

MDD05N06C

60V N-Channel Enhancement Mode MOSFET

1. Description

This N-Channel MOSFET is produced using MDD Semiconductor's advanced Power Trench process technology. This process has been optimized to minimize on-state resistance and yet maintain superior switching performance with best in class soft body diode.

2. Features

- Max $R_{DS(on)}$ = 41 mΩ at V_{GS} = 10 V, I_D =5A
- Low Reverse Recovery Charge, Qrr
- Pb-free plating

3. Application

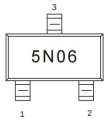
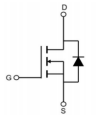
- Load Switch
- PWM Application
- DC-DC converters
- Power Management

4. Absolute Maximum Ratings(T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Note 1)	I_D	5	A
Pulsed Drain Current (Note 2)	I_{DM}	20	A
Thermal Resistance, steady-state	$R_{\theta JA}$	50	°C/W
Junction Temperature	T_J	-55~+150	°C
Storage Temperature	T_{stg}	-55~+150	°C

Note: 1)Calculated continuous current based on maximum allowable junction temperature.
2)Repetitive rating, pulse width limited by max. junction temperature.

5. Pinning information

Pin	Symbol	Description	Simplified outline	Equivalent Circuit	Marking	Package
1	G	Gate			5N06	SOT-23-3
2	S	Source				
3	D	Drain				

6. T_A=25°C unless otherwise specified

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	60	—	—	V
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V	—	—	±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS}=60V, V_{GS}=0V	—	—	1	μA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	—	2.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=5A	—	32	41	mΩ
		V_{GS}=4.5V, I_D=4A	—	44	50	mΩ

7. Dynamic Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=30V f=1.0MHz	—	880	—	pF
C_{oss}	Output Capacitance		—	65	—	pF
C_{rss}	Reverse Transfer Capacitance		—	58	—	pF
Q_g	Total Gate Charge	V_{GS}=0-10V V_{DS}=30V I_D=5A	—	23	—	nC
Q_{gs}	Gate Source Charge		—	4.2	—	nC
Q_{gd}	Gate Drain Charge		—	5.1	—	nC

8. Switching Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$t_{d(on)}$	Turn on Delay Time	V_{GS} =10V V_{DD}=30V I_D=5A R_G=3Ω	—	10.8	—	ns
t_r	Turn on Rise Time		—	18	—	ns
$t_{d(off)}$	Turn Off Delay Time		—	32	—	ns
t_f	Turn Off Fall Time		—	23	—	ns

9. Source Drain Diode Characteristics

Symbol	Parameter	Condition		Typ	Max	Unit
V_{SD}	Drain-Source Diode Forward Voltage	I_S=5A, V_{GS}=0V	—	0.8	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	IF=5A di/dt=100A/μs	—	18	—	ns
Q_{rr}	Body Diode Reverse Recovery Charge		—	12	—	nC

10.Test Circuits And Waveforms

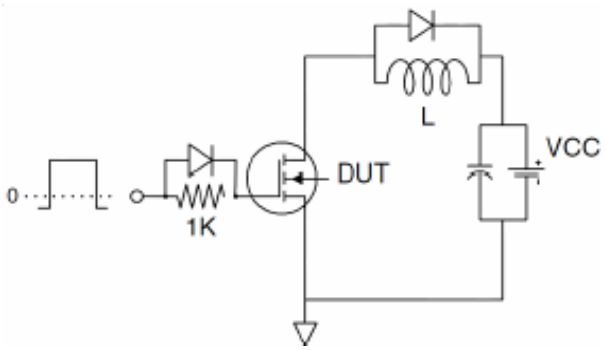


Figure 1. Gate Charge test Circuit

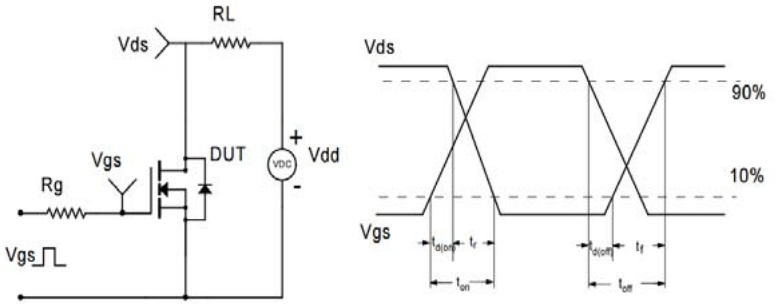


Figure 2. Switchingtime testcircuit & waveforms

The curve above is for reference only.

