

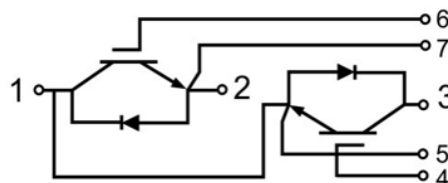
GT150HF120T1NH

Circuit Diagram

IGBT Module

Features:

- $V_{CES}=1200V$ $I_C=150A$ Trench & Field Stop IGBT Module
- Short Circuit Capability
- Low Switching Loss
- 100% RBSOA Tested($2 \times I_C$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- Welding
- Induction Heating
- UPS Systems

Type	Package	Marking
GT150HF120T1NH	T1N	GT150HF120T1NH

IGBT, Inverter

Maximum Rated Values ($T_C=25^\circ C$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Continuous Collector Current Limited by T_{Jmax}	$T_C=90^\circ C$	150	A
		$T_C=25^\circ C$	300	A
I_{CM}	Peak Collector Current Repetitive	T_p limited by T_{Jmax}	300	A
P_D	Maximum Power Dissipation (IGBT)	$T_C=25^\circ C$, $T_{Jmax}=150^\circ C$	790	W

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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	$I_C=5.7\text{mA}$, $V_{CE}=V_{GE}$	5.1	5.8	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=150\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	2.02	2.45	V
			$T_J=125^{\circ}\text{C}$	2.65		V
			$T_J=150^{\circ}\text{C}$	2.80		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0\text{V}$, $V_{CE}=1200\text{V}$, $T_J=25^{\circ}\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			200	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		16.96		nF
C_{oes}	Output Capacitance			0.79		nF
C_{res}	Reverse Transfer Capacitance			0.16		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=4.7\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		209		ns
			$T_J=125^{\circ}C$		215		
			$T_J=150^{\circ}C$		226		
t_r	Rise Time		$T_J=25^{\circ}C$		45		ns
			$T_J=125^{\circ}C$		52		
			$T_J=150^{\circ}C$		53		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^{\circ}C$		226		ns
			$T_J=125^{\circ}C$		270		
			$T_J=150^{\circ}C$		282		
t_f	Fall Time	$T_J=25^{\circ}C$		48		ns	
		$T_J=125^{\circ}C$		54			
		$T_J=150^{\circ}C$		55			
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=4.7\Omega, V_{GE}=\pm 15V,$ $di/dt=2200A/\mu s(T_J=150^{\circ}C)$ Inductive Load	$T_J=25^{\circ}C$		6.8		mJ
		$T_J=125^{\circ}C$		11.1			
		$T_J=150^{\circ}C$		12.3			



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E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =150A, R _{Goff} =4.7Ω, V _{GE} =±15V, du/dt=8200V/μs(T _J =150°C) Inductive Load	T _J =25°C		5.3		mJ
			T _J =125°C		8.6		
			T _J =150°C		9.3		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		963		nC
R _{G (int)}	Internal Gate Resistance		T _J =25°C		3.0		Ω
T _{SC}	V _{CC} =600V, V _{GE} =±15V, T _J =150°C ^{note1}					10	us
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.157	°C/W
R _{θCS}	IGBT Thermal Resistance: Case-to-Sink (per IGBT) (per IGBT, λ _{grease} = 1 W/(m · K))				0.096		°C/W

note1: Short circuit withstand time cannot exceed 10us under specified condition

Diode, Inverter

Maximum Rated Values of Diode (T_C=25°C unless otherwise specified)

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1200	V
I _F	Diode Continuous Forward Current		150	A
I _{FM}	Diode Maximum Forward Current	tp=1ms	300	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =150A	T _J =25°C		1.70	2.05	V
			T _J =125°C		1.81		
			T _J =150°C		1.78		
t _{rr}	Reverse Recovery Time	I _F =150A, -diF/dt=3200A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		349		ns
			T _J =125°C		469		
			T _J =150°C		600		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		121		A
			T _J =125°C		117		
			T _J =150°C		123		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		10.4		μC
			T _J =125°C		13.2		
			T _J =150°C		16.2		



