UMW IRF7401TR

N-Channel MOSFET

1.Features

- $V_{DS\ (V)}$=20V
- I_D=8.7A
- $R_{DS(ON)}$<22mΩ(V_{GS}=4.5V)
- RoHS Compliant, Halogen-Free
- Compatible with Existing Surface Mount Techniques

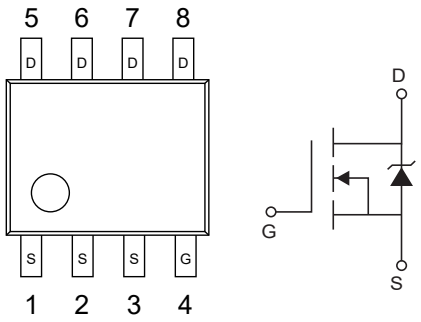
2.Benefits

- Multi-Vendor Compatibility
- Easier Manufacturing
- Environmentally
- Increased Reliability

3.Pinning information

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

SOP-8



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

Parameter		Symbol	Rating	Units
10 Sec. Pulsed Drain Current, V_{GS}=4.5V	T_A=25°C	I_D	10	A
Continuous Drain Current, V_{GS}=4.5V	T_A=25°C		8.7	A
Continuous Drain Current, V_{GS}=4.5V	T_A=70°C		7	A
Pulsed Drain Current ①		I_{DM}	35	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}	±12	V
Peak Diode Recovery dv/dt ②		dv/dt	5	V/nS
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

5.Thermal Resistance Rating

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ④	$R_{\theta JA}$		62.5	°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	20			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	I_D=1mA,Reference to 25°C		0.044		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=4.1A ③			22	mΩ
		V_{GS}=2.7V, I_D=3.5A ③			30	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.7			V
Forward Transconductance	g_{FS}	V_{DS}=15V, I_D=4.1A	11			S
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=16V, V_{GS}=0V			1	μA
		V_{DS}=16V,V_{GS}=0V,T_J=125°C			25	
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=12V			100	nA
Gate-to-Source Reverse Leakage		V_{GS}=-12V			-100	
Total Gate Charge	Q_g	I_D=4.1A			48	nC
Gate-to-Source Charge	Q_{gs}	V_{DS}=16V, V_{GS}=4.5V			5.1	
Gate-to-Drain ("Miller") Charge	Q_{gd}	See Fig. 6 and 12 ③			20	
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=10V		13		ns
Rise Time	t_r	I_D=4.1A		72		ns
Turn-Off Delay Time	$t_{D(off)}$	R_G=6Ω		65		ns
Internal Drain inductance	L_D	R_D=2.4Ω, See Fig. 10 ③		2.5		ns
Fall Time	t_f	Between lead tip		92		nH
Internal Source inductance	L_S	and center of die contact		4		
Input Capacitance	C_{iss}	V_{GS}=0V		1600		pF
Output Capacitance	C_{oss}	V_{DS}=15V		690		pF
Reverse Transfer Capacitance	C_{rss}	f=1.0MHz, See Fig.		310		pF

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}				35	
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=2A,V_{GS}=0V ③			1	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=4.1A dI/dt=100A/μs ③		39	59	ns
Reverse Recovery Charge	Q_{rr}			42	63	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

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

② I_{SD}≤ 4.1A, di/dt ≤ 100A/μS, V_{DD}≤ $V_{(BR)DSS}$,T_J≤ 150°C.

