UMW IRLML6401TR

-12V P-Channel MOSFET

1.1Features

- $V_{DS\ (V)}$=-12V
- $R_{DS(ON)}$<50mΩ(V_{GS}=-4.5V)
- $R_{DS(ON)}$<85mΩ(V_{GS}=-2.5V)
- $R_{DS(ON)}$<125mΩ(V_{GS}=-1.8V)

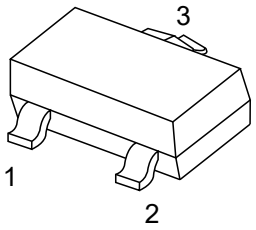
1.2Features

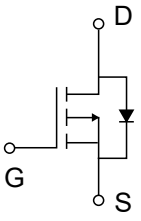
- Ultra low on-resistance
- P-Channel MOSFET
- Fast switching

2.Pinning information

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

SOT-23





3.Maximum ratings (T_A=25°C unless otherwise noted)

Parameter		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	-12	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current, V_{GS}=4.5V	T_A=25°C	I_D	-4.3	A
Continuous Drain Current, V_{GS}=4.5V	T_A=70°C		-3.4	
Pulsed Drain Current [a]		I_{DM}	-34	
Power Dissipation	T_A=25°C	P_D	1.3	W
Power Dissipation	T_A=70°C		0.8	
Single Pulse Avalanche Energy [b]		E_{AS}	33	mJ

Thermal Resistance.Junction- to-Ambient	R_{thJA}	100	°C/W
Linera Derating Factor		0.01	W/°C
Junction Temperature	T_J	150	°C
Junction and Storage Temperature Range	T_{STG}	-55 to 150	

Notes:

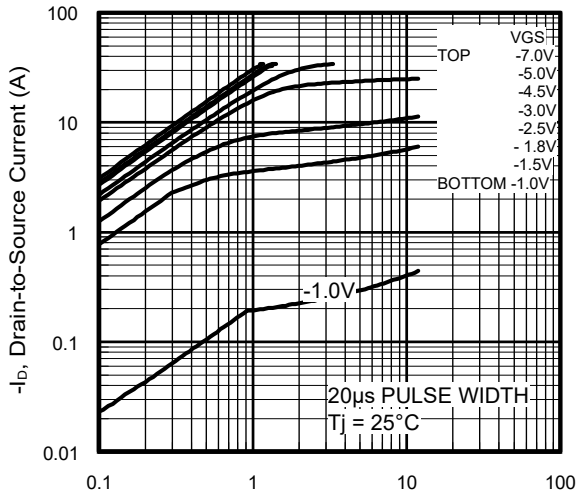
a.Repetitive Rating :Pulse width limited by maximum junction temperature.

b.Starting T_J=25°C, L=3.5mH, R_G=25Ω, I_{AS}=-4.3A.

4.Electrical Characteristics T_A=25°C

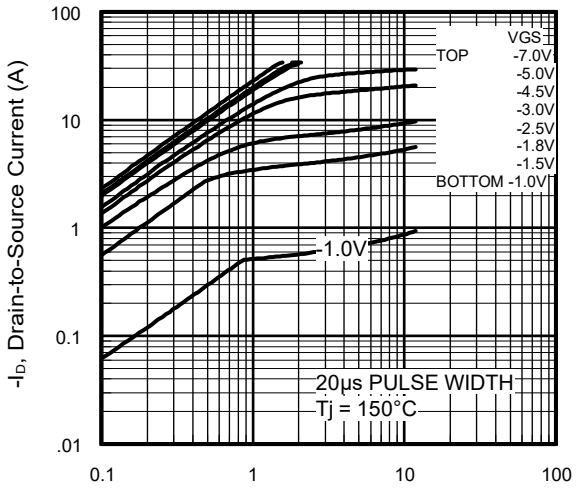
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	-12			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-12V, V_{GS}=0V			-1	μA
		V_{DS}=-9.6V, V_{GS}=0V, T_J=55°C			-25	
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.4	-0.55	-0.95	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-4.3A			50	mΩ
		V_{GS}=-2.5V, I_D=-2.5A			85	
		V_{GS}=-1.8V, I_D=-2A			125	mΩ
Forward Transconductance	g_{FS}	I_D=-4.3A, V_{DS}=-10V	8.6			S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-10V, f=1MHz		830		pF
Output Capacitance	C_{oss}			180		pF
Reverse Transfer Capacitance	C_{rss}			125		pF
Total Gate Charge	Q_g	V_{GS}=-5V V_{DS}=-10V I_D=-4.3A		10	15	nC
Gate Source Charge	Q_{gs}			1.4	2.1	nC
Gate Drain Charge	Q_{gd}			2.6	3.9	nC
Turn-On DelayTime	$t_{D(on)}$	I_D=-1A, V_{DS}=-6V R_L=6Ω, R_{GEN}=89Ω		11		ns
Turn-On Rise Time	t_r			32		ns
Turn-Off DelayTime	$t_{D(off)}$			250		ns
Turn-Off Fall Time	t_f			210		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F=-1.3A, dI/dt=-100A/μs		22	33	ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=-1.3A, dI/dt=-100A/μs		8	12	nC
Maximum Body-Diode Continuous Current	I_S				1.3	A
Diode Forward Voltage	V_{SD}	I_S=-1.3A, V_{GS}=0V			-1.2	V

