

IGBT Module

Features:

- Short Circuit Rated 10 μ s
- Low Saturation Voltage: $V_{CE(sat)} = 1.80V @ I_C = 300A, T_C=25^{\circ}C$
- Low Switching Loss
- 100% RBSOA Tested ($2 \times I_C$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- High Power Converters
- Motor Drives
- UPS systems
- Wind Turbines

Maximum Rated Values of IGBT($T_C=25^{\circ}C$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Continuous Collector Current	$T_C = 80^{\circ}C$	300	A
		$T_C = 25^{\circ}C$	600	A
I_{CM}	Repetitive Peak Collector Current	$T_J = 175^{\circ}C$	600	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	$T_C = 25^{\circ}C$ $T_{Jmax}=175^{\circ}C$	1660	W



SL300H120TL

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	$I_C = 3\text{mA}$, $V_{CE} = V_{GE}$	4.5	5.0	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 300\text{A}$, $V_{GE} = 15\text{V}$		1.80	2.00	V
		$T_J = 125^{\circ}\text{C}$		2.00	2.20	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	$V_{GE} = \pm 20\text{V}$, $V_{CE} = 0\text{V}$, $T_J = 25^{\circ}\text{C}$			200	nA
C_{ies}	Input Capacitance	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$		42.4		nF
C_{oes}	Output Capacitance			2.18		nF

Switching Characteristics

Switching Characteristics							
$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600V, I_C = 300A,$ $R_G = 3.3\ \Omega, V_{GE} = \pm 15V,$ Inductive Load	$T_J = 25^{\circ}C$		300		ns
			$T_J = 125^{\circ}C$		290		
t_r	Rise Time		$T_J = 25^{\circ}C$		200		ns
			$T_J = 125^{\circ}C$		210		
$t_{d(off)}$	Turn-off Delay Time		$T_J = 25^{\circ}C$		540		ns
			$T_J = 125^{\circ}C$		600		
t_f	Fall Time		$T_J = 25^{\circ}C$		175		ns
			$T_J = 125^{\circ}C$		195		
E_{on}	Turn-on Switching Loss		$T_J = 25^{\circ}C$		16.9		mJ
			$T_J = 125^{\circ}C$		21.4		
E_{off}	Turn-off Switching Loss		$T_J = 25^{\circ}C$		24.8		mJ
			$T_J = 125^{\circ}C$		31.7		
Q_g	Total Gate Charge		$T_J = 25^{\circ}C$		1760		nC
RBSOA	RBSOA	$I_C=600A, V_{CC}=1050V, V_p=1200V,$ $R_g = 15\Omega, V_{GE}=\pm 15V \text{ to } 0V, T_J=150^{\circ}C$		Trapezoid			
SCSOA	SCSOA	$V_{CC} = 600V, V_{GE} = 15V,$ $T_J = 150^{\circ}C$		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.09		$^{\circ}C/W$



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

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	300	A
I_{FM}	Diode Maximum Forward Current	600	A

Electrical Characteristics of Diode

Symbol	Description	Conditions		Min	Typ	Max	Unit
V _{FM}	Forward Voltage	I _F = 300A , V _{GE} = 0V	T _J = 25℃		2.20		V
			T _J = 125℃		2.40		
I _{rr}	Peak Reverse Recovery Current	I _F =300A, di/dt =1673A/μs, V _{rr} = 600V, V _{GE} = -15V	T _J = 25℃		145		A
			T _J = 125℃		180		
Q _{rr}	Reverse Recovery Charge		T _J = 25℃		18.9		μC
			T _J = 125℃		32.6		
E _{rec}	Reverse Recovery Energy		T _J = 25℃6		7.68		mJ
			T _J = 125℃		15.22		
R _{θJC}	Diode Thermal Resistance: Junction-To-Case				0.11		℃/W

Internal NTC-Thermistor Characteristics

R_{25}	$T_C = 25^{\circ}\text{C}$	5		k Ω
$\Delta R/R$	$T_C = 100^{\circ}\text{C}$, $R_{100} = 481\Omega$		± 5	%
P_{25}	$T_C = 25^{\circ}\text{C}$	50		mW
$B_{25/50}$	$R_2 = R_{25} \exp[B_{25/50}(1/T_2 - 1/(298.15\text{K}))]$	3380		K
$B_{25/80}$	$R_2 = R_{25} \exp[B_{25/80}(1/T_2 - 1/(298.15\text{K}))]$	3440		K



