STARPOWER

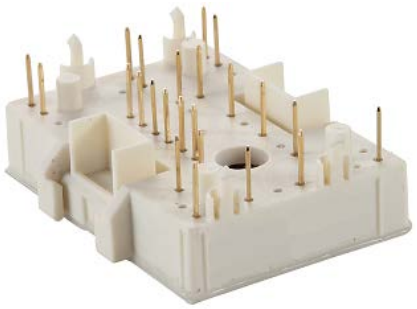
SEMICONDUCTOR **MOSFET**

MD170HFN100L1S

100V/170A 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.



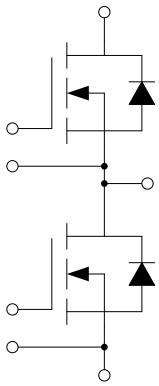
Features

- Low $R_{DS(on)}$
- Optimized intrinsic reverse diode
- Low inductance case avoid oscillations
- Kelvin source terminals for easy drive
- Isolated 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 T_C=25°C unless otherwise noted

MOSFET

Symbol	Description	Value	Unit
V_{DSS}	Drain-Source Voltage	100	V
V_{GSS}	Gate-Source Voltage	±30	V
I_D	Drain Current	170	A
I_{DM}	Pulsed Drain Current	340	A
P_D	Maximum Power Dissipation @ T_j=175°C	407	W

Inverse Diode

Symbol	Description	Value	Unit
I_S	Source Current	170	A
I_{SM}	Pulsed Source Current	340	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 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=100A,V_{GS}=10V, T_j=25°C			9.00	mΩ
$V_{GS(th)}$	Gate-Source Threshold Voltage	I_D=0.25mA,V_{DS}=V_{GS}, T_j=25°C	3.0		5.0	V
g_{fs}	Forward Transconductance	V_{DS}=50V,I_D=100A	52			S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=V_{DSS},V_{GS}=0V, T_j=25°C			75	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=V_{GSS},V_{DS}=0V, T_j=25°C			100	nA
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=25V, f=1.0MHz		6.79		nF
C_{oss}	Output Capacitance			2.47		nF
C_{rss}	Reverse Transfer Capacitance			0.99		nF
Q_g	Total Gate Charge	I_D=100A,V_{DS}=80V, V_{GS}=10V		260		nC
Q_{gs}	Gate-Source Charge			49		nC
Q_{gd}	Gate-Drain ("Miller") Charge			160		nC
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=50V,I_D=100A, R_G=1.03Ω,V_{GS}=10V, T_j=25°C		24		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 T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	I_S=100A,V_{GS}=0V,T_j=25°C			1.30	V
t_{rr}	Diode Reverse Recovery Time	V_R=50V,I_F=100A, -di/dt=100A/μs, T_j=25°C, V_{GS}=0V			220	ns
Q_r	Diode Reverse Recovery Charge			1.64		μC

Module Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Unit
L_{CE}	Stray Inductance		17		nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal to Chip		0.18		mΩ
R_{thJC}	Junction-to-Case (per Mosfet)		0.335	0.368	K/W
R_{thCH}	Case-to-Heatsink (per Mosfet) Case-to-Heatsink (per Module)		0.060 0.030		K/W
F	Mounting Force Per Clamp	40		80	N
G	Weight of Module		36		g

