STARPOWER

SEMICONDUCTOR **IGBT**

GD75CUK120C1S

Molding Type Module

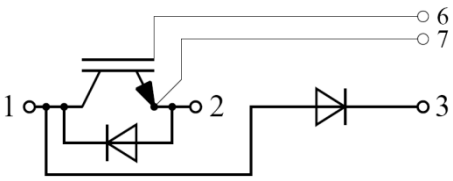
1200V/75A chopper in one-package

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 UPS and SMPS.

Features

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



Equivalent Circuit Schematic

Typical Applications

- Switching mode power supplies
- Electrical welding
- UPS

Absolute Maximum Ratings T_C=25℃ unless otherwise noted

Symbol	Description	GD75CUK120C1S	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25℃ @ T_C=80℃	150 75	A
I_{CM}	Pulsed Collector Current t_p=1ms	150	A
I_F	Diode Continuous Forward Current	75	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	150	A
P_D	Maximum Power Dissipation @ T_j=150℃	581	W
T_{jmax}	Maximum Junction Temperature	150	℃
T_{jop}	Operating Junction Temperature	-40 to +125	
T_{STG}	Storage Temperature Range	-40 to +125	℃
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	4000	V
Mounting Torque	Power Terminal Screw:M5 Mounting Screw:M6	2.5 to 5.0 3.0 to 5.0	N.m
Weight	Weight of Module	150	g

Electrical Characteristics of IGBT T_C=25℃ unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	T_j=25℃	1200			V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_j=25℃			5.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_j=25℃			400	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=0.75mA,V_{CE}=V_{GE}, T_j=25℃	4.4	5.2	6.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=75A,V_{GE}=15V, T_j=25℃		2.10	2.55	V
		I_C=75A,V_{GE}=15V, T_j=125℃		2.40		

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=15Ω,V_{GE}=±15V, T_j=25℃		460		ns
t_r	Rise Time			104		ns
$t_{d(off)}$	Turn-Off Delay Time			419		ns
t_f	Fall Time			164		ns
E_{on}	Turn-On Switching Loss			9.45		mJ
E_{off}	Turn-Off Switching Loss			5.04		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=75A, R_G=15Ω,V_{GE}=±15V, T_j=125℃		484		ns
t_r	Rise Time			107		ns
$t_{d(off)}$	Turn-Off Delay Time			454		ns
t_f	Fall Time			216		ns
E_{on}	Turn-On Switching Loss			11.2		mJ
E_{off}	Turn-Off Switching Loss			7.20		mJ
C_{ies}	Input Capacitance	V_{CE}=30V,f=1MHz, V_{GE}=0V		6.45		nF
C_{oes}	Output Capacitance			0.60		nF
C_{res}	Reverse Transfer Capacitance			0.24		nF
I_{SC}	SC Data	t_P≤10μs,V_{GE}=15 V, T_j=125℃,V_{CC}=900V, V_{CEM}≤1200V		600		A
L_{CE}	Stray Inductance				30	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal To Chip			0.75		mΩ