③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

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

7.1Typical Characterisitics

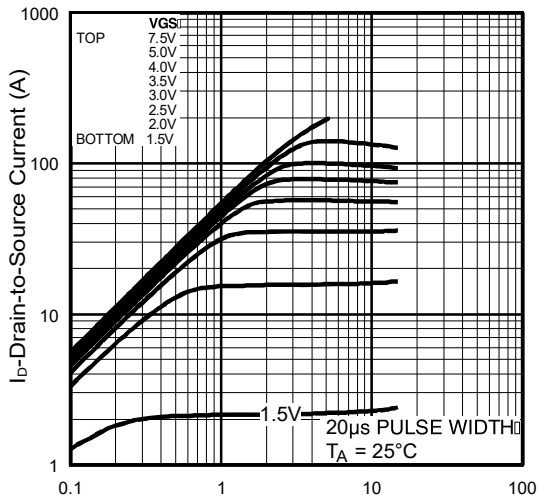


Fig 1. Typical Output Characteristics

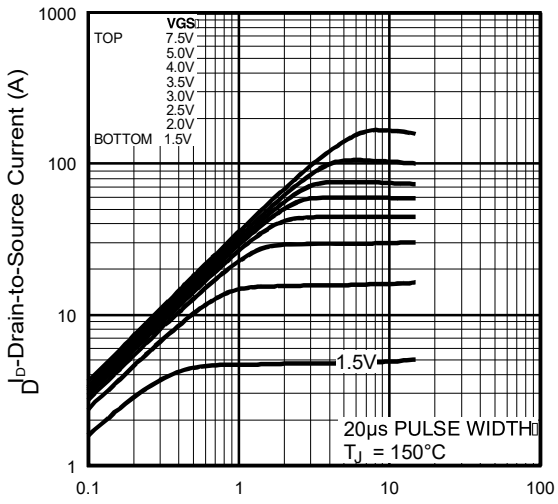


Fig 2. Typical Output Characteristics

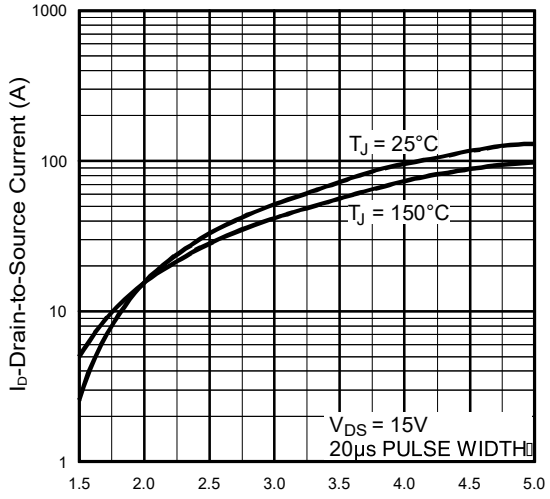


Fig 3. Typical Transfer Characteristics

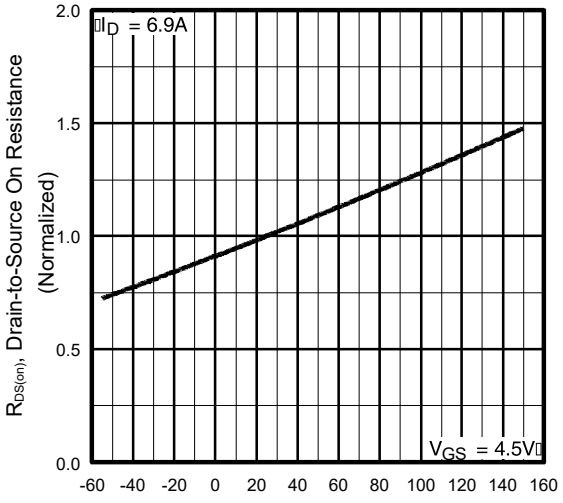
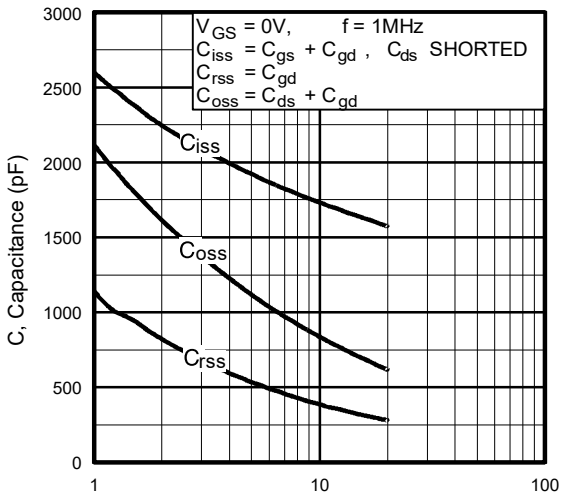


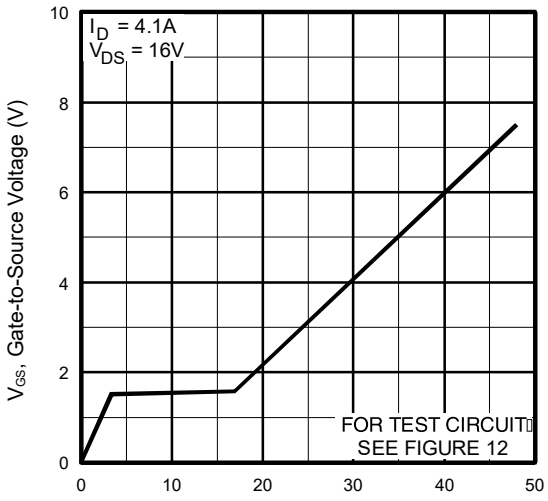
Fig 4. Nomalized On-ResistanceVs. Temperature

