

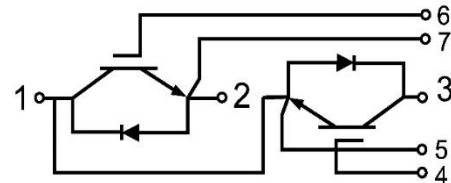
GT200HF120T2NH

IGBT Module

Circuit Diagram

Features:

- $V_{CES}=1200V$ $I_C=200A$ Trench & Field Stop IGBT Module
- Short Circuit Capability
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested($2 \times I_C$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- High-power Converters
- UPS System
- Motor Drives
- Wind Turbines

Type	Package	Marking
GT200HF120T2NH	T2N	GT200HF120T2NH

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}	$T_C=90^\circ C$	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

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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	$I_C=7.6\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.9	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=200\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	1.70	2.10	V
			$T_J=125^\circ\text{C}$	2.07		V
			$T_J=175^\circ\text{C}$	2.24		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	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		22.88		nF
C_{oes}	Output Capacitance			1.30		nF
C_{res}	Reverse Transfer Capacitance			0.24		nF

Switching Characteristics

$t_{d(ON)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=200A,$ $R_{Gon}=1\Omega, V_{GE}=+15V/-15V,$ Inductive Load	$T_J=25^{\circ}C$		118		ns
			$T_J=125^{\circ}C$		127		
			$T_J=175^{\circ}C$		133		
t_r	Rise Time		$T_J=25^{\circ}C$		28		ns
			$T_J=125^{\circ}C$		35		
			$T_J=175^{\circ}C$		38		
$t_{d(OFF)}$	Turn-off Delay Time	$T_J=25^{\circ}C$		231		ns	
		$T_J=125^{\circ}C$		266			
		$T_J=175^{\circ}C$		276			
t_f	Fall Time	$T_J=25^{\circ}C$		125		ns	
		$T_J=125^{\circ}C$		206			
		$T_J=175^{\circ}C$		256			
E_{ON}	Turn-on Switching Loss	$V_{CC}=600V, I_C=200A,$ $R_{Gon}=1\Omega, V_{GE}=+15V/-15V,$ $di/dt=4200A/\mu s(T_J=175^{\circ}C)$ Inductive Load	$T_J=25^{\circ}C$		14.5		mJ
		$T_J=125^{\circ}C$		21.5			
		$T_J=175^{\circ}C$		25.2			

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E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =200A, R _{Goff} =1Ω, V _{GE} =+15V/-15V, du/dt=5100V/μs(T _J =175°C) Inductive Load	T _J =25°C		12.4		mJ
			T _J =125°C		18.0		
			T _J =175°C		19.5		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		1.29		μC
R _{G (int)}	Internal Gate Resistance		T _J =25°C		3.5		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))				0.045		°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		1.69	2.10	V
			T _J =125°C		1.77		
			T _J =175°C		1.76		
t _{rr}	Reverse Recovery Time	I _F =200A, -diF/dt=4500A/μs(T _J =175°C), V _R =600V, V _{GE} =-15V	T _J =25°C		343		ns
			T _J =125°C		441		
			T _J =175°C		556		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		188		A
			T _J =125°C		176		
			T _J =175°C		175		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		19.5		μC
			T _J =125°C		29.4		
			T _J =175°C		39.6		

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E _{rec}	Reverse Recovery Energy	I _F =200A, -diF/dt=4500A/μs(T _J =175°C), V _R =600V, V _{GE} =-15V	T _J =25°C		7.1		mJ
			T _J =125°C		11.3		
			T _J =175°C		15.6		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.215	°C/W
R _{θCS}	Diode Thermal Resistance: Case-to-Sink (per Diode, λ _{grease} = 1 W/(m • K))				0.094		°C/W

Module

Symbol	Description	Conditions	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:M6		3.0		5.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			300		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	T2N	H
①	②	③	④	⑤	⑥	⑦

