

GT15FF120B3H

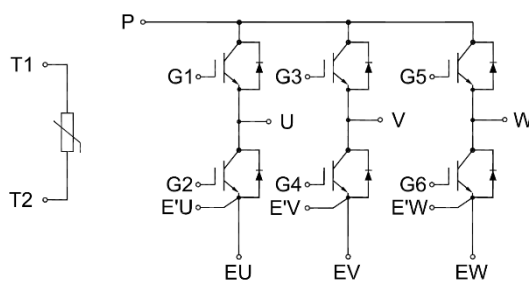
IGBT Module

Preliminary Data

Features:

- Field Stop Trench Gate IGBT
- Short Circuit Rated $>10\mu\text{s}$
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested($2\times I_c$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Circuit Diagram



Applications:

- Industrial Inverters

IGBT, Inverter

Maximum Rated Values (T_C=25°C 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°C	15	A
		T _C =25°C	30	A
I _{CM}	Repetitive Peak Collector Current	t _p =1ms	30	A
P _D	Maximum Power Dissipation per IGBT	T _C =25°C, T _{Jmax} =175°C	199	W



Electrical Characteristics of IGBT ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=1\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.9	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=15\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.85	2.00	V
			$T_J=125^{\circ}\text{C}$	2.05		V
			$T_J=150^{\circ}\text{C}$	2.10		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0\text{V}$, $V_{CE}=V_{CES}$, $T_J=25^{\circ}\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			± 200	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		0.98		nF
C_{oes}	Output Capacitance			0.07		nF
C_{res}	Reverse Transfer Capacitance			0.02		nF

Switching Characteristics

Switching Characteristics							
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_c=15A,$ $R_{Gon}=36\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		85		ns
			$T_J=125^{\circ}C$		89		
			$T_J=150^{\circ}C$		92		
t_r	Rise Time		$T_J=25^{\circ}C$		50		ns
			$T_J=125^{\circ}C$		52		
			$T_J=150^{\circ}C$		53		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=600V, I_c=15A,$ $R_{Goff}=36\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		137		ns
			$T_J=125^{\circ}C$		146		
			$T_J=150^{\circ}C$		151		
t_f	Fall Time		$T_J=25^{\circ}C$		222		ns
			$T_J=125^{\circ}C$		290		
			$T_J=150^{\circ}C$		428		
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_c=15A,$ $R_{Gon}=36\Omega, V_{GE}=\pm 15V,$ $di/dt=232A/\mu s(T_J=150^{\circ}C),$ Inductive Load	$T_J=25^{\circ}C$		2.82		mJ
			$T_J=125^{\circ}C$		3.48		
			$T_J=150^{\circ}C$		3.78		



E_{off}	Turn-off Switching Loss	$V_{CC}=600V$, $I_C=15A$, $R_{Goff}=36\Omega$, $V_{GE}=\pm 15V$, $du/dt=1010V/\mu s$ ($T_J=150^\circ C$), Inductive Load	$T_J=25^\circ C$		0.66		mJ
			$T_J=125^\circ C$		1.12		
			$T_J=150^\circ C$		1.16		
Q_g	Total Gate Charge	$V_{GE}=\pm 15V \dots -15V$	$T_J=25^\circ C$		354		nC
$R_{G(int)}$	Internal Gate Resistance				0		Ω
I_{SC}	$V_{CC}=600V$, $V_{GE}=\pm 15V$, $t_p=10\mu s$, $T_J=25^\circ C$				55		A
$R_{\theta JC}$	Thermal Resistance: Junction-to-Case (per IGBT)					0.75	$^\circ C/W$

Diode, Inverter

Maximum Rated Values ($T_C=25^\circ C$ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	$T_J=25^\circ C$	1200	V
I_F	Diode Continuous Forward Current	$T_C=100^\circ C$	15	A
I_{FM}	Diode Maximum Forward Current	$t_p=1ms$	30	A

Electrical Characteristics of Diode ($T_C=25^\circ C$ unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =15A	T _J =25℃		1.90		V
			T _J =125℃		2.05		
			T _J =150℃		2.00		
t _{rr}	Reverse Recovery Time	I _F =15A, -diF/dt=344A/μs(T _J =150℃), V _{rr} =600V, V _{GE} =-15V	T _J =25℃		154		ns
			T _J =125℃		159		
			T _J =150℃		206		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		7.8		A
			T _J =125℃		12.2		
			T _J =150℃		12.8		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		0.83		μC
			T _J =125℃		1.22		
			T _J =150℃		1.47		



