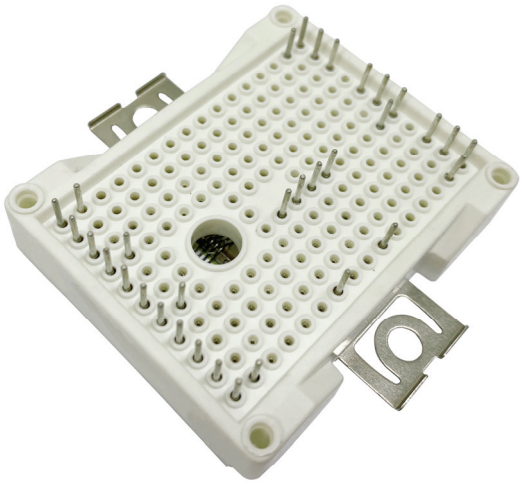
GTM75FF120B9H
IGBT Module

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}	Repetitive Peak Collector Current	T_J = 175℃	150	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C = 25℃ T_{Jmax}=175℃	650	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=1mA, V_{CE}=V_{GE}		5.0	5.6	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=75A, V_{GE} =15V	T_J=25℃		1.60	1.90	V
			T_J=125℃		1.80		V
			T_J=150℃		1.90		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			5.55		nF
C_{oes}	Output Capacitance				0.91		nF
C_{res}	Reveres Transfer Capacitance				0.43		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V,I_C=75A, R_{Gon}=1Ω,V_{GE}=±15V, Inductive Load	T_J=25℃		187		ns
			T_J=125℃		192		
			T_J=150℃		195		
t_r	Rise Time		T_J=25℃		54		ns
			T_J=125℃		56		
			T_J=150℃		56		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V,I_C=75A, R_{Goff}=1Ω,V_{GE}=±15V, Inductive Load	T_J=25℃		232		ns
			T_J=125℃		249		
			T_J=150℃		252		
t_f	Fall Time		T_J=25℃		299		ns
			T_J=125℃		486		
			T_J=150℃		504		
E_{on}	Turn-on Switching Loss	V_{CC}=600V,I_C=75A, R_{Gon}=1Ω,V_{GE}=±15V, di/dt=1138A/μs(T_J=150℃), Inductive Load	T_J=25℃		3.1		mJ
			T_J=125℃		4.5		
			T_J=150℃		4.9		

E_{off}	Turn-off Switching Loss	V_{CC}=600V,I_C=75A, R_{Goff}=1Ω,V_{GE}=±15V, du/dt=3433V/μs(T_J=150℃), Inductive Load	T_J=25℃		5.02		mJ
			T_J=125℃		8.19		
			T_J=150℃		8.94		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		628		nC
R_{gint}	Internal Gate Resistor		T_J=25℃		10		Ω
RBSOA	I_C=150A,V_{CC}=1050V,Vp=1200V, R_{Goff}=1Ω, V_{GE}=+15V to 0V, T_J=150°C				Trapezoid		
SC data	Vcc=600V, tp=10us, Vge=+/-15V, R_{Gon}=1ohm, R_{Goff}=1ohm,Tj=25℃				397		A
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case					0.228	℃/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℃		1.50		V
			T_J=125℃		1.55		
			T_J=150℃		1.50		
t_{rr}	Reverse Recovery Time	I_F=75A, -di$_F$/dt =1590A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		318		ns
			T_J=125℃		514		
			T_J=150℃		566		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		78.7		A
			T_J=125℃		91.9		
			T_J=150℃		94.7		

Q_{rr}	Reverse Recovery Charge	I_F=75A, $-di_F/dt$ =1590A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		11.48		μC
			T_J=125℃		18.83		
			T_J=150℃		21.00		
E_{rec}	Reverse Recovery Energy		T_J=25℃		4.91		mJ
			T_J=125℃		8.78		
			T_J=150℃		9.93		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case					0.346	℃/W