5.1Typical Characterisitics



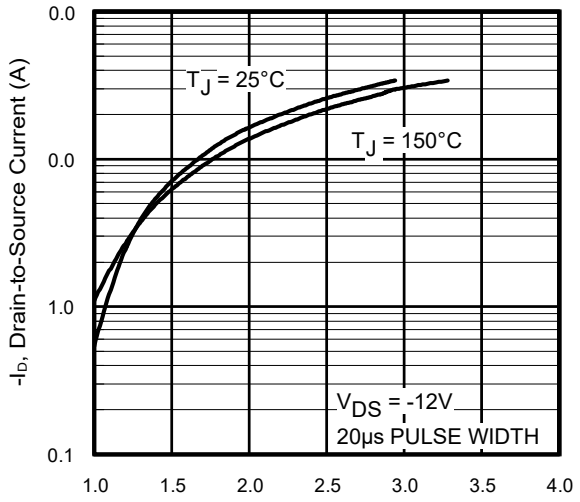
-V_{DS} - Drain-to-Source Voltage (V)

Fig 1. Typical Output Characteristics



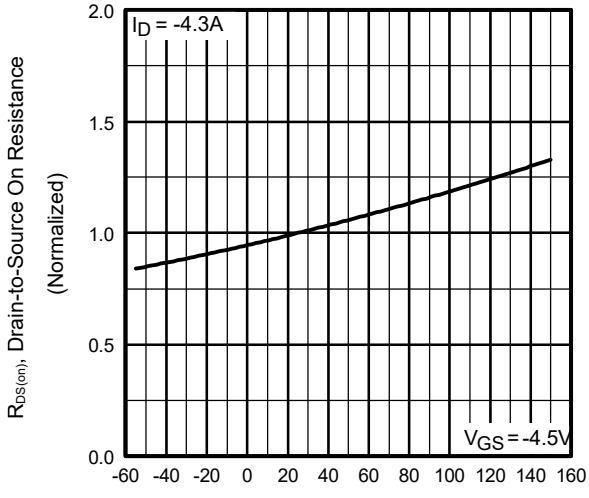
-V_{DS} - Drain-to-Source Voltage (V)

Fig 2. Typical Output Characteristics



-V_{GS}, Gate-to-Source Voltage (V)

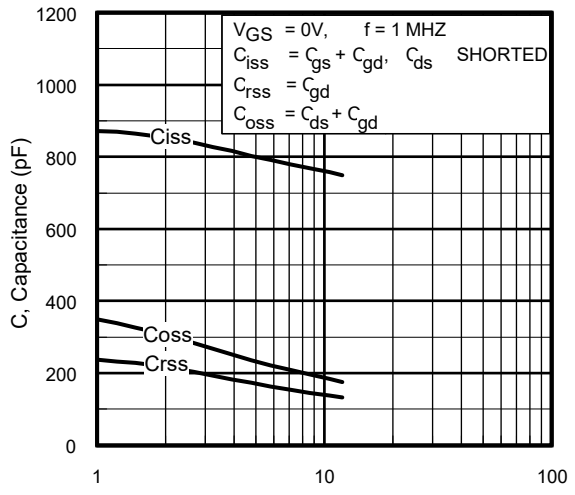
Fig 3. Typical Transfer Characteristics



T_J, Junction Temperature (°C)

