

STARPOWER

SEMICONDUCTOR

IGBT

GD75HCU120B3S

Molding Type Module**1200V/75A 4 in one-package**

General Description

STARPOWER IGBT Power Module provides ultrafast switching speed as well as short circuit ruggedness. It's designed for the applications such as electronic welder and inductive heating.



Features

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

Typical Applications

- Switching mode power supplies
- Inductive heating
- Electronic welder

IGBT-inverter $T_C=25^{\circ}\text{C}$ unless otherwise noted**Maximum Rated Values**

Symbol	Description	GD75HCU120B3S	Units
V_{CES}	Collector-Emitter Voltage @ $T_j=25^{\circ}\text{C}$	1200	V
V_{GES}	Gate-Emitter Voltage @ $T_j=25^{\circ}\text{C}$	± 20	V
I_C	Collector Current @ $T_C=25^{\circ}\text{C}$ @ $T_C=80^{\circ}\text{C}$	110 75	A
I_{CM}	Pulsed Collector Current $t_p=1\text{ms}$	150	A
P_{tot}	Total Power Dissipation @ $T_j=150^{\circ}\text{C}$	595	W

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	$I_C=1.5\text{mA}, V_{CE}=V_{GE},$ $T_j=25^{\circ}\text{C}$	4.8	5.5	6.3	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=75\text{A}, V_{GE}=15\text{V},$ $T_j=25^{\circ}\text{C}$		2.90	3.35	V
		$I_C=75\text{A}, V_{GE}=15\text{V},$ $T_j=125^{\circ}\text{C}$		3.60		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=75A,$ $R_G=8.6\Omega, V_{GE}=\pm 15V,$ $T_j=25^\circ C$		205		ns
t_r	Rise Time			49		ns
$t_{d(off)}$	Turn-Off Delay Time			262		ns
t_f	Fall Time			137		ns
E_{on}	Turn-On Switching Loss			6.30		mJ
E_{off}	Turn-Off Switching Loss			2.46		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=75A,$ $R_G=8.6\Omega, V_{GE}=\pm 15V,$ $T_j=125^\circ C$		205		ns
t_r	Rise Time			50		ns
$t_{d(off)}$	Turn-Off Delay Time			275		ns
t_f	Fall Time			170		ns
E_{on}	Turn-On Switching Loss			8.25		mJ
E_{off}	Turn-Off Switching Loss			3.62		mJ
C_{ies}	Input Capacitance	$V_{CE}=25V, f=1MHz,$ $V_{GE}=0V$		5.18		nF
C_{oes}	Output Capacitance			0.78		nF
C_{res}	Reverse Transfer Capacitance			0.35		nF
I_{SC}	SC Data	$t_p \leq 10\mu s, V_{GE}=15V,$ $T_j=125^\circ C, V_{CC}=900V,$ $V_{CEM} \leq 1200V$		660		A
Q_G	Gate Charge	$V_{CC}=600V, I_C=75A,$ $V_{GE}=-15 \sim +15V$		0.5		μC
R_{Gint}	Internal Gate Resistance			/		Ω

Diode-inverter $T_C=25^\circ C$ unless otherwise noted**Maximum Rated Values**

Symbol	Description	GD75HCU120B3S	Units
V_{RRM}	Repetitive Peak Reverse Voltage @ $T_j=25^\circ C$	1200	V
I_F	DC Forward Current	30	A
I_{FRM}	Repetitive Peak Forward Current $t_p=1ms$	60	A

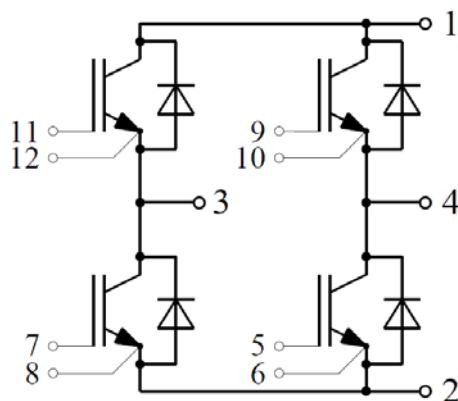
Characteristics Values

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=30A$	$T_j=25^\circ C$	1.90	2.30	V
			$T_j=125^\circ C$	1.80		
Q_r	Recovered Charge	$I_F=30A,$	$T_j=25^\circ C$	2.6		μC
			$T_j=125^\circ C$	4.2		
I_{RM}	Peak Reverse Recovery Current	$V_R=600V,$ $R_G=15\Omega,$	$T_j=25^\circ C$	20		A
			$T_j=125^\circ C$	23		
E_{rec}	Reverse Recovery Energy	$V_{GE}=-15V$	$T_j=25^\circ C$	1.31		mJ
			$T_j=125^\circ C$	2.08		

