GTS25FB120A1H

IGBT Module

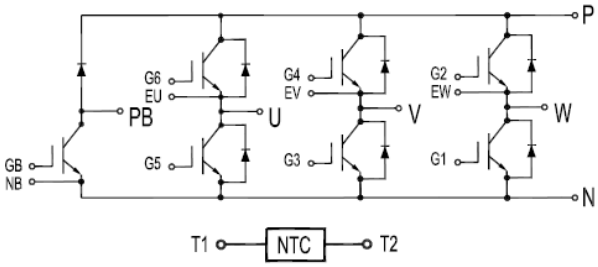
Preliminary Date

Features：

- Short Circuit Rated ＞10μs
- Low Saturation Voltage: $V_{CE\ (sat)}$ = 2.20V @ I_C = 25A , T_C=25℃
- Low Switching Loss
- 100% RBSOA Tested（2×Ic）
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Applications：

- Industrial Inverters
- Servo Applications
- UPS Systems



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℃	25	A
		T_C = 25℃	50	A
$I_{CM(1)}$	Peak Collector Current Repetitive	T_J = 150℃	50	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation (IGBT)	T_C = 25℃ T_{Jmax}=150℃	250	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}		5.0	5.9	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 25 A, V_{GE} = 15V	T_J = 25℃		2.20	2.50	V
			T_J = 125℃		2.40		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			1.72		nF
C_{oes}	Output Capacitance				0.43		nF
C_{res}	Reverse Transfer Capacitance				0.08		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V,I_C = 25A, R_G = 20 Ω,V_{GE} = ±15V, Inductive Load	T_J = 25℃		119		ns
			T_J = 125℃		92		
t_r	Rise Time		T_J = 25℃		37		ns
			T_J = 125℃		42		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		175		ns
			T_J = 125℃		190		
t_f	Fall Time		T_J = 25℃		221		ns
			T_J = 125℃		385		
E_{on}	Turn-on Switching Loss		T_J = 25℃		1.86		mJ
			T_J = 125℃		2.45		
E_{off}	Turn-off Switching Loss		T_J = 25℃		0.90		mJ
			T_J = 125℃		1.68		
Q_g	Total Gate Charge		T_J = 25℃		430		nC
			T_J = 125℃		446		
RBSOA	RBSOA	I_C=50A,V_{CC}=1050V,Vp=1200V, Rg = 20Ω, 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 (Per Leg)				0.499		℃/W

SILVERMICRO

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	25	A
I_{FM}	Peak FWD Current Repetitive	50	A

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

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F = 25A	T_J = 25℃		2.20		V
			T_J = 125℃		2.35		
t_{rr}	Reverse Recovery Time	I_F = 25A, di/dt = 658A/μs, V_{rr} = 600V, V_{GE} = -15V	T_J = 25℃		148		ns
			T_J = 125℃		282		
I_{rr}	Peak Reverse Recovery Current		T_J = 25℃		14.1		A
			T_J = 125℃		19.1		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		1.34		μC
			T_J = 125℃		2.72		
E_{rec}	Reverse Recovery Energy		T_J = 25℃		0.21		mJ
			T_J = 125℃		1.03		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case (Per Leg)				0.719		℃/W

IGBT, Brake-Chopper

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℃,	15	A
		T_C = 25℃	30	A
I_{CM}	Peak Collector Current Repetitive	T_J = 150℃	30	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation (IGBT)	T_C = 25℃ T_{Jmax}=150℃	185	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}		5.2	5.9	6.7	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 15A, V_{GE} = 15V	T_J = 25℃		2.15	2.50	V
			T_J = 125℃		2.40		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			1.12		nF
C_{oes}	Output Capacitance				0.09		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V,I_C = 15A, R_G = 20Ω,V_{GE} = ±15V, Inductive Load	T_J = 25℃		79		ns
			T_J = 125℃		53		
t_r	Rise Time		T_J = 25℃		35		ns
			T_J = 125℃		36		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		146		ns
			T_J = 125℃		155		
t_f	Fall Time		T_J = 25℃		280		ns
			T_J = 125℃		383		
E_{on}	Turn-on Switching Loss		T_J = 25℃		1.40		mJ
			T_J = 125℃		1.59		
E_{off}	Turn-off Switching Loss		T_J = 25℃		0.41		mJ
			T_J = 125℃		0.76		
Q_g	Total Gate Charge		T_J = 25℃		399		nC
RBSOA	RBSOA	I_C=30A,V_{CC}=1050V,Vp=1200V, Rg = 20Ω, 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(Per Leg)				0.677		℃/W

