

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 load switch or in PWM applications.

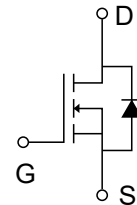
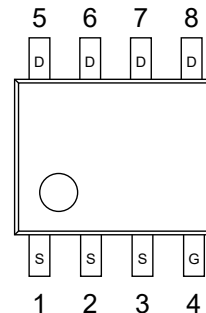
3.Application

- Generation VTechnology
- Ultra Low On-Resistance
- N-Channel Mosfet
- Surface Mount
- Available in Tape & Reel

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 ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

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



UMW IRF7413TR

Single Pulse Avalanche Energy 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 resist ance 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 $T_J=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/T_J$	$I_D=1\text{mA}$, Reference to 25°C		0.034		V/ $^{\circ}\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=7.3\text{A}$ ④			12	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=3.7\text{A}$ ④			17	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1		3	V
Forward Transconductance	g_{FS}	$V_{GS}=10\text{V}$, $I_D=3.7\text{A}$	10			S
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$			12	μA
		$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^{\circ}\text{C}$			25	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS}=-20\text{V}$			-100	nA
Gate-to-Source Reverse Leakage		$V_{GS}=20\text{V}$			100	
Total Gate Charge	Q_g	$I_D=7.3\text{A}$		52	79	nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=24\text{V}$, $V_{GS}=10\text{V}$		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	$t_{D(on)}$	$V_{DD}=15\text{V}$		8.6		ns
Rise Time	t_r	$I_D=7.3\text{A}$		50		
Turn-Off Delay Time	$t_{D(off)}$	$R_G=6.2\Omega$		52		
Fall Time	t_f	See Fig. 10 ④		46		
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$		1800		pF
Output Capacitance	C_{oss}	$V_{DS}=25\text{V}$		680		
Reverse Transfer Capacitance	C_{rss}	$f=1.0\text{MHz}$, 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}	$T_J=25^{\circ}\text{C}, I_S=7.3\text{A}, V_{GS}=0\text{V}$ ③			1	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}, I_F=7.3\text{A}$		74	110	ns
Reverse Recovery Charge	Q_{rr}	$di/dt=100\text{A}/\mu\text{s}$		200	300	nC

Notes:

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

② Starting $T_J=25^{\circ}\text{C}$, $L=9.8\text{mH}$

$R_G=252$, $I_{AS}=7.3\text{A}$.(See Figure 12)

③ $I_{SD}\leq 7.3\text{A}$, $di/dt\leq 100\text{A}/\mu\text{s}$, $V_{DD}\leq V_{(BR)DSS}$, $T_J\leq 150^{\circ}\text{C}$

