UMW IRF7807TR

30V N-Channel MOSFET

1.Description

The IRF7807TR 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
- $R_{DS(ON)}$<13.8mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<18.2mΩ(V_{GS}=4.5V)

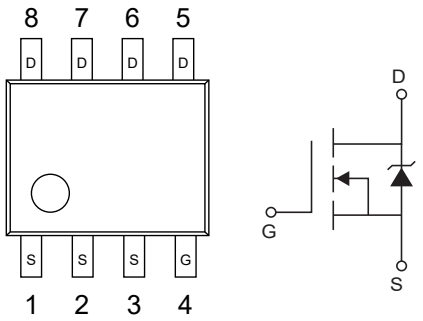
3.Application

- Synchronous Rectifier MOSFET forGraphics Cards and POL Converters in Networking and Telecommunication Systems
- Control FET for Notebook Processor Power

4.Pinning information

Pin	Symbol	Description
1,2,3	S	SOURCE
4	G	GATE
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	11	A
Continuous Drain Current, V_{GS} @ 10V	T_A=70°C		8.7	
Pulsed Drain Current ①		I_{DM}	88	
Power Dissipation ④	T_A=25°C	P_D	2.5	W
Power Dissipation ④	T_A=70°C		1.6	
Linear Derating Factor			0.02	W/°C
Operating Junction andStorage 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

7.Electrical Characteristics T_J=25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	30			V
Breakdown Voltage Temp. Coefficient	$\Delta BV_{DSS}/T_J$	I_D=1mA,Reference to 25°C		0.023		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=11A ③		11	13.8	mΩ
		V_{GS}=4.5V, I_D=8.8A ③		14.5	18.2	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.35	1.8	2.25	V
Forward Transconductance	$\Delta V_{GS(th)}$			-4.7		mV/°C
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			150	
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=20V			100	nA
Gate-to-Source Reverse Leakage		V_{GS}=-20V			-100	
Forward Transconductance	g_{fs}	V_{DS}=15V, I_D=8.8A	22			S
Total Gate Charge	Q_g	V_{DS}=15V V_{GS}=4.5V I_D=8.8A See Fig. 16		7.2	11	nC
Pre-Vth Gate-to-Source Charge	Q_{gs1}			2.1		
Post-Vth Gate-to-Source Charge	Q_{gs2}			0.7		
Gate-to-Drain Charge	Q_{gd}			2.7		
Gate Charge Overdrive	Q_{godr}			1.7		
Switch Charge (Q_{gs2} + Q_{gd})	Q_{sw}			3.4		
Output Charge	Q_{oss}	V_{DS}= 15V, V_{GS}= 0V		2.8		nC
Gate Resistance	R_G			2.5	4.8	Ω
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=15V, V_{GS}= 4.5V ③ I_D=8.8A Clamped Inductive Load		6.9		ns
Rise Time	t_r			6.2		
Turn-Off Delay Time	$t_{D(off)}$			10		
Fall Time	t_f			3.1		
Input Capacitance	C_{iss}	V_{GS}= 0V V_{DS}= 15V f = 1.0MHz		770		pF
Output Capacitance	C_{oss}			190		
Reverse Transfer Capacitance	C_{rss}			100		

Avalanche Characteristics						
Single Pulse Avalanche Energy ②					63	mJ
Avalanche Curren ①					8.8	A
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}				88	
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=8.8A,V_{GS}=0V③			1	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=8.8A, V_{DD}=15V		31	46	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs		17	26	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)

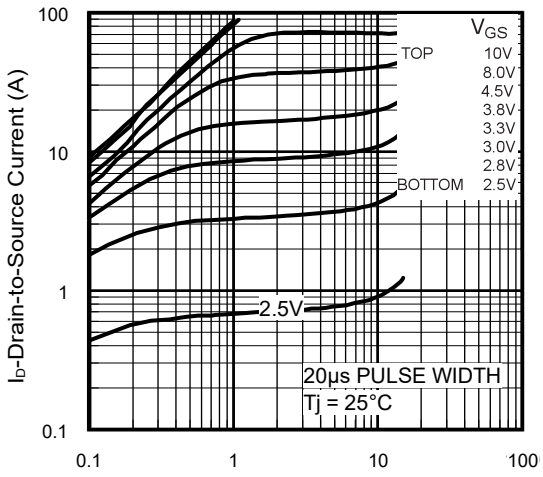
③ I_{SD}≤ 7.3A, di/dt ≤ 100A/μS, V_{DD}≤ $V_{(BR)DSS}$.TJ≤ 150°C

