



GT450CL120T2NH

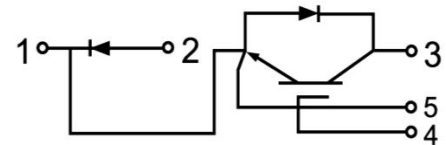
IGBT Module

Preliminary Datasheet

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

Circuit Diagram



Applications:

- Industrial Inverters
- Servo Applications

IGBT, Brake-Chopper

Maximum Rated Values of IGBT (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	450	A
		T _C =25°C	900	A
I _{CM}	Peak Collector Current Repetitive	t _p =1ms	900	A
P _D	Maximum Power Dissipation (IGBT)	T _C =25°C T _{Jmax} =175°C	2860	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	$I_C=15\text{mA}$, $V_{CE}=V_{GE}$	5.0		6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=450\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.79		V
			$T_J=125^{\circ}\text{C}$	2.13		V
			$T_J=175^{\circ}\text{C}$	2.25		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	$V_{GE}=20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			400	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		50.0		nF
C_{oes}	Output Capacitance			2.56		nF
C_{res}	Reveres Transfer Capacitance			0.51		nF

Switching Characteristics

t _{d(on)}	Turn-on Delay Time	V _{CC} =600V, I _C =450A, R _{Gon} =1Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		164		ns
			T _J =125℃		182		
			T _J =175℃		196		
t _r	Rise Time		T _J =25℃		99		ns
			T _J =125℃		110		
			T _J =175℃		116		
t _{d(off)}	Turn-off Delay Time	V _{CC} =600V, I _C =450A, R _{Goff} =1Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		261		ns
			T _J =125℃		290		
			T _J =175℃		310		
t _f	Fall Time		T _J =25℃		155		ns
			T _J =125℃		169		
			T _J =175℃		220		
E _{on}	Turn-on Switching Loss	V _{CC} =600V, I _C =450A, R _{Gon} =1Ω, V _{GE} =±15V, di/dt=3100A/μs(T _J =175℃), Inductive Load	T _J =25℃		58.6		mJ
			T _J =125℃		73.6		
			T _J =175℃		87.7		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =450A, R _{Goff} =1Ω, V _{GE} =±15V, du/dt=4800V/μs(T _J =175°C), Inductive Load	T _J =25°C		34.6		mJ
			T _J =125°C		39.2		
			T _J =175°C		48.9		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		2.86		nC
R _{G(int)}	Internal Gate Resistor				1.0		Ω
SCSOA	V _{CC} =600V, V _{GE} =±15V, T _J =175°C			10			μs
R _{θJC}	Thermal Resistance: Junction-to-Case (per IGBT)					0.052	°C/W

Diode, Brake-Chopper

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

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1200	V
I _F	Diode Continuous Forward Current		450	A
I _{FP}	Peak FWD Current Repetitive	t _p =1ms	900	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _F	Forward Voltage	I _F =450A	T _J =25℃		1.84		V
			T _J =125℃		1.98		
			T _J =175℃		1.99		
t _{rr}	Reverse Recovery Time	I _F =450A, -diF/dt=2300A/μs(T _J =175℃), V _R =600V, V _{GE} =-15V	T _J =25℃		314		ns
			T _J =125℃		464		
			T _J =175℃		594		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		160		A
			T _J =125℃		192		
			T _J =175℃		216		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		31.7		μC
			T _J =125℃		56.9		
			T _J =175℃		77.5		



E _{rec}	Reverse Recovery Energy	I _F =450A, -diF/dt=2300A/μs(T _J =175°C), V _R =600V, V _{GE} =-15V	T _J =25°C		9.7		mJ
			T _J =125°C		19.7		
			T _J =175°C		27.7		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.109	°C/W

