UMW FDS4435BZ

-30V P-Channel MOSFET

1.Description

This device is well suited for Power Management and load switching applications common in Notebook Computers and Portable Battery Packs.

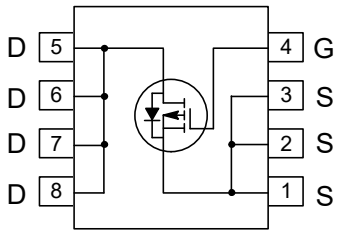
2.Features

- $V_{DS\ (V)}$=-30V
- I_D=-8.8A
- $R_{DS(ON)}$＜20mΩ(V_{GS}=-10V)
- $R_{DS(ON)}$＜35mΩ(V_{GS}=-4.5V)

3.Pinning information

Pin	Symbol	Description
1,2,3	S	SOURCE
4	G	GATE
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_{DS}	-30	V
Gate-Source Voltage			V_{GS}	±25	V
Drain Current – Continuous	T_A=25°C	(Note 1a)	I_D	-8.8	A
Drain Current – Pulsed				-50	
Power Dissipation	T_A=25°C	(Note 1a)	P_D	2.5	W
Power Dissipation	T_A=25°C	(Note 1b)		1	
Single Pulse Avalanche Energy		(Note 4)	E_{AS}	24	mJ
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 Case	$R_{\theta JA}$	25	°C/W
Thermal Resistance, Junction to Ambient (Note 1a)	$R_{\theta JC}$	50	°C/W

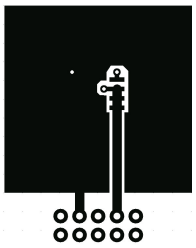
6.Electrical Characteristics (T_J=25°C unless otherwise noted)

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		-21		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±25V, V_{DS}=0V			±10	μA
Gate to Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1	-2.1	-3	V
Gate to Source Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I_D=-250μA Referenced to 25°C		6		mV/°C
Static Drain to Source On Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-8.8A		16	20	mΩ
		V_{GS}=-4.5V, I_D=-6.7A		26	35	mΩ
Forward Transconductance	g_{FS}	V_{GS}=-5V, I_D=-8.8A		24		S
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V		1385	1845	pF
Output Capacitance	C_{oss}	f =1MHz		275	365	pF
Reverse Transfer Capacitance	C_{rss}			230	345	pF
Gate Resistance	R_G			4.5		Ω
Turn-On Delay Time	$t_{D(on)}$			10	20	ns
Rise Time	t_r	V_{DD}=-15V, I_D=-8.8A		6	12	ns
Turn-Off DelayTime	$t_{D(off)}$	V_{GS}=-10V, R_{GEN}=6Ω		30	48	ns
Fall Time	t_f			12	22	ns
Total Gate Charge	Q_g	V_{GS}=0V to -10V, V_{DD}=-15V		28	40	nC
Total Gate Charge	Q_g	V_{GS}=0V to -5V, I_D=-8.8A		16	23	nC
Gate to Source Charge	Q_{gs}			5.2		nC
Gate to Drain “Miller” Charge	Q_{gd}	V_{GS}=0V, I_S=-8.8A (Note 2)		7.4		nC
Source to Drain Diode Forward Voltage	V_{SD}			-0.9	-1.2	V
Reverse Recovery Time	t_{rr}			29	44	ns
Reverse Recovery Charge	Q_{rr}	I_F=-8.8A, di/dt=100A/μs		23	35	nC

Notes:

1. $R_{\theta JA}$ is determined with the device mounted on a 1in ^{2} pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material.

$R_{\theta JC}$ is guaranteed by design while RθCA is determined by the user's board design.



a) 50°C/W when mounted on a 1in ^{2} pad of 2 oz copper

b) 125°C/W when mounted on a minimum pad of 2 oz copper.

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.

