GT150HH65T5H

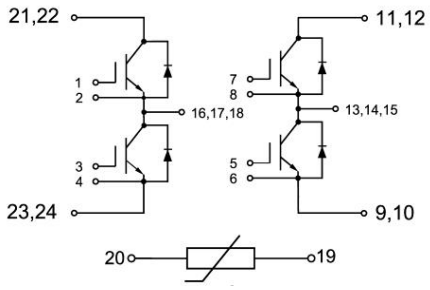
IGBT Module

Preliminary Data

Features:

- Trench & Field Stop 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

Circuit Diagram



Applications：

- Industrial Inverters
- Servo Applications

IGBT, Inverter

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

V_{CES}	Collector-Emitter Blocking Voltage	T_J=25℃	650	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C=100℃	150	A
		T_C=25℃	300	A
I_{CM}	Peak Collector Current Repetitive	tp=1ms	300	A
P_D	Maximum Power Dissipation per IGBT	T_C=25℃ T_{Jmax}=175℃	566	W

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

Static Characteristics

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=2mA, V_{CE}=V_{GE}		4.0	4.7	5.4	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=150A, V_{GE}=15V	T_J=25℃		1.35	1.65	V
			T_J=125℃		1.45		V
			T_J=150℃		1.50		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
Cies	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=100kHz			10.4		nF
Coes	Output Capacitance				0.62		nF
Cres	Reveres Transfer Capacitance				0.22		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=300V, I_C=150A, R_G=6.8Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		276		ns
			T_J=125℃		283		
			T_J=150℃		307		
t_r	Rise Time		T_J=25℃		131		ns
			T_J=125℃		132		
			T_J=150℃		142		
$t_{d(off)}$	Turn-off Delay Time		T_J=25℃		314		ns
			T_J=125℃		316		
			T_J=150℃		331		
t_f	Fall Time		T_J=25℃		137		ns
			T_J=125℃		154		
			T_J=150℃		157		
E_{on}	Turn-on Switching Loss	V_{CC}=300V, I_C=150A, R_G=6.8Ω, V_{GE}=±15V, di/dt=968A/μs(T_J=150℃), Inductive Load	T_J=25℃		2.5		mJ
			T_J=125℃		2.8		
			T_J=150℃		3.1		

E_{off}	Turn-off Switching Loss	V_{CC}=300V, I_C=150A, R_G=6.8Ω, V_{GE}=±15V, du/dt=2923V/μs(T_J=150℃), Inductive Load	T_J=25℃		4.0		mJ
			T_J=125℃		5.3		
			T_J=150℃		5.7		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		750		nC
$R_{g\ internal}$	Internal Gate Resistor				2.0		Ω
SCSOA	Vcc=300V, V_{GE}=+/-15V, T_J=150℃			10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.26	℃/W

FWD, Inverter

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

V_{RRM}	Repetitive peak reverse voltage	T_J=25℃	650	V
I_F	Diode Continuous Forward Current		150	A
I_{FM}	Peak FWD Current Repetitive	t_P=1ms	300	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F=150A	T_J=25℃		1.52		V
			T_J=125℃		1.55		
			T_J=150℃		1.53		
t_{rr}	Reverse Recovery Time	I_F=150A, -diF/dt=882A/μs(T_J=150℃), V_{rr}=300V, V_{GE}=-15V	T_J=25℃		133		ns
			T_J=125℃		166		
			T_J=150℃		178		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		45		A
			T_J=125℃		69		
			T_J=150℃		75		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		3.47		μC
			T_J=125℃		7.08		
			T_J=150℃		8.23		

E_{rec}	Reverse Recovery Energy	I_F=150A, -diF/dt=882A/μs(T_J=150℃), V_{rr}=300V, V_{GE}=-15V	T_J=25℃		0.33		mJ
			T_J=125℃		1.04		
			T_J=150℃		1.53		
$R_{\theta JC}$	Thermal Resistance: Junction-to-Case (per Diode)					0.36	℃/W

