GT300HF120T9H

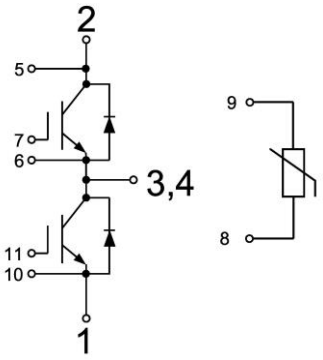
IGBT Module

Preliminary Data

Features:

- Trench & Field Stop IGBT
- Short Circuit Rated ＞10μs
- Low Switching Loss
- 100% RBSOA Tested(2×Ic)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Circuit Diagram



Applications:

- Motor Drives
- Servo Drives
- UPS Systems
- Wind Turbines

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℃	300	A
		T_C=25℃	530	A
I_{CM}	Peak Collector Current Repetitive	tp=1ms	600	A
P_D	Maximum Power Dissipation (IGBT)	T_C=25℃, T_{Jmax}=175℃	1899	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=11.5mA, V_{CE}=V_{GE}		5.0	5.9	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=300A, V_{GE}=15V	T_J=25℃		1.80	2.10	V
			T_J=125℃		2.20		V
			T_J=150℃		2.30		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=100kHz			34.1		nF
C_{oes}	Output Capacitance				1.7		nF
C_{res}	Reverse Transfer Capacitance				0.3		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V, I_C=300A, R_G=2Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		154		ns
			T_J=125℃		164		
			T_J=150℃		166		
t_r	Rise Time		T_J=25℃		74		ns
			T_J=125℃		80		
			T_J=150℃		84		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V, I_C=300A, R_G=2Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		382		ns
			T_J=125℃		428		
			T_J=150℃		436		
t_f	Fall Time		T_J=25℃		144		ns
			T_J=125℃		234		
			T_J=150℃		278		
E_{on}	Turn-on Switching Loss	V_{CC}=600V, I_C=300A, R_G=2Ω, V_{GE}=±15V, di/dt=2966A/μs (T_J=150℃) Inductive Load	T_J=25℃		19.5		mJ
			T_J=125℃		23.6		
			T_J=150℃		26.3		

E_{off}	Turn-off Switching Loss	V_{CC}=600V, I_C=300A, R_G=2Ω, V_{GE}=±15V, du/dt=5400V/μs (T_J=150℃) Inductive Load	T_J=25℃		20.1		mJ
			T_J=125℃		31.2		
			T_J=150℃		32.3		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		2.79		uC
$R_{G(int)}$	Internal Gate Resistance		T_J=25℃		1.5		Ω
Isc	V_{CC}=600V, V_{GE}=±15V, tp=10μs, T_J=150℃				908		A
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.079	℃/W

Diode, Inverter

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

V_{RRM}	Repetitive Peak Reverse Voltage	T_J=25℃	1200	V
I_F	Diode Continuous Forward Current		300	A
I_{FM}	Peak Diode Current Repetitive	tp=1ms	600	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F=300A	T_J=25℃		1.80		V
			T_J=125℃		1.95		
			T_J=150℃		1.95		
t_{rr}	Reverse Recovery Time	I_F=300A, -diF/dt=3129A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		204		ns
			T_J=125℃		552		
			T_J=150℃		644		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		158		A
			T_J=125℃		162		
			T_J=150℃		173		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		19.5		μC
			T_J=125℃		38.1		
			T_J=150℃		42.1		

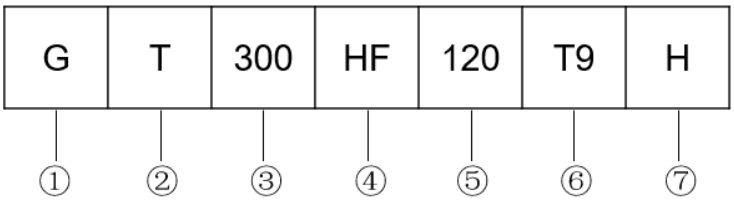
E_{rec}	Reverse Recovery Energy	I_F=300A, -diF/dt=3129A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		5.5		mJ
			T_J=125℃		11.4		
			T_J=150℃		12.6		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.163	℃/W

