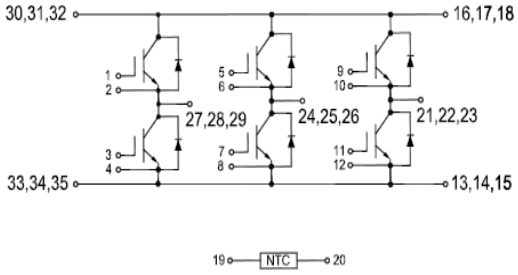
GT75FF120T6H-M

IGBT Module

Features：

- Field Stop Trench Gate 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℃	75	A
		T_C = 25℃	150	A
I_{CM}	Peak Collector Current Repetitive	T_J = 175℃	150	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation (IGBT)	T_C = 25℃ T_{Jmax}=175℃	555	W

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

Static Characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C = 2.6 mA, V_{CE} = V_{GE}		5.0	5.5	6.8	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C =75A, V_{GE} = 15V	T_J = 25℃		1.60		V
			T_J = 125℃		1.80		V
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			7.5		nF
C_{res}	Reveres Transfer Capacitance				0.21		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V, I_C =75A, R_{Gon} = 2Ω, V_{GE} = ±15V, Inductive Load	T_J = 25℃		158		ns
			T_J = 125℃		163		
t_r	Rise Time		T_J = 25℃		49		ns
			T_J = 125℃		53		
$t_{d(off)}$	Turn-off Delay Time	V_{CC} = 600V, I_C =75A, R_{Goff} = 2Ω, V_{GE} = ±15V, Inductive Load	T_J = 25℃		193		ns
			T_J = 125℃		211		
t_f	Fall Time		T_J = 25℃		204		ns
			T_J = 125℃		371		
E_{on}	Turn-on Switching Loss	V_{CC} = 600V, I_C =75A, R_{Gon} = 2Ω, V_{GE} = ±15V, di/dt=1205A/μs(T_J=125℃), Inductive Load	T_J = 25℃		3.22		mJ
			T_J = 125℃		4.35		
E_{off}	Turn-off Switching Loss	V_{CC} = 600V, I_C =75A, R_{Goff} = 2Ω, V_{GE} = ±15V, du/dt=4110V/μs(T_J=125℃), Inductive Load	T_J = 25℃		3.40		mJ
			T_J = 125℃		5.91		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J = 25℃		374		nC
$R_{gint.}$	Internal Gate Resistor				10		Ω
RBSOA	RBSOA	I_C=150A,V_{CC}=1050V,Vp=1200V, R_{Goff} = 2Ω, V_{GE}=+15V to 0V, T_J =150°C		Trapezoid			
SC data	Vcc=800V, tp=10us, Vge=+/-15V, R_{Gon}=10ohm, R_{Goff}=10ohm, T_J=25℃				469		A
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.27		℃/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	75	A
I_{FM}	Peak FWD Current Repetitive	150	A

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

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F = 75A	T_J=25℃		2.10		V
			T_J=125℃		2.20		
t_{rr}	Reverse Recovery Time	I_F=75A, -di_F/dt =1740A/μs(T_J=125℃), V_{rr} = 600V, V_{GE} = -15V	T_J=25℃		204		ns
			T_J=125℃		389		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		47.8		A
			T_J=125℃		64.7		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		4.56		μC
			T_J=125℃		9.42		
E_{rec}	Reverse Recovery Energy		T_J=25℃		1.68		mJ
			T_J=125℃		3.60		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.43		℃/W

Internal NTC-Thermistor Characteristics

R_{25}	T_C =25℃	5		kΩ
△R/R	T_C =100℃， R_{100} =481Ω		±5	%
P_{25}	T_C =25℃	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	Conditions	Min	Typ	Max	Unit
V_{iso}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500			V
L_{sCE}	Stray Inductance Module			21		nH
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			V
$R_{\theta CS}$	Case-To-Sink Thermally (Conductive Grease Applied)				0.02	℃/W
M	Power Terminals Screw:M5		3.0		6.0	N·m
G	Weight			300		g

