



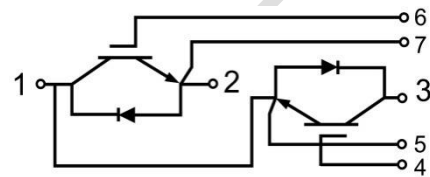
GF100HF120T1NH

IGBT Module

Features:

- Non Punch Through (NPT) Technology
- 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:

- Welding Machine、Cutting Machine
- Plating Power Supply、Induction Heating
- SMPS、UPS

Maximum Rated Values of IGBT($T_C=25^\circ\text{C}$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_C=80^\circ\text{C}$	100	A
		$T_C=25^\circ\text{C}$	200	A
I_{CM}	Repetitive Peak Collector Current	$T_J=150^\circ\text{C}$	200	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per leg	$T_C=25^\circ\text{C}$ $T_{Jmax}=150^\circ\text{C}$	875	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	$I_C=4\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.9	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=100\text{A}$, $V_{GE}=15\text{V}$		3.15 3.90	3.50	
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	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		7630		pF
C_{oes}	Output Capacitance			710		
C_{res}	Reverse Transfer Capacitance			350		

Switching Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600\text{V}$, $I_C=100\text{A}$, $R_{Gon}=15\Omega$, $V_{GE}=\pm 15\text{V}$, Inductive Load	$T_J=25^\circ\text{C}$		563	ns
			$T_J=125^\circ\text{C}$		564	
t_r	Rise Time		$T_J=25^\circ\text{C}$		110	ns
			$T_J=125^\circ\text{C}$		109	
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^\circ\text{C}$		544	ns
			$T_J=125^\circ\text{C}$		572	
t_f	Fall Time	$T_J=25^\circ\text{C}$		144	ns	
		$T_J=125^\circ\text{C}$		159		
E_{on}	Turn-on Switching Loss	$V_{CC}=600\text{V}$, $I_C=100\text{A}$, $R_{Gon}=15\Omega$, $V_{GE}=\pm 15\text{V}$, $di/dt=810\text{A}/\mu\text{s}(T_J=125^\circ\text{C})$, Inductive Load	$T_J=25^\circ\text{C}$		7.3	mJ
		$T_J=125^\circ\text{C}$		8.6		
E_{off}	Turn-off Switching Loss	$V_{CC}=600\text{V}$, $I_C=100\text{A}$, $R_{Goff}=15\Omega$, $V_{GE}=\pm 15\text{V}$, $du/dt=4320\text{V}/\mu\text{s}(T_J=125^\circ\text{C})$, Inductive Load	$T_J=25^\circ\text{C}$		4.2	mJ
		$T_J=125^\circ\text{C}$		5.6		
Q_g	Total Gate Charge	$V_{GE}=+15\text{V}\dots-15\text{V}$	$T_J=25^\circ\text{C}$		1.1	μC
RBSOA	$I_C=200\text{A}$, $V_{CC}=1050\text{V}$, $V_P=1200\text{V}$, $R_G=15\Omega$, $V_{GE}=+15\text{V}$ to 0V , $T_J=150^\circ\text{C}$		Trapezoid			
I_{sc}	$V_{CC}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_G=15\Omega$, $t_P=10\mu\text{s}$, $T_J=125^\circ\text{C}$			1369		A
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-to-Case				0.14	$^\circ\text{C}/\text{W}$



Maximum Rated Values of Diode ($T_C=25^\circ\text{C}$ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	100	A
I_{FM}	Diode Maximum Forward Current	200	A

