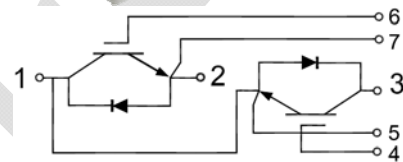


GT150HF120A5H-M

IGBT Module

Features:

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



Applications:

- Industrial Inverters
- Servo Applications
- EV/HEV

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

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_C=100^\circ\text{C}$	150	A
		$T_C=25^\circ\text{C}$	300	A
I_{CM}	Repetitive Peak Collector Current	$T_J=175^\circ\text{C}$	300	A
t_{SC}	Short Circuit Withstand Time		> 10	μs
P_D	Maximum Power Dissipation per IGBT	$T_C=25^\circ\text{C}$ $T_{Jmax}=175^\circ\text{C}$	1085	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	$I_C = 4\text{mA}, V_{CE} = V_{GE}$	5.0	5.7	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 150\text{A}, V_{GE} = 15\text{V}$	$T_J = 25^\circ\text{C}$	1.70	2.00	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	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		9.97		nF
C_{oes}	Output Capacitance			0.94		nF
C_{res}	Reverse Transfer Capacitance			0.64		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600\text{V}, I_C = 150\text{A}, R_{Gon} = 3.3\Omega, V_{GE} = \pm 15\text{V},$ Inductive Load	$T_J = 25^\circ\text{C}$	245		ns		
			$T_J = 125^\circ\text{C}$	234				
t_r	Rise Time		$T_J = 25^\circ\text{C}$	84		ns		
			$T_J = 125^\circ\text{C}$	85				
$t_{d(off)}$	Turn-off Delay Time		$V_{CC} = 600\text{V}, I_C = 150\text{A}, R_{Goff} = 3.3\Omega, V_{GE} = \pm 15\text{V},$ Inductive Load	$T_J = 25^\circ\text{C}$	263		ns	
				$T_J = 125^\circ\text{C}$	271			
t_f	Fall Time	$T_J = 25^\circ\text{C}$		178		ns		
		$T_J = 125^\circ\text{C}$		213				
E_{on}	Turn-on Switching Loss	$V_{CC} = 600\text{V}, I_C = 150\text{A}, R_{Gon} = 3.3\Omega, V_{GE} = \pm 15\text{V},$ $di/dt = 1492\text{A}/\mu\text{s} (T_J = 125^\circ\text{C}),$ Inductive Load		$T_J = 25^\circ\text{C}$	10.1		mJ	
				$T_J = 125^\circ\text{C}$	12.5			
E_{off}	Turn-off Switching Loss		$V_{CC} = 600\text{V}, I_C = 150\text{A}, R_{Goff} = 3.3\Omega, V_{GE} = \pm 15\text{V},$ $du/dt = 4367\text{V}/\mu\text{s} (T_J = 125^\circ\text{C}),$ Inductive Load	$T_J = 25^\circ\text{C}$	8.4		mJ	
				$T_J = 125^\circ\text{C}$	13.5			
Q_g	Total Gate Charge			$V_{GE} = +15\text{V} \dots -15\text{V}$	$T_J = 25^\circ\text{C}$	728		nC
RBSOA	Reverse Bias Safe Operation Area			$I_C = 300\text{A}, V_{CC} = 1050\text{V}, V_p = 1200\text{V}, R_{Goff} = 3.3\Omega, V_{GE} = +15\text{V to } 0\text{V}, T_J = 150^\circ\text{C}$	Trapezoid			
SC Data	$V_{CC} = 600\text{V}, t_p = 10\mu\text{s}, V_{GE} = \pm 15\text{V}, R_{Gon} = 4.7\Omega, R_{Goff} = 4.7\Omega, T_J = 25^\circ\text{C}$				775		A	
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.138		$^\circ\text{C}/\text{W}$	

