

MDDG10R02L

100V N-Channel Enhancement Mode MOSFET

1. Description

This N-Channel MV 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) = 2.4 m Ω at V_{GS} = 10 V, I_D = 50 A
- Extremely Low Reverse Recovery Charge, Q_{rr}
- 100% UIS Tested
- 100% dVDS Tested

3. Application

- PWM Application
- Motor Drives and Uninterruptible Power Supplies
- Micro Solar Inverter
- Battery management System

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	100	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current (Note 1)	I _D	224	A
Pulsed Drain Current (Note 2)	I _{DM}	896	A
Single Pulsed Avalanche Energy (Note 3)	E _{AS}	576	mJ
Thermal Resistance (min. footprint)	R _{θJA}	62	°C/W
Power Dissipation	P _D	208	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}=50V, V_{GS}=10V, L= 0.5mH, R_g= 25 Ω , I_{AS}=48A.

5. Pinning information

Pin	Symbol	Description	Simplified outline	Equivalent Circuit	Marking	Package
1	G	Gate			MDD G10R02L	TOLL
9-11	D	Drain				
2-8	S	Source				

6. TA=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	100	—	—	V
I _{SS}	Gate-Source Leakage Current	Forward	—	—	100	nA
		Reverse	—	—	-100	nA
I _{DSS}	Drain-Source Leakage Current	V _{DS} =100V, V _{GS} =0V	—	—	1	μA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =50A	—	2.0	2.4	mΩ

7. Dynamic Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} =0V V _{DS} =50V f=1MHz	—	7448	—	pF
C _{oss}	Output Capacitance		—	2501	—	pF
C _{rss}	Reverse Transfer Capacitance		—	55	—	pF
Q _g	Total Gate Charge	V _{GS} =10V V _{DS} =50V I _D =100A	—	104	—	nC
Q _{gs}	Gate Source Charge		—	39	—	nC
Q _{gd}	Gate Drain Charge		—	27	—	nC