Diode, Brake-Chopper

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}	Forward Voltage	I_F = 10A	T_J = 25℃		1.80	2.30	V
			T_J = 125℃		2.00		
I_{rr}	Peak Reverse Recovery Current	I_F = 10A, di/dt =500A/μs, V_{rr} = 600V, V_{GE} = -15V	T_J = 25℃		10		A
			T_J = 125℃		15		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		0.75		μC
			T_J = 125℃		1.50		
E_{rec}	Reverse Recovery Energy		T_J = 25℃		0.30		mJ
			T_J = 125℃		0.62		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case (Per Leg)				1.173		℃/W

Internal NTC-Thermistor Characteristics

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

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	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
CTI	Comparative Tracking Index		200			V
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)			0.1		℃/W
M	Mounting Screw:M3		1.5		2.0	N·m
G	Weight			30		g

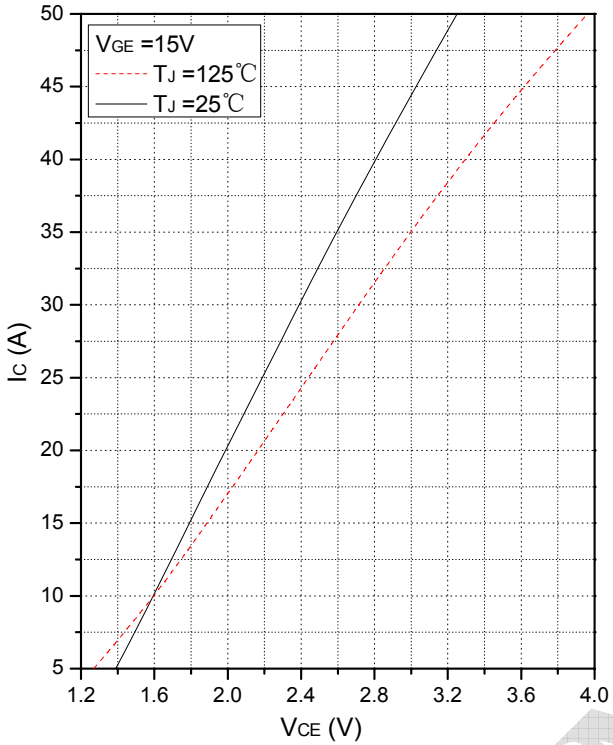


Fig.1 Typical Saturation Voltage Characteristics (Inverter)

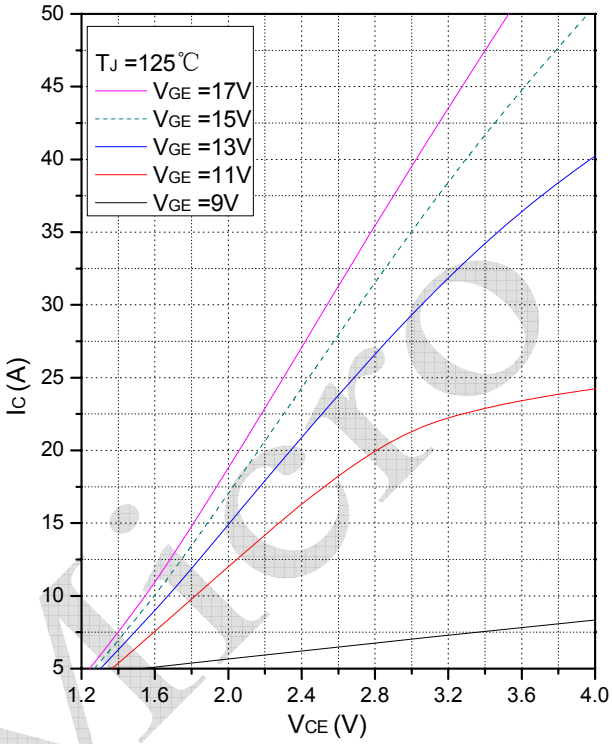


Fig.2 Typical Output Characteristics (Inverter)

