

GT600HF120A4H

Preliminary Data

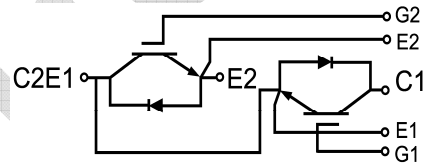
Features:

- Short Circuit Rated 10 μ s
- Low Saturation Voltage: $V_{CE(sat)} = 1.90V @ I_C = 600A, T_C=25^\circ C$
- Low Switching Loss
- 100% RBSOA Tested ($2 \times I_C$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- Industrial Inverters
- Servo Applications



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	$T_C = 80^\circ C,$	600	A
		$T_C = 25^\circ C$	1000	A
I_{CM}	Repetitive Peak Collector Current	$T_J = 175^\circ C$	1200	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	$T_C = 25^\circ C$ $T_{Jmax}=175^\circ C$	3480	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	$I_C = 4\text{mA}$, $V_{CE} = V_{GE}$	4.5	5.0	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 600\text{A}$, $V_{GE} = 15\text{V}$	$T_J = 25^\circ\text{C}$	1.90	2.20	V
			$T_J = 125^\circ\text{C}$	2.20		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE} = 0\text{V}$, $V_{CE} = V_{CES}$, $T_J = 25^\circ\text{C}$			3	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE} = \pm 20\text{V}$, $V_{CE} = 0\text{V}$, $T_J = 25^\circ\text{C}$			400	nA
C_{ies}	Input Capacitance	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$		85.0		nF
C_{oes}	Output Capacitance			4.30		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600\text{V}$, $I_C = 600\text{A}$, $R_G = 5\ \Omega$, $V_{GE} = \pm 15\text{V}$, Inductive Load	$T_J = 25^\circ\text{C}$	1317		ns
			$T_J = 125^\circ\text{C}$	1257		
t_r	Rise Time		$T_J = 25^\circ\text{C}$	427		ns
			$T_J = 125^\circ\text{C}$	428		
$t_{d(off)}$	Turn-off Delay Time		$T_J = 25^\circ\text{C}$	920		ns
			$T_J = 125^\circ\text{C}$	954		
t_f	Fall Time		$T_J = 25^\circ\text{C}$	160		ns
			$T_J = 125^\circ\text{C}$	180		
E_{on}	Turn-on Switching Loss		$T_J = 25^\circ\text{C}$	88.0		mJ
			$T_J = 125^\circ\text{C}$	99.6		
E_{off}	Turn-off Switching Loss	$T_J = 25^\circ\text{C}$	81.6		mJ	
		$T_J = 125^\circ\text{C}$	89.0			
Q_g	Total Gate Charge	$T_J = 25^\circ\text{C}$	4900		nC	
RBSOA	Reverse Bias Safe Operation Area	$I_C=1200\text{A}$, $V_{CC}=960\text{V}$, $V_p=1200\text{V}$, $R_g = 15\ \Omega$, $V_{GE}=\pm 15\text{V}$ to 0V , $T_J=150^\circ\text{C}$	Trapezoid			
SCSOA	Short Circuit Safe Operation Area	$V_{CC} = 600\text{V}$, $V_{GE} = 15\text{V}$, $T_J = 150^\circ\text{C}$	10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case			0.04		$^\circ\text{C/W}$

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	600	A
I_{FM}	Diode Maximum Forward Current	1200	A

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

Symbol	Description	Conditions	Min	Typ	Max	Unit
V_{FM}	Forward Voltage	$I_F = 600\text{A}$, $V_{GE} = 0\text{V}$	$T_J = 25^\circ\text{C}$	2.20		V
			$T_J = 125^\circ\text{C}$	2.40		
I_{rr}	Peak Reverse Recovery Current	$I_F = 600\text{A}$, $di/dt = 1300\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$, $V_{GE} = -15\text{V}$	$T_J = 25^\circ\text{C}$	125		A
			$T_J = 125^\circ\text{C}$	190		
Q_{rr}	Reverse Recovery Charge	$I_F = 600\text{A}$, $di/dt = 1300\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$, $V_{GE} = -15\text{V}$	$T_J = 25^\circ\text{C}$	19.7		μC
			$T_J = 125^\circ\text{C}$	47.7		
E_{rec}	Reverse Recovery Energy	$I_F = 600\text{A}$, $di/dt = 1300\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$, $V_{GE} = -15\text{V}$	$T_J = 25^\circ\text{C}$	8.7		mJ
			$T_J = 125^\circ\text{C}$	18.2		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case			0.07		$^\circ\text{C}/\text{W}$

