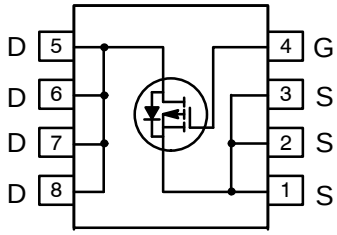
General Description

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



SOP-8

Features

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

MOSFET Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter			Ratings	Units
V_{DS}	Drain to Source Voltage			-30	V
V_{GS}	Gate to Source Voltage			±25	V
I_D	Drain Current -Continuous	T_A = 25°C	(Note 1a)	-8.8	A
	-Pulsed			-50	
P_D	Power Dissipation	T_A = 25°C	(Note 1a)	2.5	W
	Power Dissipation	T_A = 25°C	(Note 1b)	1.0	
E_{AS}	Single Pulse Avalanche Energy		(Note 4)	24	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range			-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case	25	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	50	

Electrical Characteristics T_J = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = -250μA, V_{GS} = 0V	-30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = -250μA, referenced to 25°C		-21		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -24V, V_{GS} = 0V			1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±25V, V_{DS} = 0V			±10	μA
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = -250μA	-1	-2.1	-3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = -250μA, referenced to 25°C		6		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = -10V, I_D = -8.8A		16	20	mΩ
		V_{GS} = -4.5V, I_D = -6.7A		26	35	
g_{FS}	Forward Transconductance	V_{DS} = -5V, I_D = -8.8A		24		S
C_{iss}	Input Capacitance	V_{DS} = -15V, V_{GS} = 0V,		1385	1845	pF
C_{oss}	Output Capacitance	f = 1MHz		275	365	pF
C_{rss}	Reverse Transfer Capacitance	f = 1MHz		230	345	pF
R_g	Gate Resistance			4.5		Ω
$t_{d(on)}$	Turn-On Delay Time			10	20	ns
t_r	Rise Time	V_{DD} = -15V, I_D = -8.8A,		6	12	ns
$t_{d(off)}$	Turn-Off Delay Time	V_{GS} = -10V, R_{GEN} = 6Ω		30	48	ns
t_f	Fall Time	V_{DD} = -15V, I_D = -8.8A		12	22	ns
Q_g	Total Gate Charge	V_{GS} = 0V to -10V		28	40	nC
Q_g	Total Gate Charge	V_{GS} = 0V to -5V		16	23	nC
Q_{gs}	Gate to Source Charge			5.2		nC
Q_{gd}	Gate to Drain “Miller” Charge			7.4		nC
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0V, I_S = -8.8A (Note 2)		-0.9	-1.2	V
t_{rr}	Reverse Recovery Time			29	44	ns
Q_{rr}	Reverse Recovery Charge	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 $R_{\theta CA}$ is determined by the user's board design.

a. 50°C/W when mounted on a 1 in^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

