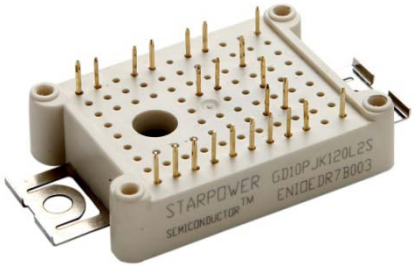
STARPOWER

SEMICONDUCTOR **IGBT**

GD30HCK60L2S

Molding Type Module

600V/30A 4 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 solar power.

Features

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

Typical Applications

- Switching mode power supply
- Solar power
- Electronic welder

IGBT-inverter T_C=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	GD30HCK60L2S	Units
V_{CES}	Collector-Emitter Voltage @ T_j=25℃	600	V
V_{GES}	Gate-Emitter Voltage @ T_j=25℃	±20	V
I_C	Collector Current @ T_C=25℃ @ T_C=80℃	50 30	A
I_{CM}	Pulsed Collector Current t_p=1ms	60	A
P_{tot}	Total Power Dissipation @ T_j=150℃	152	W

Off Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	T_j=25℃	600			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=250μA,V_{CE}=V_{GE}, T_j=25℃	3.5	4.5	5.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=30A,V_{GE}=15V, T_j=25℃		1.95	2.40	V
		I_C=30A,V_{GE}=15V, T_j=125℃		2.35		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V,I_C=30A, R_G=10Ω,V_{GE}=±15V, T_j=25℃		47		ns
t_r	Rise Time			30		ns
$t_{d(off)}$	Turn-Off Delay Time			190		ns
t_f	Fall Time			30		ns
E_{on}	Turn-On Switching Loss			0.35		mJ
E_{off}	Turn-Off Switching Loss			0.83		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V,I_C=30A, R_G=10Ω,V_{GE}=±15V, T_j=125℃		49		ns
t_r	Rise Time			30		ns
$t_{d(off)}$	Turn-Off Delay Time			205		ns
t_f	Fall Time			33		ns
E_{on}	Turn-On Switching Loss			0.64		mJ
E_{off}	Turn-Off Switching Loss			1.15		mJ
C_{ies}	Input Capacitance	V_{CE}=30V,f=1MHz, V_{GE}=0V		1750		pF
C_{oes}	Output Capacitance			160		pF
C_{res}	Reverse Transfer Capacitance			60		pF
Q_G	Gate Charge	V_{CC}=400V,I_C=30A, V_{GE}=15V		102		nC
I_{SC}	SC Data	t_P≤10μs,V_{GE}=15V, T_j=125℃,V_{CC}=360V, V_{CEM}≤600V		270		A

Diode-inverter T_C=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	GD30HCK60L2S	Units
V_{RRM}	Repetitive Peak Reverse Voltage @ T_j=25℃	600	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=30V_{GE}=0V	T_j=25℃		1.30	1.75	V
			T_j=125℃		1.25		
Q_r	Recovered Charge	I_F=30A V_R=400V, R_G=10Ω, V_{GE}=-15V	T_j=25℃		2.2		μC
			T_j=125℃		4.6		
I_{RM}	Peak Reverse Recovery Current		T_j=25℃		38		A
			T_j=125℃		44		
E_{rec}	Reverse Recovery Energy		T_j=25℃		0.41		mJ
			T_j=125℃		0.92		

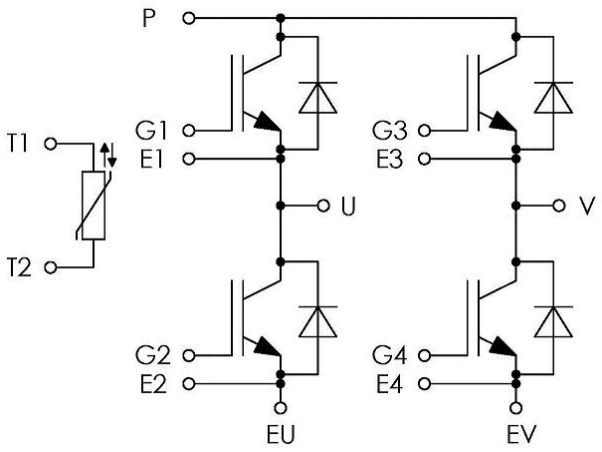
NTC T_C=25℃ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
R_{25}	Rated Resistance			5.0		kΩ
ΔR/R	Deviation of R_{100}	T_C=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