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E _{rec}	Reverse Recovery Energy	I _F =150A, -diF/dt=3200A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		5.0		mJ
			T _J =125°C		6.3		
			T _J =150°C		7.6		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.259	°C/W
R _{θCS}	Diode Thermal Resistance: Case-to-Sink (per Diode, λ _{grease} = 1 W/(m • K))				0.159		°C/W

Module

Symbol	Description		Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 60s	2500			V
T _J	Maximum Junction Temperature		-40		150	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		150	°C
T _{stg}	Storage Temperature		-40		125	°C
CTI	Comparative Tracking Index		200			
T	Power Terminals Screw:M5		3		5	N·m
T	Mounting Screw:M6		4		6	N·m
G	Weight			150		g

Ordering Information Table

Device code	G	T	150	HF	120	T1N	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Field Stop Trench Gate IGBT
- ③ - Rated Current (150=150A)
- ④ - Circuit Configuration:HF (Half Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

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IGBT Module Datasheet



Characteristic diagram

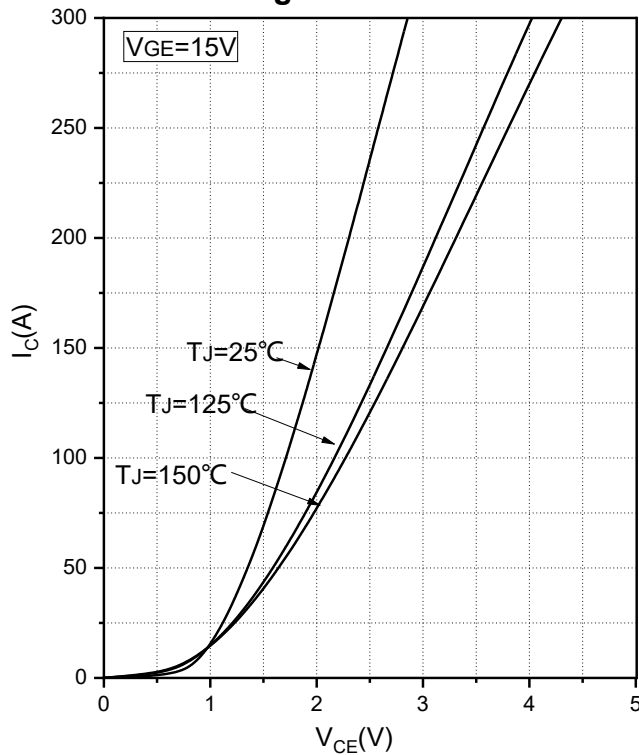


Fig.1 Typical Saturation Voltage Characteristics

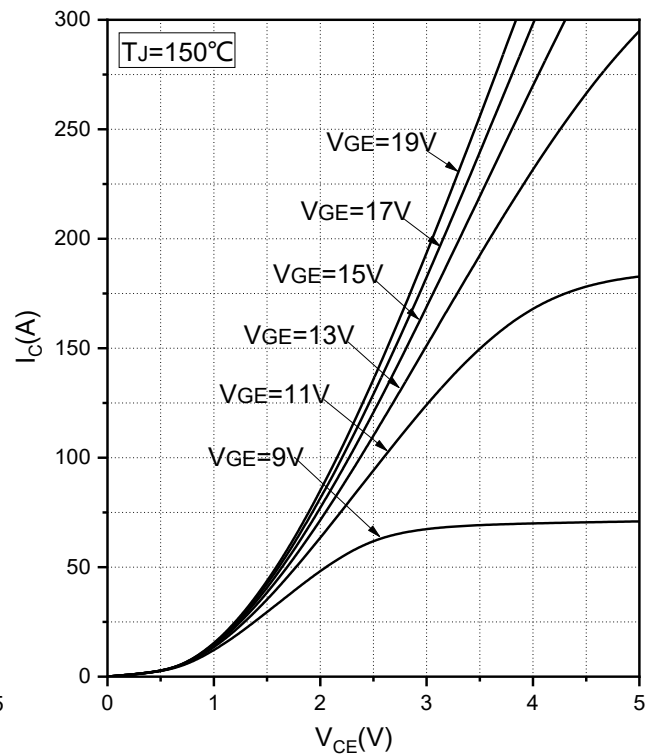


Fig.2 Typical Output Characteristics

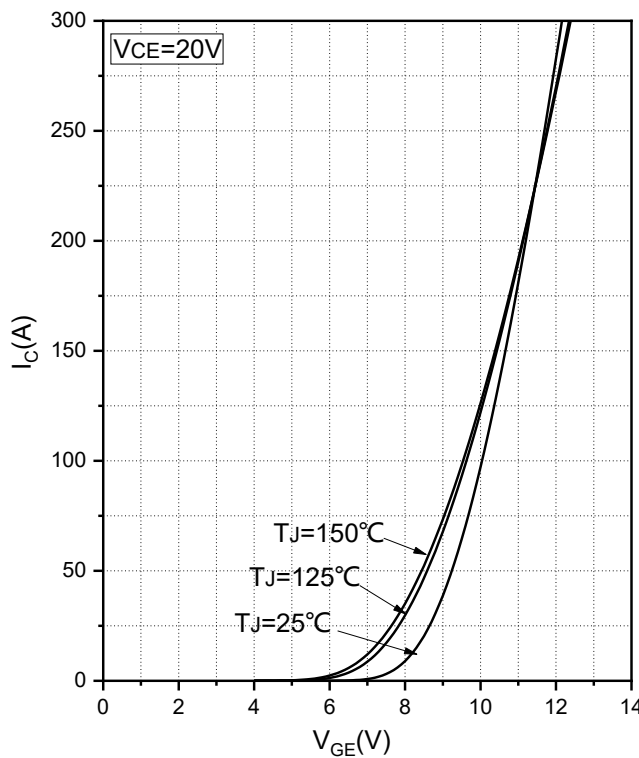


Fig.3 Transfer Characteristic

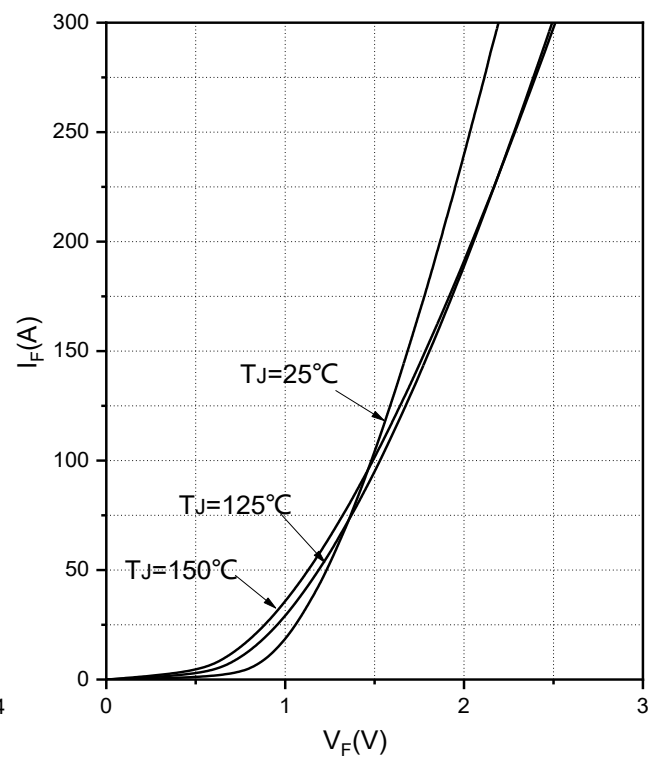


Fig.4 Forward Characteristics of Diode

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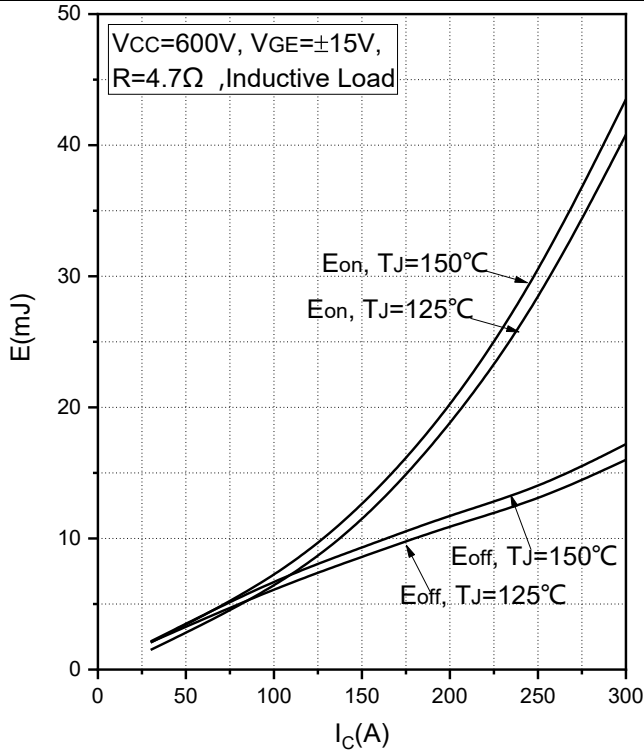


