



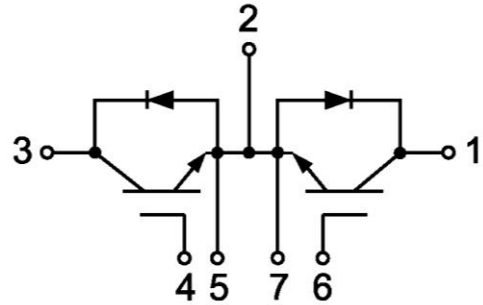
GT150CE120T1H

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(2xIc)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- Welding
- 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	$T_C = 100^\circ\text{C}$	150	A
		$T_C = 25^\circ\text{C}$	300	A
I_{CM}	Repetitive Peak Collector Current	$T_J = 175^\circ\text{C}$	300	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per leg	$T_C = 25^\circ\text{C}$ $T_{Jmax}=175^\circ\text{C}$	1085	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	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=150\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	1.70	2.00	V
			$T_J=125^\circ\text{C}$	1.90		V
			$T_J=150^\circ\text{C}$	2.00		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	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^\circ\text{C}$			400	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$		10.13		nF
C_{oes}	Out Capacitance			1.01		nF
C_{res}	Reverse Transfer Capacitance			0.77		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600\text{V}$, $I_C=150\text{A}$, $R_{Gon}=1\Omega$, $V_{GE}=\pm 15\text{V}$, Inductive Load	$T_J=25^\circ\text{C}$	258		ns
			$T_J=125^\circ\text{C}$	258		
			$T_J=150^\circ\text{C}$	260		
t_r	Rise Time		$T_J=25^\circ\text{C}$	85		ns
			$T_J=125^\circ\text{C}$	89		
			$T_J=150^\circ\text{C}$	89		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^\circ\text{C}$	265		ns
			$T_J=125^\circ\text{C}$	277		
			$T_J=150^\circ\text{C}$	284		
t_f	Fall Time	$T_J=25^\circ\text{C}$	205		ns	
		$T_J=125^\circ\text{C}$	376			
		$T_J=150^\circ\text{C}$	428			
E_{on}	Turn-on Switching Loss	$V_{CC}=600\text{V}$, $I_C=150\text{A}$, $R_{Gon}=1\Omega$, $V_{GE}=\pm 15\text{V}$, $di/dt=1550\text{A}/\mu\text{s}$ ($T_J=150^\circ\text{C}$) Inductive Load	$T_J=25^\circ\text{C}$	8.5		mJ
			$T_J=125^\circ\text{C}$	13.5		
			$T_J=150^\circ\text{C}$	15.5		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =150A, R _{Goff} =1Ω, V _{GE} = ±15V, du/dt=4106V/μs (T _J =150°C) Inductive Load	T _J =25°C	8.3	mJ
			T _J =125°C	13.0	
			T _J =150°C	15.0	
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C	0.71	μC
R _{g internal}	Internal Gate Resistance		T _J =25°C	5	Ω
RBSOA	I _C =300A, V _{CC} =1050V, V _p =1200V, R _{Goff} =1Ω, V _{GE} =+15V to 0V, T _J =150°C			Trapezoid	
SC Data	V _{CC} =600V, R _{Gon} =1Ω, R _{Goff} =1Ω, t _p =10μs, V _{GE} =±15V, T _J =150°C			680	A
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case(per leg)			0.138	°C/W

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

V _{RRM}	Repetitive Peak Reverse Voltage	1200	V
I _F	Diode Continuous Forward Current	150	A
I _{FM}	Peak FWD Current Repetitive	300	A

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

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =150A	T _J =25°C	1.50		V
			T _J =125°C	1.50		
			T _J =150°C	1.50		
t _{rr}	Reverse Recovery Time	I _F =150A, -diF/dt=1670A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C	371		ns
			T _J =125°C	562		
			T _J =150°C	625		
I _{rr}	Peak Reverse Recovery Current	I _F =150A, -diF/dt=1670A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C	127		A
			T _J =125°C	142		
			T _J =150°C	145		
Q _{rr}	Reverse Recovery Charge	I _F =150A, -diF/dt=1670A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C	22.6		μC
			T _J =125°C	34.6		
			T _J =150°C	39.4		



E _{rec}	Reverse Recovery Energy	I _F =150A, -diF/dt=1670A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C	7.8	mJ
			T _J =125°C	13.8	
			T _J =150°C	15.8	
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per leg)			0.213	°C/W

