UMW IRF7311TR

Dual 30V N-Channel MOSFET

1.Description

The is the highest performance trench 2N-ch MOSFETs with extreme high cell density,which provide excellent RDSON and gate charge for most of the small power switching and load switch applications.

2.Features

- $V_{DS\ (V)}$=30V
- I_D=9A
- $R_{DS(ON)}$<13mΩ(V_{GS}=10)
- $R_{DS(ON)}$<18mΩ(V_{GS}=4.5V)

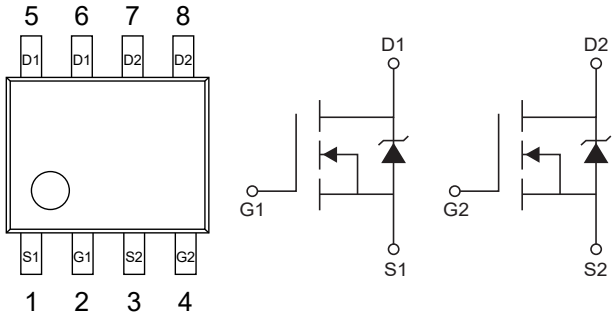
3.Application

- Battery protection
- Load switch
- Uninterruptible power supply

4.Pinning information

Pin	Symbol	Description
2,4	G1,G2	GATE
1,3	S1,S2	SOURCE
5,6,7,8	D1,D2	DRAIN

SOP-8



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

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current, V_{GS}=10V [1]	T_C=25°C	I_D	9	A
Continuous Drain Current, V_{GS}=10V [1]	T_C=100°C		8.2	A
Continuous Drain Current, V_{GS}=10V [1]	T_A=25°C		6.5	A
Continuous Drain Current, V_{GS}=10V [1]	T_A=70°C		5.6	A
Pulsed Drain Current [2]		I_{DM}	30	A
Single Pulse Avalanche Energy [3]		E_{AS}	15	mJ
Avalanche Current		I_{AS}	22	A

Total Power Dissipation [4]	T_C=25°C	P_D	1.6	W
Total Power Dissipation [4]	T_A=70°C		1	W
Storage Temperature Range		T_{STG}	-55 to 150	°C
Operating Junction Temperature Range		T_J	-40 to 105	°C
Thermal Resistance Junction-Ambient [1]		$R_{\theta JA}$	75	°C/W
Thermal Resistance Junction-Case [1]		$R_{\theta JC}$	4.8	°C/W

6.Electrical Characteristics T_J=25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	30			V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=1mA,Reference to 25°C		0.023		V/°C
Static Drain-to-Source On-Resistance [2]	$R_{DS(ON)}$	V_{GS}=10V, I_D=6.5A			13	mΩ
		V_{GS}=4.5V, I_D=5A			18	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1		2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA		-5.08		mV/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V, T_J=25°C			1	μA
		V_{DS}=24V, V_{GS}=0V, T_J=55°C			5	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=6.5A		32		S
Gate Resistance	R_g	V_{DS}=0V, V_{GS}=0V, f=1MHz		1.7		Ω
Total Gate Charge (4.5V)	Q_g	V_{DS}=15V, V_{GS}=4.5V, I_D=5A		5.3		nC
Gate-Source Charge	Q_{gs}			0.78		nC
Gate-Drain Charge	Q_{gd}			2.2		nC
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=15V, V_{GS}=10V, R_G=1.5Ω, I_D=6.5A		6.4		ns
Rise Time	t_r			39		ns
Turn-Off Delay Time	$t_{D(off)}$			21		ns
Fall Time	t_f			4.7		ns
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, f=1MHz		580		pF
Output Capacitance	C_{oss}			97		pF
Reverse Transfer Capacitance	C_{rss}			39		pF
Continuous Source Current [1,5]	I_S	V_G=V_D=0V, Force Current			37	A
Pulsed Source Current [2,5]	I_{SM}				75	A
Diode Forward Voltage [2]	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C			1	V

Note :

1 .The data tested by surface mounted on a 1 inch ^{2} FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≤ 300μs , duty cycle ≤ 2%.

3 .The E_{AS} data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=22A.

4.The power dissipation is limited by 175°C junction temperature.

5 .The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

7.1Typical Characterisitics

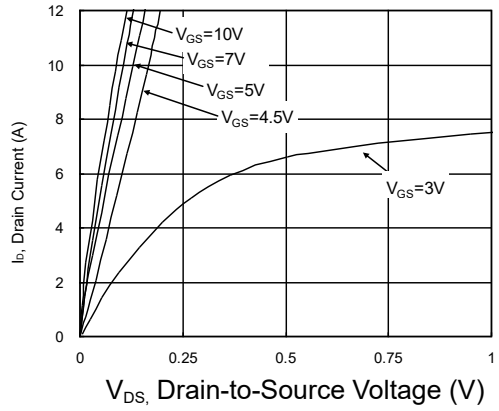


Figure 1: Typical Output Characteristics.