Internal NTC-Thermistor Characteristic

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			40		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			
$R_{\theta CS}$	Case-To-Sink Thermally (Conductive Grease Applied)				0.05	℃/W
T	Mounting Screw:M4		1.5		1.8	N·m
G	Weight			40		g

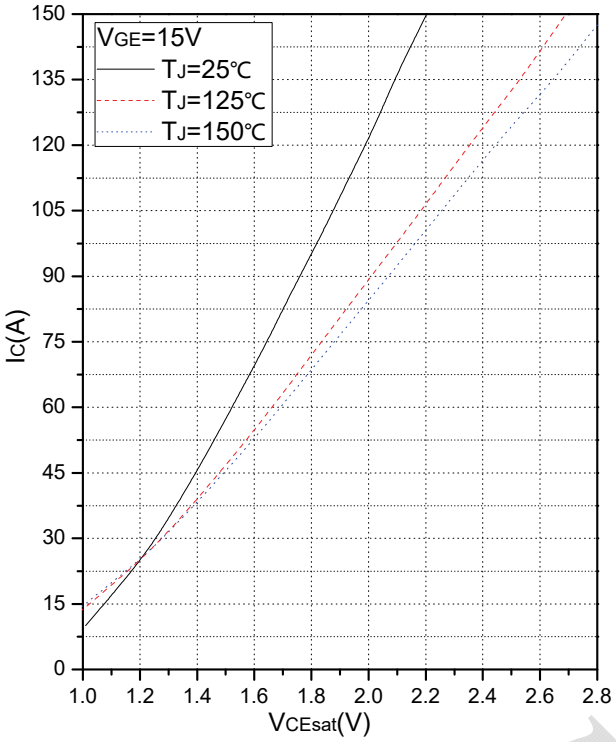


Fig.1 Typical Saturation Voltage Characteristics（Inverter）