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	150	A
I_{FM}	Diode Maximum Forward Current	300	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	$I_F = 150\text{A}$	$T_J=25^\circ\text{C}$	1.75		V	
			$T_J=125^\circ\text{C}$		1.85		
t_{rr}	Reverse Recovery Time	$I_F=150\text{A}$, $-di_F/dt = 1200\text{A}/\mu\text{s}(T_J=125^\circ\text{C})$, $V_{rr} = 600\text{V}$, $V_{GE} = -15\text{V}$	$T_J=25^\circ\text{C}$	267		ns	
			$T_J=125^\circ\text{C}$		415		
I_{rr}	Peak Reverse Recovery Current		$T_J=25^\circ\text{C}$		78	A	
			$T_J=125^\circ\text{C}$		98		
Q_{rr}	Reverse Recovery Charge		$T_J=25^\circ\text{C}$		9.18	μC	
			$T_J=125^\circ\text{C}$		17.9		
E_{rec}	Reverse Recovery Energy		$T_J=25^\circ\text{C}$		3.2	mJ	
			$T_J=125^\circ\text{C}$		6.4		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case			0.212		$^\circ\text{C}/\text{W}$	

Module

Symbol	Description	Conditions	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
CTI	Comparative Tracking Index		200			
R _{eCS}	Case-To-Sink Thermally (Conductive Grease Applied)			0.10		°C/W
T	Power Terminals Screw:M5		4.0		6.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			200		g

