

STARPOWER

SEMICONDUCTOR

IGBT

GD200HFT120C2S_T4

Molding Type Module

1200V/200A 2 in one-package

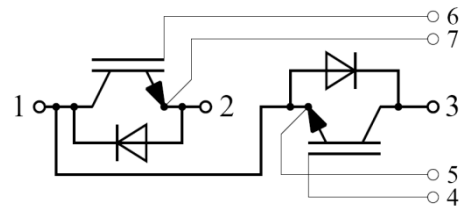
General Description

STARPOWER IGBT Power Module provides ultra low conduction loss as well as short circuit ruggedness. They are designed for the applications such as inverters and UPS.



Features

- Low $V_{CE(sat)}$ Trench IGBT technology
- Low switching loss
- 10 μ s short circuit capability
- Low inductance case
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast & soft reverse recovery anti-parallel FWD
- Isolated copper baseplate using DBC technology



Equivalent Circuit Schematic

Typical Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

Absolute Maximum Ratings $T_C=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Description	GD200HFT120C2S_T4	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C=25^{\circ}\text{C}$	320	A
	@ $T_C=100^{\circ}\text{C}$	200	
I_{CM}	Pulsed Collector Current $t_p=1\text{ms}$	400	A
I_F	Diode Continuous Forward Current	200	A
I_{FM}	Diode Maximum Forward Current $t_p=1\text{ms}$	400	A
P_D	Maximum Power Dissipation @ $T_j=175^{\circ}\text{C}$	1103	W
T_{jmax}	Maximum Junction Temperature	175	$^{\circ}\text{C}$
T_{jop}	Operating Junction Temperature	-40 to +150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-40 to +125	$^{\circ}\text{C}$
V_{ISO}	Isolation Voltage RMS, $f=50\text{Hz}, t=1\text{min}$	4000	V
Mounting Torque	Power Terminal Screw:M6 Mounting Screw:M6	2.5 to 5.0 3.0 to 5.0	N.m

Electrical Characteristics of IGBT $T_C=25^{\circ}\text{C}$ unless otherwise noted**Off Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$T_j=25^{\circ}\text{C}$	1200			V
I_{CES}	Collector Cut-Off Current	$V_{CE}=V_{CES}, V_{GE}=0\text{V}, T_j=25^{\circ}\text{C}$			5.0	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0\text{V}, T_j=25^{\circ}\text{C}$			400	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=7.6\text{mA}, V_{CE}=V_{GE}, T_j=25^{\circ}\text{C}$	5.2	5.8	6.4	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=200\text{A}, V_{GE}=15\text{V}, T_j=25^{\circ}\text{C}$		1.75	2.20	V
		$I_C=200\text{A}, V_{GE}=15\text{V}, T_j=125^{\circ}\text{C}$		2.05		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=200A,$ $R_G=2.4\Omega, V_{GE}=\pm 15V,$ $T_j=25^\circ C$		162		ns
t_r	Rise Time			39		ns
$t_{d(off)}$	Turn-Off Delay Time			451		ns
t_f	Fall Time			98		ns
E_{on}	Turn-On Switching Loss			10.1		mJ
E_{off}	Turn-Off Switching Loss			13.9		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=200A,$ $R_G=2.4\Omega, V_{GE}=\pm 15V,$ $T_j=125^\circ C$		171		ns
t_r	Rise Time			45		ns
$t_{d(off)}$	Turn-Off Delay Time			522		ns
t_f	Fall Time			160		ns
E_{on}	Turn-On Switching Loss			15.2		mJ
E_{off}	Turn-Off Switching Loss			20.0		mJ
C_{ies}	Input Capacitance	$V_{CE}=25V, f=1Mhz,$ $V_{GE}=0V$		12.3		nF
C_{oes}	Output Capacitance			0.81		nF
C_{res}	Reverse Transfer Capacitance			0.69		nF
I_{SC}	SC Data	$t_p \leq 10\mu s, V_{GE}=15V,$ $T_j=125^\circ C, V_{CC}=900V,$ $V_{CEM} \leq 1200V$		800		A
Q_G	Gate Charge	$V_{GE}=-15 \dots +15V$		1.81		μC
R_{Gint}	Internal Gate Resistance			3.8		Ω
L_{CE}	Stray Inductance				20	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal To Chip			0.35		m Ω

Electrical Characteristics of Diode $T_C=25^\circ C$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=200A$ $V_{GE}=0V$	$T_j=25^\circ C$	1.65	2.10	V
			$T_j=125^\circ C$	1.65		
Q_r	Recovered Charge	$I_F=200A,$	$T_j=25^\circ C$	20.1		μC
			$T_j=125^\circ C$	32.0		
I_{RM}	Peak Reverse Recovery Current	$V_R=600V,$ $R_G=2.4\Omega,$	$T_j=25^\circ C$	232		A
			$T_j=125^\circ C$	248		
E_{rec}	Reverse Recovery Energy	$V_{GE}=-15V$	$T_j=25^\circ C$	9.00		mJ
			$T_j=125^\circ C$	17.6		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per IGBT)		0.136	K/W
$R_{\theta JC}$	Junction-to-Case (per Diode)		0.202	K/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)	0.035		K/W
Weight	Weight of Module	300		g

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