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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	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+150	°C
T _{stg}	Storage Temperature		-40		+125	°C
R _{θCS}	Case-To-Sink (Conductive Grease Applied)			0.1		°C/W
T	Power Terminals Screw:M5		3.0		5.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			330		g

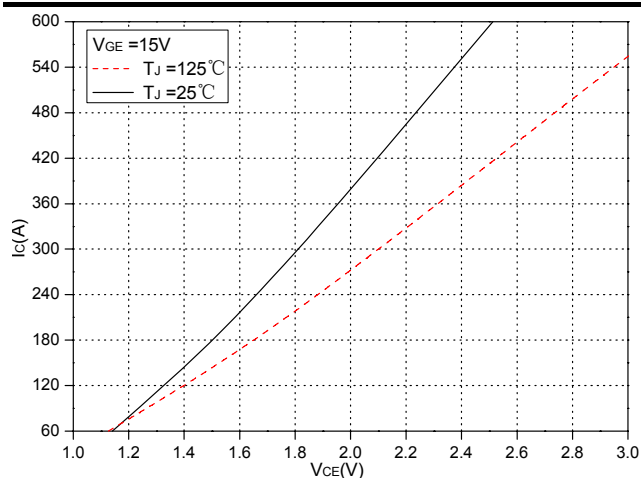


Fig.1 Typical Saturation Voltage Characteristics

