



GT100FF120T5H

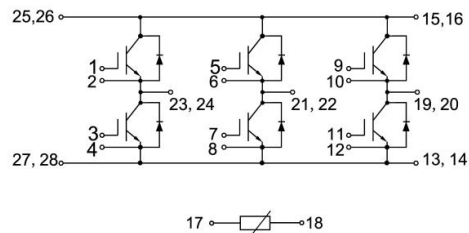
IGBT Module

Preliminary Data

Features:

- Field Stop Trench Gate IGBT
- Short Circuit Rated > 10 μ s
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested (2 $\times$ I_C)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Circuit Diagram



Applications:

- Motor Drives
- Servo Drives
- Auxiliary Inverters

IGBT, Inverter

Maximum Rated Values (T_C=25°C 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°C	100	A
		T _C =25°C	200	A
I _{CM}	Peak Collector Current Repetitive	t _p =1ms	200	A
P _D	Maximum Power Dissipation (IGBT)	T _C =25°C T _{Jmax} =175°C	1125	W



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	$I_C=4\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.9	6.8	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=100\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.95	2.20	V
			$T_J=125^{\circ}\text{C}$	2.50		V
			$T_J=150^{\circ}\text{C}$	2.60		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0\text{V}$, $V_{CE}=V_{CES}$, $T_J=25^{\circ}\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			200	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		7.53		nF
C_{oes}	Output Capacitance			1.05		nF
C_{res}	Reveres Transfer Capacitance			0.09		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=100A,$ $R_{Gon}=10\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		265		ns
			$T_J=125^{\circ}C$		267		
			$T_J=150^{\circ}C$		267		
t_r	Rise Time		$T_J=25^{\circ}C$		94		ns
			$T_J=125^{\circ}C$		102		
			$T_J=150^{\circ}C$		103		
$t_{d(off)}$	Turn-off Delay Time	$T_J=25^{\circ}C$		273		ns	
		$T_J=125^{\circ}C$		276			
		$T_J=150^{\circ}C$		279			
t_f	Fall Time	$T_J=25^{\circ}C$		181		ns	
		$T_J=125^{\circ}C$		206			
		$T_J=150^{\circ}C$		206			
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=100A,$ $R_{Gon}=10\Omega, V_{GE}=\pm 15V,$ $di/dt=816A/\mu s(T_J=150^{\circ}C),$ Inductive Load	$T_J=25^{\circ}C$		8.1		mJ
		$T_J=125^{\circ}C$		9.5			
		$T_J=150^{\circ}C$		10.8			



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =100A, R _{Goff} =10Ω, V _{GE} =±15V, du/dt=4461V/μs(T _J =150°C), Inductive Load	T _J =25°C		3.5		mJ
			T _J =125°C		4.7		
			T _J =150°C		5.2		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		708		nC
R _{G(int)}	Internal Gate Resistor		T _J =25°C		6.0		Ω
I _{SC}	V _{CC} =600V, V _{GE} =+/-15V, tp=10μs, T _J =150°C				320		A
R _{θJC}	Thermal Resistance: Junction-to-Case (per IGBT)					0.13	°C/W

Diode, Inverter

Maximum Rated Values (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	T _C =100°C	100	A
I _{FM}	Repetitive Peak Forward Current	tp=1ms	200	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 =100A	T _J =25℃		1.80		V
			T _J =125℃		2.00		
			T _J =150℃		2.00		
t _{rr}	Reverse Recovery Time	I _F =100A, -diF/dt=1108A/μs(T _J =150℃), V _{rr} =600V, V _{GE} =-15V	T _J =25℃		267		ns
			T _J =125℃		268		
			T _J =150℃		335		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		67.3		A
			T _J =125℃		70.2		
			T _J =150℃		71.9		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		8.1		μC
			T _J =125℃		10.7		
			T _J =150℃		11.7		



E _{rec}	Reverse Recovery Energy	I _F =100A, -diF/dt=1108A/μs(T _J =150°C), V _{rr} =600V, V _{GE} =-15V	T _J =25°C		3.0		mJ
			T _J =125°C		3.9		
			T _J =150°C		4.4		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.23	°C/W

