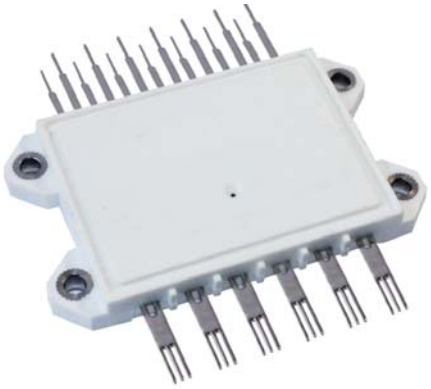
GT15FB120A1H

IGBT Module

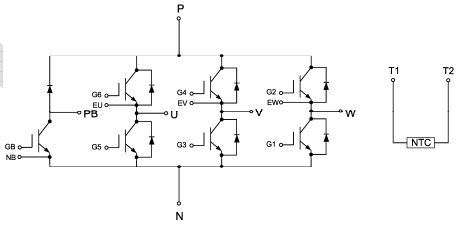
Features：



- Short Circuit Rated 10μs
- Low Saturation Voltage: $V_{CE\ (sat)}$ = 1.90V @ I_C = 15A , 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



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℃,	15	A
		T_C = 25℃	30	A
I_{CM}	Repetitive Peak Collector Current	T_J = 175℃	30	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C = 25℃ T_{Jmax}=175℃	240	W

SILVERMICRO

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}		4.5	5.3	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C =15 A, V_{GE} = 15V	T_J = 25℃		1.90	2.10	V
			T_J = 125℃		2.20		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			2.00		nF
C_{oes}	Output Capacitance				0.07		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V,I_C = 15A, R_G = 40Ω,V_{GE} = ±15V, Inductive Load	T_J = 25℃		175		ns
			T_J = 125℃		160		
t_r	Rise Time		T_J = 25℃		50		ns
			T_J = 125℃		55		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		140		ns
			T_J = 125℃		145		
t_f	Fall Time		T_J = 25℃		245		ns
			T_J = 125℃		380		
E_{on}	Turn-on Switching Loss		T_J = 25℃		1.74		mJ
			T_J = 125℃		2.08		
E_{off}	Turn-off Switching Loss		T_J = 25℃		0.63		mJ
			T_J = 125℃		1.09		
Q_g	Total Gate Charge		T_J = 25℃		140		nC
RBSOA	Reverse Bias Safe Operation Area	I_C=30A,V_{CC}=1050V,Vp=1200V, Rg = 40Ω, V_{GE}=+15V to 0V, T_J =150°C		Trapezoid			
SCSOA	Short Circuit Safe Operation Area	V_{CC} = 600V, V_{GE} = 15V, T_J = 150℃		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.615		℃/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	15	A
I_{FM}	Diode Maximum Forward Current	30	A

Electrical Characteristics of FWD

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F =15A , V_{GE} = 0V	T_J = 25℃		1.90		V
			T_J = 125℃		2.00		
I_{rr}	Peak Reverse Recovery Current	I_F =15A, di/dt =370A/μs, V_{rr} = 600V, V_{GE} = -15V	T_J = 25℃		20		A
			T_J = 125℃		25		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		3.15		μC
			T_J = 125℃		5.05		
E_{rec}	Reverse Recovery Energy		T_J = 25℃		1.24		mJ
			T_J = 125℃		2.12		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				1.173		℃/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}	Repetitive Peak Collector Current	T_J = 175℃	30	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C = 25℃, T_{Jmax}=175℃	240	W

