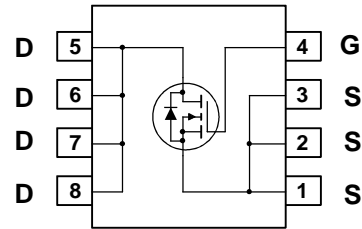


General Description

These devices are well suited for low voltage and battery powered applications where low in-line power loss and fast switching are required.



SOP-8

Features

- $V_{DS} (V) = 30V$
- $I_D = 13 A (V_{GS} = 10V)$
- $R_{DS(ON)} < 8m\Omega (V_{GS}=10V)$
- $R_{DS(ON)} < 10m\Omega (V_{GS}=4.5V)$
- Fast switching speed
- Low gate charge
- High performance trench technology for extremely low $R_{DS(ON)}$
- High power and current handling capability

Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain-Source Voltage	30	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous (Note 1a)	13	A
	– Pulsed	50	
P_D	Power Dissipation for Single Operation (Note 1a)	2.5	W
	(Note 1b)	1.0	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1a)	50	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1b)	125	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 1)	25	

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units	
Off Characteristics							
BV _{DSS}	Drain–Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	30			V	
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C		26		mV/°C	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 24 V, V _{GS} = 0 V			1	μA	
		V _{DS} = 24 V, V _{GS} = 0 V, T _J =55°C			10	μA	
I _{GSS}	Gate–Body Leakage	V _{GS} = ±20 V, V _{DS} = 0 V			±100	nA	
On Characteristics (Note 2)							
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	1	1.8	3	V	
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C		-5.3		mV/°C	
R _{DS(on)}	Static Drain–Source On–Resistance	V _{GS} = 10 V, I _D = 13 A V _{GS} = 4.5 V, I _D = 10.5 A		6 7.2	8 10	mΩ	
I _{D(on)}	On–State Drain Current	V _{GS} = 10 V, V _{DS} = 5 V	50			A	
g _{FS}	Forward Transconductance	V _{DS} = 15 V, I _D = 13 A		55		S	
Dynamic Characteristics							
C _{iss}	Input Capacitance	V _{DS} = 15 V, V _{GS} = 0 V, f = 1.0 MHz		2220		pF	
C _{oss}	Output Capacitance				535		pF
C _{rss}	Reverse Transfer Capacitance				200		pF
R _G	Gate Resistance	V _{GS} = 15 mV, f = 1.0 MHz		1.7		Ω	
Switching Characteristics (Note 2)							
t _{d(on)}	Turn–On Delay Time	V _{DD} = 10 V, I _D = 1 A, V _{GS} = 10 V, R _{GEN} = 6 Ω		11	19	ns	
t _r	Turn–On Rise Time			13	24	ns	
t _{d(off)}	Turn–Off Delay Time			40	64	ns	
t _f	Turn–Off Fall Time			13	24	ns	
Q _g	Total Gate Charge	V _{DS} = 15 V, I _D = 13 A, V _{GS} = 5 V		21	30	nC	
Q _{gs}	Gate–Source Charge			6		nC	
Q _{gd}	Gate–Drain Charge			7		nC	
Drain–Source Diode Characteristics and Maximum Ratings							
I _S	Maximum Continuous Drain–Source Diode Forward Current				2.1	A	
V _{SD}	Drain–Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 2.1 A (Note 2)		0.7	1.2	V	
t _{rr}	Diode Reverse Recovery Time	I _F = 13 A, d _F /d _t = 100 A/μs		31		nS	
Q _{rr}	Diode Reverse Recovery Charge			21		nC	

Notes:

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



a) 50°C/W when mounted on a 1in² pad of 2 oz copper



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

Scale 1 : 1 on letter size paper

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

Typical Characteristics

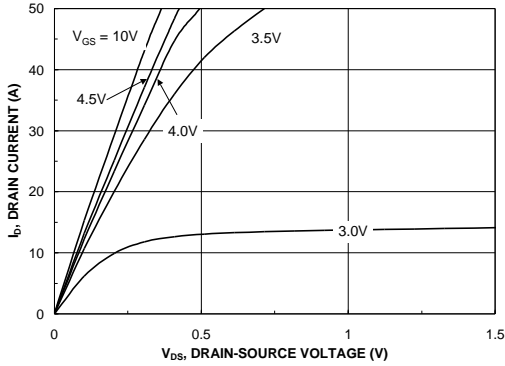


Figure 1. On-Region Characteristics.

