南京银茂微电子

NJSM

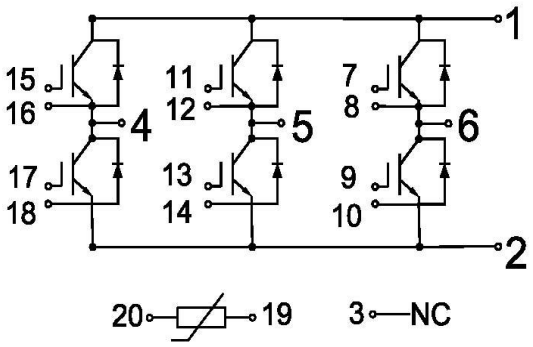
GT50FF120A1H

IGBT Module

Features:

- Vces=1200V Ic=50A 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

Circuit Diagram



Applications:

- High Power Converters
- Industial Motor Drives
- UPS Systems

Type	Package	Marking
GT50FF120A1H	A1	GT50FF120A1H

IGBT, Inverter

Maximum Rated Values (T_C=25℃ 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℃	50	A
		T_C=25℃	100	A
I_{CM}	Peak Collector Current Repetitive	Tp limited by T_{Jmax}	100	A
P_D	Maximum Power Dissipation (IGBT)	T_C=25℃, T_{Jmax}=175℃	470	W

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=1.7mA, V_{CE}=V_{GE}		5.0	5.8	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=50A, V_{GE}=15V	T_J=25℃		1.74	2.15	V
			T_J=125℃		2.18		V
			T_J=175℃		2.35		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=1200V, T_J=25℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=20V, V_{CE}=0V, T_J=25℃				200	nA
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=100kHz			5.41		nF
C_{oes}	Output Capacitance				0.69		nF
C_{res}	Reverse Transfer Capacitance				0.06		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V, I_C=50A, R_{Gon}=10Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		60		ns
			T_J=125℃		61		
			T_J=175℃		62		
t_r	Rise Time		T_J=25℃		41		ns
			T_J=125℃		44		
			T_J=175℃		45		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V, I_C=50A, R_{Goff}=10Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		178		ns
			T_J=125℃		198		
			T_J=175℃		217		
t_f	Fall Time		T_J=25℃		161		ns
			T_J=125℃		202		
			T_J=175℃		228		
E_{on}	Turn-on Switching Loss	V_{CC}=600V, I_C=50A, R_{Gon}=10Ω, V_{GE}=±15V, di/dt=889A/μs(T_J=175℃) Inductive Load	T_J=25℃		4.9		mJ
			T_J=125℃		6.1		
			T_J=175℃		6.8		

E_{off}	Turn-off Switching Loss	V_{CC}=600V, I_C=50A, R_{Goff}=10Ω, V_{GE}=±15V, du/dt=5500V/μs(T_J=175℃) Inductive Load	T_J=25℃		3.0		mJ
			T_J=125℃		3.9		
			T_J=175℃		4.3		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		301		nC
$R_{G\ (int)}$	Internal Gate Resistance		T_J=25℃		3		Ω
T_{SC}	V_{CC}=600V, V_{GE}=±15V,T_J=175℃note1					10	us
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.318	℃/W
$R_{\theta CS}$	IGBT Thermal Resistance: Case-to-Sink (per IGBT) (per IGBT, λ_{grease} = 1 W/(m • K))				0.311		℃/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℃	1200	V
I_F	Diode Continuous Forward Current		50	A
I_{FM}	Diode Maximum Forward Current	tp=1ms	100	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F=50A	T_J=25℃		1.90	2.30	V
			T_J=125℃		2.10		
			T_J=175℃		2.07		
t_{rr}	Reverse Recovery Time	I_F=50A, -diF/dt=750A/μs(T_J=175℃), V_R=600V, V_{GE}=-15V	T_J=25℃		345		ns
			T_J=125℃		487		
			T_J=175℃		685		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		28		A
			T_J=125℃		33		
			T_J=175℃		36		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		5.1		μC
			T_J=125℃		8.4		
			T_J=175℃		10.8		

