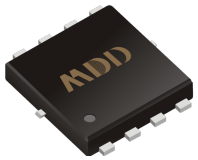


MDDG03R01G

30V N-Channel Enhancement Mode MOSFET

1. Description

This N-Channel MOSFET is produced using MDD Semiconductor's advanced Power Trench process that incorporates Shielded Gate 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 $R_{DS(on)}$ = 1.0 mΩ at V_{GS} = 10 V, I_D = 50 A
- Extremely Low Reverse Recovery Charge, Qrr
- 100% UIS Tested
- RoHS Compliant

3. Application

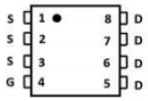
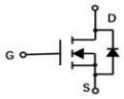
- Synchronous Rectification for ATX / Server / Telecom PSU
- Motor Drives and Uninterruptible Power Supplies
- DC-DC converters

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	300	A
Pulsed Drain Current (Note 2)	I_{DM}	1200	A
Single Pulsed Avalanche Energy (Note 3)	E_{AS}	430.5	mJ
Thermal Resistance, steady-state	$R_{\theta JA}$	82	°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.
3)E_{AS} condition：T_J=25°C, V_{DD}=24V, V_{GS}=10V, L= 0.5mH, IAS=41.5A

5. Pinning information

Pin	Symbol	Description	Simplified outline	Equivalent Circuit	Marking	Package
4	G	Gate			MDD G03R01G	PDFN5*6-8L
5-8	D	Drain				
1-3	S	Source				

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	Forward	V_{GS}=20V	—	—	100	nA
		Reverse	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}=VGS, I_D=250μA	1.0	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance		V_{GS}=10V, I_D=50A	—	0.75	1	mΩ
			V_{GS}=4.5V, I_D=30A	—	1.1	1.6	mΩ

7. Dynamic Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=15V f=400KHz	—	4650	—	pF
C_{oss}	Output Capacitance		—	3200	—	pF
C_{rss}	Reverse Transfer Capacitance		—	580	—	pF
Q_g	Total Gate Charge	V_{GS}=10V V_{DS}=25 I_D=20A	—	61	—	nC
Q_{gs}	Gate Source Charge		—	14	—	nC
Q_{gd}	Gate Drain Charge		—	4	—	nC

8. Switching Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$t_{d(on)}$	Turn on Delay Time	V_{GS}=10V V_{DD}=15V I_D=15A R_G=1.6Ω	—	10	—	ns
t_r	Turn on Rise Time		—	40	—	ns
$t_{d(off)}$	Turn Off Delay Time		—	71	—	ns
t_f	Turn Off Fall Time		—	77	—	ns

9. Source Drain Diode Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{SD}	Drain-Source Diode Forward Voltage	I_S=100A, V_{GS}=0V	—	1.0	—	V
t_{rr}	Body Diode Reverse Recovery Time	IF=50A di/dt=100A/μs	—	82	—	ns
Q_{rr}	Body Diode Reverse Recovery Charge		—	73	—	nC