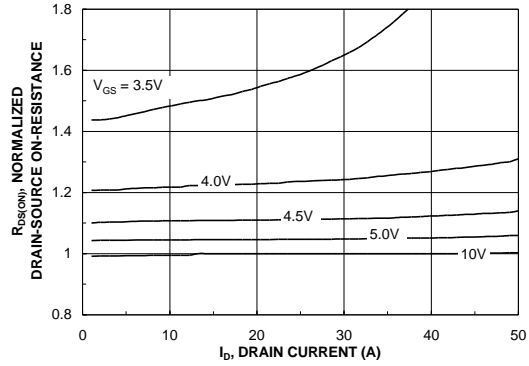


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

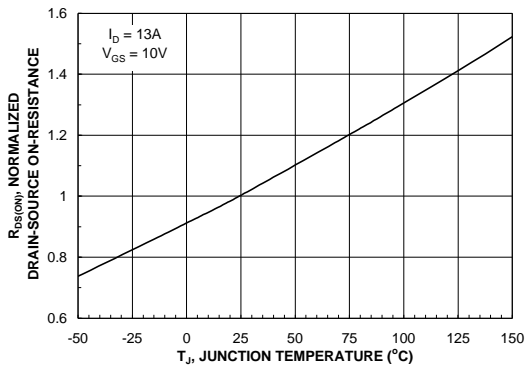


Figure 3. On-Resistance Variation with Temperature.

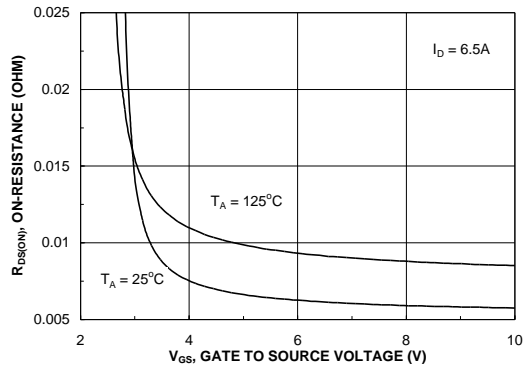


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

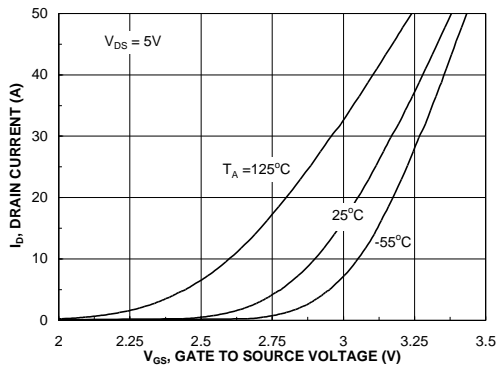


Figure 5. Transfer Characteristics.

