

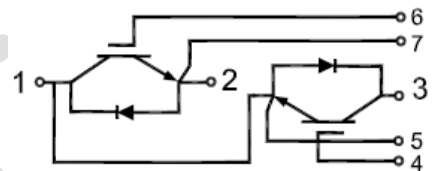
GTS200HF120T1WH

IGBT Module

Preliminary Data

Features:

- Field Stop Trench Gate IGBT
- Short Circuit Rated >10 μ s
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested(2 \times I_c)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- Welding
- HEV Inverter
- Industrial Motor Drives
- UPS

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		\pm 20	V
I _C	Continuous Collector Current	T _C =80 $^{\circ}$ C	200	A
		T _C =25 $^{\circ}$ C	400	A
I _{CM}	Repetitive Peak Collector Current	T _J =150 $^{\circ}$ C	400	A
t _{SC}	Short Circuit Withstand Time		>10	μ s
P _D	Maximum Power Dissipation per IGBT	T _C =25 $^{\circ}$ C T _{Jmax} =150 $^{\circ}$ C	919	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	$I_C = 1\text{mA}, V_{CE} = V_{GE}$	5.0	5.5	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 200\text{A}, V_{GE} = 15\text{V}$	$T_J=25^\circ\text{C}$	1.60		V
			$T_J=125^\circ\text{C}$	1.90		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	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}, T_J = 25^\circ\text{C}$			400	nA
C_{ies}	Input Capacitance			30.8		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		2.1		nF
C_{res}	Reverse Transfer Capacitance			1.4		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600\text{V}, I_C = 200\text{A}, R_{Gon} = 4.7\Omega, V_{GE} = \pm 15\text{V}, \text{Inductive Load}$	$T_J=25^\circ\text{C}$	0.68		μs
			$T_J=125^\circ\text{C}$	0.69		
t_r	Rise Time	$V_{CC} = 600\text{V}, I_C = 200\text{A}, R_{Gon} = 4.7\Omega, V_{GE} = \pm 15\text{V}, \text{Inductive Load}$	$T_J=25^\circ\text{C}$	0.15		μs
			$T_J=125^\circ\text{C}$	0.17		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC} = 600\text{V}, I_C = 200\text{A}, R_{Goff} = 4.7\Omega, V_{GE} = \pm 15\text{V}, \text{Inductive Load}$	$T_J=25^\circ\text{C}$	0.56		μs
			$T_J=125^\circ\text{C}$	0.61		
t_f	Fall Time	$V_{CC} = 600\text{V}, I_C = 200\text{A}, R_{Goff} = 4.7\Omega, V_{GE} = \pm 15\text{V}, \text{Inductive Load}$	$T_J=25^\circ\text{C}$	0.20		μs
			$T_J=125^\circ\text{C}$	0.21		
E_{on}	Turn-on Switching Loss	$V_{CC} = 600\text{V}, I_C = 200\text{A}, R_{Gon} = 4.7\Omega, V_{GE} = \pm 15\text{V}, di/dt=1059\text{A}/\mu\text{s} (T_J=125^\circ\text{C}) \text{ Inductive Load}$	$T_J=25^\circ\text{C}$	16.3		mJ
			$T_J=125^\circ\text{C}$	21.0		
E_{off}	Turn-off Switching Loss	$V_{CC} = 600\text{V}, I_C = 200\text{A}, R_{Goff} = 4.7\Omega, V_{GE} = \pm 15\text{V}, du/dt=4647\text{V}/\mu\text{s} (T_J=125^\circ\text{C}) \text{ Inductive Load}$	$T_J=25^\circ\text{C}$	14.7		mJ
			$T_J=125^\circ\text{C}$	18.7		
Q_g	Total Gate Charge	$V_{GE} = +15\text{V} \dots -15\text{V}$	$T_J=25^\circ\text{C}$	2.02		μC
RBSOA	$I_C=400\text{A}, V_{CC}=1050\text{V}, V_p=1200\text{V}, R_{Goff} = 4.7\Omega, V_{GE}=+15\text{V to } 0\text{V}, T_J = 150^\circ\text{C}$			Trapezoid		
SCSOA	$V_{CC}=600\text{V}, V_{GE}=15\text{V}, T_J = 150^\circ\text{C}$			10		μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case(per leg)			0.136		$^\circ\text{C}/\text{W}$

