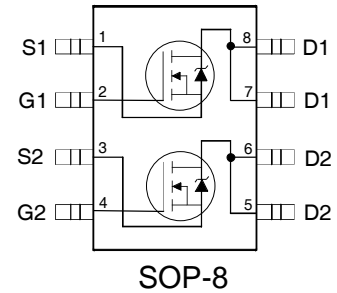


General Description

The IRF8313TR is the highest performance trench N-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. They meet the RoHS and Product requirement with full function reliability approved.



General Features

$V_{DS} = 30V$ $I_D = 9A$

$R_{DS(ON)} < 13m\Omega$ @ $V_{GS}=10V$

$R_{DS(ON)} < 18m\Omega$ @ $V_{GS}=4.5V$

Application

Battery protection

Load switch

Uninterruptible power supply

Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, V_{GS} @ 10V ¹	9	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, V_{GS} @ 10V ¹	8.2	A
$I_D@T_A=25^\circ C$	Continuous Drain Current, V_{GS} @ 10V ¹	6.5	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, V_{GS} @ 10V ¹	5.6	A
I_{DM}	Pulsed Drain Current ²	30	A
EAS	Single Pulse Avalanche Energy ³	15	mJ
I_{AS}	Avalanche Current	22	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	1.6	W
$P_D@T_A=70^\circ C$	Total Power Dissipation ⁴	1.0	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	75	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	4.8	$^\circ C/W$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30			V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25 °C, I _D =1mA		0.023		V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =15A			13	mΩ
		V _{GS} =4.5V, I _D =10A			18	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0		2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			-5.08		mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V, V _{GS} =0V, T _J =25°C			1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =55°C			5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =15A		32		S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz		1.7		Ω
Q _g	Total Gate Charge (4.5V)			5.3		nC
Q _{gs}	Gate-Source Charge	V _{DS} =15V, V _{GS} =4.5V, I _D =12A		0.78		
Q _{gd}	Gate-Drain Charge			2.2		
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V, R _G =1.5Ω I _D =20A		6.4		ns
T _r	Rise Time			39		
T _{d(off)}	Turn-Off Delay Time			21		
T _f	Fall Time			4.7		
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz		580		pF
C _{oss}	Output Capacitance			97		
C _{rss}	Reverse Transfer Capacitance			39		
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current			37	A
I _{SM}	Pulsed Source Current ^{2,5}				75	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C			1	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3 .The EAS 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.

