STARPOWER

SEMICONDUCTOR **IGBT**

GD75FFT60F4S

600V/75A 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.

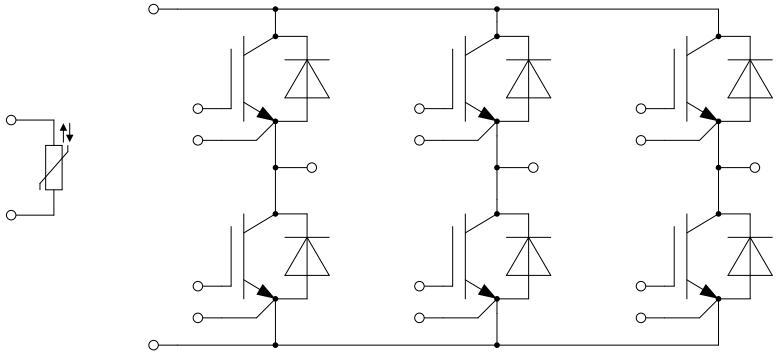
Features

- Low $V_{CE(sat)}$ Trench IGBT technology
- Low switching loss
- 5μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175°C
- 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_C=25°C unless otherwise noted

IGBT-inverter

Symbol	Description	Value	Unit
V_{CES}	Collector-Emitter Voltage	600	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25°C @ T_C=55°C	89 75	A
I_{CM}	Pulsed Collector Current t_p=1ms	150	A
P_D	Maximum Power Dissipation @ T_j=175°C	248	W

Diode-inverter

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	600	V
I_F	Diode Continuous Forward Current	75	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	150	A

Module

Symbol	Description	Value	Unit
T_{jmax}	Maximum Junction Temperature	175	°C
T_{jop}	Operating Junction Temperature	-40 to +150	°C
T_{STG}	Storage Temperature Range	-40 to +125	°C
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	4000	V

IGBT-inverter Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=75A,V_{GE}=15V, T_j=25°C		1.70	2.15	V
		I_C=75A,V_{GE}=15V, T_j=125°C		1.95		
		I_C=75A,V_{GE}=15V, T_j=150°C		2.00		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=2.1mA,V_{CE}=V_{GE}, T_j=25°C	4.0	4.5	6.5	V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_j=25°C			1.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_j=25°C			400	nA
R_{Gint}	Internal Gate Resistance			/		Ω
C_{ies}	Input Capacitance	V_{CE}=30V,f=1MHz, V_{GE}=0V		4.44		nF
C_{res}	Reverse Transfer Capacitance			0.13		nF
Q_G	Gate Charge	V_{GE}=15V		0.15		μC
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=300V,I_C=75A, R_G=8.2Ω,V_{GE}=±15V, T_j=25°C		105		ns
t_r	Rise Time			54		ns
$t_{d(off)}$	Turn-Off Delay Time			104		ns
t_f	Fall Time			76		ns
E_{on}	Turn-On Switching Loss			0.65		mJ
E_{off}	Turn-Off Switching Loss			0.82		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=300V,I_C=75A, R_G=8.2Ω,V_{GE}=±15V, T_j=125°C		105		ns
t_r	Rise Time			54		ns
$t_{d(off)}$	Turn-Off Delay Time			109		ns
t_f	Fall Time			100		ns
E_{on}	Turn-On Switching Loss			0.75		mJ
E_{off}	Turn-Off Switching Loss			1.09		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=300V,I_C=75A, R_G=8.2Ω,V_{GE}=±15V, T_j=150°C		105		ns
t_r	Rise Time			55		ns
$t_{d(off)}$	Turn-Off Delay Time			112		ns
t_f	Fall Time			108		ns
E_{on}	Turn-On Switching Loss			0.83		mJ
E_{off}	Turn-Off Switching Loss			1.28		mJ
I_{SC}	SC Data	t_P≤5μs,V_{GE}=15V, T_j=150°C,V_{CC}=360V, V_{CEM}≤600V		675		A

Diode-inverter Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=75A,V_{GE}=0V,T_j=25°C		1.55	2.00	V
		I_F=75A,V_{GE}=0V,T_j=125°C		1.50		
		I_F=75A,V_{GE}=0V,T_j=150°C		1.50		
Q_r	Recovered Charge	V_R=300V,I_F=75A, -di/dt=1600A/μs,V_{GE}=-15V T_j=25°C		3.4		μC
I_{RM}	Peak Reverse Recovery Current			53		A
E_{rec}	Reverse Recovery Energy			0.76		mJ
Q_r	Recovered Charge	V_R=300V,I_F=75A, -di/dt=1600A/μs,V_{GE}=-15V T_j=125°C		5.7		μC
I_{RM}	Peak Reverse Recovery Current			66		A
E_{rec}	Reverse Recovery Energy			1.47		mJ
Q_r	Recovered Charge	V_R=300V,I_F=75A, -di/dt=1600A/μs,V_{GE}=-15V T_j=150°C		6.0		μC
I_{RM}	Peak Reverse Recovery Current			70		A
E_{rec}	Reverse Recovery Energy			1.54		mJ

