UMW IRF7413TR

30V N-Channel MOSFET

1.Description

The IRF7413TR uses advanced trench technology to provide excellent $R_{DS(on)}$ with low gate charge. This device is suitable for use as a loads witch or in PWM applications.

2.Features

- $V_{DS\ (V)}$=30V
- I_D=13A
- $R_{DS(ON)}$＜12mΩ(V_{GS}=10V)
- $R_{DS(ON)}$＜17mΩ(V_{GS}=4.5V)

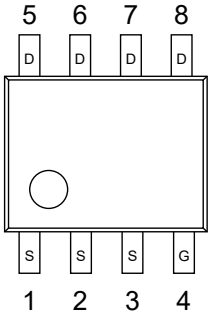
3.Application

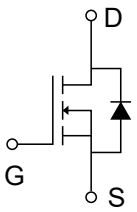
- Generation VTechnology
- Ultra Low On-Resistance
- N-Channel Mosfet
- Surface Mount
- Available in Tape &Reel
- Dynamic dv/dt Rating
- Fast Switching
- 100% Rg Tested
- Lead-Free

4.Pinning information

Pin	Symbol	Description
4	G	GATE
1,2,3	S	SOURCE
5,6,7,8	D	DRAIN

SOP-8





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

Parameter		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current, V_{GS} @ 10V	T_A=25°C	I_D	13	A
Continuous Drain Current, V_{GS} @ 10V	T_A=70°C		9.2	
Pulsed Drain Current ①		I_{DM}	58	
Power Dissipation	T_A=25°C	P_D	2.5	W
Linear Derating Factor			0.02	mW/°C

Single Pulse Avalanche Energency ②	E_{AS}	260	mJ
Peak Diode Recovery dv/dt ③	dv/dt	5	V/ns
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

6.Thermal Resistance Rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Drain Lead	$R_{\theta JL}$		20	°C/W
Junction-to-Ambient ⑤	$R_{\theta JA}$		50	°C/W

6.Electrical Characteristics T_J=25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=250μA, V_{GS}=0V	30			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/T_J$	I_D=1mA,Reference to 25°C		0.034		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=7.3A ④			12	mΩ
		V_{GS}=4.5V, I_D=3.7A ④			17	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1		3	V
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=3.7A	10			S
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			12	μA
		V_{DS}=24V,V_{GS}=0V,T_J=125°C			25	
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=-20V			-100	nA
Gate-to-Source Reverse Leakage		V_{GS}=20V			100	
Total Gate Charge	Q_g	I_D=7.3A		52	79	nC
Gate-to-Source Charge	Q_{gs}	V_{DS}=24V, V_{GS}=10V		6.1	9.2	
Gate-to-Drain ("Miller") Charge	Q_{gd}	See Fig. 6 and 9 ④		16	23	
Gate Resistance	R_G				3.7	Ω
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=15V		8.6		ns
Rise Time	t_r	I_D=7.3A		50		
Turn-Off Delay Time	$t_{D(off)}$	R_G=6.2Ω		52		
Fall Time	t_f	See Fig. 10 ④		46		
Input Capacitance	C_{iss}	V_{GS}=0V		1800		pF
Output Capacitance	C_{oss}	V_{DS}=25V		680		
Reverse Transfer Capacitance	C_{rss}	f=1.0MHz, See Fig. 5		240		

Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			3.1	A
Pulsed Source Current (Body Diode) ①	I_{SM}				58	
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=7.3A,V_{GS}=0V③			1	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=7.3A		74	110	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs		200	300	nC

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.(See fig.11)

② Starting T,= 25'C,L= 9.8mH

R_G= 252, IAs =7.3A.(See Figure 12)