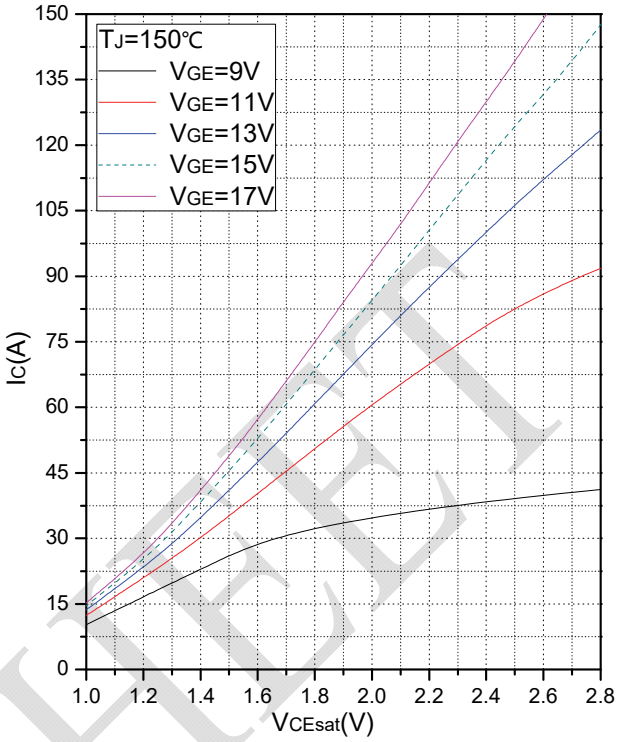


Fig.2 Typical Output Characteristics（Inverter）

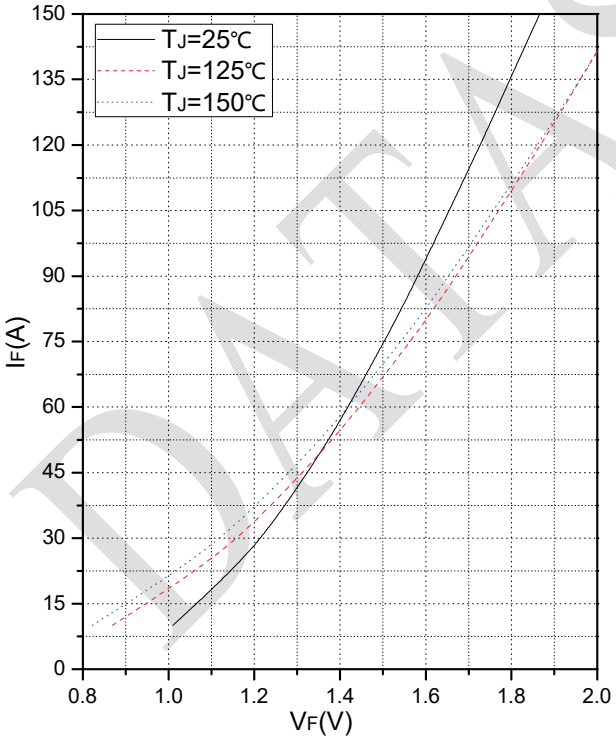


Fig.3 Forward Characteristics of FWD（Inverter）

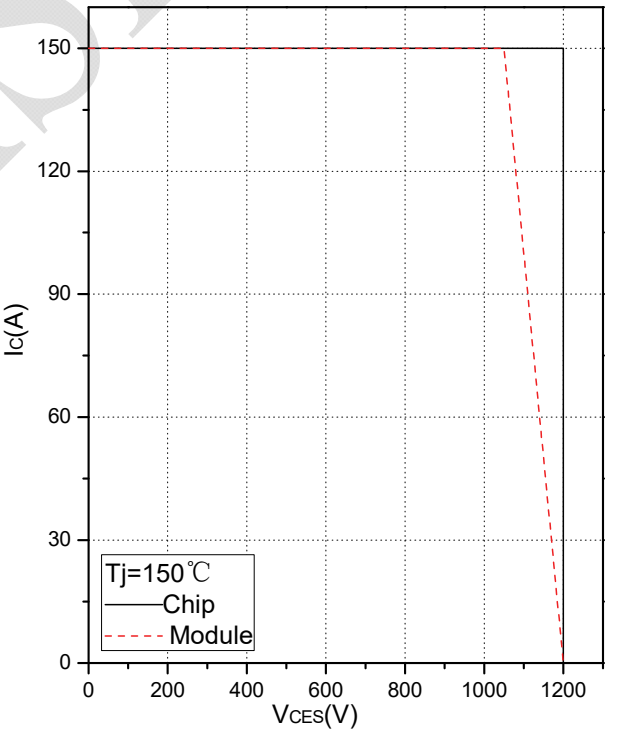


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

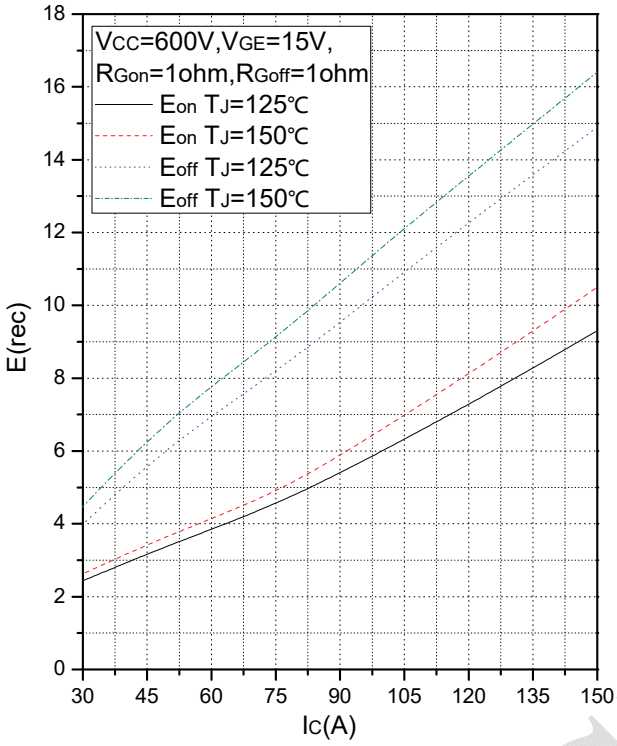


Fig.5 Typical Switching Loss vs. Collector Current (Inverter)