Fig.5 Typical Switching Loss vs. Collector Current

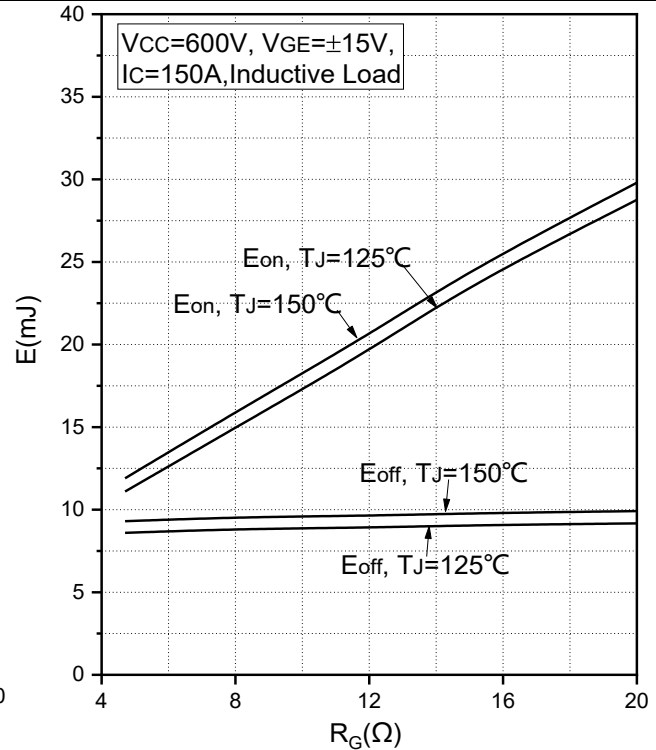


Fig.6 Typical Switching Loss vs. Gate Resistance

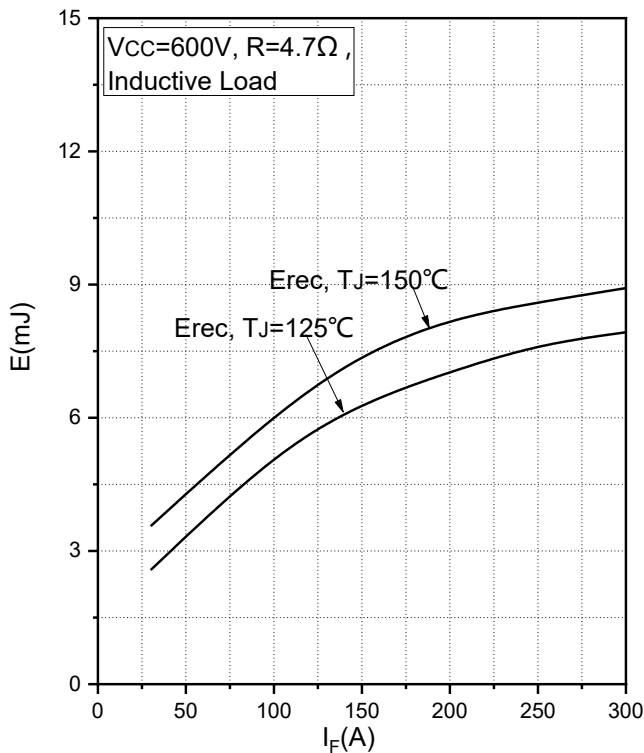


Fig.7 Typical Switching Loss vs. Forward Current