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

⑤ Surface mounted on FR-4 board

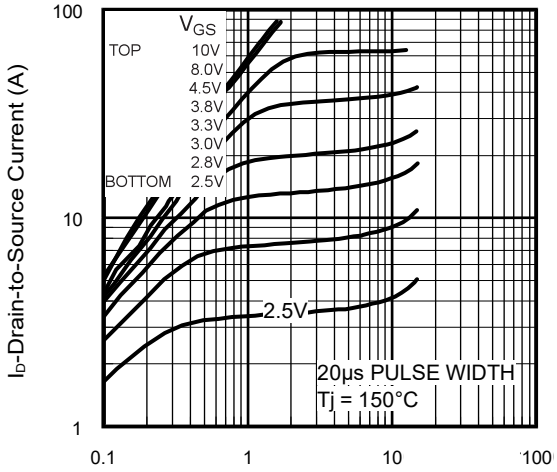
⑥ Rois measured at T,approximately 90°C

8.1Typical Characterisitics



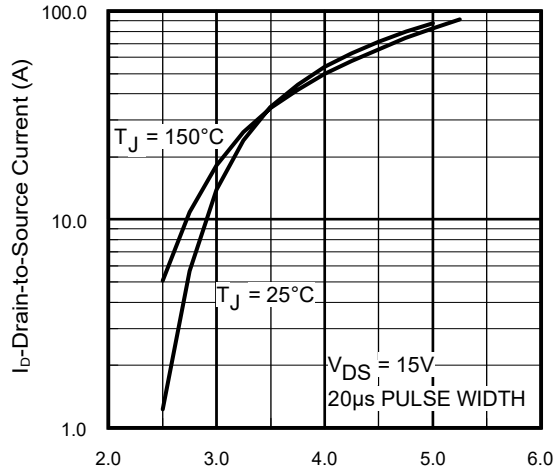
V_{DS} - Drain-to-Source Voltage (V)

Fig 1. Typical Output Characteristics



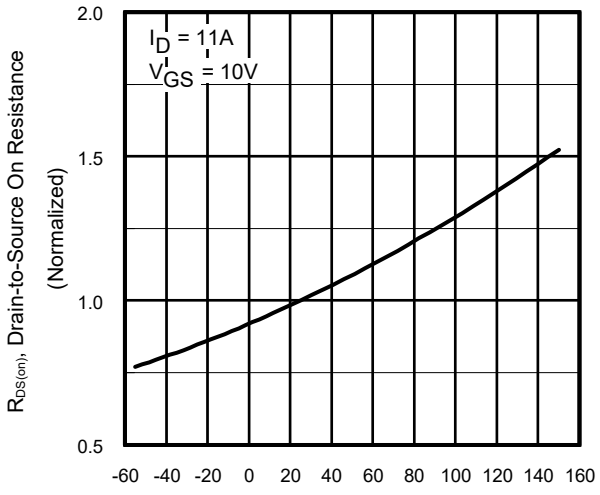
V_{DS} - Drain-to-Source Voltage (V)

Fig 2. Typical Output Characteristics



V_{GS}, Gate-to-Source Voltage (V)

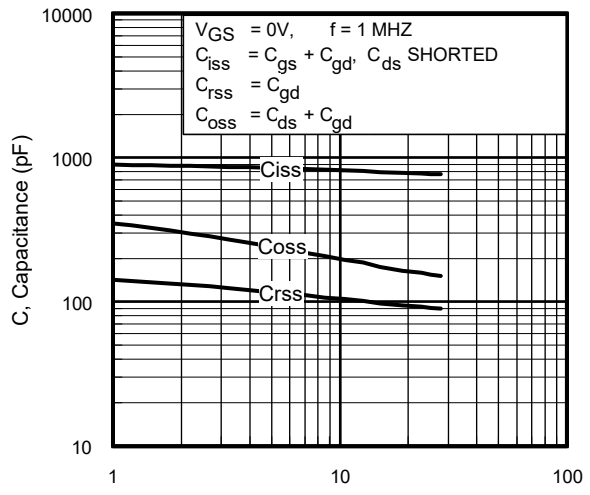
Fig 3. Typical Transfer Characteristics



T_J, Junction Temperature (°C)