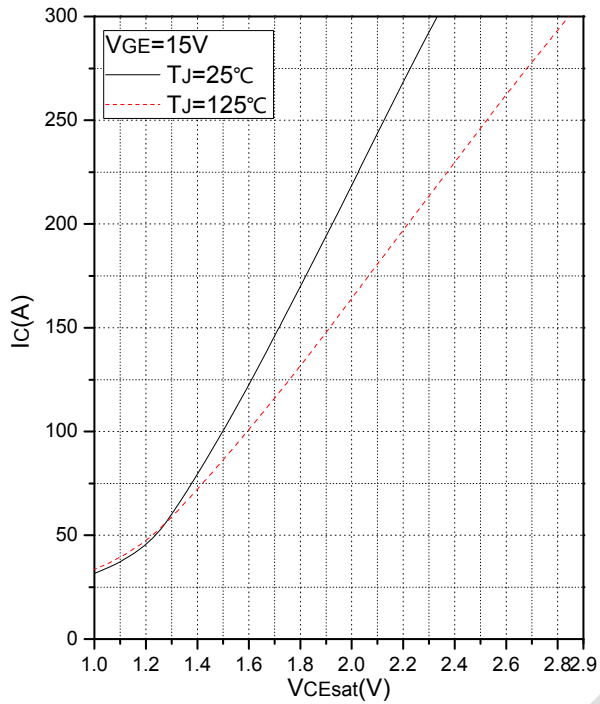


Fig.1 Typical Saturation Voltage Characteristics

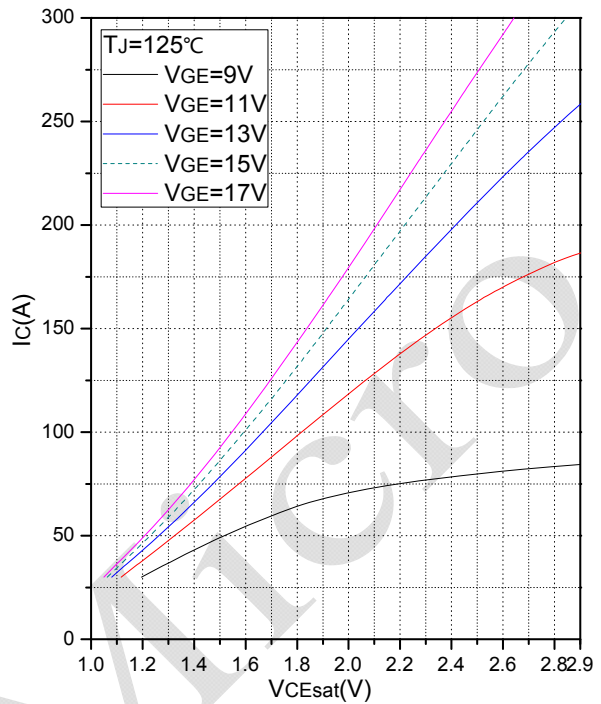


Fig.2 Typical Output Characteristics

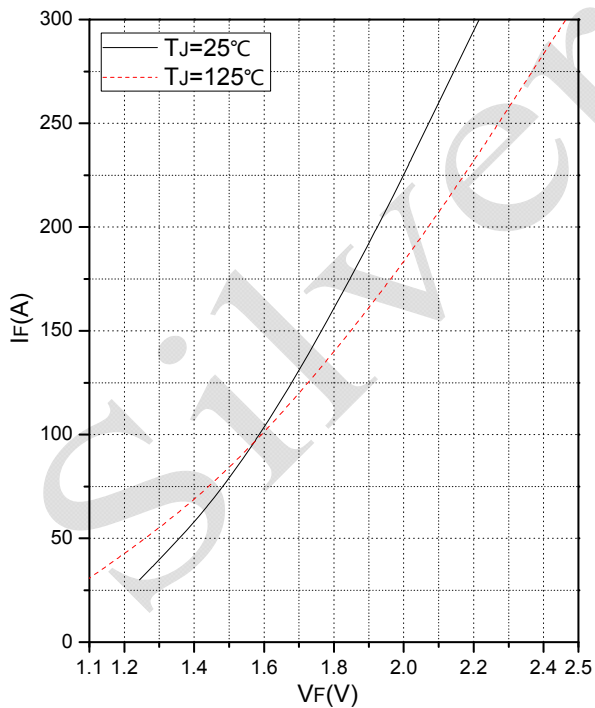


Fig.3 Forward Characteristics of Diode

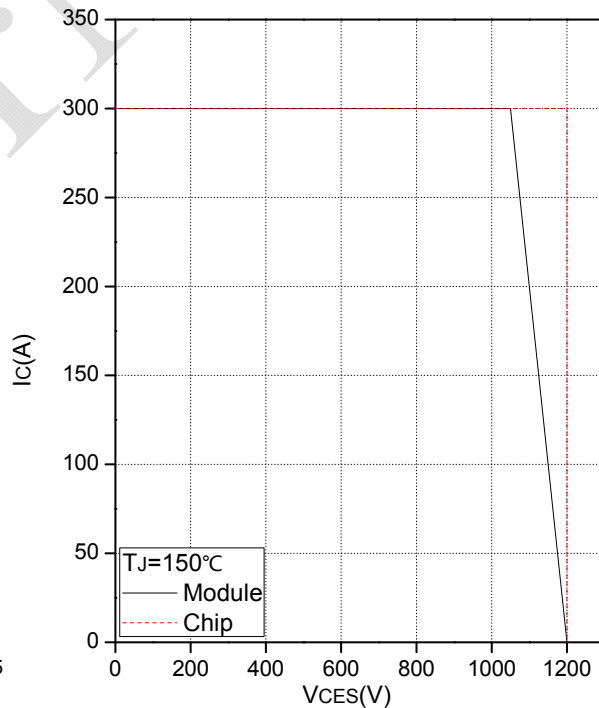


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

