

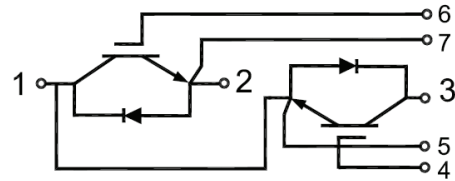


GT300HF120T2NH

IGBT Module

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

Maximum Rated Values of IGBT

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	300	A
		T _C =25°C	580	A
I _{CM}	Repetitive Peak Collector Current	t _p =1ms	600	A
t _{SC}	Short Circuit Withstand Time		>10	μs
P _D	Maximum Power Dissipation per leg	T _C =25°C T _{Jmax} =175°C	1975	W



Electrical Characteristics of IGBT

Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=4mA, V_{CE}=V_{GE}, T_J=25^\circ C$	5.0	5.6	6.6	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300A, V_{GE}=15V$	$T_J=25^\circ C$	1.70	1.90	V
			$T_J=125^\circ C$	1.90		V
			$T_J=150^\circ C$	2.00		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	$V_{GE}=\pm 20V, V_{CE}=0V, T_J=25^\circ C$			400	nA
C_{ies}	Input Capacitance	$V_{CE}=25V, V_{GE}=0V, f=1MHz, T_J=25^\circ C$		25.2		nF
C_{res}	Reverse Transfer Capacitance			0.86		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=300A, R_{Gon}=2\Omega, V_{GE}=\pm 15V, \text{Inductive Load}$	$T_J=25^\circ C$	0.39		μs
			$T_J=125^\circ C$	0.40		
			$T_J=150^\circ C$	0.40		
t_r	Rise Time		$T_J=25^\circ C$	0.13		μs
			$T_J=125^\circ C$	0.13		
			$T_J=150^\circ C$	0.13		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^\circ C$	0.39		μs
			$T_J=125^\circ C$	0.42		
			$T_J=150^\circ C$	0.42		
t_f	Fall Time	$T_J=25^\circ C$	0.13		μs	
		$T_J=125^\circ C$	0.19			
		$T_J=150^\circ C$	0.21			
E_{on}	Turn-on Switching Loss	$T_J=25^\circ C$	20.6		mJ	
		$T_J=125^\circ C$	27.3			
		$T_J=150^\circ C$	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, tp=10us, T _J =125°C, Inductive Load		1594	A
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case(per leg)			0.076	°C/W

Maximum Rated Values of Diode

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1200	V
I _F	Diode Continuous Forward Current		300	A
I _{FM}	Diode Maximum Forward Current	tp=1ms	600	A

Electrical Characteristics of Diode

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
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		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		T _J =25°C	29.7		μC
			T _J =125°C	50.7		
			T _J =150°C	57.8		



E _{rec}	Reverse Recovery Energy	I _F =300A, -diF/dt =2010/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	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.	Units
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		3.0	5.0	N·m
T	Mounting Screw:M6		4.0	6.0	N·m
G	Weight			300	g

Ordering Information Table

Device code	G	T	300	HF	120	T2N	H
	①	②	③	④	⑤	⑥	⑦

- ① - IGBT Module
- ② - Trench , Low Switching Losses IGBT
- ③ - Rated Current (300=300A)
- ④ - Circuit Configuration (Half Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