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

Symbol	Description	Conditions	Min.	Typ.	Max.	Units	
V_{FM}	Forward Voltage	$I_F=100\text{A}$	$T_J=25^\circ\text{C}$	2.95		V	
			$T_J=125^\circ\text{C}$	3.05			
t_{rr}	Reverse Recovery Time	$I_F=100\text{A},$ $-di_F/dt=1165\text{A}/\mu\text{s}(T_J=125^\circ\text{C}),$ $V_{rr}=600\text{V},$ $V_{GE}=-15\text{V}$	$T_J=25^\circ\text{C}$	132		ns	
			$T_J=125^\circ\text{C}$	265			
I_{rr}	Peak Reverse Recovery Current		$T_J=25^\circ\text{C}$	39.1		A	
			$T_J=125^\circ\text{C}$	54.7			
Q_{rr}	Reverse Recovery Charge		$T_J=25^\circ\text{C}$	2.8		μC	
			$T_J=125^\circ\text{C}$	6.1			
E_{rec}	Reverse Recovery Energy		$T_J=25^\circ\text{C}$	1.08		mJ	
			$T_J=125^\circ\text{C}$	2.38			
$R_{\theta JC}$	Diode Thermal Resistance: Junction-to-Case				0.41	$^\circ\text{C}/\text{W}$	



Module

Symbol	Description	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	f =50Hz, 1minute	2500		V
L _{sCE}	Stray Inductance Module		27		nH
T _J	Maximum Junction Temperature			150	°C
T _{JOP}	Maximum Operating Junction Temperature Range	-40		+125	°C
T _{stg}	Storage Temperature	-40		+125	°C
CTI	Comparative Tracking Index	200			
R _{eCS}	Case-to-Sink Thermally (Conductive Grease Applied)			0.07	°C/W
T	Power Terminals Screw:M5	3.0		5.0	N·m
T	Mounting Screw:M6	4.0		6.0	N·m
G	Weight		155		g

Ordering Information Table

Device code	G	F	100	HF	120	T1N	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - NPT, Fast IGBT
- ③ - Rated Current (100=100A)
- ④ - Circuit Configuration (Half Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

