

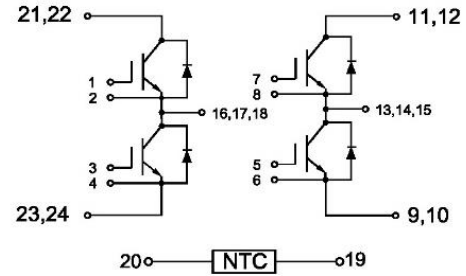


GF75HH120T5H

IGBT Module

Features:

- NPT Technology
- Short Circuit Rated >10 μ s
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested (2xIc)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- UPS
- Welding Machine, Cutting Machine
- Induction Heating, Plating Power Supply

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 =80°C	75	A
		T _C =25°C	150	A
I _{CM}	Repetitive Pulse Collector Current	T _J =150°C	150	A
t _{sc}	Short Circuit Withstand Time		>10	μs
P _D	Maximum Power Dissipation per leg	T _C =25°C T _{Jmax} =150°C	700	W



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

Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=1\text{mA}, V_{CE}=V_{GE}$	4.5	5.4	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=75\text{A}, V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	2.55	2.85	V
			$T_J=125^\circ\text{C}$	3.20		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	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		6.58		nF
C_{oes}	Output Capacitance			0.57		nF
C_{res}	Reverse Transfer Capacitance			0.29		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600\text{V}, I_C=75\text{A}, R_{Gon}=10\Omega, V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		425		ns	
			$T_J=125^\circ\text{C}$		335			
t_r	Rise Time		$T_J=25^\circ\text{C}$		85		ns	
			$T_J=125^\circ\text{C}$		67			
$t_{d(off)}$	Turn-off Delay Time		$V_{CC}=600\text{V}, I_C=75\text{A}, R_{Goff}=10\Omega, V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		445		ns
				$T_J=125^\circ\text{C}$		375		
t_f	Fall Time	$T_J=25^\circ\text{C}$			142		ns	
		$T_J=125^\circ\text{C}$			167			
E_{on}	Turn-on Switching Loss	$V_{CC}=600\text{V}, I_C=75\text{A}, R_G=10\Omega, V_{GE}=\pm 15\text{V},$ $di/dt=950\text{A}/\mu\text{s}(T_J=125^\circ\text{C})$ Inductive Load		$T_J=25^\circ\text{C}$		4.92		mJ
				$T_J=125^\circ\text{C}$		5.18		
E_{off}	Turn-off Switching Loss		$T_J=25^\circ\text{C}$		2.60		mJ	
			$T_J=125^\circ\text{C}$		3.58			
Q_g	Total Gate Charge		$V_{GE}=+15\text{V}\dots-15\text{V}$	$T_J=25^\circ\text{C}$		892		nC
RBSOA	Reverse Bias Safe Operation Area		$I_C=150\text{A}, V_{CC}=1050\text{V}, V_B=1200\text{V}, R_g=10\Omega, V_{GE}=+15\text{V to }0\text{V}, T_J=150^\circ\text{C}$	Trapezoid				
SCSOA	Short Circuit Safe Operation Area	$V_{CC}=600\text{V}, V_{GE}=15\text{V}, T_J=150^\circ\text{C}$	10				μs	
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-to-Case				0.18		$^\circ\text{C}/\text{W}$	



Diode, Inverter

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

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	75	A
I_{FM}	Diode Maximum Forward Current	150	A

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

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	$I_F=75\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	2.55		V
			$T_J=125^\circ\text{C}$	2.65		
t_{rr}	Reverse Recovery Time		$T_J=25^\circ\text{C}$	175		ns
			$T_J=125^\circ\text{C}$	312		
I_{rr}	Peak Reverse Recovery Current	$I_F=75\text{A}$, $di/dt=1318\text{A}/\mu\text{s}$, $V_{rr}=600\text{V}$, $V_{GE}=-15\text{V}$	$T_J=25^\circ\text{C}$	43.5		A
			$T_J=125^\circ\text{C}$	57.7		
Q_{rr}	Reverse Recovery Charge		$T_J=25^\circ\text{C}$	4.00		μC
			$T_J=125^\circ\text{C}$	7.55		
E_{rec}	Reverse Recovery Energy		$T_J=25^\circ\text{C}$	1.72		mJ
			$T_J=125^\circ\text{C}$	3.40		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-to-Case				0.52	$^\circ\text{C}/\text{W}$

