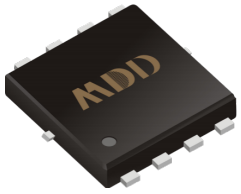


MDDG03R015G

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 $R_{DS(on)}$ = 1.5 mΩ at V_{GS} = 10 V, I_D = 30 A
- Extremely Low Reverse Recovery Charge, Qrr
- 100% UIS Tested
- 100% dVDS Tested

3. Application

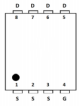
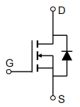
- Synchronous Rectification for ATX / Server / Telecom PSU
- Motor Drives and Uninterruptible Power Supplies
- Micro Solar Inverter

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	190	A
Pulsed Drain Current (Note 2)	I_{DM}	760	A
Single Pulsed Avalanche Energy (Note 3)	E_{AS}	139	mJ
Thermal Resistance, steady-state	$R_{\theta JA}$	60	°C/W
Power Dissipation@Tj=25°C	P_D	75	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= 0.1mH, R_g= 25Ω, I_{AS}=52.7A.

5. Pinning information

Pin	Symbol	Description	Simplified outline	Equivalent Circuit	Marking	Package
4	G	Gate			MDD G03R015G	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	1.1	1.5	2.2	V
$R_{DS(ON)}$	Drain-Source On-State Resistance		V_{GS}=10V, I_D=20A	—	1.3	1.5	mΩ
			V_{GS}=4.5V, I_D=15A	—	1.85	2.4	mΩ

7. Dynamic Electrical Characteristics

Symbol	Parameter	Condition		Min	Typ	Max	Unit
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=20V	f=1MHz	_	3060	_	pF
C_{oss}	Output Capacitance			_	1300	_	pF
C_{rss}	Reverse Transfer Capacitance		f=100kHz	_	60	_	pF
Q_g	Total Gate Charge	V_{GS}=0 to 10V V_{DS}=15V I_D=20A		_	45	_	nC
Q_{gs}	Gate Source Charge			_	25	_	nC
Q_{gd}	Gate Drain Charge			_	10	_	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=30A R_G=3Ω	_	25	_	ns
t_r	Turn on Rise Time		_	12	_	ns
$t_{d(off)}$	Turn Off Delay Time		_	33	_	ns
t_f	Turn Off Fall Time		—	10	—	ns

9. Source Drain Diode Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{SD}	Drain-Source Diode Forward Voltage	I_S=30A, V_{GS}=0V	_	0.8	_	V
t_{rr}	Body Diode Reverse Recovery Time	IF=20A di/dt=100A/μs	—	50	—	ns
Q_{rr}	Body Diode Reverse Recovery Charge		_	41	_	nC