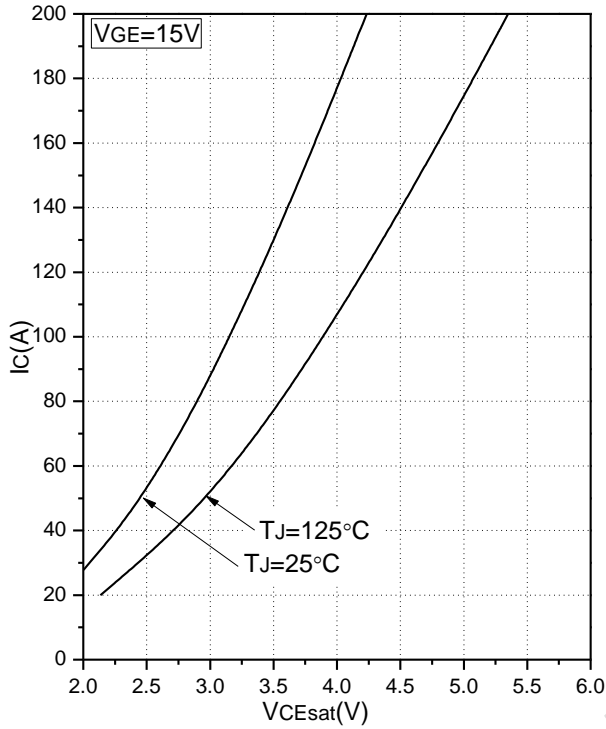


Fig.1 Typical Saturation Voltage Characteristics

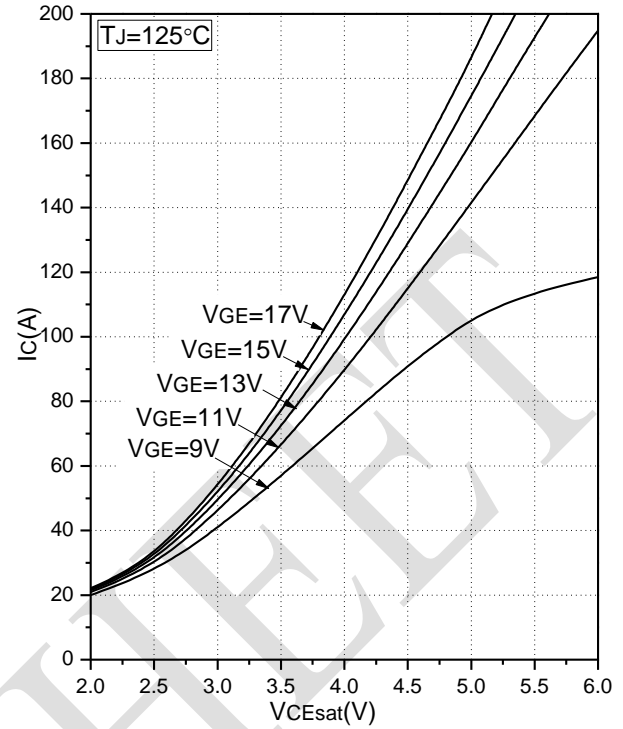


Fig.2 Typical Output Characteristics

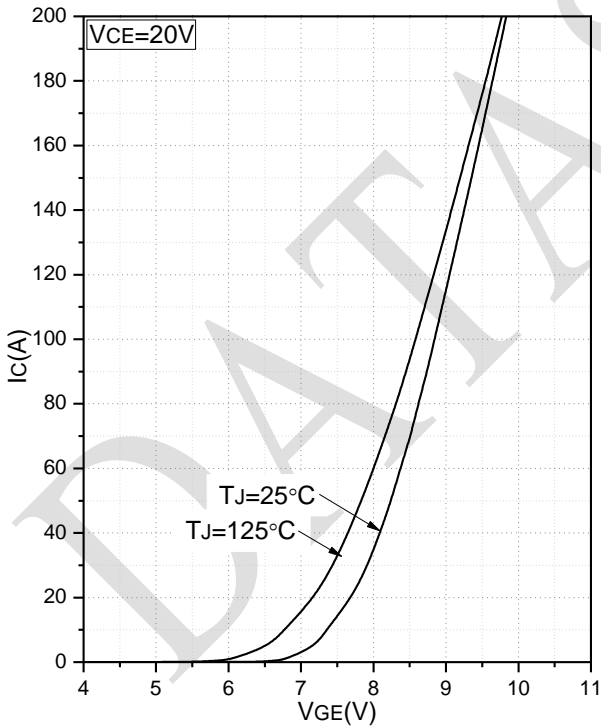


Fig.3 Transfer Characteristic

