



GT300TL65A8H

IGBT Module

Preliminary Data

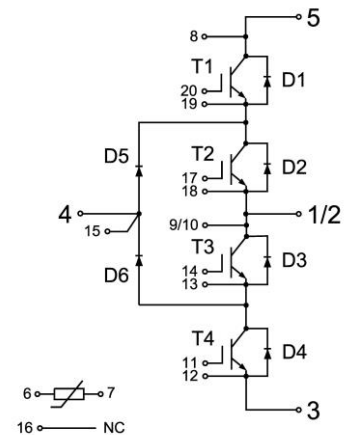
Features:

- 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

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		650	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_c	Continuous Collector Current	$T_c=100^\circ\text{C}$	300	A
		$T_c=25^\circ\text{C}$	600	A
I_{CM}	Peak Collector Current Repetitive	$t_p=1\text{ms}$	600	A
P_D	Maximum Power Dissipation (IGBT)	$T_c=25^\circ\text{C}, T_{Jmax}=175^\circ\text{C}$	1113	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	$I_C=6.4\text{mA}$, $V_{CE}=V_{GE}$	4.0	4.8	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.65	1.90	V
			$T_J=125^{\circ}\text{C}$	1.95		V
			$T_J=150^{\circ}\text{C}$	2.00		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	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			± 200	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		22.0		nF
C_{oes}	Output Capacitance			0.96		nF
C_{res}	Reverse Transfer Capacitance			0.44		nF

Switching Characteristics

t _{d(on)}	Turn-on Delay Time	V _{CC} =300V, I _C =300A, R _G =2.6Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		132		ns
			T _J =125℃		134		
			T _J =150℃		136		
t _r	Rise Time		T _J =25℃		120		ns
			T _J =125℃		122		
			T _J =150℃		123		
t _{d(off)}	Turn-off Delay Time		T _J =25℃		370		ns
			T _J =125℃		388		
			T _J =150℃		400		
t _f	Fall Time	T _J =25℃		88		ns	
		T _J =125℃		106			
		T _J =150℃		110			
E _{on}	Turn-on Switching Loss	V _{CC} =300V, I _C =300A, R _G =2.6Ω, V _{GE} =±15V, di/dt=1178A/μs (T _J =150℃) Inductive Load	T _J =25℃		1.4		mJ
		T _J =125℃		2.4			
		T _J =150℃		3.0			



E _{off}	Turn-off Switching Loss	V _{CC} =300V, I _C =300A, R _G =2.6Ω, V _{GE} =±15V, du/dt=5518V/μs (T _J =150°C) Inductive Load	T _J =25°C		13.4		mJ
			T _J =125°C		15.2		
			T _J =150°C		16.0		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		2.84		μC
R _{g internal}	Internal Gate Resistance		T _J =25°C		0		Ω
SCSOA	V _{CC} =300V, V _{GE} =±15V, R _G =6.8Ω, T _J =150°C			10			μs
R _{θJC}	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.13	°C/W

Diode, 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	650	V
I _F	Diode Continuous Forward Current	T _C =100°C	300	A
I _{FM}	Peak FWD 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℃		1.58		V
			T _J =125℃		1.60		
			T _J =150℃		1.60		
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/dt=1217A/μs(T _J =150℃), V _R =300V, V _{GE} =-15V	T _J =25℃		238		ns
			T _J =125℃		240		
			T _J =150℃		250		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		140		A
			T _J =125℃		156		
			T _J =150℃		164		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		16.3		μC
			T _J =125℃		20.5		
			T _J =150℃		23.2		



E _{rec}	Reverse Recovery Energy	I _F =300A, -diF/dt=1217μs(T _J =150°C), V _R =300V, V _{GE} =-15V	T _J =25°C		4.6		mJ
			T _J =125°C		5.8		
			T _J =150°C		6.6		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.18	°C/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	650	V
I _F	Diode Continuous Forward Current	T _C =100°C	300	A
I _{FM}	Diode Maximum Forward Current	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℃		1.58		V
			T _J =125℃		1.60		
			T _J =150℃		1.60		
t _{rr}	Reverse Recovery Time	I _F =300A, -diF/dt=1217A/μs(T _J =150℃), V _R =300V, V _{GE} =-15V	T _J =25℃		238		ns
			T _J =125℃		240		
			T _J =150℃		250		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		140		A
			T _J =125℃		156		
			T _J =150℃		164		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		16.3		μC
			T _J =125℃		20.5		
			T _J =150℃		23.2		
E _{rec}	Reverse Recovery Energy		T _J =25℃		4.6		mJ
			T _J =125℃		5.8		
			T _J =150℃		6.6		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.18	℃/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, 1minute	2500			V
T _J	Maximum Junction Temperature				175	℃
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T _{stg}	Storage Temperature		-40		+150	℃
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