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	200	A
I_{FM}	Diode Maximum Forward Current	400	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	$I_F = 200\text{A}$	$T_J = 25^\circ\text{C}$	1.90		V
			$T_J = 125^\circ\text{C}$		2.00	
t_{rr}	Reverse Recovery Time		$T_J = 25^\circ\text{C}$	0.19		μs
			$T_J = 125^\circ\text{C}$		0.40	
I_{rr}	Peak Reverse Recovery Current	$I_F = 200\text{A}$, $-di_F/dt = 1373\text{A}/\mu\text{s}(T_J = 125^\circ\text{C})$, $V_R = 600\text{V}$, $V_{GE} = -15\text{V}$	$T_J = 25^\circ\text{C}$	105		A
			$T_J = 125^\circ\text{C}$		122	
Q_{rr}	Reverse Recovery Charge		$T_J = 25^\circ\text{C}$	11.5		μC
			$T_J = 125^\circ\text{C}$		22.2	
E_{rec}	Reverse Recovery Energy		$T_J = 25^\circ\text{C}$	4.7		mJ
			$T_J = 125^\circ\text{C}$		9.0	
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case (per leg)			0.210		$^\circ\text{C}/\text{W}$

Module

Symbol	Description	Min	Typ	Max	Unit
V _{iso}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500		V
T _J	Maximum Junction Temperature			150	°C
T _{JOP}	Maximum Operating Junction Temperature Range	-40		+150	°C
T _{stg}	Storage Temperature	-40		+125	°C
CTI	Comparative Tracking Index	200			
R _{θCS}	Case-To-Sink Thermally (Conductive Grease Applied)		0.05		°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		155		g

