



MDDG04R02LG

40V 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 RDS(on) = 1.8m Ω at VGS = 10 V, ID = 30A
- 100% UIS Tested
- 100% dVDS Tested

3. Application

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

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	40	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current (Note 1)	I _D	140	A
Pulsed Drain Current (Note 2)	I _{DM}	560	A
Single Pulsed Avalanche Energy (Note 3)	E _{AS}	173	mJ
Thermal Resistance, steady-state	R _{θJA}	45	°C/W
Power Dissipation	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}=32V, V_{GS}=10V, L= 0.5mH, R_g= 25 Ω , ID=26.3A

5. Pinning information

Pin	Symbol	Description	Simplified outline	Equivalent Circuit	Marking	Package
4	G	Gate			MDD G04R02LG	PDFN5*6-8L
5-8	D	Drain				
1-3	S	Source				

6. $T_A=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	—	—	V
I _{less}	Gate-Source Leakage Current	Forward	—	—	100	nA
		Reverse	—	—	-100	nA
I _{DSS}	Drain-Source Leakage Current	$V_{DS}=40V, V_{GS}=0V$	—	—	1	μA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=30A$	—	1.5	1.8	m Ω
		$V_{GS}=4.5V, I_D=20A$	—	2.2	3.0	m Ω

7. Dynamic Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit	
C _{iss}	Input Capacitance	$V_{GS}=0V$ $V_{DS}=20V$	—	3100	—	pF	
C _{oss}	Output Capacitance						f=1MHz
C _{rss}	Reverse Transfer Capacitance						f=100kHz
Q _g	Total Gate Charge	$V_{GS}=0$ to 10V $V_{DS}=20V$ $I_D=20A$	—	40	—	nC	
Q _{gs}	Gate Source Charge						
Q _{gd}	Gate Drain Charge						

