

STARPOWER

SEMICONDUCTOR™

IGBT

GD200HFU60C8S

Molding Type Module

600V/200A 2 in one-package

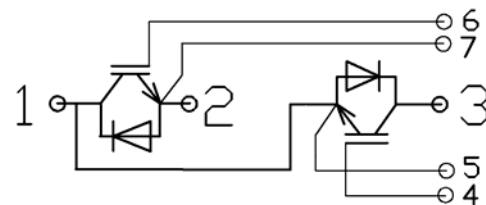
General Description

STARPOWER IGBT Power Module provides ultrafast switching speed as well as short circuit ruggedness. It's designed for the applications such as electronic welder and Inductive heating.

**Preliminary**

Features

- High short circuit capability
- 10 μ s short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Rugged with ultrafast performance
- Square RBSOA
- Low inductance case
- Fast & soft reverse recovery anti-parallel FWD
- Isolated copper baseplate using DBC technology



Equivalent Circuit Schematic

Typical Applications

- Switching mode power supplies
- Inductive heating
- UPS
- Electronic welder

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

Symbol	Description	GD200HFU60C8S	Units
V_{CES}	Collector-Emitter Voltage	600	V

Symbol	Description	GD200HFU60C8S	Units
V_{GES}	Gate-Emitter Voltage	$\pm 20V$	V
I_C	Collector Current @ $T_C=25^\circ C$	270	A
	@ $T_C=80^\circ C$	200	
$I_{CM(1)}$	Pulsed Collector Current $t_p=1ms$	400	A
I_F	Diode Continuous Forward Current	200	A
I_{FM}	Diode Maximum Forward Current	400	A
P_D	Maximum Power Dissipation @ $T_j=150^\circ C$	781	W
T_{SC}	Short Circuit Withstand Time @ $T_j=125^\circ C$	10	μs
T_j	Operating Junction Temperature	-40 to +150	$^\circ C$
T_{STG}	Storage Temperature Range	-40 to +125	$^\circ C$
I^2t -value, Diode	$V_R=0V, t=10ms, T_j=125^\circ C$	4050	A^2s
V_{ISO}	Isolation Voltage RMS, $f=50Hz, t=1min$	2500	V
Mounting Torque	Power Terminal Screw:M5	1.5 to 2.0	N.m
	Mounting Screw:M6	3.0 to 5.0	N.m

Notes:

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

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	$I_{CES}=1mA, V_{GE}=0V, T_j=25^\circ C$	600			V
I_{CES}	Collector Cut-Off Current	$V_{CE}=V_{CES}, V_{GE}=0V, T_j=25^\circ C$			100	μA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0V, T_j=25^\circ C$			1.1	μA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=250\mu A, V_{CE}=V_{GE}, T_j=25^\circ C$	3.5	4.40	5.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=200A, V_{GE}=15V, T_j=25^\circ C$		2.75		V
		$I_C=200A, V_{GE}=15V, T_j=125^\circ C$		3.05		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=300V, I_C=200A, R_G=4.7\Omega, V_{GE}=\pm 15V, T_j=25^\circ C$		80		ns
t_r	Rise Time			50		ns
$t_{d(off)}$	Turn-Off Delay Time				250	

t_f	Fall Time	$V_{CC}=300V, I_C=200A,$ $R_G=4.7\Omega, V_{GE} = \pm 15V,$ $T_J=25^\circ C$		70		ns
E_{on}	Turn-On Switching Loss			4.0		mJ
E_{off}	Turn-Off Switching Loss			6.0		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=300V, I_C=200A,$ $R_G=4.7\Omega, V_{GE} = \pm 15V,$ $T_J=125^\circ C$		110		ns
t_r	Rise Time			60		ns
$t_{d(off)}$	Turn-Off Delay Time			300		ns
t_f	Fall Time			75		ns
E_{on}	Turn-On Switching Loss			5.2		mJ
E_{off}	Turn-Off Switching Loss			10		mJ
C_{ies}	Input Capacitance	$V_{CE} = 25V, f=1MHz,$ $V_{GE} = 0V$		12.0		nF
C_{oes}	Output Capacitance			1.15		nF
C_{res}	Reverse Transfer Capacitance			0.80		nF
I_{SC}	SC Data	$T_P \leq 10\mu s, V_{GE}=15V,$ $T_J=125^\circ C, V_{CC}=450V,$ $V_{CEM} \leq 600V$		TBD		
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

