UMW AO4406A

30V N-Channel Enhancement Mode MOSFET

1.Description

The AO4406A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

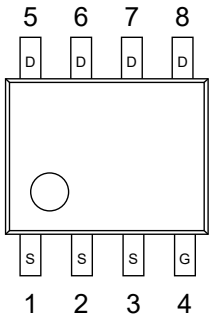
2.Features

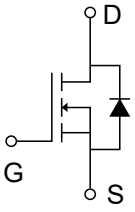
- V_{DS}=30V
- I_D =12A
- $R_{DS(ON)}$ <13mΩ(V_{GS}=10V)

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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, VGS@10V[1]	I_D@T_A=25°C	12	A
Continuous Drain Current, VGS@10V[1]	I_D@T_A=70°C	8	A
Pulsed Drain Current[2]	I_{DM}	30	A
Single Pulse Avalanche Energy[3]	E_{AS}	20	mJ
Avalanche Current	I_{AS}	22	A
Total Power Dissipation[4]	P_D@T_A=25°C	4.5	W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C
Thermal Resistance Junction-ambient[1]	$R_{\theta JA}$	50	°C/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	30	°C/W

5.Electrical Characteristic (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=1mA		0.027		V/°C
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=10V, I_D=10A		10	13	mΩ
		V_{GS}=4.5V, I_D=8A		12	16	
Gate Threshold Voltage	$V_{GS(th)}$		1.2	1.5	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA		5.8		mV/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			1	uA
		V_{DS}=24V, V_{GS}=0V, T_J=55°C			5	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=10A		5.8		S
Gate Resistance	R_g	V_{DS}=0V, V_{GS}=0V, f=1MHz		2.2	3.8	Ω
Total Gate Charge (4.5V)	Q_g	V_{DS}=15V, V_{GS}=4.5V, I_D=10A		12.6	17.6	nC
Gate-Source Charge	Q_{gs}			4.2	5.9	
Gate-Drain Charge	Q_{gd}			5.1	7.1	
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=15V, V_{GS}=10V R_G=3.3, I_D=10A	3.5	6.2	12.4	ns
Rise Time	t_f			59	106	
Turn-Off Delay Time	$t_{D(off)}$			27.6	55	
Fall Time	t_f			8.4	16.8	
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, f=1MHz		960		pF
Output Capacitance	C_{oss}			139		
Reverse Transfer Capacitance	C_{rss}			87		
Continuous Source Current[1,5]	I_S	V_G=V_D=0V , Force Current			10.3	A
Pulsed Source Current[2,5]	I_{SM}				42	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C			1.2	V
Reverse Recovery Time	t_{rr}	I_F=10A, dI/dt=100A/μs T_J=25°C		12.5		nS
Reverse Recovery Charge	Q_{rr}			5		nC

Nots:

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.

3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=35A.

4.The power dissipation is limited by 150℃ junction temperature.

