

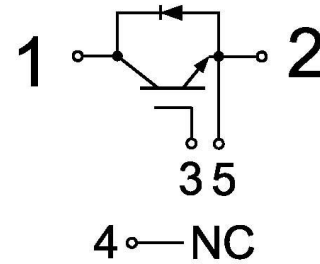


GF600SD120T2ZH

IGBT Module

Features:

- Non Punch Through (NPT) Technology
- Short Circuit Rated $>10\mu\text{s}$
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested($2\times I_c$)
- 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 ($T_c=25^\circ\text{C}$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_c=80^\circ\text{C}$	600	A
		$T_c=25^\circ\text{C}$	1200	A
I_{CM}	Repetitive Peak Collector Current	$T_J=150^\circ\text{C}$	1200	A
P_D	Maximum Power Dissipation	$T_c=25^\circ\text{C}$ $T_{Jmax}=150^\circ\text{C}$	5208	W



Electrical Characteristics of IGBT ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=24\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.7	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=600\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	3.50	4.00	V
			$T_J=125^{\circ}\text{C}$	4.25		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0\text{V}$, $V_{CE}=V_{CES}$, $T_J=25^{\circ}\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			800	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		47.0		nF
C_{oes}	Output Capacitance			3.92		nF
C_{res}	Reverse Transfer Capacitance			2.08		nF

Switching Characteristics

Switching Characteristics							
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_c=600A,$ $R_{Gon}=1\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		865		ns
			$T_J=125^{\circ}C$		900		
t_r	Rise Time		$T_J=25^{\circ}C$		220		ns
			$T_J=125^{\circ}C$		221		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=600V, I_c=600A,$ $R_{Goff}=1\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		875		ns
			$T_J=125^{\circ}C$		925		
t_f	Fall Time		$T_J=25^{\circ}C$		134		ns
			$T_J=125^{\circ}C$		126		
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_c=600A,$ $R_{Gon}=1\Omega, V_{GE}=\pm 15V,$ $di/dt=2148A/\mu s(T_J=125^{\circ}C),$ Inductive Load	$T_J=25^{\circ}C$		24.8		mJ
			$T_J=125^{\circ}C$		28.8		
E_{off}	Turn-off Switching Loss	$V_{CC}=600V, I_c=600A,$ $R_{Goff}=1\Omega, V_{GE}=\pm 15V,$ $du/dt=3443V/\mu s(T_J=125^{\circ}C),$ Inductive Load	$T_J=25^{\circ}C$		67.2		mJ
			$T_J=125^{\circ}C$		74.0		
Q_g	Total Gate Charge	$V_{GE}=+15V \dots -15V$	$T_J=25^{\circ}C$		6.76		μC
$R_{G(int)}$	Internal Gate Resistor		$T_J=25^{\circ}C$		0.42		Ω
SCSOA	$V_{CC}=600V, V_{GE}=\pm 15V, T_J=150^{\circ}C$			10			μs
$R_{\theta JC}$	Thermal Resistance: Junction-to-Case (per IGBT)					0.024	$^{\circ}C/W$



Diode, Inverter

Maximum Rated Values of Diode ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	$T_J=25^{\circ}\text{C}$	1200	V
I_F	Diode Continuous Forward Current		600	A
I_{FM}	Diode Maximum Forward Current	$t_p=1\text{ms}$	1200	A

Electrical Characteristics of Diode ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units	
V _{FM}	Forward Voltage	I _F =600A	T _J =25°C		2.50		V	
			T _J =125°C		2.65			
t _{rr}	Reverse Recovery Time	I _F =600A, -diF/dt =2632A/μs(T _J =125°C), V _{rr} =600V, V _{GE} =-15V	T _J =25°C		172		ns	
			T _J =125°C		269			
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		169		A	
			T _J =125°C		250			
Q _{rr}	Reverse Recovery Charge		T _J =25°C		18.9		μC	
			T _J =125°C		40.0			
E _{rec}	Reverse Recovery Energy		T _J =25°C		5.6		mJ	
			T _J =125°C		17.7			
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.065	°C/W	



