UMW AO4409

P-Channel MOSFET

1.Description

The AO4409 uses advanced trench technology to provide excellent $R_{DS(ON)}$, and ultra-low low gate charge. This device is suitable for use as a load switch or in PWM applications.

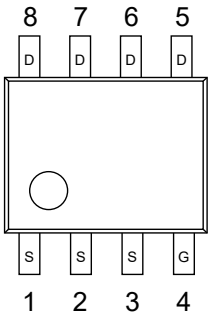
2.Features

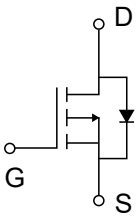
- V_{DS}(V)=-30V
- I_D =-15A
- $R_{DS(ON)}$ <7.5mΩ(V_{GS}=-10V)
- $R_{DS(ON)}$ <12mΩ(V_{GS}=-4.5V)

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	Maximum	Units
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[A]	T_A=25°C	I_D	-15	A
	T_A=70°C		-12.8	
Pulsed Drain Current [B]		I_{DM}	-80	
Power Dissipation [A]	T_A=25°C	P_D	3	W
	T_A=70°C		2.1	
Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150	°C

5.Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	26	40	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		50	50	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	14	14	°C/W

6.Electrical Characteristics (T_J=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
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-5	μA
		T_J=55°C			-25	
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.4	-1.9	-2.7	V
On-State Drain Current	$I_{D(ON)}$	V_{GS}=-10V, V_{DS}=-5V	80			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-15A		6.2	7.5	mΩ
		V_{GS}=-4.5V, I_D=-10A		9.5	12	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-15A	35	50		S
Diode Forward Voltage	V_{SD}	I_S=-1A, V_{GS}=0V		-0.71	-1	V
Maximum Body-Diode Continuous Current	I_S				-5	A
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-15V, f=1MHz		5270		pF
Output Capacitance	C_{oss}			945		pF
Reverse Transfer Capacitance	C_{rss}			745		pF
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		2		Ω
Total Gate Charge	Q_g	V_{GS}=-10V, V_{DS}=-15V, I_D=-15A		100		nC
Gate Charge	Q_g(4.5V)			51.5	20	nC
Gate Source Charge	Q_{gs}			14.5		nC
Gate Drain Charge	Q_{gd}			23		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS}=-10V, V_{DS}=-15V, R_L=1Ω, R_{GEN}=3Ω		14		ns
Turn-On Rise Time	t_r			16.5		ns
Turn-Off DelayTime	$t_{D(off)}$			76.5		ns
Turn-Off Fall Time	t_f			37.5		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F=-15A, dI/dt=100A/μs		36.7		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=-15A, dI/dt=100A/μs		28		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The value in any a given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

D. The static characteristics in Figures 1 to 6,12,14 are obtained using 80 μs pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