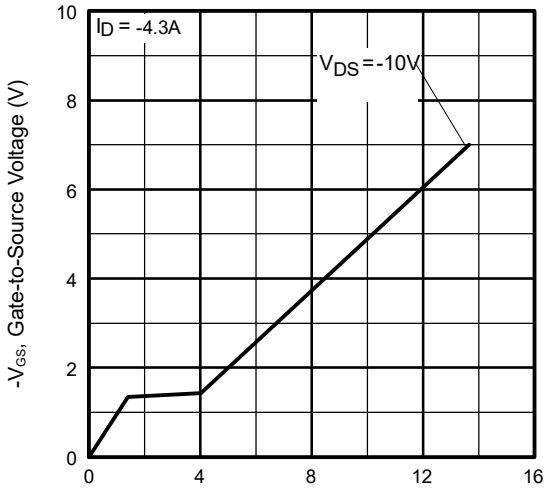
Fig 4. Nomalized On-ResistanceVs. Temperature

5.2Typical Characterisitics



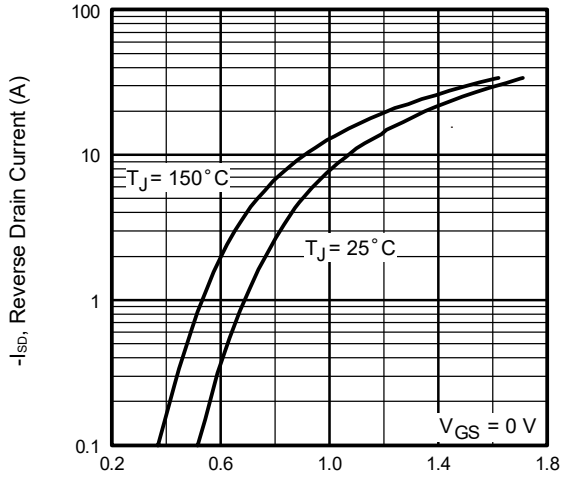
V_{DS} ,Drain-to-Source Voltage (V)

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



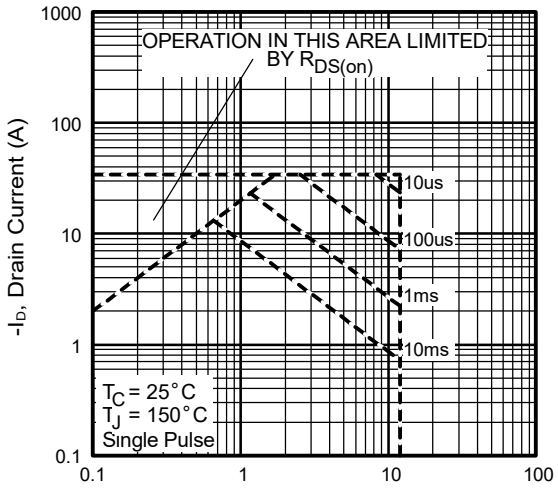
Q_G, Total Gate Charge (nC)