Internal NTC-Thermistor Characteristics

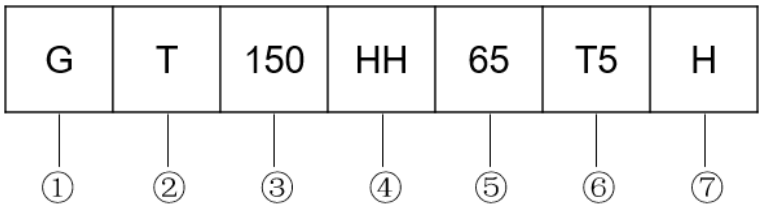
Symbol	Description	Min.	Typ.	Max.	Units
R_{25}	T_C=25℃		5		kΩ
△R/R	T_C=100℃, R_{100}=465Ω	-5		5	%
P_{25}	T_C=25℃			10	mW
$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3380		K
$B_{25/80}$	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$		3440		K
$B_{25/100}$	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298.15K))]$		3545		K

Module

Symbol	Description		Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 1mintue		2500		V
Internal Isolation				Al_2O_3		
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)				0.04	℃/W
M	Mounting Screw:M5		3.0		6.0	N·m
G	Weight			190		g

Ordering Information Table

Device code



① - IGBT Module
② - Trench, Low Switching Losses IGBT
③ - Rated Current (150=150A)
④ - Circuit Configuration: HH (H Bridge)
⑤ - Rated Voltage (65=650V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