11.Electrical Characteristics Diagrams

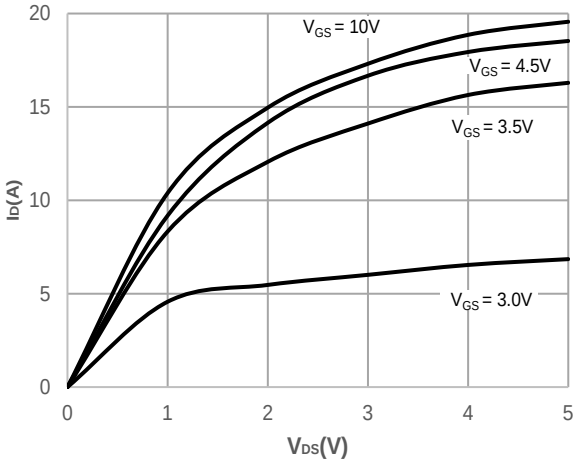


Figure 1. Typ. output characteristics

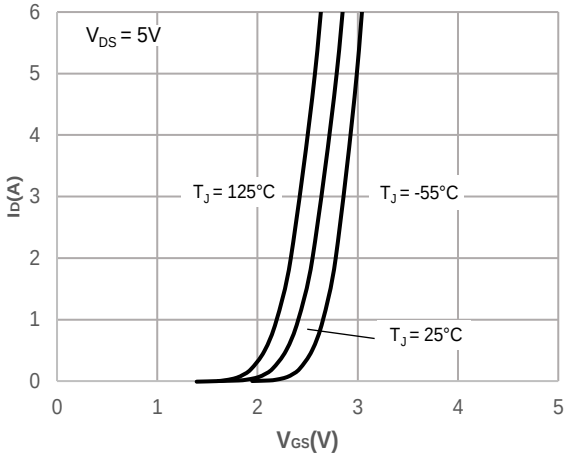


Fig 2. Transfer Charhacteristics

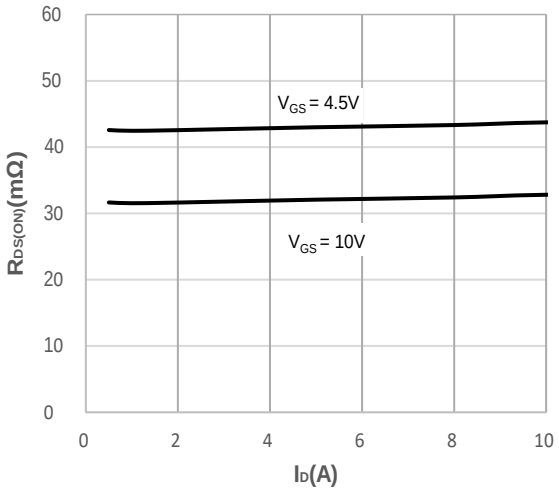


Fig 3. RDson vs I_D Characteristics

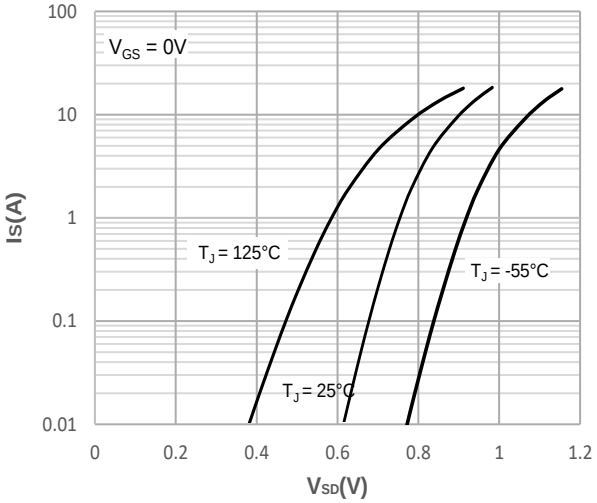


Fig 4. Source current Characteristics

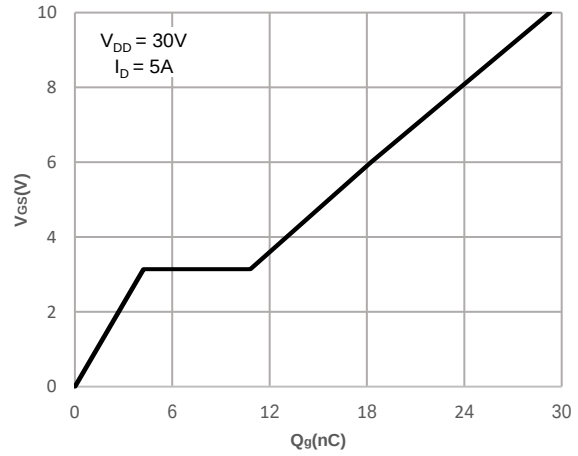


Fig 5. Gate Charge Characteristics

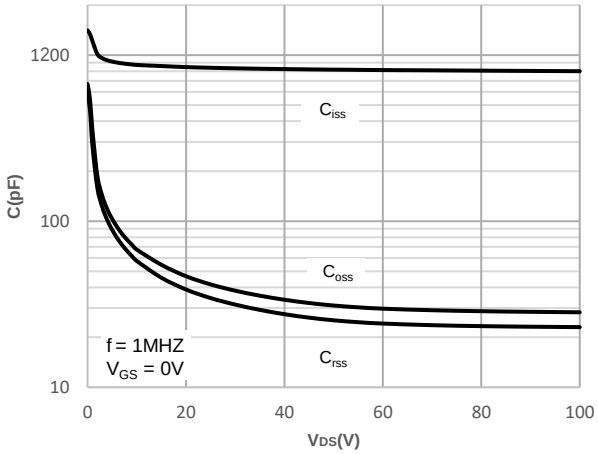
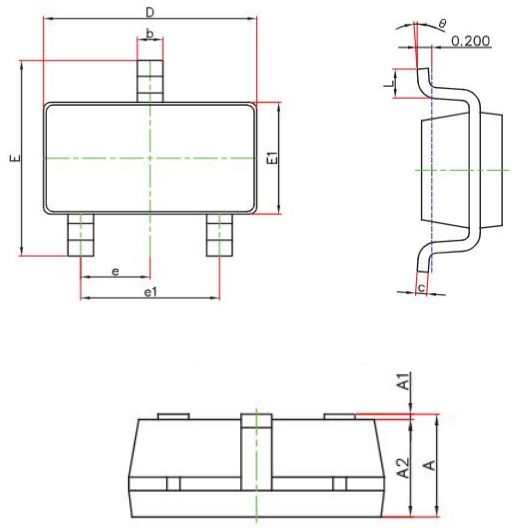


Fig 6. Capacitance Characteristics

The curve above is for reference only

12. Outline Drawing

SOT-23-3 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

13. Important Notice and Disclaimer

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