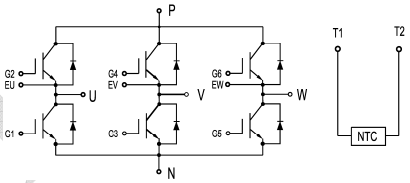
GT10FF120A1H

IGBT Module

Preliminary Data

Features：

- Short Circuit Rated 10μs
- Low Saturation Voltage: VCE (sat) = 1.90V @ IC = 10A , TC=25℃
- Low Switching Loss
- 100% RBSOA Tested（2×Ic）
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications：

- Industrial Inverters
- Servo Applications

IGBT, Inverter

Maximum Rated Values(T_C=25℃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℃,	10	A
		T_C = 25℃	20	A
I_{CM}	Peak Collector Current Repetitive	T_J = 175℃	20	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation (IGBT)	T_C = 25℃ T_{Jmax}=175℃	144	W

Electrical Characteristics of IGBT (T_C=25℃Unless otherwise specified)

Static characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C = 1 mA, V_{CE} = V_{GE}		3.0	6.25	6.5	V
$V_{CE(sat)}$ (Terminal)	Collector-Emitter Saturation Voltage	I_C = 10 A, V_{GE} = 15V	T_J = 25℃		2.20	2.50	V
			T_J = 125℃		2.60		V
			T_J = 150℃		2.70		V
$V_{CE(sat)}$ (Chip)	Collector-Emitter Saturation Voltage	I_C = 10 A, V_{GE} = 15V	T_J = 25℃		1.90	2.10	V
			T_J = 125℃		2.20		V
			T_J = 150℃		2.30		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE} = 0V, V_{CE} = V_{CES}, T_J = 25℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = ±20V V_{CE} = 0V, T_J = 25℃				200	nA
C_{ies}	Input Capacitance	V_{CE} = 25V, V_{GE} = 0V , f ＝1MHz			1.5		nF
C_{oes}	Output Capacitance				0.1		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V,I_C = 10A, R_G = 15Ω,V_{GE} = ±15V, Inductive Load	T_J = 25℃		48		ns
			T_J = 125℃		49		
			T_J = 150℃		39		
t_r	Rise Time		T_J = 25℃		23		ns
			T_J = 125℃		24		
			T_J = 150℃		25		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		108		ns
			T_J = 125℃		114		
			T_J = 150℃		120		
t_f	Fall Time		T_J = 25℃		319		ns
			T_J = 125℃		374		
			T_J = 150℃		438		

E_{on}	Turn-on Switching Loss	V_{CC} = 600V,I_C = 10A, R_G = 15Ω,V_{GE} = ±15V, Inductive Load	T_J = 25℃		0.87		mJ
			T_J = 125℃		0.97		
			T_J = 150℃		1		
E_{off}	Turn-off Switching Loss		T_J = 25℃		0.37		mJ
			T_J = 125℃		0.58		
			T_J = 150℃		0.57		
Q_g	Total Gate Charge		T_J = 25℃		333		nC
			T_J = 125℃		373		
			T_J = 150℃		390		
RBSOA	RBSOA	I_C=20A,V_{CC}=1050V,Vp=1200V, Rg = 15Ω, V_{GE}=+15V to 0V, T_J =150°C		Trapezoid			
SCSOA	SCSOA	V_{CC} = 600V, V_{GE} = 15V, T_J = 150℃		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				1.04		℃/W

Diode, Inverter

Maximum Rated Values (T_C=25℃Unless otherwise specified)

V_{RRM}	Repetitive peak reverse voltage	1200	V
I_F	Diode Continuous Forward Current	10	A
I_{FM}	Peak FWD Current Repetitive	20	A

Electrical Characteristics of FWD (T_C=25℃Unless otherwise specified)

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM} (Terminal)	Forward Voltage	I_F= 10 A , V_{GE} = 0V	T_J = 25℃		1.90		V
			T_J = 125℃		2.00		
			T_J = 150℃		2.00		
V_{FM} (Chip)	Forward Voltage	I_F= 10 A , V_{GE} = 0V	T_J = 25℃		1.70		V
			T_J = 125℃		1.80		
			T_J = 150℃		1.80		

I_{rr}	Peak Reverse Recovery Current	I_F＝10A, di/dt =900A/μs, V_{rr} = 600V, V_{GE} = -15V	T_J = 25℃		13.13		A
			T_J = 125℃		14.84		
			T_J = 150℃		15.31		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		1.19		μC
			T_J = 125℃		1.39		
			T_J = 150℃		1.43		
E_{rec}	Reverse Recovery Energy		T_J = 25℃		0.54		mJ
			T_J = 125℃		0.61		
			T_J = 150℃		0.78		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				1.53		℃/W

