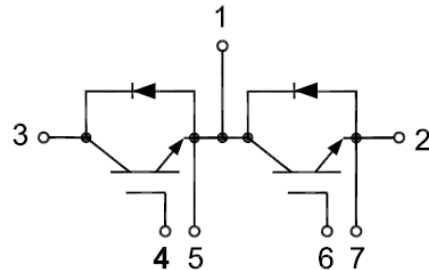


SYMT150HF120T1VH

IGBT Module

Features:

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



Applications:

- Welding Machine、Cutting Machine
- Plating Power Supply、Induction Heating
- SMPS、UPS

Maximum Rated Values of IGBT (T_C=25°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°C	150	A
		T _C = 25°C	300	A
I _{CM}	Repetitive Peak Collector Current	T _J = 175°C	300	A
t _{sc}	Short Circuit Withstand Time		>10	μs
P _D	Maximum Power Dissipation per IGBT	T _C = 25°C T _{Jmax} =175°C	1085	W



Electrical Characteristics of IGBT (T_C=25°C unless otherwise specified)

Static Characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
V _{GE(th)}	Gate-Emitter Threshold Voltage	I _C = 4mA, V _{CE} = V _{GE}	5.0	5.7	6.6	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C = 150A, V _{GE} = 15V	T _J = 25°C	1.70	2.00	V
			T _J = 125°C	1.90		V
I _{CES}	Collector-Emitter Leakage Current	V _{GE} = 0V, V _{CE} = V _{CES} , T _J = 25°C			1	mA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} = ±20V, V _{CE} = 0V, T _J = 25°C			400	nA
C _{ies}	Input Capacitance	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz		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} = 600V, I _C = 150A, R _{Gon} = 3.3Ω, V _{GE} = ±15V, Inductive Load	T _J = 25°C	245		ns
			T _J = 125°C	234		
t _r	Rise Time		T _J = 25°C	84		ns
			T _J = 125°C	85		
t _{d(off)}	Turn-off Delay Time	V _{CC} = 600V, I _C = 150A, R _{Goff} = 3.3Ω, V _{GE} = ±15V, Inductive Load	T _J = 25°C	263		ns
			T _J = 125°C	271		
t _f	Fall Time		T _J = 25°C	178		ns
			T _J = 125°C	213		
E _{on}	Turn-on Switching Loss	V _{CC} = 600V, I _C = 150A, R _{Gon} = 3.3Ω, V _{GE} = ±15V, di/dt = 1492A/μs (T _J = 125°C), Inductive Load	T _J = 25°C	10.1		mJ
			T _J = 125°C	12.5		
E _{off}	Turn-off Switching Loss		T _J = 25°C	8.4		mJ
			T _J = 125°C	13.5		
Q _g	Total Gate Charge	V _{GE} = +15V...-15V	T _J = 25°C	728		nC
R _{g internal}	Internal Gate Resistance		T _J = 25°C	5		Ω
RBSOA	Reverse Bias Safe Operation Area	I _C = 300A, V _{CC} = 1050V, V _p = 1200V, R _{Goff} = 3.3Ω, V _{GE} = +15V to 0V, T _J = 150°C	Trapezoid			
SC Data	V _{CC} = 600V, t _p = 10μs, V _{GE} = ±15V, R _{Gon} = 4.7ohm, R _{Goff} = 4.7ohm, T _J = 25°C		775			A
R _{θJC}	IGBT Thermal Resistance: Junction-To-Case			0.138		°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	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		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 _{θCS}	Case-To-Sink Thermally (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			165		g