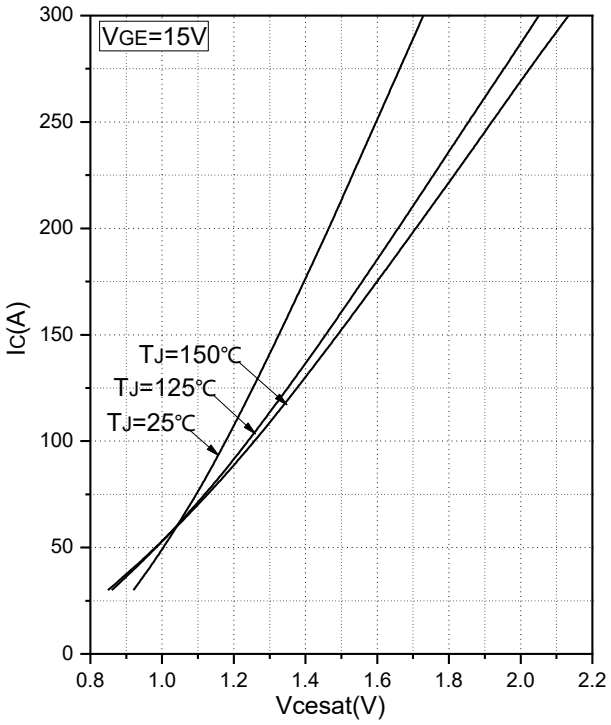


Fig.1 Typical Saturation Voltage Characteristics

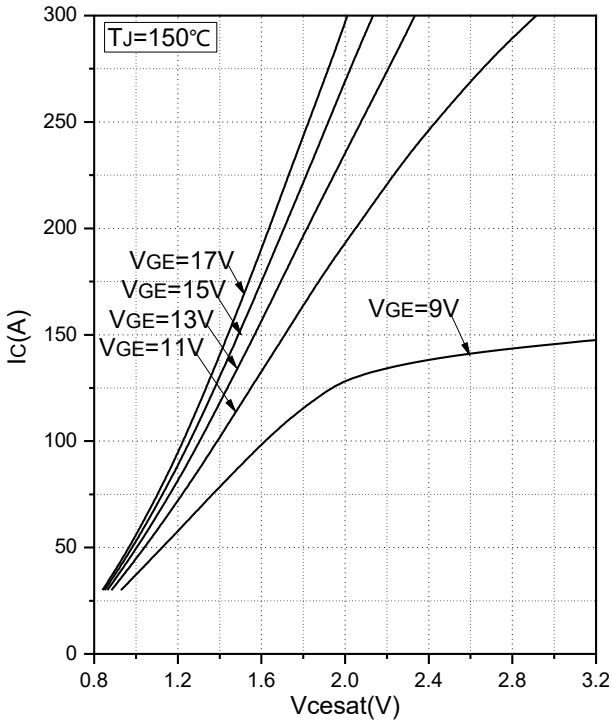


Fig.2 Typical Output Characteristics

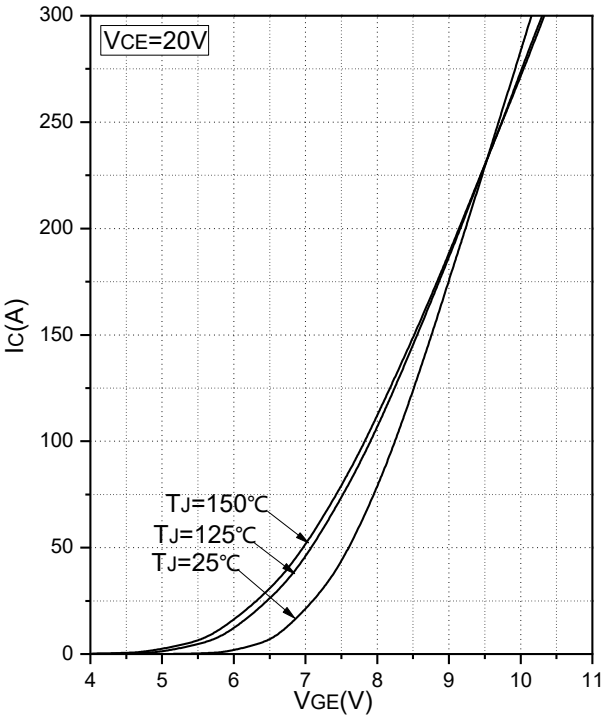


Fig.3 Transfer Characteristic

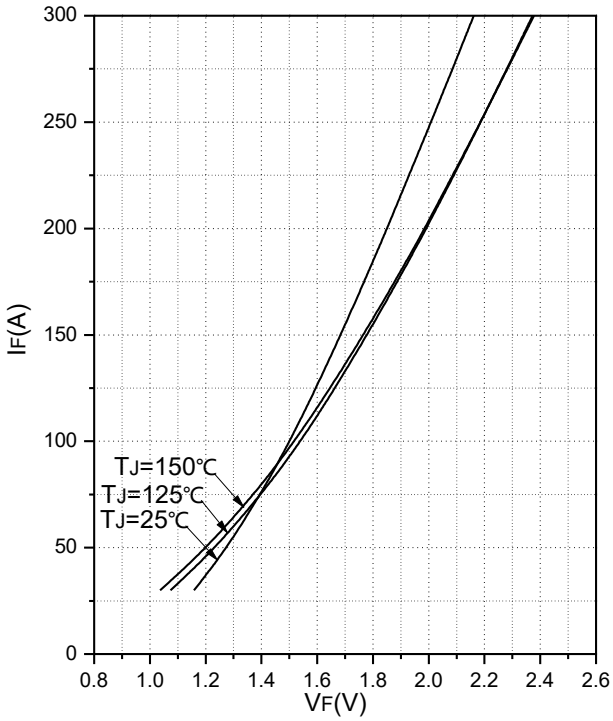