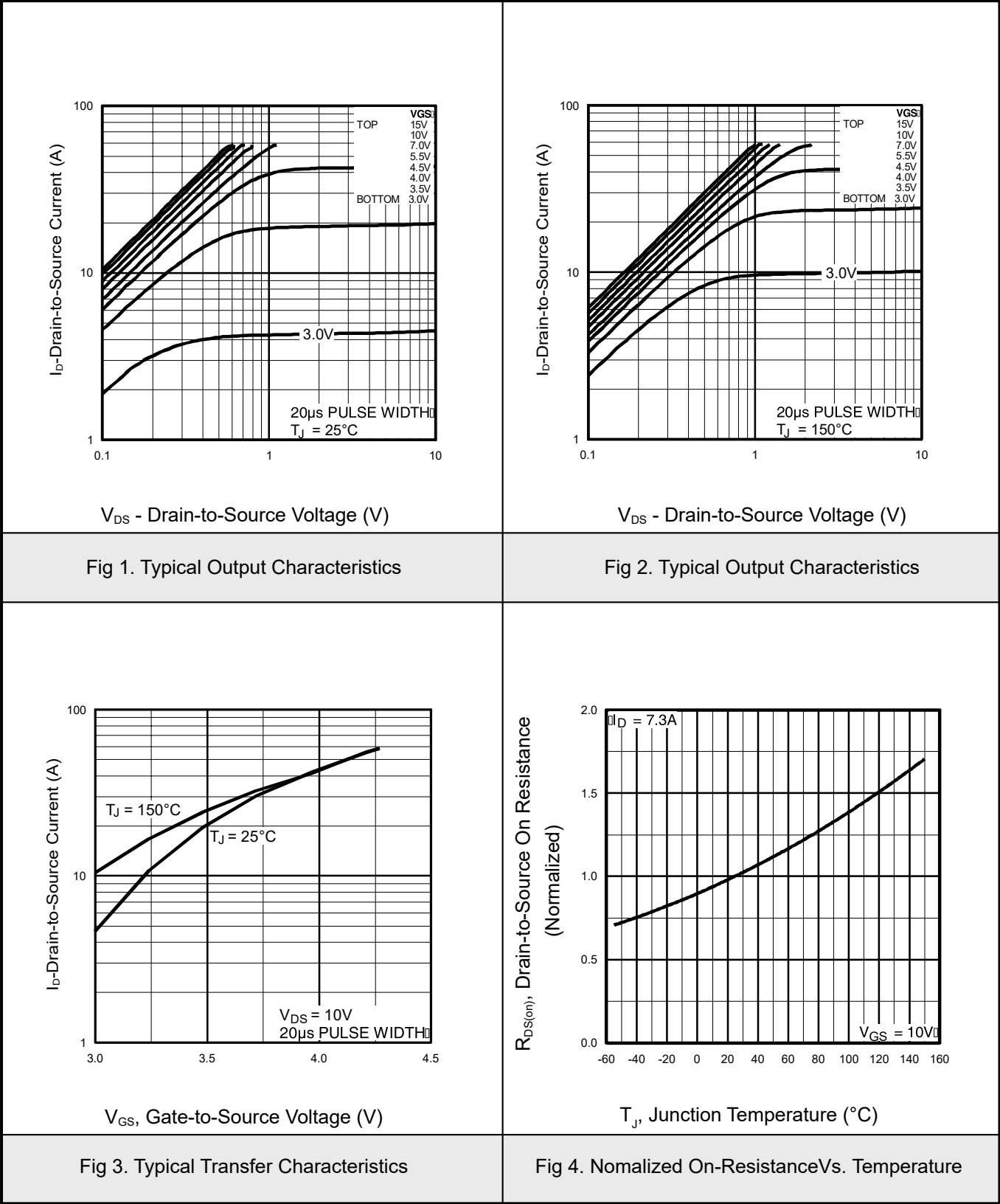
④ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$

