

General Description

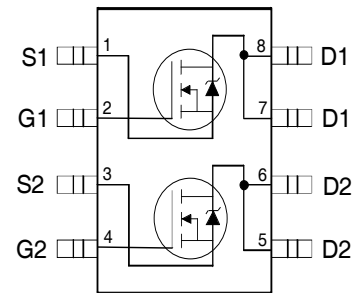
The IRF7311TR is the highest performance trench 2N-ch MOSFETs with extreme high cell density, which provide excellent R_{DS(on)} and gate charge for most of the small power switching and load switch applications. They meet the RoHS and Product requirement with full function reliability approved.

General Features

V_{DS} = 30V I_D = 9A

R_{DS(ON)} < 13mΩ @ V_{GS}=10 V

R_{DS(ON)} < 18mΩ @ V_{GS}=4.5V



SOP-8

Application

- Battery protection
- Load switch
- Uninterruptible power supply

Absolute Maximum Ratings (T_A=25°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°C	Continuous Drain Current, V _{GS} @ 10V ¹	9	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	8.2	A
I _D @T _A =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	6.5	A
I _D @T _A =70°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°C	Total Power Dissipation ⁴	1.6	W
P _D @T _A =70°C	Total Power Dissipation ⁴	1.0	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance Junction-Ambient ¹	75	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	4.8	°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 2OZ 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

