UMW IRF9321TR

-30V P-Channel MOSFET

1.Features

- $V_{DS\ (V)}$=-30V
- I_D=-15A
- $R_{DS(ON)}$<7.2mΩ(V_{GS}=-10V)
- $R_{DS(ON)}$<11.2mΩ(V_{GS}=-4.5V)
- Industry-Standard SO8 Package
- RoHS Compliant Containing no Lead, no Bromide and no Halogen

2.Application

- Charge and Discharge Switch for Notebook PC Battery Application

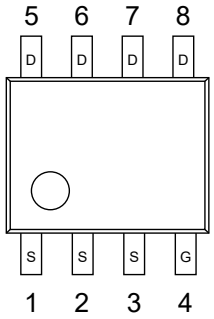
3.Benefits

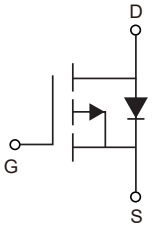
- Multi-Vendor Compatibility
- Environmentally Friendlier

4.Pinning information

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

SOP-8





5.Absolute Maximum Ratings

Parameter		Symbol	Rating	Units
Drain- Source Voltage		V_{DS}	-30	V
Gate-to-Source Voltage		V_{GS}	±20	V
Continuous Drain Current, V_{GS}=-10V	T_A=25°C	I_D	-15	A
Continuous Drain Current, V_{GS}=-10V	T_A=70°C		-12	A
Pulsed Drain Current ①		I_{DM}	-120	A
Power Dissipation ④	T_A=25°C	P_D	2.5	W
Power Dissipation ④	T_A=70°C		1.6	W
Linear Derating Factor			0.02	W/°C
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

6.Electrical Characteristics TA = 25°C unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=-250μA, V_{GS}=0V	-30			V
Breakdown Voltage Temp. Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=-1mA,Reference to 25°C		0.021		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-15A ③		5.9	7.2	mΩ
		V_{GS}=-4.5V, I_D=-12A ③		9.3	11.2	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-50μA	-1.3	-1.8	-2.4	V
Gate Threshold Voltage Coefficient	$\Delta V_{GS(th)}$			-5.9		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	μA
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=-20V			-100	nA
Gate-to-Source Reverse Leakage		V_{GS}=20V			100	nA
Forward Transconductance	g_{FS}	V_{DS}=-10V, I_D=-12A	30			S
Total Gate Charge ⑥	Q_g	V_{DS}=-15V,V_{GS}=-4.5V,I_D=-12A		34		nC
Total Gate Charge ⑥	Q_g	V_{DS}=-10V		65	98	nC
Gate-to-Source Charge ⑥	Q_{gs}	V_{GS}=-15V		10		nC
Gate-to-Drain Charge ⑥	Q_{gd}	I_D=-12A		16		nC
Gate Resistance ⑥	R_g			18		Ω
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=-30V, V_{GS}=-4.5V ③		21		ns
Rise Time	t_r	I_D=-1A		79		ns
Turn-Off Delay Time	$t_{D(off)}$	R_G=6.8Ω		185		ns
Fall Time	t_f	See Figs. 19a &19b		145		ns
Input Capacitance	C_{iss}	V_{GS}=0V		2590		pF
Output Capacitance	C_{oss}	V_{DS}=-25V		590		pF
Reverse Transfer Capacitance	C_{rss}	f=1.0MHz		360		pF
Avalanche Characteristics						
Single Pulse Avalanche Energy ②	E_{AS}				310	mJ
Avalanche Current ①	I_{AR}				-12	A

Diode 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}				-120	A
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=-2.5A,V_{GS}=0V③			-1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=-2.5A,V_{DD}=-24V		38	57	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs ③		24	36	nC
Thermal Resistance						
Junction-to-Drain Lead ⑤	$R_{\theta JL}$				20	°C/W
Junction-to-Ambient ④	$R_{\theta JA}$				50	°C/W

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Starting T_J=25°C, L=4.3mH, R_G=25Ω, I_{AS}=-12A.

③ Pulse width ≤ 400μs; duty cycle ≤ 2%.

④ When mounted on 1 inch square copper board.