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

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Characteristic diagram

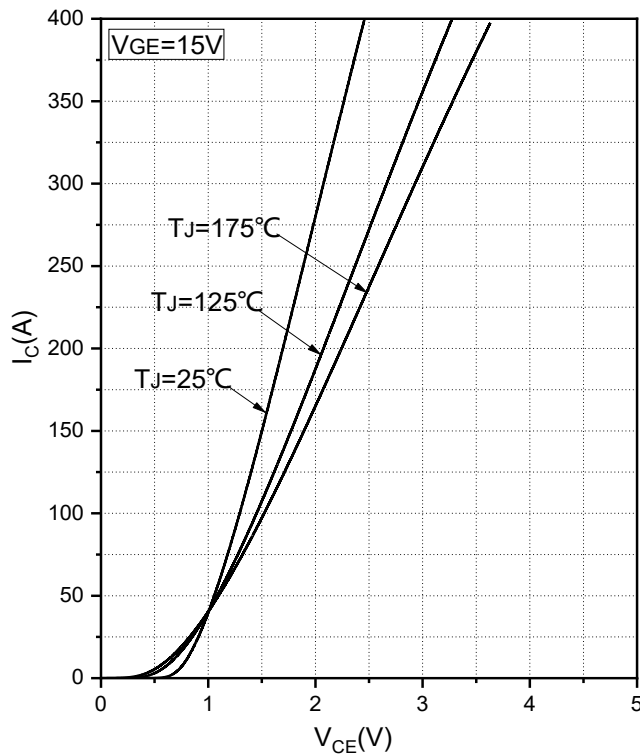


Fig.1 Typical Saturation Voltage Characteristics

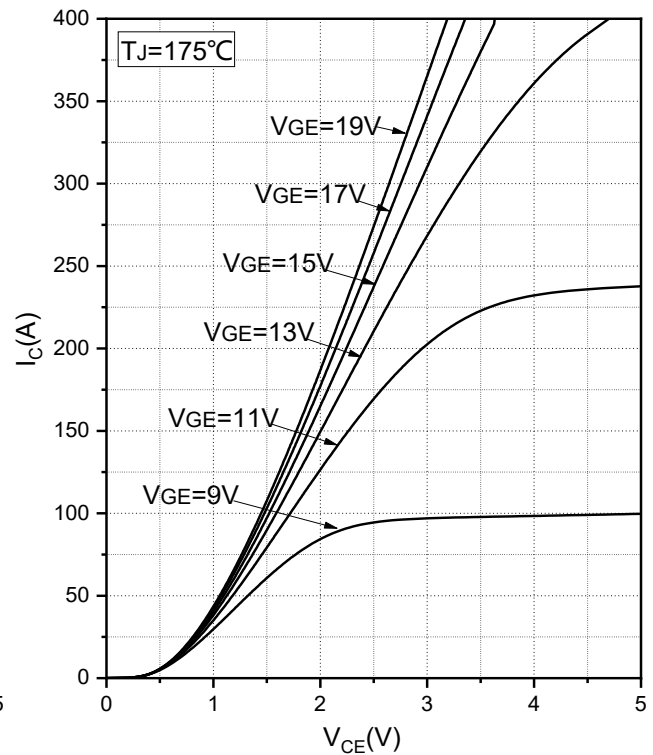


