

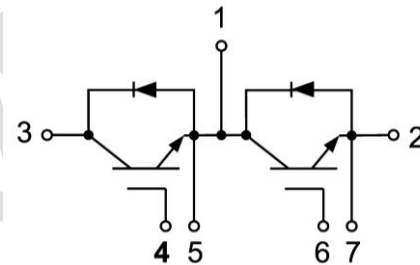
GF300HF120T2NH

IGBT Module

Preliminary Data

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:

- Welding Machine
- Cutting Machine
- Plating Power Supply
- Induction Heating

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	$T_C=80^\circ\text{C}$	300	A
		$T_C=25^\circ\text{C}$	600	A
I_{CM}	Repetitive Peak Collector Current	$T_J=150^\circ\text{C}$	600	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per leg	$T_C=25^\circ\text{C}$ $T_{Jmax}=150^\circ\text{C}$	2535	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	$I_C=6\text{mA}$, $V_{CE}=V_{GE}$	4.5	5.5	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	2.90	3.20	V
			$T_J=125^{\circ}\text{C}$	3.50		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	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			400	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$		23.5		nF
C_{oes}	Output Capacitance			2.16		nF
C_{res}	Reverse Transfer Capacitance			1.11		nF

Switching Characteristics

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=300A,$ $R_{Gon}=5\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		538		ns
			$T_J=125^{\circ}C$		560		
t_r	Rise Time		$T_J=25^{\circ}C$		114		ns
			$T_J=125^{\circ}C$		114		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^{\circ}C$		536		ns
			$T_J=125^{\circ}C$		581		
t_f	Fall Time		$T_J=25^{\circ}C$		193		ns
			$T_J=125^{\circ}C$		210		
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=300A,$ $R_{Gon}=5\Omega, V_{GE}=\pm 15V,$ $di/dt=2310A/\mu s(T_J=125^{\circ}C),$ Inductive Load	$T_J=25^{\circ}C$		30.6		mJ
			$T_J=125^{\circ}C$		37.5		
E_{off}	Turn-off Switching Loss	$V_{CC}=600V, I_C=300A,$ $R_{Goff}=5\Omega, V_{GE}=\pm 15V,$ $du/dt=4248V/\mu s(T_J=125^{\circ}C),$ Inductive Load	$T_J=25^{\circ}C$		16.8		mJ
			$T_J=125^{\circ}C$		20.1		
Q_g	Total Gate Charge	$V_{GE}=+15V...-15V$	$T_J=25^{\circ}C$		3.3		μC
RBSOA	Reverse Bias Safe Operation Area	$I_C=600A, V_{CC}=1050V, V_p=1200V,$ $R_{Goff}=5\Omega, V_{GE}=+15V$ to $0V, T_J=150^{\circ}C$			Trapezoid		
SCSOA	SCSOA	$V_{CC}=600V, V_{GE}=15V, T_J=150^{\circ}C$			10		μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-to-Case					0.048	$^{\circ}C/W$

Diode, Inverter

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

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	300	A
I_{FM}	Diode Maximum Forward Current	600	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 =300A	T _J =25℃		2.65		V	
			T _J =125℃		2.80			
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/dt=3150A/μs(T _J =125℃), V _{rr} =600V, V _{GE} =-15V	T _J =25℃		172		ns	
			T _J =125℃		364			
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		108		A	
			T _J =125℃		136			
Q _{rr}	Reverse Recovery Charge		T _J =25℃		11.7		μC	
			T _J =125℃		23.8			
E _{rec}	Reverse Recovery Energy		T _J =25℃		4.08		mJ	
			T _J =125℃		8.52			
R _{θJC}	Diode Thermal Resistance: Junction-to-Case					0.143	℃/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	Power Terminals Screw:M6	3.0		5.0	N·m
T	Mounting Screw:M6	4.0		6.0	N·m
G	Weight		290		g

Ordering Information Table

Device code	G	F	300	HF	120	T2N	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - NPT, Fast IGBT
- ③ - Rated Current (300=300A)
- ④ - Circuit Configuration (Half Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