SILVERMICRO

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}		4.5	5.3	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 15 A, V_{GE} = 15V	T_J = 25℃		1.90	2.10	V
			T_J = 125℃		2.20		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			2.00		nF
C_{oes}	Output Capacitance				0.10		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V,I_C = 15A, R_G = 40 Ω,V_{GE} = ±15V, Inductive Load	T_J = 25℃		175		ns
			T_J = 125℃		160		
t_r	Rise Time		T_J = 25℃		50		ns
			T_J = 125℃		55		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		140		ns
			T_J = 125℃		145		
t_f	Fall Time		T_J = 25℃		245		ns
			T_J = 125℃		380		
E_{on}	Turn-on Switching Loss		T_J = 25℃		1.74		mJ
			T_J = 125℃		2.08		
E_{off}	Turn-off Switching Loss		T_J = 25℃		0.63		mJ
			T_J = 125℃		1.09		
Q_g	门 Total Gate Charge		T_J = 25℃		140		nC
RBSOA	Reverse Bias Safe Operation Area	I_C=30A,V_{CC}=960V,Vp=1200V, Rg = 40Ω, V_{GE}=+15V to 0V, T_J =150°C		Trapezoid			
SCSOA	Short Circuit Safe Operation Area	V_{CC} = 600V, V_{GE} = 15V, T_J = 150℃		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.629		℃/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	15	A
I_{FM}	Diode Maximum Forward Current	30	A

Electrical Characteristics of Diode

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F = 15 A , V_{GE} = 0V	T_J = 25℃		1.90		V
			T_J = 125℃		2.00		
I_{rr}	Peak Reverse Recovery Current	I_F=15A, di/dt =370A/μs, V_{rr} = 600V, V_{GE} = -15V	T_J = 25℃		12		A
			T_J = 125℃		15		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		0.94		μC
			T_J = 125℃		1.64		
E_{rec}	Reverse Recovery Energy		T_J = 25℃		0.37		mJ
			T_J = 125℃		0.76		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				1.173		℃/W

Internal NTC-Thermistor Characteristic

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				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		1.5		2.0	N·m
G	Weight			30		g

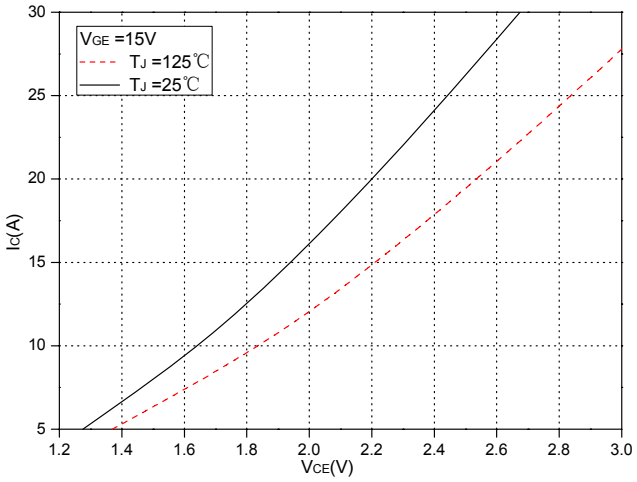


Fig.1 Typical Saturation Voltage Characteristics (Inverter)

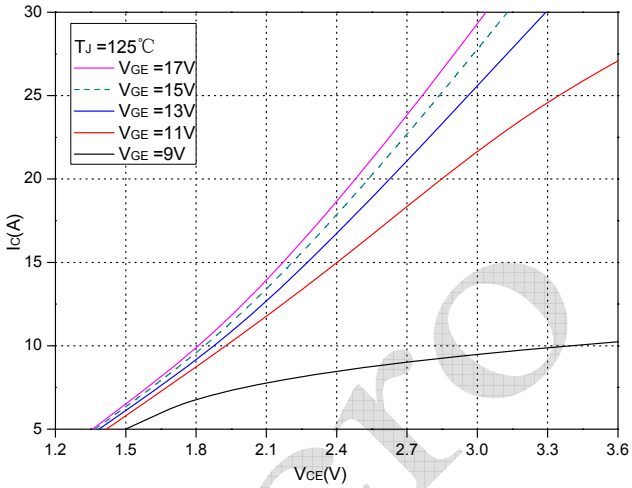


Fig.2 Typical Output Characteristics (Inverter)