Fig.2 Typical Output Characteristics

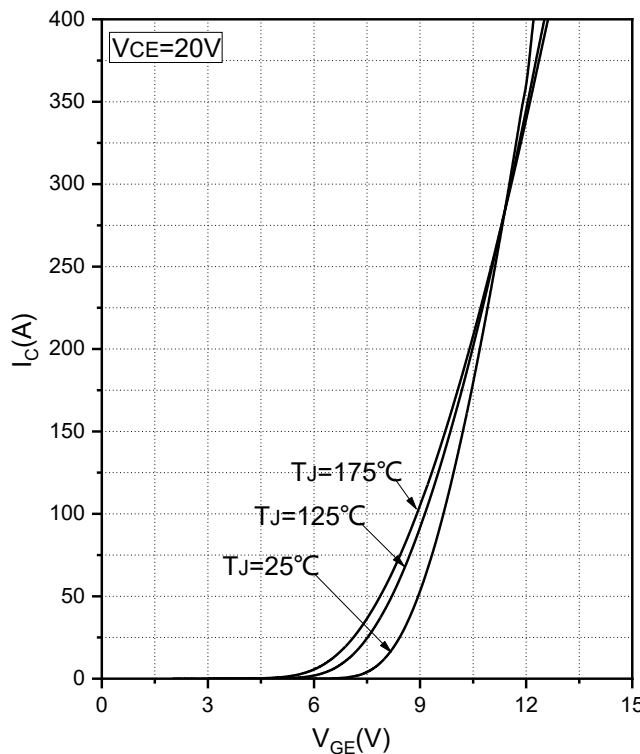


Fig.3 Transfer Characteristic

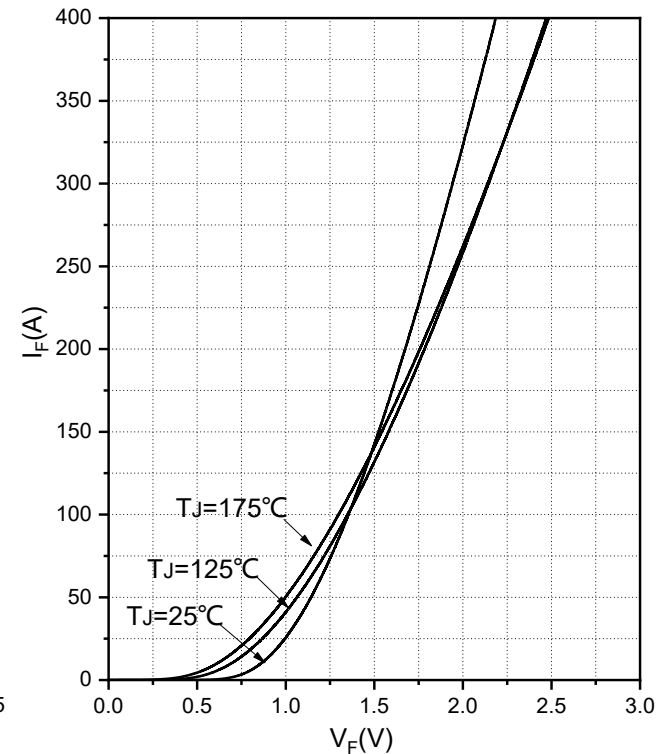


Fig.4 Forward Characteristics of Diode

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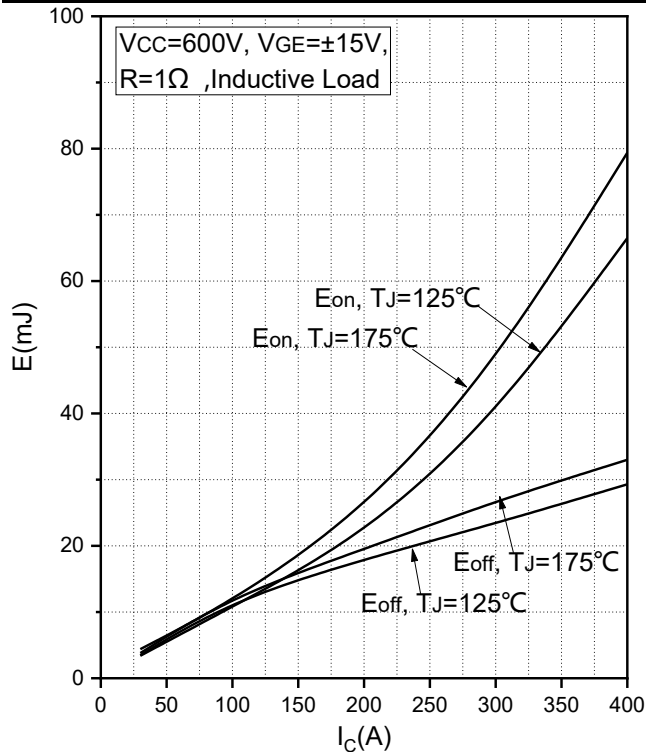


