



GT300TL120A8H

IGBT Module

Preliminary Datasheet

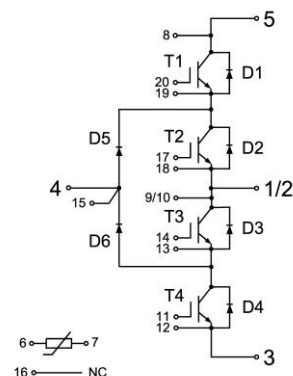
Features:

- Trench & Field Stop IGBT
- Short Circuit Rated $> 10\mu\text{s}$
- Low Switching Loss
- 100% RBSOA Tested($2 \times I_c$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Applications:

- Industrial Inverters
- Motor Drives
- UPS Systems
- 3-Level-Applications

Circuit Diagram



IGBT, Inverter (T1,T2,T3,T4)

Maximum Rated Values ($T_c=25^\circ\text{C}$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_c=100^\circ\text{C}$	300	A
		$T_c=25^\circ\text{C}$	530	A
I_{CM}	Peak Collector Current Repetitive	$t_p=1\text{ms}$	600	A
P_D	Maximum Power Dissipation (IGBT)	$T_c=25^\circ\text{C}$, $T_{Jmax}=175^\circ\text{C}$	1910	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	$I_C=11.5\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.9	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.80	2.20	V
			$T_J=125^{\circ}\text{C}$	2.20		V
			$T_J=150^{\circ}\text{C}$	2.30		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	$V_{GE}=20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			250	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		34.1		nF
C_{oes}	Output Capacitance			1.7		nF
C_{res}	Reverse Transfer Capacitance			0.3		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=300A,$ $R_G=2\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		154		ns
			$T_J=125^{\circ}C$		164		
			$T_J=150^{\circ}C$		166		
t_r	Rise Time		$T_J=25^{\circ}C$		74		ns
			$T_J=125^{\circ}C$		80		
			$T_J=150^{\circ}C$		84		
$t_{d(off)}$	Turn-off Delay Time		$T_J=25^{\circ}C$		382		ns
			$T_J=125^{\circ}C$		428		
			$T_J=150^{\circ}C$		436		
t_f	Fall Time	$T_J=25^{\circ}C$		144		ns	
		$T_J=125^{\circ}C$		234			
		$T_J=150^{\circ}C$		278			
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=300A,$ $R_G=2\Omega, V_{GE}=\pm 15V,$ $di/dt=2966A/\mu s$ ($T_J=150^{\circ}C$) Inductive Load	$T_J=25^{\circ}C$		19.5		mJ
		$T_J=125^{\circ}C$		23.6			
		$T_J=150^{\circ}C$		26.3			



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =300A, R _G =2Ω, V _{GE} =±15V, du/dt=5400V/μs (T _J =150°C) Inductive Load	T _J =25°C		20.1		mJ
			T _J =125°C		31.2		
			T _J =150°C		32.3		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		2.79		uC
R _{G(int)}	Internal Gate Resistance		T _J =25°C		1.5		Ω
I _{sc}	V _{CC} =600V, V _{GE} =±15V, tp=10μs, T _J =150°C				908		A
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.079	°C/W

FWD, Inverter (D1,D2,D3,D4)

Maximum Rated Values (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	tp=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℃		1.80		V
			T _J =125℃		1.95		
			T _J =150℃		1.95		
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/dt=3129A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		204		ns
			T _J =125℃		552		
			T _J =150℃		644		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		158		A
			T _J =125℃		162		
			T _J =150℃		173		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		19.5		μC
			T _J =125℃		38.1		
			T _J =150℃		42.1		



E _{rec}	Reverse Recovery Energy	I _F =300A, -diF/dt=3129A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		5.5		mJ
			T _J =125℃		11.4		
			T _J =150℃		12.6		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.163	℃/W

Diode, 3-Level (D5,D6)

Maximum Rated Values (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	tp=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℃		1.80		V
			T _J =125℃		1.95		
			T _J =150℃		1.95		
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/dt=3129A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		204		ns
			T _J =125℃		552		
			T _J =150℃		644		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		158		A
			T _J =125℃		162		
			T _J =150℃		173		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		19.5		μC
			T _J =125℃		38.1		
			T _J =150℃		42.1		
E _{rec}	Reverse Recovery Energy		T _J =25℃		5.5		mJ
			T _J =125℃		11.4		
			T _J =150℃		12.6		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.163	℃/W



Internal NTC-Thermistor Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
R ₂₅	T _C =25℃		5		kΩ
△R/R	T _C =100℃, R ₁₀₀ =465Ω	-5		+5	%
P ₂₅	T _C =25℃			10	mW
B _{25/50}	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15K))]$		3380		K
B _{25/80}	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15K))]$		3440		K
B _{25/100}	$R_2=R_{25} \exp[B_{25/100}(1/T_2-1/(298.15K))]$		3545		K

