STARPOWER

SEMICONDUCTOR **MOSFET**

MD300HFC120C2S

1200V/300A 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 SMPS and DC drives.

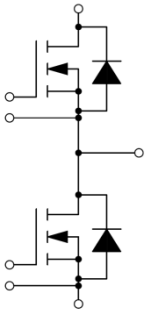
Features

- SiC power MOSFET
- Low $R_{DS(on)}$
- Optimized intrinsic reverse diode
- Chip sintering technology
- Low inductance case avoid oscillations
- Isolated copper baseplate using AlN DBC technology

Typical Applications

- Main and auxiliary AC drives of electric vehicles
- DC servo and robot drives
- Battery vehicles
- UPS equipment
- Plasma cutting

Equivalent Circuit Schematic



Absolute Maximum Ratings

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 @ T_C=100°C	487 300	A
I_{DM}	Pulsed Drain Current	1200	A

Body Diode

Symbol	Description	Value	Unit
I_S	Source Current @ T_C=100°C	208	A
I_{SM}	Pulsed Source Current	1200	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 +125	°C
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	2500	V

MOSFET Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$R_{DS(on)}$	Static Drain-Source On-Resistance	I_D=300A,V_{GS}=15V, T_j=25°C		3.50	4.50	mΩ
		I_D=300A,V_{GS}=15V, T_j=175°C		6.33		
$V_{GS(th)}$	Gate-Source Threshold Voltage	I_D=106mA,V_{DS}=V_{GS}, T_j=25°C	1.8	2.5	3.6	V
g_{fs}	Forward Transconductance	V_{DS}=20V,I_D=300A		210		S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=V_{DSS},V_{GS}=0V, T_j=25°C			150	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=V_{GSS},V_{DS}=0V, T_j=25°C			1500	nA
R_{Gint}	Internal Gate Resistance			0.55		Ω
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=1000V, f=100kHz		28.9		nF
C_{oss}	Output Capacitance			1.08		nF
C_{rss}	Reverse Transfer Capacitance			0.07		nF
Q_g	Total Gate Charge	I_D=300A,V_{DS}=800V, V_{GS}=-4/+15V		972		nC
Q_{gs}	Gate-Source Charge			294		nC
Q_{gd}	Gate-Drain ("Miller") Charge			300		nC

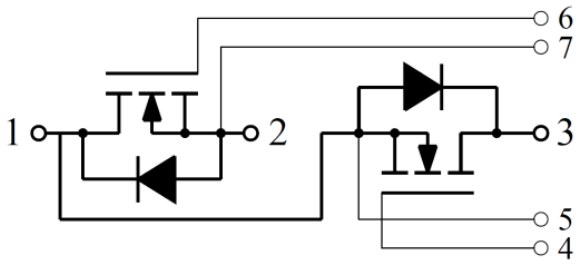
Body Diode Characteristics T_F=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	I_S=180A,V_{GS}=-4V, T_j=25°C		4.50		V
		I_S=180A,V_{GS}=-4V, T_j=175°C		4.00		
t_{rr}	Diode Reverse Recovery Time	V_R=800V,I_S=300A, -di/dt=33000A/μs, V_{GS}=-4V, T_j=175°C		26		ns
Q_r	Diode Reverse Recovery Charge			6.14		μC
I_{RM}	Peak Reverse Recovery Current			384		A

Module Characteristics T_C=25°C unless otherwise noted

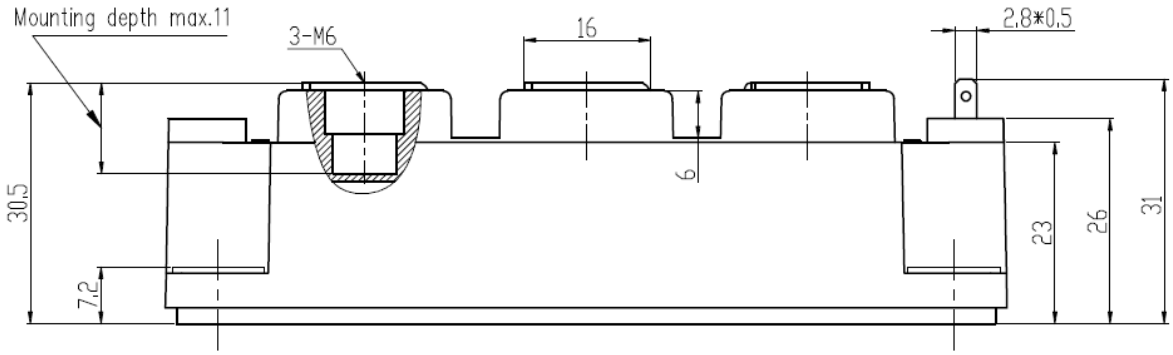
Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case(Mosfet)			0.086	K/W
R_{thCH}	Case-to-Heatsink (Mosfet) Case-to-Heatsink (per Module)		0.020 0.010		K/W
M	Terminal Connection Torque, Screw M6 Mounting Torque, Screw M6	2.5 3.0		5.0 5.0	N.m
G	Weight of Module		300		g

