UMW IRF7301TR

Dual 20V N-Channel MOSFET

1.Description

The SOP-8 has been modified through a customized leadframe for enhan-ced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements,multiple devices can be used in an application with dramatically reduced board space.

2.1Features

- $V_{DS(V)}$=20V
- I_D=5.7A
- $R_{DS(ON)}$<40mΩ(V_{GS}=4.5V)
- $R_{DS(ON)}$<50mΩ(V_{GS}=2.7V)

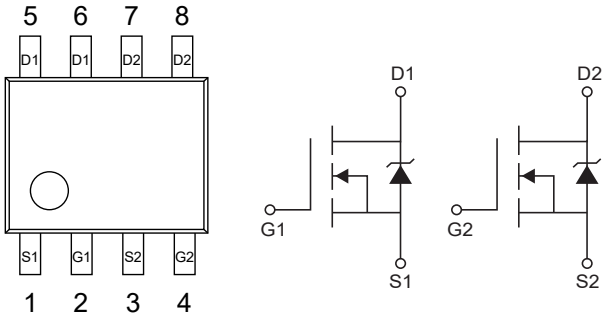
2.2Features

- Generation V Technology
- Ultra Low On-Resistance
- Dual N-Channel Mosfet
- Surface Mount
- Available in Tape &Reel
- Dynamic dv/dt Rating
- Fast Switching
- Lead-Free

3.Pinning information

Pin	Symbol	Description
2,4	G1,G2	GATE
1,3	S1,S2	SOURCE
5,6,7,8	D1,D2	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	5.7	A
Continuous Drain Current, V_{GS}=4.5V	T_A=25°C		5.2	A
Continuous Drain Current, V_{GS}=4.5V	T_A=70°C		4.1	A
Pulsed Drain Current ①		I_{DM}	21	A
Power Dissipation	T_A=25°C	P_D	2	W
Linear Derating Factor			0.016	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 resist ance 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	$\Delta V_{(BR)DSS}/T_J$	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=2.6A ③			40	mΩ
		V_{GS}=2.7V, I_D=2.2A ③			50	
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=2.6A	8.3			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=2.6A			20	nC
Gate-to-Source Charge	Q_{gs}	V_{DS}=16V, V_{GS}=4.5V			2.2	
Gate-to-Drain ("Miller") Charge	Q_{gd}	See Fig. 6 and 12 ③			8	
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=10V		9		ns
Rise Time	t_r	I_D=2.6A		42		ns
Turn-Off Delay Time	$t_{D(off)}$	R_G=6Ω		32		ns
Fall Time	t_f	R_D=3.8Ω, See Fig. 10 ③		51		ns
Internal Drain inductance	L_D	Between lead tip and center of die contact		4		nH
Internal Source inductance	L_S			6		
Input Capacitance	C_{iss}	V_{GS}=0V		660		pF
Output Capacitance	C_{oss}	V_{DS}=15V		280		pF
Reverse Transfer Capacitance	C_{rss}	f=1.0MHz, See Fig. 5		140		pF

Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			2.5	A
Pulsed Source Current (Body Diode) ①	I_{SM}				21	
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=1.8A,V_{GS}=0V③			1	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=2.6A		29	44	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs ③		22	33	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}≤ 2.6A, 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.

