



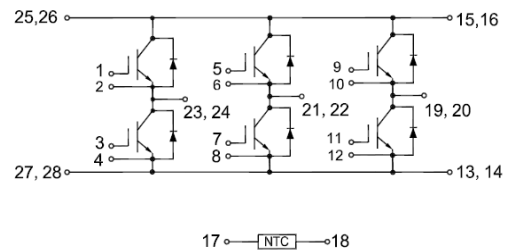
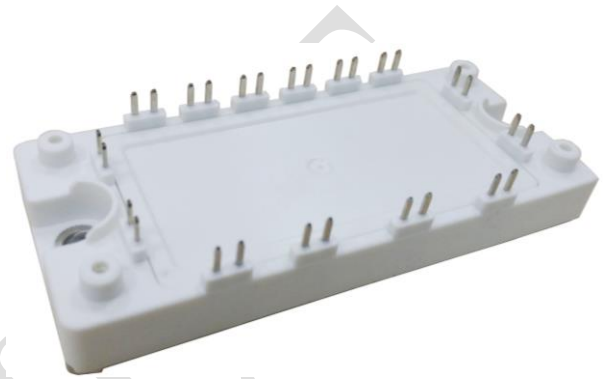
GT100FF120T5H

IGBT Module

Preliminary Data

Features:

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



Applications:

- Industrial Inverters
- Servo Applications

IGBT, Inverter

Maximum Rated Values ($T_C = 25^\circ\text{C}$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_C = 100^\circ\text{C}$	100	A
		$T_C = 25^\circ\text{C}$	200	A
I_{CM}	Peak Collector Current Repetitive	$T_J = 175^\circ\text{C}$	200	A
t_{sc}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation (IGBT)	$T_C = 25^\circ\text{C}$ $T_{Jmax}=175^\circ\text{C}$	1066	W



Electrical Characteristics of IGBT ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Static Characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=1\text{mA}, V_{CE}=V_{GE}$	5.0	5.6	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=100\text{A}, V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	1.85		V
			$T_J=125^\circ\text{C}$	2.15		V
			$T_J=150^\circ\text{C}$	2.20		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	$V_{GE}=\pm 20\text{V}, V_{CE}=0\text{V}, T_J=25^\circ\text{C}$			200	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		5.62		nF
C_{oes}	Output Capacitance			0.49		nF
C_{res}	Reveres Transfer Capacitance			0.38		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600\text{V}, I_C=100\text{A}, R_{Gon}=1\Omega, V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	185		ns
			$T_J=125^\circ\text{C}$	195		
			$T_J=150^\circ\text{C}$	195		
t_r	Rise Time		$T_J=25^\circ\text{C}$	60		ns
			$T_J=125^\circ\text{C}$	70		
			$T_J=150^\circ\text{C}$	70		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^\circ\text{C}$	220		ns
			$T_J=125^\circ\text{C}$	245		
			$T_J=150^\circ\text{C}$	245		
t_f	Fall Time	$T_J=25^\circ\text{C}$	280		ns	
		$T_J=125^\circ\text{C}$	420			
		$T_J=150^\circ\text{C}$	450			
E_{on}	Turn-on Switching Loss	$V_{CC}=600\text{V}, I_C=100\text{A}, R_{Gon}=1\Omega, V_{GE}=\pm 15\text{V},$ $di/dt=1227\text{A}/\mu\text{s}(T_J=150^\circ\text{C}),$ Inductive Load	$T_J=25^\circ\text{C}$	3.5		mJ
			$T_J=125^\circ\text{C}$	6.0		
			$T_J=150^\circ\text{C}$	6.6		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =100A, R _{Goff} =1Ω, V _{GE} =±15V, du/dt=4368V/μs(T _J =150°C), Inductive Load	T _J =25°C	5.5	mJ
			T _J =125°C	10.5	
			T _J =150°C	11.5	
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C	630	nC
R _{gint}	Internal Gate Resistance		T _J =25°C	10	Ω
RBSOA	I _C =200A, V _{CC} =1050V, V _p =1200V, R _{Goff} =1Ω, V _{GE} =+15V to 0V, T _J =150°C			Trapezoid	
SC data	V _{CC} =600V, t _p =10us, V _{ge} =+/-15V, R _{Gon} =1ohm, R _{Goff} =1ohm, T _J =125°C			605	A
R _{θJC}	IGBT Thermal Resistance: Junction-To-Case			0.14	°C/W