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

5.3Typical Characterisitics

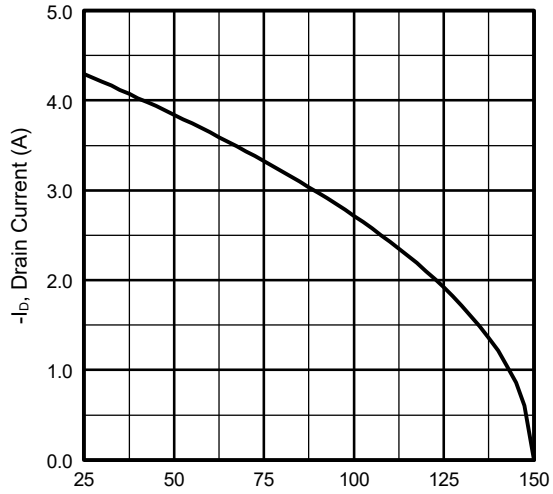


Fig 9. Maximum Drain Current Vs. Case Temperature

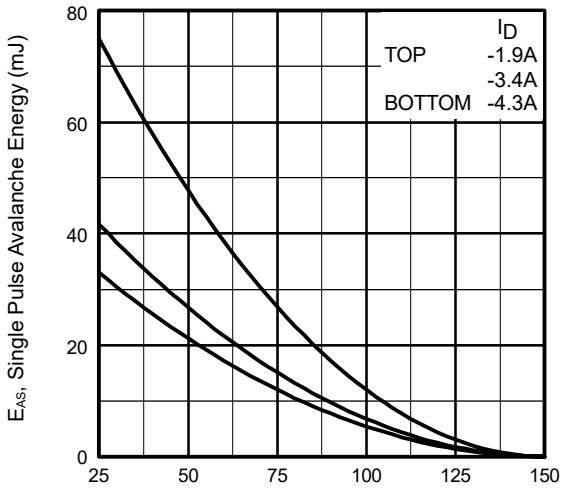


Fig 10. Maximum Avalanche Energy Vs. Drain Current

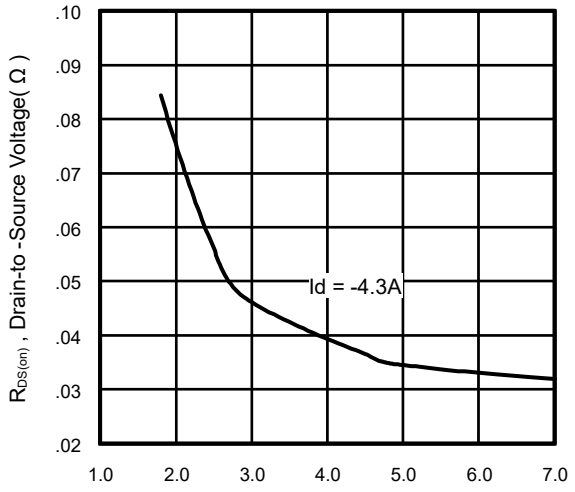


Fig 11. Typical On-Resistance Vs. Gate Voltage

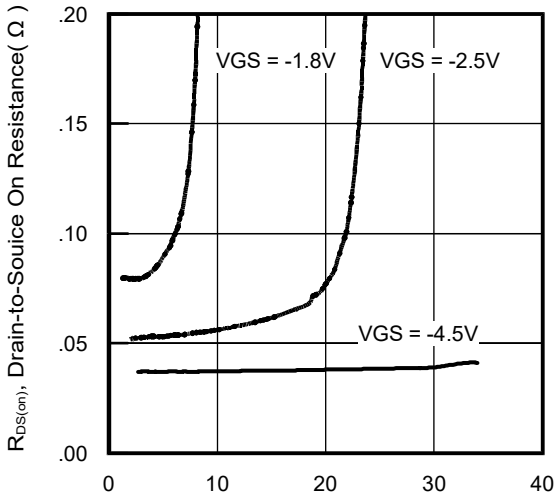


Fig 12. Typical On-Resistance Vs.Drain Current

5.4Typical Characterisitics

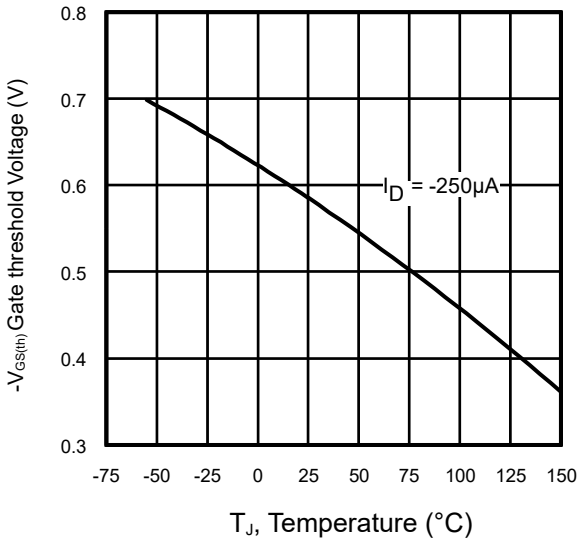


Fig 13. Typical Threshold Voltage Vs. JunctionTemperature