7.1 Typical Characterisitics

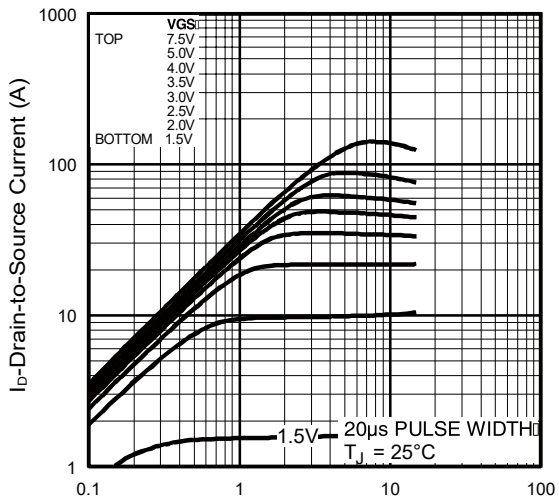


Fig 1. Typical Output Characteristics

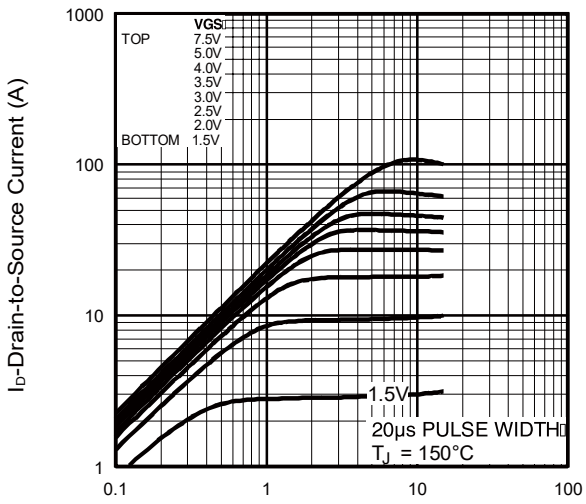


Fig 2. Typical Output Characteristics

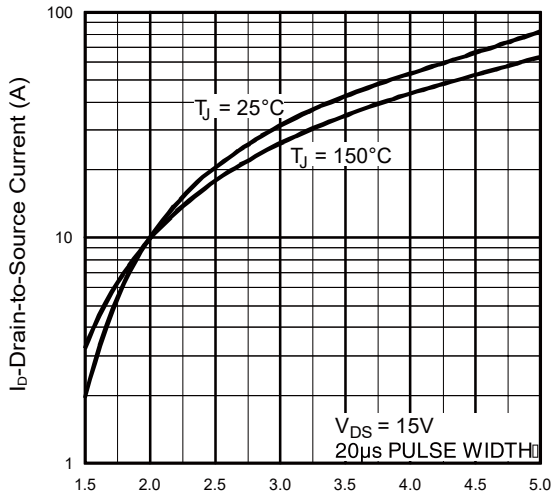


Fig 3. Typical Transfer Characteristics

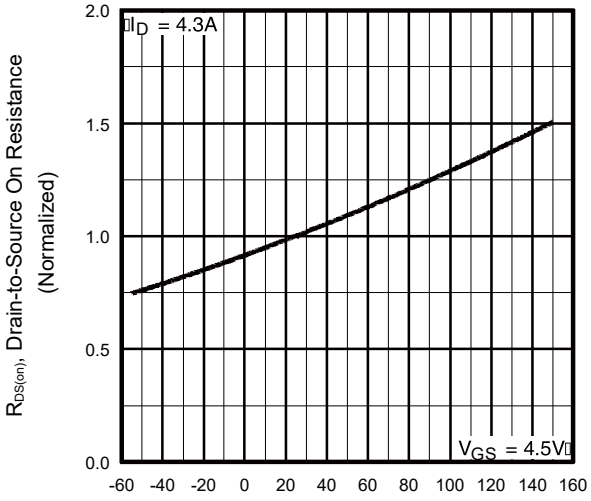
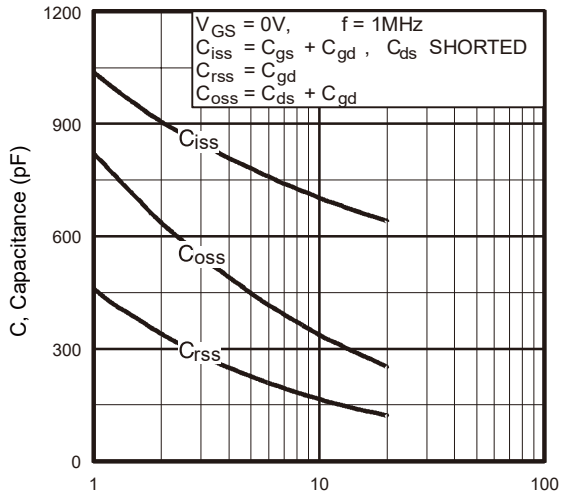


