UMW FDS8949

Dual 40V N-Channel MOSFET

1.Features

These N-channel Logic Level MOSFETS has been especially tailoredto minimize the on-state resistance and yet maintainsuperior switching.

2.1 Features

- $V_{DS\ (V)}$=40V
- I_D=6A
- $R_{DS(ON)}$＜29mΩ(V_{GS}=10V)
- $R_{DS(ON)}$＜36mΩ(V_{GS}=4.5V)

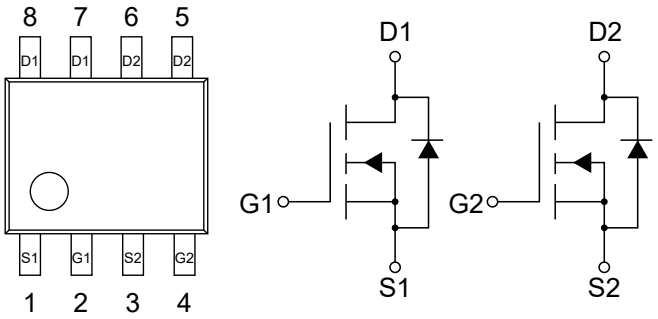
2.2 Features

- High power and current handling capability
- High performance trench technology for extremely low $R_{DS(ON)}$
- Low gate charge
- RoHS compliant

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	Value	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current – Continuous	(Note 1a)	I_D	6	A
– Pulsed			20	
Drain-Source Avalanche Energy	(Note 3)	E_{AS}	26	W
Power Dissipation for Dual Operation		P_D	2	W
Power Dissipation for Single Operation	(Note 1a)		1.6	W
	(Note 1b)		0.9	mJ
Storage Junction Temperature Range		T_J, T_{STG}	-55 to 150	°C

5.Thermal Characteristics

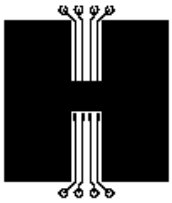
Parameter	Symbol	Rating	Units
Thermal Resistance, Junction-to-Ambient (Note 1a)	$R_{\theta JA}$	81	°C/W
Thermal Resistance, Junction-to-Case (Note 1b)	$R_{\theta JA}$	135	°C/W
Thermal Resistance, Junction-to-Case (Note 1)	$R_{\theta JC}$	40	°C/W

6.Electrical Characteristics (T_A=25°C unless otherwise noted)

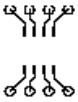
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	40			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		33		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=32V, V_{GS}=0V			1	μA
		T_J=55°C			10	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Gate to Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.9	3	V
Gate to Source Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		-4.6		mV/°C
Drain to Source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=6A		21	29	mΩ
		V_{GS}=4.5V, I_D=4.5A		26	36	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10, I_D=6V		22		S
Input Capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V,f =1MHz		715	955	pF
Output Capacitance	C_{oss}			105	140	pF
Reverse Transfer Capacitance	C_{rss}			60	90	pF
Gate Resistance	R_G	f =1MHz		1.1		Ω
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=20V, I_D=1A V_{GS}=10V, R_{GEN}=6Ω		9	18	ns
Rise Time	t_r			5	10	ns
Turn-Off DelayTime	$t_{D(off)}$			23	37	ns
Fall Time	t_f			3	6	ns
Total Gate Charge	Q_g	V_{DS}=20V, I_D=6A V_{GS}=5V		7.7	11	nC
Gate to Source Charge	Q_{gs}			2.4		nC
Gate to Drain “Miller” Charge	Q_{gd}			2.8		nC
Source to Drain Diode Forward Voltage	V_{SD}			0.8	1.2	V
Reverse Recovery Time (note 3)	t_{rr}	V_{GS}=0V, I_S=6A (Note 2)		17	26	ns
Reverse Recovery Charge	Q_{rr}	I_F=6A, di_F/d_t=100A/μs		7	11	nC

Notes:

1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.