Diode, Reverse

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

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25°C	1200	V
I _F	Diode Continuous Forward Current		300	A
I _{FM}	Peak Diode Current Repetitive	t _p =1ms	600	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 =300A	T _J =25°C		1.70		V
			T _J =125°C		1.80		
			T _J =175°C		1.80		
t _{rr}	Reverse Recovery Time	I _F =300A, -di _F /dt=2153A/μs (T _J =175°C), V _R =600V, V _{GE} =-15V	T _J =25°C		262		ns
			T _J =125°C		473		
			T _J =175°C		499		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		228		A
			T _J =125°C		246		
			T _J =175°C		246		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		25.2		μC
			T _J =125°C		46.2		
			T _J =175°C		52.4		
E _{rec}	Reverse Recovery Energy		T _J =25°C		7.2		mJ
			T _J =125°C		15.3		
			T _J =175°C		17.1		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.143	°C/W



Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 60s	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

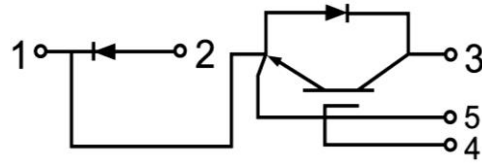
Device code

G	T	450	CL	120	T2N	H
①	②	③	④	⑤	⑥	⑦

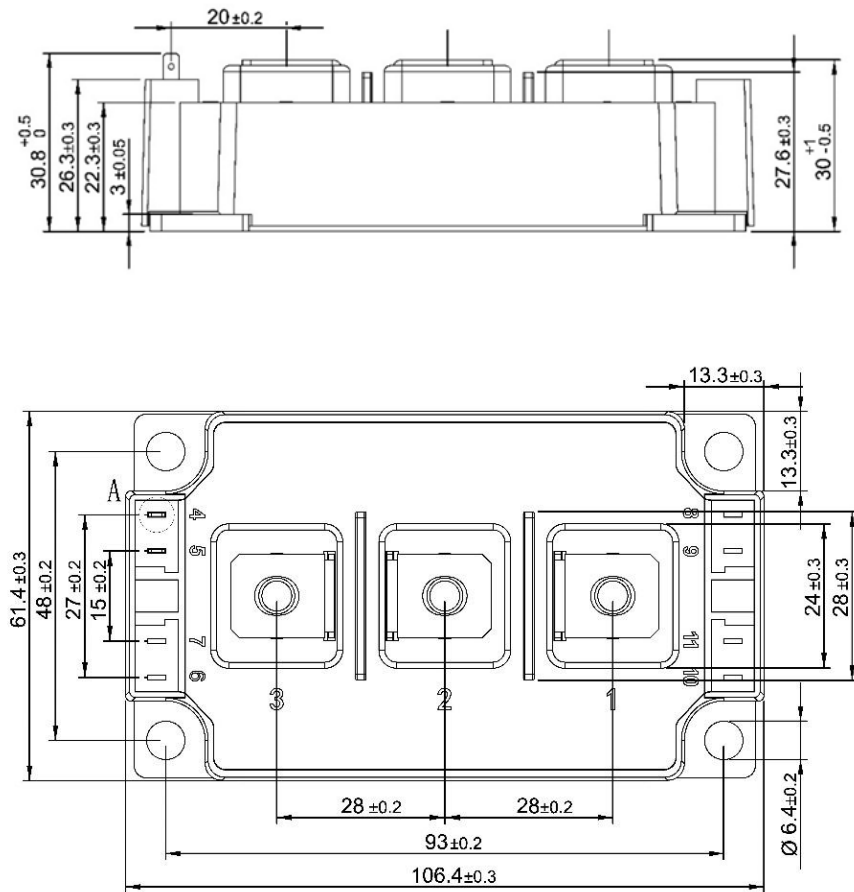
- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (450=450A)
- ④ - Circuit Configuration: Chopper, CL(Diode on Low Side)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



Internal Circuit



Package Outline (Unit: mm):





Revision	Notes
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”.