STARPOWER

SEMICONDUCTOR   **IGBT**

GD800HFL170A3S

**Molding Type Module**

1700V/800A 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
high power converters.

Features

- Low $V_{CE(sat)}$ SPT+ IGBT technology
- 10μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Low inductance case
- Fast & soft reverse recovery anti-parallel FWD
- AlSiC baseplate for high power cycling capability
- AlN substrate for low thermal resistance
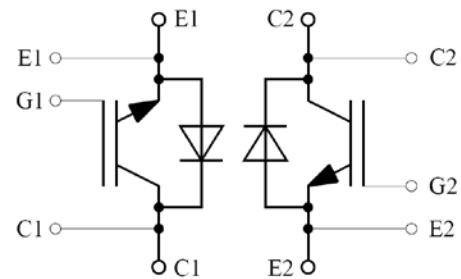
Equivalent Circuit Schematic

Typical Applications

- High Power Converters
- Motor Drivers
- Wind Turbines

Absolute Maximum Ratings $T_C=25℃$ unless otherwise noted

Symbol	Description	GD800HFL170A3S	Units
V_{CES}	Collector-Emitter Voltage	1700	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ $T_C=25℃$ @ $T_C=100℃$	1400 800	A
I_{CM}	Pulsed Collector Current $t_p=1ms$	1600	A
I_F	Diode Continuous Forward Current	800	A
I_{FM}	Diode Maximum Forward Current $t_p=1ms$	1600	A
P_D	Maximum Power Dissipation @ $T_j=175℃$	4.97	kW
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
Mounting Torque	Signal Terminal Screw:M4 Power Terminal Screw:M8 Mounting Screw:M6	1.8 to 2.1 8.0 to 10 4.25 to 5.75	N.m
Weight	Weight of Module	1050	g

Electrical Characteristics of IGBT $T_C=25℃$ unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$T_j=25℃$	1700			V
I_{CES}	Collector Cut-Off Current	$V_{CE}=V_{CES},V_{GE}=0V,$ $T_j=25℃$			5.0	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=V_{GES},V_{CE}=0V,$ $T_j=25℃$			400	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=32mA,V_{CE}=V_{GE},$ $T_j=25℃$	5.4		7.4	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=800A,V_{GE}=15V,$ $T_j=25℃$		2.50	2.95	V
		$I_C=800A,V_{GE}=15V,$ $T_j=125℃$		3.00		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=900V,I_C=800A, R_{Gon}=1.5Ω, V_{GE}=±15V,T_j=25℃		235		ns
t_r	Rise Time			110		ns
$t_{d(off)}$	Turn-Off Delay Time			390		ns
t_f	Fall Time			145		ns
E_{on}	Turn-On Switching Loss			216		mJ
E_{off}	Turn-Off Switching Loss			152		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=900V,I_C=800A, R_{Gon}=1.5Ω, V_{GE}=±15V,T_j=125℃		250		ns
t_r	Rise Time			120		ns
$t_{d(off)}$	Turn-Off Delay Time			475		ns
t_f	Fall Time			155		ns
E_{on}	Turn-On Switching Loss			280		mJ
E_{off}	Turn-Off Switching Loss			232		mJ
C_{ies}	Input Capacitance	V_{CE}=25V,f=1MHz, V_{GE}=0V		54.0		nF
C_{oes}	Output Capacitance			2.72		nF
C_{res}	Reverse Transfer Capacitance			1.82		nF
I_{SC}	SC Data	t_P≤10μs,V_{GE}=15 V, T_j=150℃,V_{CC}=1300 V, V_{CEM}≤1700V		2480		A
R_{Gint}	Internal Gate Resistance			0.63		Ω
L_{CE}	Stray Inductance			20		nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal To Chip			0.37		mΩ

## Electrical Characteristics of Diode T_C=25℃ unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=800A	T_j=25℃		1.80	2.20	V
			T_j=125℃		1.95		
Q_r	Recovered Charge	I_F=800A, V_R=900V, R_G=1.5Ω, V_{GE}=-15V	T_j=25℃		232		μC
			T_j=125℃		360		
I_{RM}	Peak Reverse Recovery Current		T_j=25℃		720		A
			T_j=125℃		840		
E_{rec}	Reverse Recovery Energy		T_j=25℃		134		mJ
			T_j=125℃		259		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per IGBT)		30.2	K/kW
$R_{\theta JC}$	Junction-to-Case (per Diode)		46.4	K/kW
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)	6		K/kW

