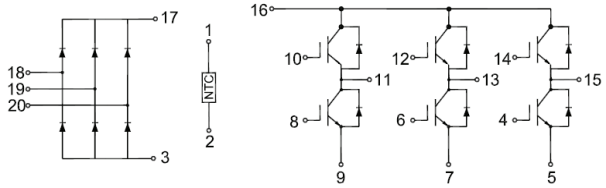
GT10RFF120B2H

IGBT Module

Preliminary Data

Features：



- Trench & Field Stop IGBT
- Short Circuit Rated>10μs
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested(2×Ic)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Applications：

- Industrial Inverters
- Servo Applications

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	T_C=100℃	10	A
		T_C=25℃	20	A
I_{CM}	Repetitive Peak Collector Current	T_J=175℃	20	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C=25℃ T_{Jmax}=175℃	170	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=1mA, V_C=V_{GE}		4.5	5.5	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=10A, V_{GE}=15V	T_J=25℃		1.90	2.10	V
			T_J=125℃		2.20		
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=V_{CES}, 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=1MHz			1.5		nF
C_{oes}	Output Capacitance				0.1		

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V, I_C=10A, R_{Gon}=40Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		110		ns
			T_J=125℃		105		
t_r	Rise Time		T_J=25℃		35		ns
			T_J=125℃		30		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V, I_C=10A, R_{Goff}=40Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		90		ns
			T_J=125℃		105		
t_f	Fall Time		T_J=25℃		350		ns
			T_J=125℃		440		
E_{on}	Turn-on Switching Loss	V_{CC}=600V, I_C=10A, R_{Gon}=40Ω, V_{GE}=±15V, di/dt=235A/μs(T_J=125℃), Inductive Load	T_J=25℃		1.27		mJ
			T_J=125℃		1.48		
E_{off}	Turn-off Switching Loss	V_{CC}=600V, I_C=10A, R_{Goff}=40Ω, V_{GE}=±15V, du/dt=2000V/μs(T_J=125℃), Inductive Load	T_J=25℃		0.59		mJ
			T_J=125℃		0.70		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		80		nC
RBSOA	Reverse Bias Safe Operation Area	I_C=20A, V_{CC}=1050V, Vp=1200V, R_G=40Ω, V_{GE}=+15V to 0V, T_J=150°C		Trapezoid			
SCSOA	Short Circuit Safe Operation Area	V_{CC}=600V, V_{GE}=15V, T_J=150℃		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case					0.889	℃/W

Diode, Inverter

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

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	10	A
I_{FM}	Diode Maximum Forward Current	20	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F=10A	T_J=25℃		1.70		V
			T_J=125℃		1.80		
t_{rr}	Reverse Recovery Time	I_F=10A, di/dt=340A/μs(T_J=125℃), V_{rr}=600V, V_{GE}=-15V	T_J=25℃		239		ns
			T_J=125℃		252		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		10		A
			T_J=125℃		12		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		1.00		μC
			T_J=125℃		1.49		
E_{rec}	Reverse Recovery Energy		T_J=25℃		0.32		mJ
			T_J=125℃		0.56		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case					1.284	℃/W

Diode, Rectifier (T_C=25℃unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	T_J=25℃	1600	V
I_{FRMSM}	Maximum RMS Forward Current Per Chip	T_J=80℃	20	A
I_{RMSM}	Maximum RMS Current at Rectifier Output	T_J=80℃	30	A
I_{FSM}	Surge Current @t_p=10ms	T_J=25℃	300	A
		T_J=150℃	250	
I^2t	I²t-value	T_J=25℃	450	A^2s
		T_J=150℃	300	

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_F	Forward Voltage	I_F=10A	T_J=25℃		1.10		V
			T_J=150℃		1.00		
I_R	Reverse Current	V_R=1600V	T_J=25℃			1	mA
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case					0.925	℃/W

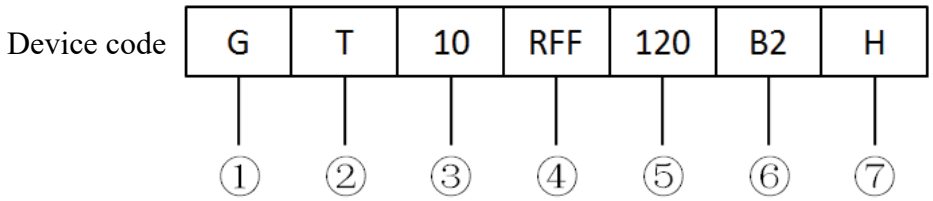
Internal NTC-Thermistor Characteristic

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
R_{25}	T_C=25℃			22.7		kΩ
△R/R	T_C=100℃, R_{100}=1481KΩ		-3		+3	%
P_{25}	T_C=25℃			5		mW
$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$			3950		K
$B_{25/80}$	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298.15K))]$			4000		K

