GT25FF120B3H

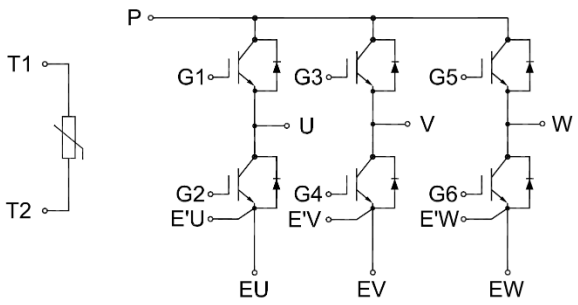
IGBT Module

Preliminary Data

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

Circuit Diagram



Applications：

- Air Conditioning
- Motor Drives
- Servo Drives
- UPS Systems

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℃	25	A
		T_C=25℃	50	A
I_{CM}	Repetitive Peak Collector Current	t_P=1ms	50	A
P_D	Maximum Power Dissipation per IGBT	T_C=25℃ T_{Jmax}=175℃	280	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=1mA, V_{CE}=V_{GE}		5.0	5.6	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=25A, V_{GE}=15V	T_J=25℃		1.75	2.10	V
			T_J=125℃		2.10		
			T_J=150℃		2.20		
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=100kHz			1.64		nF
C_{oes}	Output Capacitance				0.44		
C_{res}	Reverse Transfer Capacitance				0.02		

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V, I_C=25A, R_{Gon}=20Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		57		ns
			T_J=125℃		58		
			T_J=150℃		62		
t_r	Rise Time		T_J=25℃		55		ns
			T_J=125℃		58		
			T_J=150℃		60		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V, I_C=25A, R_{Goff}=20Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		208		ns
			T_J=125℃		211		
			T_J=150℃		214		
t_f	Fall Time		T_J=25℃		76		ns
			T_J=125℃		223		
			T_J=150℃		225		
E_{on}	Turn-on Switching Loss	V_{CC}=600V, I_C=25A, R_{Gon}=20Ω, V_{GE}=±15V, di/dt=368A/μs (T_J=150℃) Inductive Load	T_J=25℃		3.1		mJ
			T_J=125℃		3.8		
			T_J=150℃		4.1		

E_{off}	Turn-off Switching Loss	V_{CC}=600V, I_C=25A, R_{Goff}=20Ω, V_{GE}=±15V, du/dt=4543V/μs (T_J=150℃) Inductive Load	T_J=25℃		2.1		mJ
			T_J=125℃		2.4		
			T_J=150℃		2.5		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		400		nC
$R_{G(int)}$	Internal Gate Resistor		T_J=25℃		0		Ω
I_{SC}	Vcc=600V, V_{GE}=+/-15V, T_J=25℃				100		A
$R_{\theta JC}$	Thermal Resistance: Junction-to-Case (per IGBT)					0.54	℃/W

FWD, Inverter

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

V_{RRM}	Repetitive Peak Reverse Voltage	T_J=25℃	1200	V
I_F	Diode Continuous Forward Current		25	A
I_{FM}	Diode Maximum Forward Current	tp=1ms	50	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F=25A	T_J=25℃		1.70		V
			T_J=125℃		1.85		
			T_J=150℃		1.85		
t_{rr}	Reverse Recovery Time	I_F=25A, -di$_F$/dt=271A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		312		ns
			T_J=125℃		489		
			T_J=150℃		540		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		16.2		A
			T_J=125℃		19.3		
			T_J=150℃		20.5		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		2.5		μC
			T_J=125℃		4.3		
			T_J=150℃		4.4		

E_{rec}	Reverse Recovery Energy	I_F=25A, -di$_F$/dt=271A/μs(T_J=150℃), V_R=600V, V_{GE}=-15V	T_J=25℃		0.7		mJ
			T_J=125℃		1.4		
			T_J=150℃		1.5		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-to-Case(per Leg)					0.97	℃/W

