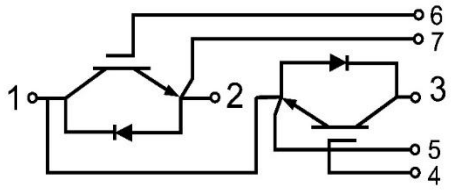
南京银茂微电子

NJSM

GT200HF170T2VH

IGBT Module

Circuit Diagram



Features:

- Vces=1700V Ic=200A Trench & Field Stop IGBT Module
- Short Circuit Capability
- Low Switching Loss
- 100% RBSOA Tested(2×Ic)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- Industrial Inverters
- Motor Drives
- UPS Systems

Type	Package	Marking
GT200HF170T2VH	T2V	GT200HF170T2VH

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℃	200	A
		T_C=25℃	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℃,T_{Jmax}=175℃	1700	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=8mA, V_{CE}=V_{GE}		5.0	6.0	7.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=200A, V_{GE}=15V	T_J=25℃		1.78	2.30	V
			T_J=125℃		2.27		V
			T_J=150℃		2.36		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℃				400	nA
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=100kHz			18.90		nF
C_{oes}	Output Capacitance				1.67		nF
C_{res}	Reverse Transfer Capacitance				0.24		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=900V, I_C=200A, R_{Gon}=1Ω, V_{GE}=+15V/-15V, Inductive Load	T_J=25℃		227		ns
			T_J=125℃		230		
			T_J=150℃		240		
t_r	Rise Time		T_J=25℃		61		ns
			T_J=125℃		70		
			T_J=150℃		80		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=900V, I_C=200A, R_{Goff}=1Ω, V_{GE}=+15V/-15V, Inductive Load	T_J=25℃		523		ns
			T_J=125℃		600		
			T_J=150℃		630		
t_f	Fall Time		T_J=25℃		321		ns
			T_J=125℃		390		
			T_J=150℃		420		
E_{on}	Turn-on Switching Loss	V_{CC}=900V, I_C=200A, R_{Gon}=1Ω, V_{GE}=+15V/-15V, di/dt=6000A/μs(T_J=150℃) Inductive Load	T_J=25℃		60		mJ
			T_J=125℃		70		
			T_J=150℃		84		

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E_{off}	Turn-off Switching Loss	V_{CC}=900V, I_C=200A, R_{Goff}=1Ω, V_{GE}=+15V/-15V, du/dt=6000V/μs(T_J=150℃) Inductive Load	T_J=25℃		42		mJ
			T_J=125℃		47		
			T_J=150℃		58		
Q_g	Total Gate Charge	V_{CE}=900V, V_{GE}=±15V,I_C=200A	T_J=25℃		1.58		uC
$R_{G\ (int)}$	Internal Gate Resistance		T_J=25℃		2.5		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)					0.087	℃/W
$R_{\theta CS}$	IGBT Thermal Resistance: Case-to-Sink (per IGBT) (per IGBT, λ_{grease} = 1 W/(m • K))				0.043		℃/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		200	A
I_{FM}	Diode Maximum Forward Current	t_p=1ms	400	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F=200A	T_J=25℃		1.92	2.40	V
			T_J=125℃		2.21		
			T_J=150℃		2.22		
t_{rr}	Reverse Recovery Time	I_F=200A, -diF/dt=6100A/μs(T_J=150℃), V_{CC}=900V, V_{GE}=-15V	T_J=25℃		556		ns
			T_J=125℃		880		
			T_J=150℃		900		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		180		A
			T_J=125℃		186		
			T_J=150℃		186		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		40		μC
			T_J=125℃		62		
			T_J=150℃		65		

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E_{rec}	Reverse Recovery Energy	I_F=200A, -diF/dt=6100A/μs(T_J=150℃), V_{CC}=900V, V_{GE}=-15V	T_J=25℃		23		mJ
			T_J=125℃		32		
			T_J=150℃		34		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.134	℃/W
$R_{\theta CS}$	Diode Thermal Resistance: Case-to-Sink (per Diode, λ_{grease} = 1 W/(m • K))				0.066		℃/W

Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1minute		3400		V
T_J	Maximum Junction Temperature		-40		175	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		150	℃
T_{stg}	Storage Temperature		-40		125	℃
CTI	Comparative Tracking Index			200		
T	Power Terminals Screw:M6		3		5	N·m
T	Mounting Screw:M6		3		6	N·m
G	Weight			300		g