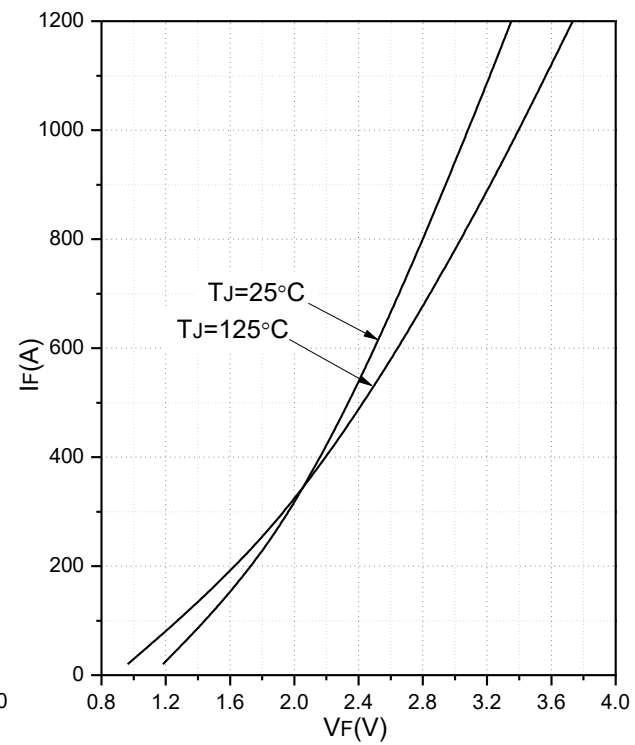
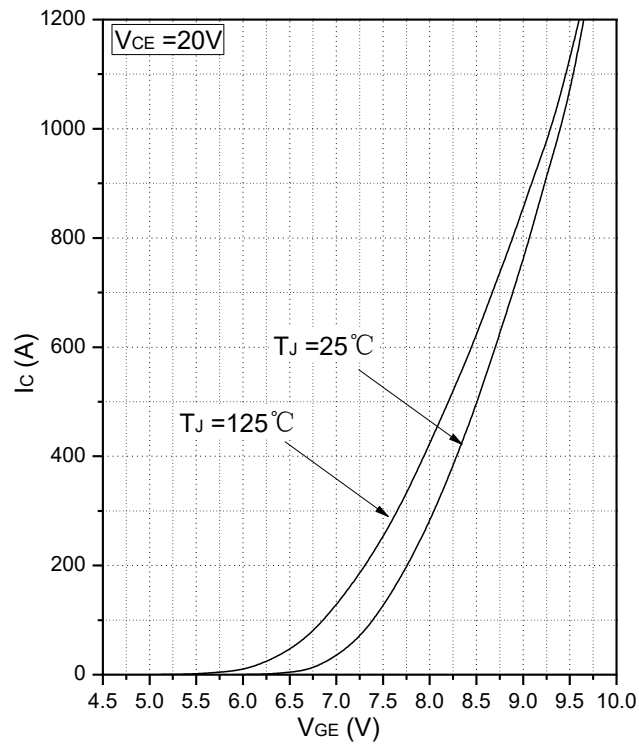
