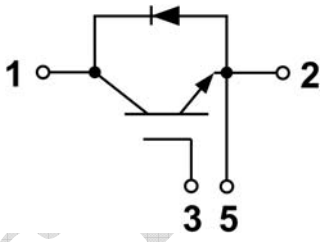
GF600SD120T2ZH

IGBT Module

Features：



- Non Punch Through (NPT) Technology
- Short Circuit Rated >10μs
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested(2×Ic)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Applications：

- Motor Drives
- Induction Heating
- Ultrasonic Device
- High Frequency Switching Application

IGBT, Inverter

Maximum Rated Values of IGBT(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℃	600	A
		T_C=25℃	1200	A
I_{CM}	Repetitive Peak Collector Current	T_J=150℃	1200	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation	T_C=25℃ T_{Jmax}=150℃	5208	W

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

Static Characteristics

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=24mA, V_{CE}=V_{GE}		4.5	5.6	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=600A, V_{GE}=15V	T_J=25℃		3.00	3.20	V
			T_J=125℃		3.60		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℃				800	nA
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=100KHz			46.1		nF
C_{oes}	Output Capacitance				4.53		nF
C_{res}	Reverse Transfer Capacitance				2.14		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V, I_C=600A, R_{Gon}=1Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		874		ns
			T_J=125℃		906		
t_r	Rise Time		T_J=25℃		223		ns
			T_J=125℃		226		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V, I_C=600A, R_{Goff}=1Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		881		ns
			T_J=125℃		931		
t_f	Fall Time		T_J=25℃		142		ns
			T_J=125℃		144		
E_{on}	Turn-on Switching Loss	V_{CC}=600V, I_C=600A, R_{Gon}=1Ω, V_{GE}=±15V, di/dt=2232A/μs(T_J=125°C), Inductive Load	T_J=25℃		22.6		mJ
			T_J=125℃		30.7		
E_{off}	Turn-off Switching Loss	V_{CC}=600V, I_C=600A, R_{Goff}=1Ω, V_{GE}=±15V, du/dt=3224V/μs(T_J=125°C), Inductive Load	T_J=25℃		70.5		mJ
			T_J=125℃		79.7		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		6.59		μC
RBSOA	Reverse Bias Safe Operation Area	I_C=1200A, V_{CC}=1050V, Vp=1200V, R_{Goff}=1Ω, V_{GE}=+15V to 0V, T_J=150°C		Trapezoid			
SCSOA	SCSOA	V_{CC}=600V, V_{GE}=15V, T_J=150°C		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-to-Case					0.024	°C/W

Diode, Inverter

Maximum Rated Values of Diode (T_C=25℃ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	600	A
I_{FM}	Diode Maximum Forward Current	1200	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F=600A	T_J=25℃		2.05		V
			T_J=125℃		2.25		
t_{rr}	Reverse Recovery Time	I_F=600A, -diF/dt =2632A/μs(T_J=125℃), V_{rr}=600V, V_{GE}=-15V	T_J=25℃		172		ns
			T_J=125℃		269		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		169		A
			T_J=125℃		250		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		18.9		μC
			T_J=125℃		40.0		
E_{rec}	Reverse Recovery Energy		T_J=25℃		5.64		mJ
			T_J=125℃		17.7		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-to-Case					0.065	℃/W

Module

Symbol	Description		Min.	Typ.	Max.	Units
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			
$R_{\theta CS}$	Case-to-Sink Thermally (Conductive Grease Applied)				0.03	℃/W
T	Signal Terminals Screw:M4		1.1		2.0	N·m
T	Power Terminals Screw:M6		2.5		5.0	N·m
T	Mounting Screw:M6		3.0		6.0	N·m
G	Weight			320		g

Ordering Information Table

Device code

G	F	600	SD	120	T2Z	H
①	②	③	④	⑤	⑥	⑦

① - IGBT Module
② - NPT, Fast IGBT
③ - Rated Current (600=600A)
④ - Circuit Configuration (Single Switch)
⑤ - Rated Voltage (120=1200V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