Module

Symbol	Description		Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 30s	4500			V
T_J	Maximum Junction Temperature				175	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
CTI	Comparative Tracking Index		200			
$R_{\theta CS}$	Case-To-Sink Thermally (Conductive Grease Applied)				0.09	℃/W
T	Mounting Screw:M4		1.0		1.2	N·m
G	Weight			25		g

Ordering Information Table



① - IGBT Module
② - Trench & Field Stop IGBT
③ - Rated Current (10=10A)
④ - Circuit Configuration: RFF (Full Bridge + Rectifier)
⑤ - Rated Voltage (120=1200V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

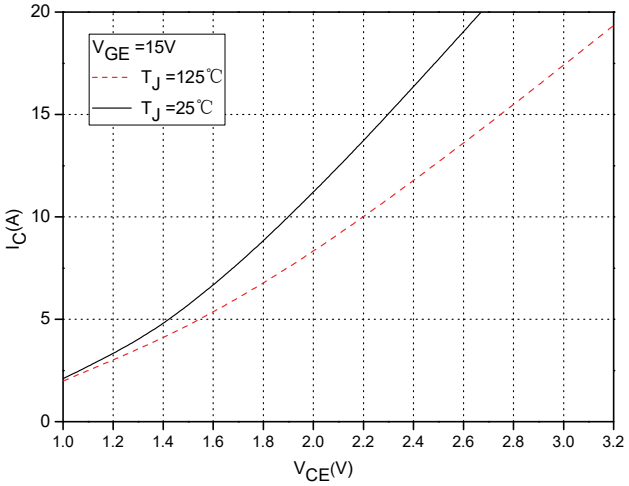


Fig.1 Typical Saturation Voltage Characteristics

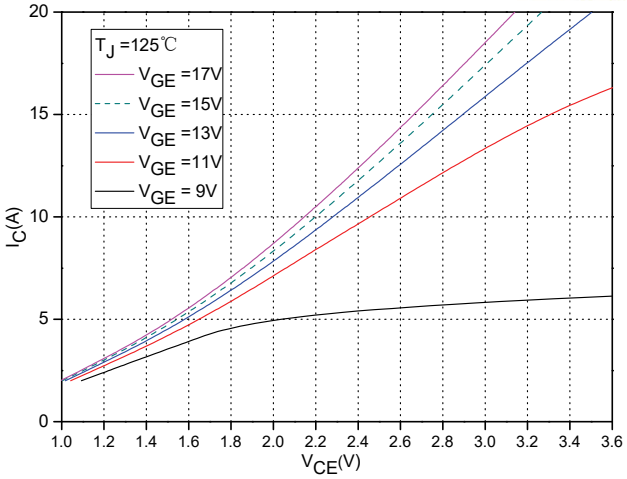


Fig.2 Typical Output Characteristics

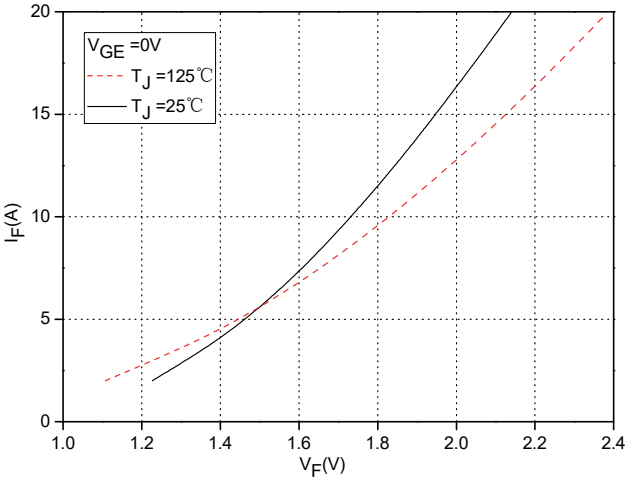


Fig.3 Forward Characteristics of FWD

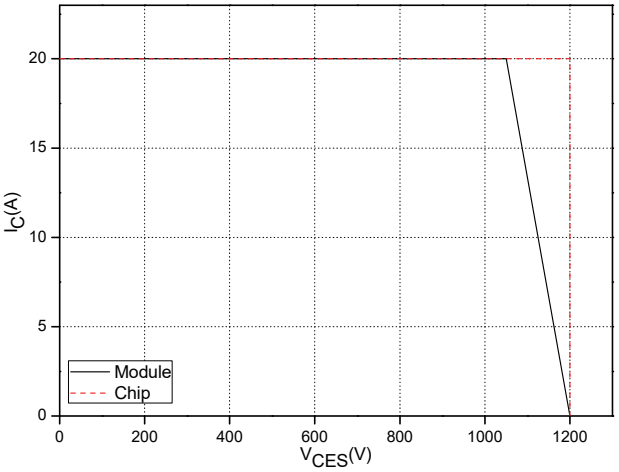


Fig.4 Reverse Bias Safe Operation Area

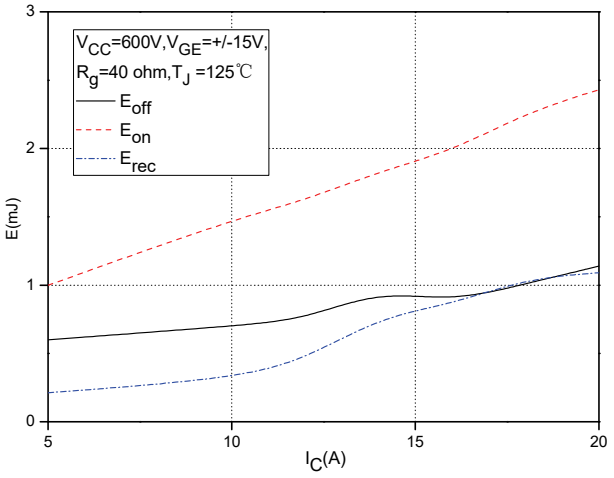


Fig.5 Typical Switching Loss vs. Collector Current

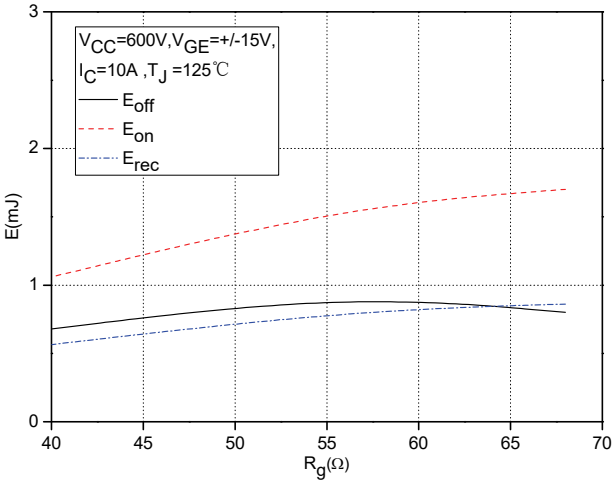


Fig.6 Typical Switching Loss vs. Gate Resistance

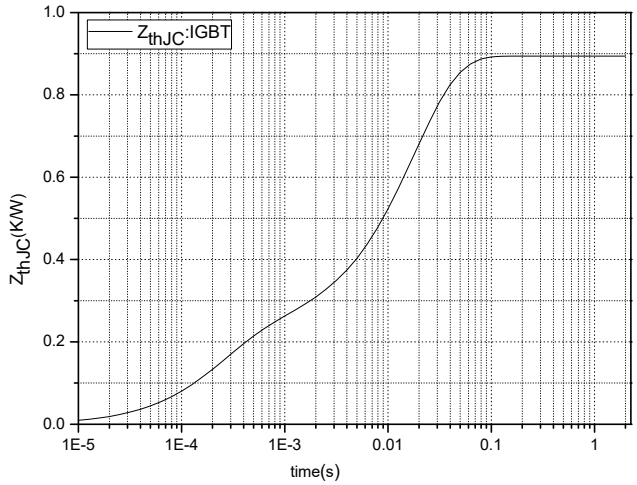


Fig.7 Transient Thermal Impedance (IGBT)