Typical Characteristics T_J = 25°C unless otherwise noted

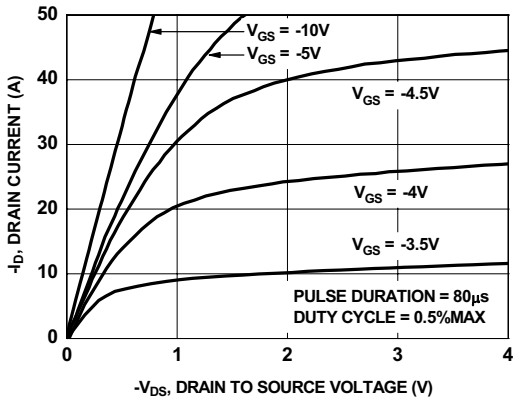


Figure 1. On-Region Characteristics

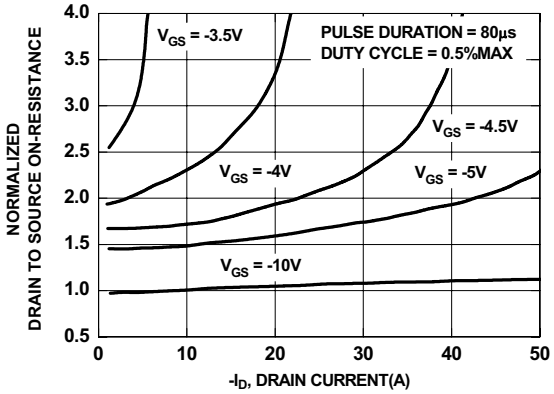


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

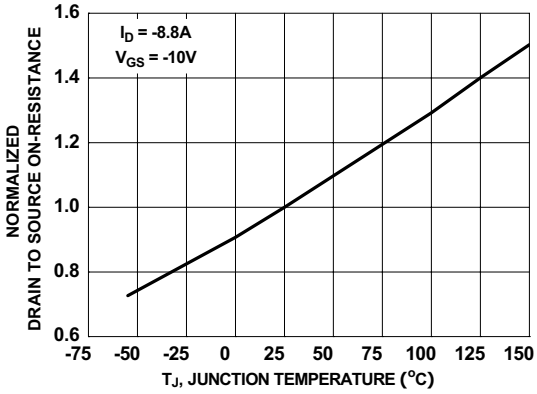


Figure 3. Normalized On-Resistance vs Junction Temperature

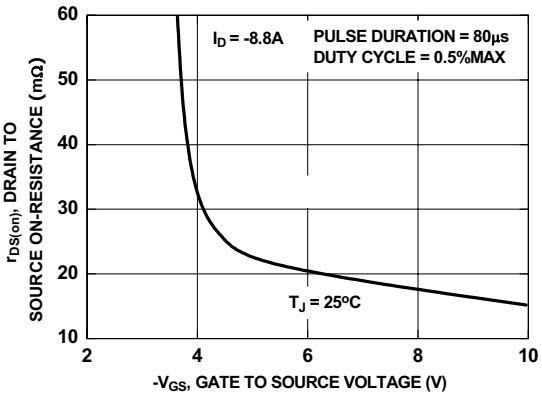


Figure 4. On-Resistance vs Gate to Source Voltage

