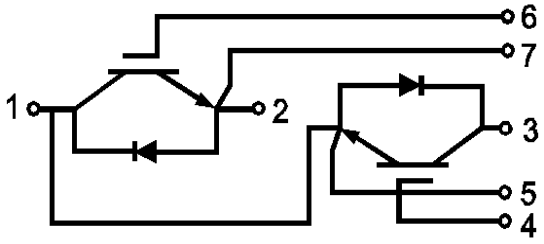
南京银茂微电子

NJSM

GT150HF170T2VH

IGBT Module

Circuit Diagram



Features:

- Vces=1700V Ic=150A Trench & Field Stop IGBT Module
- Short Circuit Capability
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested(2×Ic)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- Welding
- Power Supply
- Induction Heating

Type	Package	Marking
GT150HF170T2VH	T2V	GT150HF170T2VH

IGBT, Inverter

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

V_{CES}	Collector-Emitter Blocking Voltage		1700	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current, Limited by T_{Jmax}	T_C=90℃	150	A
		T_C=25℃	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℃,T_{Jmax}=175℃	1380	W

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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=6mA, V_{CE}=V_{GE}		5.2	5.9	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=150A, V_{GE}=15V	T_J=25℃		1.85	2.20	V
			T_J=125℃		2.31		V
			T_J=150℃		2.42		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=1700V, T_J=25℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=20V, V_{CE}=0V, T_J=25℃				600	nA
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=100kHz			14.42		nF
C_{oes}	Output Capacitance				1.33		nF
C_{res}	Reverse Transfer Capacitance				0.15		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=900V, I_C=150A, R_{Gon}=1Ω, V_{GE}=+15V/-15V, Inductive Load	T_J=25℃		145		ns
			T_J=125℃		166		
			T_J=150℃		168		
t_r	Rise Time		T_J=25℃		52		ns
			T_J=125℃		61		
			T_J=150℃		66		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=900V, I_C=150A, R_{Goff}=1Ω, V_{GE}=+15V/-15V, Inductive Load	T_J=25℃		326		ns
			T_J=125℃		355		
			T_J=150℃		377		
t_f	Fall Time		T_J=25℃		203		ns
			T_J=125℃		272		
			T_J=150℃		375		
E_{on}	Turn-on Switching Loss	V_{CC}=900V, I_C=150A, R_{Gon}=1Ω, V_{GE}=+15V/-15V, di/dt=1300A/μs(T_J=150℃) Inductive Load	T_J=25℃		25		mJ
			T_J=125℃		37		
			T_J=150℃		41		

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E_{off}	Turn-off Switching Loss	V_{CC}=900V, I_C=150A, R_{Goff}=1Ω, V_{GE}=+15V/-15V, du/dt=5000V/μs(T_J=150℃) Inductive Load	T_J=25℃		23		mJ
			T_J=125℃		28		
			T_J=150℃		32		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		1.23		uC
$R_{G\ (int)}$	Internal Gate Resistance		T_J=25℃		3.0		Ω
T_{SC}	V_{CC}=1000V, V_{GE}=±15V,T_J=150℃note1					10	us
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.108	℃/W
$R_{\theta CS}$	IGBT Thermal Resistance: Case-to-Sink (per IGBT) (per IGBT, λ_{grease} = 1 W/(m • K))				0.048		℃/W

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

Diode, Inverter

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

V_{RRM}	Repetitive Peak Reverse Voltage	T_J=25℃	1700	V
I_F	Diode Continuous Forward Current		150	A
I_{FM}	Diode Maximum Forward Current	t_p=1ms	300	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F=150A	T_J=25℃		2.13	2.56	V
			T_J=125℃		2.32		
			T_J=150℃		2.31		
t_{rr}	Reverse Recovery Time	I_F=150A, -diF/dt=1600A/μs(T_J=150℃), V_R=900V, V_{GE}=-15V	T_J=25℃		512		ns
			T_J=125℃		532		
			T_J=150℃		591		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		75		A
			T_J=125℃		78		
			T_J=150℃		81		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		22		μC
			T_J=125℃		33		
			T_J=150℃		41		