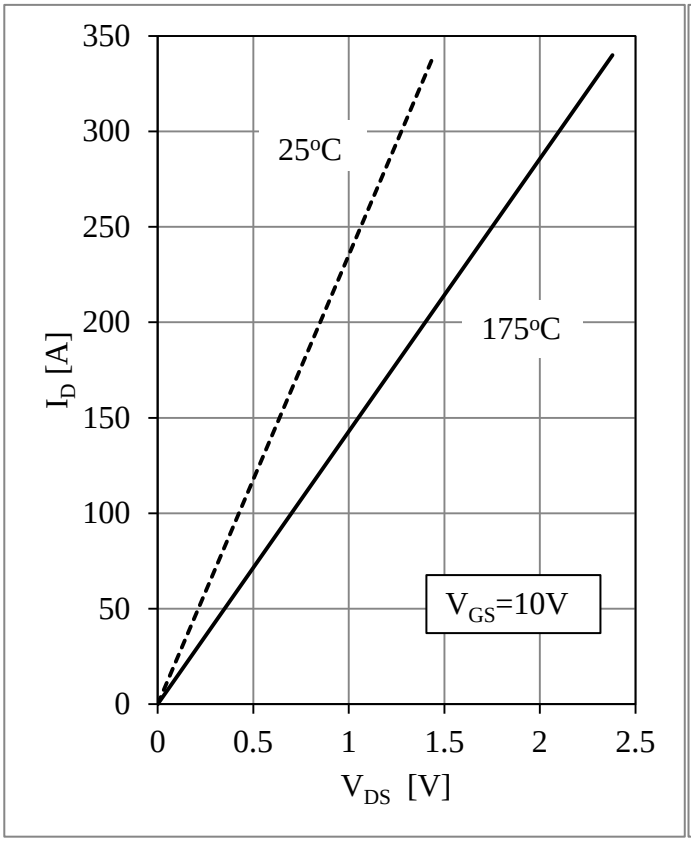


Fig 1. Mosfet Output Characteristics

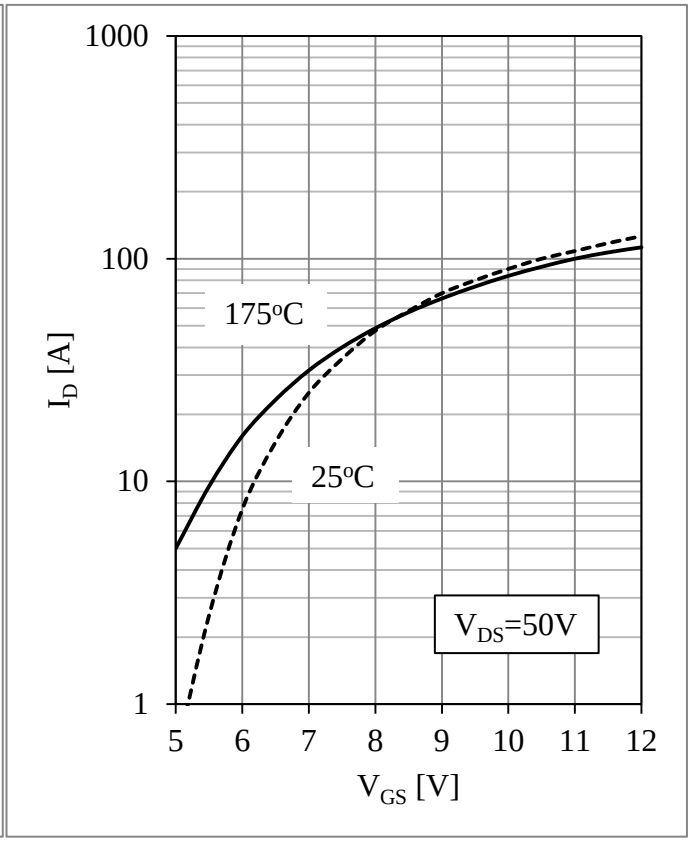


Fig 2. Mosfet Transfer Characteristics

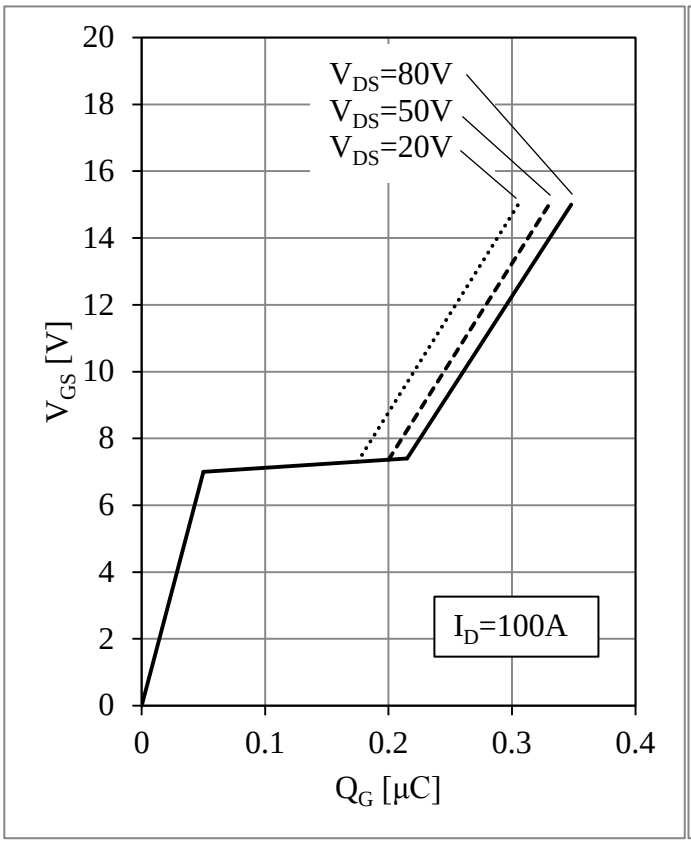


Fig 3. Gate Charge Characteristic