7.1TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

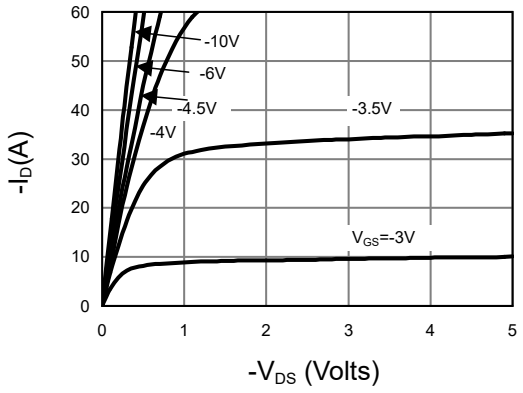


Fig 1: On-Region Characteristics

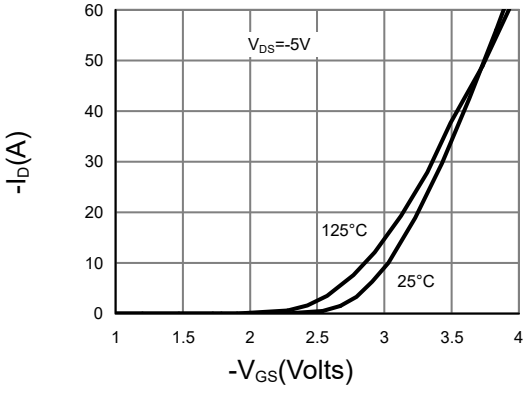


Figure 2: Transfer Characteristics

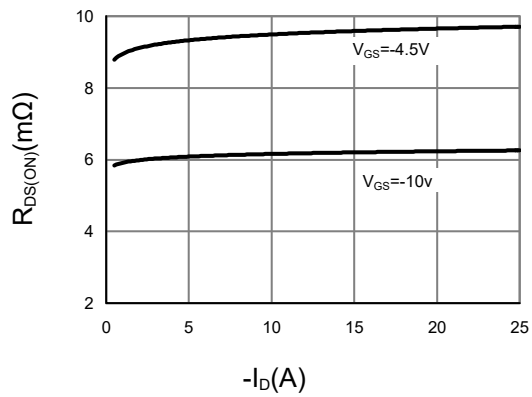


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

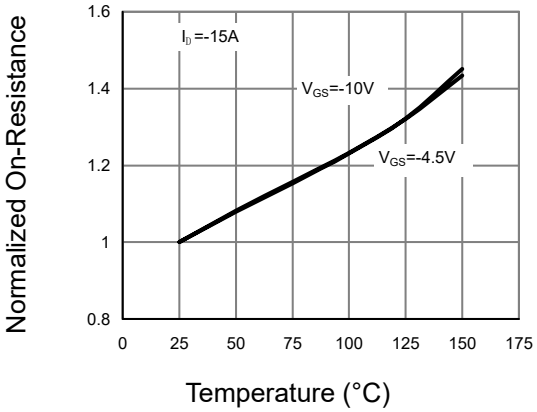


Figure 4: On-Resistance vs. Junction Temperature

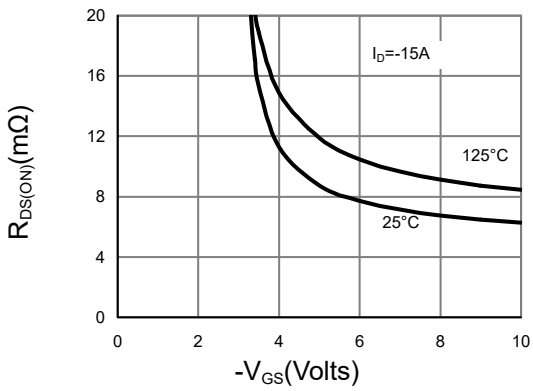


Figure 5: On-Resistance vs. Gate-Source Voltage

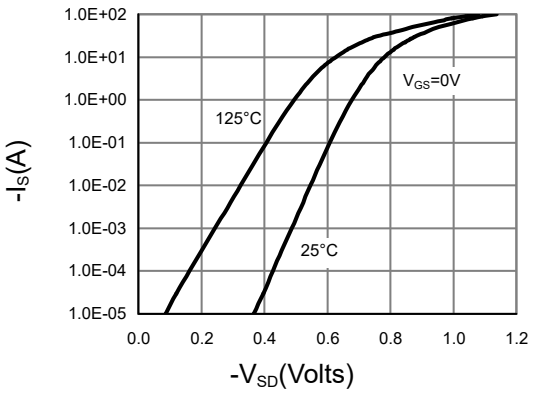


Figure 6: Body-Diode Characteristics

7.2TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

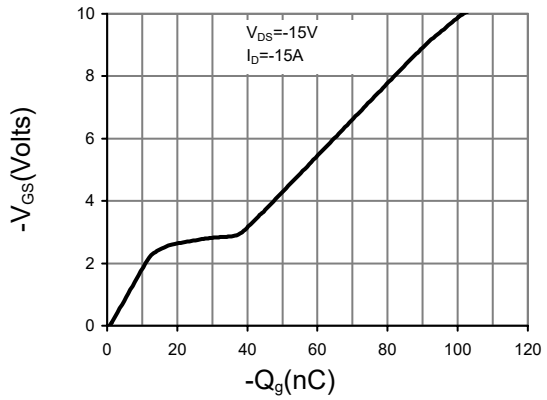


Figure 7: Gate-Charge Characteristics

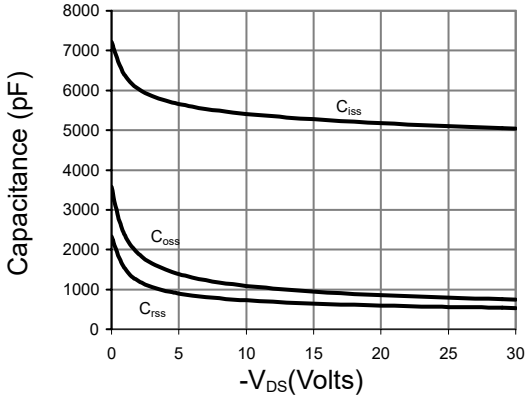


Figure 8: Capacitance Characteristics

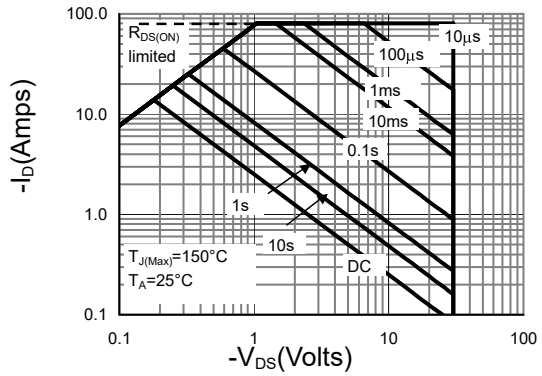


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

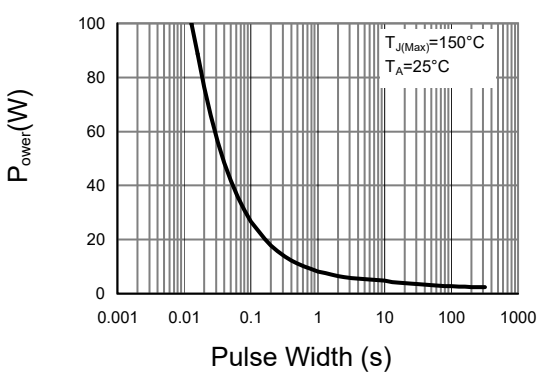


Figure 10: Single Pulse Power Rating Junction-to -Ambient (Note E)

