



GT225HF120T9H

IGBT Module

Preliminary Datasheet

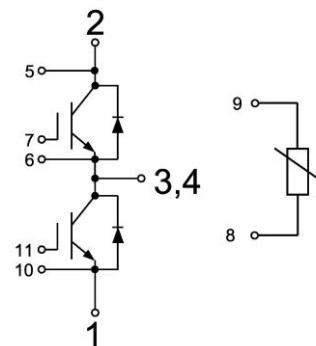
Features:

- 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:

- Motor Drives
- Servo Drives
- UPS Systems
- Wind Turbines

Circuit Diagram



IGBT, Inverter

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	$T_c=100^\circ\text{C}$	225	A
		$T_c=25^\circ\text{C}$	450	A
I_{CM}	Peak Collector Current Repetitive	$t_p=1\text{ms}$	450	A
P_D	Maximum Power Dissipation (IGBT)	$T_c=25^\circ\text{C}, T_{Jmax}=175^\circ\text{C}$	1568	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	$I_C=7.8\text{mA}$, $V_{CE}=V_{GE}$	5.0		6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=225\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.70		V
			$T_J=125^{\circ}\text{C}$	2.10		V
			$T_J=150^{\circ}\text{C}$	2.15		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	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		23.28		nF
C_{oes}	Output Capacitance			3.25		nF
C_{res}	Reverse Transfer Capacitance			0.24		nF

Switching Characteristics

Switching Characteristics							
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=225A,$ $R_{Gon}=3.3\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		201		ns
			$T_J=125^{\circ}C$		236		
			$T_J=150^{\circ}C$		245		
t_r	Rise Time	$V_{CC}=600V, I_C=225A,$ $R_{Gon}=3.3\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		92		ns
			$T_J=125^{\circ}C$		104		
			$T_J=150^{\circ}C$		112		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=600V, I_C=225A,$ $R_{Goff}=3.3\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		492		ns
			$T_J=125^{\circ}C$		530		
			$T_J=150^{\circ}C$		623		
t_f	Fall Time	$V_{CC}=600V, I_C=225A,$ $R_{Goff}=3.3\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		290		ns
			$T_J=125^{\circ}C$		420		
			$T_J=150^{\circ}C$		489		
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=225A,$ $R_{Gon}=3.3\Omega, V_{GE}=\pm 15V,$ $di/dt=5378A/\mu s$ ($T_J=150^{\circ}C$) Inductive Load	$T_J=25^{\circ}C$		13.7		mJ
			$T_J=125^{\circ}C$		20.5		
			$T_J=150^{\circ}C$		23.1		



E _{off}	Turn-off Switching Loss	V _{CC} =600V, I _C =225A, R _{Goff} =3.3Ω, V _{GE} =±15V, du/dt=12700V/μs (T _J =150°C) Inductive Load	T _J =25°C		17.7		mJ
			T _J =125°C		24.5		
			T _J =150°C		25.6		
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25°C		1300		nC
R _{G(int)}	Internal Gate Resistance		T _J =25°C		2		Ω
SCSOA	V _{CC} =600V, V _{GE} =±15V, T _J =150°C			10			μs
R _{θJC}	Thermal Resistance: Junction-to-Case (per IGBT)					0.096	°C/W

Diode, Inverter

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		225	A
I _{FM}	Peak Diode Current Repetitive	tp=1ms	450	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 =225A	T _J =25℃		1.65		V
			T _J =125℃		1.75		
			T _J =150℃		1.75		
t _{rr}	Reverse Recovery Time	I _F =225A, -diF/dt=5103A/μs(T _J =150℃), V _R =600V, V _{GE} =-15V	T _J =25℃		210		ns
			T _J =125℃		323		
			T _J =150℃		349		
I _{rr}	Peak Reverse Recovery Current		T _J =25℃		278		A
			T _J =125℃		284		
			T _J =150℃		288		
Q _{rr}	Reverse Recovery Charge		T _J =25℃		21.6		μC
			T _J =125℃		32.6		
			T _J =150℃		37.2		



E _{rec}	Reverse Recovery Energy	I _F =225A, -diF/dt=5103A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		7.9		mJ
			T _J =125°C		12.0		
			T _J =150°C		14.0		
R _{θJC}	Thermal Resistance: Junction-to-Case (per Diode)					0.166	°C/W