Internal NTC-Thermistor Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
R ₂₅	T _C =25°C		5		kΩ
ΔR/R	T _C =100°C, R ₁₀₀ =465Ω	-5		5	%
P ₂₅	T _C =25°C			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	Conditions	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1minute	2500			V
T _J	Maximum Junction Temperature				175	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+150	°C
T _{stg}	Storage Temperature		-40		+125	°C
CTI	Comparative Tracking Index		200			
R _{θCS}	Case-To-Sink Thermally (Conductive Grease Applied)				0.04	°C/W
T	Power Terminals Screw:M5		3.0		6.0	N·m
G	Weight			190		g



Ordering Information Table

Device code	G	T	100	FF	120	T5	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (100=100A)
- ④ - Circuit Configuration (Full Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

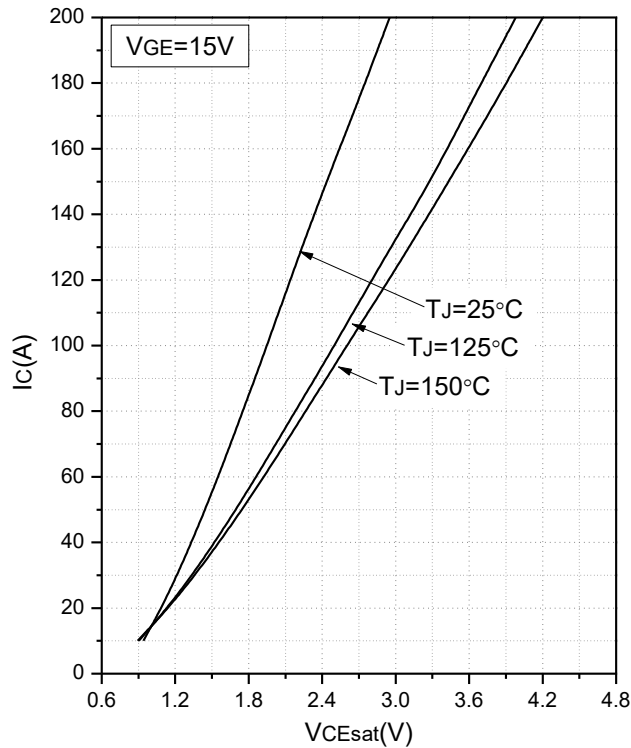


Fig.1 Typical Saturation Voltage Characteristics

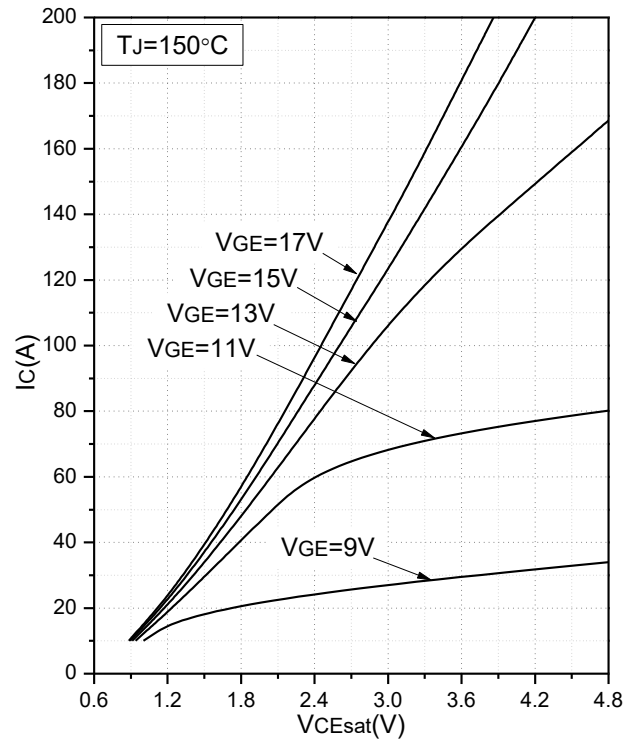


Fig.2 Typical Output Characteristics

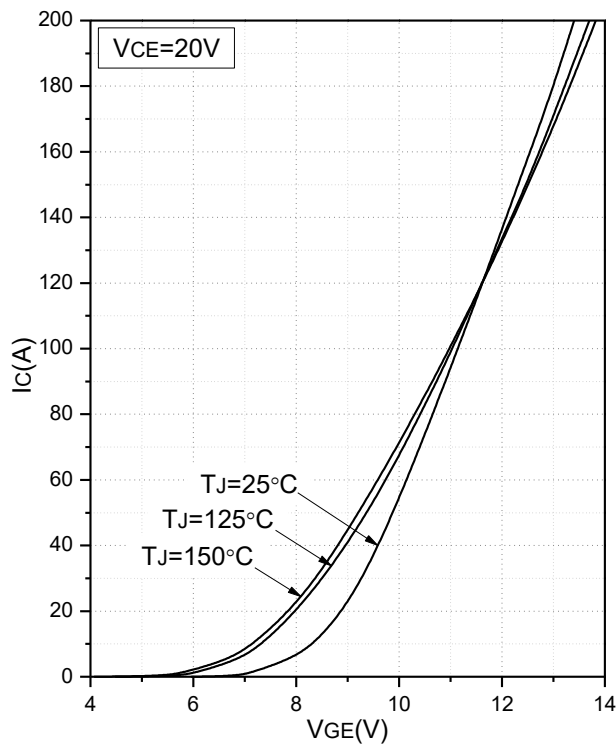


Fig.3 Transfer Characteristics