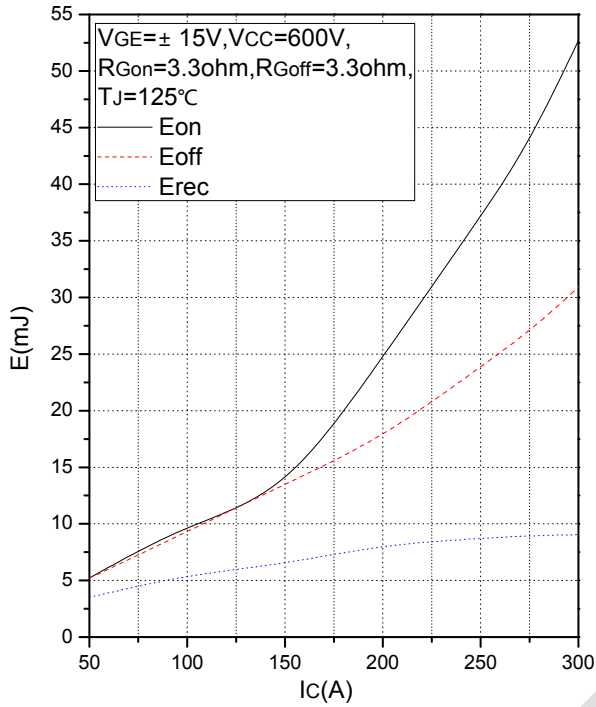


Fig.5 Typical Switching Loss vs. Collector Current

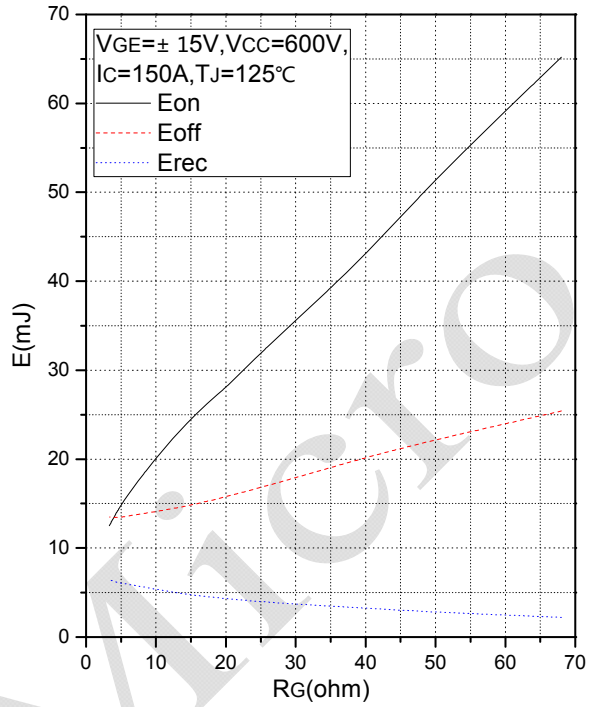


Fig.6 Typical Switching Loss vs. Gate Resistance

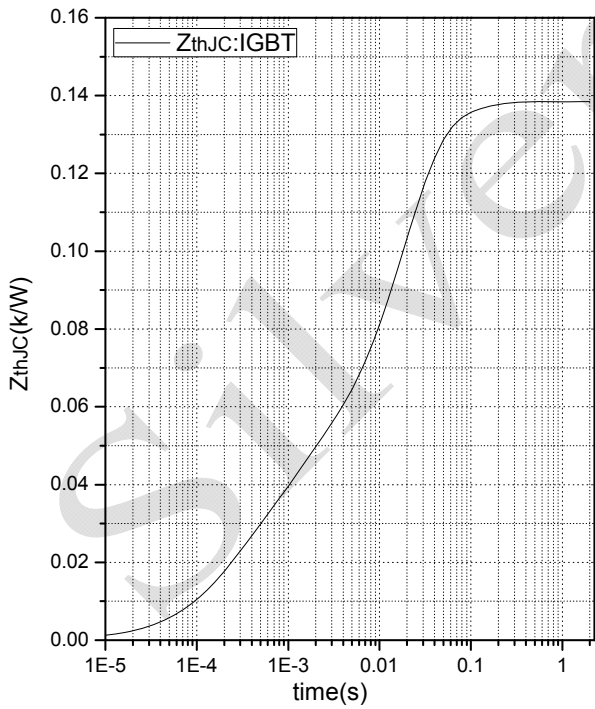


Fig.7 Transient Thermal Impedance (IGBT)

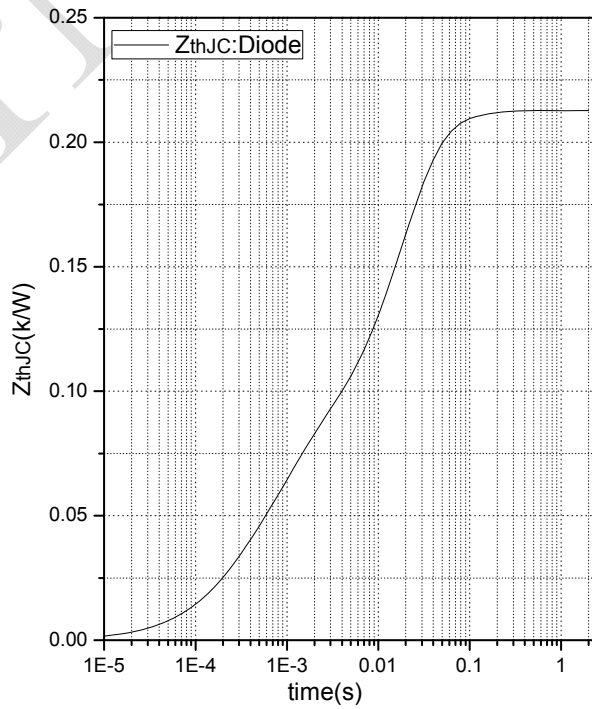


Fig.8 Transient Thermal Impedance (Diode)

