

MDD2304

30V 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 $R_{DS(on)}$ = 39 mΩ at V_{GS} = 10 V, I_D =3.6 A
- Extremely Low Reverse Recovery Charge, Qrr
- Surface Mount device

3. Application

- Load switch
- Motor Drives and Uninterruptible Power Supplies
- DC-DC converters

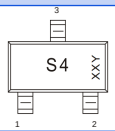
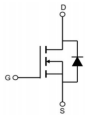
4. Absolute Maximum Ratings(T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Note 1)	I_D	3.6	A
Pulsed Drain Current (Note 2)	I_{DM}	15	A
Power Dissipation	P_D	1000	mW
Thermal Resistance, steady-state	$R_{\theta JA}$	125	°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.

Microdiode Semiconductor

5. Pinning information

Pin	Symbol	Description	Simplified outline	Equivalent Circuit	Marking	Package
1	G	Gate			S4 XXY:Date Code	SOT-23
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	30	—	—	V
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V	—	—	±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V, V_{GS}=0V	—	—	1	μA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	1.6	2.3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=3.6A	—	31	39	mΩ
		V_{GS}=4.5V, I_D= 3A	—	40	53	mΩ

7. Dynamic Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=15V f=1.0MHz	—	390	—	pF
C_{oss}	Output Capacitance		—	67	—	pF
C_{rss}	Reverse Transfer Capacitance		—	41	—	pF
Q_g	Total Gate Charge	V_{GS}=10V V_{DS}=15V I_D=3.6A	—	4.2	—	nC
Q_{gs}	Gate Source Charge		—	1.0	—	nC
Q_{gd}	Gate Drain Charge		—	1.3	—	nC

8. Switching Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$t_{d(on)}$	Turn on Delay Time	V_{GS} =4.5V V_{DD}=15V I_D=3.6A R_G=6Ω	—	11	—	ns
t_r	Turn on Rise Time		—	48	—	ns
$t_{d(off)}$	Turn Off Delay Time		—	14	—	ns
t_f	Turn Off Fall Time		—	9	—	ns

9. Source Drain Diode Characteristics

Symbol	Parameter	Condition		Typ	Max	Unit
V_{SD}	Drain-Source Diode Forward Voltage	I_S=3.6A, V_{GS}=0V	—	0.8	1.2	V