4. Starting T_J=25°C, L=1mH, I_{AS}=-7A, V_{DD}=-30V, V_{GS}=-10V.

7.1Typical Characteristics

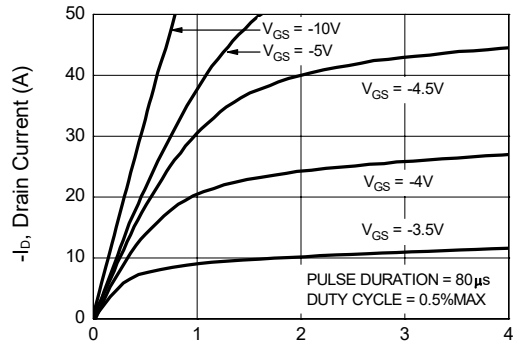


Fig 1: On-Region Characteristics

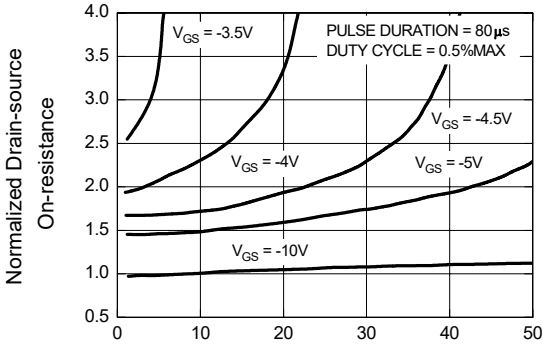


Figure 2: Normalized On-Resistance vs Drain Current and Gate Voltage

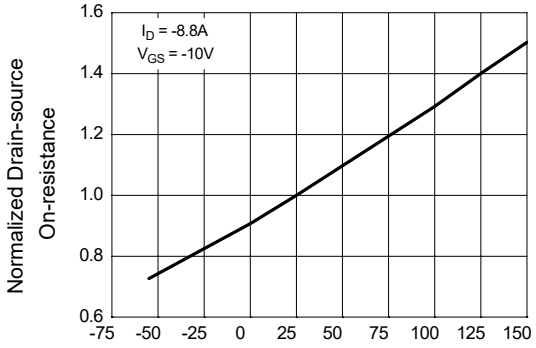


Figure 3: Normalized On-Resistance vs Drain Current and Gate Voltage

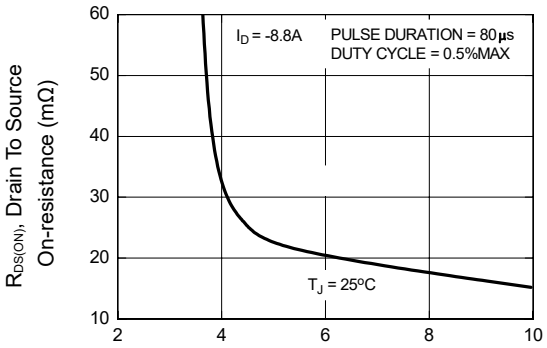


Figure 4: On-Resistance Variation with Gate-to-Source Voltage

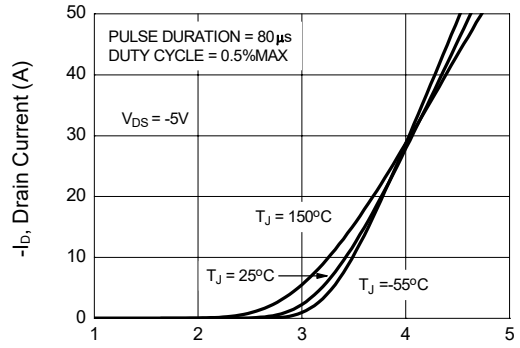


Figure 5: Transfer Characteristics.

