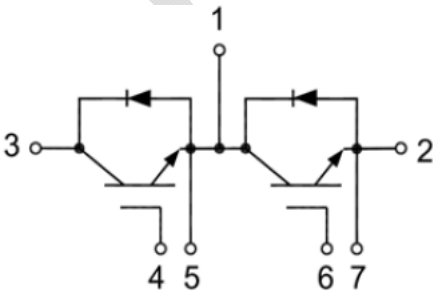
GT150HF120T1H-M

IGBT Module



Features：

- Field Stop Trench Gate IGBT
- 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：

- Industrial Inverters
- Servo Applications
- EV And EHV
- Induction Heating
- UPS Systems

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 = 100℃	150	A
		T_C = 25℃	300	A
I_{CM}	Repetitive Peak Collector Current	T_J = 175℃	300	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C = 25℃ T_{Jmax}=175℃	1085	W

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=4mA, V_{CE}=V_{GE}		5.0	5.9	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=150A, V_{GE} =15V	T_J=25℃		1.70	2.00	V
			T_J=125℃		1.90		V
			T_J=150℃		2.00		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			10.13		nF
C_{oes}	Out Capacitance				1.01		nF
C_{res}	Reverse Transfer Capacitance				0.77		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V,I_C=150A, R_{Gon}=4.7Ω,V_{GE}= ±15V, Inductive Load	T_J=25℃		258		ns
			T_J=125℃		258		
			T_J=150℃		260		
t_r	Rise Time		T_J=25℃		85		ns
			T_J=125℃		89		
			T_J=150℃		89		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V,I_C=150A, R_{Goff} =4.7Ω,V_{GE}= ±15V, Inductive Load	T_J=25℃		265		ns
			T_J=125℃		277		
			T_J=150℃		284		
t_f	Fall Time		T_J=25℃		205		ns
			T_J=125℃		376		
			T_J=150℃		428		
E_{on}	Turn-on Switching Loss	V_{CC}=600V,I_C=150A, R_{Gon} =4.7Ω,V_{GE}= ±15V, di/dt=1550A/μs (T_J=150℃) Inductive Load	T_J=25℃		12.5		mJ
			T_J=125℃		15.7		
			T_J=150℃		17.5		

E_{off}	Turn-off Switching Loss	V_{CC}=600V,I_C=150A, R_{Goff} =4.7Ω,V_{GE}= ±15V, du/dt=4106V/μs (T_J=150℃) Inductive Load	T_J=25℃		10.3		mJ
			T_J=125℃		15.8		
			T_J=150℃		17.4		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J = 25℃		0.71		uC
RBSOA	I_C=300A,V_{CC}=1050V,Vp=1200V, R_{Goff} =4.7Ω, V_{GE}=+15V to 0V, T_J=150°C			Trapezoid			
SC Data	Vcc=600V, R_{Gon}=4.7 Ω, R_{Goff}=4.7 Ω, tp=10us, V_{GE}=+/-15V,T_J=125℃				680		A
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case（per leg）				0.138		℃/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	150	A
I_{FM}	Diode Maximum Forward Current	300	A

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

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F=150A	T_J=25℃		1.50		V
			T_J=125℃		1.50		
			T_J=150℃		1.50		
t_{rr}	Reverse Recovery Time	I_F=150A, -diF/dt=1670A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		371		ns
			T_J=125℃		562		
			T_J=150℃		625		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		127		A
			T_J=125℃		142		
			T_J=150℃		145		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		22.6		μC
			T_J=125℃		34.6		
			T_J=150℃		39.4		

E_{rec}	Reverse Recovery Energy	I_F=150A, -diF/dt=1670A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		9.7		mJ
			T_J=125℃		15.2		
			T_J=150℃		17.6		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case（per leg）				0.213		℃/W

Module

Symbol	Description		Min	Typ	Max	Unit
V_{iso}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500			V
Internal Isolation				Al2O3		
Material of Module Baseplate				Copper		
d_{creep}	Creepage Distance: Terminal to Heatsink			17.0		mm
	Creepage Distance: Terminal to Terminal			20.0		mm
d_{clear}	Clearance: Terminal to Heatsink			17.0		mm
	Clearance: Terminal to Terminal			9.5		mm
L_{SCE}	Stray Inductance Module			30		nH
T_J	Maximum Junction Temperature				175	℃
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)			0.1		℃/W
T	Power Terminals Screw:M5		3.0		5.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			135		g

