STARPOWER

SEMICONDUCTOR **IGBT**

GD75HFT120C1S_T4F

1200V/75A 2 in one-package

General Description

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

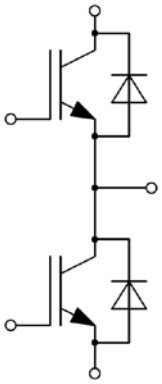
Features

- Low $V_{CE(sat)}$ Trench IGBT technology
- Low switching loss
- 10μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175℃
- Fast & soft reverse recovery anti-parallel FWD
- Isolated copper baseplate using DBC technology

Typical Applications

- Switching mode power supply
- Inductive heating
- Welding machine

Equivalent Circuit Schematic



Absolute Maximum Ratings T_C=25℃ 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℃ @ T_C=100℃	114 75	A
I_{CM}	Pulsed Collector Current t_p=1ms	150	A
P_D	Maximum Power Dissipation @ T_j=175℃	432	W

Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	75	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	150	A

Module

Symbol	Description	Value	Unit
T_{jmax}	Maximum Junction Temperature	175	℃
T_{jop}	Operating Junction Temperature	-40 to +150	℃
T_{STG}	Storage Temperature Range	-40 to +125	℃
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	4000	V

IGBT Characteristics T_C=25℃ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=75A,V_{GE}=15V, T_j=25℃		2.05	2.50	V
		I_C=75A,V_{GE}=15V, T_j=125℃		2.40		
		I_C=75A,V_{GE}=15V, T_j=150℃		2.45		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=2.6mA,V_{CE}=V_{GE}, T_j=25℃	5.3	5.8	6.3	V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_j=25℃			1.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_j=25℃			400	nA
R_{Gint}	Internal Gate Resistance			10		Ω
C_{ies}	Input Capacitance	V_{CE}=25V,f=1MHz, V_{GE}=0V		4.40		nF
C_{res}	Reverse Transfer Capacitance			0.26		nF
Q_G	Gate Charge	V_{GE}=15V		0.35		μC
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=75A, R_G=8.2Ω,V_{GE}=±15V, T_j=25℃		176		ns
t_r	Rise Time			53		ns
$t_{d(off)}$	Turn-Off Delay Time			221		ns
t_f	Fall Time			137		ns
E_{on}	Turn-On Switching Loss			4.70		mJ
E_{off}	Turn-Off Switching Loss			2.76		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=75A, R_G=8.2Ω,V_{GE}=±15V, T_j=125℃		178		ns
t_r	Rise Time			55		ns
$t_{d(off)}$	Turn-Off Delay Time			242		ns
t_f	Fall Time			194		ns
E_{on}	Turn-On Switching Loss			6.28		mJ
E_{off}	Turn-Off Switching Loss			4.64		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=75A, R_G=8.2Ω,V_{GE}=±15V, T_j=150℃		178		ns
t_r	Rise Time			55		ns
$t_{d(off)}$	Turn-Off Delay Time			244		ns
t_f	Fall Time			203		ns
E_{on}	Turn-On Switching Loss			6.32		mJ
E_{off}	Turn-Off Switching Loss			4.74		mJ
I_{SC}	SC Data	t_P≤10μs,V_{GE}=15V, T_j=150℃,V_{CC}=900V, V_{CEM}≤1200V		300		A

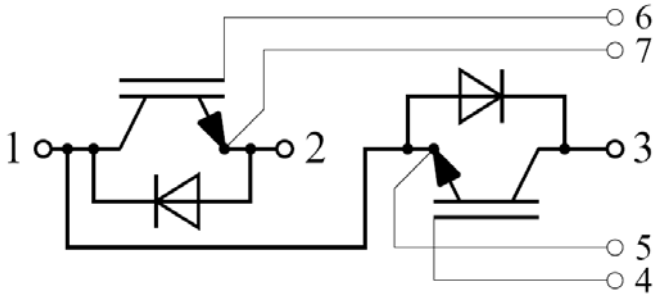
Diode Characteristics T_C=25℃ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=75A,V_{GE}=0V,T_j=25℃		1.80	2.25	V
		I_F=75A,V_{GE}=0V,T_j=125℃		1.75		
		I_F=75A,V_{GE}=0V,T_j=150℃		1.67		
Q_r	Recovered Charge	V_R=600V,I_F=75A, R_G=4.7Ω,V_{GE}=-15V T_j=25℃		4.05		μC
I_{RM}	Peak Reverse Recovery Current			59		A
E_{rec}	Reverse Recovery Energy			2.38		mJ
Q_r	Recovered Charge	V_R=600V,I_F=75A, R_G=4.7Ω,V_{GE}=-15V T_j=125℃		10.5		μC
I_{RM}	Peak Reverse Recovery Current			69		A
E_{rec}	Reverse Recovery Energy			4.56		mJ
Q_r	Recovered Charge	V_R=600V,I_F=75A, R_G=4.7Ω,V_{GE}=-15V T_j=150℃		12.8		μC
I_{RM}	Peak Reverse Recovery Current			74		A
E_{rec}	Reverse Recovery Energy			5.51		mJ

