

GT200HF120A5H

IGBT Module

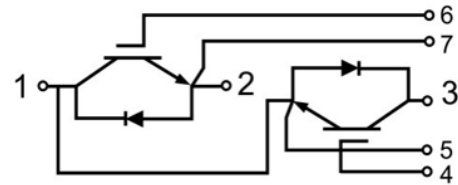
Features:

- $V_{CES}=1200V$ $I_C=200A$ 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:

- Inverter for Motor Drive
- AC and DC Servo Drive Amplifier
- UPS Systems
- Industrial Machines, such as Welding Machines

Circuit Diagram



Type	Package	Marking
GT200HF120A5H	A5	GT200HF120A5H

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}	$T_C=100^\circ C$	200	A
		$T_C=25^\circ C$	400	A
I_{CM}	Peak Collector Current Repetitive	T_p limited by T_{Jmax}	400	A
P_D	Maximum Power Dissipation (IGBT)	$T_C=25^\circ C, T_{Jmax}=175^\circ C$	1400	W

GT200HF120A5H

IGBT Module Datasheet



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	$I_C=7.6\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.7	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=200\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	1.65	2.00	V
			$T_J=125^\circ\text{C}$	2.02		V
			$T_J=175^\circ\text{C}$	2.19		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	$V_{GE}=20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^\circ\text{C}$			250	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		23.14		nF
C_{oes}	Output Capacitance			1.18		nF
C_{res}	Reverse Transfer Capacitance			0.26		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=200A,$ $R_{Gon}=1\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		118		ns
			$T_J=125^{\circ}C$		130		
			$T_J=175^{\circ}C$		134		
t_r	Rise Time		$T_J=25^{\circ}C$		29		ns
			$T_J=125^{\circ}C$		33		
			$T_J=175^{\circ}C$		36		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^{\circ}C$		232		ns
			$T_J=125^{\circ}C$		266		
			$T_J=175^{\circ}C$		282		
t_f	Fall Time	$T_J=25^{\circ}C$		163		ns	
		$T_J=125^{\circ}C$		218			
		$T_J=175^{\circ}C$		268			
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=200A,$ $R_{Gon}=1\Omega, V_{GE}=\pm 15V,$ $di/dt=4500A/\mu s(T_J=175^{\circ}C)$ Inductive Load	$T_J=25^{\circ}C$		7.3		mJ
		$T_J=125^{\circ}C$		11.9			
		$T_J=175^{\circ}C$		15.0			

GT200HF120A5H

IGBT Module Datasheet



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =200A, R _{Goff} =1Ω, V _{GE} =±15V, du/dt=4900V/μs(T _J =175°C) Inductive Load	T _J =25°C		14.2		mJ
			T _J =125°C		18.8		
			T _J =175°C		21.5		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		1.34		μC
R _{G (int)}	Internal Gate Resistance		T _J =25°C		3		Ω
T _{SC}	V _{CC} =600V, V _{GE} =±15V, T _J =175°C ^{note1}					10	μs
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.107	°C/W
R _{θCS}	IGBT Thermal Resistance: Case-to-Sink (per IGBT) (per IGBT, λ _{grease} = 1 W/(m · K))				0.070		°C/W

note1: Short circuit withstand time cannot exceed 10μs 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		200	A
I _{FM}	Diode Maximum Forward Current	t _p =1ms	400	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 =200A	T _J =25°C		1.58	1.90	V
			T _J =125°C		1.67		
			T _J =175°C		1.64		
t _{rr}	Reverse Recovery Time	I _F =200A, -diF/dt=6100A/μs(T _J =175°C), V _R =600V, V _{GE} =-15V	T _J =25°C		203		ns
			T _J =125°C		360		
			T _J =175°C		482		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		292		A
			T _J =125°C		284		
			T _J =175°C		284		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		19.9		μC
			T _J =125°C		30.5		
			T _J =175°C		37.5		

GT200HF120A5H

IGBT Module Datasheet



E _{rec}	Reverse Recovery Energy	I _F =200A, -diF/dt=6100A/μs(T _J =175°C), V _R =600V, V _{GE} --15V	T _J =25°C		9.4		mJ
			T _J =125°C		14.1		
			T _J =175°C		17.2		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.218	°C/W
R _{θCS}	Diode Thermal Resistance: Case-to-Sink (per Diode, λ _{grease} = 1 W/(m • K))				0.143		°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		175	$^{\circ}C$
T_{JOP}	Maximum Operating Junction Temperature Range ^{note2}	-40		150	$^{\circ}C$
T_{stg}	Storage Temperature	-40		125	$^{\circ}C$
CTI	Comparative Tracking Index	200			
T	Power Terminals Screw:M5	3		5	N·m
T	Mounting Screw:M6	4		6	N·m
G	Weight		200		g

note2: $T_{JOP} > 150^{\circ}C$ is only allowed for operation at overload conditions.

