



GT225HF170T9H

IGBT Module

Preliminary Datasheet

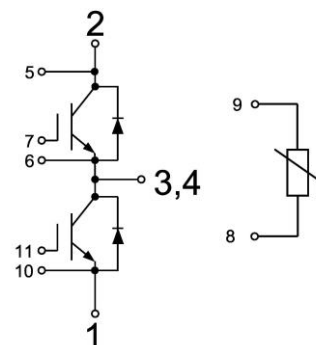
Features:

- 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:

- Commercial Agriculture Vehicles
- Motor Drives
- Solar Applications
- UPS Systems

Circuit Diagram



IGBT, Inverter

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

V_{CES}	Collector-Emitter Blocking Voltage		1700	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)	$T_C=25^\circ\text{C}, T_{Jmax}=175^\circ\text{C}$	2508	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	$I_C=9\text{mA}$, $V_{CE}=V_{GE}$	5.0		6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=225\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.80		V
			$T_J=125^{\circ}\text{C}$	2.20		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	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		20.1		nF
C_{oes}	Output Capacitance			TBD		nF
C_{res}	Reverse Transfer Capacitance			0.08		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=900V, I_C=225A,$ $R_{Gon}=3.3\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		220		ns
			$T_J=125^{\circ}C$		230		
t_r	Rise Time		$T_J=25^{\circ}C$		500		ns
			$T_J=125^{\circ}C$		550		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC}=900V, I_C=225A,$ $R_{Goff}=3.3\Omega, V_{GE}=\pm 15V,$ Inductive Load	$T_J=25^{\circ}C$		440		ns
			$T_J=125^{\circ}C$		540		
t_f	Fall Time		$T_J=25^{\circ}C$		440		ns
			$T_J=125^{\circ}C$		540		
E_{on}	Turn-on Switching Loss	$V_{CC}=900V, I_C=225A,$ $R_{Gon}=3.3\Omega, V_{GE}=\pm 15V,$ $di/dt= TBD A/\mu s,$ Inductive Load	$T_J=25^{\circ}C$		90		mJ
			$T_J=125^{\circ}C$		105		
E_{off}	Turn-off Switching Loss	$V_{CC}=900V, I_C=225A,$ $R_{Goff}=3.3\Omega, V_{GE}=\pm 15V,$ $du/dt=TBD V/\mu s,$ Inductive Load	$T_J=25^{\circ}C$		48		mJ
			$T_J=125^{\circ}C$		60		
Q_g	Total Gate Charge	$V_{GE}=+15V...-15V$	$T_J=25^{\circ}C$		TBD		nC
$R_{G(int)}$	Internal Gate Resistance		$T_J=25^{\circ}C$		2.0		Ω
I_{sc}	$V_{CC}=900V, V_{GE}=\pm 15V, T_J=150^{\circ}C$			10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-to-Case (per IGBT)					0.060	$^{\circ}C/W$



Diode, Inverter

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

V_{RRM}	Repetitive Peak Reverse Voltage	$T_J=25^{\circ}\text{C}$	1700	V
I_F	Diode Continuous Forward Current		225	A
I_{FM}	Peak Diode Current Repetitive	$t_p=1\text{ms}$	450	A

Electrical Characteristics of Diode ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units	
V _{FM}	Forward Voltage	I _F =225A	T _J =25°C		1.90		V	
			T _J =125°C		2.20			
t _{rr}	Reverse Recovery Time	I _F =225A, -diF/dt=1440A/μs, V _R =900V, V _{GE} =-15V	T _J =25°C		1154		ns	
			T _J =125°C		1211			
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		60		A	
			T _J =125°C		82			
Q _{rr}	Reverse Recovery Charge		T _J =25°C		39		μC	
			T _J =125°C		63			
E _{rec}	Reverse Recovery Energy		T _J =25°C		18.0		mJ	
			T _J =125°C		33.2			
R _{θJC}	Diode Thermal Resistance: Junction-to-Case (per Diode)					0.153	°C/W	

Internal NTC-Thermistor Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
R_{25}	$T_C=25^{\circ}\text{C}$		5		$\text{k}\Omega$
$\Delta R/R$	$T_C=100^{\circ}\text{C}, R_{100}=465\Omega$	-5		5	%
P_{25}	$T_C=25^{\circ}\text{C}$			10	mW
$B_{25/50}$	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15\text{K}))]$		3380		K
$B_{25/80}$	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15\text{K}))]$		3440		K
$B_{25/100}$	$R_2=R_{25} \exp[B_{25/100}(1/T_2-1/(298.15\text{K}))]$		3545		K