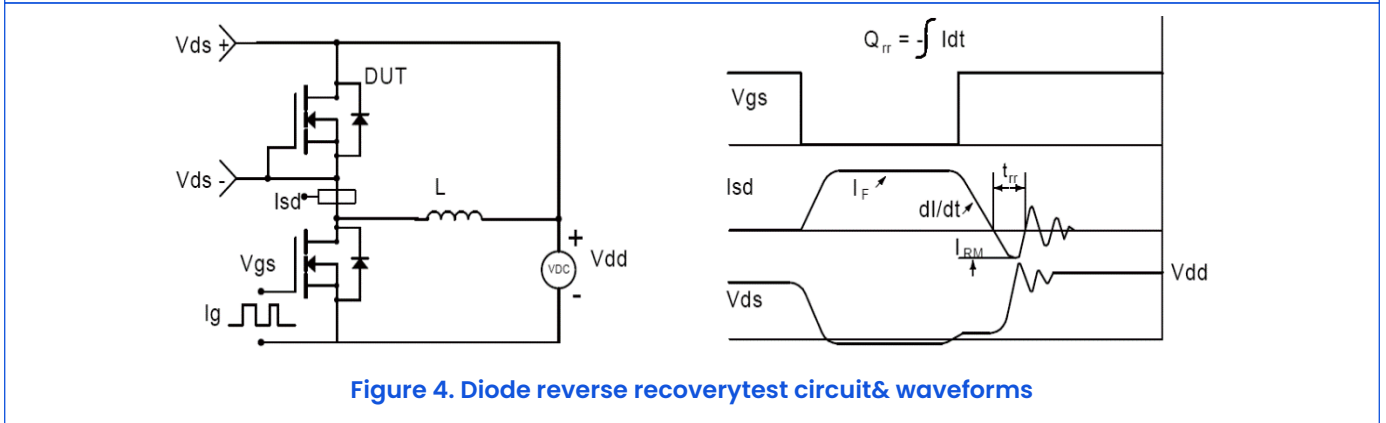
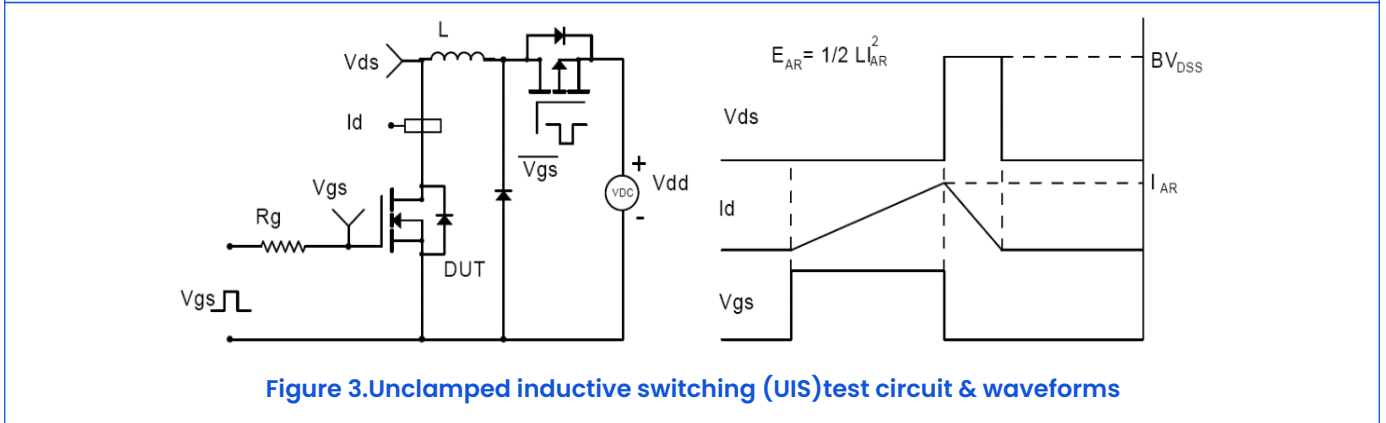
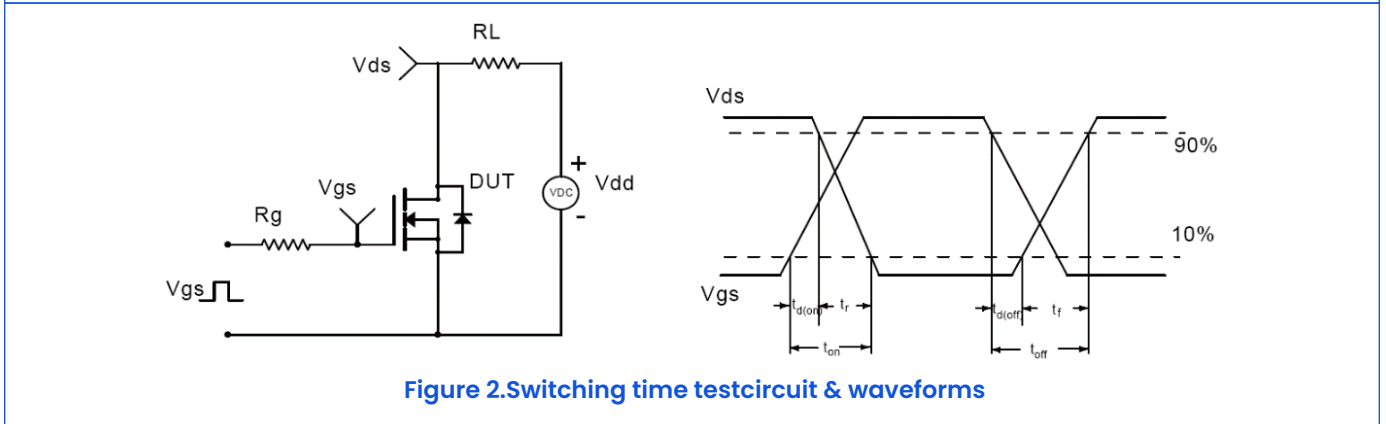
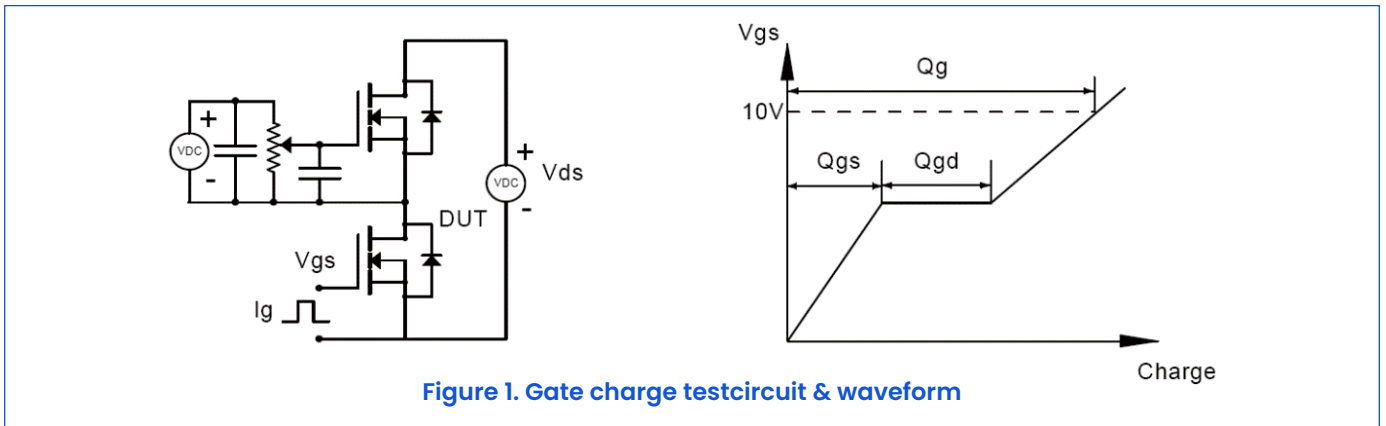
8. Switching Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
t _{d(on)}	Turn on Delay Time	$V_{GS}=10V$ $V_{DD}=20V$ $I_D=30A$ $R_G=3\Omega$	—	12.5	—	ns
t _r	Turn on Rise Time					
t _{d(off)}	Turn Off Delay Time					
t _f	Turn Off Fall Time					