③ I_{SD}≤ 7.3A, di/dt ≤ 100A/μS, V_{DD}≤ $V_{(BR)DSS}$.TJ≤ 150°C

④ Pulse width ≤ 300us; duty cycle ≤ 2%

⑤ Surface mounted on FR-4 board

⑥ Rois measured at T,approximately 90°C

7.1Typical Characterisitics

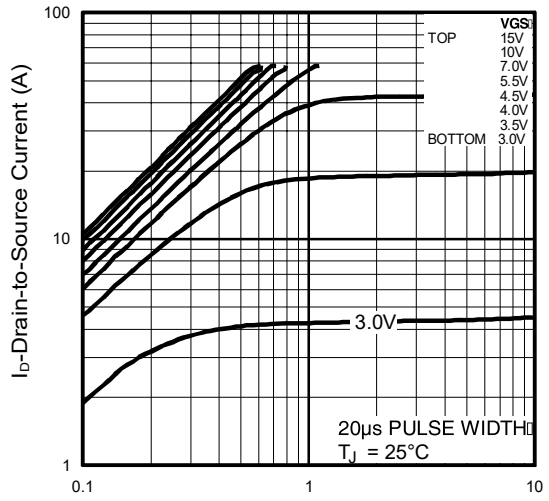


Fig 1. Typical Output Characteristics

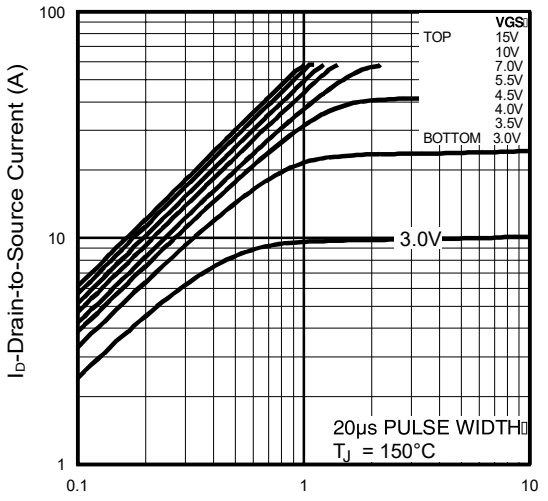


Fig 2. Typical Output Characteristics

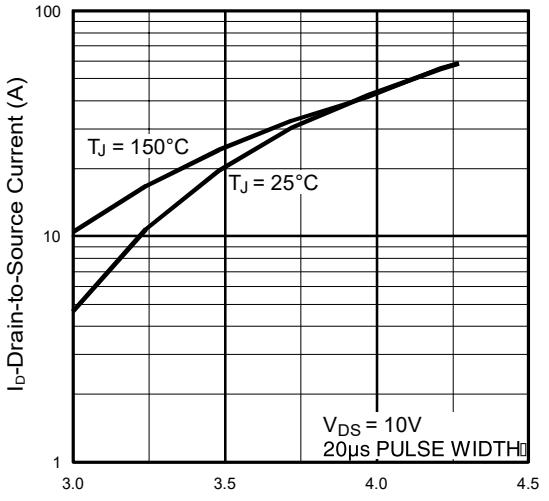


Fig 3. Typical Transfer Characteristics

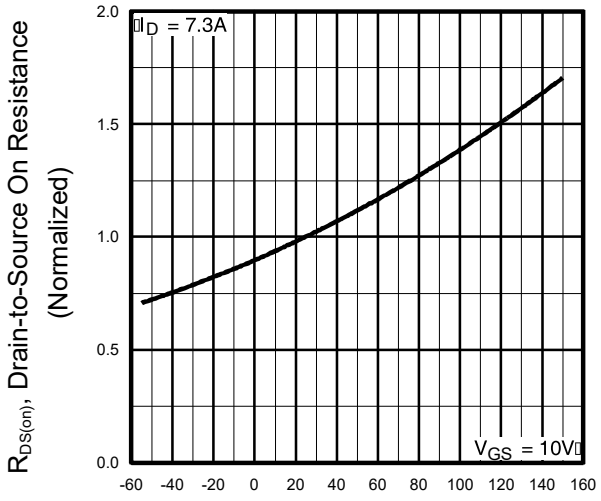
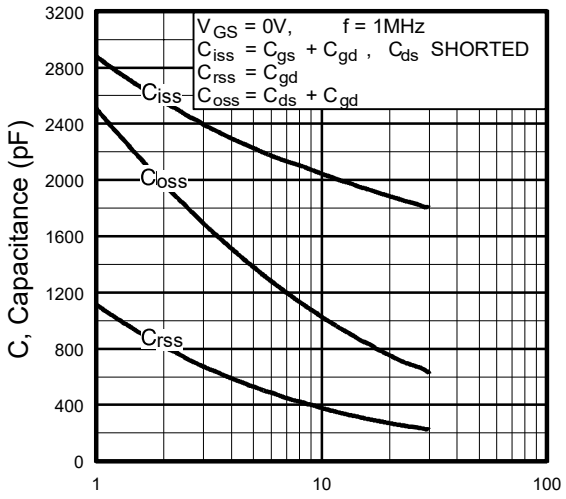


