

GT150HF120A5H

IGBT Module

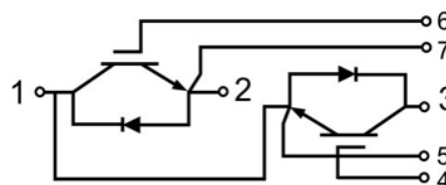
Features:

- $V_{CES}=1200V$ $I_C=150A$ 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:

- Motor Drives
- UPS Systems
- Servo Drives

Circuit Diagram



Type	Package	Marking
GT150HF120A5H	A5	GT150HF120A5H

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)	$T_C=25^\circ C$, $T_{Jmax}=175^\circ C$	750	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 =6mA, V _{CE} =V _{GE}		5.0	5.7	6.4	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =150A, V _{GE} =15V	T _J =25°C		1.70	2.05	V
			T _J =125°C		2.10		V
			T _J =175°C		2.25		V
I _{CES}	Collector-Emitter Leakage Current	V _{GE} =0V, V _{CE} =1200V, T _J =25°C				1	mA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} =20V, V _{CE} =0V, T _J =25°C				250	nA
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f=100kHz			16.00		nF
C _{oes}	Output Capacitance				0.87		nF
C _{res}	Reverse Transfer Capacitance				0.15		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=3.3\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		130		ns
			$T_J=125^{\circ}C$		142		
			$T_J=175^{\circ}C$		147		
t_r	Rise Time		$T_J=25^{\circ}C$		32		ns
			$T_J=125^{\circ}C$		36		
			$T_J=175^{\circ}C$		40		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^{\circ}C$		228		ns
			$T_J=125^{\circ}C$		259		
			$T_J=175^{\circ}C$		273		
t_f	Fall Time	$T_J=25^{\circ}C$		180		ns	
		$T_J=125^{\circ}C$		248			
		$T_J=175^{\circ}C$		260			
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=150A,$ $R_{Gon}=3.3\Omega, V_{GE}=\pm 15V,$ $di/dt=3000A/\mu s(T_J=175^{\circ}C)$ Inductive Load	$T_J=25^{\circ}C$		9.0		mJ
		$T_J=125^{\circ}C$		13.9			
		$T_J=175^{\circ}C$		17.4			



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E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =150A, R _{Goff} =3.3Ω, V _{GE} =±15V, du/dt=5500V/μs(T _J =175°C) Inductive Load	T _J =25°C		10.5		mJ
			T _J =125°C		13.6		
			T _J =175°C		15.0		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		0.893		uC
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	us
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.200	°C/W
R _{θCS}	IGBT Thermal Resistance: Case-to-Sink (per IGBT) (per IGBT, λ _{grease} = 1 W/(m · K))				0.074		°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		1.55	1.86	V
			T _J =125°C		1.61		
			T _J =175°C		1.58		
t _{rr}	Reverse Recovery Time	I _F =150A, -diF/dt=3600A/μs(T _J =175°C), V _R =600V, V _{GE} =-15V	T _J =25°C		264		ns
			T _J =125°C		430		
			T _J =175°C		578		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		174		A
			T _J =125°C		171		
			T _J =175°C		177		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		13.8		μC
			T _J =125°C		23.2		
			T _J =175°C		30.6		



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E _{rec}	Reverse Recovery Energy	I _F =150A, -diF/dt=3600A/μs(T _J =175°C), V _R =600V, V _{GE} =-15V	T _J =25°C		5.6		mJ
			T _J =125°C		9.7		
			T _J =175°C		12.8		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.350	°C/W
R _{θCS}	Diode Thermal Resistance: Case-to-Sink (per Diode, λ _{grease} = 1 W/(m • K))				0.130		°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	150	HF	120	A5	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench, Low Switching Losses 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