Fig.4 Forward Characteristics of Diode

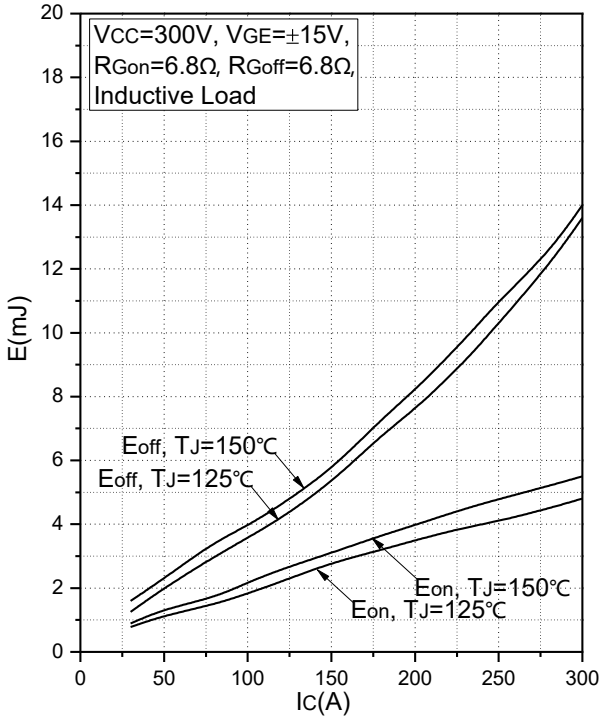


Fig.5 Typical Switching Loss vs. Collector Current

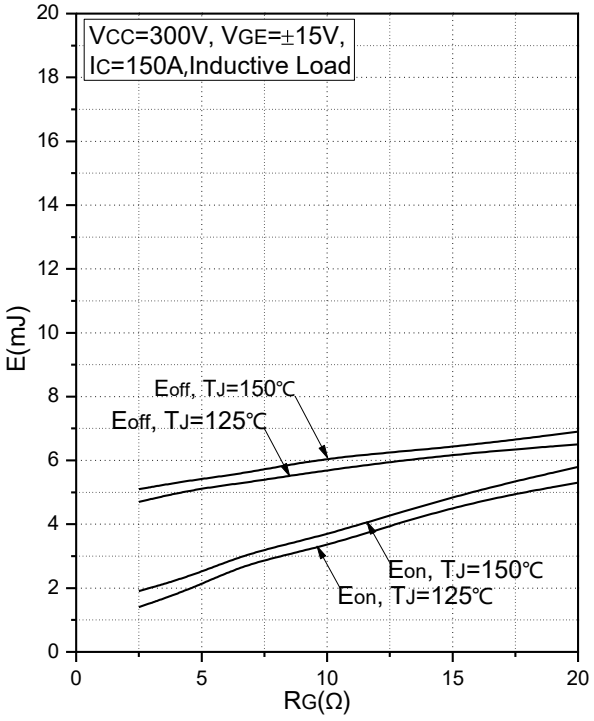


Fig.6 Typical Switching Loss vs. Gate Resistance

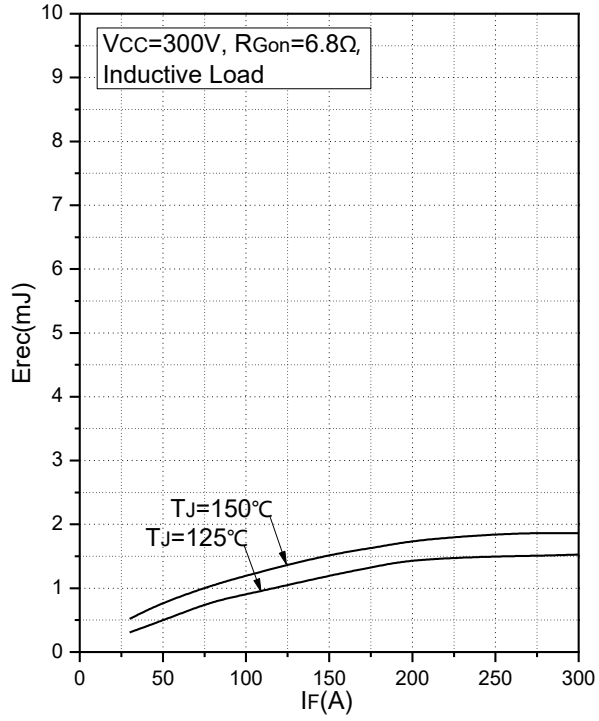


Fig.7 Typical Switching Losses vs. Forward Current