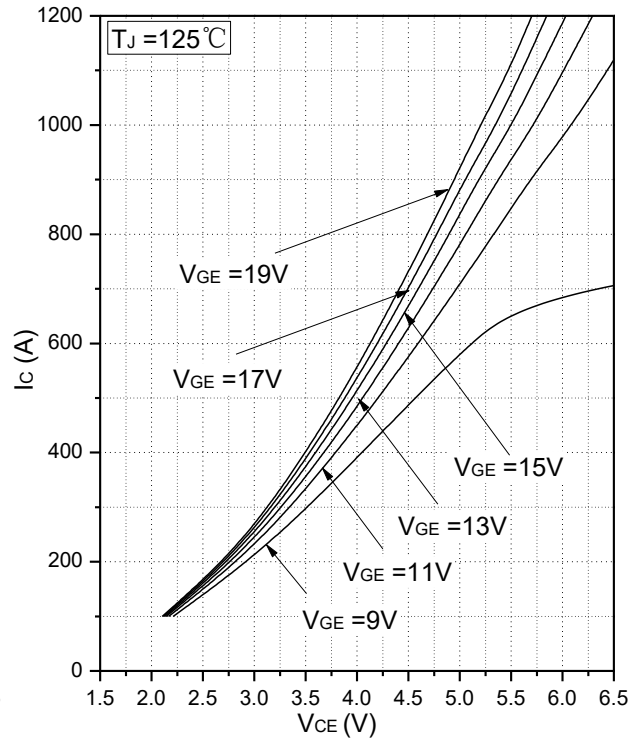
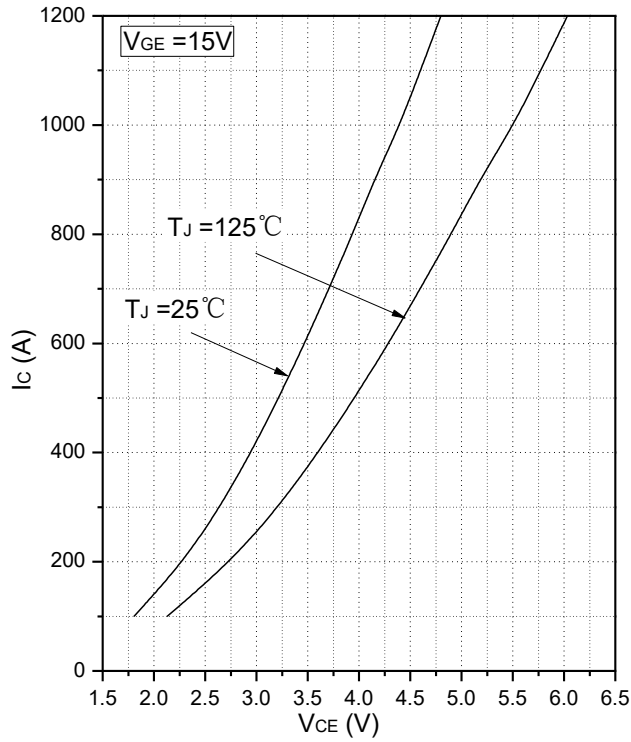
Module