Module

Symbol	Description	Min	Typ	Max	Unit
V_{iso}	Isolation Voltage(All Terminals Shorted)	$f = 50\text{Hz}$, 1minute		2500	V
T_J	Maximum Junction Temperature			175	$^\circ\text{C}$
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)		0.1		$^\circ\text{C}/\text{W}$
T	Power Terminals Screw:M5	3.0		5.0	N·m
T	Mounting Screw:M6	4.0		6.0	N·m
G	Weight		410		g

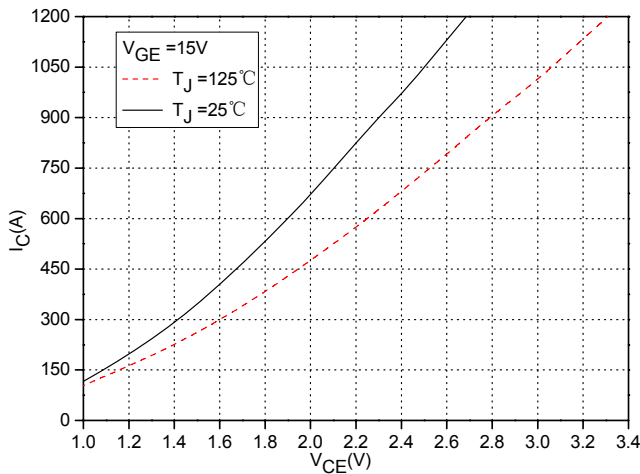


Fig.1 Typical Saturation Voltage Characteristics

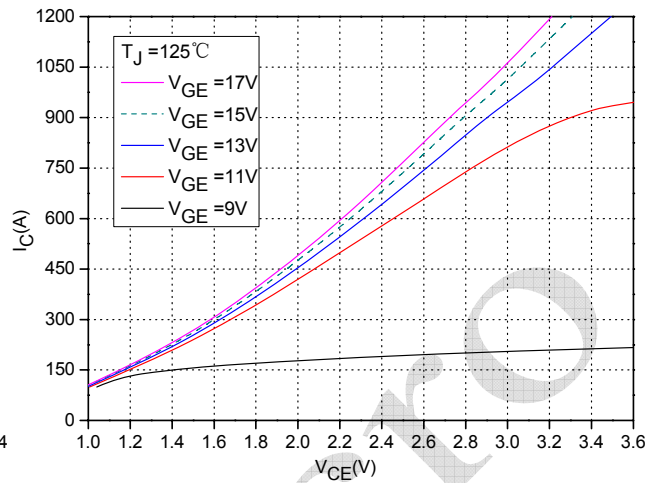