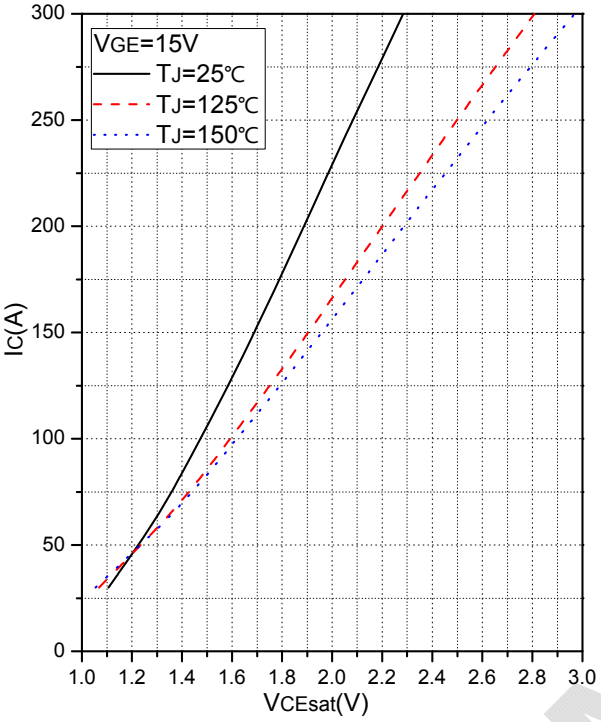


Fig.1 Typical Saturation Voltage Characteristics

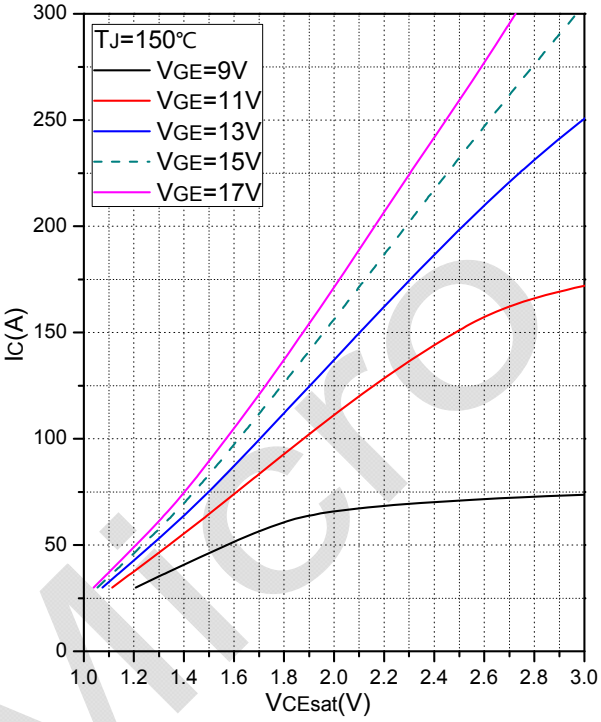


Fig.2 Typical Output Characteristics

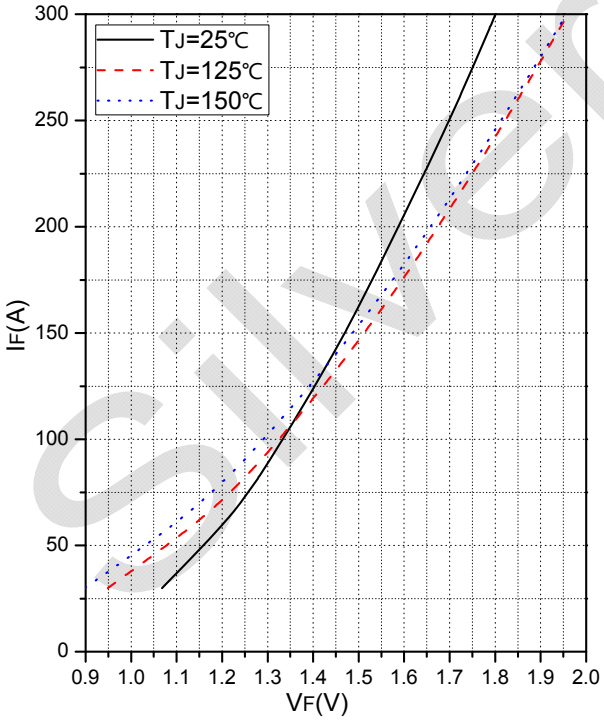


Fig.3 Forward Characteristics of FWD

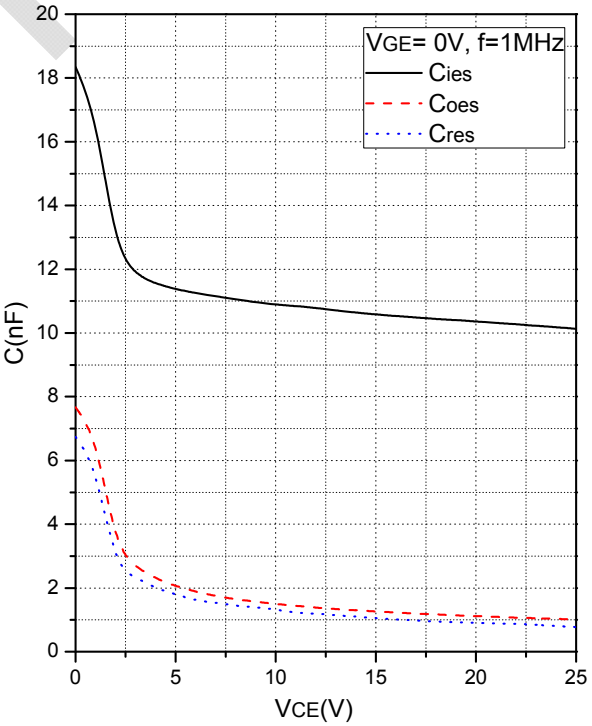