Module Characteristics T_C=25℃ unless otherwise noted

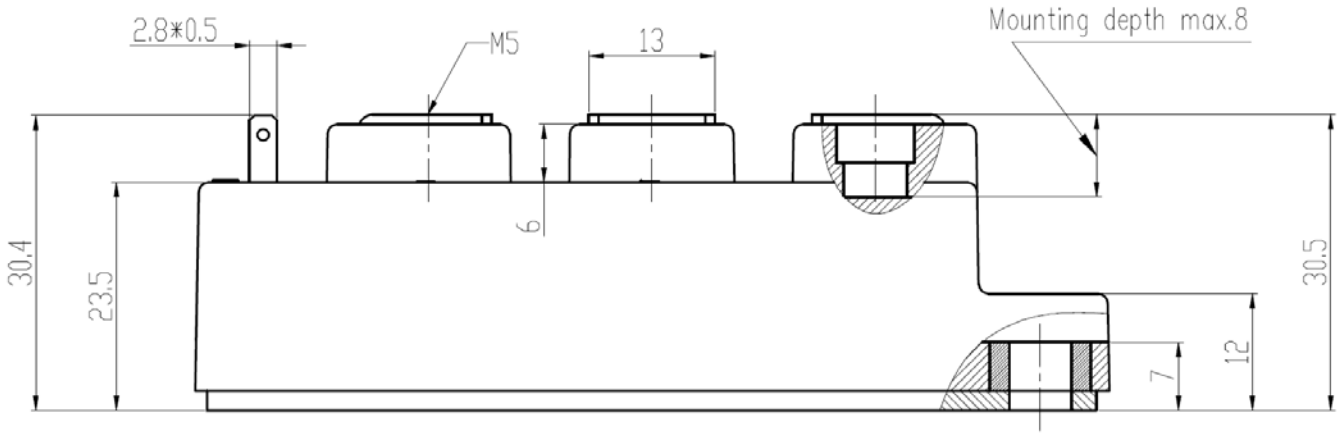
Symbol	Parameter	Min.	Typ.	Max.	Unit
L_{CE}	Stray Inductance			30	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal to Chip		0.75		mΩ
$R_{\theta JC}$	Junction-to-Case (per IGBT) Junction-to-Case (per Diode)			0.347 0.387	K/W
$R_{\theta CS}$	Case-to-Sink (per IGBT) Case-to-Sink (per Diode)		0.190 0.212		K/W
$R_{\theta CS}$	Case-to-Sink		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

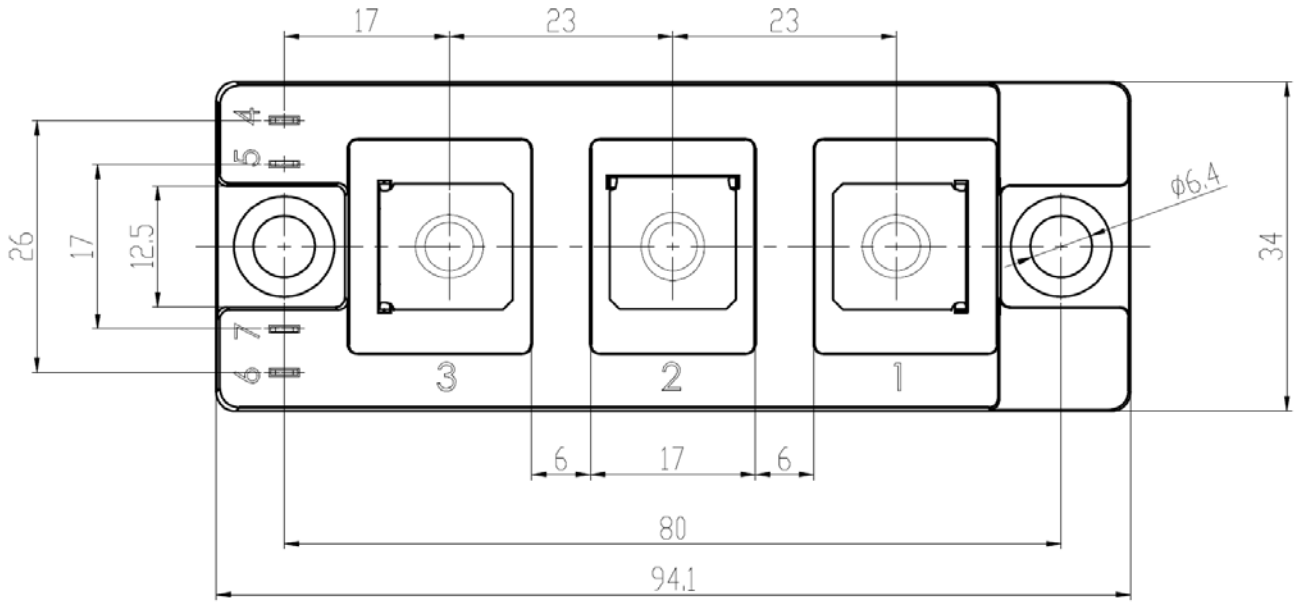
Circuit Schematic



Package Dimensions

Dimensions in Millimeters





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