UMW IRF7416TR

P-Channel 30 V (D-S) MOSFET

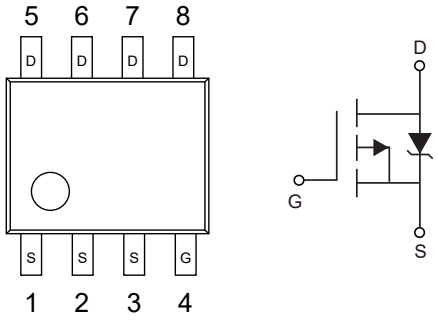
1.Features

- Low On-Resistance
- P-Channel Mosfet
- Surface Mount
- dv/dt Rating
- Fast Switching

2.Pinning information

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

SOP-8



3.Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Rating	Units
Continuous Drain Current, V_{GS}=-10V	T_A=25°C	I_D	-10	A
Continuous Drain Current, V_{GS}=-10V	T_A=70°C		-7.1	A
Pulsed Drain Current ①		I_{DM}	-45	A
Power Dissipation	T_A=25°C	P_D	2.5	W
Linear Derating Factor			0.02	W/°C
Gate-to-Source Voltage		V_{GS}	±20	V
Single Pulse Avalanche Energy ②		E_{AS}	370	mJ
Peak Diode Recovery dv/dt ③		dv/dt	-5	V/ns
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

4.Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ④	$R_{\theta JA}$		50	°C/W

5.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		-0.024		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-5.6A ④			20	mΩ
		V_{GS}=-4.5V, I_D=-2.8A ④			35	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1		-2.04	V
Forward Transconductance	g_{FS}	V_{DS}=-10V, I_D=-2.8A	5.6			S
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	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=-5.6A		61	92	nC
Gate-to-Source Charge	Q_{gs}	V_{DS}=-24V		8	12	
Gate-to-Drain ("Miller") Charge	Q_{gd}	V_{GS}=-10V, See Fig. 6 & 9 ④		22	32	
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=-15V		18		ns
Rise Time	t_r	I_D=-5.6A		49		ns
Turn-Off Delay Time	$t_{D(off)}$	R_G=6.2Ω		59		ns
Fall Time	t_f	R_D=2.7Ω, See Fig. 10 ④		60		ns
Input Capacitance	C_{iss}	V_{GS}=0V		1700		pF
Output Capacitance	C_{oss}	V_{DS}=-25V		890		pF
Reverse Transfer Capacitance	C_{rss}	f=1.0MHz, See Fig. 5		410		pF

6.Diode 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}				-45	
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=-5.6A,V_{GS}=0V ③			-1	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=-5.6A		56	85	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs ③		99	150	nC

Notes:

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

② Starting T_J= 25°C,L=25mH, R_G=25Ω,1_{AS}= -5.6A.(See Figure 12)

③ I_{SD}≤ -5.6A, di/dt ≤ 100A/μs, V_{DD}≤ $V_{(BR)DSS}$,T_J≤150°C

④ Pulse width ≤ 300μs; duty cycle ≤ 2%.

⑤ Surface mounted on FR-4 board, t ≤ 10sec.