a) 81°C/W when mounted on a $1in^2$ pad of 2 oz copper



b) 135°C/W when mounted on a minimum pad

2 Test: Pulse Width < 300μs, Duty Cycle < 2.0%

3 Starting T_J =25°C, L=1mH, I_{AS}=7.3A, V_{DD}=40V, V_{GS}=10V

7.1Typical Characteristics

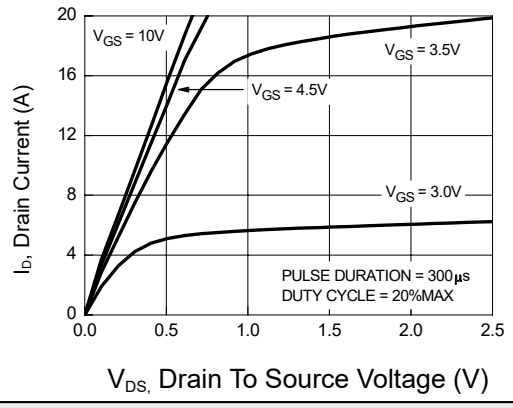


Figure 1: On-Region Characteristics

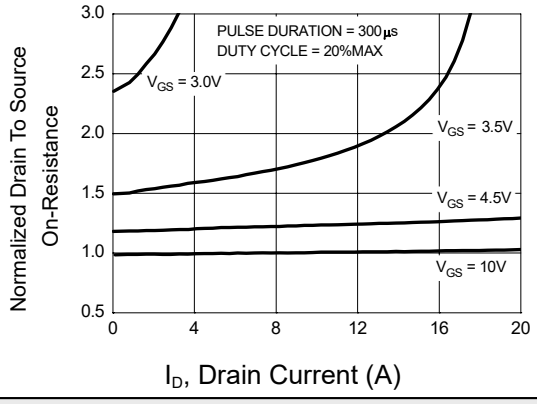


Figure 2: Normalized On-Resistance vs Drain Current and Gate Voltage

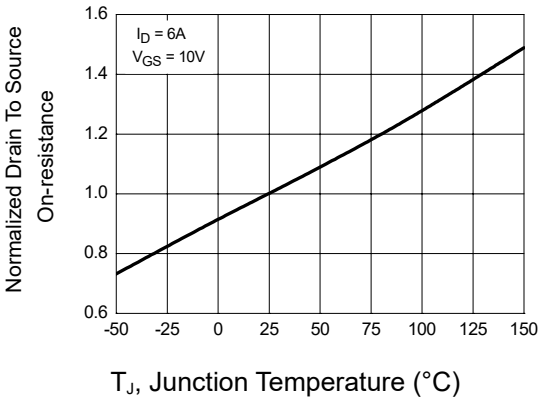


Figure 3: Normalized On Resistance vs Junction Temperature

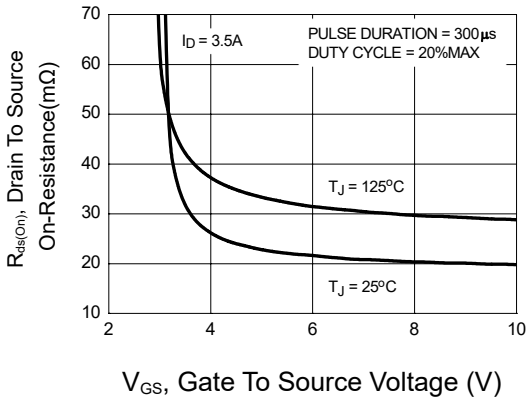


Figure 4: On-Resistance vs Gate to Source Voltage

