



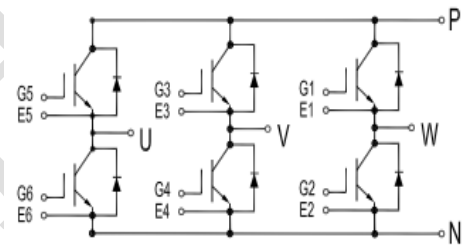
GT50FF120A1H-C

IGBT Module

Preliminary Data

Features:

- Trench & Field Stop IGBT
- Short Circuit Rated >10 μ s
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested(2xI_c)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- Industrial Inverters
- Servo Applications

IGBT, Inverter Maximum Rated Values

V _{CES}	Collector-Emitter Blocking Voltage	T _J =25°C	1200	V
V _{GES}	Gate-Emitter Voltage		±20	V
I _C	Continuous Collector Current	T _C =100°C	50	A
		T _C =25°C	100	A
I _{CM}	Repetitive Peak Collector Current	t _p =1ms	100	A
t _{SC}	Short Circuit Withstand Time		>10	μs
P _D	Maximum Power Dissipation per IGBT	T _C =25°C T _{Jmax} =175°C	398	W



Electrical Characteristics of IGBT

Static Characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=1mA, V_{CE}=V_{GE}, T_J=25^{\circ}C$	5.0	5.6	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=50A, V_{GE}=15V$	$T_J=25^{\circ}C$	1.70	2.00	V
			$T_J=125^{\circ}C$	1.90		V
			$T_J=150^{\circ}C$	1.90		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0V, V_{CE}=V_{CES}, T_J=25^{\circ}C$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=\pm 20V, V_{CE}=0V, T_J=25^{\circ}C$			200	nA
C_{ies}	Input Capacitance	$V_{CE}=25V, V_{GE}=0V, f=100kHz, T_J=25^{\circ}C$		3.65		nF
C_{oes}	Output Capacitance			0.50		nF
C_{res}	Reveres Transfer Capacitance			0.31		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=50A, R_{Gon}=15\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^{\circ}C$	154		ns
			$T_J=125^{\circ}C$	169		
			$T_J=150^{\circ}C$	174		
t_r	Rise Time		$T_J=25^{\circ}C$	51		ns
			$T_J=125^{\circ}C$	54		
			$T_J=150^{\circ}C$	56		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^{\circ}C$	202		ns
			$T_J=125^{\circ}C$	216		
			$T_J=150^{\circ}C$	225		
t_f	Fall Time	$T_J=25^{\circ}C$	220		ns	
		$T_J=125^{\circ}C$	379			
		$T_J=150^{\circ}C$	407			
E_{on}	Turn-on Switching Loss	$T_J=25^{\circ}C$	3.37		mJ	
		$T_J=125^{\circ}C$	5.10			
		$T_J=150^{\circ}C$	5.53			



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =50A, R _{Goff} =15Ω, V _{GE} =±15V, du/dt=3488V/μs(T _J =150°C), Inductive Load	T _J =25°C	2.42	mJ
			T _J =125°C	4.09	
			T _J =150°C	4.52	
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C	504	nC
RBSOA	I _C =100A, V _{CC} =1050V, V _p =1200V, R _{Goff} =15Ω, V _{GE} =+15V to 0V, T _J =150°C			Trapezoid	
SC data	V _{CC} =600V, t _p =10us, V _{ge} =+/-15V, R _{Gon} =15ohm, R _{Goff} =15ohm, T _J =25°C			256	A
R _{θJC}	IGBT Thermal Resistance: Junction-To-Case			0.38	°C/W

Diode, Inverter Maximum Rated Values

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1200	V
I _F	Diode Continuous Forward Current		40	A
I _{FM}	Diode Maximum Forward Current	t _p =1ms	80	A

Electrical Characteristics of FWD

Symbol	Description	Conditions	Min	Typ	Max	Unit
V _{FM}	Forward Voltage	I _F =40 A	T _J =25°C	2.10		V
			T _J =125°C	2.20		
			T _J =150°C	2.20		
t _{rr}	Reverse Recovery Time		T _J =25°C	173		ns
			T _J =125°C	360		
			T _J =150°C	367		
I _{rr}	Peak Reverse Recovery Current	I _F =40A, -diF/dt =885A/μs (T _J =150°C), V _{rr} =600V, V _{GE} =-15V	T _J =25°C	23.1		A
			T _J =125°C	29.4		
			T _J =150°C	30.6		
Q _{rr}	Reverse Recovery Charge		T _J =25°C	2.03		μC
			T _J =125°C	4.38		
			T _J =150°C	4.97		