5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

6.1 Typical Characteristic

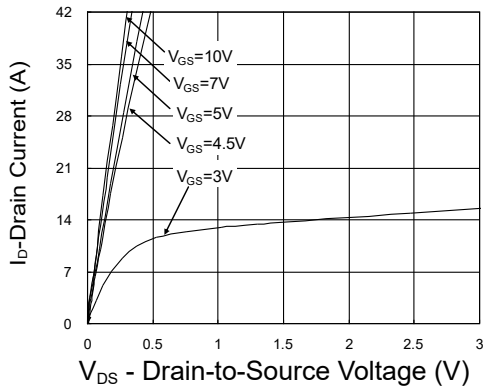


Fig.1 Typical Output Characteristics

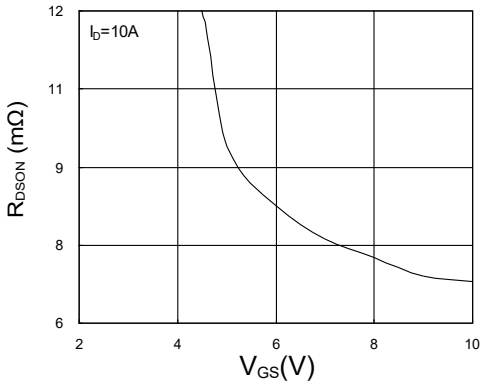


Fig.2 On-Resistance vs. Gate-Source

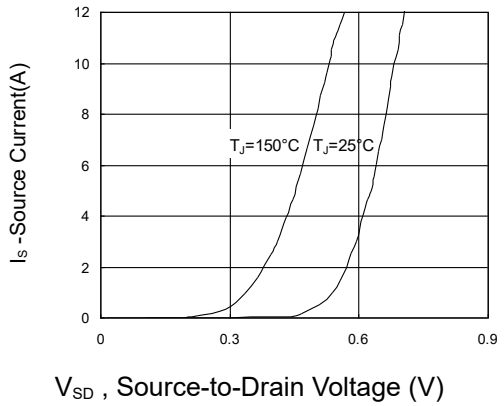


Fig.3 Forward Characteristics of reverse

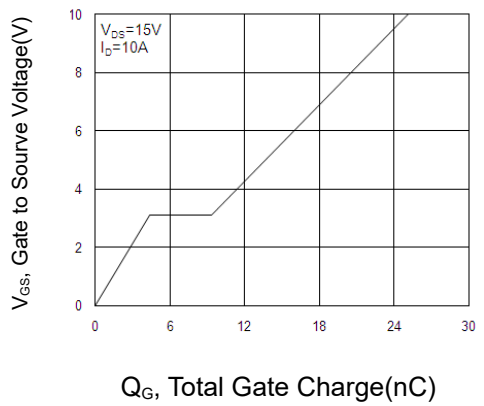


Fig.4 Gate-Charge Characteristics

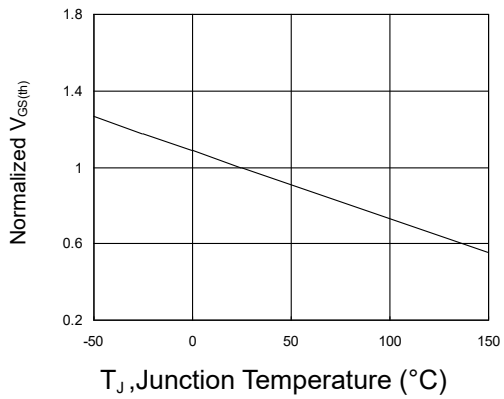


Fig.5 Normalized $V_{GS(th)}$ vs. TJ

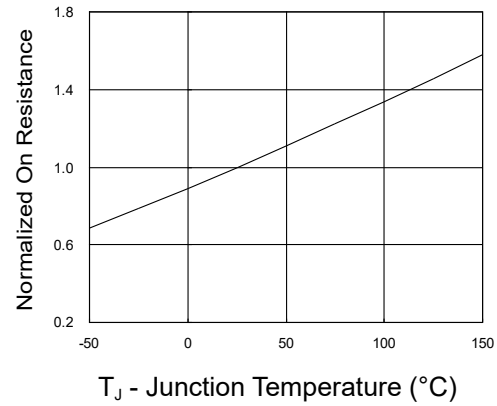


Fig.6 Normalized R_{DSON} vs. TJ

6.2 Typical Characteristic

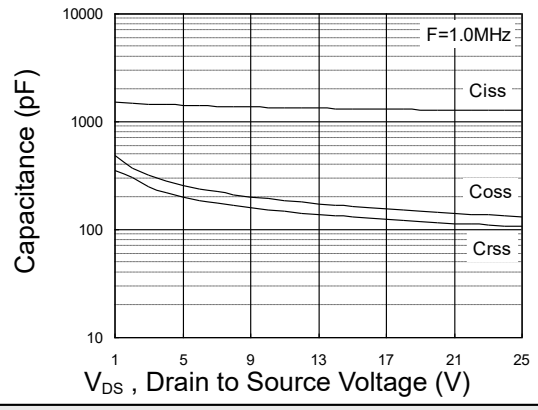


Fig.7 Capacitance

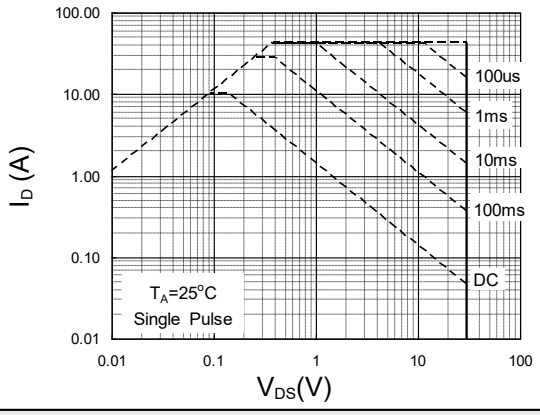