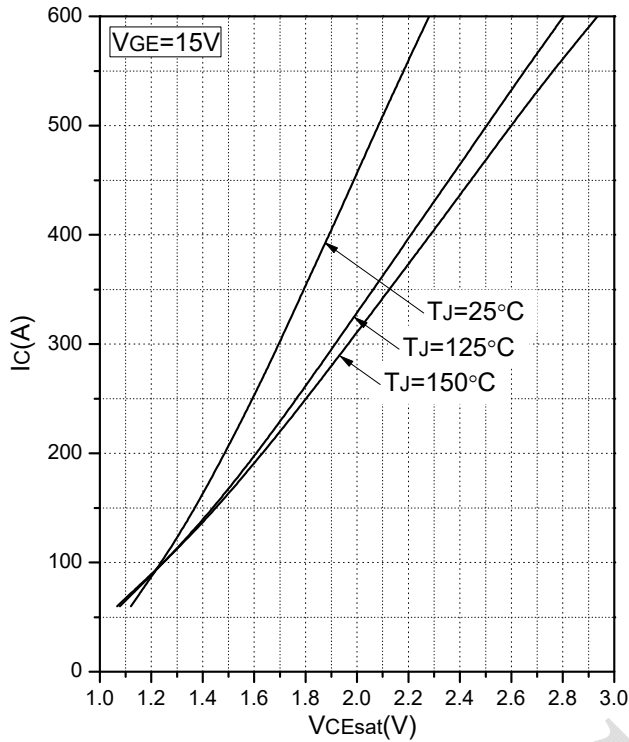


Fig.1 Typical Saturation Voltage Characteristics

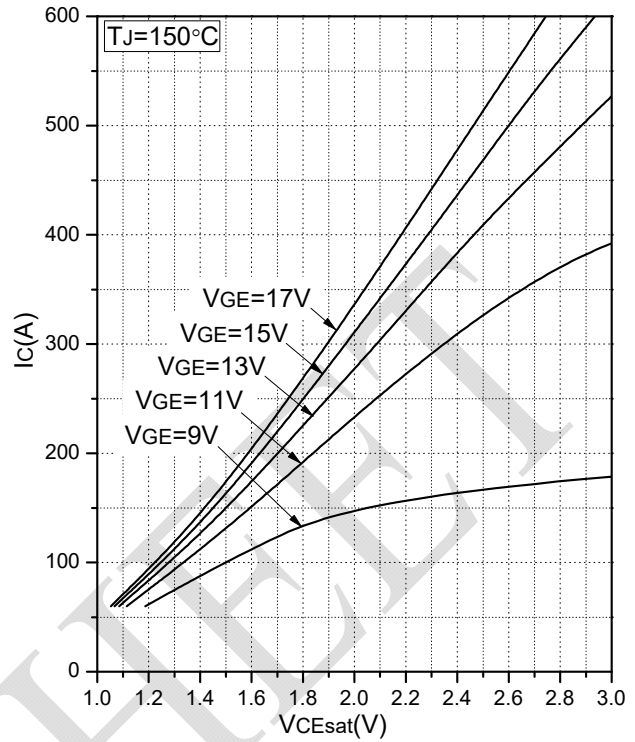


Fig.2 Typical Output Characteristics

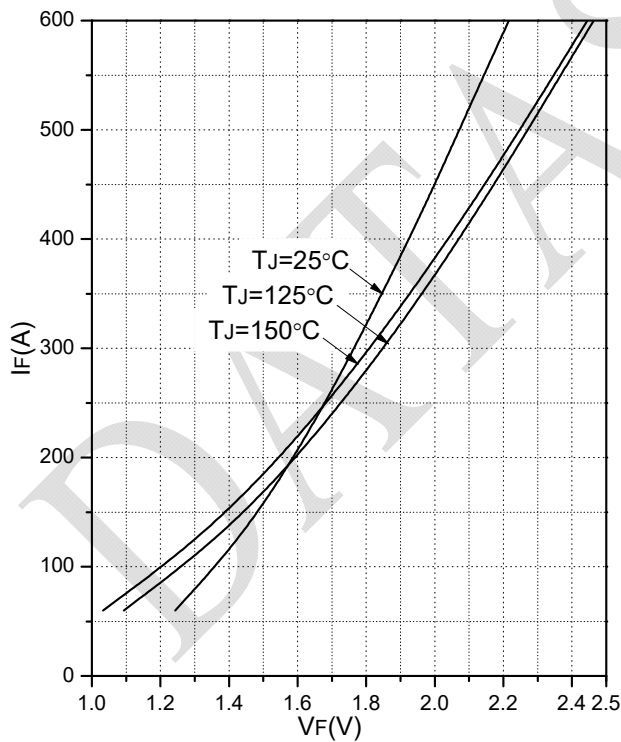


