

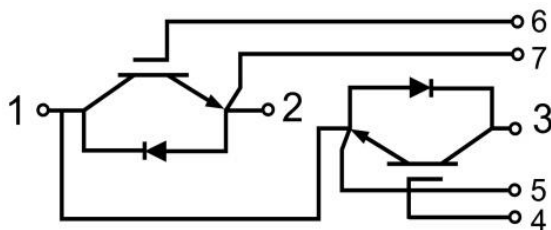
SYMT100HF170T1VH

IGBT Module



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:

- Industrial Inverters
- Servo Applications
- UPS Systems
- Wind Turbines

IGBT, Inverter

Maximum Rated Values (T_C=25°C unless otherwise specified)

V _{CES}	Collector-Emitter Blocking Voltage		1700	V
V _{GES}	Gate-Emitter Voltage		±20	V
I _C	Continuous Collector Current	T _C =100°C	100	A
		T _C =25°C	200	A
I _{CM}	Peak Collector Current Repetitive	t _p =1ms	200	A
P _D	Maximum Power Dissipation (IGBT)	T _C =25°C T _{Jmax} =175°C	712	W

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

Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=6\text{mA}$, $V_{CE}=V_{GE}$	5.1	6.0	6.9	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=100\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.80	2.10	V
			$T_J=125^{\circ}\text{C}$	2.10		V
			$T_J=150^{\circ}\text{C}$	2.20		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0\text{V}$, $V_{CE}=V_{CES}$, $T_J=25^{\circ}\text{C}$			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	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		9.92		nF
C_{oes}	Output Capacitance			0.65		nF
C_{res}	Reveres Transfer Capacitance			0.27		nF

Switching Characteristics

t _{d(on)}	Turn-on Delay Time	V _{CC} =900V, I _C =100A, R _{Gon} =10Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		572		ns
			T _J =125℃		583		
			T _J =150℃		627		
t _r	Rise Time		T _J =25℃		97		ns
			T _J =125℃		99		
			T _J =150℃		99		
t _{d(off)}	Turn-off Delay Time	V _{CC} =900V, I _C =100A, R _{Goff} =10Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		385		ns
			T _J =125℃		415		
			T _J =150℃		420		
t _f	Fall Time		T _J =25℃		584		ns
			T _J =125℃		820		
			T _J =150℃		901		
E _{on}	Turn-on Switching Loss	V _{CC} =900V, I _C =100A, R _{Gon} =10Ω, V _{GE} =±15V, di/dt=845A/μs(T _J =150℃), Inductive Load	T _J =25℃		17.1		mJ
			T _J =125℃		22.8		
			T _J =150℃		23.9		

E _{off}	Turn-off Switching Loss	V _{CC} =900V, I _C =100A, R _{Goff} =10Ω, V _{GE} =±15V, du/dt=3653V/μs(T _J =150°C), Inductive Load	T _J =25°C		19.3		mJ
			T _J =125°C		27.0		
			T _J =150°C		30.0		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		1075		nC
R _{G(int)}	Internal Gate Resistor		T _J =25°C		1		Ω
I _{SC}	V _{CC} =900V, V _{GE} =±5V, R _{Gon} =10Ω, R _{Goff} =10Ω, T _J =150°C				480		A
R _{θJC}	Thermal Resistance: Junction-To-Case (per IGBT)					0.21	°C/W

Diode, Inverter

Maximum Rated Values (T_C=25°C unless otherwise specified)

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1700	V
I _F	Diode Continuous Forward Current	T _C =100°C	100	A
I _{FM}	Peak FWD Current Repetitive	t _p =1ms	200	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =100A	T _J =25°C		2.00		V
			T _J =125°C		2.20		
			T _J =150°C		2.15		
t _{rr}	Reverse Recovery Time	I _F =100A, -diF/dt=1235A/μs(T _J =150°C), V _R =900V, V _{GE} =-15V	T _J =25°C		311		ns
			T _J =125°C		596		
			T _J =150°C		665		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		96.9		A
			T _J =125°C		121.9		
			T _J =150°C		129.7		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		12.6		μC
			T _J =125°C		24.8		
			T _J =150°C		28.7		

E _{rec}	Reverse Recovery Energy	I _F =100A, -diF/dt=1235A/μs(T _J =150°C), V _R =900V, V _{GE} =-15V	T _J =25°C		6.64		mJ
			T _J =125°C		14.42		
			T _J =150°C		16.87		
R _{θJC}	Thermal Resistance: Junction-To-Case (per Diode)					0.38	°C/W

Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 30s	4500			V
T _J	Maximum Junction Temperature				175	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+150	°C
T _{stg}	Storage Temperature		-40		+150	°C
CTI	Comparative Tracking Index		200			
R _{θCS}	Case-To-Sink Thermally (Conductive Grease Applied)				0.07	°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

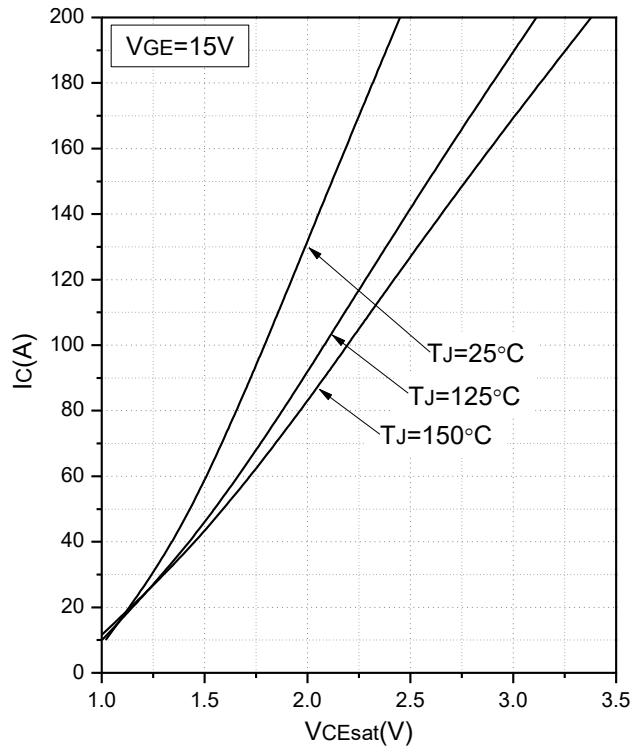


Fig.1 Typical Saturation Voltage Characteristics

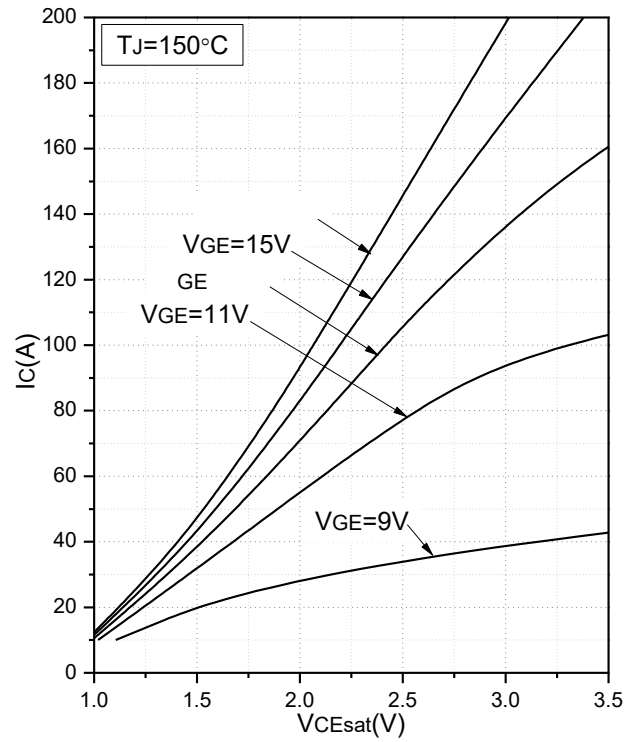


Fig.2 Typical Output Characteristics

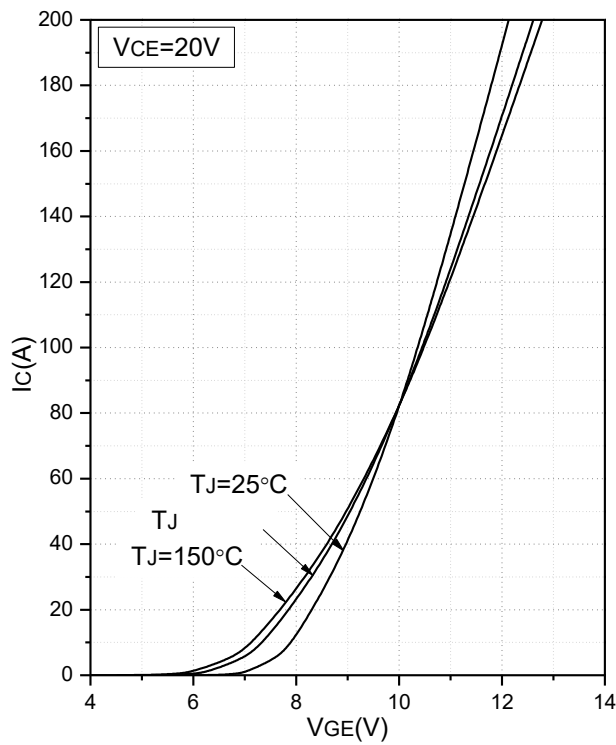


Fig.3 Transfer Characteristics

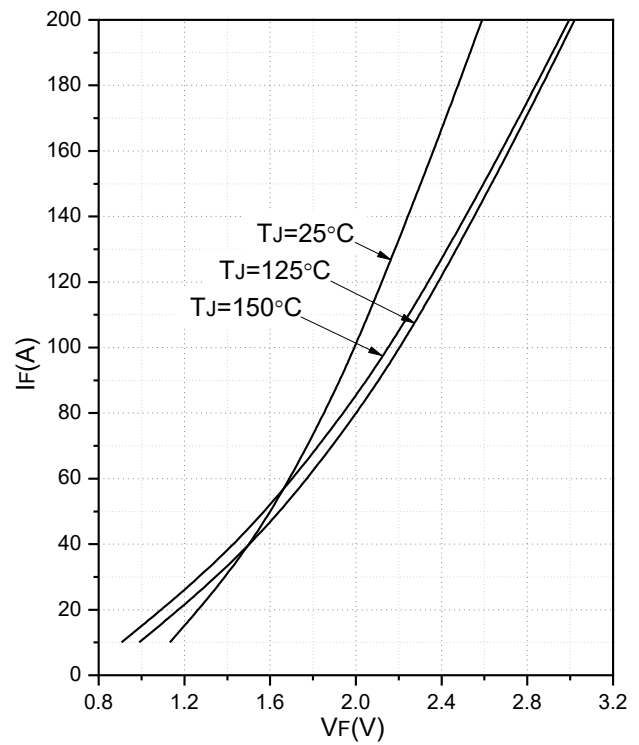


Fig.4 Forward Characteristics of Diode

