UMW FDS7779Z

-30V P-Channel MOSFET

1.Description

This P-channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers, and battery chargers.

2.1Features

- $V_{DS\ (V)}$=-30V
- I_D=-16A
- $R_{DS(ON)}$<7.2mΩ(V_{GS}=-10V)
- $R_{DS(ON)}$<11.5mΩ(V_{GS}=-4.5V)

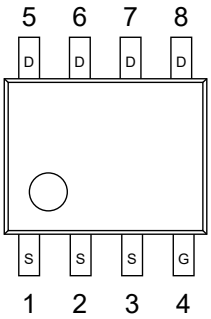
2.2Features

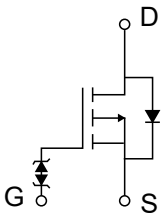
- ESD protection diode (note 3)
- High power and current handling capability
- High performance trench technology for extremely low $R_{DS(ON)}$

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}	±25	V
Drain Current – Continuous		I_D	-16	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

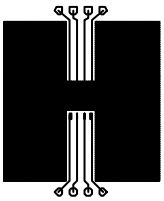
6.Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
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		-22		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	μA
Gate–Body Leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±10	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1	-1.5	-3	V
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I_D=-250μA Referenced to 25°C		5		mV/°C
Static Drain–Source On–Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-16A		6	7.2	mΩ
		V_{GS}=-4.5V, I_D=-15A		9	11.5	mΩ
On–State Drain Current	$I_{D(ON)}$	V_{GS}=-4.5V, V_{DS}=-5V	-50			A
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-13A		43		S
Input Capacitance	C_{iss}	V_{DS}=-15V V_{GS}=0V f =1MHz		3800		pF
Output Capacitance	C_{oss}			980		pF
Reverse Transfer Capacitance	C_{rss}			490		pF
Gate Resistance	R_G	V_{GS}=15mV, f =1MHz		3		Ω
Turn-On DelayTime	$t_{D(on)}$	V_{DD}=-15V, I_D=-1A V_{GS}=-10V, R_{GEN}=6Ω		20	36	ns
Turn-On Rise Time	t_r			9	18	ns
Turn-Off DelayTime	$t_{D(off)}$			100	160	ns
Turn-Off Fall Time	t_f			55	88	ns
Total Gate Charge	Q_g	V_{DS}=-15V, I_D=-16A V_{GS}=-10V		70	98	nC
Gate–Source Charge	Q_{gs}			10		nC
Gate–Drain Charge	Q_{gd}			16		nC
Maximum Continuous Drain–Source Diode Forward Current	I_S				-2.5	A

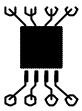
Drain–Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-2.5A (Note 2)		-0.7	-1.2	V
Diode Reverse Recovery Time	T_{rr}	I_F=-16A, d_{IF}/d_t=100A/μs		39		nS
Diode Reverse Recovery Charge	Q_{rr}	(Note 2)		24		nC

Notes:

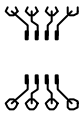
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 50°C/W (10 sec)
62.5°C/W steady state
when mounted on a
1in ^{2} pad of 2 oz copper



b) 105° C/W when
mounted on a 0.4 in ^{2}
pad of 2 oz. copper.

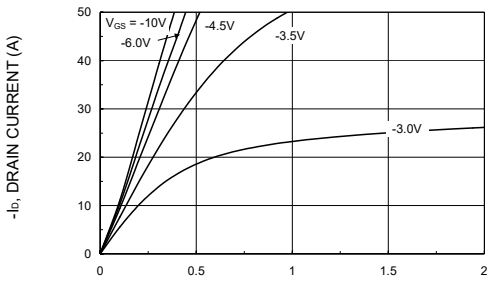


c) 125° C/W when
mounted on a minimum
pad.
Scale 1:1 on letter size paper

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

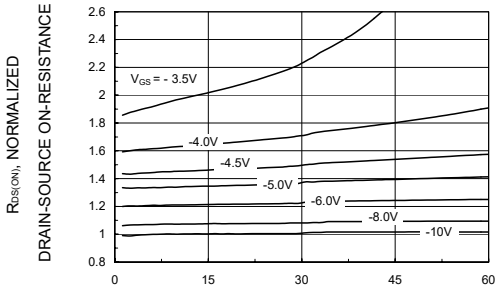
3. The diode connected between the gate and source serves only as protection against ESD. No gate overvoltage rating is implied.