Ordering Information Table

Device code

G	T	200	HF	170	T2V	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 : 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

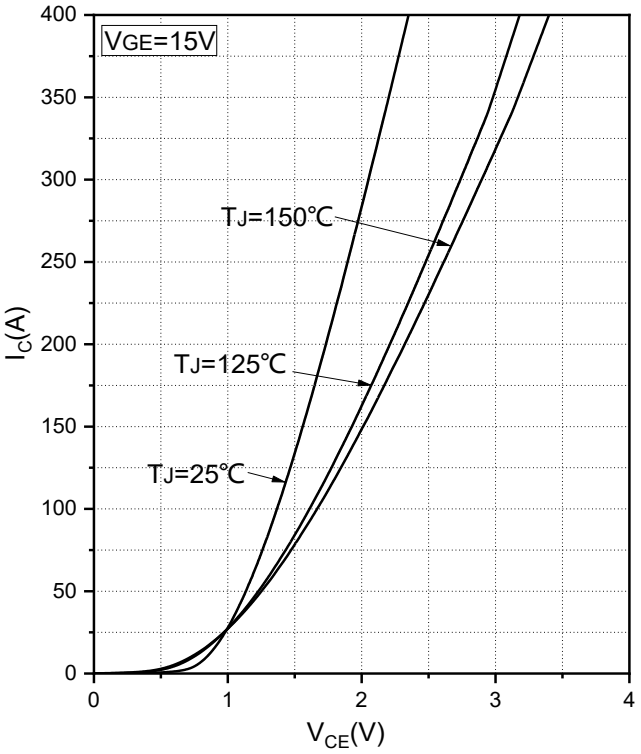


Fig.1 Typical Saturation Voltage Characteristics

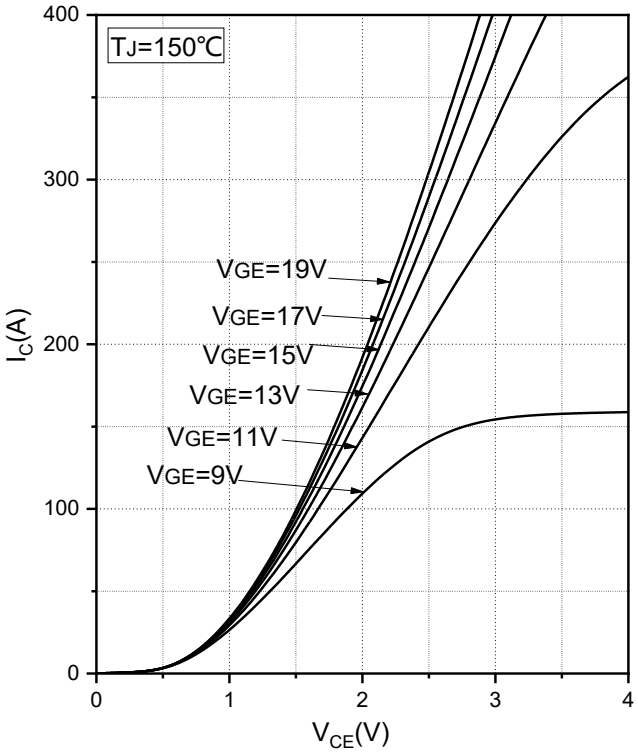