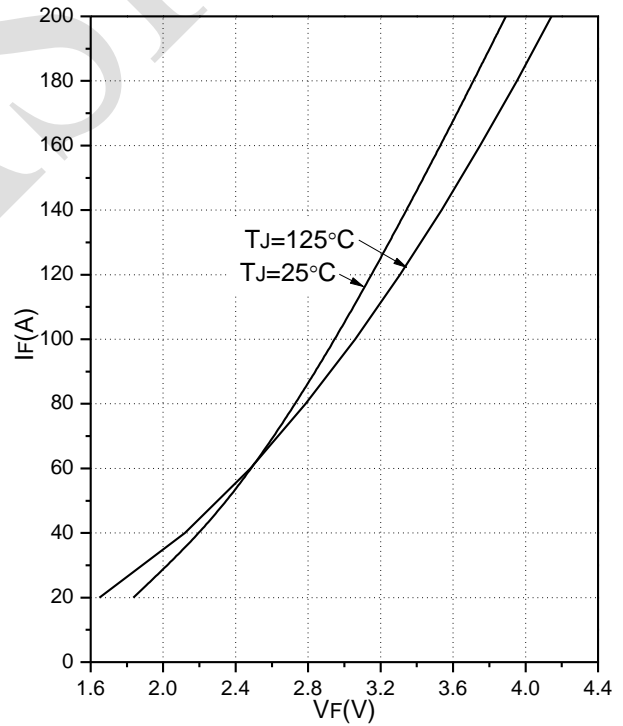


Fig.4 Forward Characteristics of Diode

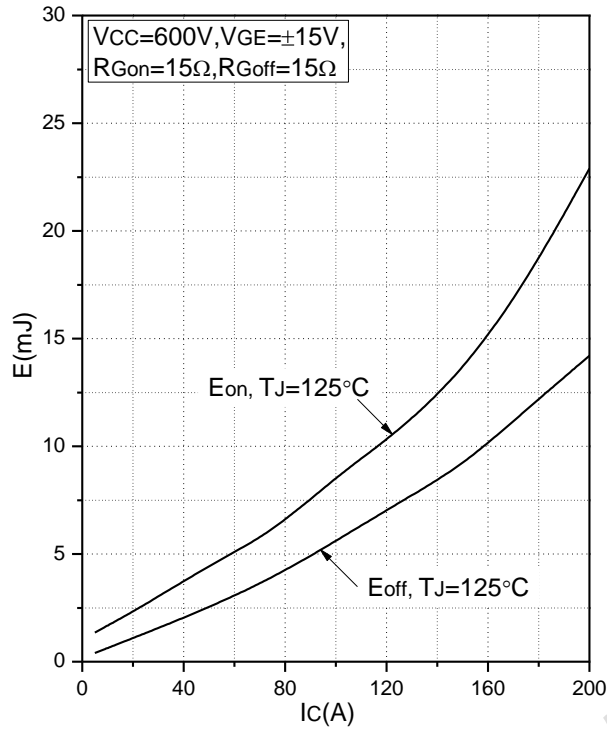


Fig.5 Typical Switching Loss vs. Collector Current

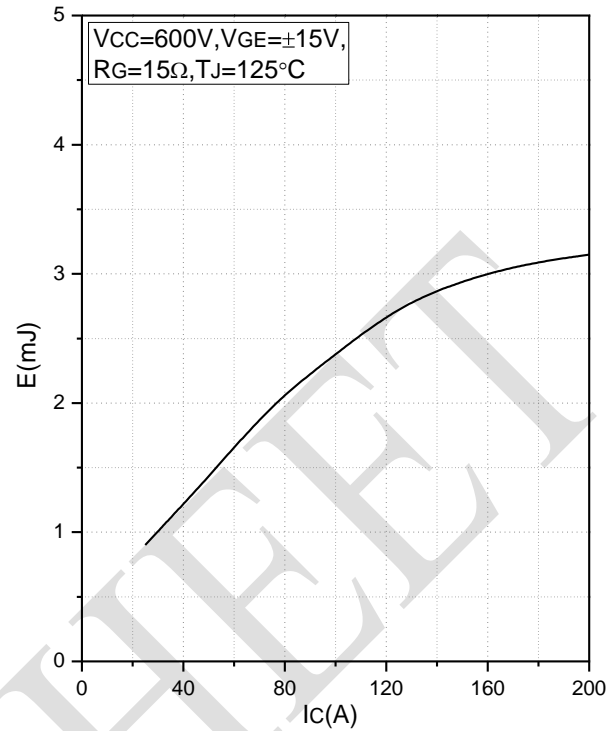


Fig.6 Typical Switching Loss vs. Forward Current