10.Test Circuits And Waveforms

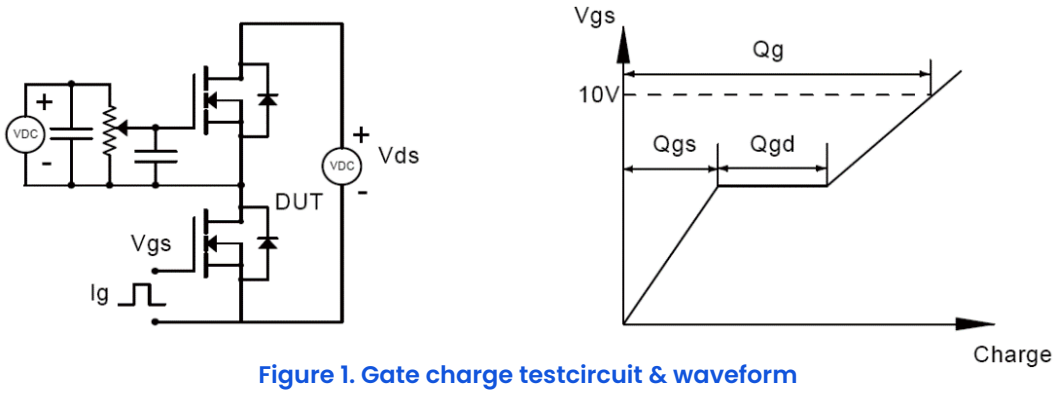


Figure 1. Gate charge testcircuit & waveform

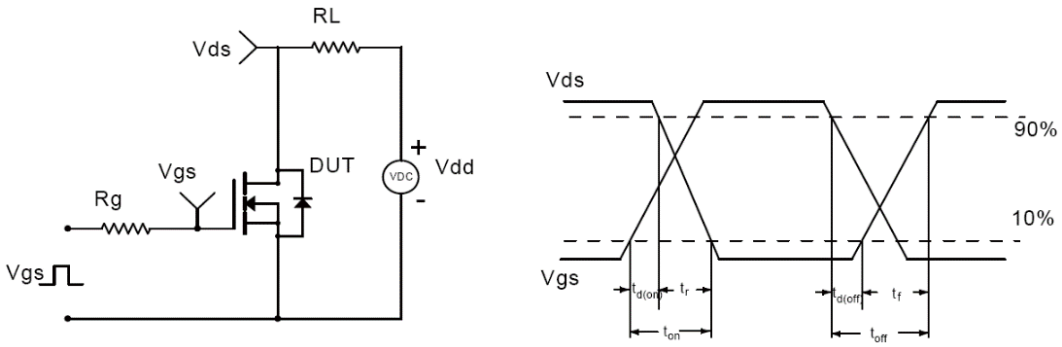


Figure 2.Switching time testcircuit & waveforms

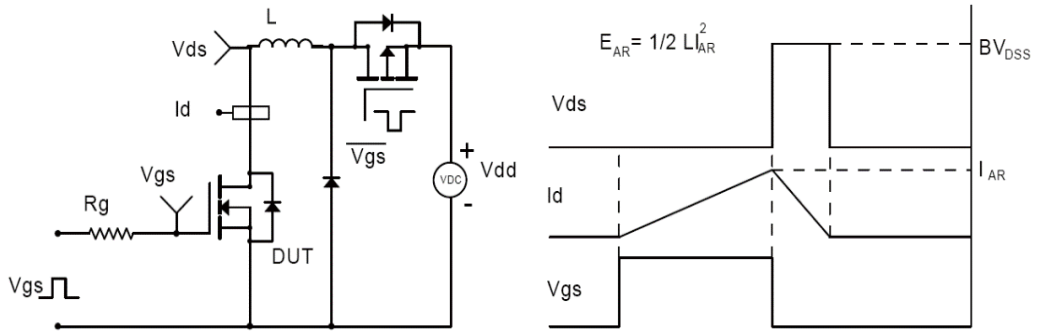


Figure 3.Unclamped inductive switching (UIS)test circuit & waveforms

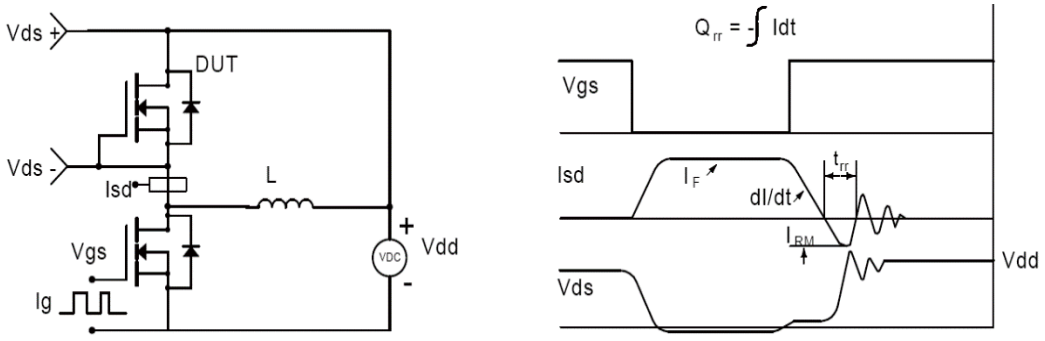


Figure 4. Diode reverse recoverytest circuit& waveforms

11.Electrical Characteristics Diagrams

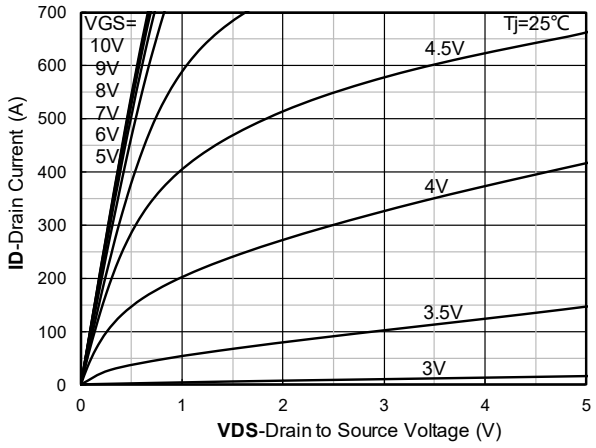


Figure 1. Typ. output characteristics