Symbol	Description	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1minute		2500	V
T _J	Maximum Junction Temperature			150	°C
T _{JOP}	Maximum Operating Junction Temperature Range	-40		+150	°C
T _{stg}	Storage Temperature	-40		+125	°C
CTI	Comparative Tracking Index	200			
R _{θCS}	Case-to-Sink Thermally (Conductive Grease Applied)			0.03	°C/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)



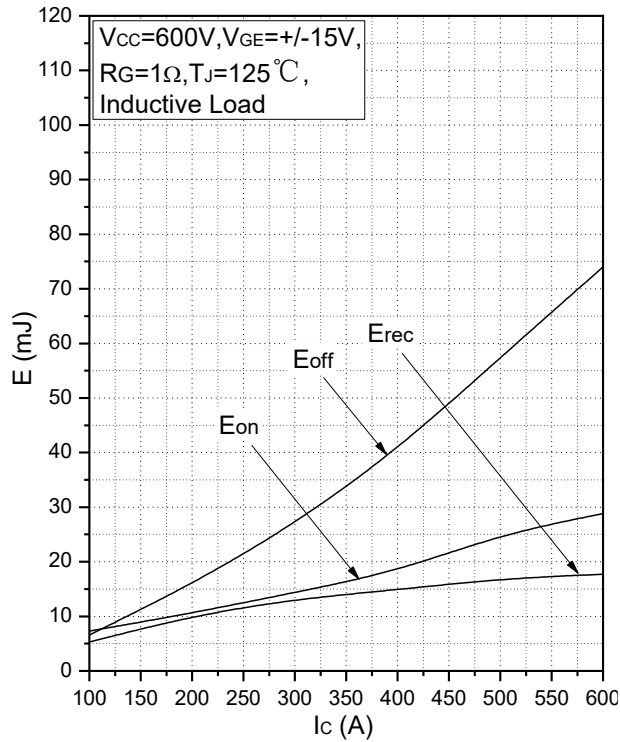


Fig.5 Typical Switching Loss vs. Collector Current

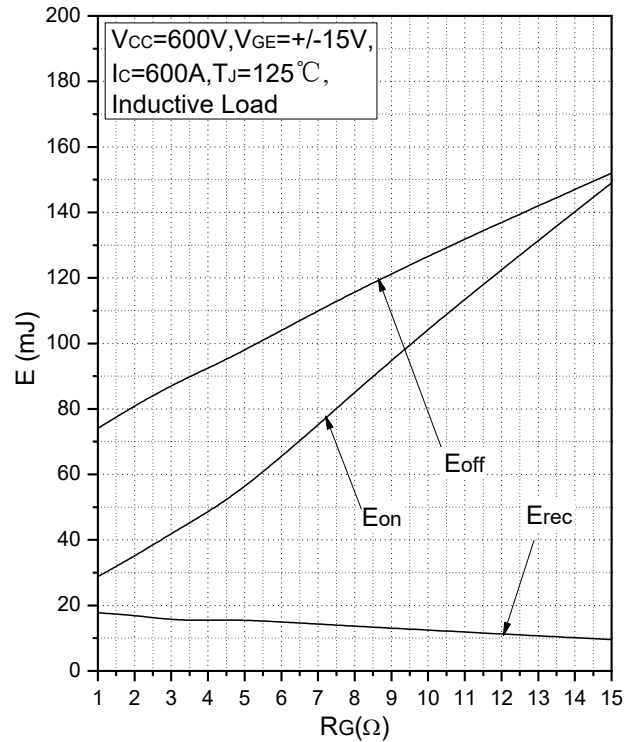


Fig.6 Typical Switching Loss vs. Gate Resistance

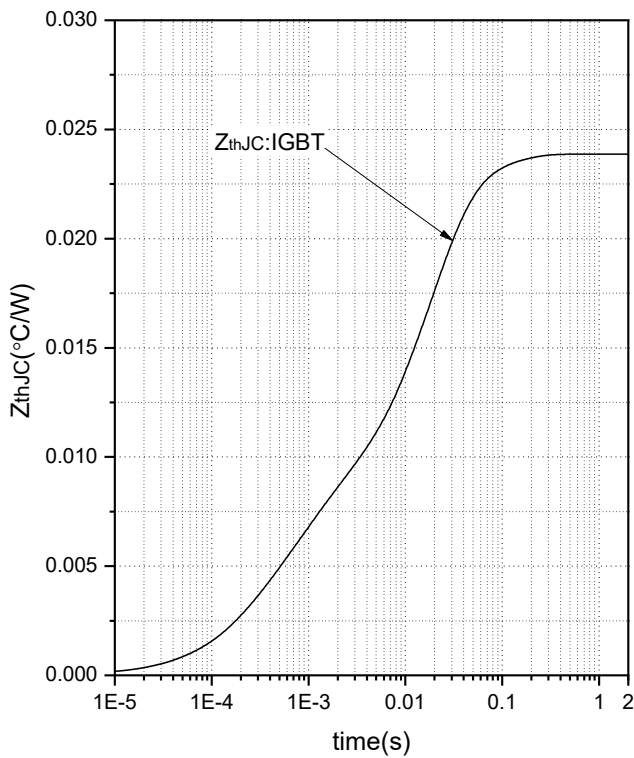


Fig.7 Transient Thermal Impedance (IGBT)