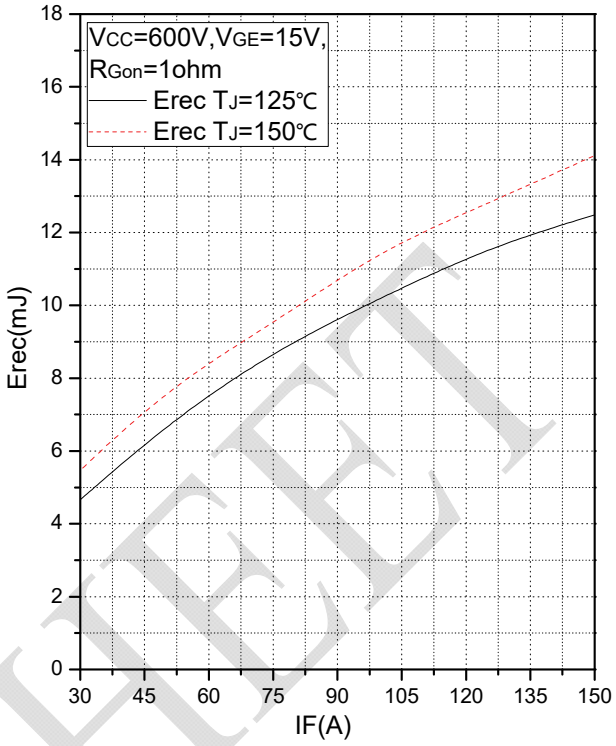


Fig.6 Typical Switching Loss vs. Forward Current (Inverter)

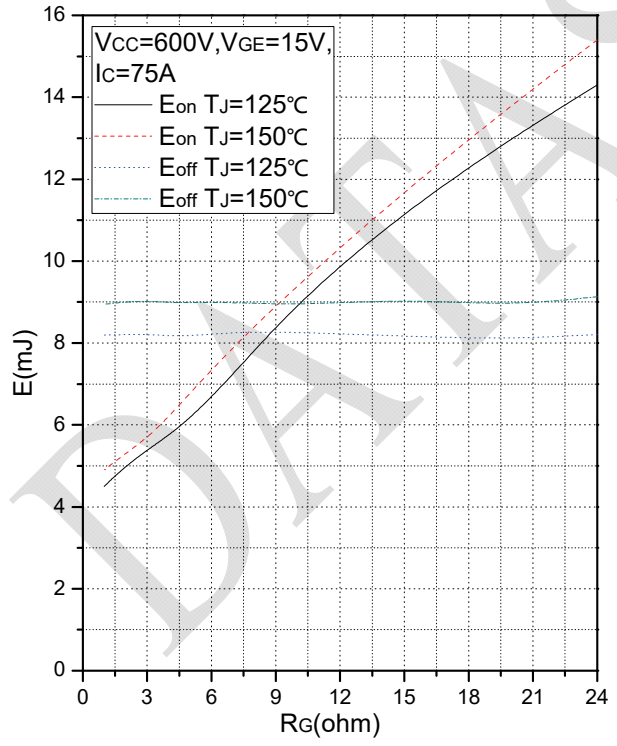


Fig.7 Typical Switching Loss vs. Gate Resistance (Inverter)