Fig.8 Safe Operating Area

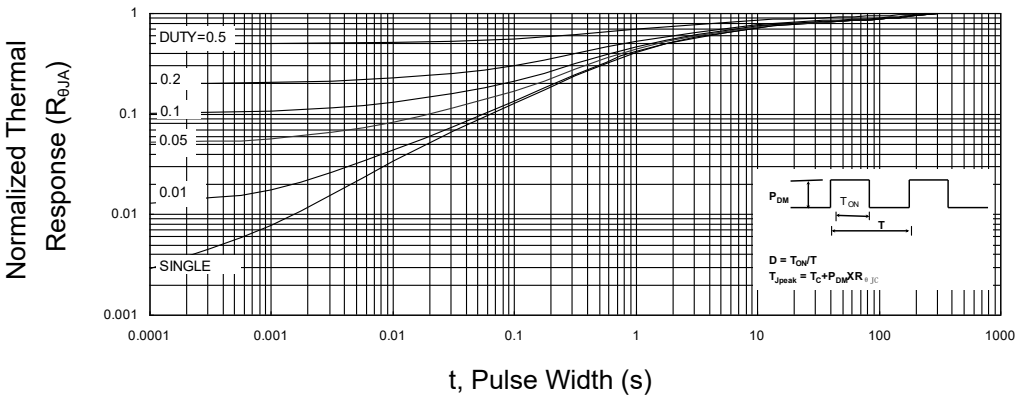


Fig.9 Normalized Maximum Transient Thermal Impedance

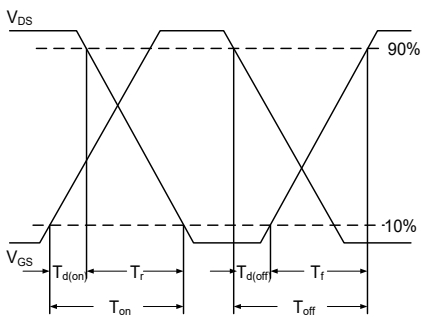


Fig.10 Switching Time Waveform

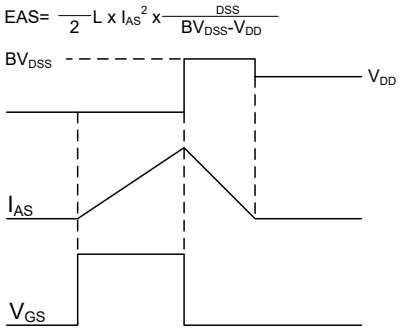
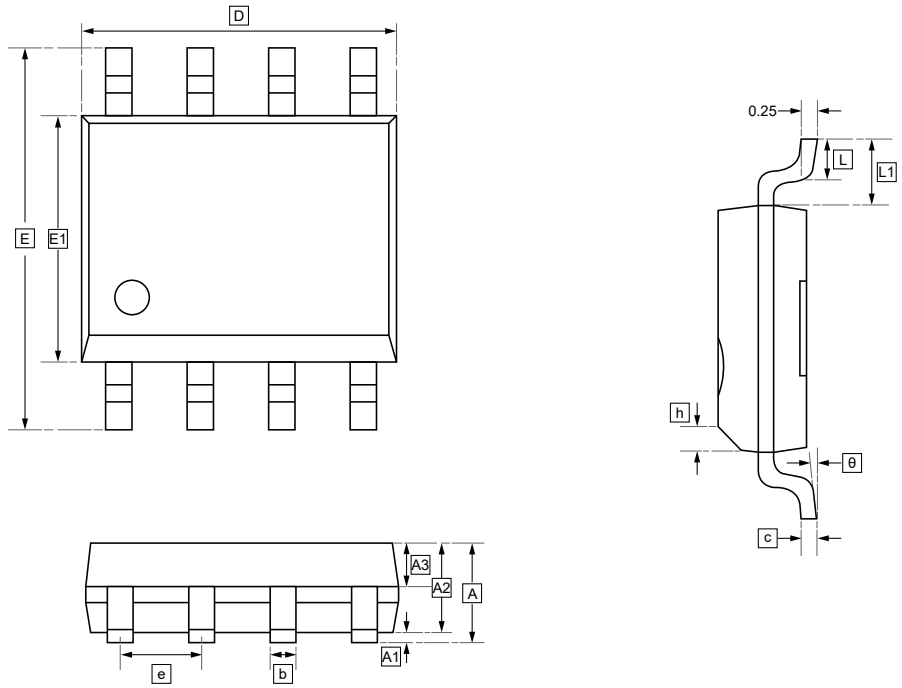


Fig.11 Unclamped Inductive Switching Waveform

7.SOP-8 Package Outline Dimensions

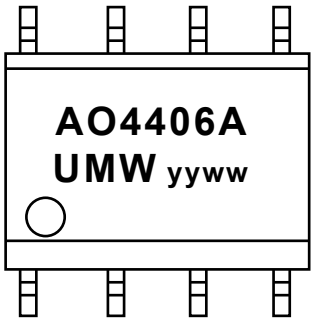


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.70	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°

8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW AO4406A	SOP-8	3000	Tape and reel

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