Package Dimensions

Dimensions in Millimeters
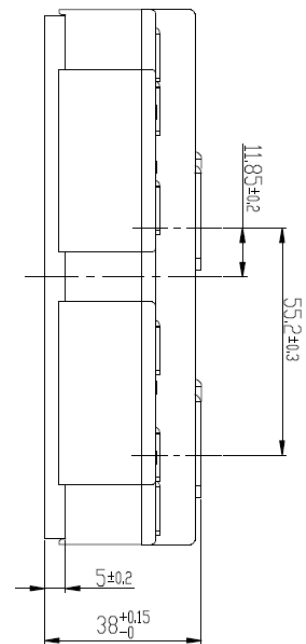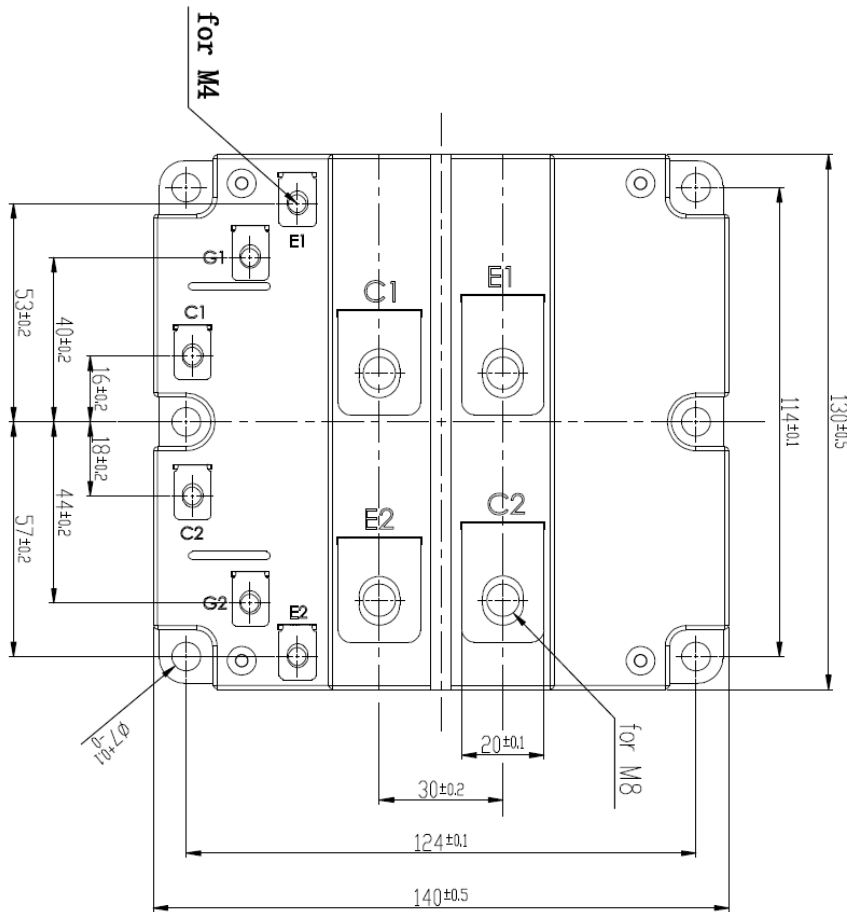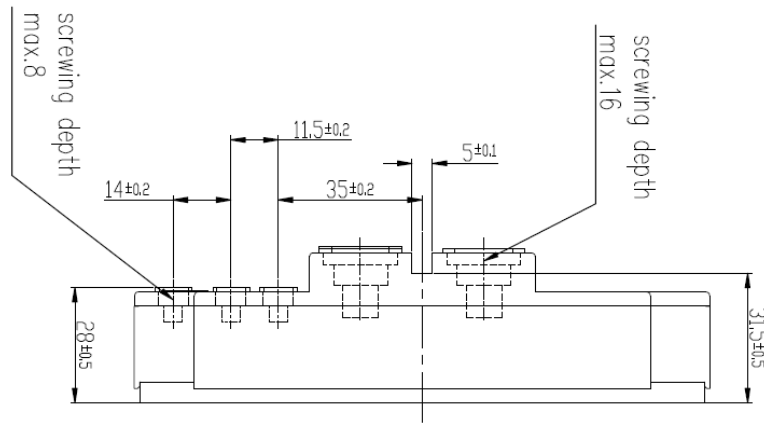
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