7.2Typical Characterisitics



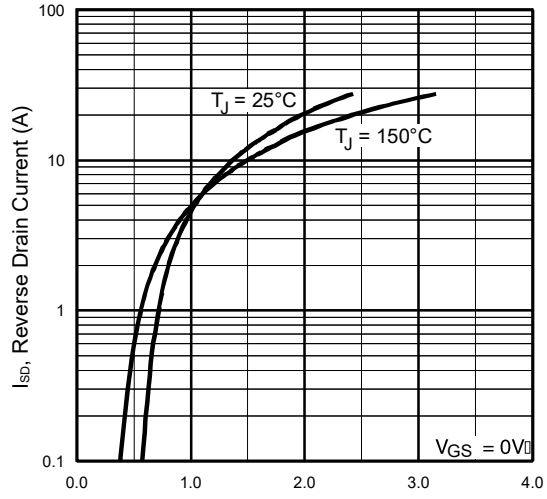
V_{DS} ,Drain-to-Source Voltage (V)

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



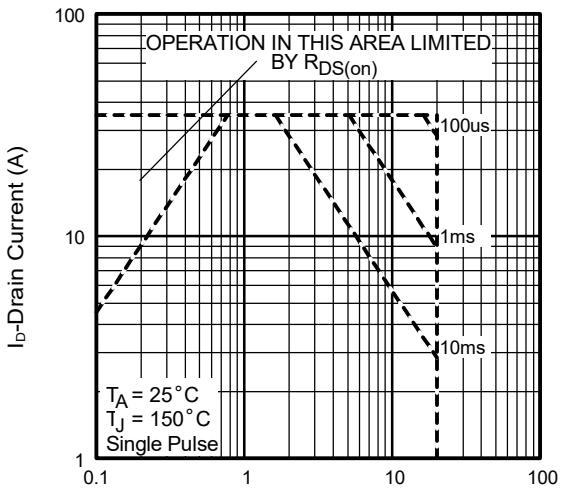
Q_G, Total Gate Charge (nC)

