STARPOWER

SEMICONDUCTOR **MOSFET**

MD35SGR120D6S_B20

1200V/35A 1 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 SMPS and solar power.

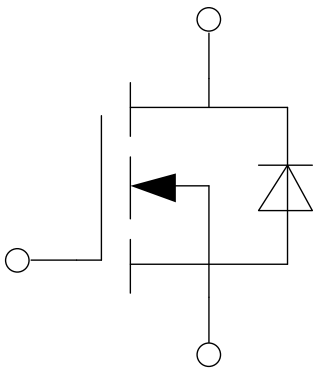
Features

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

Typical Applications

- Electric vehicle
- Solar Power
- Switching mode power supply

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_{GSS}	Gate-Source Voltage	-4/+22	V
I_D	Drain Current @ T_C=25°C @ T_C=100°C	50 35	A
I_{DM}	Pulsed Drain Current	137	A
P_D	Maximum Power Dissipation @ T_j=175°C	208	W

Diode

Symbol	Description	Value	Unit
I_S	Source Current	35	A
I_{SM}	Pulsed Source Current	137	A

Module

Symbol	Description	Value	Unit
T_{jmax}	Maximum Junction Temperature	175	°C
T_{jop}	Operating Junction Temperature	-40 to +150	°C
T_{STG}	Storage Temperature Range	-40 to +150	°C
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	4000	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=20A,V_{GS}=18V, T_j=25°C		40.0	50.0	mΩ
		I_D=20A,V_{GS}=20V, T_j=125°C		60.0		
$V_{GS(th)}$	Gate-Source Threshold Voltage	I_D=10.0mA,V_{DS}=10V, T_j=25°C	2.7		5.6	V
g_{fs}	Forward Transconductance	V_{DS}=10V,I_D=20A, T_j=25°C		8.3		S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=V_{DSS},V_{GS}=0V, T_j=25°C			10	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=V_{GSS},V_{DS}=0V, T_j=25°C			100	μA
R_{Gint}	Internal Gate Resistance			7.0		Ω
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=800V, f=1.0MHz		1337		pF
C_{oss}	Output Capacitance			76		pF
C_{rss}	Reverse Transfer Capacitance			27		pF
Q_g	Total Gate Charge	I_D=20A,V_{DS}=600V, V_{GS}=18V		107		nC
Q_{gs}	Gate-Source Charge			22		nC
Q_{gd}	Gate-Drain ("Miller") Charge			41		nC
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=400V,I_D=18A, R_G=0Ω,V_{GS}=0/18V, T_j=25°C		21		ns
t_r	Rise Time			39		ns
$t_{d(off)}$	Turn-Off Delay Time			49		ns
t_f	Fall Time			24		ns
E_{on}	Turn-On Switching Loss	V_{DS}=600V,I_D=20A, R_G=0Ω,V_{GS}=0/18V		0.28		mJ
E_{off}	Turn-Off Switching Loss			0.12		mJ

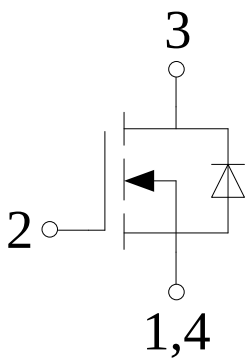
Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=20A,T_j=25°C		1.50	1.70	V
		I_F=20A,T_j=150°C		1.80		
		I_F=20A,T_j=175°C		1.90		
I_R	Diode Reverse Current	V_R=V_{RRM},T_j=25°C		20	400	μA
		V_R=V_{RRM},T_j=150°C		160		
		V_R=V_{RRM},T_j=175°C		260		
Q_C	Total Capacitive Charge	V_R=800V,di/dt=500A/μs		66		nC

