

STARPOWER

SEMICONDUCTOR™

IGBT

GD2400SGL120C3S

Preliminary

Molding Type Module**1200V/2400A 1 in one-package**

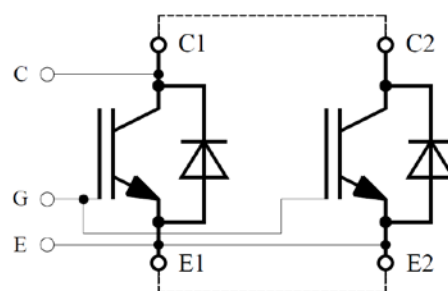
General Description

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



external connection to be done
Equivalent Circuit Schematic

Typical Applications

- AC Inverter Drives
- Uninterruptible Power Supply
- Wind Turbines

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

Symbol	Description	GD2400SGL120C3S	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C=25^\circ\text{C}$ @ $T_C=80^\circ\text{C}$	3400	A
		2400	
$I_{CM(1)}$	Pulsed Collector Current $t_p=1\text{ms}$	4800	A
I_F	Diode Continuous Forward Current	2400	A
I_{FM}	Diode Maximum Forward Current	4800	A
P_D	Maximum power Dissipation @ $T_j=150^\circ\text{C}$	10.4	kW
T_j	Maximum Junction Temperature	-40 to +150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-40 to +125	$^\circ\text{C}$
V_{ISO}	Isolation Voltage RMS, $f=50\text{Hz}, t=1\text{min}$	2500	V
Mounting Torque	Signal Terminal Screw:M4	1.8 to 2.1	N.m
	Power Terminal Screw:M8	8.0 to 10	
	Mounting Screw:M6	4.25 to 5.75	

Notes:

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

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	$I_C=96.0\text{mA}, V_{CE}=V_{GE},$ $T_j=25^\circ\text{C}$	5.0	6.3	7.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=2400\text{A}, V_{GE}=15\text{V},$ $T_j=25^\circ\text{C}$		2.00	2.45	V
		$I_C=2400\text{A}, V_{GE}=15\text{V},$ $T_j=125^\circ\text{C}$		2.20		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Q_G	Gate charge	$V_{GE}=-15\dots+15V$		24.5		μC
R_{Gint}	Internal Gate Resistor	$T_j=25^\circ C$		0.13		Ω
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=2400A,$ $R_{Goff}=0.43\Omega,$ $V_{GE}=\pm 15V, T_j=25^\circ C$		210		ns
t_r	Rise Time			80		ns
$t_{d(off)}$	Turn-Off Delay Time			480		ns
t_f	Fall Time			60		ns
E_{on}	Turn-On Switching Loss			260		mJ
E_{off}	Turn-Off Switching Loss			155		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=2400A,$ $R_G=0.43\Omega,$ $V_{GE}=\pm 15V, T_j=125^\circ C$		250		ns
t_r	Rise Time			85		ns
$t_{d(off)}$	Turn-Off Delay Time			550		ns
t_f	Fall Time			90		ns
E_{on}	Turn-On Switching Loss			360		mJ
E_{off}	Turn-Off Switching Loss			250		mJ
C_{ies}	Input Capacitance	$V_{CE}=25V, f=1MHz,$ $V_{GE}=0V$		170		nF
C_{oes}	Output Capacitance			11.4		nF
C_{res}	Reverse Transfer Capacitance			7.52		nF
I_{SC}	SC Data	$t_{sc}\leq 10\mu s, V_{GE}=15V,$ $T_j=125^\circ C, V_{CC}=900V,$ $V_{CEM}\leq 1200V$		TBD		A
L_{CE}	Stray Inductance			12		nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal To Chip			0.19		m Ω