Die Information:
IGBT, Inverter

Parameter	Specification
Chip Size	7.80mm*9.00mm
Thickness	130μm
Front side passivation	Polyimide: 4μm
Front side metal	Al-Si: 6.5μm
Back side metal	Al/Ti/Ni/Au: 1.45μm

Diode, Inverter

Parameter	Specification
Chip Size	4.80mm*9.20mm
Thickness	180μm
Anode metallization	Al-Si: 4μm
Cathode metallization	Ti/Ni/Ag system, suitable for epoxy and soft solder die bonding

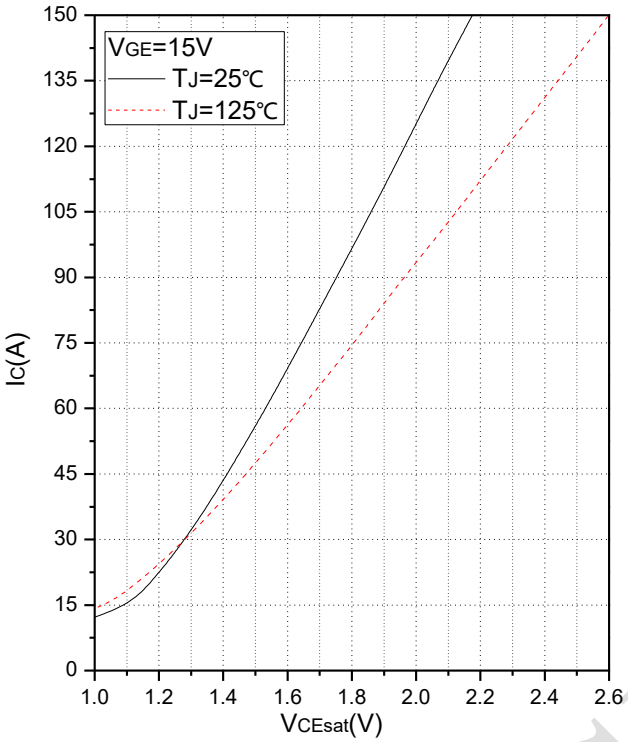


Fig.1 Typical Saturation Voltage Characteristics

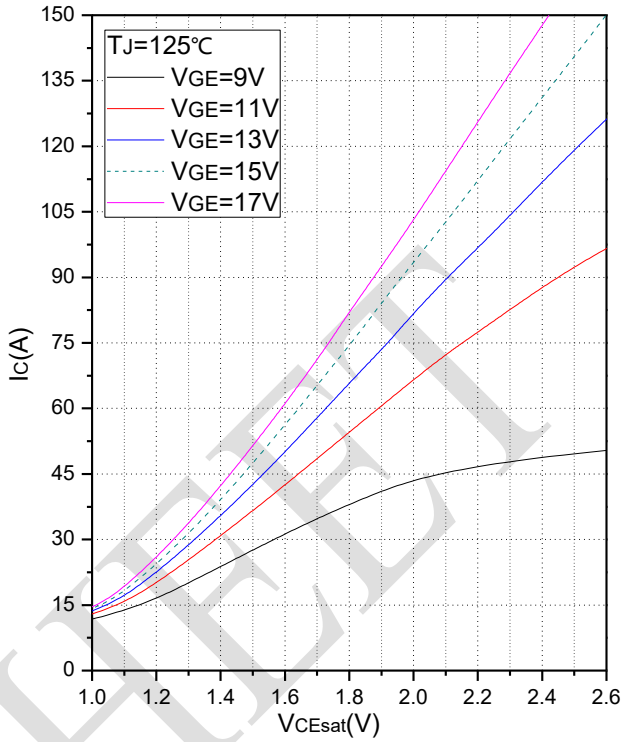


Fig.2 Typical Output Characteristics

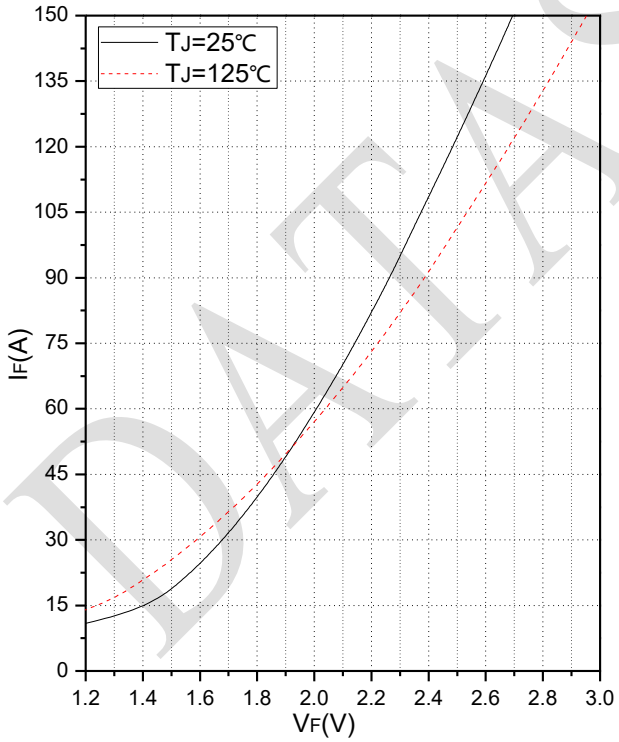


Fig.3 Forward Characteristics of FWD

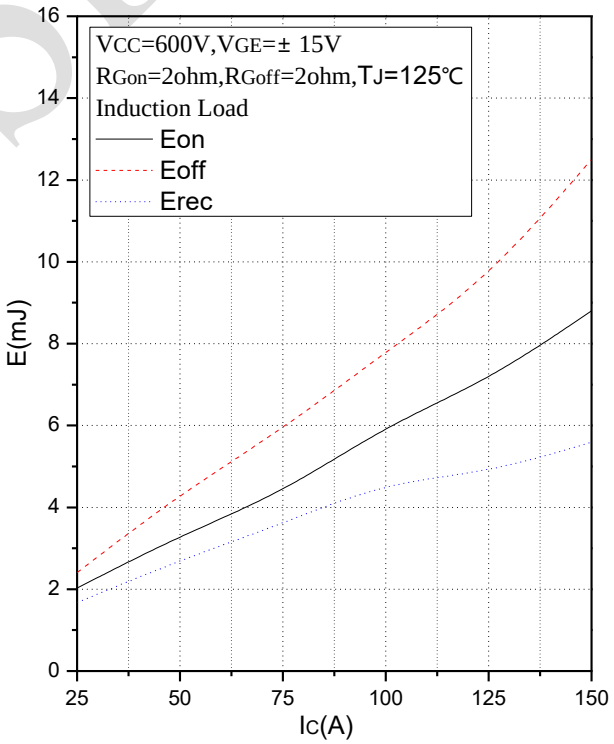


Fig.4 Typical Switching Loss vs. Collector Current

