UMW IRF8736TR

30V N-Channel MOSFET

1.Features

- $V_{DS\ (V)}$=30V
- I_D=18A
- $R_{DS(ON)}$<4.8mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<6.8mΩ(V_{GS}=4.5V)

2.Applications

- Synchronous MOSFET for Notebook Processor Power
- Synchronous Rectifier MOSFET for Isolated DC-DC Converters in Networking Systems

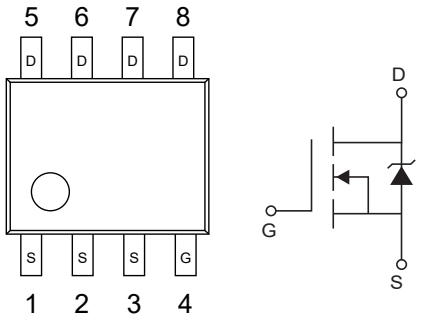
3.Benefits

- Very Low $R_{DS(ON)}$ at 4.5V V_{GS}
- Low Gate Charge
- Lead -Free
- Fully Characterized Avalanche Voltage and Current
- 100% Tested for R_G

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	18	A
Continuous Drain Current, V_{GS}=10V	T_A=70°C		14.4	A
Pulsed Drain Current ①		I_{DM}	144	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
Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

6.Thermal Resistance Rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Drain Lead ⑤	$R_{\theta JL}$		20	°C/W
Junction-to-Ambient ④ ⑤	$R_{\theta JA}$		50	°C/W

7.Electrical Characteristics T_J=25°C

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		0.022		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=18A ③		3.9	4.8	mΩ
		V_{GS}=4.5V, I_D=14.4A ③		5.5	6.8	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=50μA	1.35	1.8	2.35	V
Gate Threshold Voltage Coefficient	$\Delta V_{GS(th)}$	V_{DS}=V_{GS}, I_D=50μA		-6.1		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}=15V, I_D=14.4A	52			S
Total Gate Charge	Q_g	V_{DS}=15V V_{GS}=4.5V I_D=14.4A See Fig. 16		17	26	nC
Pre-Vth Gate-to-Source Charge	Q_{gs1}			4.4		nC
Post-Vth Gate-to-Source Charge	Q_{gs2}			1.9		nC
Gate-to-Drain Charge	Q_{gd}			5.8		nC
Gate Charge Overdrive	Q_{godr}			4.9		nC
Switch Charge (Q_{gs2} + Q_{gd})	Q_{sw}			7.7		nC
Output Charge	Q_{oss}	V_{GS}=0V, V_{DS}=10V		7.1		nC
Gate Resistance	R_G			1.3	2.2	Ω
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=15V V_{GS}=4.5V ③ I_D=14.4A R_G=1.8Ω, See Fig. 14		12		ns
Rise Time	t_r			15		ns
Turn-Off Delay Time	$t_{D(off)}$			13		ns
Fall Time	t_f			7.5		ns
Input Capacitance	C_{iss}	V_{GS}=0V V_{DS}=15V f=1.0MHz		2315		pF
Output Capacitance	C_{oss}			449		pF
Reverse Transfer Capacitance	C_{rss}			219		pF

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}				144	
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=14.4A,V_{GS}=0V ③			1	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=14.4A		16	24	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=300A/μs ③		19	29	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

8.Avalanche Characteristics

Parameter	Symbol	Typ	Max	Units
Single Pulse Avalanche Energy ②	E_{AS}		126	mJ
Avalanche Current ①	I_{AR}		14.4	A