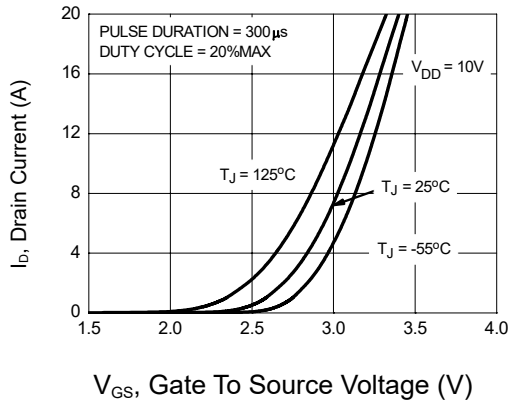


Figure 5: Transfer Characteristics

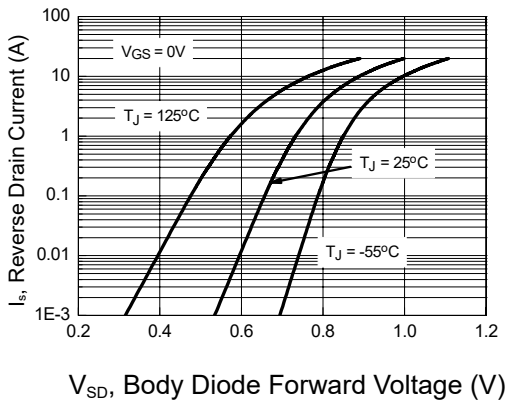


Figure 6: Source to Drain Diode Forward Voltage vs Source Current

7.2Typical Characteristics

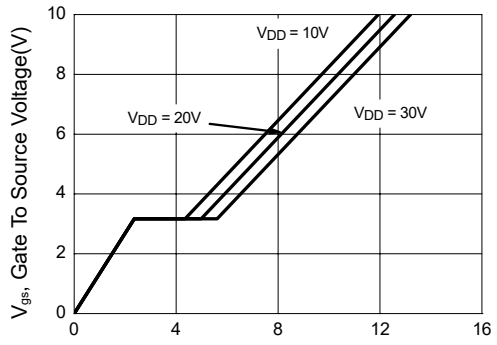


Figure 7: Gate Charge Characteristics

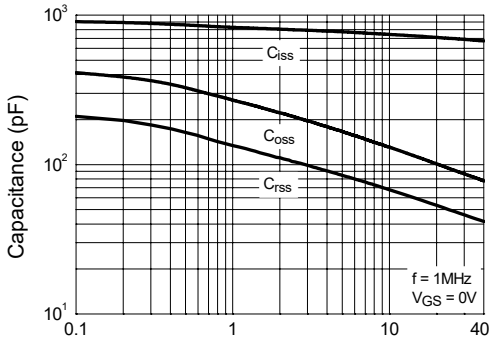


Figure 8: Capacitance vs Drain to Source Voltage

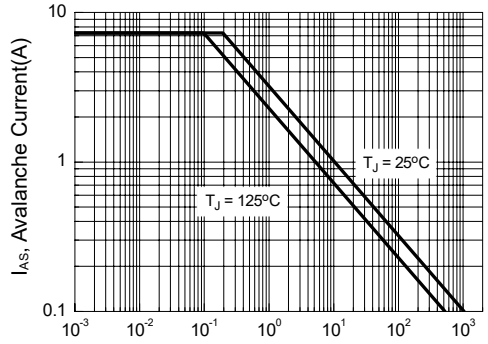


Figure 9: Unclamped Inductive Switching Capability

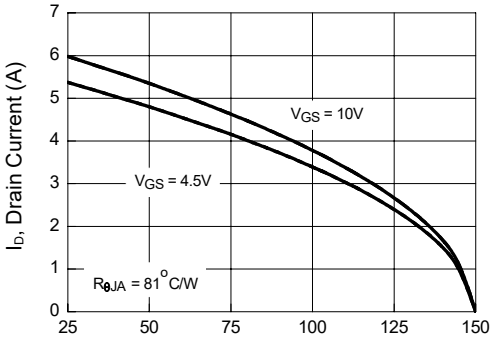


Figure 10: Maximum Continuous Drain Current vs Case Temperature