Fig.2 Typical Output Characteristics

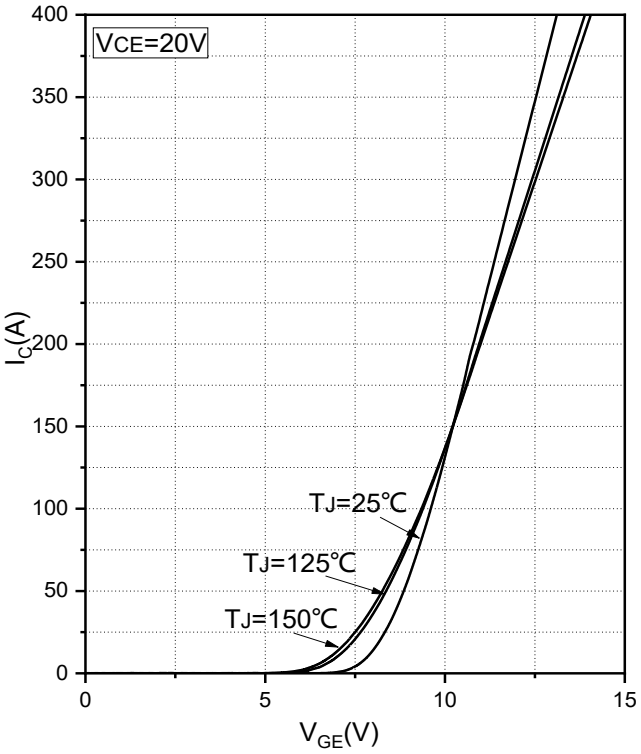


Fig.3 Transfer Characteristic

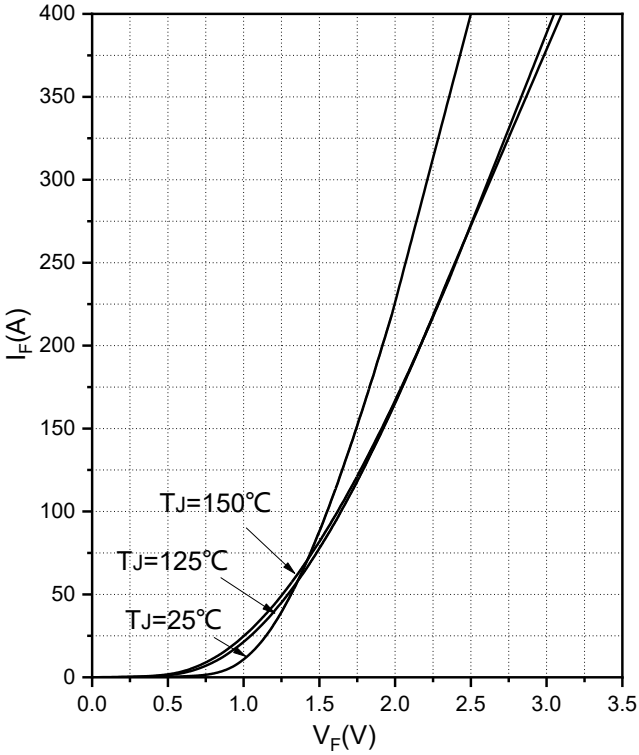


Fig.4 Forward Characteristics of Diode

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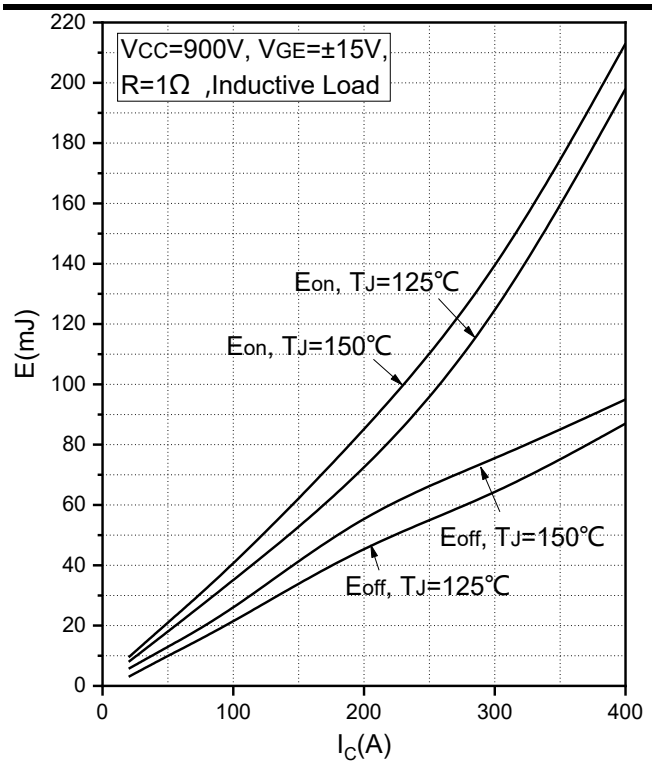