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E_{rec}	Reverse Recovery Energy	I_F=150A, -diF/dt=1600A/μs(T_J=150℃), V_R=900V, V_{GE}=-15V	T_J=25℃		11		mJ
			T_J=125℃		13		
			T_J=150℃		18		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.186	℃/W
$R_{\theta CS}$	Diode Thermal Resistance: Case-to-Sink (per Diode, λ_{grease} = 1 W/(m • K))				0.083		℃/W

Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 60s		3400		V
T_J	Maximum Junction Temperature		-40		175	℃
T_{JOP}	Maximum Operating Junction Temperature Range[note2]		-40		150	℃
T_{stg}	Storage Temperature		-40		125	℃
CTI	Comparative Tracking Index			200		
M	Power Terminals Screw:M6		3.0		5.0	N·m
M	Mounting Screw:M6		3.0		6.0	N·m
G	Weight			300		g

note2: T_{JOP}> 150°C is only allowed for operation at overload conditions.

Ordering Information Table

Device code

G	T	150	HF	170	T2V	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 (170=1700V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

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Characteristic diagram

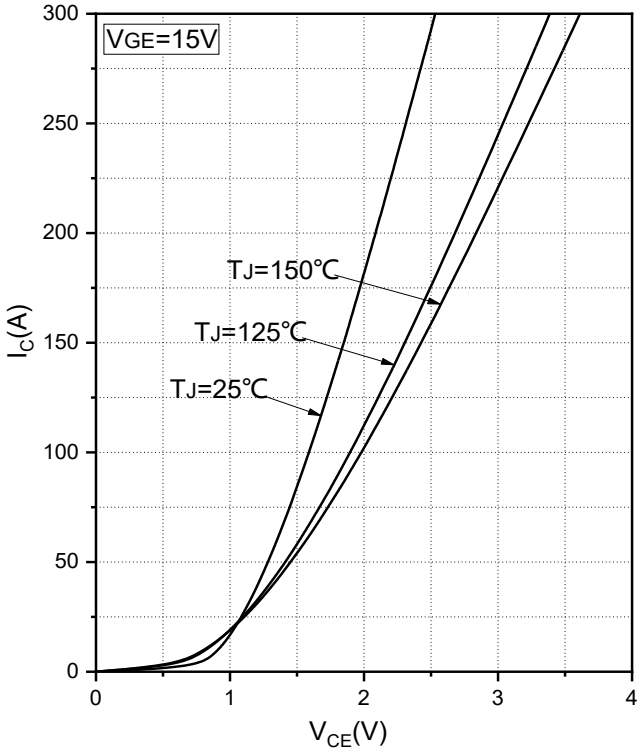


Fig.1 Typical Saturation Voltage Characteristics

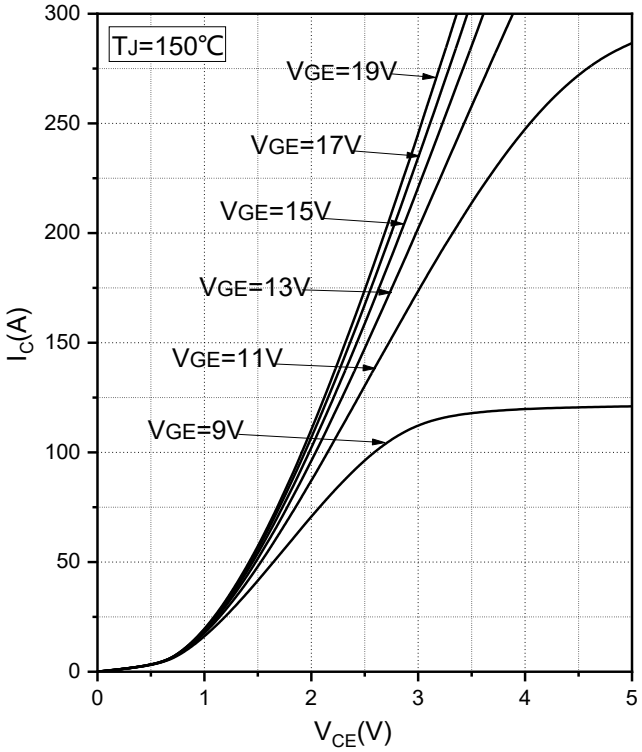


Fig.2 Typical Output Characteristics

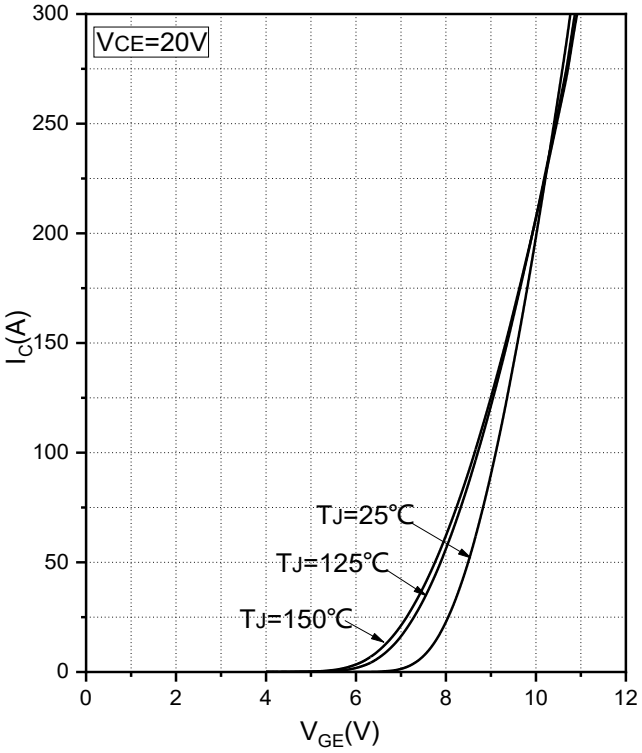


Fig.3 Transfer Characteristic

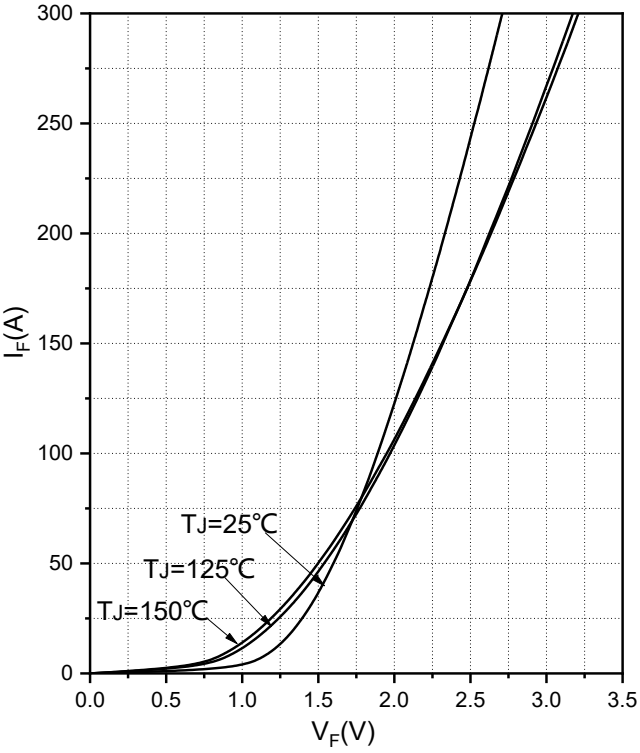


Fig.4 Forward Characteristics of Diode

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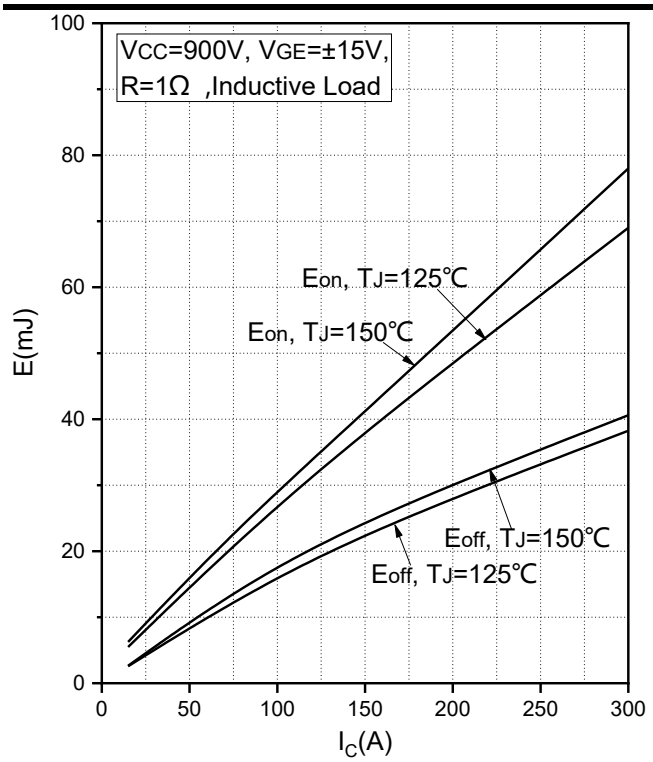


