

STARPOWER

SEMICONDUCTOR

MOSFET

MD1560HFM100B6S

Molding Type Module

100V/1560A 2 in one-package

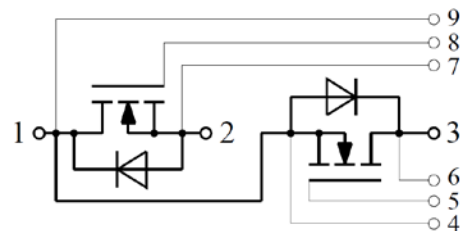
General Description

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

- Low $R_{DS(on)}$
- Optimized intrinsic reverse diode
- Low inductance case avoid oscillations
- Kelvin source terminals for easy drive
- Isolated copper baseplate using DBC technology



Equivalent Circuit Schematic

Typical Applications

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

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Description	MD1560HFM100B6S	Units
V_{DSS}	Drain-Source Voltage	100	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Drain Current @ $T_C=25^\circ\text{C}$ @ $T_C=80^\circ\text{C}$	1560	A
		1104	
I_F	Diode Forward Current	1560	A
P_D	Maximum Power Dissipation @ $T_j=175^\circ\text{C}$	2000	W
T_{jmax}	Maximum Junction Temperature	175	$^\circ\text{C}$
T_{jop}	Operating Junction Temperature	-40 to +150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-40 to +125	$^\circ\text{C}$
V_{ISO}	Isolation Voltage RMS, $f=50\text{Hz}$, $t=1\text{min}$	2500	V
Mounting Torque	Power Terminal Screw:M5 Mounting Screw:M5	2.5 to 5.0 3.0 to 5.0	N.m

Electrical Characteristics of MOSFET $T_C=25^\circ\text{C}$ unless otherwise noted**Off Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$T_j=25^\circ\text{C}$	100			V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=V_{DSS}$, $V_{GS}=0\text{V}$, $T_j=25^\circ\text{C}$			240	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=V_{GSS}$, $V_{DS}=0\text{V}$, $T_j=25^\circ\text{C}$			1.2	μA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GS(th)}$	Gate-Source Threshold Voltage	$I_D=3.0\text{mA}$, $V_{DS}=V_{GS}$, $T_j=25^\circ\text{C}$	2.0		4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$I_D=900\text{A}$, $V_{GS}=10\text{V}$, $T_j=25^\circ\text{C}$		0.47	0.58	$\text{m}\Omega$
g_{fs}	Forward Transconductance	$V_{DS}=50\text{V}$, $I_D=900\text{A}$	1920			S

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
R_{Gint}	Internal Gate Resistance			0.95		Ω
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=65V, I_D=900A,$ $R_G=0.22\Omega, V_{GS}=\pm 10V,$ $T_j=25^\circ C$		26		ns
t_r	Rise Time			110		ns
$t_{d(off)}$	Turn-Off Delay Time			68		ns
t_f	Fall Time			78		ns
Q_g	Total Gate Charge	$I_D=900A, V_{DS}=80V,$ $V_{GS}=10V$		2040		nC
Q_{gs}	Gate-Source Charge			552		nC
Q_{gd}	Gate-Drain ("Miller") Charge			744		nC
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=50V,$ $f=1.0MHz$		92.0		nF
C_{oss}	Output Capacitance			6.48		nF
C_{rss}	Reverse Transfer Capacitance			3.36		nF

