



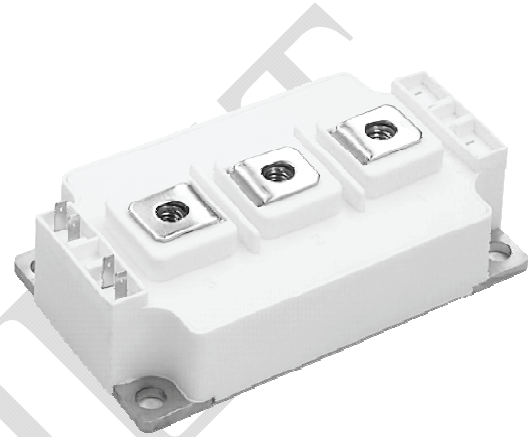
GT300CE120T2NH

IGBT Module

Preliminary Data

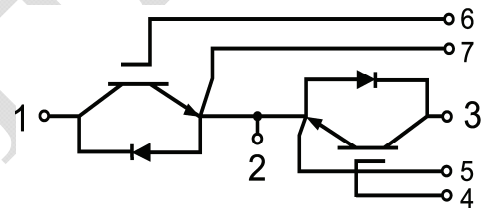
Features:

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



Applications:

- Welding
- HEV Inverter
- Industrial Motor Drives
- UPS



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	300	A
		T _C =25°C	580	A
I _{CM}	Repetitive Peak Collector Current	T _J =175°C	600	A
t _{SC}	Short Circuit Withstand Time		>10	μs
P _D	Maximum Power Dissipation per IGBT	T _C =25°C T _{Jmax} =175°C	1975	W



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

Static Characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C = 4\text{mA}, V_{CE} = V_{GE}$	5.0	5.6	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 300\text{A}, V_{GE} = 15\text{V}$	$T_J=25^\circ\text{C}$	1.70	1.90	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	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		25.2		nF
C_{res}	Reverse Transfer Capacitance			0.86		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600\text{V}, I_C = 300\text{A}, R_{Gon} = 2\Omega, V_{GE} = \pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	0.39		μs	
			$T_J=125^\circ\text{C}$	0.40			
			$T_J=150^\circ\text{C}$	0.40			
t_r	Rise Time		$T_J=25^\circ\text{C}$	0.13		μs	
			$T_J=125^\circ\text{C}$	0.13			
			$T_J=150^\circ\text{C}$	0.13			
$t_{d(off)}$	Turn-off Delay Time		$V_{CC} = 600\text{V}, I_C = 300\text{A}, R_{Goff} = 2\Omega, V_{GE} = \pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	0.39		μs
				$T_J=125^\circ\text{C}$	0.42		
				$T_J=150^\circ\text{C}$	0.42		
t_f	Fall Time	$T_J=25^\circ\text{C}$		0.13		μs	
		$T_J=125^\circ\text{C}$		0.19			
		$T_J=150^\circ\text{C}$		0.21			
E_{on}	Turn-on Switching Loss	$V_{CC} = 600\text{V}, I_C = 300\text{A}, R_{Gon} = 2\Omega, V_{GE} = \pm 15\text{V},$ $di/dt=1880\text{A}/\mu\text{s} (T_J=150^\circ\text{C})$ Inductive Load		$T_J=25^\circ\text{C}$	20.6		mJ
				$T_J=125^\circ\text{C}$	27.3		
				$T_J=150^\circ\text{C}$	29.7		



E _{off}	Turn-off Switching Loss	V _{CC} = 600V, I _C = 300A, R _{Goff} = 2Ω, V _{GE} = ±15V, du/dt=3300V/μs (T _J =150°C) Inductive Load	T _J =25°C	26.7	mJ
			T _J =125°C	35.6	
			T _J =150°C	38.3	
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C	1.56	μC
R _{g internal}	Internal Gate Resistance		T _J =25°C	2.5	Ω
RBSOA	I _C =600A, V _{CC} =1050V, V _p =1200V, R _{Goff} = 2Ω, V _{GE} =+15V to 0V, T _J =150°C			Trapezoid	
I _{SC}	SC Data	V _{CC} =600V, V _{GE} =±15V, R _{Gon} =2ohm, R _{Goff} =2ohm, t _p =10us, T _J =125°C, Inductive Load		1594	A
R _{θJC}	IGBT Thermal Resistance: Junction-To-Case(per leg)			0.076	°C/W