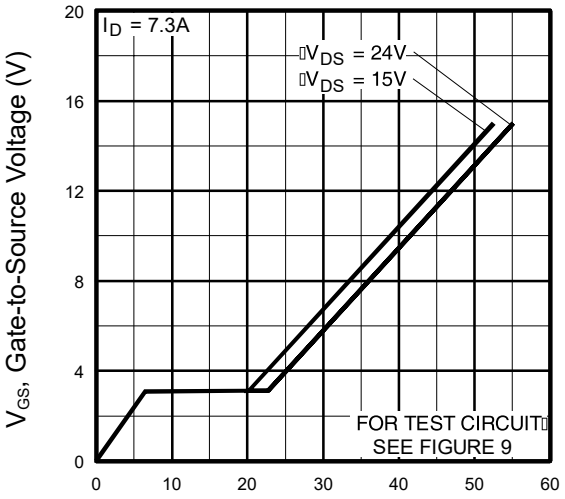
Fig 4. Nomalized On-ResistanceVs. Temperature

7.2Typical Characterisitics



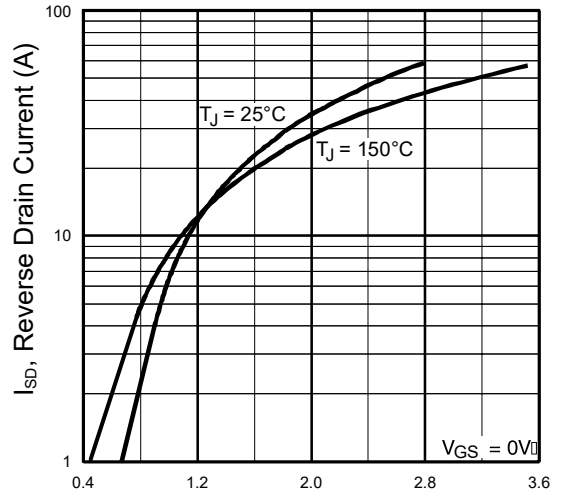
V_{DS} ,Drain-to-Source Voltage (V)

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



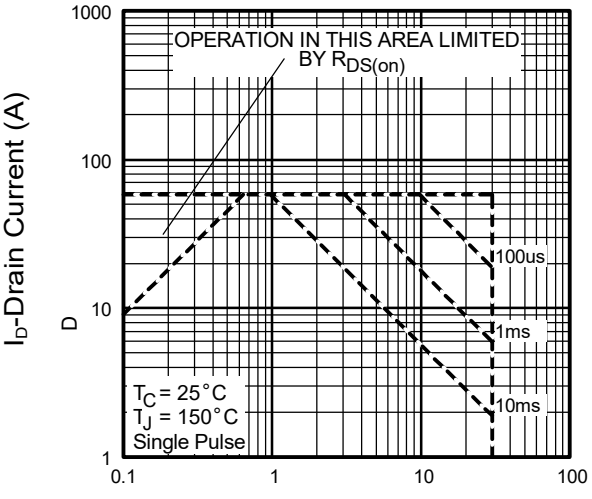
Q_G, Total Gate Charge (nC)