Fig.2 Typical Output Characteristics

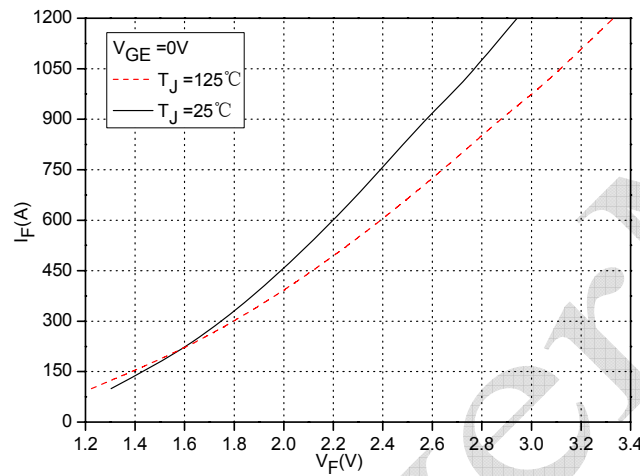


Fig.3 Forward Characteristics of Diode

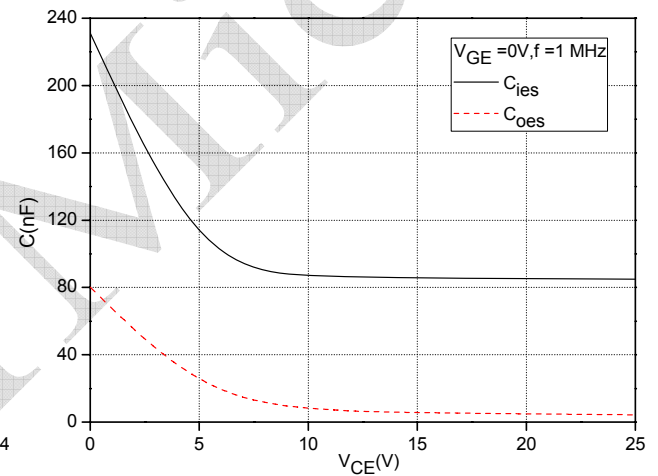


Fig.4 Capacitance Characteristics

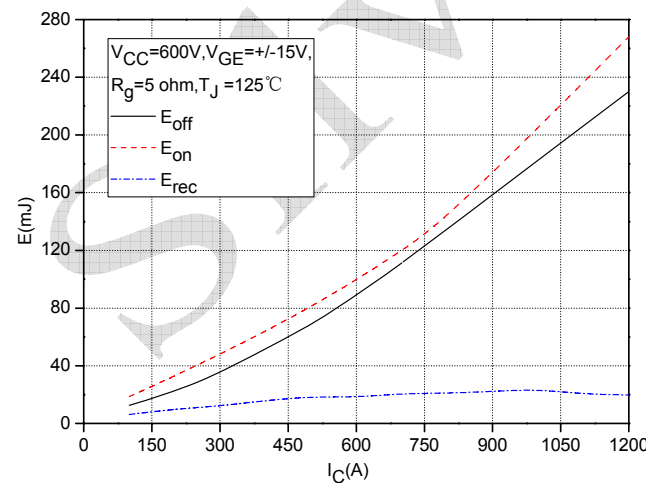


Fig.5 Typical Switching Loss vs. Collector Current

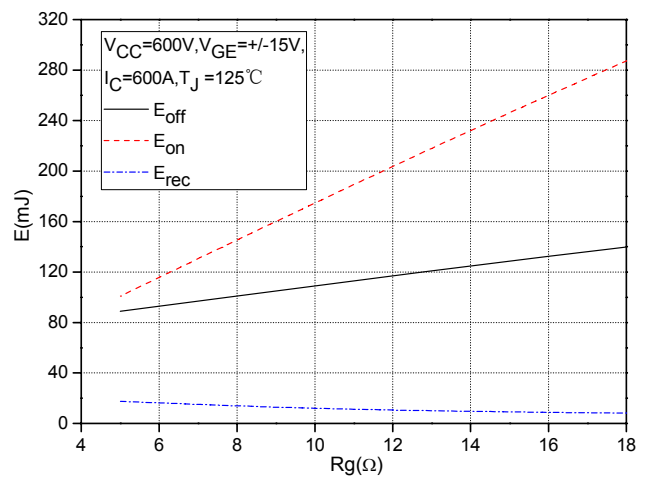


Fig.6 Typical Switching Loss vs. Gate Resistance

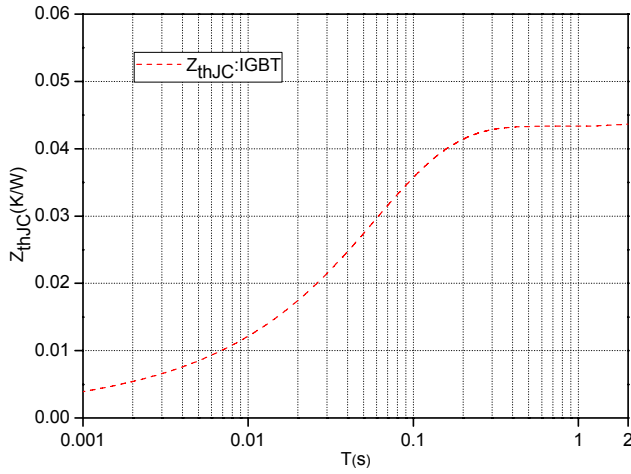


Fig.7 Transient thermal impedance (IGBT)