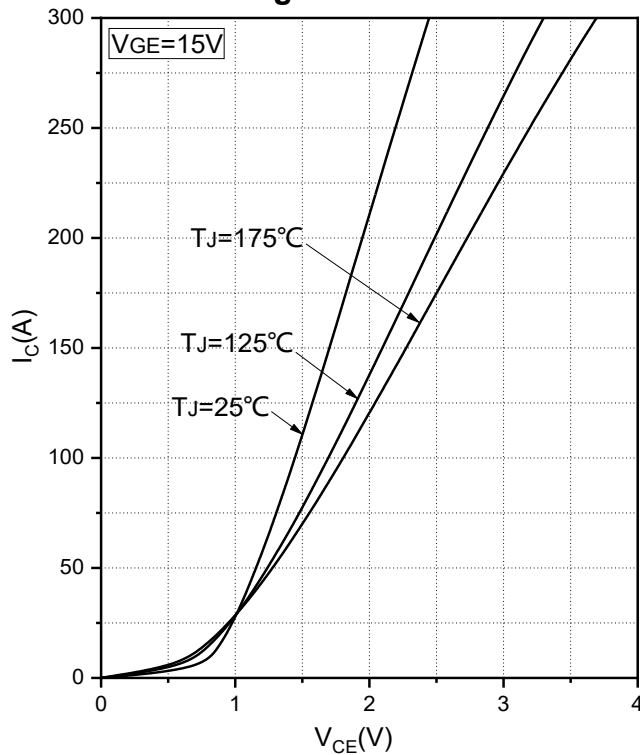


Fig.1 Typical Saturation Voltage Characteristics

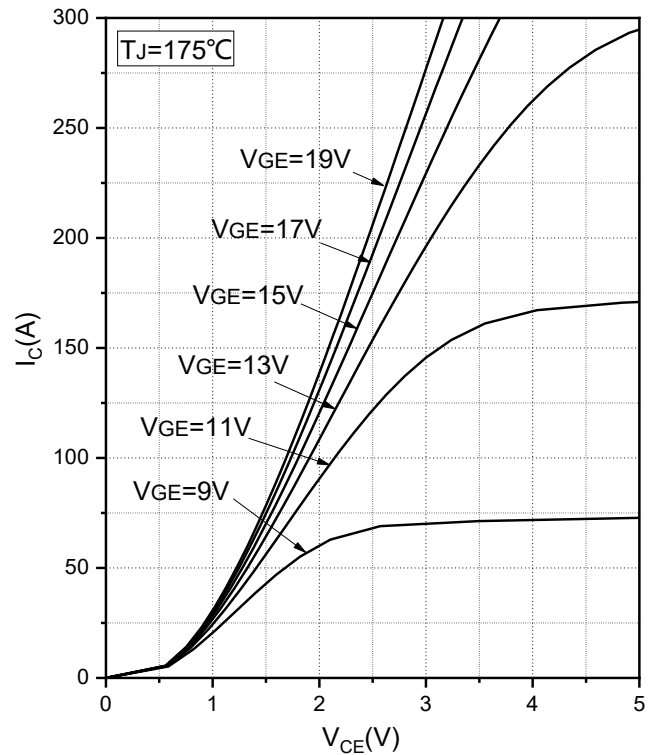


Fig.2 Typical Output Characteristics

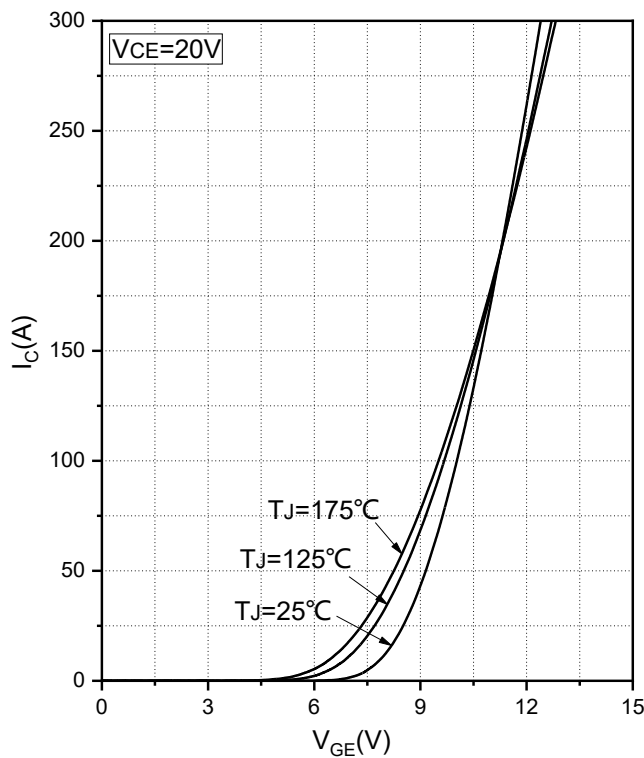