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

V _{RRM}	Repetitive Peak Reverse Voltage	1200	V
I _F	Diode Continuous Forward Current	100	A
I _{FM}	Diode Maximum Forward Current	200	A

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

Symbol	Description	Conditions	Min	Typ	Max	Unit
V _{FM}	Forward Voltage	I _F =100A	T _J =25°C	1.65		V
			T _J =125°C	1.75		
			T _J =150°C	1.75		
t _{rr}	Reverse Recovery Time		T _J =25°C	350		ns
			T _J =125°C	550		
			T _J =150°C	653		
I _{rr}	Peak Reverse Recovery Current	I _F =100A, -diF/dt =1656A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C	80		A
			T _J =125°C	105		
			T _J =150°C	108		
Q _{rr}	Reverse Recovery Charge		T _J =25°C	12.0		μC
			T _J =125°C	22.0		
			T _J =150°C	25.0		



E _{rec}	Reverse Recovery Energy	I _F =100A, -diF/dt =1656A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C	5.5	mJ
			T _J =125°C	10.2	
			T _J =150°C	11.5	
R _{θJC}	Diode Thermal Resistance: Junction-To-Case			0.21	°C/W

Internal NTC-Thermistor Characteristics

R ₂₅	T _C =25°C	5		kΩ
ΔR/R	T _C =100°C, R ₁₀₀ =481Ω		±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

Module

Symbol	Description	Min	Typ	Max	Unit
V _{iso}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500		V
L _{sCE}	Stray Inductance Module			19	nH
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)			0.03	°C/W
M	Mounting 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 - Field Stop Trench
- 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)