9.1Typical Characterisitics

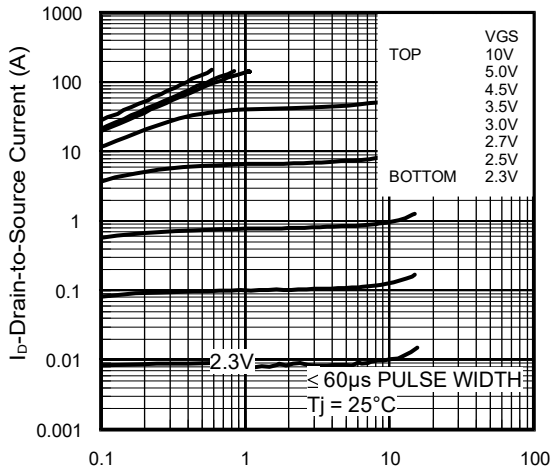


Fig 1. Typical Output Characteristics

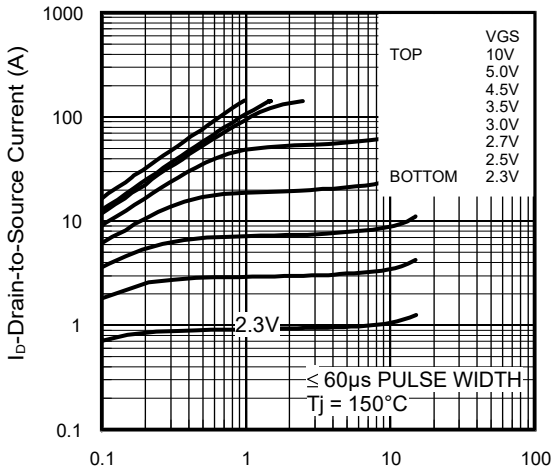


Fig 2. Typical Output Characteristics

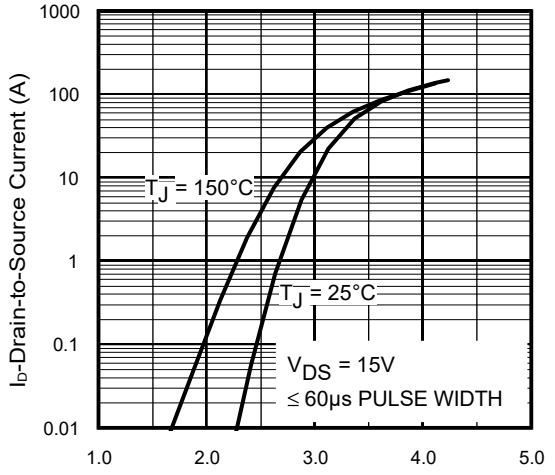


Fig 3. Typical Transfer Characteristics

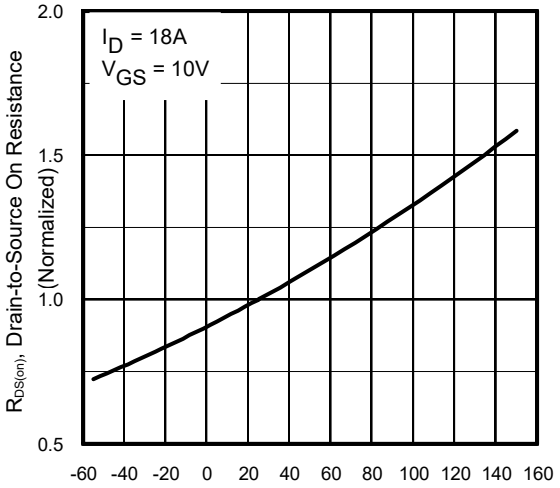
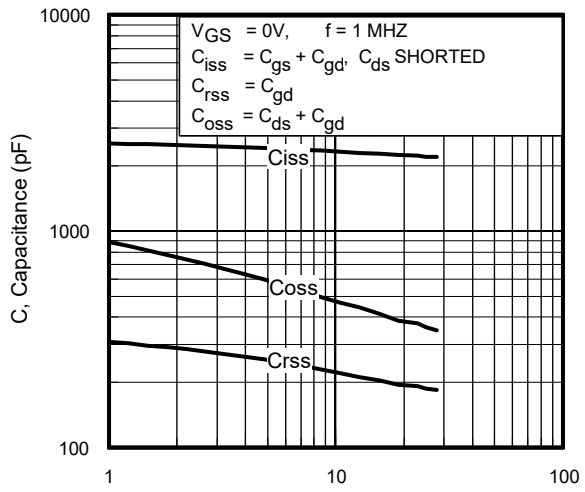


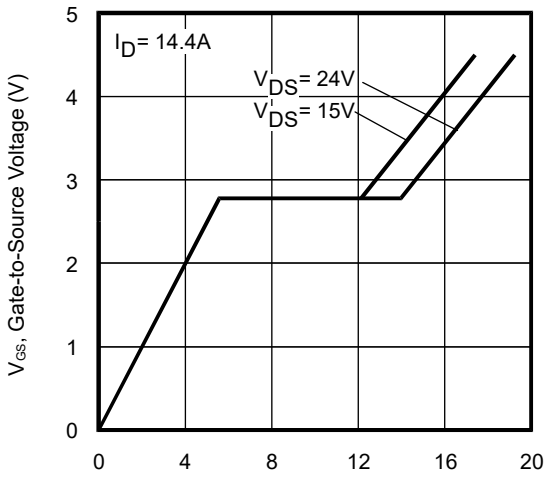
Fig 4. Nomalized On-ResistanceVs. Temperature