Typical Characteristics

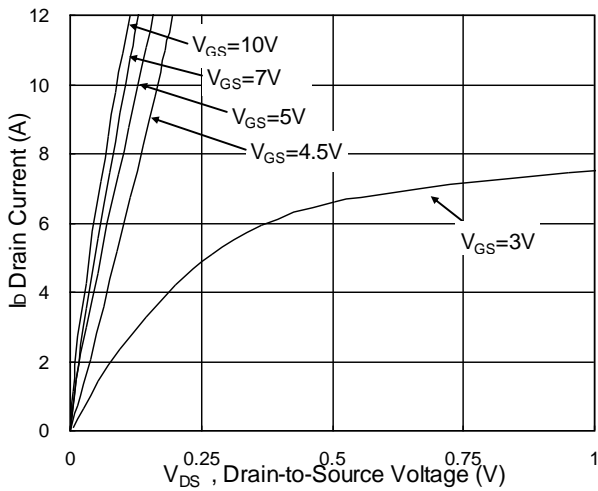


Fig.1 Typical Output Characteristics

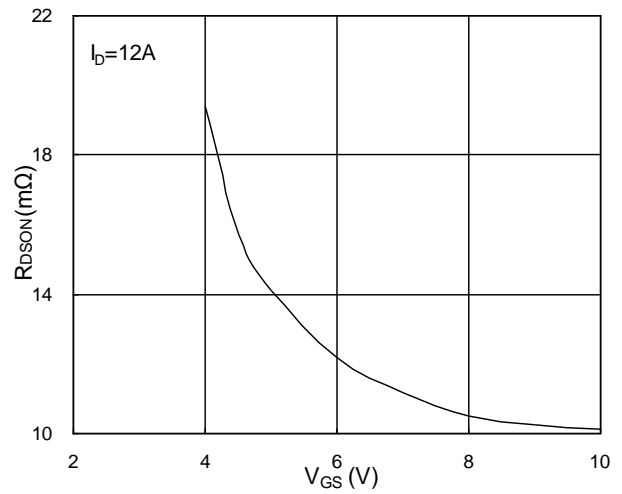


Fig.2 On-Resistance vs. G-S Voltage

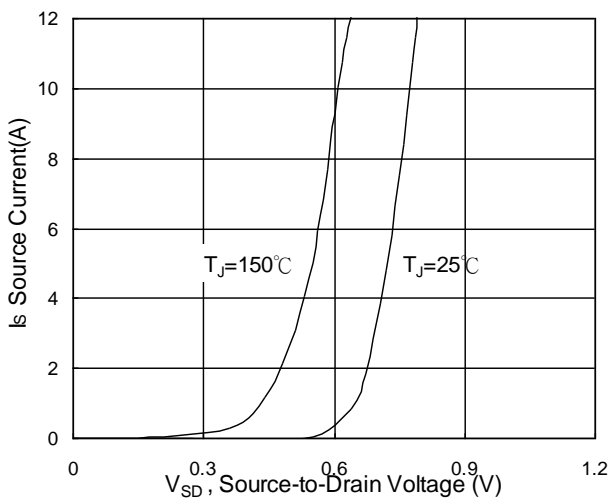


Fig.3 Forward Characteristics of Reverse

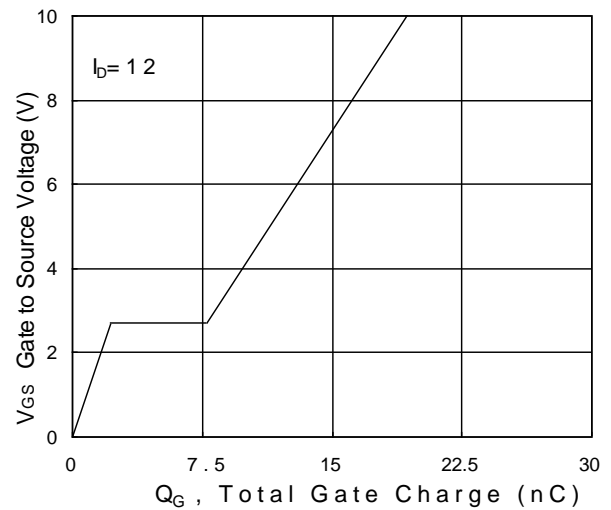


Fig.4 Gate-charge Characteristics