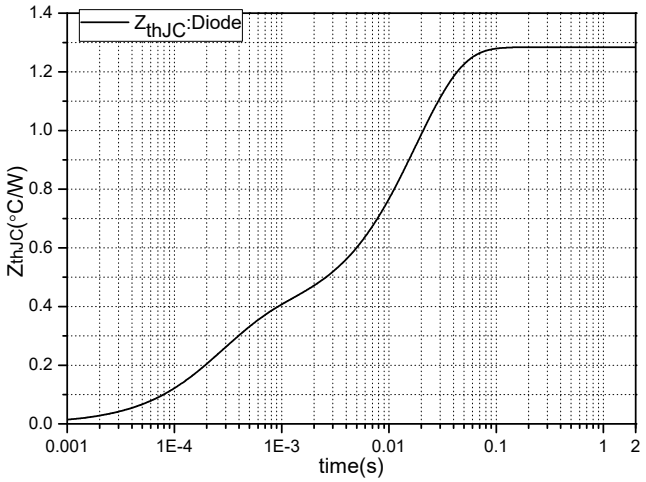


Fig.8 Transient Thermal Impedance (Diode)

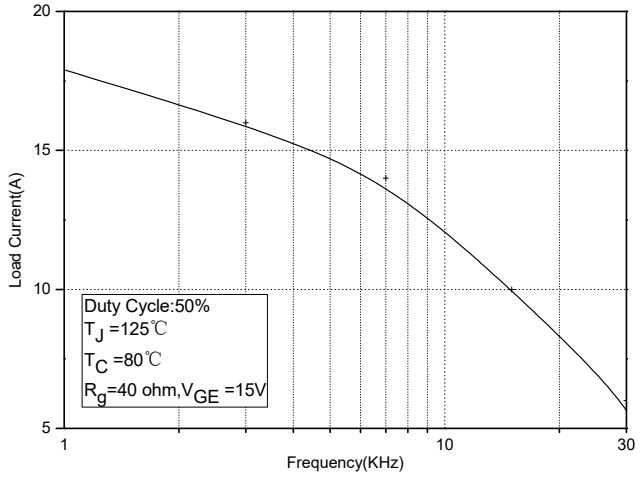


Fig.9 Typical Load Current vs. Frequency

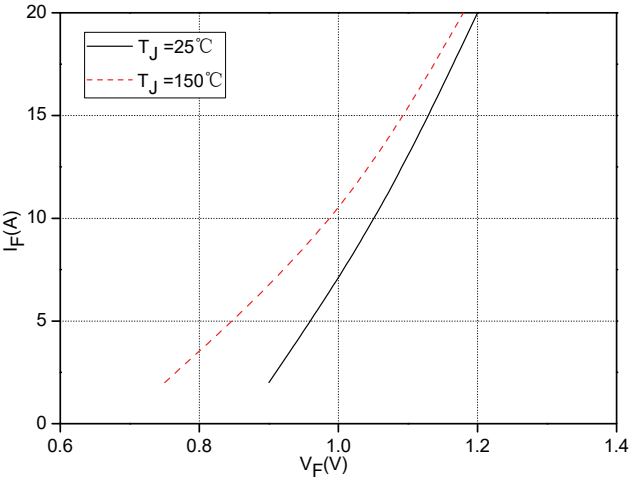


Fig.10 Forward Characteristics of Diode (Rectifier)