Internal NTC-Thermistor Characteristics

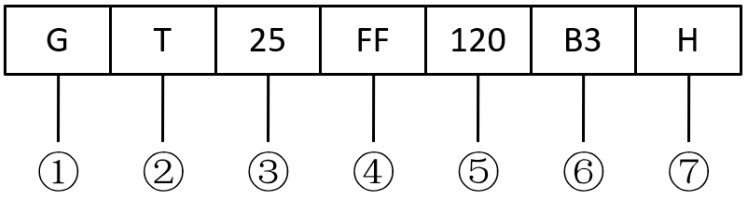
Symbol	Conditions	Min.	Typ.	Max.	Units
R_{25}	T_C=25℃		5		kΩ
△R/R	T_C=100℃, R_{100}=465Ω	-5		+5	%
P_{25}	T_C=25℃			10	mW
$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3380		K
$B_{25/80}$	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$		3440		K
$B_{25/100}$	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298.15K))]$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

Module

Symbol	Description		Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 1minute	2500			V
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)				0.08	℃/W
T	Mounting Screw:M4		1.5		1.8	N·m
G	Weight			23		g

Ordering Information Table

Device code



① - IGBT Module
② - Trench, Low Switching Losses IGBT
③ - Rated Current (25=25A)
④ - Circuit Configuration (Full Bridge)
⑤ - Rated Voltage (120=1200V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