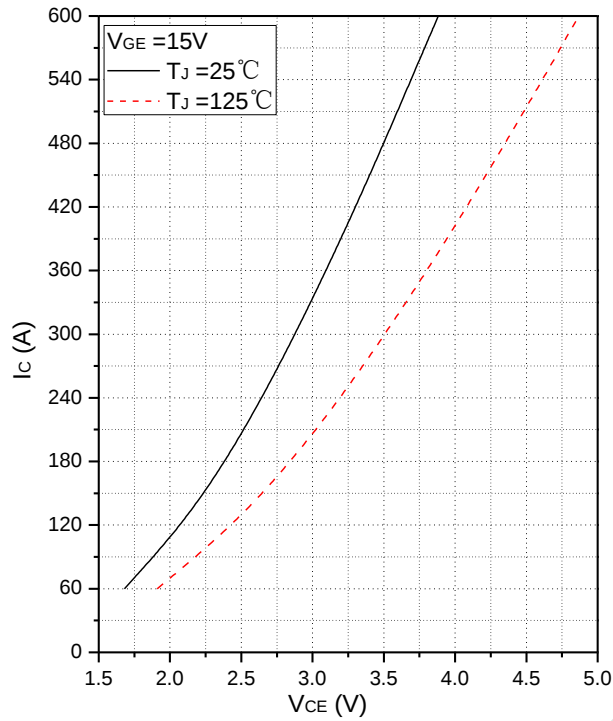


Fig.1 Typical Saturation Voltage Characteristics

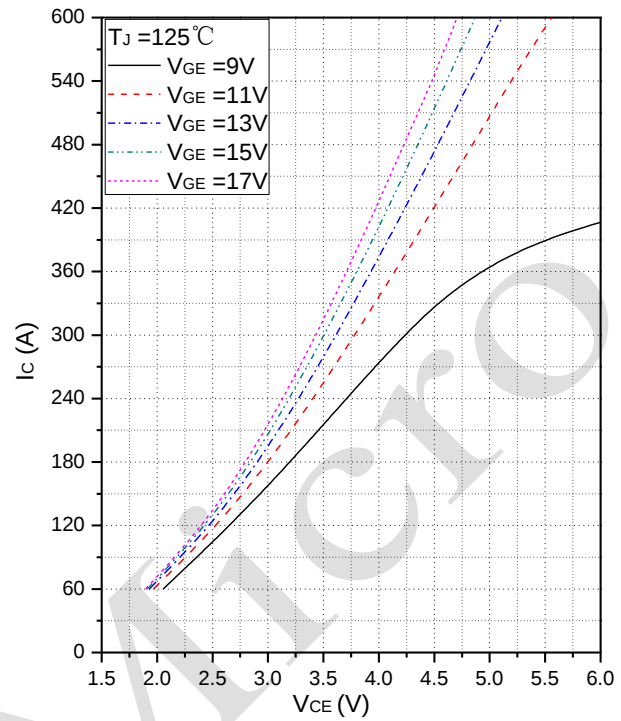