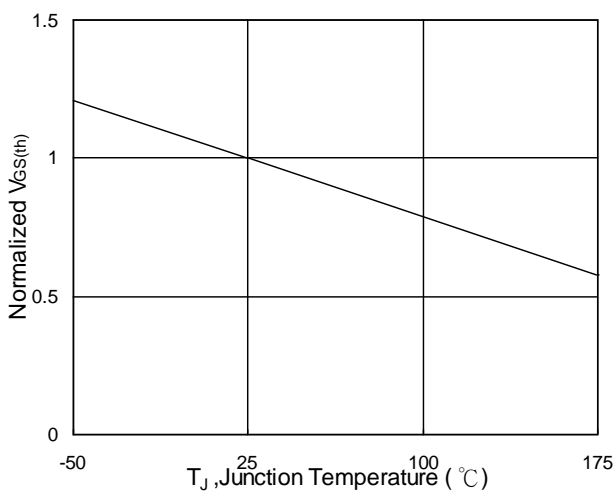


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

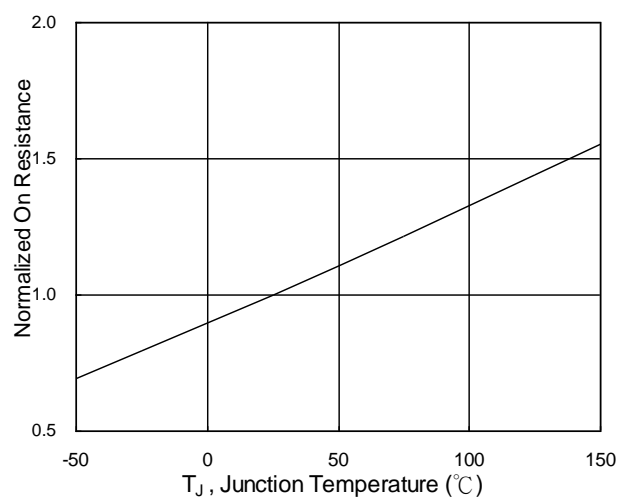


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

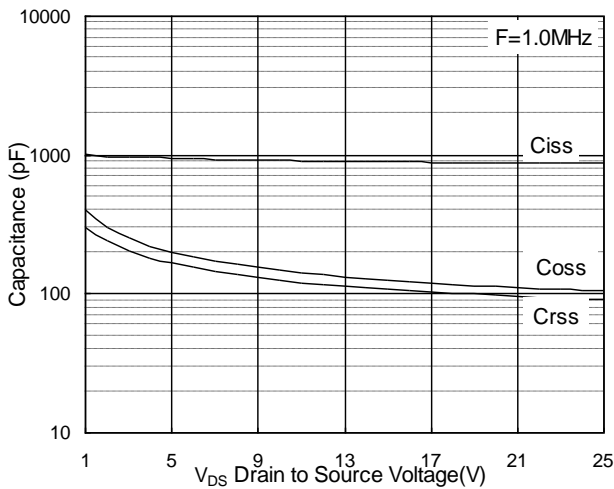


Fig.7 Capacitance

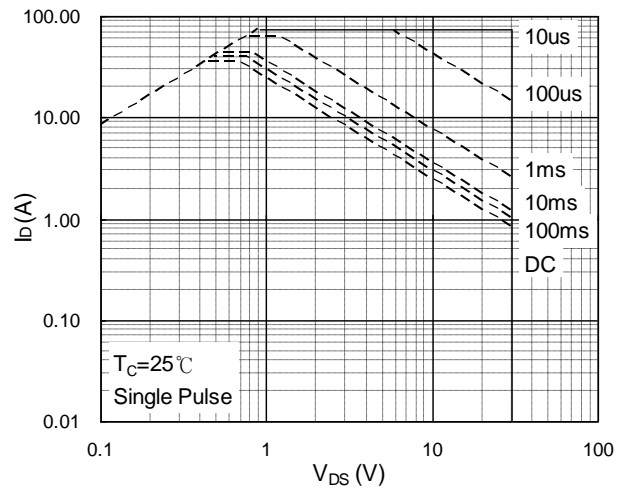


Fig.8 Safe Operating Area

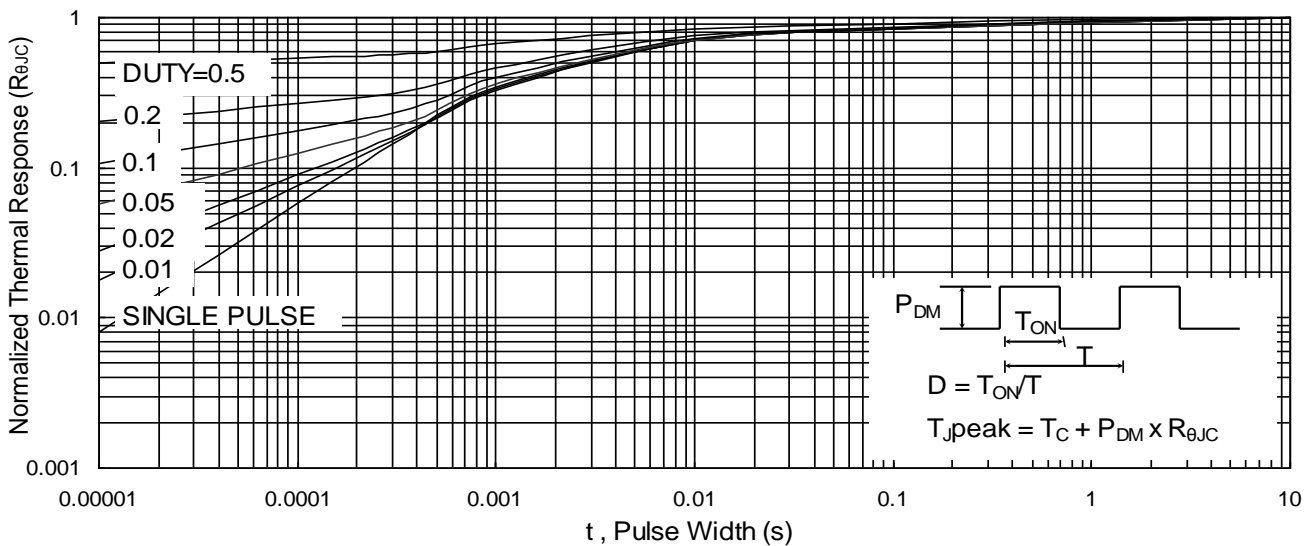