Internal NTC-Thermistor Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
R ₂₅	T _C =25°C		5		kΩ
ΔR/R	T _C =100°C, R ₁₀₀ =465Ω	-5		5	%
P ₂₅	T _C =25°C			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	°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
M	Power Terminals Screw:M6		4.0		5.0	N·m
M	Mounting Screw:M5		3.0		6.0	N·m
G	Weight			330		g



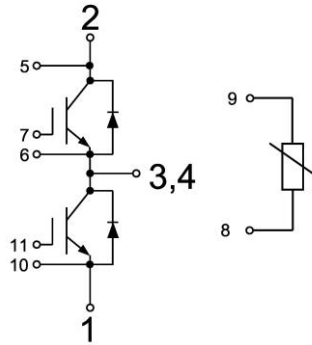
Ordering Information Table

Device code	G	T	225	HF	120	T9	H
	①	②	③	④	⑤	⑥	⑦

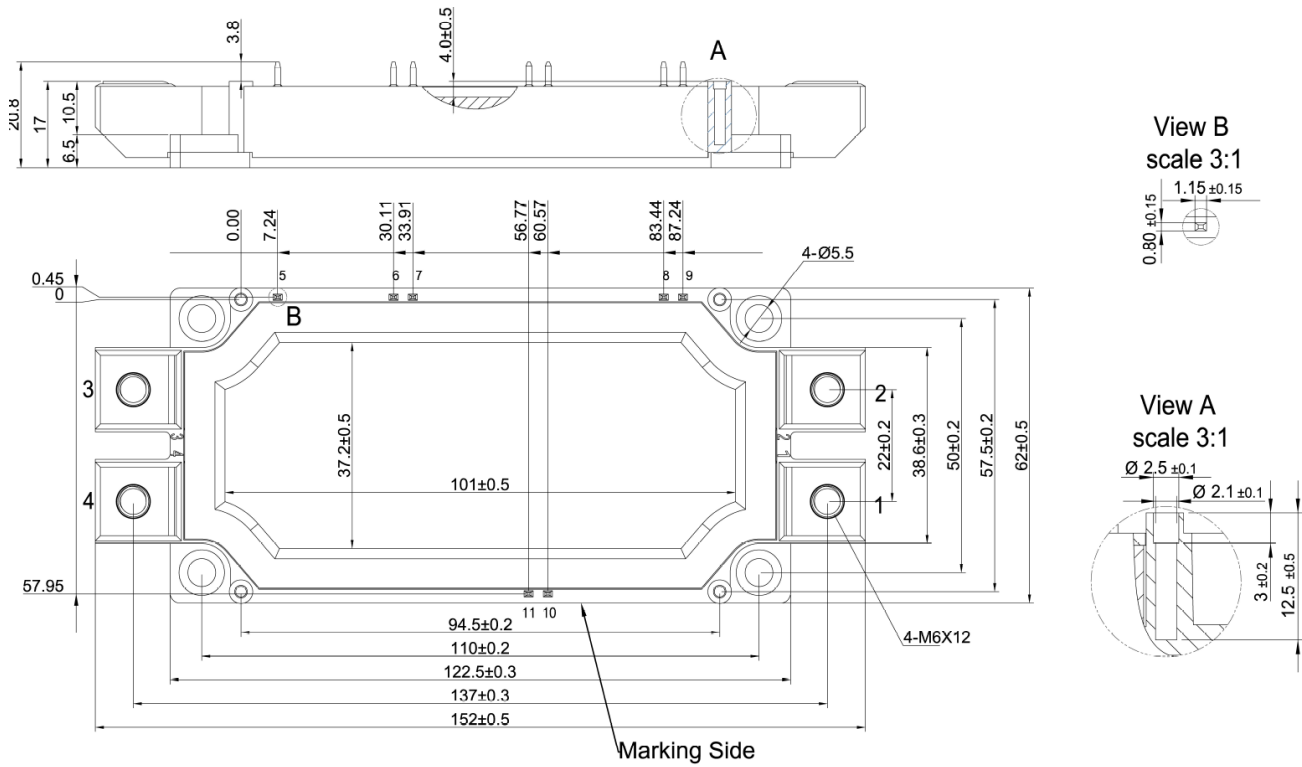
- ① - IGBT Module
- ② - Field Stop Trench Gate IGBT
- ③ - Rated Current (225=225A)
- ④ - Circuit Configuration (Half Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



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”.