DATA SHEET

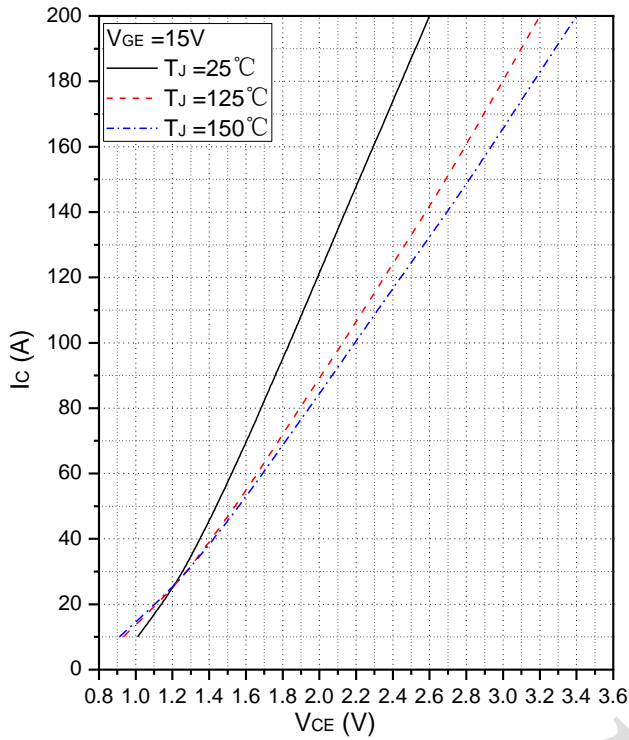


Fig.1 Typical Saturation Voltage Characteristics

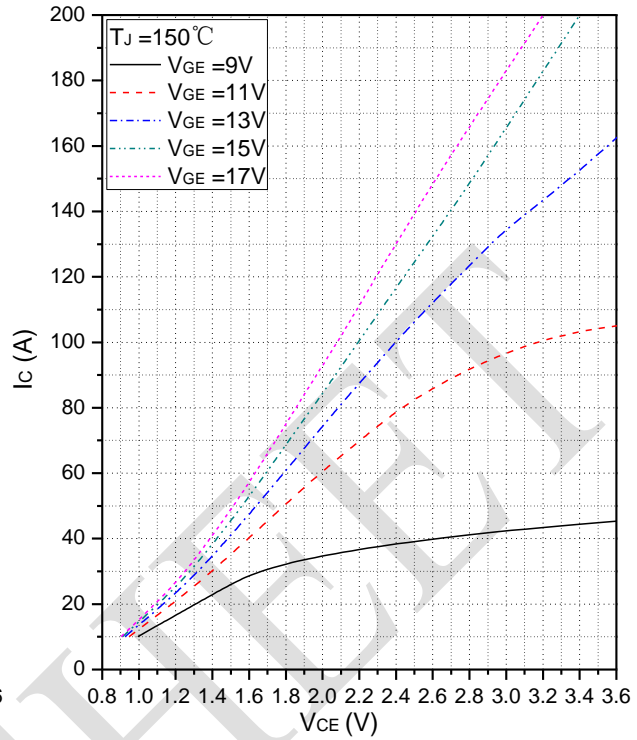


Fig.2 Typical Output Characteristics

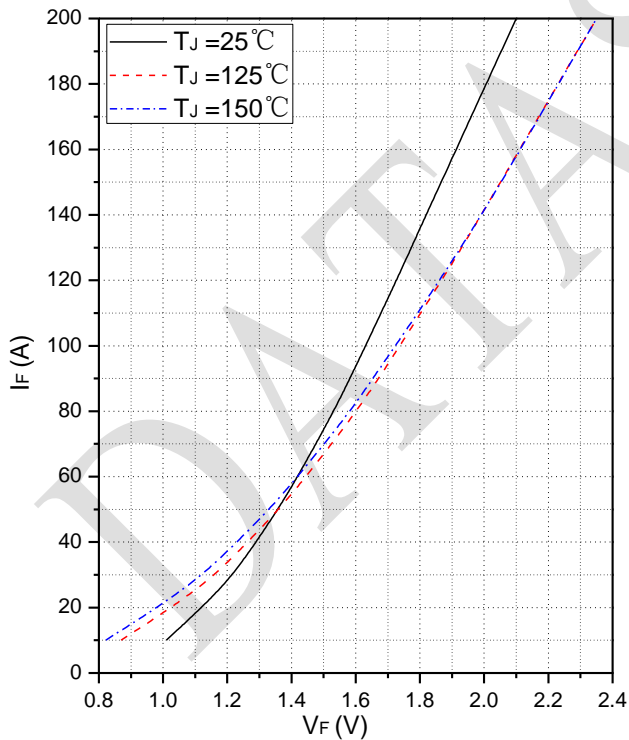


Fig.3 Forward Characteristics of FWD