Module

V_{iso}	Isolation Voltage(All Terminals Shorted)	f = 50Hz, 1minute		2500		V
T_J	Maximum Junction Temperature			175		℃
T_{JOP}	Maximum Operating Junction Temperature Range			-40 +150		℃
T_{stg}	Storage Temperature			-40 +125		℃
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)			0.1		℃/W
M	Mounting Screw:M3		1.0		1.5	N·m
G	Weight			30		g

NTC-Thermistor

Characteristic values

R_{25}	T_c =25℃	5		kΩ
△R/R	T_c =100℃， R_{100} =481Ω		±5	%
P_{25}	T_c =25℃	50		mW
$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$	3380		K
$B_{25/80}$	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$	3440		K

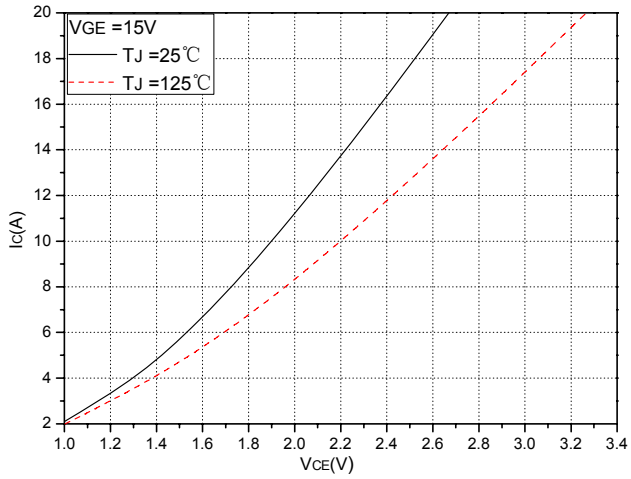


Fig.1 Typical Saturation Voltage Characteristics (Chip)

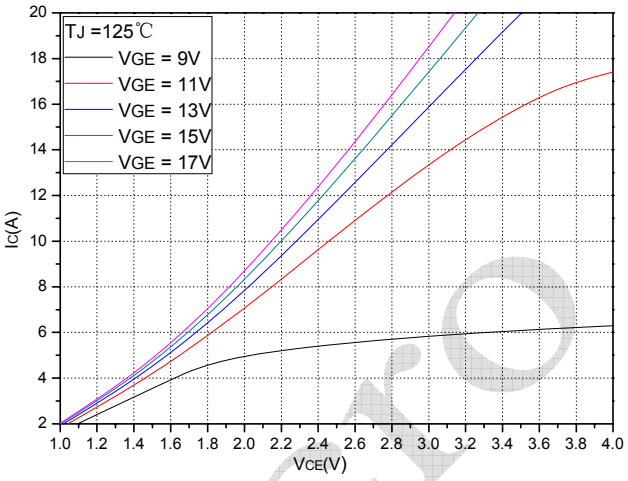


Fig.2 Typical Output Characteristics

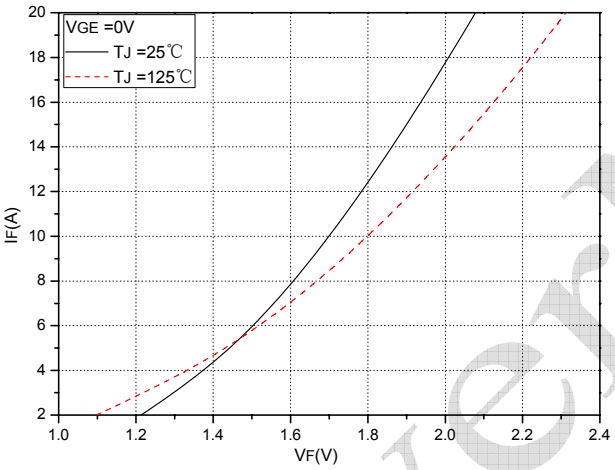


Fig.3 Forward Characteristics of FWD (Chip)