Electrical Characteristics of Inverse Diode $T_C=25^\circ C$ unless otherwise

noted

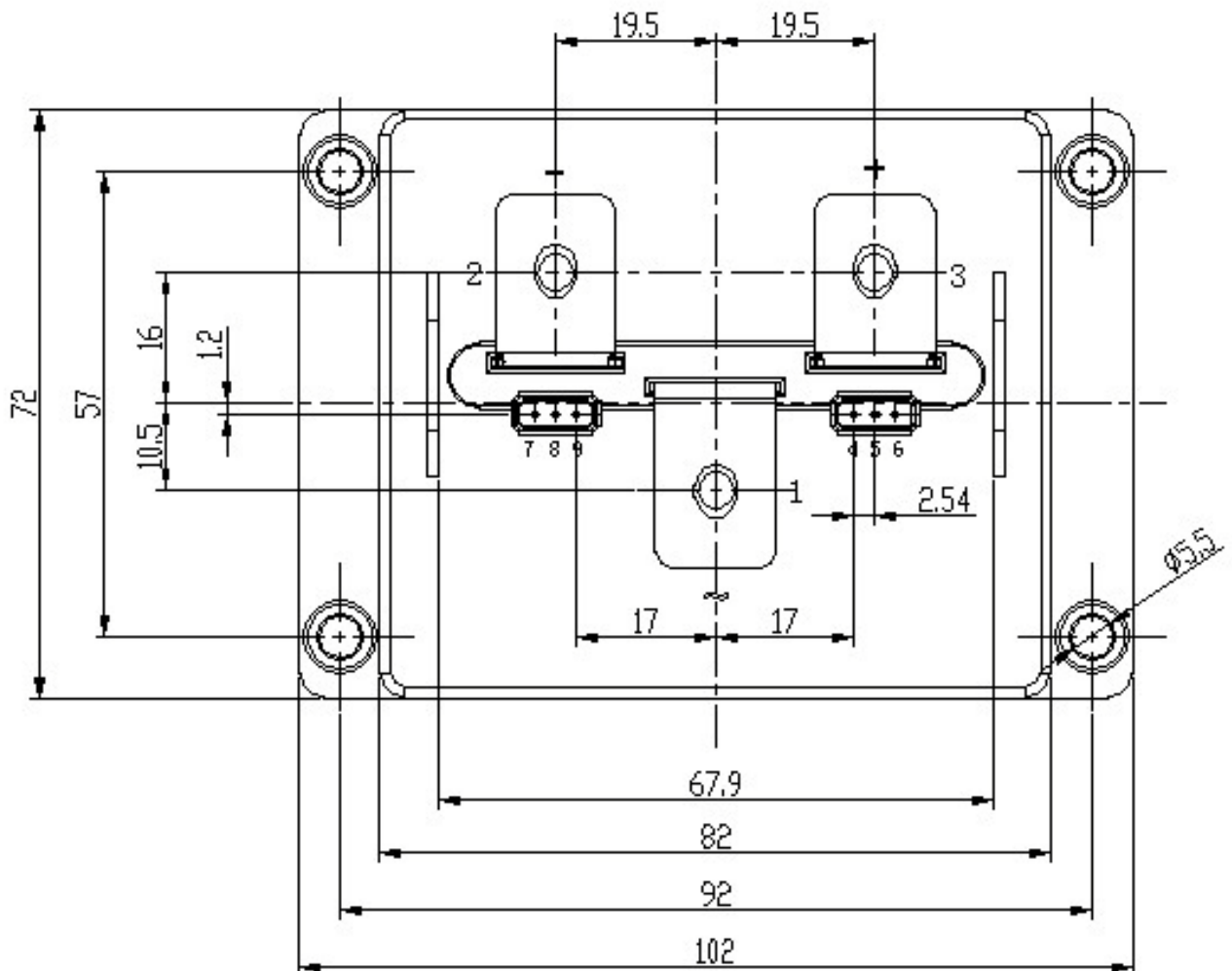
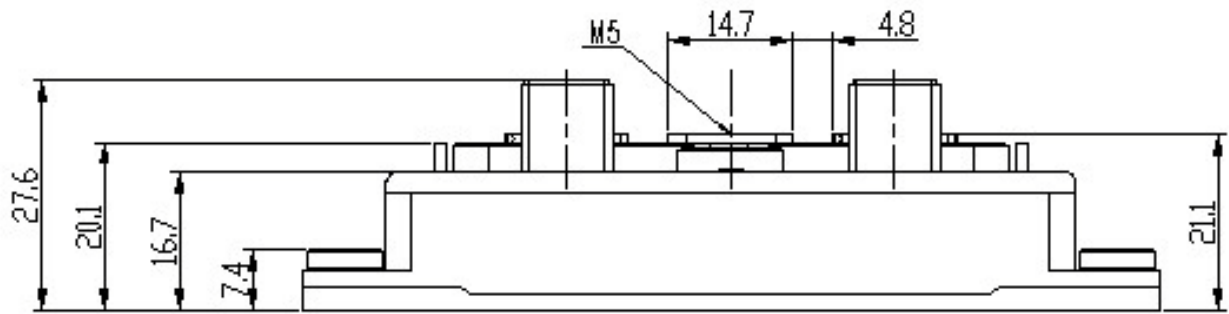
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Diode Forward Voltage	$I_F=900A, V_{GS}=0V, T_j=25^\circ C$			1.30	V
t_{rr}	Diode Reverse Recovery Time	$V_R=85V, I_F=900A,$ $di/dt=1200A/\mu s, T_j=25^\circ C$		45		ns
Q_{rr}	Diode Reverse Recovery Charge				0.98	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per MOSFET)		0.075	K/W
Weight	Weight of Module	350		g

Package Dimensions

Dimensions in Millimeters



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