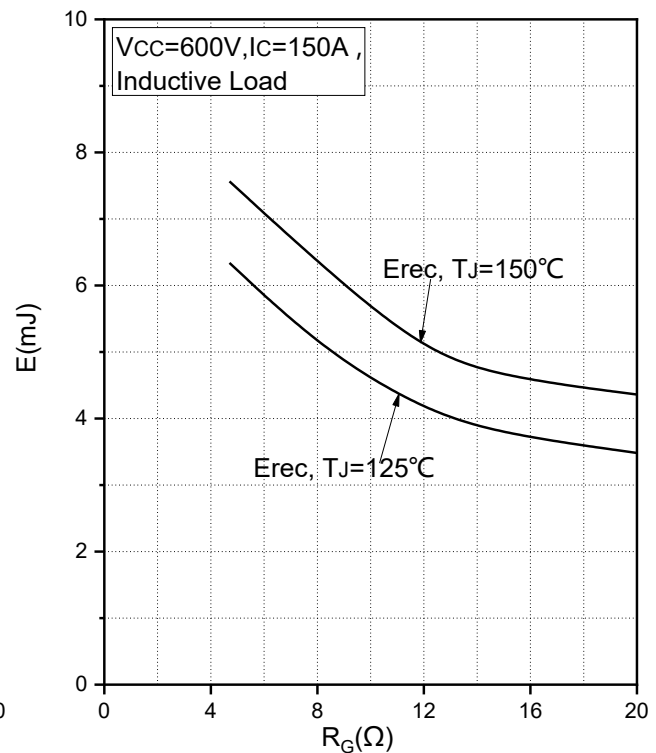


Fig.8 Typical Switching Loss vs. Gate Resistance

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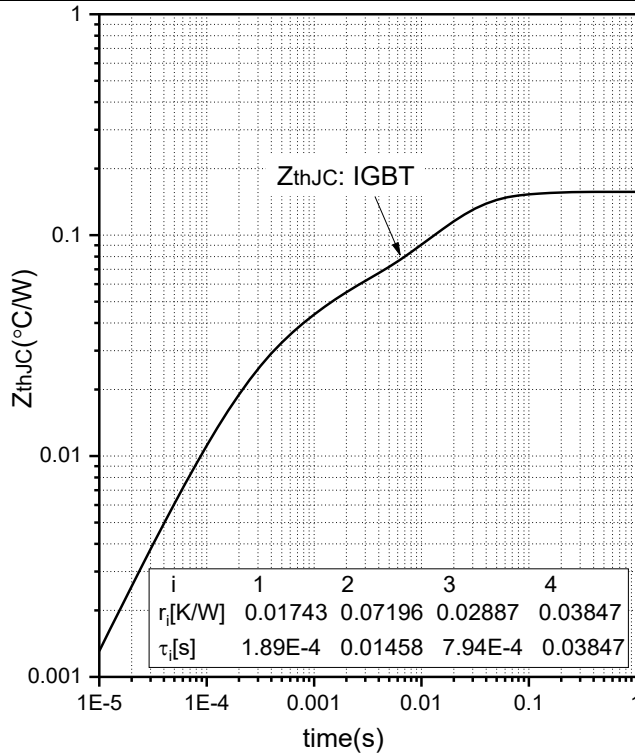