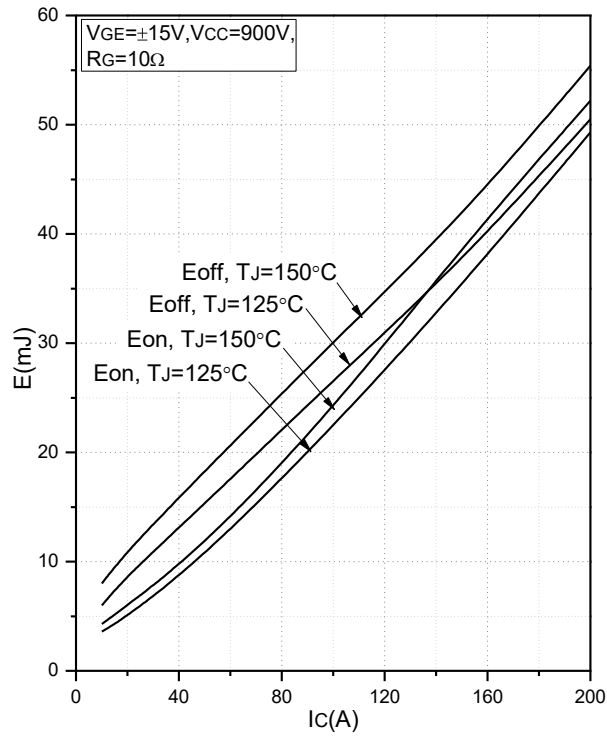


Fig.5 Typical Switching Loss vs. Collector Current

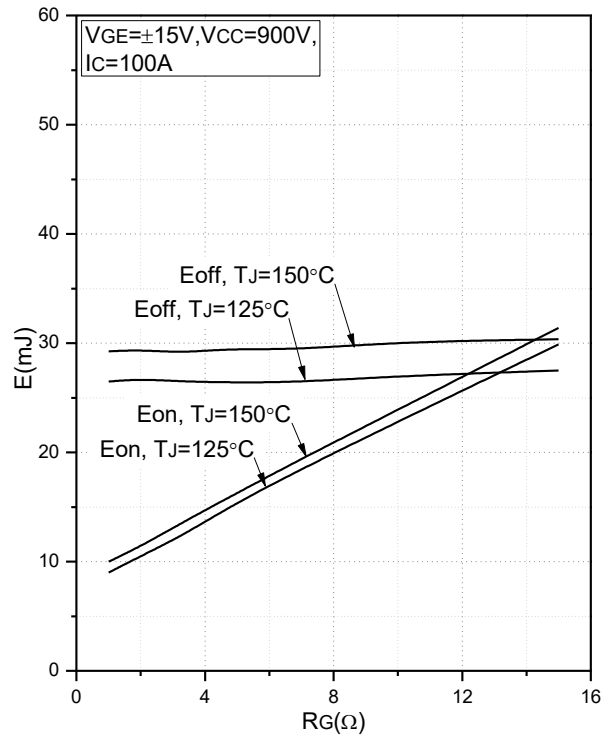


Fig.6 Typical Switching Loss vs. Gate Resistance

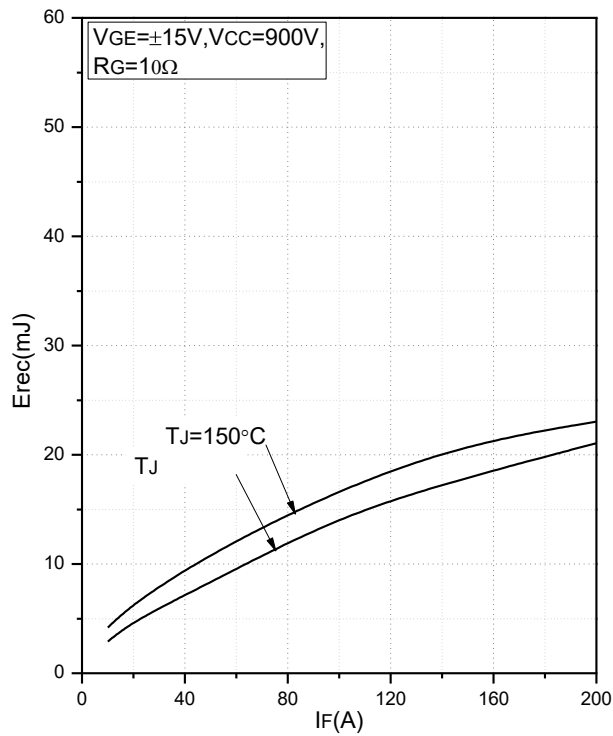


Fig.7 Typical Switching Loss vs. Forward Current

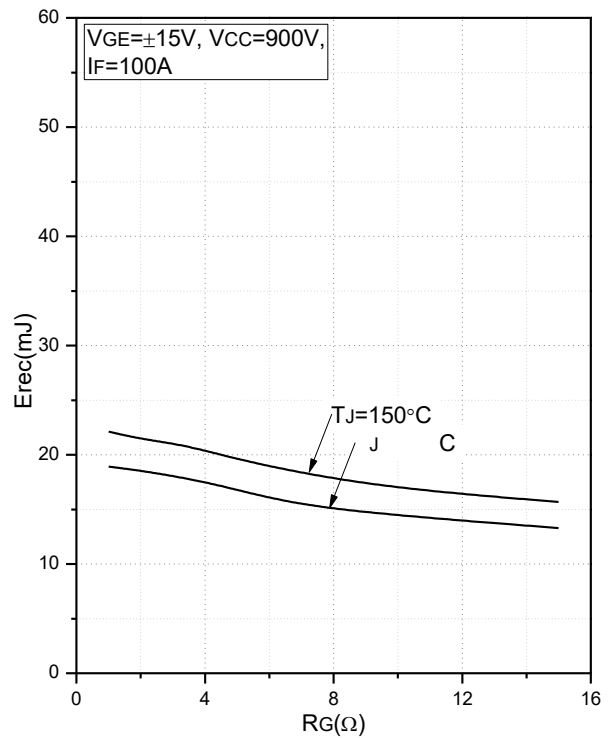


Fig.8 Typical Switching Loss vs. Gate Resistance