Fig.5 Typical Switching Loss vs. Collector Current

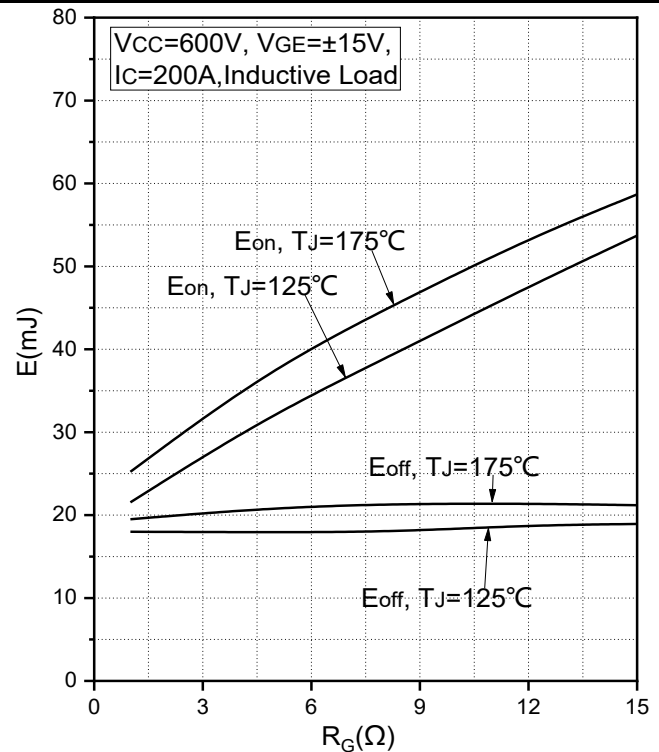


Fig.6 Typical Switching Loss vs. Gate Resistance

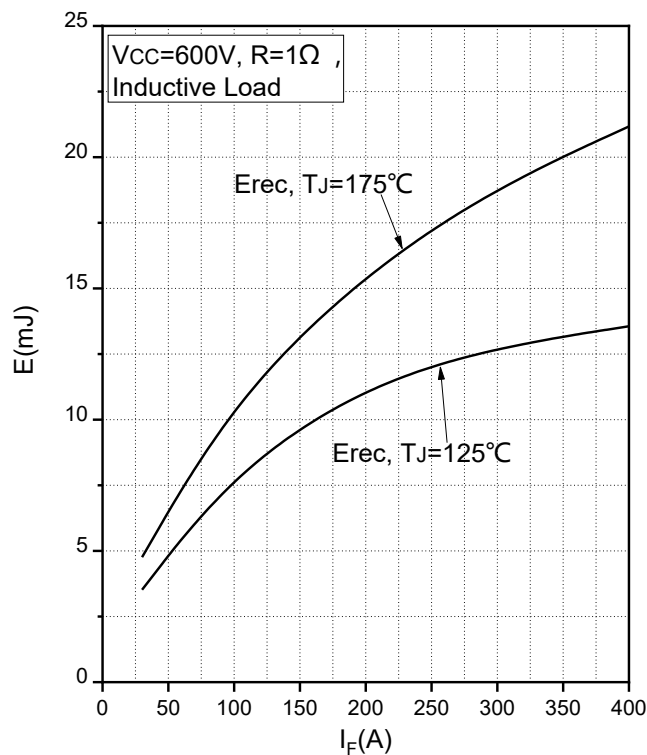


Fig.7 Typical Switching Loss vs. Forward Current

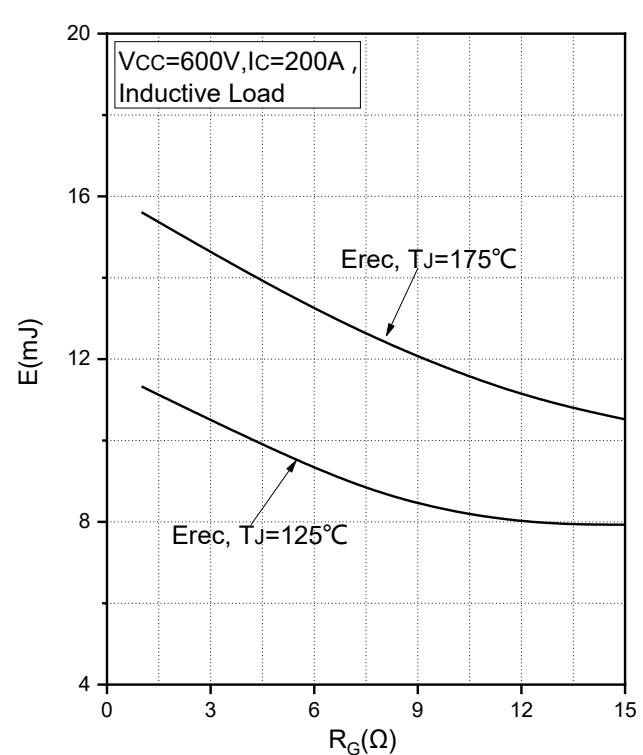


