STARPOWER

SEMICONDUCTOR™

IGBT

GD100FFK120C6S

Molding Type Module

1200V/100A 6 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
- 10μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast & soft reverse recovery anti-parallel FWD
- Isolated copper baseplate using DBC technology

Typical Applications

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

Absolute Maximum Ratings T_C=25°C unless otherwise noted

IGBT

Symbol	Description	Value	Unit
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25°C @ T_C=80°C	150 100	A
I_{CM}	Pulsed Collector Current t_p=1ms	200	A
P_D	Maximum Power Dissipation @ T_j=150°C	570	W

Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	100	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	200	A

Module

Symbol	Description	Value	Unit
T_{jmax}	Maximum Junction Temperature	150	°C
T_{jop}	Operating Junction Temperature	-40 to +125	°C
T_{STG}	Storage Temperature Range	-40 to +125	°C
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	2500	V

IGBT 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=100A,V_{GE}=15V, T_j=25°C		2.15	2.60	V
		I_C=100A,V_{GE}=15V, T_j=125°C		2.65		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=1.0mA,V_{CE}=V_{GE}, T_j=25°C	5.1	5.7	6.3	V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_j=25°C			5.0	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			2.5		Ω
C_{ies}	Input Capacitance	V_{CE}=25V,f=1MHz, V_{GE}=0V		6.45		nF
C_{res}	Reverse Transfer Capacitance			0.40		nF
Q_G	Gate Charge	V_{GE}=-15…+15V		1.02		μC
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=100A, R_G=6.8Ω,V_{GE}=±15V, T_j=25°C		395		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			6.20		mJ
E_{off}	Turn-Off Switching Loss			8.82		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=100A, R_G=6.8Ω,V_{GE}=±15V, T_j=125°C		395		ns
t_r	Rise Time			135		ns
$t_{d(off)}$	Turn-Off Delay Time			605		ns
t_f	Fall Time			155		ns
E_{on}	Turn-On Switching Loss			8.15		mJ
E_{off}	Turn-Off Switching Loss			10.1		mJ
I_{SC}	SC Data	t_P≤10μs,V_{GE}=15V, T_j=125°C,V_{CC}=900V, V_{CEM}≤1200V		700		A

Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=100A,V_{GE}=0V,T_j=25°C		1.95	2.40	V
		I_F=100A,V_{GE}=0V,T_j=125°C		1.85		
Q_r	Recovered Charge	V_R=600V,I_F=100A, -di/dt=1900A/μs,V_{GE}=-15V T_j=25°C		5.4		μC
I_{RM}	Peak Reverse Recovery Current			11.2		A
E_{rec}	Reverse Recovery Energy			81		mJ
Q_r	Recovered Charge	V_R=600V,I_F=100A, -di/dt=1900A/μs,V_{GE}=-15V T_j=125°C		101		μC
I_{RM}	Peak Reverse Recovery Current			3.54		A
E_{rec}	Reverse Recovery Energy			6.57		mJ

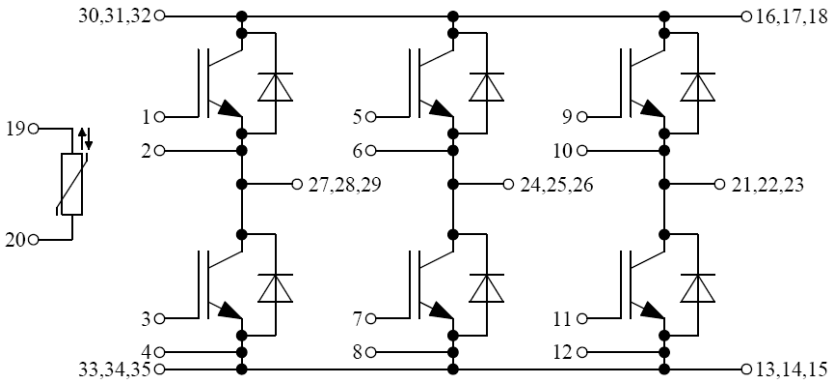
Electrical Characteristics of NTC T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
R_{25}	Rated Resistance			5.0		kΩ
ΔR/R	Deviation of R_{100}	R_{100}=493.3Ω	-5		5	%
P_{25}	Power Dissipation				20.0	mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3375		K

Thermal Characteristics

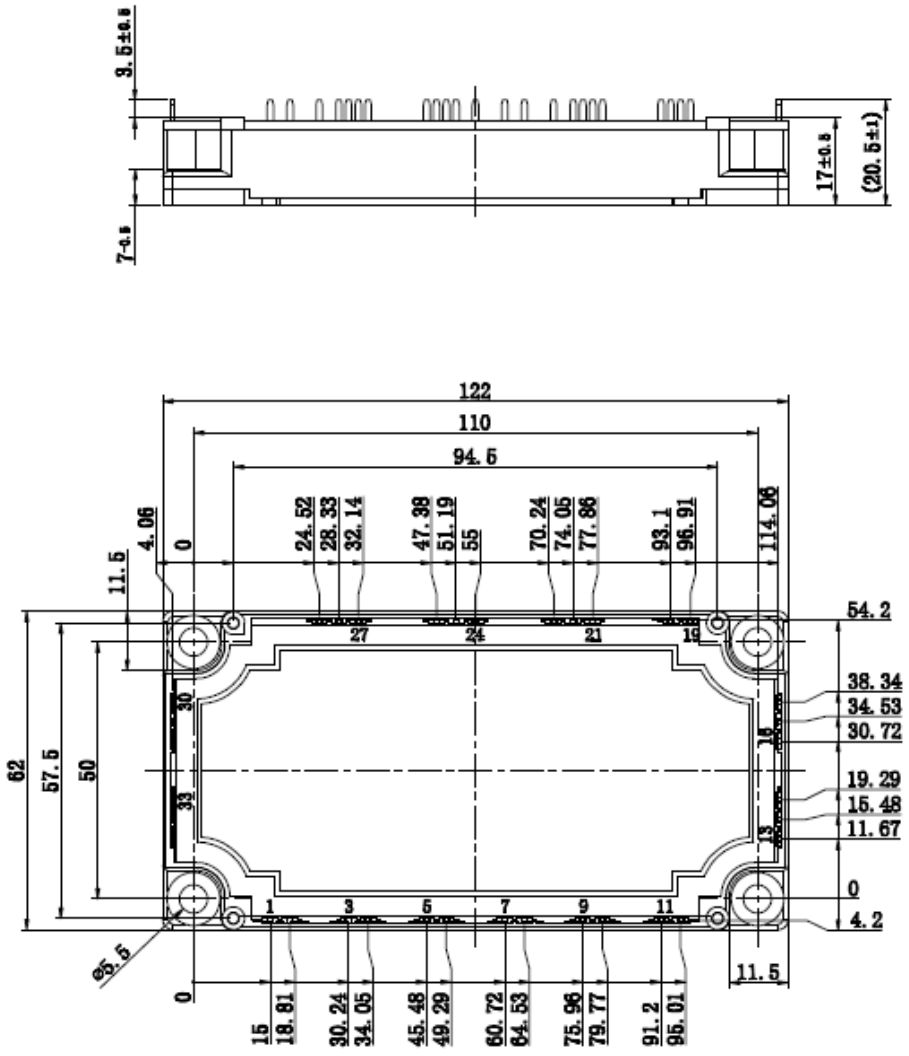
Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per IGBT)		0.219	K/W
$R_{\theta JC}$	Junction-to-Case (per DIODE)		0.522	K/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)	0.009		K/W
Weight	Weight of Module	300		g

Equivalent Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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