Module

Symbol	Description		Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 1minute	2500			V
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)				0.02	℃/W
M	Power Terminals Screw:M6		4.0		5.0	N·m
M	Mounting Screw:M5		3.0		6.0	N·m
G	Weight			330		g

Ordering Information Table

Device code



① - IGBT Module
② - Field Stop Trench Gate 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)

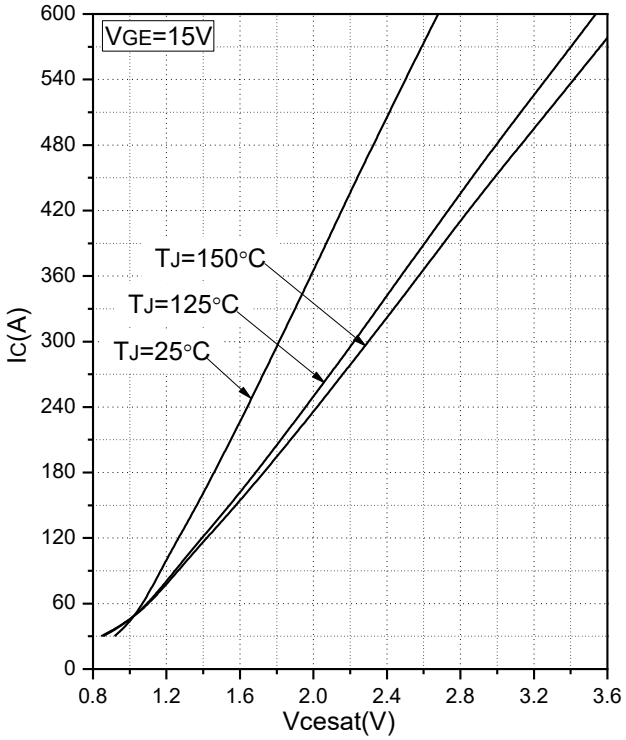


Fig.1 Typical Saturation Voltage Characteristics

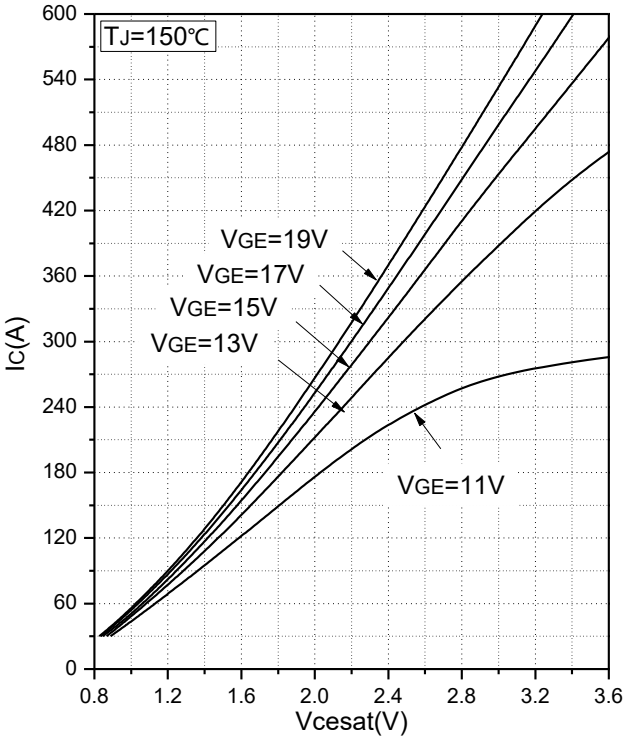


Fig.2 Typical Output Characteristics

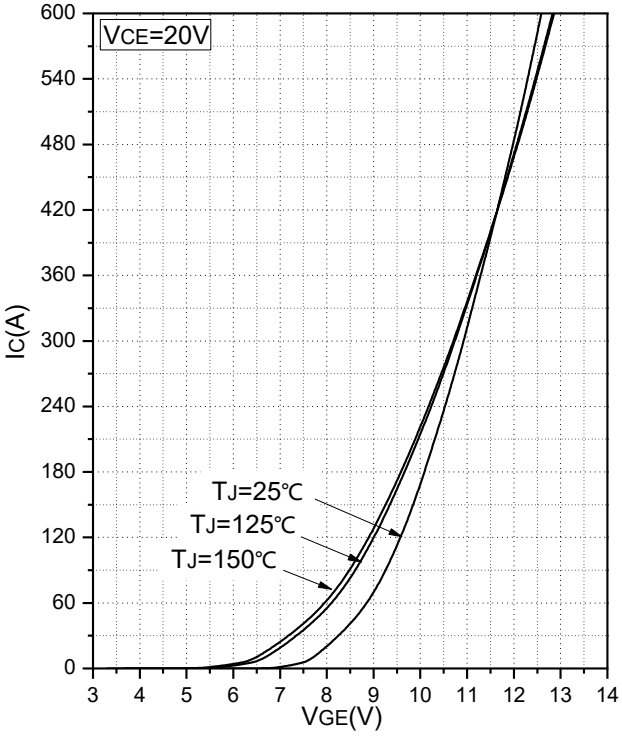


Fig.3 Transfer Characteristic

