuous Collector Current	$T_C = 80^\circ C,$	150	A
		$T_C = 25^\circ C$	240	A
$I_{CM(1)}$	Peak Collector Current Repetitive	$T_J = 150^\circ C$	300	A
t_{SC}	Short Circuit Withstand Time		>10	μ s
P_D	Maximum Power Dissipation (IGBT)	$T_C = 25^\circ C$ $T_{Jmax} = 150^\circ C$	840	W

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

Static characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C = 2 \text{ mA}, V_{CE} = V_{GE}$	5.5	6.0	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 150 \text{ A}, V_{GE} = 15 \text{ V}$	$T_J = 25^{\circ}\text{C}$	2.30	2.60	V
			$T_J = 125^{\circ}\text{C}$	2.80		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE} = 0 \text{ V}, V_{CE} = V_{CES}, T_J = 25^{\circ}\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE} = \pm 20 \text{ V}, V_{CE} = 0 \text{ V}, T_J = 25^{\circ}\text{C}$			100	nA
C_{ies}	Input Capacitance	$V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 1 \text{ MHz}$		10.0		nF
C_{oes}	Output Capacitance			0.60		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 900 \text{ V}, I_C = 150 \text{ A}, R_G = 5 \Omega, V_{GE} = \pm 15 \text{ V},$ Inductive Load	$T_J = 25^{\circ}\text{C}$	350		ns
			$T_J = 125^{\circ}\text{C}$	365		
t_r	Rise Time		$T_J = 25^{\circ}\text{C}$	170		ns
			$T_J = 125^{\circ}\text{C}$	170		
$t_{d(off)}$	Turn-off Delay Time		$T_J = 25^{\circ}\text{C}$	335		ns
			$T_J = 125^{\circ}\text{C}$	370		
t_f	Fall Time		$T_J = 25^{\circ}\text{C}$	280		ns
			$T_J = 125^{\circ}\text{C}$	690		
E_{on}	Turn-on Switching Loss		$T_J = 25^{\circ}\text{C}$	49.6		mJ
			$T_J = 125^{\circ}\text{C}$	60.2		
E_{off}	Turn-off Switching Loss	$T_J = 25^{\circ}\text{C}$	18.9		mJ	
		$T_J = 125^{\circ}\text{C}$	36.1			
Q_g	Total Gate Charge	$T_J = 25^{\circ}\text{C}$	870		nC	
RBSOA	RBSOA	$I_C=300\text{A}, V_{CC}=1400\text{V}, V_p=1700\text{V}, R_g = 5\Omega, V_{GE}=\pm 15\text{V to } 0\text{V}, T_J=150^{\circ}\text{C}$	Trapezoid			
SCSOA	SCSOA	$V_{CC} = 900 \text{ V}, V_{GE} = 15 \text{ V}, T_J = 150^{\circ}\text{C}$	10		μs	
$R_{\theta JC}$	Junction-To-Case (IGBT)		0.149		$^{\circ}\text{C/W}$	

Diode, Inverter

Maximum Rated Values ($T_C=25^\circ\text{C}$ Unless otherwise specified)

V_{RRM}	Repetitive peak reverse voltage	1700	V
I_F	Diode Continuous Forward Current	150	A
I_{FM}	Peak FWD Current Repetitive	300	A

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

Symbol	Description	Conditions	Min	Typ	Max	Unit
V_{FM}	Forward Voltage	$I_F = 150\text{ A}$, $V_{GE} = 0\text{ V}$	$T_J = 25^\circ\text{C}$	1.70	2.00	V
			$T_J = 125^\circ\text{C}$		1.90	
I_{rr}	Peak Reverse Recovery Current	$I_F = 150\text{ A}$, $di/dt = 980\text{ A}/\mu\text{s}$, $V_{rr} = 900\text{ V}$, $V_{GE} = -15\text{ V}$	$T_J = 25^\circ\text{C}$	90		A
			$T_J = 125^\circ\text{C}$		115	
Q_{rr}	Reverse Recovery Charge	$I_F = 150\text{ A}$, $di/dt = 980\text{ A}/\mu\text{s}$, $V_{rr} = 900\text{ V}$, $V_{GE} = -15\text{ V}$	$T_J = 25^\circ\text{C}$	28.3		μC
			$T_J = 125^\circ\text{C}$		51.2	
E_{rec}	Reverse Recovery Energy	$I_F = 150\text{ A}$, $di/dt = 980\text{ A}/\mu\text{s}$, $V_{rr} = 900\text{ V}$, $V_{GE} = -15\text{ V}$	$T_J = 25^\circ\text{C}$	16.5		mJ
			$T_J = 125^\circ\text{C}$		31.9	
$R_{\theta JC}$	Junction-To-Case Diode			0.253		$^\circ\text{C}/\text{W}$