Module

Symbol	Description		Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 1minute	3400			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

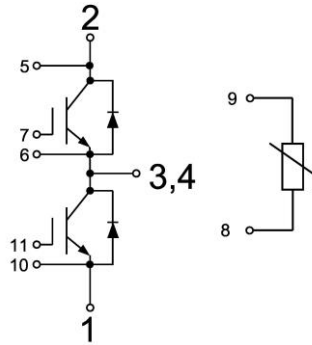
Device code

G	T	225	HF	170	T9	H
①	②	③	④	⑤	⑥	⑦

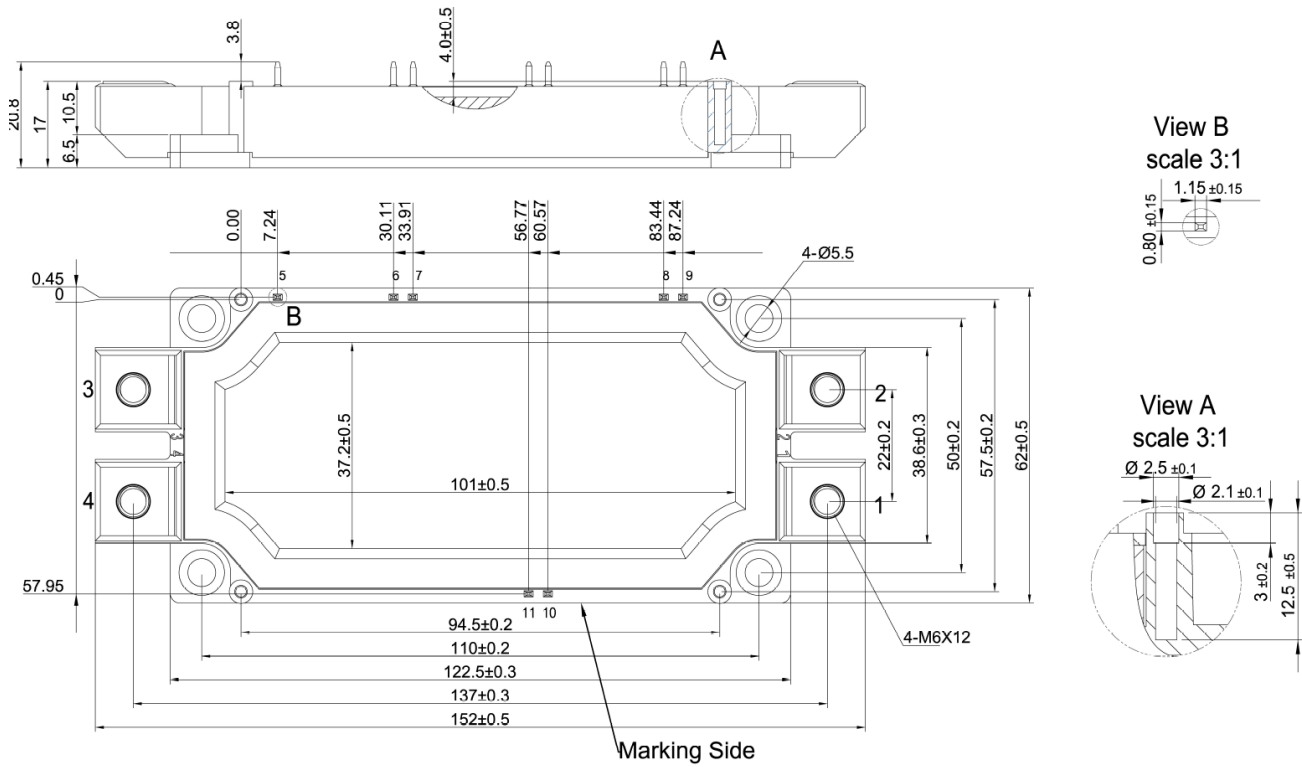
- ① - IGBT Module
- ② - Field Stop Trench Gate IGBT
- ③ - Rated Current (225=225A)
- ④ - Circuit Configuration (Half Bridge)
- ⑤ - Rated Voltage (170=1700V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



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”.