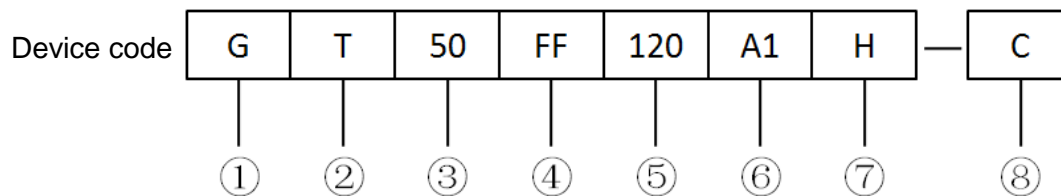


E _{rec}	Reverse Recovery Energy	I _F =40A, -diF/dt =885A/μs (T _J =150°C), V _{rr} =600V, V _{GE} =-15V	T _J =25°C	0.73	mJ
			T _J =125°C	1.59	
			T _J =150°C	2.03	
R _{θJC}	Diode Thermal Resistance: Junction-To-Case (Diode Part, Per Leg)			0.55	°C/W

Module

Symbol	Description	Min	Typ	Max	Unit
V _{iso}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500		V
T _J	Maximum Junction Temperature				
T _{JOP}	Maximum Operating Junction Temperature Range				
T _{stg}	Storage Temperature				
CTI	Comparative Tracking Index				
R _{θCS}	Case-To-Sink Thermally (Conductive Grease Applied)				
T	Mounting Screw:M3				
G	Weight				

Ordering Information Table



- ① - IGBT Module
- ② - Trench & Field Stop IGBT
- ③ - Rated Current (50=50A)
- ④ - Circuit Configuration: FF(Full Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)
- ⑧ -Internal Code