Diode, Rectifier

Maximum Rated Values ($T_C=25^\circ\text{C}$ Unless otherwise specified)

V_{RRM}	Repetitive peak reverse voltage	$T_J = 25^\circ\text{C}$	1800	V
I_{FRMSM}	Maximum RMS forward current per chip	$T_J = 80^\circ\text{C}$	150	A
I_{RMSM}	Maximum RMS current at rectifier output	$T_J = 80^\circ\text{C}$	225	A
I_{FSM}	Surge Current @ $t_p=10\text{ ms}$	$T_J = 25^\circ\text{C}$	2000	A
		$T_J = 150^\circ\text{C}$	1650	
I^2t	I^2t - value	$T_J = 25^\circ\text{C}$	20000	A^2s
		$T_J = 150^\circ\text{C}$	13600	



SL150HR170TL

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

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_F	Forward voltage	$I_F = 150 \text{ A}$,	$T_J = 25^{\circ}\text{C}$	1.15			V
			$T_J = 150^{\circ}\text{C}$	1.10			
I_R	Reverse current	$V_R = 1700\text{V}$	$T_J = 25^{\circ}\text{C}$			1	mA
$R_{\theta JC}$	Junction-To-Case Diode				0.248		$^{\circ}\text{C}/\text{W}$

Module

V_{iso}	Isolation Voltage(All Terminals Shorted)	$f = 50\text{Hz}$, 1minute	2500			V
T_J	Maximum Junction Temperature		150			$^{\circ}\text{C}$
T_{JOP}	Maximum Operating Junction Temperature Range		-40 +150			$^{\circ}\text{C}$
T_{stg}	Storage Temperature		-40 +125			$^{\circ}\text{C}$
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)			0.02		$^{\circ}\text{C}/\text{W}$
M	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			300		g