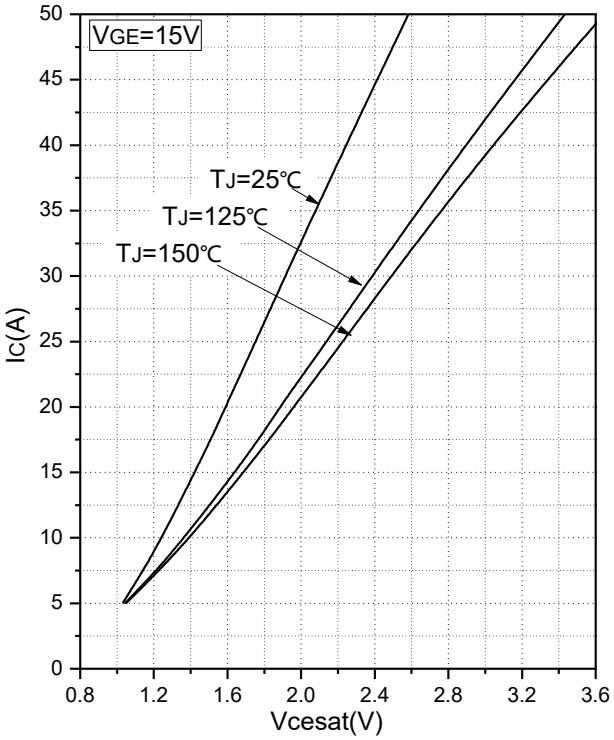


Fig.1 Typical Saturation Voltage Characteristics

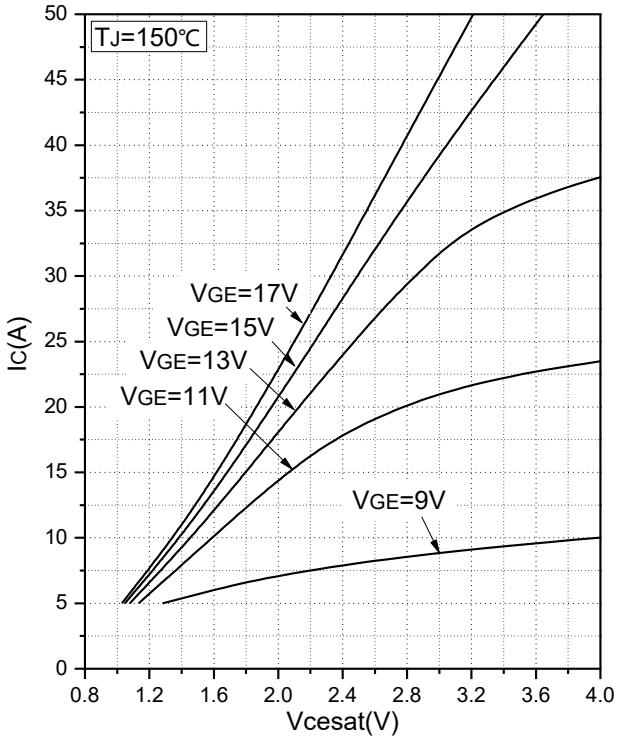


Fig.2 Typical Output Characteristics

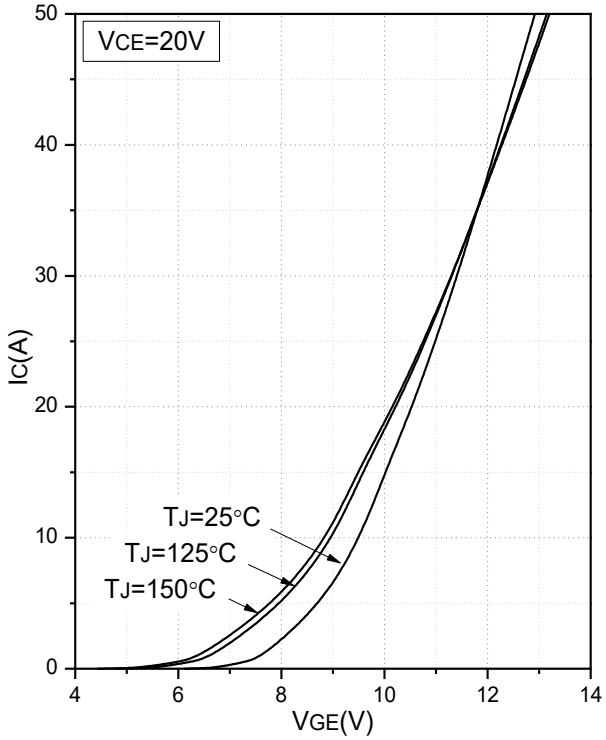


Fig.3 Transfer Characteristic

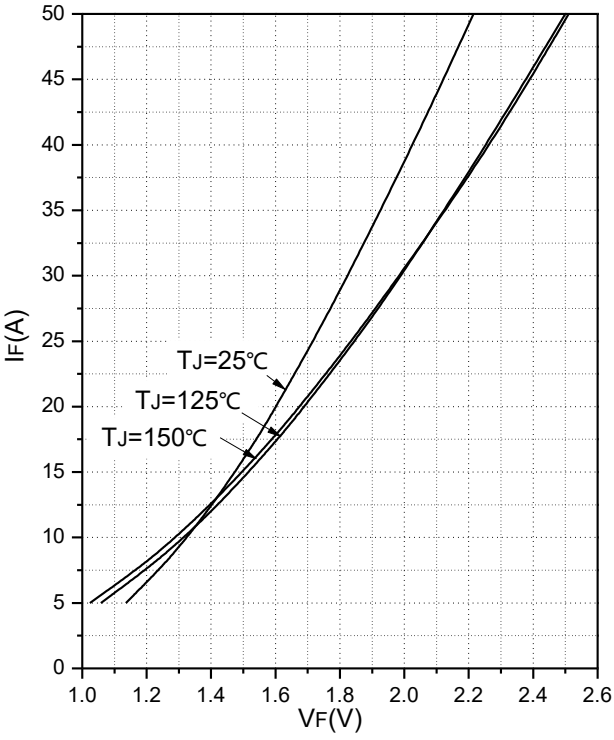