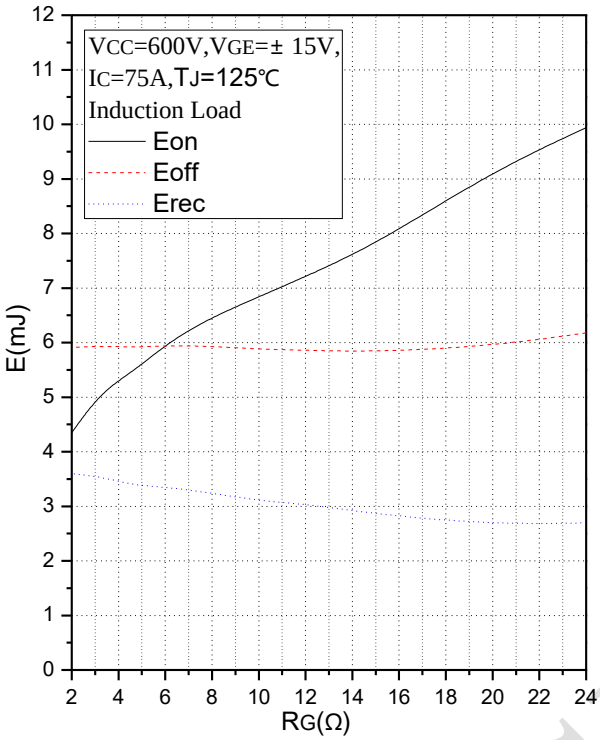


Fig.5 Typical Switching Loss vs. Gate Resistance

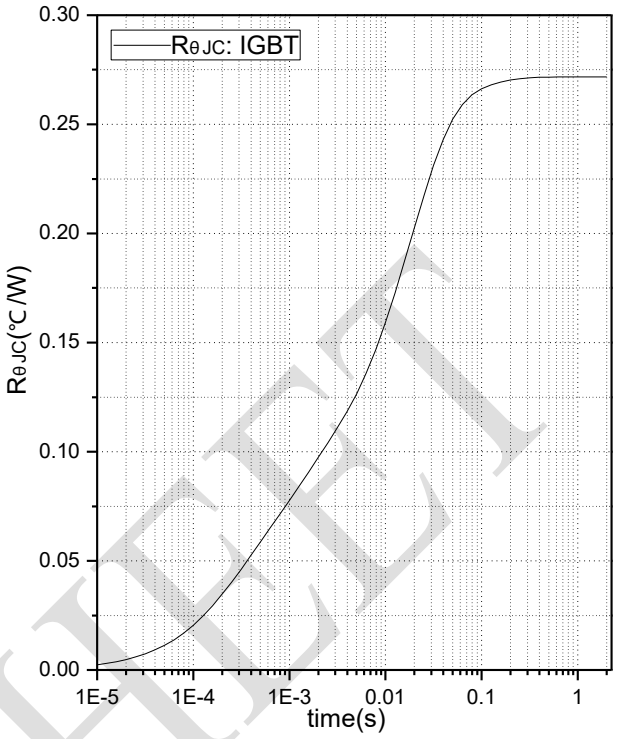


Fig.6 Transient Thermal Impedance

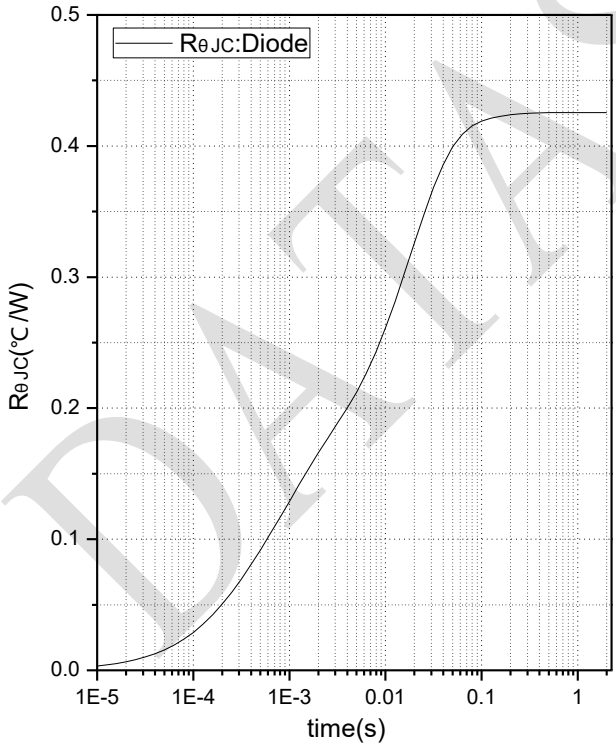


Fig.7 Transient Thermal Impedance

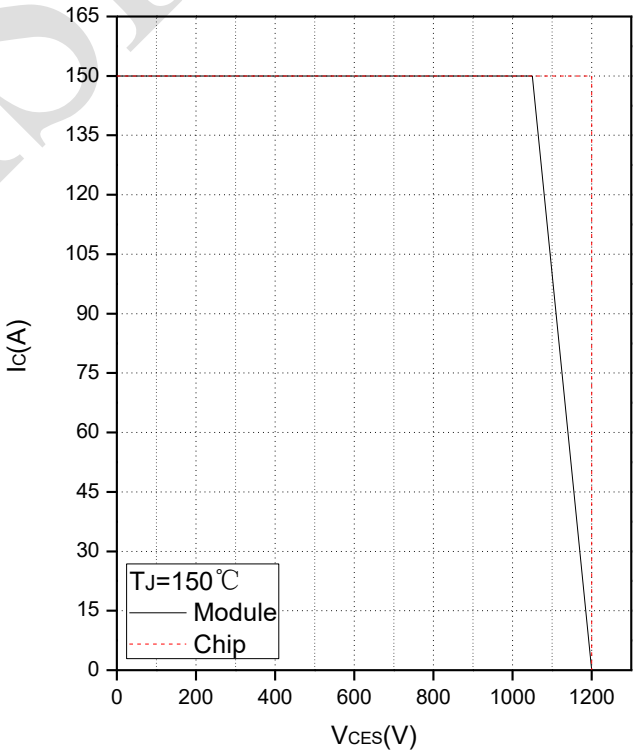


Fig.8 Reverse Bias Safe Operation Area (RBSOA)