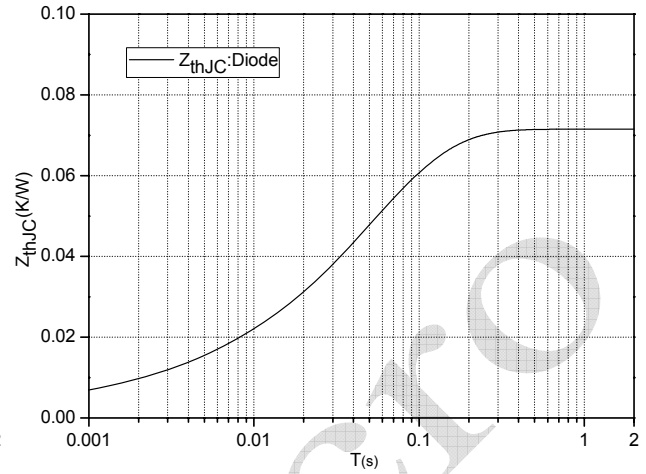


Fig.8 Transient thermal impedance (Diode)

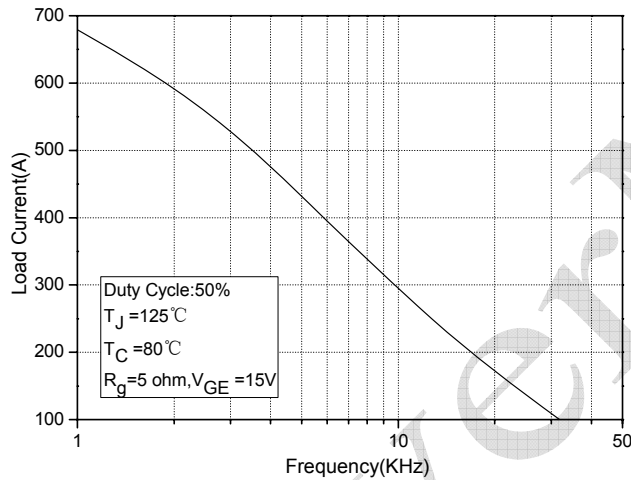


Fig.9 Typical Load Current vs. Frequency

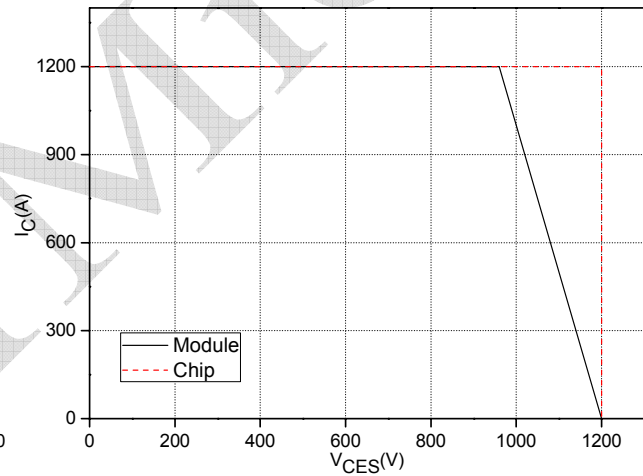
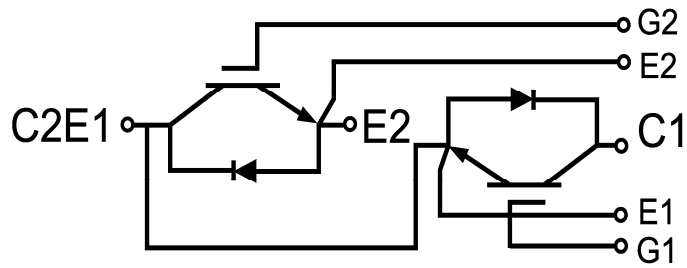