Fig.4 Forward Characteristics of Diode

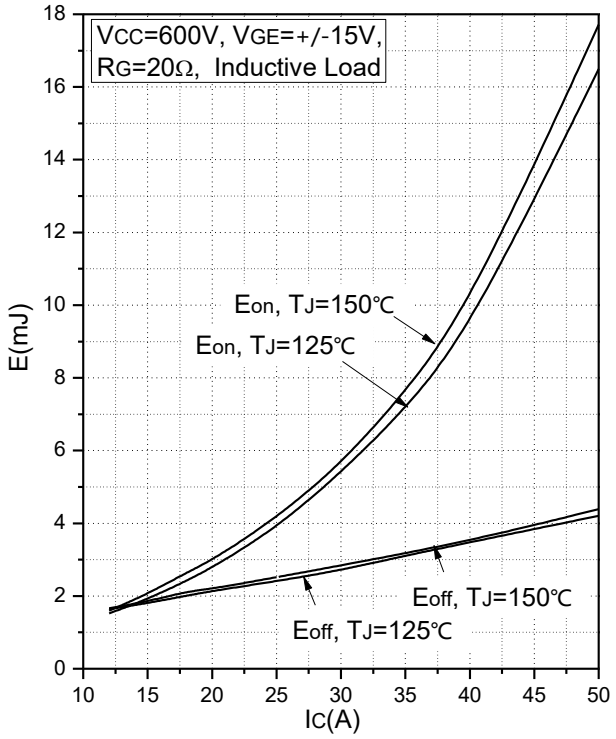


Fig.5 Typical Switching Loss vs. Collector Current

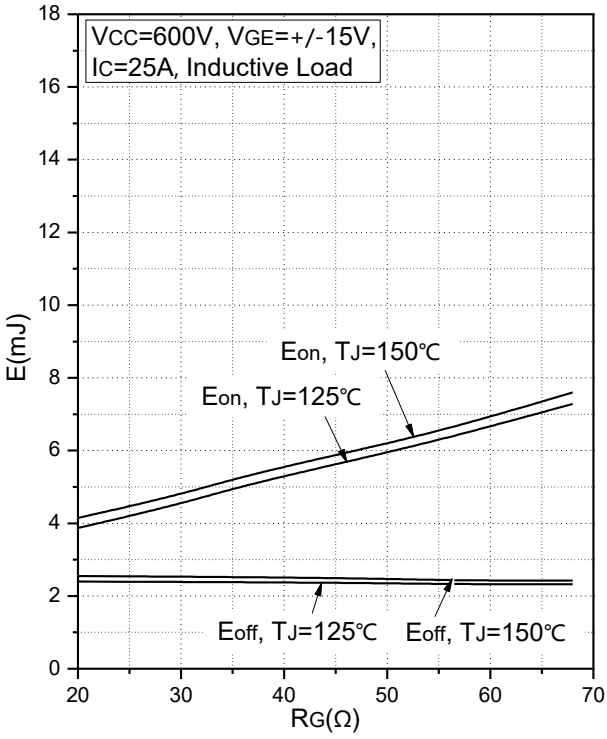


Fig.6 Typical Switching Loss vs. Gate Resistance

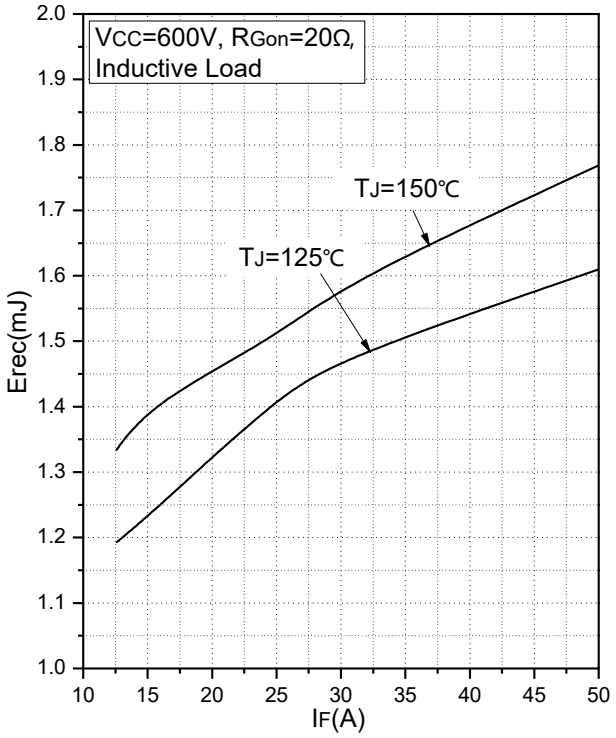