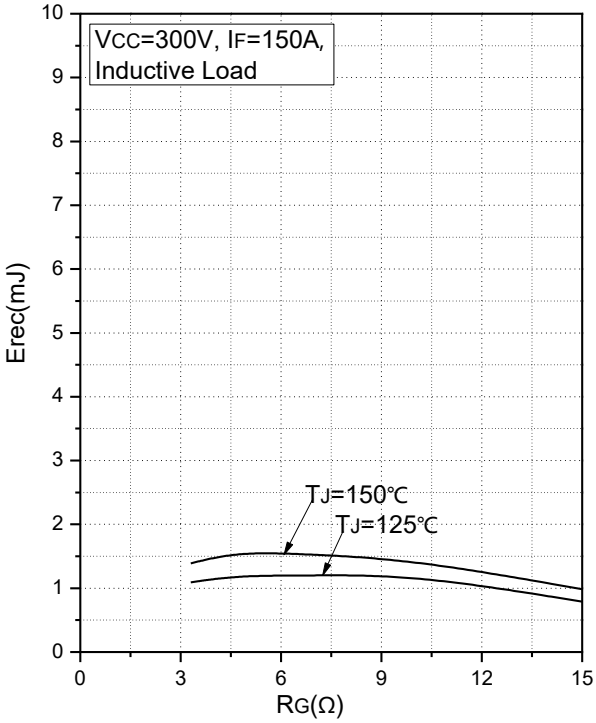


Fig.8 Typical Switching Loss vs. Gate Resistance

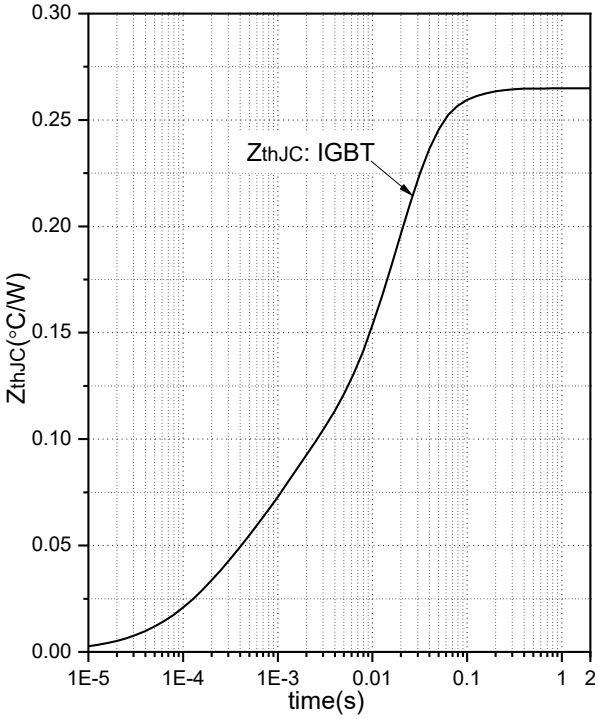


Fig.9 Transient Thermal Impedance (IGBT)

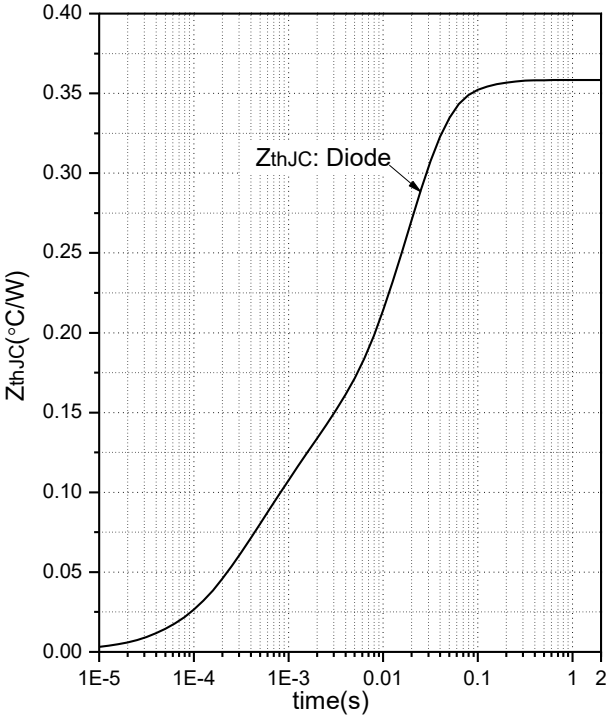


Fig.10 Transient Thermal Impedance (Reverse Diode)