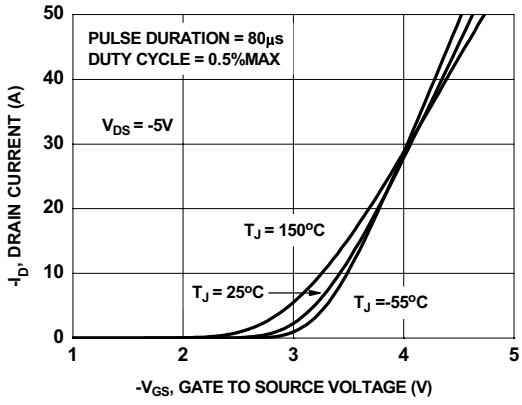


Figure 5. Transfer Characteristics

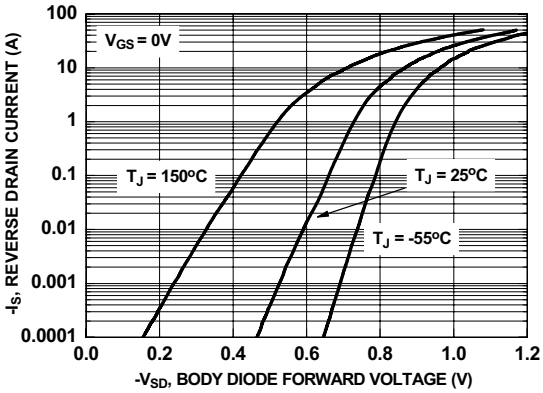


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25°C unless otherwise noted

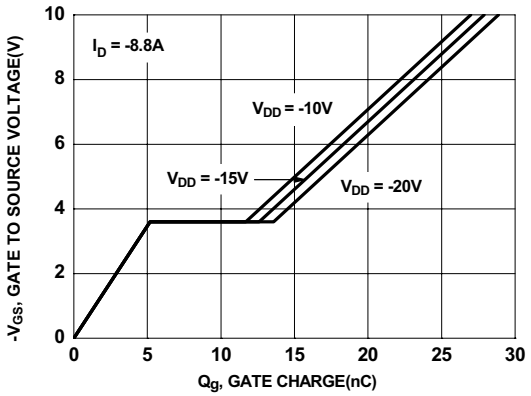


Figure 7. Gate Charge Characteristics

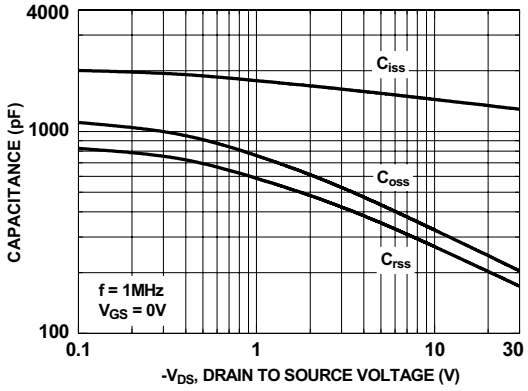


Figure 8. Capacitance vs Drain to Source Voltage