Ordering Information Table

Device code	G	T	200	HF	120	A5	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Field Stop Trench Gate IGBT
- ③ - Rated Current (200=200A)
- ④ - Circuit Configuration:HF (Half Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



Characteristic diagram

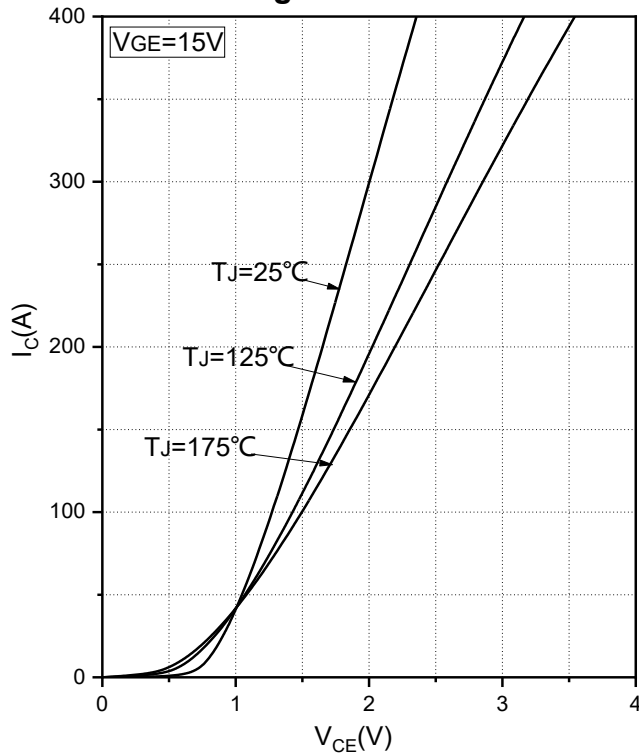