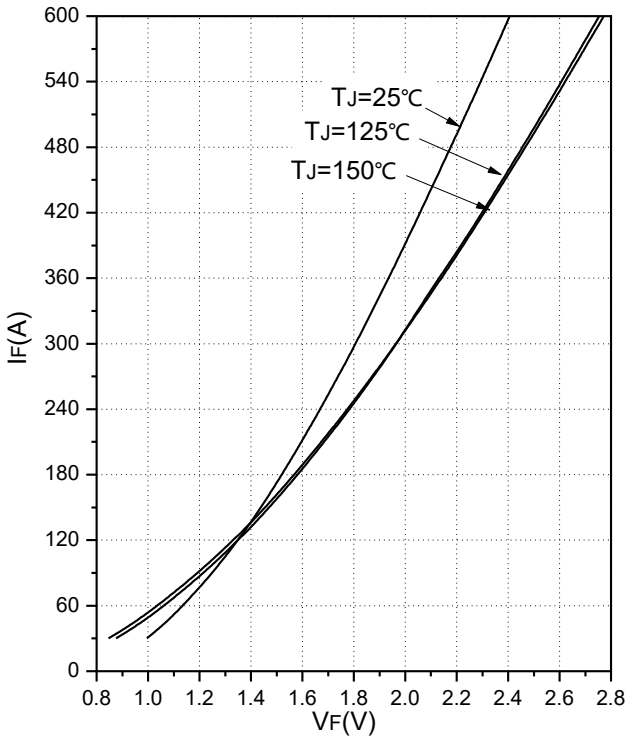


Fig.4 Forward Characteristics of Diode

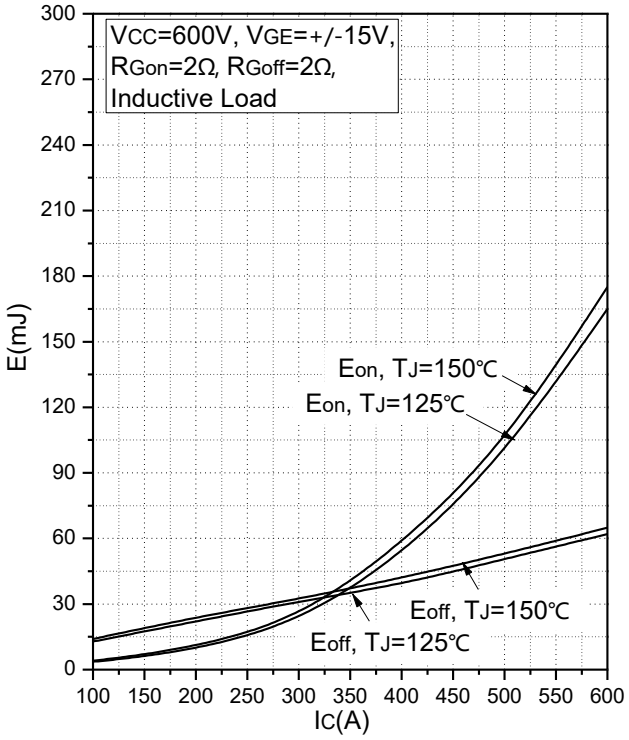


Fig.5 Typical Switching Loss vs. Collector Current

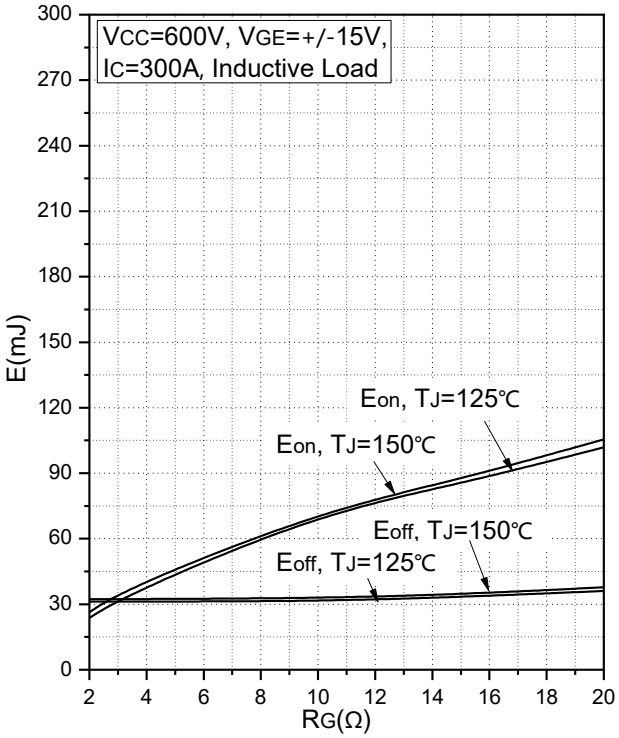


Fig.6 Typical Switching Loss vs. Gate Resistance

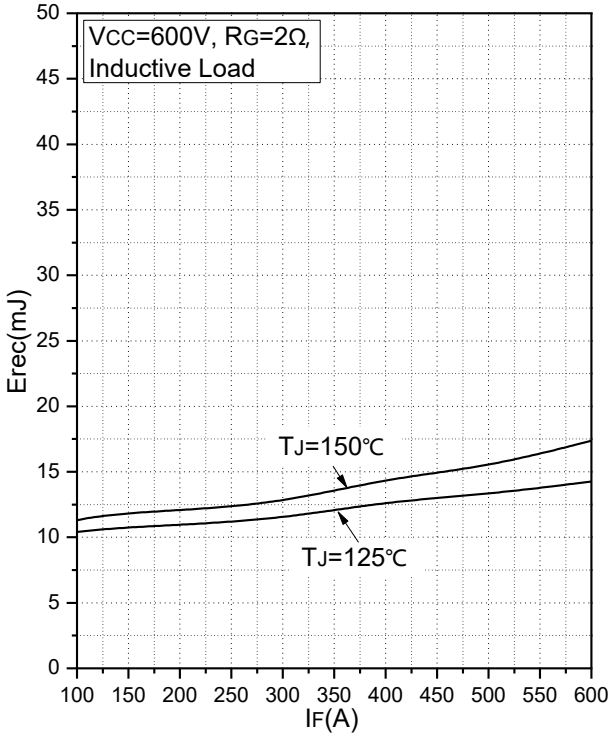


