# UMW AO4805

Dual -30V P-Channel MOSFET

## 1.Description

The AO4805 uses advanced trench technology to provide excellent $R_{DS(ON)}$, and ultra-low low gate charge with a 25V gate rating. This device is suitable for use as a load switch or in PWM applications.

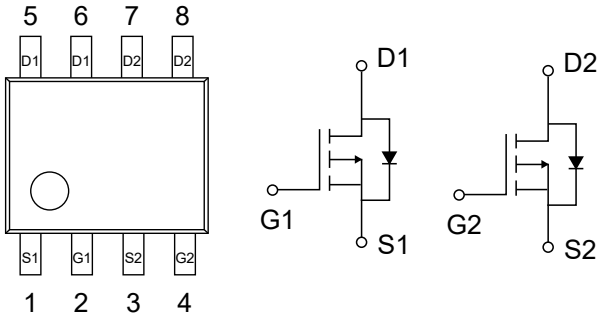
## 2.Features

- $V_{DS\ (V)}$=-30V
- $I_D$=-9A
- $R_{DS(ON)}$<15mΩ($V_{GS}$=10V)
- $R_{DS(ON)}$<19mΩ($V_{GS}$=4.5V)

## 3.Pinning information

| Pin | Symbol | Description |
|---|---|---|
| 2,4 | G1, G2 | GATE |
| 1,3 | S1, S2 | SOURCE |
| 5,6,7,8 | D1, D2 | 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 | | $V_{GS}$ | ±25 | V |
| Continuous Drain Current [A] | $T_A$=25°C | $I_D$ | -9 | A |
| | $T_A$=70°C | | -6.9 | |
| Pulsed Drain Current [B] | | $I_{DM}$ | -40 | |
| Power Dissipation [A] | $T_A$=25°C | $P_D$ | 2 | W |
| | $T_A$=70°C | | 1.44 | |
| 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 | $R_{\theta JA}$ | 50 | 62.5 | °C/W |
| Maximum Junction-to-Ambient [A] | Steady-State | | 73 | 110 | °C/W |
| Maximum Junction-to-Lead [C] | Steady-State | $R_{\theta JL}$ | 31 | 40 | °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 | | | -1 | μA |
| | | $T_J$=55°C | | | -5 | μA |
| 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 | -1.5 | -2.5 | V |
| On state drain current | $I_{D(ON)}$ | $V_{GS}$=-10V, $V_{DS}$=-5V | 40 | | | A |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$=-10V, $I_D$=-8A | | 12 | 15 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-5A | | 16 | 19 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=-5V, $I_D$=-8A | 16 | 21 | | S |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-1A, $V_{GS}$=0V | | -0.75 | -1 | V |
| Maximum Body-Diode Continuous Current | $I_S$ | | | | -2.6 | A |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=-15V, f=1MHz | | 2076 | | pF |
| Output Capacitance | $C_{oss}$ | | | 503 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 302 | | 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<br>$I_D$=-8A | | 39 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 8 | | nC |
| Gate Drain Charge | $Q_{gd}$ | | | 11.4 | | nC |
| Turn-On DelayTime | $t_{D(on)}$ | $V_{GS}$=-10V, $V_{DS}$=-15V<br>$R_L$=1.8Ω, $R_{GEN}$=3Ω | | 12.7 | | ns |
| Turn-On Rise Time | $t_r$ | | | 7 | | ns |
| Turn-Off DelayTime | $t_{D(off)}$ | | | 25.2 | | ns |
| Turn-Off Fall Time | $t_f$ | | | 12 | | ns |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $I_F$=-8A, dI/dt=100A/μs | | 32 | | ns |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | $I_F$=-8A, dI/dt=100A/μs | | 26 | | 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 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