E_{rec}	Reverse Recovery Energy	I_F=50A, -diF/dt=750A/μs(T_J=175℃), V_R=600V, V_{GE}=-15V	T_J=25℃		1.8		mJ
			T_J=125℃		3.3		
			T_J=175℃		4.4		
$R_{θJC}$	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.663	℃/W
$R_{θCS}$	Diode Thermal Resistance: Case-to-Sink (per Diode, λ_{grease} = 1 W/(m • K))				0.648		℃/W

Internal NTC-Thermistor Characteristics

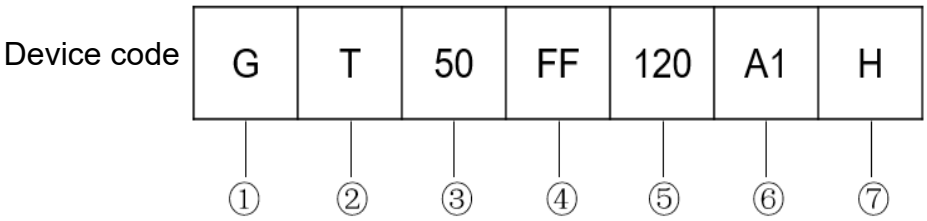
Symbol	Conditions	Min.	Typ.	Max.	Units.
R_{25}	T_C=25℃		5		kΩ
△R/R	T_C=100℃, R_{100}=465Ω	-5		+5	%
P_{25}	T_C=25℃			10	mW
$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3380		K
$B_{25/80}$	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$		3440		K
$B_{25/100}$	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298.15K))]$		3545		K

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	℃
T_{JOP}	Maximum Operating Junction Temperature Range[note2]		-40		150	℃
T_{stg}	Storage Temperature		-40		125	℃
CTI	Comparative Tracking Index			200		
T	Mounting Screw:M3		0.75		1.20	N·m
G	Weight			30		g

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

Ordering Information Table



① - IGBT Module
② - Field Stop Trench Gate IGBT
③ - Rated Current (50=50A)
④ - Circuit Configuration: FF(Full Bridge)
⑤ - Rated Voltage (120=1200V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