7.1Typical Characterisitics

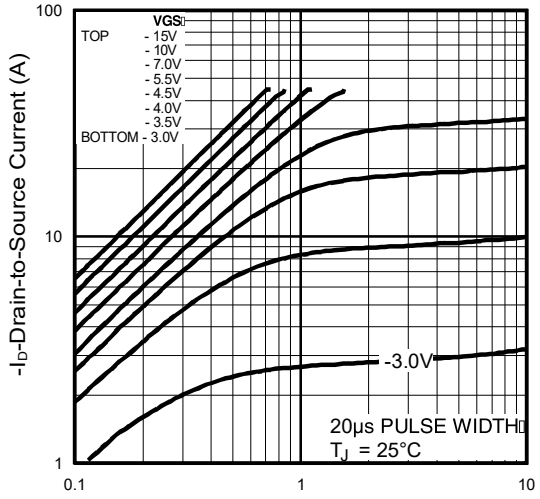


Fig 1. Typical Output Characteristics

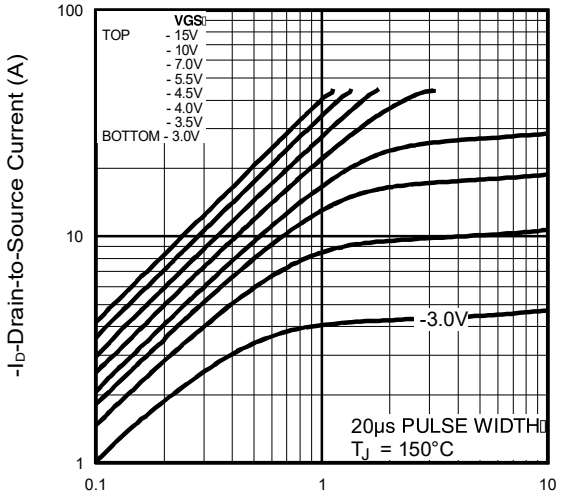


Fig 2. Typical Output Characteristics

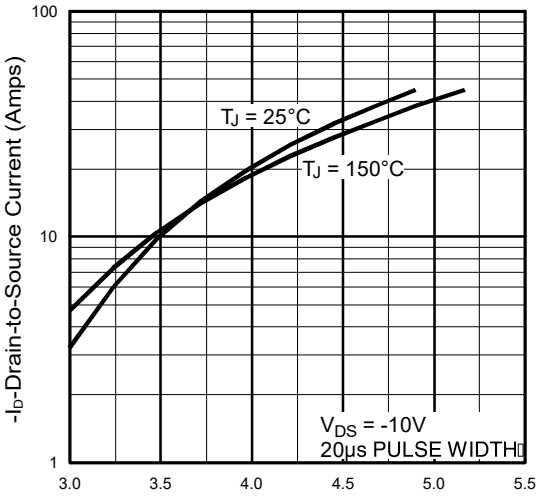


Fig 3. Typical Transfer Characteristics

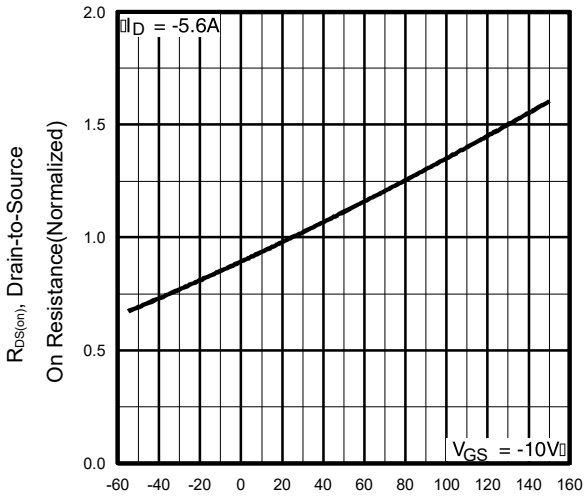
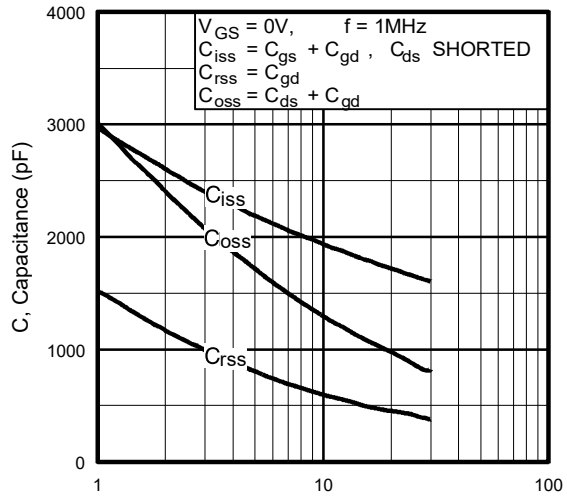