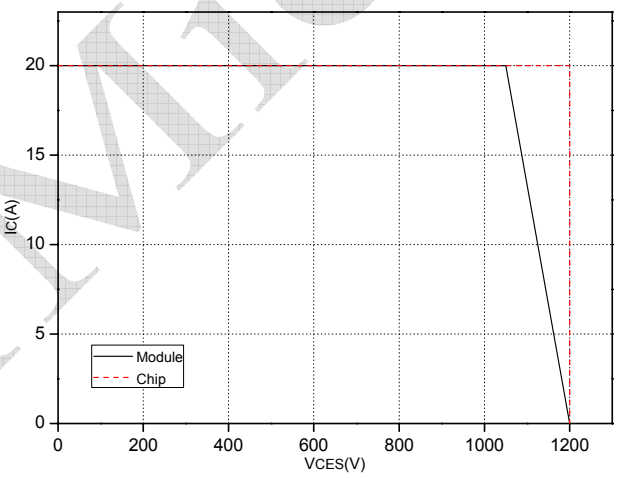


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

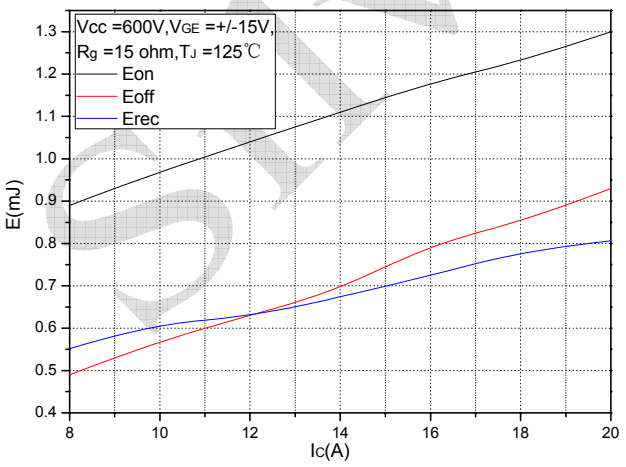


Fig.5 Typical Switching Loss vs. Collector Current

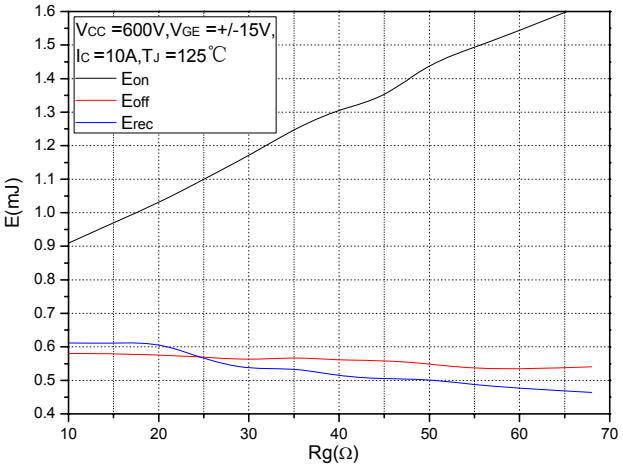


Fig.6 Typical Switching Loss vs. Gate Resistance

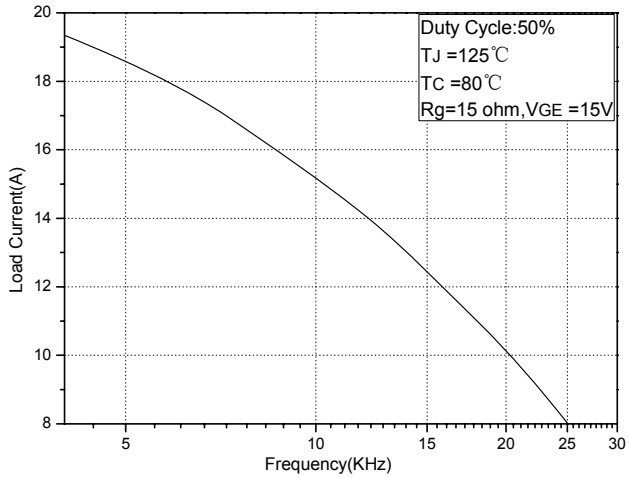


Fig.7 Typical Load Current vs. Frequency

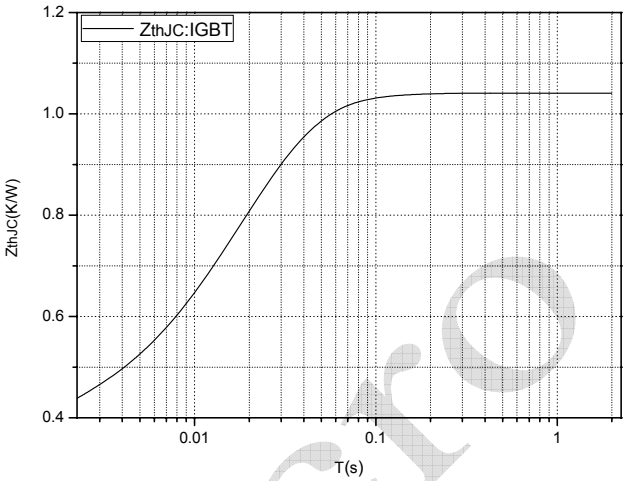