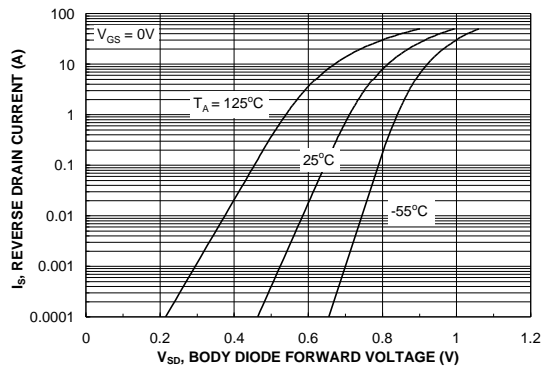


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics

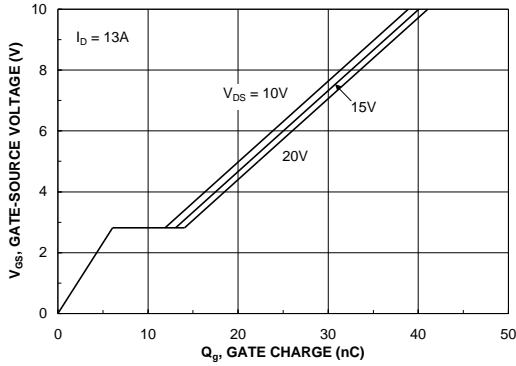


Figure 7. Gate Charge Characteristics.

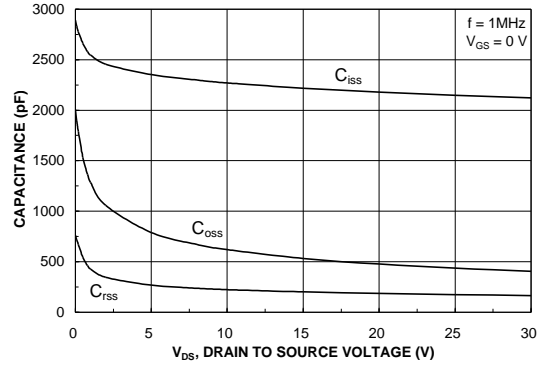


Figure 8. Capacitance Characteristics.

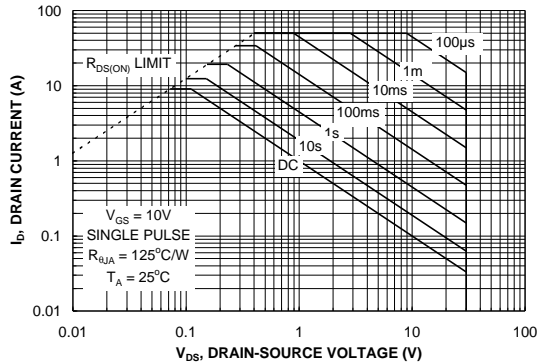


Figure 9. Maximum Safe Operating Area.

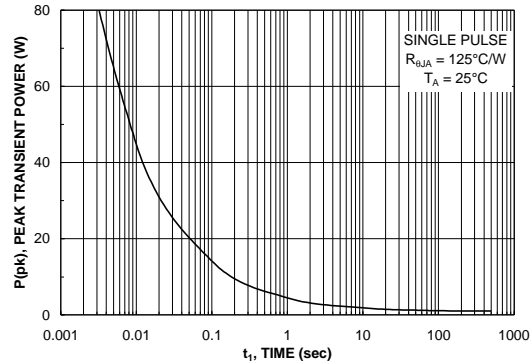


Figure 10. Single Pulse Maximum Power Dissipation.

