

STARPOWER

SEMICONDUCTOR™

IGBT

GD200HFT60C8S

Preliminary

Molding Type Module

600V/200A 2 in one-package

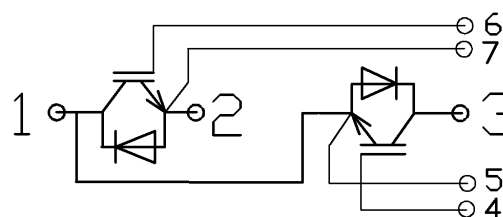
General Description

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



Features

- Low $V_{CE(sat)}$ trench IGBT technology
- Low switching losses
- Maximum junction temperature 175°C
- 5 μ s short circuit capability
- Square RBSOA
- $V_{CE(sat)}$ with positive temperature coefficient
- Low inductance case
- Fast & soft reverse recovery anti-parallel FWD
- Isolated copper baseplate using DBC technology



Equivalent Circuit Schematic

Typical Applications

- AC inverter drives
- Switching mode power supplies
- Electronic welders

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

Symbol	Description	GD200HFT60C8S	Units
V_{CES}	Collector-Emitter Voltage	600	V

Symbol	Description	GD200HFT60C8S	Units
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C=25^\circ\text{C}$	350	A
	@ $T_C=80^\circ\text{C}$	200	
$I_{CM(1)}$	Pulsed Collector Current $t_p=1\text{ms}$	400	A
I_F	Diode Continuous Forward Current	200	A
I_{FM}	Diode Maximum Forward Current	400	A
P_D	Maximum power Dissipation @ $T_j=175^\circ\text{C}$	811	W
T_{SC}	Short Circuit Withstand Time @ $T_j=125^\circ\text{C}$	10	μs
T_j	Operating Junction Temperature	-40 to +175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-40 to +125	$^\circ\text{C}$
I^2t -value, Diode	$V_R=0\text{V}, t=10\text{ms}, T_j=125^\circ\text{C}$	4050	A^2s
V_{ISO}	Isolation Voltage RMS, $f=50\text{Hz}, t=1\text{min}$	2500	V
Mounting Torque	Power Terminal Screw:M5	2.5 to 5.0	N.m
	Mounting Screw:M6	3.0 to 6.0	N.m

Notes:

(1) Repetitive rating: Pulse width limited by max. junction temperature

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE}=0\text{V}, I_C=500\mu\text{A}, T_j=25^\circ\text{C}$	600			V
I_{CES}	Collector Cut-Off Current	$V_{CE}=V_{CES}, V_{GE}=0\text{V}, T_j=25^\circ\text{C}$			100	μA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0\text{V}, T_j=25^\circ\text{C}$			200	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=2.0\text{mA}, V_{CE}=V_{GE}, T_j=25^\circ\text{C}$	4.0	4.5	6.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=200\text{A}, V_{GE}=15\text{V}, T_j=25^\circ\text{C}$		1.8		V
		$I_C=200\text{A}, V_{GE}=15\text{V}, T_j=175^\circ\text{C}$		2.1		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=300\text{V}, I_C=200\text{A}, R_G=2.3\Omega, V_{GE}=\pm 15\text{V}, T_j=25^\circ\text{C}$		24		ns
t_r	Rise Time			59		ns
$t_{d(off)}$	Turn-Off Delay Time				106	

t_f	Fall Time	$V_{CC}=300V, I_C=200A,$ $R_G=2.3\Omega, V_{GE}=\pm 15V,$ $T_j=25^\circ C$		69		ns
E_{on}	Turn-On Switching Loss			6.9		mJ
E_{off}	Turn-Off Switching Loss			5.1		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=300V, I_C=200A,$ $R_G=2.3\Omega, V_{GE}=\pm 15V,$ $T_j=175^\circ C$		28		ns
t_r	Rise Time			62		ns
$t_{d(off)}$	Turn-Off Delay Time			131		ns
t_f	Fall Time			88		ns
E_{on}	Turn-On Switching Loss			9.6		mJ
E_{off}	Turn-Off Switching Loss			7.3		mJ
C_{ies}	Input Capacitance	$V_{CE}=25V, f=1MHz,$ $V_{GE}=0V$		15.4		nF
C_{oes}	Output Capacitance			1.2		nF
C_{res}	Reverse Transfer Capacitance			0.6		nF
I_{SC}	SC Data	$t_{sc} \leq 10\mu s, V_{GE}=15V,$ $T_j=125^\circ C, V_{CC}=360V,$ $V_{CEM} \leq 600V$		TBD		A
L_{CE}	Stray Inductance				26	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal to Chip	$T_C=25^\circ C$		0.62		m Ω