Module

Symbol	Description	Min	Typ	Max	Unit
V _{iso}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500		V
T _J	Maximum Junction Temperature			175	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40	+150	°C
T _{stg}	Storage Temperature		-40	+125	°C
CTI	Comparative Tracking Index		200		
R _{θCS}	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			135	g

Ordering Information Table

Device code

G	T	150	CE	120	T1	H
①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (150=150A)
- ④ - Circuit Configuration (Common Emitter)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

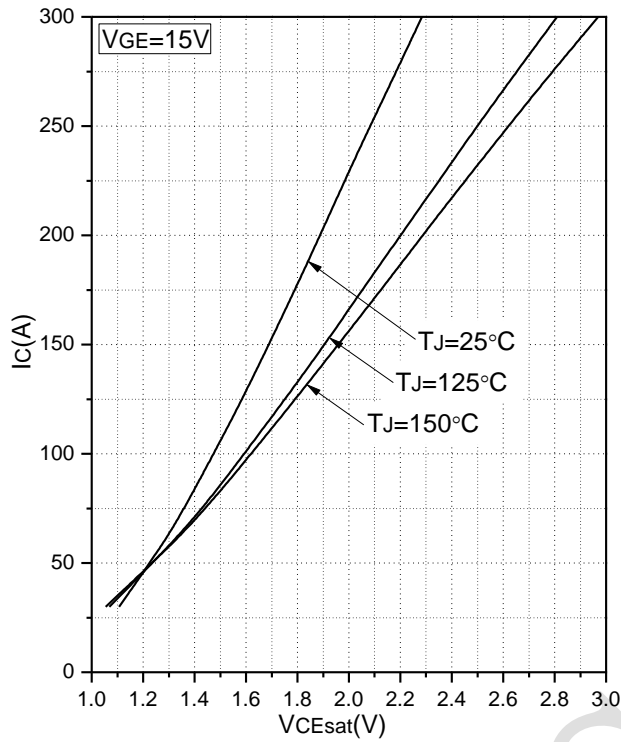


Fig.1 Typical Saturation Voltage Characteristics

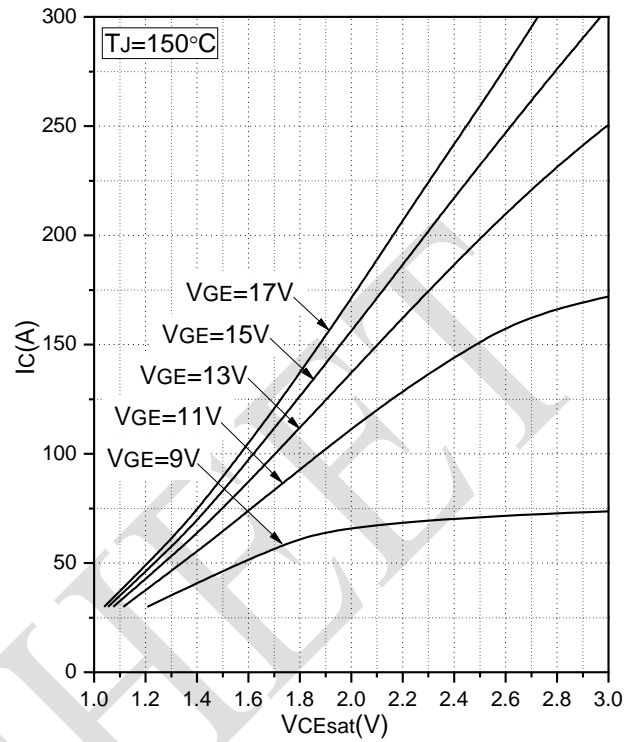


Fig.2 Typical Output Characteristics

