UMW IRF8313TR

30V 2N-Channel Enhancement Mode MOSFET

1.Description

The IRF8313TR is the highest performance trench N-ch MOSFETs with extreme high cell density,which provide excellent $R_{DS(ON)}$ and gate charge for most of the small power switching and load switch applications. The meet the RoHS and Product requirement with full function reliability approved.

2.Features

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

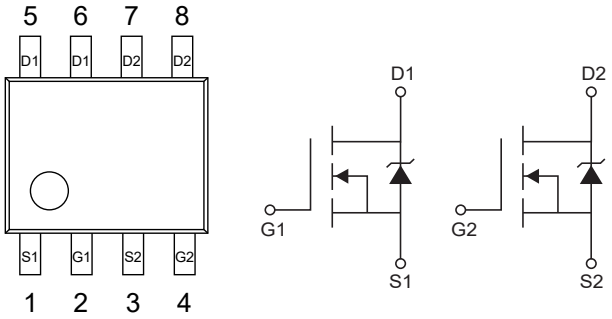
3.Application

- 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			±20	A
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
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	-55 to 150	°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=9A			13	mΩ
		V_{GS}=4.5V, I_D=8A			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=8A		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		5.3		nC
Gate-Source Charge	Q_{gs}	V_{GS}=4.5V		0.78		nC
Gate-Drain Charge	Q_{gd}	I_D=8A		2.2		nC
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=15V, V_{GS}=10V, R_G=1.5Ω, I_D=8A		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

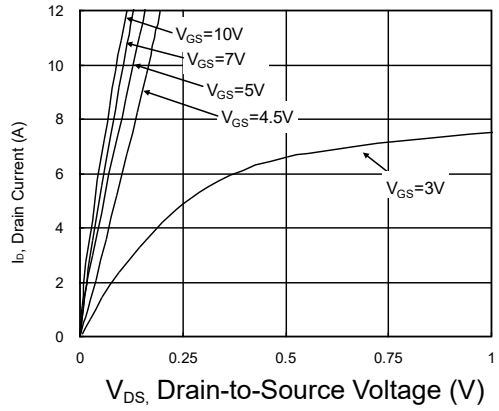


Figure 1: Typical Output Characteristics.

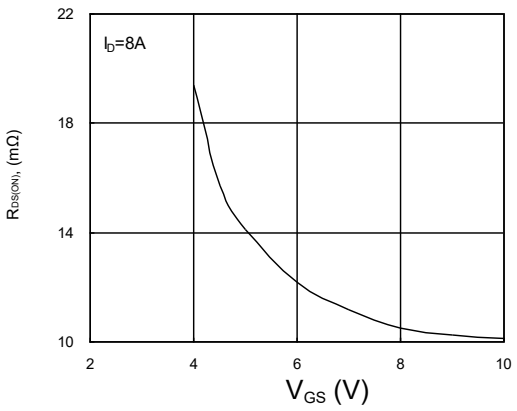


Figure 2: On-Resistance vs. G-S Voltage.

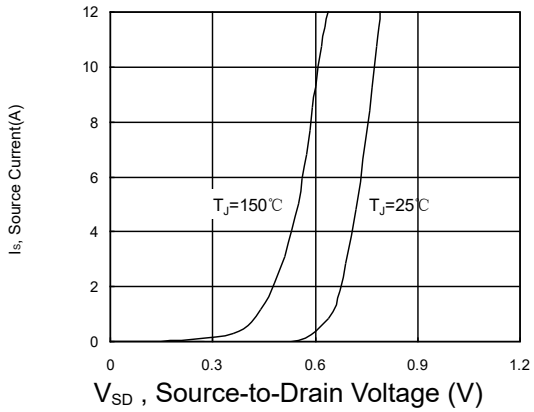


Figure 3: Forward Characteristics of Reverse.

