UMW FDS6676AS

30V N-Channel MOSFET

1.Description

The FDS6676AS is designed to replace a single SO-8 MOSFET and Schottky diode in synchronous DC:DC power supplies.This 30V MOSFET is designed to maximize power conversion efficiency, providing a low $R_{DS(ON)}$ and low gate charge.

2.1Features

- $V_{DS\ (V)}$=30V
- I_D=14.5A
- $R_{DS(ON)}$<6mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<7.25mΩ(V_{GS}=4.5V)

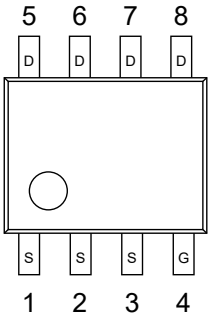
2.2Features

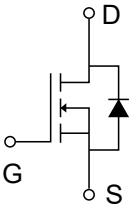
- High power and current handling capability.
- High performance trench technology for extremely low $R_{DS(ON)}$ and fast switching RoHS Compliant
- Includes SyncFET Schottky body diode
- Low gate charge (45nC typical)

3.Pinning information

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

SOP-8





4.Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current – Continuous		I_D	14.5	A
– Pulsed	(Note 1a)		50	
Power Dissipation for Single Operation	(Note 1a)	P_D	2.5	W
	(Note 1b)		1.2	
	(Note 1c)		1	
Operating and 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)	$R_{\theta JA}$	50	°C/W
Thermal Resistance, Junction-to-Case (Note 1)	$R_{\theta JC}$	25	°C/W

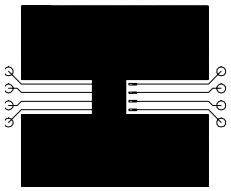
6.Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=1mA, V_{GS}=0V	30			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I_D=10mA Referenced to 25°C		20		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			500	μA
Gate–Body Leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
On Characteristics (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=1mA	1	1.5	3	V
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I_D=10mA Referenced to 25°C		-4		mV/°C
Static Drain–Source On–Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=14.5A		4.5	6	mΩ
		V_{GS}=4.5V, I_D=13.2A		5.9	7.25	
On–State Drain Current	$I_{D(ON)}$	V_{GS}=10V, V_{DS}=5V	50			A
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=14.5A		66		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, f =1MHz		2510		pF
Output Capacitance	C_{oss}			710		pF
Reverse Transfer Capacitance	C_{rss}			270		pF
Gate Resistance	R_G	V_{GS}=15mV, f =1MHz		1.6	2.8	Ω
SWITCHING PARAMETERS (Note 2)						
Turn-On DelayTime	$t_{D(on)}$	V_{DD}=15V, I_D=1A V_{GS}=10V, R_{GEN}=6Ω		10	20	ns
Turn-On Rise Time	t_r			12	22	ns
Turn-Off DelayTime	$t_{D(off)}$			43	69	ns
Turn-Off Fall Time	t_f			29	46	ns

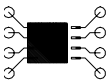
Turn-On DelayTime	$t_{D(on)}$	V_{DD}=15V, I_D=1A V_{GS}=4.5V, R_{GEN}=6Ω		17	31	ns
Turn-On Rise Time	t_r			22	35	ns
Turn-Off DelayTime	$t_{D(off)}$			34	54	ns
Turn-Off Fall Time	t_f			29	46	ns
Total Gate Charge at V_{GS}=10V	Q_g(TOT)	V_{DD}=15V, I_D=14.5A		45	63	nC
Total Gate Charge at V_{GS}=5V	Q_g			25	35	nC
Gate–Source Charge	Q_{gs}			7		nC
Gate–Drain Charge	Q_{gd}			8		nC
Drain-Source Diode Characteristics						
Drain–Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=3.5A (Note 2)		0.4	0.7	V
		V_{GS}=0V, I_S=7A (Note 2)		0.5		V
Diode Reverse Recovery Time	t_{rr}	I_F=14.5A dI_F/dt=300A/μs (Note 3)		27		nS
Diode Reverse Recovery Current	I_{RM}			1.9		A
Diode Reverse Recovery Charge	Q_{rr}			26		nC

Notes:

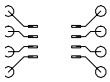
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.



a) 50° C/W when mounted on a 0.5 in ^{2} pad of 2 oz. copper.

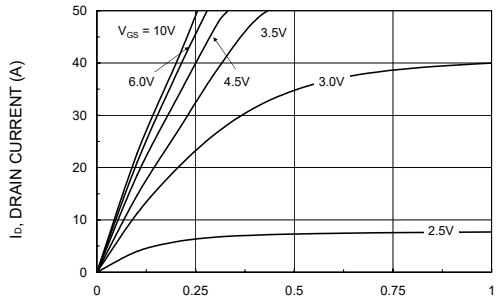


b) 105° C/W when mounted on a 0.02 in ^{2} pad of 2 oz. copper.