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

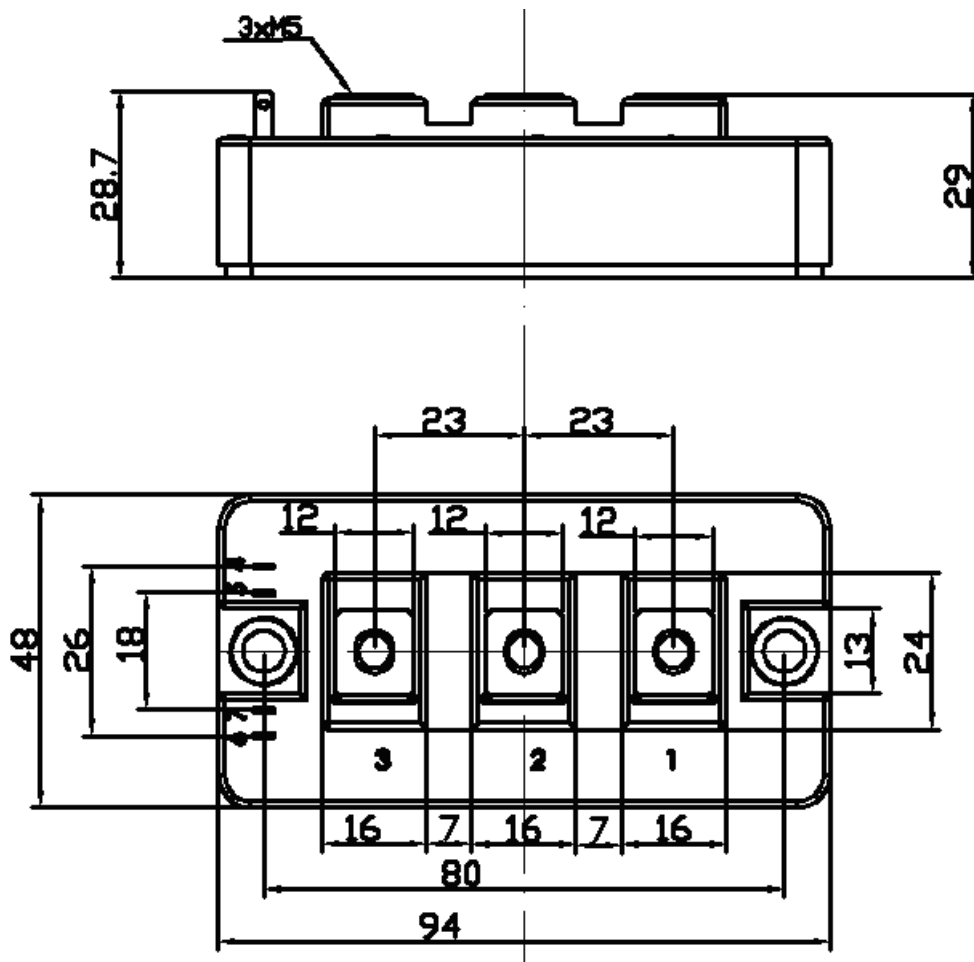
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=200A$	$T_j=25^\circ C$		1.4	V
			$T_j=125^\circ C$		1.3	
Q_r	Diode Reverse Recovery Charge	$I_F=200A,$ $V_R=300V,$ $di/dt=-4000A/\mu s,$ $V_{GE}=-15V$	$T_j=25^\circ C$		12.1	μC
			$T_j=125^\circ C$		19.7	
I_{RM}	Diode Peak Reverse Recovery Current		$T_j=25^\circ C$		154	A
			$T_j=125^\circ C$		188	
E_{rec}	Reverse Recovery Energy		$T_j=25^\circ C$		2.9	mJ
			$T_j=125^\circ C$		4.1	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (IGBT Part, per 1/2 Module)		0.185	K/W
$R_{\theta JC}$	Junction-to-Case (DIODE Part, per 1/2 Module)		0.296	K/W
$R_{\theta JC}$	Case-to-Sink (Conductive grease applied)	0.046		K/W
Weight	Weight of Module	200		g

Package Dimension

Dimensions in Millimeters



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