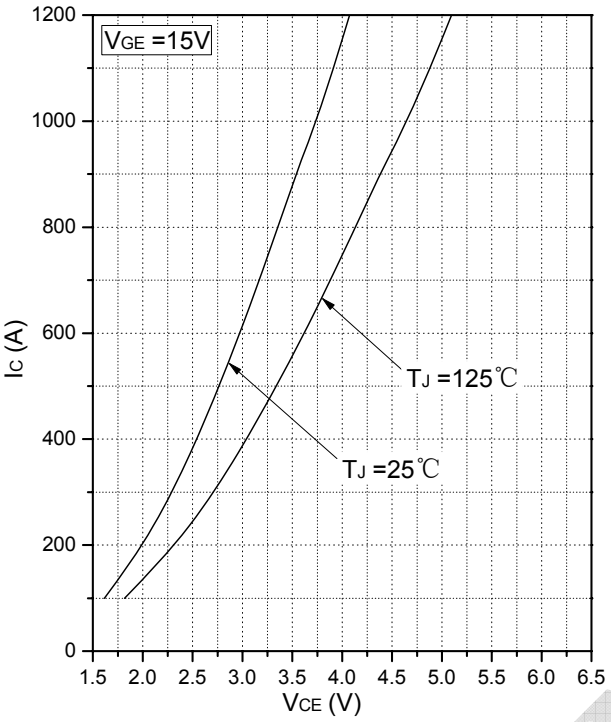


Fig.1 Typical Saturation Voltage Characteristics

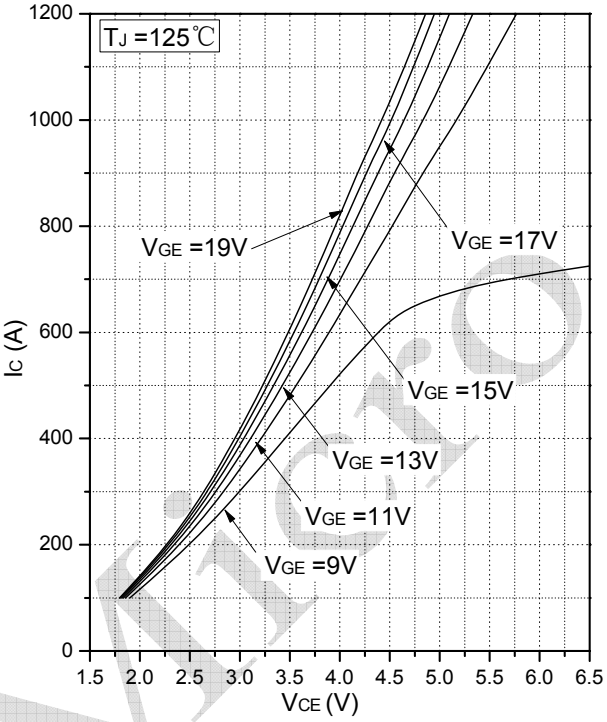


Fig.2 Typical Output Characteristics

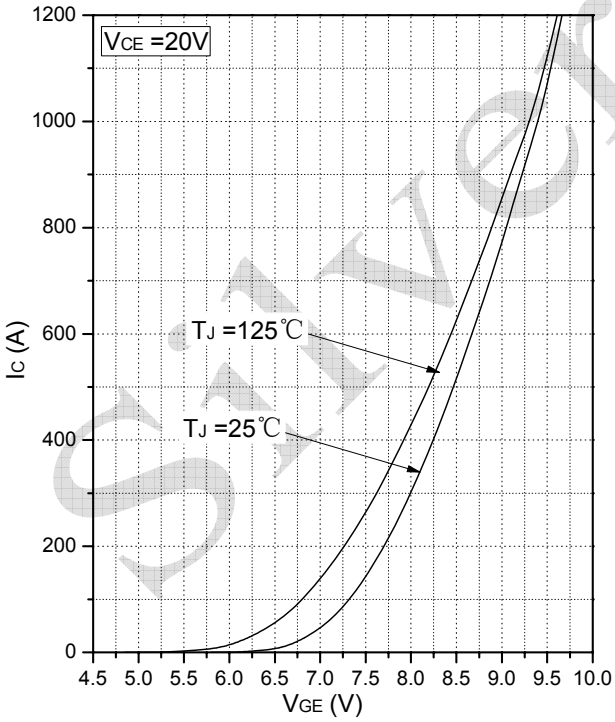