Fig.1 Typical Saturation Voltage Characteristics

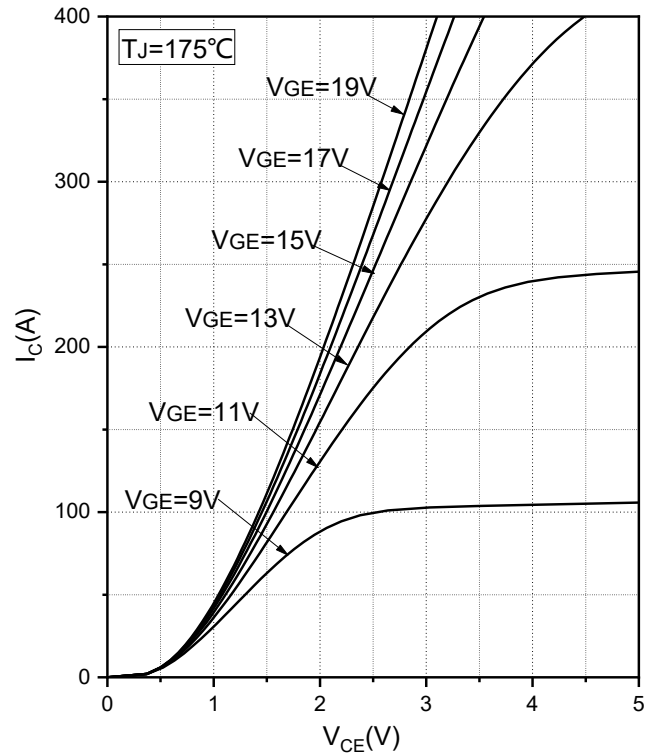


Fig.2 Typical Output Characteristics

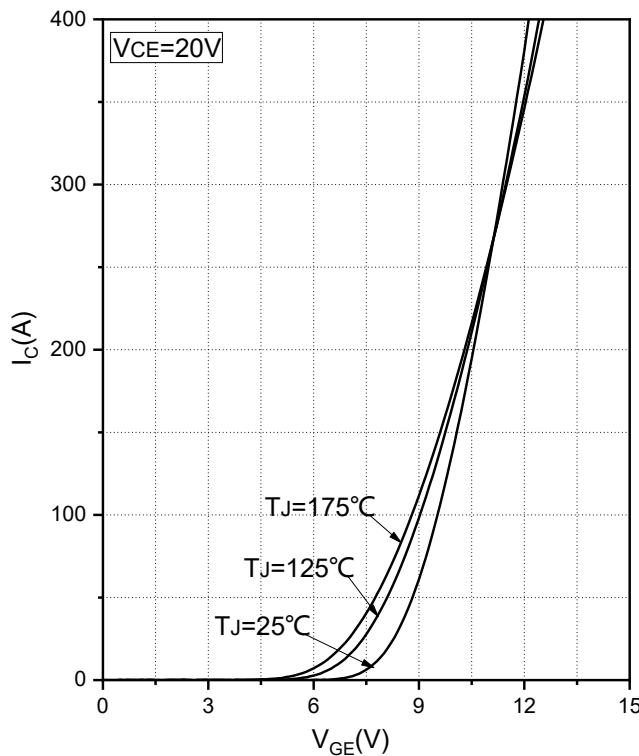


Fig.3 Transfer Characteristic

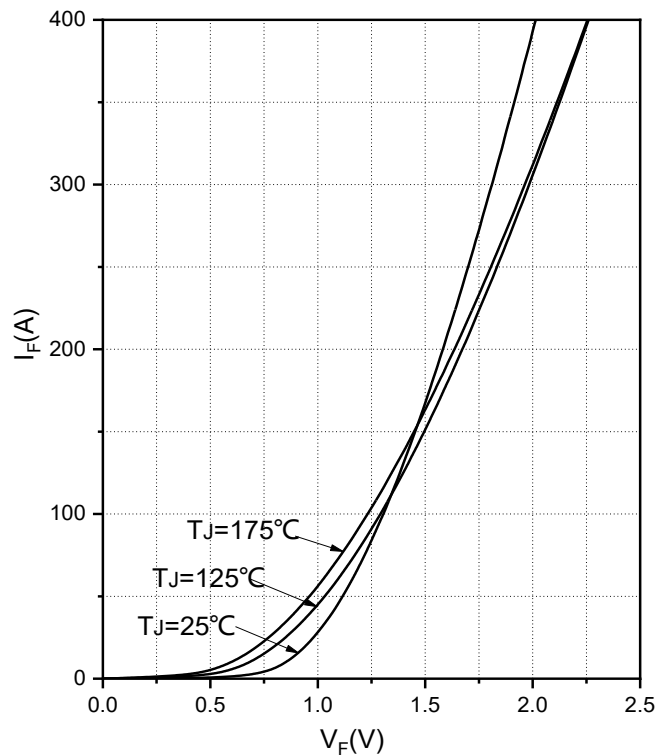


Fig.4 Forward Characteristics of Diode