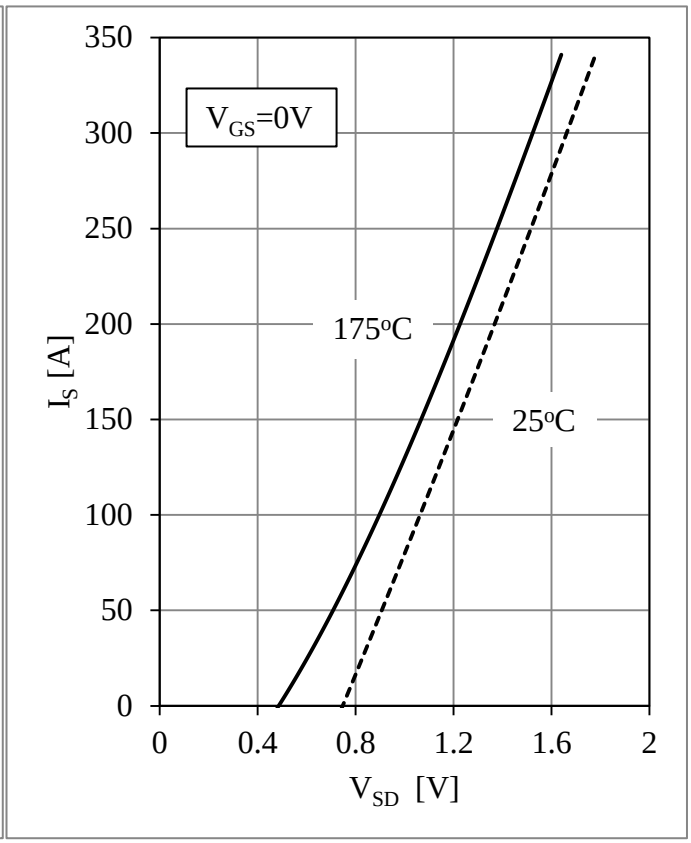


Fig 4. Inverse Diode Output Characteristics

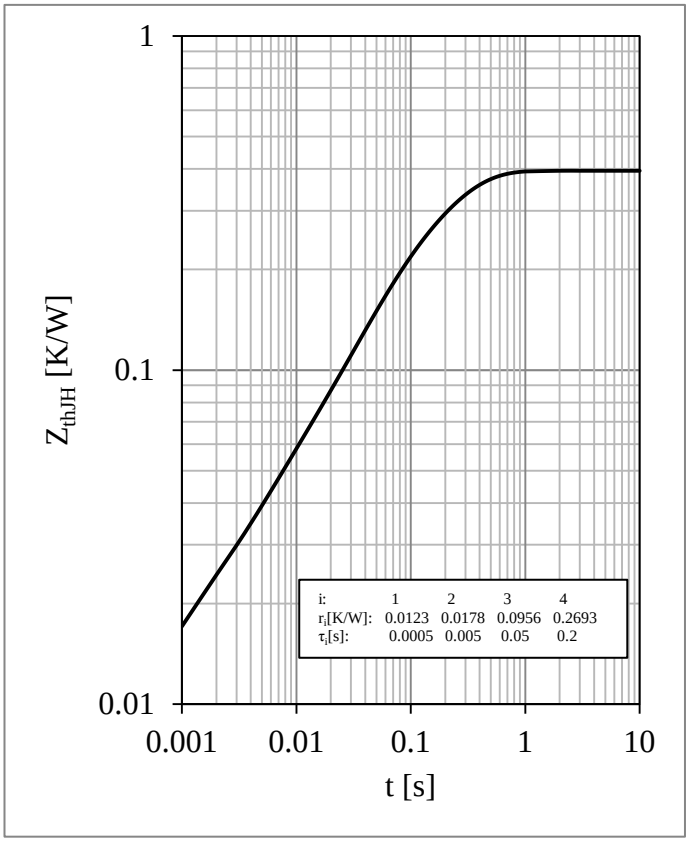
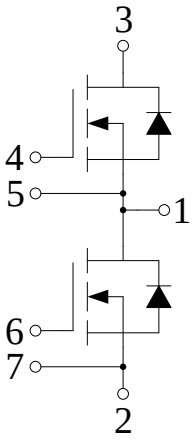


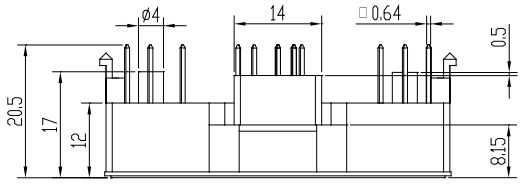