Internal NTC-Thermistor Characteristics

Symbol	Description	Min.	Typ.	Max.	Units.
R_{25}	Rated Resistance	$T_C=25^\circ\text{C}$	5		k Ω
$\Delta R/R$	Deviation of R100	$T_C=100^\circ\text{C}$, $R_{100}=481\Omega$	-5	5	%
P_{25}	Power Dissipation	$T_C=25^\circ\text{C}$		10	mW
$B_{25/50}$	B-Value	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15\text{K}))]$	3380		K
$B_{25/80}$	B-Value	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15\text{K}))]$	3440		K



Module

Symbol	Description	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 1minute	2500		V
T _J	Maximum Junction Temperature			150	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40	+150	°C
T _{stg}	Storage Temperature		-40	+125	°C
CTI	Comparative Tracking Index		200		
R _{ecs}	Case-to-Sink Thermally (Conductive Grease Applied)			0.03	°C/W
T	Mounting Torque for Module Mounting	Screw M5--Mounting according to valid application note	3.0	6.0	N·m
G	Weight			190	g

Ordering Information Table

Device code

G	F	75	HH	120	T5	H
①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - NPT , Fast IGBT
- ③ - Rated Current (75=75A)
- ④ - Circuit Configuration (H Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

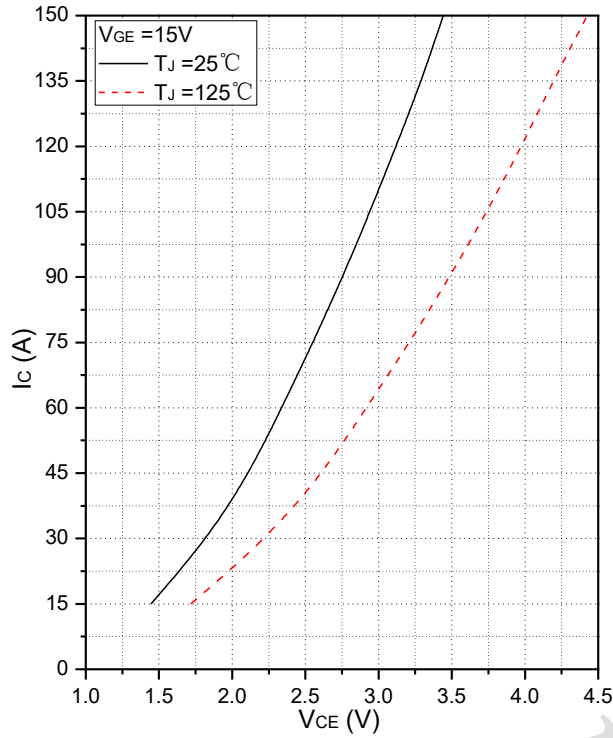