Fig.3 Forward Characteristics of Diode

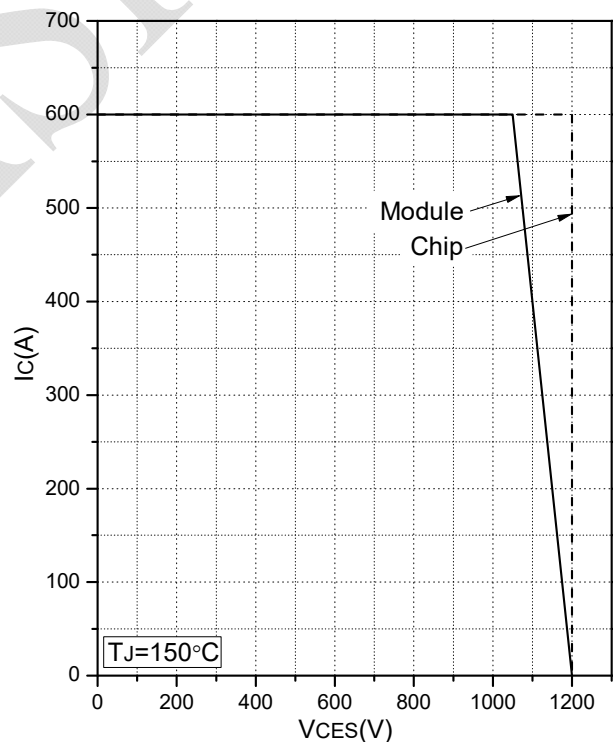


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

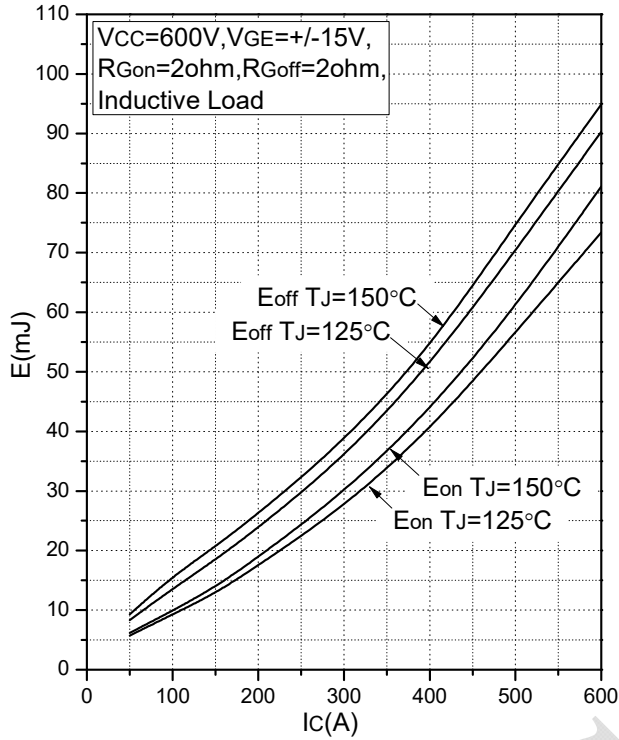


Fig.5 Typical Switching Loss vs. Collector Current

