STARPOWER

SEMICONDUCTOR **MOSFET**

MD85HFS120L2S_B11

1200V/8.5 mΩ 2 in one-package

General Description

STARPOWER MOSFET Power Module provides very low $R_{DS(on)}$ as well as optimized intrinsic diode. It's designed for the applications such hybrid electrical vehicles.

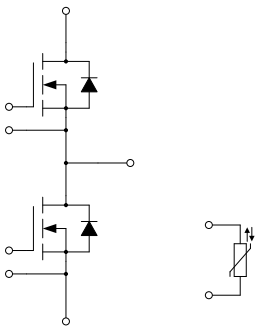
Features

- SiC power MOSFET
- Low $R_{DS(on)}$
- Optimized intrinsic reverse diode
- Avalanche ruggedness
- Low inductance case
- Substrate for low thermal resistance
- Isolated heatsink using AlN DBC technology

Typical Applications

- Automotive applications
- Auxiliary inverters
- DC/DC converter
- Hybrid electrical vehicles(H)EV

Equivalent Circuit Schematic



Absolute Maximum Ratings T_C=25°C unless otherwise noted

MOSFET

Symbol	Description	Value	Unit
V_{DSS}	Drain-Source Voltage	1200	V
V_{GSSmax}	Gate-Source Voltage	-8/+19	V
V_{GSSop}	Gate-Source Voltage	-4/+15	V
I_D	Drain Current @ T_C=25°C	230	A
I_{DRM}	Repetitive Peak Drain Current tp limited by T_{vjop}	460	A
P_D	Maximum Power Dissipation @ T_{vj}=175°C	1014	W

Body Diode

Symbol	Description	Value	Unit
I_S	Source Current @ T_C=25°C	170	A

Module

Symbol	Description	Value	Unit
T_{vjmax}	Maximum Junction Temperature	175	°C
T_{vjop}	Operating Junction Temperature	-40 to +150	°C
T_{STG}	Storage Temperature Range	-40 to +125	°C
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	2500	V

MOSFET Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$R_{DS(on)}$	Static Drain-Source On-Resistance	I_D=150A,V_{GS}=15V, T_{vj}=25°C		8.50		mΩ
		I_D=150A,V_{GS}=15V, T_{vj}=150°C		13.6		
		I_D=150A,V_{GS}=15V, T_{vj}=175°C		14.3		
$V_{GS(th)}$	Gate-Source Threshold Voltage	I_D=41.7mA,V_{DS}= V_{GS}, T_{vj}=25°C		2.6		V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=V_{DSS},V_{GS}=0V, T_{vj}=25°C			500	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=19V,V_{DS}=0V, T_{vj}=25°C			600	nA
R_{Gint}	Internal Gate Resistance			1.0		Ω
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=1000V, f=100kHz		13.1		nF
C_{oss}	Output Capacitance			0.43		nF
C_{rss}	Reverse Transfer Capacitance			0.02		nF
Q_g	Total Gate Charge	I_D=150A,V_{DS}=800V, V_{GS}=-4/+15V		0.38		μC

Body Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	I_{SD}=76A,V_{GS}=-4V, T_{vj}=25°C		4.35		V
		I_{SD}=76A,V_{GS}=-4V, T_{vj}=175°C		3.80		

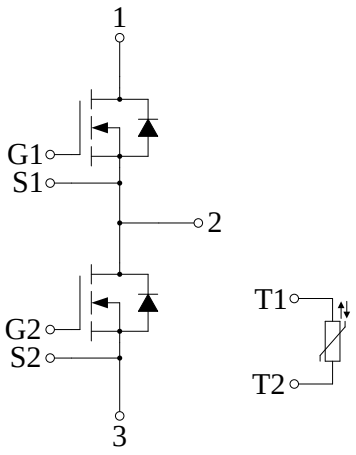
NTC Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated Resistance			5.0		kΩ
ΔR/R	Deviation of R_{100}	T_j =100 °C,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
$B_{25/80}$	B-value	R_2=R_{25}exp[$B_{25/80}$(1/T_2-1/(298.15K))]		3411		K
$B_{25/100}$	B-value	R_2=R_{25}exp[$B_{25/100}$(1/T_2-1/(298.15K))]		3433		K