Fig.1 Typical Saturation Voltage Characteristics

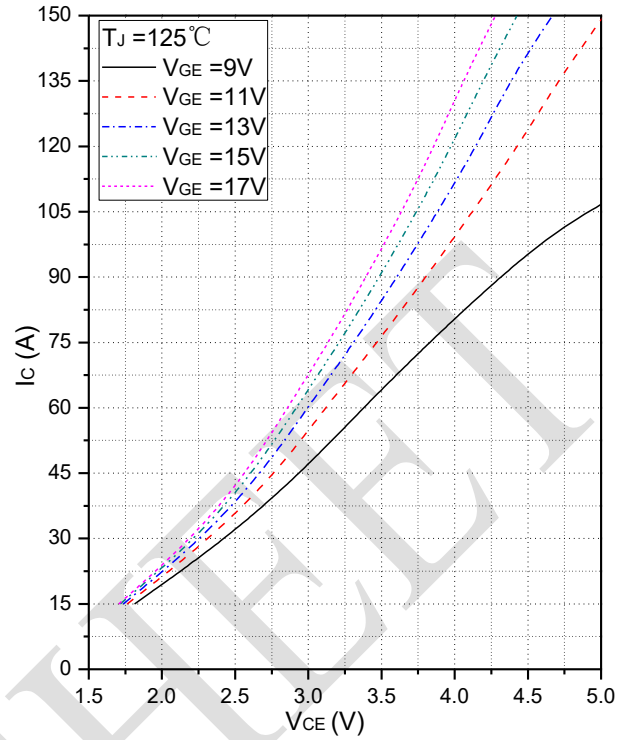


Fig.2 Typical Output Characteristics

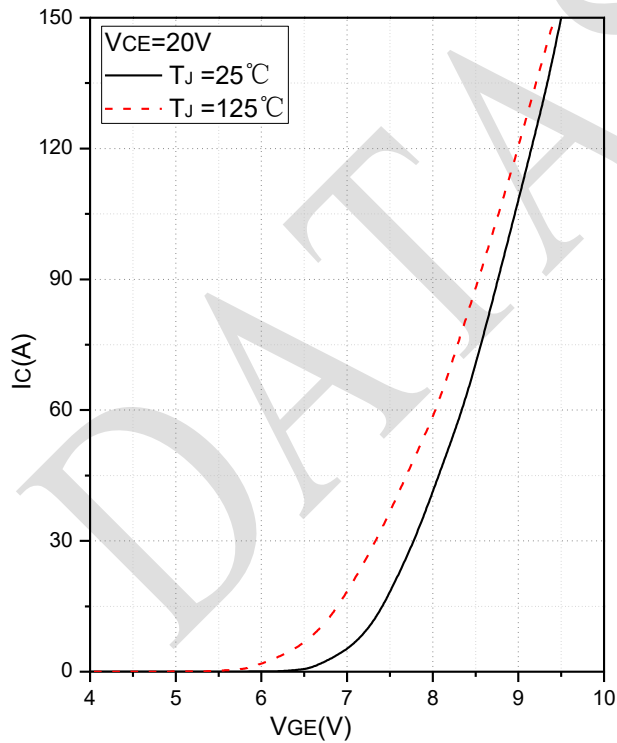


Fig.3 Transfer Characteristic

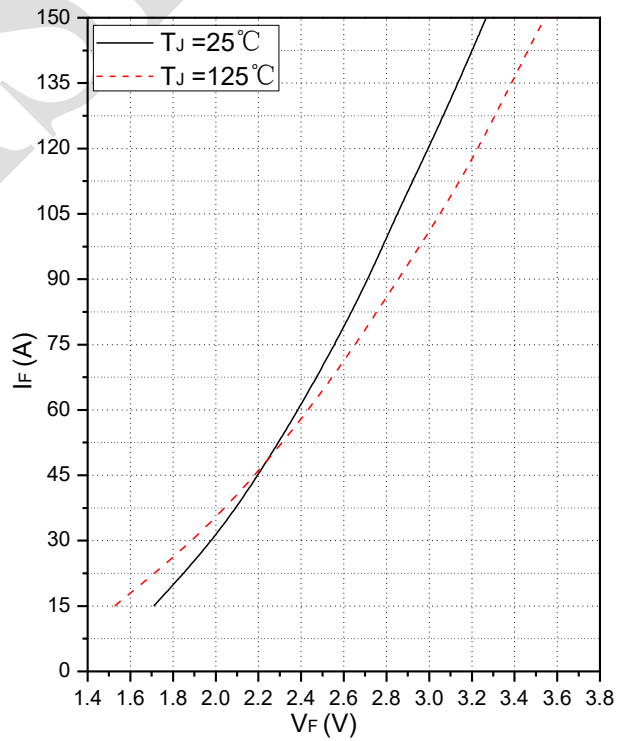


Fig.4 Forward Characteristics of Diode

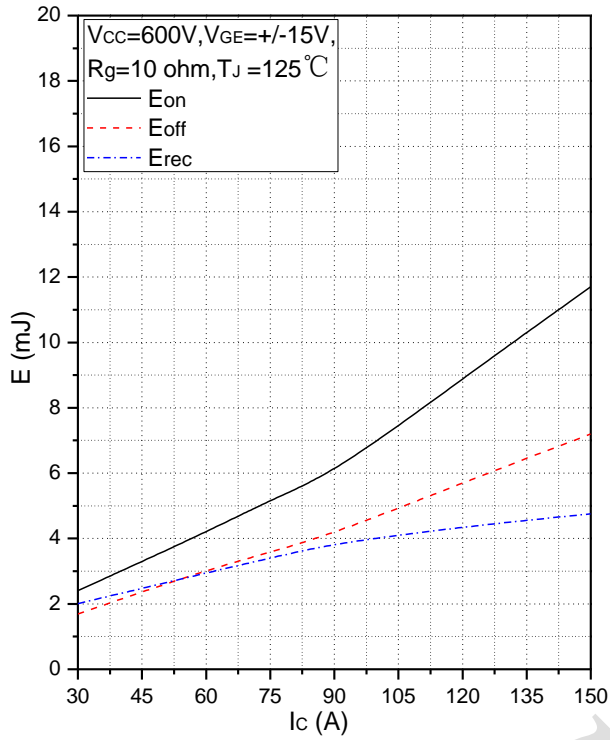


Fig.5 Typical Switching Loss vs. Collector Current

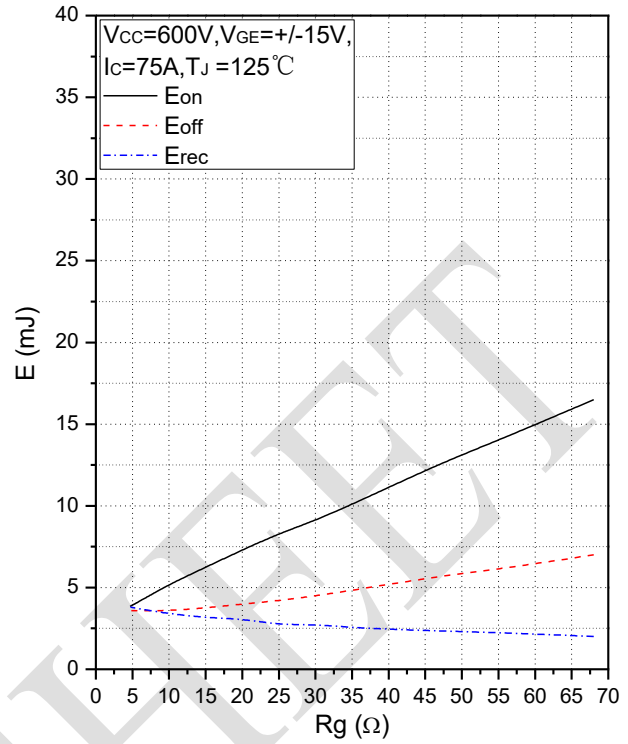


Fig.6 Typical Switching Loss vs. Gate Resistance

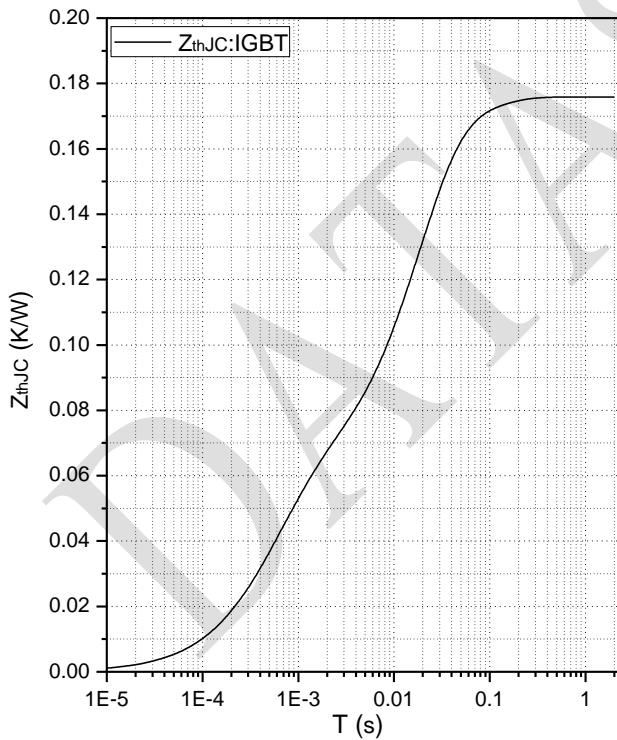


Fig.7 Transient Thermal Impedance (IGBT)

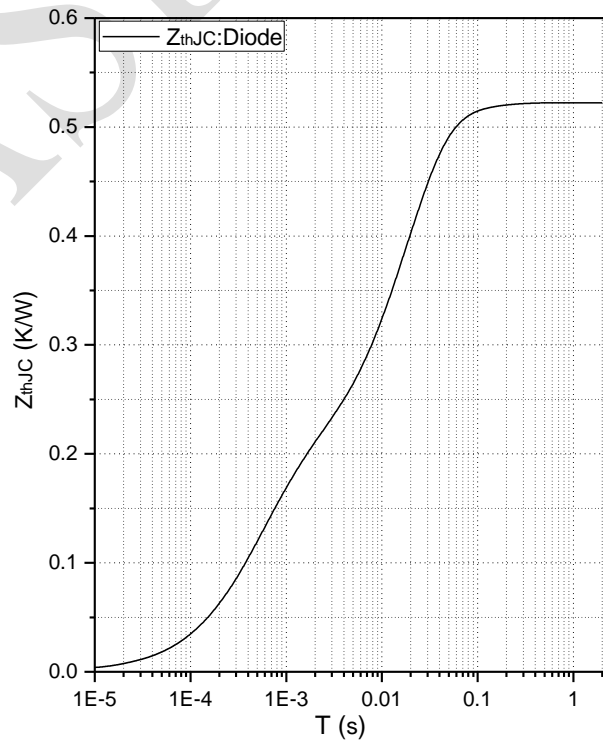


Fig.8 Transient Thermal Impedance (Diode)