10.Test Circuits And Waveforms

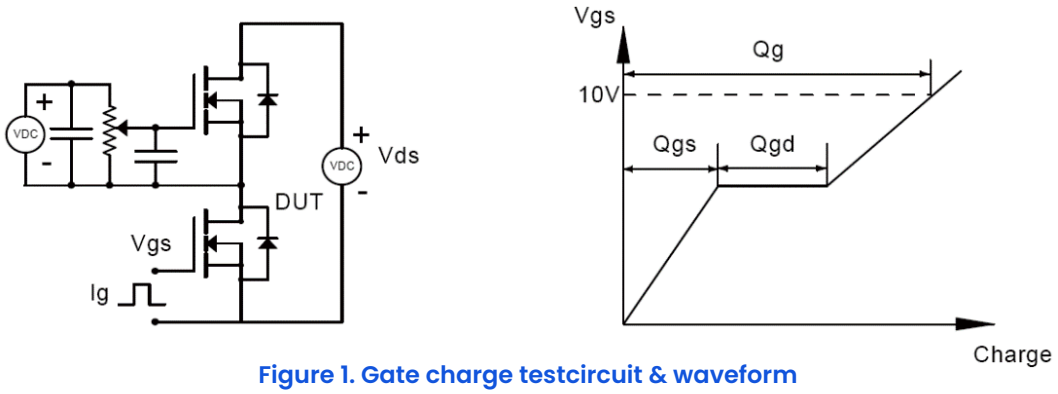


Figure 1. Gate charge testcircuit & waveform

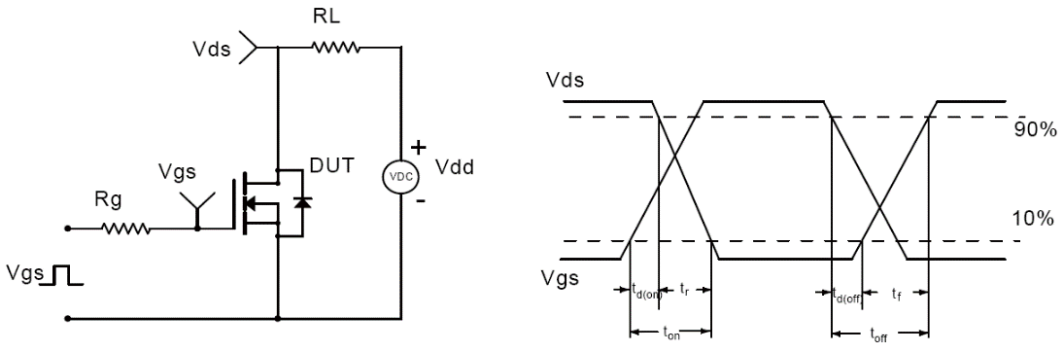


Figure 2.Switching time testcircuit & waveforms

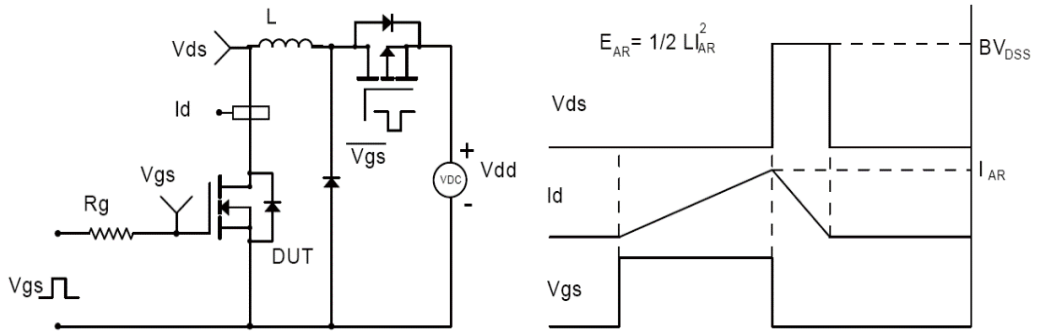


Figure 3.Unclamped inductive switching (UIS)test circuit & waveforms

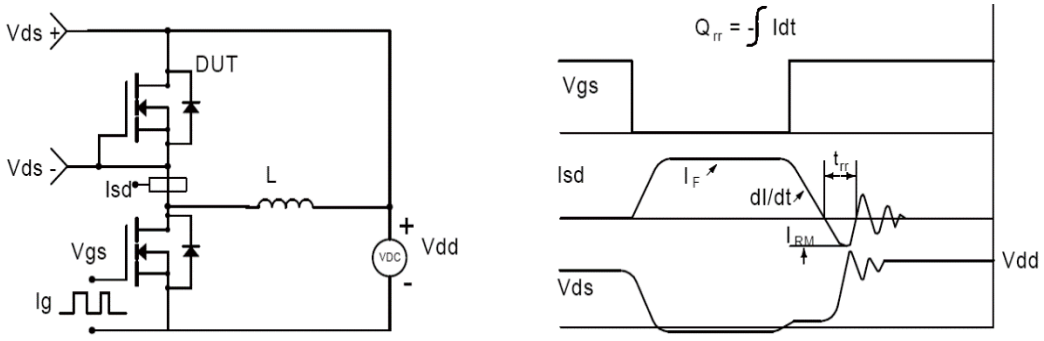


Figure 4. Diode reverse recoverytest circuit& waveforms

11.Electrical Characteristics Diagrams

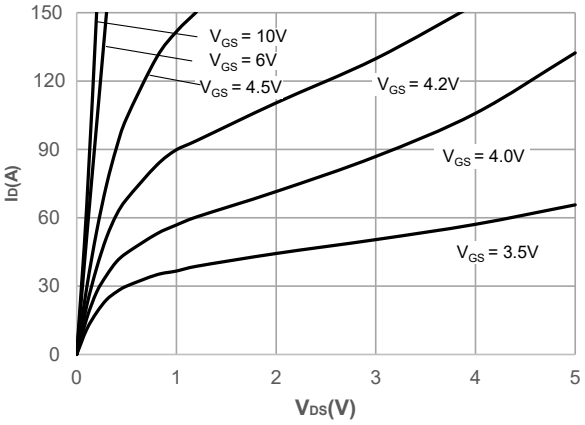


Figure 1. Typ. output characteristics

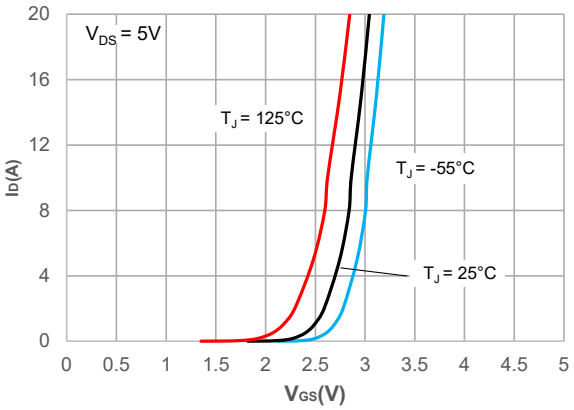


Figure 2. Typ. transfer characteristics

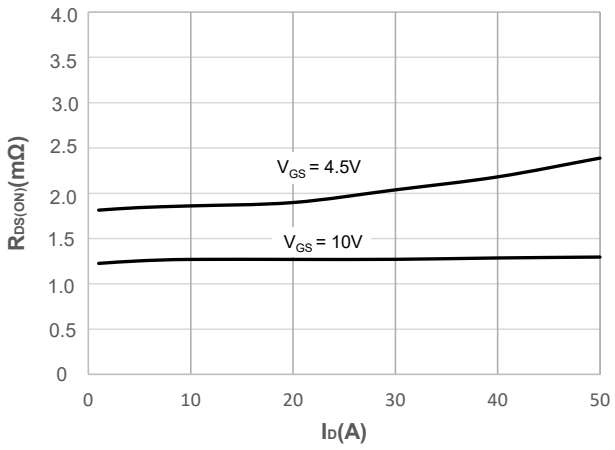


Figure 3. On-Resistance vs. Drain Current

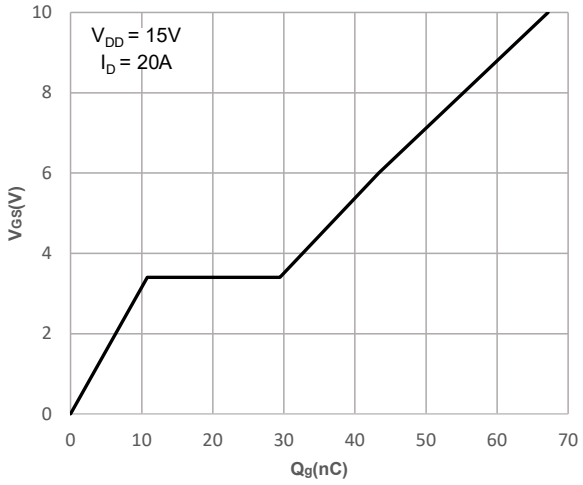