GT200HF120A5H

IGBT Module Datasheet

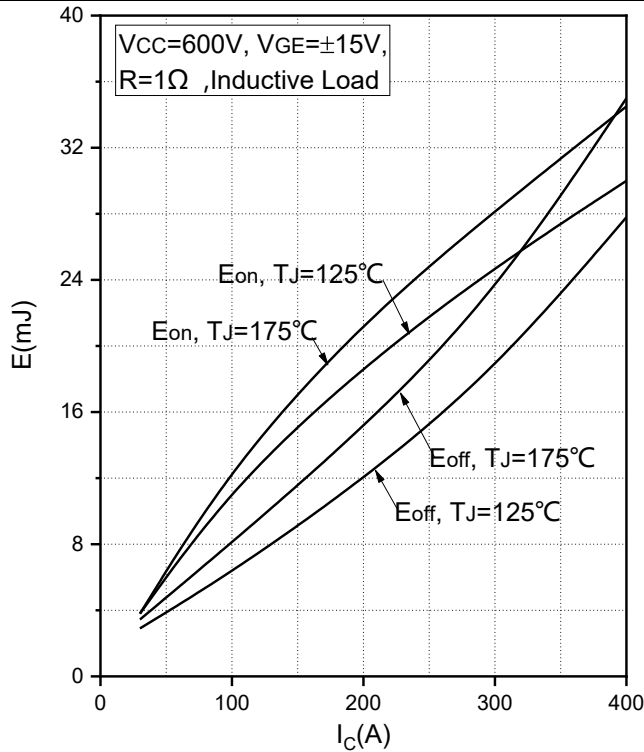


Fig.5 Typical Switching Loss vs. Collector Current

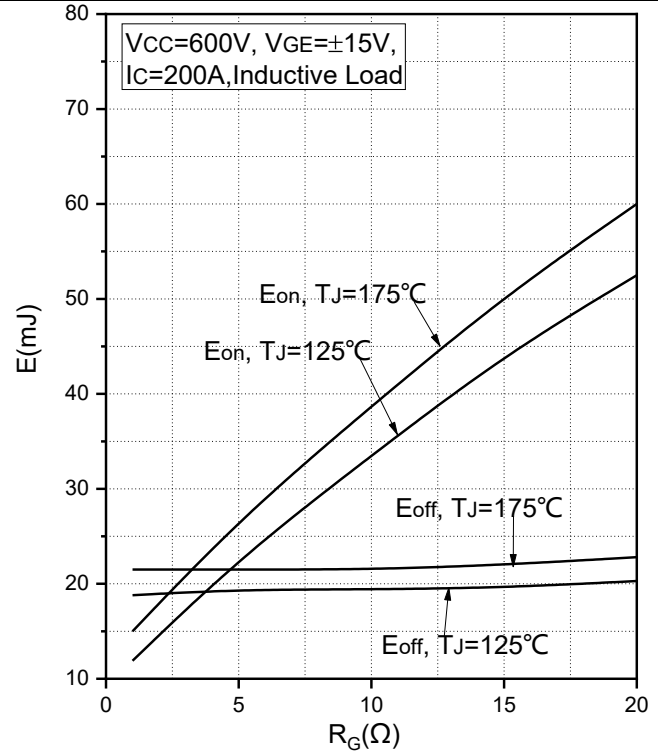


Fig.6 Typical Switching Loss vs. Gate Resistance

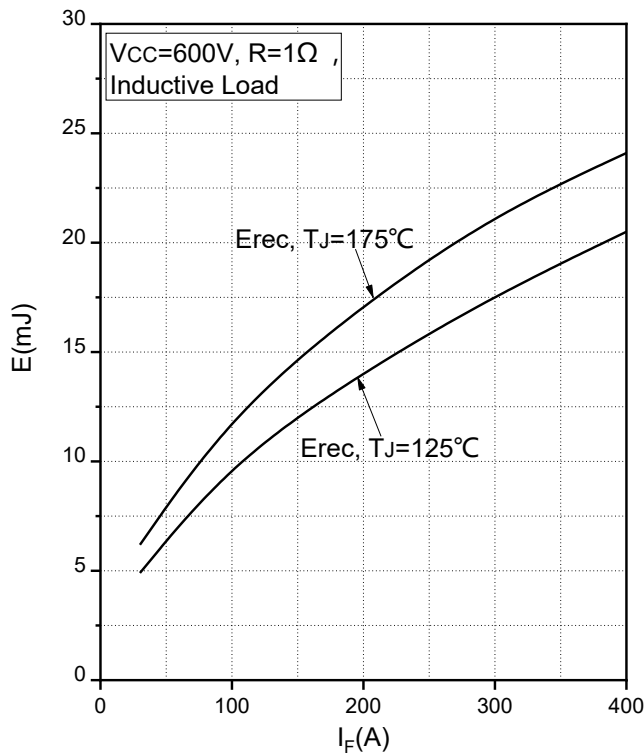


Fig.7 Typical Switching Loss vs. Forward Current