Fig.9 Transient Thermal Impedance (IGBT)

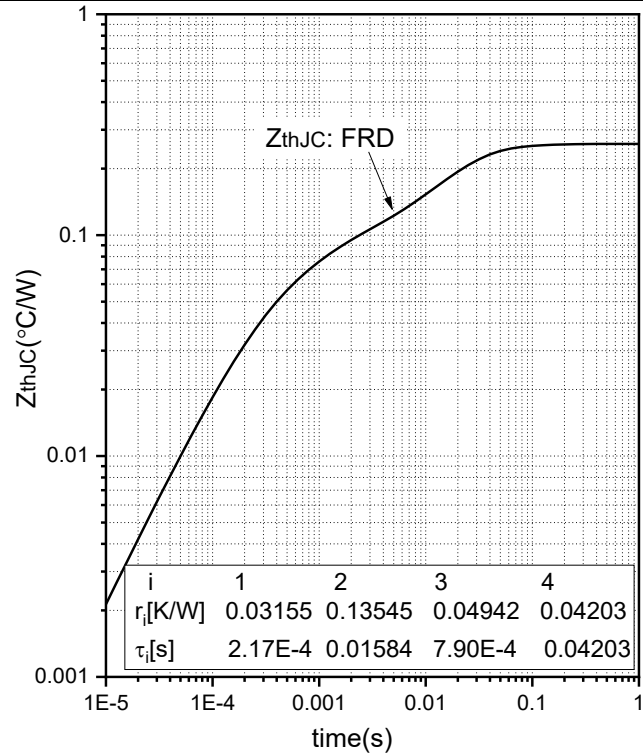


Fig.10 Transient Thermal Impedance (Diode)

