

# STARPOWER

SEMICONDUCTOR

**IGBT**

## GD25FSA120L2S

**1200V/25A 6 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 general inverters and UPS.

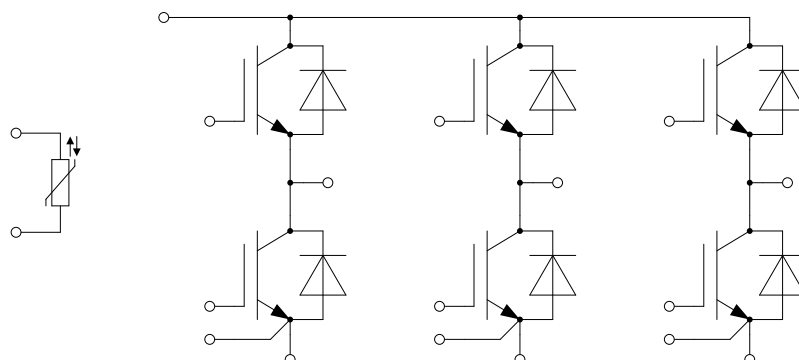
### Features

- Low  $V_{CE(sat)}$  Trench IGBT technology
- 8 $\mu$ s short circuit capability
- $V_{CE(sat)}$  with positive temperature coefficient
- Maximum junction temperature 175°C
- Low inductance case
- Fast & soft reverse recovery anti-parallel FWD
- Isolated heatsink using DBC technology

### Typical Applications

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

### Equivalent Circuit Schematic



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

Symbol	Description	Value	Unit
$V_{CES}$	Collector-Emitter Voltage	1200	V
$V_{GES}$	Gate-Emitter Voltage	$\pm 20$	V
$I_C$	Collector Current @ $T_H=90^{\circ}\text{C}$	25	A
$I_{CM}$	Pulsed Collector Current $t_p=1\text{ms}$	50	A

**Diode**

Symbol	Description	Value	Unit
$V_{RRM}$	Repetitive Peak Reverse Voltage	1200	V
$I_F$	Diode Continuous Forward Current	25	A
$I_{FM}$	Diode Maximum Forward Current $t_p=1\text{ms}$	50	A

**Module**

Symbol	Description	Value	Unit
$T_{vjmax}$	Maximum Junction Temperature	175	$^{\circ}\text{C}$
$T_{vjop}$	Operating Junction Temperature	-40 to +175	$^{\circ}\text{C}$
$T_{STG}$	Storage Temperature Range	-40 to +125	$^{\circ}\text{C}$
$V_{ISO}$	Isolation Voltage RMS, $f=50\text{Hz}, t=1\text{min}$	2500	V

Note:  $T_{vjop} > 150^{\circ}\text{C}$  is allowed for operation at overload conditions.

**IGBT Characteristics**  $T_H=25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=25\text{A}, V_{GE}=15\text{V}, T_{vj}=25^\circ\text{C}$		1.50	1.95	V
		$I_C=25\text{A}, V_{GE}=15\text{V}, T_{vj}=125^\circ\text{C}$		1.70		
		$I_C=25\text{A}, V_{GE}=15\text{V}, T_{vj}=150^\circ\text{C}$		1.80		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=0.50\text{mA}, V_{CE}=V_{GE}, T_{vj}=25^\circ\text{C}$	5.4	6.2	7.0	V
$I_{CES}$	Collector Cut-Off Current	$V_{CE}=V_{CES}, V_{GE}=0\text{V}, T_{vj}=25^\circ\text{C}$			50	$\mu\text{A}$
$I_{GES}$	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0\text{V}, T_{vj}=25^\circ\text{C}$			100	nA
$R_{Gint}$	Internal Gate Resistance			0		$\Omega$
$C_{ies}$	Input Capacitance	$V_{CE}=25\text{V}, f=1\text{MHz}, V_{GE}=0\text{V}$		2.21		nF
$C_{res}$	Reverse Transfer Capacitance			0.02		nF
$Q_G$	Gate Charge	$V_{GE}=-15\dots+15\text{V}$		0.16		$\mu\text{C}$

**Diode Characteristics**  $T_H=25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_F$	Diode Forward Voltage	$I_F=25\text{A}, V_{GE}=0\text{V}, T_{vj}=25^\circ\text{C}$		1.60	2.05	V
		$I_F=25\text{A}, V_{GE}=0\text{V}, T_{vj}=125^\circ\text{C}$		1.65		
		$I_F=25\text{A}, V_{GE}=0\text{V}, T_{vj}=150^\circ\text{C}$		1.65		

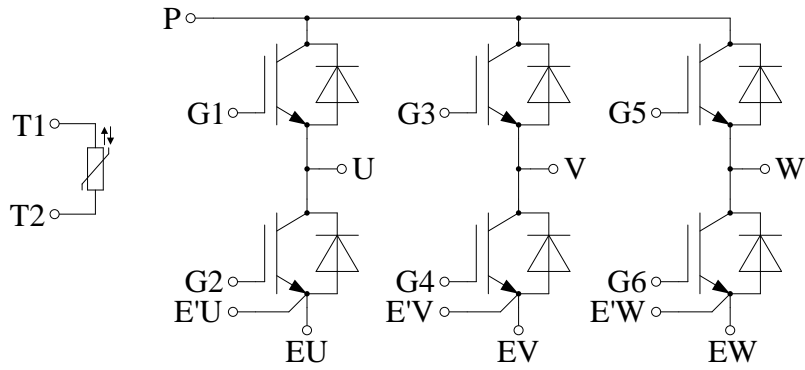
**NTC Characteristics**  $T_H=25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$R_{25}$	Rated Resistance			5.0		k $\Omega$
$\Delta R/R$	Deviation of $R_{100}$	$T_C=100^\circ\text{C}, R_{100}=493.3\Omega$	-5		5	%
$P_{25}$	Power Dissipation				20.0	mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15\text{K}))]$		3375		K
$B_{25/80}$	B-value	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15\text{K}))]$		3411		K
$B_{25/100}$	B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298.15\text{K}))]$		3433		K

