UMW FDS6570A

20V N-Channel MOSFET

1.Description

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

2.1Features

- $V_{DS\ (V)}$=20V
- I_D=15A(V_{GS}=4.5V)
- $R_{DS(ON)}$<6mΩ(V_{GS}=4.5V)
- $R_{DS(ON)}$<8mΩ(V_{GS}=2.5V)

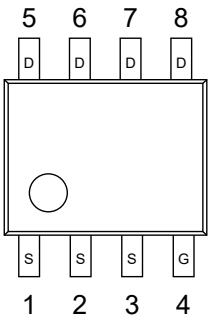
2.2Features

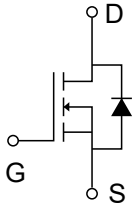
- High power and current handling capability.
- High performance trench technology for extremely low $R_{DS(ON)}$
- Low gate charge (47nC typical).
- Fast switching speed.

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}	20	V
Gate-Source Voltage		V_{GSS}	±8	V
Drain Current – Continuous		I_D	15	A
– Pulsed	(Note 1a)		50	
Power Dissipation for Single Operation	(Note 1a)	P_D	2.5	W
	(Note 1b)		1.2	
	(Note 1c)		1	
Junction and Storage 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

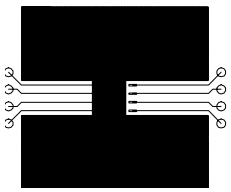
6.Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	20			V
Breakdown Voltage Temperature Coefficient	$\frac{V\Delta BV_{DSS}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		29		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V, V_{GS}=0V			1	μA
Gate–Body Leakage, Forward	I_{GSSF}	V_{DS}=0V, V_{GS}=8V			100	nA
Gate–Body Leakage, Reverse	I_{GSSR}	V_{DS}=0V, V_{GS}=-8V			-100	nA
On Characteristics (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.2	1.4	V
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		-4		mV/°C
Static Drain–Source On–Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=15A		6	7.5	mΩ
		V_{GS}=2.5V, I_D=12A		8	10	
On–State Drain Current	$I_{D(ON)}$	V_{GS}=4.5V,V_{DS}=5V	25			A
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=15A		70		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V,f =1MHz		4700		pF
Output Capacitance	C_{oss}			850		pF
Reverse Transfer Capacitance	C_{rss}			310		pF
SWITCHING PARAMETERS (Note 2)						
Turn-On DelayTime	$t_{D(on)}$	V_{DD}=10V, I_D=1A V_{GS}=4.5V, R_{GEN}=6Ω		20	32	ns
Turn-On Rise Time	t_r			27	44	ns
Turn-Off DelayTime	$t_{D(off)}$			95	133	ns
Turn-Off Fall Time	t_f			35	56	ns
Total Gate Charge	Q_g	V_{DS}=10V, I_D=15A V_{GS}=5V		47	66	nC
Gate–Source Charge	Q_{gs}			7		nC
Gate–Drain Charge	Q_{gd}			10.5		nC

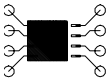
Drain-Source Diode Characteristics						
Maximum Continuous Drain-Source Diode Forward Current	I_S				2.1	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=2.1A(Note 2)		0.65	1.2	V

Notes:

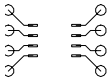
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.



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 0.003 in ^{2} pad of 2 oz. copper.

Scale 1 : 1 on letter size paper

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

7.1TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

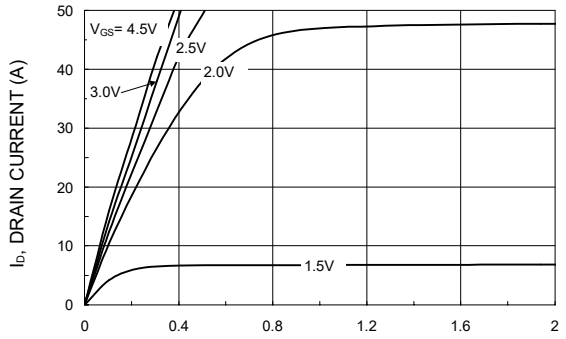


Fig 1: On-Region Characteristics.

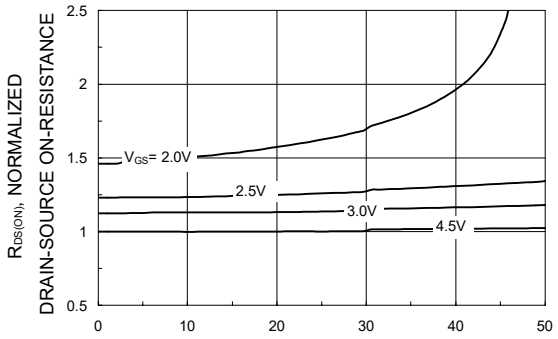


Figure 2: On-Resistance Variation with Drain Current and Gate Voltage.