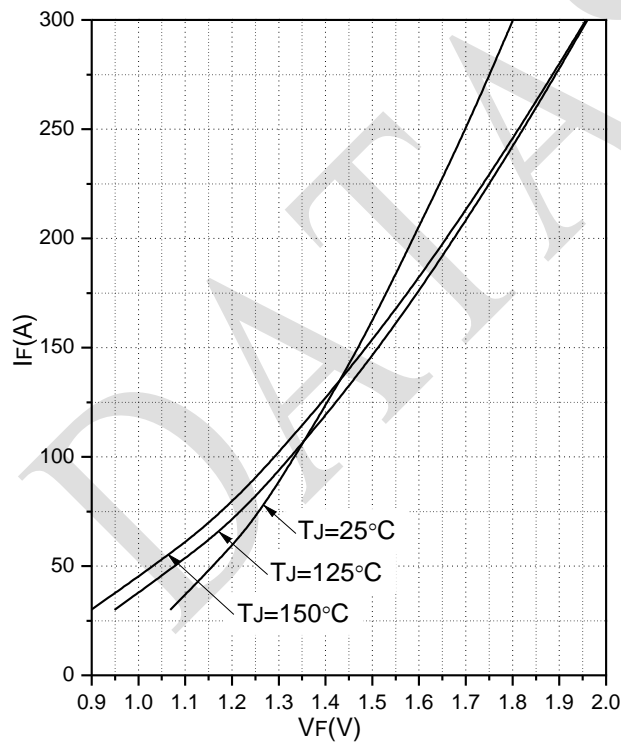


Fig.3 Forward Characteristics of Diode

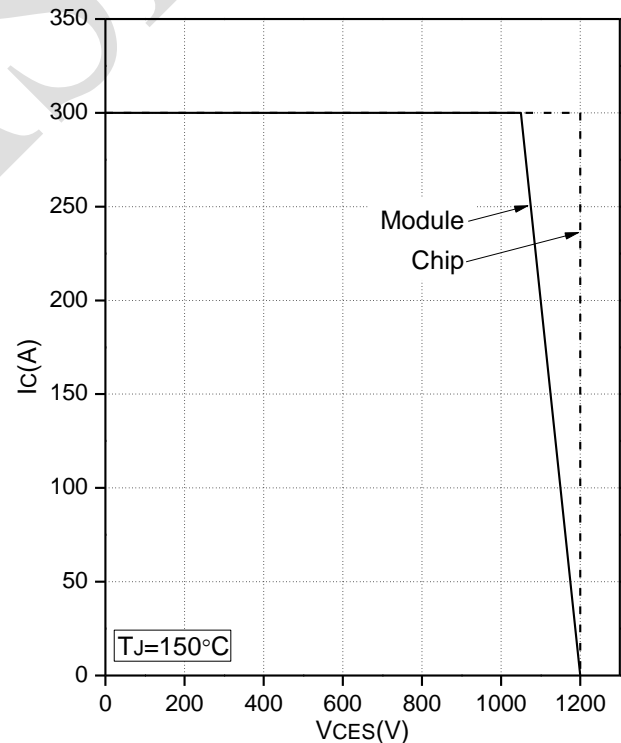


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

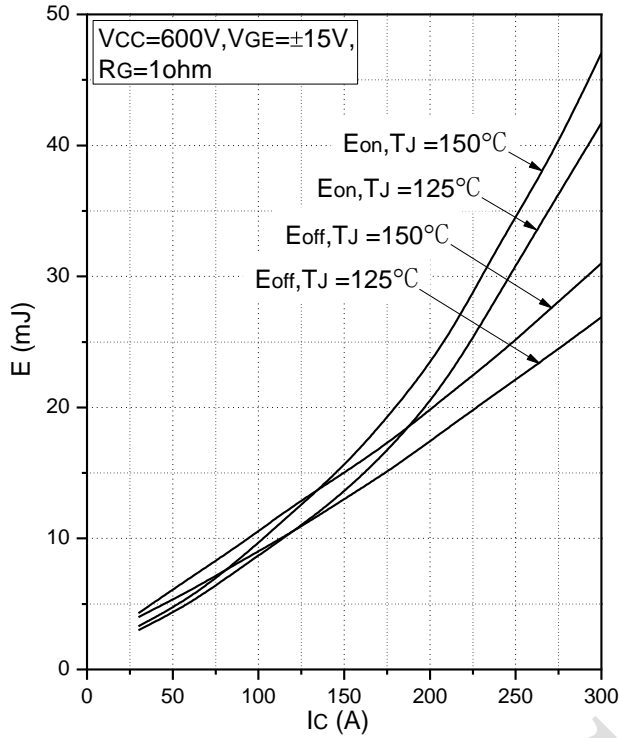


Fig.5 Typical Switching Loss vs. Collector Current

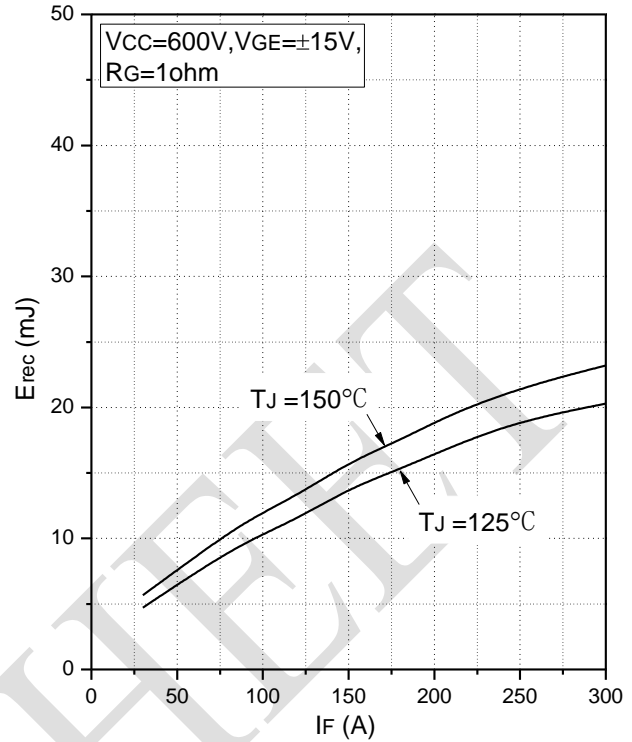


Fig.6 Typical Switching Loss vs. Forward Current

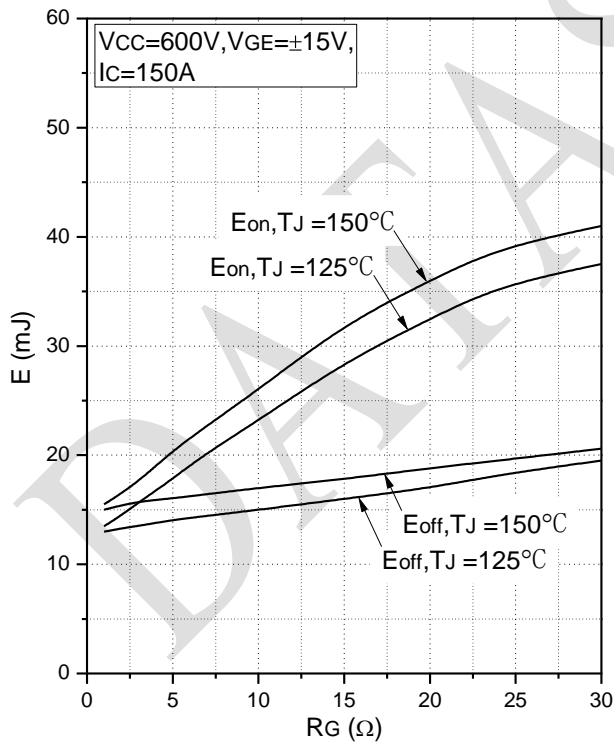