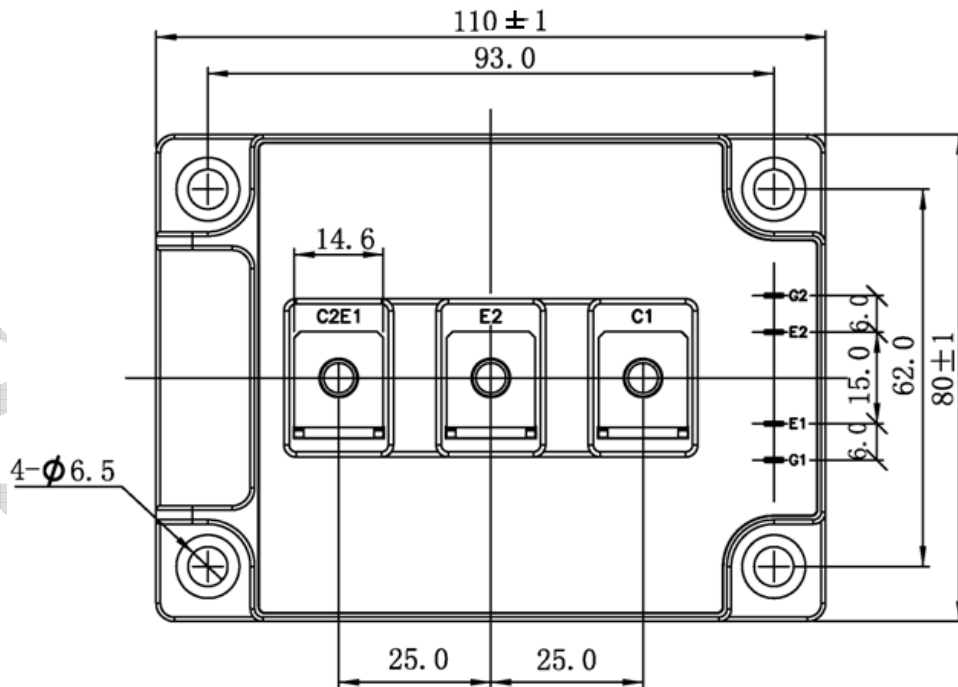
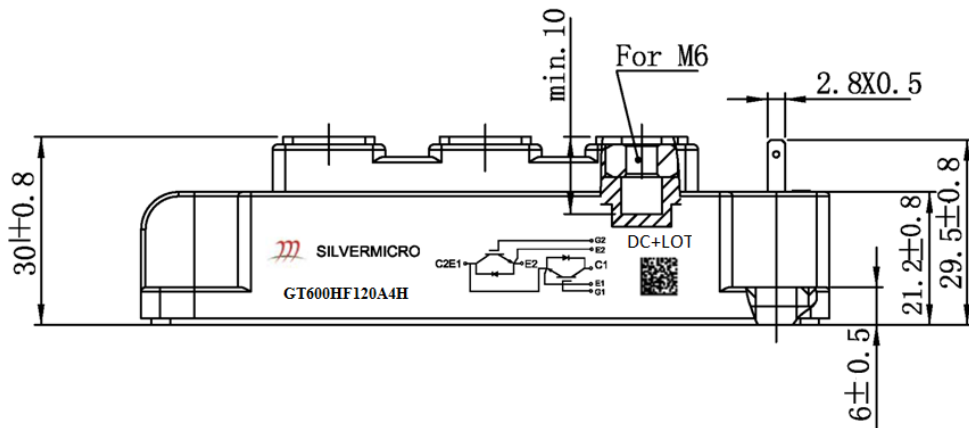


Fig.10 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit



Package Outline (Unit: mm):



Announcement

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