Fig.5 Typical Switching Loss vs. Collector Current

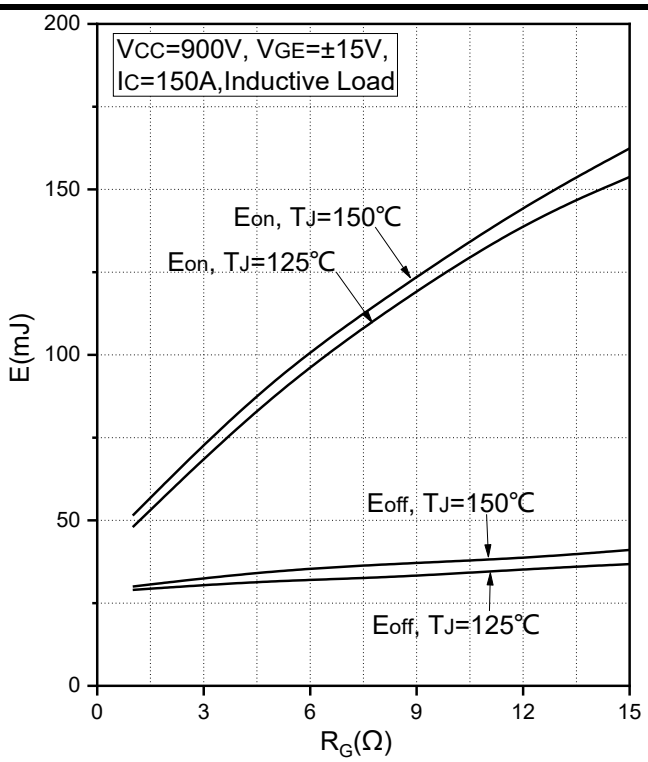


Fig.6 Typical Switching Loss vs. Gate Resistance

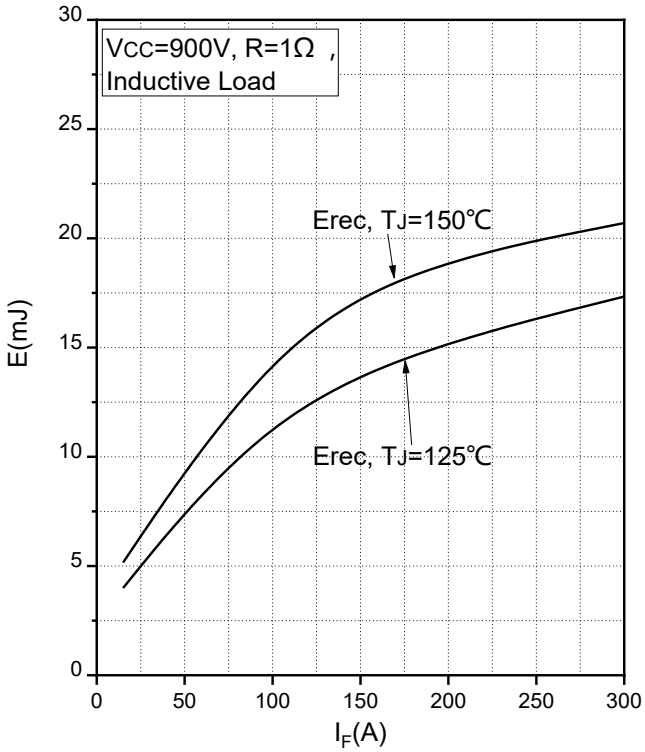


Fig.7 Typical Switching Loss vs. Forward Current