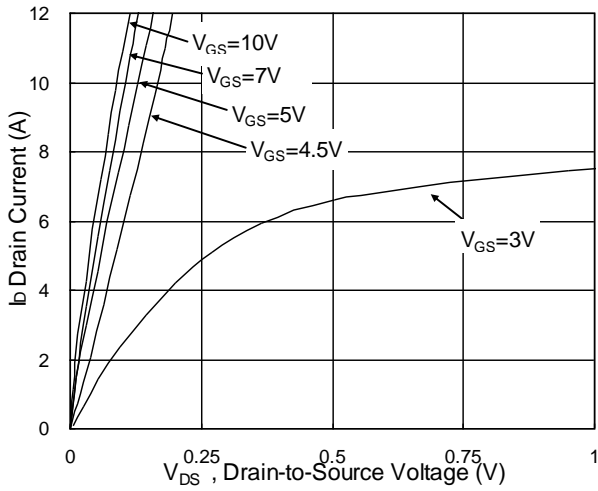


Fig.1 Typical Output Characteristics

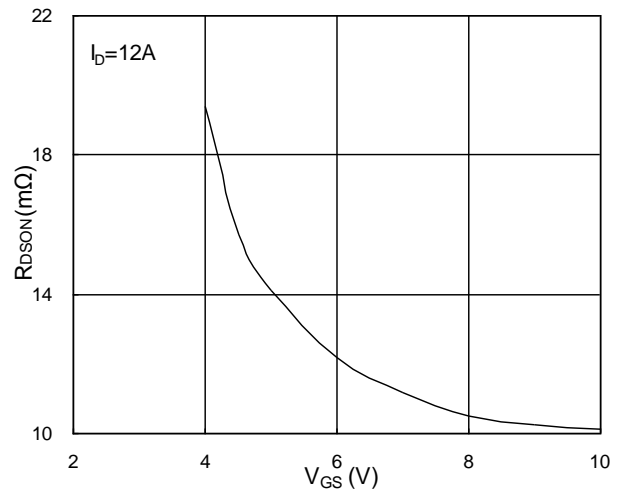


Fig.2 On-Resistance vs. G-S Voltage

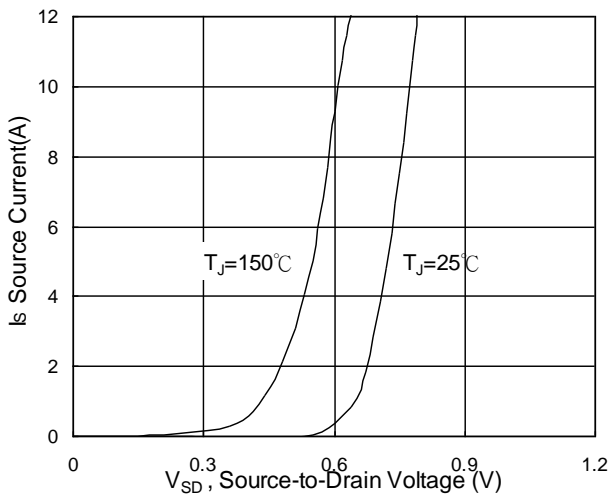


Fig.3 Forward Characteristics of Reverse

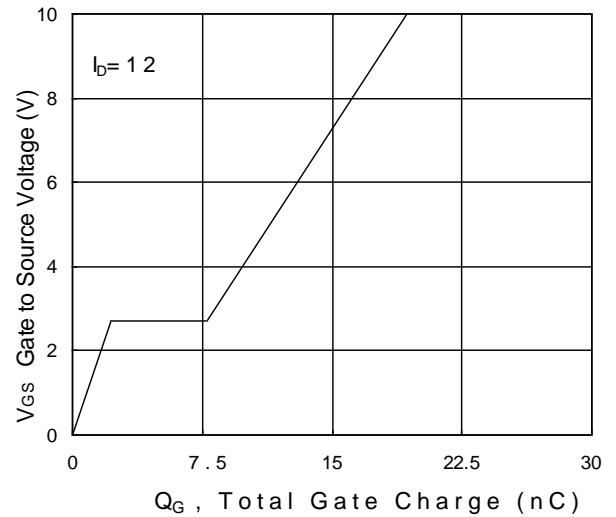


Fig.4 Gate-charge Characteristics

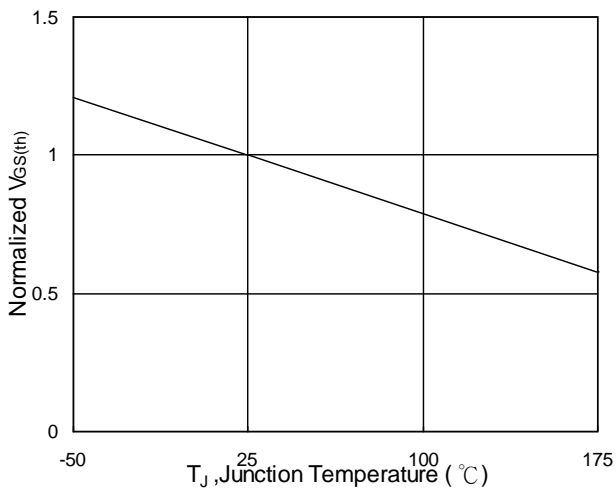