Module

Symbol	Description	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted) RMS, f=50Hz, 60s		2500		V
T _J	Maximum Junction Temperature			175	℃
T _{JOP}	Maximum Operating Junction Temperature Range	-40		+150	℃
T _{stg}	Storage Temperature	-40		+125	℃
CTI	Comparative Tracking Index		200		
R _{θCS}	Case-to-Sink Thermally (Conductive Grease Applied)			0.026	℃/W
M	Power Terminals Screw:M6	3.0		6.0	N·m
M	Mounting Screw:M5	3.0		6.0	N·m
G	Weight		390		g



Ordering Information Table

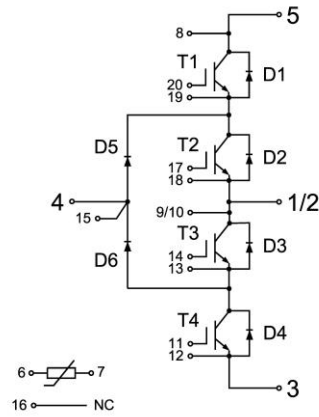
Device code

G	T	300	TL	120	A8	H
①	②	③	④	⑤	⑥	⑦

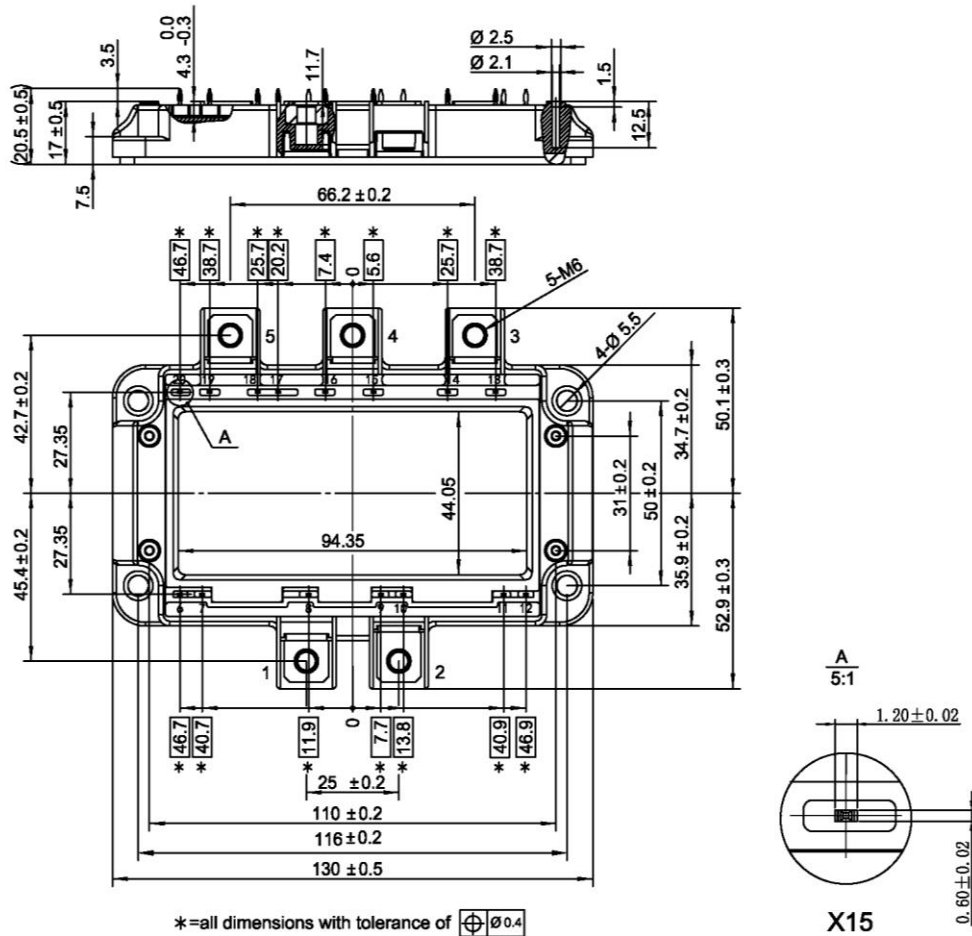
- ① - IGBT Module
- ② - Field Stop Trench Gate IGBT
- ③ - Rated Current (300=300A)
- ④ - Circuit Configuration (Three Level, I Type)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



Internal Circuit



Package Outline (Unit: mm):





Revision	Notes
01	Initial Release

Announcement

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