SILVERMICRO

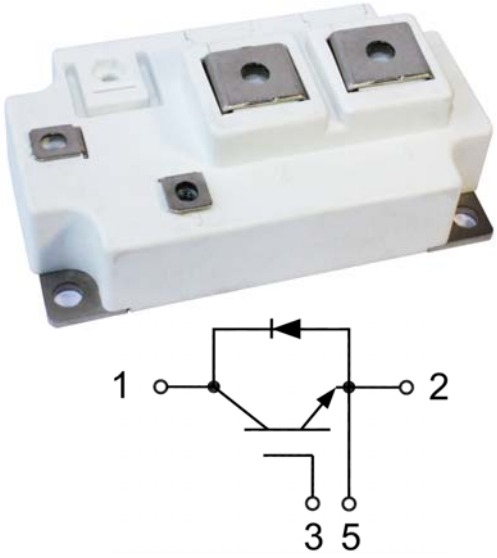
GF400SD120T2ZH

Preliminary Data

IGBT Module

Features：

- Short Circuit Rated>10μs
- Low Saturation Voltage: $V_{CE\ (sat)}$ = 3.30V @ I_C = 400A , T_C=25℃
- 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(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℃,	400	A
		T_C = 25℃	660	A
I_{CM}	Repetitive Peak Collector Current	T_J = 150℃	800	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C = 25℃ T_{Jmax}=150℃	2900	W

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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 = 2mA, V_{CE} = V_{GE}		4.5	5.0	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 400A, V_{GE} = 15V	T_J = 25℃		3.30	3.50	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℃				400	nA
C_{ies}	Input Capacitance	V_{CE} = 25V, V_{GE} = 0V , f =1MHz			45.5		nF
C_{oes}	Output Capacitance				3.65		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V,I_C = 400A, R_G = 5Ω,V_{GE} = ±15V, Inductive Load	T_J = 25℃		1730		ns
			T_J = 125℃		1200		
t_r	Rise Time		T_J = 25℃		320		ns
			T_J = 125℃		250		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		1600		ns
			T_J = 125℃		1550		
t_f	Fall Time		T_J = 25℃		140		ns
			T_J = 125℃		125		
E_{on}	Turn-on Switching Loss		T_J = 25℃		22.5		mJ
			T_J = 125℃		30.0		
E_{off}	Turn-off Switching Loss		T_J = 25℃		38.2		mJ
			T_J = 125℃		47.0		
Q_g	Total Gate Charge		T_J = 25℃		4000		nC
R_G	Internal gate resistor		T_J = 25℃		2.49		Ω
RBSOA	Reverse Bias Safe Operation Area	I_C=400A,V_{CC}=1050V,Vp=1200V, Rg = 5Ω, 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				0.043		℃/W

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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	400	A
I_{FM}	Diode Maximum Forward Current	800	A

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

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F = 400A	T_J = 25℃		3.00		V
			T_J = 125℃		3.10		
I_{rr}	Peak Reverse Recovery Current	I_F =400A, di/dt = 1270A/μs, V_{rr} = 600V, V_{GE} = -15V	T_J = 25℃		75		A
			T_J = 125℃		135		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		7.17		μC
			T_J = 125℃		22.4		
E_{rec}	Reverse Recovery Energy		T_J = 25℃		2.63		mJ
			T_J = 125℃		8.28		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.113		℃/W

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	℃
$R_{\theta CS}$	Case-To-Sink Thermally (Conductive Grease Applied)			0.03		℃/W
T	Signal Terminals Screw:M4		1.0		2.0	N·m
	Power Terminals Screw:M6		3.0		5.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			320		g