Diode Inverter

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

V _{RRM}	Repetitive Peak Reverse Voltage	1200	V
I _F	Diode Continuous Forward Current	300	A
I _{FM}	Diode Maximum Forward Current	600	A

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

Symbol	Description	Conditions	Min	Typ	Max	Unit
V _{FM}	Forward Voltage	I _F =300A	T _J =25°C	1.80		V
			T _J =125°C	1.80		
			T _J =150°C	1.80		
t _{rr}	Reverse Recovery Time	I _F =300A, -di _F /dt =2010A/μs(T _J =150°C), V _R = 600V, V _{GE} = -15V	T _J =25°C	0.41		μs
			T _J =125°C	0.60		
			T _J =150°C	0.64		
I _{rr}	Peak Reverse Recovery Current	I _F =300A, -di _F /dt =2010A/μs(T _J =150°C), V _R = 600V, V _{GE} = -15V	T _J =25°C	150		A
			T _J =125°C	181		
			T _J =150°C	191		



Q _{rr}	Reverse Recovery Charge	I _F = 300A, -diF/dt = 2010/μs(T _J = 150°C), V _R = 600V, V _{GE} = -15V	T _J = 25°C	29.7	μC
			T _J = 125°C	50.7	
			T _J = 150°C	57.8	
E _{rec}	Reverse Recovery Energy		T _J = 25°C	12.9	mJ
			T _J = 125°C	22.0	
			T _J = 150°C	25.4	
R _{θJC}	Diode Thermal Resistance: Junction-To-Case (per leg)		0.134	°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)			0.03		°C/W
T	Power Terminals Screw:M6		4.0		6.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			300		g