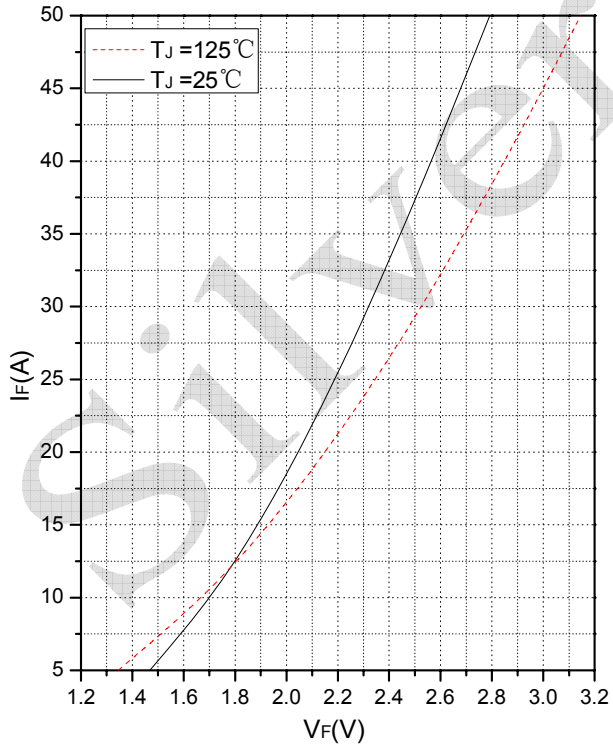


Fig.3 Forward Characteristics of FWD (Inverter)

