UMW FDS6682

30V N-Channel MOSFET

1.Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for “low side” synchronous rectifier operation, providing an extremely low RDS(ON) in a small package.

2.1Features

- $V_{DS\ (V)}$=30V
- I_D=14A
- $R_{DS(ON)}$<7.5mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<9mΩ(V_{GS}=4.5V)

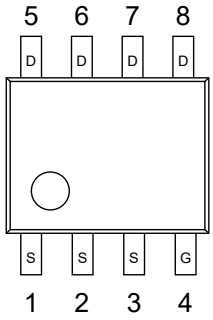
2.2Features

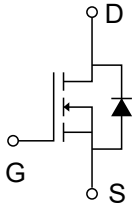
- High power and current handling capability
- High performance trench technology for extremely low $R_{DS(ON)}$
- Low gate charge (22 nC typical)

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	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

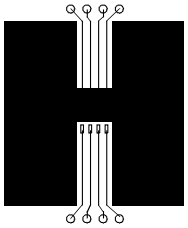
6.Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	30			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		23		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			10	μA
Gate–Body Leakage, Forward	I_{GSSF}	V_{GS}=20V, V_{DS}=0V			100	nA
Gate–Body Leakage, Reverse	I_{GSSR}	V_{GS}=-20V, V_{DS}=0V			-100	nA
On Characteristics (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.7	3	V
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		-5.6		mV/°C
Static Drain–Source On–Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=14A		5.7	7.5	mΩ
		V_{GS}=4.5V, I_D=12.5A		6.6	9	mΩ
On–State Drain Current	$I_{D(ON)}$	V_{GS}=10V, V_{DS}=5V	50			A
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=14A		70		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=15V		2310		pF
Output Capacitance	C_{oss}	V_{GS}=0V		582		pF
Reverse Transfer Capacitance	C_{rss}	f =1MHz		237		pF
SWITCHING PARAMETERS (Note 2)						
Turn-On DelayTime	$t_{D(on)}$			10	20	ns
Turn-On Rise Time	t_r	V_{DD}=15V, I_D=1A		7	14	ns
Turn-Off DelayTime	$t_{D(off)}$	V_{GS}=10V, R_{GEN}=6Ω		44	70	ns
Turn-Off Fall Time	t_f			16	29	ns

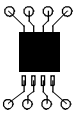
Total Gate Charge	Q_g	V_{DS}=15V, I_D=14A V_{GS}=5V		22	31	nC
Gate–Source Charge	Q_{gs}			6.4		nC
Gate–Drain Charge	Q_{gd}			8		nC
Drain–Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain–Source Diode Forward Current	I_S				2.1	A
Drain–Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=2.1A(Note 2)		0.7	1.2	V

Notes:

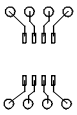
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.



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.

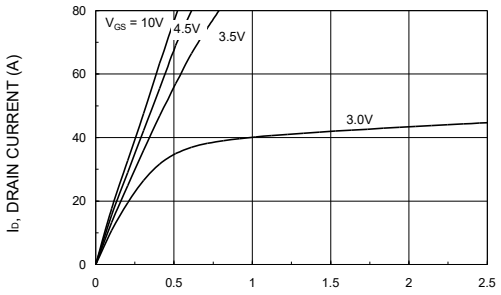


c) 125° C/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

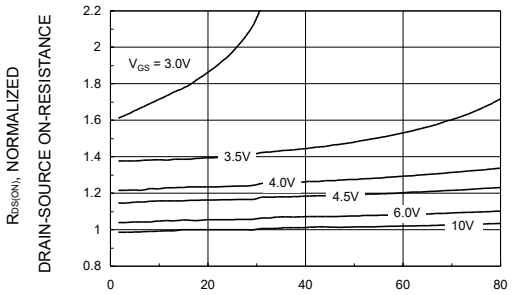
2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

7.1TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



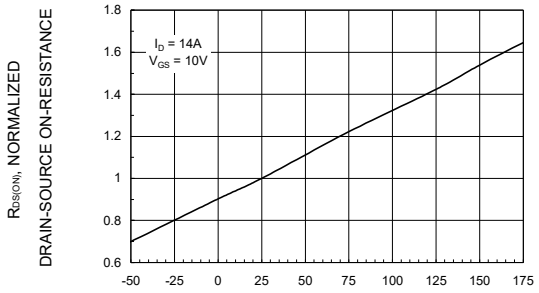
V_{DS}, DRAIN TO SOURCE VOLTAGE (V)

Fig 1: On-Region Characteristics.