7.1TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



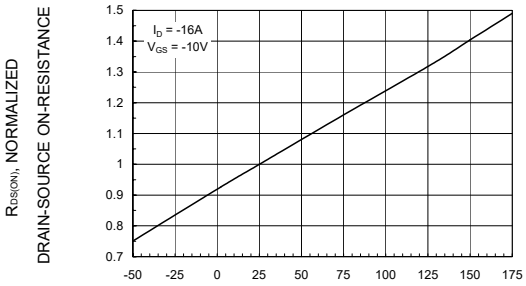
-$V_{DS,}$ DRAIN TO SOURCE VOLTAGE (V)

Fig 1: On-Region Characteristics.



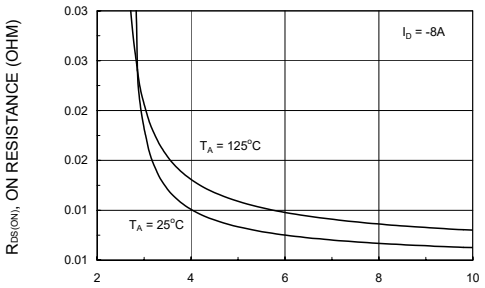
-I_D, DRAIN CURRENT (A)

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



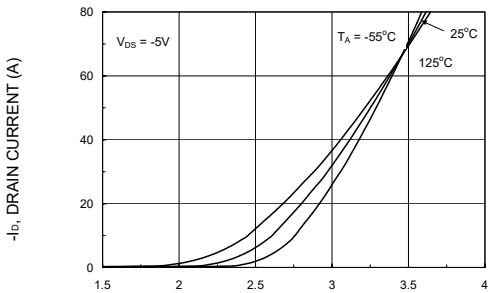
T_J, JUNCTION TEMPERATURE (°C)

Figure 3: On-Resistance Variation with Temperature.



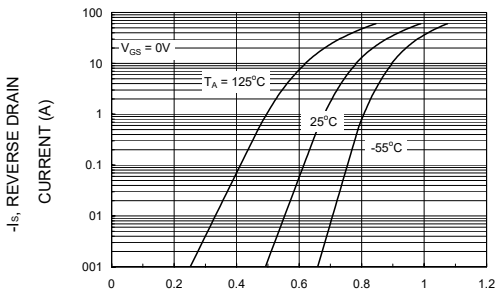
-V_{GS}, GATE TO SOURCE VOLTAGE (V)

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



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

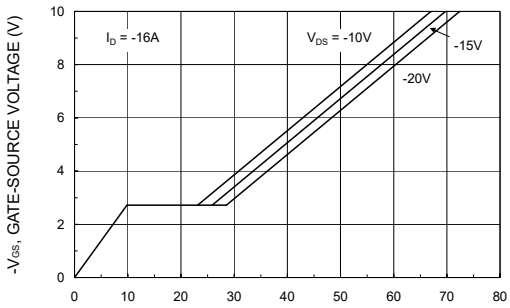
Figure 5: Transfer Characteristics.



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

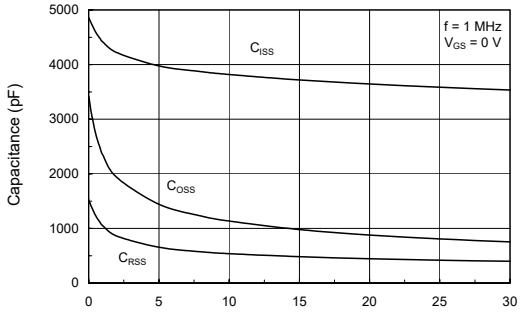
Figure 6: . Body Diode Forward Voltage Variation with Source Current and Temperature.

7.2TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



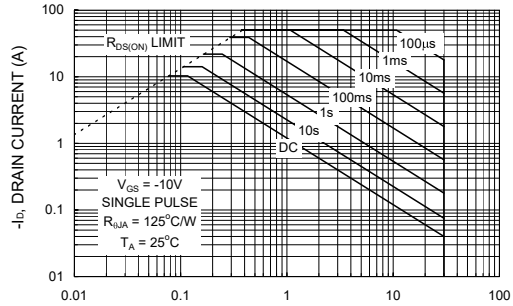
Q_g, GATE CHARGE (nC)

Figure 7: Gate-Charge Characteristics.