E _{rec}	Reverse Recovery Energy	I _F =15A, -diF/dt=344A/μs(T _J =150℃), V _{rr} =600V, V _{GE} =-15V	T _J =25℃		0.10		mJ
			T _J =125℃		0.15		
			T _J =150℃		0.17		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					1.13	℃/W

Internal NTC-Thermistor Characteristics

Symbol	Conditions	Min.	Typ.	Max.	Units
R_{25}	$T_C=25^{\circ}C$		5		k Ω
$\Delta R/R$	$T_C=100^{\circ}C$, $R_{100}=465\Omega$	-5		+5	%
P_{25}	$T_C=25^{\circ}C$			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	$^{\circ}C$
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	$^{\circ}C$
T_{stg}	Storage Temperature		-40		+125	$^{\circ}C$
CTI	Comparative Tracking Index		200			
$R_{\theta CS}$	Case-to-Sink Thermally (Conductive Grease Applied)				0.08	$^{\circ}C/W$
T	Mounting Screw:M4		1.5		1.8	N·m
G	Weight			23		g



Ordering Information Table

Device code	G	T	15	FF	120	B3	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (15=15A)
- ④ - Circuit Configuration (Full Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

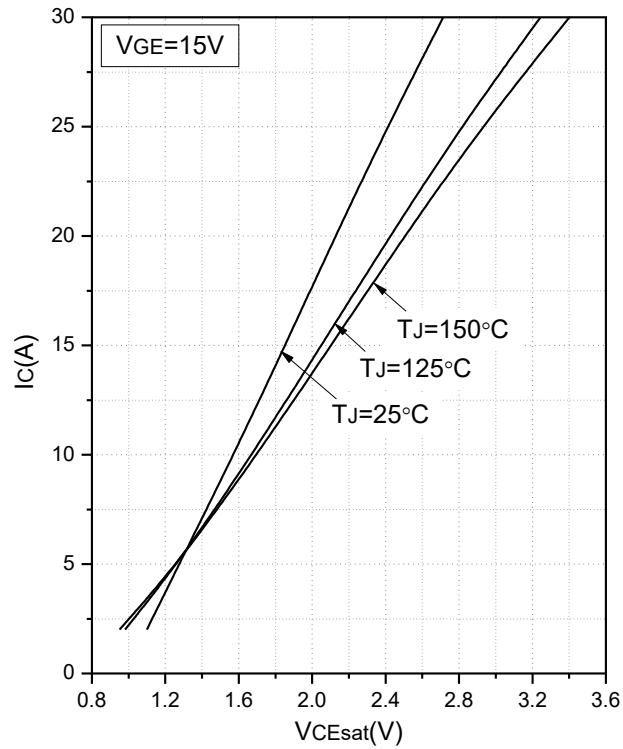


Fig.1 Typical Saturation Voltage Characteristics

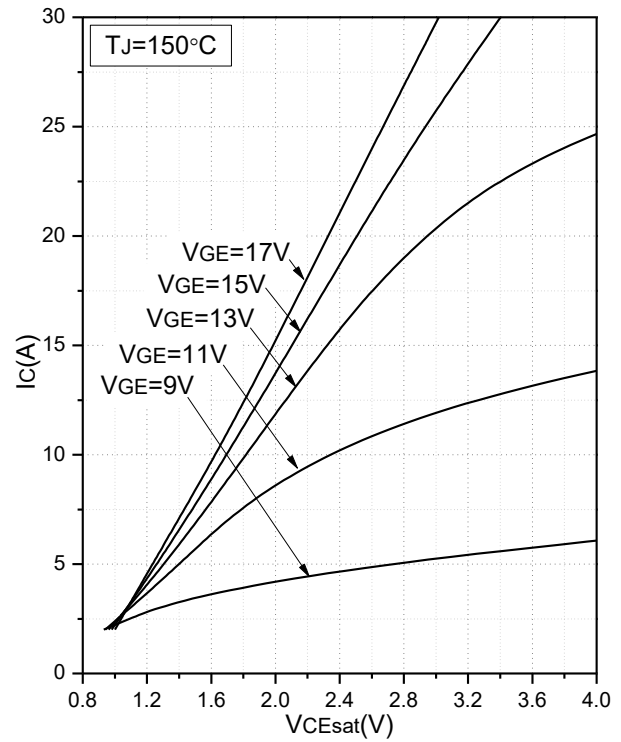


Fig.2 Typical Output Characteristics

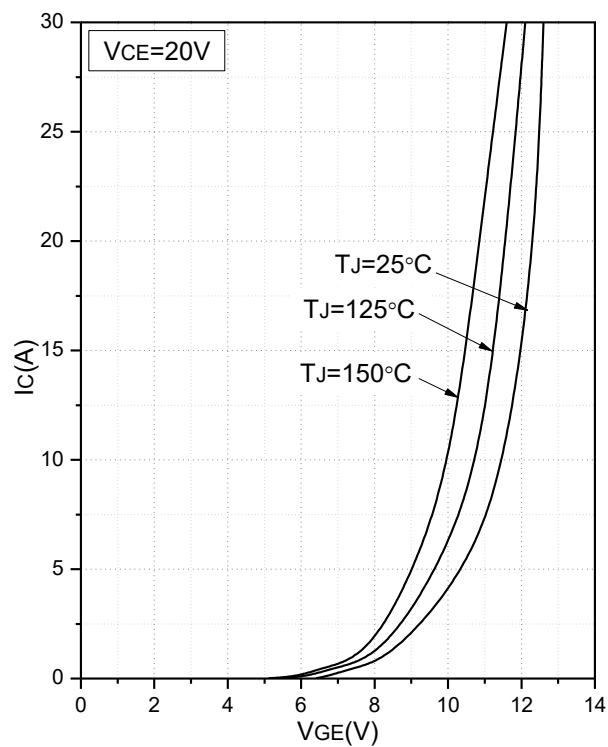


Fig.3 Transfer Characteristic

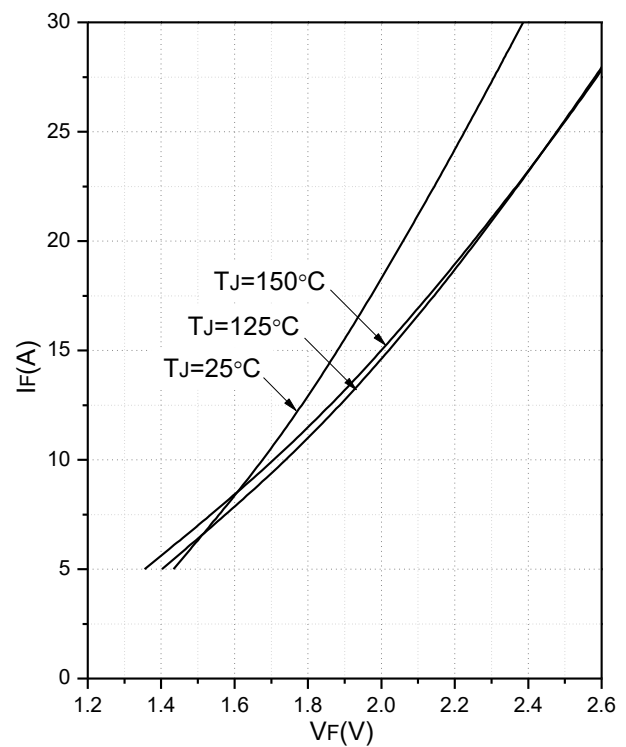


Fig.4 Forward Characteristics of Diode

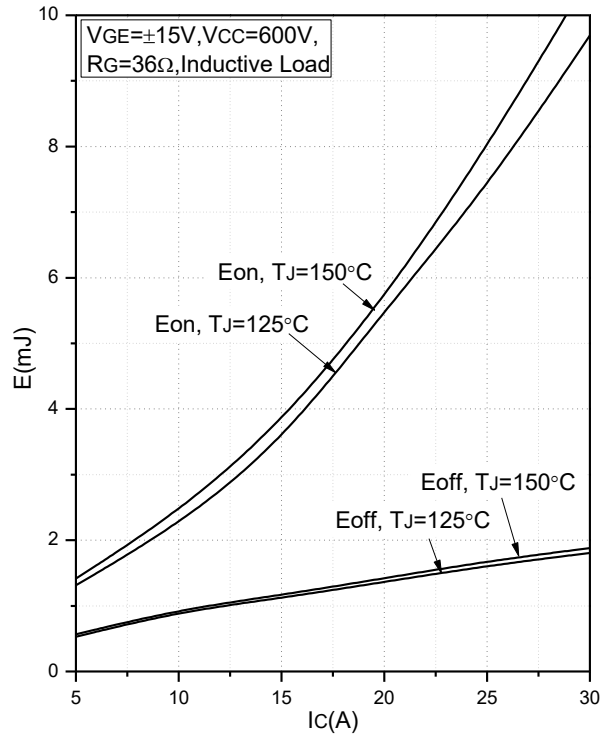


