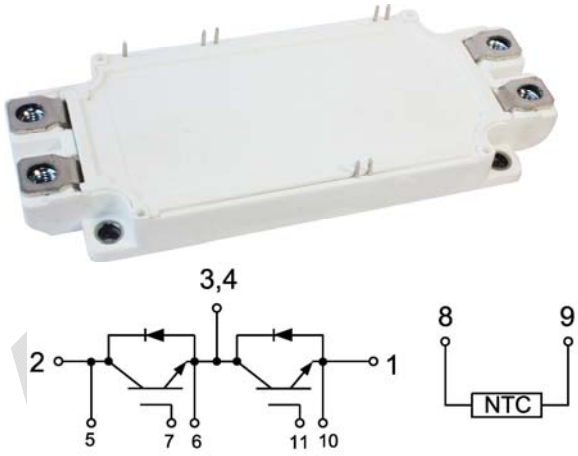
GT300HF120T9H-M

Preliminary Data

IGBT Module

Features：



- Trench & Field Stop IGBT
- Short Circuit Rated＞ 10μs
- Low Switching Loss
- 100% RBSOA Tested（2×Ic）
- Low Stray Inductance
- Copper Wire Bonding on Power Terminal
- Lead Free, Compliant with RoHS Requirement

Applications：

- Hybrid Electrical Vehicles(H)EV
- Automotive Applications
- Commercial Agriculture Vehicles
- Motor Drives

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℃	300	A
		T_C=25℃	580	A
I_{CM}	Peak Collector Current Repetitive	T_J=175℃	600	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation (IGBT)	T_C=25℃ T_{Jmax}=175℃	1975	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=4mA, V_{CE}=V_{GE}		5.0	5.6	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=300A, V_{GE}=15V	T_J=25℃		1.70	1.90	V
			T_J=125℃		1.90		V
			T_J=150℃		2.00		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℃				400	nA
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V , f =1MHz			25.2		nF
C_{res}	Reverse Transfer Capacitance				0.86		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}= 600V,I_C=300A, R_{Gon} = 2Ω,V_{GE}= ±15V, Inductive Load	T_J=25℃		0.39		μs
			T_J=125℃		0.40		
			T_J=150℃		0.40		
t_r	Rise Time		T_J=25℃		0.13		μs
			T_J=125℃		0.13		
			T_J=150℃		0.13		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}= 600V,I_C=300A, R_{Goff} = 2Ω,V_{GE}= ±15V, Inductive Load	T_J=25℃		0.39		μs
			T_J=125℃		0.42		
			T_J=150℃		0.42		
t_f	Fall Time		T_J=25℃		0.13		μs
			T_J=125℃		0.19		
			T_J=150℃		0.21		
E_{on}	Turn-on Switching Loss	V_{CC}= 600V,I_C=300A, R_{Gon} = 2Ω,V_{GE}= ±15V, di/dt=1880A/μs (T_J=150℃) Inductive Load	T_J=25℃		20.6		mJ
			T_J=125℃		27.3		
			T_J=150℃		29.7		

E_{off}	Turn-off Switching Loss	V_{CC}= 600V,I_C=300A, R_{Goff} = 2Ω,V_{GE}= ±15V, du/dt=3300V/μs (T_J=150℃) Inductive Load	T_J=25℃		26.7		mJ
			T_J=125℃		35.6		
			T_J=150℃		38.3		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		1.56		μC
$R_{g\ internal}$	Internal Gate Resistance		T_J=25℃		2.5		Ω
RBSOA	I_C=600A,V_{CC}=1050V,Vp=1200V, R_{Goff} = 2Ω, V_{GE}=+15V to 0V, T_J =150°C			Trapezoid			
I_{SC}	SC Data	V_{CC}=600V, V_{GE}=±15V, R_{Gon}=2ohm, R_{Goff}=2ohm, tp=10us,T_J=125℃,Inductive Load			1594		A
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case(per leg)				0.076		℃/W

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

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	300	A
I_{FM}	Diode Maximum Forward Current	600	A

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

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F=300A	T_J=25℃		1.80		V
			T_J=125℃		1.80		
			T_J=150℃		1.80		
t_{rr}	Reverse Recovery Time	I_F=300A, -diF/dt =2010A/μs(T_J=150℃), V_R=600V, V_{GE}= -15V	T_J=25℃		0.41		μs
			T_J=125℃		0.60		
			T_J=150℃		0.64		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		150		A
			T_J=125℃		181		
			T_J=150℃		191		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		29.7		μC
			T_J=125℃		50.7		
			T_J=150℃		57.8		