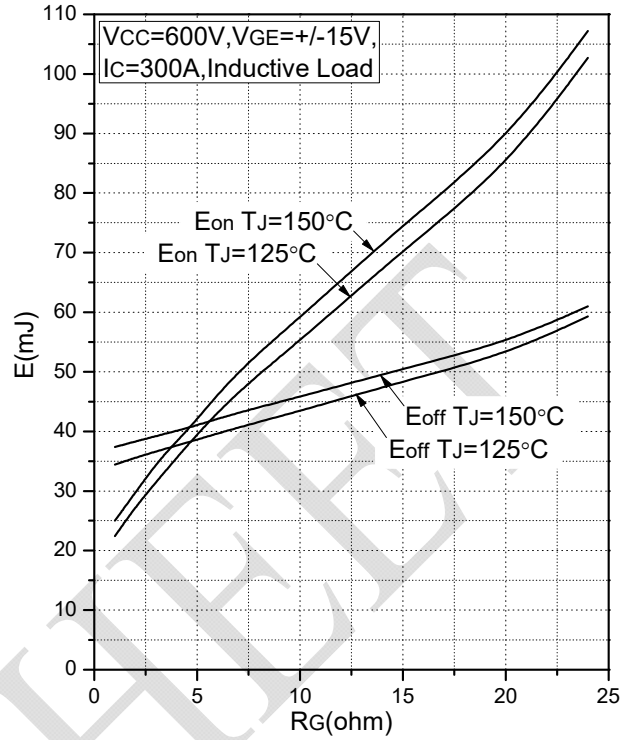


Fig.6 Typical Switching Loss vs. Gate Resistance

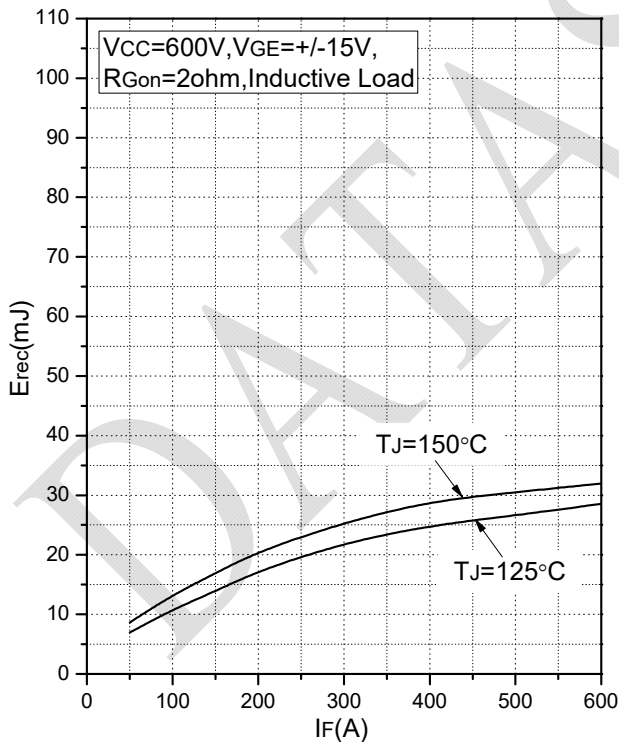


Fig.7 Typical Switching Loss vs. Forward Current

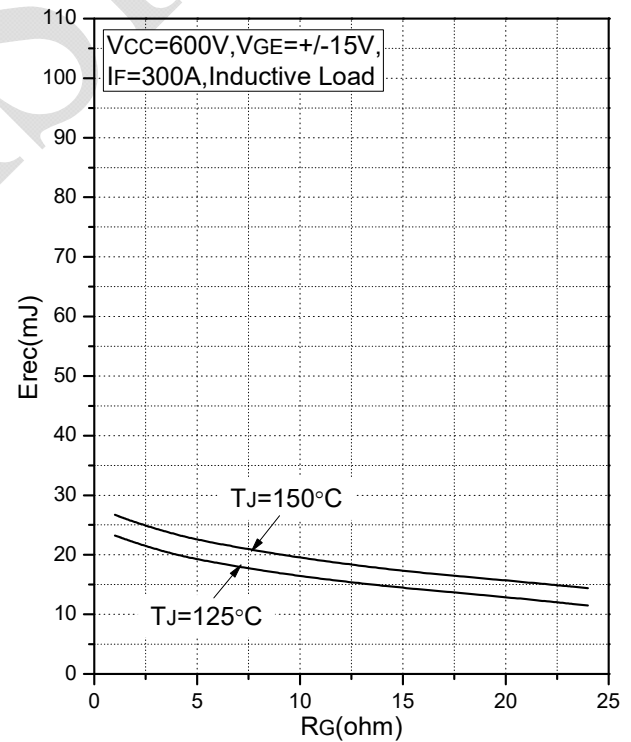


Fig.8 Typical Switching Loss vs. Gate Resistance