Fig.8 Typical Switching Loss vs. Gate Resistance

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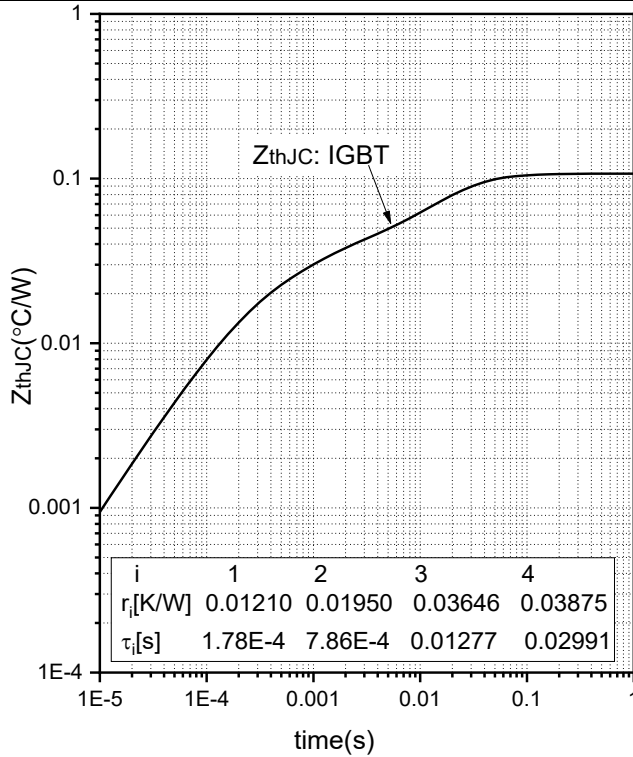


Fig.9 Transient Thermal Impedance (IGBT)

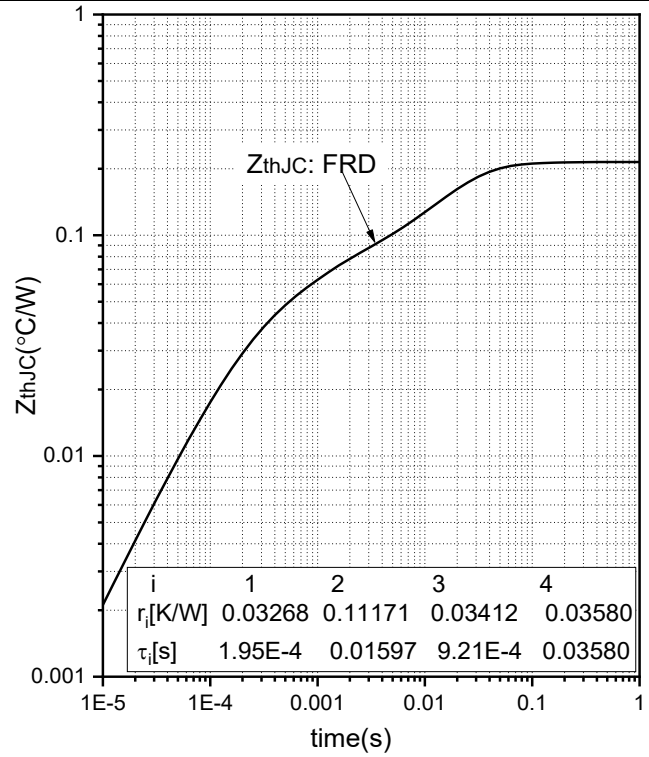


Fig.10 Transient Thermal Impedance (Diode)