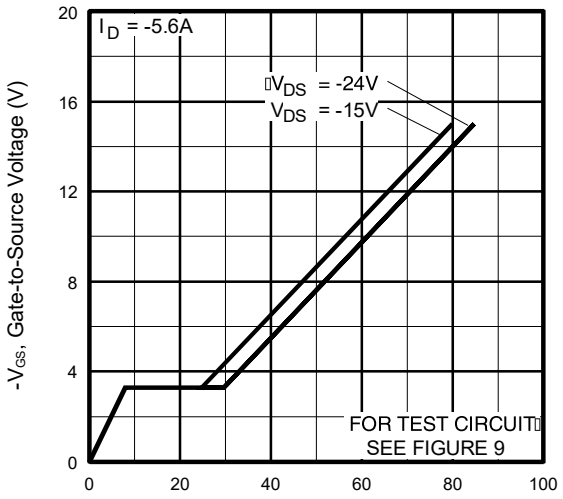
Fig 4. Nomalized On-ResistanceVs. Temperature

7.2Typical Characterisitics



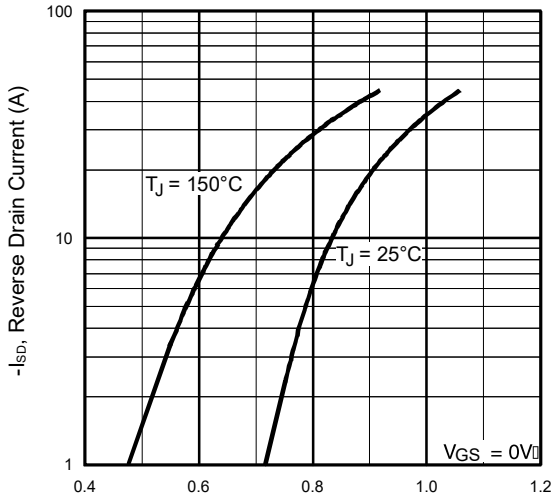
V_{DS} ,Drain-to-Source Voltage (volts)

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



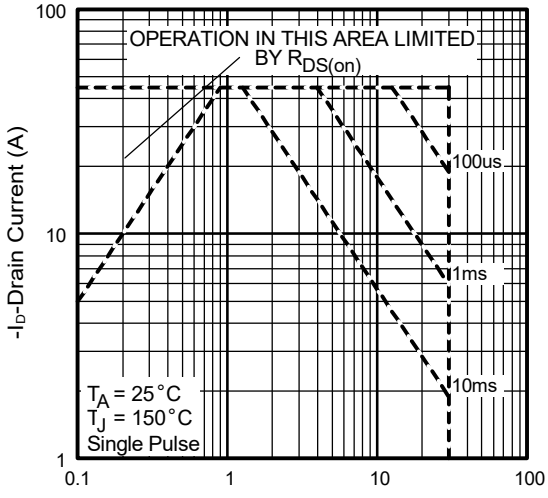
Q_G, Total Gate Charge (nC)