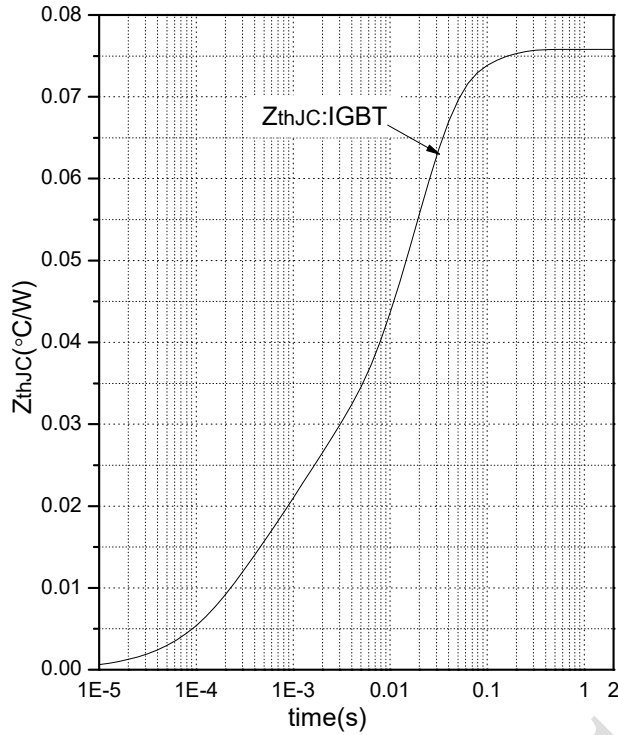


Fig.9 Transient Thermal Impedance (IGBT)

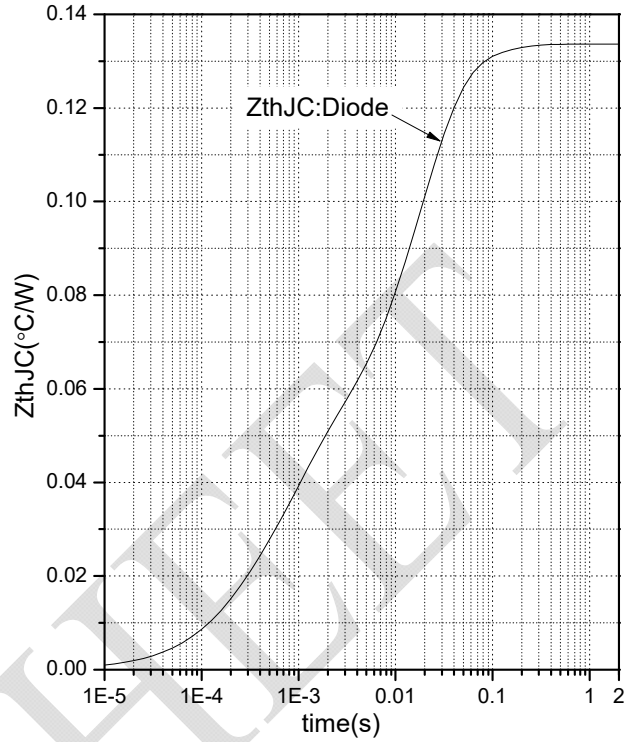
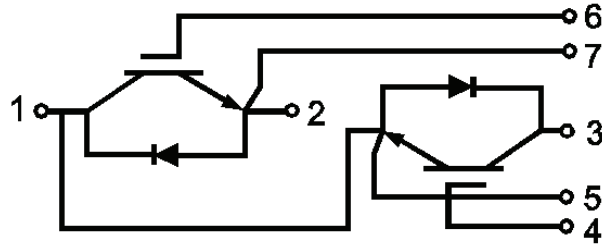


Fig.10 Transient Thermal Impedance (Diode)