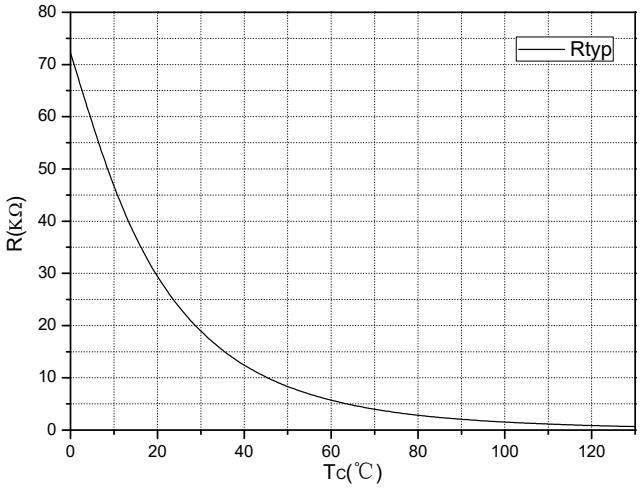
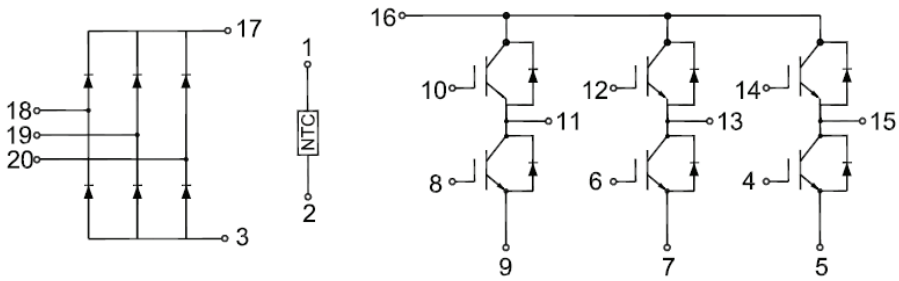
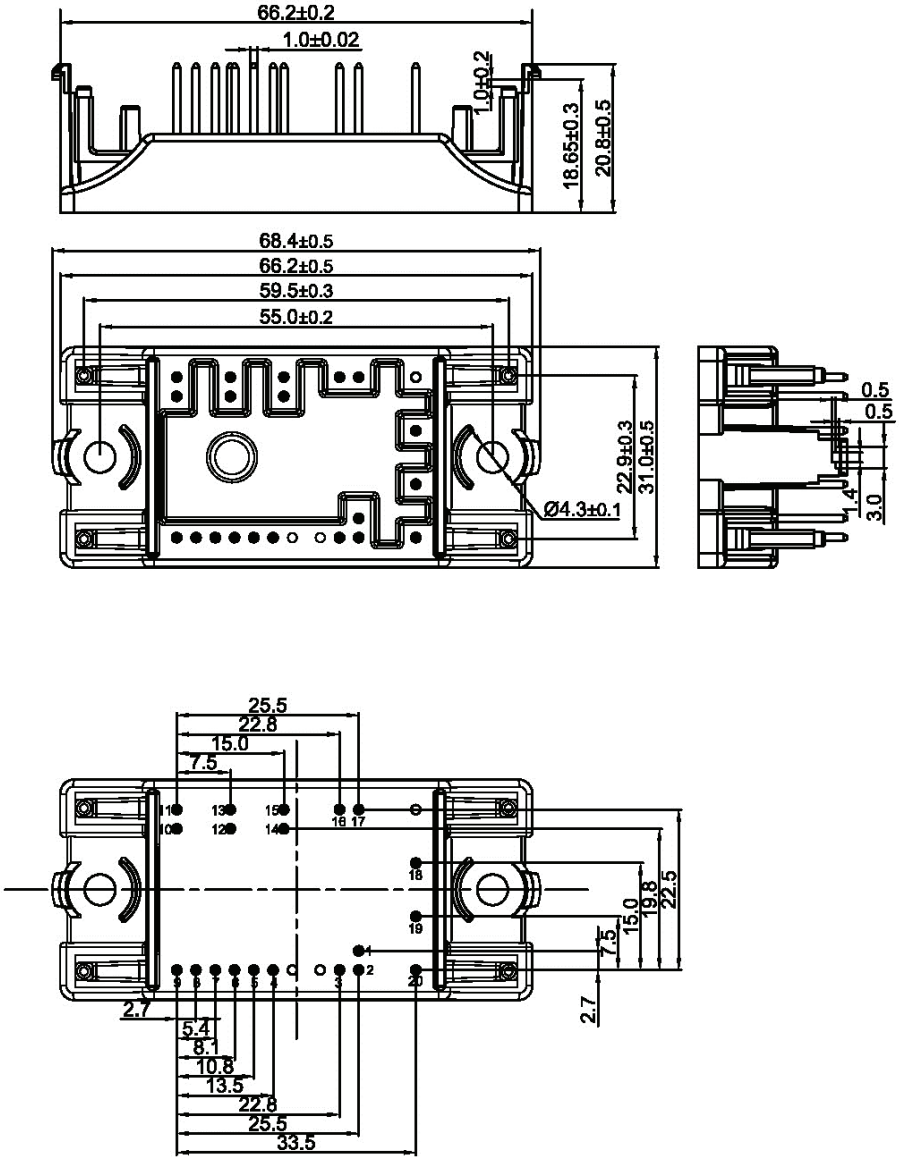


Fig.11 NTC Temperature Characteristics

Internal Circuit:



Package Outline (Unit: mm):



Date	Revision	Notes
04/08/2022	01	Initial Release
09/13/2023	02	Update NTC Temperature Characteristics

Announcement

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