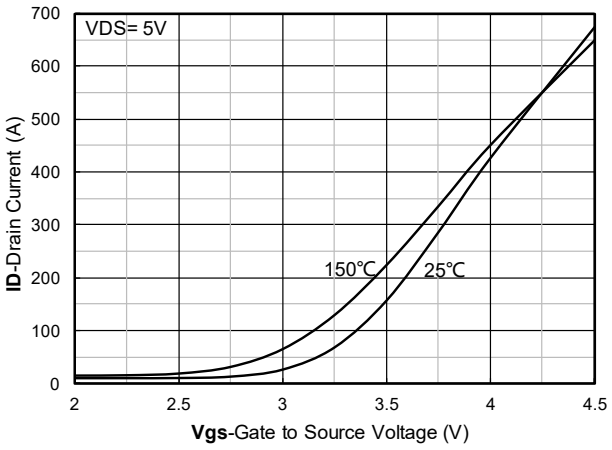


Figure 2. Typ. transfer characteristics

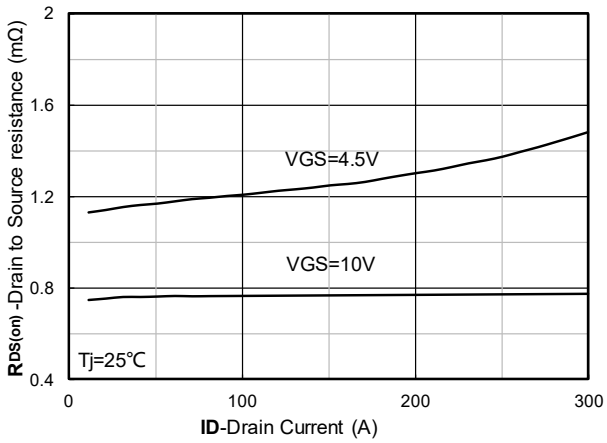


Figure 3. On-Resistance vs. Drain Current

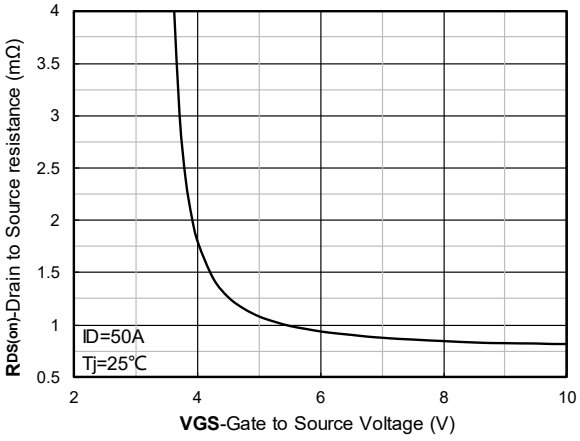


Figure 4. On-Resistance vs. Gate Voltage

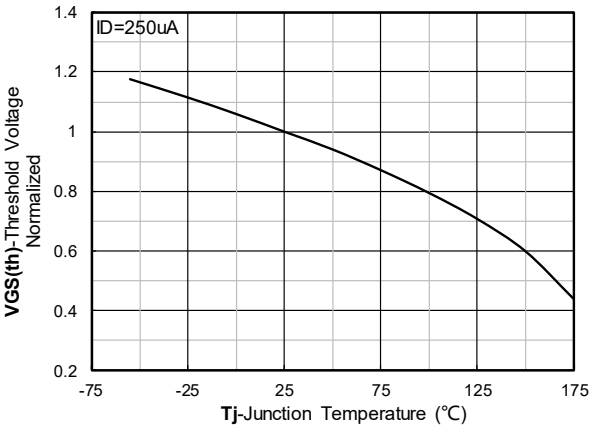


Figure 5. Normalized Threshold Voltage vs. Junction Temperature

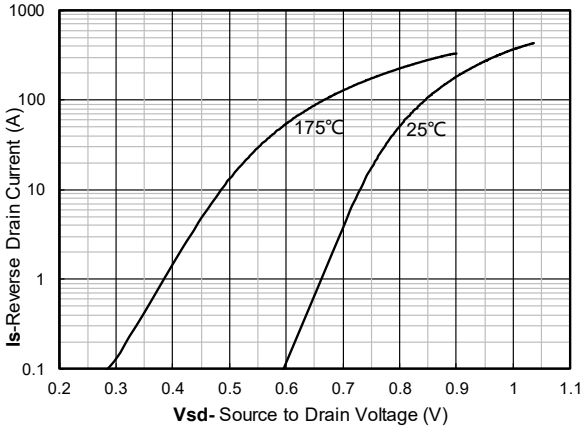
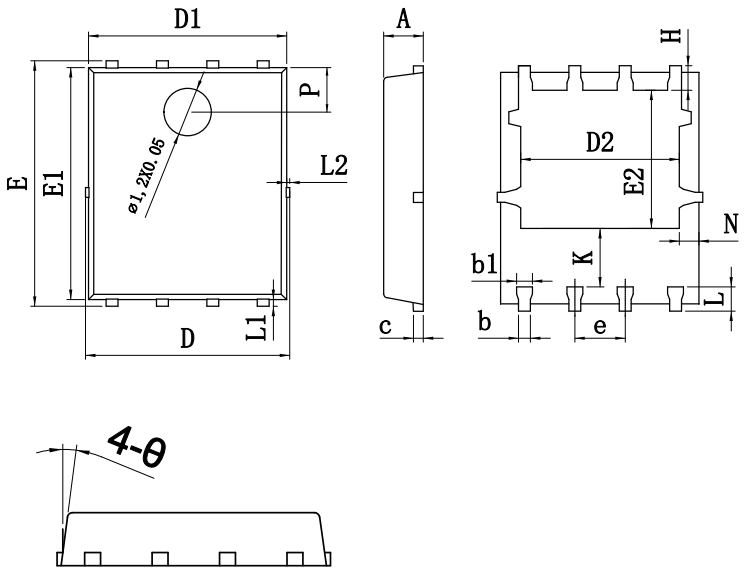


Figure 6. Forward characteristic of body diode

12. Outline Drawing

PDFN5*6-8L Package Outline Dimensions



SYMBOL	mm		
	MIN	NOM	MAX
✻A	0. 95	1. 00	1. 05
✻b	0. 25	0. 30	0. 35
✻b1	0. 30	0. 40	0. 50
✻c	0. 20	0. 25	0. 30
D	5. 15BSC		
✻D1	4. 90	5. 00	5. 10
D2	3. 90	4. 01	4. 20
✻e	1. 17	1. 27	1. 37
E	6. 15BSC		
✻E1	5. 75	5. 85	5. 95
E2	3. 35	3. 50	3. 65
H	0. 51	0. 61	0. 71
K	1. 10	1. 35	1. 50
L	0. 51	0. 61	0. 71
L1	0. 06	0. 13	0. 20
L2	-	-	0. 12
N	0. 40	0. 50	0. 60
P	0. 95	1. 10	1. 25
θ	9°	11°	13°

✻ is the key control dimension

13. Important Notice and Disclaimer

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