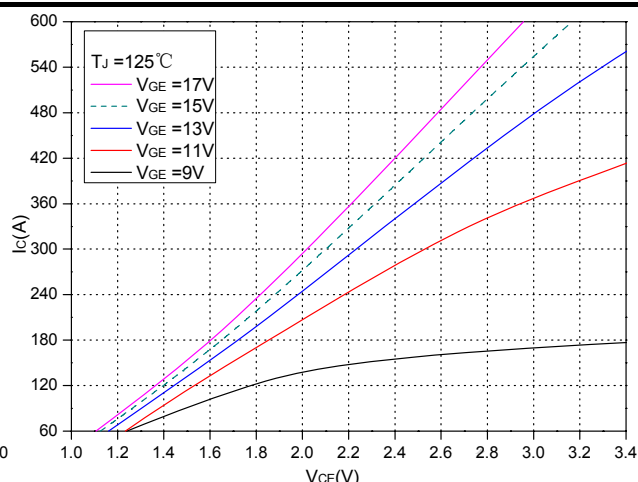


Fig.2 Typical Output Characteristics

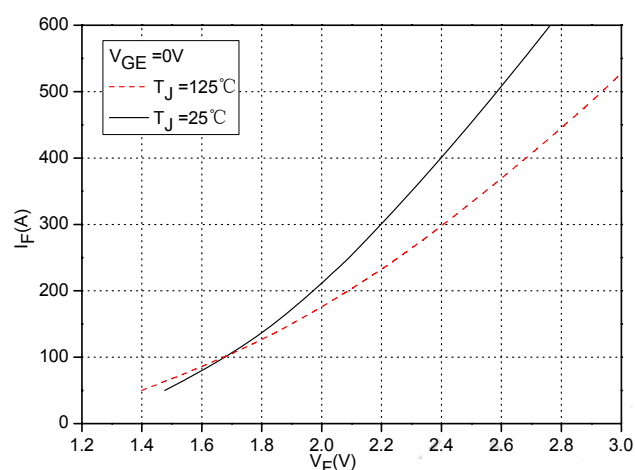


Fig.3 Forward Characteristics of Diode

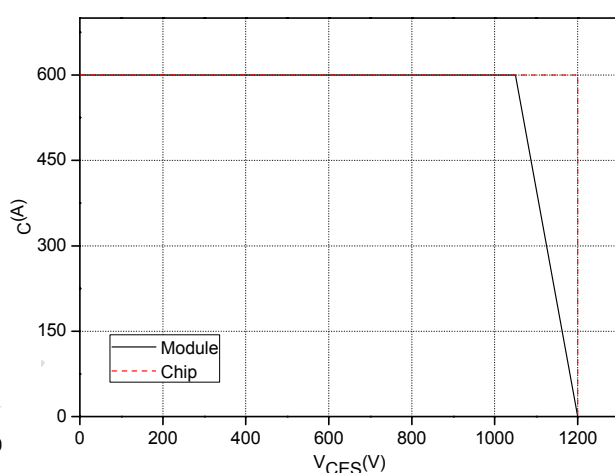


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

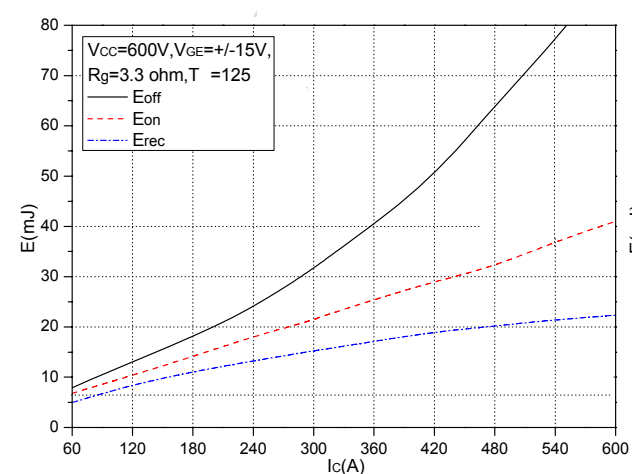


Fig.5 Typical Switching Loss vs. Collector Current

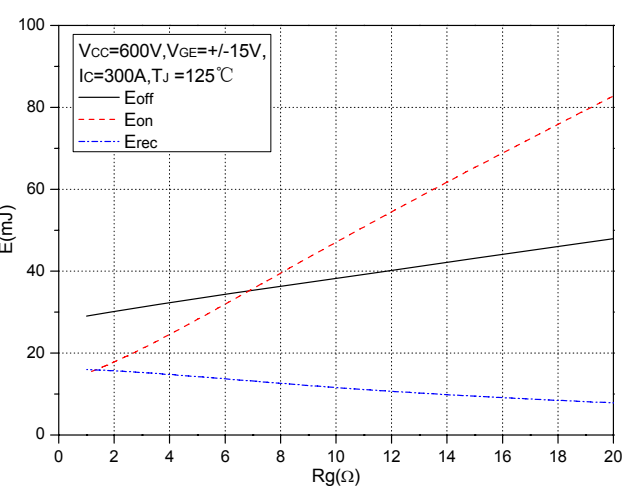


Fig.6 Typical Switching Loss vs. Gate Resistance

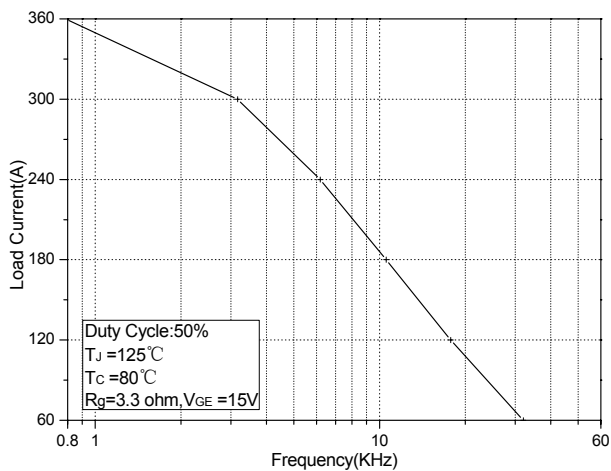