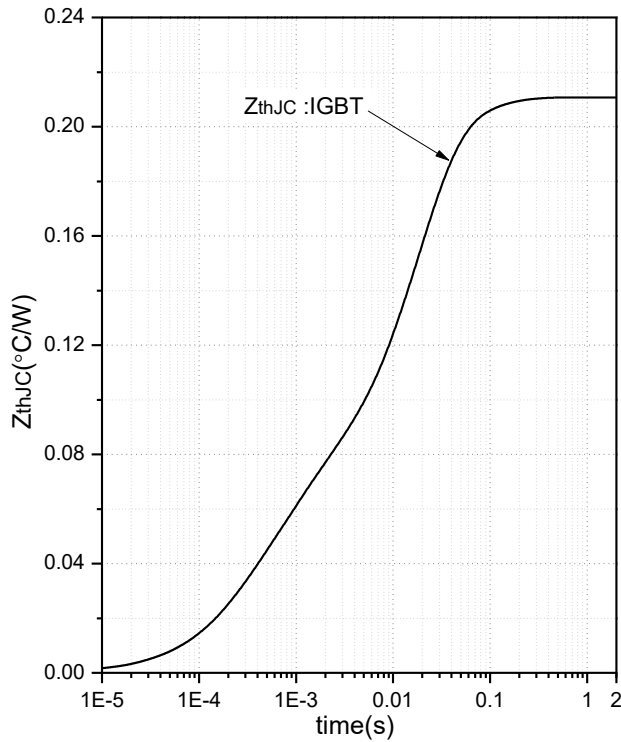


Fig.9 Transient Thermal Impedance

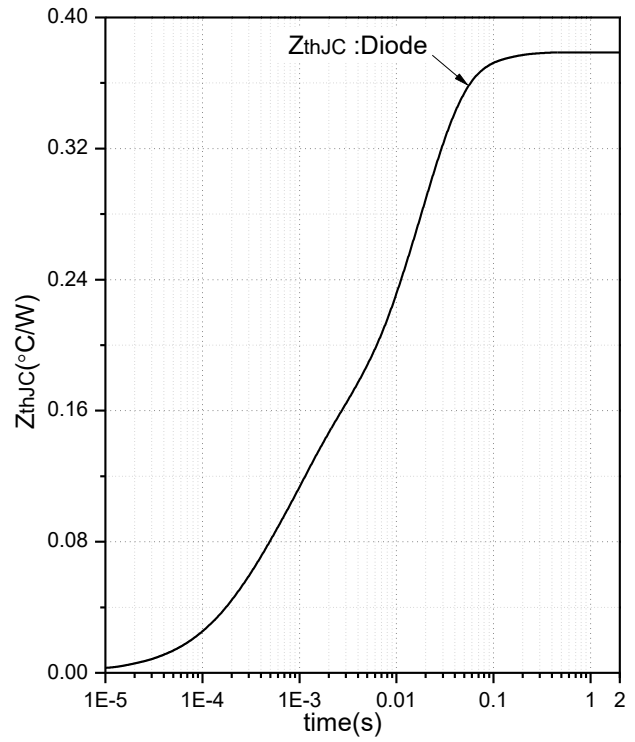


Fig.10 Transient Thermal Impedance

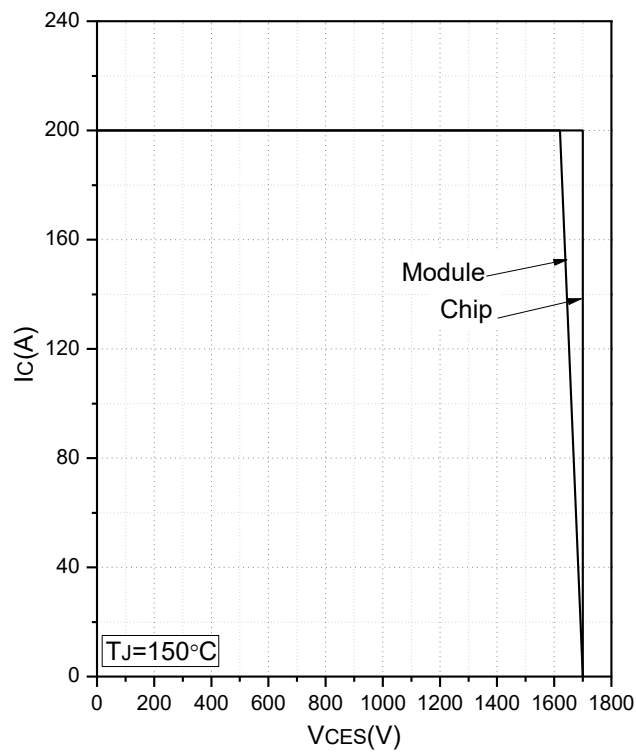
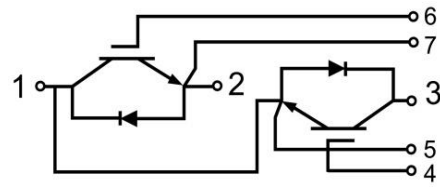


Fig.11 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit:



Package Outline (Unit: mm):