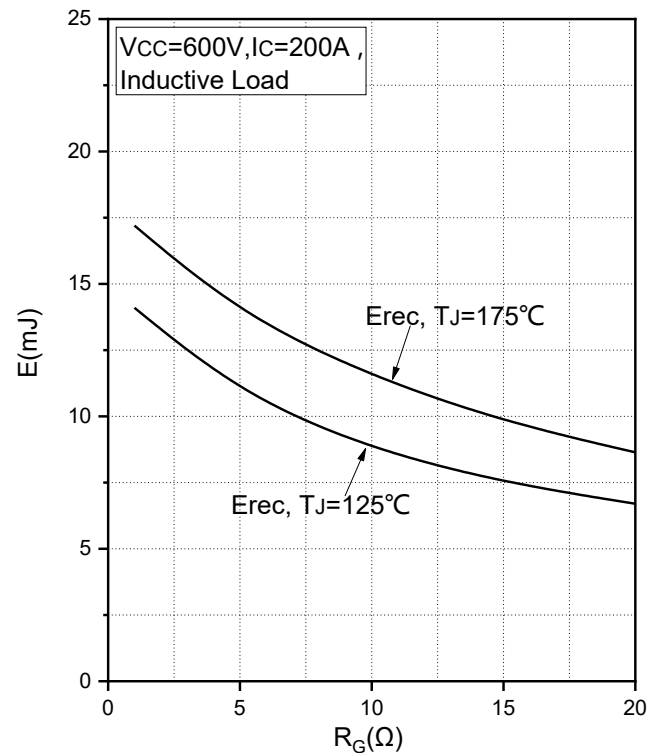


Fig.8 Typical Switching Loss vs. Gate Resistance

GT200HF120A5H

IGBT Module Datasheet

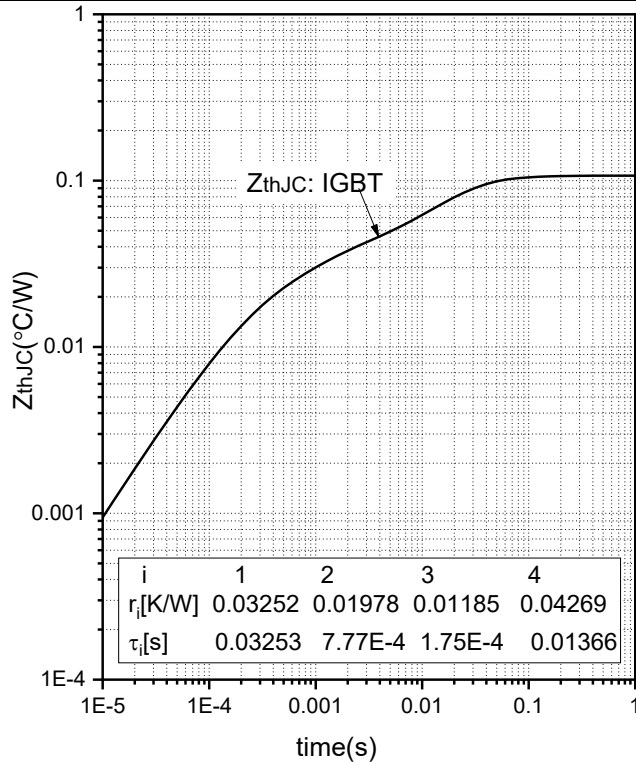


Fig.9 Transient Thermal Impedance (IGBT)

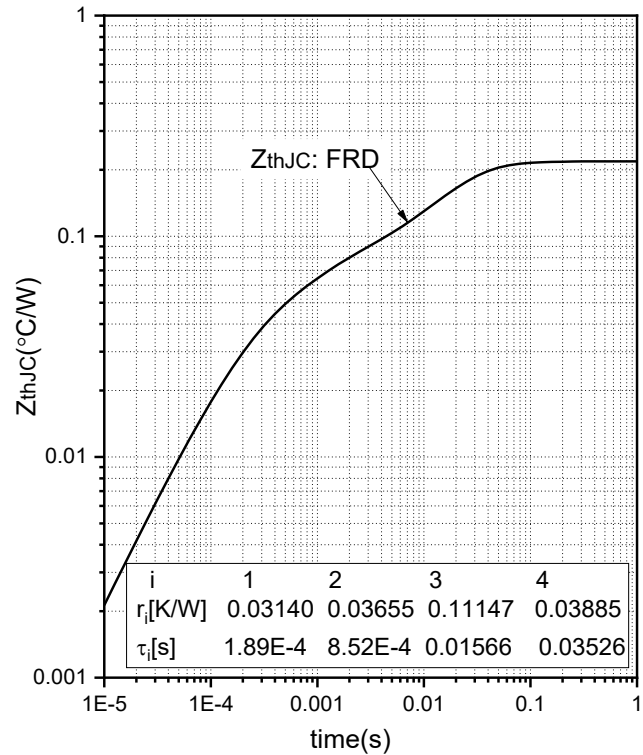


Fig.10 Transient Thermal Impedance (Diode)

