STARPOWER

SEMICONDUCTOR **IGBT**

GD100HFU120C1SD

1200V/100A 2 in one-package

General Description

STARPOWER IGBT Power Module provides ultra switching speed as well as short circuit ruggedness. They are designed for the applications such as electronic welder and inductive heating.

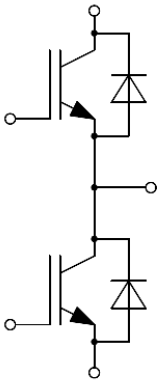
Features

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

Typical Applications

- Switching mode power supply
- Inductive heating
- Electronic welder

Equivalent Circuit Schematic



Absolute Maximum Ratings T_C=25°C unless otherwise noted

IGBT

Symbol	Description	Value	Unit
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25°C @ T_C=80°C	140 100	A
I_{CM}	Pulsed Collector Current t_p=1ms	200	A
P_D	Maximum Power Dissipation @ T_j=150°C	694	W

Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	100	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	200	A

Module

Symbol	Description	Value	Unit
T_{jmax}	Maximum Junction Temperature	150	°C
T_{jop}	Operating Junction Temperature	-40 to +125	°C
T_{STG}	Storage Temperature Range	-40 to +125	°C
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	2500	V

IGBT Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=100A,V_{GE}=15V, T_j=25°C		2.90	3.35	V
		I_C=100A,V_{GE}=15V, T_j=125°C		3.60		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=2.0mA,V_{CE}=V_{GE}, T_j=25°C	5.0	6.1	7.0	V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_j=25°C			5.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_j=25°C			400	nA
R_{Gint}	Internal Gate Resistance			2.5		Ω
C_{ies}	Input Capacitance	V_{CE}=25V,f=1MHz, V_{GE}=0V		6.60		nF
C_{res}	Reverse Transfer Capacitance			0.51		nF
Q_G	Gate Charge	V_{GE}=-15…+15V		1.08		μC
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=100A, R_G=5.6Ω,V_{GE}=±15V, T_j=25°C		300		ns
t_r	Rise Time			64		ns
$t_{d(off)}$	Turn-Off Delay Time			340		ns
t_f	Fall Time			105		ns
E_{on}	Turn-On Switching Loss			6.76		mJ
E_{off}	Turn-Off Switching Loss			4.25		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=100A, R_G=5.6Ω,V_{GE}=±15V, T_j=125°C		320		ns
t_r	Rise Time			65		ns
$t_{d(off)}$	Turn-Off Delay Time			350		ns
t_f	Fall Time			13		ns
E_{on}	Turn-On Switching Loss			10.2		mJ
E_{off}	Turn-Off Switching Loss			5.50		mJ
I_{SC}	SC Data	t_P≤10μs,V_{GE}=15V, T_j=125°C,V_{CC}=900V, V_{CEM}≤1200V		900		A

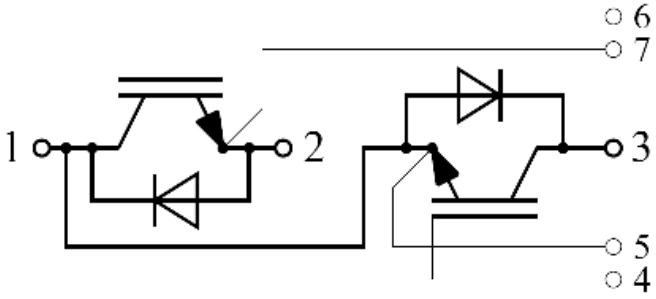
Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=100A,V_{GE}=0V,T_i=25°C		1.95	2.40	V
		I_F=100A,V_{GE}=0V,T_j=125°C		1.85		
Q_r	Recovered Charge	V_R=600V,I_F=100A, -di/dt=1900A/μs,V_{GE}=-15V T_j=25°C		5.4		μC
I_{RM}	Peak Reverse Recovery Current			11.2		A
E_{rec}	Reverse Recovery Energy			81		mJ
Q_r	Recovered Charge	V_R=600V,I_F=100A, -di/dt=1900A/μs,V_{GE}=-15V T_j=125°C		101		μC
I_{RM}	Peak Reverse Recovery Current			3.54		A
E_{rec}	Reverse Recovery Energy			6.57		mJ