IGBT Module

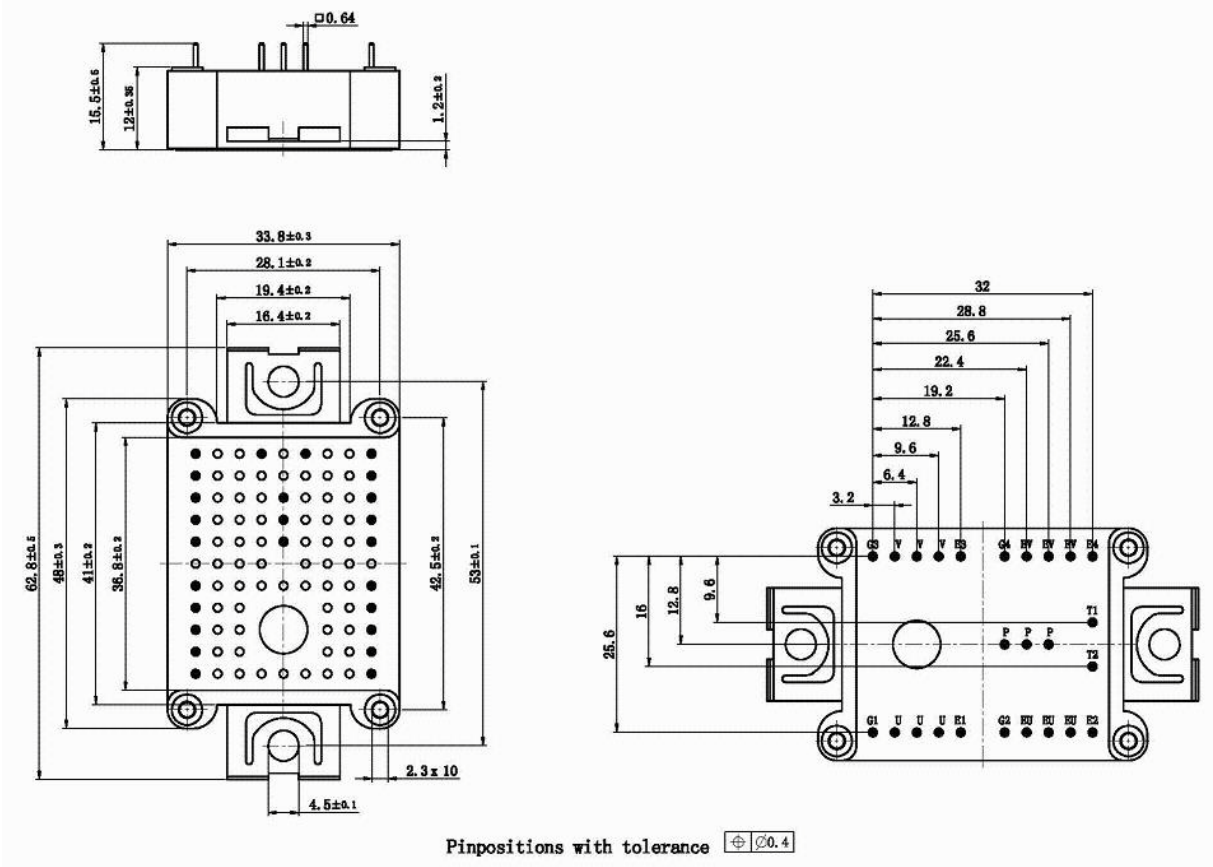
Symbol	Parameter	Min.	Typ.	Max.	Units
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	2500			V
L_{CE}	Stray Inductance		20		nH
$R_{CC'+EE'}$	Module Lead Resistance,Terminal to Chip @ T_C=25℃		8.00		mΩ
$R_{\theta JC}$	Junction-to-Case (per IGBT-inverter) Junction-to-Case (per Diode-inverter)			0.820 1.560	K/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)		0.058		K/W
T_j	Maximum Junction Temperature			150	℃
T_{jop}	Operating Junction Temperature	-40		125	℃
T_{STG}	Storage Temperature Range	-40		125	℃
F	Mounting Force Per Clamp	20		50	N
G	Weight of Module		24		g

Equivalent Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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