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

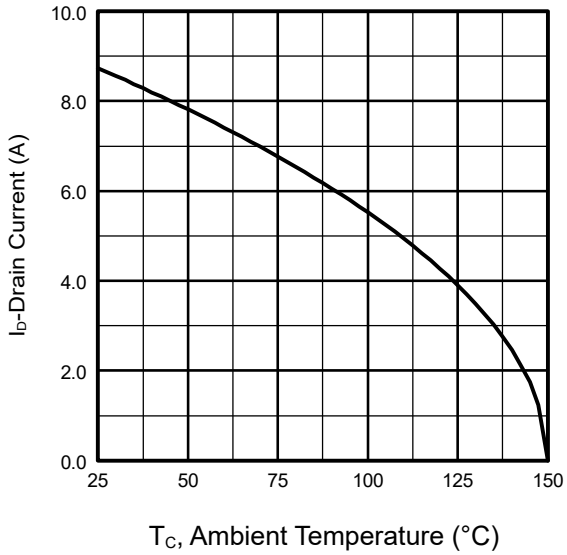


Fig 9. Maximum Drain Current Vs.AmbientTemperature

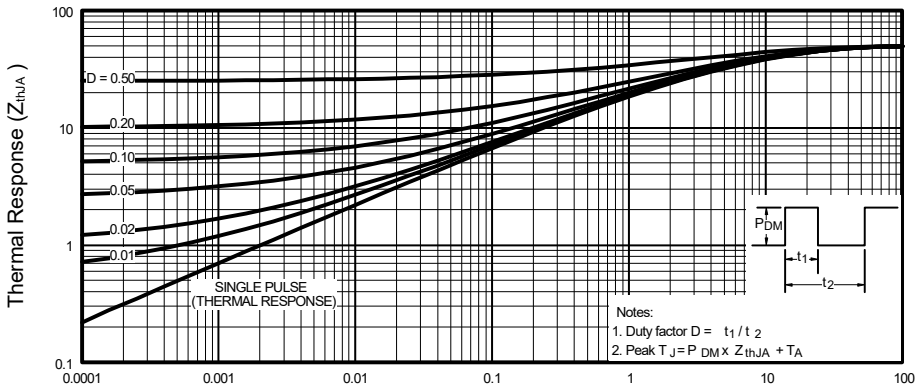


Fig 10. Maximum Effective Transient Themal Impedance, Junction-to-Ambient

7.4Typical Characterisitics

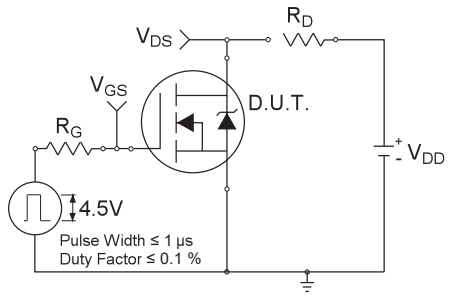


Fig 11a. Switching Time Test Circuit

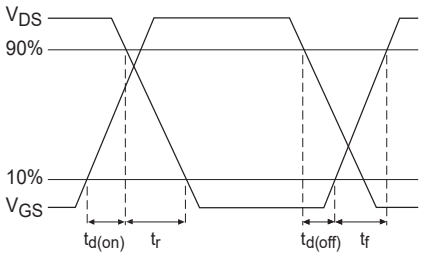


Fig 11b. Switching Time Waveforms

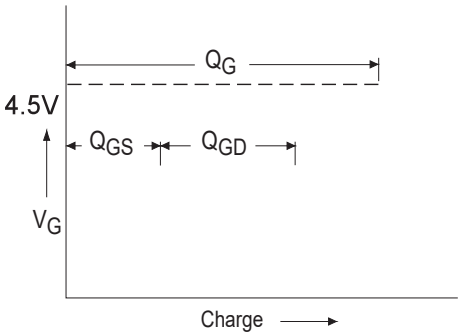


Fig 12a. Basic Gate Charge Wavefomm

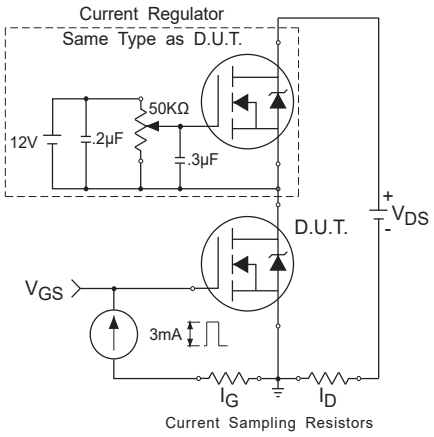
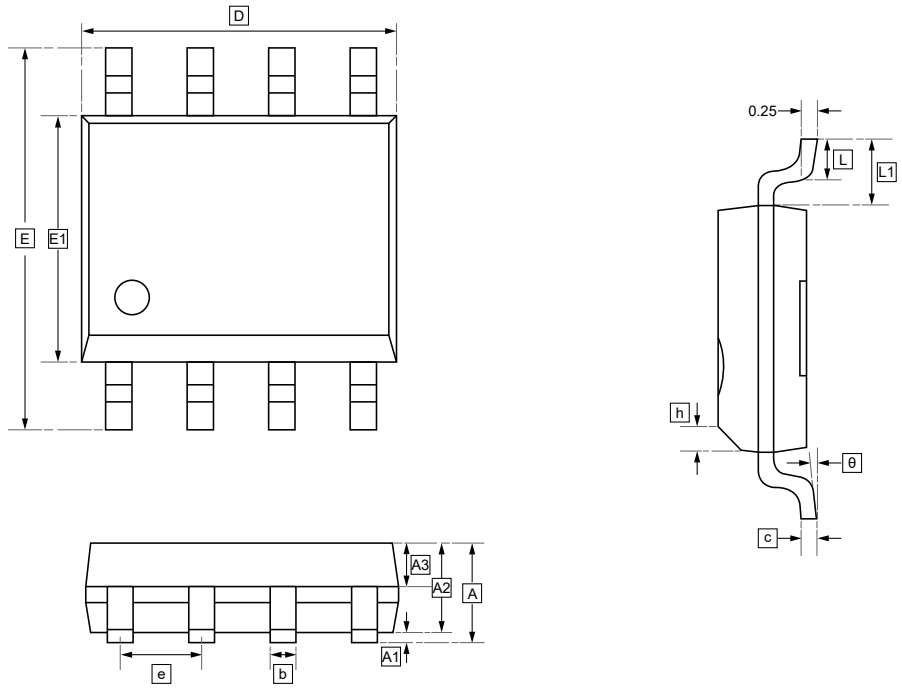


Fig 12b. Gate Charge Test Circuit

8.SOP-8 Package Outline Dimensions

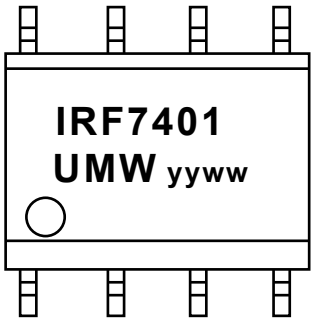


DIMENSIONS (mm are the original dimensions)

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 IRF7401TR	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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