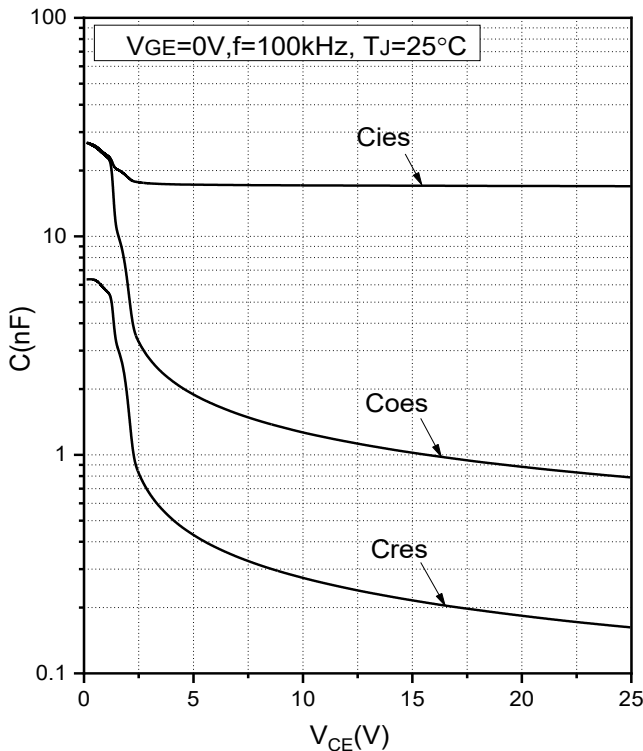


Fig.11 Capacitance Characteristics

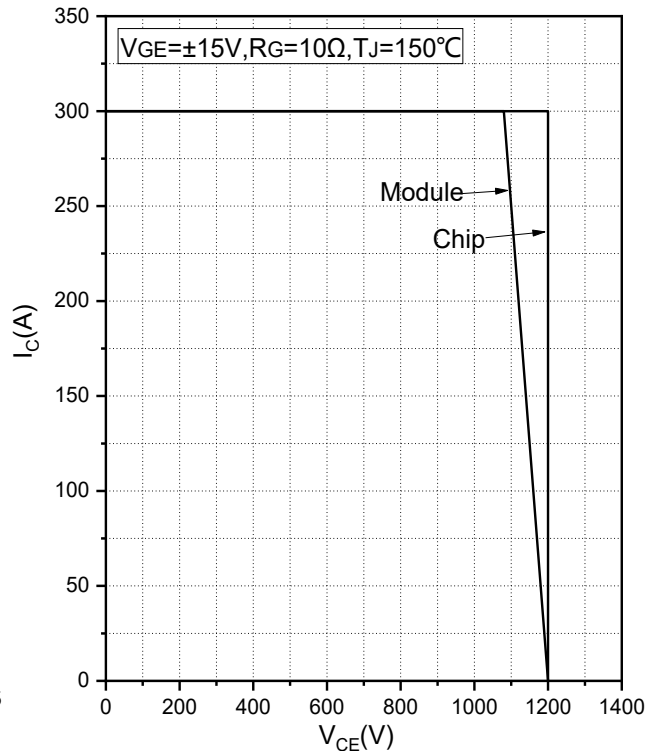


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

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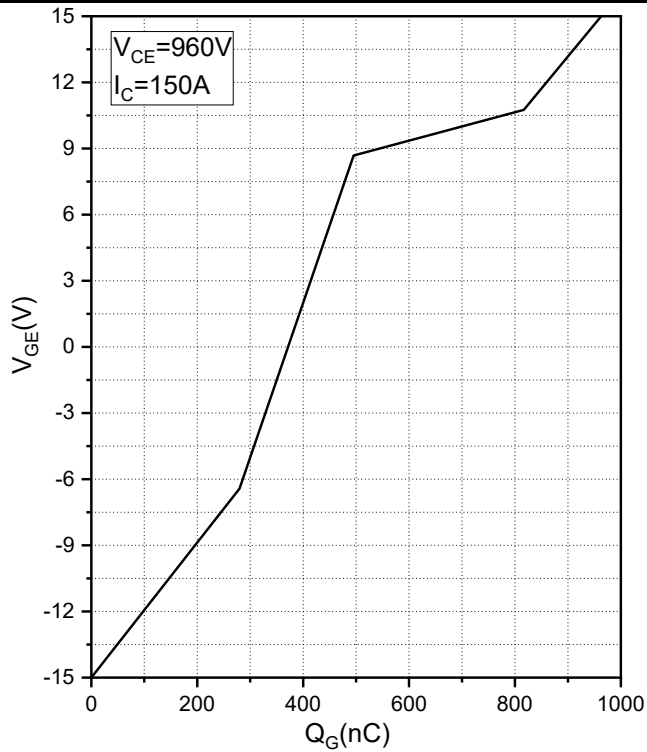