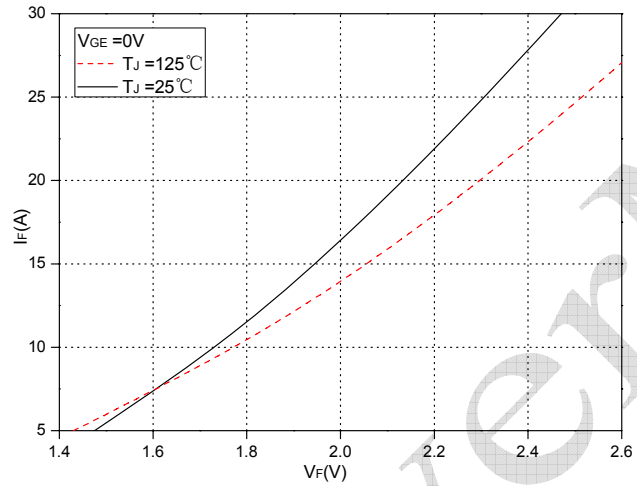


Fig.3 Forward Characteristics of FWD (Inverter)

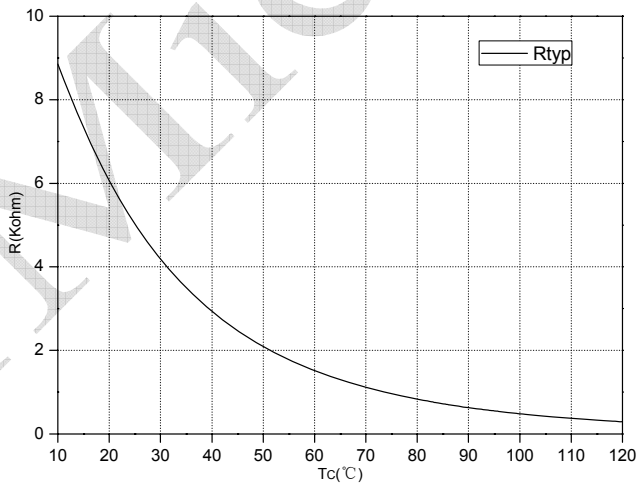


Fig.4 NTC Temperature characteristics

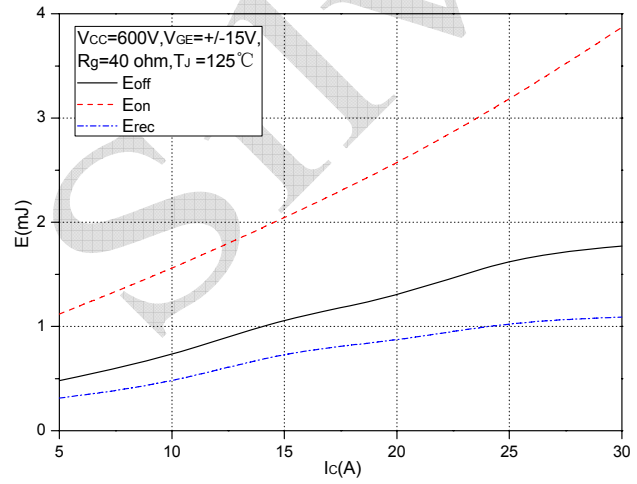


Fig. 5 Typical Switching Loss vs. Collector Current (Inverter)

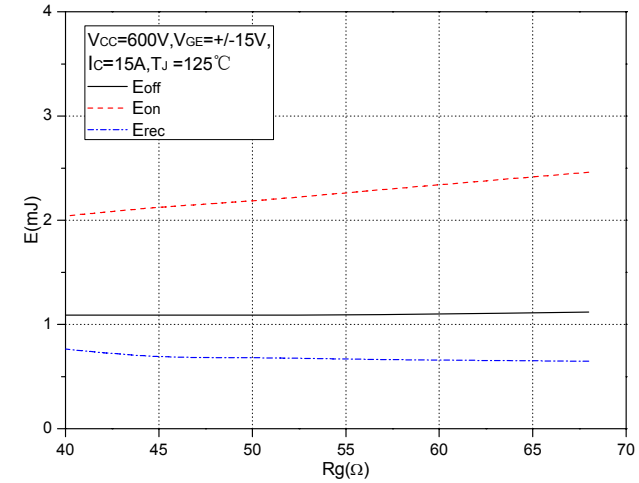


Fig.6 Typical Switching Loss vs. Gate Resistance (Inverter)