Fig.5 Typical Switching Loss IGBT vs. Collector Current

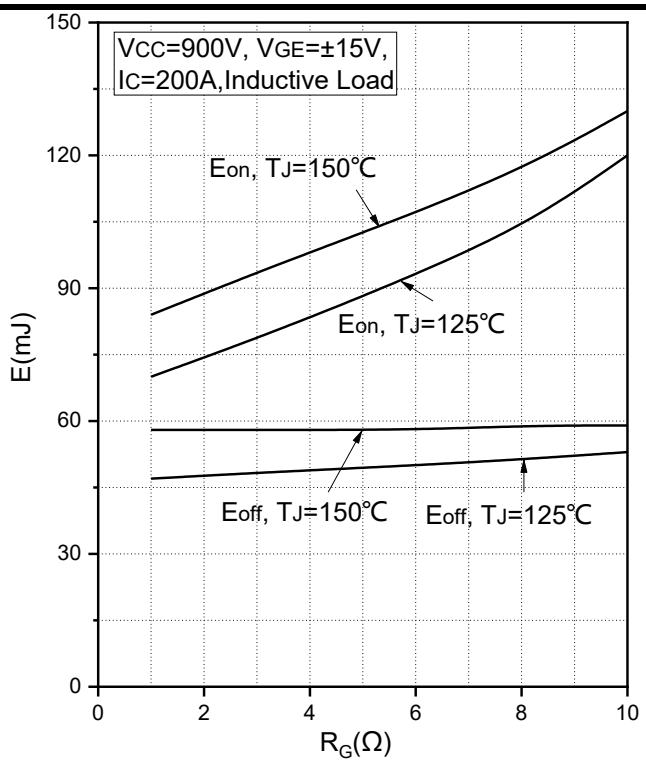


Fig.6 Typical Switching Loss IGBT vs. Gate Resistance

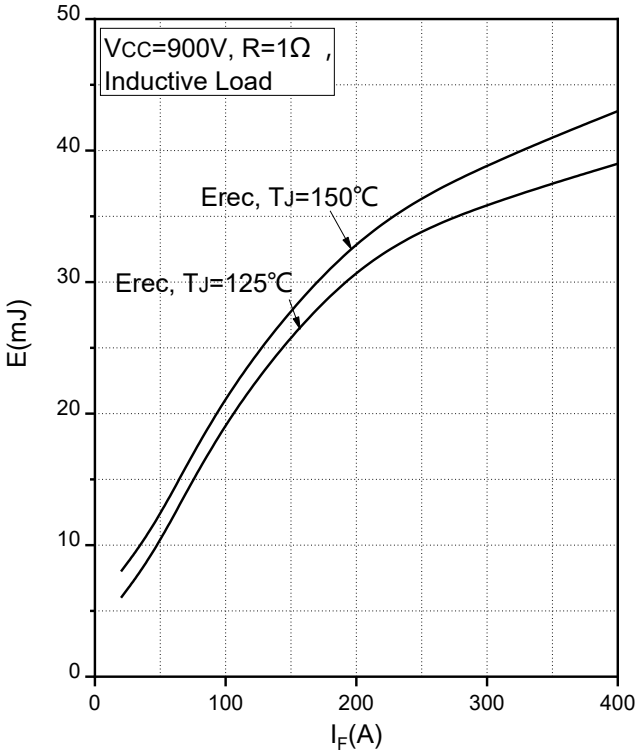


Fig.7 Typical Switching Loss Diode vs. Forward Current

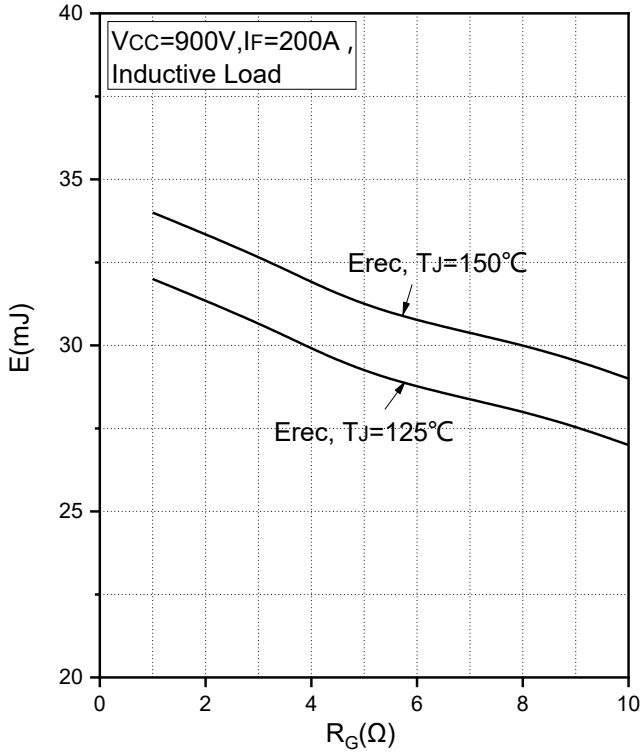