Characteristic diagram

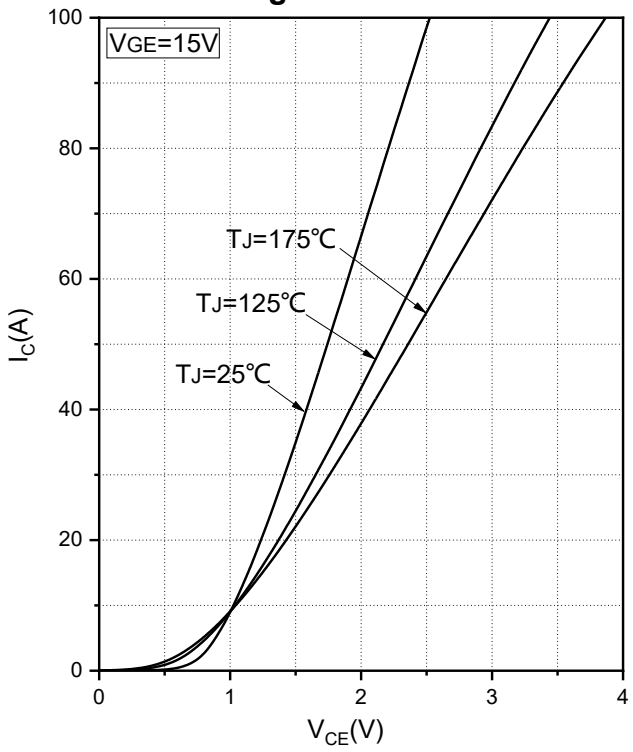


Fig.1 Typical Saturation Voltage Characteristics

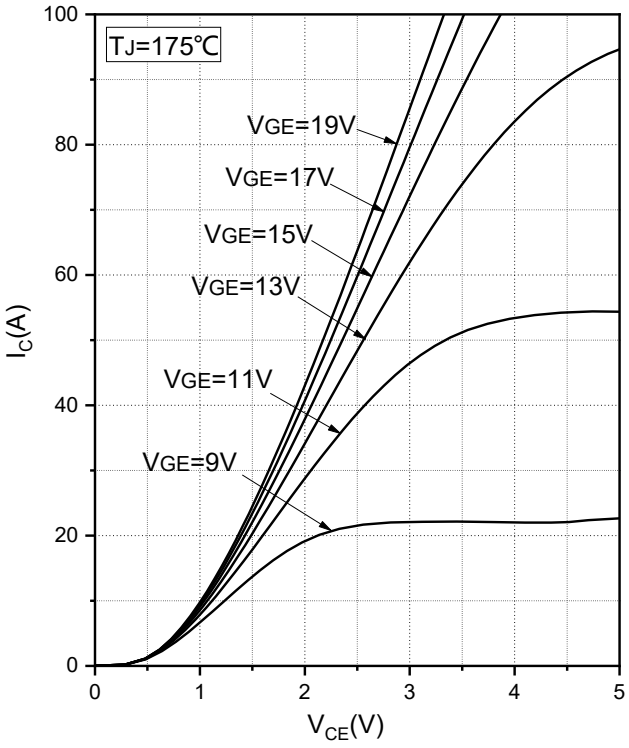


Fig.2 Typical Output Characteristics

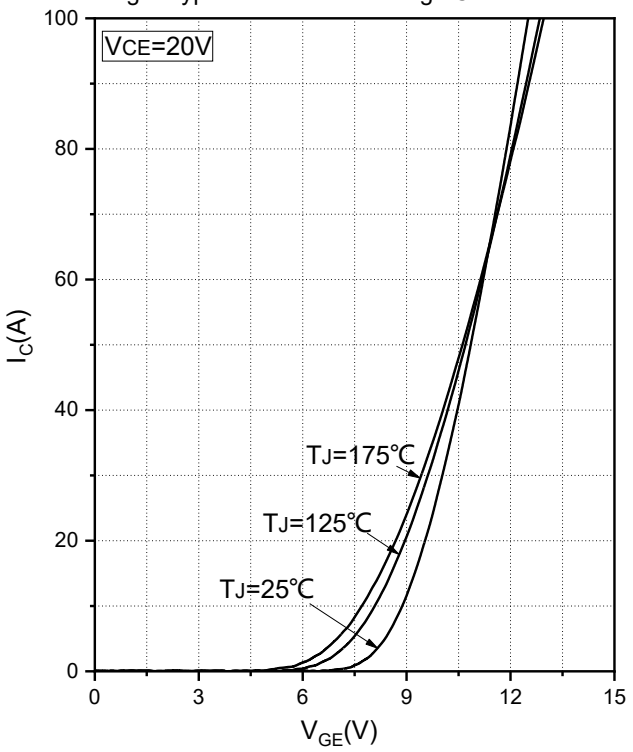


Fig.3 Transfer Characteristic