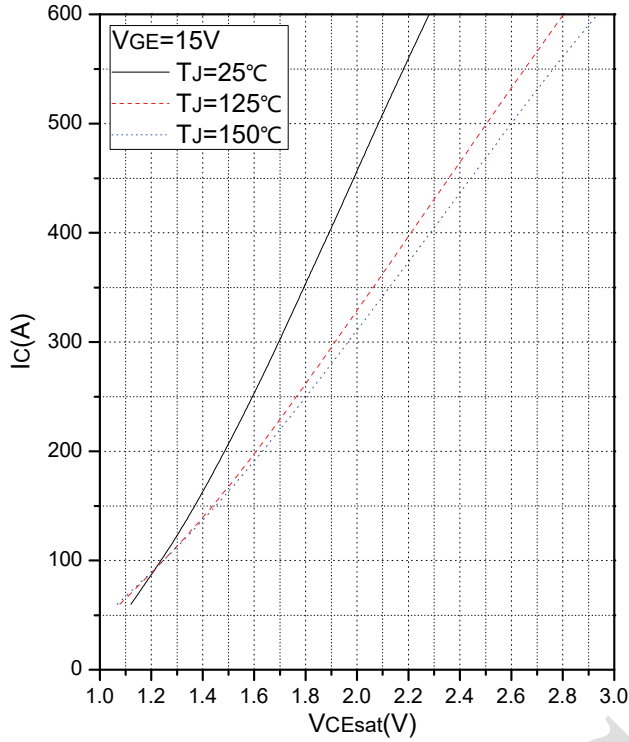


Fig.1 Typical Saturation Voltage Characteristics

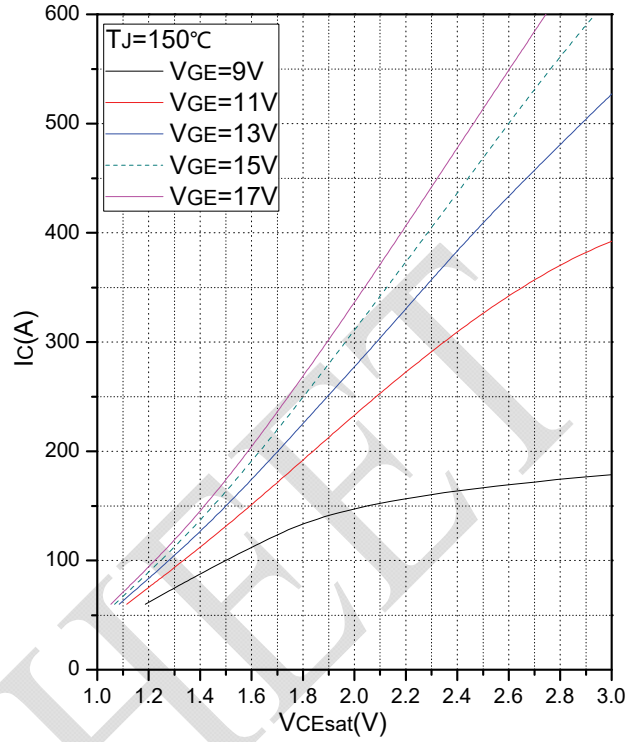


Fig.2 Typical Output Characteristics

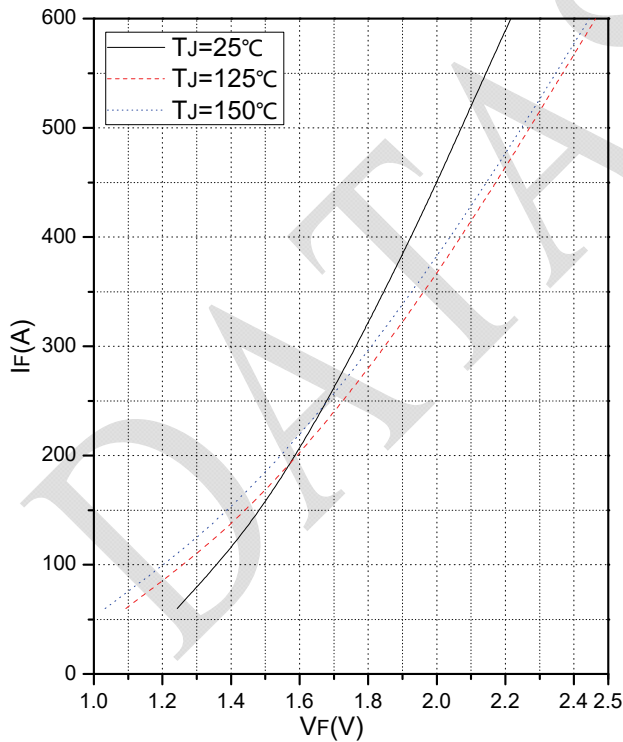


Fig.3 Forward Characteristics of Diode

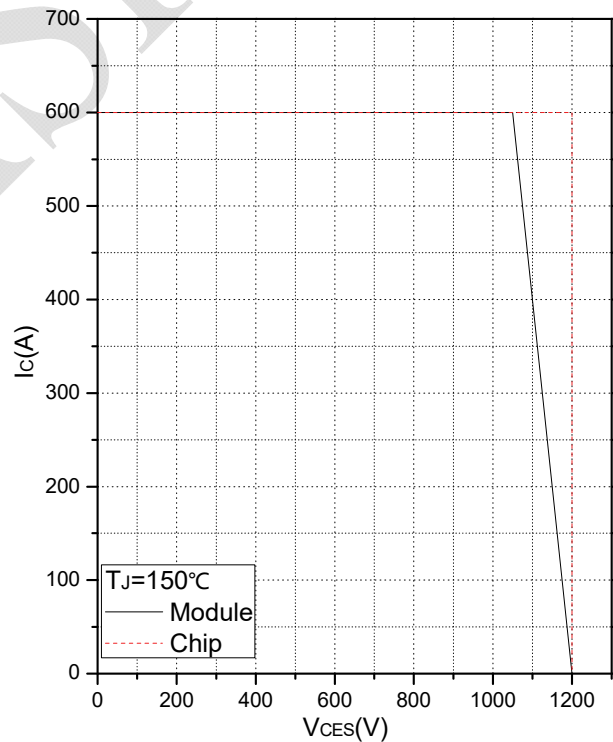