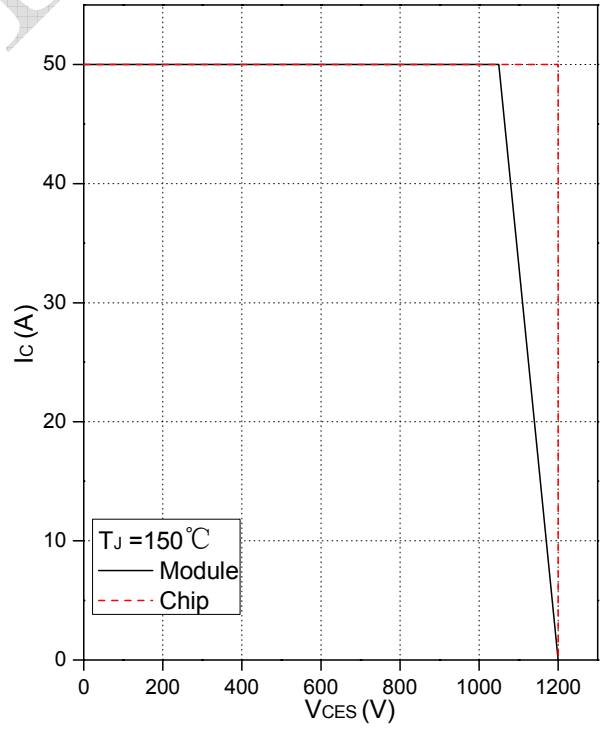


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

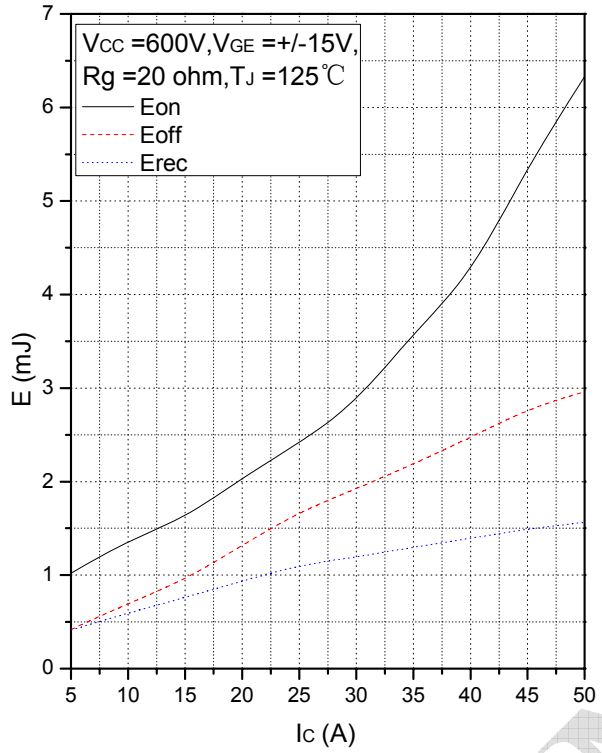


Fig.5 Typical Switching Loss vs. Collector Current (Inverter)

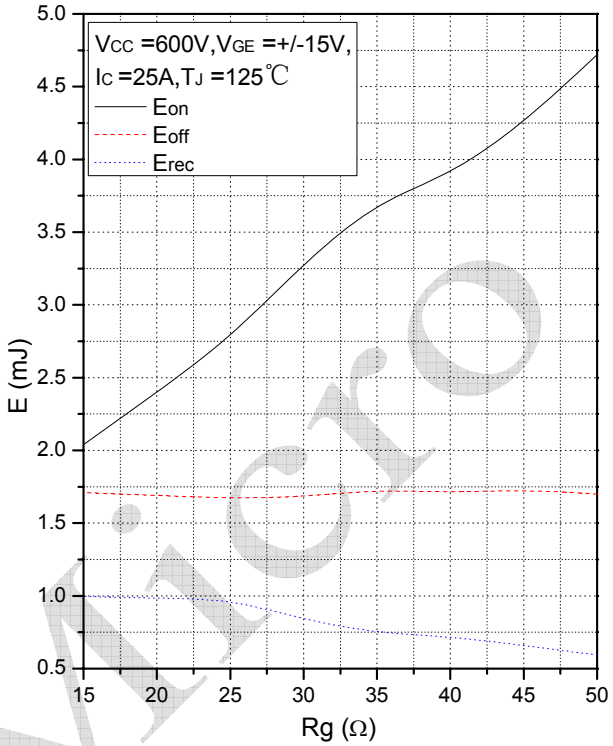


Fig.6 Typical Switching Loss vs. Gate Resistance (Inverter)

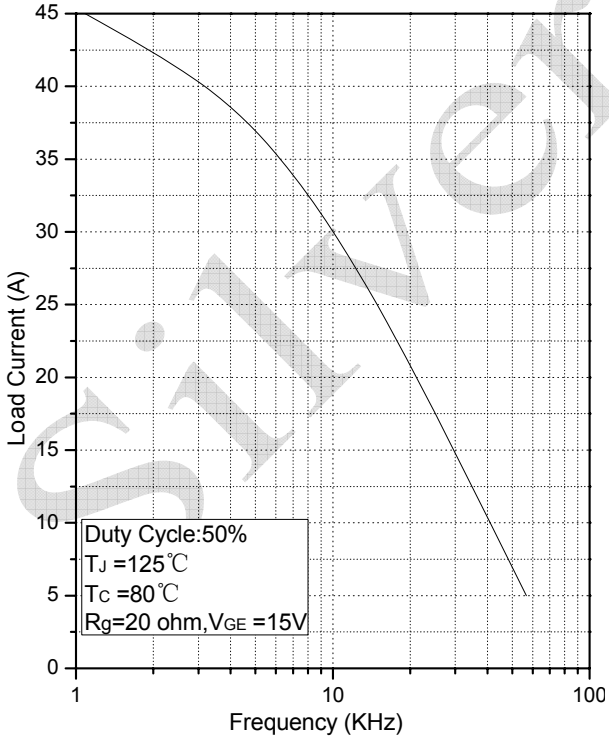


Fig.7 Typical Load Current vs. Frequency (Inverter)