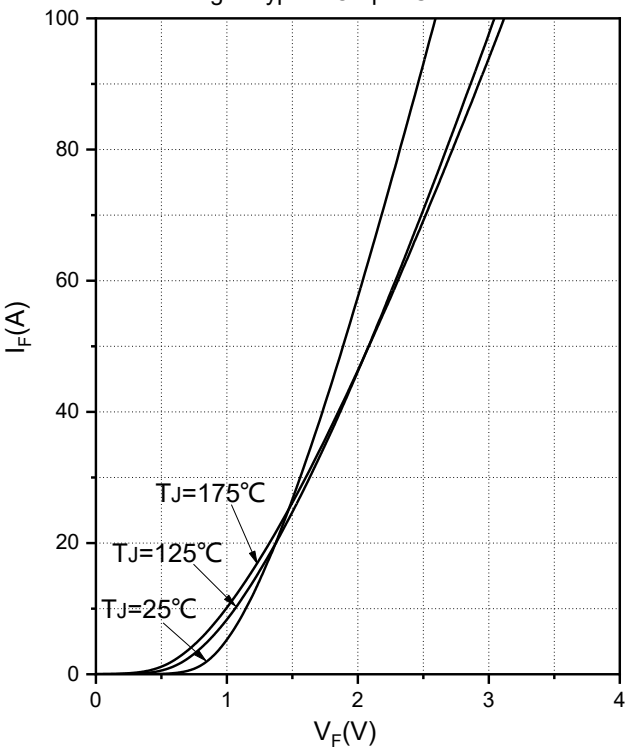


Fig.4 Forward Characteristics of Diode

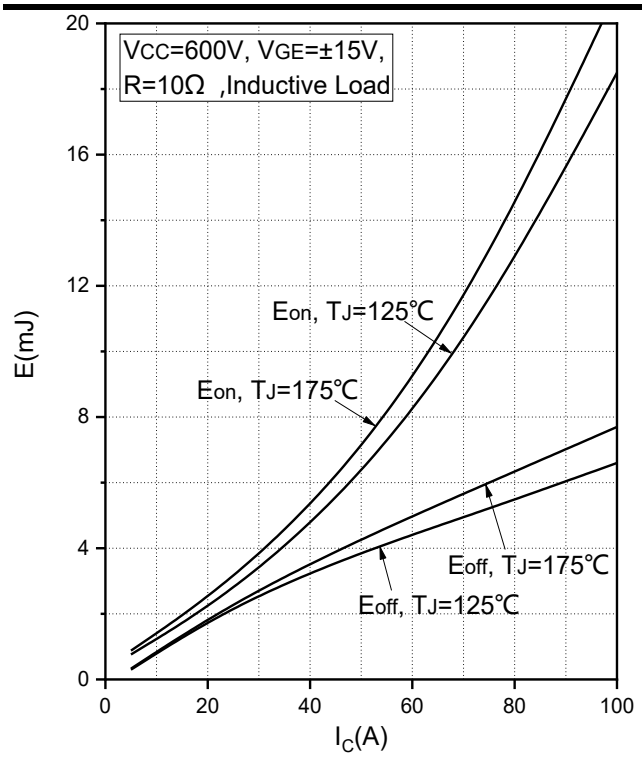


Fig.5 Typical Switching Loss vs. Collector Current

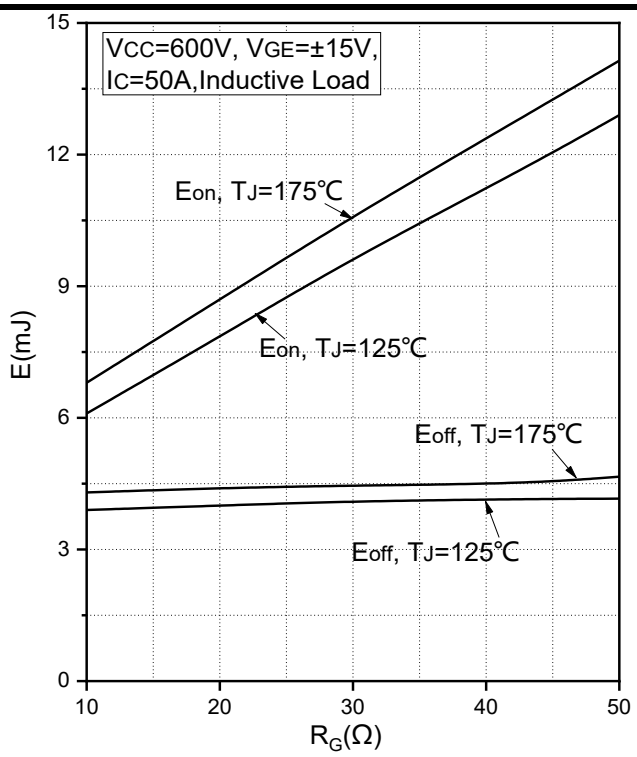


Fig.6 Typical Switching Loss vs. Gate Resistance