Figure 4. Gate Charge Characteristics

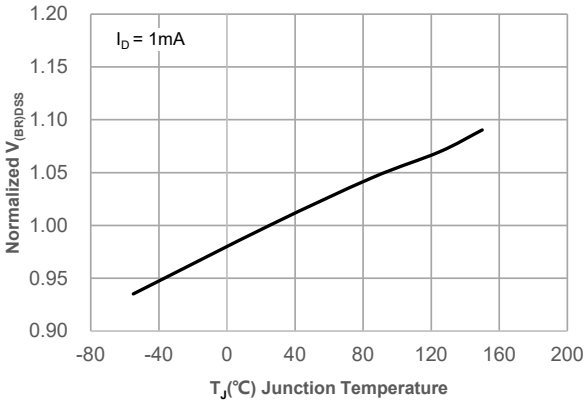


Figure 5. Normalized Breakdown Voltage vs. Junction Temperature

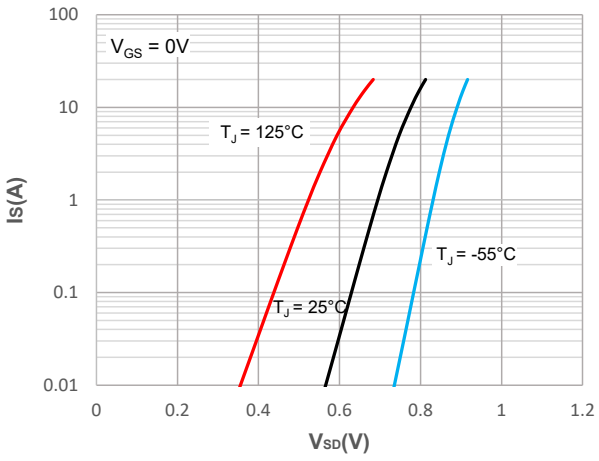
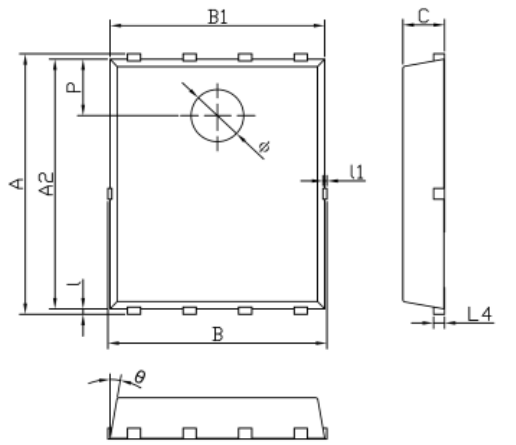


Figure 6. Forward characteristic of body diode

12. Outline Drawing

PDFN5*6-8L Package Outline Dimensions



Dimensions In Millimeters			
Symbol	MIN	TYP	MAX
A	5.90	6.00	6.10
a	3.91	4.01	4.11
A2	5.70	5.75	5.80
B	4.90	5.00	5.10
b	3.375	3.475	3.575
B1	4.80	4.90	5.00
C	0.90	0.95	1.00
L	0.30	0.40	0.50
l	0.06	0.13	0.20
L1	1.10	-	-
l1	-	-	0.10
L2	1.17	1.27	1.37
L4	0.21	0.26	0.34
L6	0.51	0.61	0.71
L7	0.51	0.61	0.71
P	1.15	1.30	1.45
θ	8°	10°	12°
Φ	1.10	1.20	1.30

13. Important Notice and Disclaimer

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