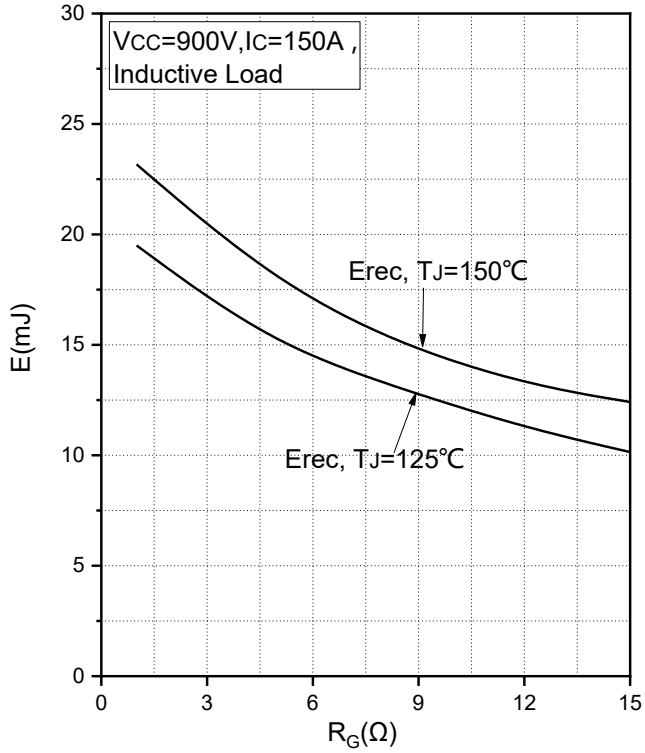


Fig.8 Typical Switching Loss vs. Gate Resistance

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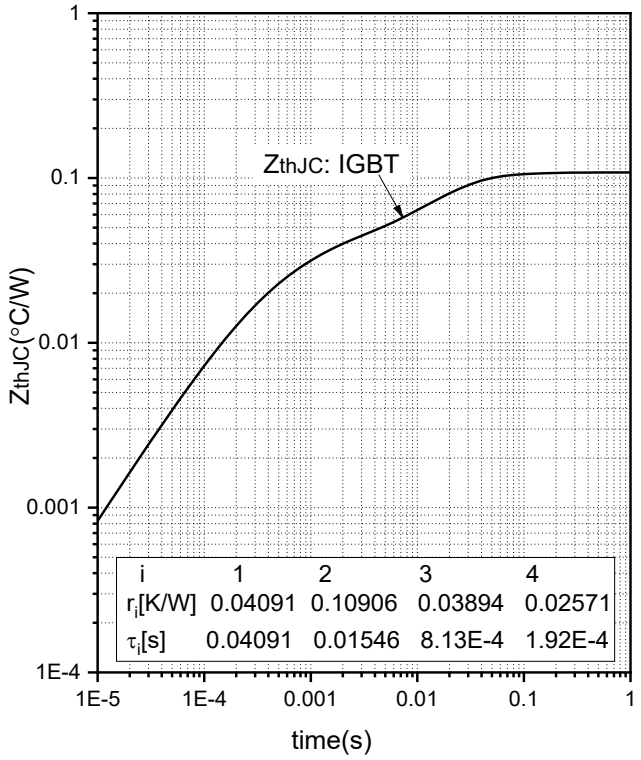