Fig.7 Typical Load Current vs. Frequency

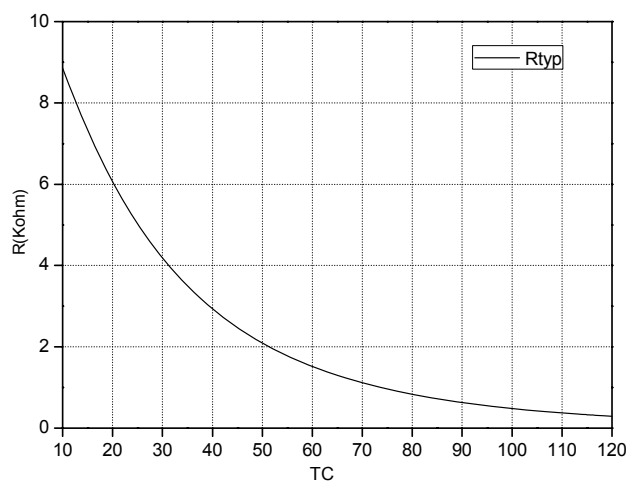


Fig.8 NTC Temperature characteristics

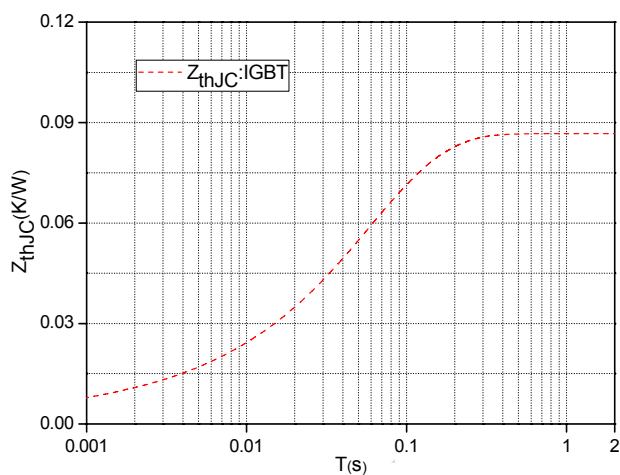


Fig.9 Transient thermal impedance (IGBT)

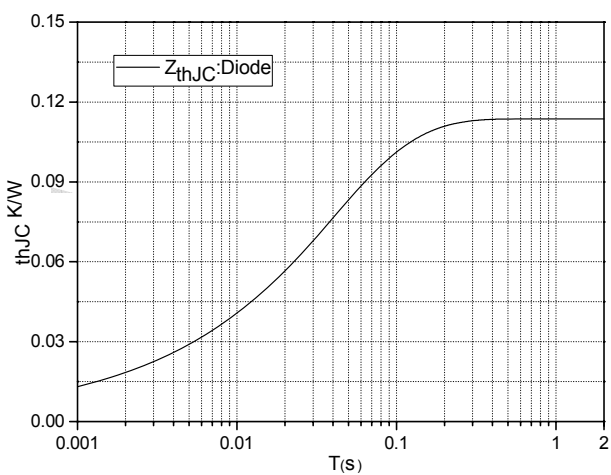


Fig.10 Transient thermal impedance (Diode)

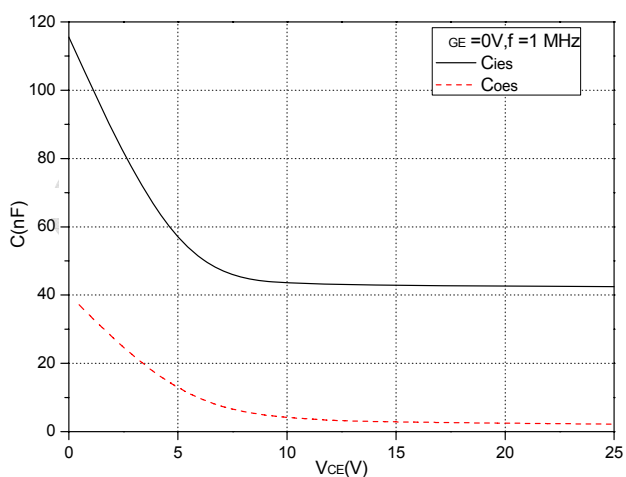
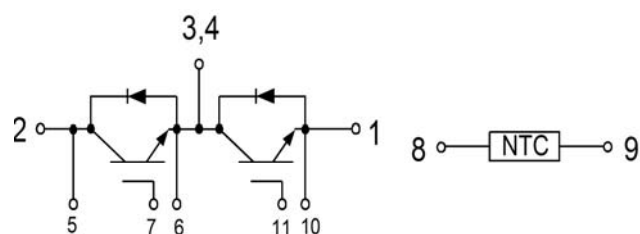


Fig.11 Capacitance Characteristics

Internal Circuit



Package Outline (Unit: mm):