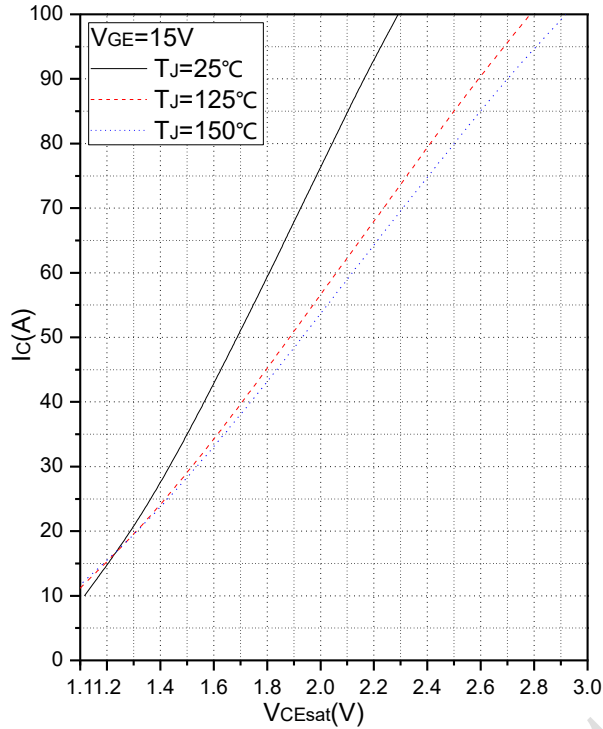


Fig.1 Typical Saturation Voltage Characteristics

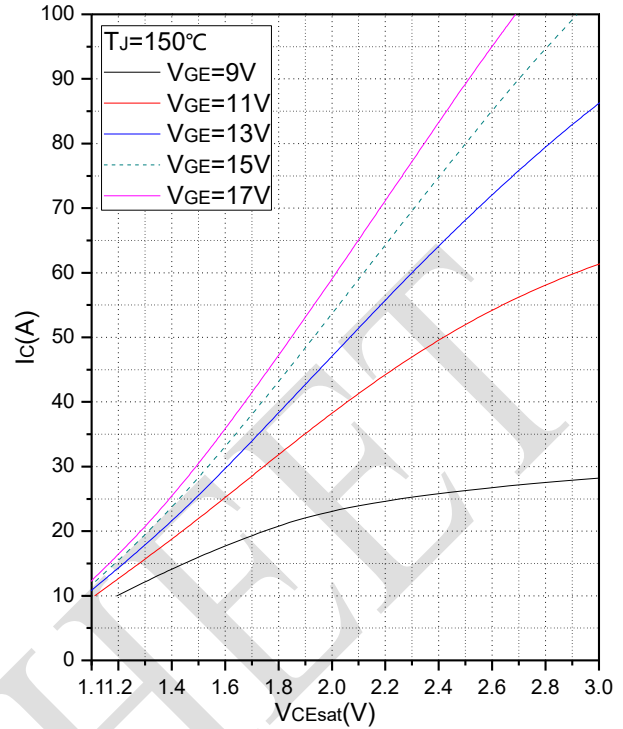


Fig.2 Typical Output Characteristics

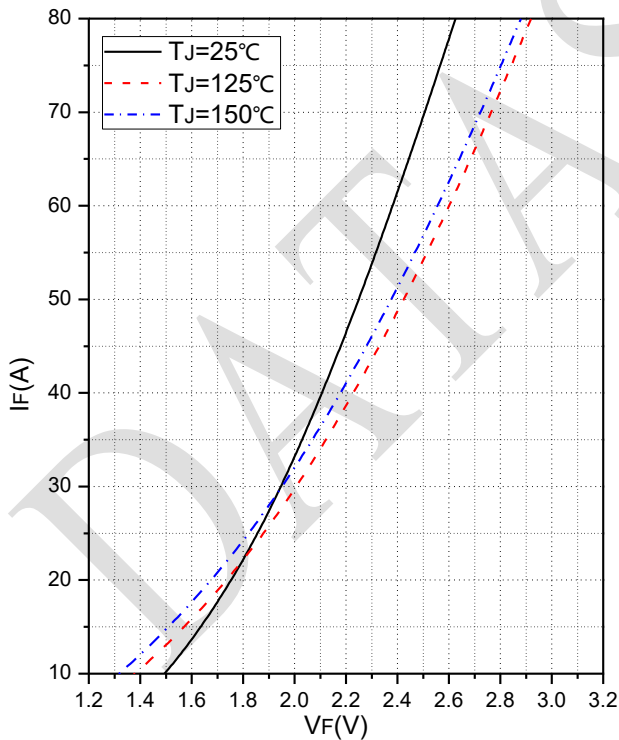


Fig.3 Forward Characteristics of FWD

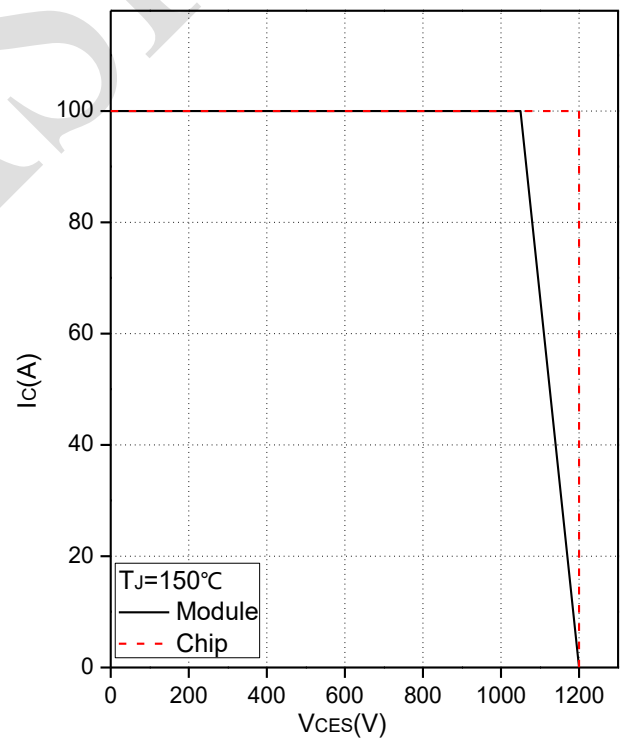