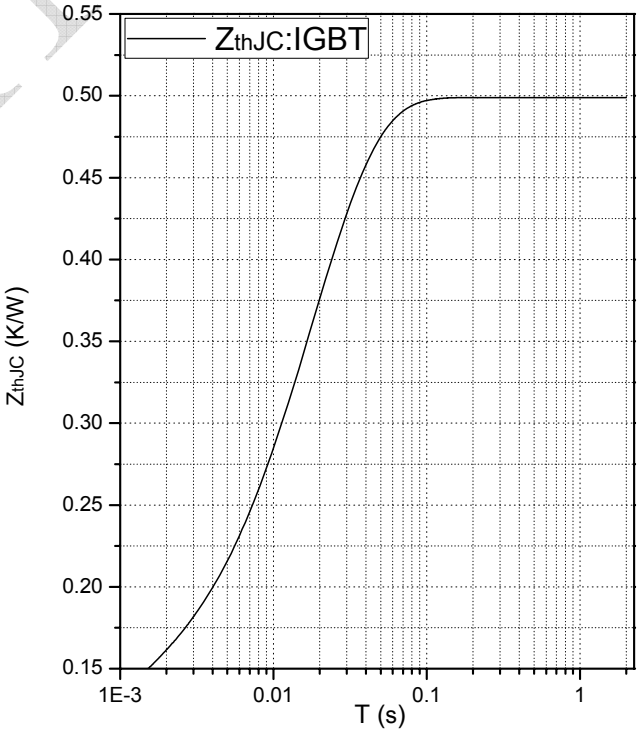
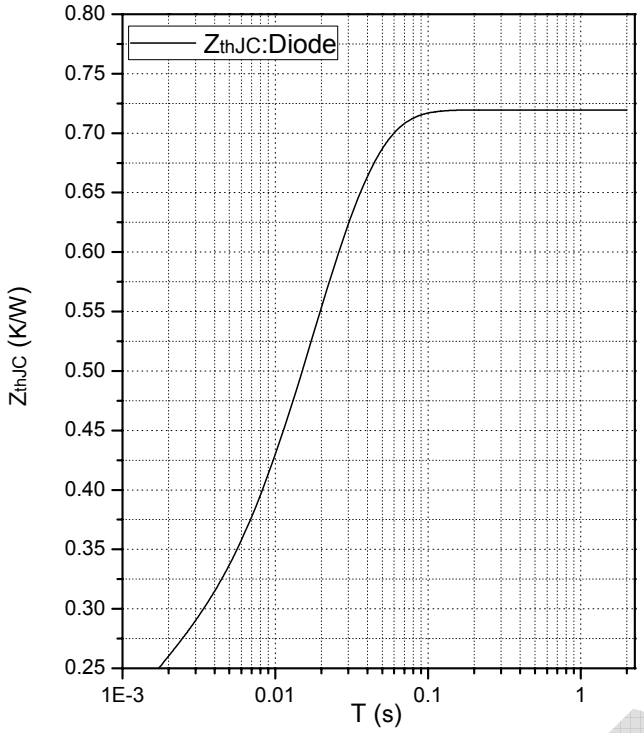


Fig.8 Transient thermal impedance IGBT (Inverter)



