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(V_{GS}=10V)
- $R_{DS(ON)}$<7.5mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<9mΩ(V_{GS}=4.5V)

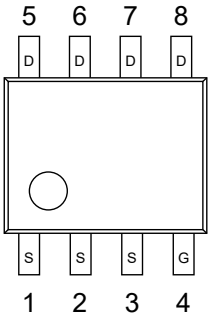
2.2Features

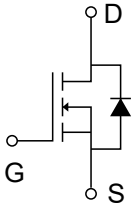
- High power and current handling capability
- High performance trench technology for extremely low $R_{DS(ON)}$
- Low gate charge (22 nC typical)

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

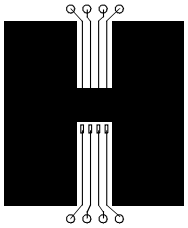
6.Electrical Characteristics (T_A=25°C unless otherwise noted)

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

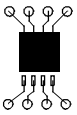
Total Gate Charge	Q_g	V_{DS}=15V, I_D=14A V_{GS}=5V		22	31	nC
Gate–Source Charge	Q_{gs}			6.4		nC
Gate–Drain Charge	Q_{gd}			8		nC
Drain–Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain–Source Diode Forward Current	I_S				2.1	A
Drain–Source Diode Forward Voltage	V_{SD}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

Notes:

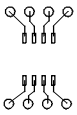
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.



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.

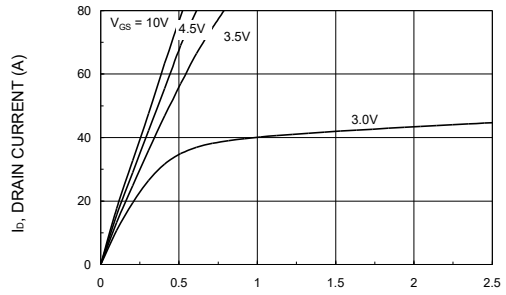


c) 125° C/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

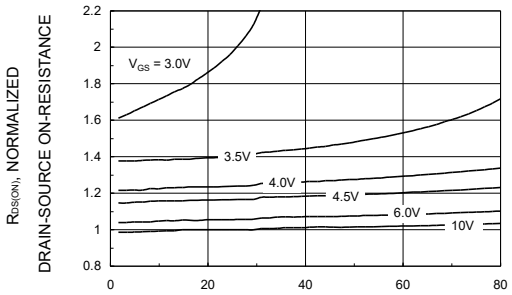
2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

7.1TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



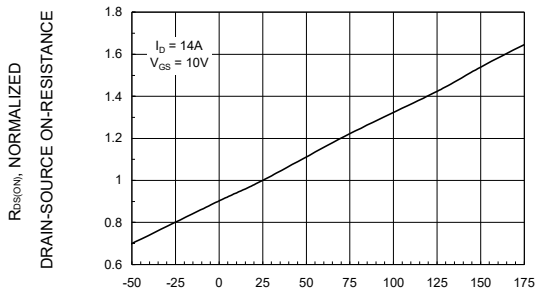
V_{DS}, DRAIN TO SOURCE VOLTAGE (V)

Fig 1: On-Region Characteristics.



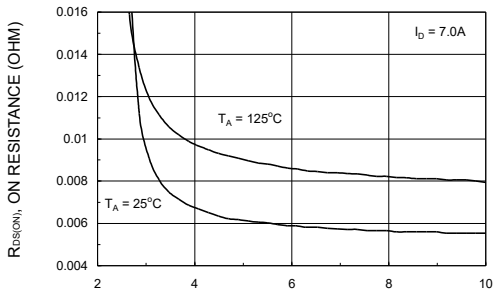
I_D, DRAIN CURRENT (A)

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



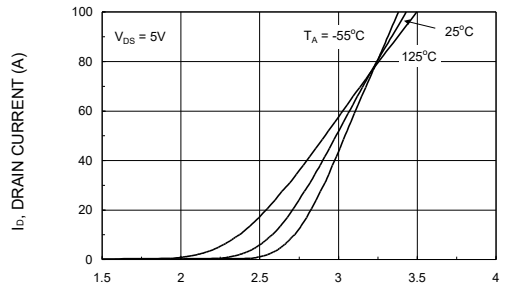
T_J, JUNCTION TEMPERATURE (°C)

Figure 3: On-Resistance Variation with Temperature.



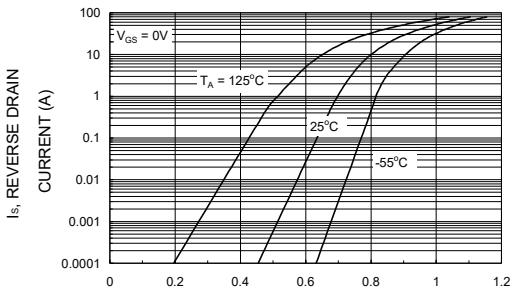
V_{GS}, GATE TO SOURCE VOLTAGE (V)