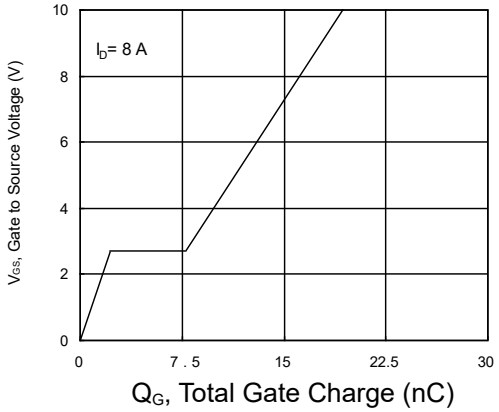


Figure 4: Gate-charge Characteristics.

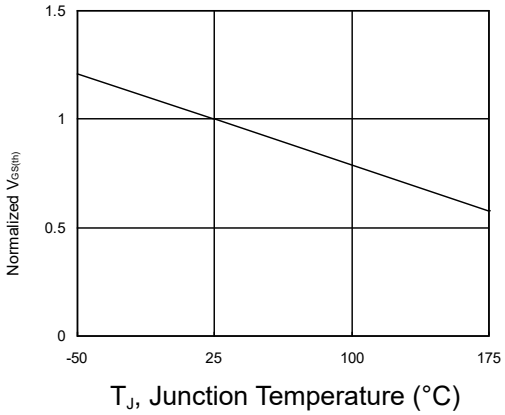


Figure 5: Normalized $V_{GS(th)}$ vs. T_J.

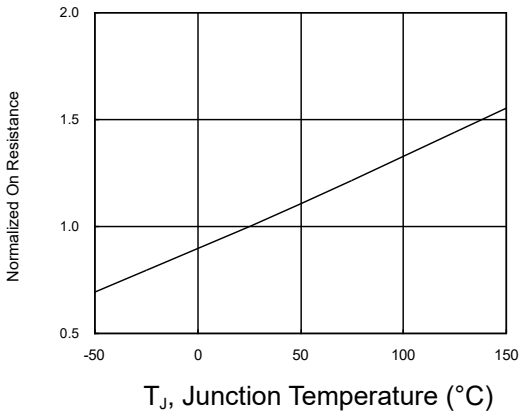


Figure 6: Normalized $R_{DS(ON)}$ vs. T_J.

7.2Typical Characterisitics

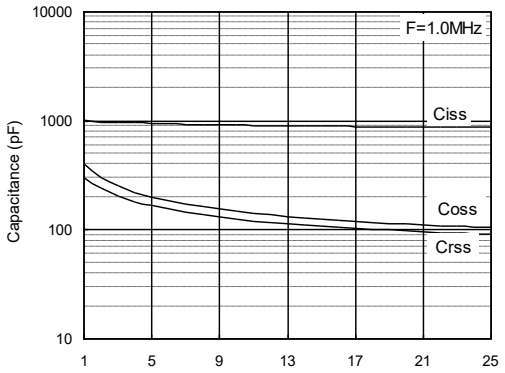


Figure 7: Capacitance.

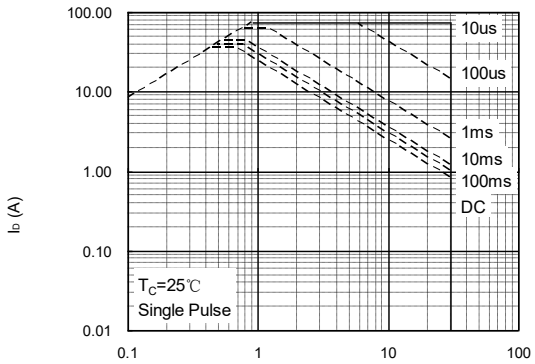


Figure 8: Safe Operating Area.

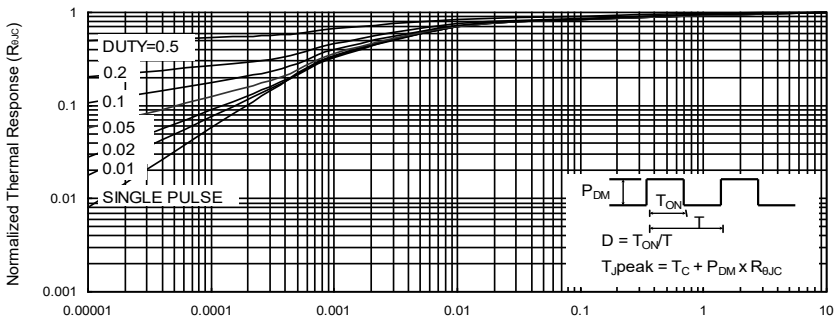


Figure 9: Normalized Maximum Transient Thermal Impedance.