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

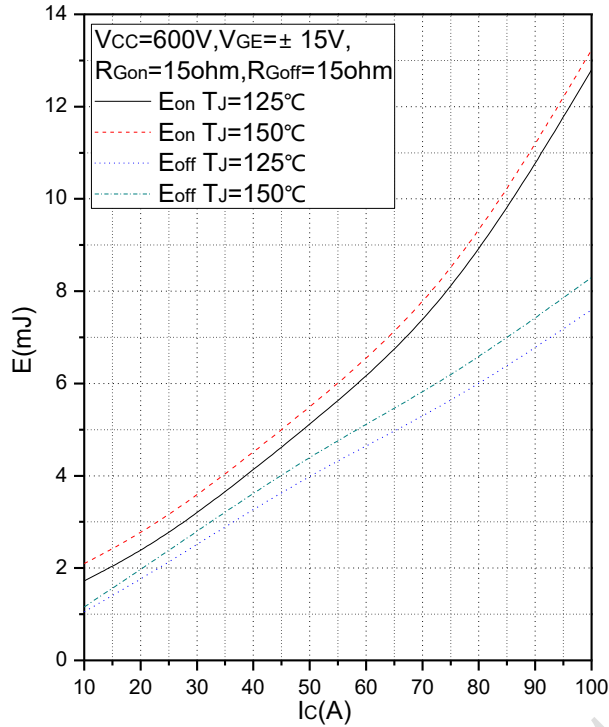


Fig.5 Typical Switching Loss vs. Collector Current

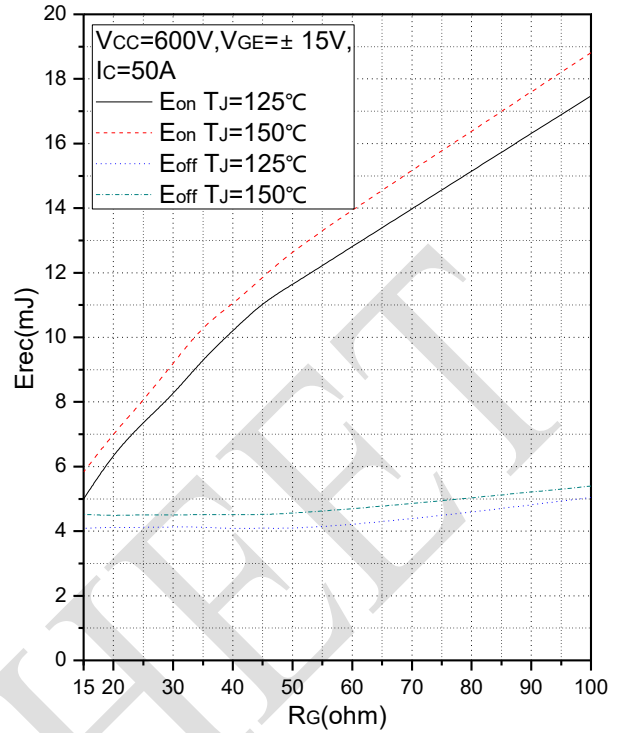


Fig.6 Typical Switching Loss vs. Gate Resistance

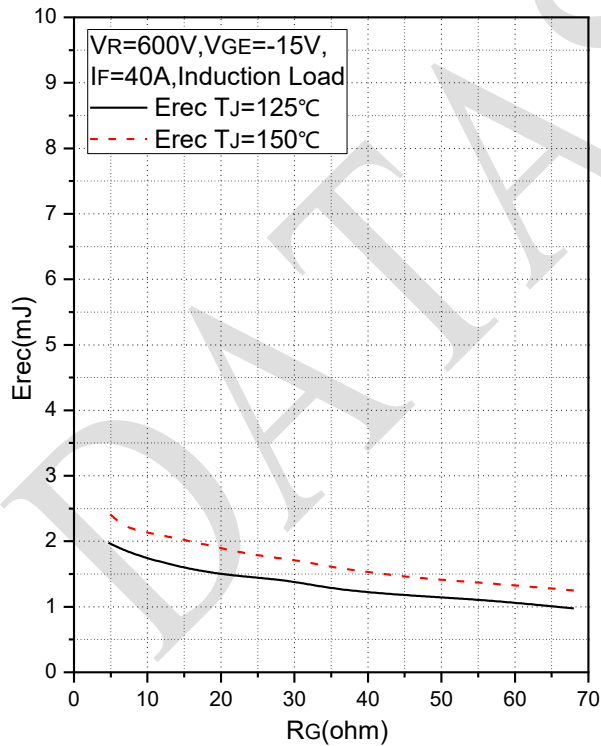