Fig.9 Normalized Maximum Transient Thermal Impedance

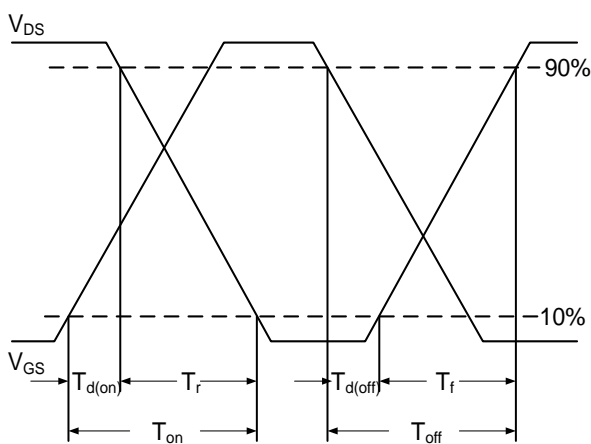


Fig.10 Switching Time Waveform

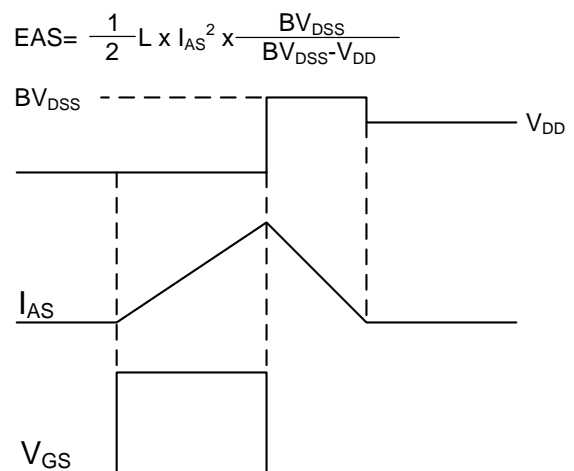
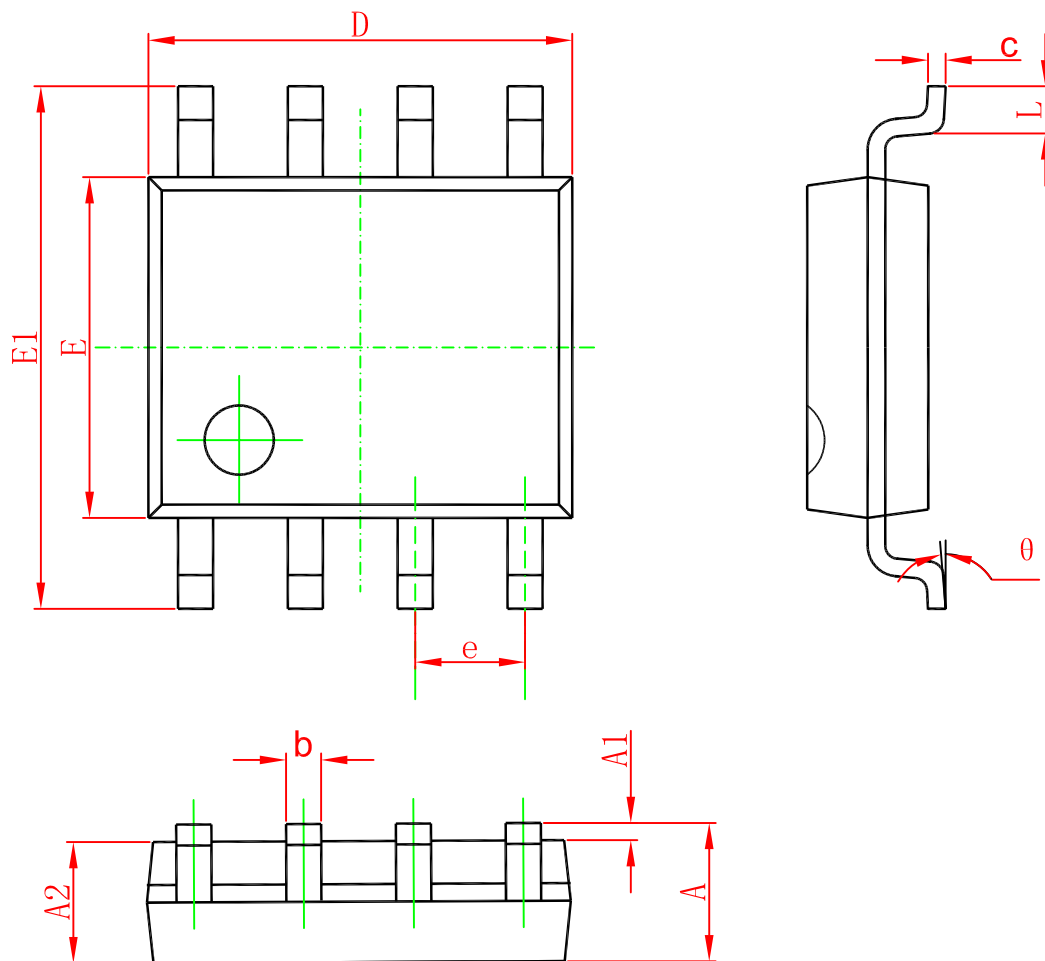


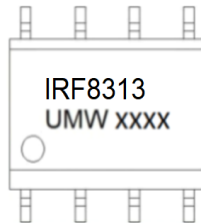
Fig.11 Unclamped Inductive Waveform

SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRF8313TR	SOP-8	3000	Tape and reel