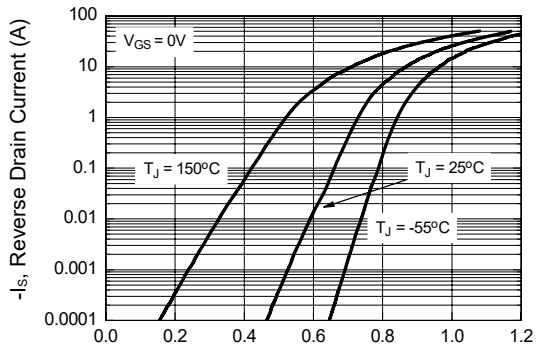


Figure 6: Source to Drain Diode Forward Voltage vs Source Current

7.2Typical Characteristics

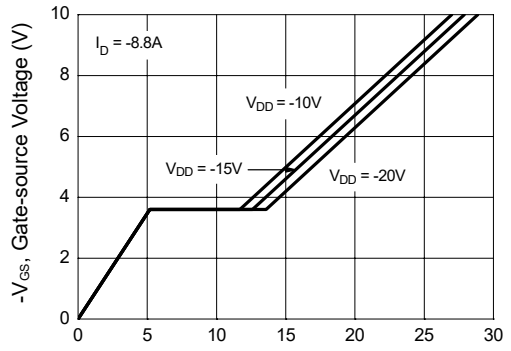


Figure 7: Gate-Charge Characteristics

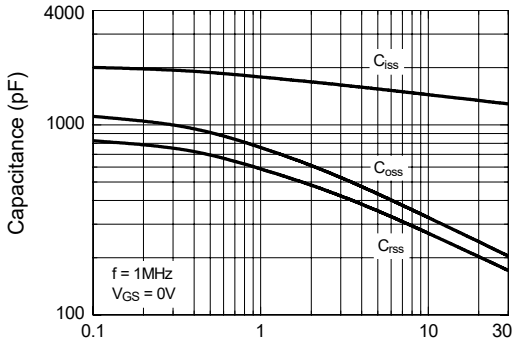


Figure 8: Capacitance vs Drain to Source Voltage

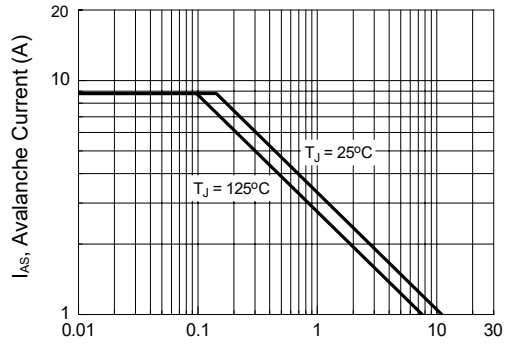


Figure 9: Unclamped Inductive Switching Capability

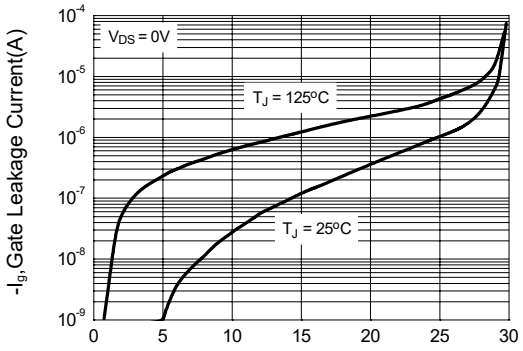


Figure 10: Gate Leakage Current vs Gate to Source Voltage

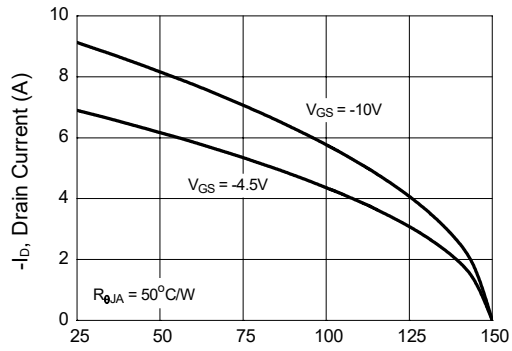


Figure 11: Maximum Continuous Drain Current vs Ambient Temperature