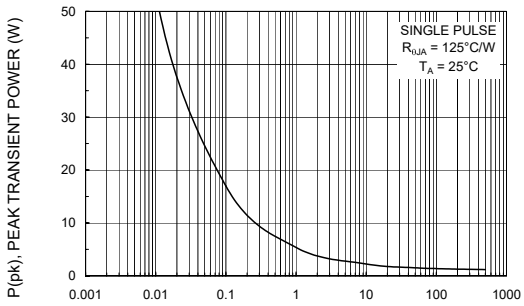
$-V_{DS}$, DRAIN TO SOURCE VOLTAGE (V)

Figure 8: Capacitance Characteristics.



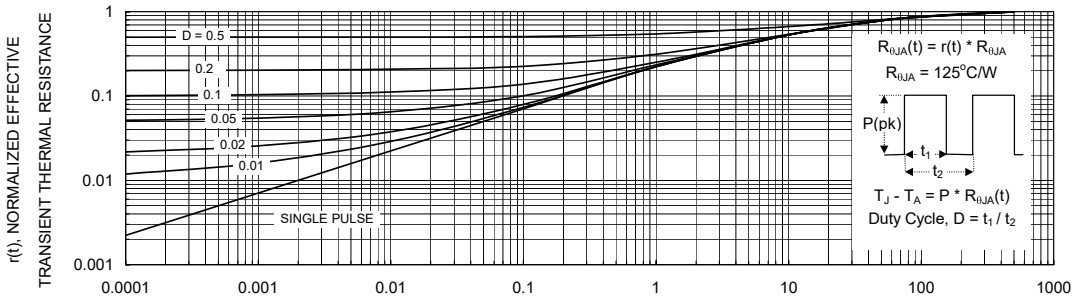
$-V_{DS}$, DRAIN-SOURCE VOLTAGE (V)

Figure 9: Maximum Safe Operating Area.



t_1, TIME (sec)

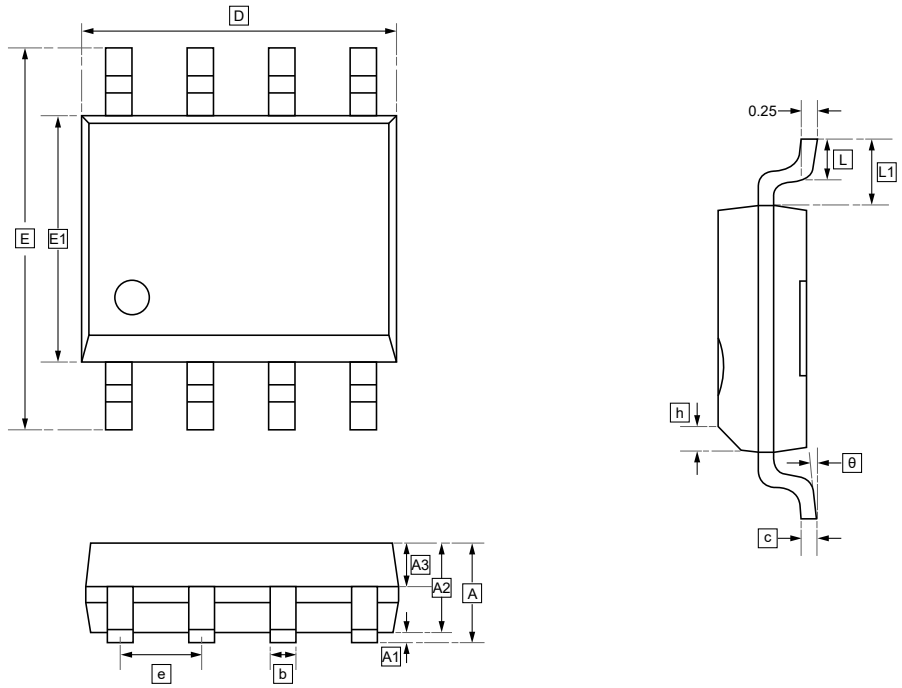
Figure 10: Single Pulse Maximum Power Dissipation.



t_1,TIME (sec)

Figure 11: Transient Thermal Response Curve.

8.SOP-8 Package Outline Dimensions

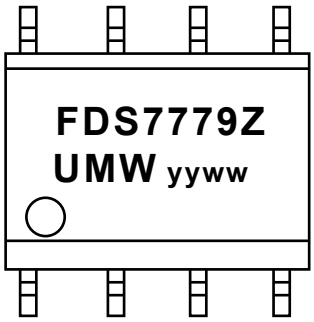


DIMENSIONS (mm are the original dimensions)

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 FDS7779Z	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.

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