Fig.7 Typical Switching Loss vs. Gate Resistance

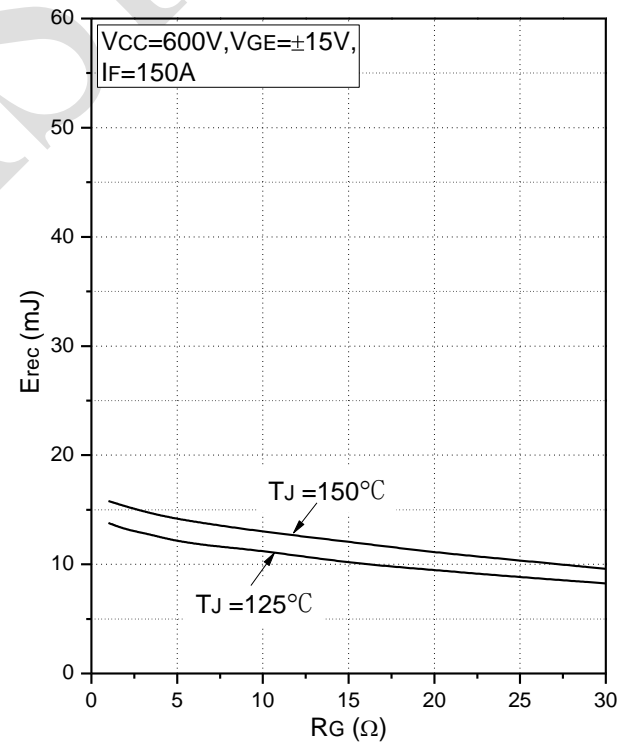


Fig.8 Typical Switching Loss vs. Gate Resistance

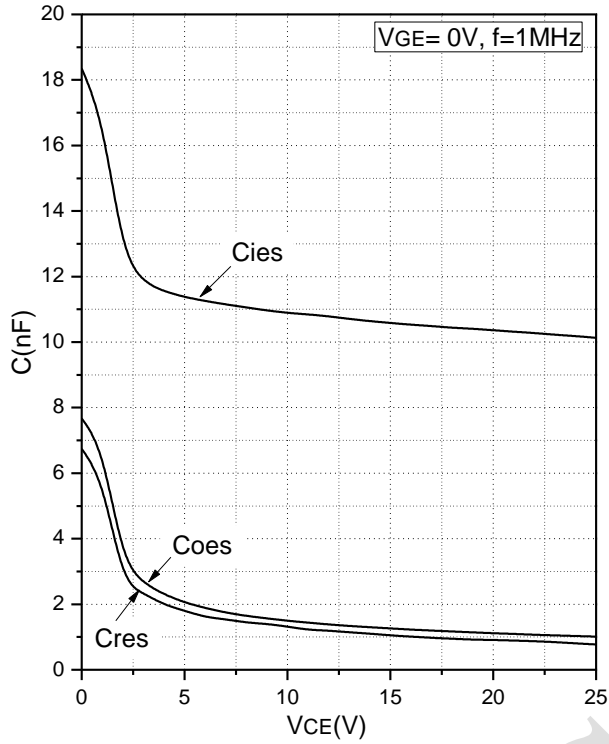


Fig.9 Capacitance Characteristics

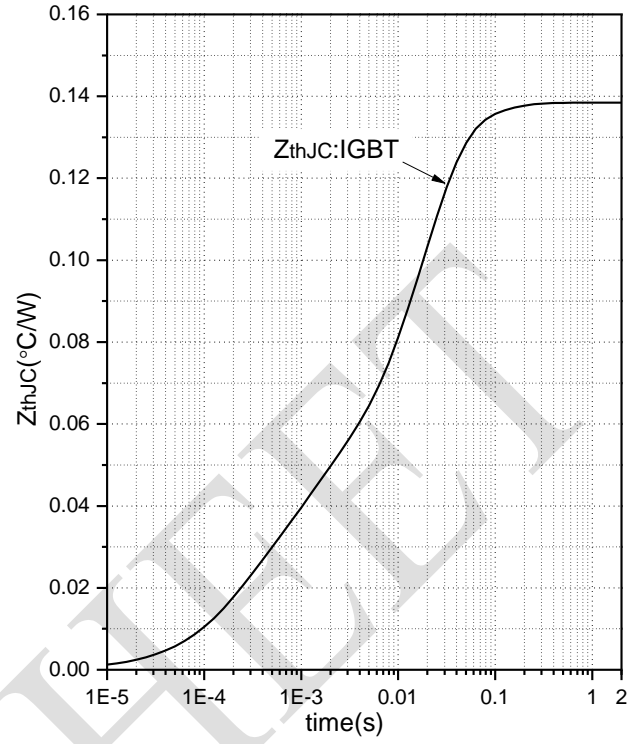


Fig.10 Transient Thermal Impedance (IGBT)

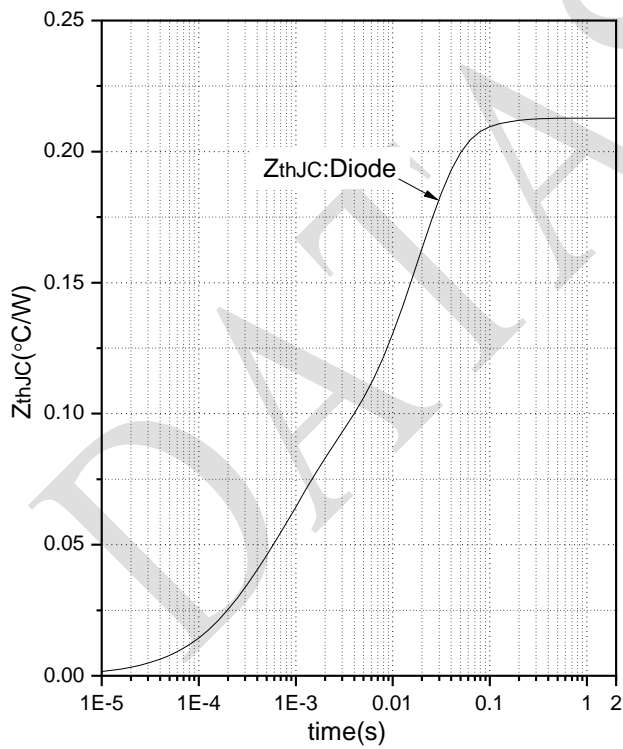
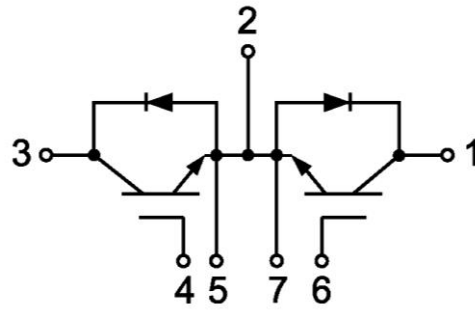