Fig.7 Typical Switching Loss vs. Forward Current

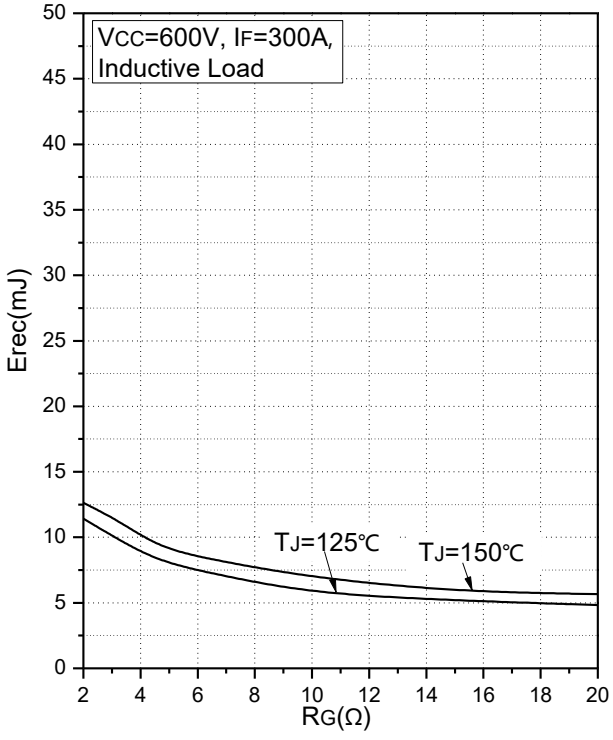


Fig.8 Typical Switching Loss vs. Gate Resistance

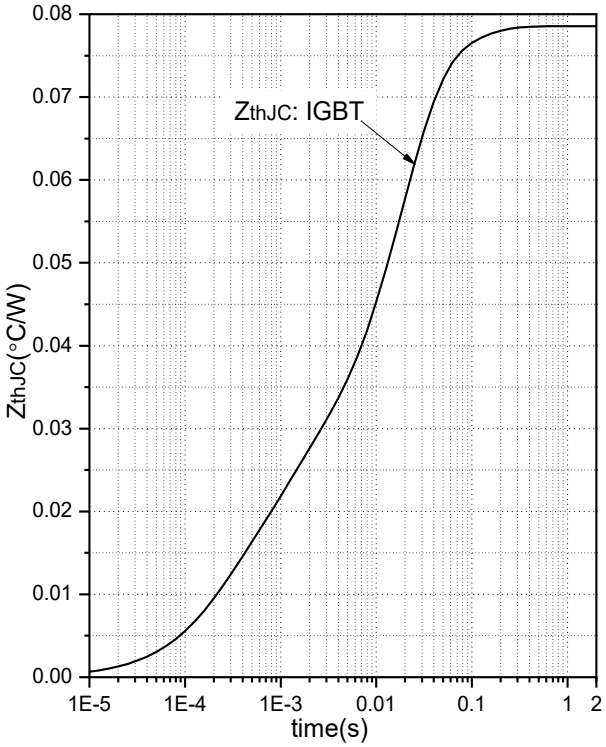


Fig.9 Transient Thermal Impedance (IGBT)

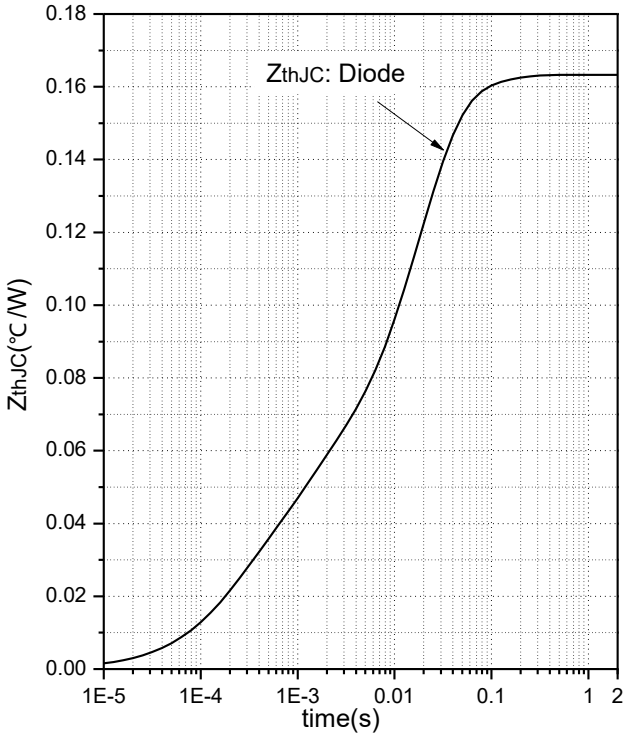


Fig.10 Transient Thermal Impedance (Diode)