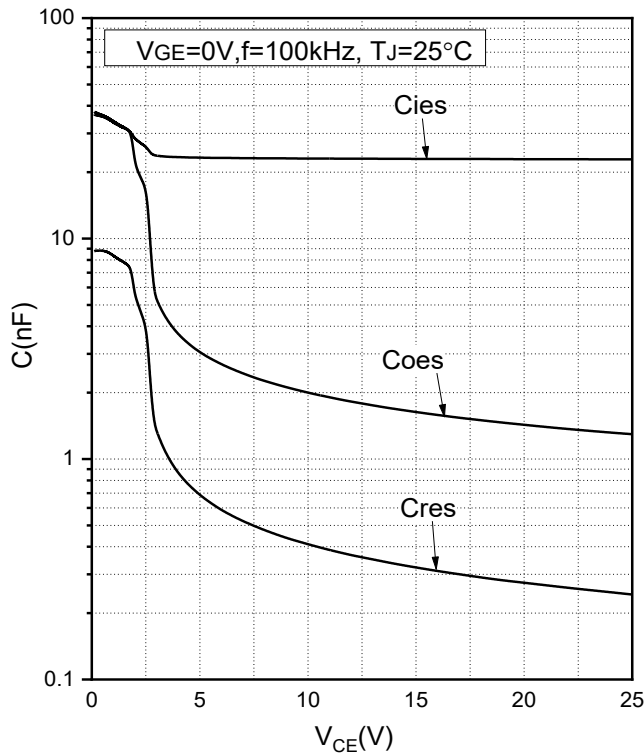


Fig.11 Capacitance Characteristics

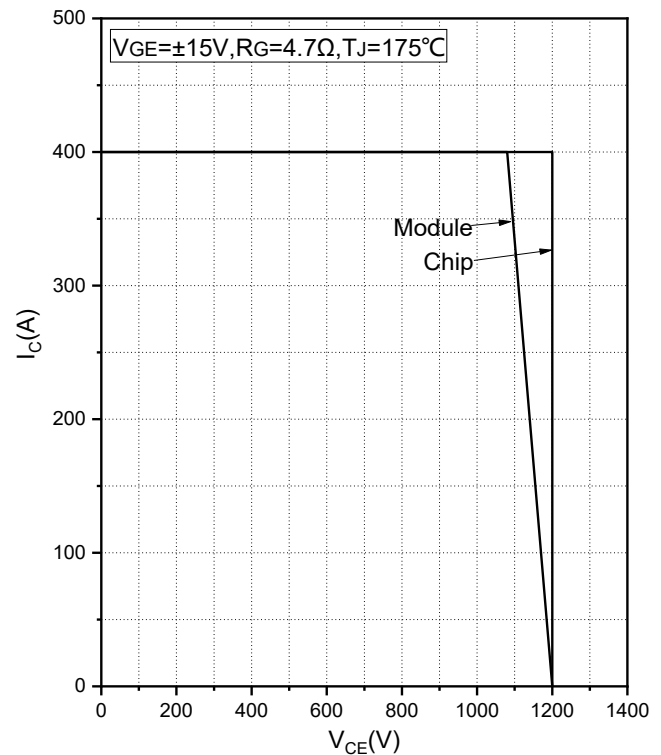


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

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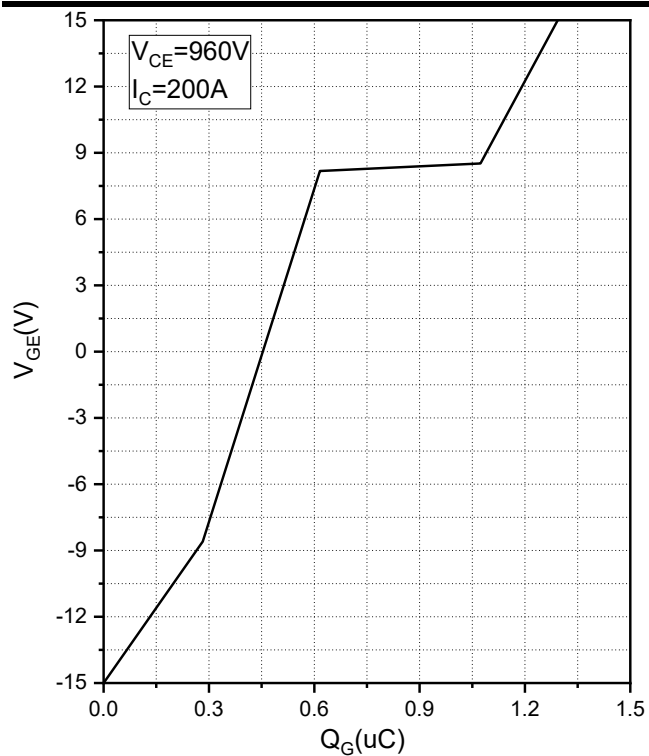