Fig.3 Transfer Characteristic

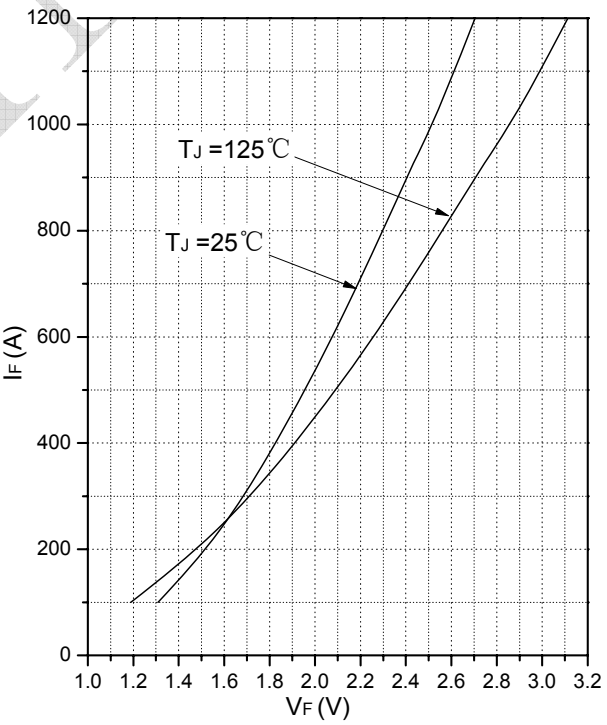


Fig.4 Forward Characteristics of Diode

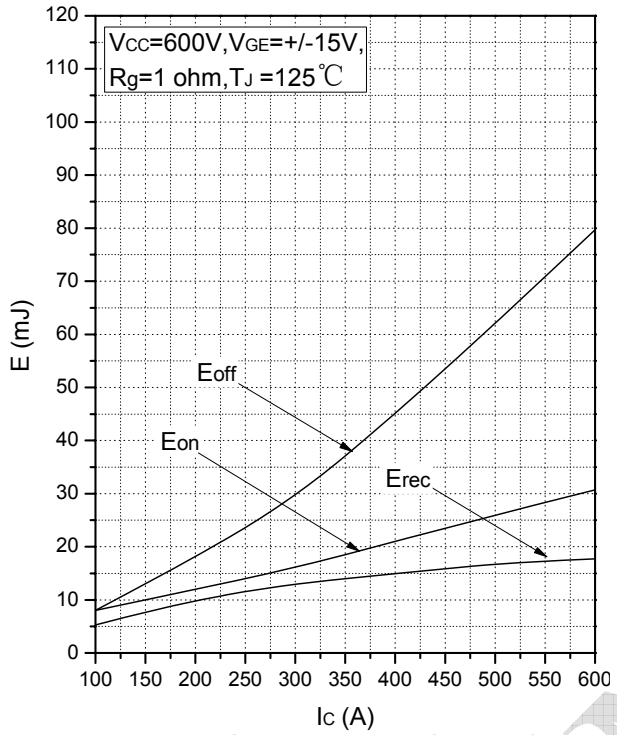


Fig.5 Typical Switching Loss vs. Collector Current

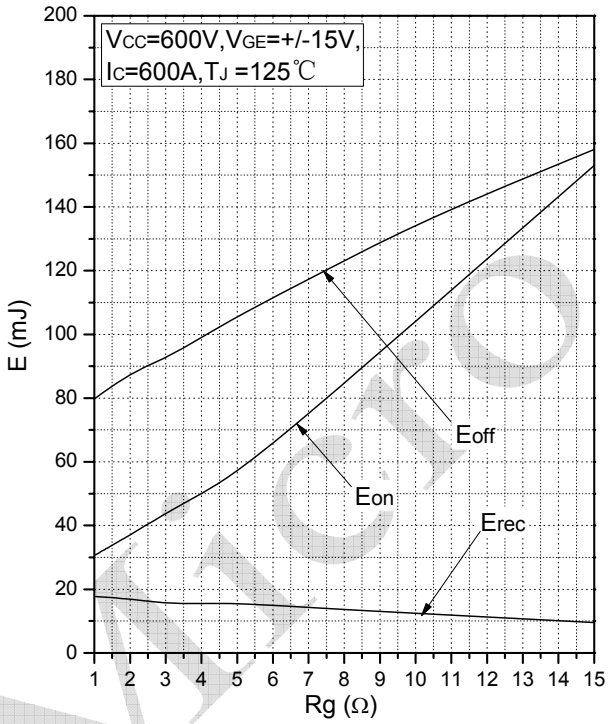