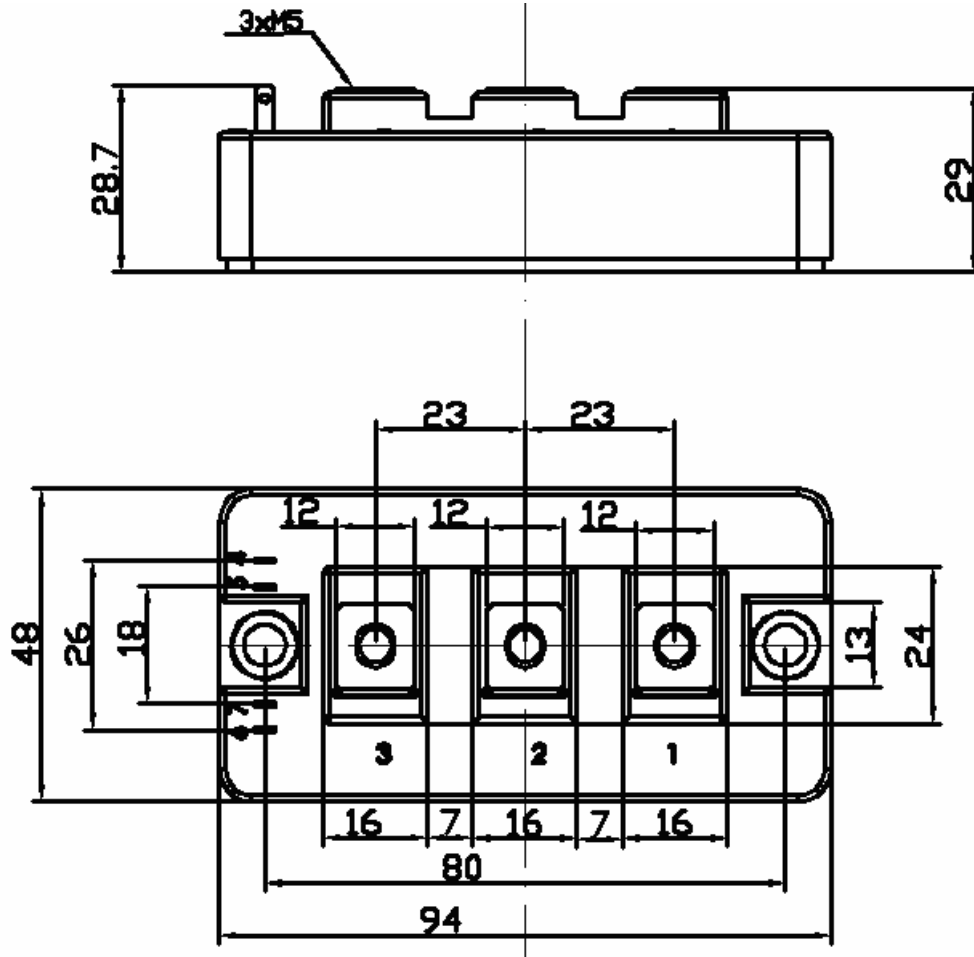
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{FM}	Diode Forward Voltage	$I_F=200A$	$T_J=25^\circ C$		1.37	V
			$T_J=125^\circ C$		1.40	
t_{rr}	Diode Reverse Recovery Time	$I_F=200A,$ $V_R=300V,$ $di/dt=-4000A/\mu s,$ $V_{GE}=-15V$	$T_J=25^\circ C$		90	ns
			$T_J=125^\circ C$		125	
I_{rr}	Diode Peak Reverse Recovery Current		$T_J=25^\circ C$		50	A
			$T_J=125^\circ C$		75	
Q_{rec}	Reverse Recovery Charge		$T_J=25^\circ C$		8	μC
			$T_J=125^\circ C$		12	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (IGBT Part, per 1/2 Module)		0.16	K/W
$R_{\theta JC}$	Junction-to-Case (DIODE Part, per 1/2 Module)		0.29	K/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)	0.046		K/W
Weight	Weight of Module	210		g

Package Dimension

Dimensions in Millimeters



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