



GT450CL120T2NH

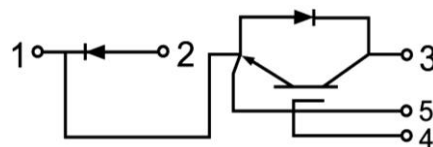
IGBT Module

Preliminary Datasheet

Features:

- Field Stop Trench Gate IGBT
- Short Circuit Rated $>10\mu\text{s}$
- 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 ($T_c=25^\circ\text{C}$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_c=100^\circ\text{C}$	450	A
		$T_c=25^\circ\text{C}$	900	A
I_{CM}	Peak Collector Current Repetitive	$t_p=1\text{ms}$	900	A
P_D	Maximum Power Dissipation (IGBT)	$T_c=25^\circ\text{C}$ $T_{Jmax}=150^\circ\text{C}$	2387	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	$I_C=17\text{mA}$, $V_{CE}=V_{GE}$	5.0		6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=450\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	2.23		V
			$T_J=125^{\circ}\text{C}$	2.93		V
			$T_J=150^{\circ}\text{C}$	3.19		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	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		51.34		nF
C_{oes}	Output Capacitance			2.58		nF
C_{res}	Reveres Transfer Capacitance			0.52		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℃		174		ns
			T _J =125℃		188		
			T _J =150℃		198		
t _r	Rise Time		T _J =25℃		45		ns
			T _J =125℃		53		
			T _J =150℃		56		
t _{d(off)}	Turn-off Delay Time	V _{CC} =600V, I _C =450A, R _{Goff} =1Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		217		ns
			T _J =125℃		244		
			T _J =150℃		258		
t _f	Fall Time		T _J =25℃		55		ns
			T _J =125℃		82		
			T _J =150℃		84		
E _{on}	Turn-on Switching Loss	V _{CC} =600V, I _C =450A, R _{Gon} =1Ω, V _{GE} =±15V, di/dt=6429A/μs(T _J =150℃), Inductive Load	T _J =25℃		26.6		mJ
			T _J =125℃		41.6		
			T _J =150℃		51.8		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =450A, R _{Goff} =1Ω, V _{GE} =±15V, du/dt=7500V/μs(T _J =150°C), Inductive Load	T _J =25°C		18.7		mJ
			T _J =125°C		24.3		
			T _J =150°C		26.0		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		2897		nC
R _{G(int)}	Internal Gate Resistor				1.0		Ω
I _{SC}	V _{CC} =600V, V _{GE} =+/-15V, T _J =150°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 Diode Current Repetitive	t _p =1ms	900	A

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

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _F	Forward Voltage	I _F =450A	T _J =25℃		1.85		V
			T _J =125℃		1.96		
			T _J =150℃		1.94		
t _{rr}	Reverse Recovery Time	I _F =450A, -diF/dt=7700A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		267		ns
			T _J =125℃		386		
			T _J =150℃		483		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		432		A
			T _J =125℃		400		
			T _J =150℃		400		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		43		μC
			T _J =125℃		63		
			T _J =150℃		80		



E _{rec}	Reverse Recovery Energy	I _F =450A, -diF/dt=7700A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		17		mJ
			T _J =125℃		25		
			T _J =150℃		32		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.109	℃/W

Diode, Reverse

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

V _{RRM}	Repetitive Peak Reverse Voltage	T _J =25℃	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℃ unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =300A	T _J =25℃		1.68		V
			T _J =125℃		1.76		
			T _J =150℃		1.85		
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/di=4000A/μs (T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		259		ns
			T _J =125℃		405		
			T _J =150℃		509		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		474		A
			T _J =125℃		462		
			T _J =150℃		462		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		29.7		μC
			T _J =125℃		47.1		
			T _J =150℃		53.5		
E _{rec}	Reverse Recovery Energy		T _J =25℃		13.2		mJ
			T _J =125℃		21.0		
			T _J =150℃		24.0		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.143	℃/W



Module

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 1minute	2500			V
T _J	Maximum Junction Temperature				150	°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)



Revision	Notes
01	Initial release

Announcement

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