Module Characteristics T_C=25°C unless otherwise noted

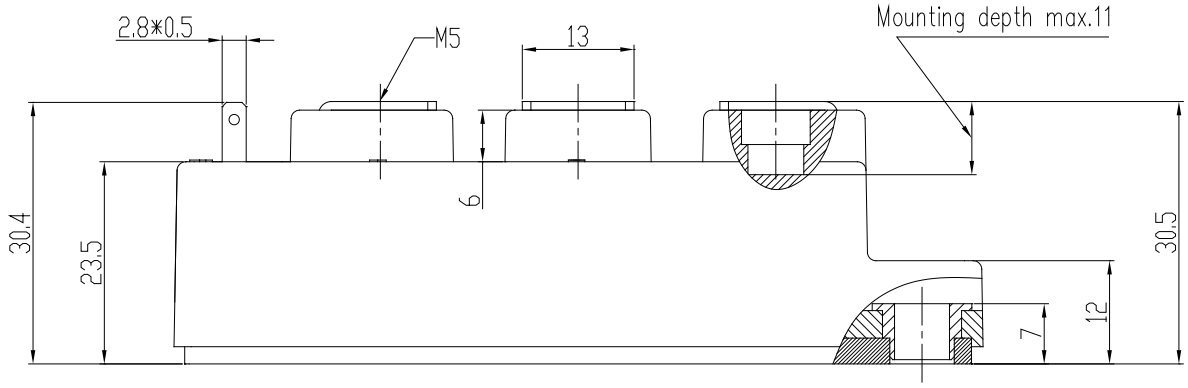
Symbol	Parameter	Min.	Typ.	Max.	Unit
L_{CE}	Stray Inductance			30	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal to Chip		0.75		mΩ
R_{thJC}	Junction-to-Case (per IGBT) Junction-to-Case (per Diode)			0.180 0.377	K/W
R_{thCH}	Case-to-Heatsink (per IGBT) Case-to-Heatsink (per Diode) Case-to-Heatsink (per Module)		0.148 0.309 0.05		K/W
M	Terminal Connection Torque, Screw M5 Mounting Torque, Screw M6	2.5 3.0		5.0 5.0	N.m
G	Weight of Module		150		g

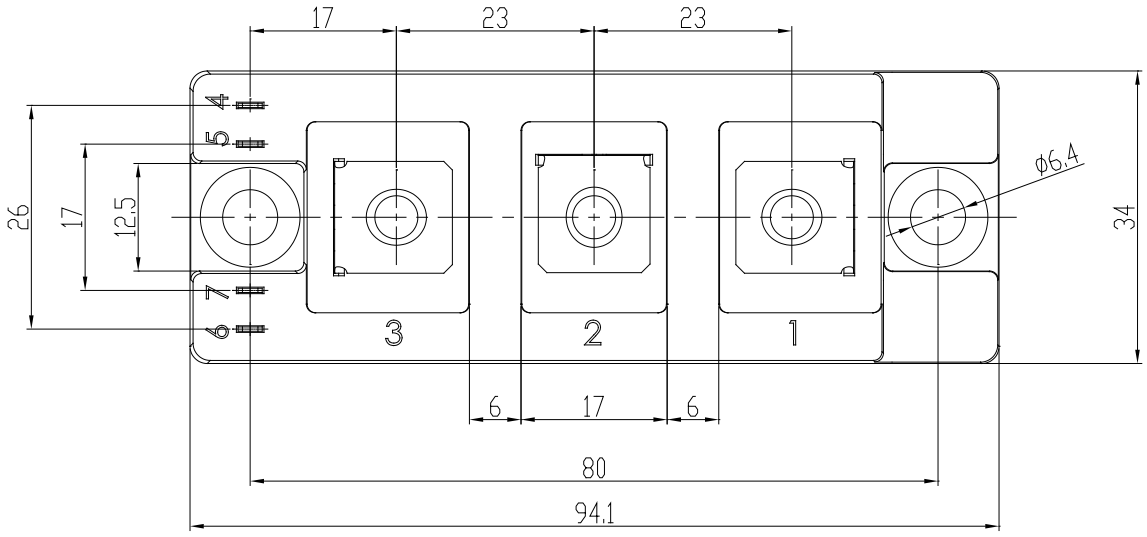
Circuit Schematic



Package Dimensions

Dimensions in Millimeters





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