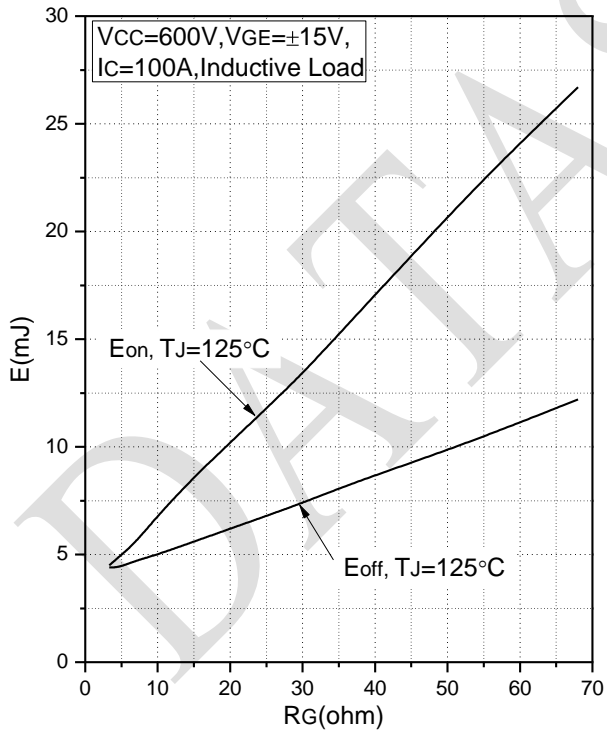


Fig.7 Typical Switching Loss vs. Gate Resistance

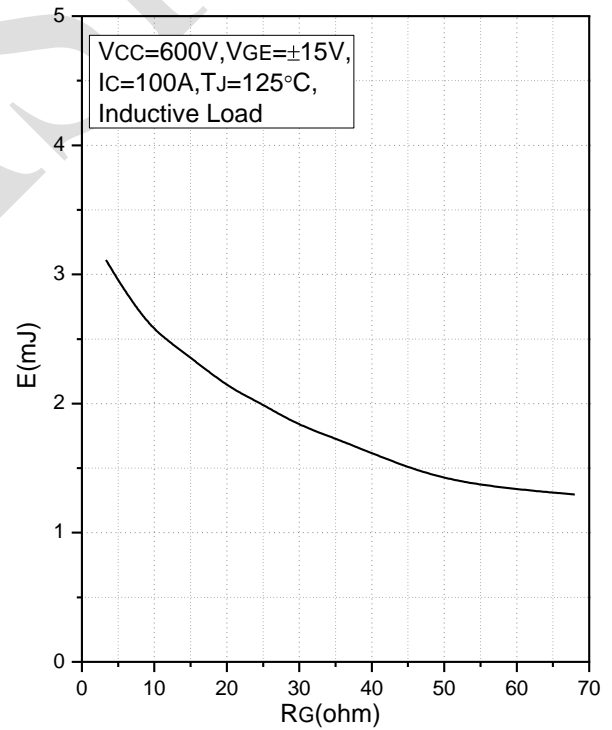


Fig.8 Typical Switching Loss vs. Gate Resistance

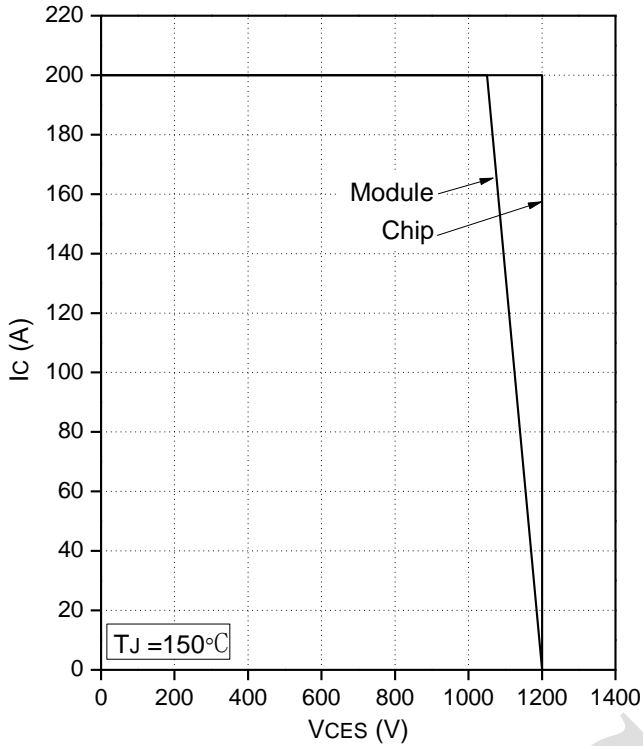


Fig.9 Reverse Bias Safe Operation Area (RBSOA)