Fig.4 Capacitance Characteristics

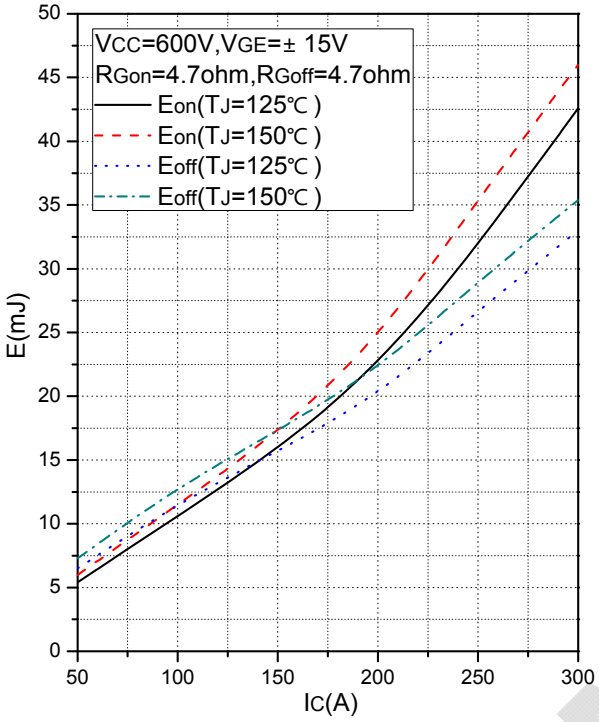


Fig.5 Typical Switching Loss vs. Collector Current

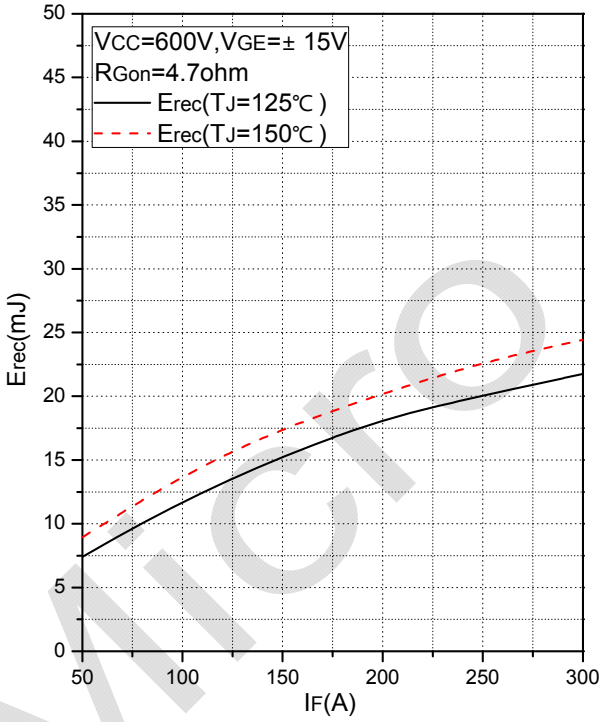


Fig.6 Typical Switching Loss vs. Forward Current

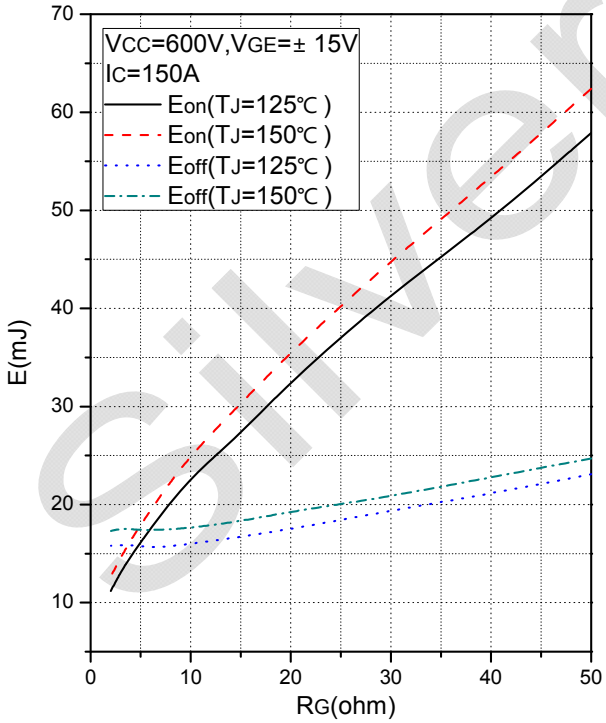


Fig.7 Typical Switching Loss vs. Gate Resistance