Fig.5 Typical Switching Loss vs. Collector Current

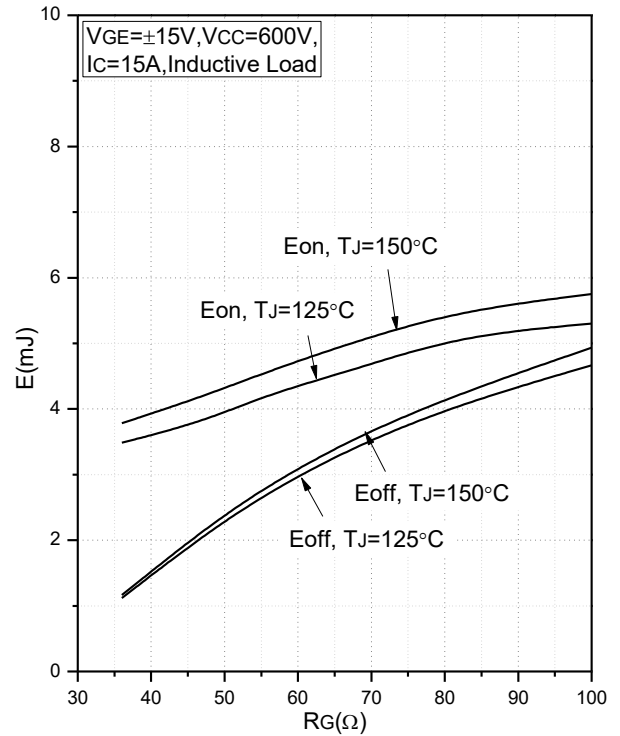


Fig.6 Typical Switching Loss vs. Gate Resistance

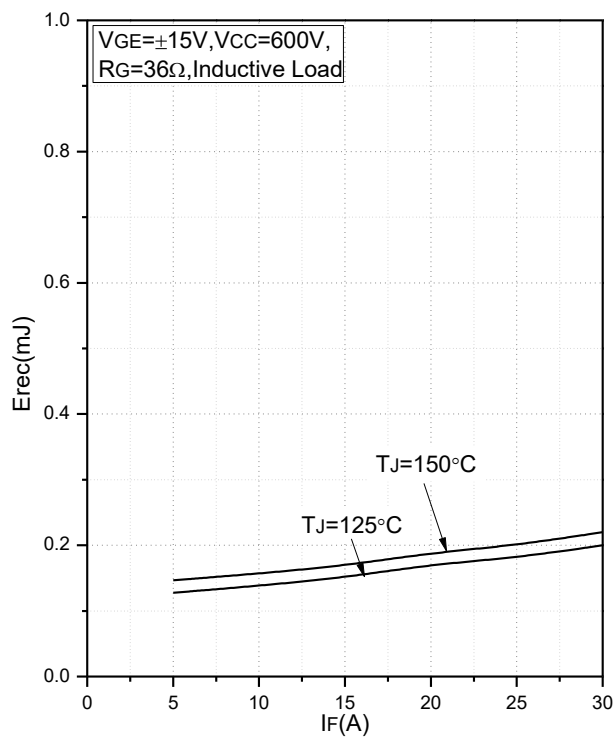


Fig.7 Typical Switching Loss vs. Forward Current

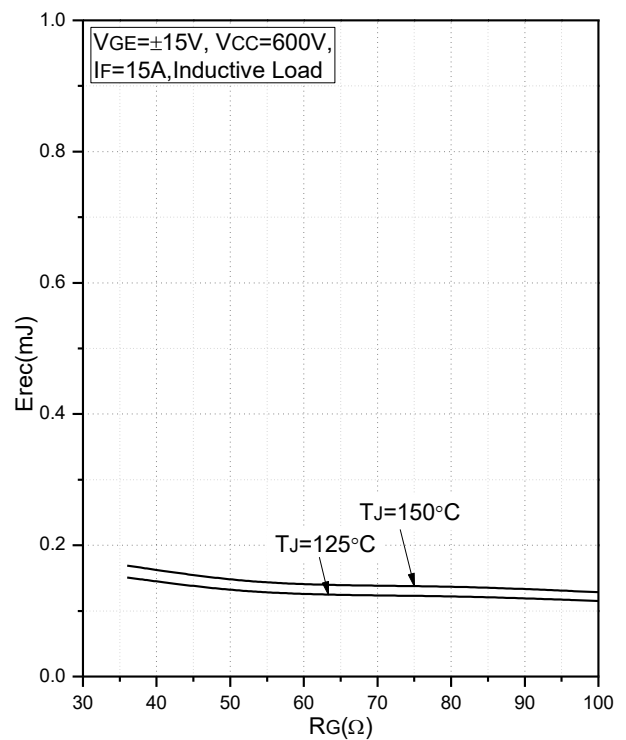
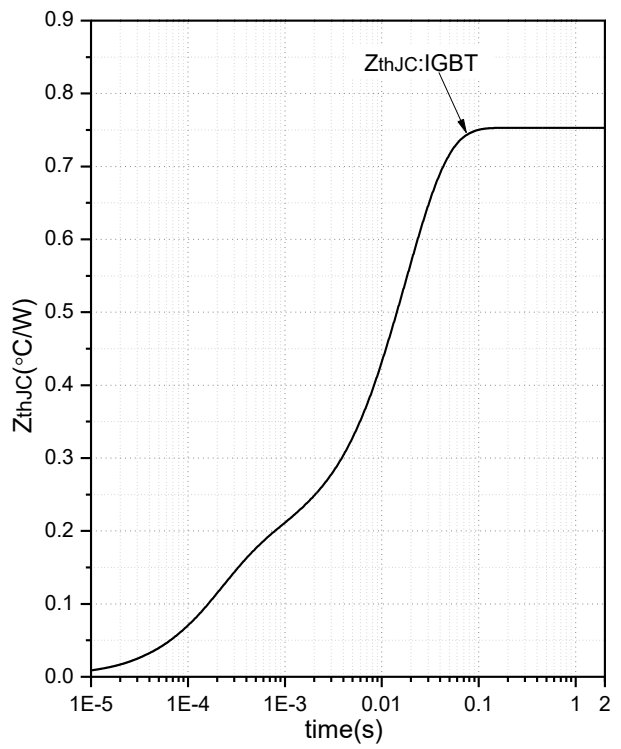
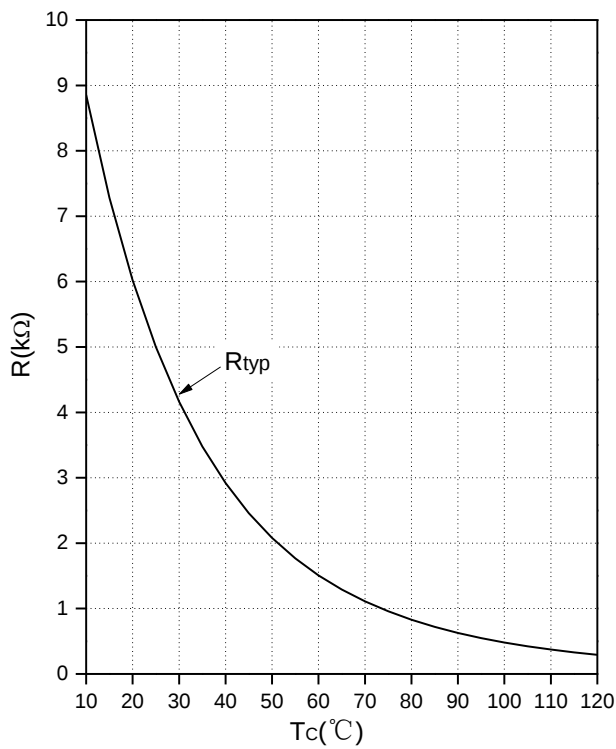
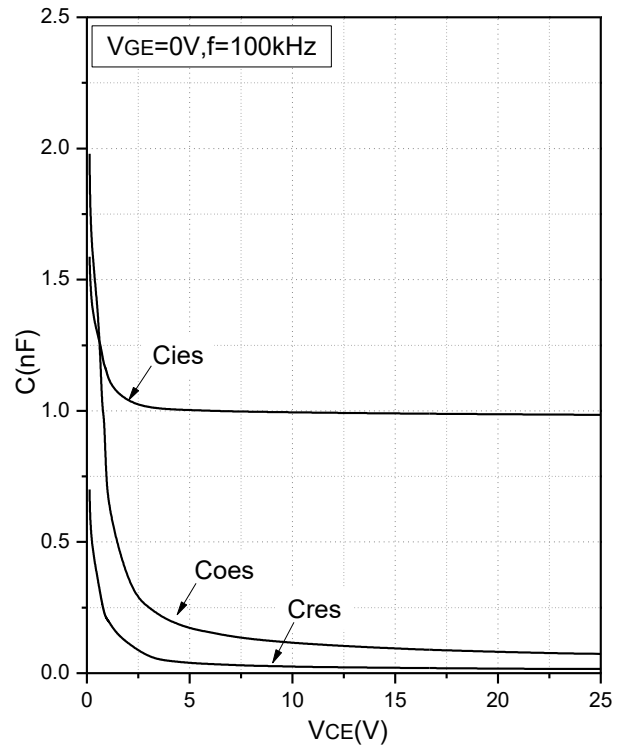
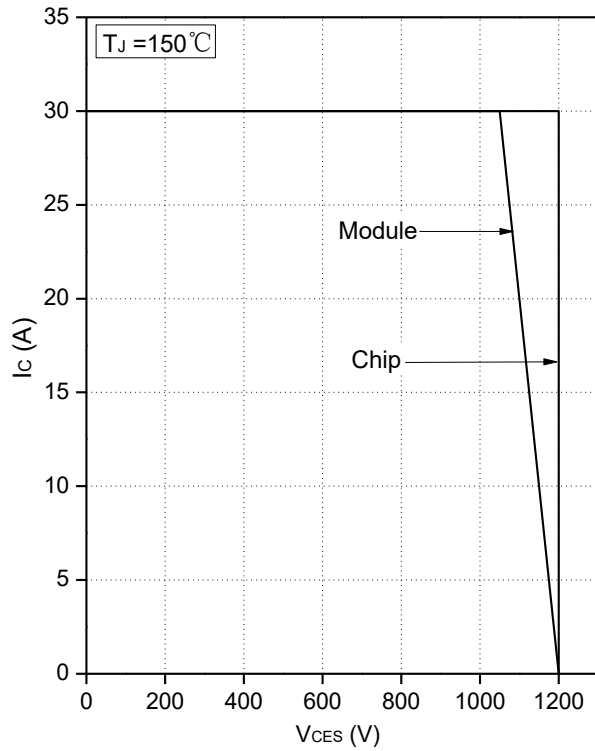