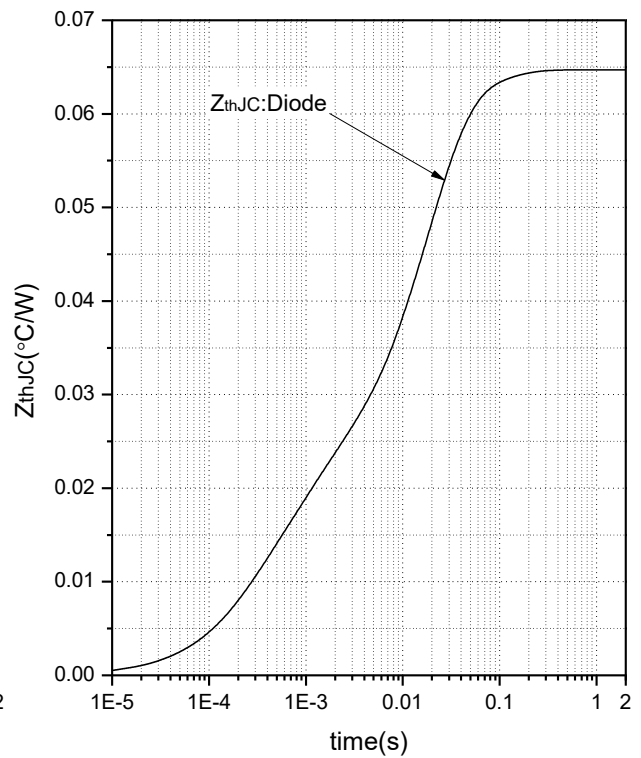


Fig.8 Transient Thermal Impedance (Diode)

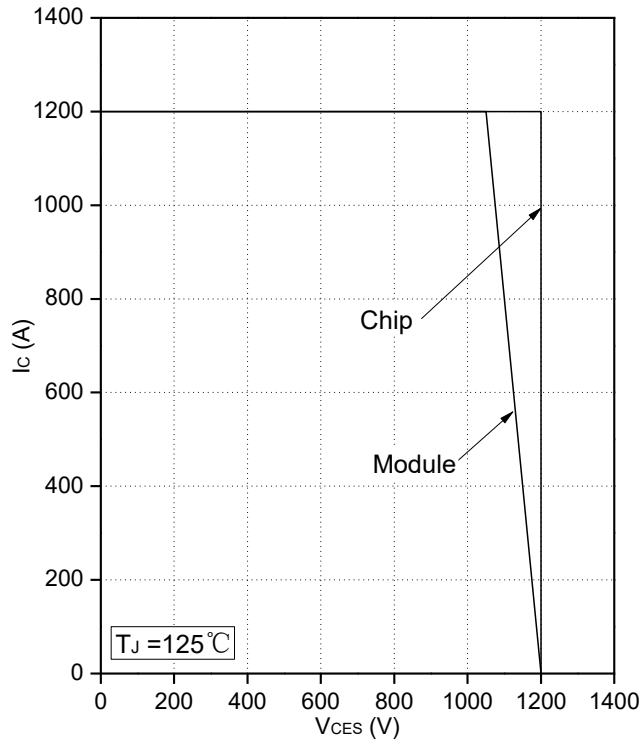
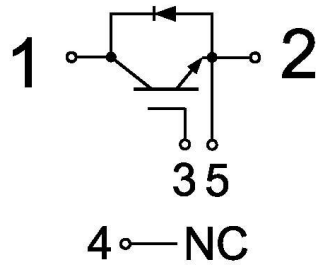