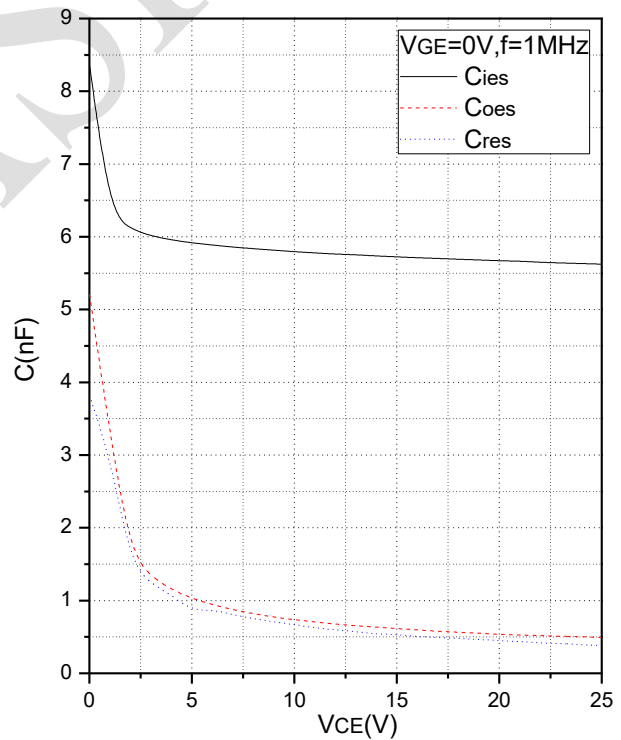


Fig.4 Capacitance Characteristics

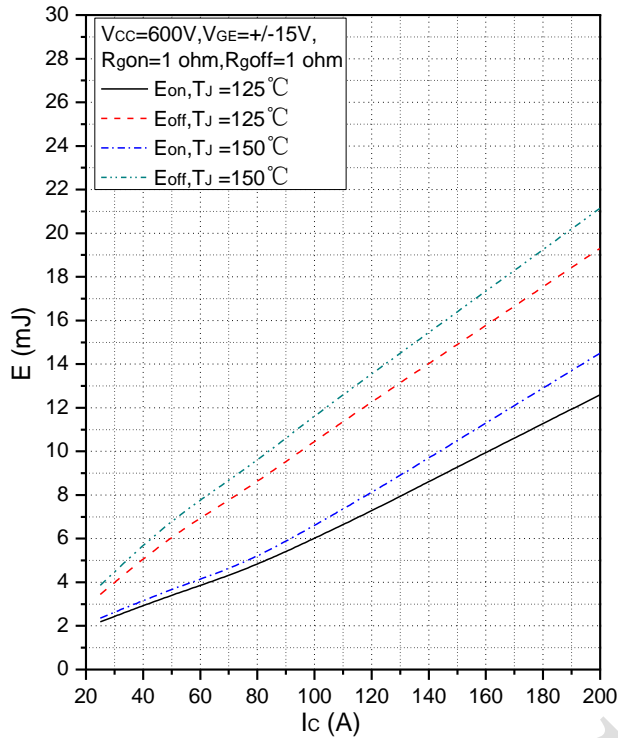


Fig.5 Typical Switching Loss vs. Collector Current

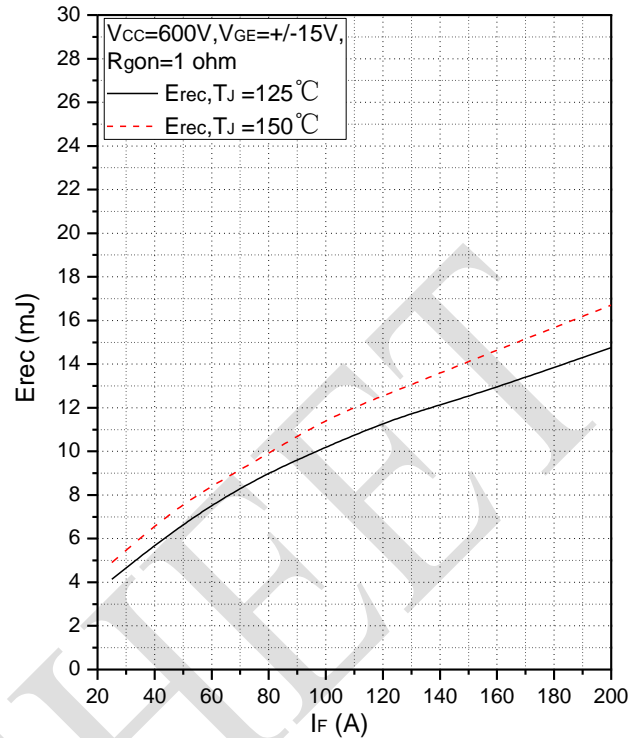


Fig.6 Typical Switching Loss vs. Forward Current