Fig.8 Typical Switching Loss vs. Gate Resistance



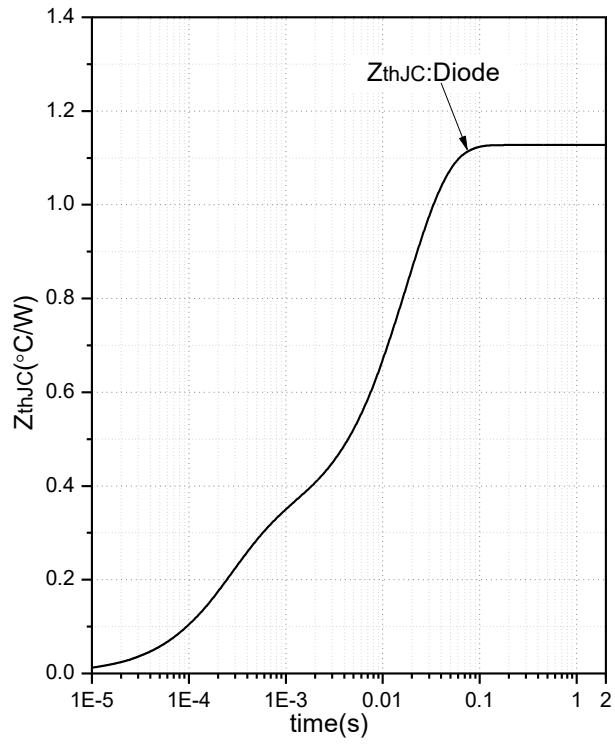
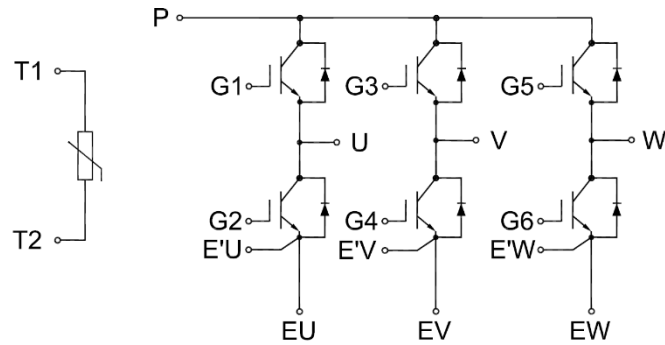