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

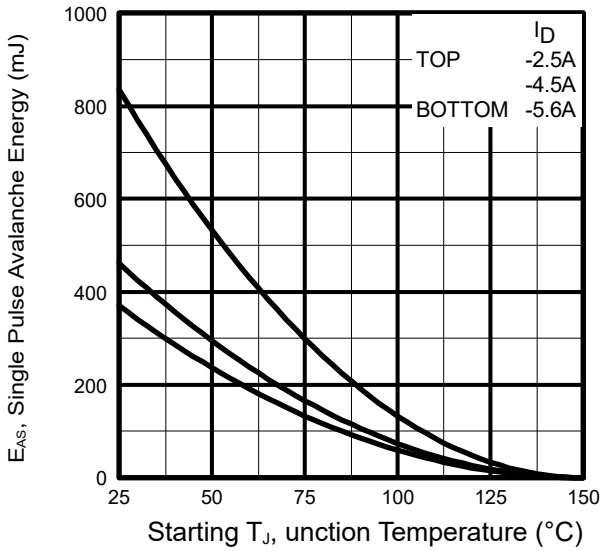


Fig 9. Maximum Avalanche EnergyVs. Drain Current

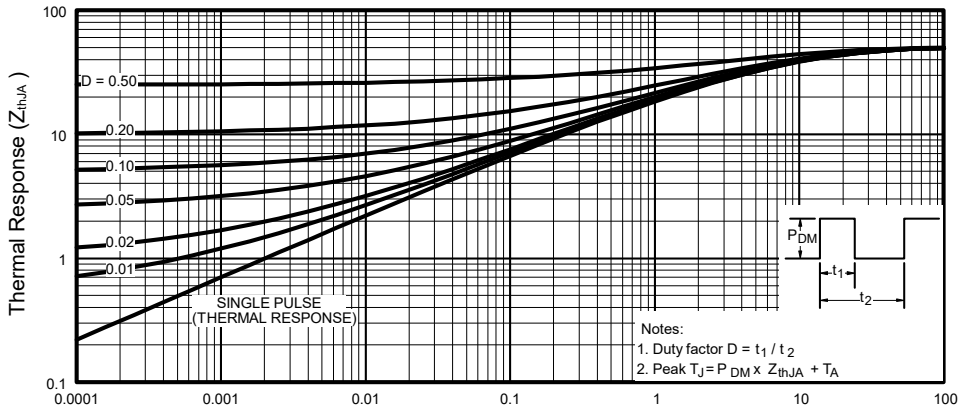


Fig 10. Maximum Effective Transient Themal Impedance, Junction-to-Ambient

7.4Typical Characterisitics

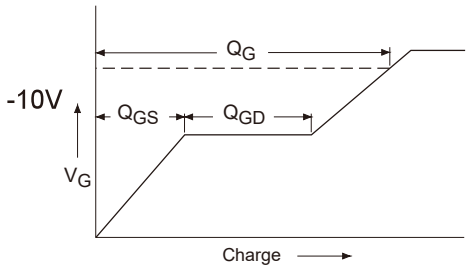


Fig 11a. Basic Gate Charge Wavefomm

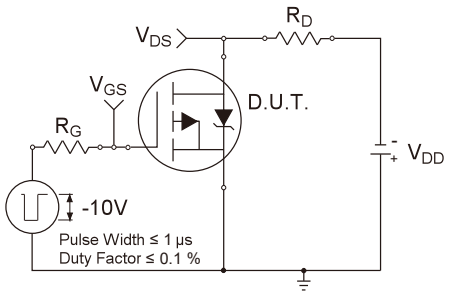


Fig 11b. Gate Charge Test Circuit

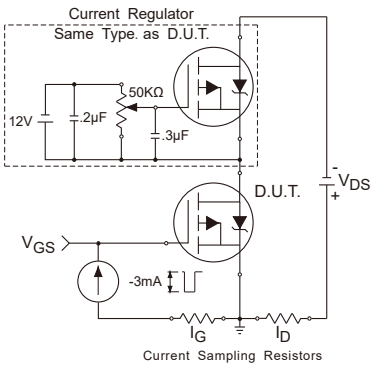


Fig 12a. Switching Time Test Circuit

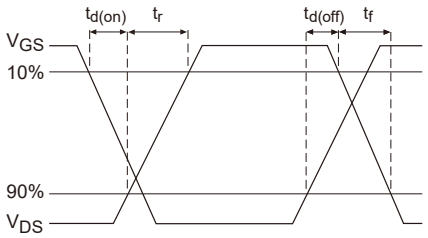