Fig.3 Transfer Characteristic

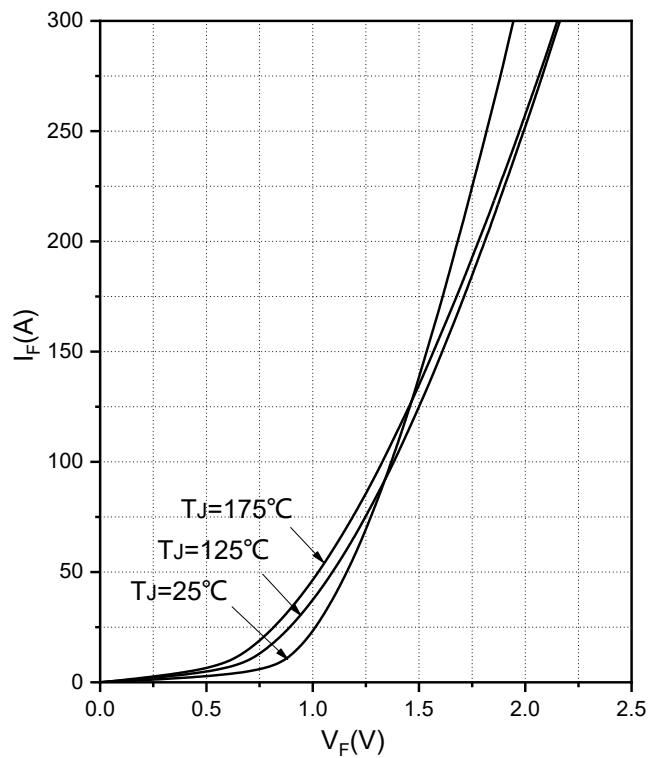


Fig.4 Forward Characteristics of Diode

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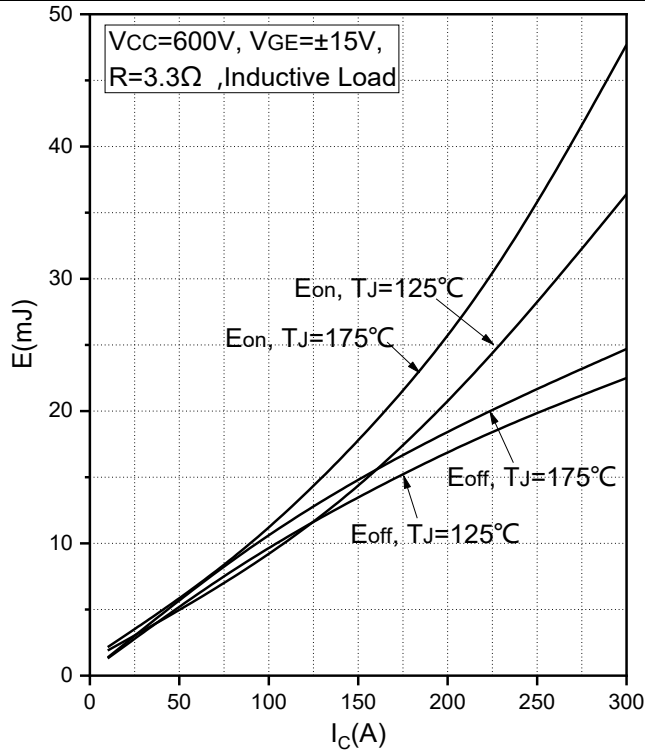