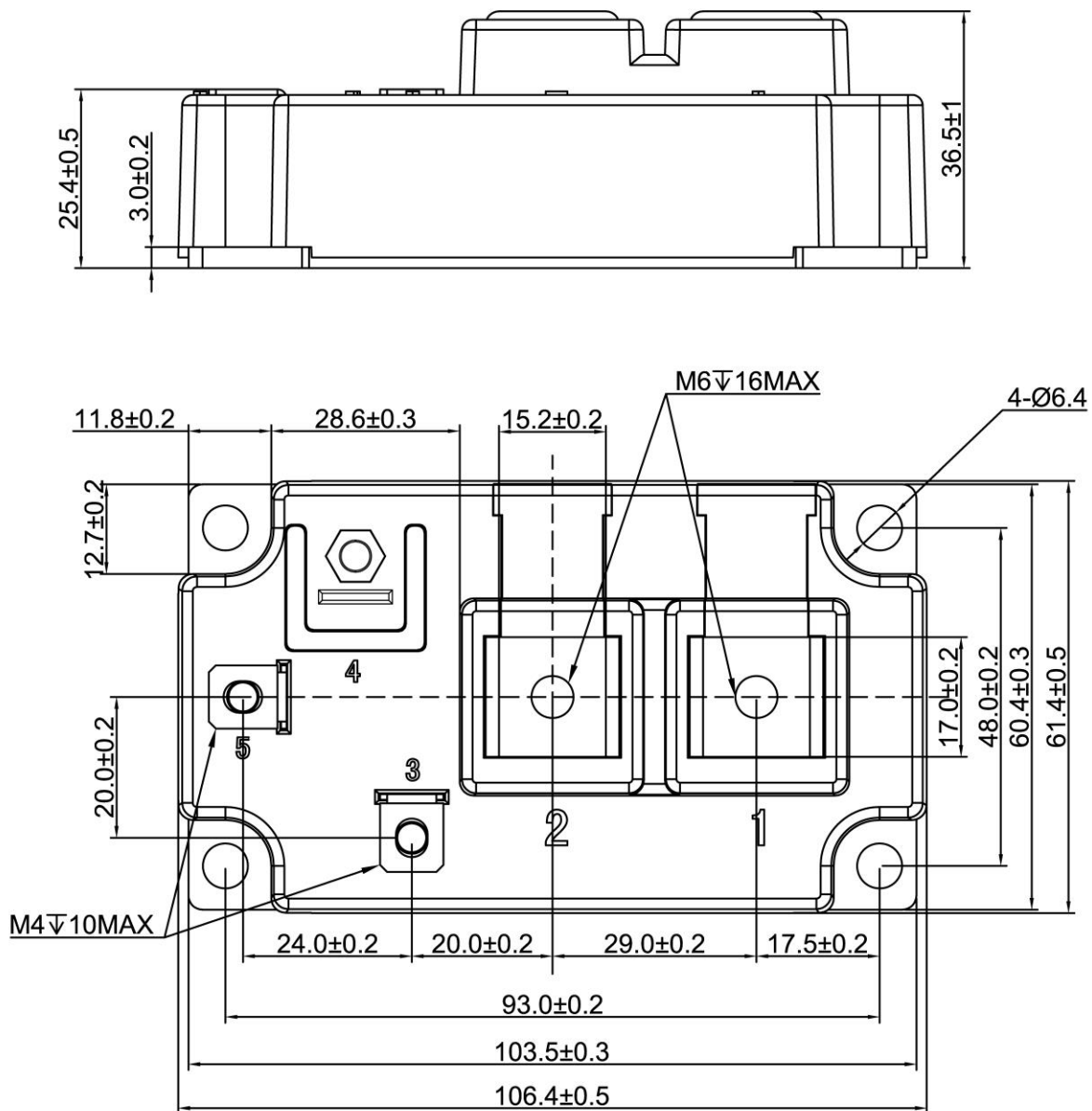
Fig.9 Reverse Bias Safe Operation Area (RBSOA)



Internal Circuit



Package Outline (Unit: mm):





Revision	Notes
A	Final Version
B	Updated Electrical Characteristics
C	Add Product Code and Update Package Outline

Announcements

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