⑤ R_θ is measured at T_J of approximately 90°C.

7.1Typical Characterisitics

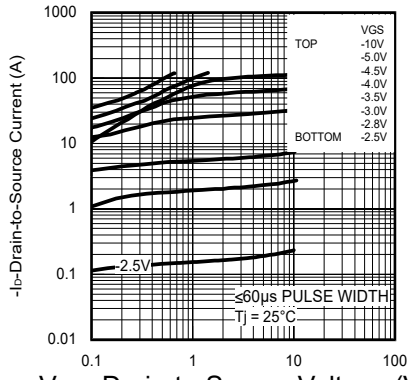


Fig 1. Typical Output Characteristics

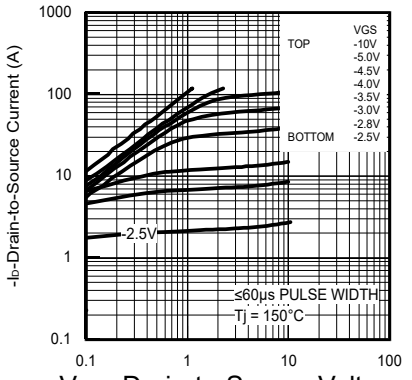


Fig 2. Typical Output Characteristics

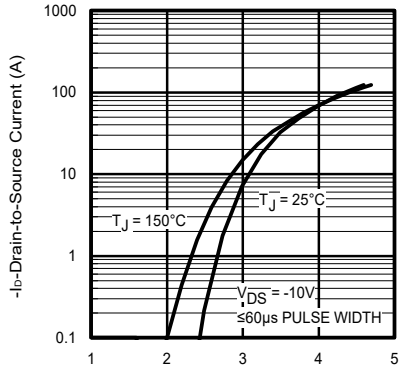


Fig 3. Typical Transfer Characteristics

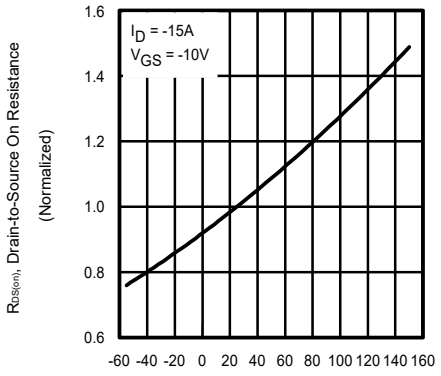


Fig 4. Nomalized On-ResistanceVs. Temperature

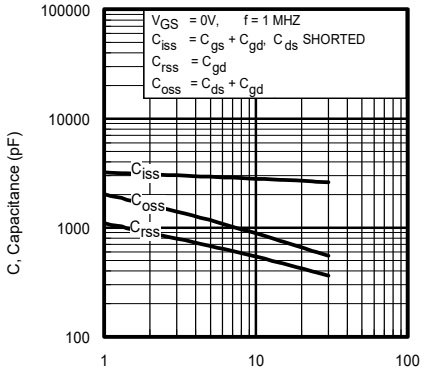


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

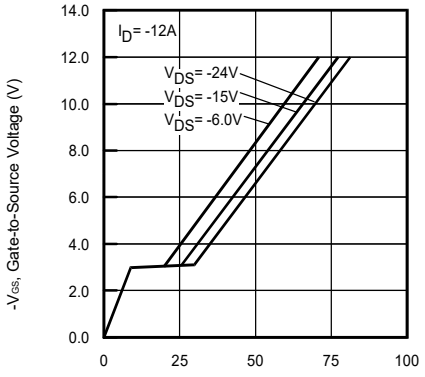
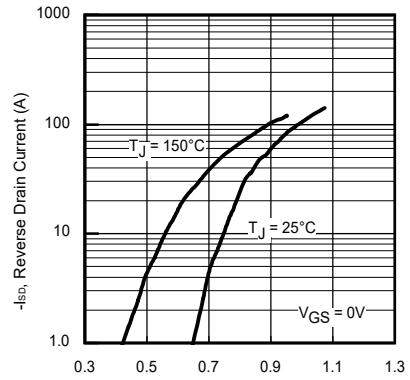