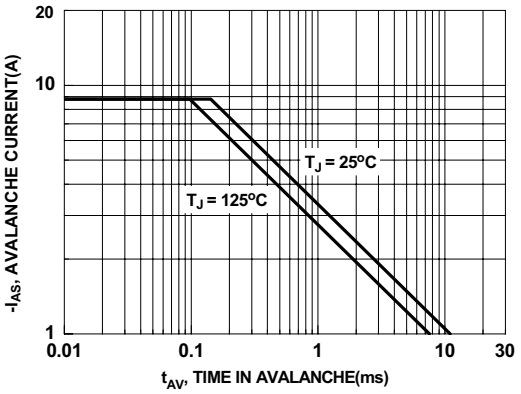


Figure 9. Unclamped Inductive Switching Capability

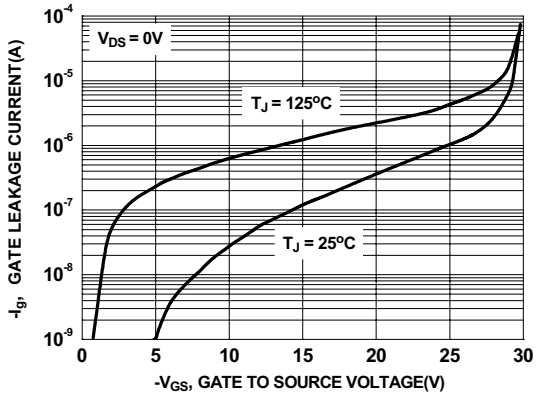


Figure 10. Gate Leakage Current vs Gate to Source Voltage

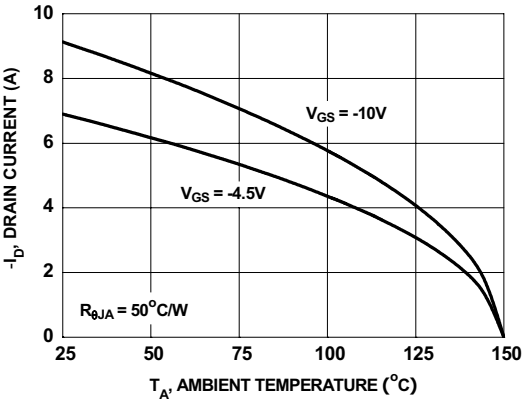


Figure 11. Maximum Continuous Drain Current vs Ambient Temperature

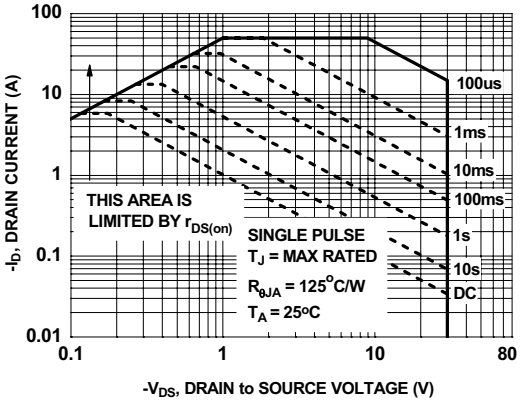


Figure 12. Forward Bias Safe Operating Area