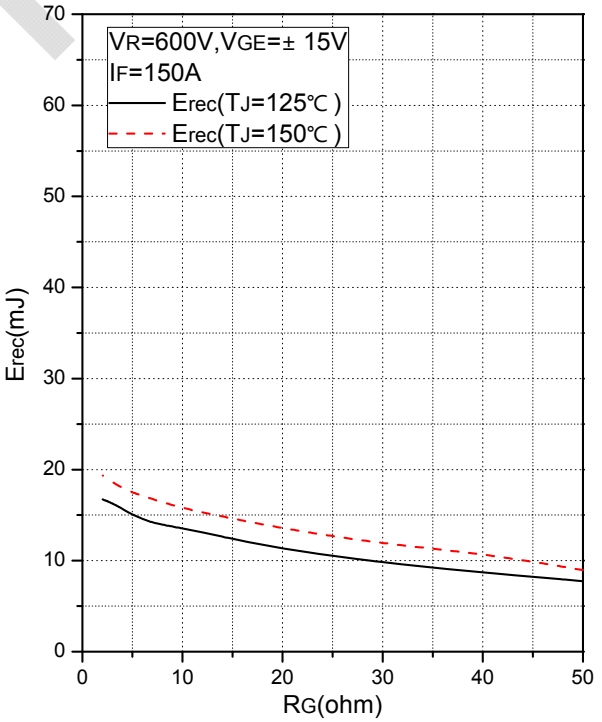


Fig.8 Typical Switching Loss vs. Gate Resistance

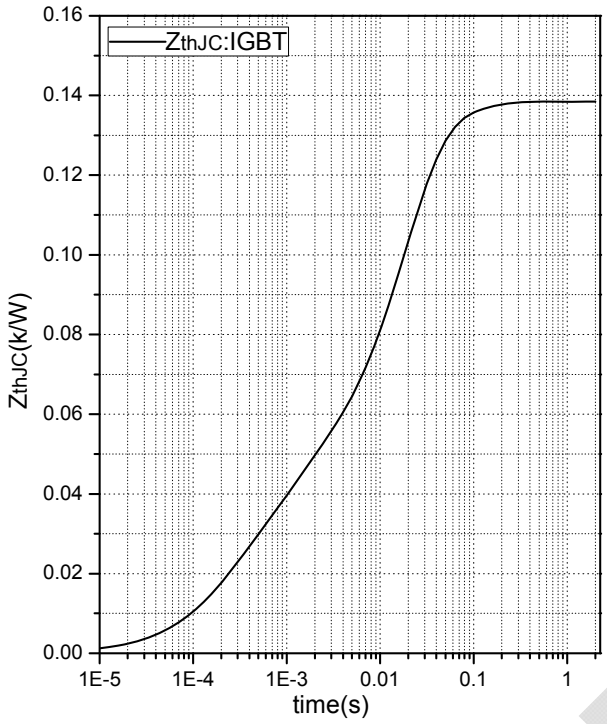


Fig.9 Transient Thermal Impedance

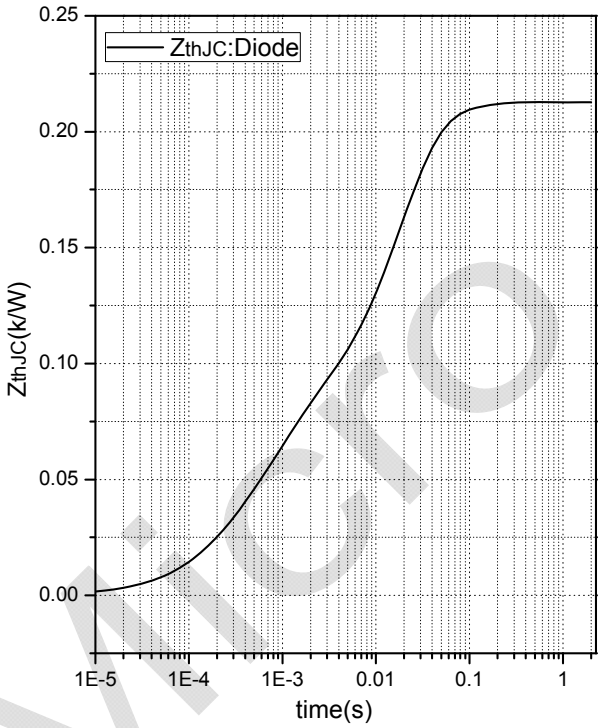


Fig.10 Transient Thermal Impedance

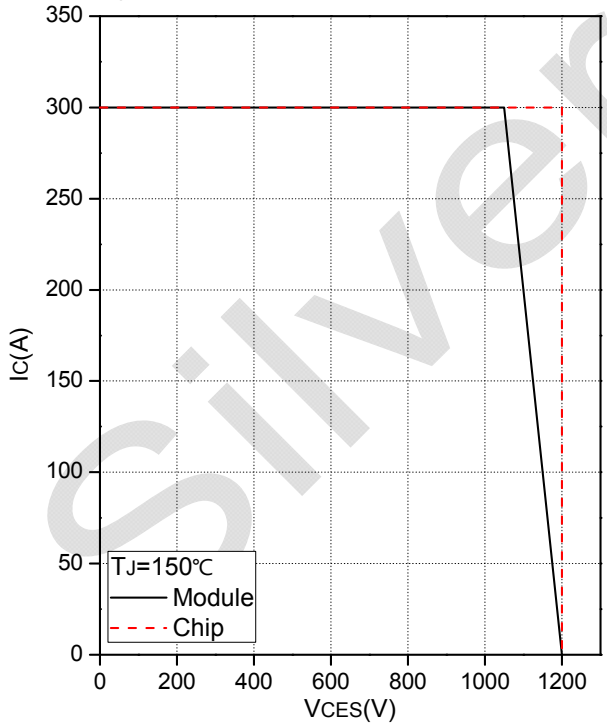