Electrical Characteristics of Diode T_C=25℃ unless otherwise noted

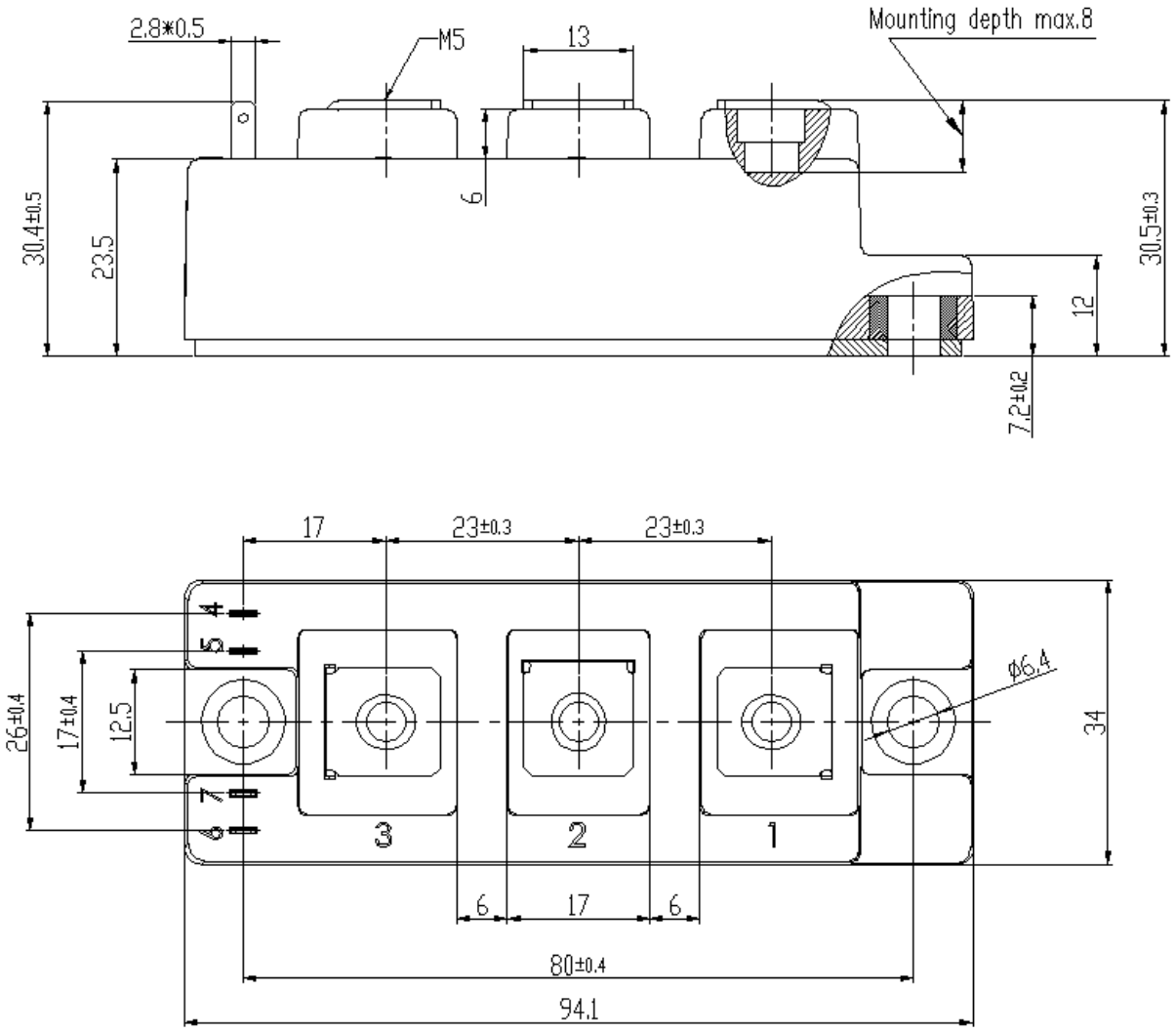
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=75A,V_{GE}=0V	T_j=25℃		1.82	2.25	V
			T_j=125℃		1.95		
Q_r	Recovered Charge	I_F=75A, V_R=600V, R_G=15Ω, V_{GE}=-15V	T_j=25℃		5.1		μC
			T_j=125℃		9.7		
I_{RM}	Peak Reverse Recovery Current		T_j=25℃		39		A
			T_j=125℃		54		
E_{rec}	Reverse Recovery Energy		T_j=25℃		2.55		mJ
			T_j=125℃		4.57		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per IGBT)		0.215	K/W
$R_{\theta JC}$	Junction-to-Case (per Diode)		0.340	K/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)	0.05		K/W

Package Dimensions

Dimensions in Millimeters



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