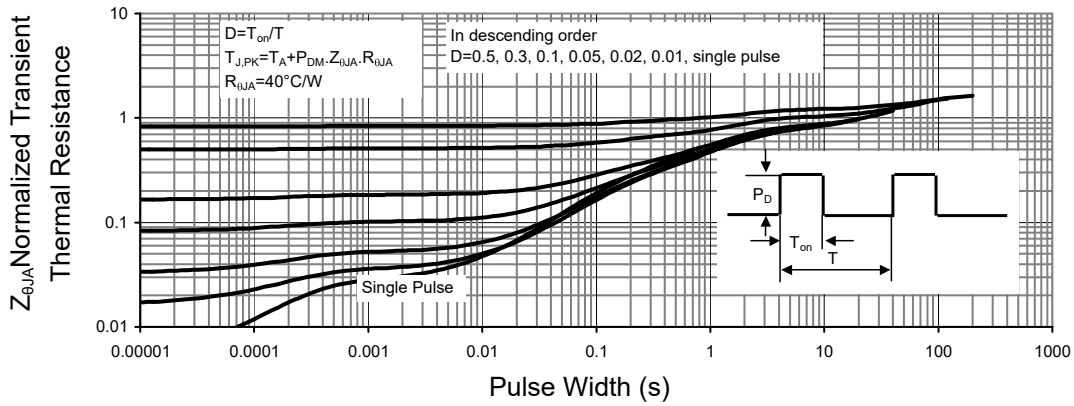
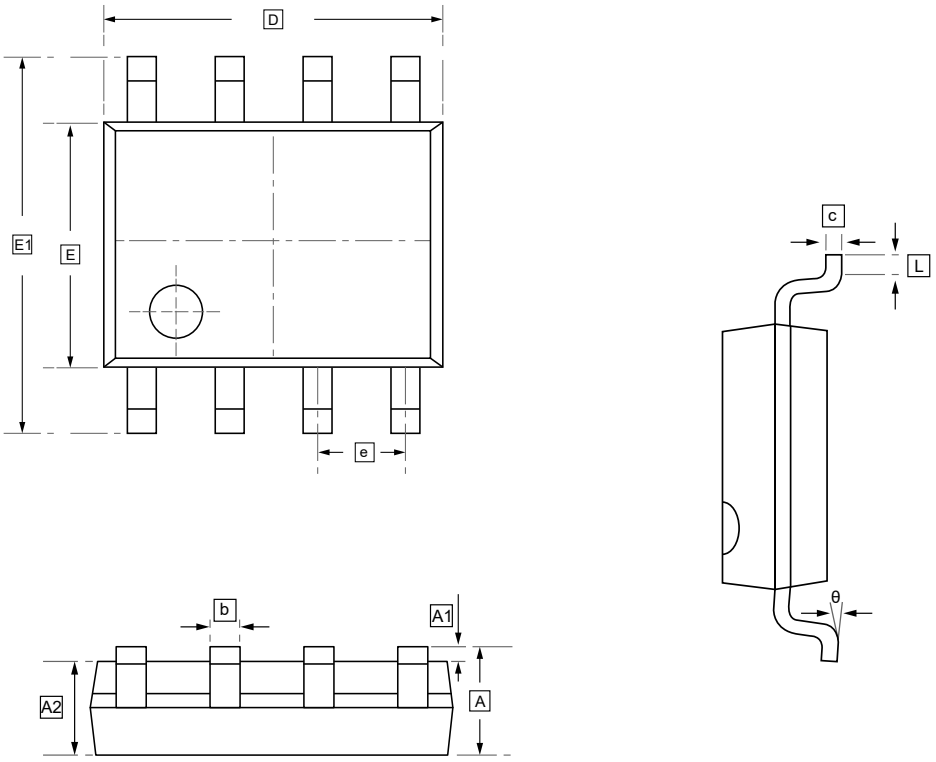


Figure 11: Normalized Maximum Transient Thermal Impedance

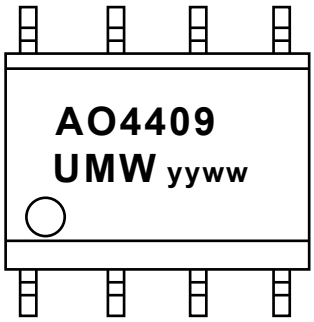
8.SOP-8 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	8°

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW AO4409	SOP-8	3000	Tape and reel

10.Disclaimer

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