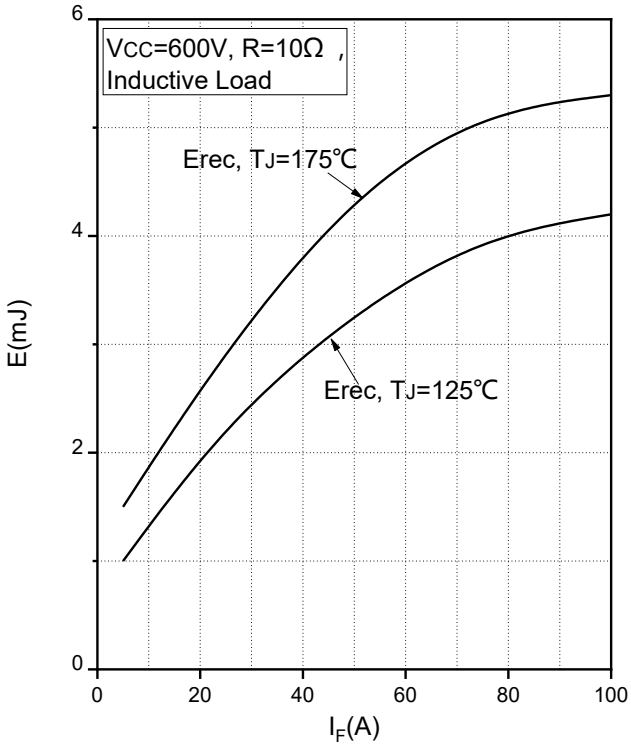


Fig.7 Typical Switching Loss vs. Forward Current

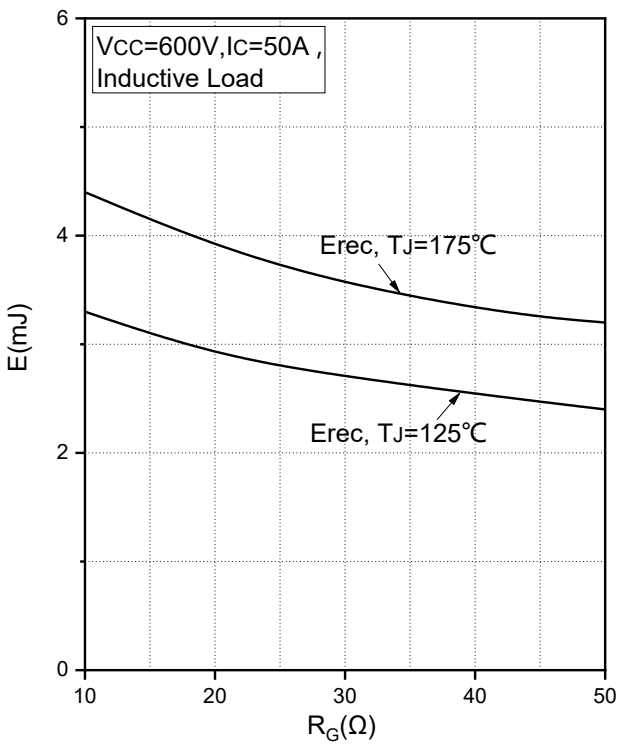


Fig.8 Typical Switching Loss vs. Gate Resistance

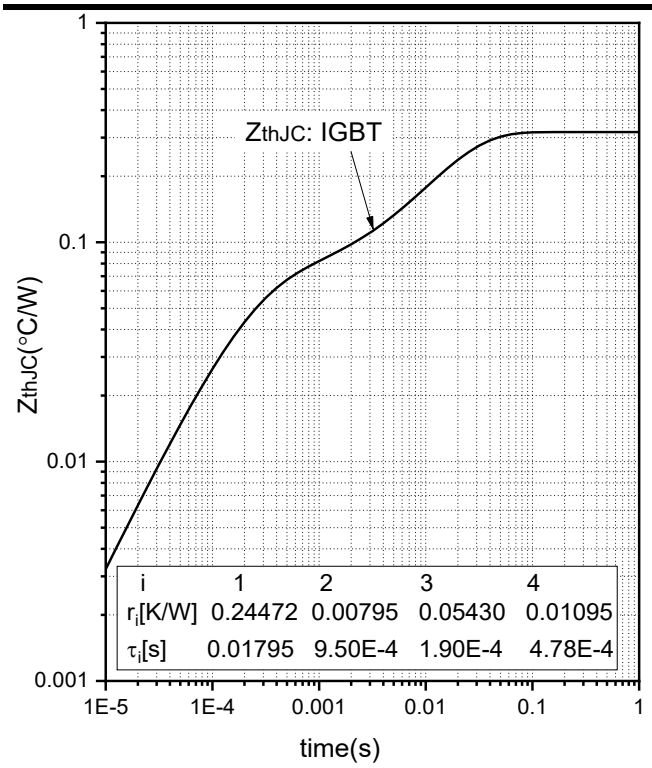


Fig.9 Transient Thermal Impedance (IGBT)