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

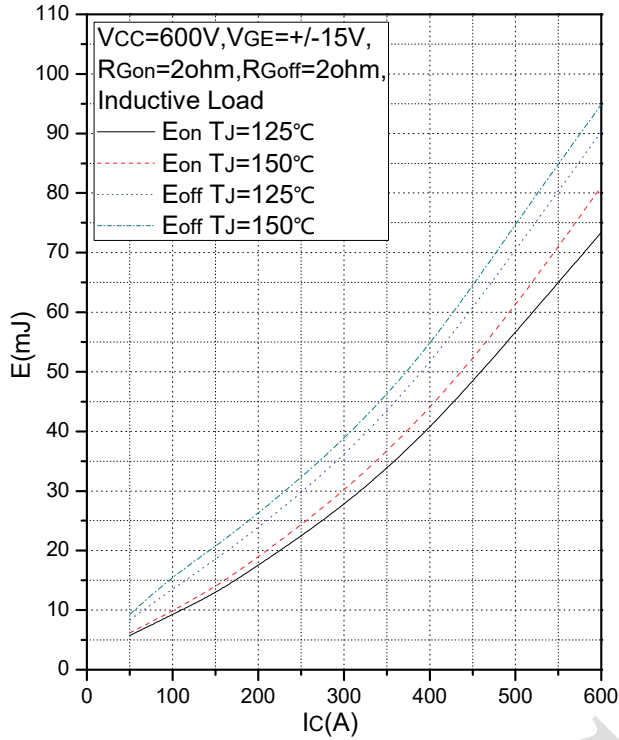


Fig.5 Typical Switching Loss vs. Collector Current

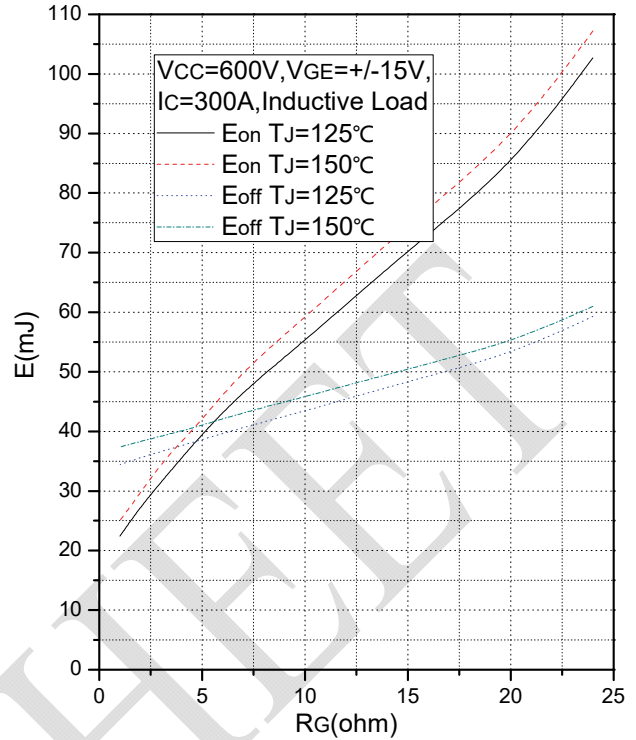


Fig.6 Typical Switching Loss vs. Gate Resistance

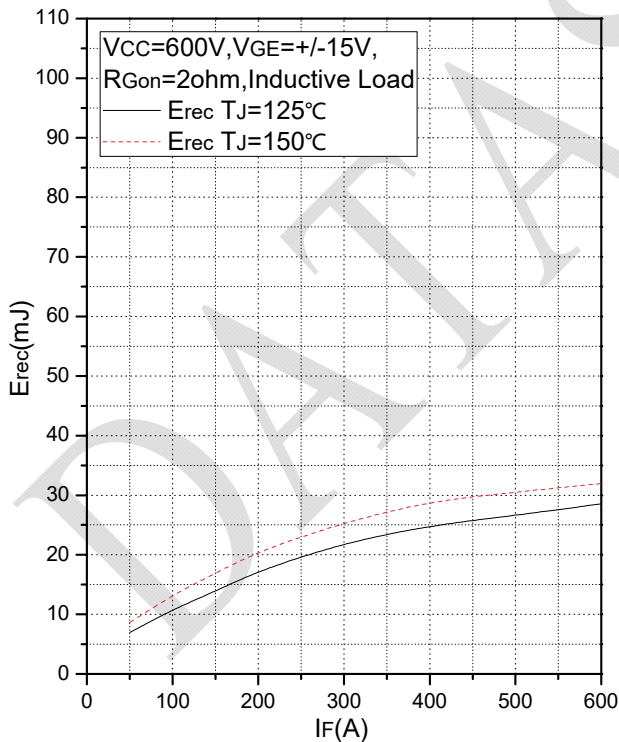


