

STARPOWER

SEMICONDUCTOR

MOSFET

MD900FFM100B7S

100V/900A 6 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.

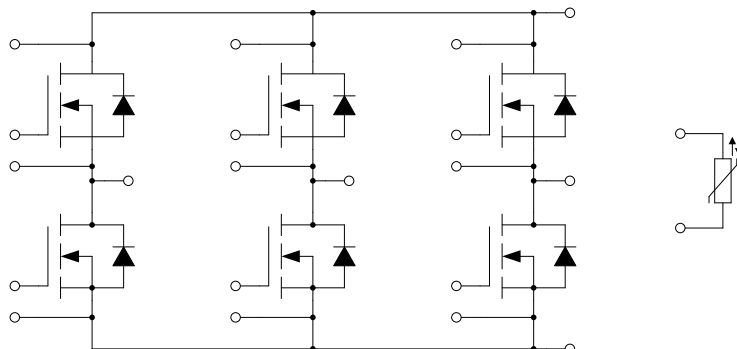
Features

- Low $R_{DS(on)}$
- Optimized intrinsic reverse diode
- Low inductance case avoid oscillations
- Kelvin source terminals for easy drive
- Isolated heatsink using 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	100	V
V_{GSS}	Gate-Source Voltage	± 30	V
I_D	Drain Current	900	A
I_{DM}	Pulsed Drain Current	2680	A

Inverse Diode

Symbol	Description	Value	Unit
I_S	Source Current	900	A
I_{SM}	Pulsed Source Current	2680	A

Module

Symbol	Description	Value	Unit
T_{jmax}	Maximum Junction Temperature	175	$^{\circ}C$
T_{jop}	Operating Junction Temperature	-40 to +150	$^{\circ}C$
T_{STG}	Storage Temperature Range	-40 to +125	$^{\circ}C$
V_{ISO}	Isolation Voltage RMS, $f=50Hz, t=1min$	2500	V
M	Terminal Connection Torque, Screw M5	2.5 to 5.0	N.m

MOSFET Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$R_{DS(on)}$	Static Drain-Source On-Resistance	$I_D=400A, V_{GS}=10V, T_j=25^\circ C$			2.25	m Ω
$V_{GS(th)}$	Gate-Source Threshold Voltage	$I_D=1.0mA, V_{DS}=V_{GS}, T_j=25^\circ C$	3.0		5.0	V
g_{fs}	Forward Transconductance	$V_{DS}=50V, I_D=400A$	208			S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=V_{DSS}, V_{GS}=0V, T_j=25^\circ C$			100	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=V_{GSS}, V_{DS}=0V, T_j=25^\circ C$			400	nA
R_{Gint}	Internal Gate Resistance			0.68		Ω
C_{iss}	Input Capacitance			27.2		nF
C_{oss}	Output Capacitance	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$		9.88		nF
C_{rss}	Reverse Transfer Capacitance			3.96		nF
Q_g	Total Gate Charge			1040		nC
Q_{gs}	Gate-Source Charge	$I_D=400A, V_{DS}=80V, V_{GS}=10V$		196		nC
Q_{gd}	Gate-Drain ("Miller") Charge			640		nC
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=50V, I_D=400A, R_G=0.26\Omega, V_{GS}=10V, T_j=25^\circ C$		25		ns
t_r	Rise Time			270		ns
$t_{d(off)}$	Turn-Off Delay Time			45		ns
t_f	Fall Time			140		ns

Inverse Diode Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	$I_S=400A, V_{GS}=0V, T_j=25^\circ C$			1.30	V
t_{rr}	Diode Reverse Recovery Time	$V_R=50V, I_S=400A, -di/dt=400A/\mu s, T_j=25^\circ C, V_{GS}=0V$			220	ns
Q_r	Diode Reverse Recovery Charge			6.56		μC

NTC Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated Resistance	$T_j=25^\circ C$		5.0		k Ω
$\Delta R/R$	Deviation of R_{100}	$T_j=100^\circ C, R_{100}=493.3\Omega$	-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

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.