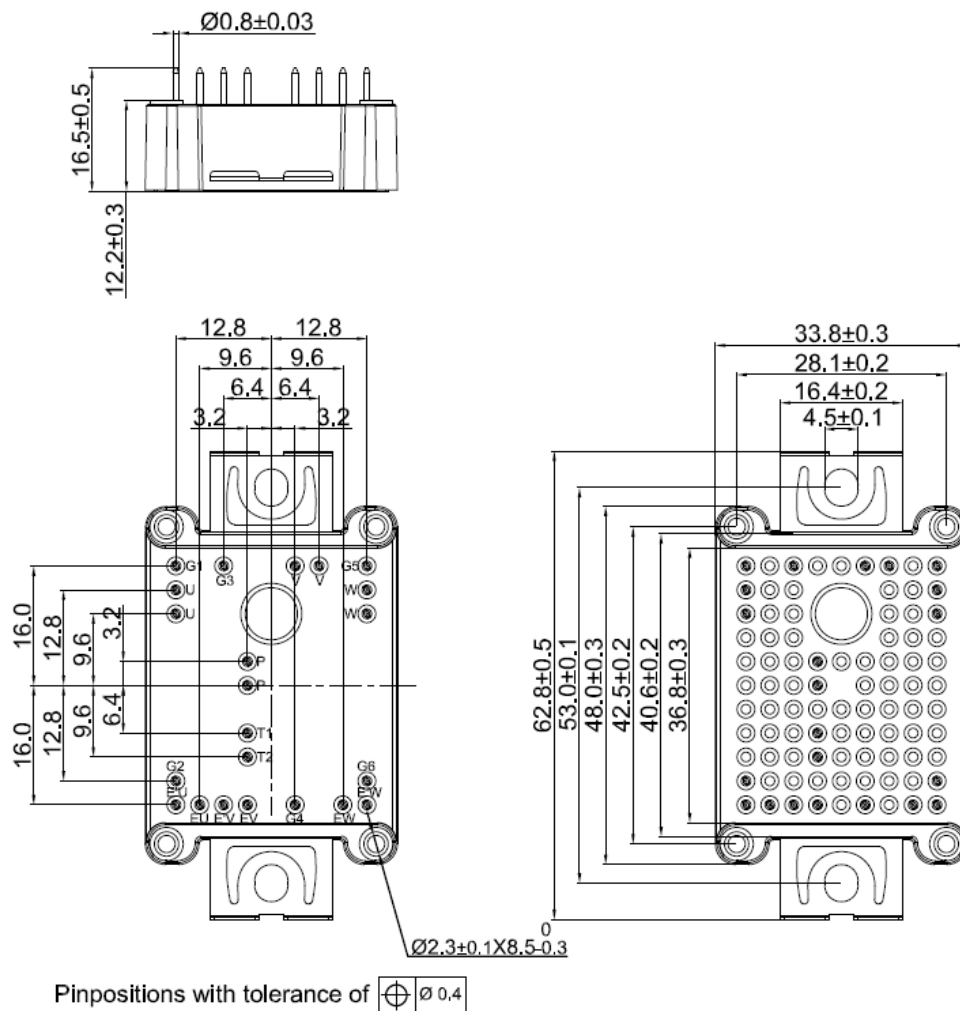
Fig.13 Transient Thermal Impedance (Diode)



Internal Circuit



Package Outline (Unit: mm):





Revision	Notes
01	Initial Release
02	Update Electrical Characteristic

Announcement

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