Fig.5 Typical Switching Loss vs. Collector Current

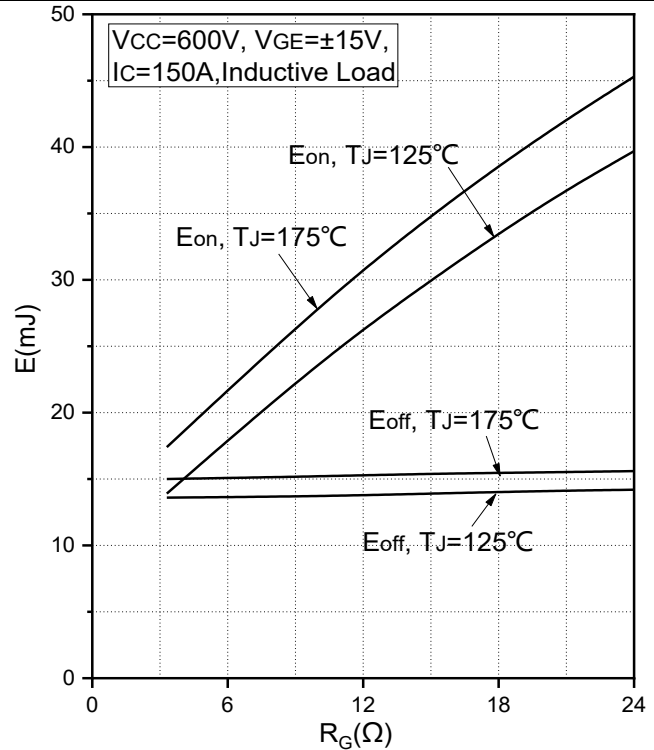


Fig.6 Typical Switching Loss vs. Gate Resistance

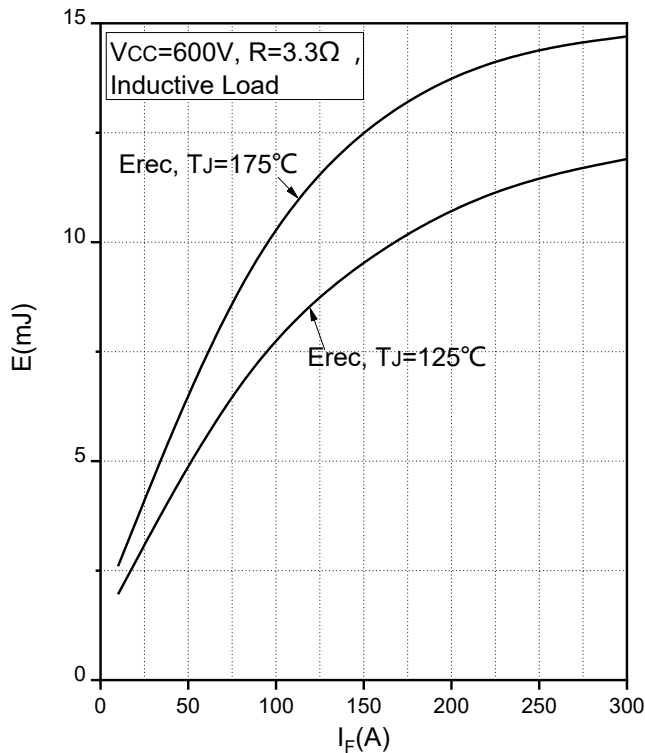


Fig.7 Typical Switching Loss vs. Forward Current

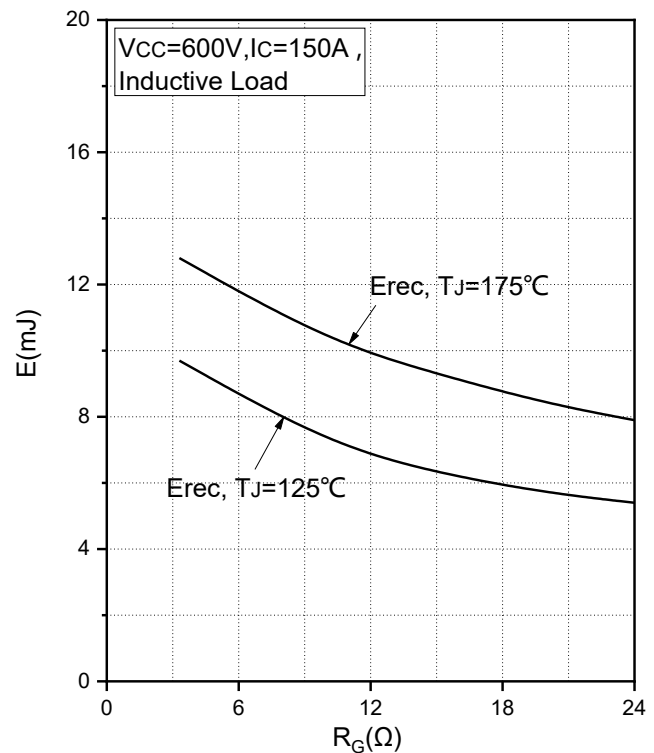