⑤ Surface mounted on FR-4 board

⑥ Rois measured at T_J , approximately 90°C

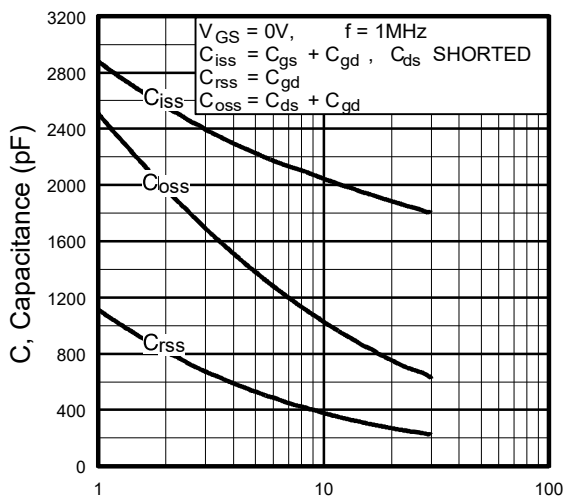


7.1Typical Characterisitics



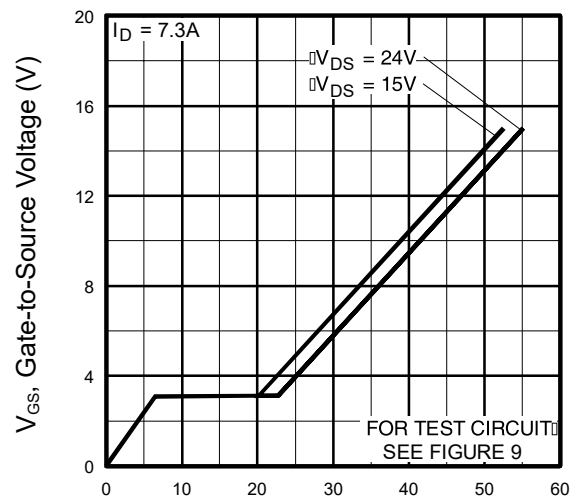


7.2 Typical Characteristics



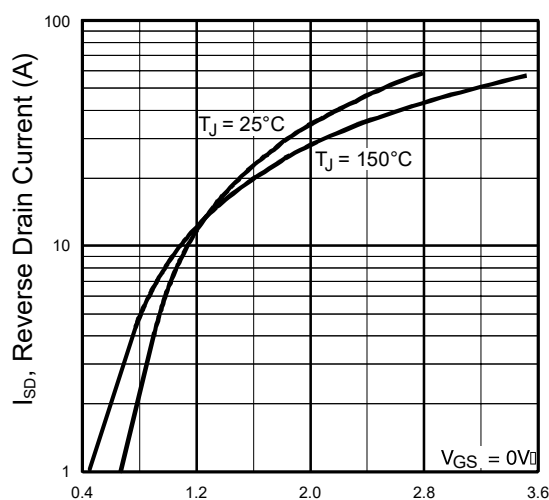
V_{DS} , Drain-to-Source Voltage (V)

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



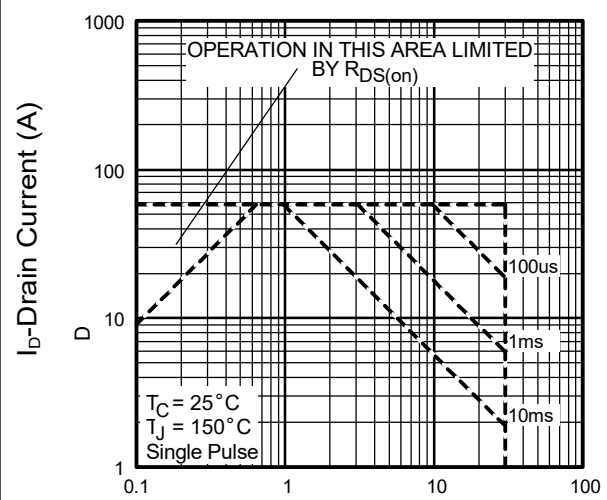
Q_G , Total Gate Charge (nC)