Fig.8 Typical Switching Loss Diode vs. Gate Resistance

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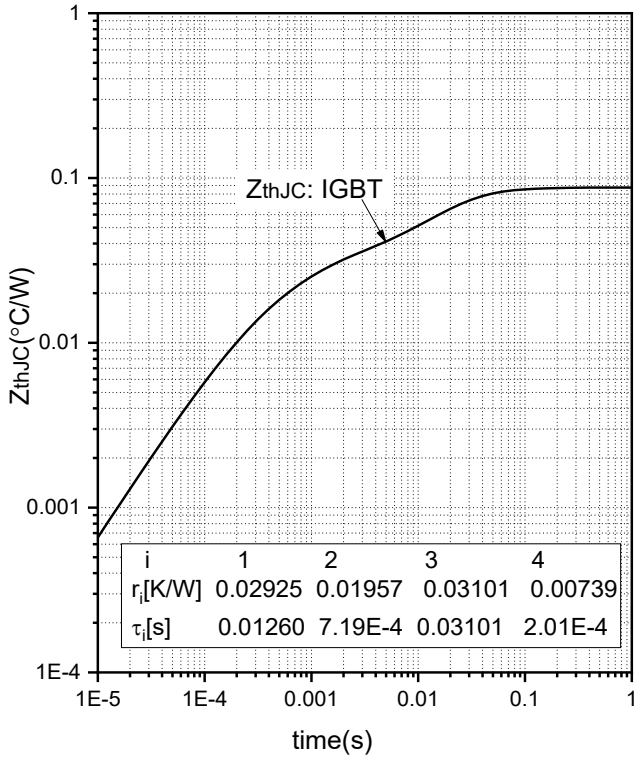


Fig.9 Transient Thermal Impedance (IGBT)

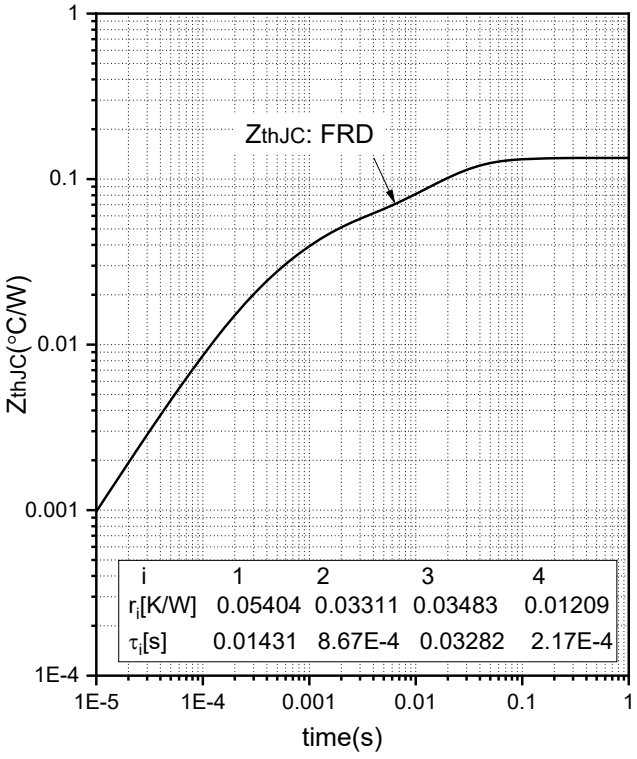


Fig.10 Transient Thermal Impedance (Diode)