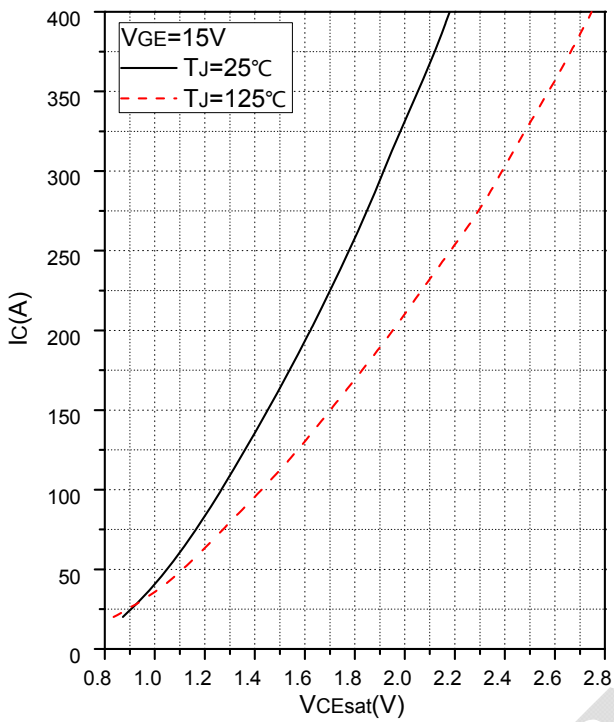


Fig.1 Typical Saturation Voltage Characteristics

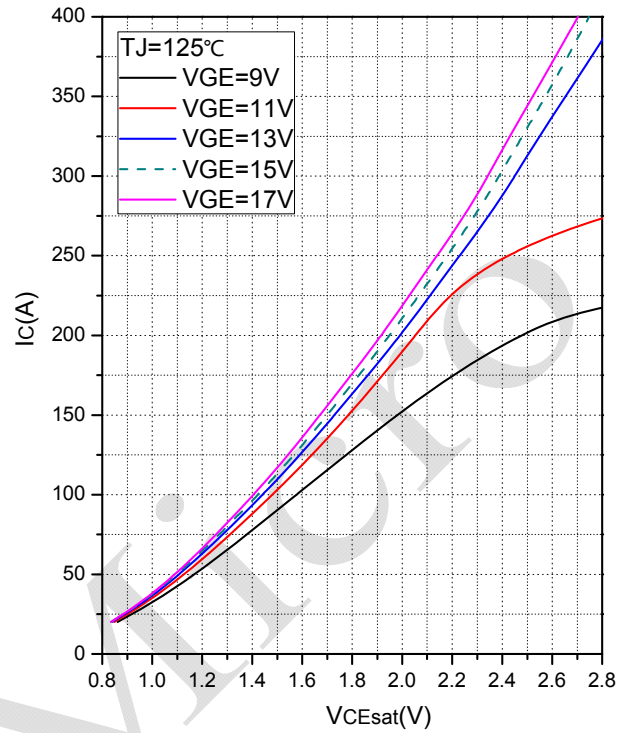


Fig.2 Typical Output Characteristics

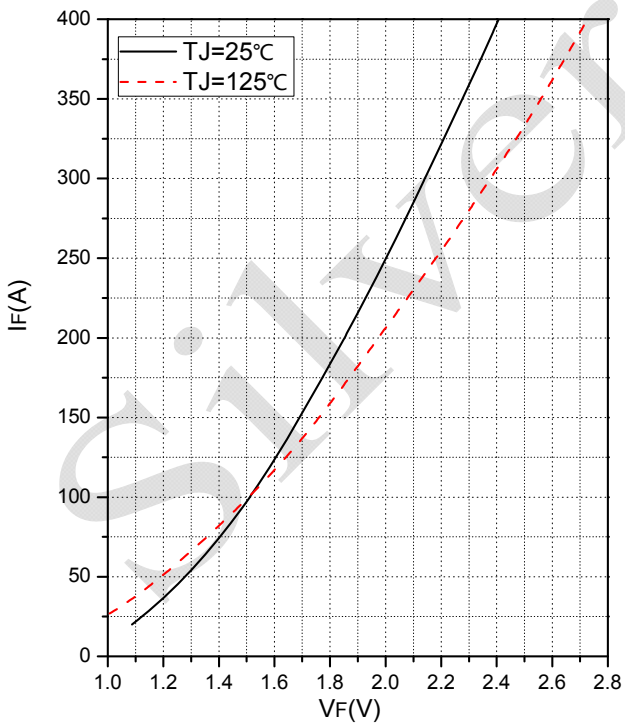


Fig.3 Forward Characteristics of Diode

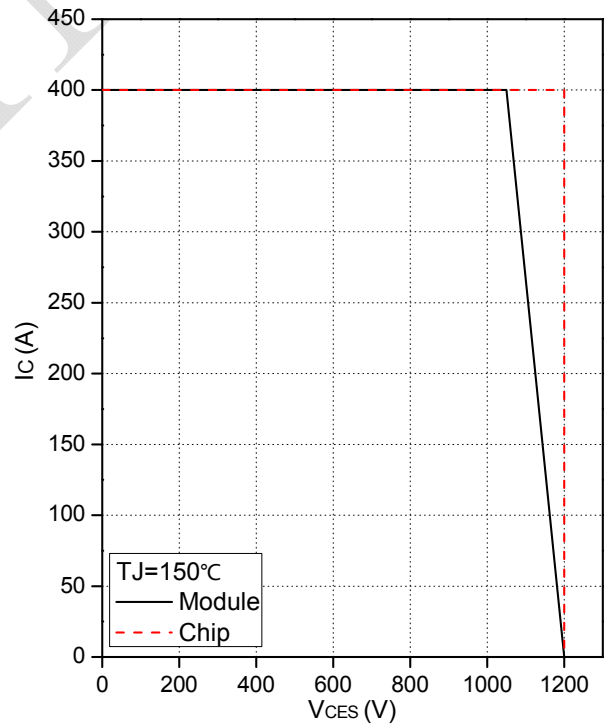