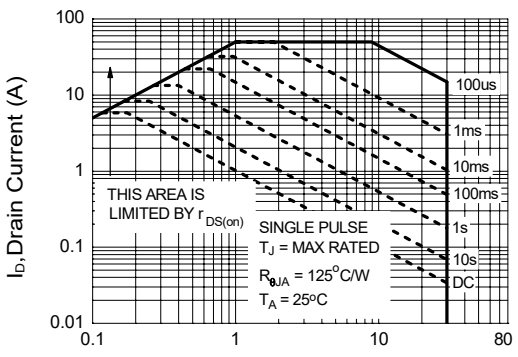


Figure 12: Forward Bias Safe Operating Area

7.3Typical Characteristics

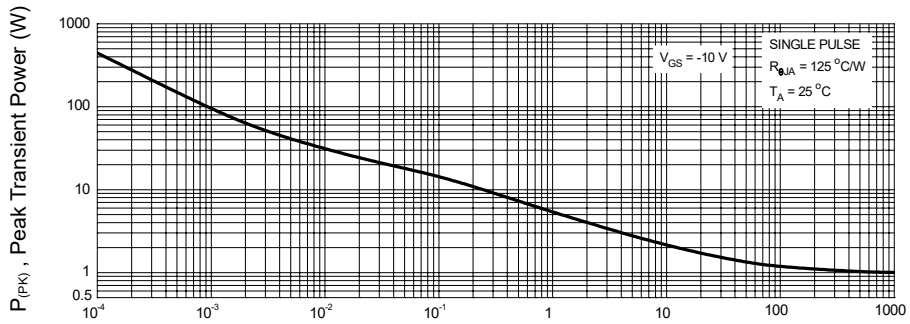


Figure 13: Single Pulse Maximum Power Dissipation

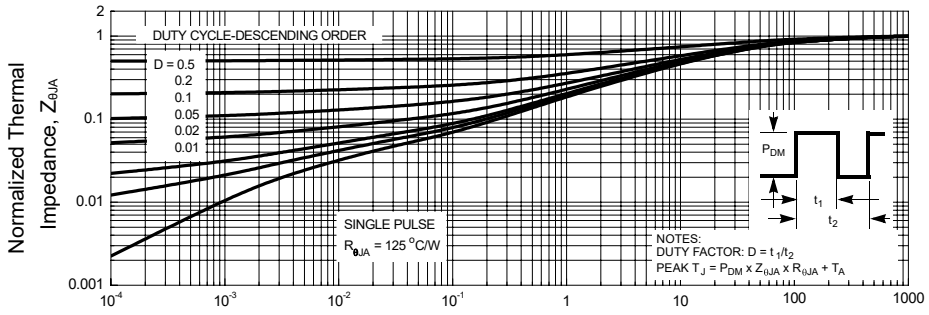
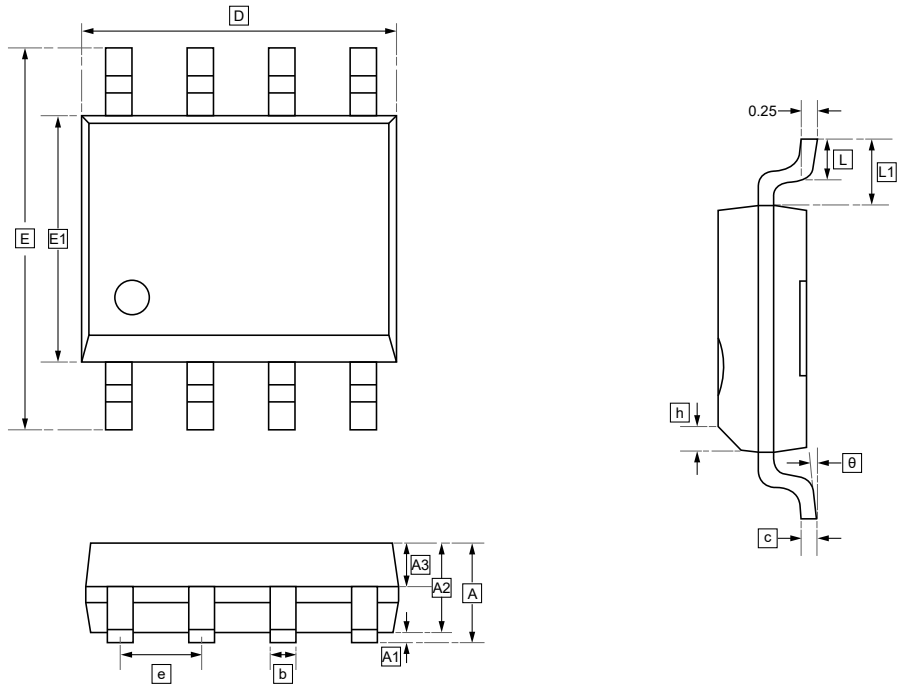


Figure 14: Transient Thermal Response Curve

8.SOP-8 Package Outline Dimensions

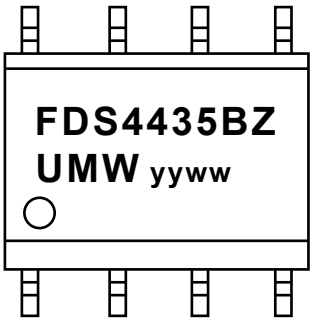


DIMENSIONS (mm are the original dimensions)

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 FDS4435BZ	SOP-8	3000	Tape and reel

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