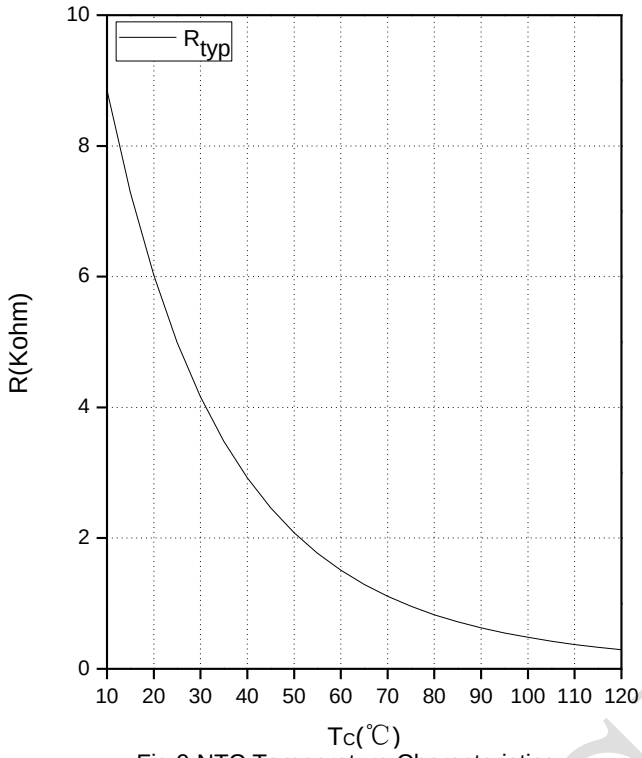


Fig.9 NTC Temperature Characteristics

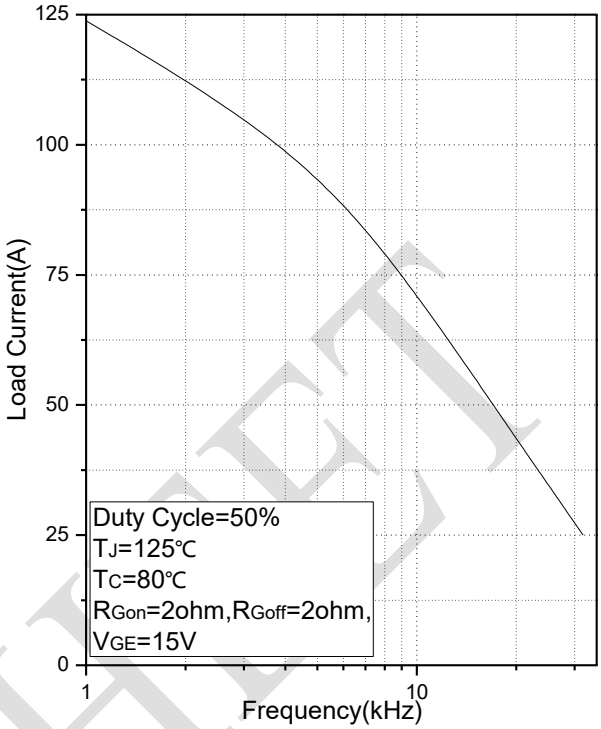
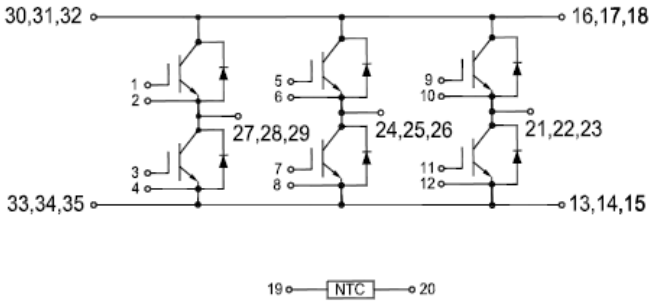
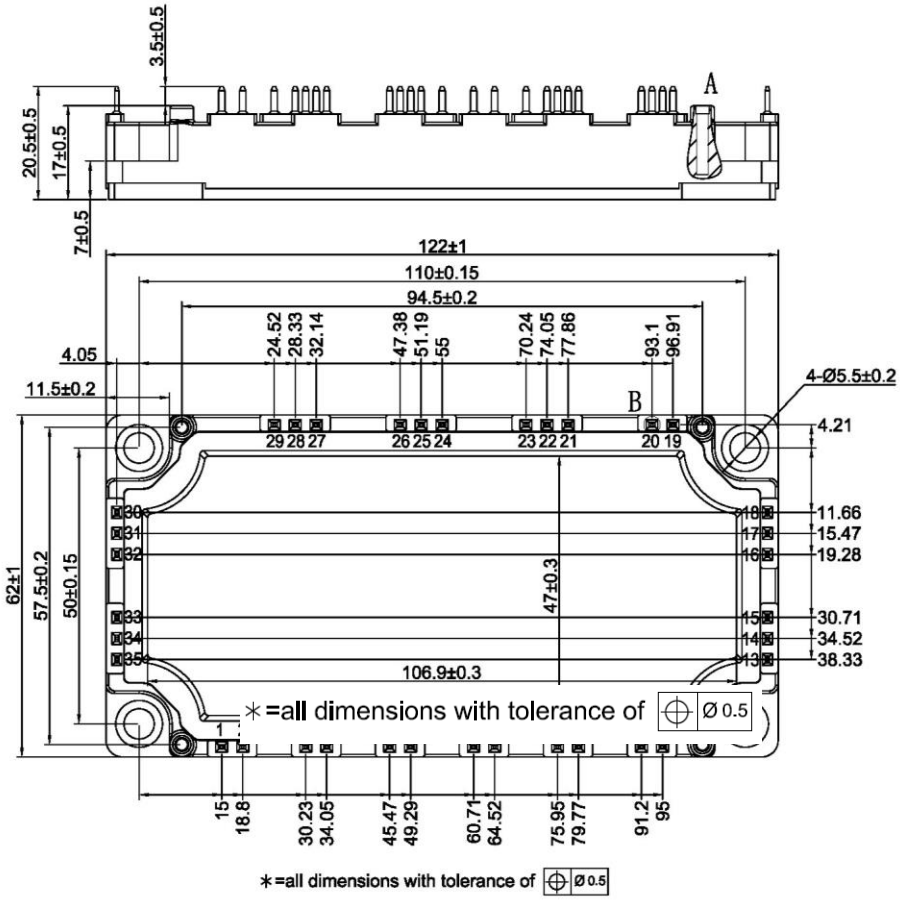


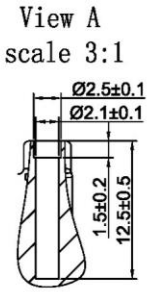
Fig.10 Typical Load Current vs. Frequency

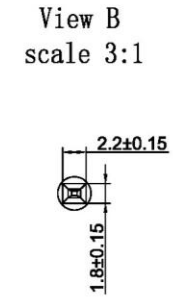
Internal Circuit:



Package Outline (Unit: mm):







Date	Revision	Notes
09/12/2017	01	Initial Release
03/19/2018	02	Changed Module Part Number. Originally named GTM75FF120T6H.
11/27/2019	A	Add die information.
03/27/2020	B	Update outline

Announcement

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