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

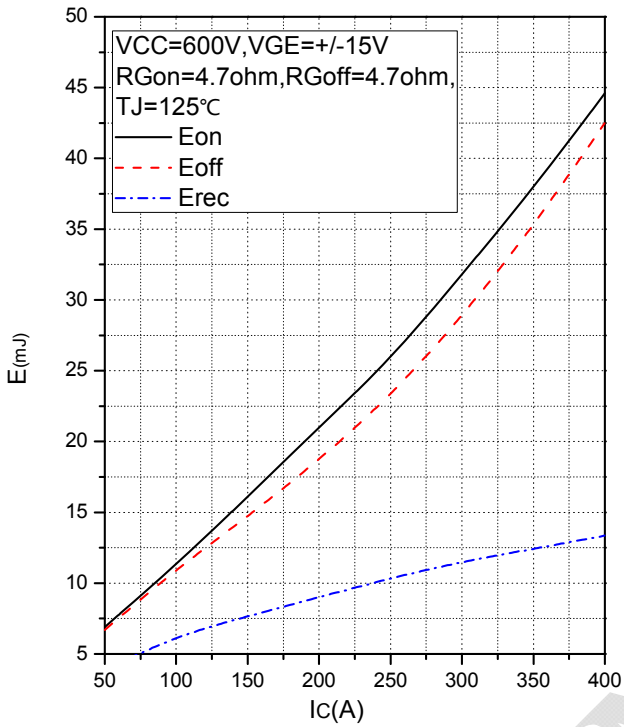


Fig.5 Typical Switching Loss vs. Collector Current

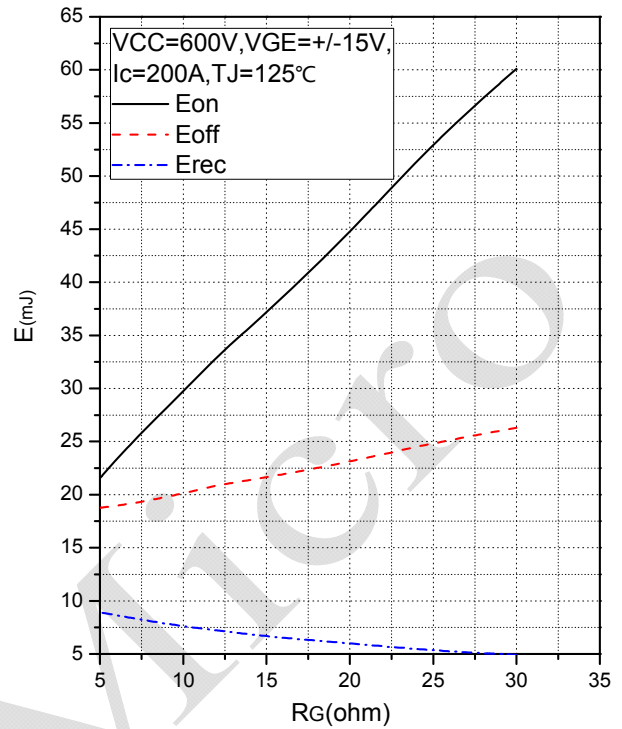


Fig.6 Typical Switching Loss vs. Gate Resistance

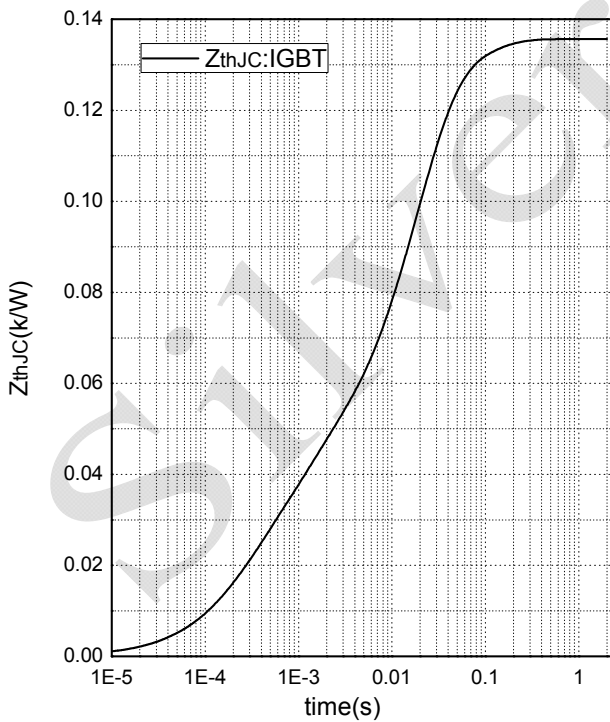


Fig.7 Transient Thermal Impedance (IGBT)

