

STARPOWER

SEMICONDUCTOR

IGBT

GD300SGK120C2S

Molding Type Module

1200V/300A 1 in one-package

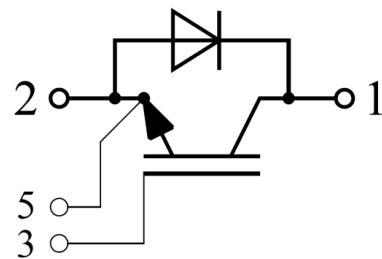


General Description

STARPOWER IGBT Power Module provides ultra low conduction and switching loss as well as short circuit ruggedness. They are designed for the applications such as general inverters and UPS.

Features

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



Equivalent Circuit Schematic

Typical Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

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

Symbol	Description	GD300SGK120C2S	Unit
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C=25^\circ\text{C}$	510	A
	@ $T_C=80^\circ\text{C}$	300	
I_{CM}	Pulsed Collector Current $t_p=1\text{ms}$	600	A
I_F	Diode Continuous Forward Current @ $T_C=80^\circ\text{C}$	300	A
I_{FM}	Diode Maximum Forward Current $t_p=1\text{ms}$	600	A
P_D	Maximum Power Dissipation @ $T_j=150^\circ\text{C}$	2083	W
T_{jmax}	Maximum Junction Temperature	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	1.1 to 2.0	N.m
	Power Terminal Screw:M6	2.5 to 5.0	
	Mounting Screw:M6	3.0 to 5.0	

Electrical Characteristics of IGBT $T_C=25^\circ\text{C}$ unless otherwise noted**Off Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)CES}$	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.	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=3.0\text{mA}, V_{CE}=V_{GE},$ $T_j=25^\circ\text{C}$	5.2	5.7	6.2	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=300\text{A}, V_{GE}=15\text{V},$ $T_j=25^\circ\text{C}$		2.15	2.60	V
		$I_C=300\text{A}, V_{GE}=15\text{V},$ $T_j=125^\circ\text{C}$		2.65		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=300A,$ $R_G=3.3\Omega, V_{GE}=\pm 15V,$ $T_j=25^\circ C$		393		ns
t_r	Rise Time			130		ns
$t_{d(off)}$	Turn-Off Delay Time			568		ns
t_f	Fall Time			144		ns
E_{on}	Turn-On Switching Loss			7.70		mJ
E_{off}	Turn-Off Switching Loss			26.3		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=300A,$ $R_G=3.3\Omega, V_{GE}=\pm 15V,$ $T_j=125^\circ C$		395		ns
t_r	Rise Time			134		ns
$t_{d(off)}$	Turn-Off Delay Time			603		ns
t_f	Fall Time			155		ns
E_{on}	Turn-On Switching Loss			11.0		mJ
E_{off}	Turn-Off Switching Loss			30.1		mJ
C_{ies}	Input Capacitance	$V_{CE}=25V, f=1MHz,$ $V_{GE}=0V$		21.3		nF
C_{res}	Reverse Transfer Capacitance			1.42		nF
I_{SC}	SC Data	$t_p \leq 10\mu s, V_{GE}=15V,$ $T_j=125^\circ C, V_{CC}=900V,$ $V_{CEM} \leq 1200V$		2100		A
L_{CE}	Stray Inductance				20	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal To Chip			0.18		m Ω