E_{rec}	Reverse Recovery Energy	I_F=300A, -diF/dt =2010/μs(T_J=150℃), V_R=600V, V_{GE} = -15V	T_J=25℃		12.9		mJ
			T_J=125℃		22.0		
			T_J=150℃		25.4		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case (per leg)				0.134		℃/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℃	50		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			20		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)			0.02		℃/W
M	Power Terminals Screw:M5		3.0		5.0	N·m
M	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			330		g

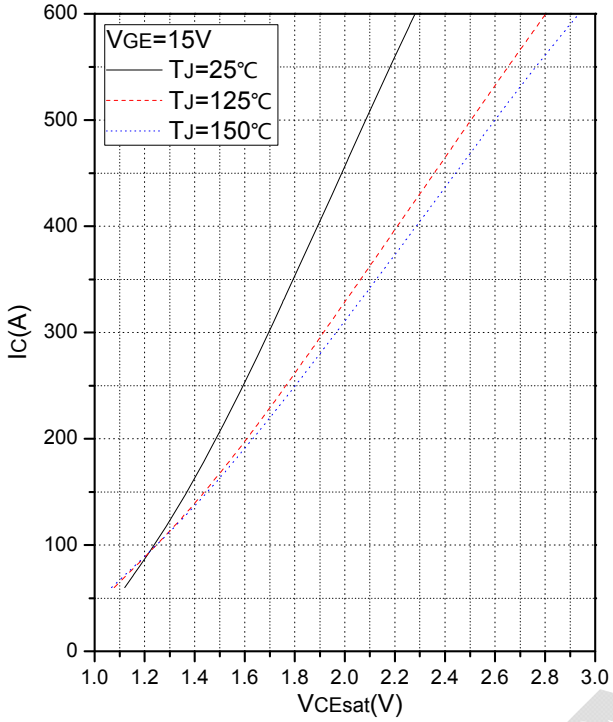


Fig.1 Typical Saturation Voltage Characteristics

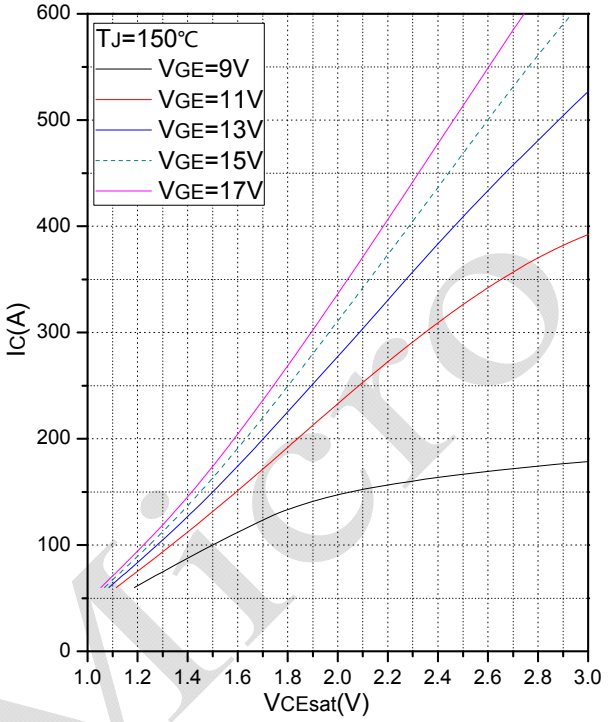


Fig.2 Typical Output Characteristics