Fig.7 Typical Switching Loss vs. Forward Current

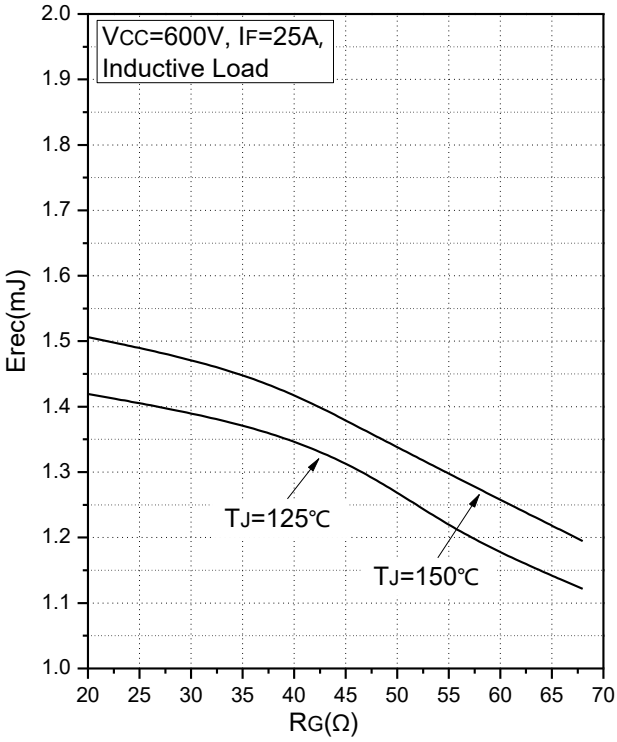


Fig.8 Typical Switching Loss vs. Gate Resistance

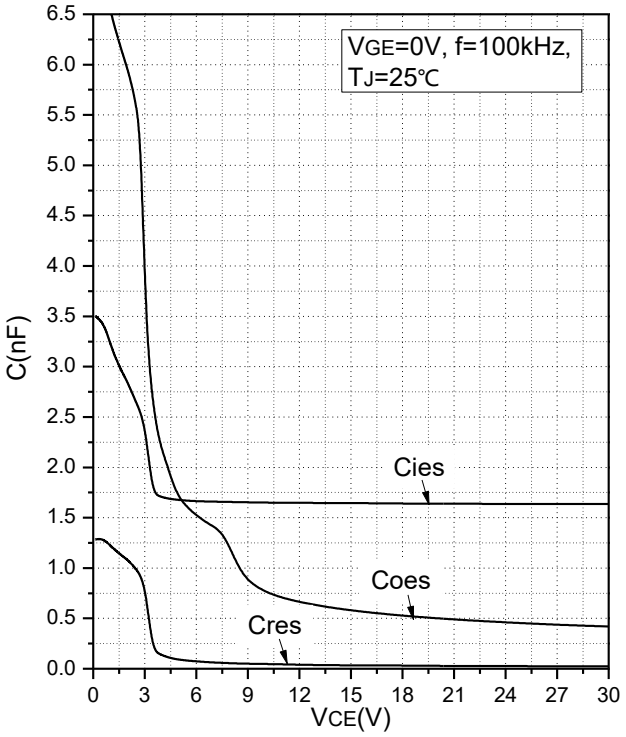


Fig.9 Capacitance Characteristics

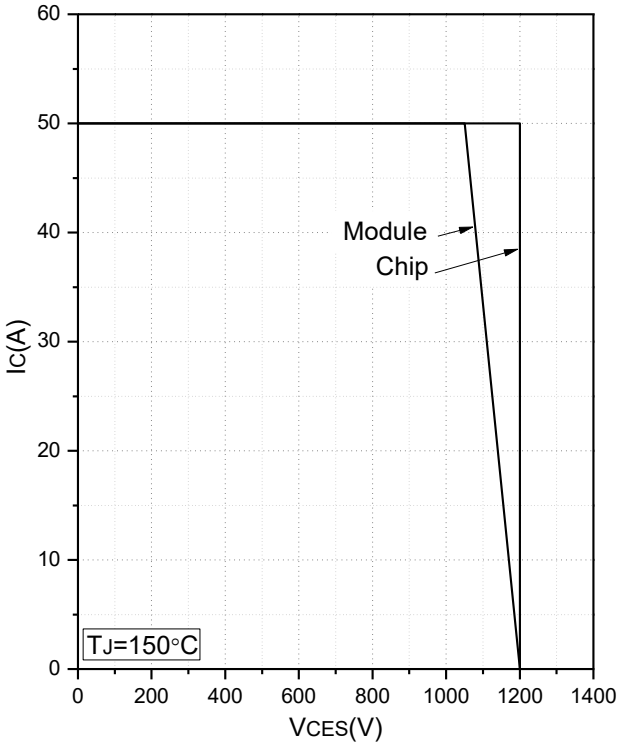