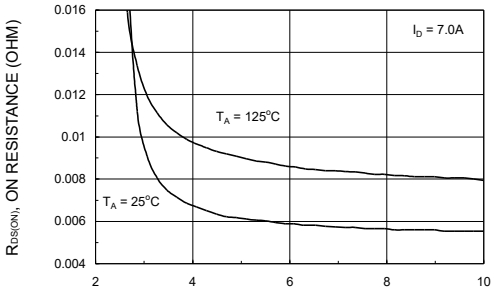
I_D, DRAIN CURRENT (A)

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



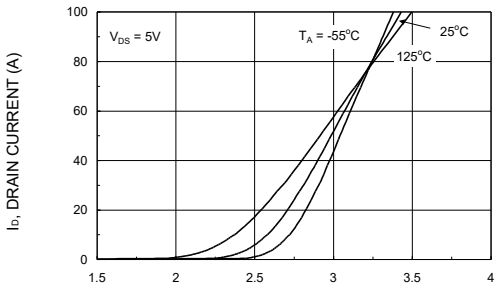
T_J, JUNCTION TEMPERATURE (°C)

Figure 3: On-Resistance Variation with Temperature.



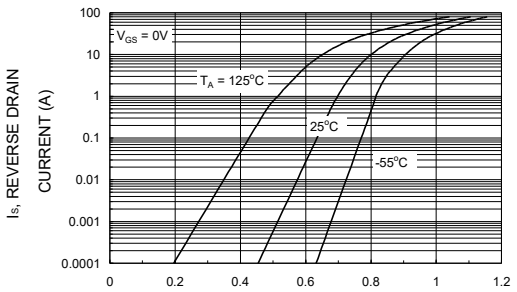
V_{GS}, GATE TO SOURCE VOLTAGE (V)

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.

7.2TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

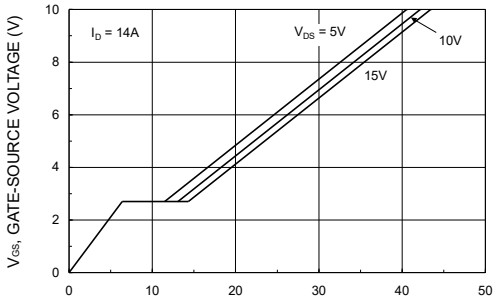


Figure 7: Gate-Charge Characteristics

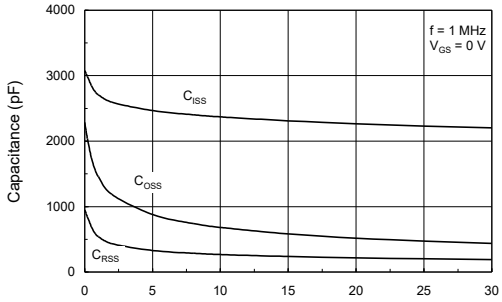


Figure 8: Capacitance Characteristics

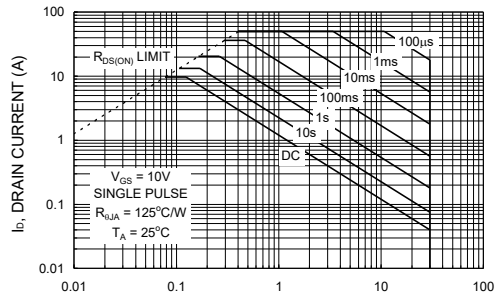


Figure 9: Maximum Safe Operating Area.

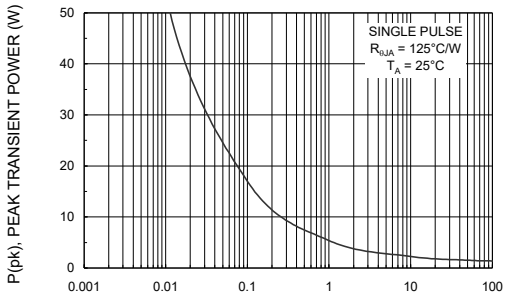


Figure 10: Single Pulse Maximum Power Dissipation.