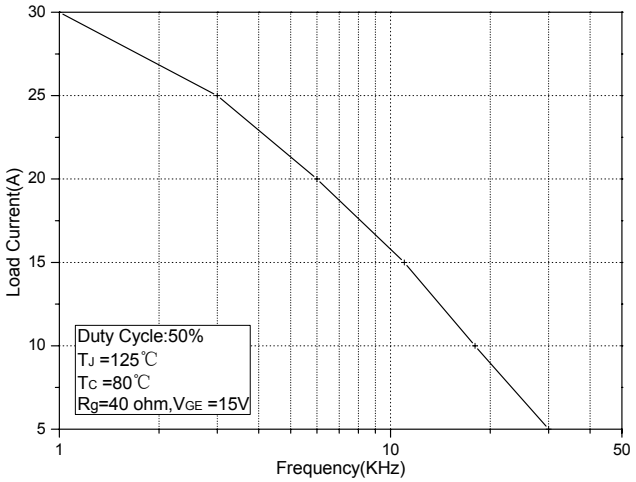


Fig.7 Typical Load Current vs. Frequency (Inverter)

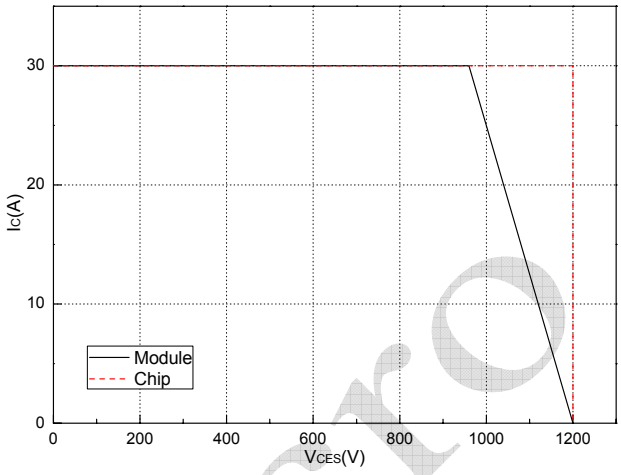


Fig.8 Reverse Bias Safe Operation Area (RBSOA)

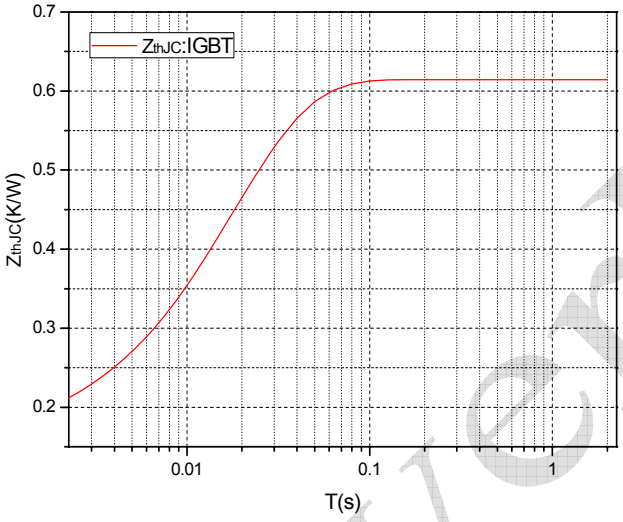


Fig. 9 Transient Thermal Impedance IGBT (Inverter)