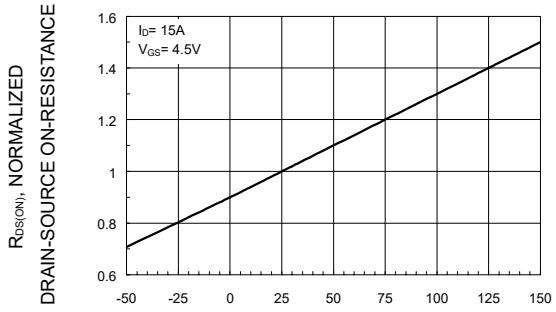


Figure 3: On-Resistance Variation with Temperature.

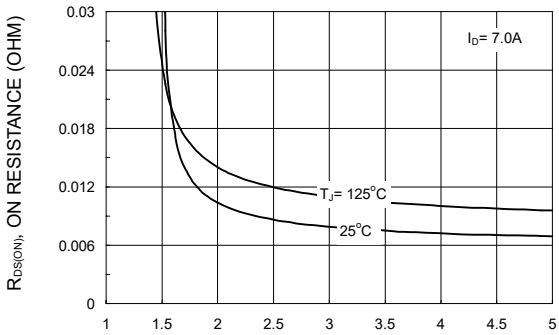


Figure 4: On-Resistance Variation with Gate-to-Source Voltage.

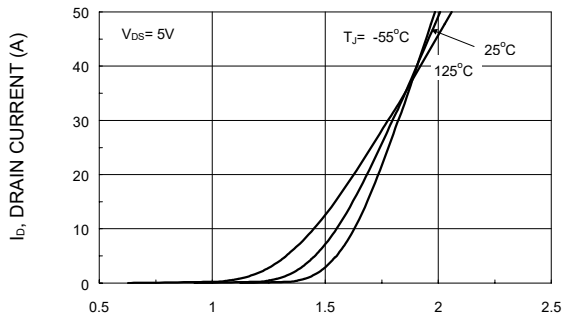


Figure 5: Transfer Characteristics.

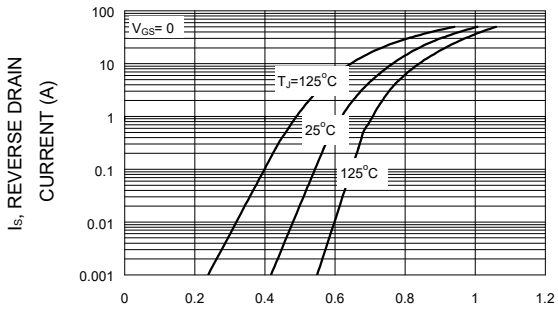
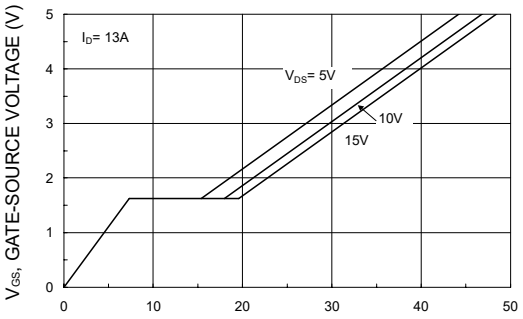


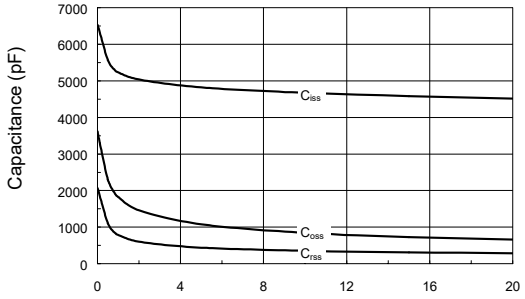
Figure 6: . Body Diode Forward Voltage Variation with Source Current and Temperature.

7.2TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



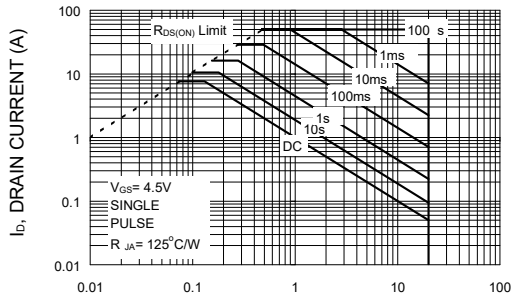
Q_g, GATE CHARGE (nC)