Fig 5. Transient Thermal Impedance

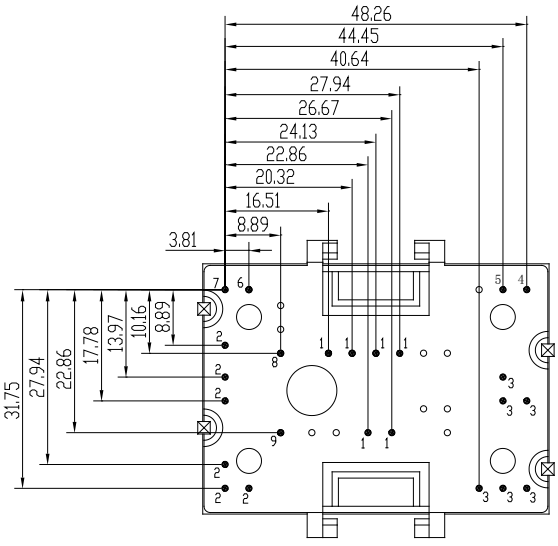
Circuit Schematic

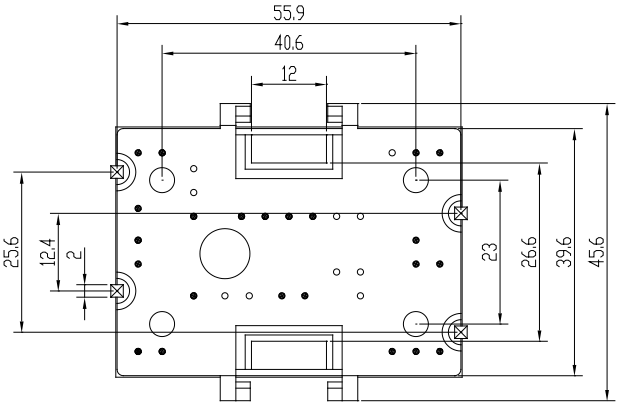


Package Dimensions

Dimensions in Millimeters







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