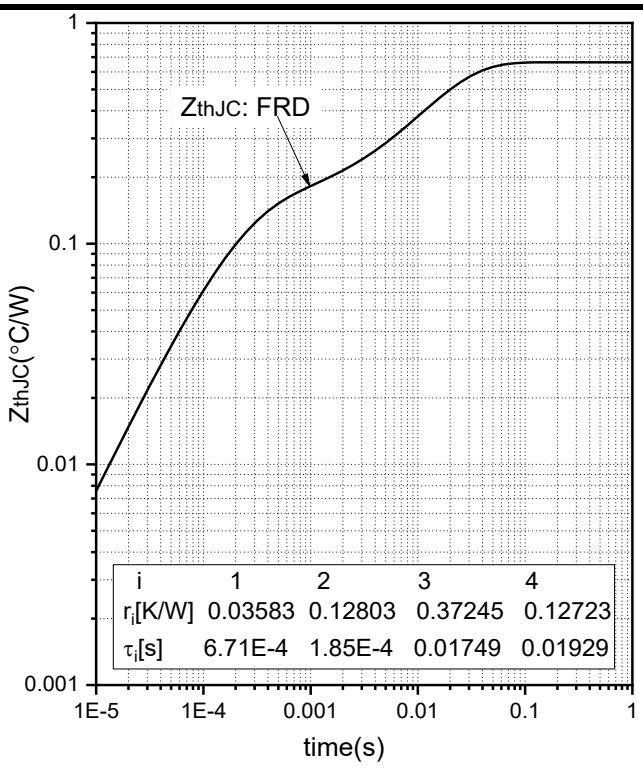


Fig.10 Transient Thermal Impedance (Diode)

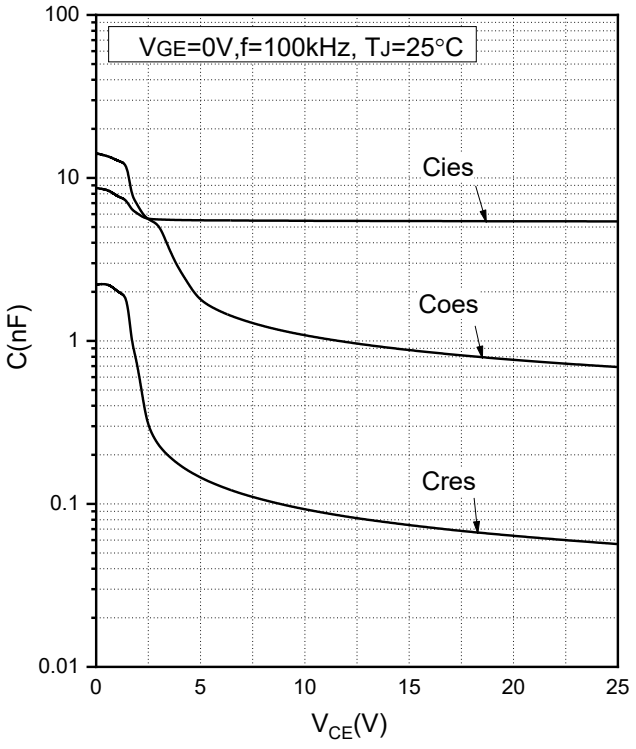


Fig.11 Capacitance Characteristics

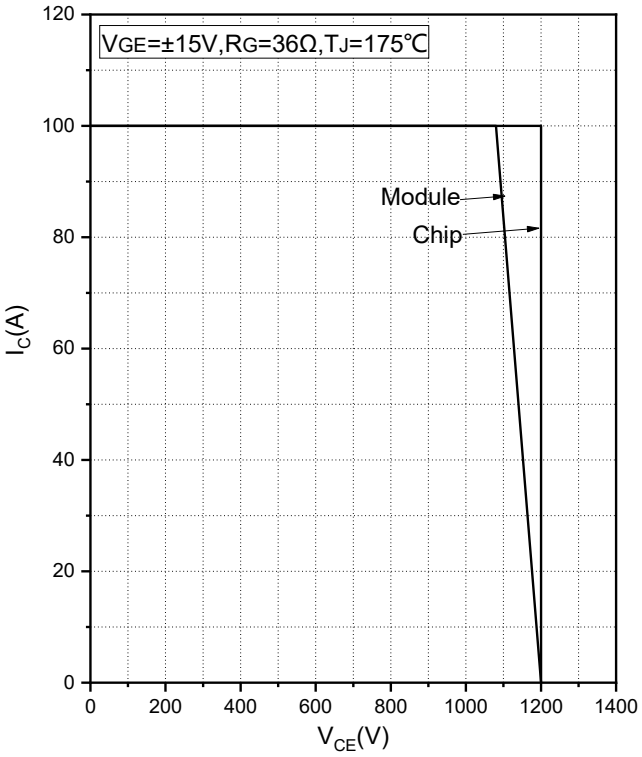


Fig.12 Reverse Bias Safe Operation Area (RBSOA)