Module Characteristics T_C=25°C unless otherwise noted

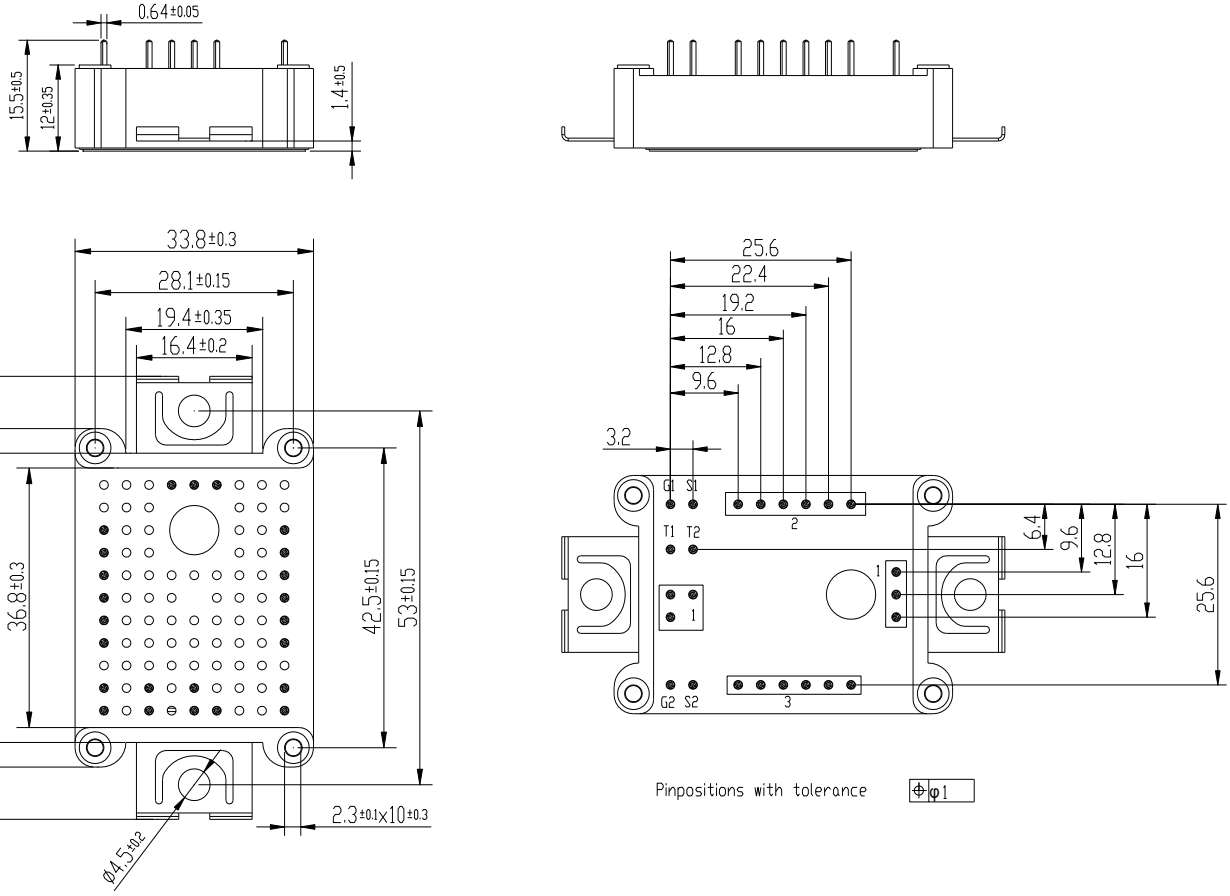
Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case (per MOSFET)		0.135	0.148	K/W
R_{thCH}	Case-to-Heatsink (per MOSFET) Case-to-Heatsink (per Module)		0.116 0.058		K/W
F	Mounting Force Per Clamp	20		50	N
G	Weight of Module		24		g

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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