10.Electrical Characteristics Diagrams

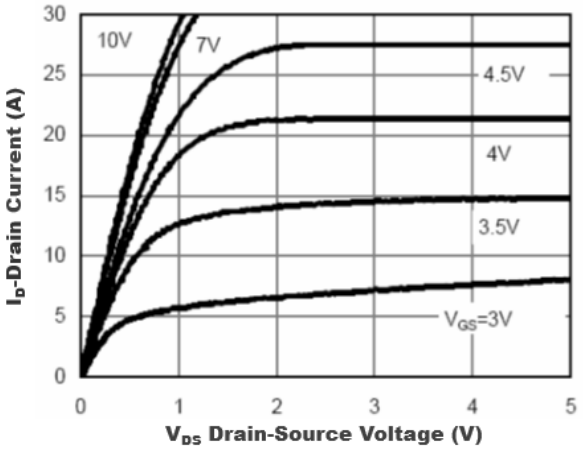


Figure 1. Typ. output characteristics

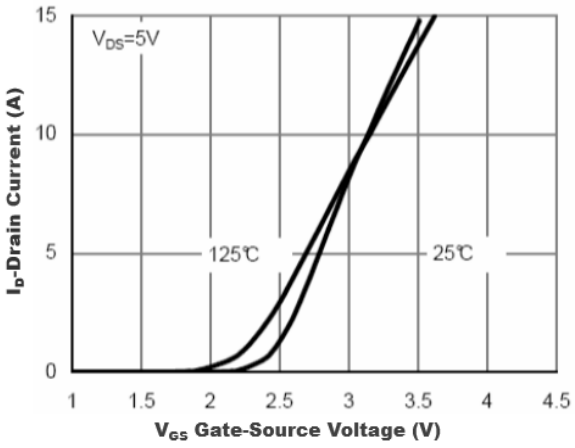


Figure 2. Typ. transfer characteristics

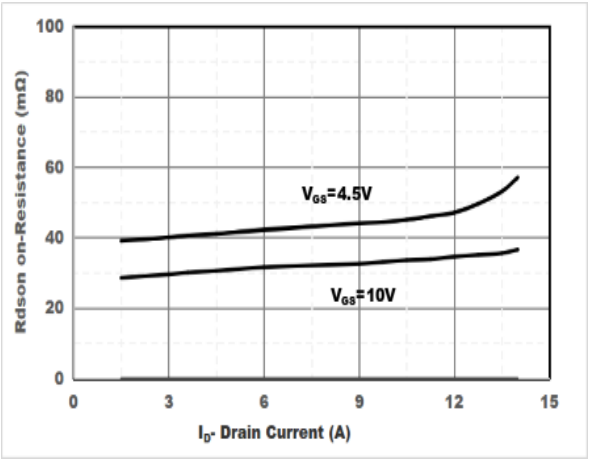


Figure 3. On-Resistance vs. Drain Current

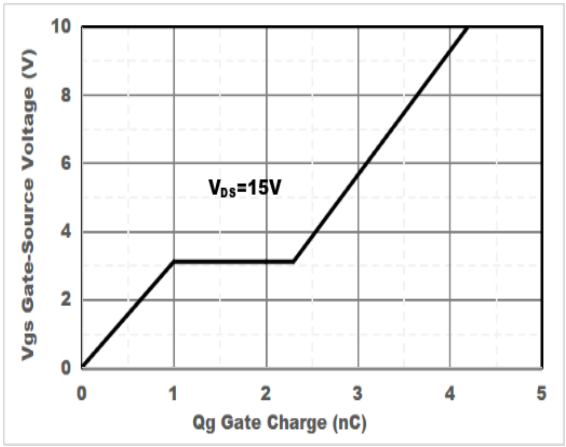


Figure 4. Gate Charge Characteristics

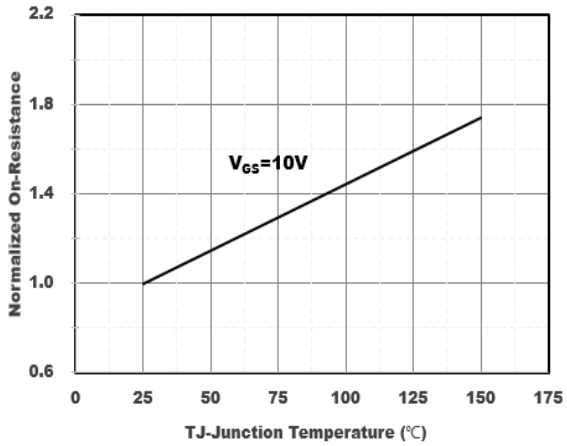


Figure 5. Normalized on Resistance vs. Junction Temperature

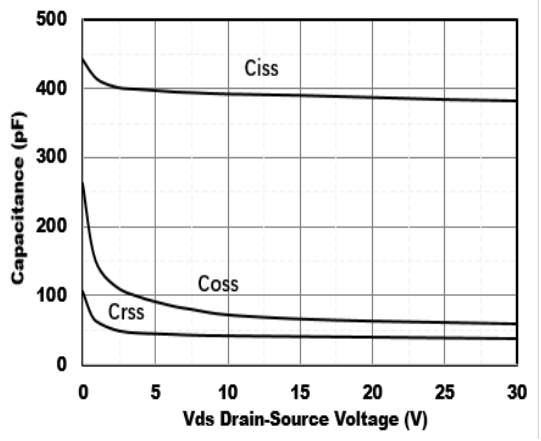


Figure 6 . Capacitance Characteristics

11.Test Circuits And Waveforms

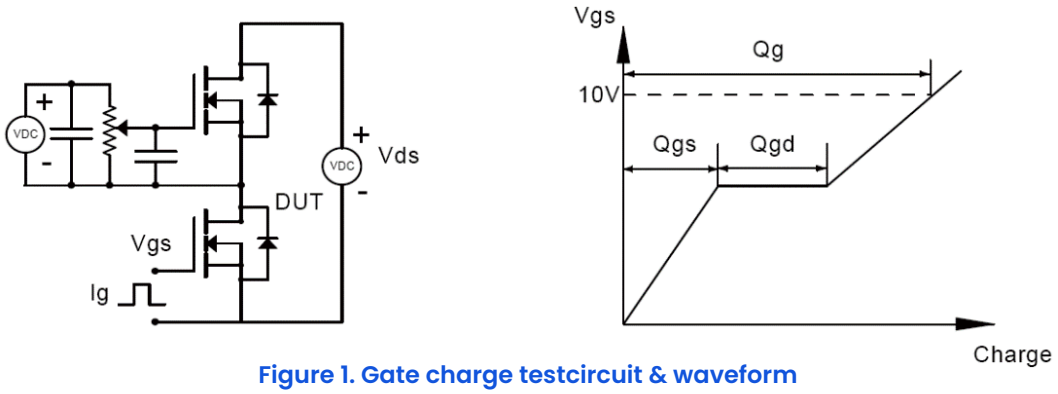


Figure 1. Gate charge testcircuit & waveform