Fig.6 Typical Switching Loss vs. Gate Resistance

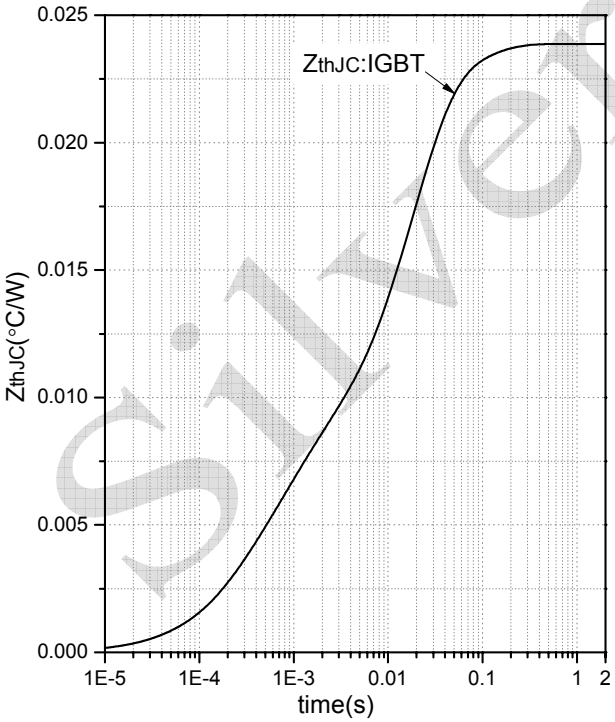


Fig.7 Transient Thermal Impedance (IGBT)

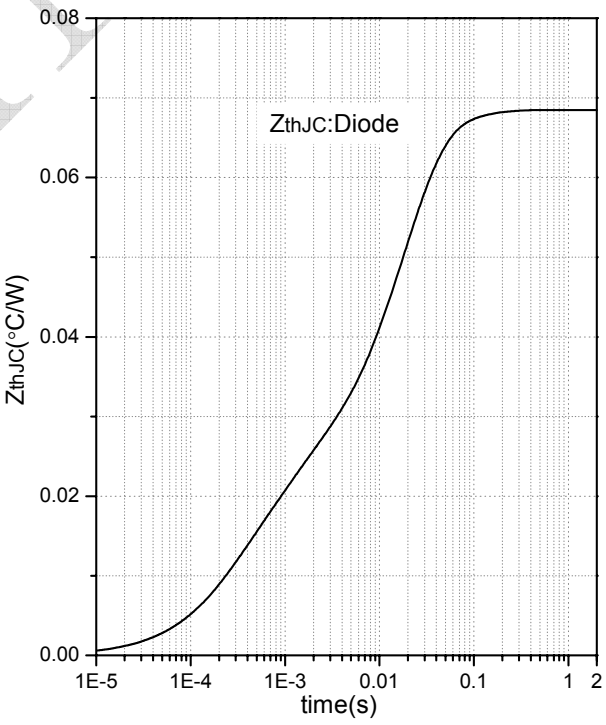


Fig.8 Transient Thermal Impedance (Diode)