Figure 7: Gate-Charge Characteristics



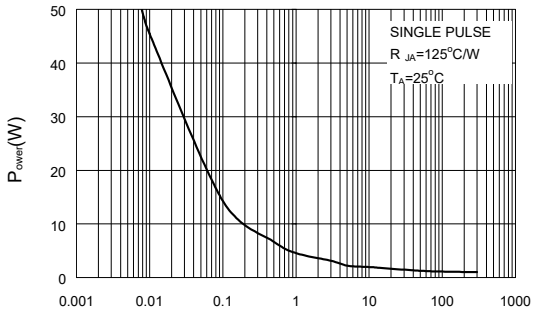
$V_{DS,}$ DRAIN TO SOURCE VOLTAGE (V)

Figure 8: Capacitance Characteristics



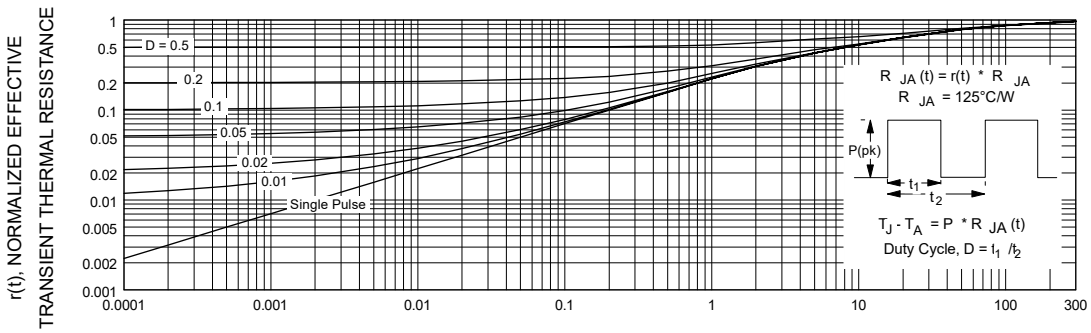
V_{DS}, DRAIN-SOURCE VOLTAGE (V)

Figure 9: Maximum Safe Operating Area.



SINGLE PULSE TIME (SEC)

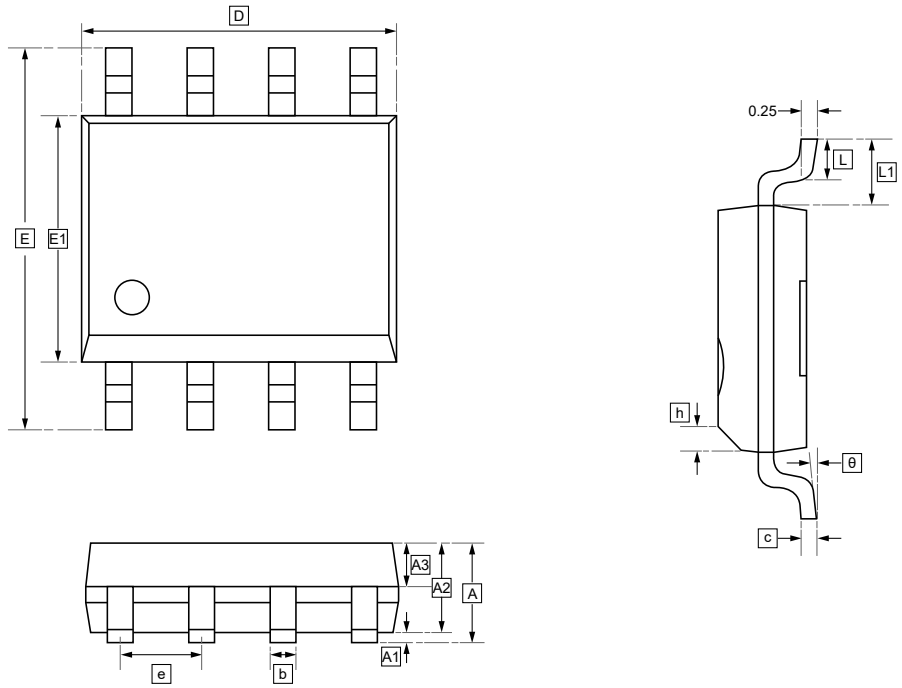
Figure 10: Single Pulse Maximum Power Dissipation.



t,TIME (sec)

Figure 11: Transient Thermal Response Curve.

8.SOP-8 Package Outline Dimensions

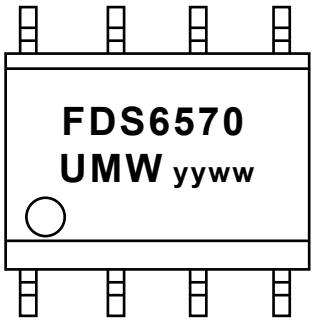


DIMENSIONS (mm are the original dimensions)

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 FDS6570A	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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