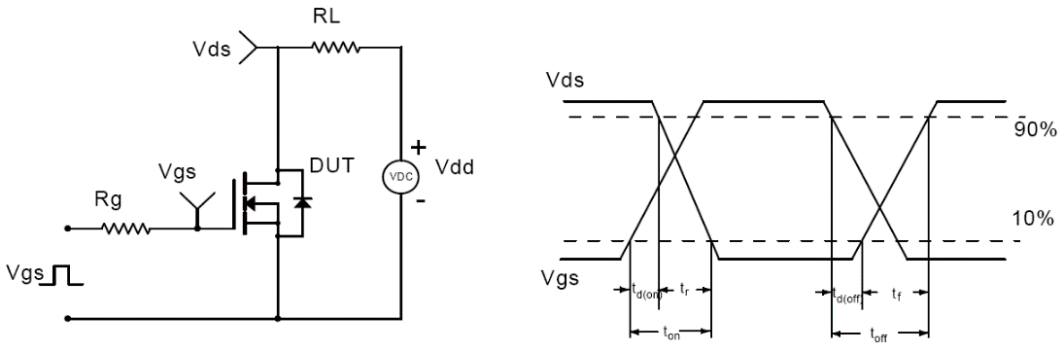
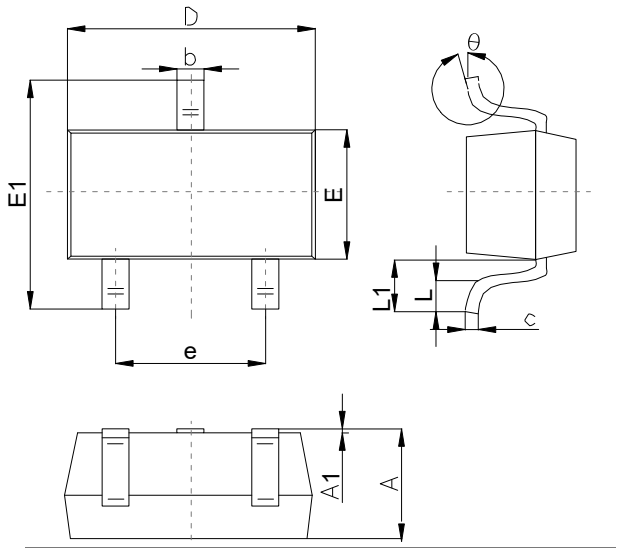


Figure 2.Switching time testcircuit & waveforms

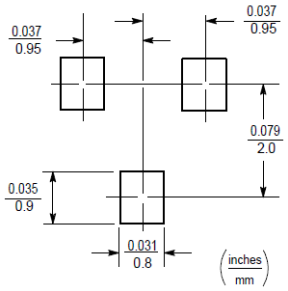
12. Outline Drawing

SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		
	Min	Typ	Max
A	0.65		1.40
A1	0.00		0.20
b	0.30		0.55
c	0.08		0.20
D	2.70		3.10
E	1.15		1.65
E1	2.10		2.80
e	1.70		2.10
L	0.15		0.50
L1	0.35		0.70
θ	0°		12°

13. Suggested Pad Layout



Note:
1.Controlling dimension:in/millimeters.
2.General tolerance: ±0.05mm.
3.The pad layout is for reference purposes only.

14. Important Notice and Disclaimer

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