UMW IRLML2502TR

20V N-Channel MOSFET

1.Description

The IRLML2502TR uses advanced trench technology to provide excellent $R_{DS(on)}$ with low gate charge. This device is suitable for use as a loads witch or in PWM applications.

2.Features

- $V_{(BR)DSS}$=20V
- I_D=4.2A
- $R_{DS(ON)}$<45mΩ(V_{GS}=4.5V)
- $R_{DS(ON)}$<60mΩ(V_{GS}=2.5V)
- TrenchFET Power MOSFET

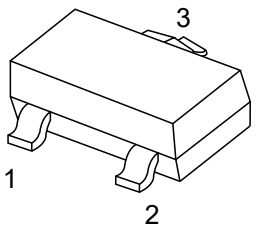
3.Application

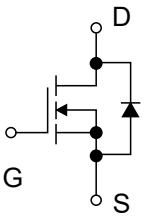
- Load Switch for Portable Devices
- DC/DC Converter

4.Pinning information

Pin	Symbol	Description
1	G	GATE
2	S	SOURCE
3	D	DRAIN

SOT-23





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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current	I_D	4.2	A
Power Dissipation	P_D	1.25	W
Thermal Resistance from Junction to Ambient (t≤5s)	$R_{\theta JA}$	0.01	°C/W
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55~+150	°C

6.T_A=25°C unless otherwise specified

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=10μA	20			V
Gate-threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=50μA	0.65		1.2	V
Gate-body leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Drain-source on-state resistance [a]	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=4.2A		0.035	0.045	Ω
		V_{GS}=2.5V, I_D=3.6A		0.045	0.06	Ω
Forward transconductance [a]	g_{FS}	V_{DS}=5V, I_D=3.6A		8		S
Diode forward voltage	V_{SD}	I_S=0.94A, V_{GS}=0V		0.76	1.2	V
Dynamic						
Total gate charge	Q_g	V_{DS}=10V, V_{GS}=4.5V, I_D=3.6A		4	10	nC
Gate-source charge	Q_{gs}			0.65		
Gate-drain charge	Q_{gd}			1.5		
Input capacitance [b]	C_{iss}	V_{DS}=10V, V_{GS}=0V, f=1MHz		300		pF
Output capacitance [b]	C_{oss}			120		
Reverse transfer capacitance [b]	C_{rss}			80		
Switching [b]						
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=10V R_L=5.5Ω, I_D≈3.6A V_{GEN}=4.5V, R_G=6Ω		7	15	ns
Rise Time	t_r			55	80	ns
Turn-Off Delay Time	$t_{D(off)}$			16	60	ns
Fall time	t_f			10	25	ns

Notes :

a. Pulse Test : Pulse width ≤ 300μs, duty cycle ≤ 2%.

b. These parameters have no way to verify.