Fig.10 Reverse Bias Safe Operation Area

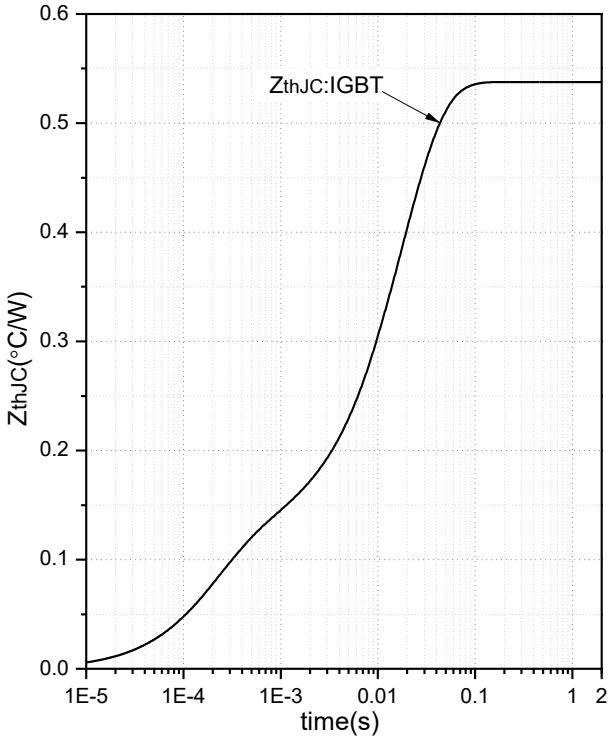


Fig.11 Transient Thermal Impedance IGBT

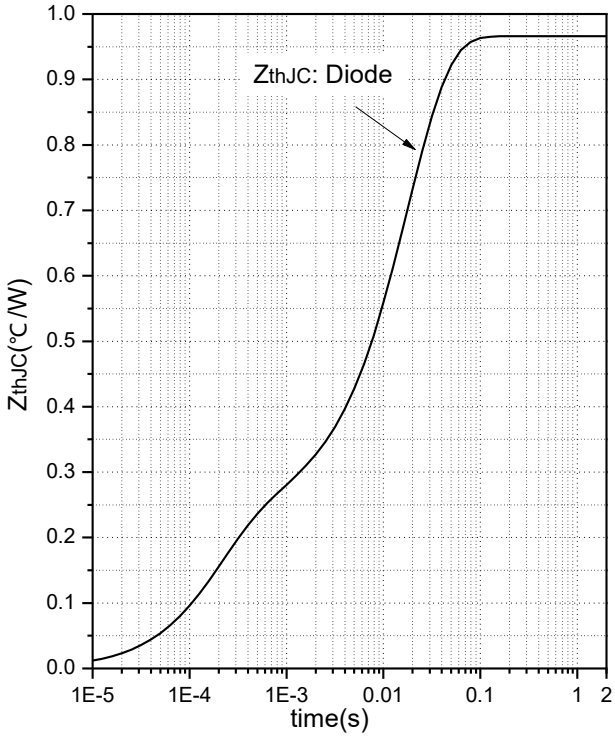


Fig.12 Transient Thermal Impedance Diode

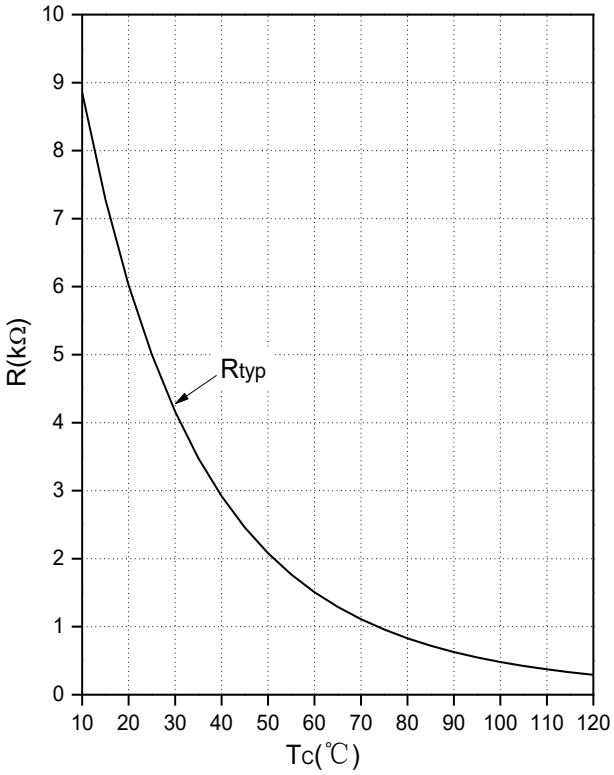