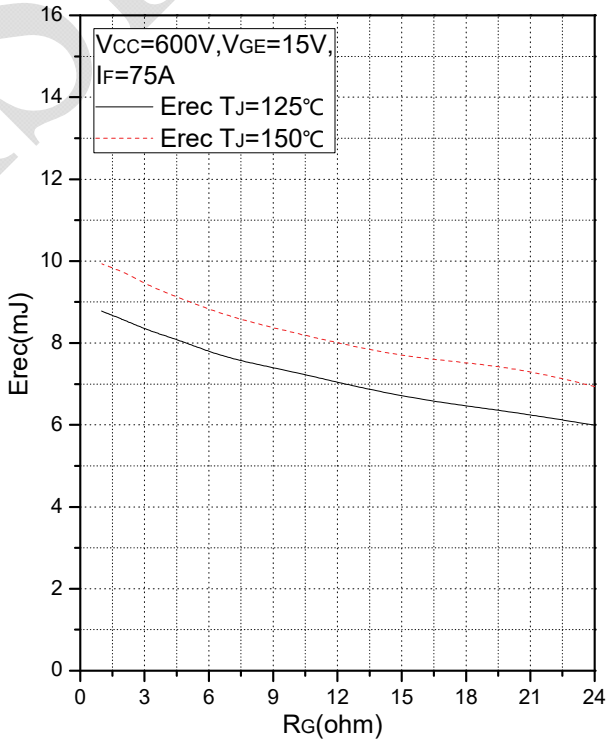


Fig.8 Typical Switching Loss vs. Gate Resistance (Inverter)

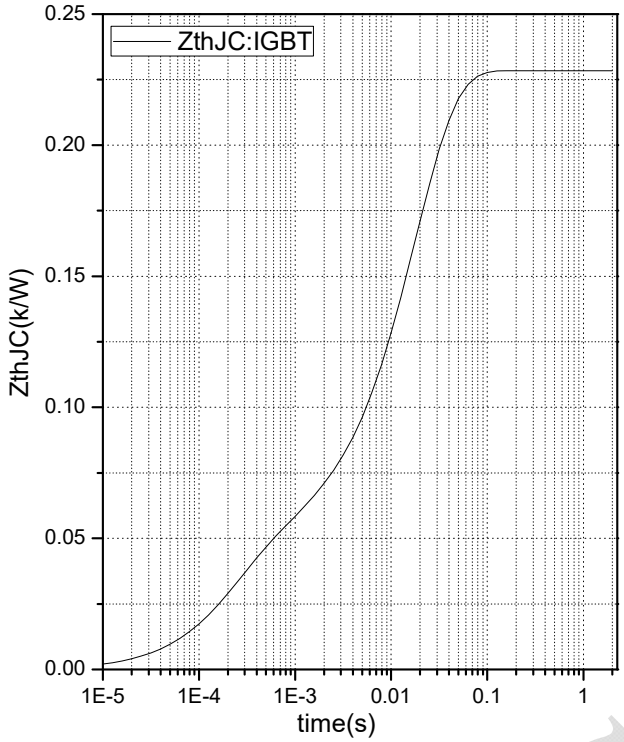


Fig.9 Transient Thermal Impedance (IGBT)