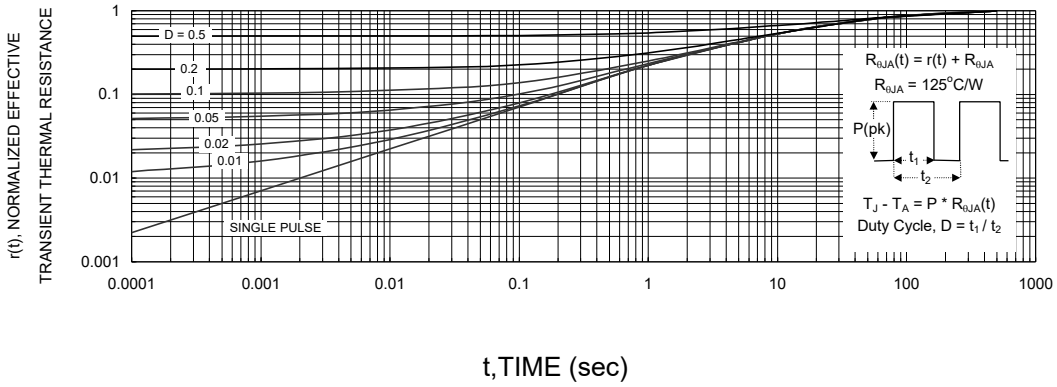
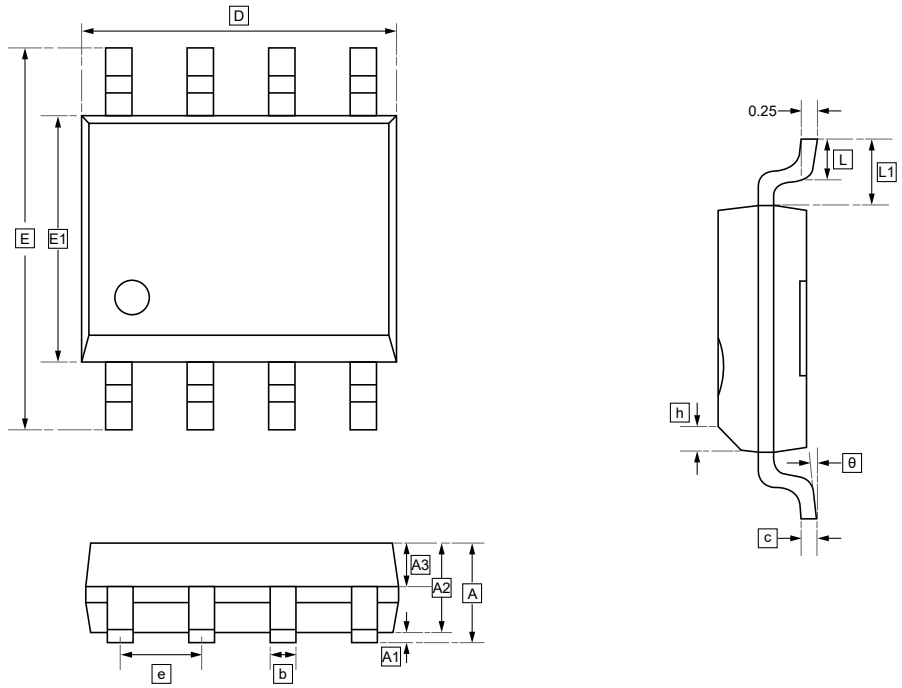


Figure 11: Transient Thermal Response Curve.

8.SOP-8 Package Outline Dimensions

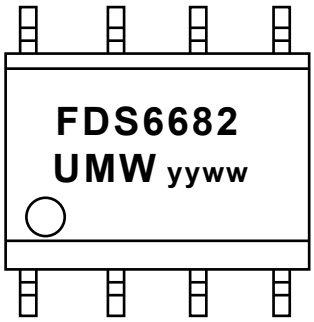


DIMENSIONS (mm are the original dimensions)

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 FDS6682	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.