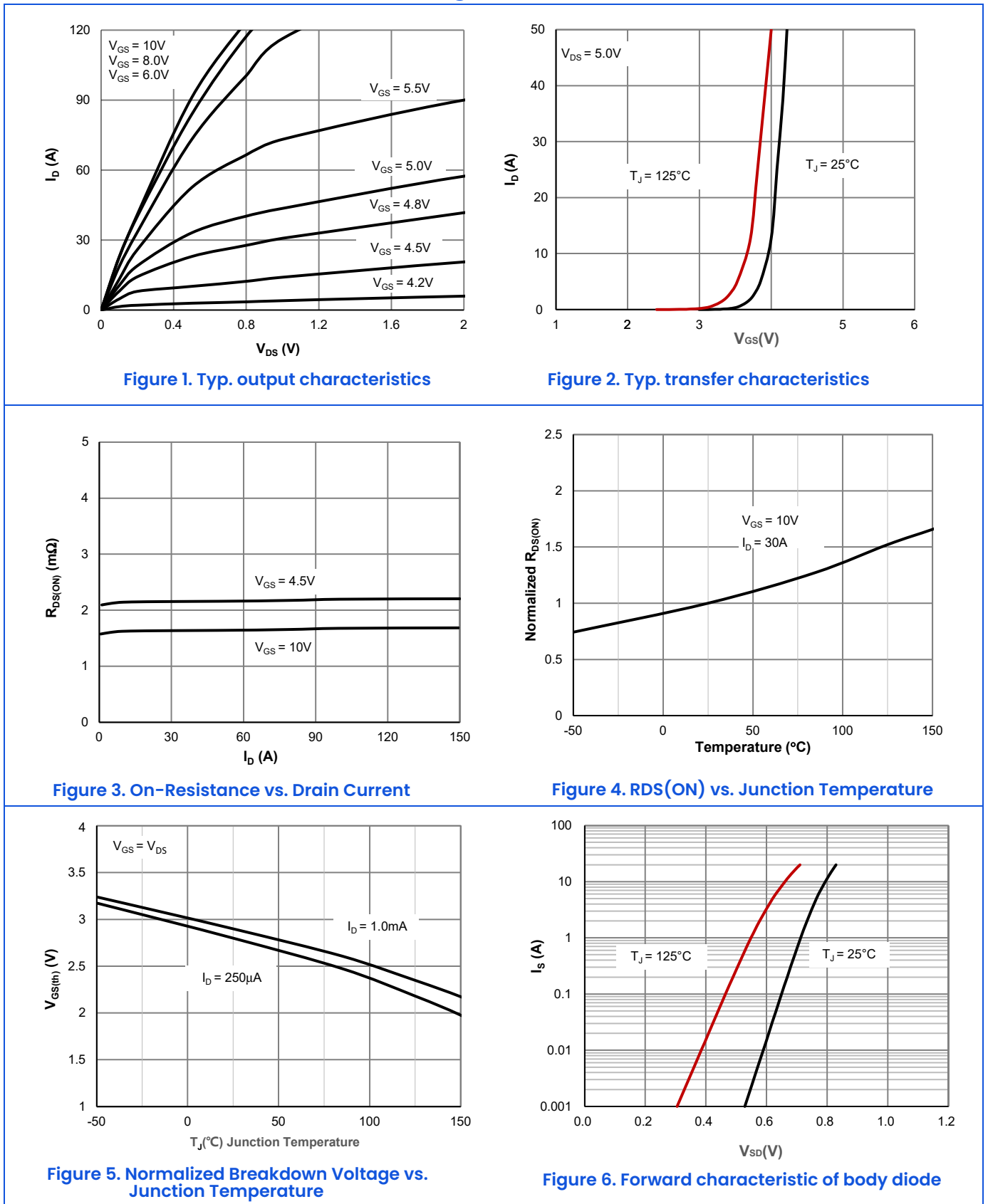
9. Source Drain Diode Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V _{SD}	Drain-Source Diode Forward Voltage	$I_S=10A, V_{GS}=0V$	—	0.8	—	V
t _{rr}	Body Diode Reverse Recovery Time	$I_F=20A$ $di/dt=100A/\mu s$	—	35	—	ns
Q _{rr}	Body Diode Reverse Recovery Charge					