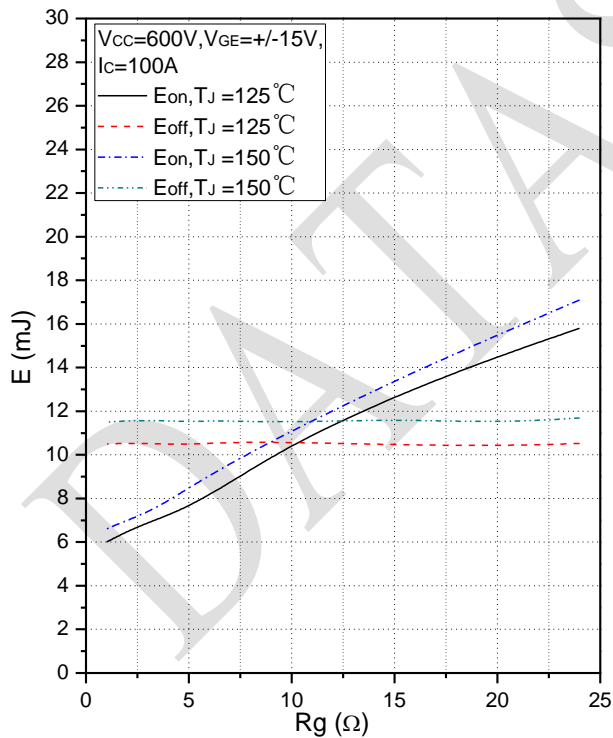


Fig.7 Typical Switching Loss vs. Gate Resistance

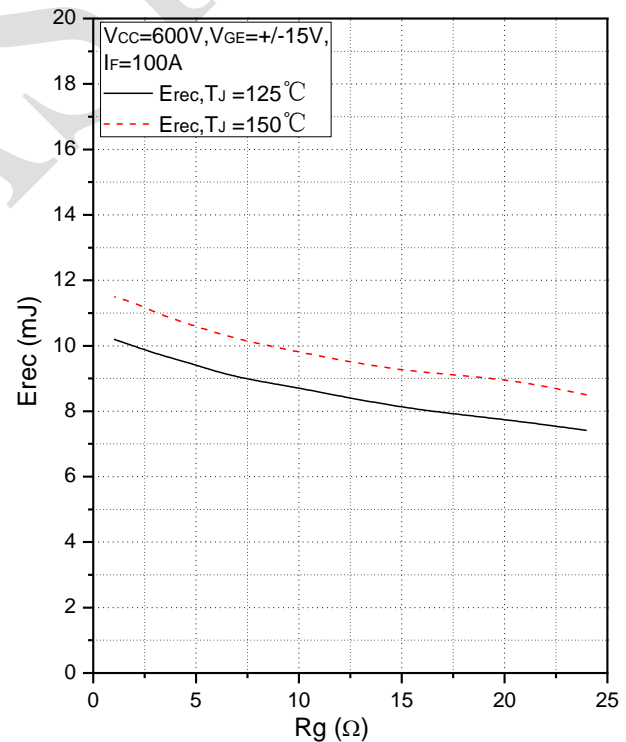


Fig.8 Typical Switching Loss vs. Gate Resistance

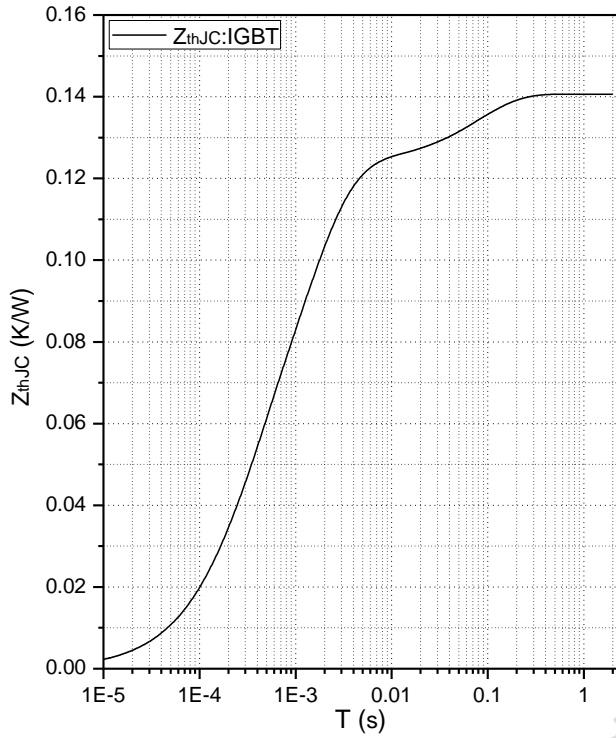


Fig.9 Transient Thermal Impedance (IGBT)