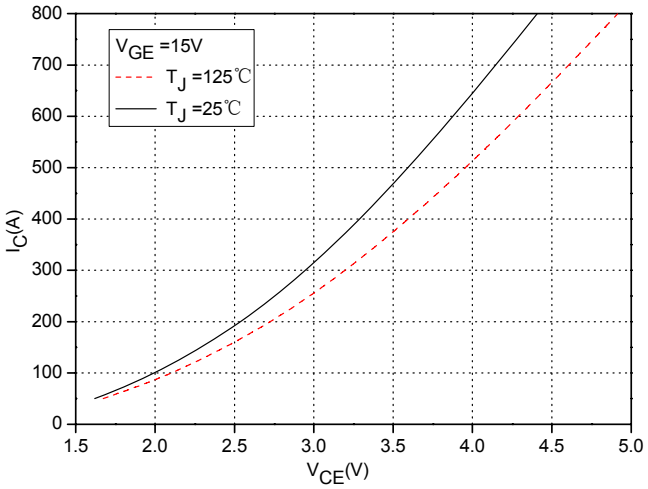


Fig.1 Typical Saturation Voltage Characteristics

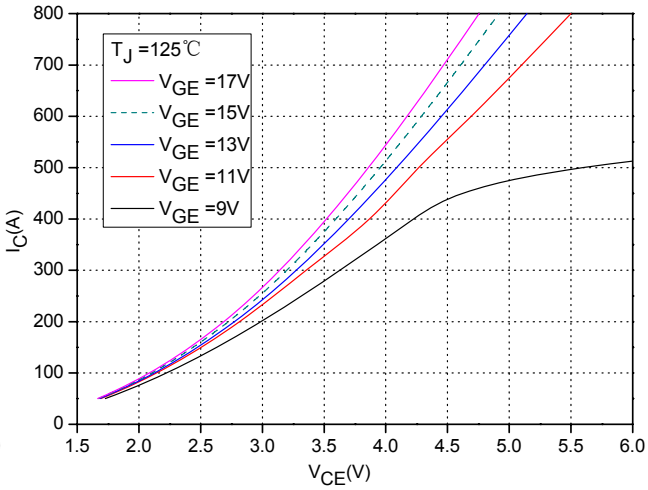


Fig.2 Typical Output Characteristics

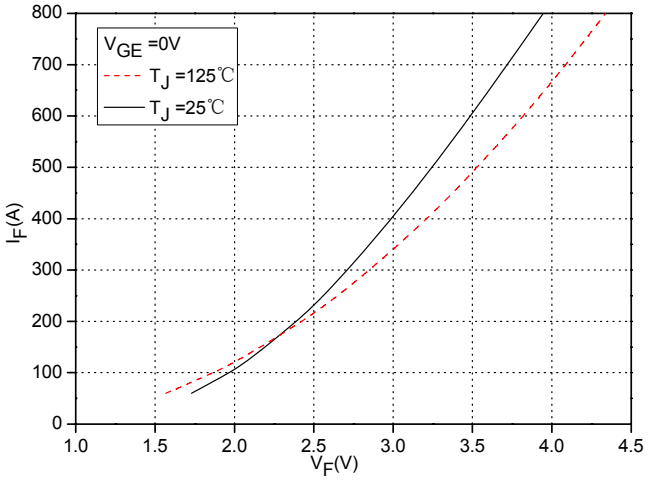


Fig.3 Forward Characteristics of FWD

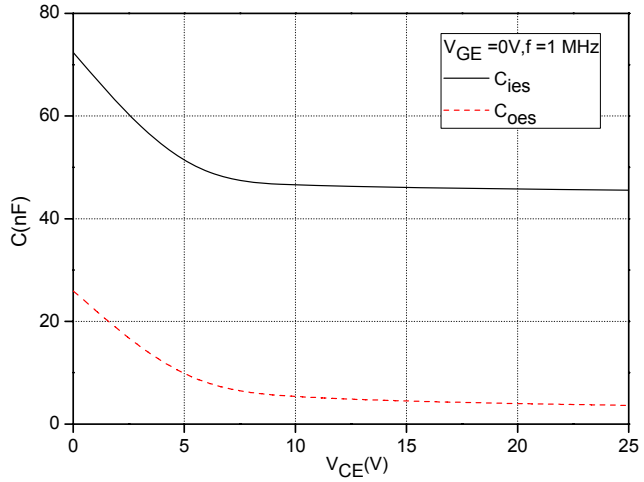


Fig.4 Capacitance Characteristics