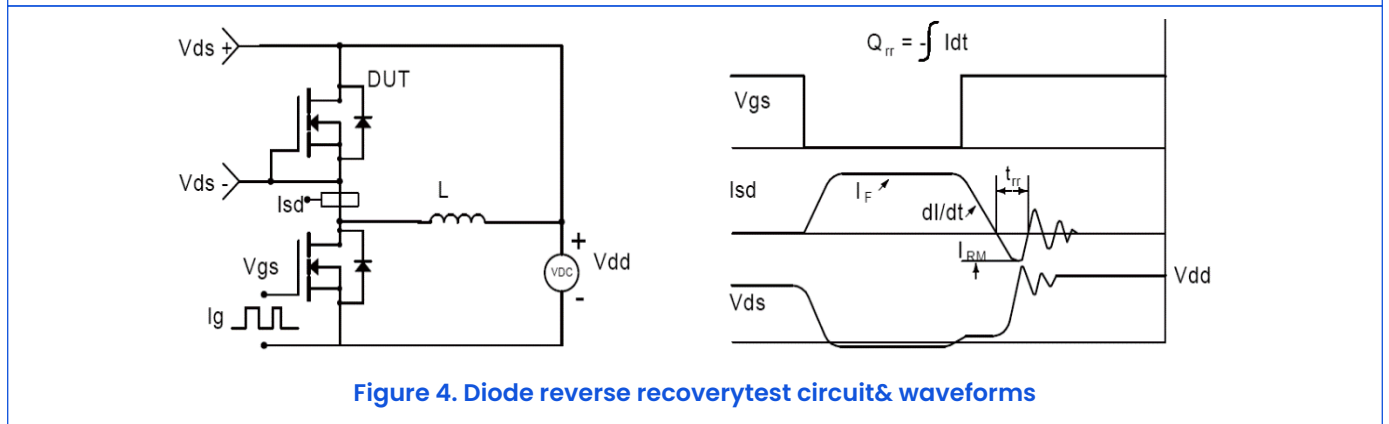
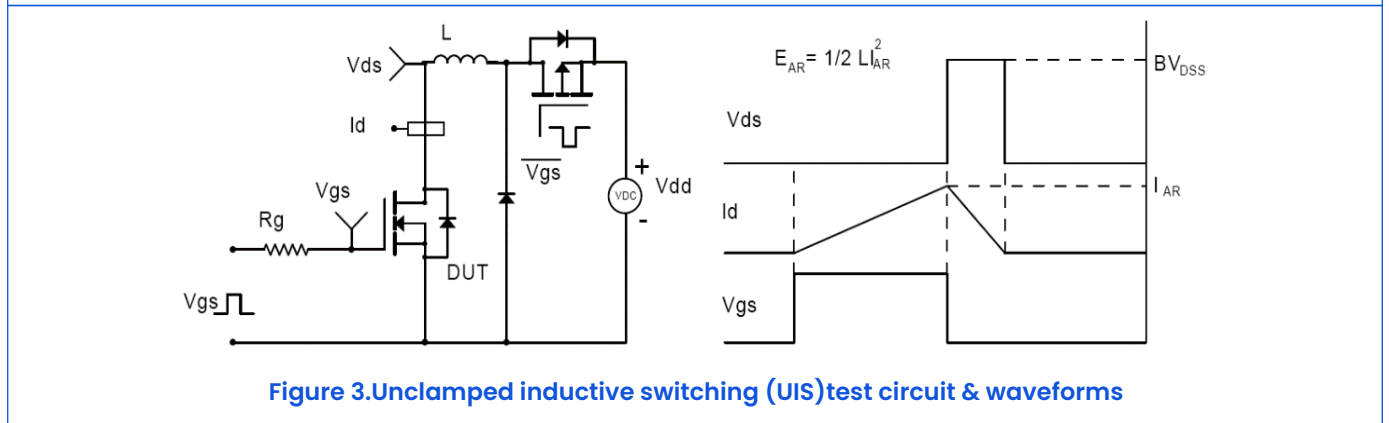
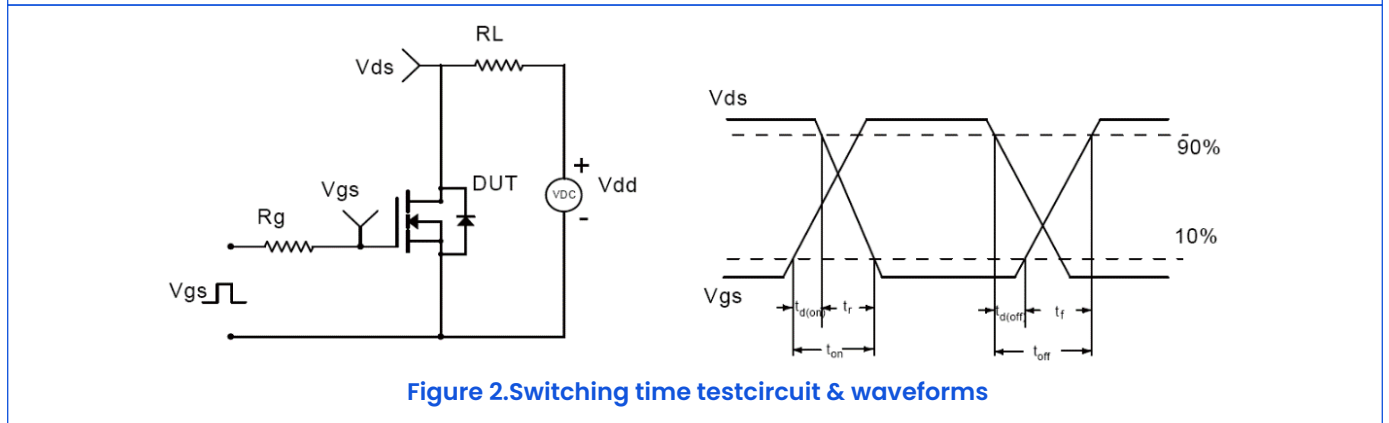
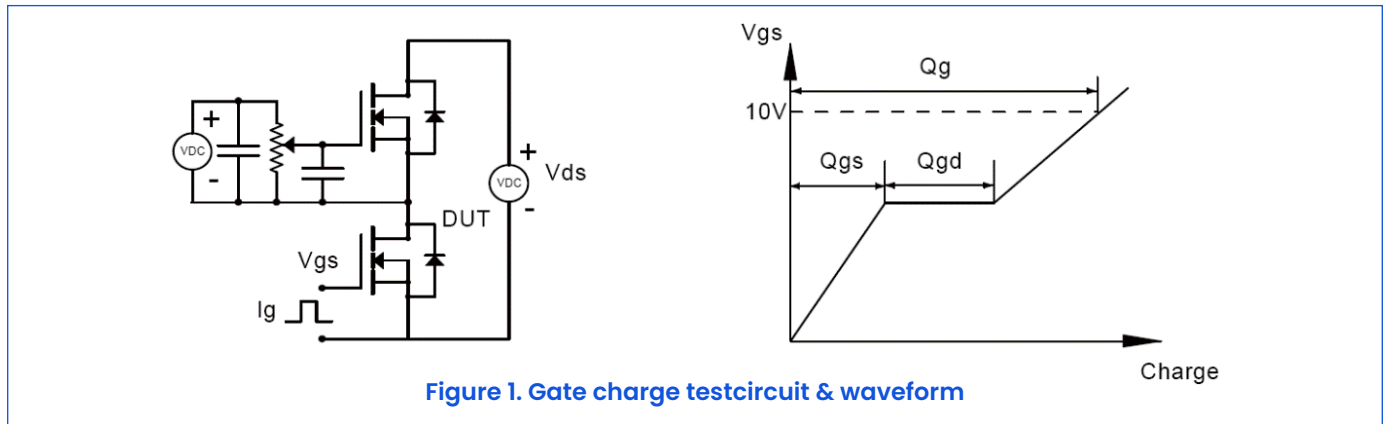
8. Switching Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
t _{d(on)}	Turn on Delay Time	V _{GS} =10V V _{DD} =50V I _D =100A R _θ =1.6Ω	—	24	—	ns
t _r	Turn on Rise Time		—	78	—	ns
t _{d(off)}	Turn Off Delay Time		—	48	—	ns
t _f	Turn Off Fall Time		—	85	—	ns