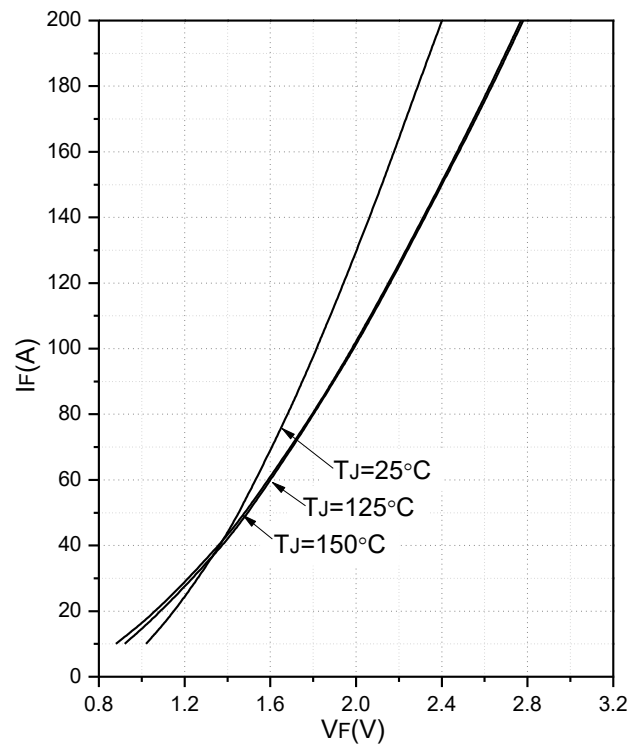


Fig.4 Forward Characteristics of Diode

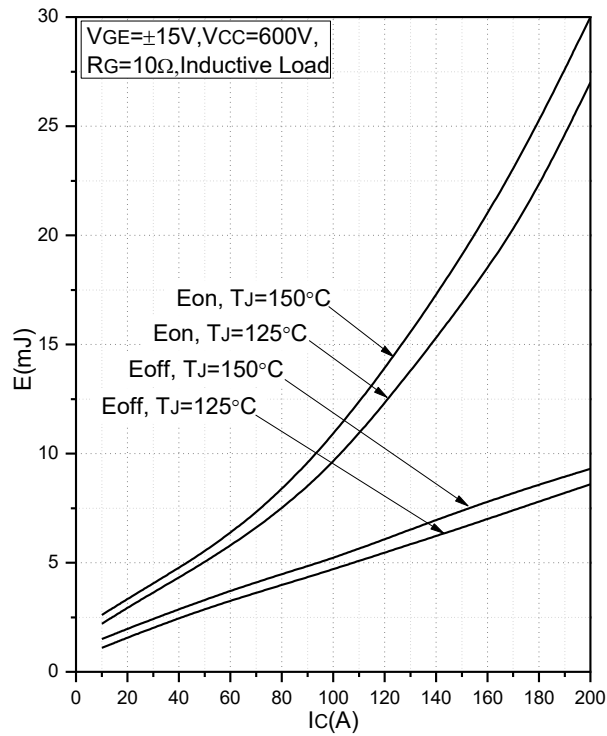


Fig.5 Typical Switching Loss vs. Collector Current

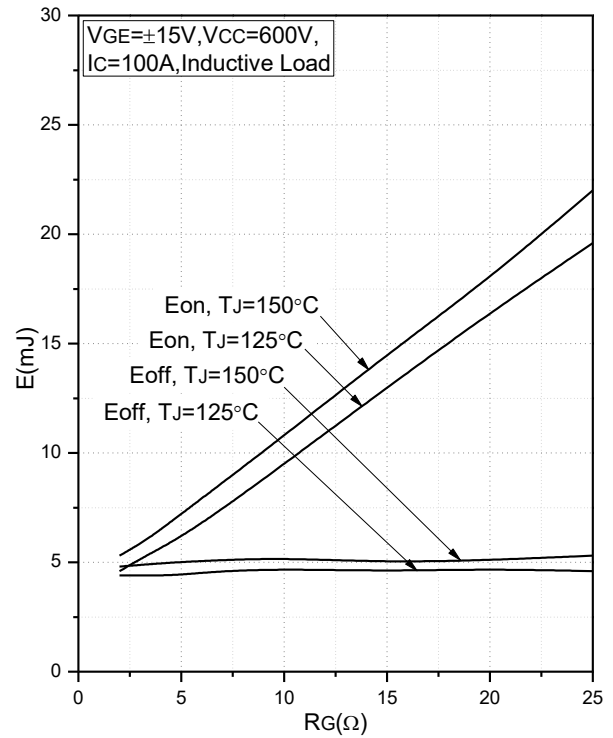


Fig.6 Typical Switching Loss vs. Gate Resistance

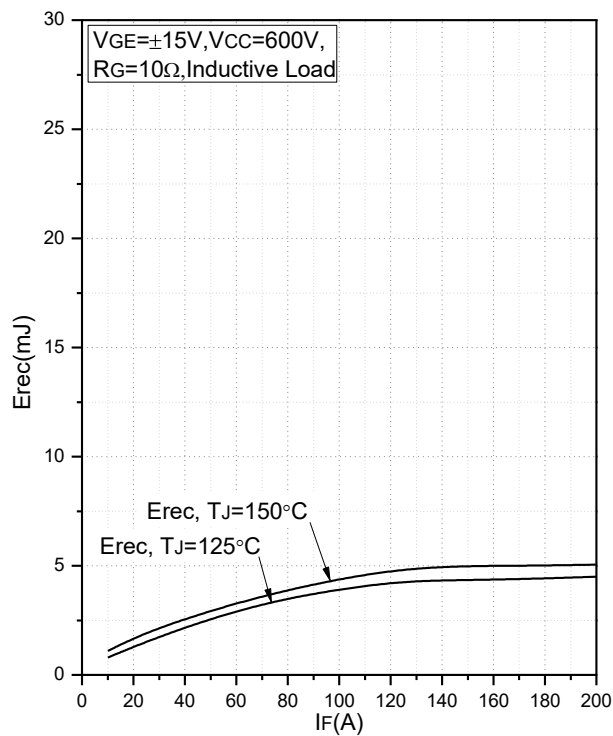


Fig.7 Typical Switching Loss vs. Forward Current

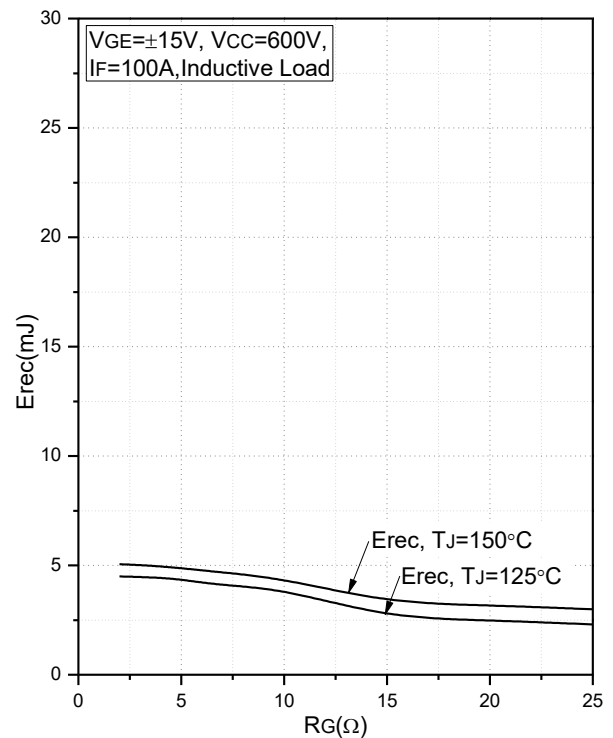


Fig.8 Typical Switching Loss vs. Gate Resistance

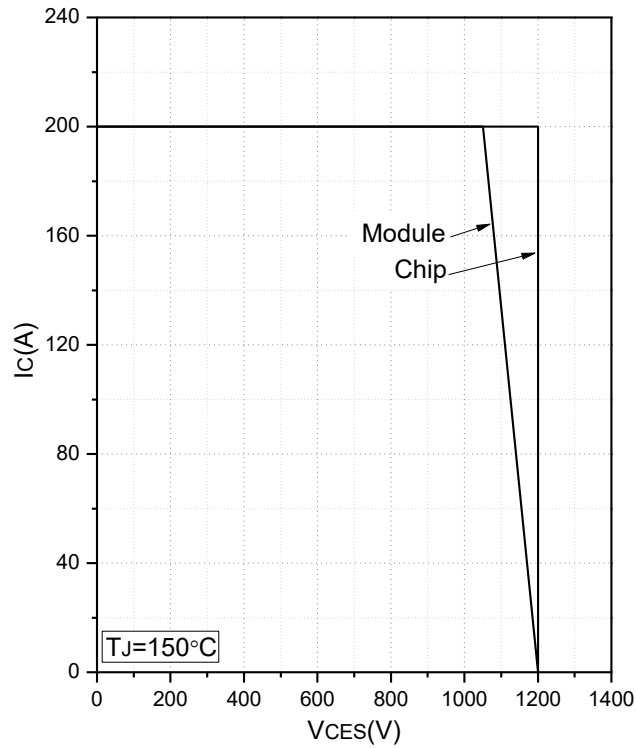


Fig.9 Reverse Bias Safe Operation Area (RBSOA)