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

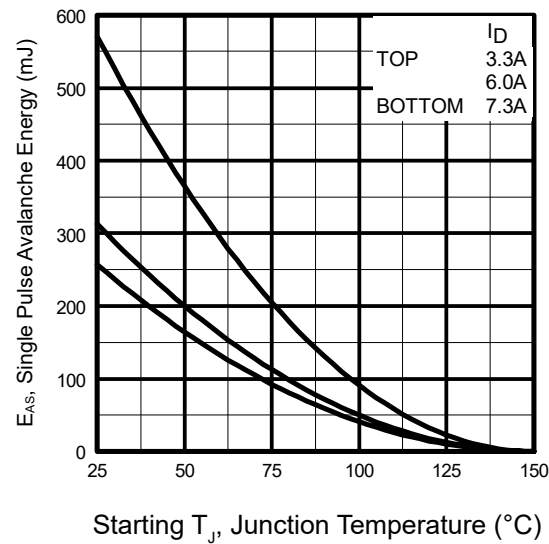


Fig 9. Maximum Avalanche EnergyVs. Drain Current

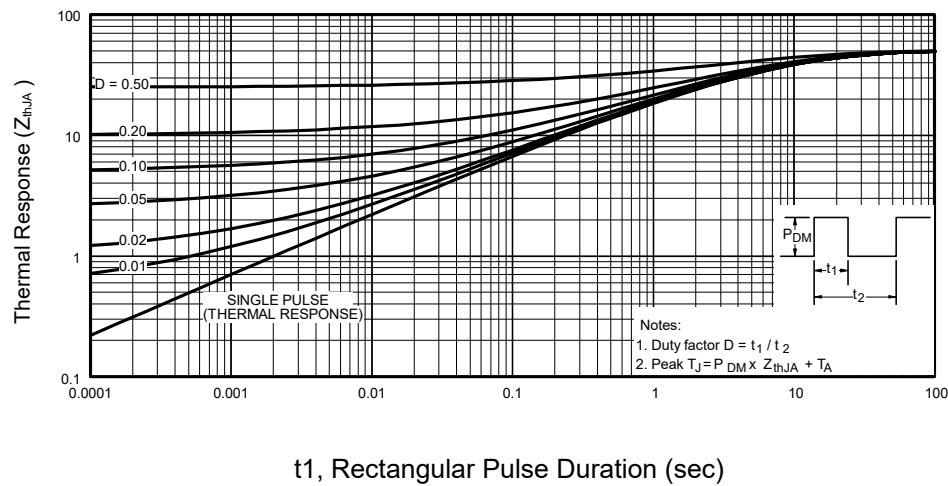


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



7.4 Typical Characteristics

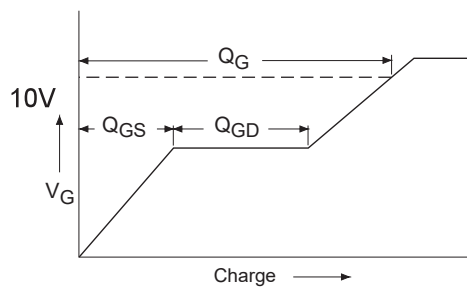


Fig 9a. Basic Gate Charge Waveform

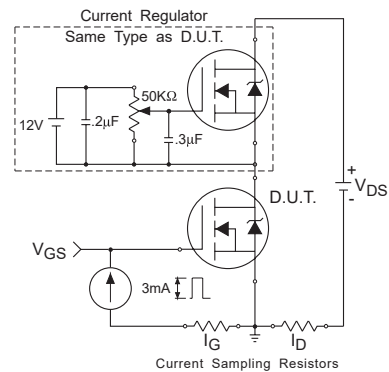


Fig 9b. Gate Charge Test Circuit

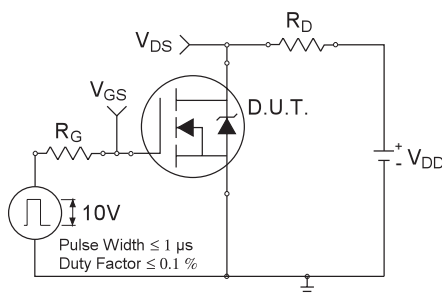


Fig 10a. Switching Time Test Circuit

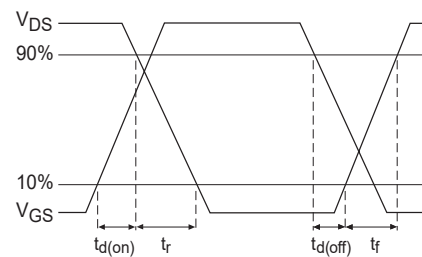