Fig.8 Transient thermal impedance IGBT

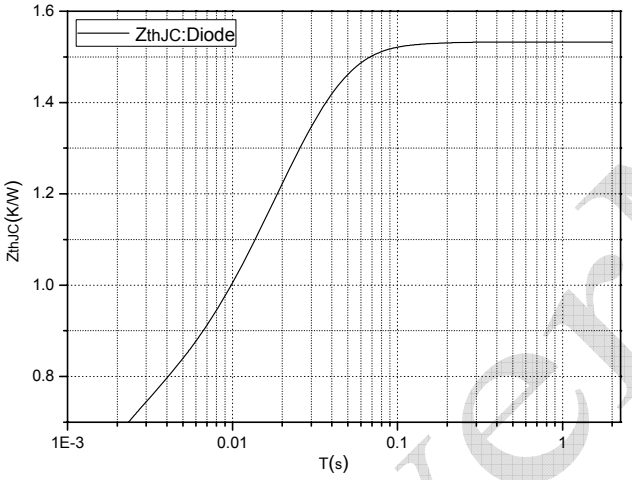


Fig.9 Transient thermal impedance Diode (Inverter)

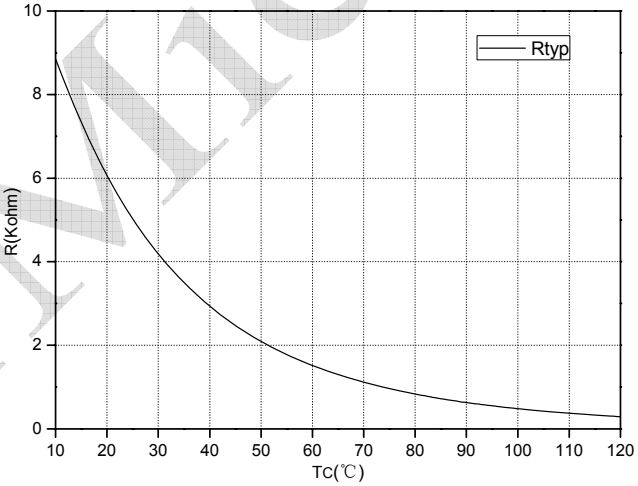
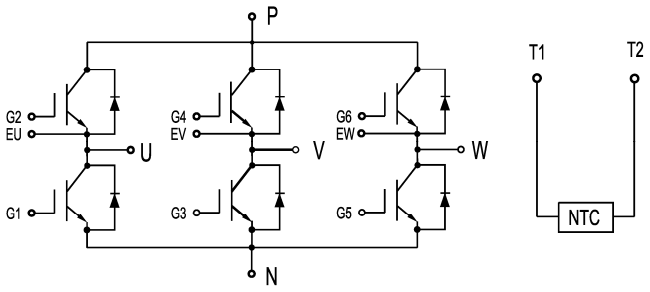
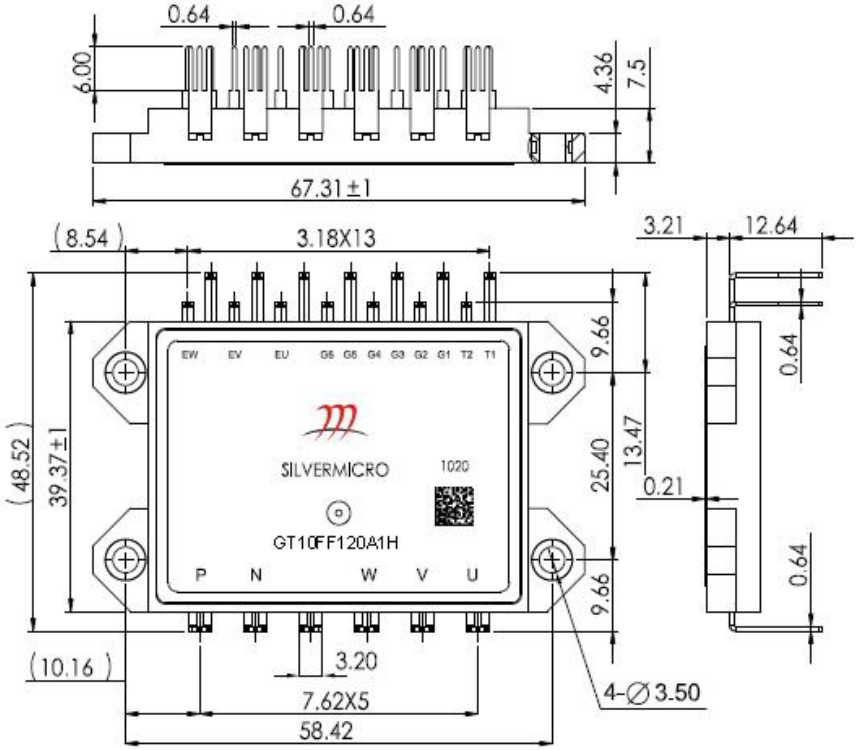


Fig.10 NTC Temperature characteristics

Internal Circuit:



Package Outline (Unit: mm):



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