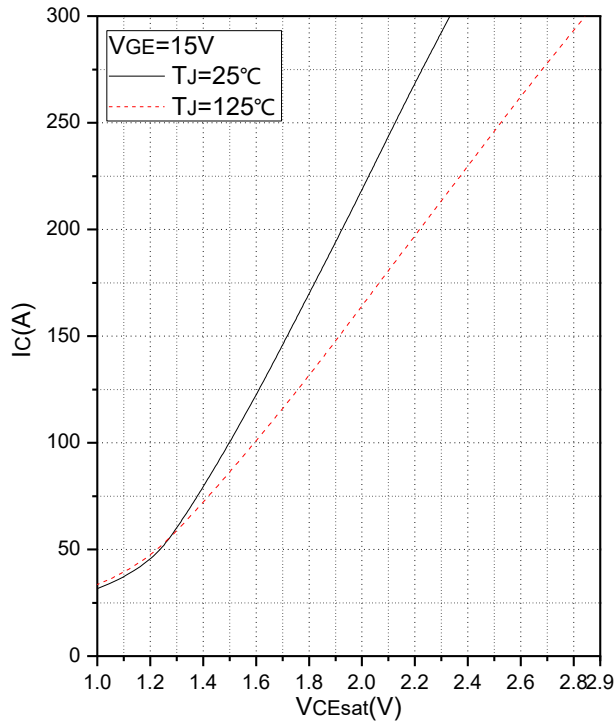


Fig.1 Typical Saturation Voltage Characteristics

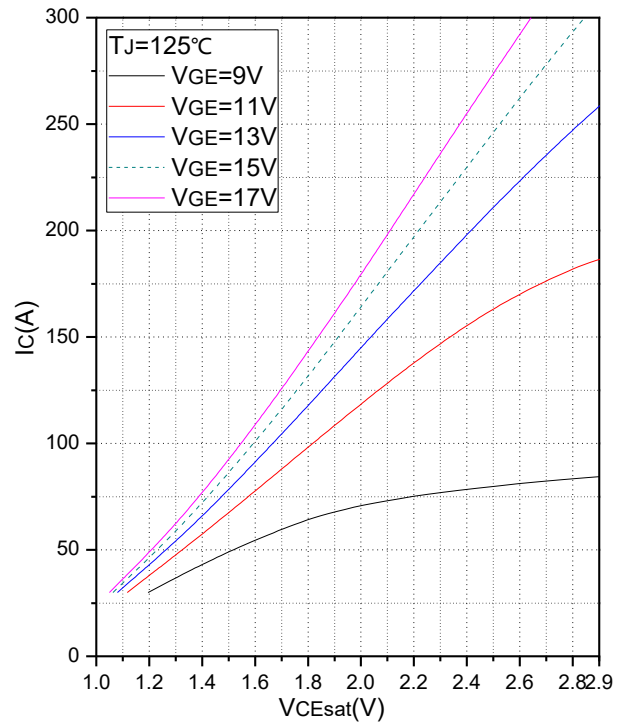


Fig.2 Typical Output Characteristics

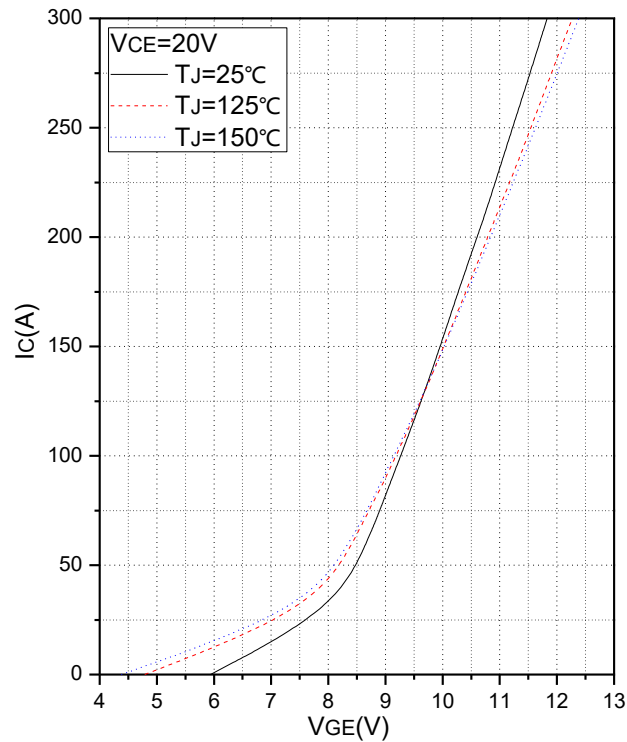