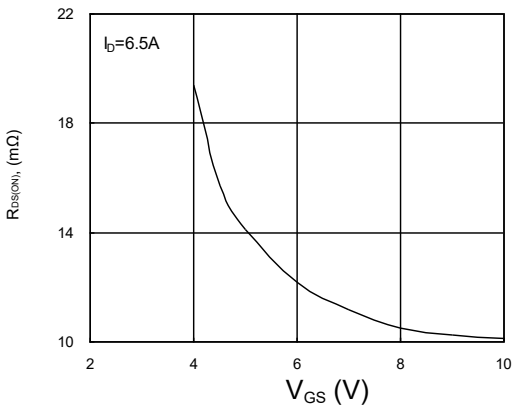


Figure 2: On-Resistance vs. G-S Voltage.

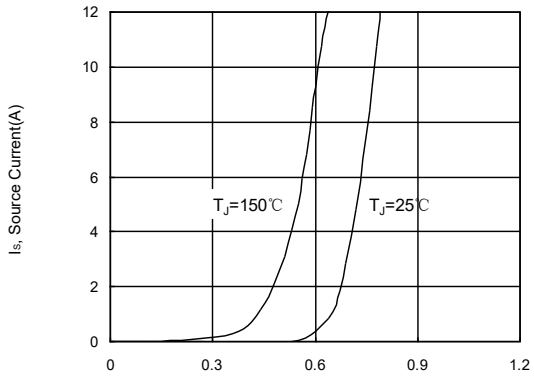


Figure 3: Forward Characteristics of Reverse.

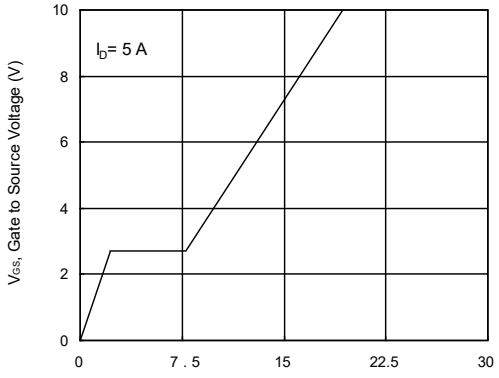


Figure 4: Gate-charge Characteristics.

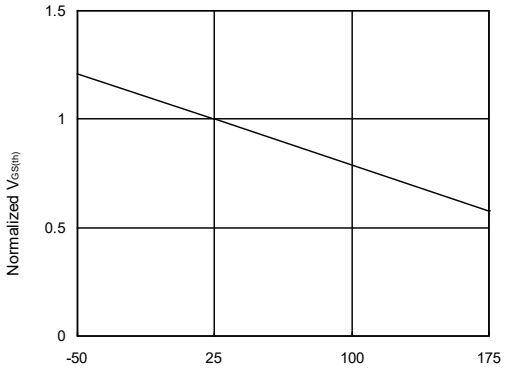


Figure 5: Normalized $V_{GS(th)}$ vs. T_J.

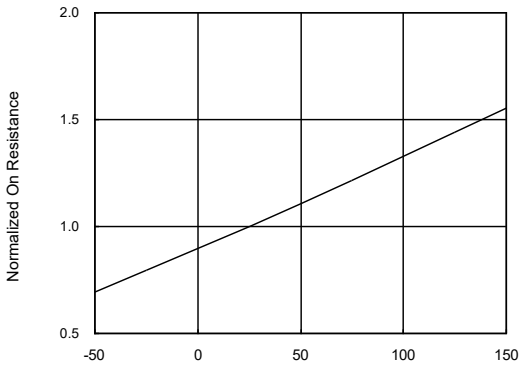


Figure 6: Normalized $R_{DS(ON)}$ vs. T_J.

7.2Typical Characterisitics

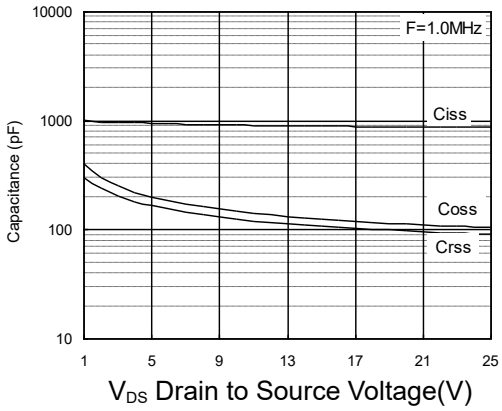


Figure 7: Capacitance.

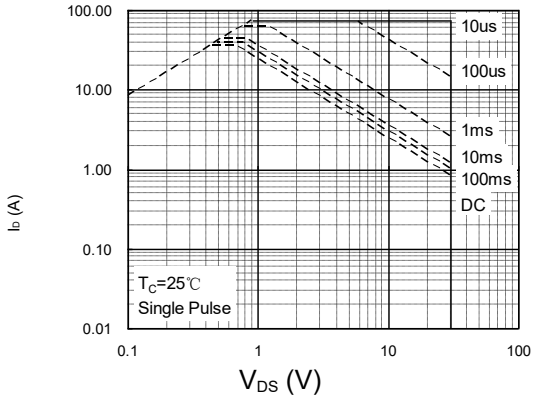


Figure 8: Safe Operating Area.