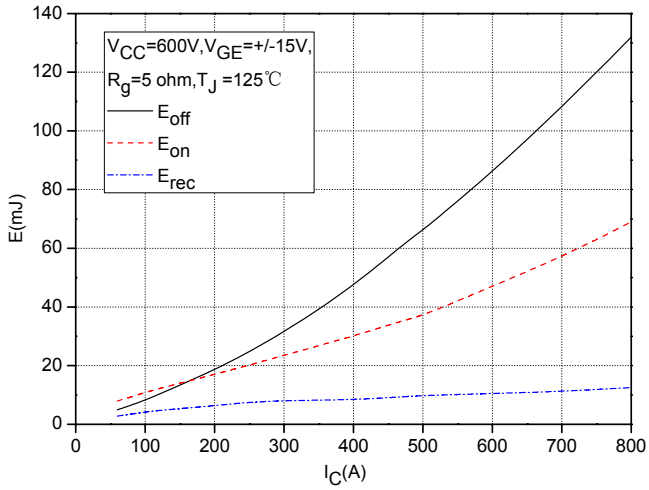


Fig.5 Typical Switching Loss vs. Collector Current

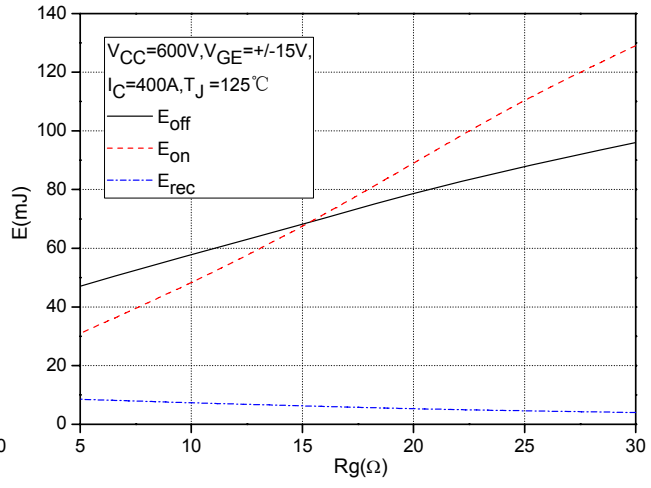


Fig.6 Typical Switching Loss vs. Gate Resistance

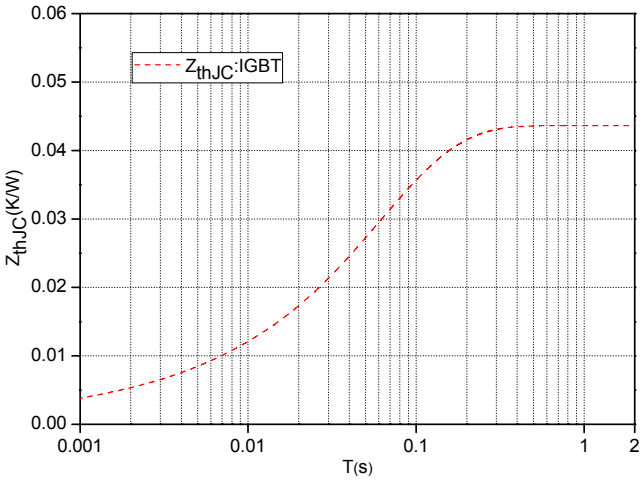


Fig.7 Transient Thermal Impedance (IGBT)

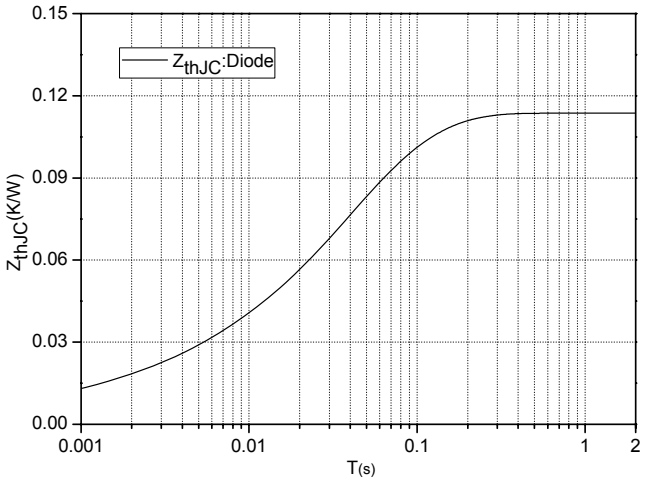


Fig.8 Transient Thermal Impedance (Diode)