Fig.7 Typical Switching Loss vs. Gate Resistance

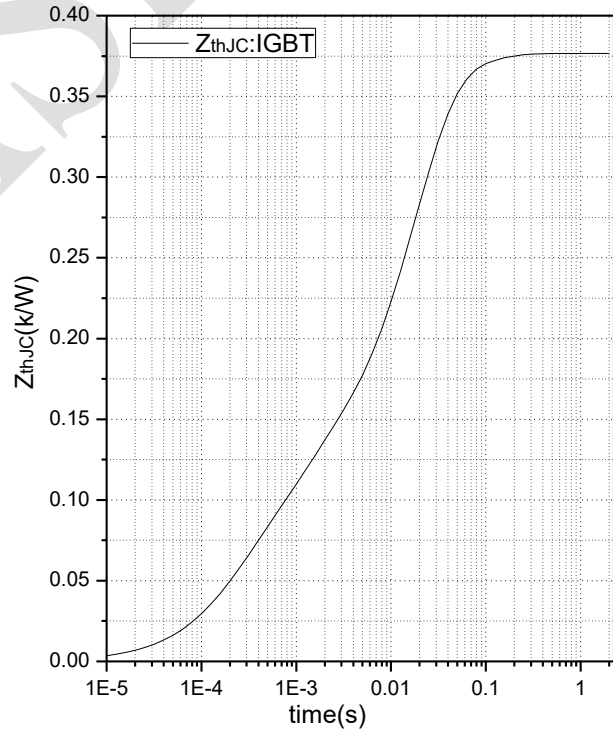


Fig.8 Transient Thermal Impedance (IGBT)

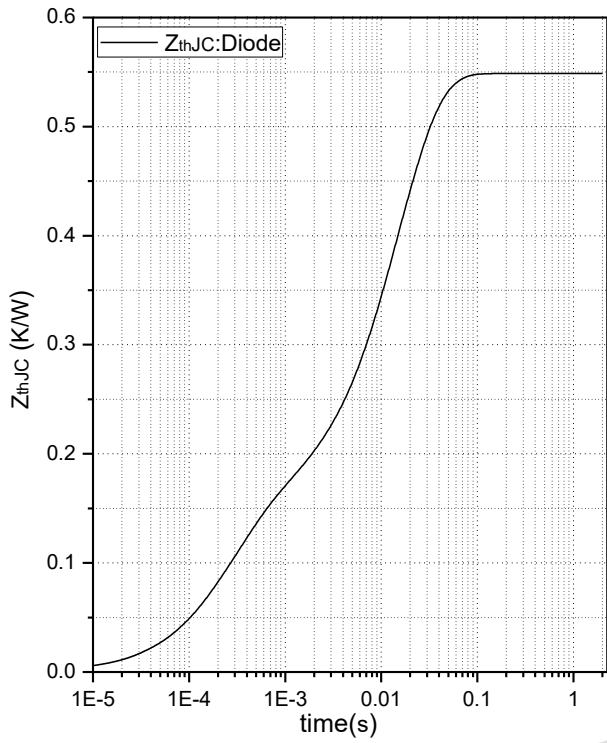


Fig.9 Transient Thermal Impedance (Diode)

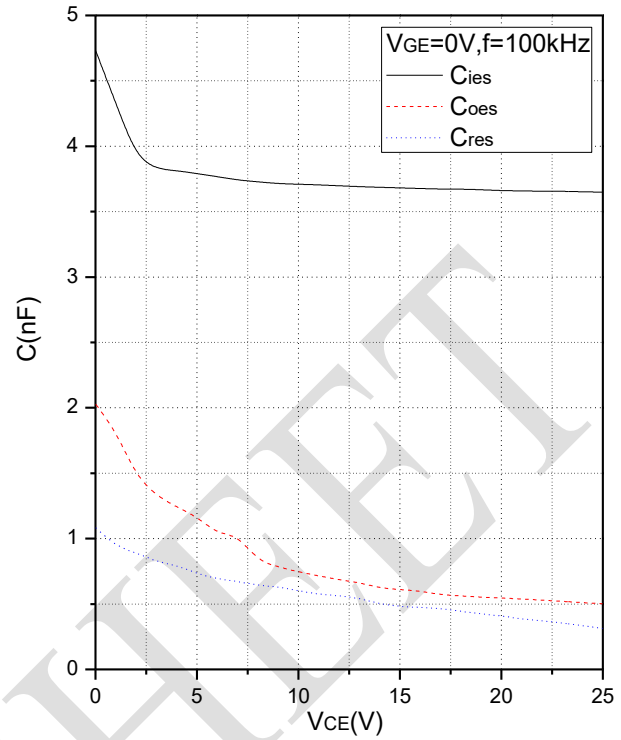
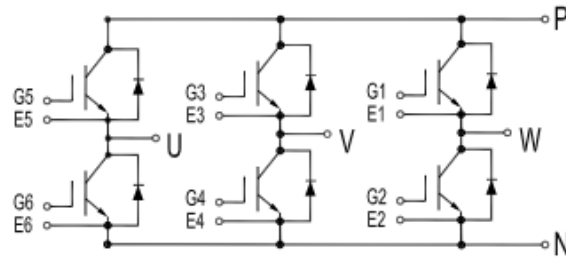