Fig 12b. Switching Time Waveforms

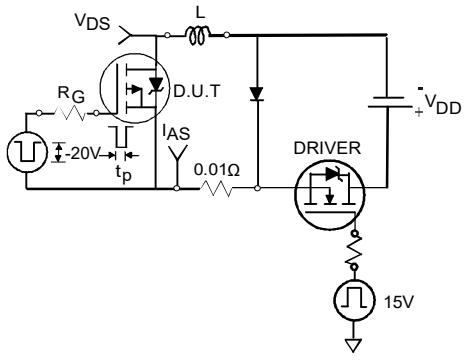


Fig 13a. Unclamped inductive Test Circuit

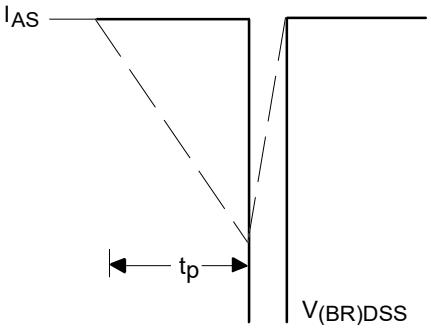
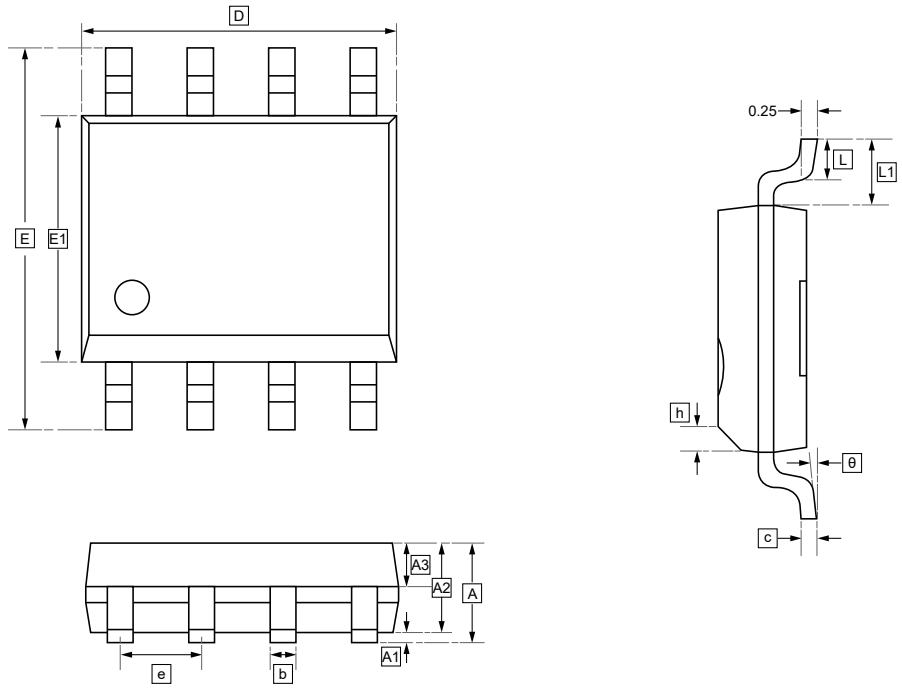


Fig 13b. Unclamped Inductive Wavefomms

8.SOP-8 Package Outline Dimensions

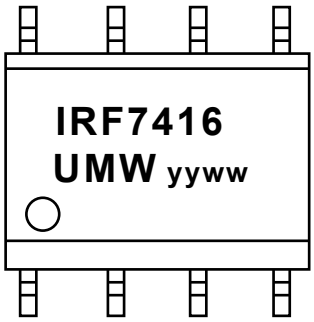


DIMENSIONS (mm are the original dimensions)

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 IRF7416TR	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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