Fig.2 Typical Output Characteristics

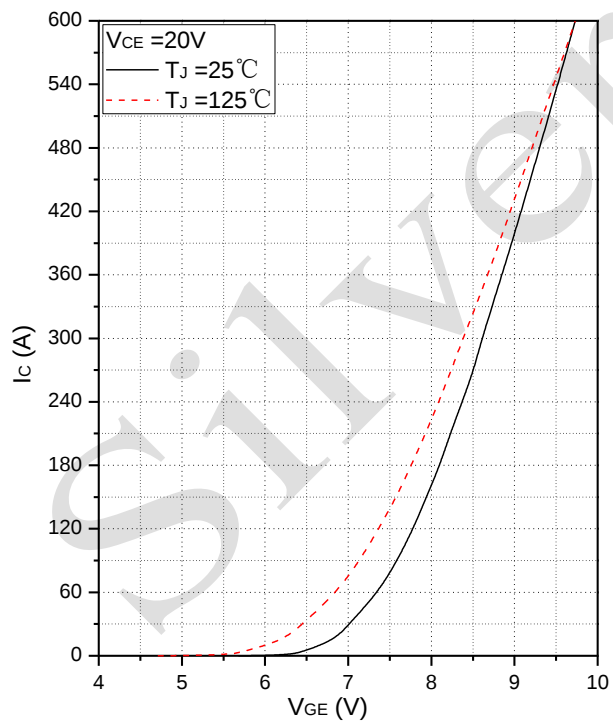


Fig.3 Transfer Characteristic

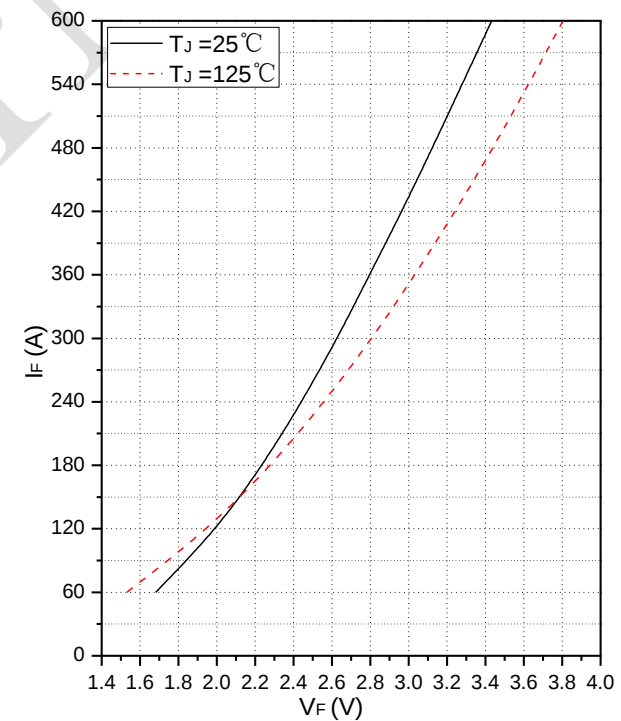