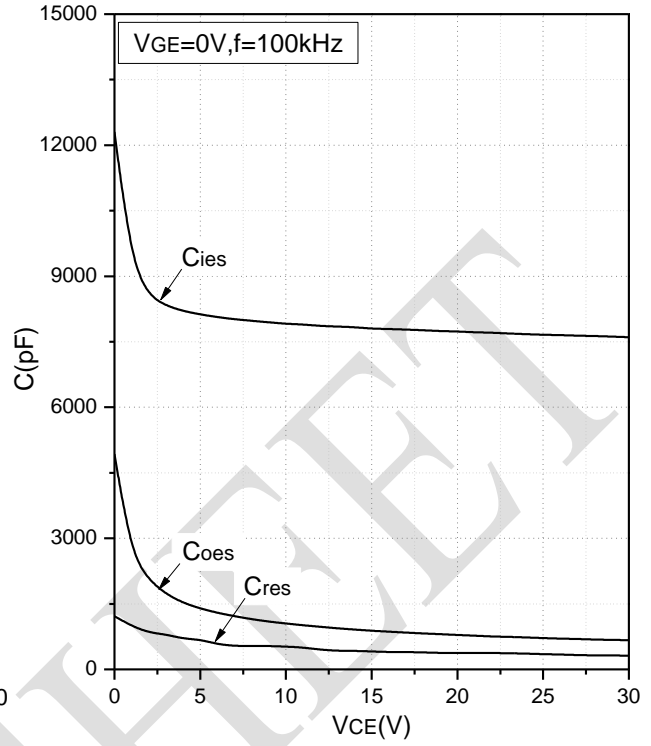


Fig.10 Capacitance Characteristics

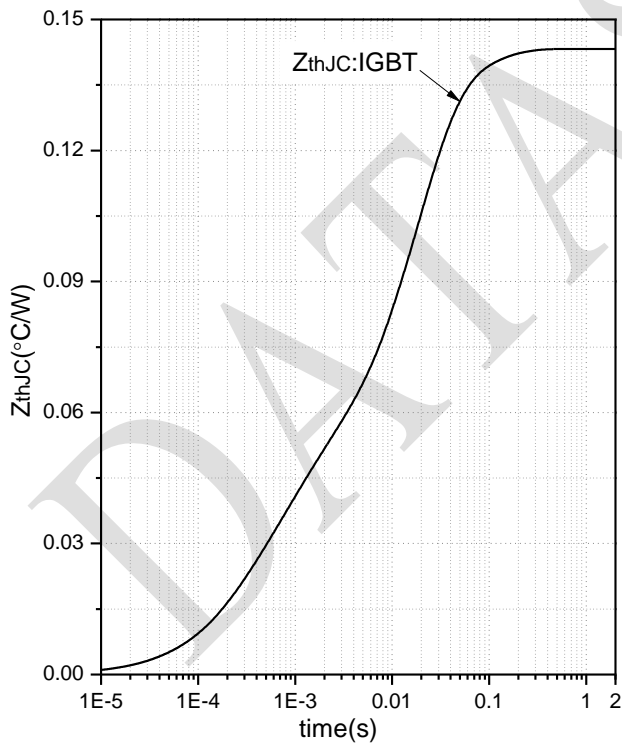


Fig.11 Transient Thermal Impedance (IGBT)