Fig.3 Transfer Characteristic

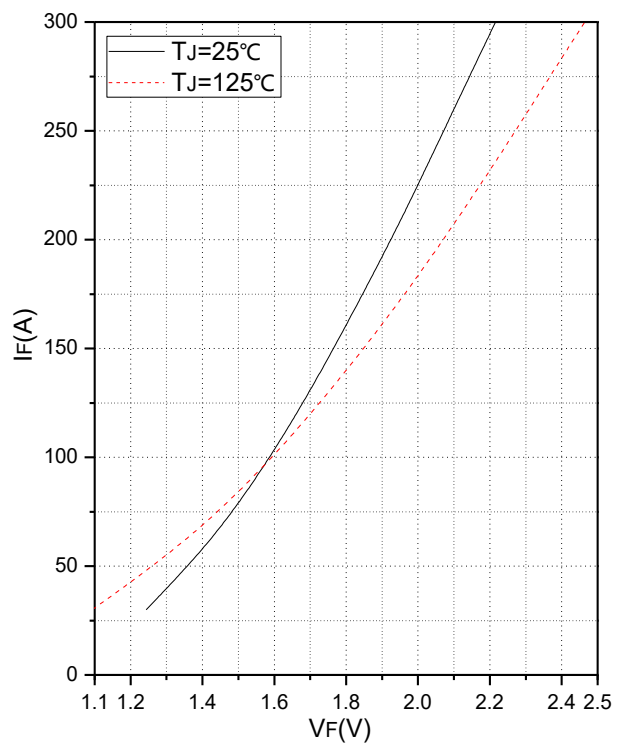


Fig.4 Forward Characteristics of Diode

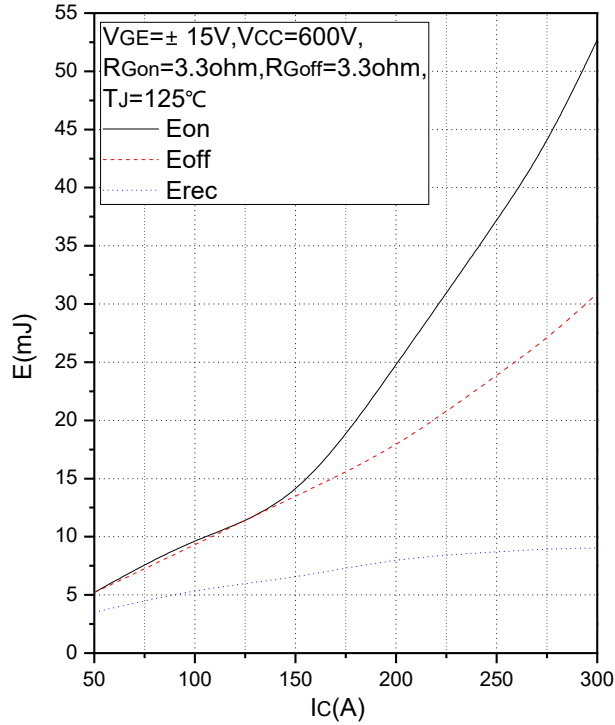


Fig.5 Typical Switching Loss vs. Collector Current

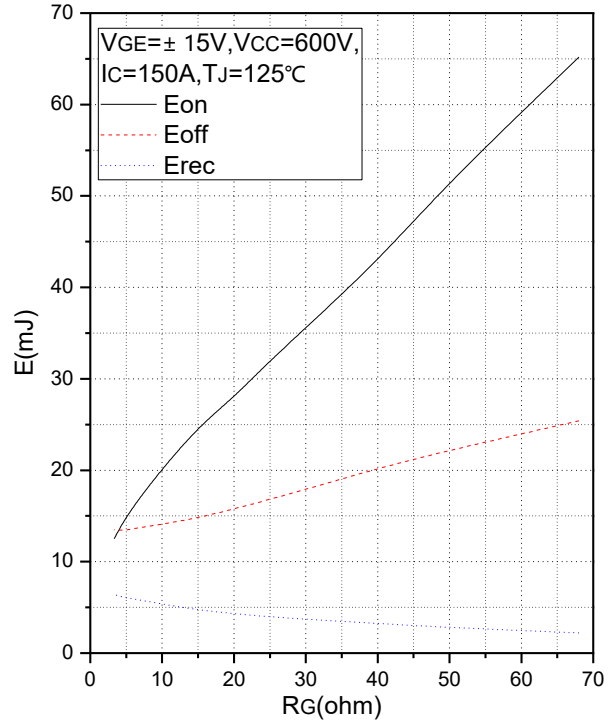