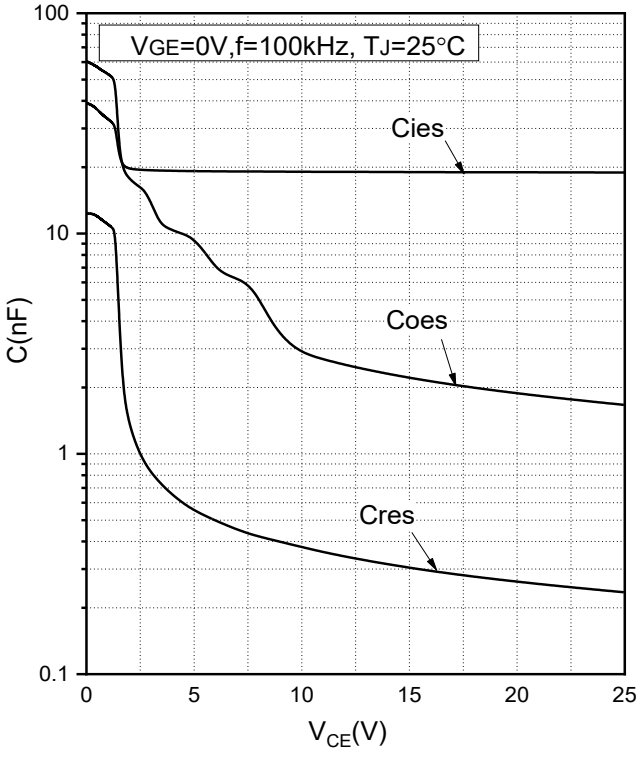


Fig.11 Capacitance Characteristics

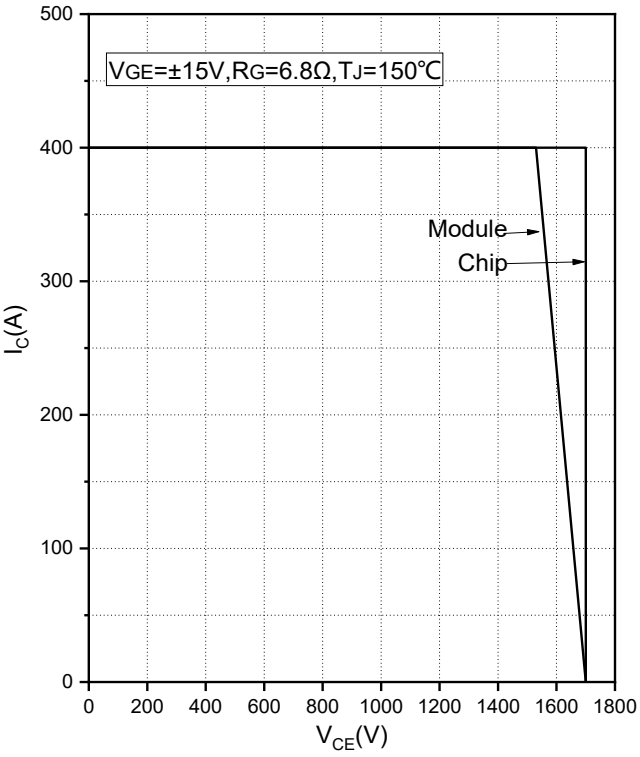


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

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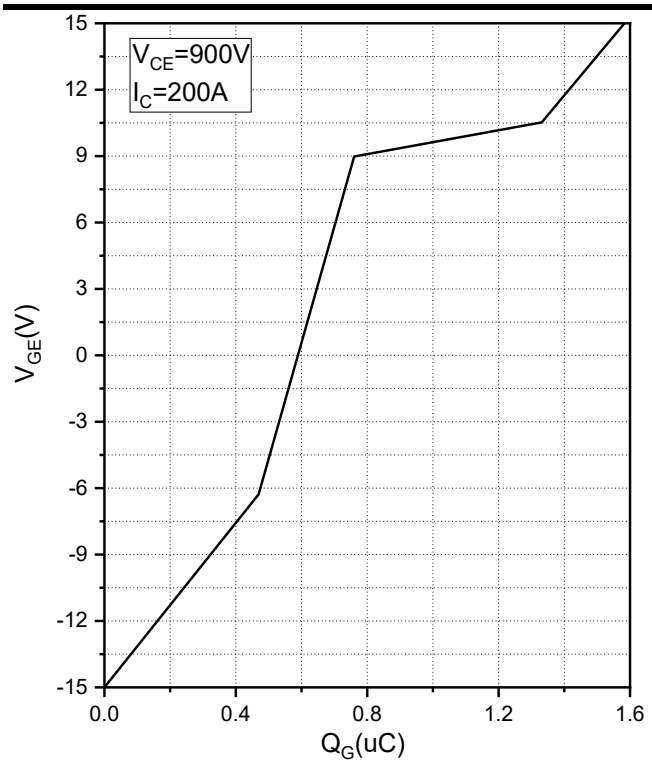
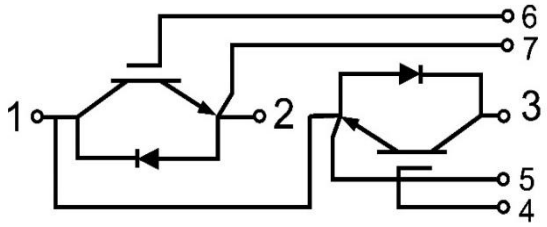