9. Source Drain Diode Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V _{SD}	Drain-Source Diode Forward Voltage	I _S =75A, V _{GS} =0V	—	0.82	1.2	V
t _{rr}	Body Diode Reverse Recovery Time	I _F =50A di/dt=100A/μs	—	75	—	ns
Q _{rr}	Body Diode Reverse Recovery Charge		—	123	—	nC

10. Test Circuits And Waveforms



II. Electrical Characteristics Diagrams

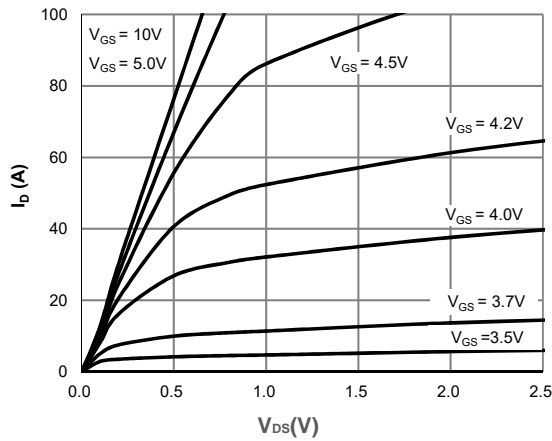


Figure 1. Typ. output characteristics

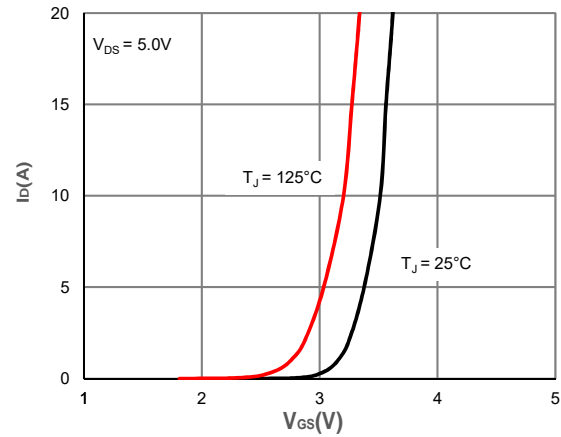


Figure 2. Typ. transfer characteristics