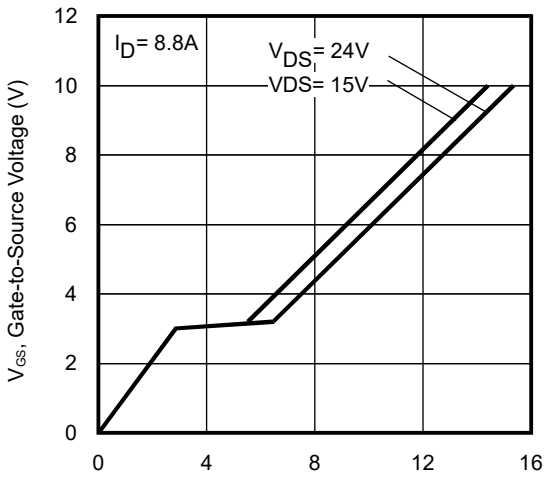
Fig 4. Nomalized On-ResistanceVs. Temperature

8.2Typical Characterisitics



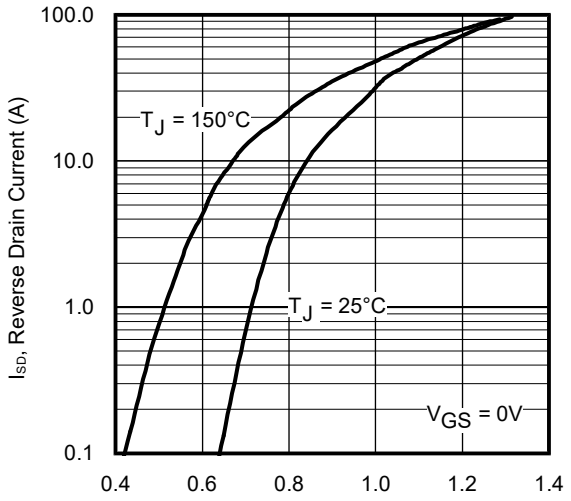
V_{DS} ,Drain-to-Source Voltage (V)

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



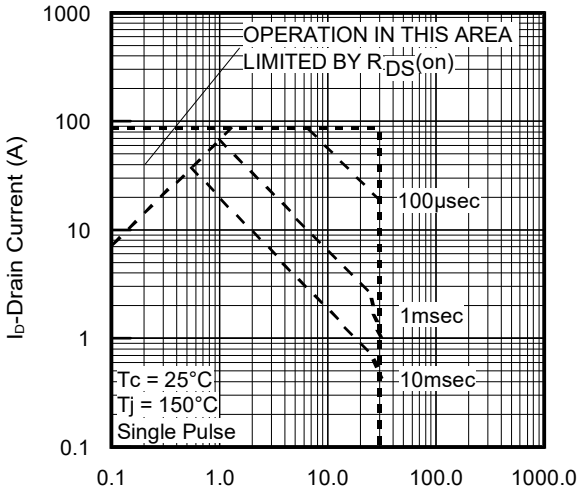
Q_G, Total Gate Charge (nC)