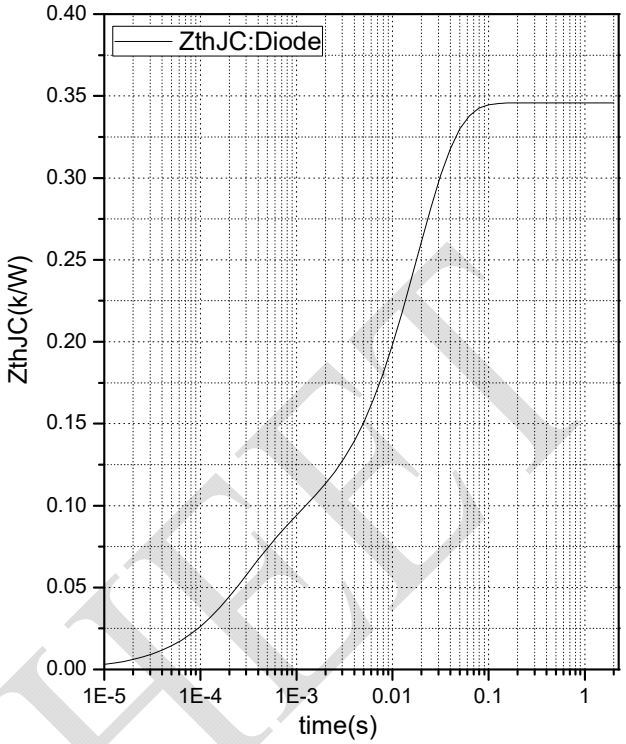


Fig.10 Transient Thermal Impedance (Diode)