Fig.8 Typical Switching Loss vs. Gate Resistance

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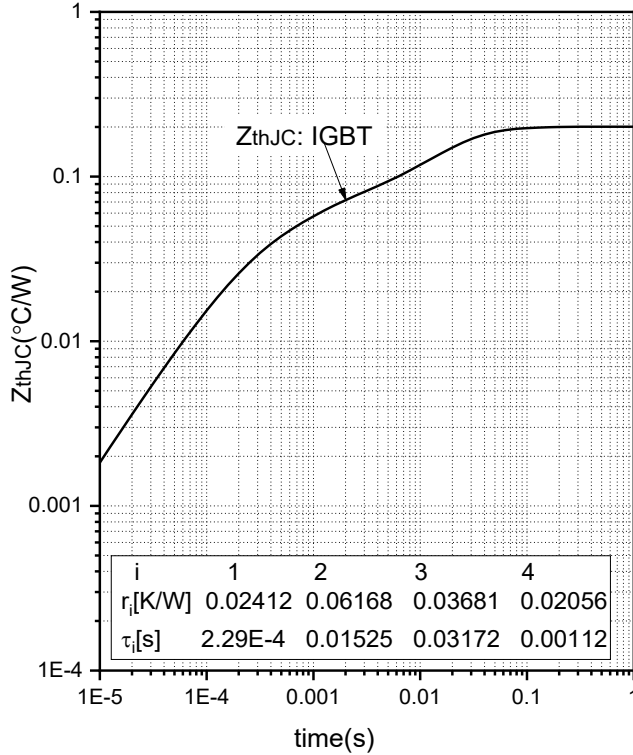


Fig.9 Transient Thermal Impedance (IGBT)

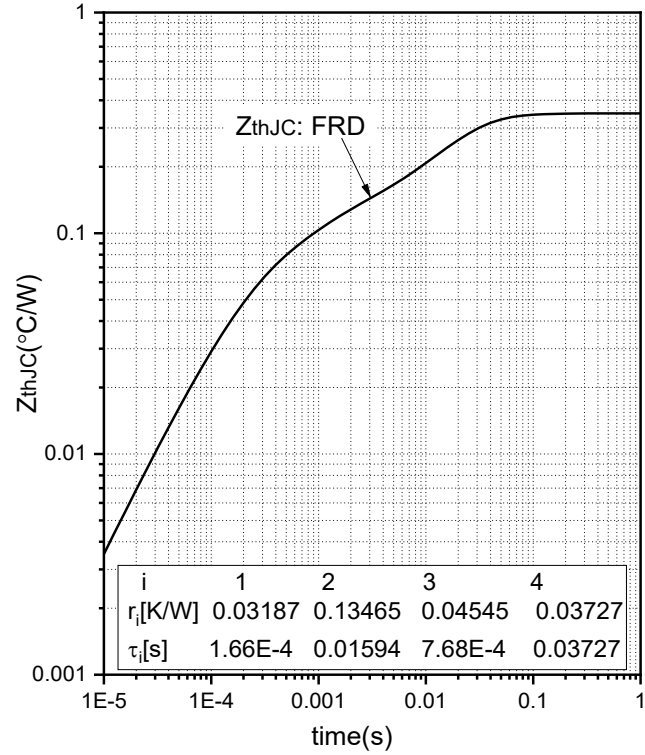


Fig.10 Transient Thermal Impedance (Diode)