Fig.9 Transient Thermal Impedance (IGBT)

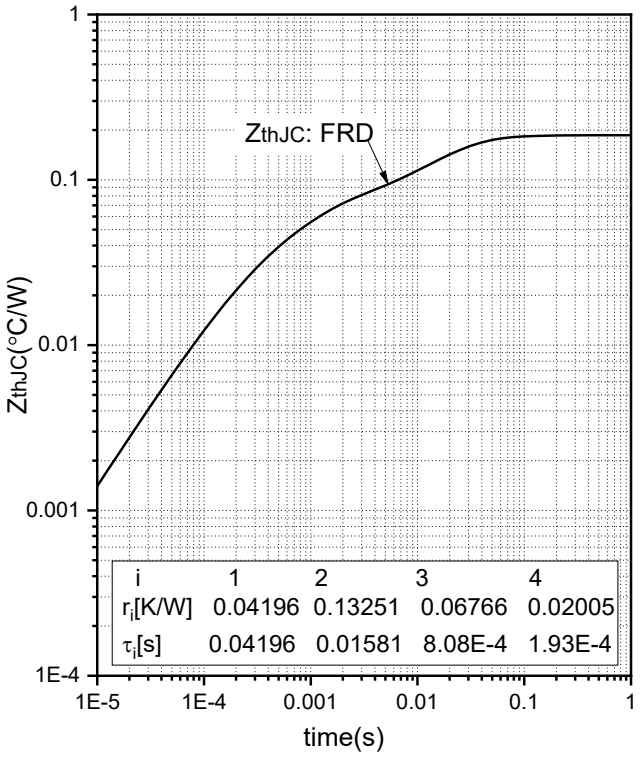


Fig.10 Transient Thermal Impedance (Diode)