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

7.3Typical Characterisitics

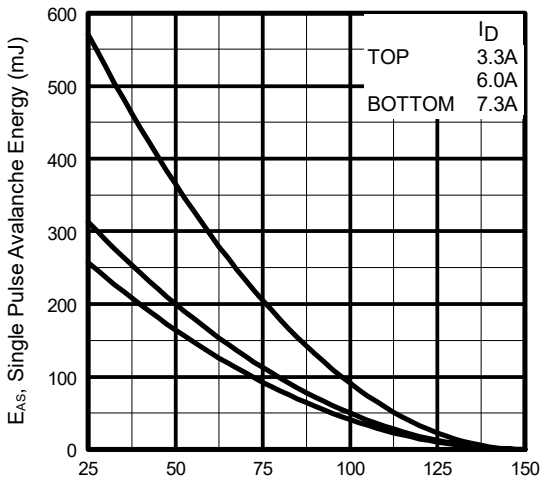


Fig 9. Maximum Avalanche EnergyVs. Drain Current

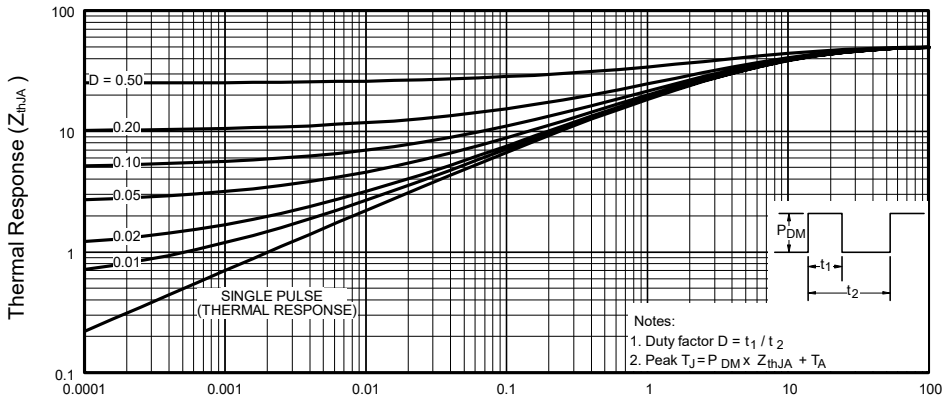


Fig 10. Maximum Effective Transient Themal Impedance, Junction-to-Ambient

7.4Typical Characterisitics

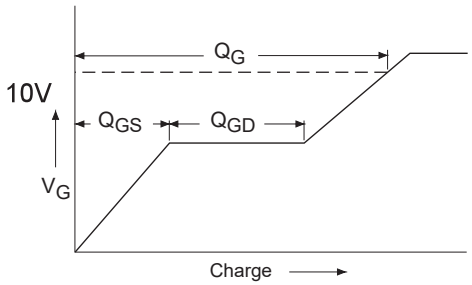


Fig 9a. Basic Gate Charge Waveform

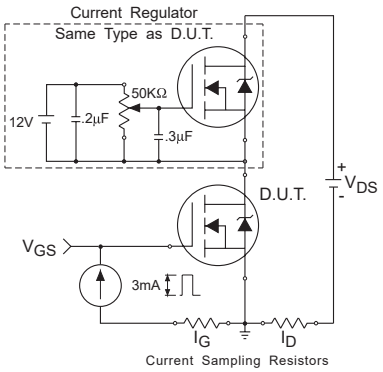


Fig 9b. Gate Charge Test Circuit

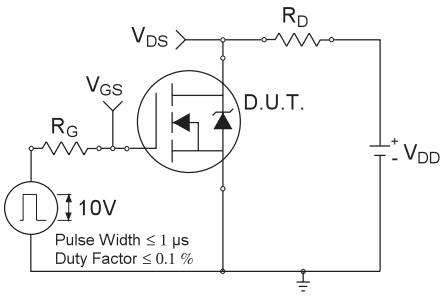


Fig 10a. Switching Time Test Circuit