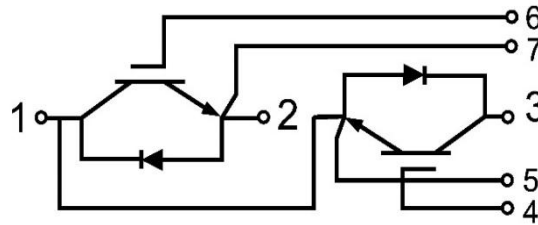
Fig.13 Gate Charge Characteristics

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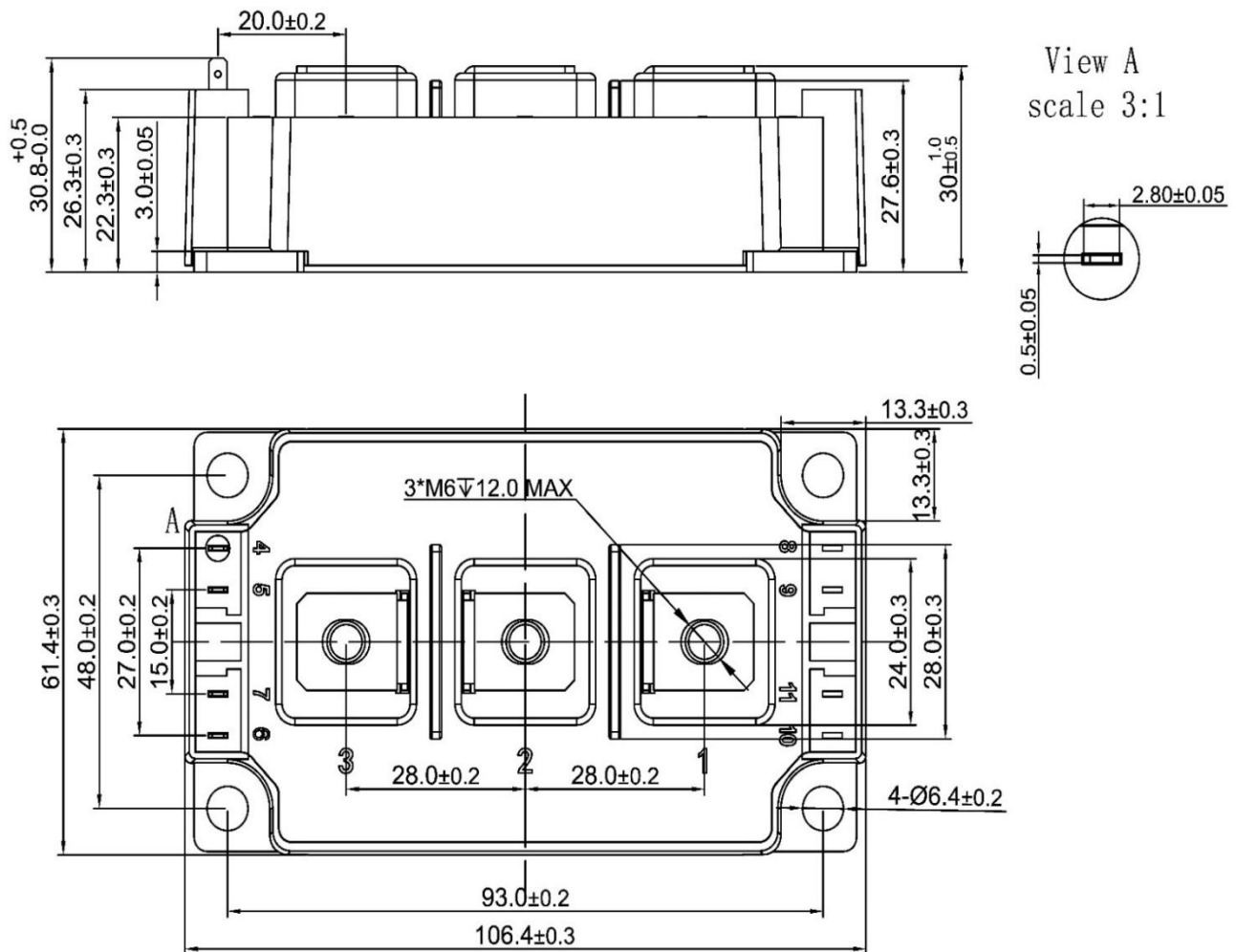
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Internal Circuit:



Package Outline (Unit: mm):



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Revision	Notes
A	Final Datasheet Initial Release

Announcement

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