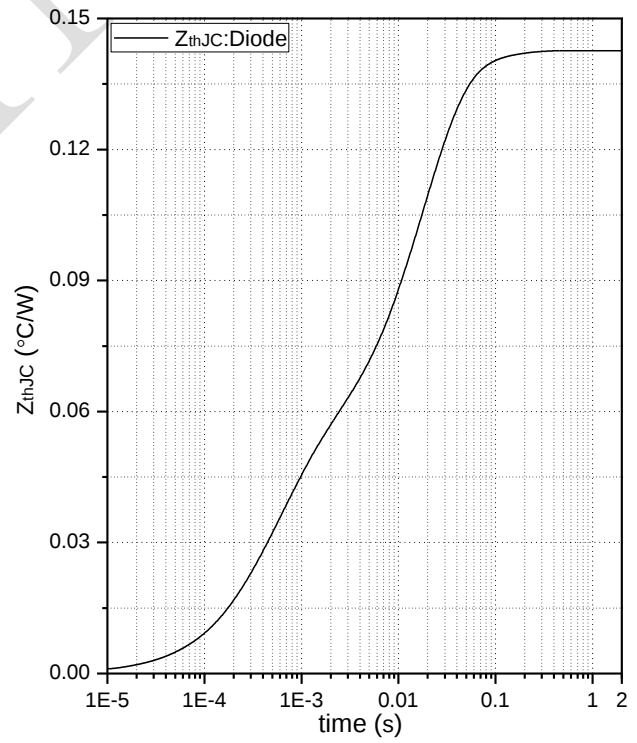
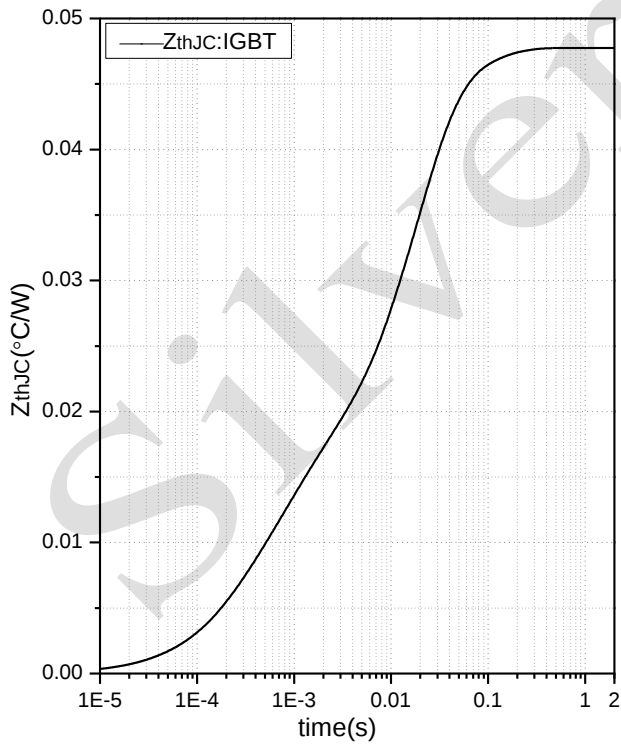
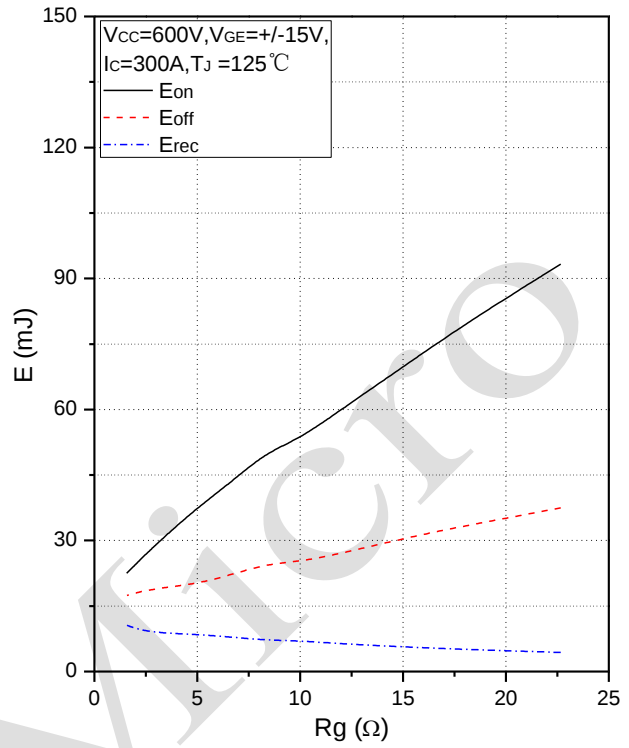
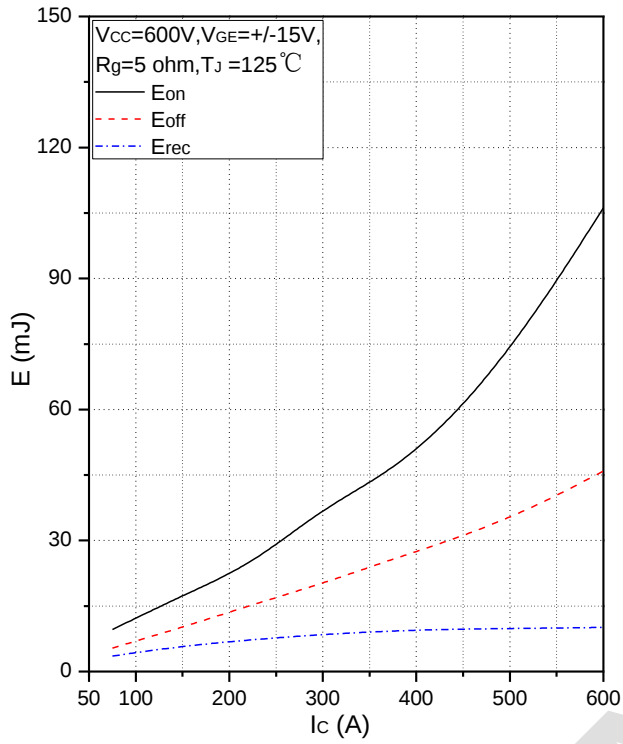