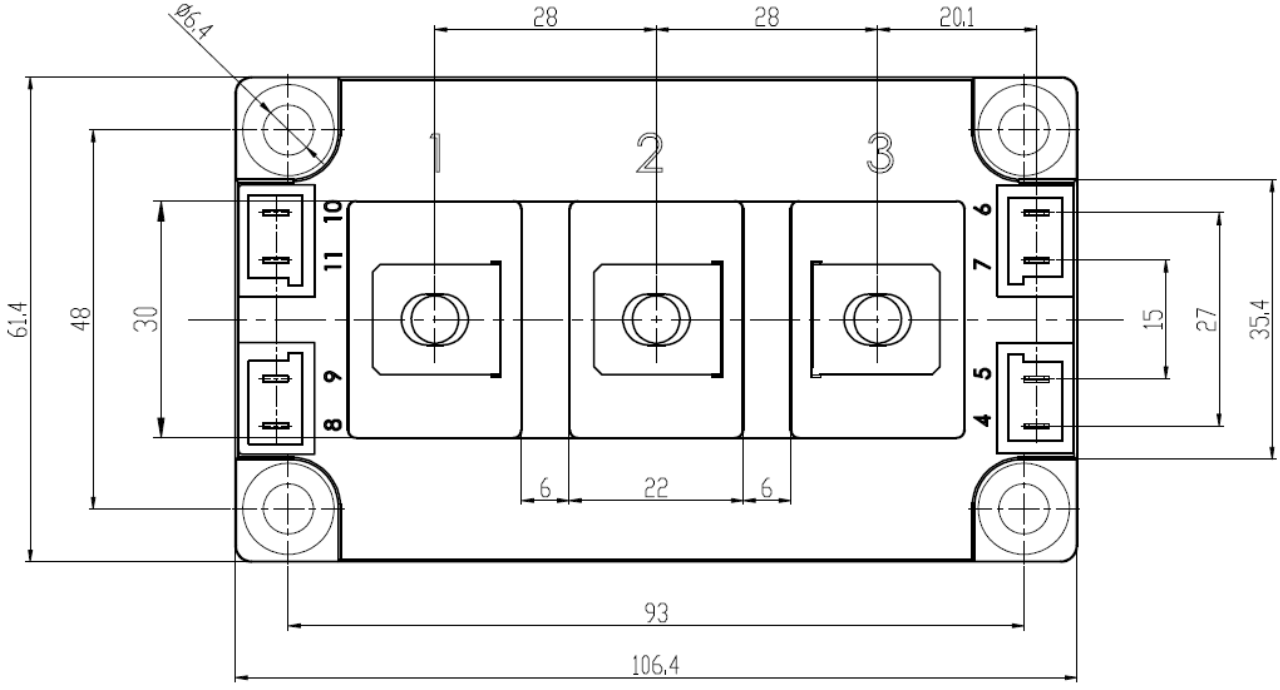
Circuit Schematic



Package Dimensions

Dimensions in Millimeters





Terms and Conditions of Usage

The data contained in this product datasheet is exclusively intended for technically trained staff. you and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application.

This product data sheet is describing the characteristics of this product for which a warranty is granted. Any such warranty is granted exclusively pursuant the terms and conditions of the supply agreement. There will be no guarantee of any kind for the product and its characteristics.

Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of our product, please contact the sales office, which is responsible for you (see www.powersemi.cc), For those that are specifically interested we may provide application notes.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

Should you intend to use the Product in aviation applications, in health or live endangering or life support applications, please notify.

If and to the extent necessary, please forward equivalent notices to your customers.
Changes of this product data sheet are reserved.