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

8.3Typical Characterisitics

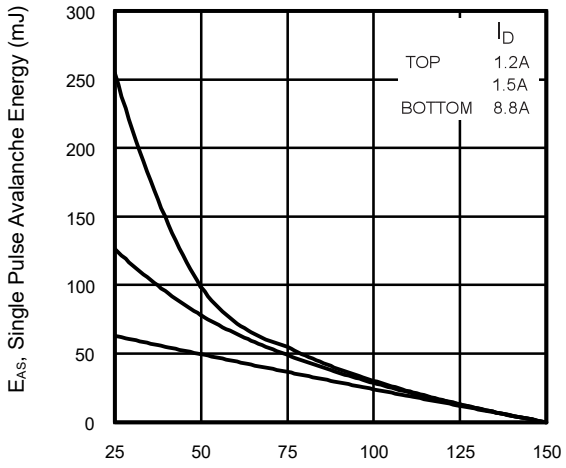


Fig 9. Maximum Avalanche EnergyVs. Drain Current

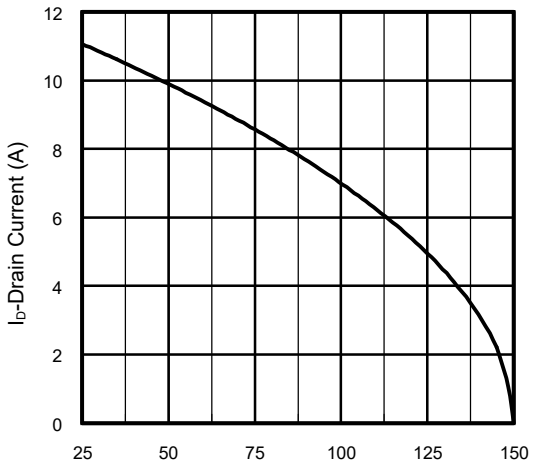


Fig 10. Maximum Drain Current Vs. Case Temperature

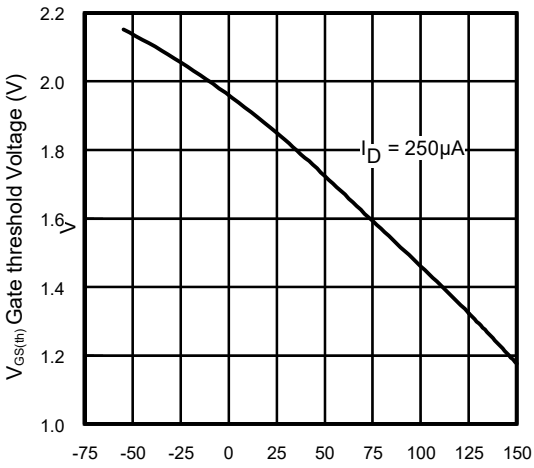


Fig 11. Threshold Voltage Vs. Temperature

8.4Typical Characterisitics

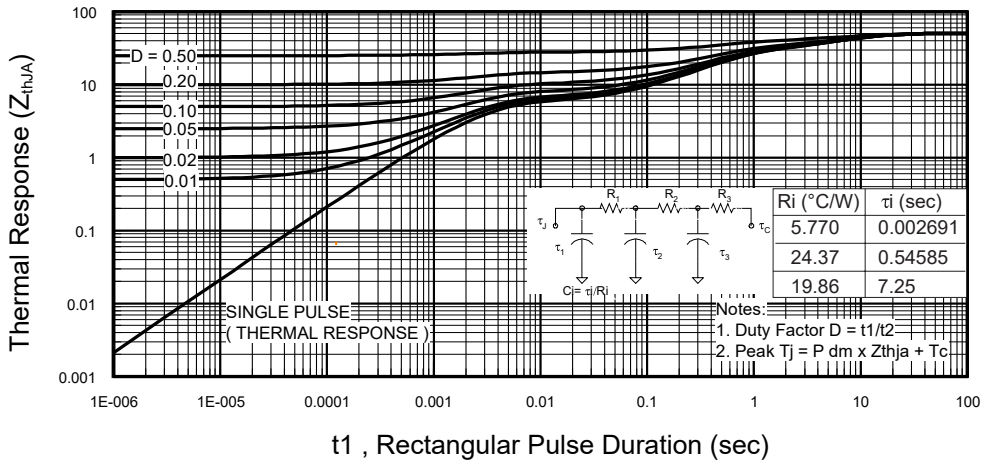


Figure 12: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

8.5Typical Characterisitics

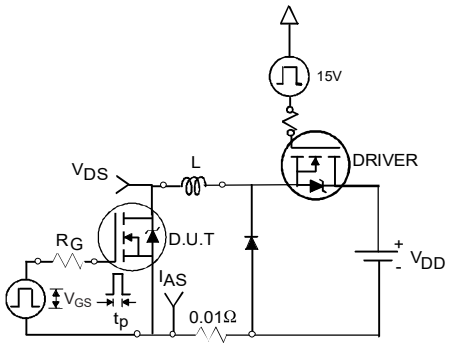


Fig 12a. Unclamped Inductive Test Circuit

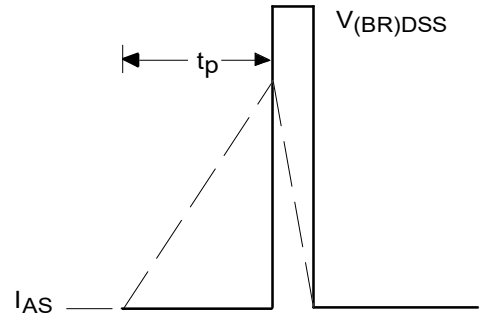