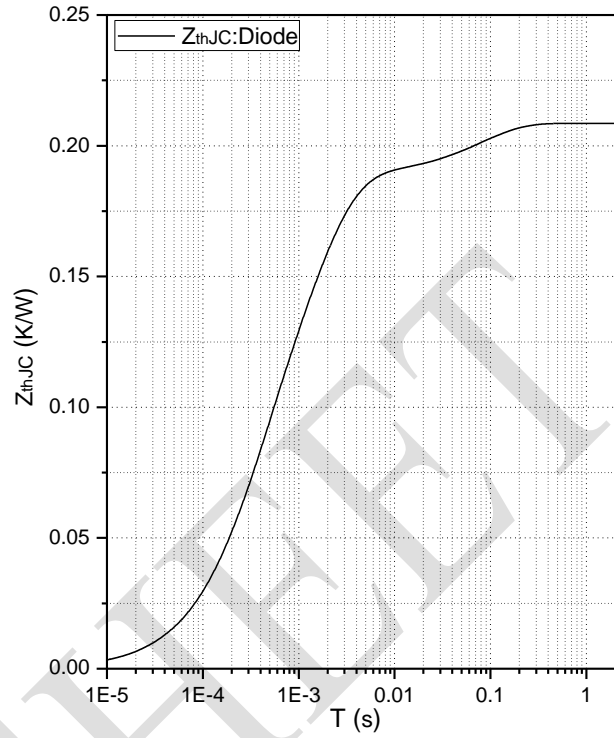


Fig.10 Transient Thermal Impedance (Diode)