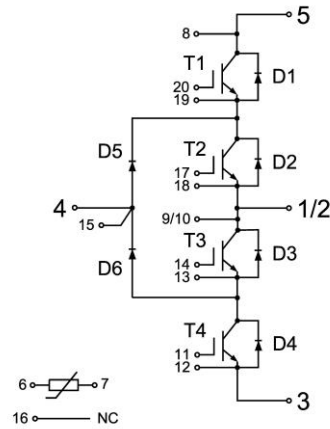
Device code

G	T	300	TL	65	A8	H
①	②	③	④	⑤	⑥	⑦

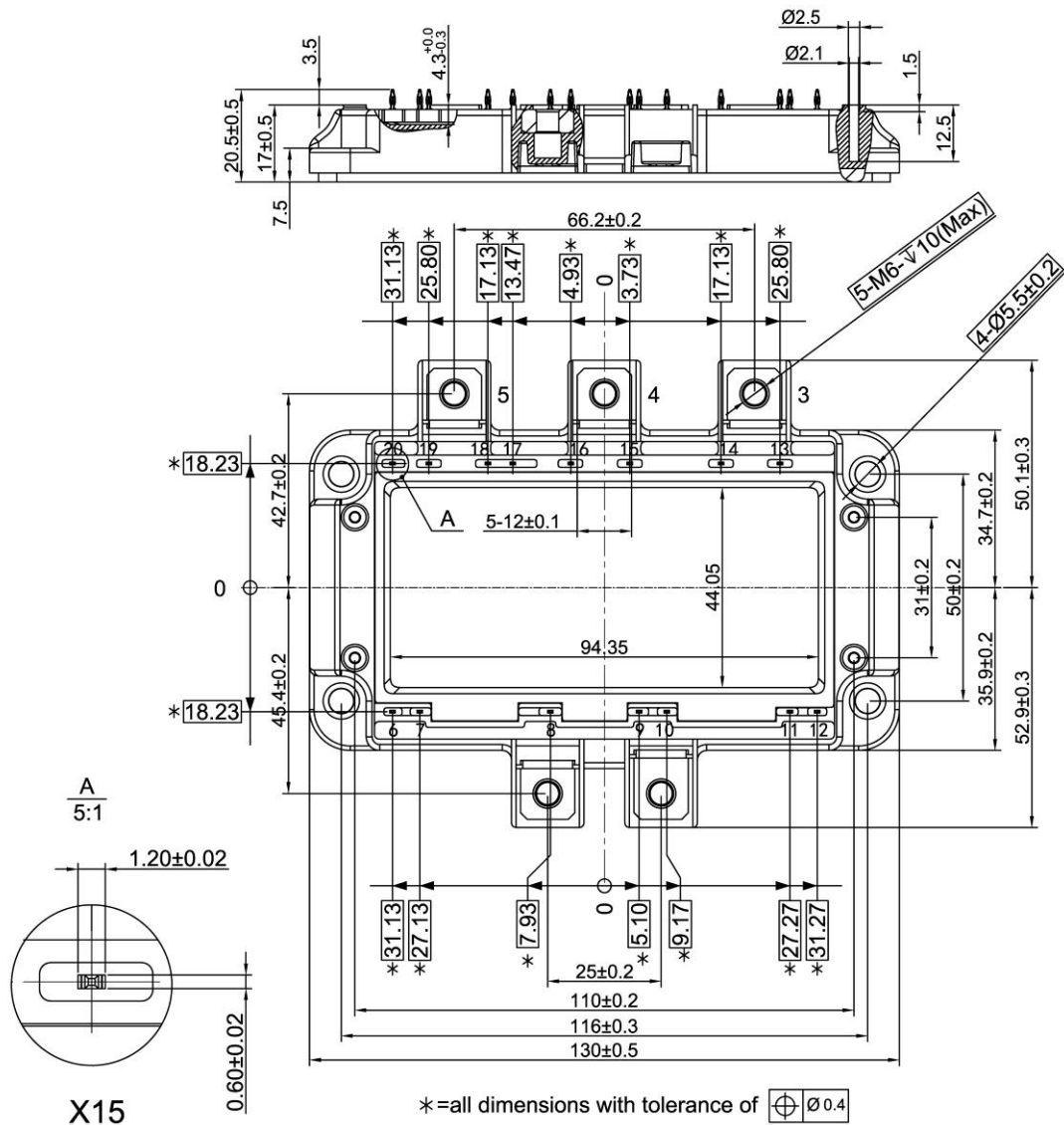
- ① - IGBT Module
- ② - Field Stop Trench Gate IGBT
- ③ - Rated Current (300=300A)
- ④ - Circuit Configuration (Three Level, I Type)
- ⑤ - Rated Voltage (65=650V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



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”.