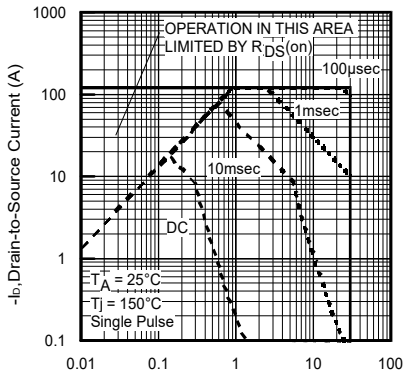
Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

7.2Typical Characterisitics



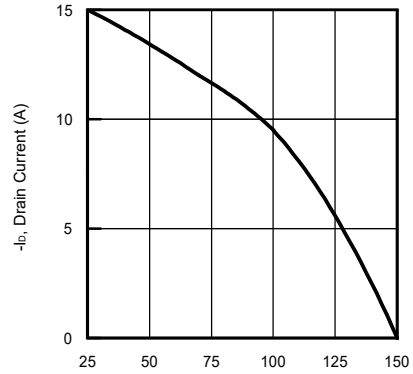
$-V_{SD}$, Source-to-Drain Voltage (V)

Fig 7. Typical Source-Drain Diode Forward Voltage



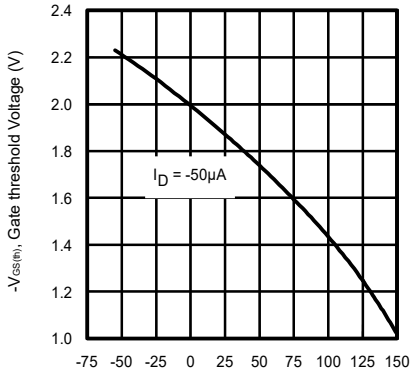
$-V_{DS}$, Drain-to-Source Voltage (V)

Fig 8. Maximum Safe Operating Area



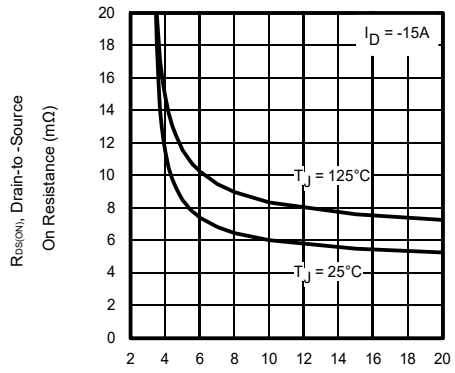
T_A , Ambient Temperature (°C)

Fig 9. Maximum Drain Current vs. Ambient Temperature



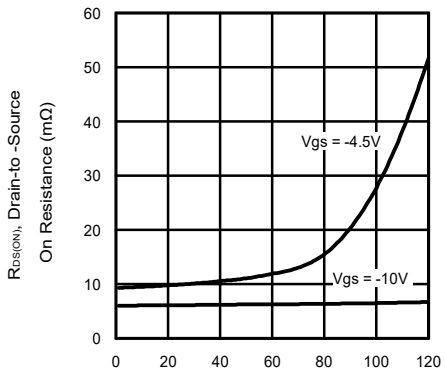
T_J , Temperature (°C)

Fig 10. Threshold Voltage vs. Temperature



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

Fig 11. On-Resistance vs. Gate Voltage



$-I_D$, Drain Current (A)