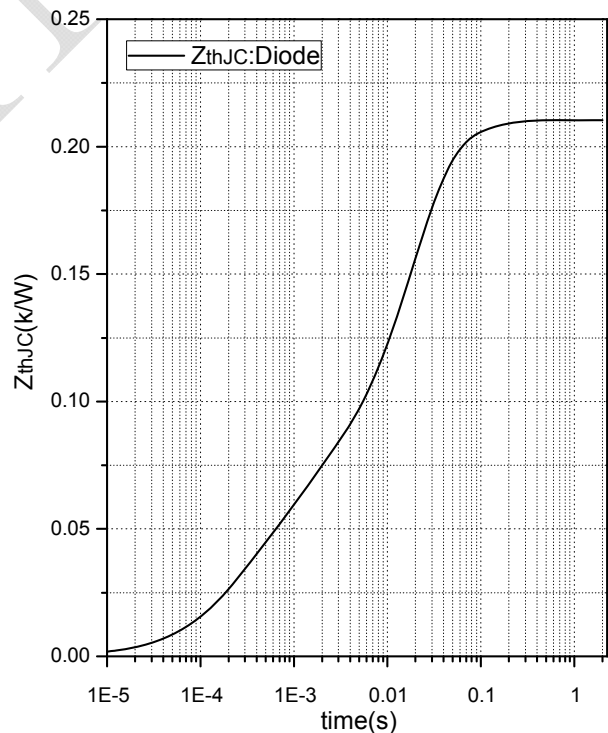
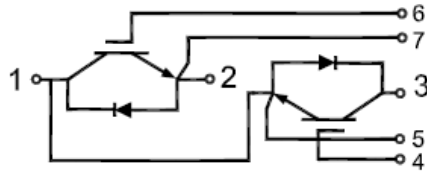
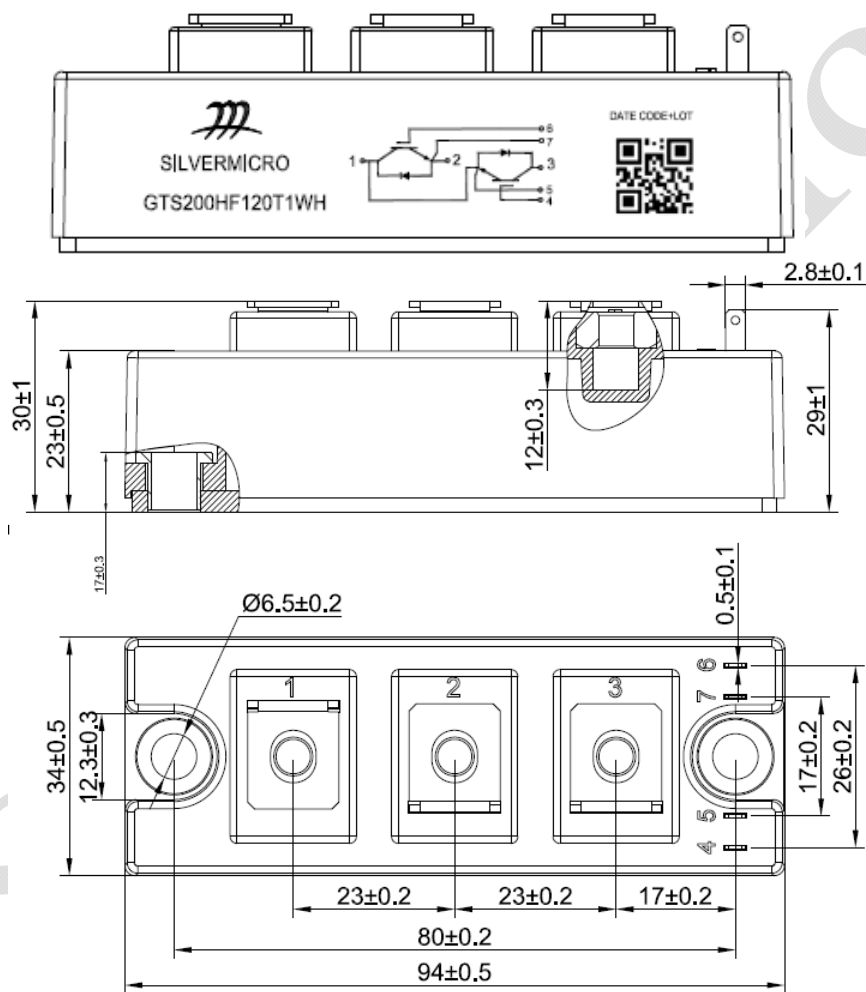


Fig.8 Transient Thermal Impedance (Diode)

Internal Circuit



Package Outline (Unit: mm):





Date	Revision	Notes
01/13/2020	01	Initial Release

Announcement

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