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

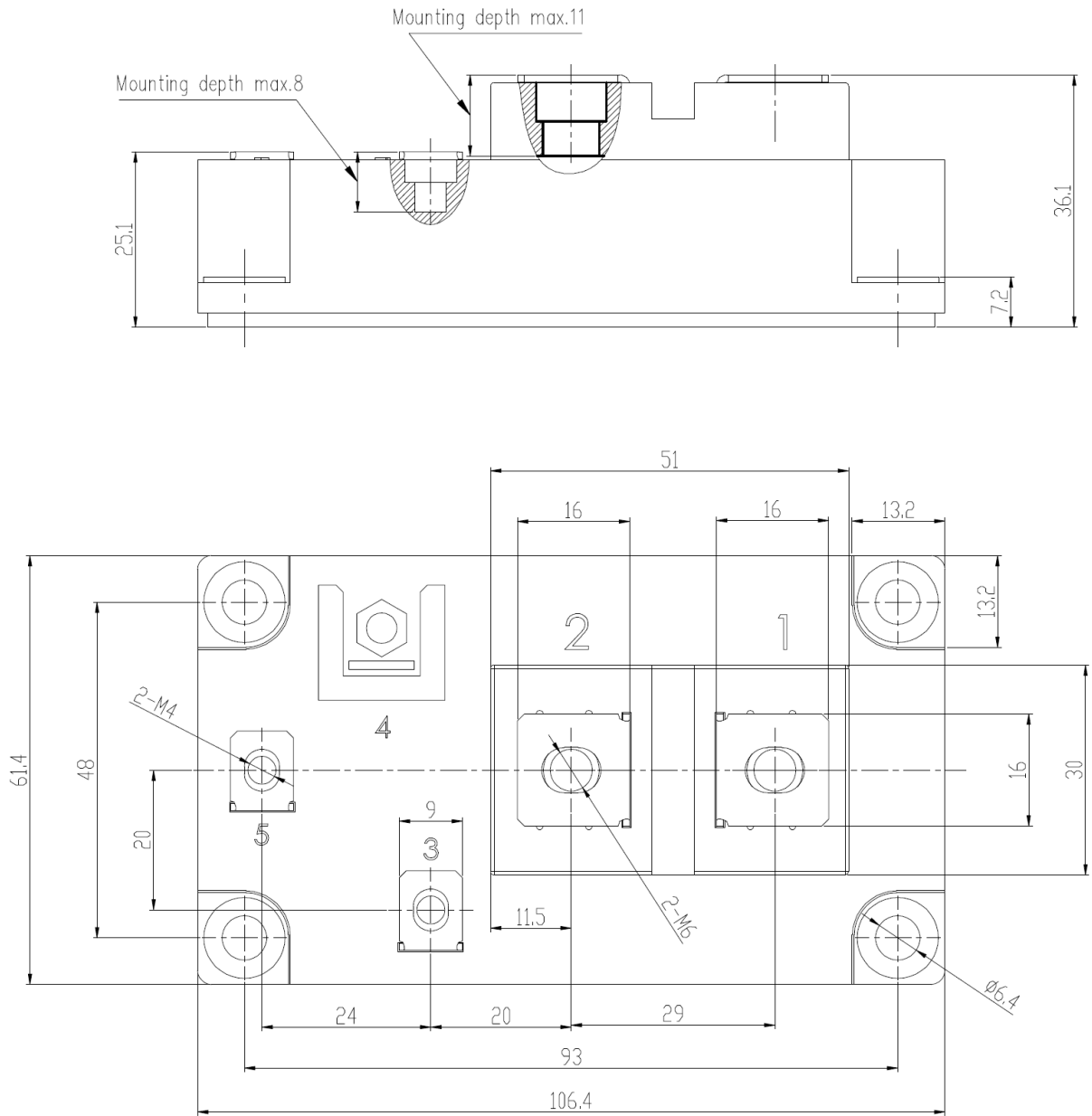
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	
V_F	Diode Forward Voltage	$I_F=300A$	$T_j=25^\circ C$		1.80	2.25	V
			$T_j=125^\circ C$		1.85		
Q_r	Recovered Charge	$I_F=300A,$	$T_j=25^\circ C$		20.2		μC
			$T_j=125^\circ C$		40.1		
I_{RM}	Peak Reverse Recovery Current	$V_R=600V,$ $R_G=3.3\Omega,$	$T_j=25^\circ C$		170		A
			$T_j=125^\circ C$		250		
E_{rec}	Reverse Recovery Energy	$V_{GE}=-15V$	$T_j=25^\circ C$		8.2		mJ
			$T_j=125^\circ C$		18.5		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Junction-to-Case (per IGBT)		0.060	K/W
$R_{\theta JC}$	Junction-to-Case (per DIODE)		0.118	K/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)	0.035		K/W
Weight	Weight of Module	300		g

Package Dimensions

Dimensions in Millimeters



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