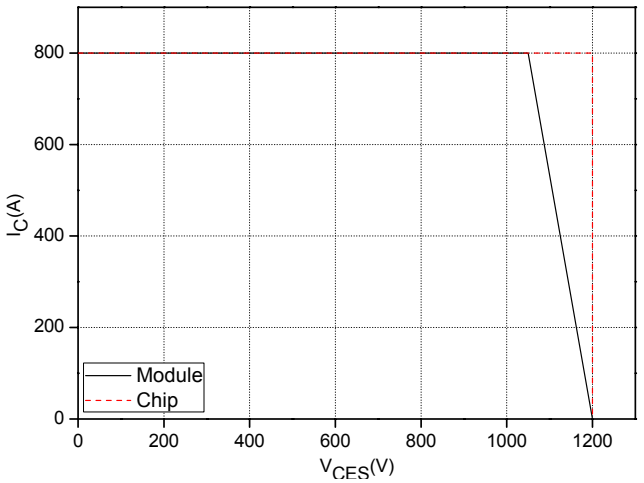
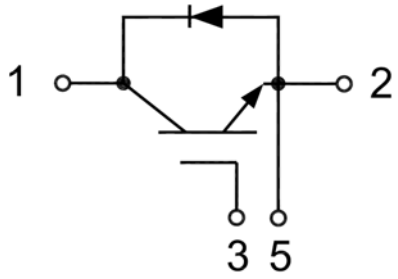
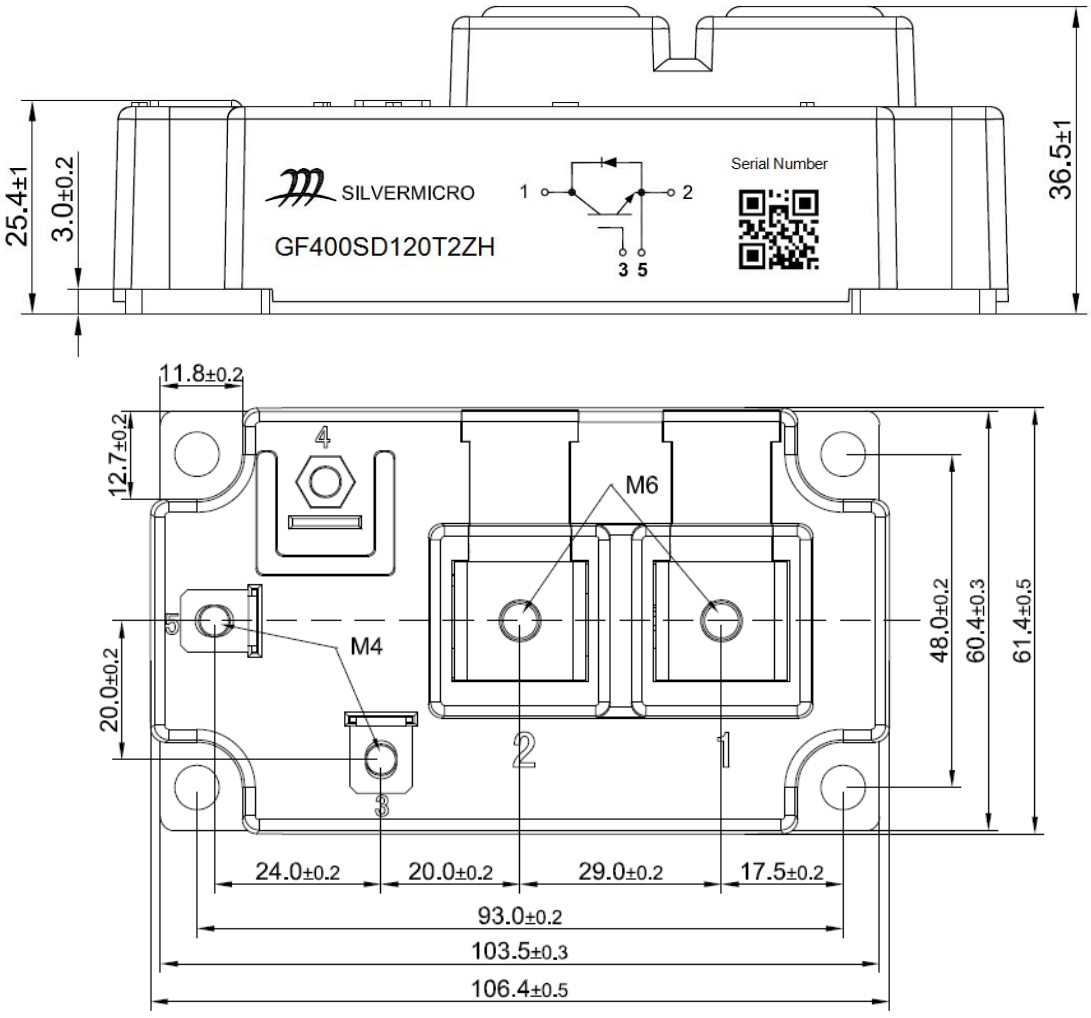


Fig.9 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit:



Package Outline (Unit: mm):



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