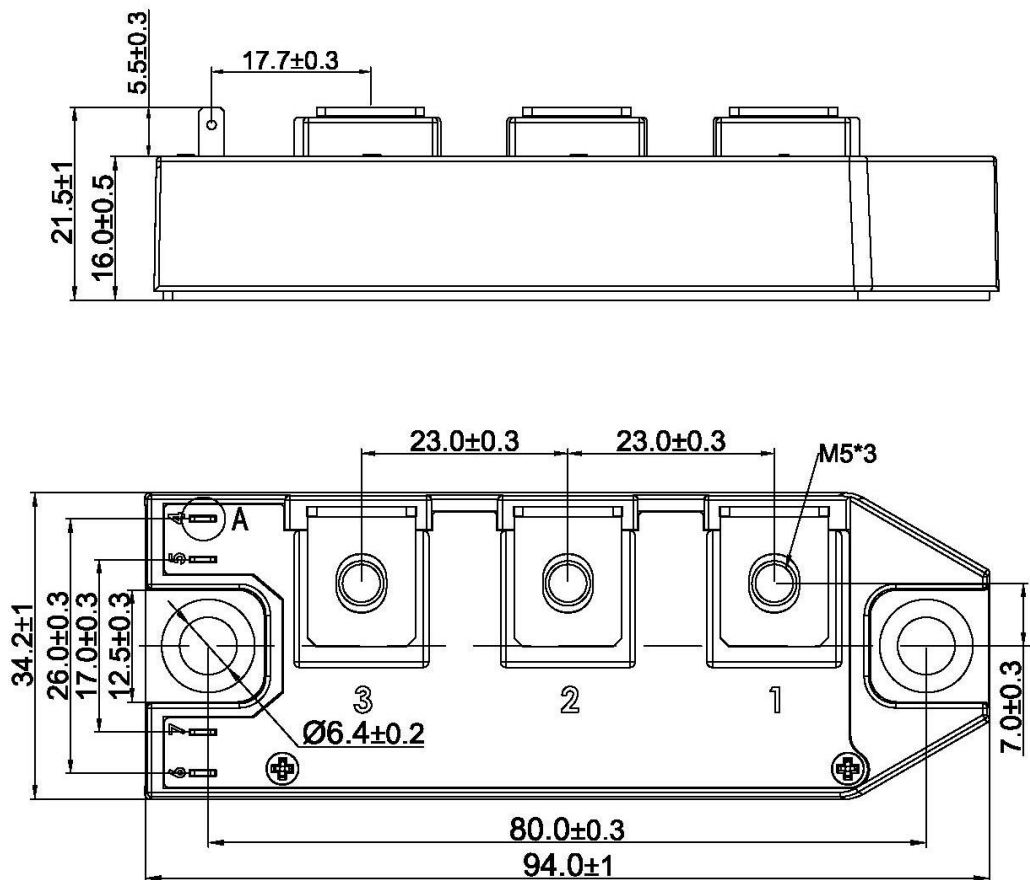
Fig.11 Transient Thermal Impedance (Diode)



Internal Circuit



Package Outline (Unit: mm):





Date	Revision	Notes
04/06/2021	01	Initial Release

Announcement

Information in this document is believed to be accurate and reliable. However, NJSME does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to Make Changes

NJSME reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

The datasheet with “REV.” + “Arabic numerals” is based on engineering data for initial reference purpose only.

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

DATA SHEET