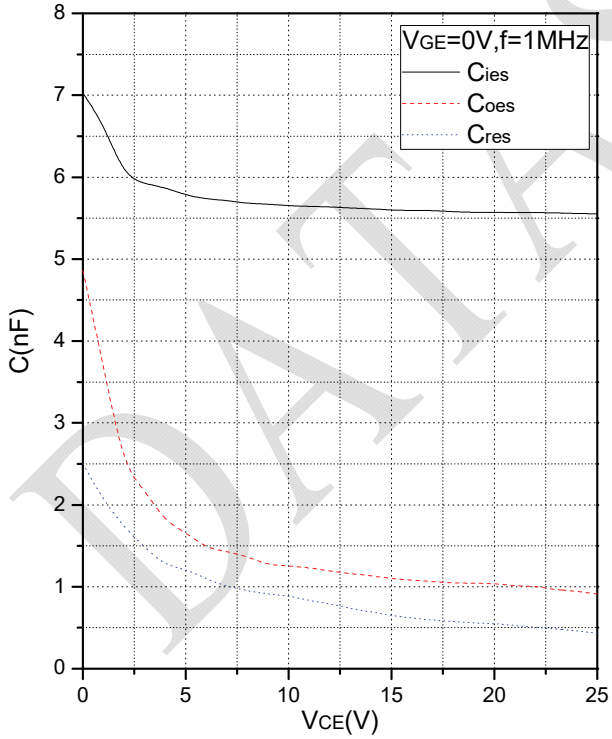


Fig.11 Capacitance Characteristics

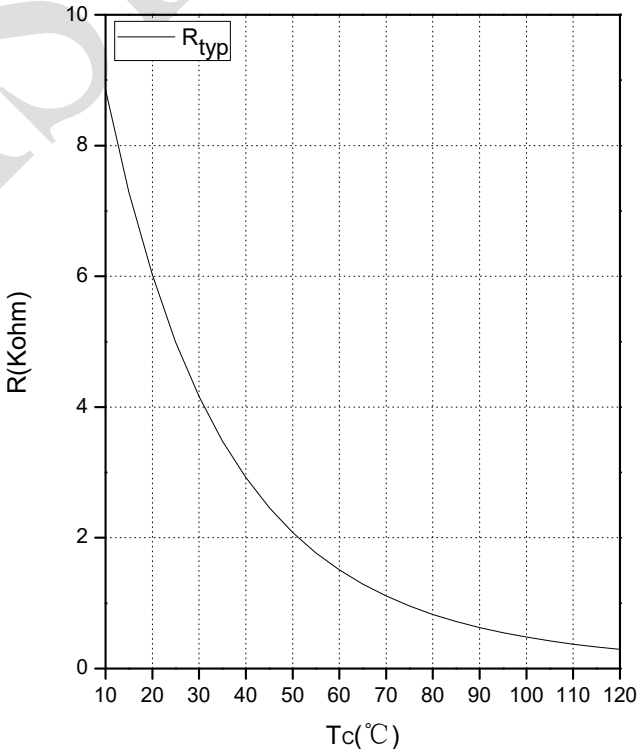
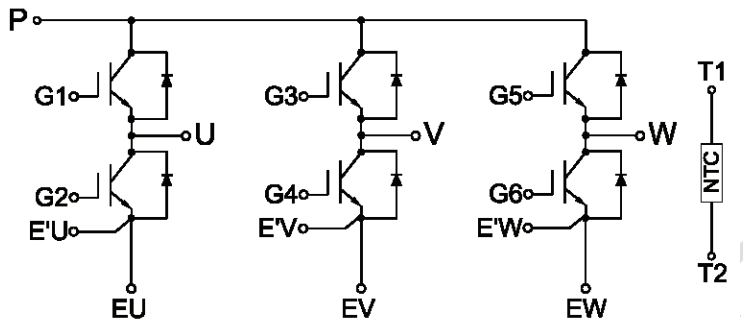
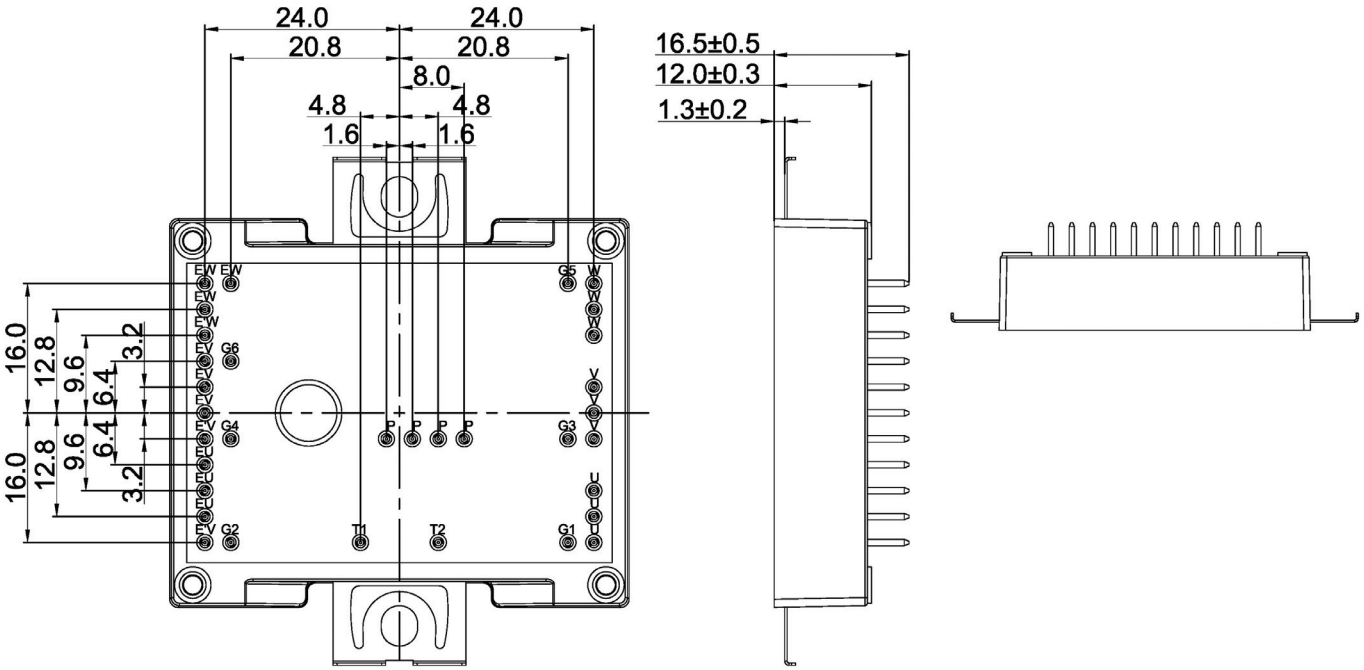


Fig.12 NTC Temperature Characteristics

Internal Circuit:



Package Outline (Unit: mm):



Date	Revision	Notes
11/26/2020	A	Final Version
01/12/2021	B	Updated Mounting Screw
10/27/2022	C	Add Rgint Value

Announcement

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