

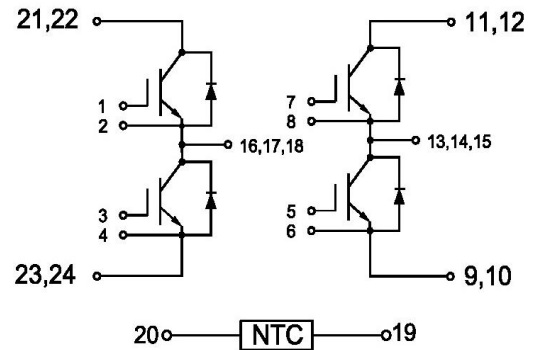


GF50HH120T5H

IGBT Module

Features:

- Non Punch Through (NPT) Technology
- Short Circuit Rated > 10 μ s
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested (2xI_c)
- 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 =100°C	50	A
		T _C =25°C	100	A
I _{CM}	Peak Collector Current Repetitive	T _J =150°C	100	A
t _{sc}	Short Circuit Withstand Time		>10	μs
P _D	Maximum Power Dissipation (IGBT)	T _C =25°C	925	W
		T _{Jmax} =150°C		



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	$I_C=2\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.9	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=50\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	3.15		V
			$T_J=125^\circ\text{C}$	3.90		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			3.73		nF
C_{oes}	Output Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		0.36		nF
C_{res}	Reveres Transfer Capacitance			0.14		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600\text{V}$, $I_C=50\text{A}$, $R_{Gon}=30\Omega$, $V_{GE}=\pm 15\text{V}$, Inductive Load	$T_J=25^\circ\text{C}$		560		ns
			$T_J=125^\circ\text{C}$		561		
t_r	Rise Time		$T_J=25^\circ\text{C}$		105		ns
			$T_J=125^\circ\text{C}$		102		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=600\text{V}$, $I_C=50\text{A}$, $R_{Goff}=30\Omega$, $V_{GE}=\pm 15\text{V}$, Inductive Load	$T_J=25^\circ\text{C}$		540		ns
			$T_J=125^\circ\text{C}$		570		
t_f	Fall Time		$T_J=25^\circ\text{C}$		140		ns
			$T_J=125^\circ\text{C}$		155		
E_{on}	Turn-on Switching Loss	$V_{CC}=600\text{V}$, $I_C=50\text{A}$, $R_{Gon}=30\Omega$, $V_{GE}=\pm 15\text{V}$, $di/dt=450\text{A}/\mu\text{s}$ ($T_J=125^\circ\text{C}$), Inductive Load	$T_J=25^\circ\text{C}$		3.7		mJ
			$T_J=125^\circ\text{C}$		4.3		
E_{off}	Turn-off Switching Loss		$T_J=25^\circ\text{C}$		2.1		mJ
			$T_J=125^\circ\text{C}$		2.8		
Q_g	Total Gate Charge	$V_{GE}=+15\text{V}\dots-15\text{V}$	$T_J=25^\circ\text{C}$		0.6		μC
RBSOA	$I_C=100\text{A}$, $V_{CC}=1050\text{V}$, $V_p=1200\text{V}$, $R_{Goff}=30\Omega$, $V_{GE}=+15\text{V}$ to 0V , $T_J=150^\circ\text{C}$	Trapezoid					
SCSOA	$V_{CC}=600\text{V}$, $V_{GE}=15\text{V}$, $T_J=150^\circ\text{C}$		10				μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case(per leg)					0.135	$^\circ\text{C}/\text{W}$



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	50	A
I_{FM}	Peak FWD Current Repetitive	100	A

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

Symbol	Description	Conditions	Min	Typ	Max	Unit	
V_{FM}	Forward Voltage	$I_F=50\text{A}$	$T_J=25^\circ\text{C}$	2.95		V	
			$T_J=125^\circ\text{C}$	3.05			
t_{rr}	Reverse Recovery Time	$I_F=50\text{A}$, $-diF/dt = 650\text{A}/\mu\text{s}(T_J=125^\circ\text{C})$, $V_R=600\text{V}$, $V_{GE}=-15\text{V}$	$T_J=25^\circ\text{C}$	130		ns	
			$T_J=125^\circ\text{C}$	260			
I_{rr}	Peak Reverse Recovery Current		$T_J=25^\circ\text{C}$	19.6		A	
			$T_J=125^\circ\text{C}$	27.4			
Q_{rr}	Reverse Recovery Charge		$T_J=25^\circ\text{C}$	1.40		μC	
			$T_J=125^\circ\text{C}$	3.05			
E_{rec}	Reverse Recovery Energy		$T_J=25^\circ\text{C}$	0.54		mJ	
			$T_J=125^\circ\text{C}$	1.19			
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case(per leg)				0.363	$^\circ\text{C}/\text{W}$	

