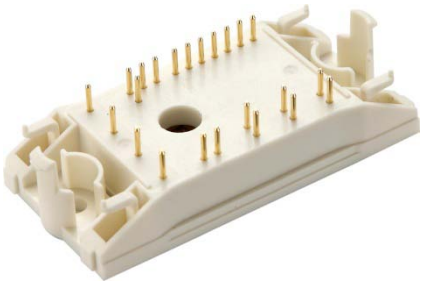
STARPOWER

SEMICONDUCTOR **IGBT**

GD75MLT60F1S

Molding Type Module

600V/75A 3-level 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 3-level-application.

Features

- Low $V_{CE(sat)}$ Trench IGBT technology
- 5μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175℃
- Fast & soft reverse recovery anti-parallel FWD

Typical Applications

- Solar power
- UPS
- 3-level-application

TI,T2,T3,T4 IGBT T_C=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	GD75MLT60F1S	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=50℃	85 75	A
I_{CM}	Pulsed Collector Current t_p=1ms	150	A
P_{tot}	Total Power Dissipation @ T_j=175℃	224	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℃			1.0	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=2.1mA,V_{CE}=V_{GE}, T_j=25℃	4.0	4.9	6.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=75A,V_{GE}=15V, T_j=25℃		1.70	2.10	V
		I_C=75A,V_{GE}=15V, T_j=175℃		2.10		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V,I_C=75A, R_G=10Ω,V_{GE}=±15V, T_j=25℃		50		ns
t_r	Rise Time			70		ns
$t_{d(off)}$	Turn-Off Delay Time			200		ns
t_f	Fall Time			60		ns
E_{on}	Turn-On Switching Loss			2.47		mJ
E_{off}	Turn-Off Switching Loss			2.16		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V,I_C=75A, R_G=10Ω,V_{GE}=±15V, T_j=175℃		50		ns
t_r	Rise Time			70		ns
$t_{d(off)}$	Turn-Off Delay Time			240		ns
t_f	Fall Time			70		ns
E_{on}	Turn-On Switching Loss			3.87		mJ
E_{off}	Turn-Off Switching Loss			2.82		mJ
C_{ies}	Input Capacitance	V_{CE}=30V,f=1MHz, V_{GE}=0V		4440		pF
C_{res}	Reverse Transfer Capacitance			130		pF
Q_G	Gate Charge	V_{CC}=400V,I_C=75A, V_{GE}=15V		150		nC
R_{Gint}	Internal Gate Resister			/		Ω
I_{SC}	SC Data	t_P≤5μs,V_{GE}=15V, T_j=125℃,V_{CC}=360V, V_{CEM}≤600V		675		A

DI,D2,D3,D4 Diode T_C=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	GD75MLT60F1S	Units
V_{RRM}	Repetitive Peak Reverse Voltage @ T_j=25℃	600	V
I_F	DC Forward Current	75	A
I_{FRM}	Repetitive Peak Forward Current t_p=1ms	150	A

Characteristics Values

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=75A,V_{GE}=0V	T_j=25℃		1.40	1.80	V
			T_j=125℃		1.40		
Q_r	Recovered Charge	I_F=75A V_R=400V, R_G=5.0Ω, V_{GE}=-15V	T_j=25℃		2.8		μC
			T_j=125℃		5.8		
I_{RM}	Peak Reverse Recovery Current		T_j=25℃		48		A
			T_j=125℃		55		
E_{rec}	Reverse Recovery Energy		T_j=25℃		0.51		mJ
			T_j=125℃		1.15		

D5,D6 Diode T_C=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	GD75MLT60F1S	Units
V_{RRM}	Repetitive Peak Reverse Voltage @ T_j=25℃	600	V
I_F	DC Forward Current	75	A
I_{FRM}	Repetitive Peak Forward Current t_p=1ms	150	A

Characteristics Values

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=75A,V_{GE}=0V	T_j=25℃		1.40	1.85	V
			T_j=125℃		1.40		
Q_r	Recovered Charge	I_F=75A V_R=400V, R_G=5.0Ω, V_{GE}=-15V	T_j=25℃		2.8		μC
			T_j=125℃		5.8		
I_{RM}	Peak Reverse Recovery Current		T_j=25℃		48		A
			T_j=125℃		55		
E_{rec}	Reverse Recovery Energy		T_j=25℃		0.51		mJ
			T_j=125℃		1.15		