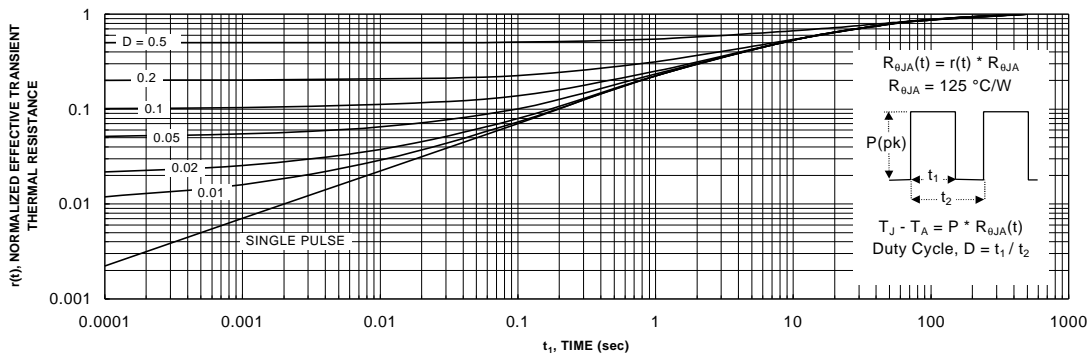
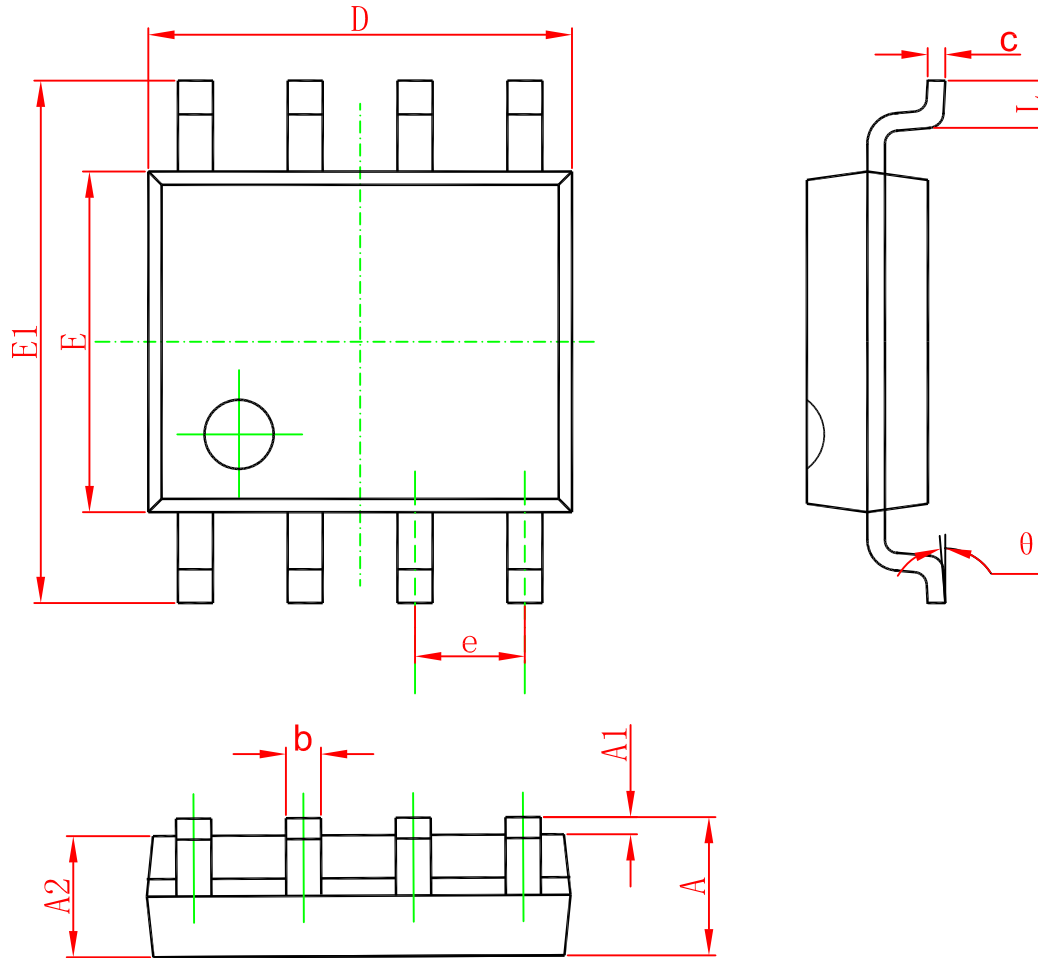


Figure 11. Transient Thermal Response Curve.

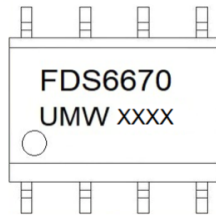
Thermal characterization performed using the conditions described in Note 1c. Transient thermal response will change depending on the circuit board design.

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
theta	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW FDS6670A	SOP-8	3000	Tape and reel