Typical Characteristics T_J = 25°C unless otherwise noted

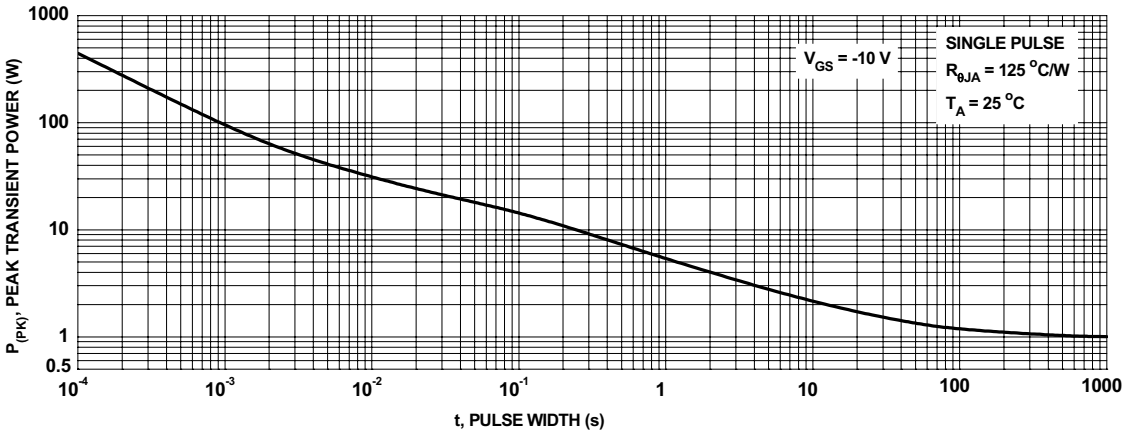


Figure 13. Single Pulse Maximum Power Dissipation

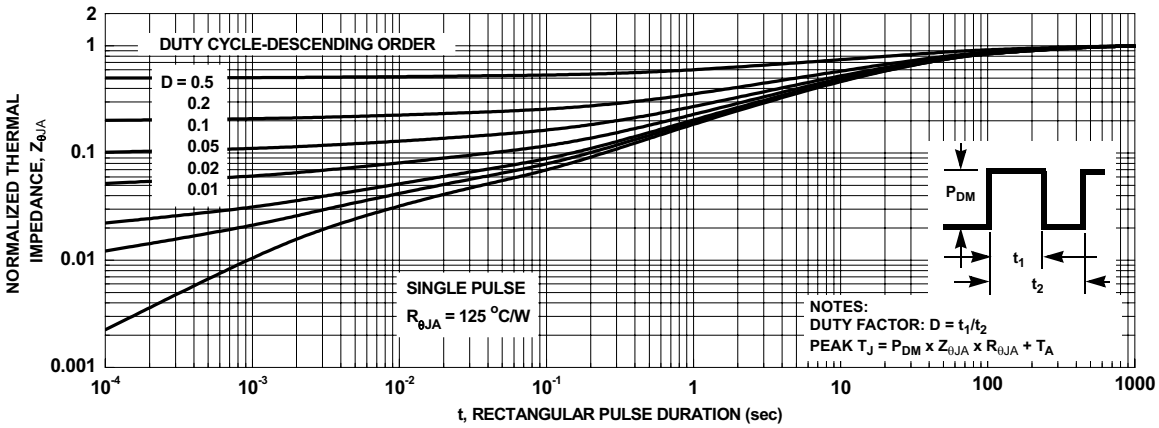
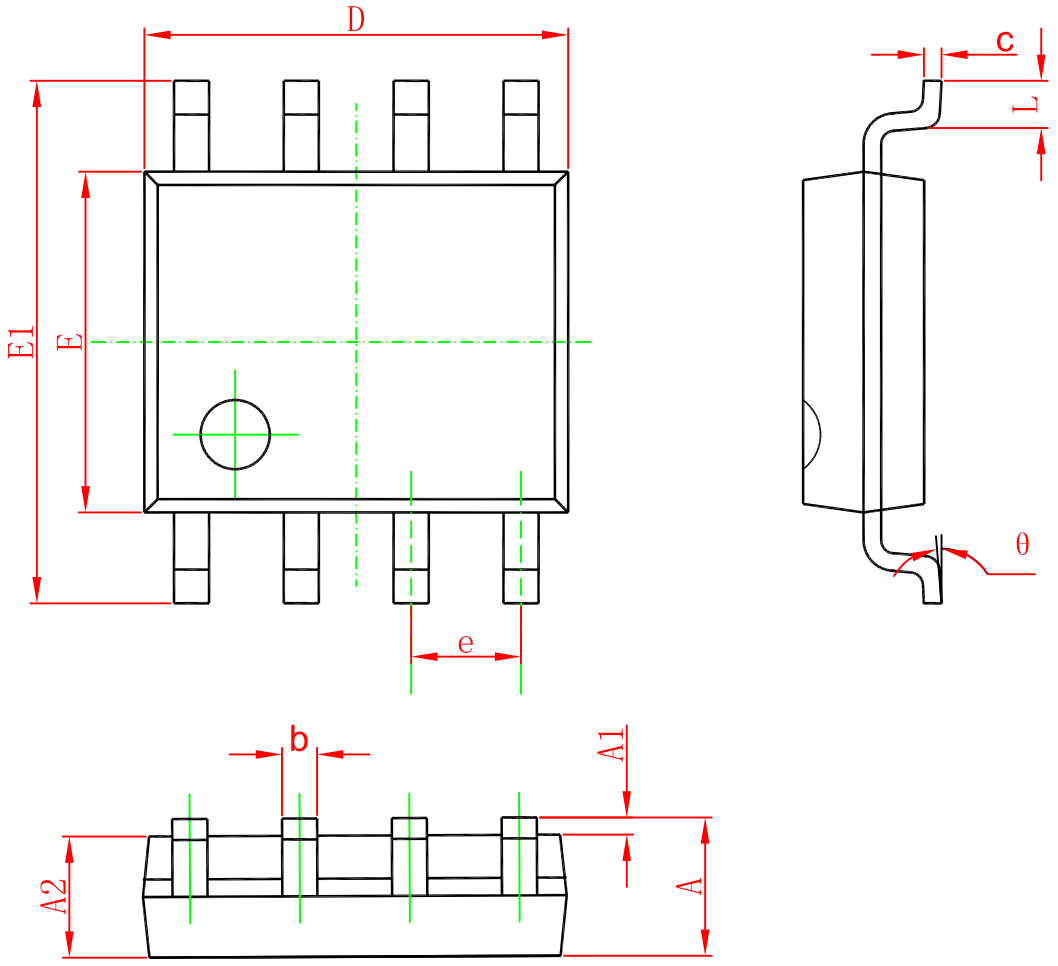


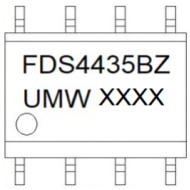
Figure 14. Transient Thermal Response Curve

Package Mechanical Data SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW FDS4435BZ	SOP-8	3000	Tape and reel