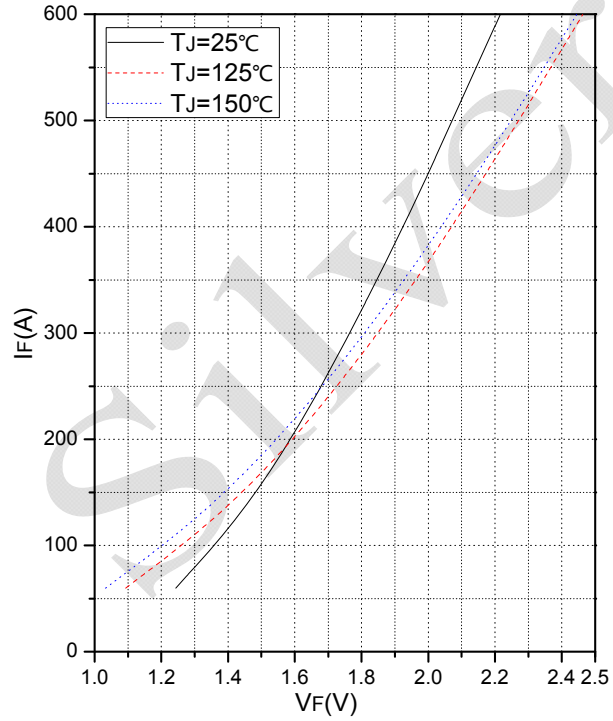


Fig.3 Forward Characteristics of Diode

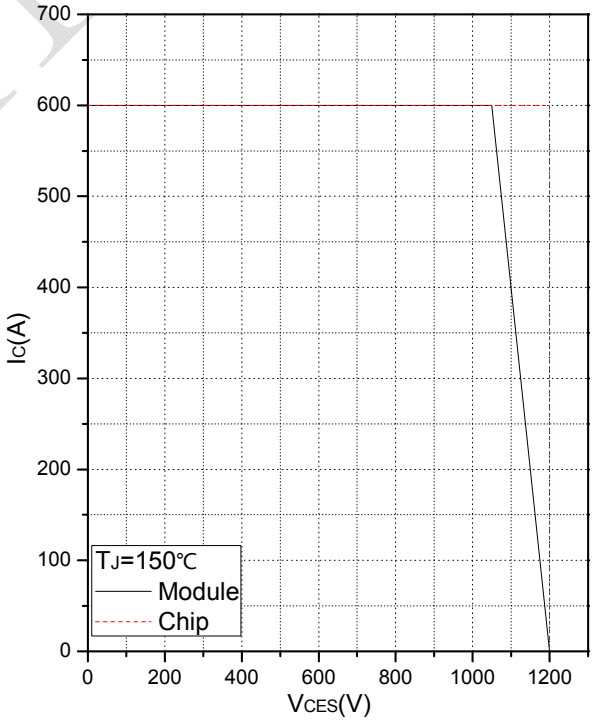


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

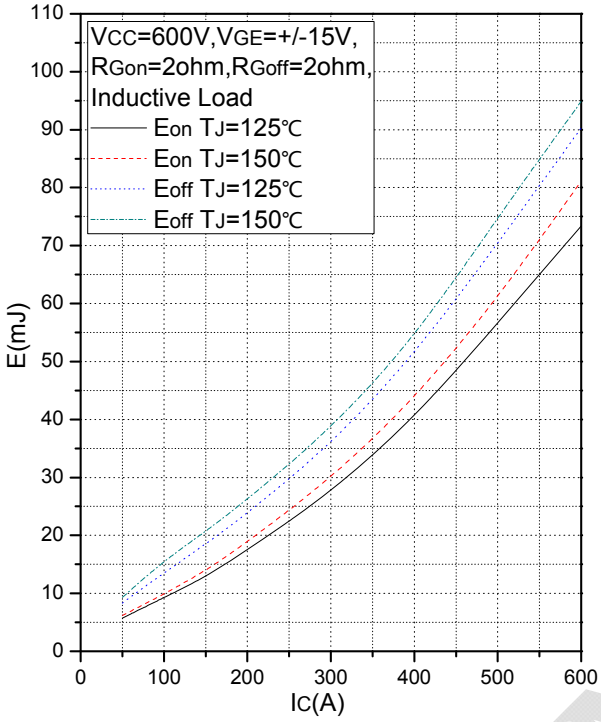


Fig.5 Typical Switching Loss vs. Collector Current

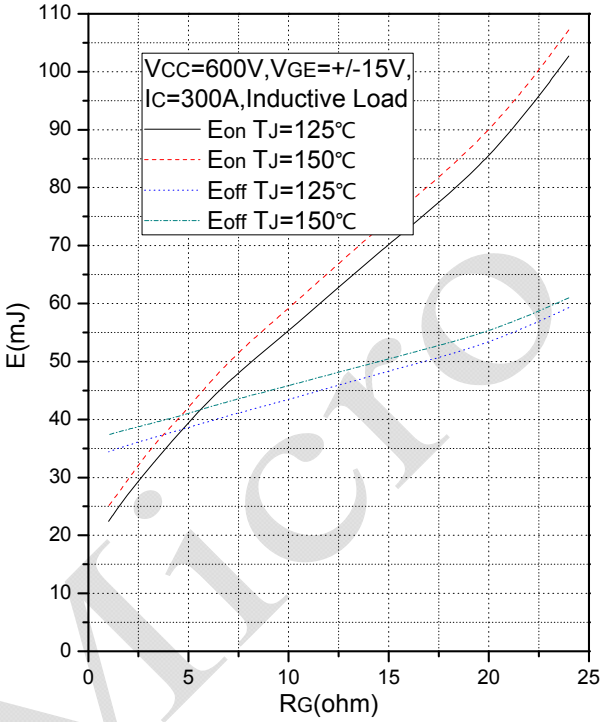


Fig.6 Typical Switching Loss vs. Gate Resistance