9.2Typical Characterisitics



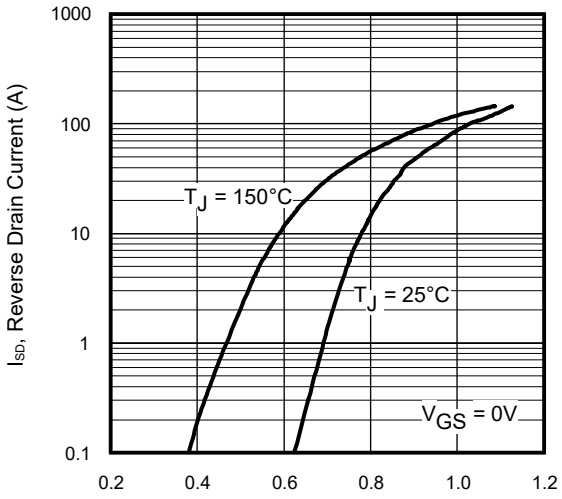
V_{DS} ,Drain-to-Source Voltage (V)

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



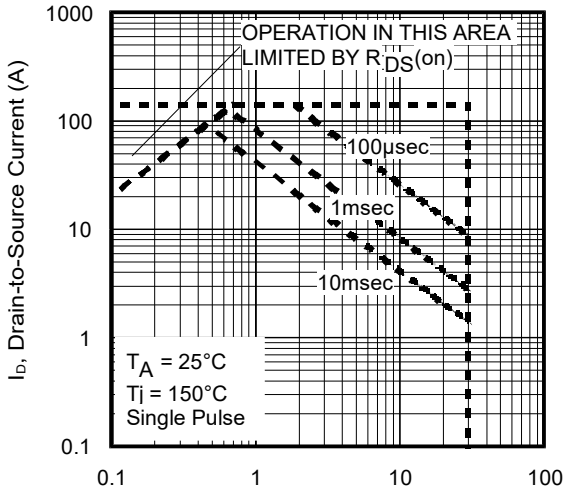
Q_G, Total Gate Charge (nC)