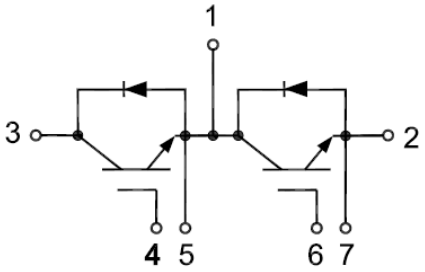
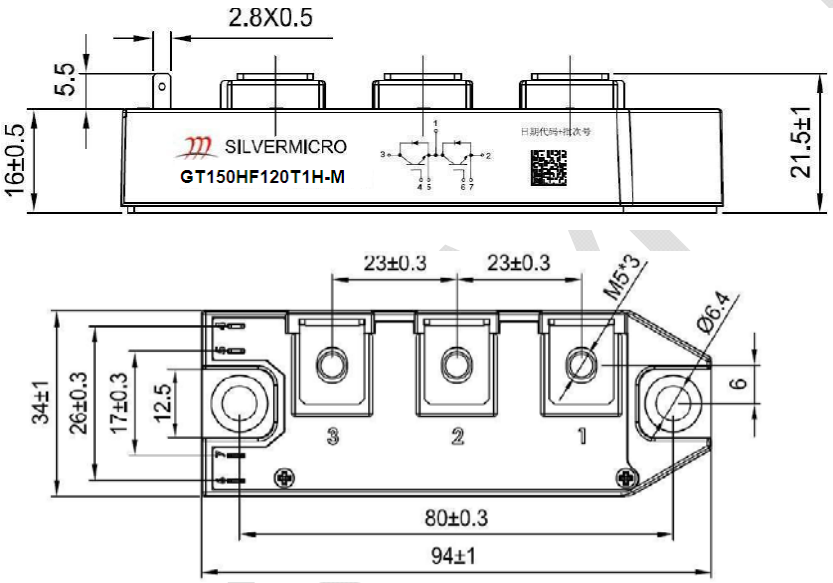


Fig.11 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit:



Package Outline (Unit: mm):



Date	Revision	Notes
04/17/2020	A	Final Version

Announcement

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