7.1 Typical Characterisitics

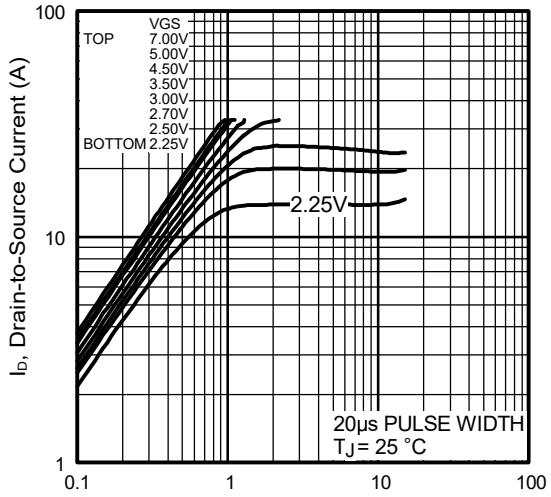


Fig 1. Typical Output Characteristics

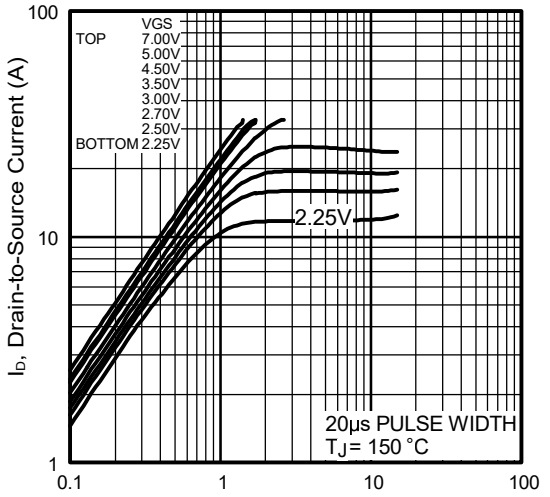


Fig 2. Typical Output Characteristics

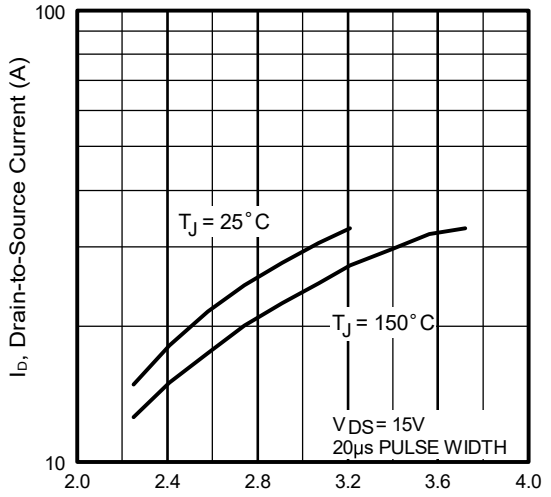


Fig 3. Typical Transfer Characteristics

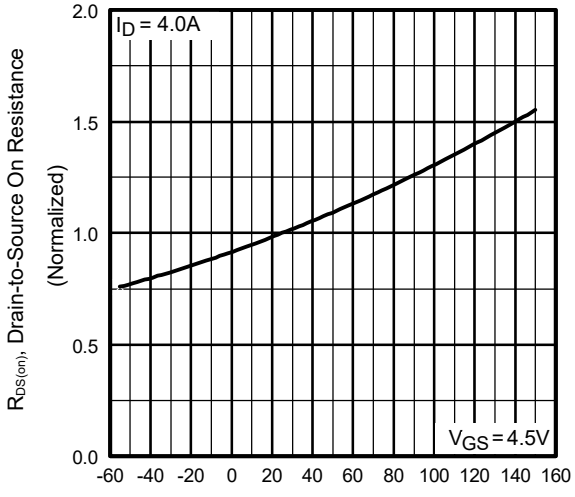
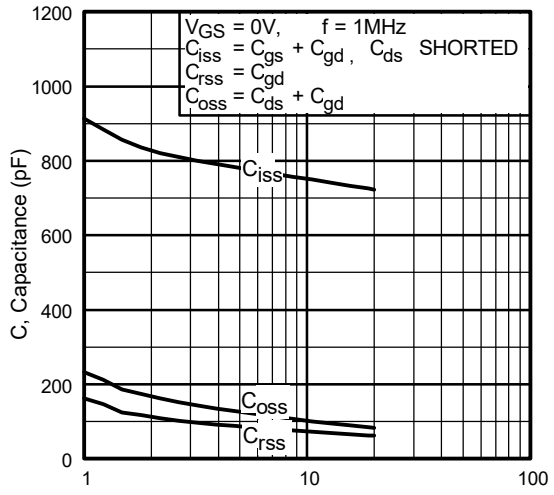


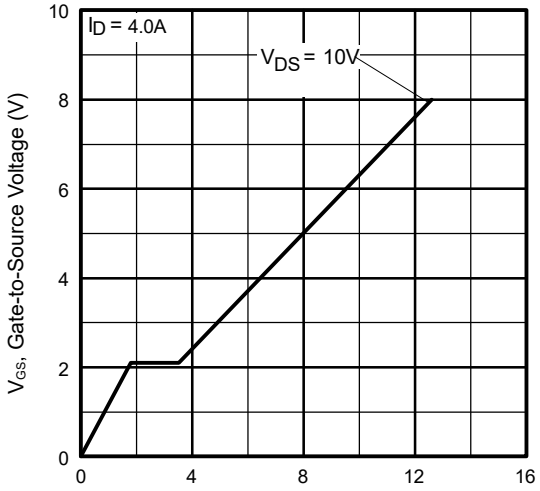
Fig 4. Nomalized On-Resistance Vs. Temperature

7.2 Typical Characterisitics



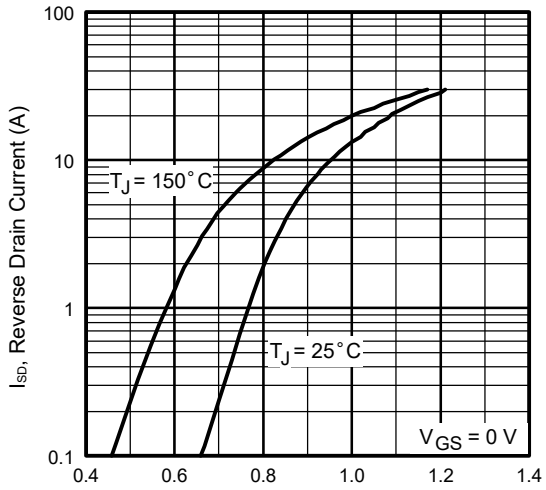
V_{DS} ,Drain-to-Source Voltage (V)

Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage



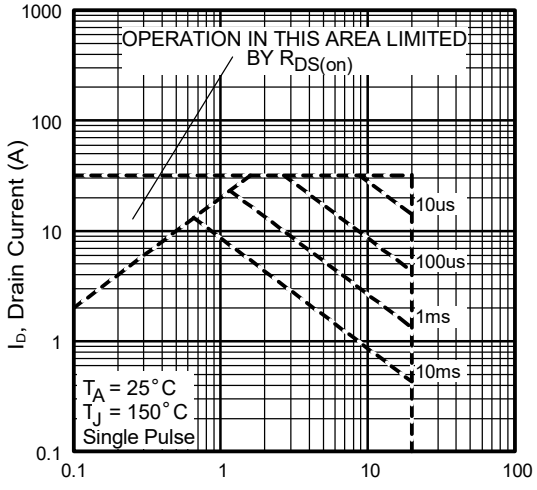
Q_G, Total Gate Charge (nC)

Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage



V_{SD}, Source-to-Drain Voltage (V)

Fig 7. Typical Source-Drain Diode Forward Voltage



V_{DS}, Drain-to-Source Voltage (V)

Fig 8. Maximum Safe Operating Area

7.3 Typical Characterisitics

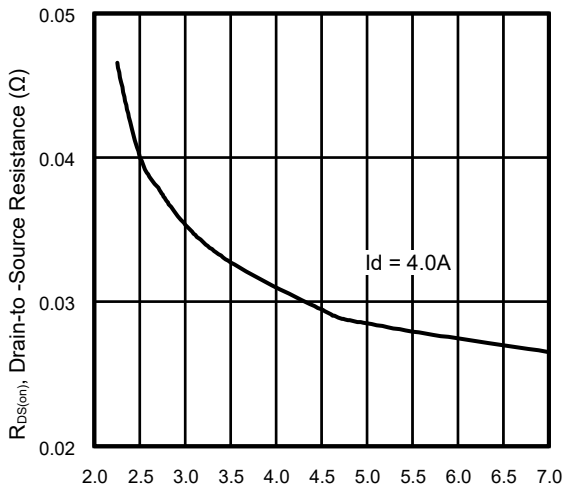


Fig 9. On-Resistance Vs. Gate Voltage

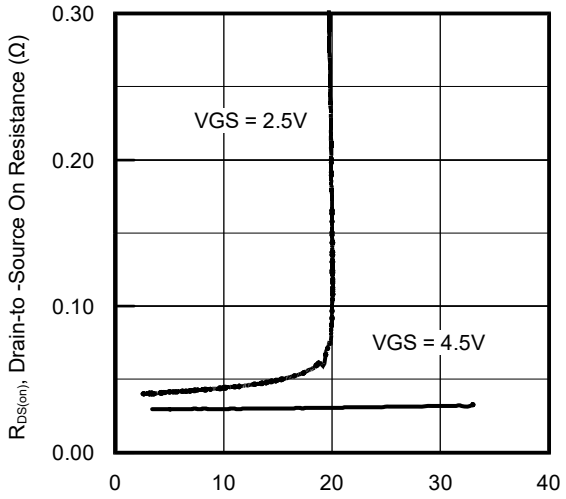


Fig 10. On-Resistance Vs. Drain Current

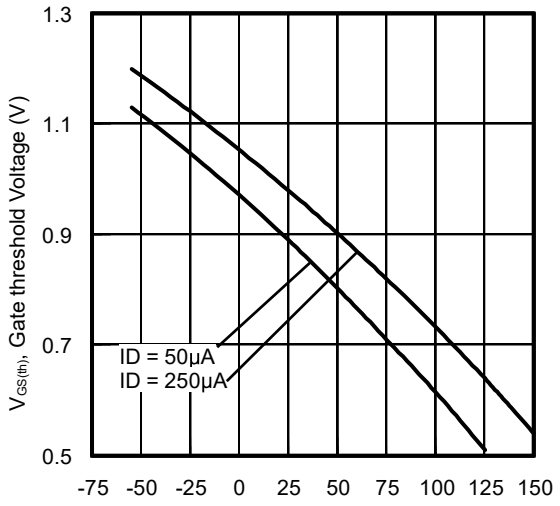


Fig 11. Threshold Voltage Vs. Temperature

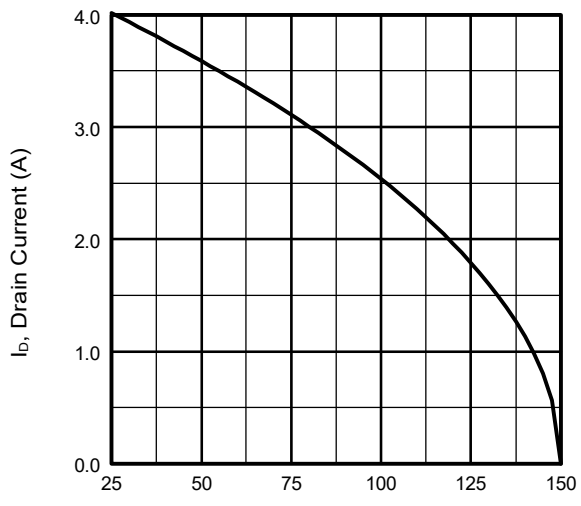


Fig 12. Maximum Drain Current Vs. Case Temperature