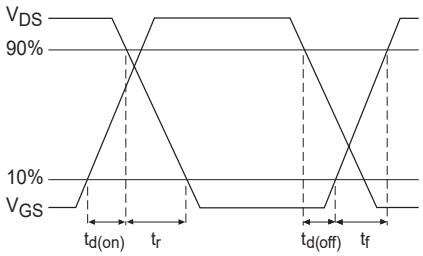


Fig 10b. Switching Time Waveforms

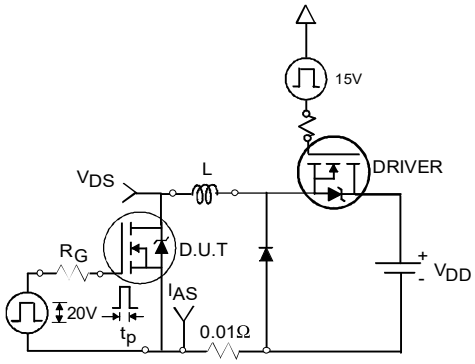


Fig 12a. Unclamped Inductive Test Circuit

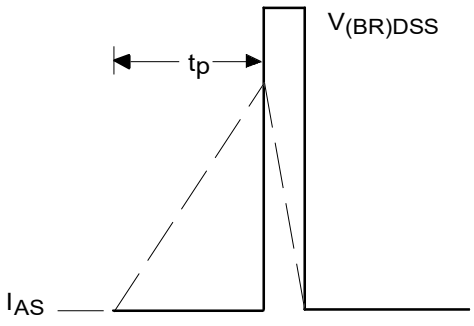
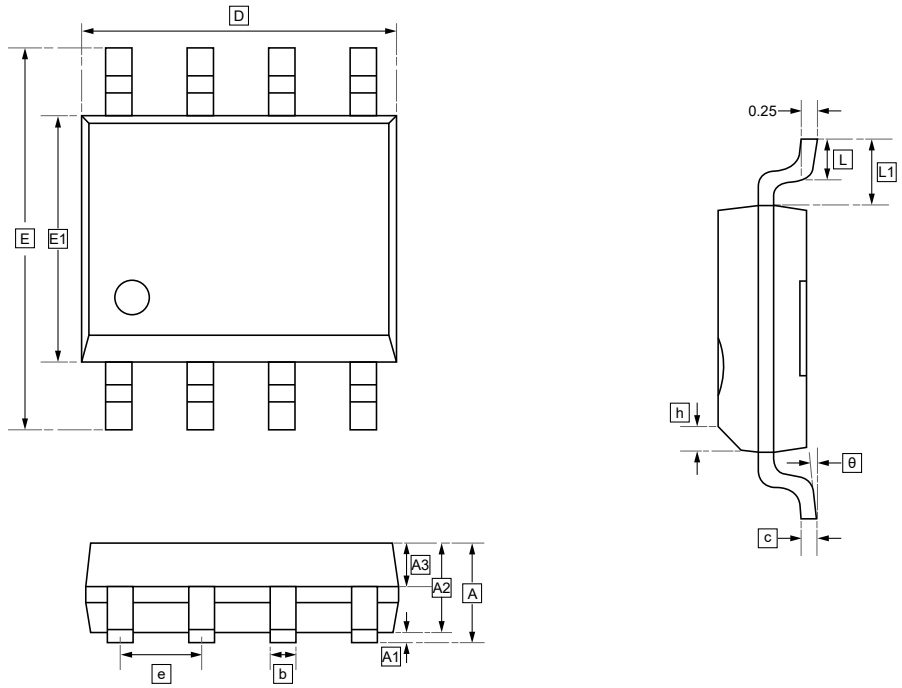


Fig 12b. Unclamped Inductive Waveforms

8.SOP-8 Package Outline Dimensions

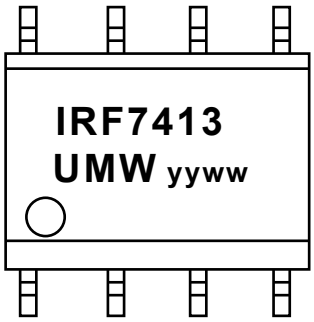


DIMENSIONS (mm are the original dimensions)

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 IRF7413TR	SOP-8	3000	Tape and reel

10.Disclaimer

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