**Module Characteristics**  $T_H=25^{\circ}\text{C}$  unless otherwise noted

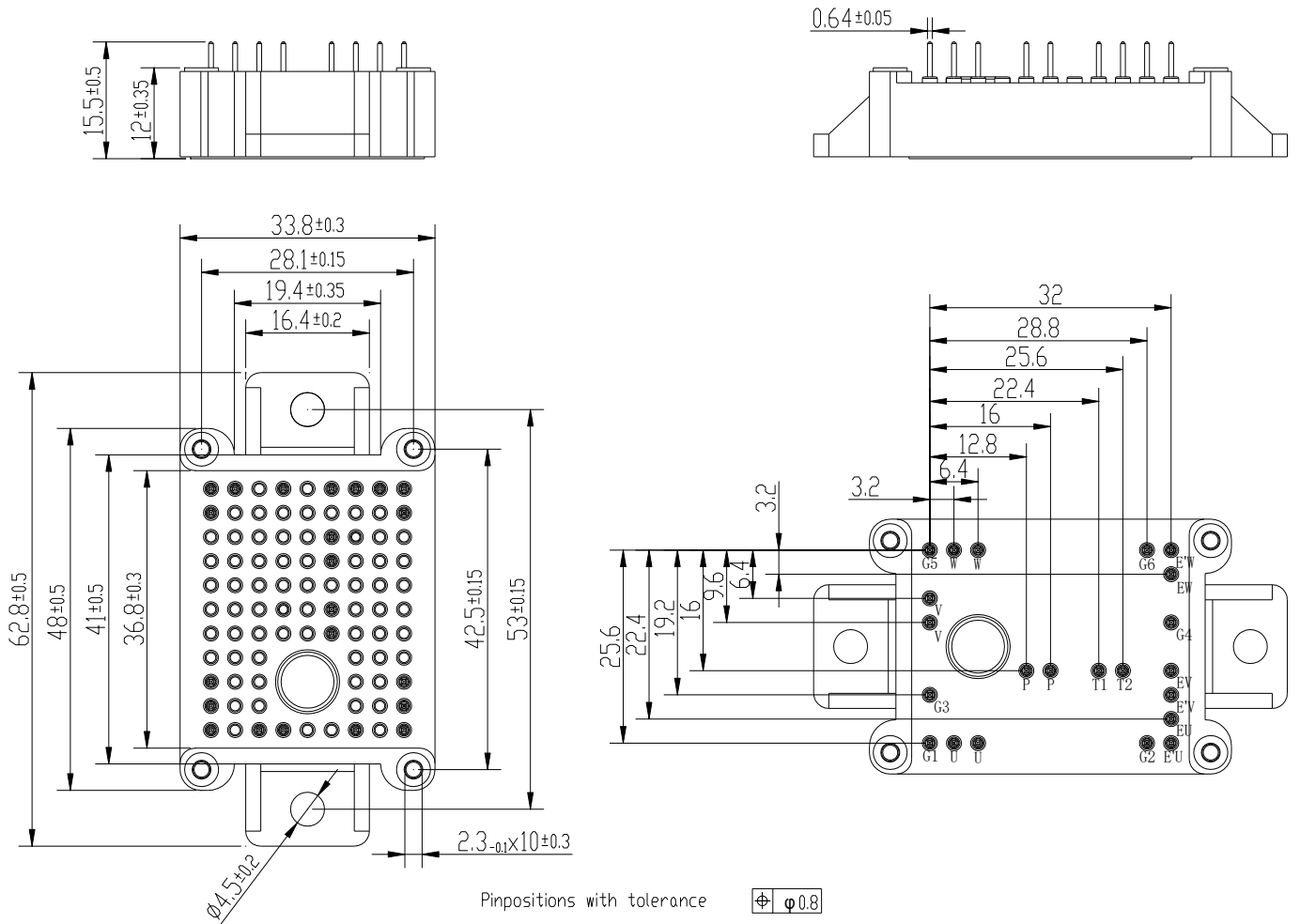
Symbol	Parameter	Min.	Typ.	Max.	Unit
$L_{CE}$	Stray Inductance		25		nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal to Chip		4.50		m $\Omega$
$R_{thJH}$	Junction-to-Heatsink(per IGBT, $\lambda_{grease}=3.3$ W/(m*K))		1.440		K/W
	Junction-to-Heatsink(per Diode, $\lambda_{grease}=3.3$ W/(m*K))		1.810		
F	Mounting Force Per Clamp	20		50	N
G	Weight of Module		24		g

**Circuit Schematic**



**Package Dimensions**

Dimensions in Millimeters



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