Module Characteristics T_C=25°C unless otherwise noted

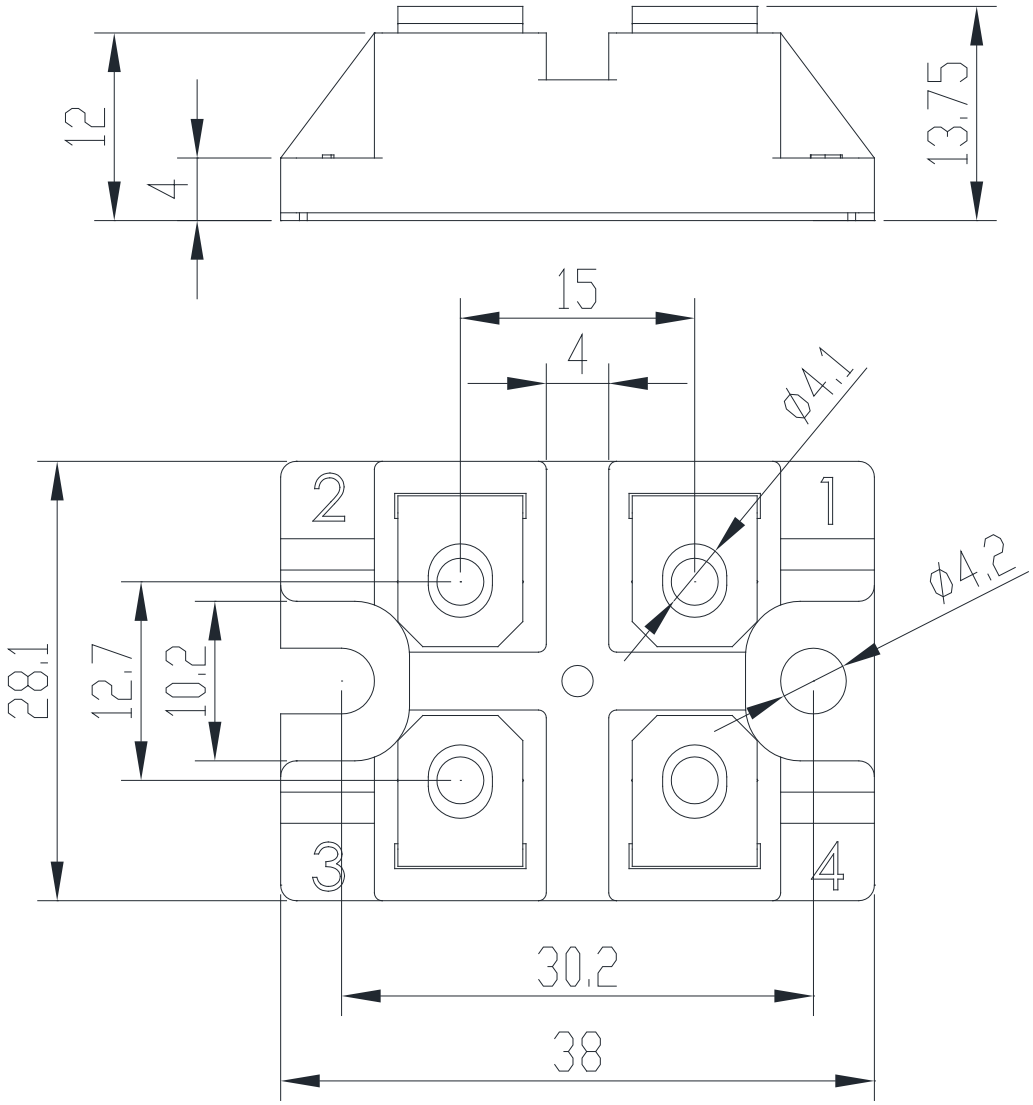
Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case (per MOSFET) Junction-to-Case (per Diode)			0.720 1.100	K/W
R_{thCH}	Case-to-Heatsink (per Module)		0.15		K/W
M	Terminal Connection Torque, Screw M4 Mounting Torque, Screw M4	1.1 1.1		1.5 1.5	N.m
G	Weight of Module		35		g

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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