



GT450CU120T2NH

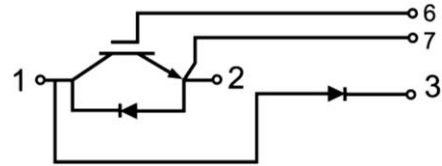
IGBT Module

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 =150℃		1.99		
t _{rr}	Reverse Recovery Time	I _F =450A, -diF/dt=2300A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		314		ns
			T _J =125℃		464		
			T _J =150℃		594		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		160		A
			T _J =125℃		192		
			T _J =150℃		216		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		31.7		μC
			T _J =125℃		56.9		
			T _J =150℃		77.5		



E _{rec}	Reverse Recovery Energy	I _F =450A, -diF/dt=2300A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		9.7		mJ
			T _J =125°C		19.7		
			T _J =150°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℃		1.70		V
			T _J =125℃		1.80		
			T _J =150℃		1.80		
t _{rr}	Reverse Recovery Time	I _F =300A, -di _F /dt=2153A/μs (T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		262		ns
			T _J =125℃		473		
			T _J =150℃		486		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		228		A
			T _J =125℃		246		
			T _J =150℃		246		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		25.2		μC
			T _J =125℃		46.2		
			T _J =150℃		49.2		
E _{rec}	Reverse Recovery Energy		T _J =25℃		7.2		mJ
			T _J =125℃		15.3		
			T _J =150℃		16.2		
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)	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

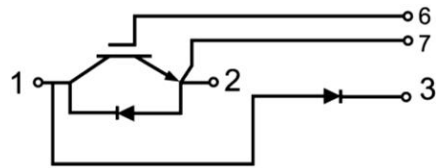
Ordering Information Table

Device code	G	T	450	CU	120	T2N	H
	①	②	③	④	⑤	⑥	⑦

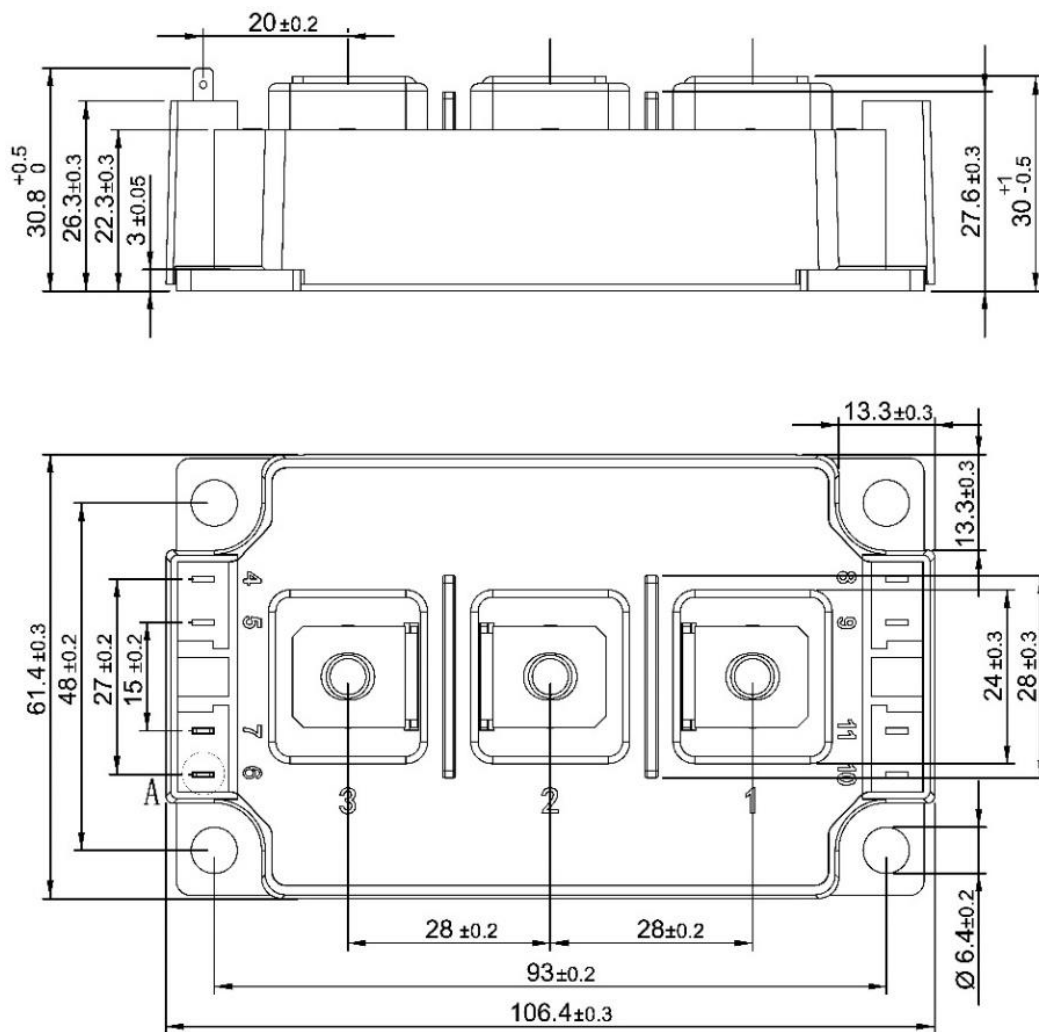
- ① - IGBT Module
- ② - Trench, Low Switching Losses IGBT
- ③ - Rated Current (450=450A)
- ④ - Circuit Configuration: Chopper, CU(Diode on High Side)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



Internal Circuit



Package Outline (Unit: mm):





Revision	Notes
01	Initial release

Announcement

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