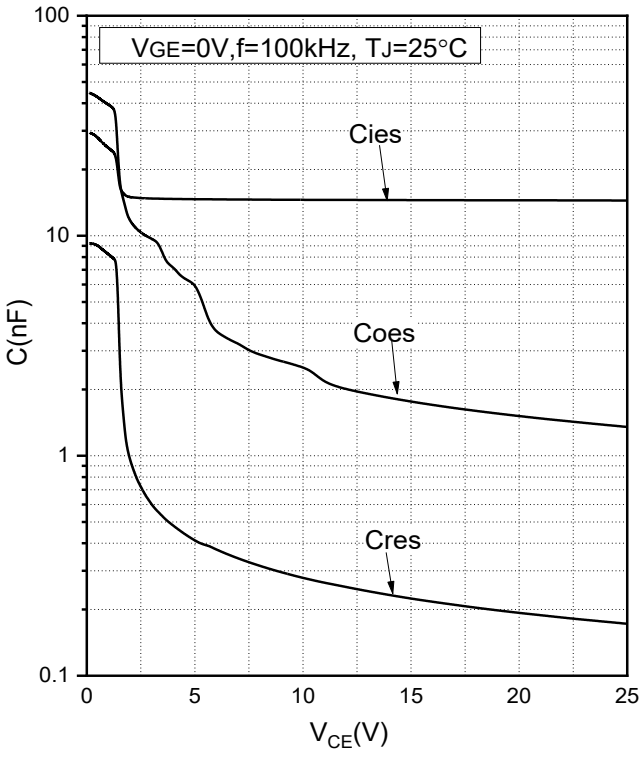


Fig.11 Capacitance Characteristics

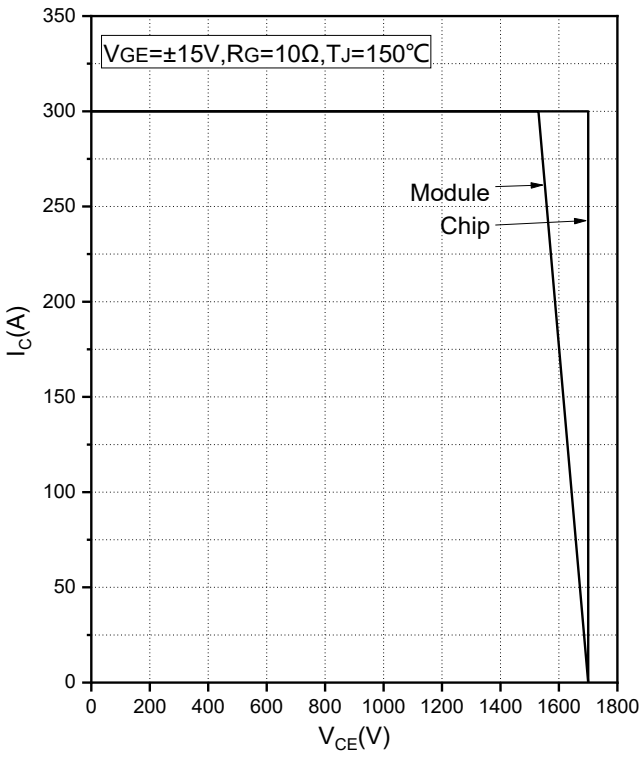


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

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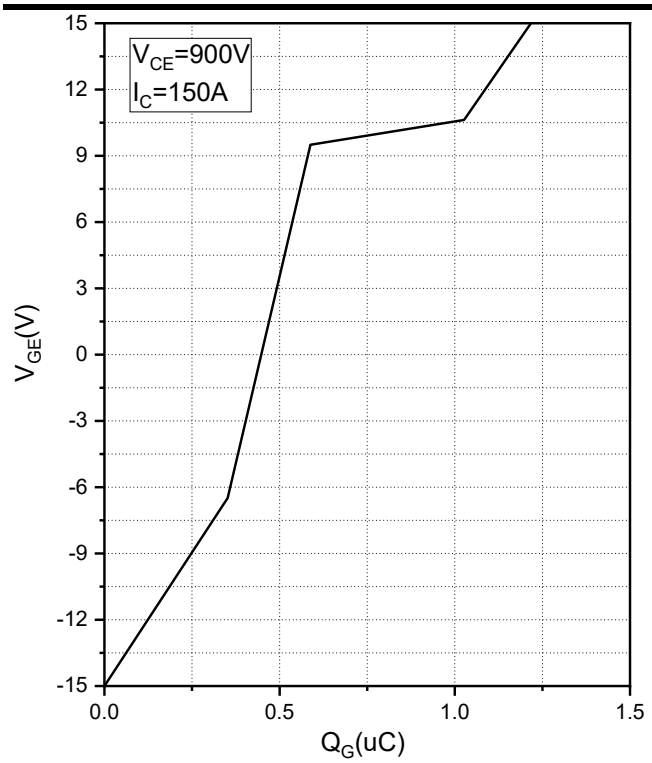
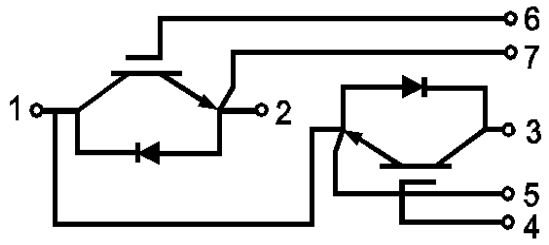