Fig.7 Typical Switching Loss vs. Forward Current

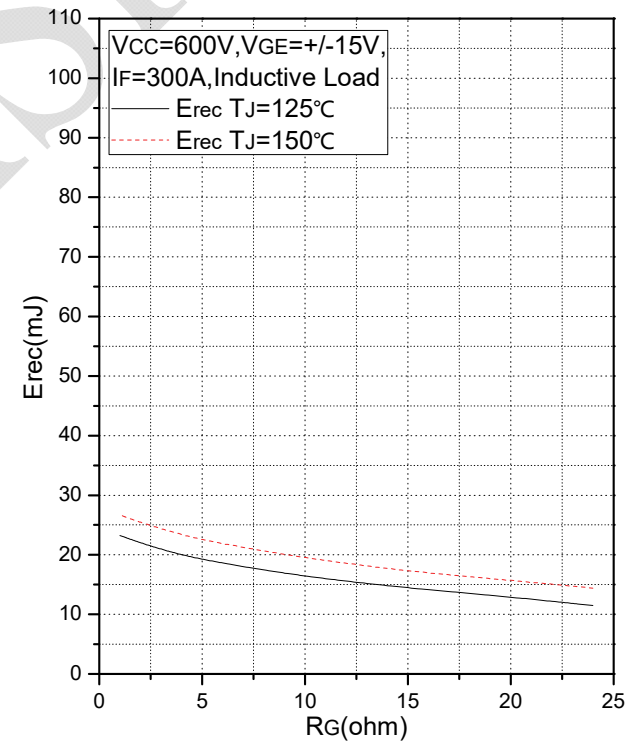


Fig.8 Typical Switching Loss vs. Gate Resistance

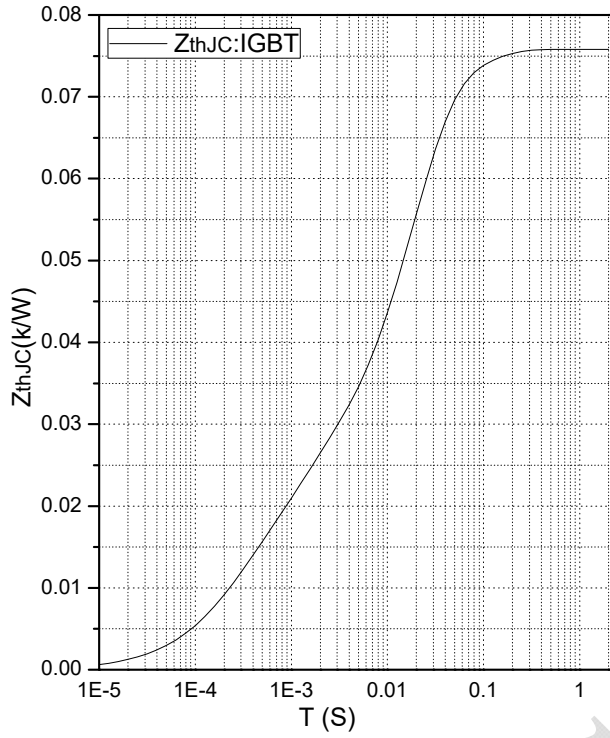


Fig.9 Transient Thermal Impedance (IGBT)

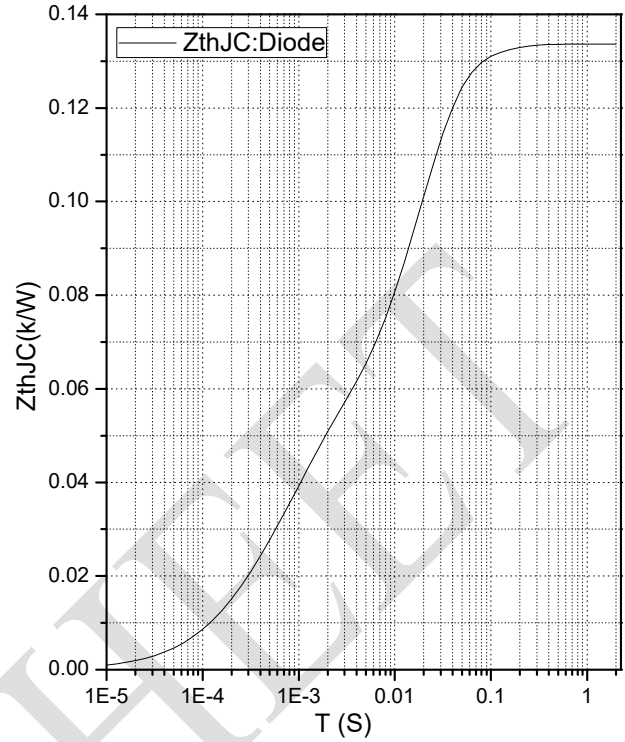
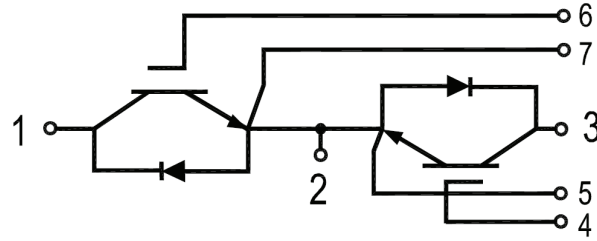