Fig 12. Typical On-Resistance vs. Drain Current

7.3Typical Characterisitics

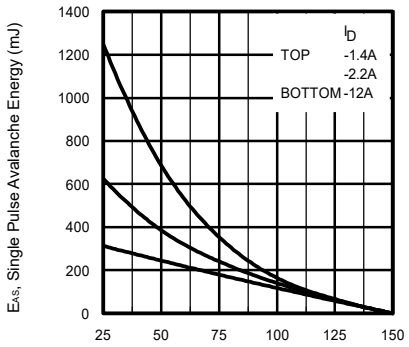


Fig 13. Maximum Avalanche Energy vs. Drain Current

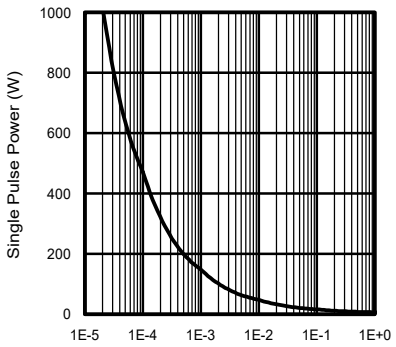


Fig 14. Typical Power vs. Time

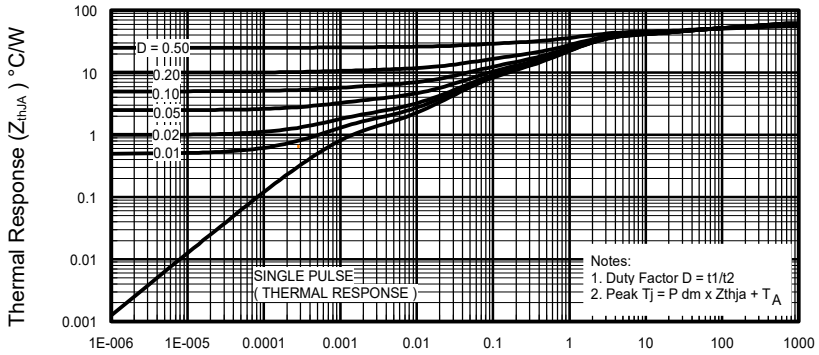
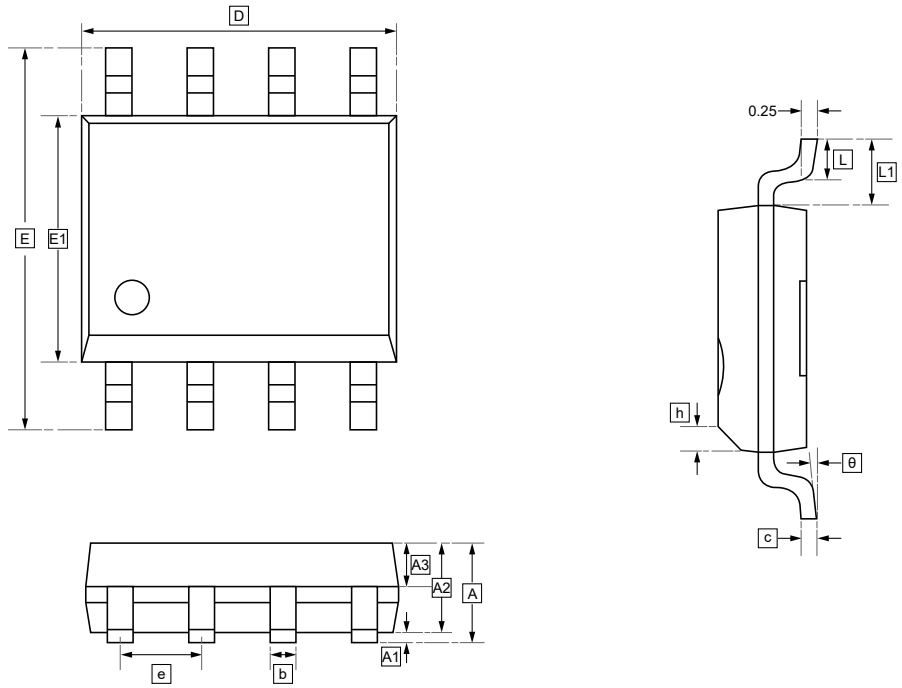


Fig 15. Maximum Effective Transient Themal Impedance, Junction-to-Ambient

8.SOP-8 Package Outline Dimensions

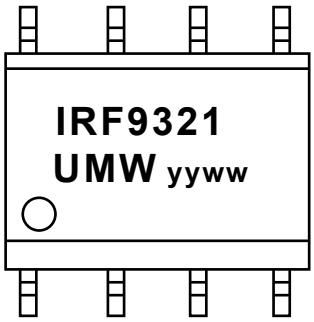


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.80	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.00	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 IRF9321TR	SOP-8	3000	Tape and reel

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