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

9.3Typical Characterisitics

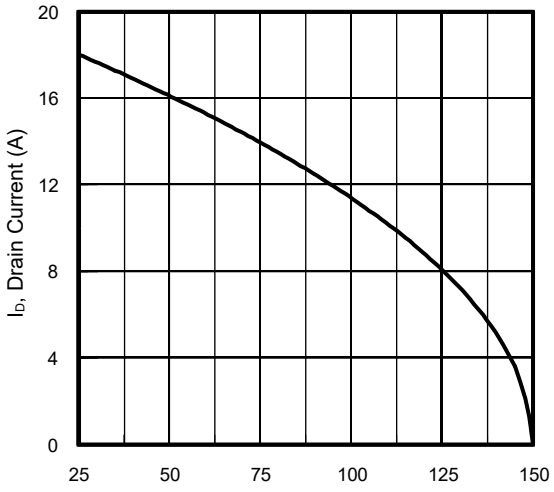


Fig 9. Maximum Drain Current Vs. Case Temperature

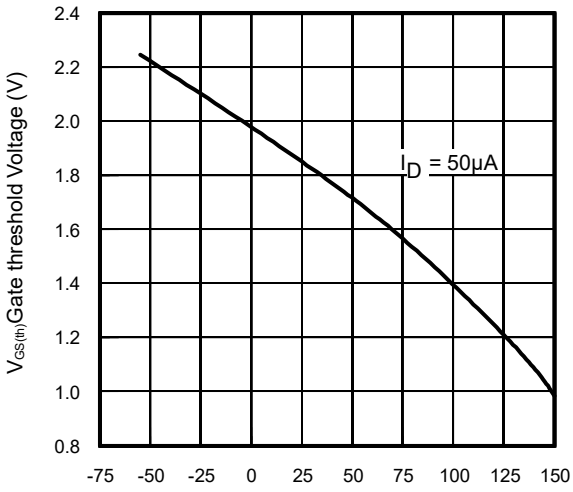


Fig 10. Threshold Voltage Vs. Temperature

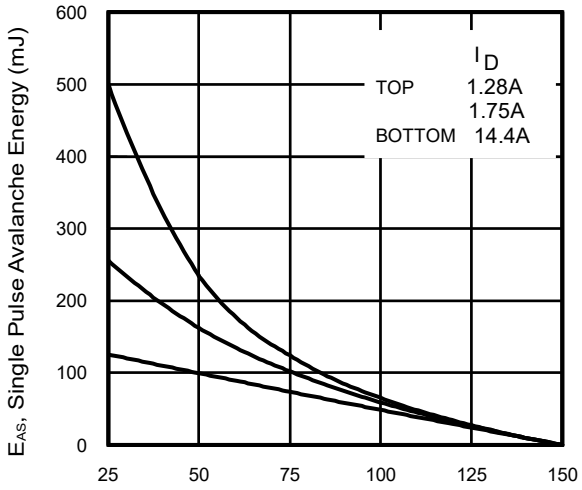
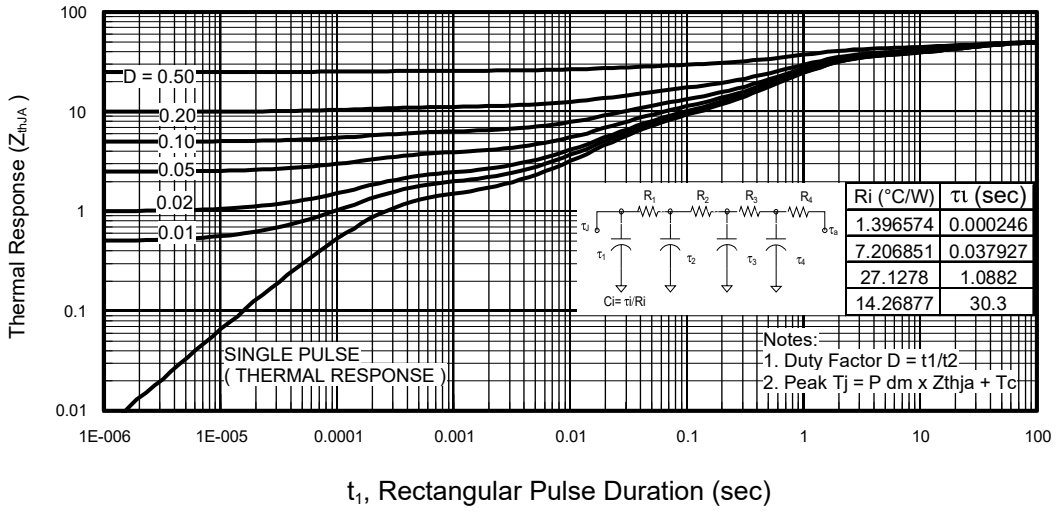


Fig 11. Maximum Avalanche EnergyVs. Drain Current

9.4Typical Characterisitics



Ri (°C/W)	τι (sec)
1.396574	0.000246
7.206851	0.037927
27.1278	1.0882
14.26877	30.3