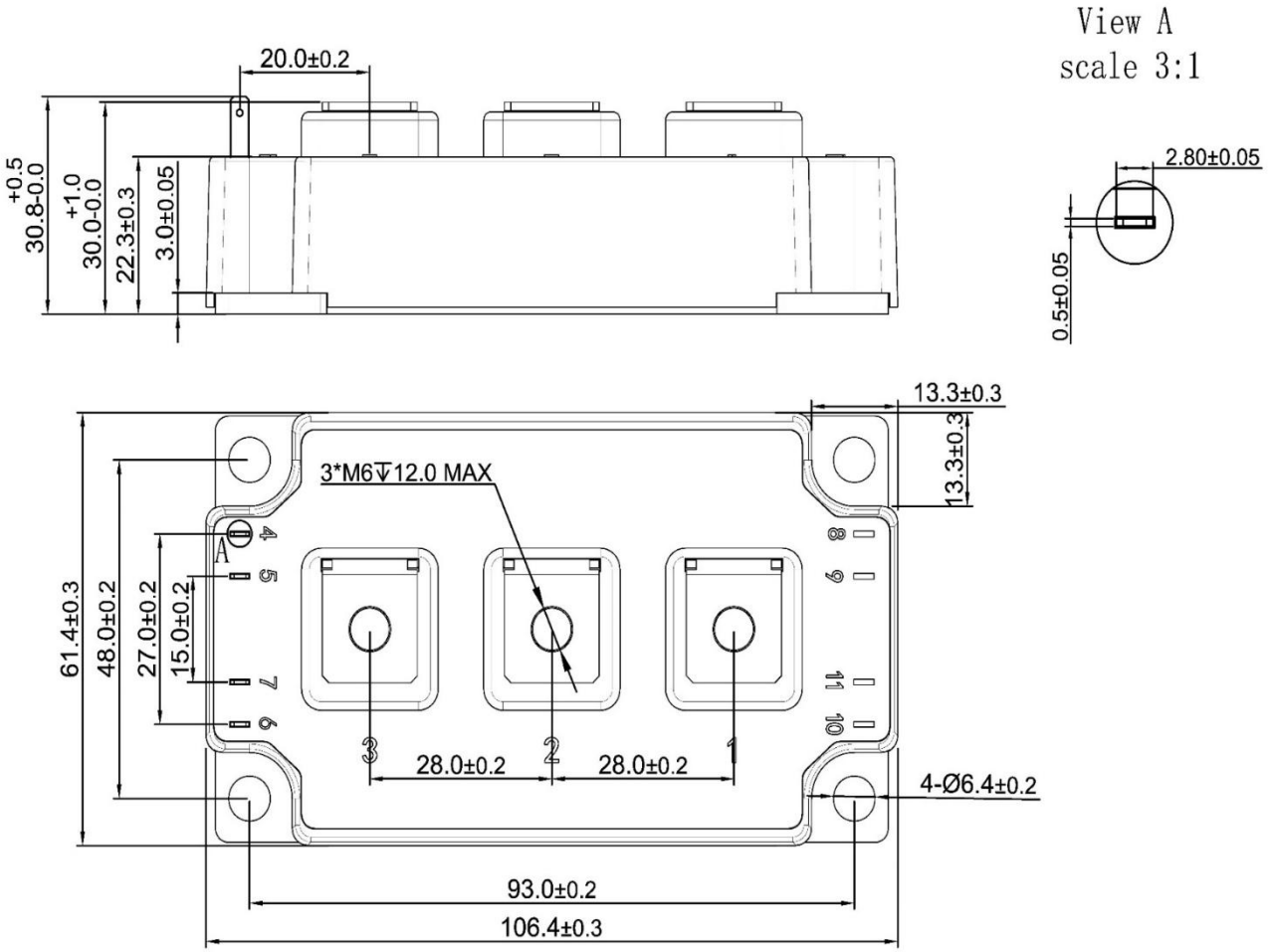
Fig.13 Gate Charge Characteristics

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Internal Circuit:



Package Outline (Unit: mm):



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Revision	Notes
01	Preliminary Datasheet
02	Engineering Sample Datasheet

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