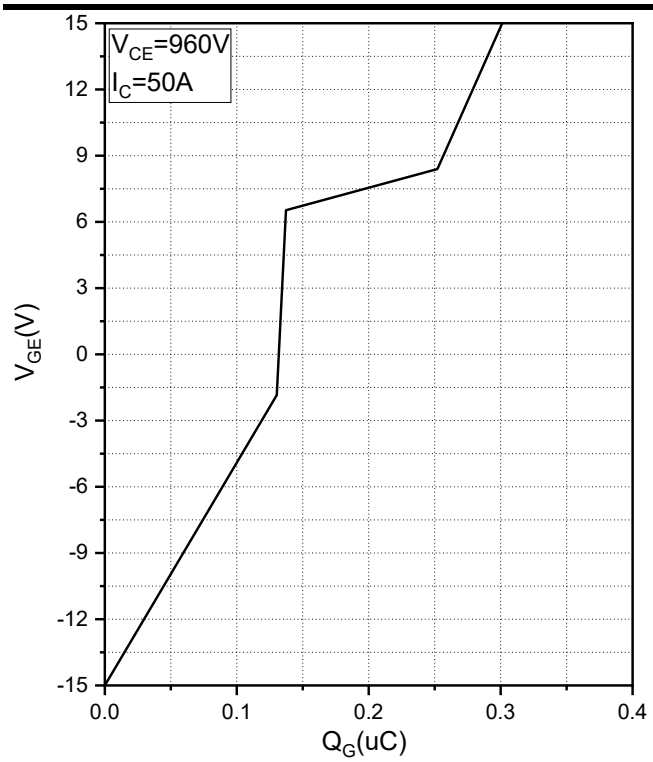


Fig.13 Gate Charge Characteristics

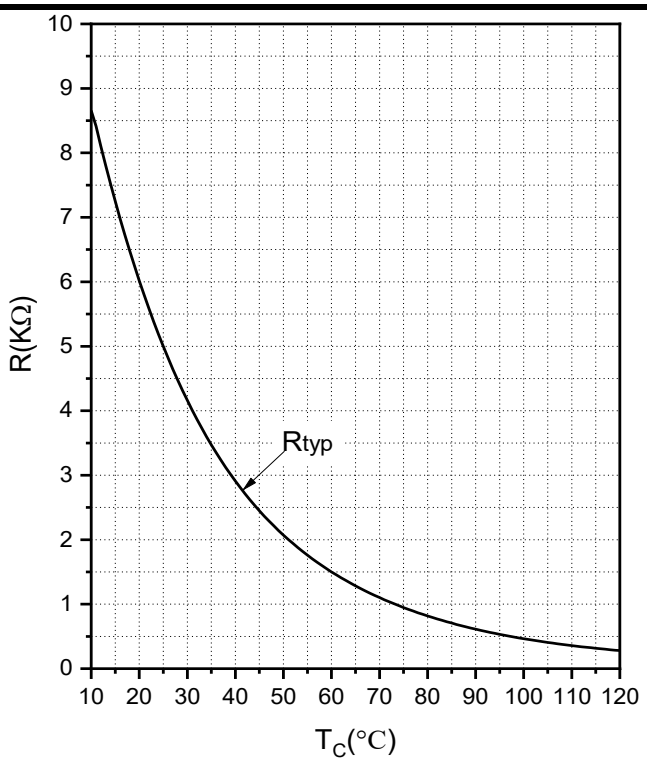
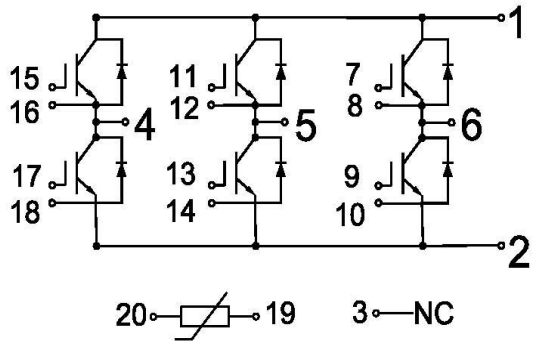
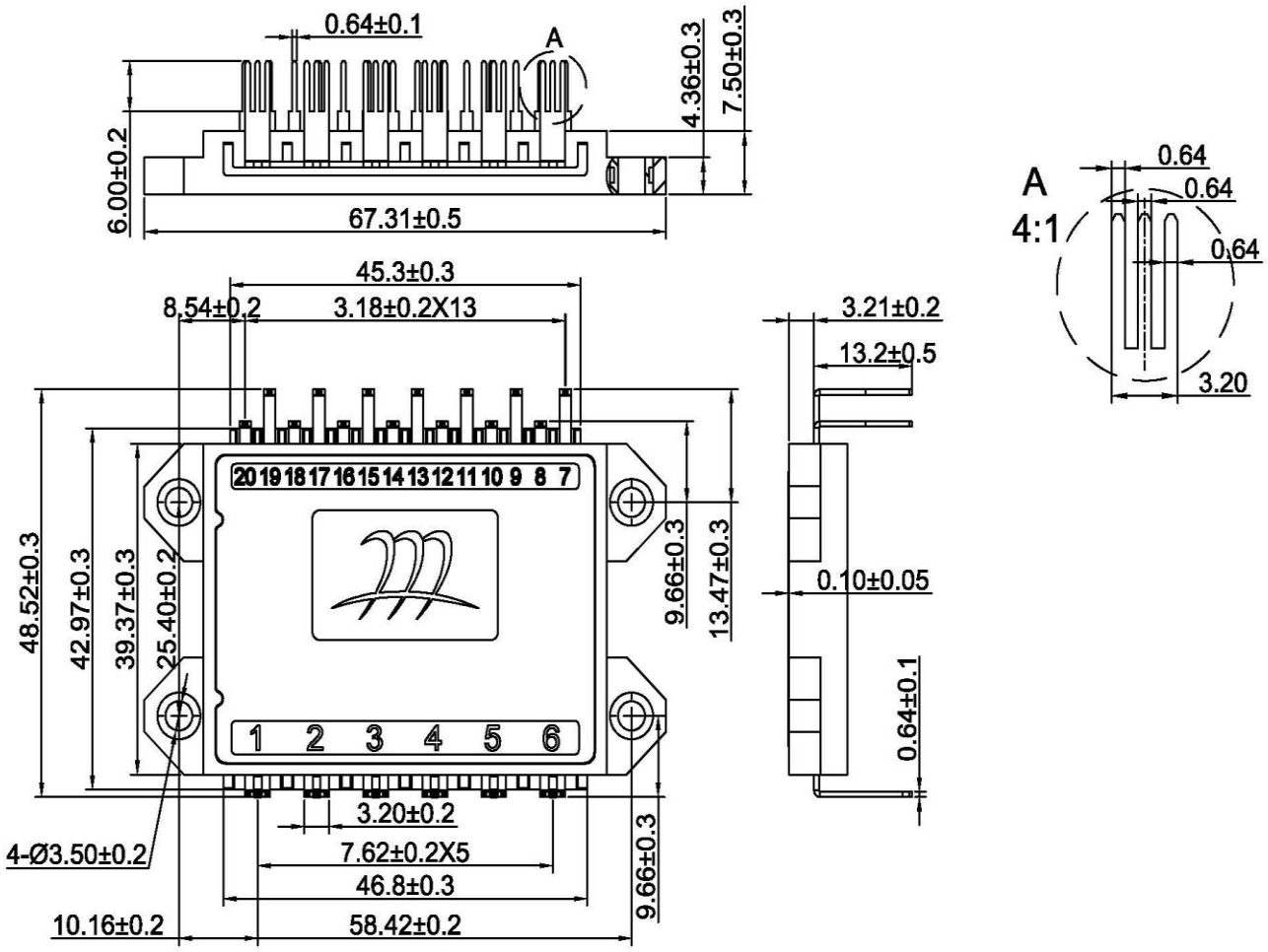


Fig.14 NTC Temperature Characteristics

Internal Circuit:



Package Outline (Unit: mm):



Revision	Notes
A	Fina Datasheet Initial Release

Announcement

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