Fig 12. Maximum Effective Transient Themal Impedance, Junction-to-Ambient

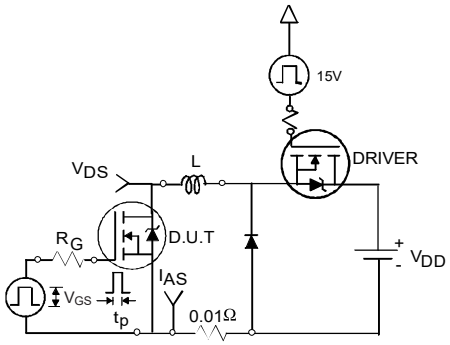


Fig 13a. Unclamped Inductive Test Circuit

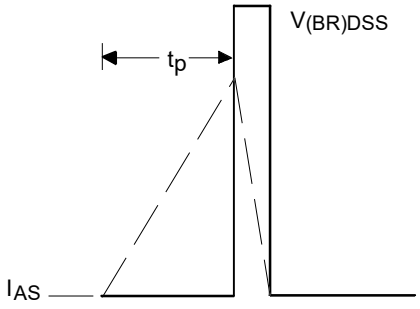


Fig 13b. Unclamped Inductive Waveforms

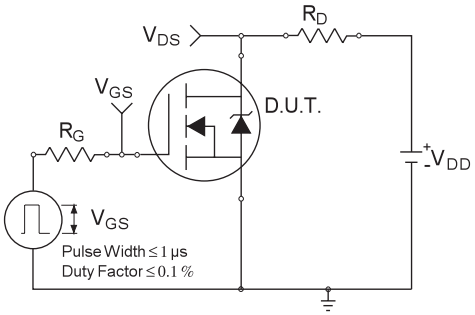


Fig 14a. Switching Time Test Circuit

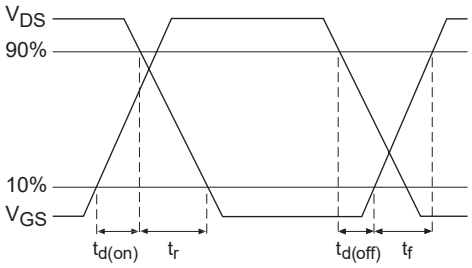


Fig 14b. Switching Time Waveforms

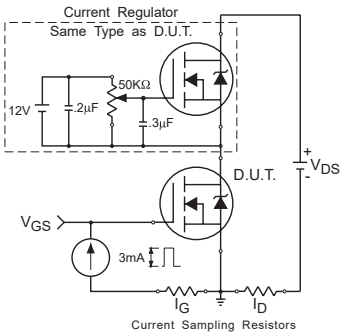
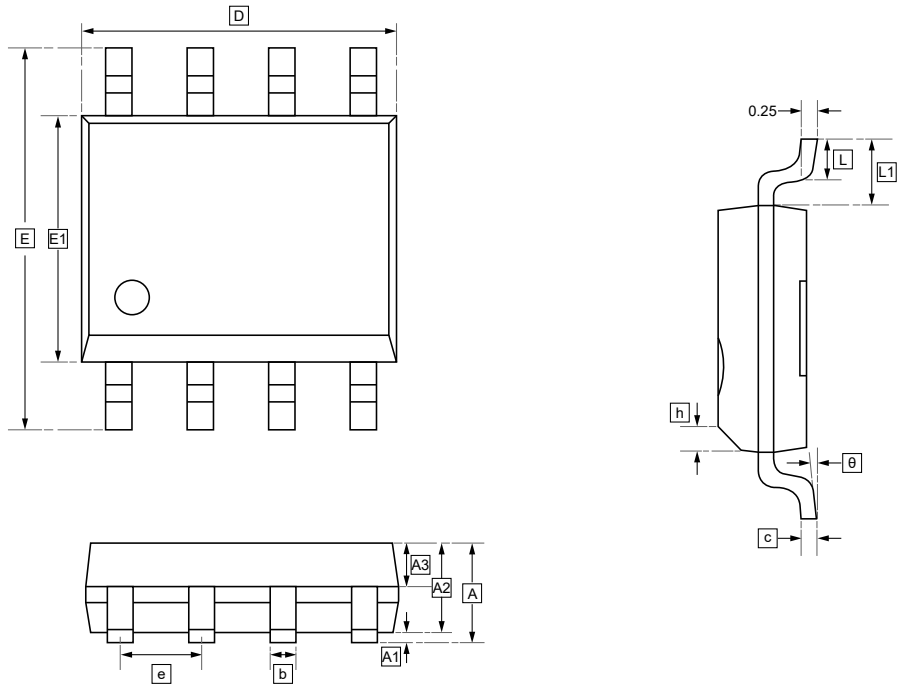


Fig 15a. Gate Charge Test Circuit

10.SOP-8 Package Outline Dimensions

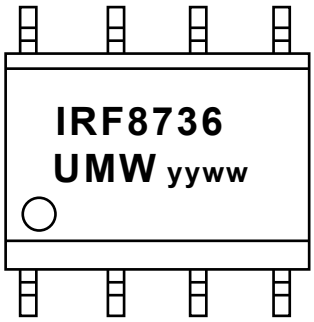


DIMENSIONS (mm are the original dimensions)

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°

11.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF8736TR	SOP-8	3000	Tape and reel

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