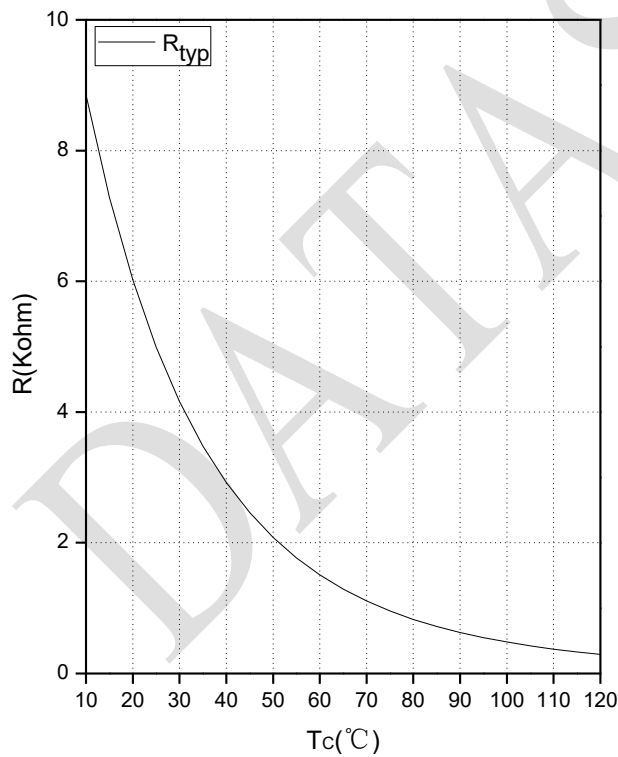


Fig.11 NTC Temperature Characteristics

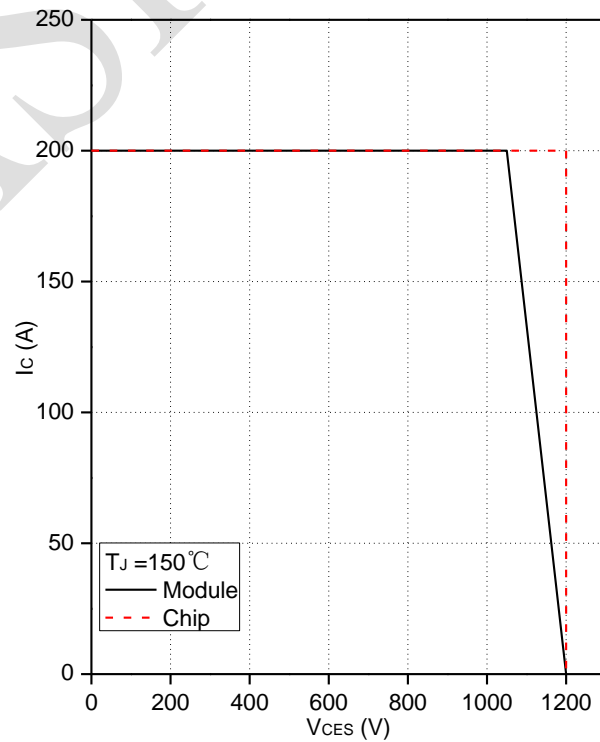
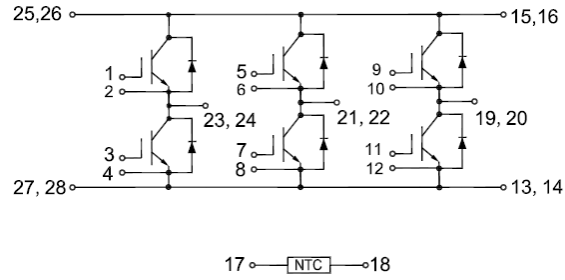


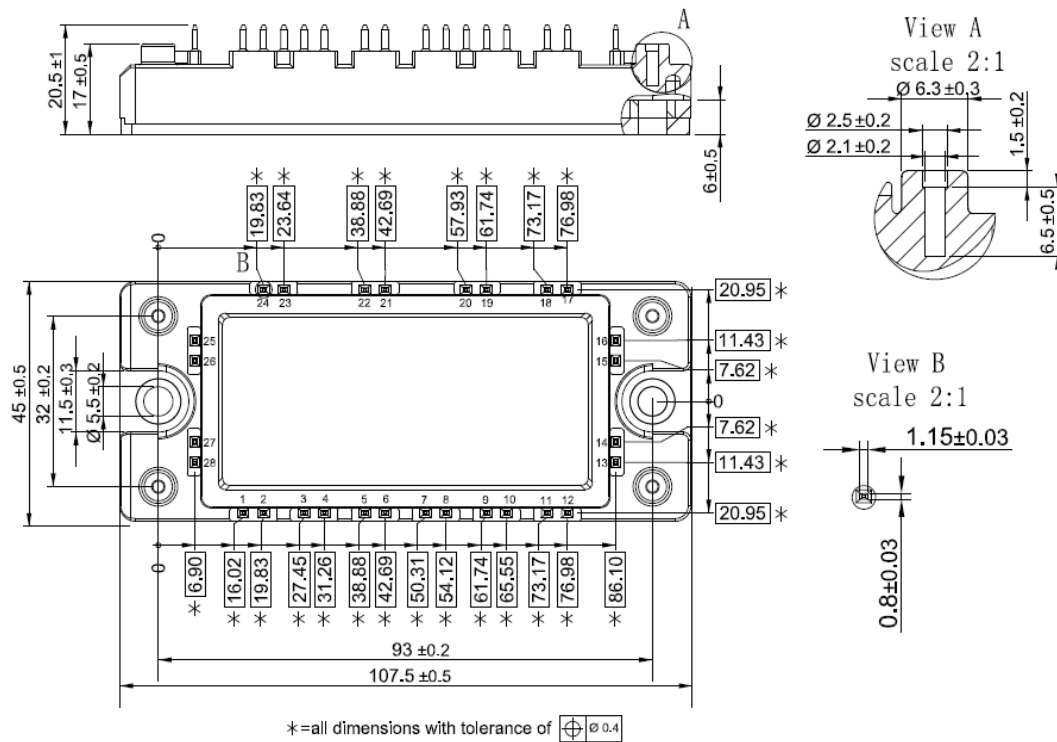
Fig.12 Reverse Bias Safe Operation Area (RBSOA)



Internal Circuit:



Package Outline (Unit: mm):





Date	Revision	Notes
05/31/2021	01	Initial Release

Announcement

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The released datasheet would be issued with “REV.” + “alphabet characters”.

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