Fig.10 Capacitance Characteristics

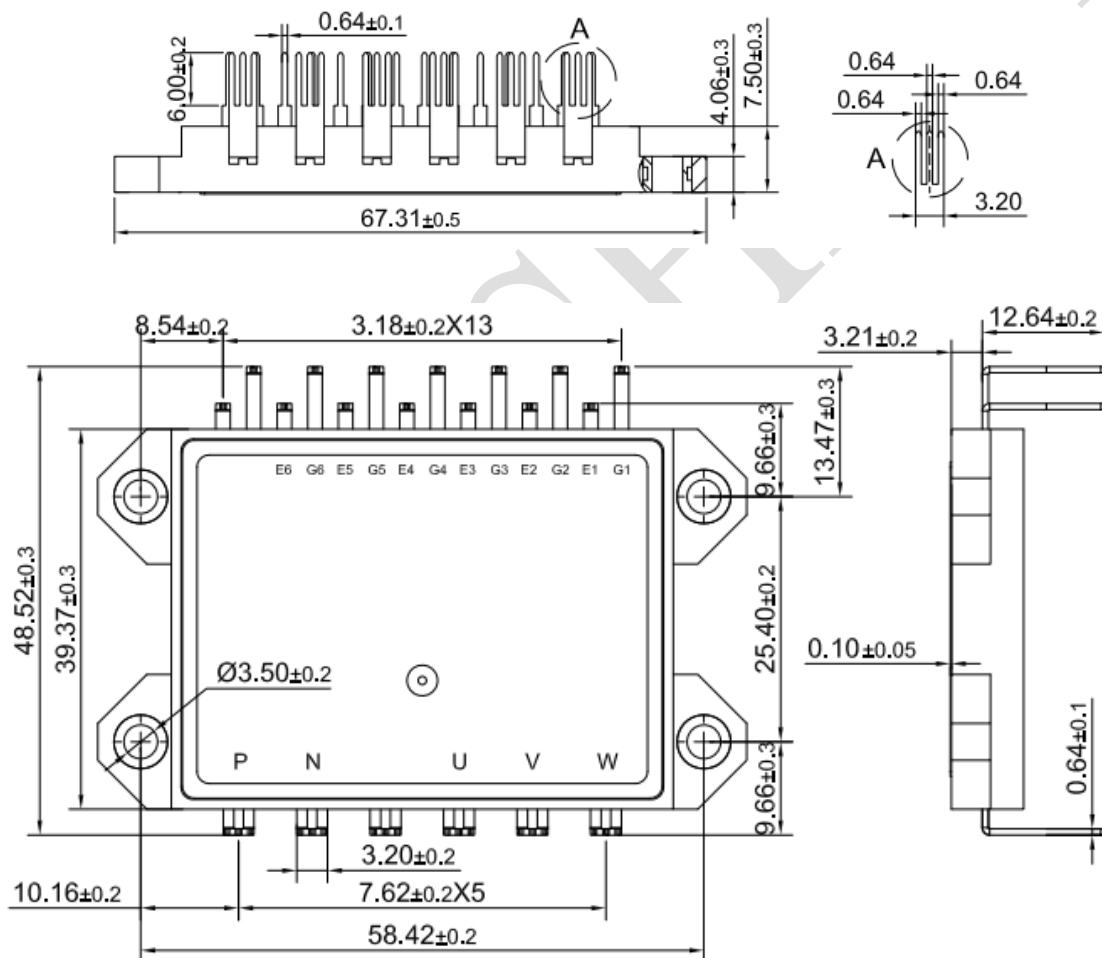
DATA SHEET



Internal Circuit:



Package Outline (Unit: mm):





Date	Revision	Notes
06/23/2022	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