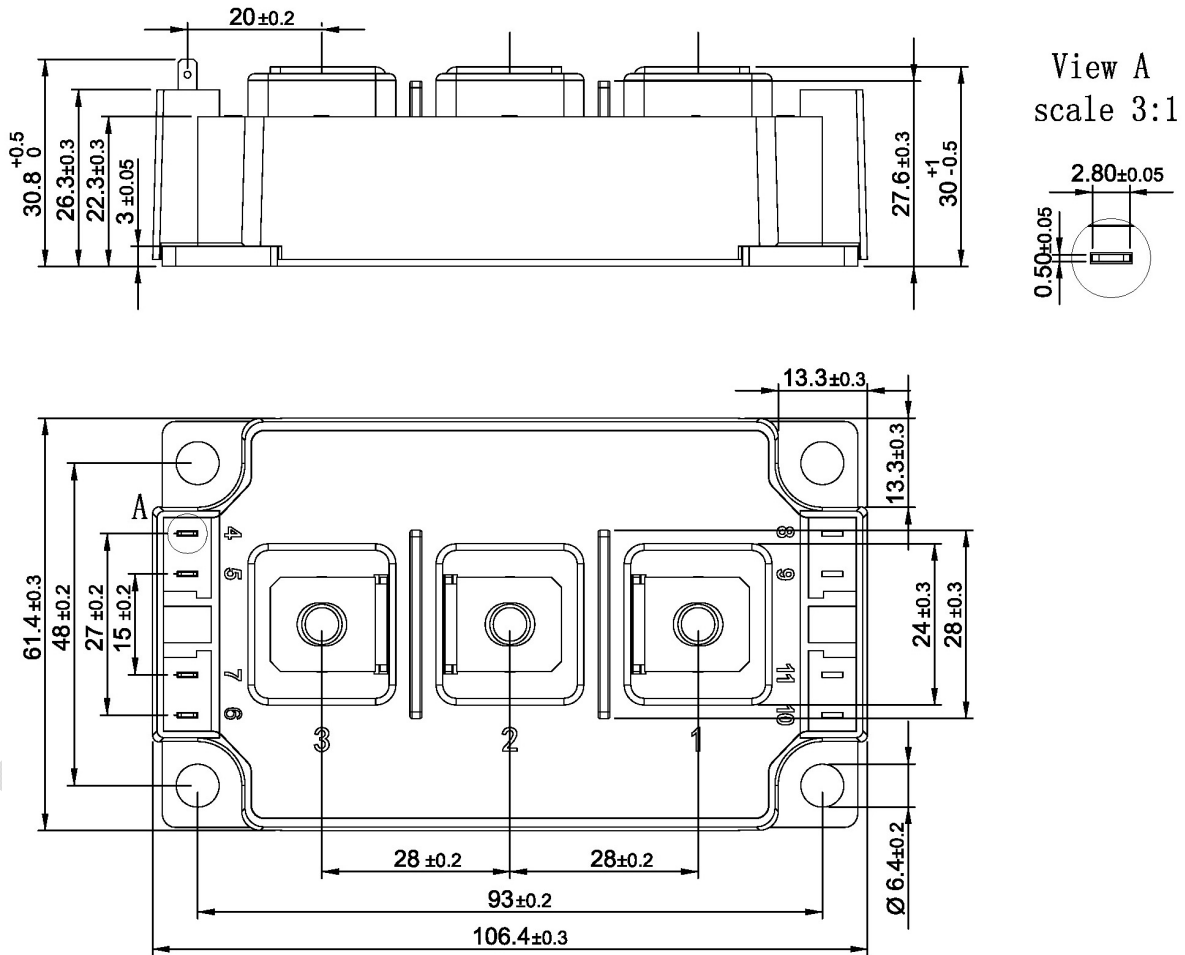
DATA SHEET



Internal Circuit



Package Outline (Unit: mm):





Date	Revision	Notes
03/24/2021	A	Final Version

Announcement

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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".