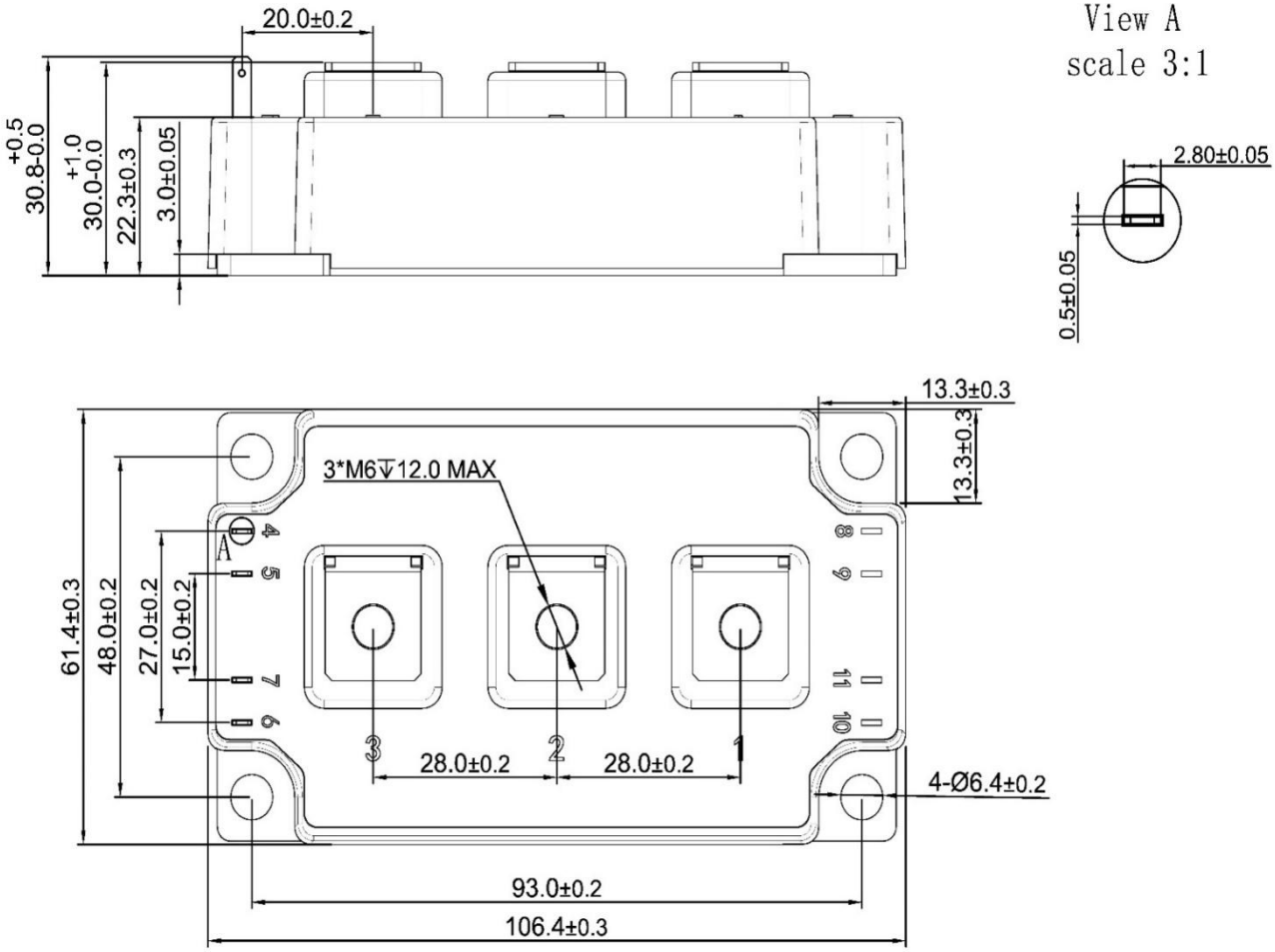
Fig.13 Gate Charge Characteristics

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Internal Circuit:



Package Outline (Unit: mm):



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Revision	Notes
01	Initial Release
02	Engineering Sample Datasheet

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