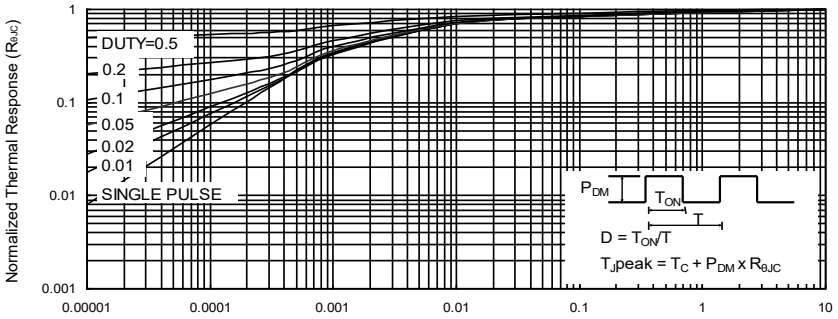


Figure 9: Normalized Maximum Transient Thermal Impedance.

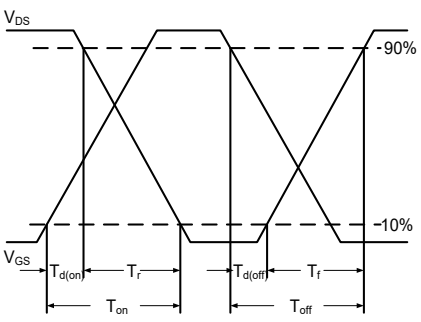


Figure 10: Switching Time Waveform

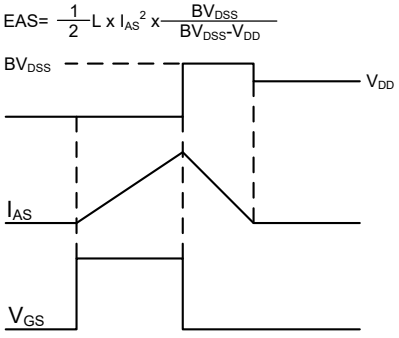
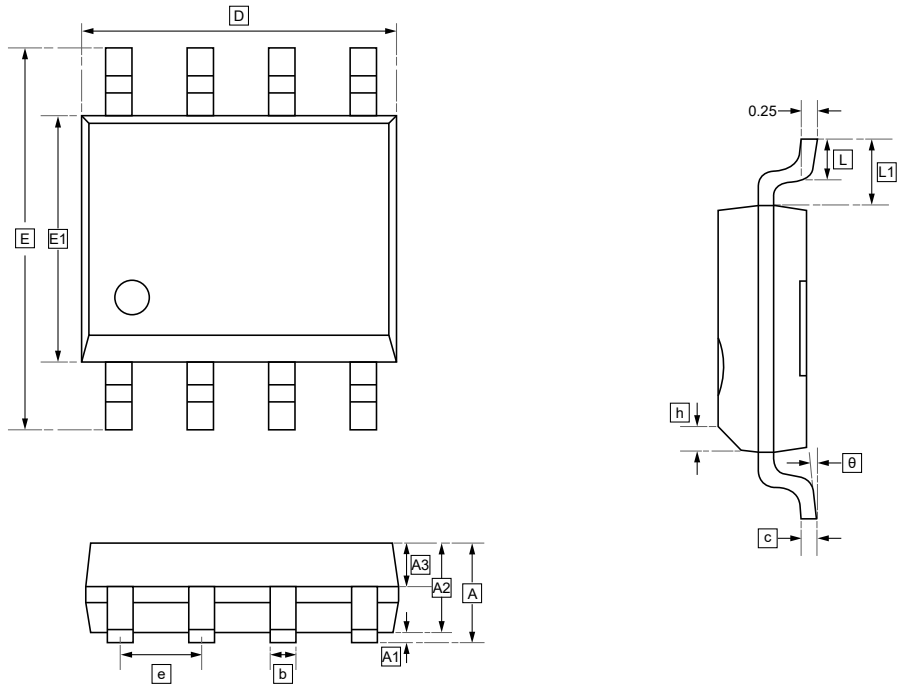


Figure 11: Unclamped Inductive Waveform

8.SOP-8 Package Outline Dimensions

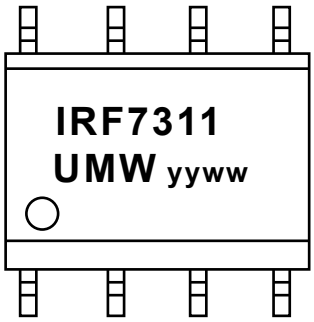


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.70	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.10	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF7311TR	SOP-8	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.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.