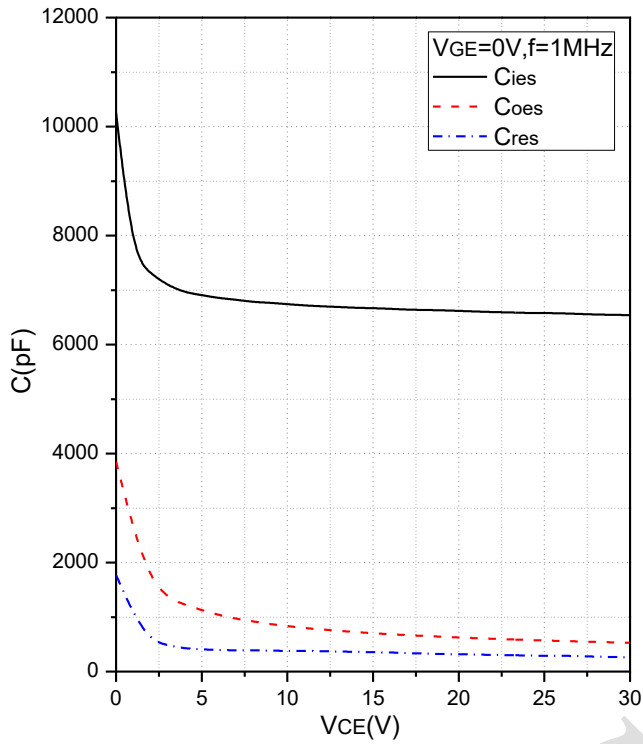


Fig.9 Capacitance Characteristics

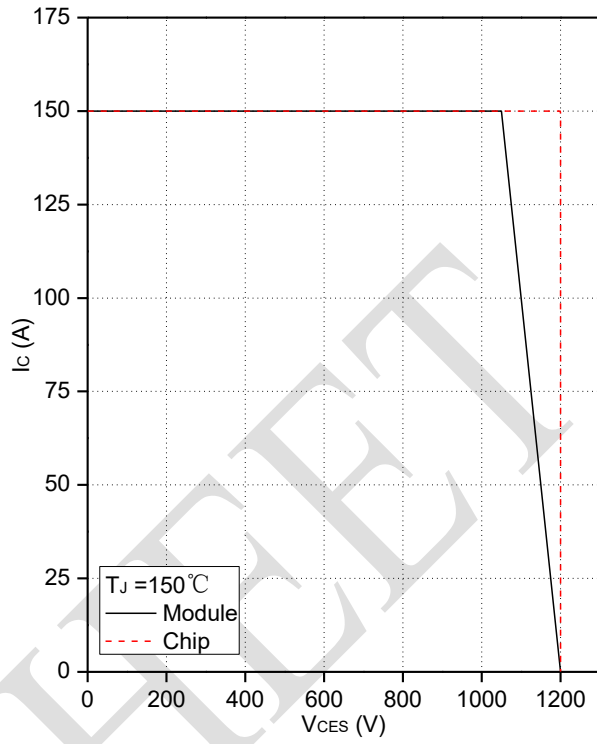


Fig.10 Reverse Bias Safe Operation Area (RBSOA)