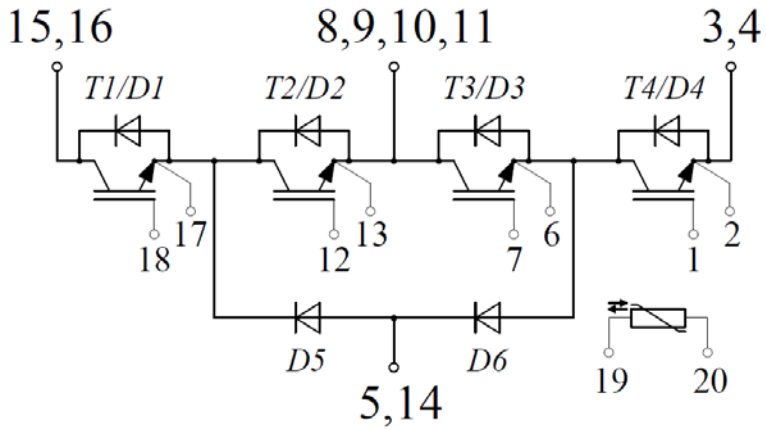
NTC T_C=25℃ unless otherwise noted

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

IGBT Module

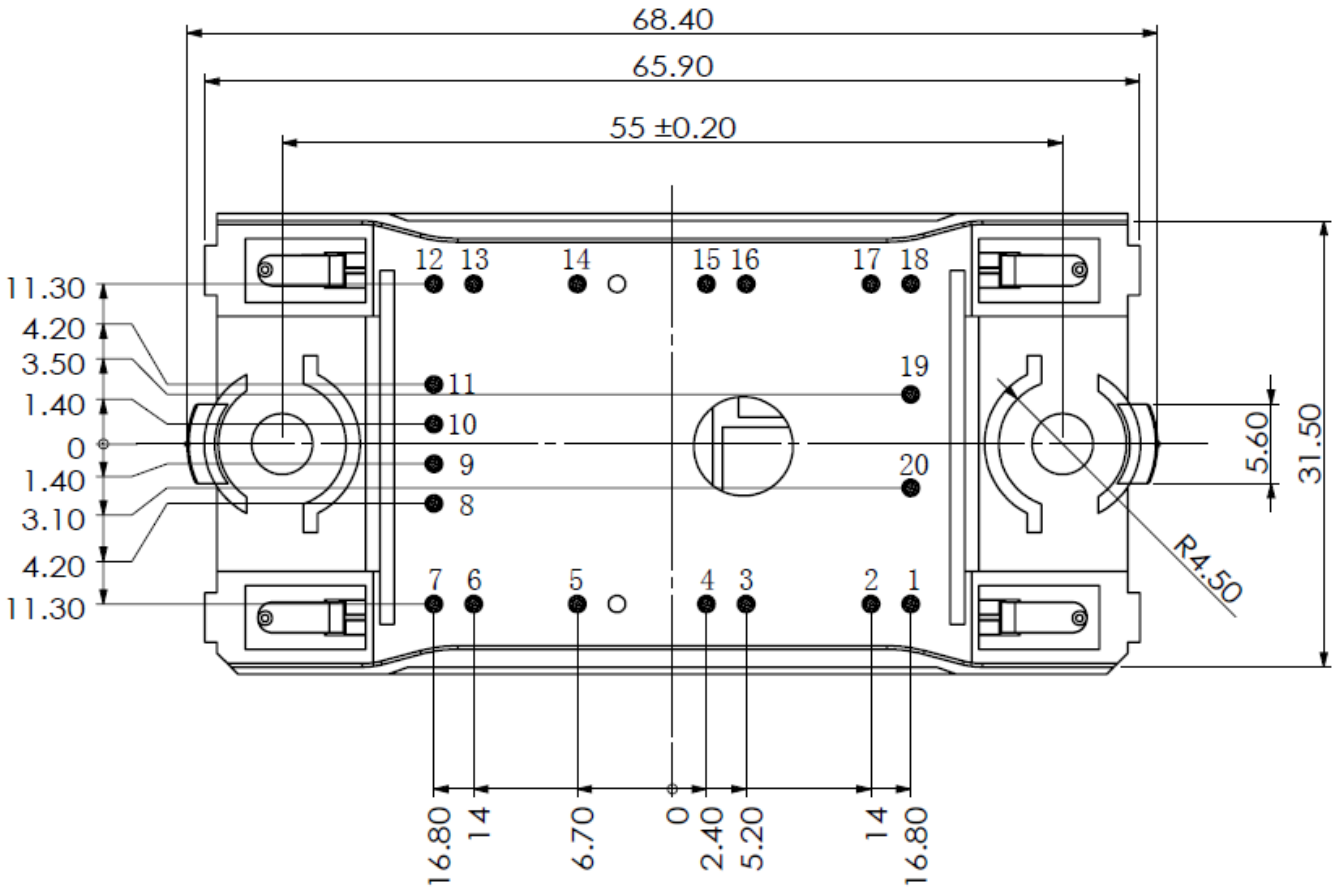
Symbol	Parameter	Min.	Typ.	Max.	Units
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=2s	4000			V
$R_{\theta JC}$	Junction-to-Case (per T1,T2,T3,T4 IGBT) Junction-to-Case (per D1,D2,D3,D4 Diode) Junction-to-Case (per D5,D6 Diode)			0.669 0.973 0.905	K/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)		0.035		K/W
T_{jmax}	Maximum Junction Temperature			175	℃
T_{jop}	Operating Junction Temperature	-40		150	℃
T_{stg}	Storage Temperature Range	-40		125	℃

Equivalent Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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