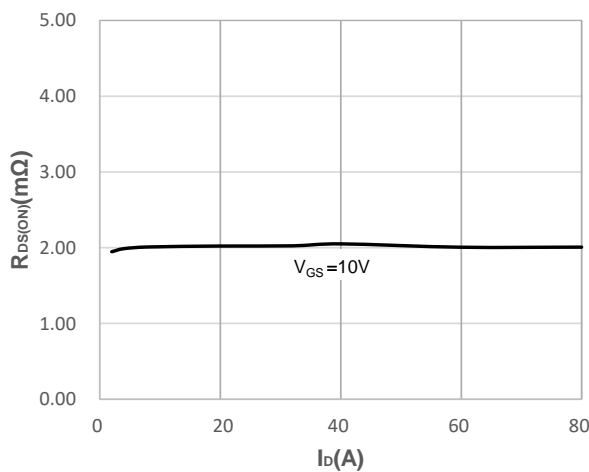


Figure 3. On-Resistance vs. Drain Current

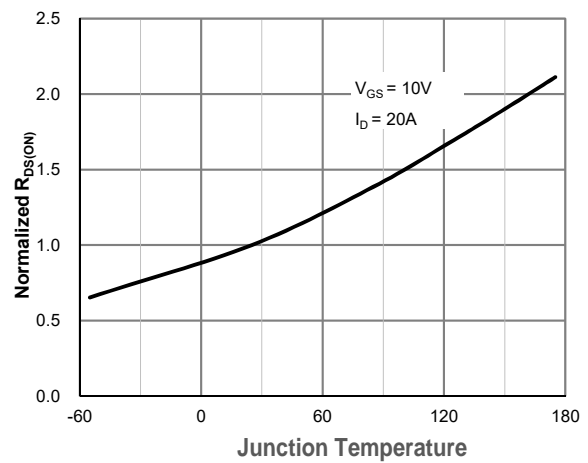


Figure 4. On-Resistance vs. Junction Temperature

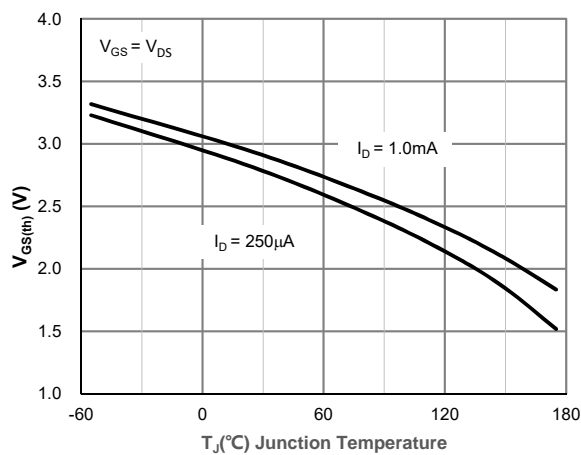


Figure 5. Normalized Threshold Voltage vs. Junction Temperature

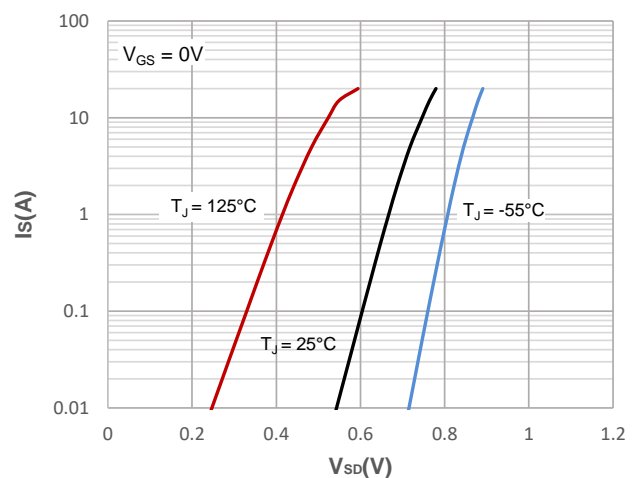
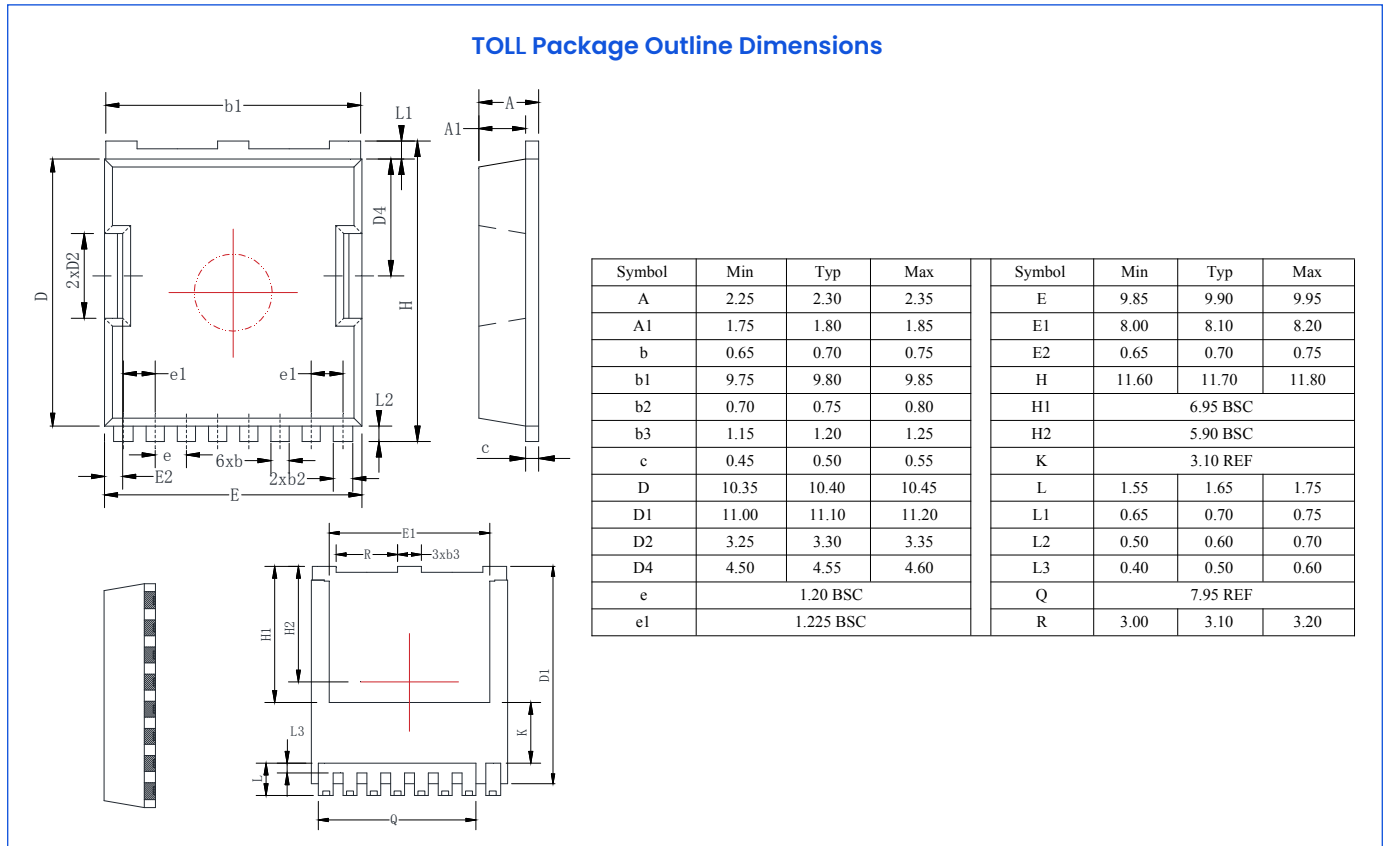


Figure 6. Forward characteristic of body diode

12. Outline Drawing



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