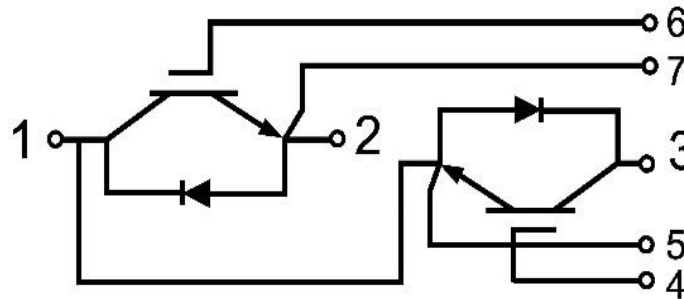
Fig.13 Gate Charge Characteristics

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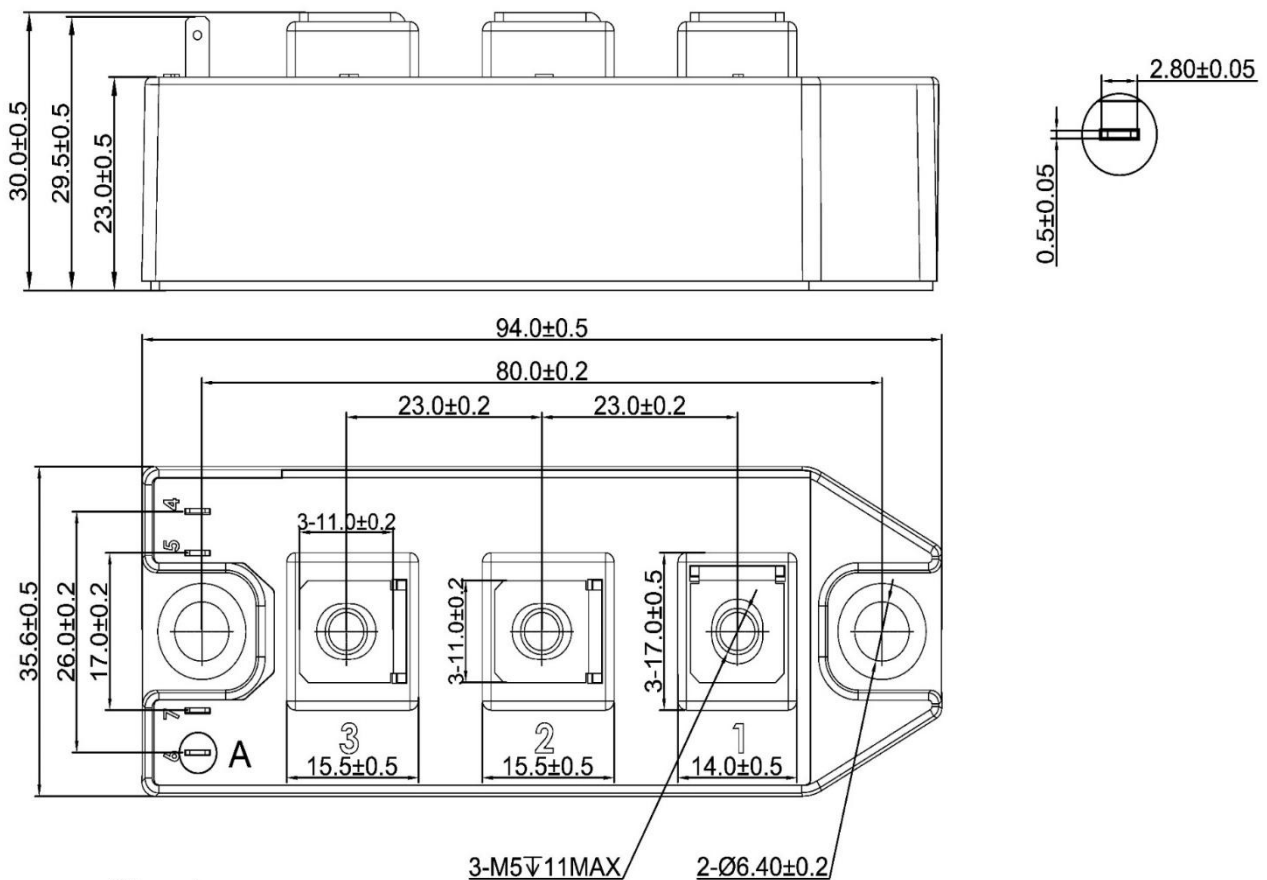
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Internal Circuit:



Package Outline (Unit: mm):



View A
scale 3:1

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IGBT Module Datasheet



Revision	Notes
02	Engineering Sample Datasheet

Announcement

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