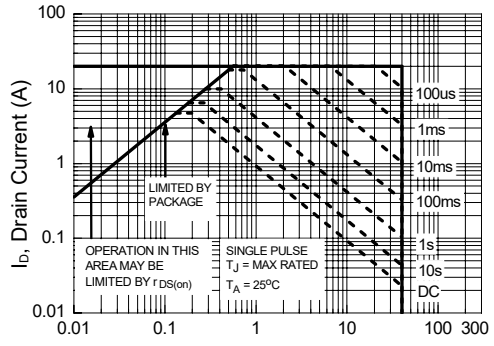


Figure 11: Forward Bias Safe Operating Area

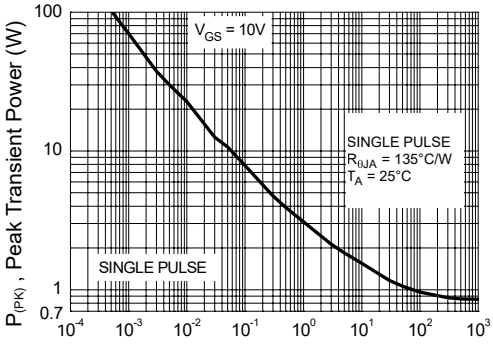


Figure 12: Single Pulse Maximum Power Dissipation

7.3Typical Characteristics

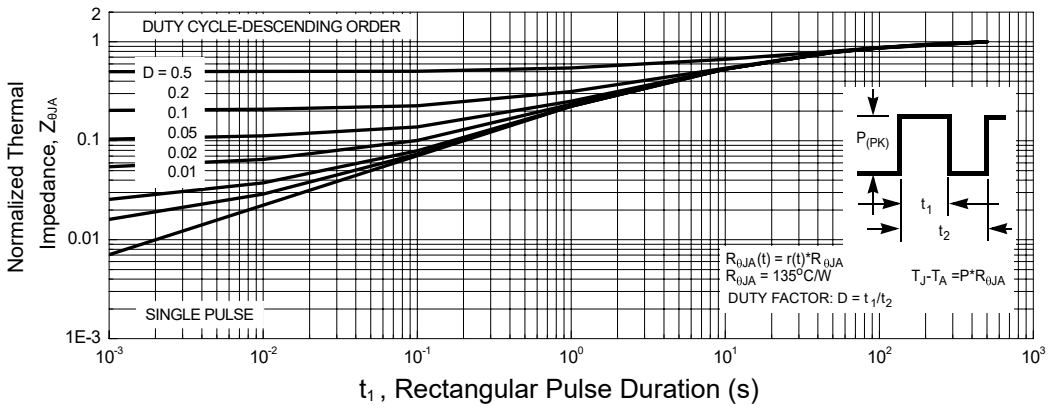
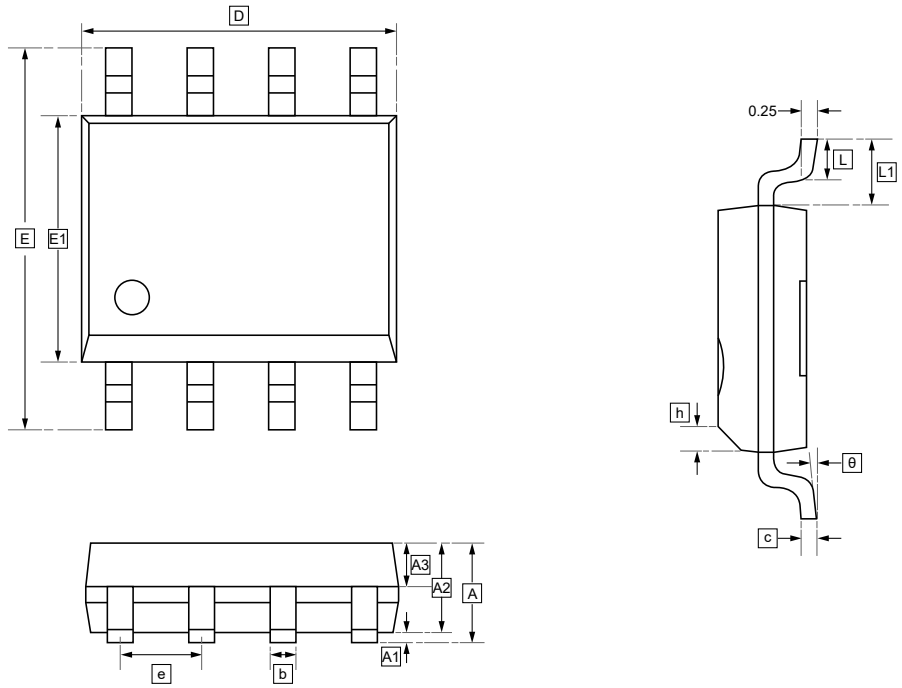


Figure 13: Transient Thermal Response Curve

8.SOP-8 Package Outline Dimensions

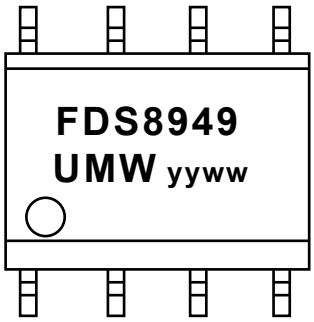


DIMENSIONS (mm are the original dimensions)

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 FDS8949	SOP-8	3000	Tape and reel

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