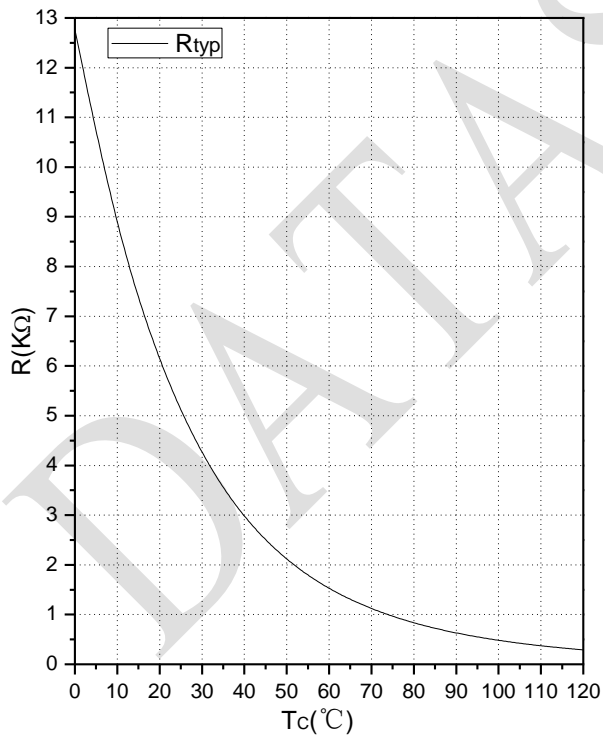
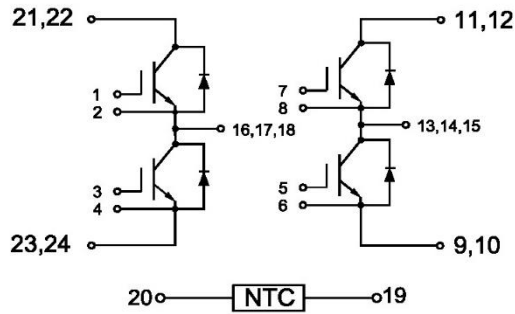


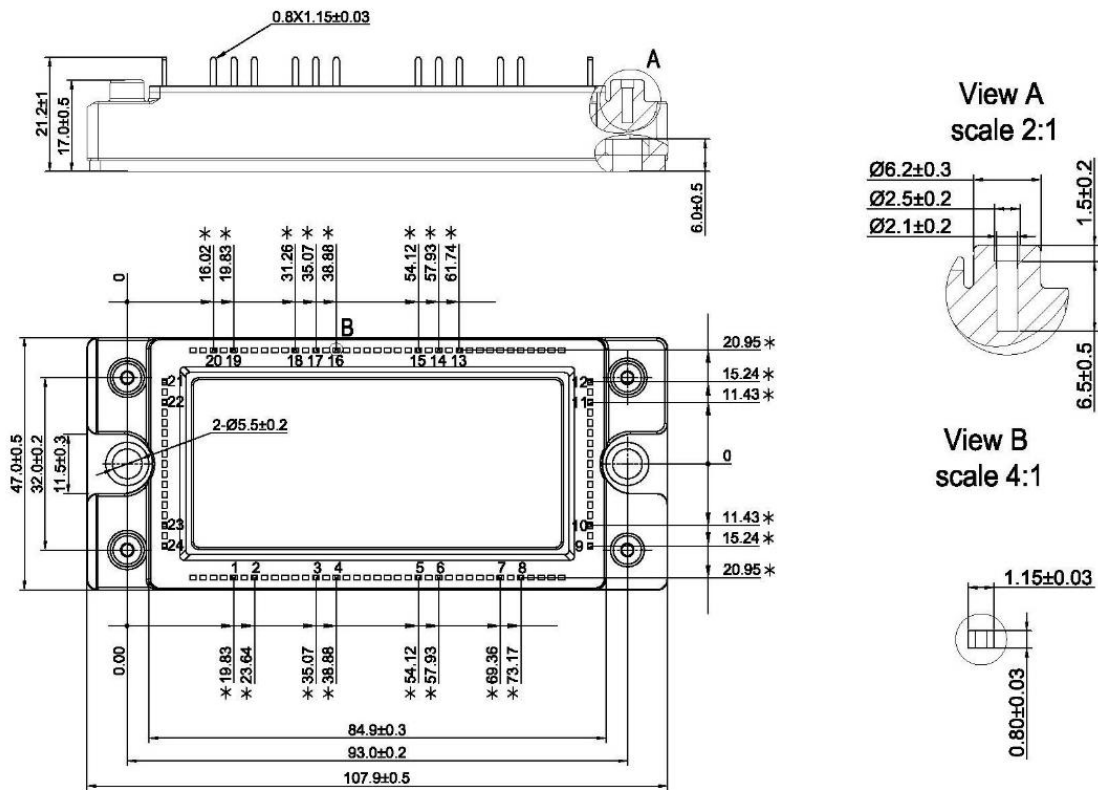
Fig.11 NTC Temperature Characteristics



Internal Circuit



Package Outline (Unit: mm):



* = all dimensions with tolerance of ± 0.4



Date	Revision	Notes
08/16/2021	A	Final Version

Announcement

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

DATA SHEET