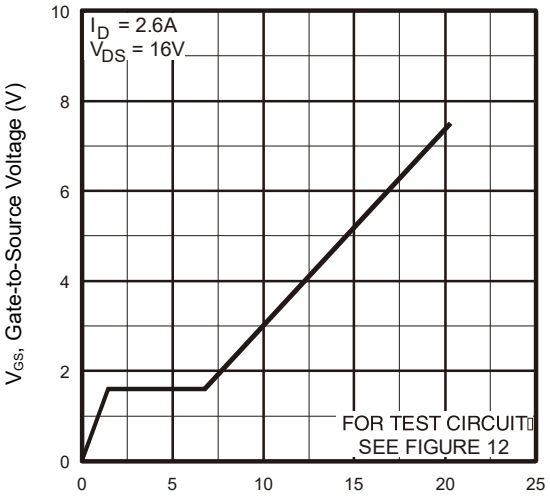
Fig 4. Nomalized On-ResistanceVs. Temperature

7.2 Typical Characterisitics



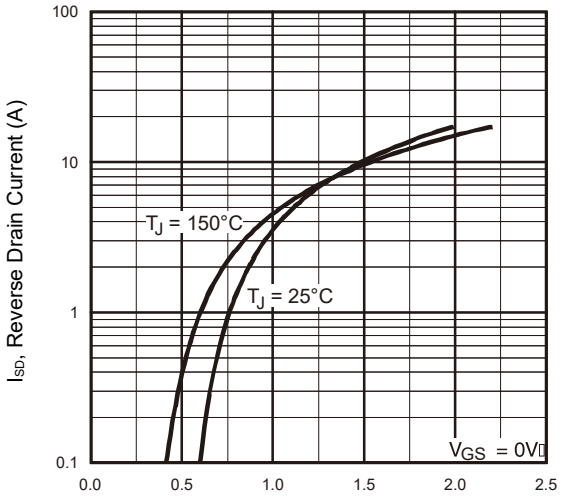
V_{DS} ,Drain-to-Source Voltage (V)

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



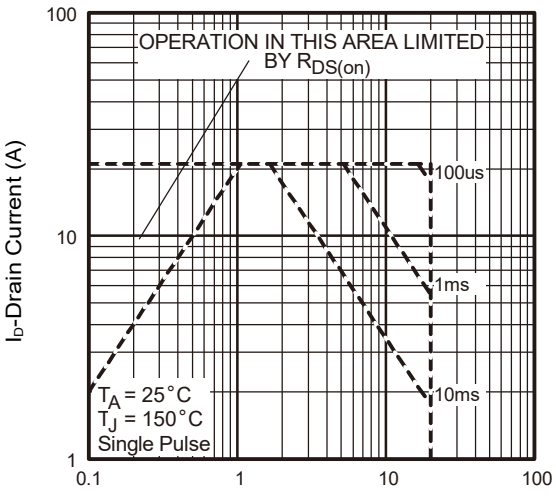
Q_G, Total Gate Charge (nC)