Fig 10b. Switching Time Waveforms

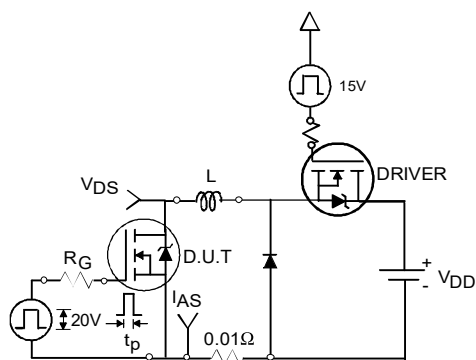


Fig 12a. Unclamped Inductive Test Circuit

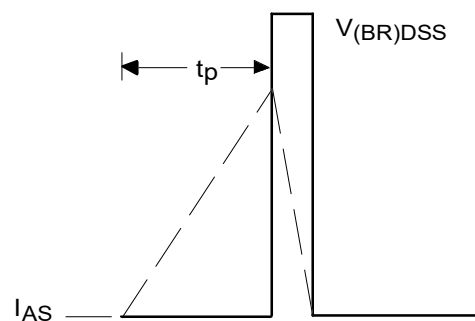
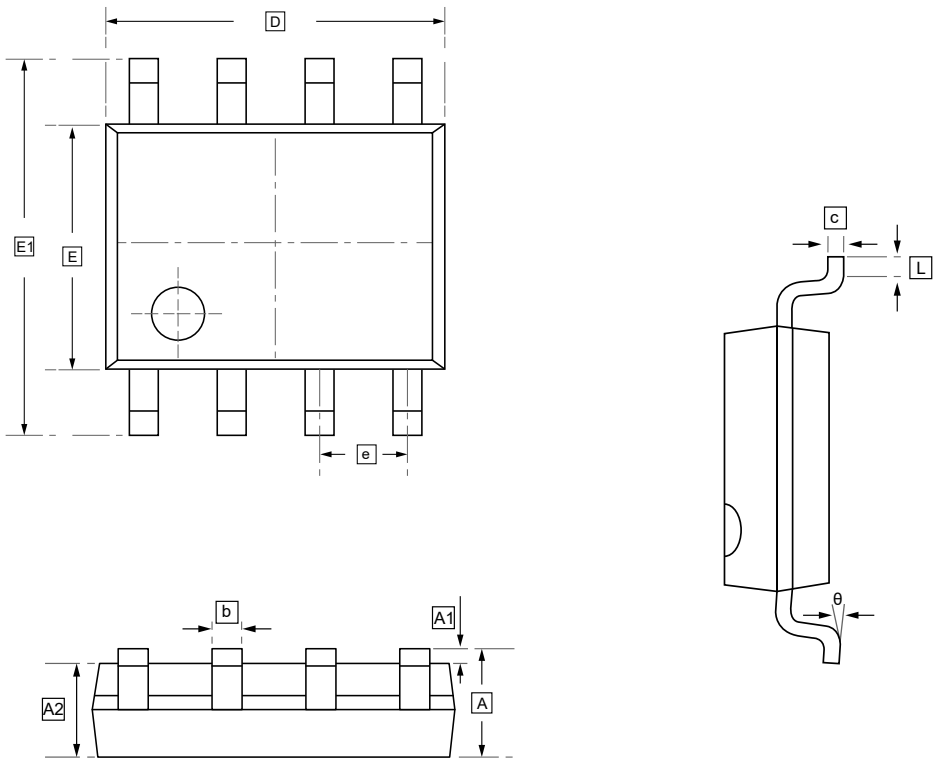


Fig 12b. Unclamped Inductive Waveforms



8.SOP-8 Package Outline Dimensions

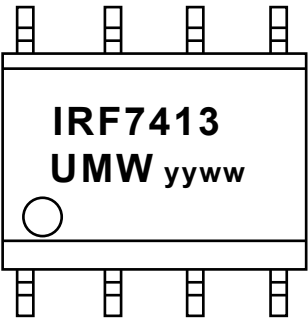


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	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

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.

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