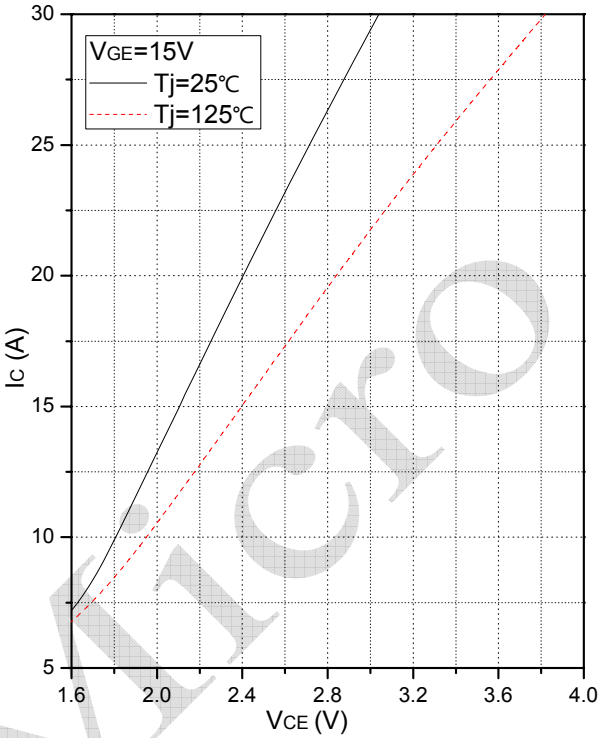


Fig.9 Transient thermal impedance Diode(Inverter) Fig.10 Typical Saturation Voltage Characteristics(Brake-Chopper)

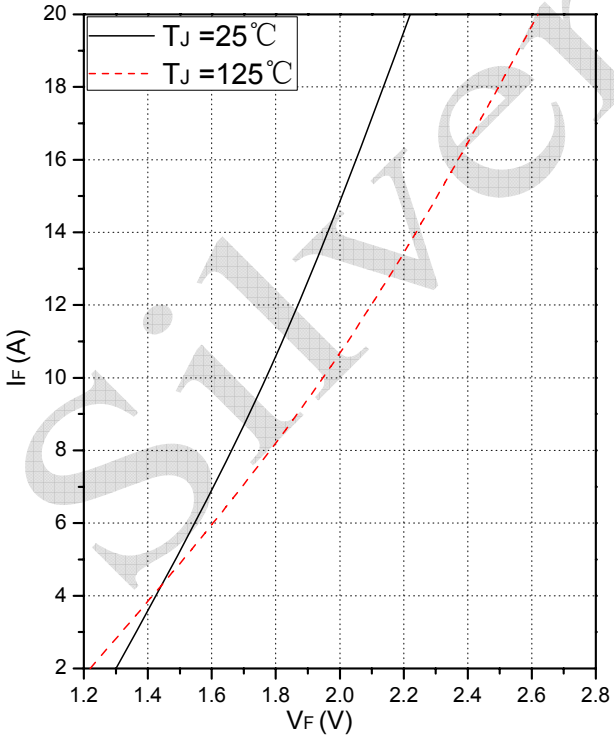


Fig.11 Forward Characteristics of FWD (Brake-Chopper)

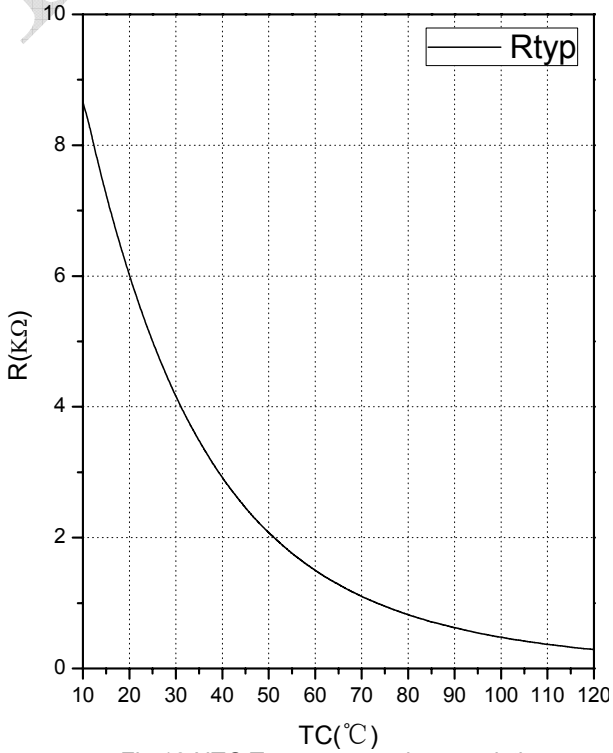
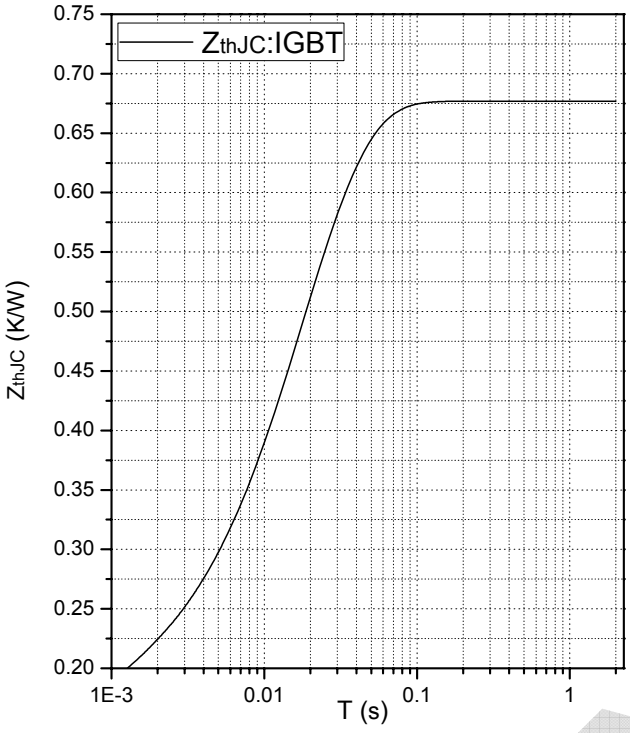