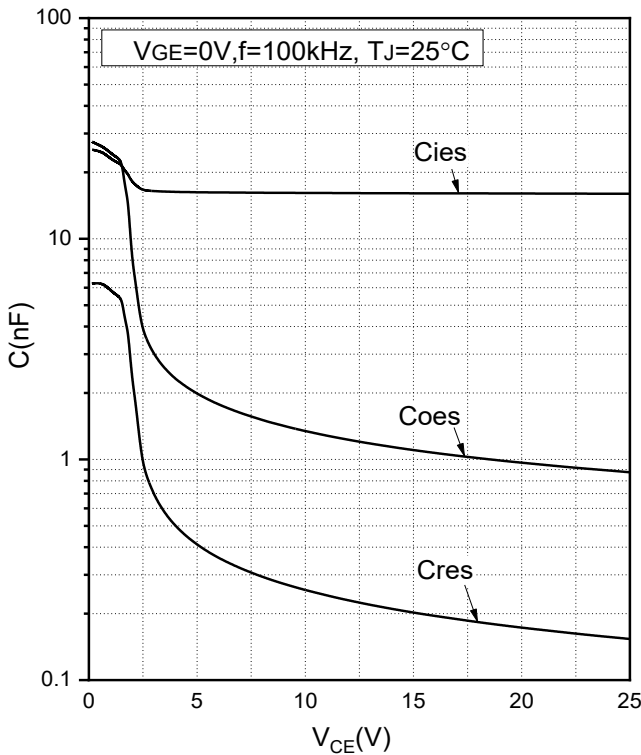


Fig.11 Capacitance Characteristics

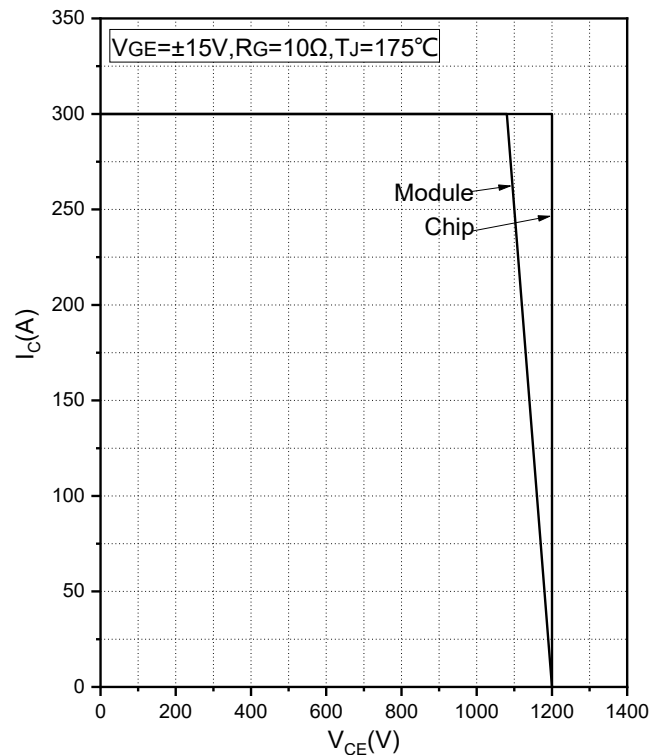


Fig.12 Reverse Bias Safe Operation Area (RBSOA)



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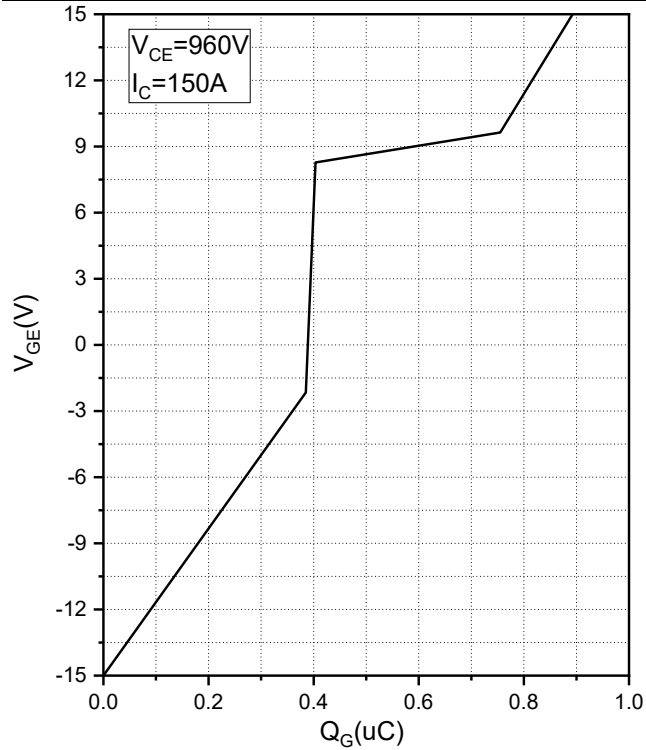