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

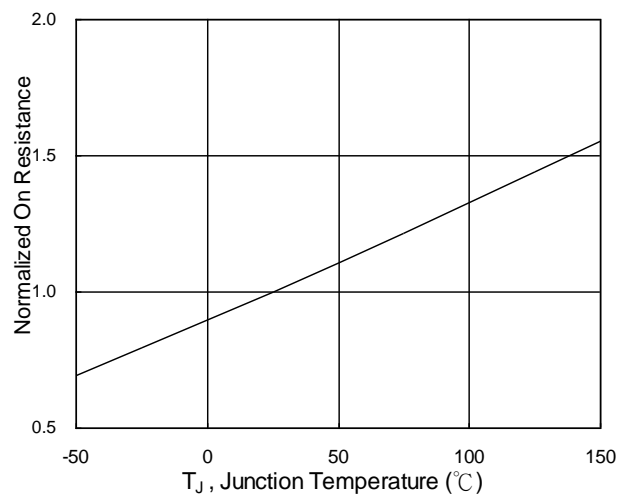


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

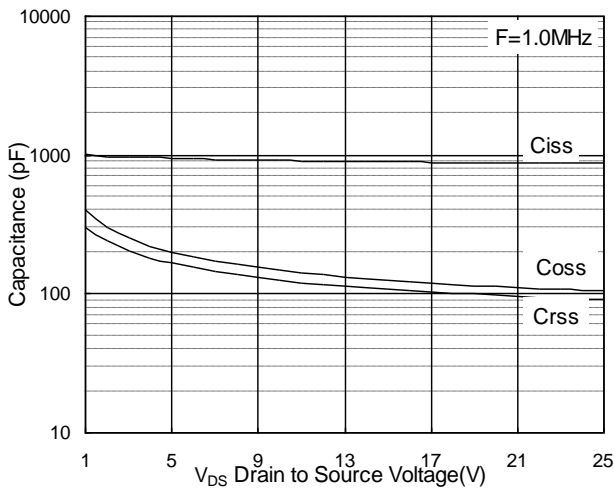


Fig.7 Capacitance

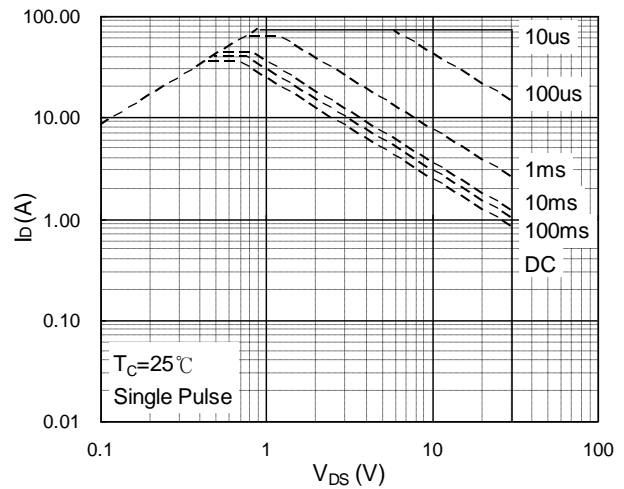


Fig.8 Safe Operating Area

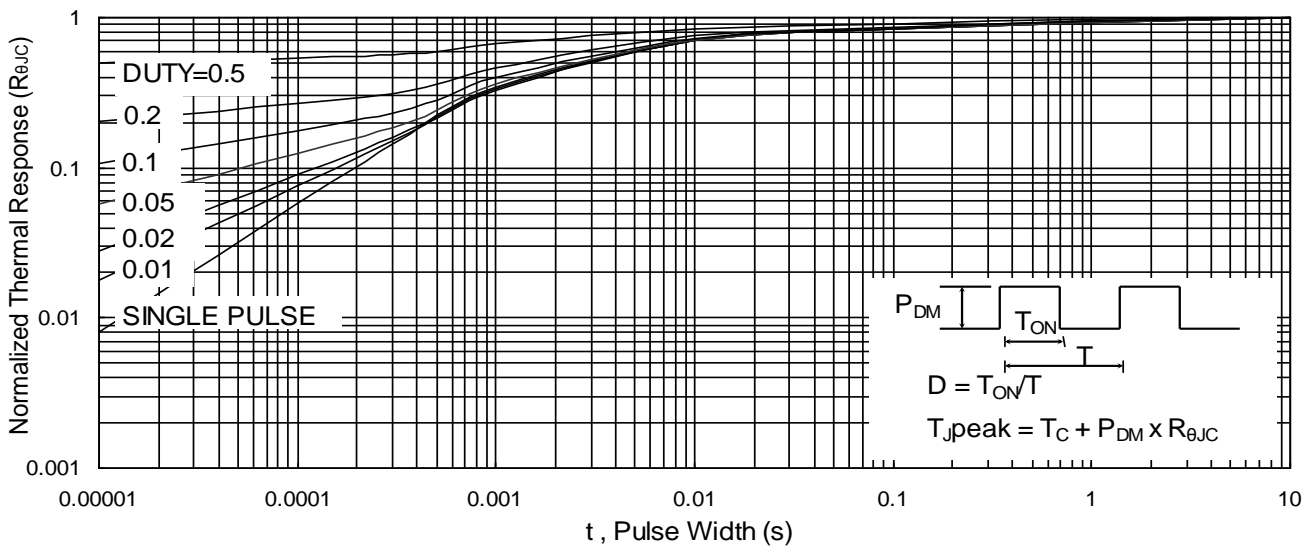


Fig.9 Normalized Maximum Transient Thermal Impedance