Electrical Characteristics of DIODE $T_C=25^\circ C$ unless otherwise noted

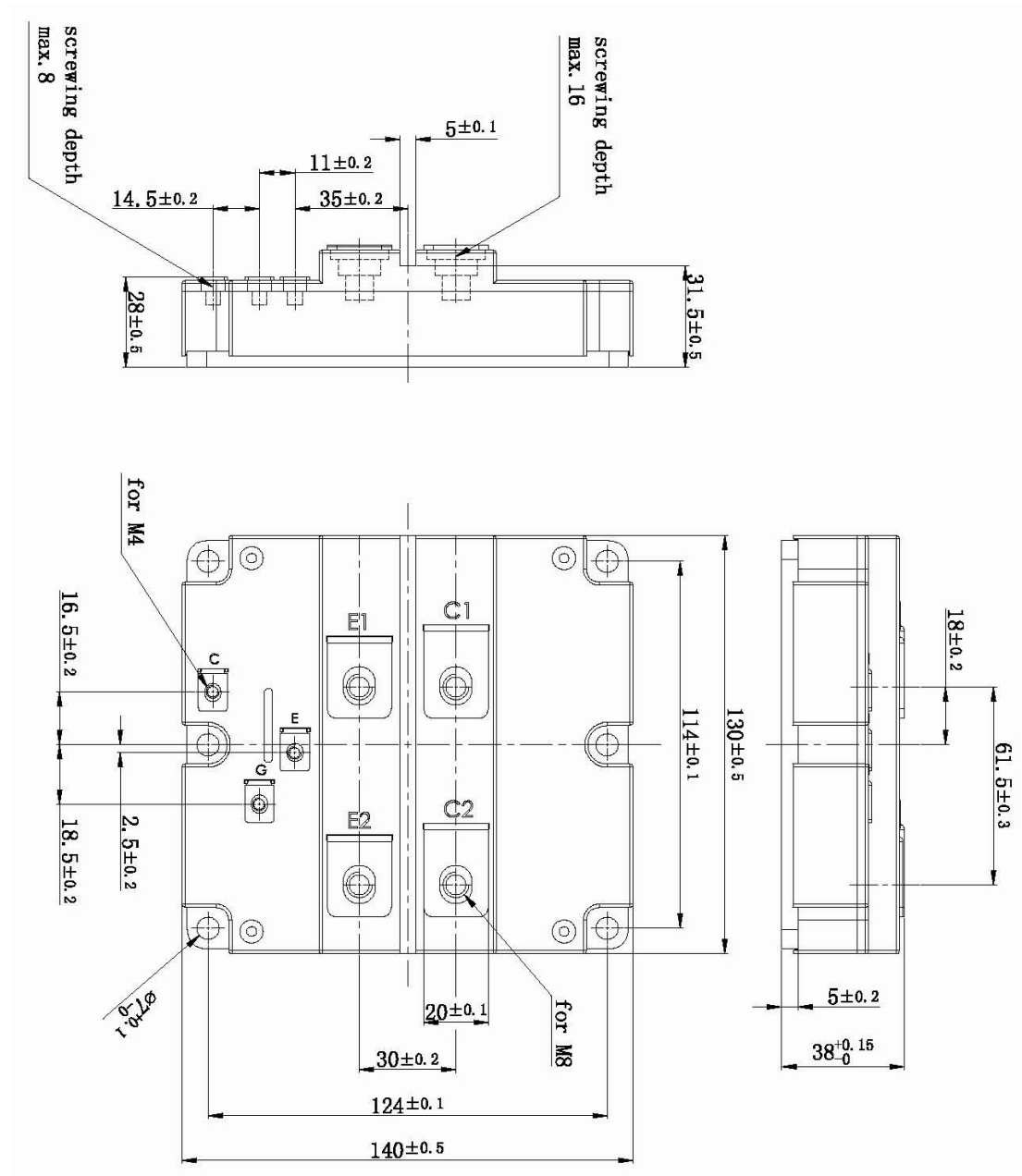
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units	
V_F	Diode Forward Voltage	$I_F=2400A$	$T_j=25^\circ C$		1.80	2.20	V
			$T_j=125^\circ C$		1.85		
Q_r	Recovered Charge	$I_F=2400A,$	$T_j=25^\circ C$		315		μC
			$T_j=125^\circ C$		530		
I_{RM}	Reverse Recovery Current	$V_R=600V,$ $R_G=0.43\Omega,$	$T_j=25^\circ C$		2000		A
			$T_j=125^\circ C$		2700		
E_{rec}	Reverse Recovery Energy	$V_{GE}=-15V$	$T_j=25^\circ C$		115		mJ
			$T_j=125^\circ C$		240		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per IGBT)		12	K/kW
$R_{\theta JC}$	Junction-to-Case (per Diode)		22	K/kW
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied, per Module)	6		K/kW
Weight	Weight of Module	1500		g

Package Dimension

Dimensions in Millimeters



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