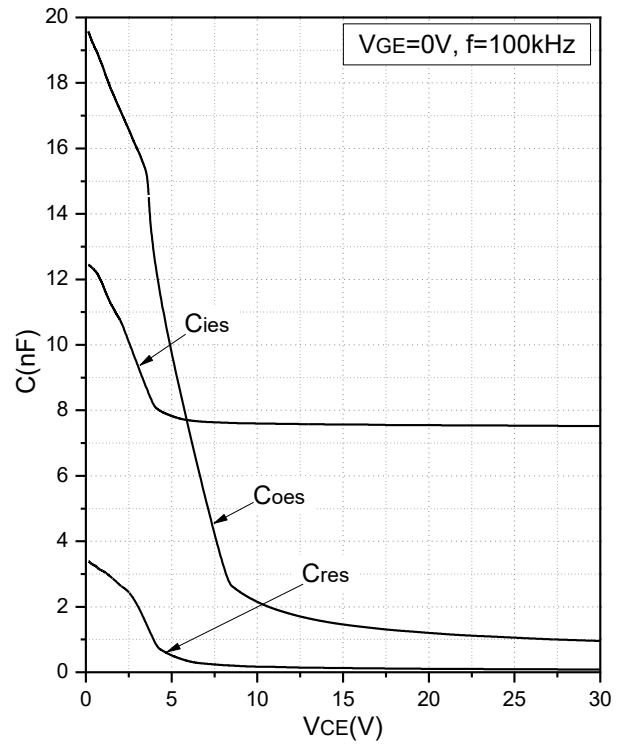


Fig.10 Capacitance Characteristics

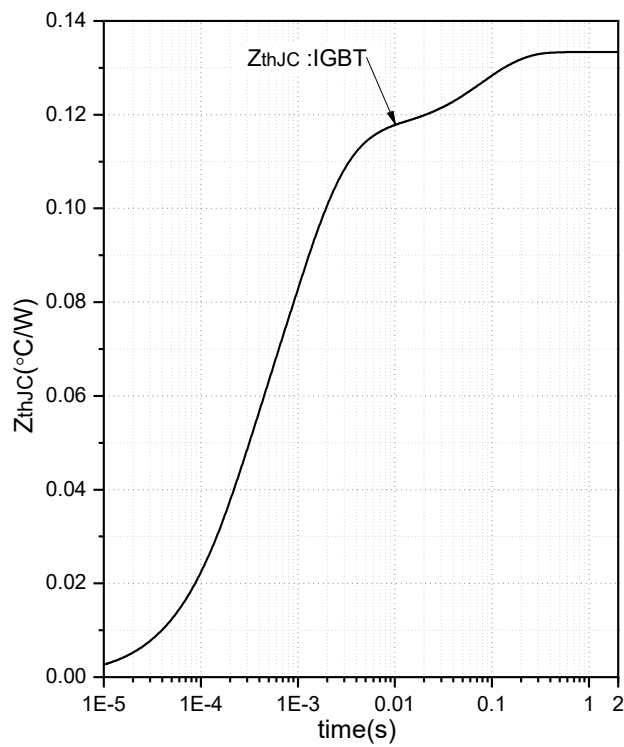


Fig.11 Transient Thermal Impedance