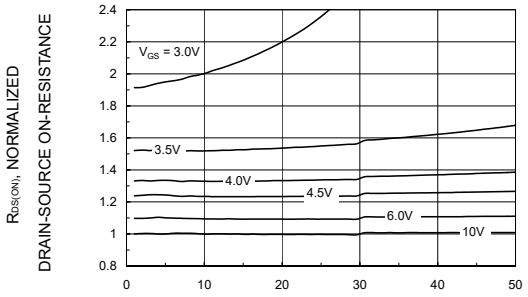
c) 125° C/W when mounted on a 0.003 in ^{2} pad of 2 oz. copper.

7.1 Typical Electrical And Thermal Characteristics



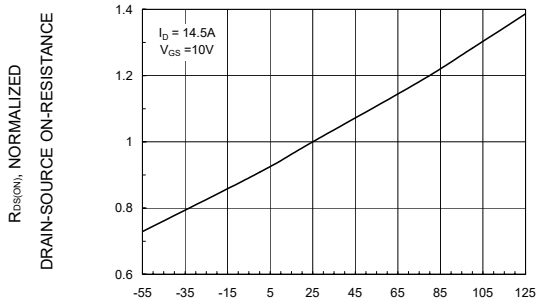
V_{DS}, DRAIN TO SOURCE VOLTAGE (V)

Fig 1: On-Region Characteristics.



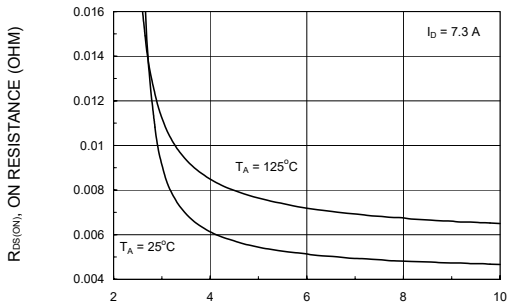
I_D, DRAIN CURRENT (A)

Figure 2: On-Resistance Variation with Drain Current and Gate Voltage.



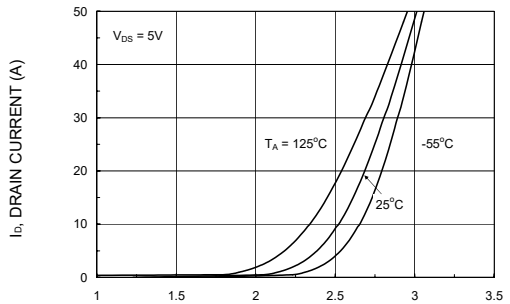
T_J, JUNCTION TEMPERATURE (°C)

Figure 3: On-Resistance Variation with Temperature.



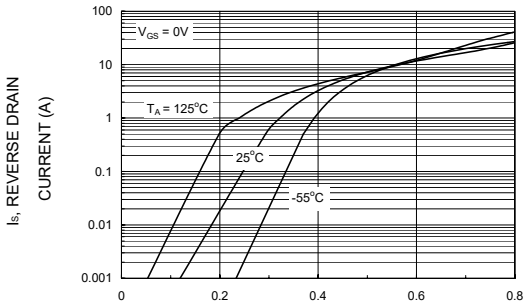
V_{GS}, GATE TO SOURCE VOLTAGE (V)

Figure 4: On-Resistance Variation with Gate-to-Source Voltage.



V_{GS}, GATE TO SOURCE VOLTAGE (V)

Figure 5: Transfer Characteristics.



$-V_{SD}$, BODY DIODE VOLTAGE (V)

Figure 6: . Body Diode Forward Voltage Variation with Source Current and Temperature.

7.2 Typical Electrical And Thermal Characteristics

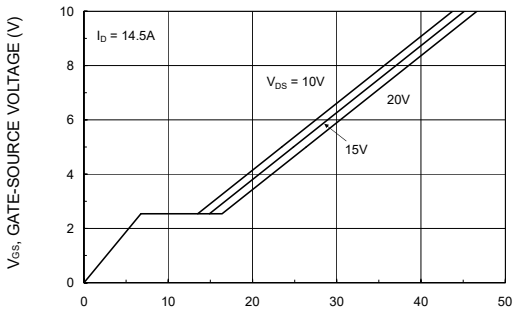


Figure 7: Gate-Charge Characteristics

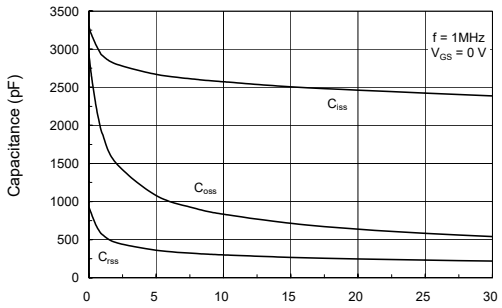


Figure 8: Capacitance Characteristics

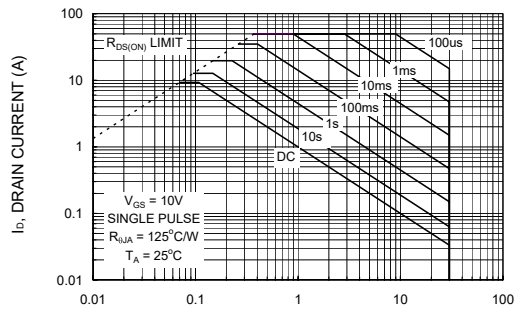


Figure 9: Maximum Safe Operating Area.