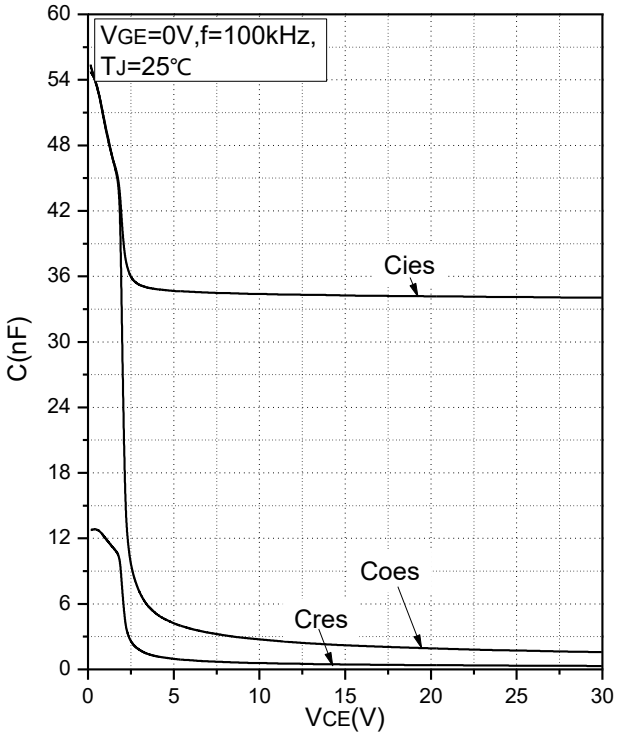


Fig.11 Capacitance Characteristics

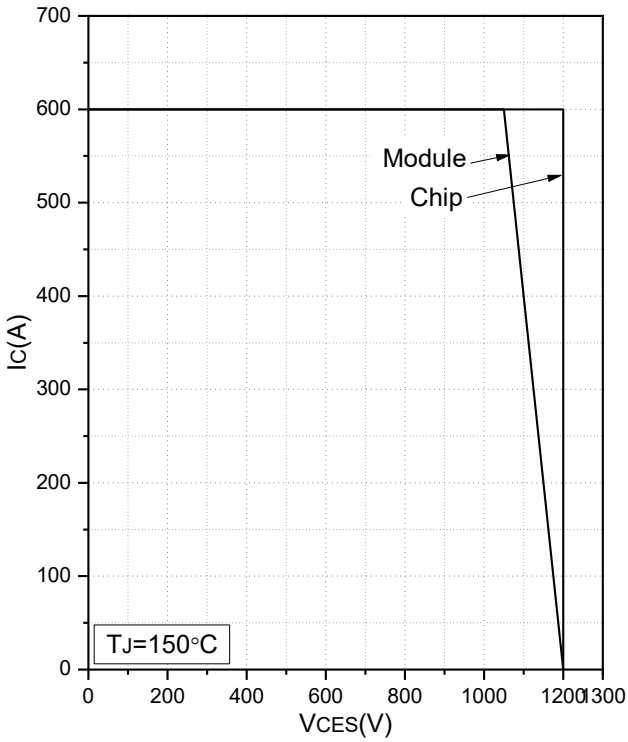
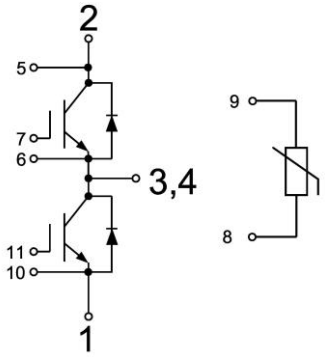
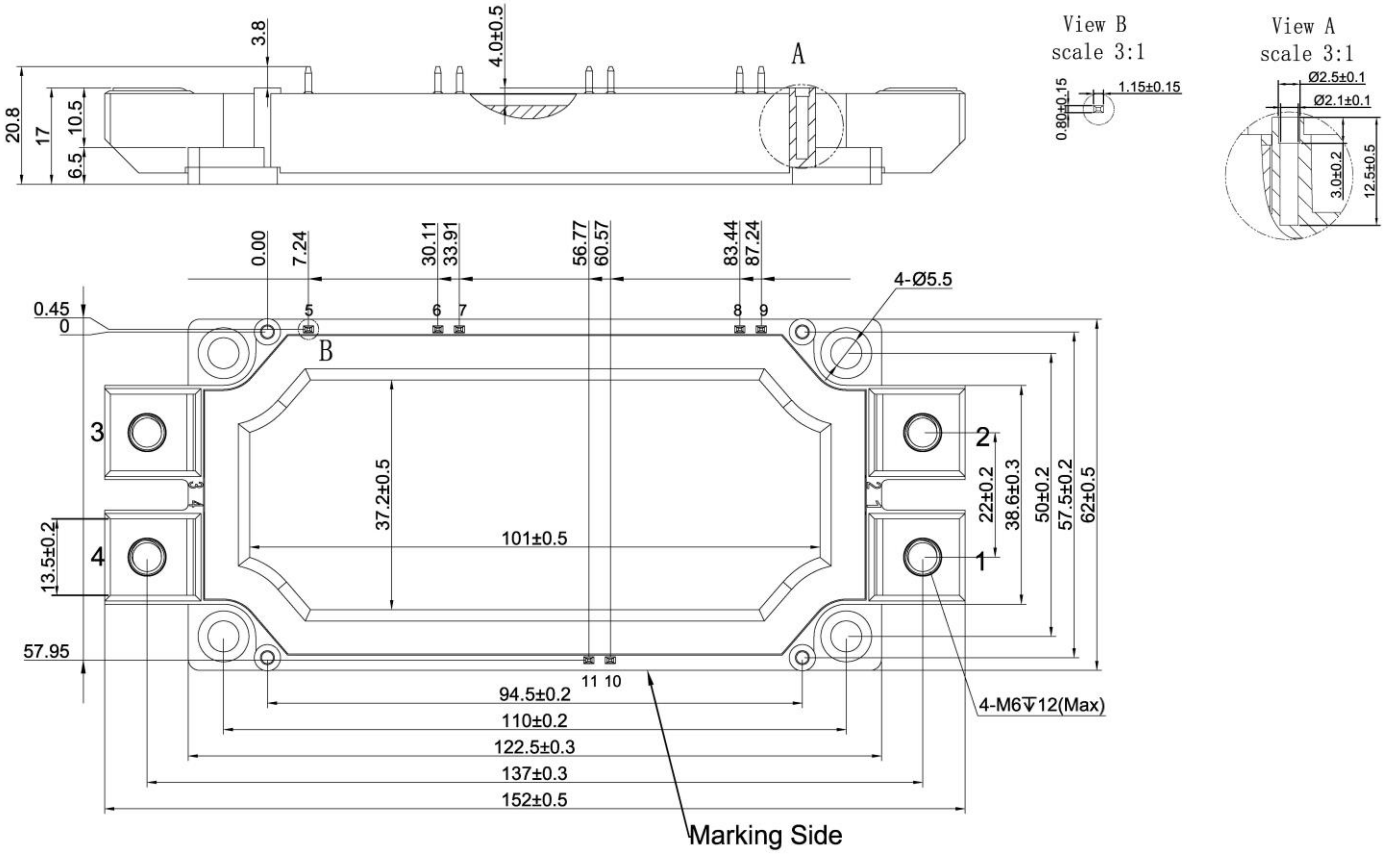


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit



Package Outline (Unit: mm):



Revision	Notes
01	Initial Release

Announcement

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