Fig.12 NTC Temperature characteristics



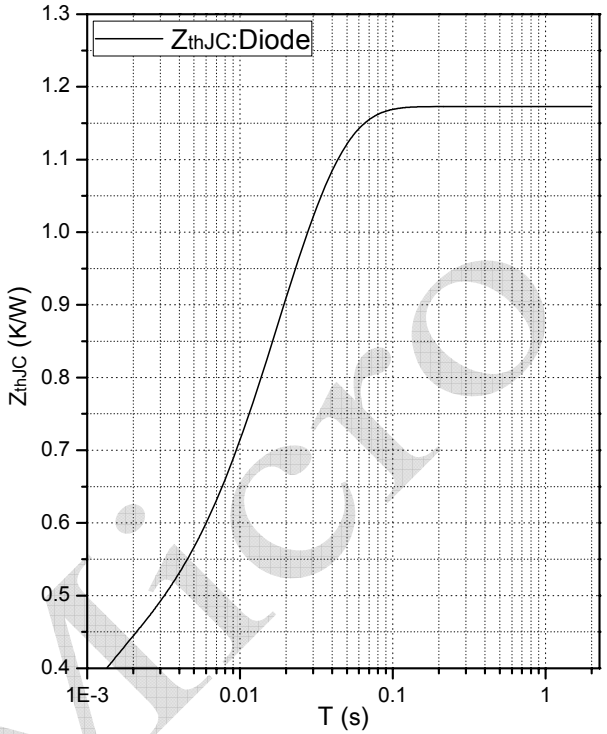
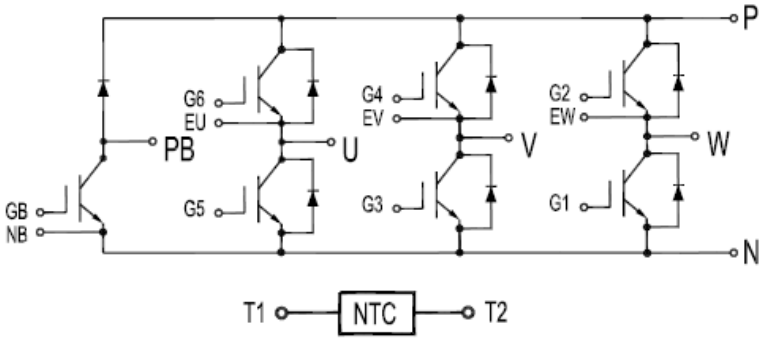
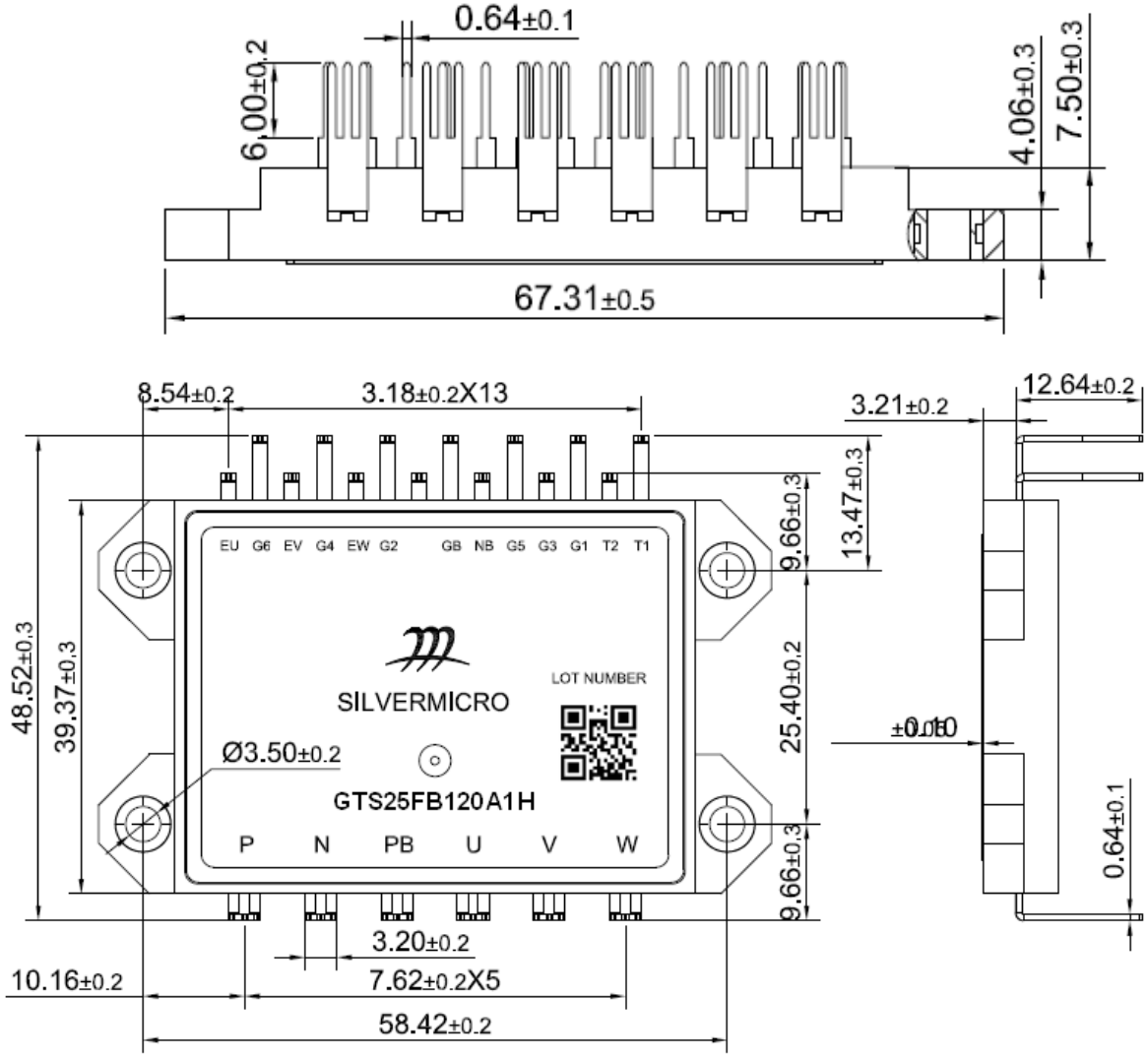


Fig.13 Transient thermal impedance IGBT (Brake-Chopper) Fig.14 Transient thermal impedance Diode(Brake-Chopper)

Internal Circuit:



Package Outline (Unit: mm):



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