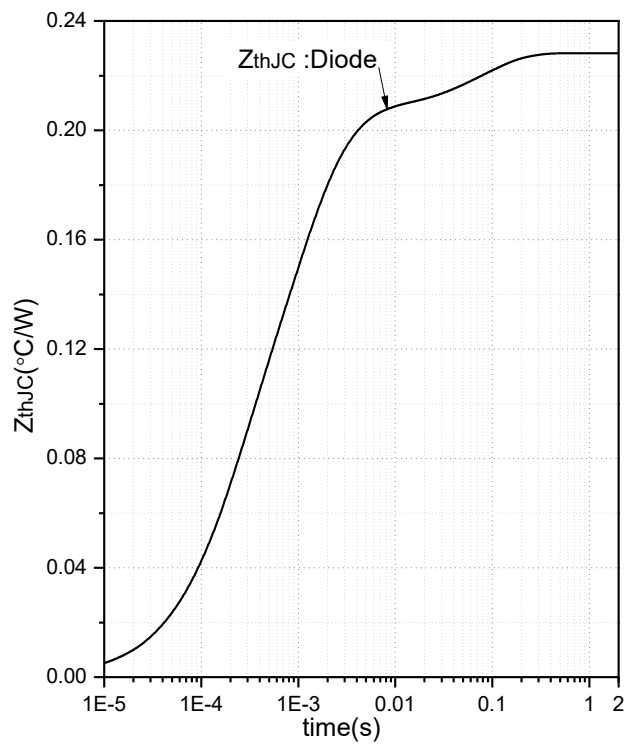


Fig.12 Transient Thermal Impedance

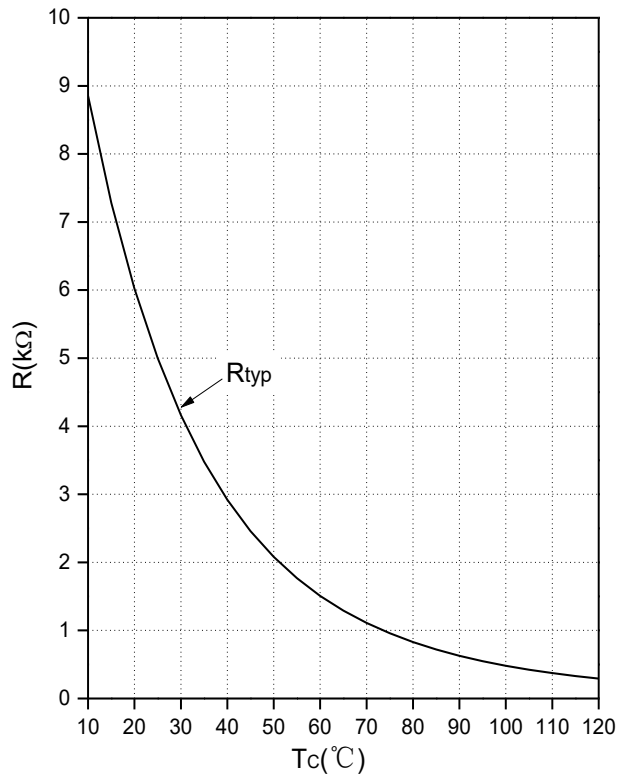
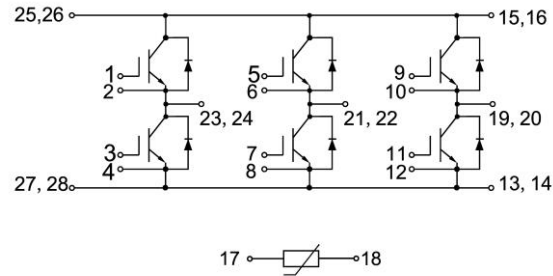