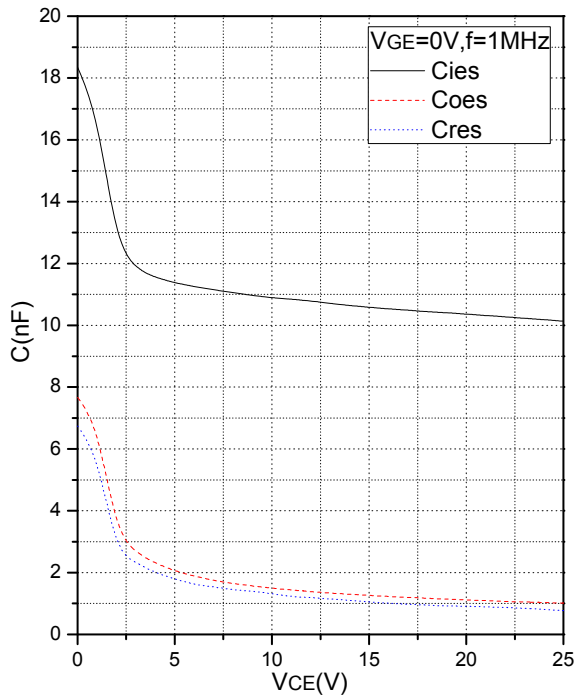
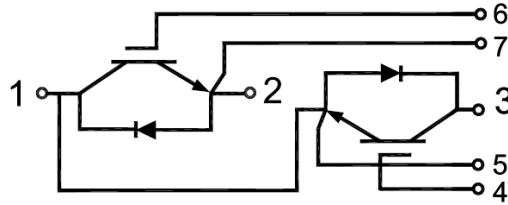


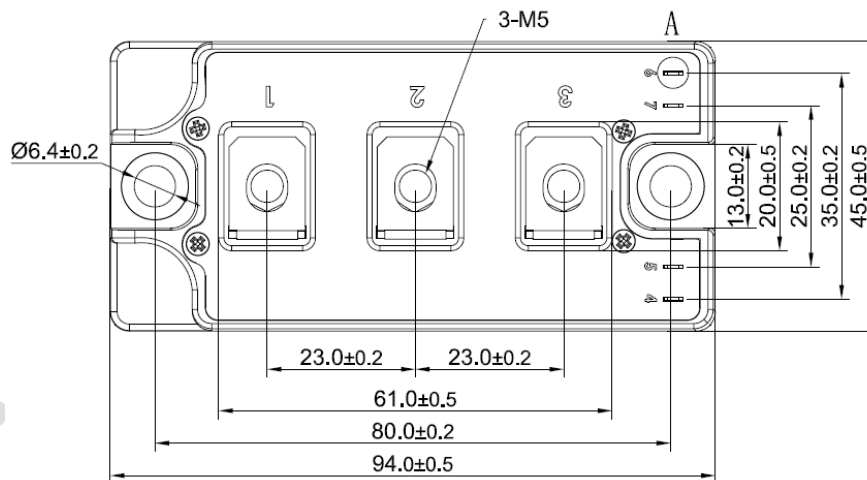
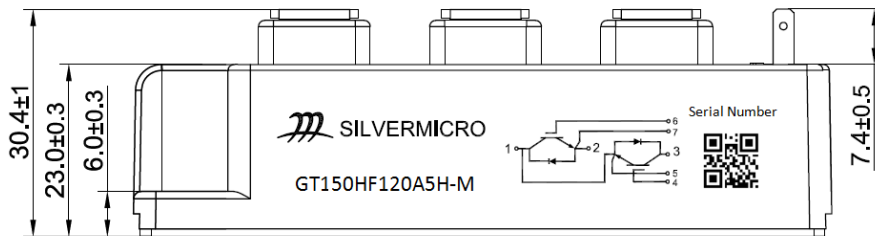
Fig.9 Capacitance Characteristics

SilverMicro

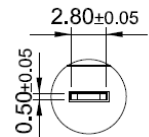
Internal Circuit



Package Outline (Unit: mm):



View A
scale 3:1





Date	Revision	Notes
03/12/2019	A	Final release

Announcement

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