

STARPOWER

SEMICONDUCTOR

IGBT

GD150HFT120C2S_T4F

Molding Type Module

1200V/150A 2 in one-package

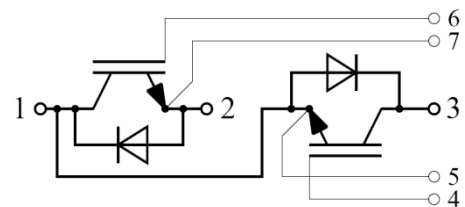
General Description

STARPOWER IGBT Power Module provides 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
- 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

- Switching mode power supply
- Inductive heating
- Welding machine

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

Symbol	Description	GD150HFT120C2S_T4F	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C=25^\circ\text{C}$	300	A
	@ $T_C=100^\circ\text{C}$	150	
I_{CM}	Pulsed Collector Current $t_p=1\text{ms}$	300	A
I_F	Diode Continuous Forward Current	150	A
I_{FM}	Diode Maximum Forward Current $t_p=1\text{ms}$	300	A
P_D	Maximum Power Dissipation @ $T_j=175^\circ\text{C}$	789	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
M	Terminal Connection Torque, Screw M6	2.5 to 5.0	N.m
	Mounting Torque, Screw M6	3.0 to 5.0	
G	Weight of Module	300	g

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	$I_C=5.2\text{mA}, V_{CE}=V_{GE}, T_j=25^\circ\text{C}$	5.3	5.8	6.3	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=150\text{A}, V_{GE}=15\text{V}, T_j=25^\circ\text{C}$		2.05	2.45	V
		$I_C=150\text{A}, V_{GE}=15\text{V}, T_j=125^\circ\text{C}$		2.40		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=150A,$ $R_G=6.8\Omega, V_{GE}=\pm 15V,$ $T_j=25^\circ C$		354		ns
t_r	Rise Time			661		ns
$t_{d(off)}$	Turn-Off Delay Time			427		ns
t_f	Fall Time			166		ns
E_{on}	Turn-On Switching Loss			10.9		mJ
E_{off}	Turn-Off Switching Loss			13.0		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=150A,$ $R_G=6.8\Omega, V_{GE}=\pm 15V,$ $T_j=125^\circ C$		384		ns
t_r	Rise Time			132		ns
$t_{d(off)}$	Turn-Off Delay Time			440		ns
t_f	Fall Time			115		ns
E_{on}	Turn-On Switching Loss			13.9		mJ
E_{off}	Turn-Off Switching Loss			16.0		mJ
C_{ies}	Input Capacitance	$V_{CE}=25V, f=1MHz,$ $V_{GE}=0V$		4.40		nF
C_{res}	Reverse Transfer Capacitance			0.24		nF
I_{SC}	SC Data	$t_p \leq 10\mu s, V_{GE}=15V,$ $T_j=125^\circ C, V_{CC}=900V,$ $V_{CEM} \leq 1200V$		600		A
R_{Gint}	Internal Gate Resistance			10		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