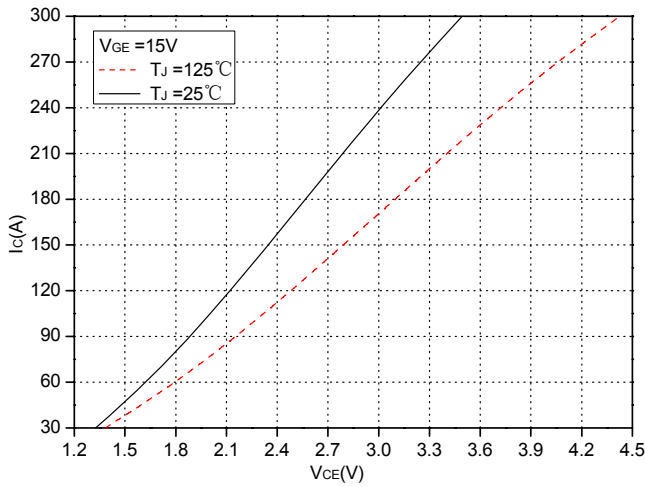


Fig.1 Typical Saturation Voltage Characteristics

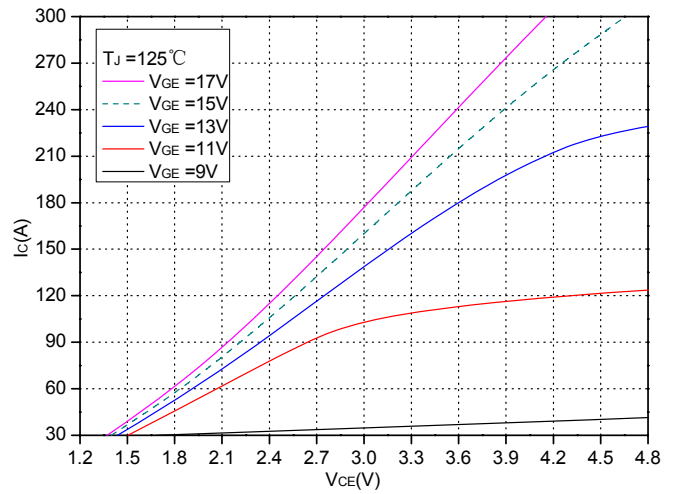


Fig.2 Typical Output Characteristics

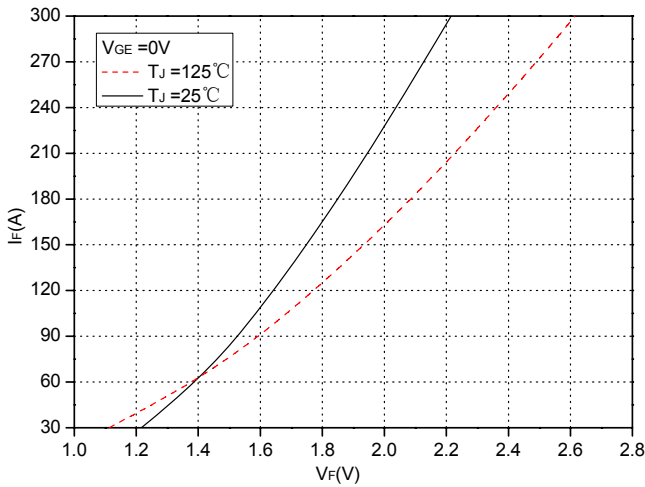


Fig.3 Forward Characteristics of FWD

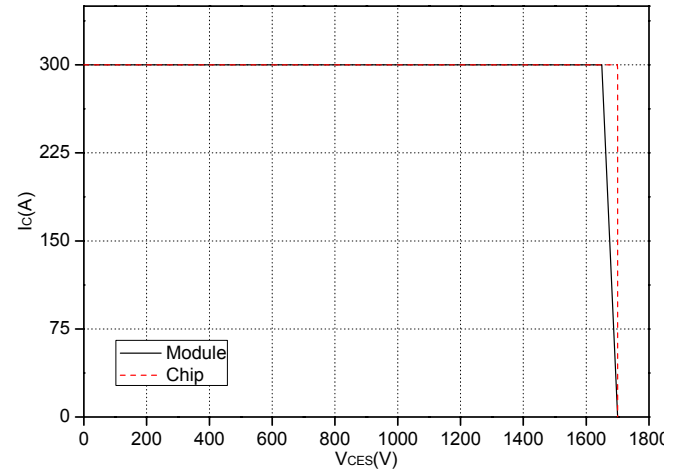


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

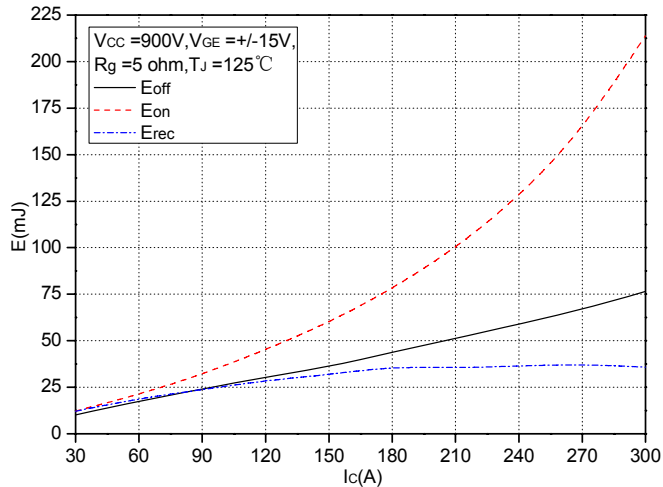


Fig.5 Typical Switching Loss vs. Collector Current

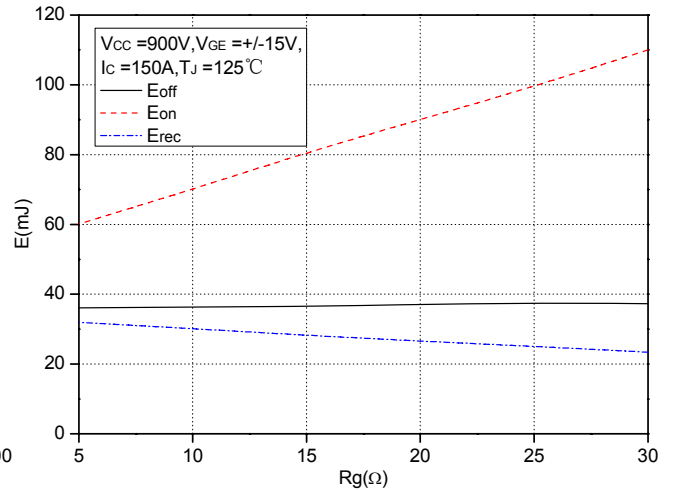