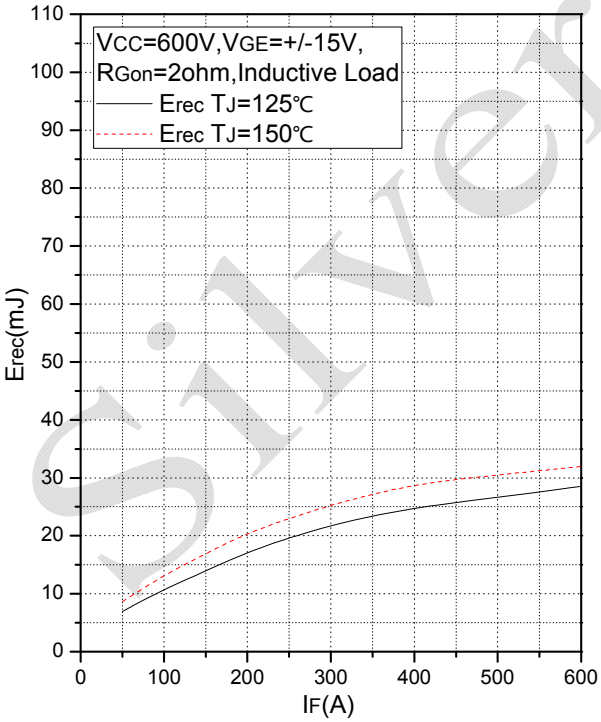


Fig.7 Typical Switching Loss vs. Forward Current

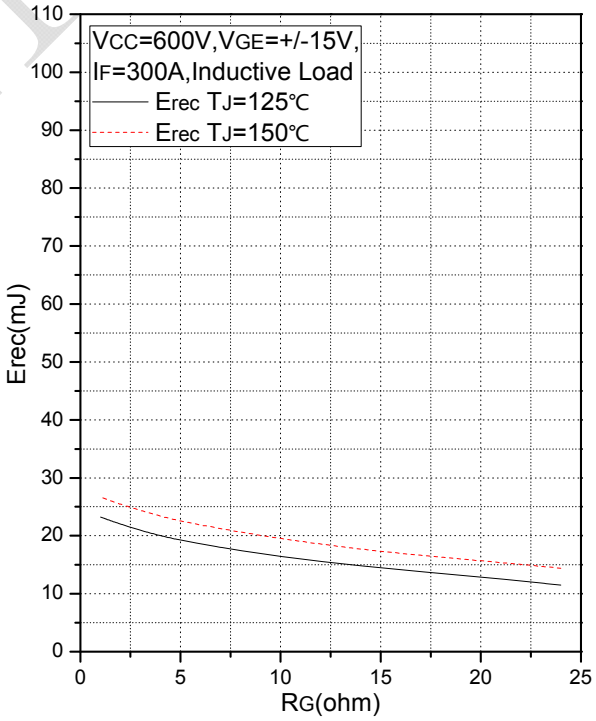


Fig.8 Typical Switching Loss vs. Gate Resistance

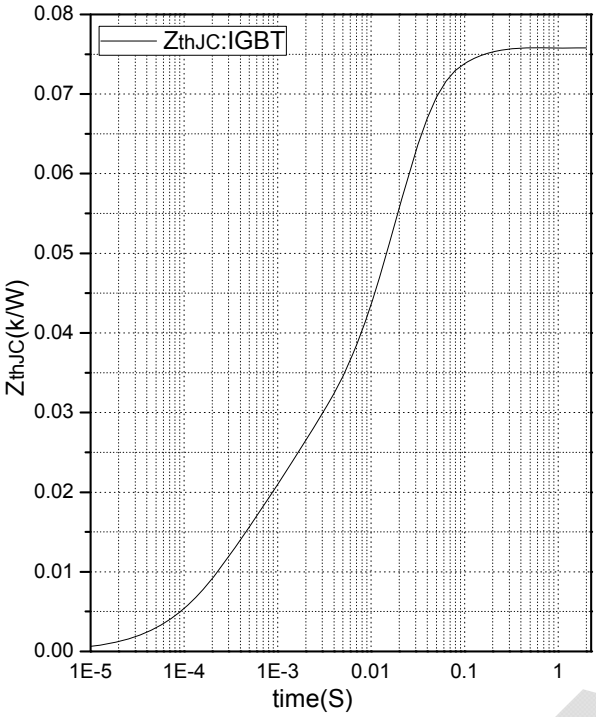


Fig.9 Transient Thermal Impedance (IGBT)

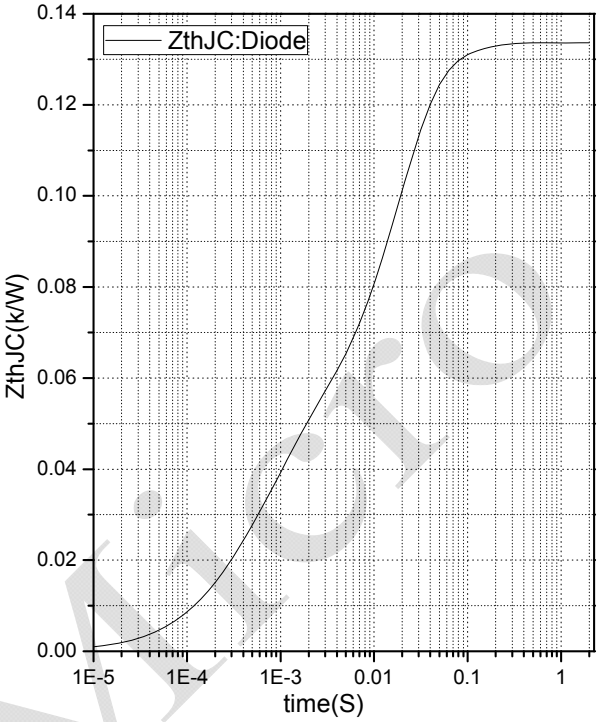


Fig.10 Transient Thermal Impedance (Diode)