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

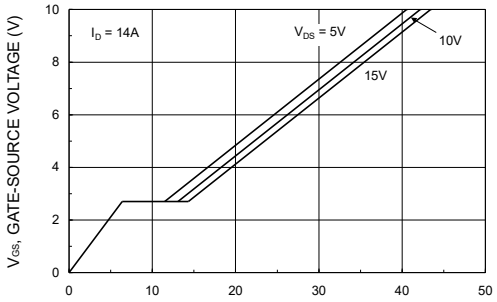


Figure 7: Gate-Charge Characteristics

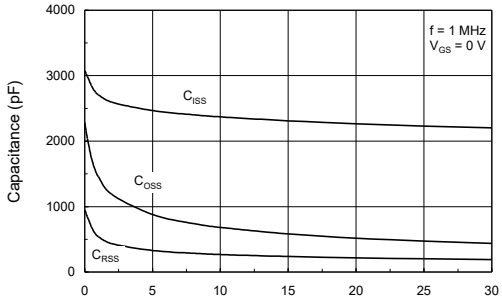


Figure 8: Capacitance Characteristics

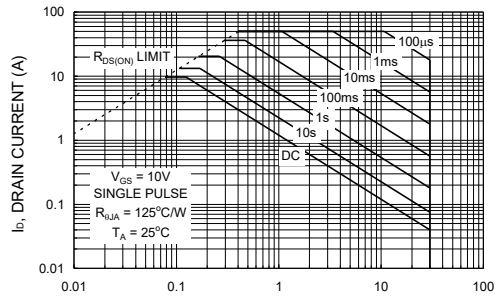


Figure 9: Maximum Safe Operating Area.

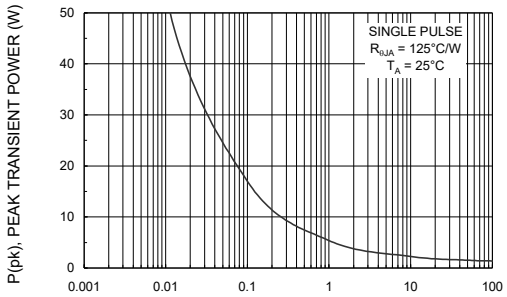


Figure 10: Single Pulse Maximum Power Dissipation.

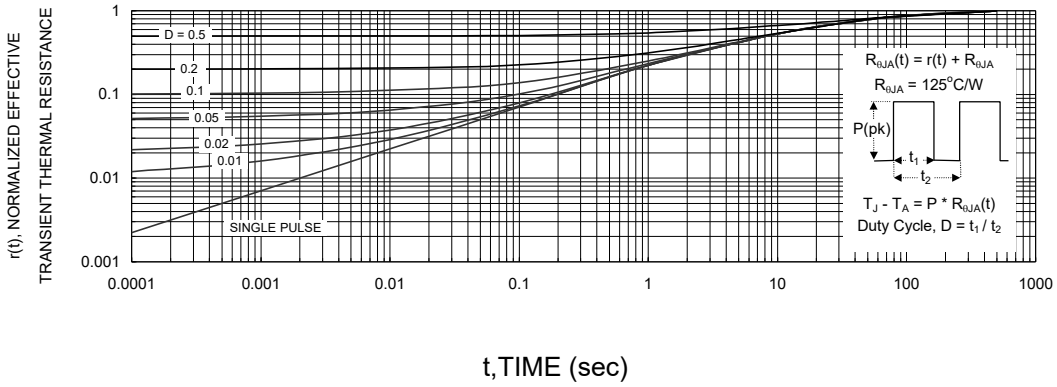
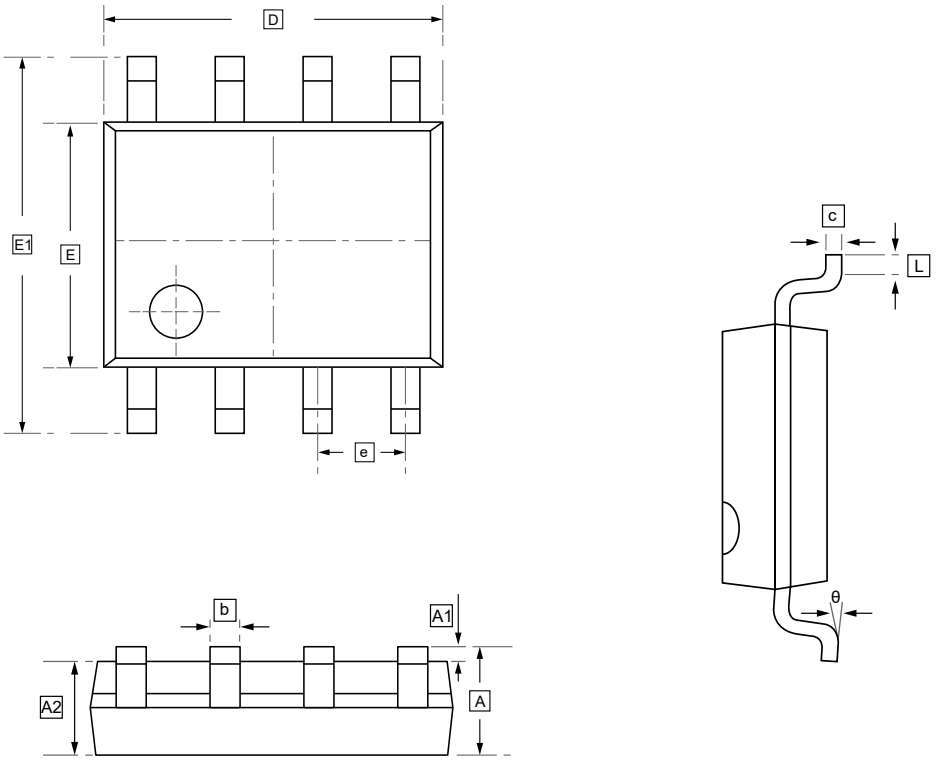


Figure 11: Transient Thermal Response Curve.

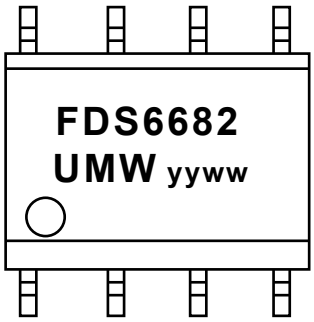
8.SOP-8 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	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

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