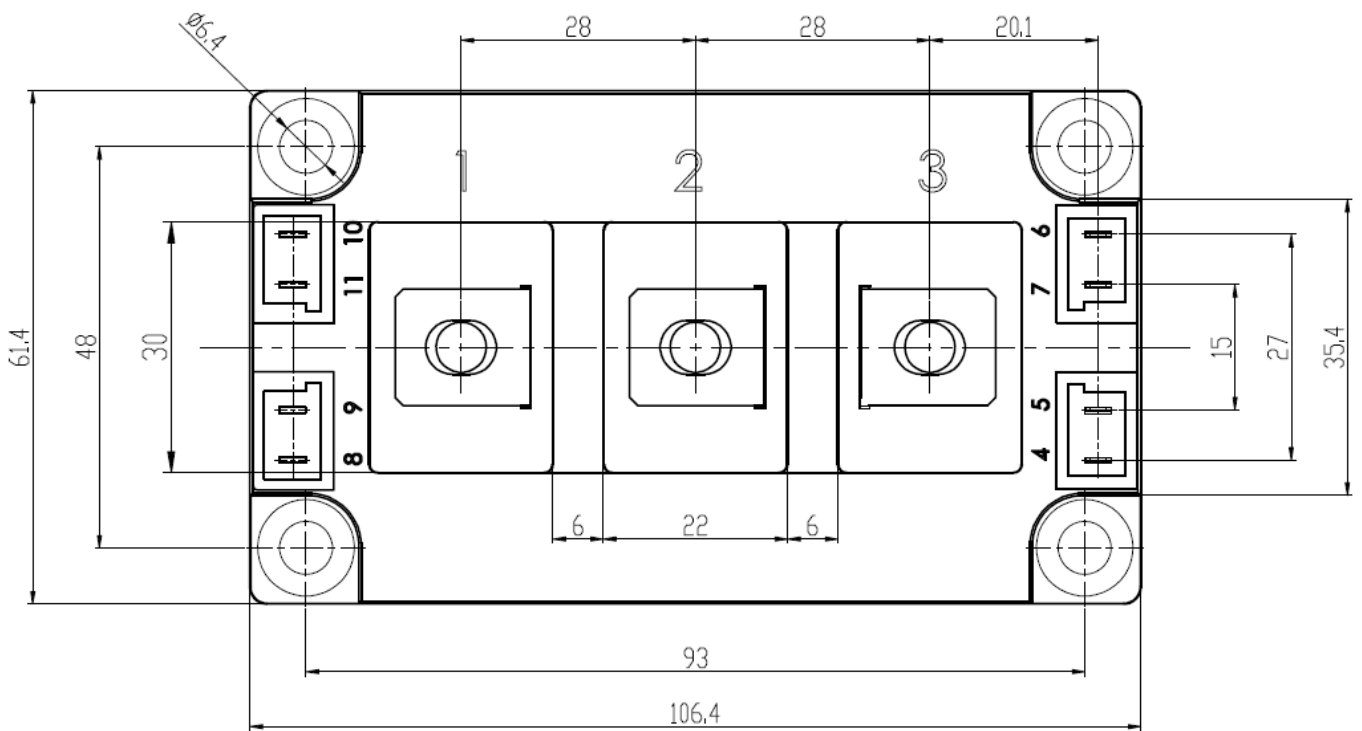
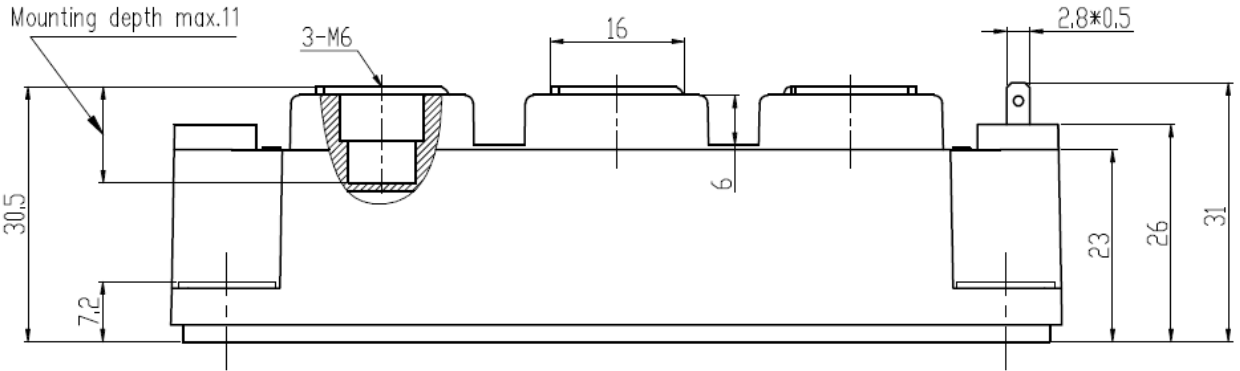
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=150A$	$T_j=25^\circ C$	1.95	2.35	V
			$T_j=125^\circ C$	2.05		
Q_r	Recovered Charge	$I_F=150A,$ $V_R=600V,$ $R_G=6.8\Omega,$ $V_{GE}=-15V$	$T_j=25^\circ C$	10.0		μC
			$T_j=125^\circ C$	20.8		
I_{RM}	Peak Reverse Recovery Current	$V_{GE}=-15V$	$T_j=25^\circ C$	100		A
			$T_j=125^\circ C$	123		
E_{rec}	Reverse Recovery Energy	$V_{GE}=-15V$	$T_j=25^\circ C$	5.60		mJ
			$T_j=125^\circ C$	10.1		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per IGBT)		0.190	K/W
$R_{\theta JC}$	Junction-to-Case (per Diode)		0.257	K/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)	0.035		K/W

Package Dimensions

Dimensions in Millimeters



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