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

7.3 Typical Characterisitics

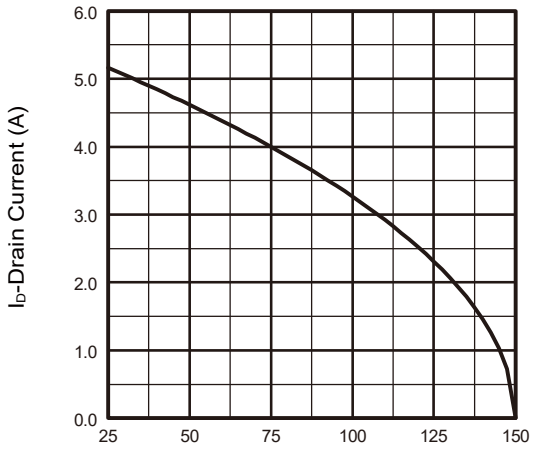


Fig 9. Maximum Drain Current Vs.AmbientTemperature

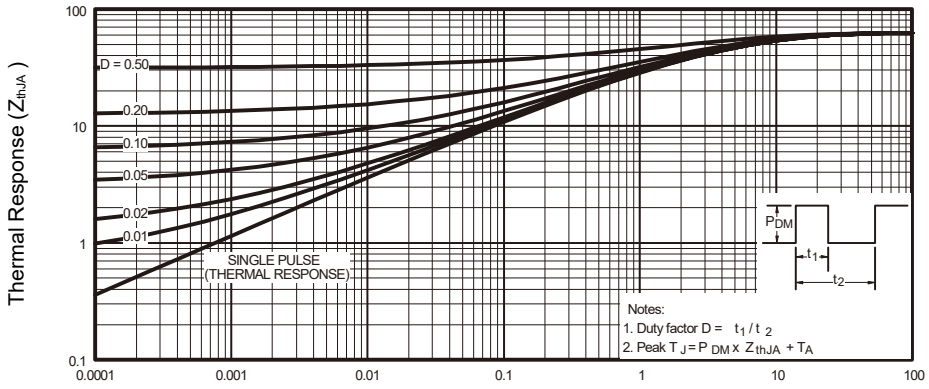


Fig 10. Maximum Effective Transient Themal Impedance, Junction-to-Ambient

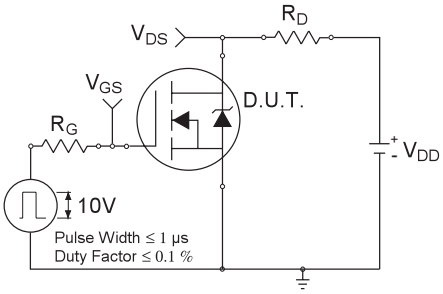


Fig 11a. Switching Time Test Circuit

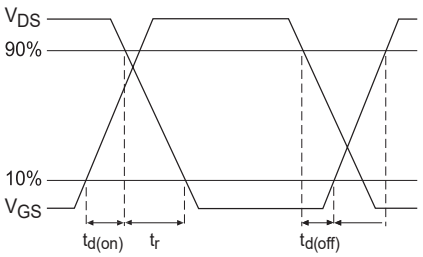
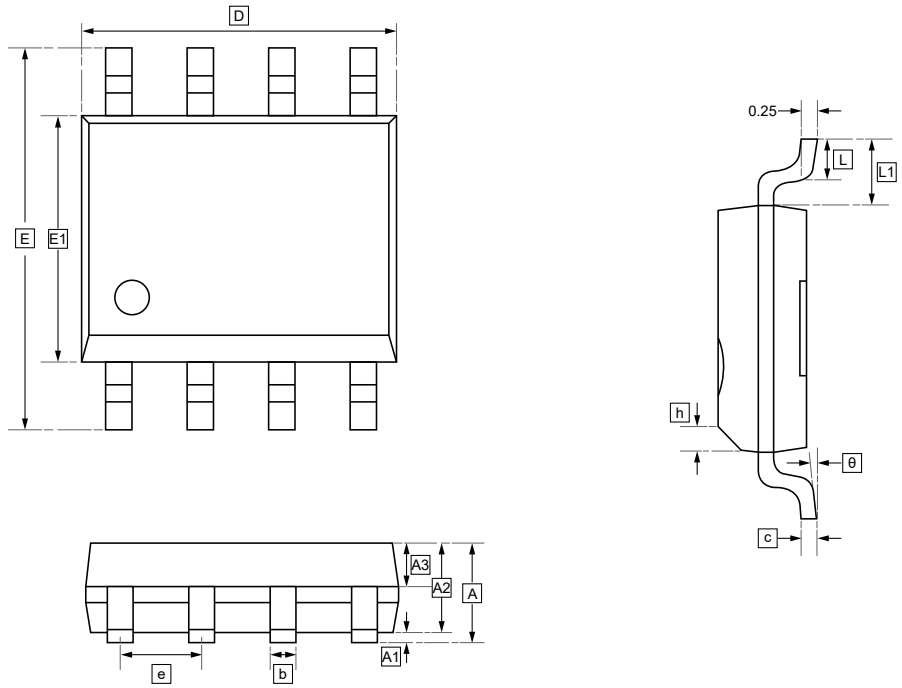


Fig 11b. Switching Time Waveforms

8.SOP-8 Package Outline Dimensions

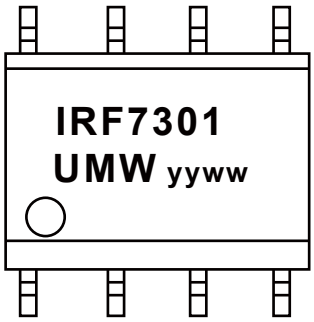


DIMENSIONS (mm are the original dimensions)

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 IRF7301TR	SOP-8	3000	Tape and reel

10.Disclaimer

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