IGBT Module

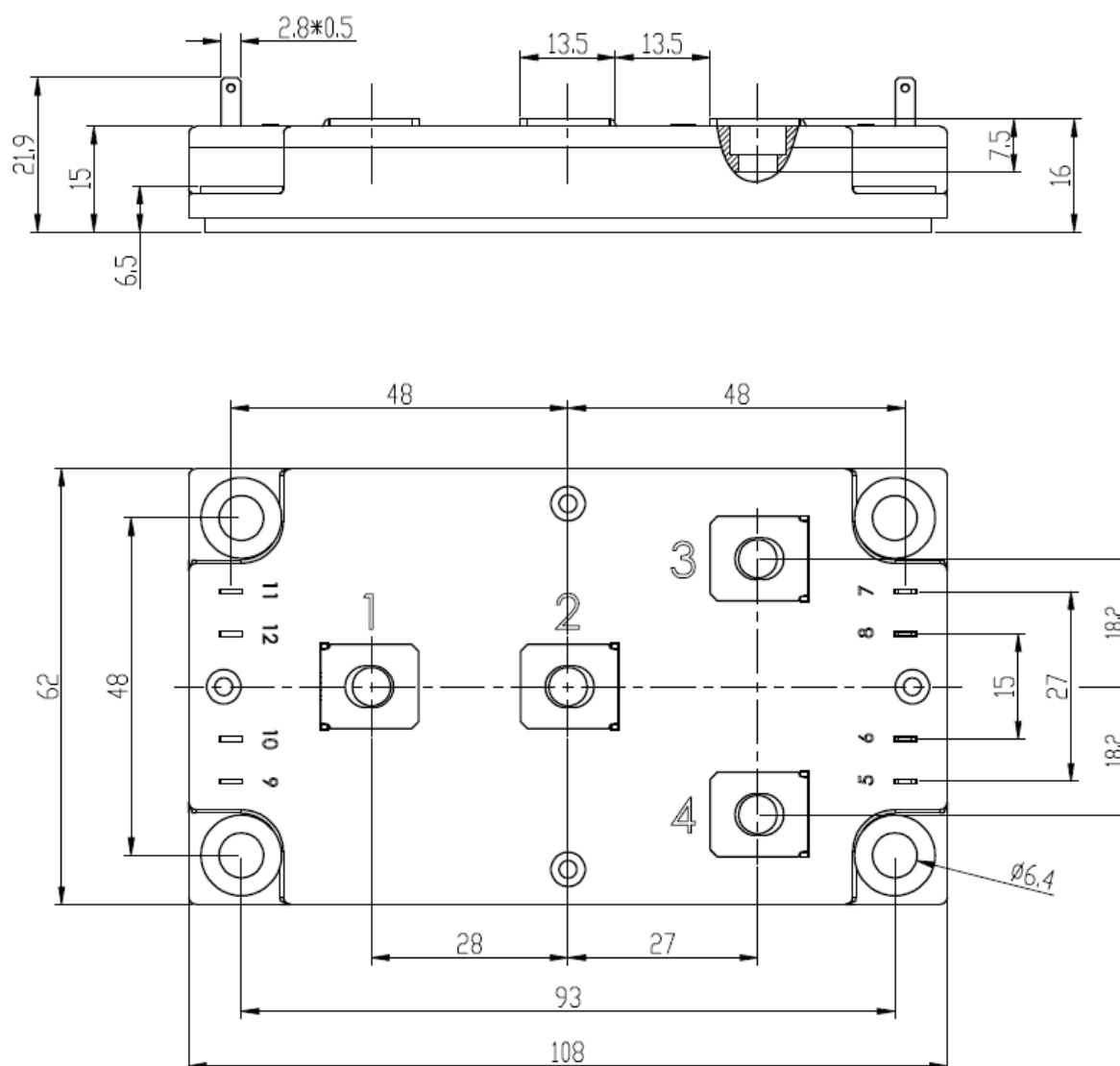
Symbol	Parameter	Min.	Typ.	Max.	Units
V _{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	2500			V
R _{θJC}	Junction-to-Case (per IGBT-inverter) Junction-to-Case (per Diode-inverter)			0.210 0.927	K/W
R _{θCS}	Case-to-Sink (Conductive grease applied)		0.035		K/W
T _{jmax}	Maximum Junction Temperature			150	°C
T _{jop}	Operating Junction Temperature	-40		125	°C
T _{STG}	Storage Temperature Range	-40		125	°C
Mounting Torque	Power Terminal Screw:M5 Mounting Screw:M6	2.5 3.0		5.0 6.0	N.m
G	Weight of Module		300		g

Equivalent Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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