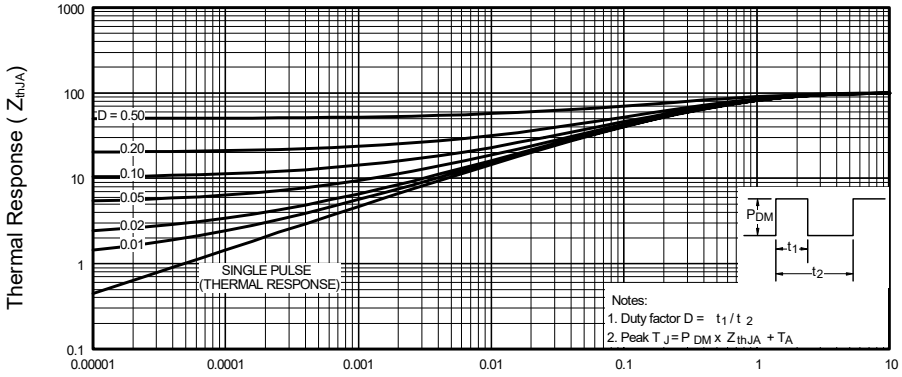
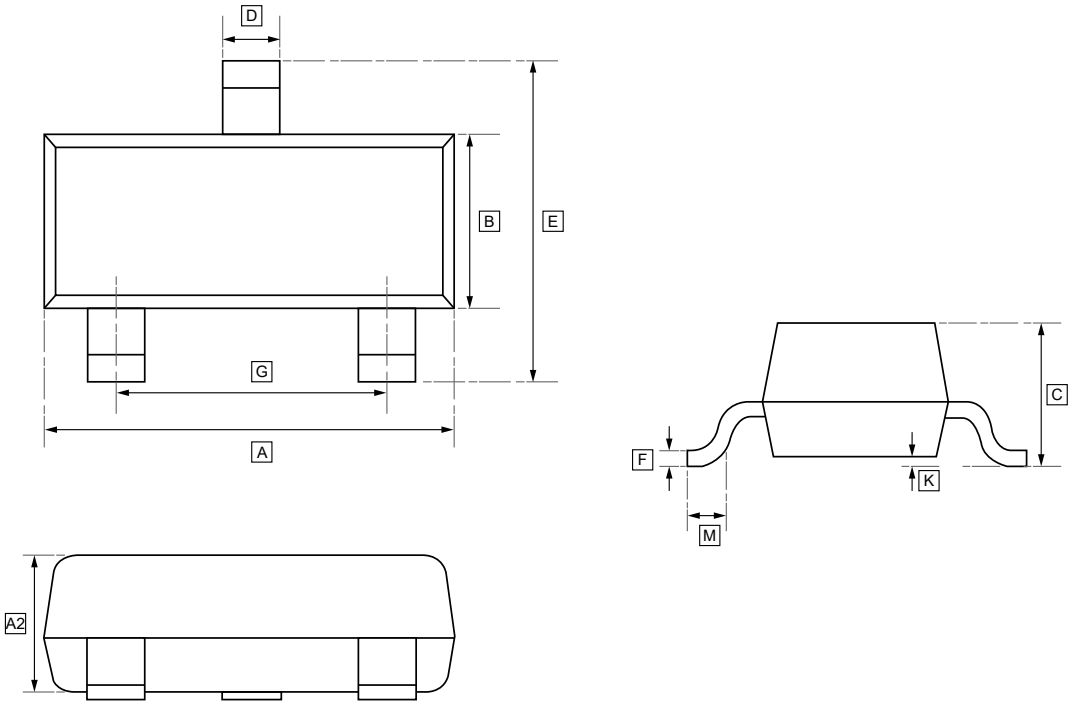


Fig 14. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

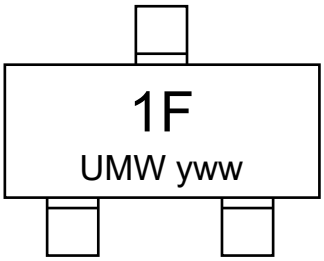
6.SOT-23 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	G	K	M	A2	F
Min	2.80	1.20	0.90	0.32	2.25	1.80	0.00	0.30	0.95	0.095
Max	3.04	1.40	1.10	0.55	2.55	2.00	0.10	-	1.05	0.115

7.Ordering information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLML6401TR	SOT-23	3000	Tape and reel

8.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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