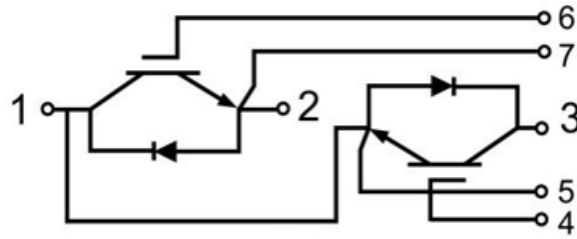
Fig.13 Gate Charge Characteristics



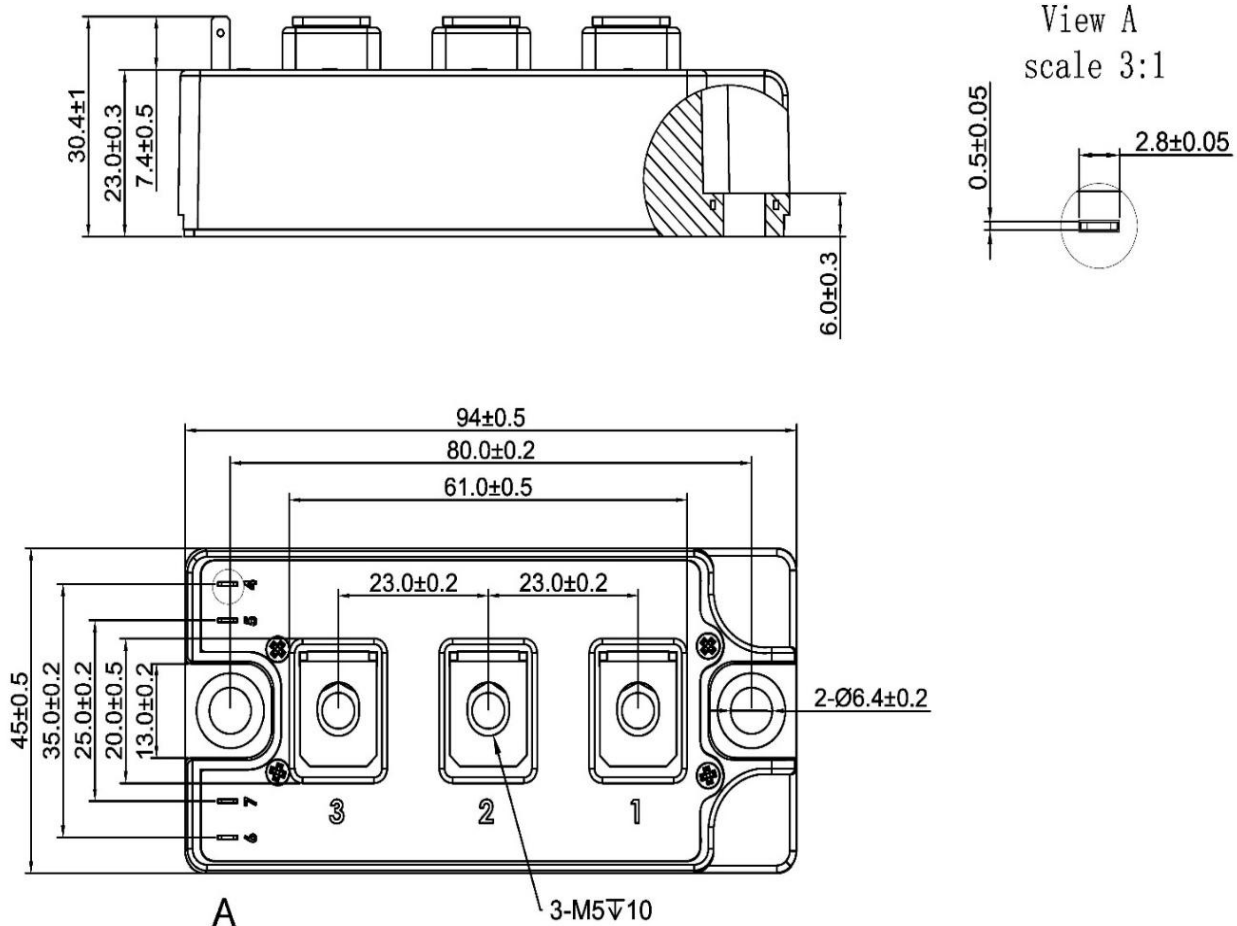
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Internal Circuit:



Package Outline (Unit: mm):



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Revision	Notes
A	Fina Datasheet Initial Release

Announcement

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