Fig.6 Typical Switching Loss vs. Gate Resistance

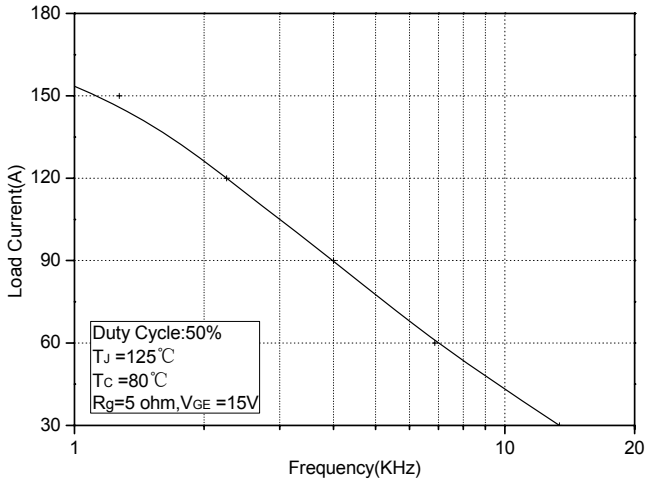


Fig.7 Typical Load Current vs. Frequency

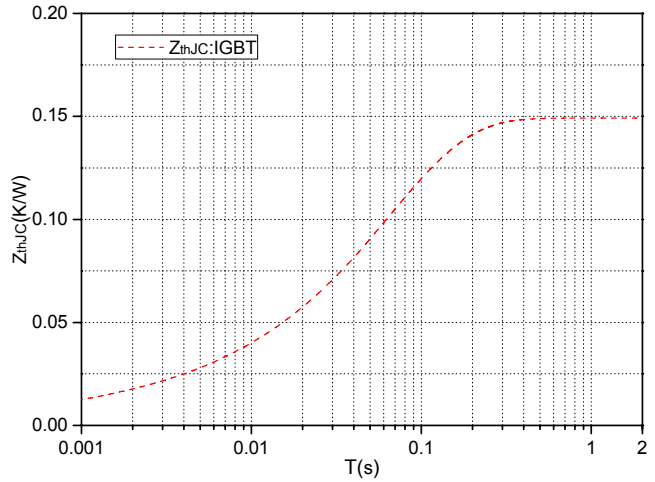


Fig.8 Transient thermal impedance (IGBT)

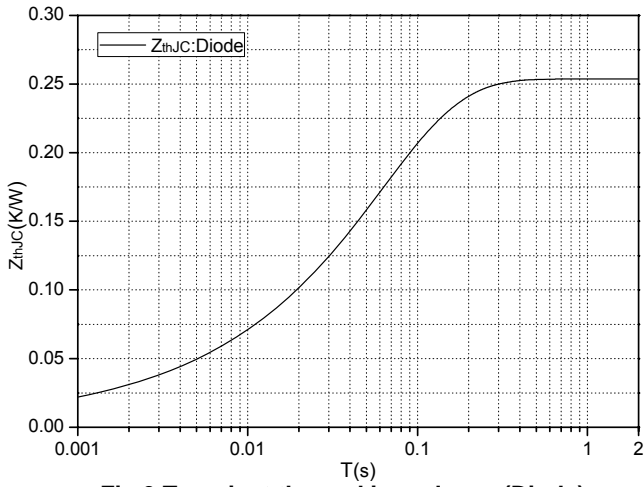


Fig.9 Transient thermal impedance (Diode)

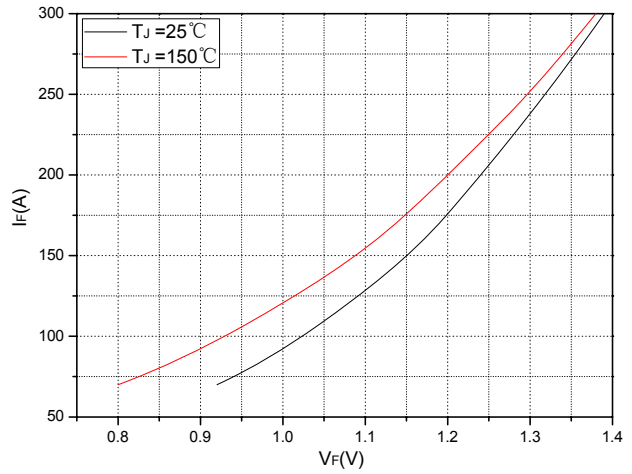
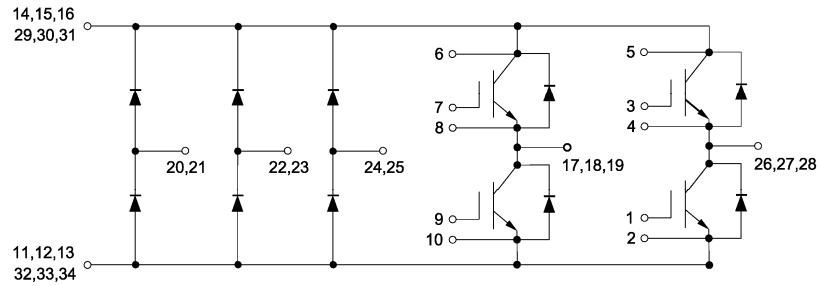


Fig.10 Forward Characteristics of Diode (Rectifier)

Internal Circuit



Package Outline (Unit: mm):