Internal NTC-Thermistor Characteristics

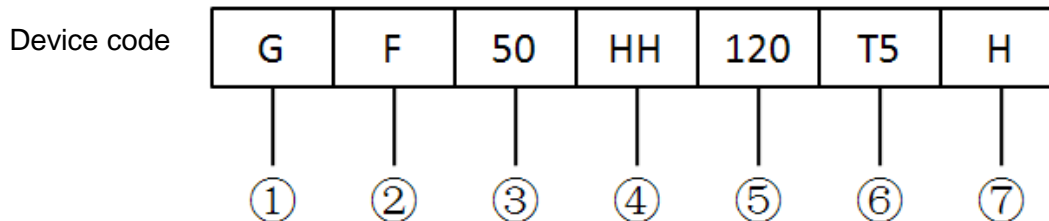
R_{25}	$T_C=25^\circ\text{C}$	5		k Ω
$\Delta R/R$	$T_C=100^\circ\text{C}$, $R_{100} = 481\Omega$		± 5	%
P_{25}	$T_C=25^\circ\text{C}$	10		mW
$B_{25/50}$	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15\text{K}))]$	3380		K
$B_{25/80}$	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15\text{K}))]$	3440		K



Module

Symbol	Description	Min	Typ	Max	Unit
V _{iso}	Isolation Voltage(All Terminals Shorted)	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			
ReCS	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



- ① - IGBT Module
- ② - NPT, Fast IGBT
- ③ - Rated Current (50=50A)
- ④ - Circuit Configuration (H Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

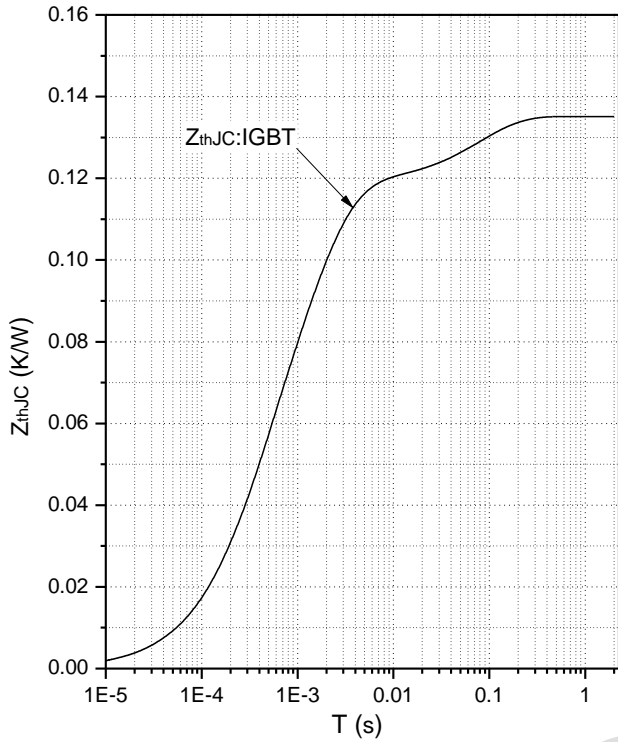


Fig.1 Transient Thermal Impedance (IGBT)