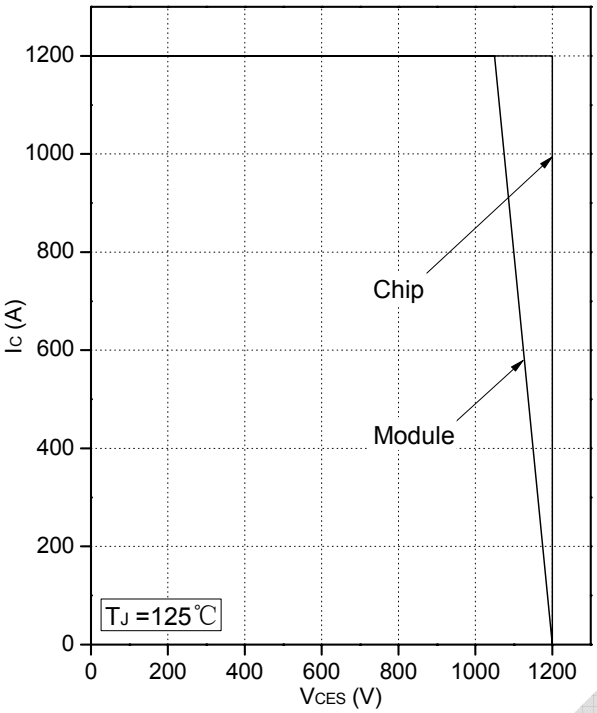
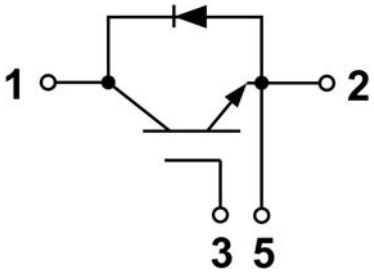
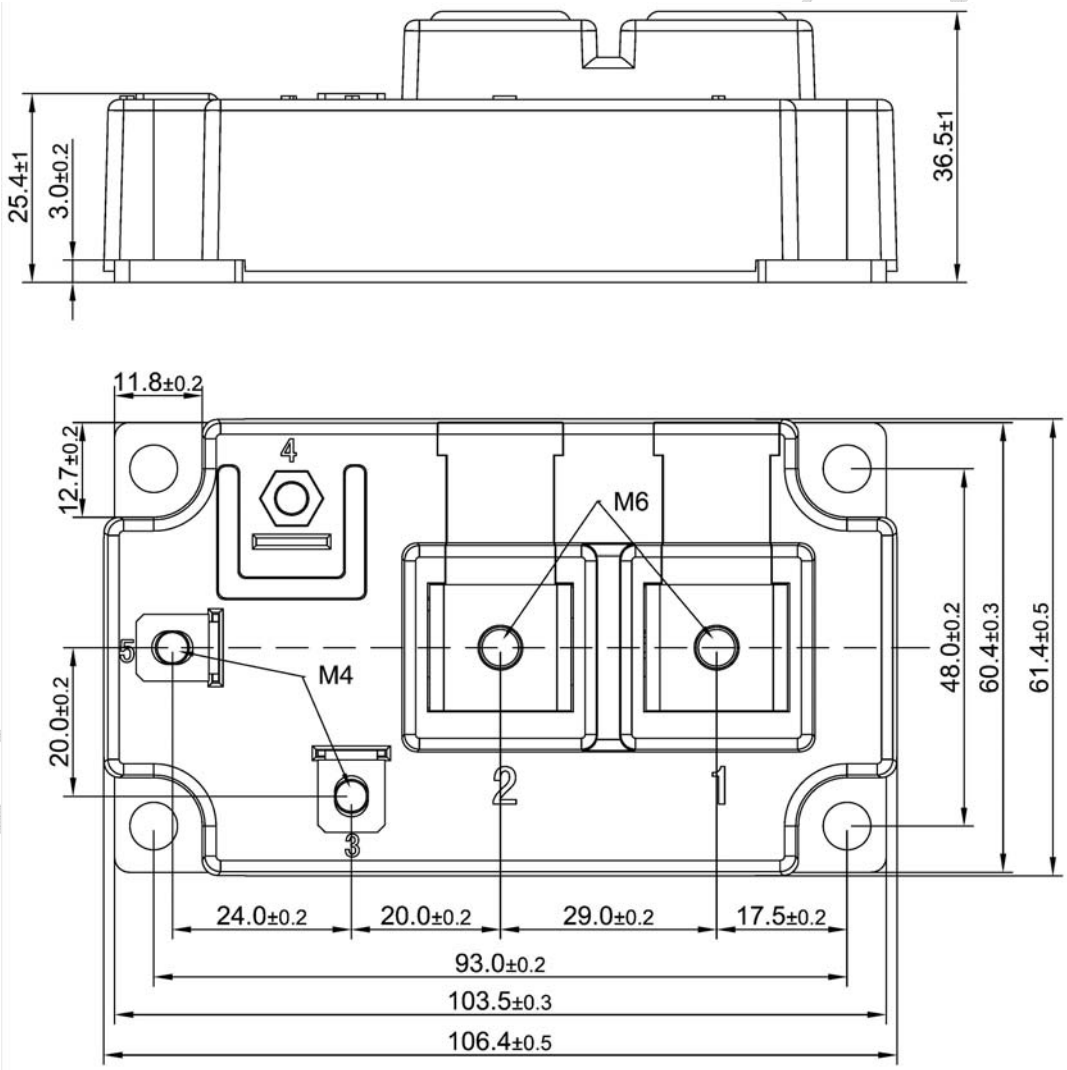


Fig.9 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit



Package Outline (Unit: mm):



Date	Revision	Notes
05/07/2021	A	Final Version
04/12/2022	B	Updated Electrical Characteristics

Announcements

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The released datasheet would be issued with “REV.” + “alphabet characters”.