7.4 Typical Characterisitics

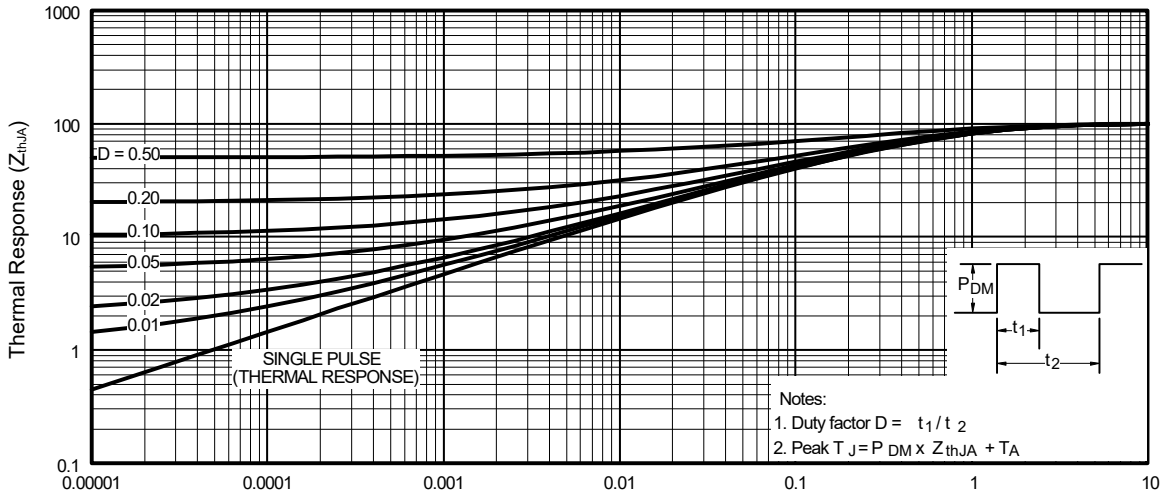
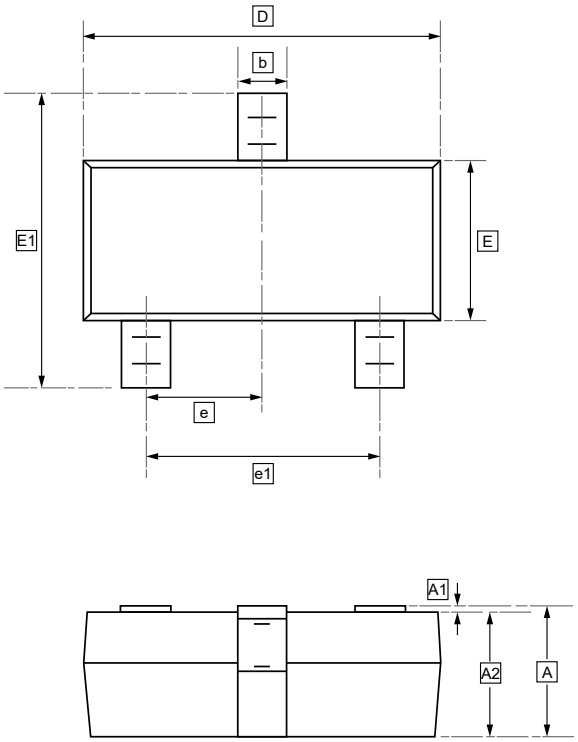


Fig 13. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

8.SOT-23 Package Outline Dimensions

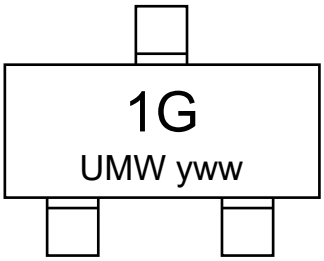


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	C	D	E	E1	e	e1	L	L1
Min	0.90	0.00	0.90	0.30	0.08	2.80	1.20	2.25	0.95	1.80	0.55	0.30
Max	1.15	0.10	1.05	0.50	0.15	3.00	1.40	2.55	TYP.	2.00	REF	0.50

Symbol	F	θ	θ1
Min	0.25	0°	2°
Max		8°	12°

9.Ordering information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLML2502TR	SOT-23	3000	Tape and reel

10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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