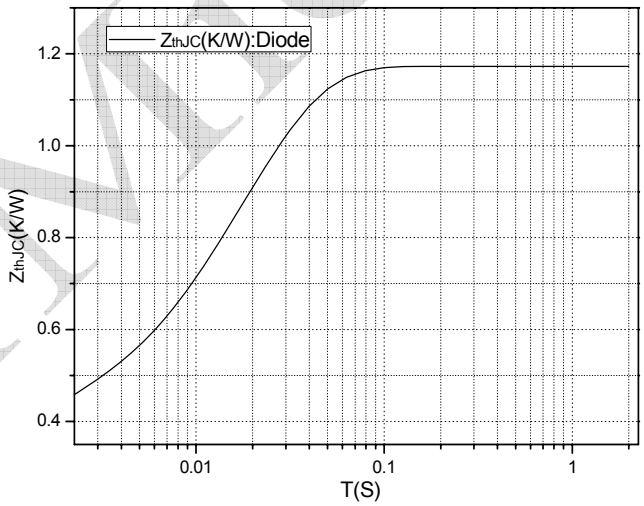


Fig.10 Transient Thermal Impedance Diode (Inverter)

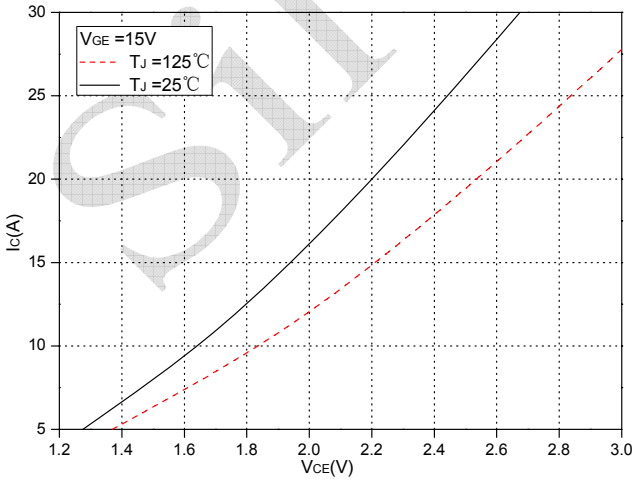


Fig.11 Typical Saturation Voltage Characteristics (Brake-Chopper)