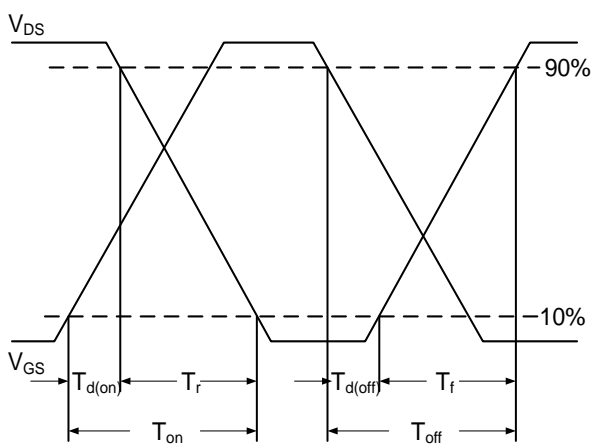


Fig.10 Switching Time Waveform

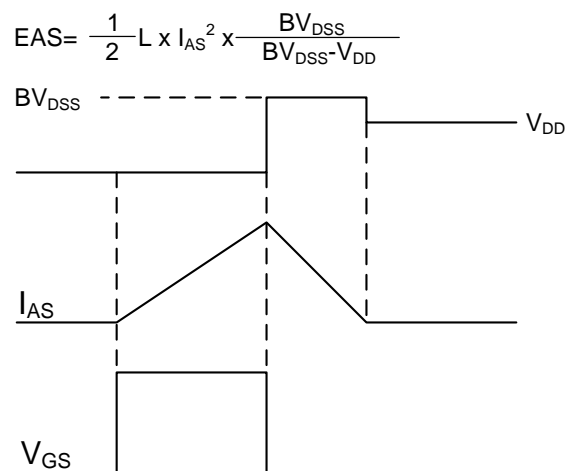
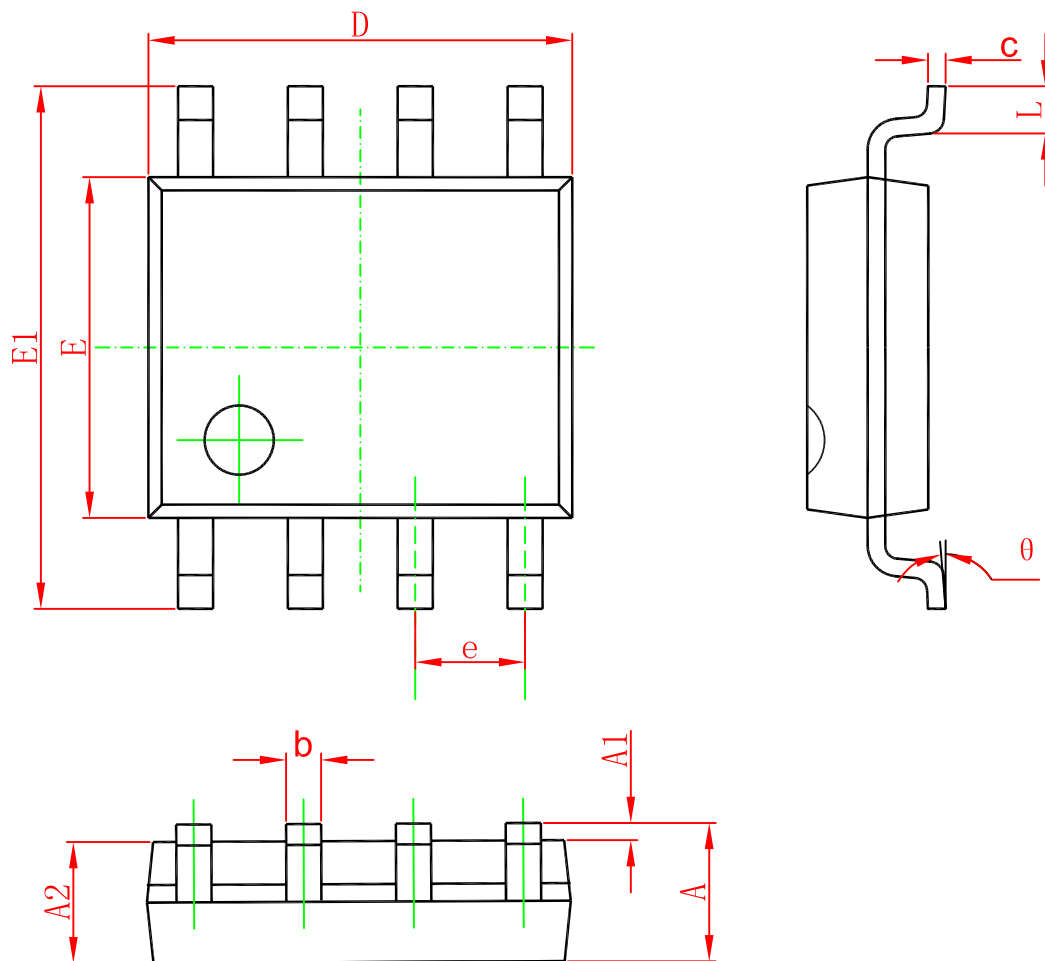


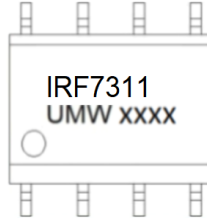
Fig.11 Unclamped Inductive Waveform

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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 IRF7311TR	SOP-8	3000	Tape and reel