UMW FDS6690A

30V N-Channel MOSFET

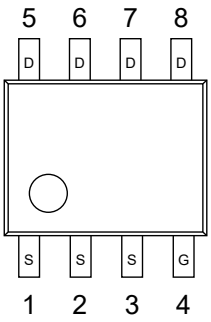
1.Features

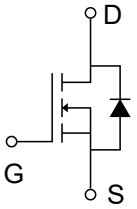
- $V_{DS\ (V)}$=30V
- I_D=11A
- $R_{DS(ON)}$<9.8mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<12mΩ(V_{GS}=4.5V)
- Fast switching speed
- Low gate charge
- High power and current handling capability
- High performance trench technology for extremely low $R_{DS(ON)}$

2.Pinning information

Pin	Symbol	Description
4	G	GATE
1,2,3	S	SOURCE
5,6,7,8	D	DRAIN

SOP-8





3.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}	±20	V
Drain Current – Continuous		I_D	11	A
– Pulsed	(Note 1a)		50	
Power Dissipation for Single Operation	(Note 1a)	P_D	2.5	W
	(Note 1b)		1	
Single Pulse Avalanche Energy	(Note 3)	E_{AS}	96	mJ
Operating and Storage Junction Temperature Range		T_J, T_{STG}	-55 to 150	°C

4.Thermal Characteristics

Parameter	Symbol	Rating	Units
Thermal Resistance, Junction-to-Ambient (Note 1a)	$R_{\theta JA}$	50	°C/W
Thermal Resistance, Junction-to-Ambient (Note 1c)	$R_{\theta JA}$	125	°C/W
Thermal Resistance, Junction-to-Case (Note 1)	$R_{\theta JC}$	25	°C/W

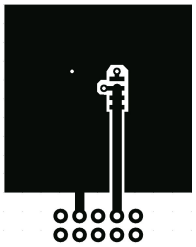
5.Electrical Characteristics (T_A=25°C unless otherwise noted)

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		25		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			-1	μA
		V_{DS}=24V, V_{GS}=0V, T_J=55°C			10	μA
Gate–Body Leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.9	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=11A		9.8	12.5	mΩ
		V_{GS}=4.5V, I_D=10A		12	17	mΩ
On–State Drain Current	$I_{D(ON)}$	V_{GS}=10V, V_{DS}=5V	50			A
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=11A		48		S
Input Capacitance	C_{iss}	V_{DS}=15V V_{GS}=0V f =1MHz		1205		pF
Output Capacitance	C_{oss}			290		pF
Reverse Transfer Capacitance	C_{rss}			115		pF
Gate Resistance	R_G	V_{GS}=15mV, f =1MHz		2.4		Ω
Turn-On DelayTime	$t_{D(on)}$	V_{DD}=15V, I_D=1A V_{GS}=10V, R_{GEN}=6Ω		9	19	ns
Turn-On Rise Time	t_r			5	10	ns
Turn-Off DelayTime	$t_{D(off)}$			28	44	ns
Turn-Off Fall Time	t_f			9	19	ns
Total Gate Charge	Q_g	V_{DS}=15V, I_D=11A V_{GS}=5V		12	16	nC
Gate–Source Charge	Q_{gs}			3.4		nC
Gate–Drain Charge	Q_{gd}			4		nC
Maximum Continuous Drain–Source Diode Forward Current	I_S				2.1	A

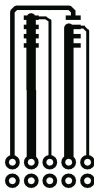
Drain–Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=2.1A (Note 2)		0.74	1.2	V
Diode Reverse Recovery Time	T_{rr}	I_F=11A, d_{IF}/d_t=100A/μs		24		nS
Diode Reverse Recovery Charge	Q_{rr}			27		nC

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 when mounted on a 1in ^{2} pad of 2 oz copper



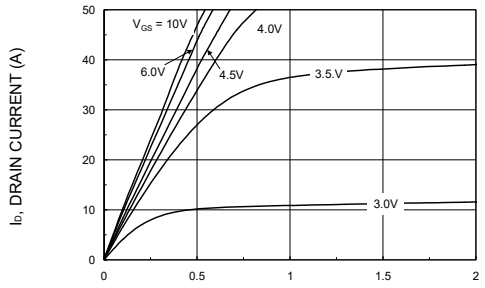
b) 125°C/W when mounted on a minimum pad

Scale 1 : 1 on letter size paper

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

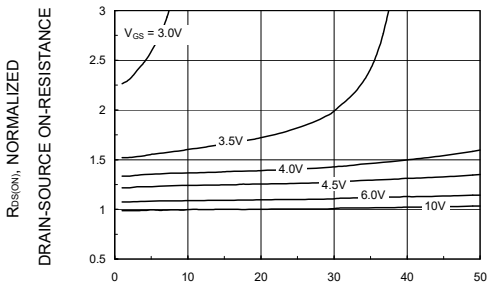
3 Starting T_J =25°C, L=3mH, I_A =8A, V_{DD}=30V, V_{GS}=10V

6.1TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



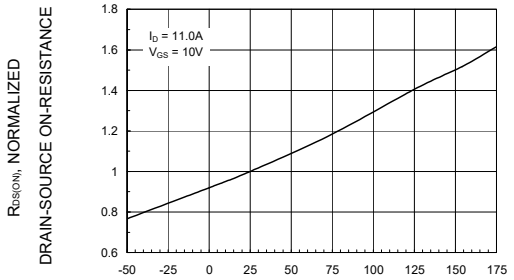
V_{DS}, DRAIN TO SOURCE VOLTAGE (V)

Fig 1: On-Region Characteristics.