Fig 12b. Unclamped Inductive Waveforms

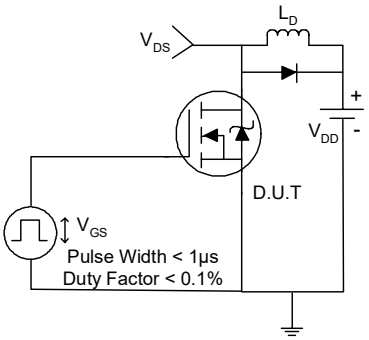


Fig 13a. Switching Time Test Circuit

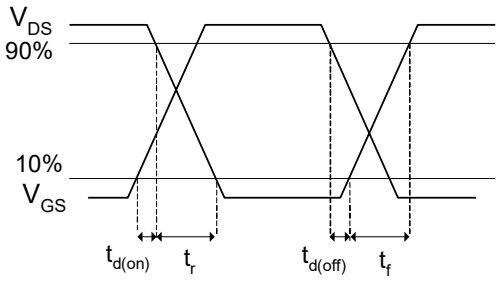


Fig 13b. Switching Time Waveforms

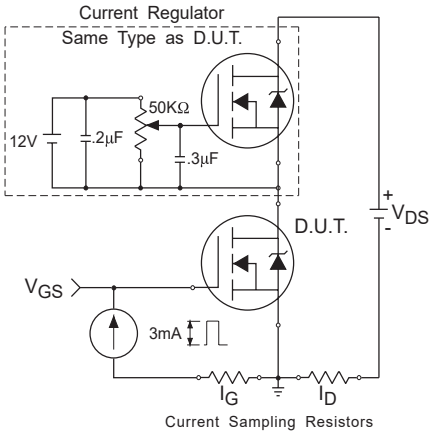
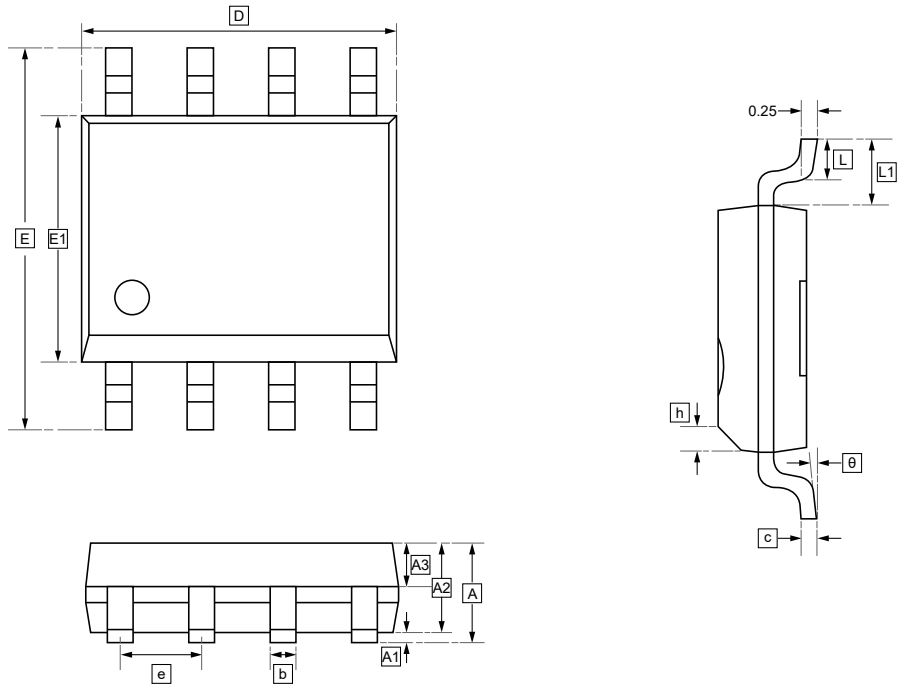


Fig 14. Gate Charge Test Circuit

9.SOP-8 Package Outline Dimensions

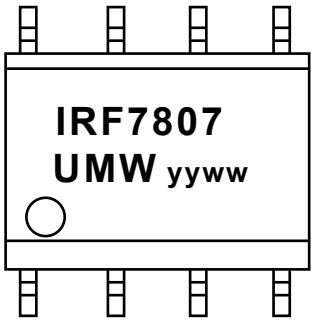


DIMENSIONS (mm are the original dimensions)

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°

10.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF7807TR	SOP-8	3000	Tape and reel

11.Disclaimer

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