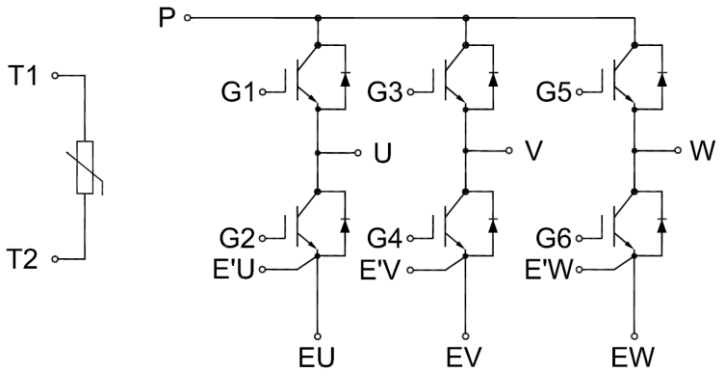
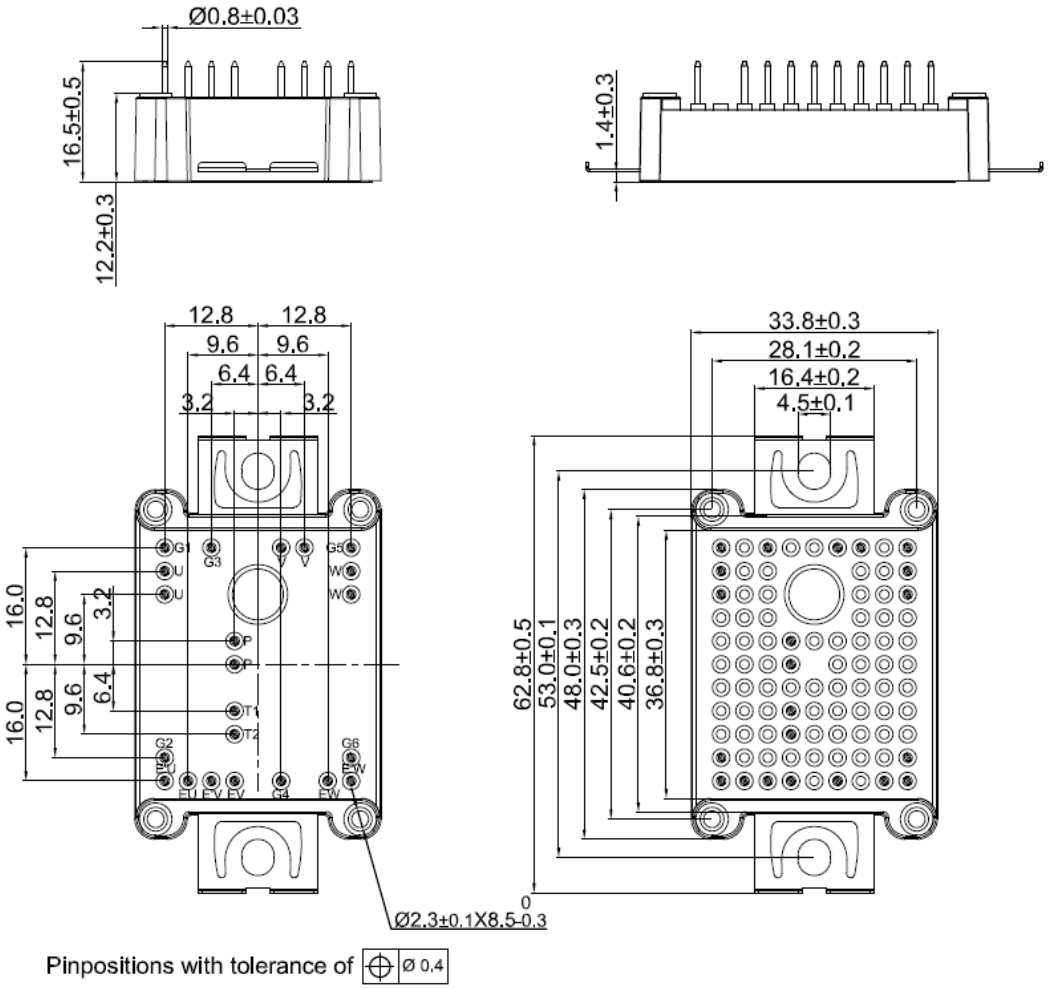


Fig.13 NTC Temperature Characteristics

Internal Circuit



Package Outline (Unit: mm):



Revision	Notes
01	Initial Release

Announcement

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