Fig.4 Forward Characteristics of Diode



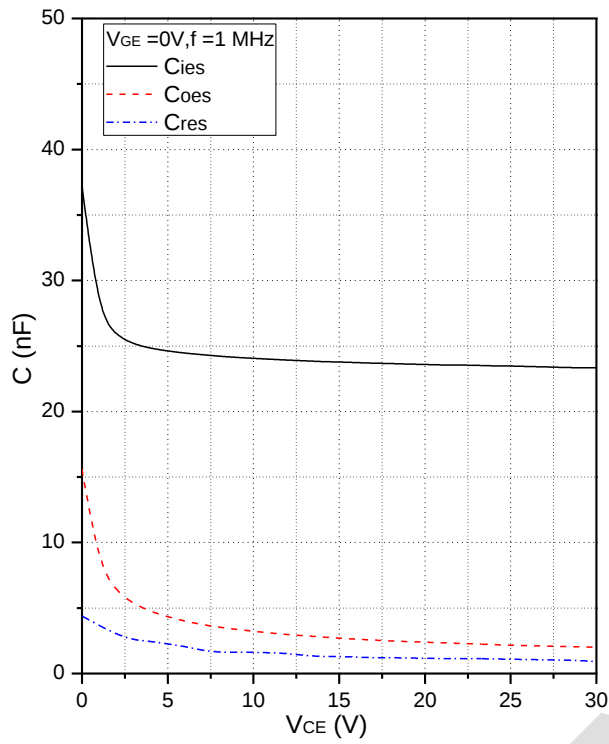


Fig.9 Capacitance Characteristics

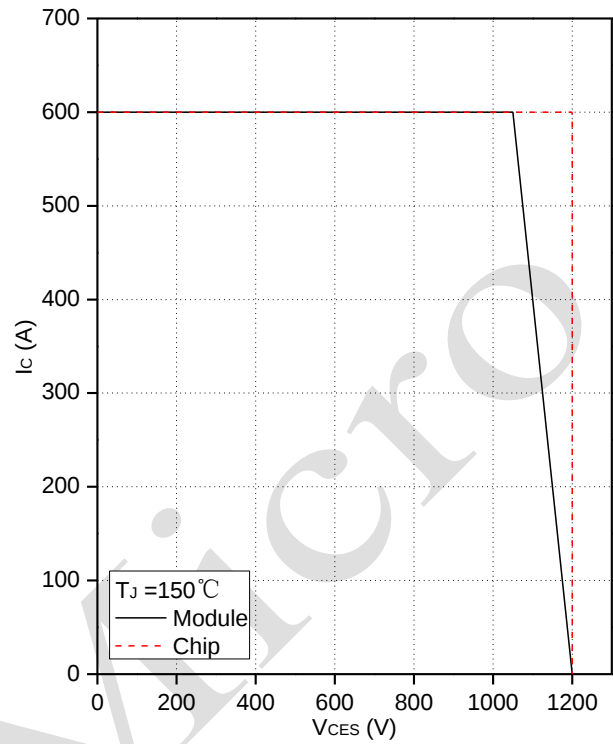
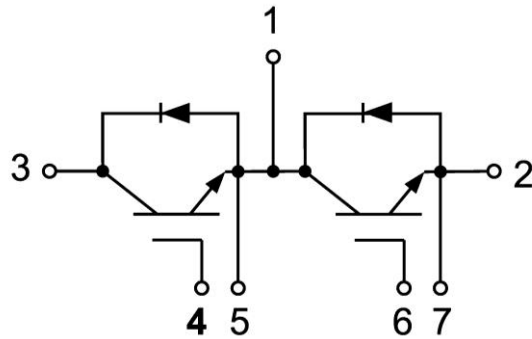
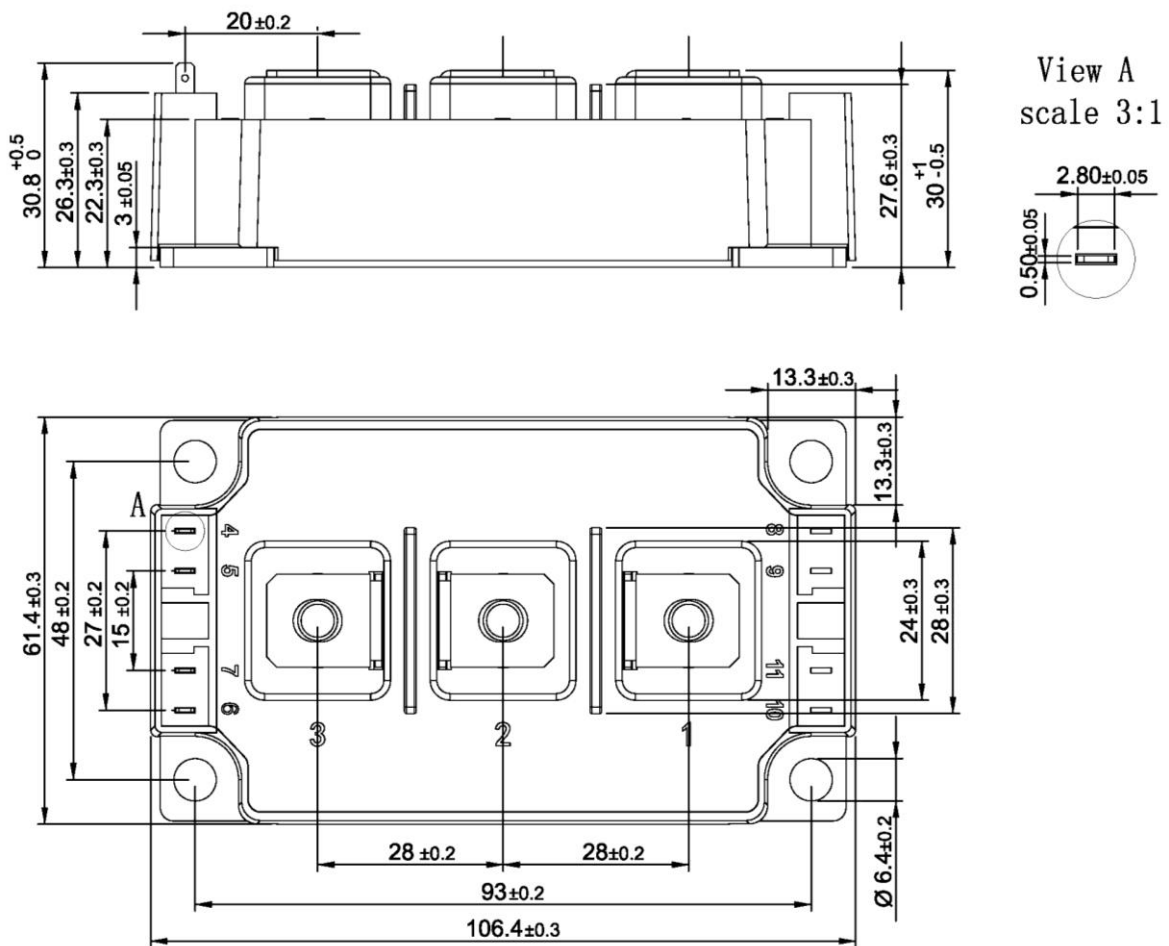


Fig.10 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit



Package Outline (Unit: mm):



Date	Revision	Notes
04/09/2021	01	Initial Release
09/17/2021	02	Change IGBT Thermal Resistance and Curve

Announcements

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