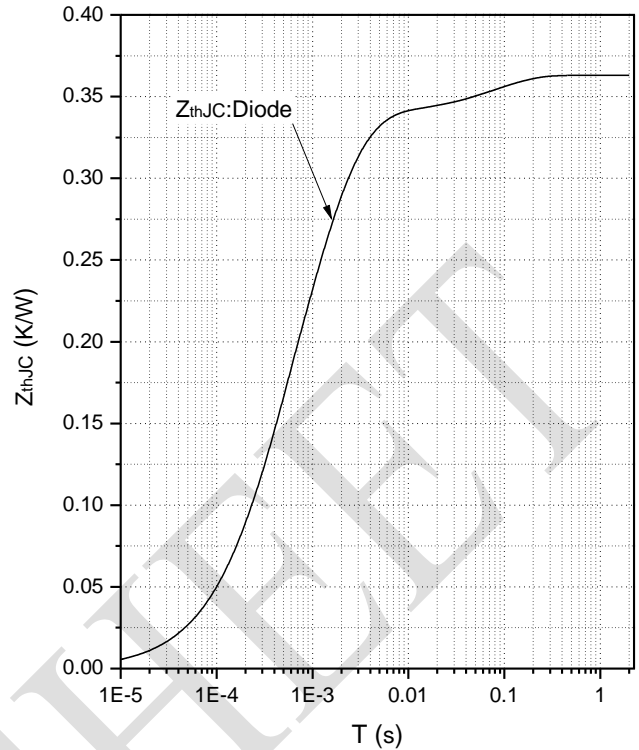


Fig.2 Transient Thermal Impedance (Diode)

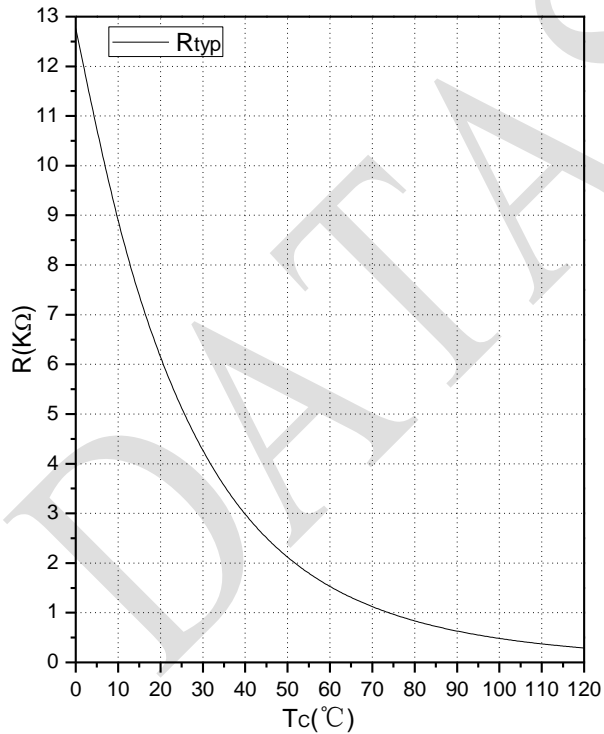


Fig.3 NTC Temperature Characteristics

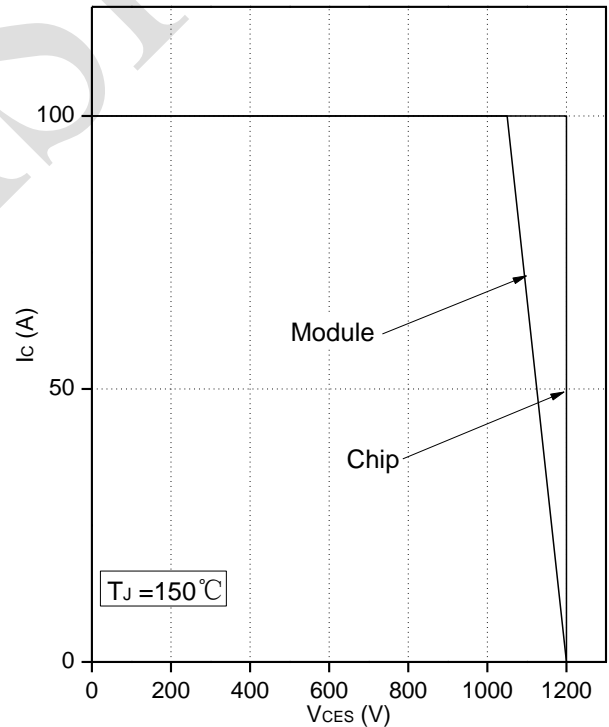
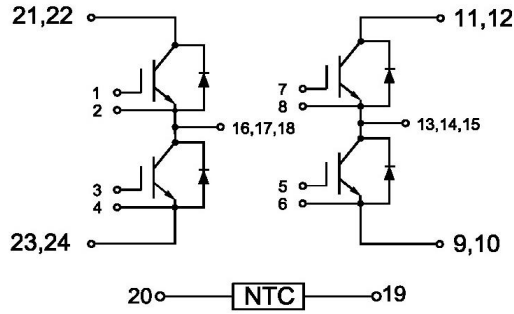