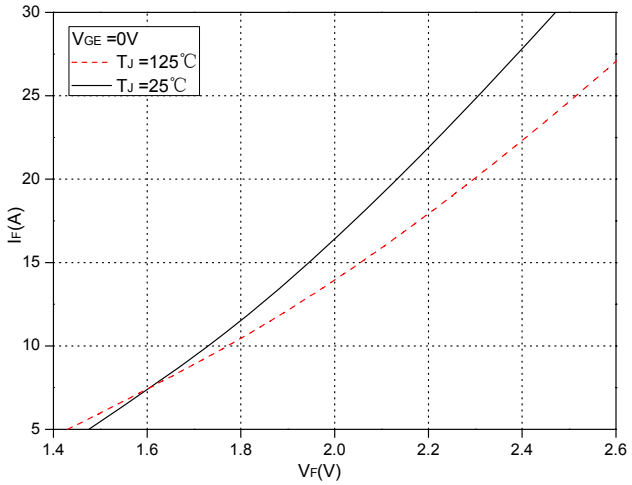
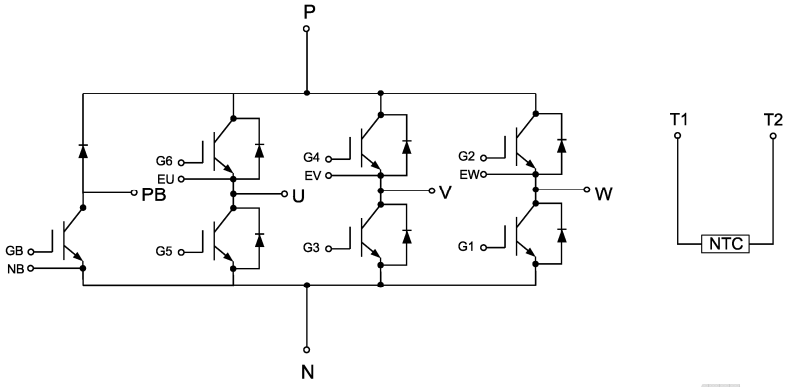
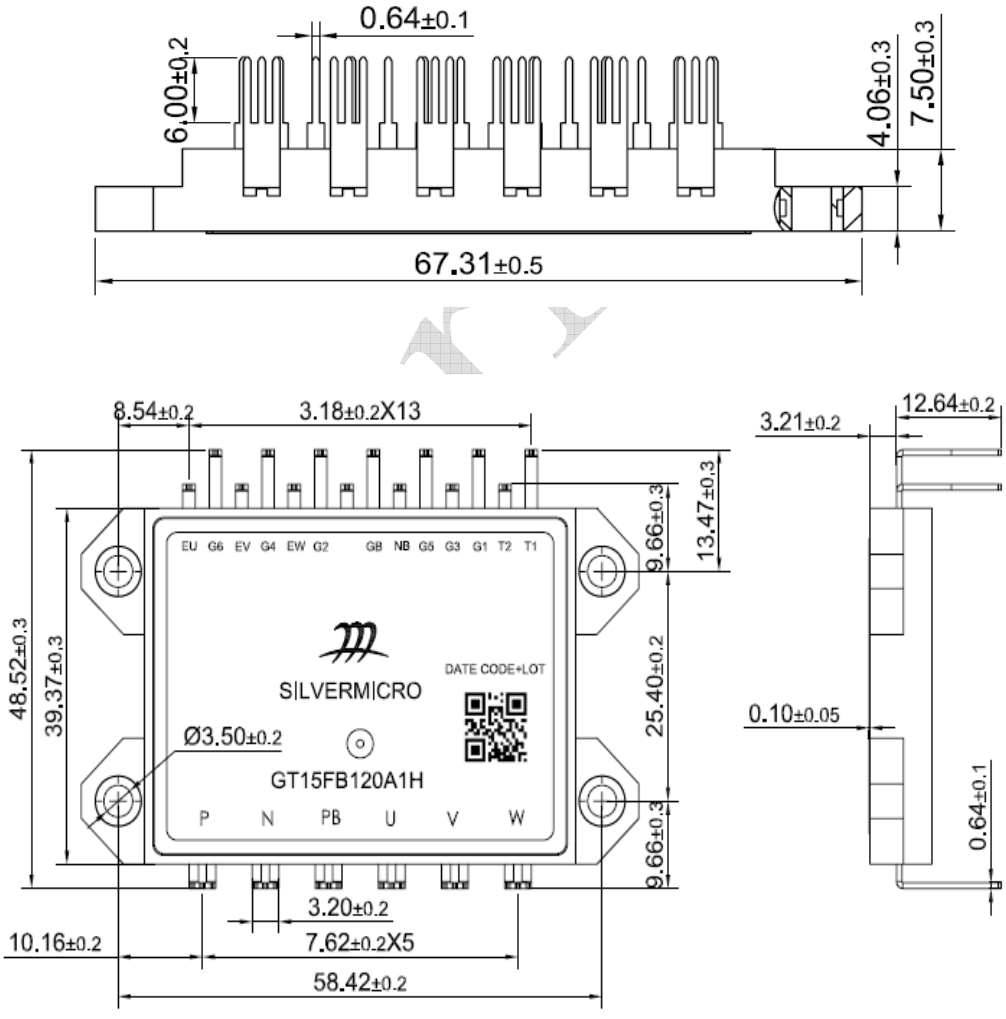


Fig.12 Forward Characteristics of Diode (Brake-Chopper)

Internal Circuit:



Package Outline (Unit: mm):



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