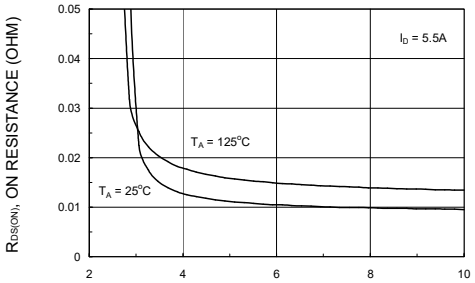
I_D, DRAIN CURRENT (A)

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



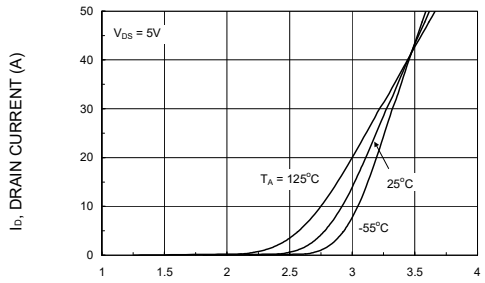
T_J, JUNCTION TEMPERATURE (°C)

Figure 3: On-Resistance Variation with Temperature.



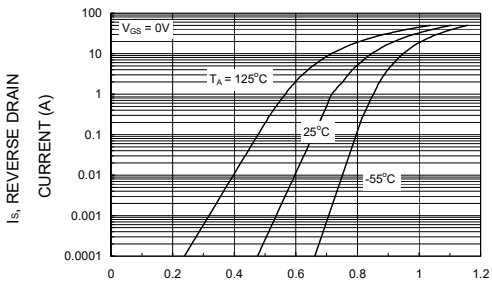
V_{GS}, GATE TO SOURCE VOLTAGE (V)

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.

6.2TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

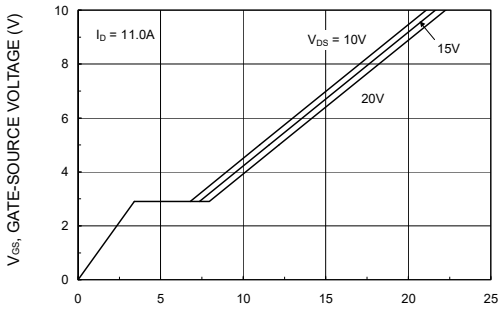


Figure 7: Gate-Charge Characteristics.

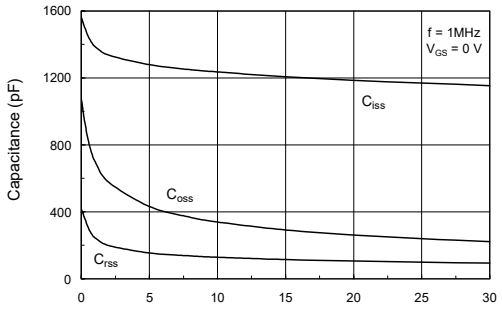


Figure 8: Capacitance Characteristics.

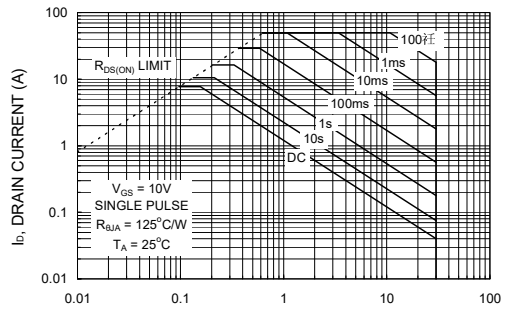


Figure 9: Maximum Safe Operating Area.

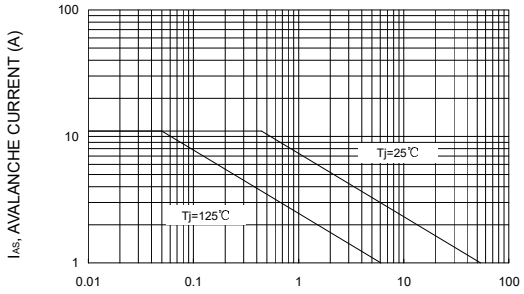


Figure 10: Unclamped Inductive Switching Capability Figure.