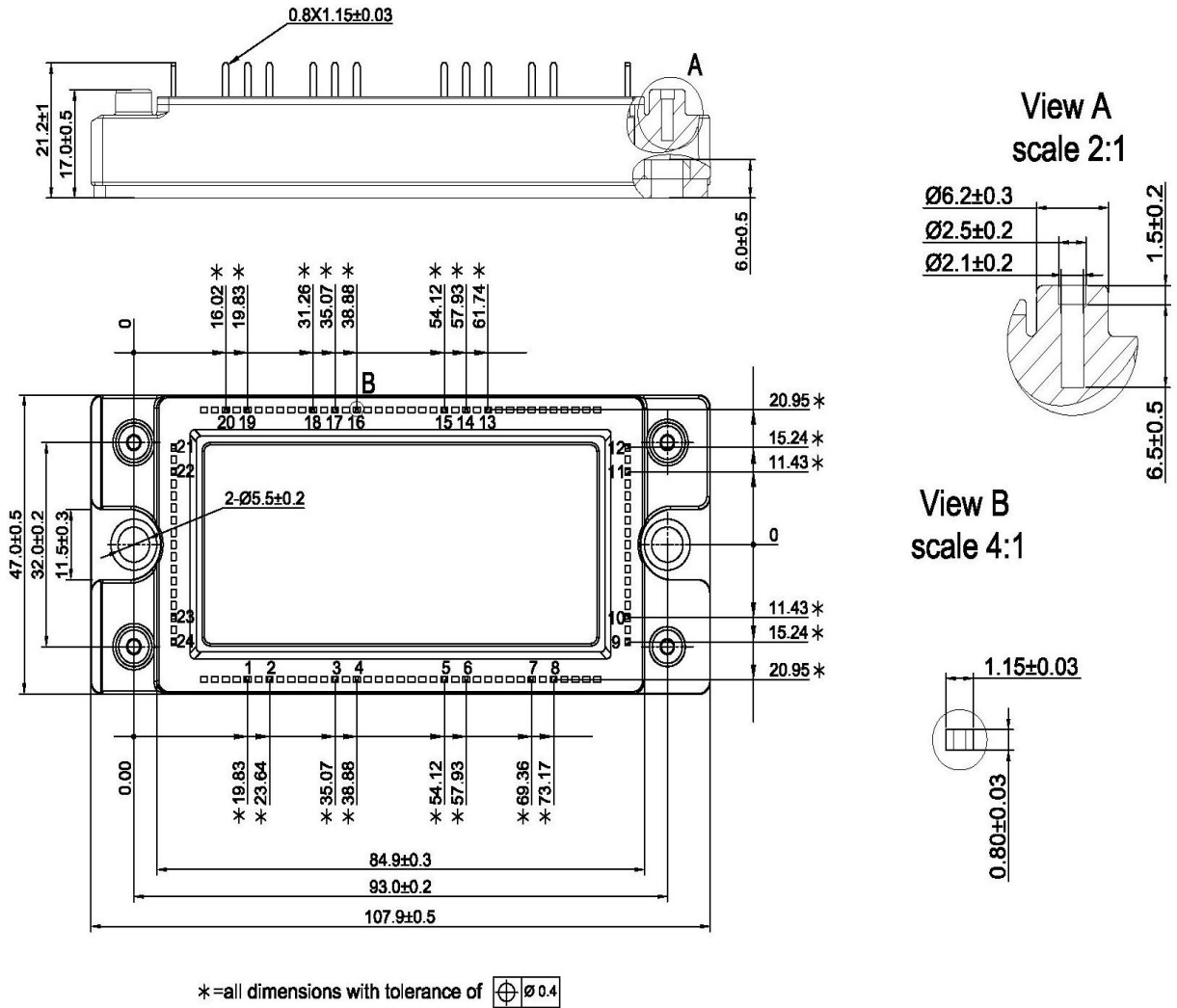
Fig.4 Reverse Bias Safe Operation Area (RBSOA)



Internal Circuit:



Package Outline (Unit: mm):





Revision History

Date	Revision	Notes
03/22/2022	01	Initial release

Announcement

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DATA SHEET