Fig.6 Typical Switching Loss vs. Gate Resistance

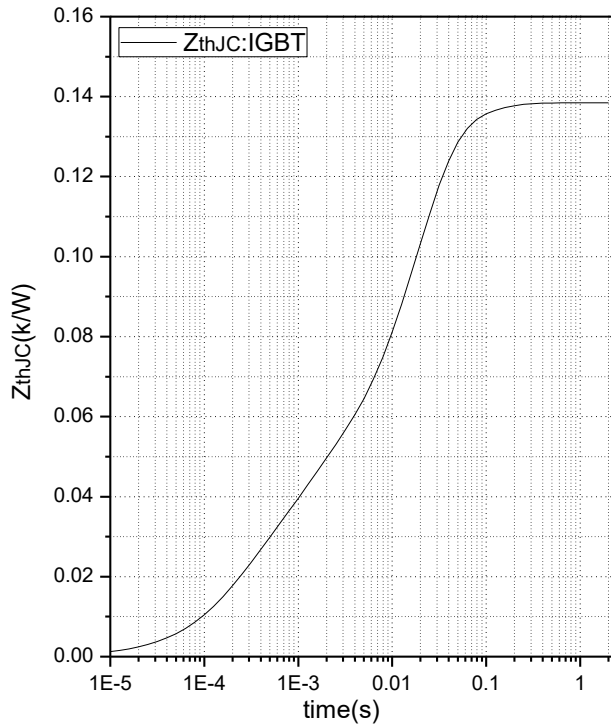


Fig.7 Transient Thermal Impedance (IGBT)

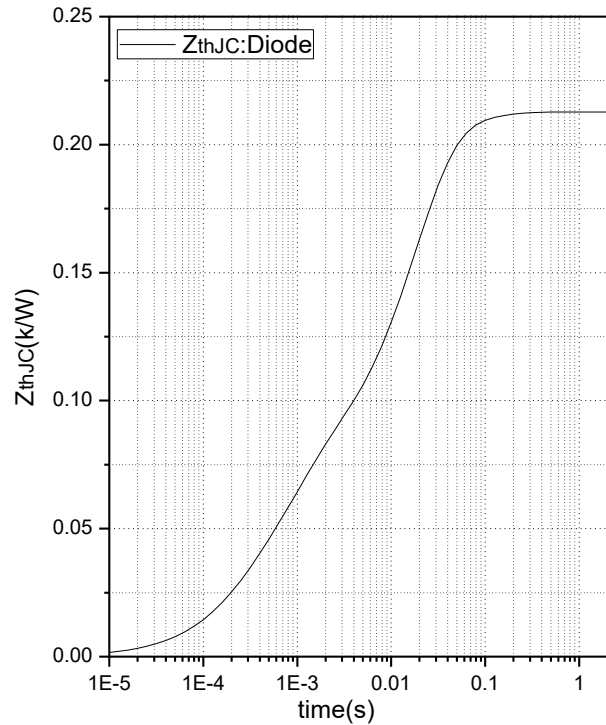


Fig.8 Transient Thermal Impedance (Diode)