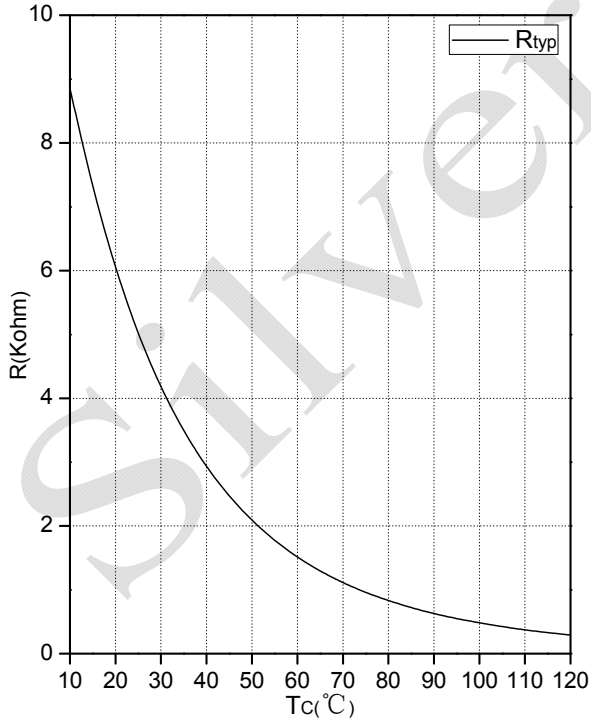
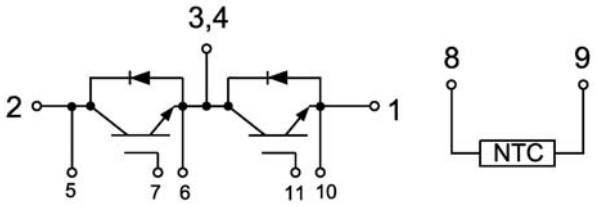
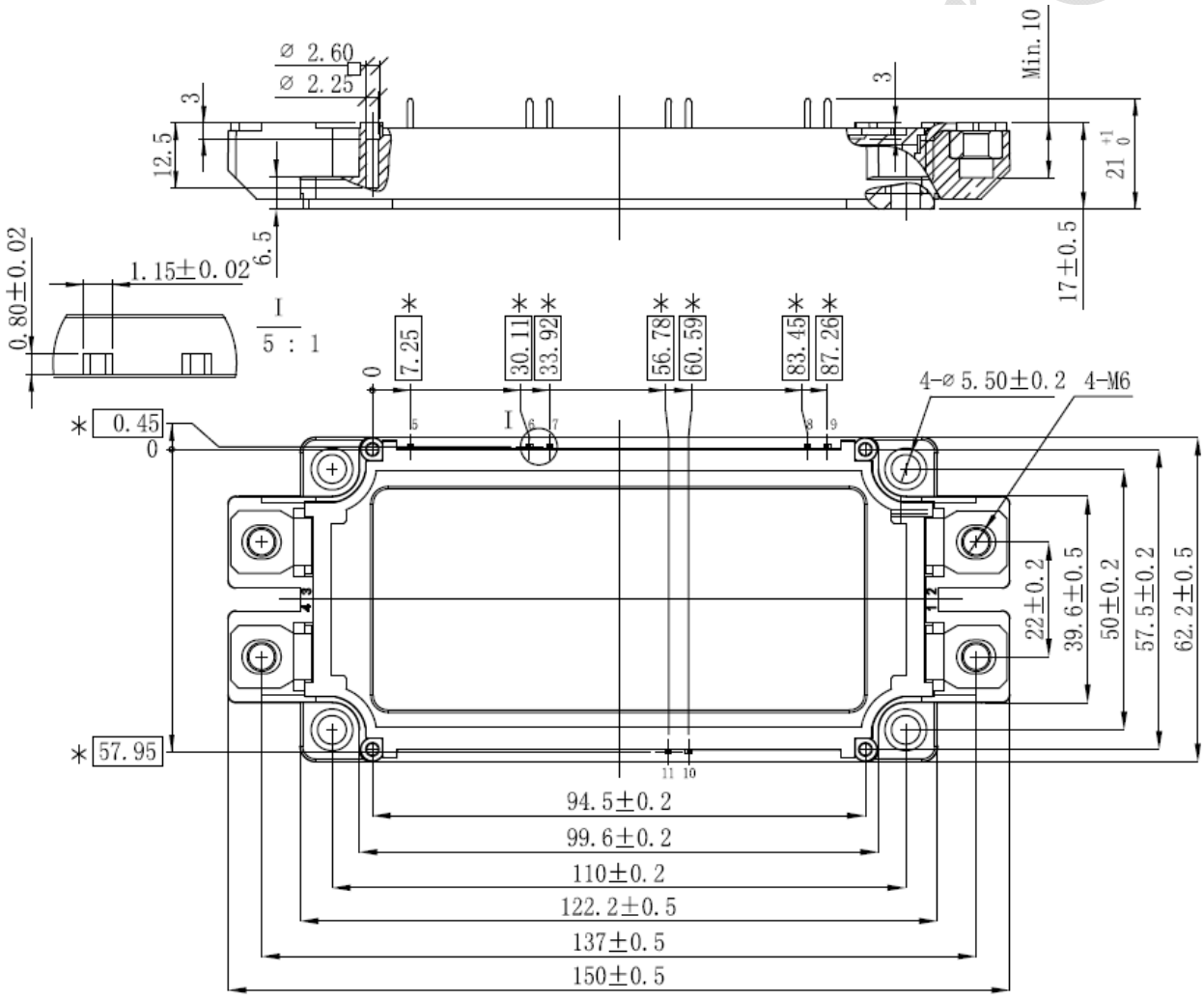


Fig.11 NTC Temperature Characteristics

Internal Circuit:



Package Outline (Unit: mm):



Date	Revision	Notes
01/21/2019	01	Initial Release

Announcement

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