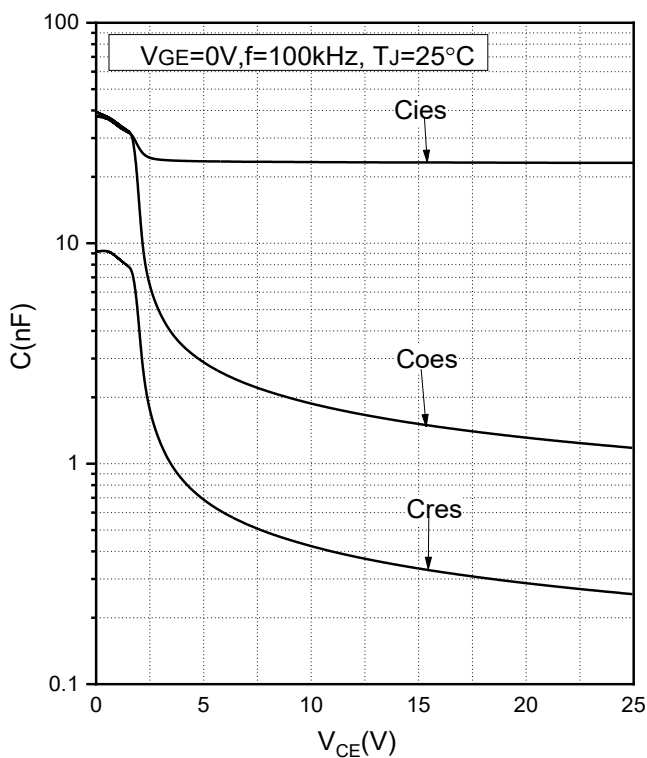


Fig.11 Capacitance Characteristics

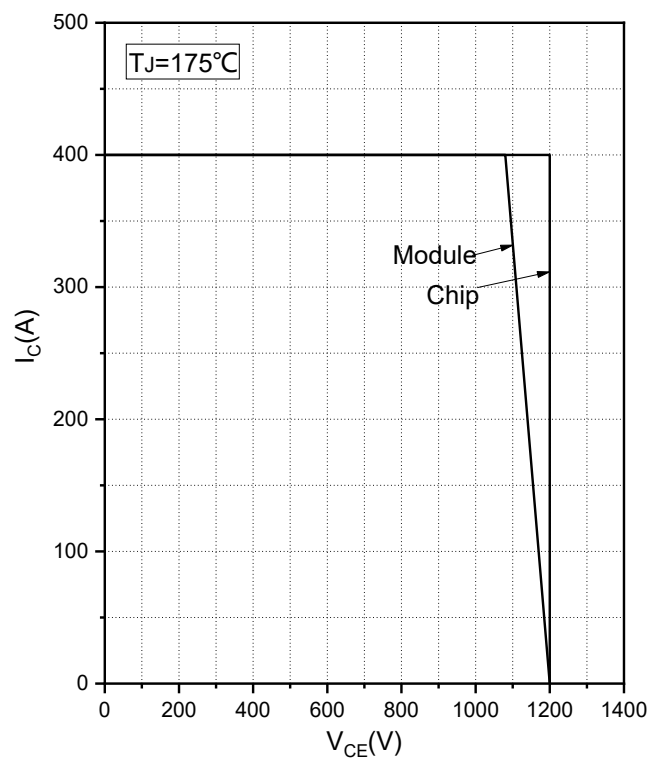


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

GT200HF120A5H

IGBT Module Datasheet

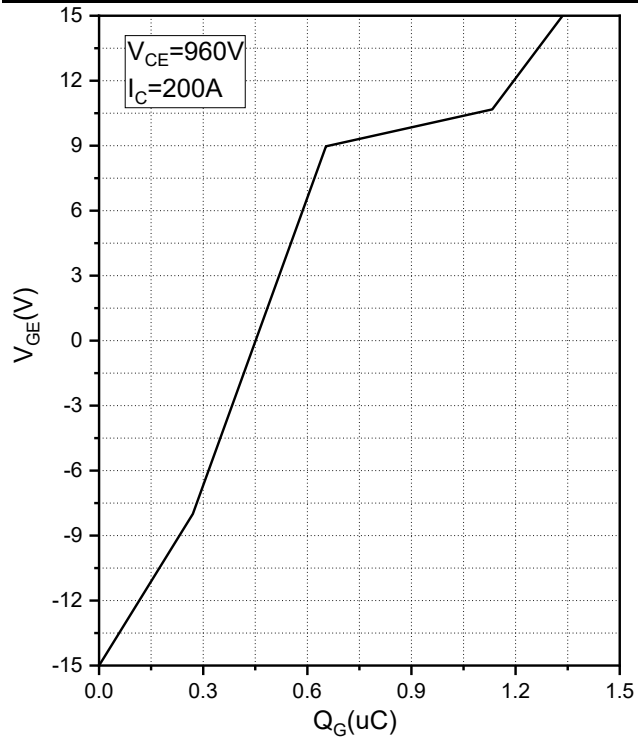


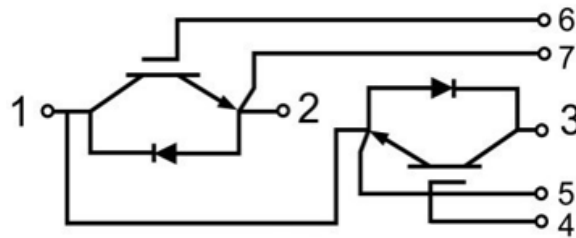
Fig.13 Gate Charge Characteristics

GT200HF120A5H

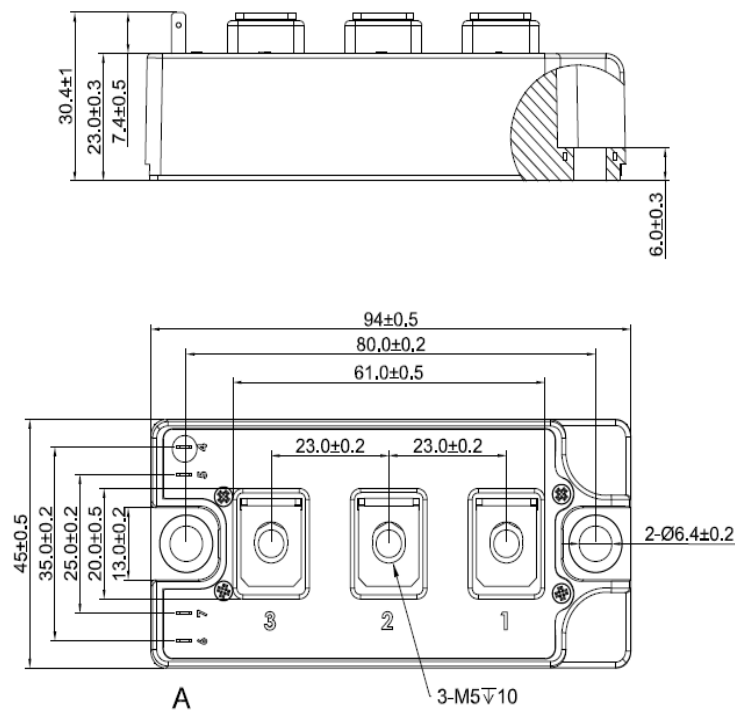
IGBT Module Datasheet



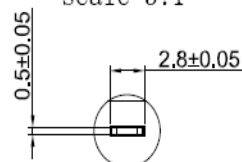
Internal Circuit:



Package Outline (Unit: mm):



View A
scale 3:1



GT200HF120A5H

IGBT Module Datasheet



Revision	Notes
A	Fina Datasheet Initial Release

Announcement

Information in this document is believed to be accurate and reliable. However, NJSME does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to Make Changes

NJSME reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

The datasheet with “REV.” + “Arabic numerals” is based on engineering data for initial reference purpose only.

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