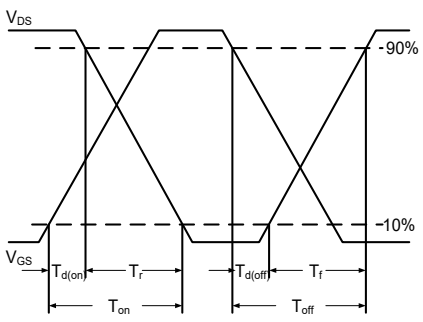


Figure 10: Switching Time Waveform

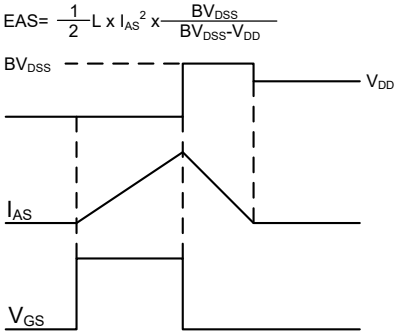
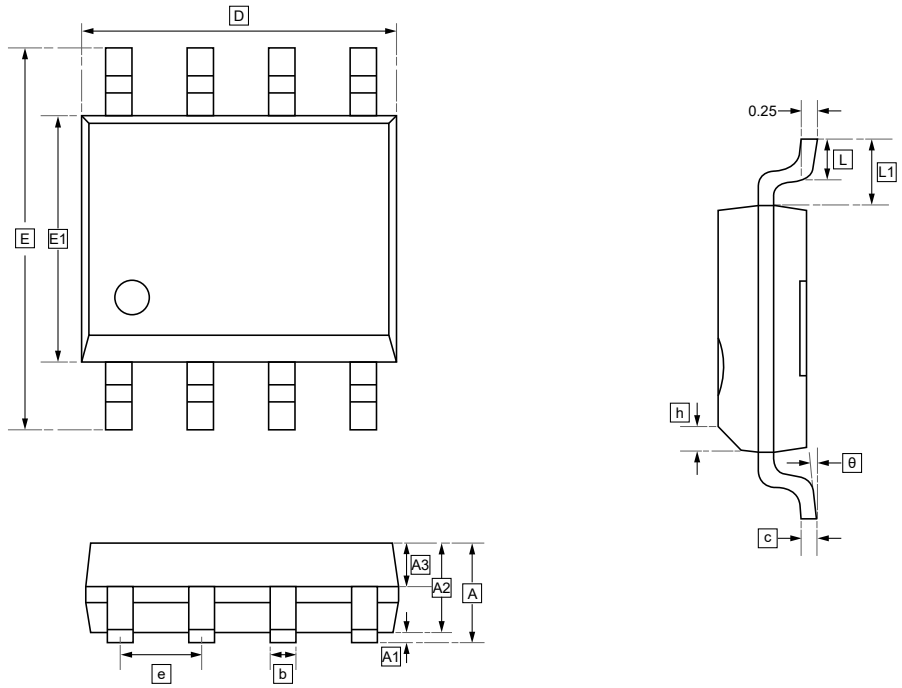


Figure 11: Unclamped Inductive Waveform

8.SOP-8 Package Outline Dimensions

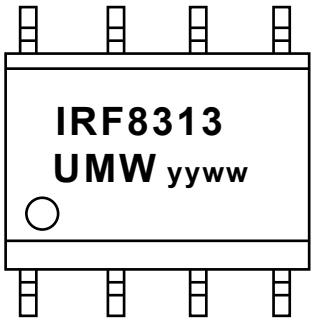


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.80	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.00	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 IRF8313TR	SOP-8	3000	Tape and reel

10.Disclaimer

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