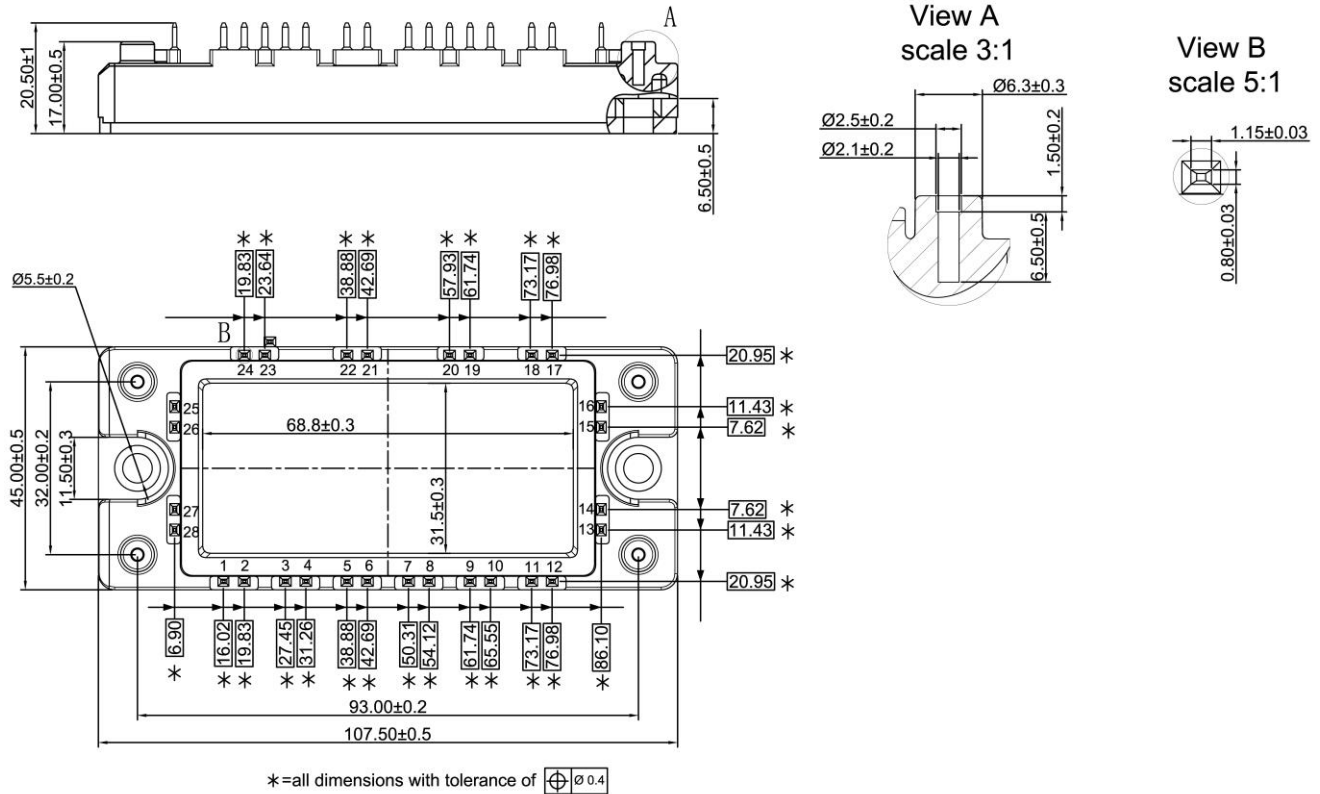
Fig.13 NTC Temperature Characteristics



Internal Circuit:



Package Outline (Unit: mm):





Revision	Notes
01	Initial Release

Announcement

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