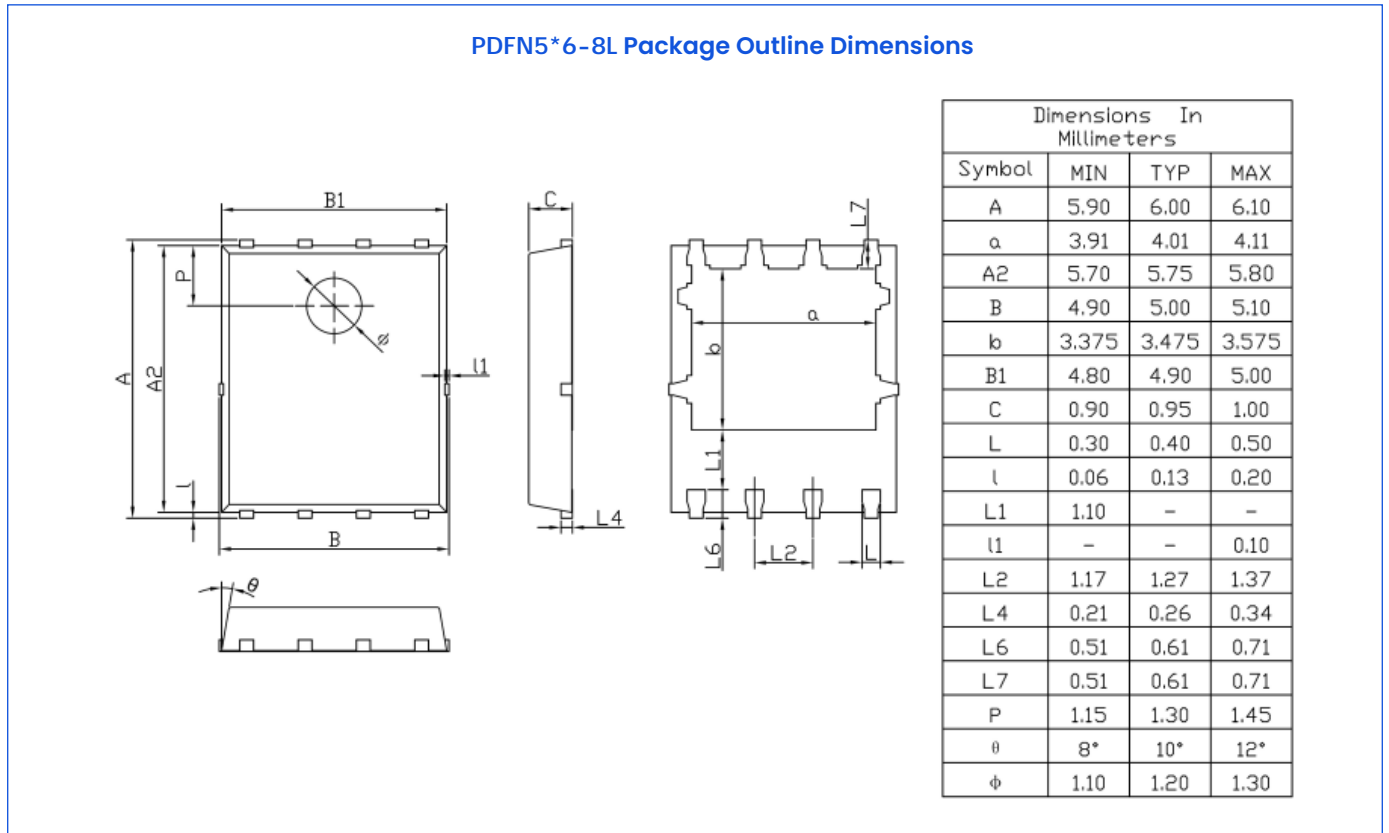
10. Test Circuits And Waveforms



II. Electrical Characteristics Diagrams



12. Outline Drawing



13. Important Notice and Disclaimer

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