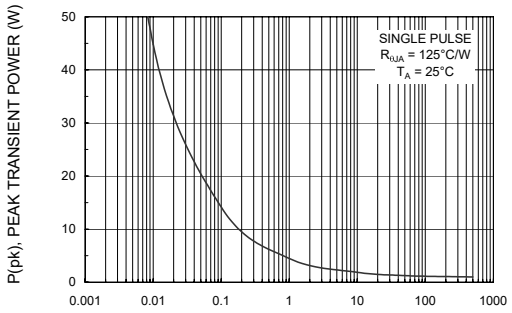


Figure 10: Single Pulse Maximum Power Dissipation.

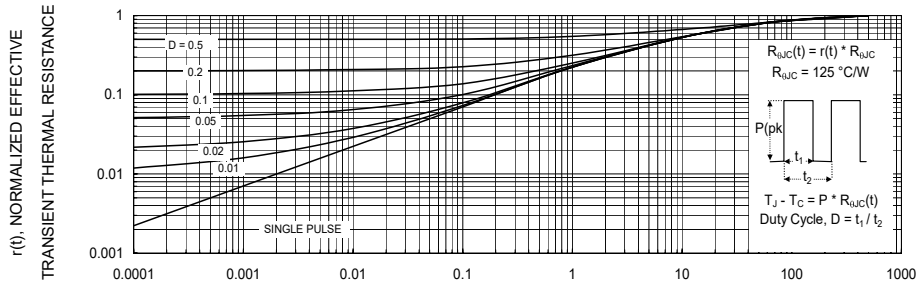
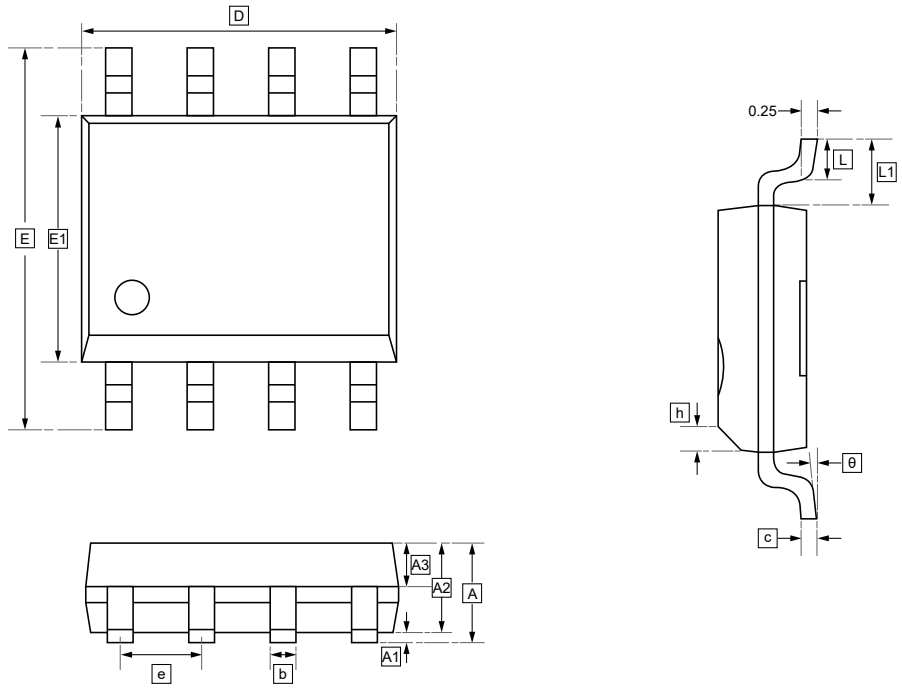


Figure 11: Transient Thermal Response Curve.

8.SOP-8 Package Outline Dimensions

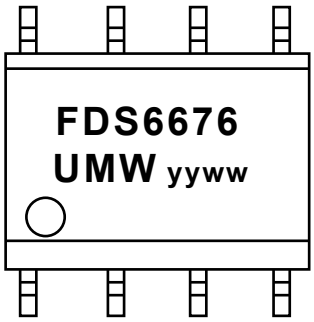


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.70	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 FDS6676AS	SOP-8	3000	Tape and reel

10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.