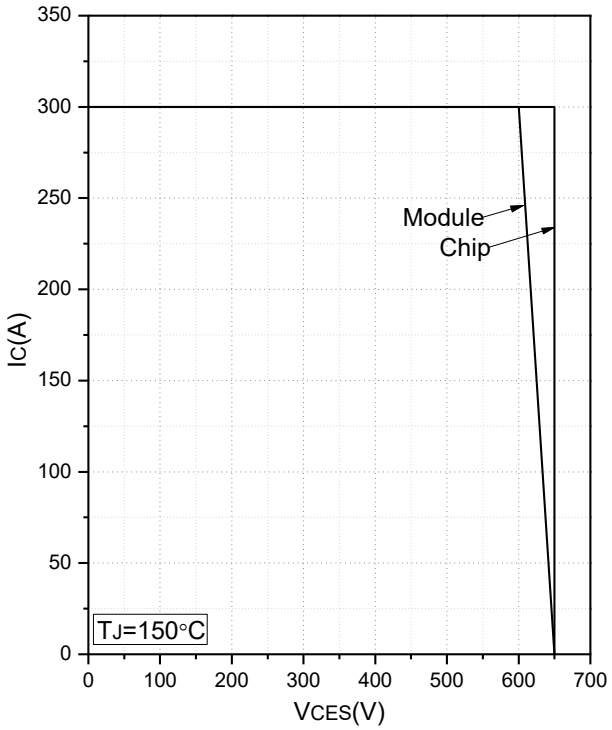


Fig.11 Reverse Bias Safe Operation Area (RBSOA)