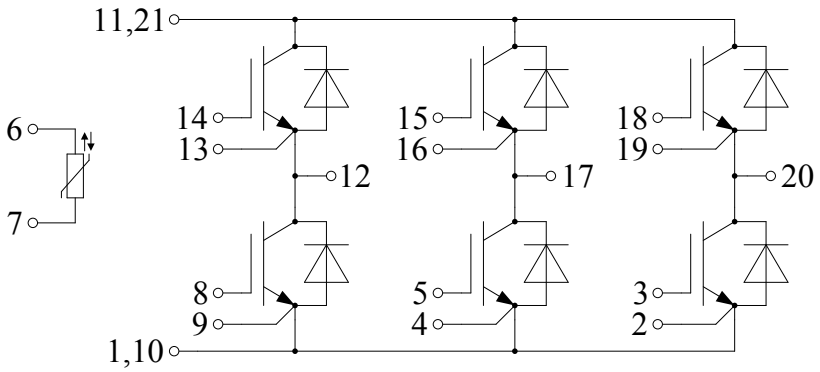
NTC Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated Resistance			22.0		kΩ
ΔR/R	Deviation of R_{100}	T_C=100°C,R_{100}=1486.1Ω	-5		5	%
P_{25}	Power Dissipation				200	mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		4000		K

Module Characteristics T_C=25°C unless otherwise noted

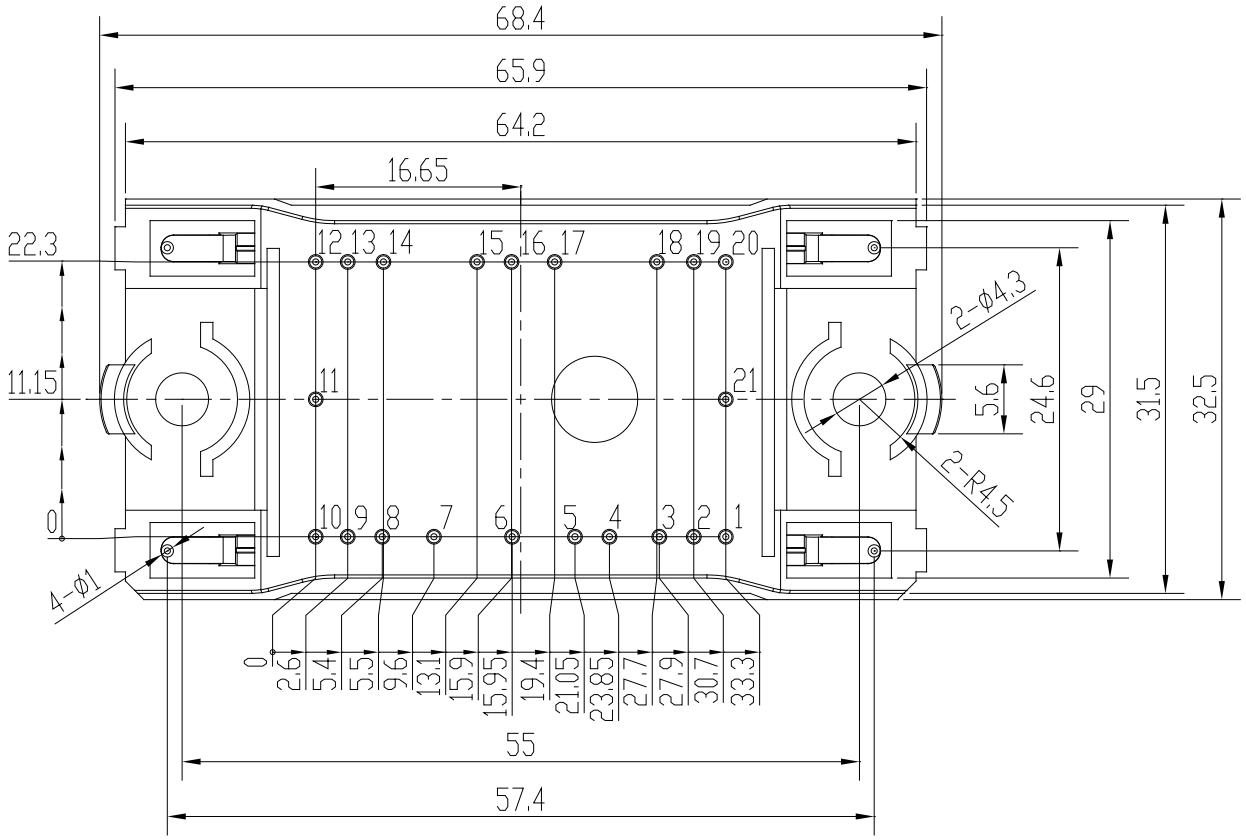
Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case (per IGBT-inverter) Junction-to-Case (per Diode-inverter)		0.549 0.610	0.604 0.671	K/W
R_{thCH}	Case-to-Heatsink (per IGBT-inverter) Case-to-Heatsink (per Diode-inverter) Case-to-Heatsink (per Module)		0.399 0.443 0.035		K/W
M	Mounting Torque, Screw M4	2.0		2.2	N.m
G	Weight of Module		26		g

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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