Fig.10 Transient Thermal Impedance (Diode)

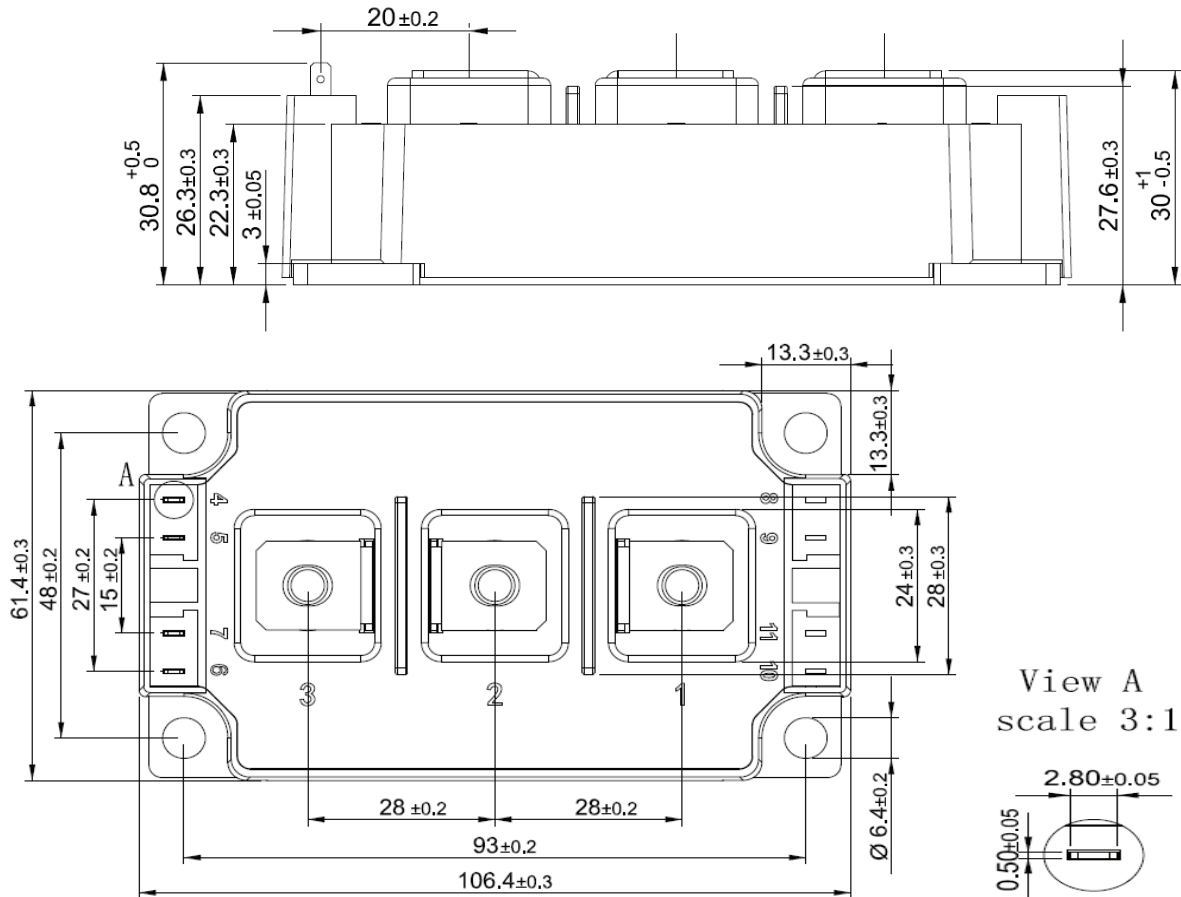
DATA SHEET



Internal Circuit



Package Outline (Unit: mm):





Date	Revision	Notes
03/20/2020	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.

DATA SHEET