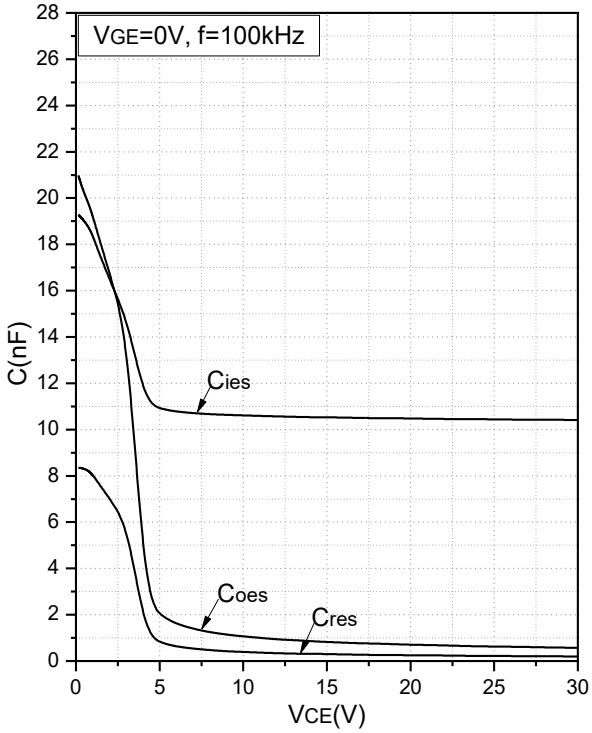


Fig.12 Capacitance Characteristics

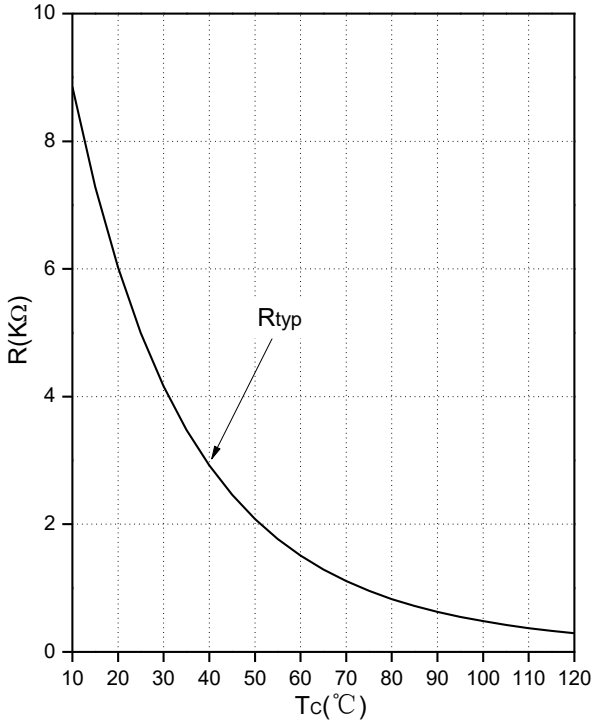
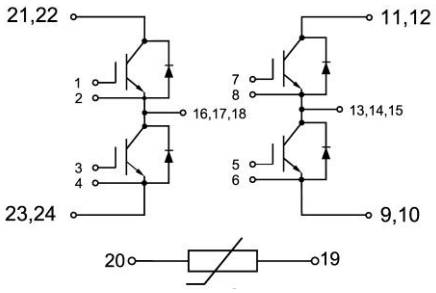
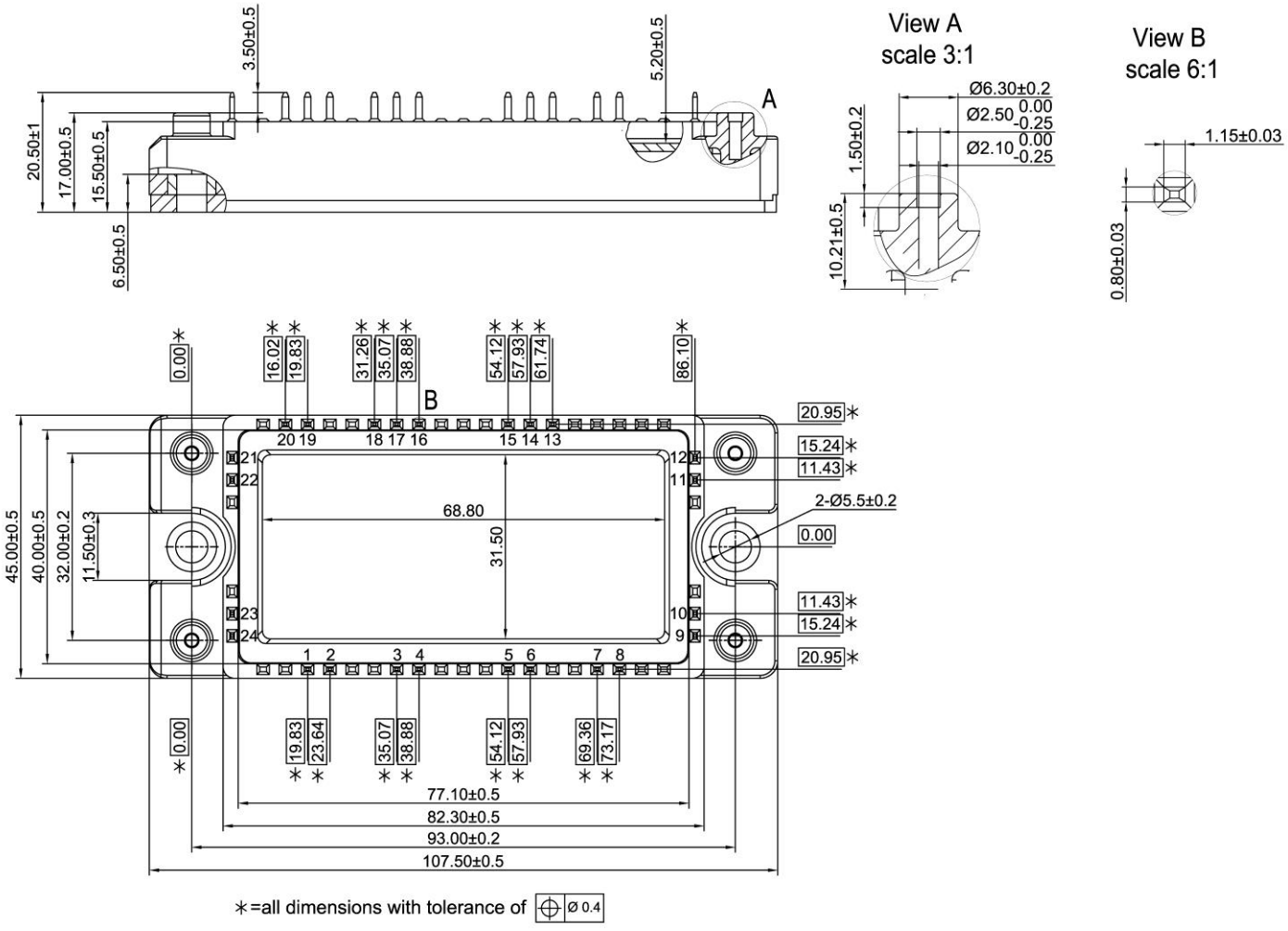


Fig.13 NTC Temperature Characteristics

Internal Circuit:



Package Outline (Unit: mm):



Revision	Notes
01	Initial Release

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