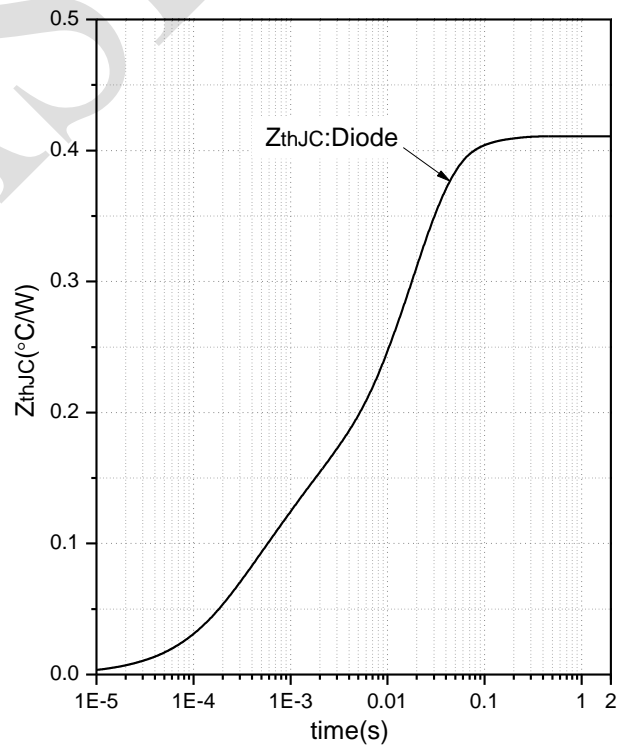
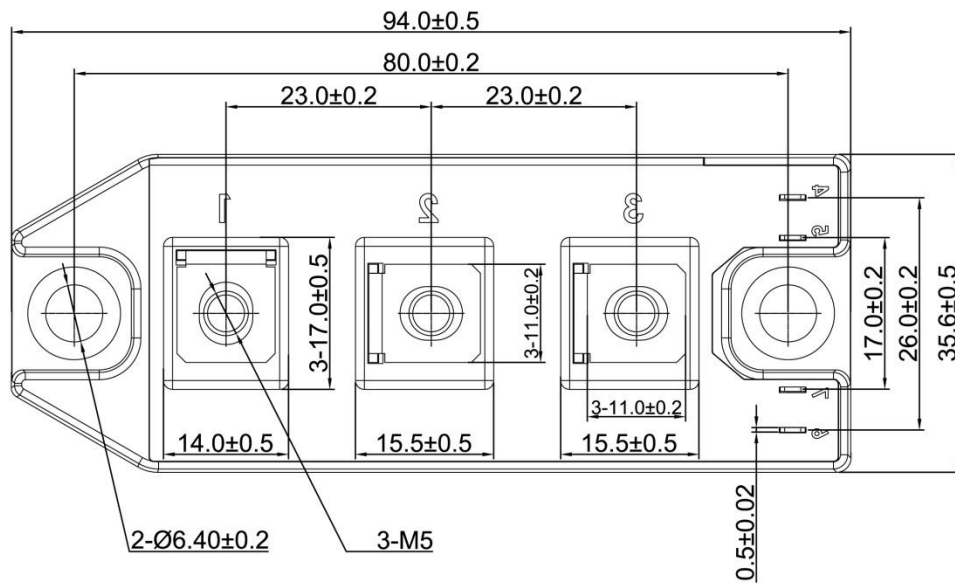
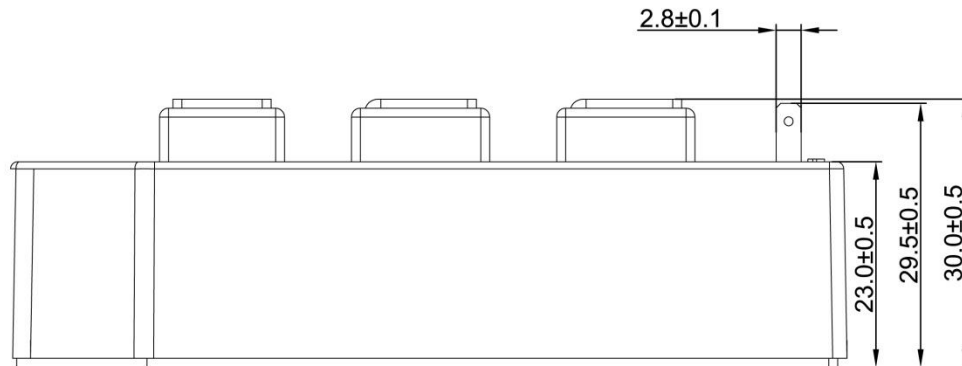


Fig.12 Transient Thermal Impedance (Diode)



Package Outline (Unit: mm):





Date	Revision	Notes
07/23/2021	A	Final Version
10/18/2021	B	Added 'Stray Inductance Module'

Announcements

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

DATA SHEET