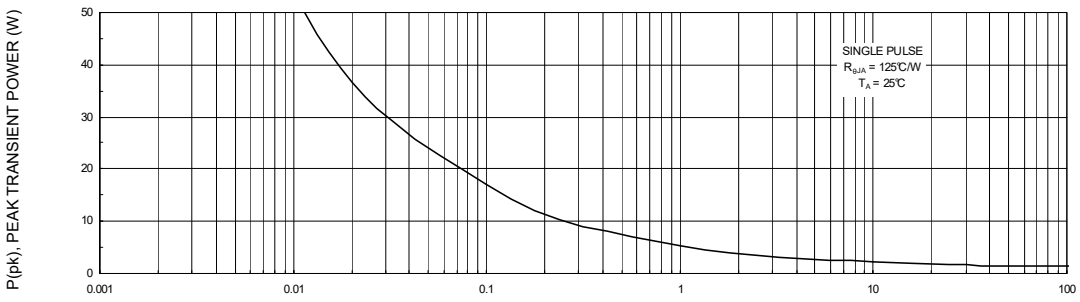


Figure 11: Single Pulse Maximum Power Dissipation.

6.3Typical Characterisitics

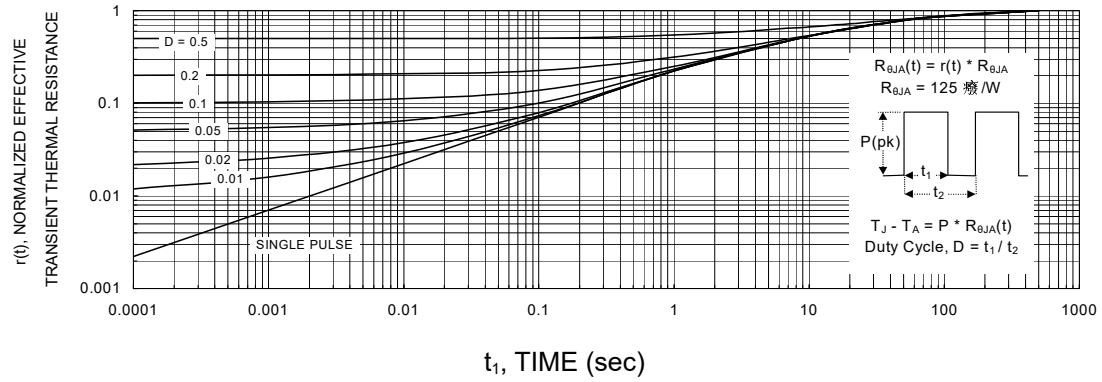
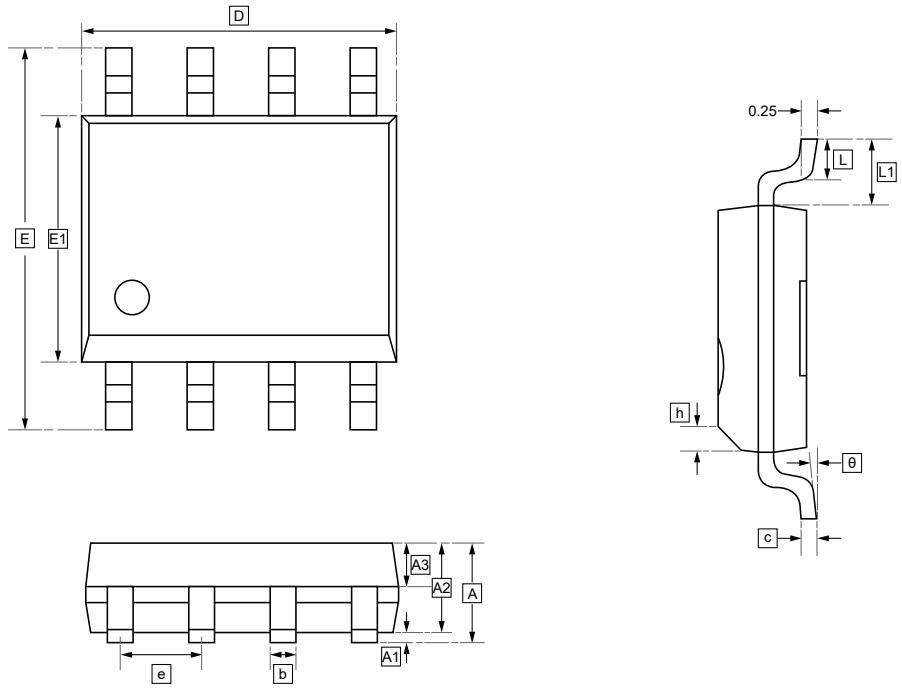


Figure 12: Transient Thermal Response Curve.

7.SOP-8 Package Outline Dimensions

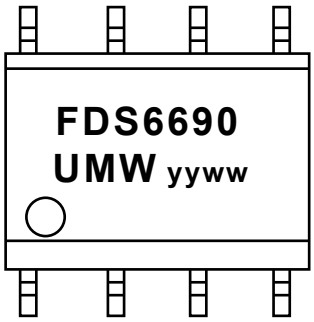


DIMENSIONS (mm are the original dimensions)

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°

8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDS6690A	SOP-8	3000	Tape and reel

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