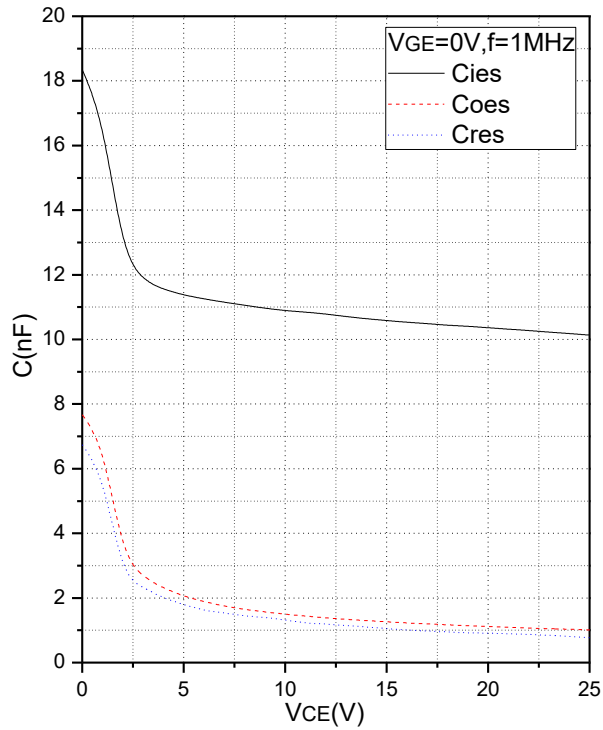


Fig.9 Capacitance Characteristics

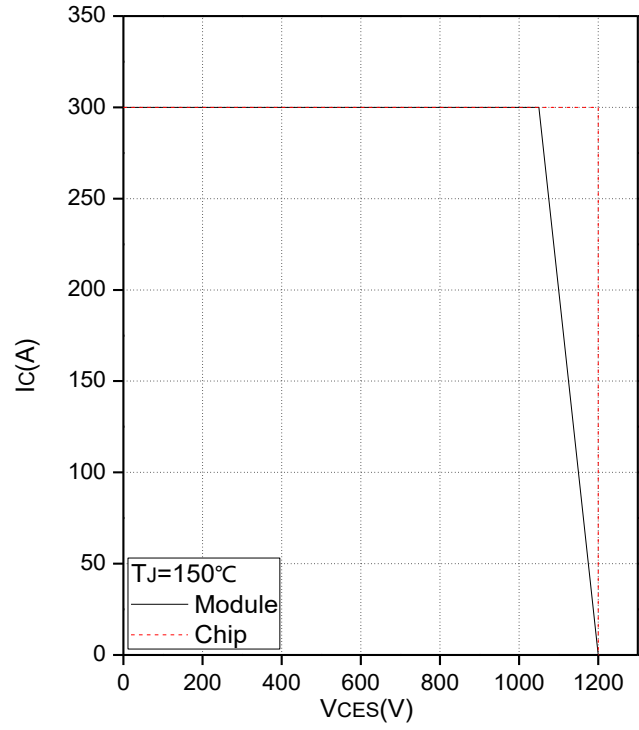
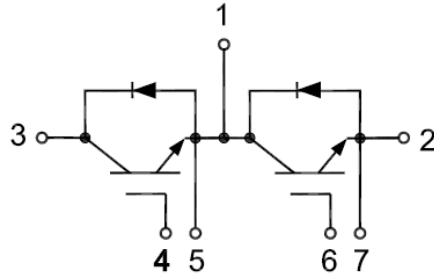


Fig.10 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit



Package Outline (Unit: mm):