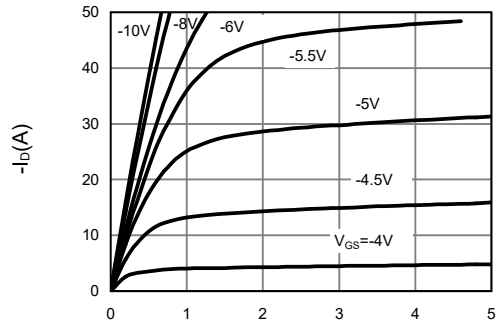



Fig 1: On-Region Characteristics

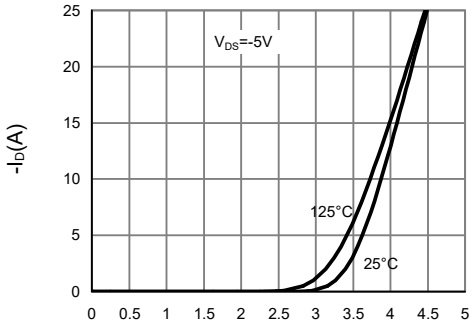



Figure 2: Transfer Characteristics

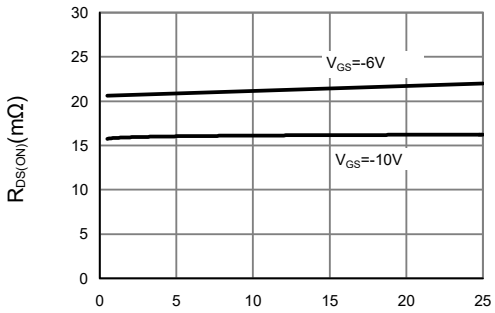



Figure 3: On-Resistance vs. Drain Current and Gate Voltage

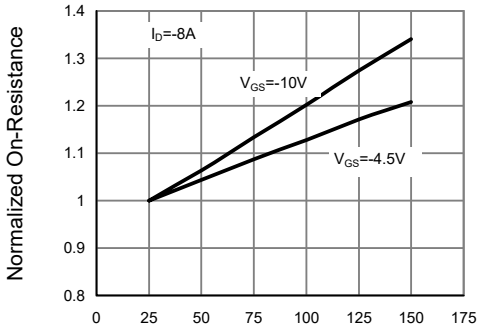



Figure 4: On-Resistance vs. Junction Temperature

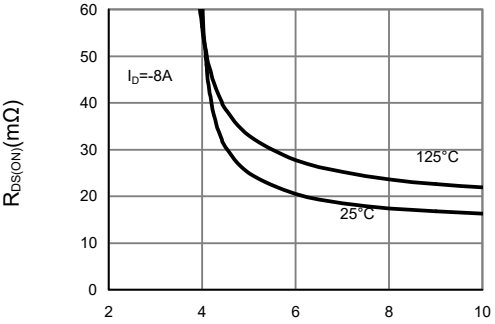



Figure 5: On-Resistance vs. Gate-Source Voltage

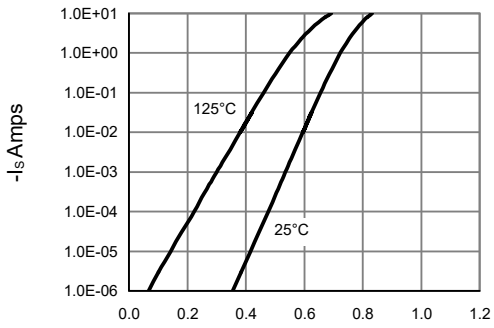



Figure 6: Body-Diode Characteristics

## 7.2TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

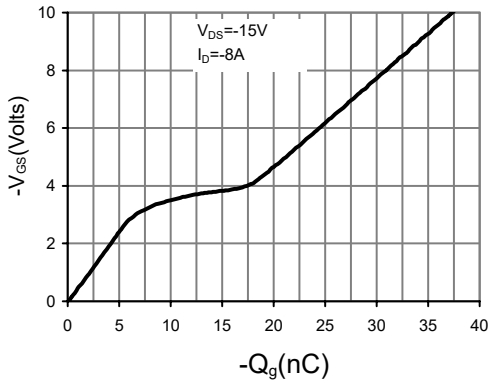



Figure 7: Gate-Charge Characteristics

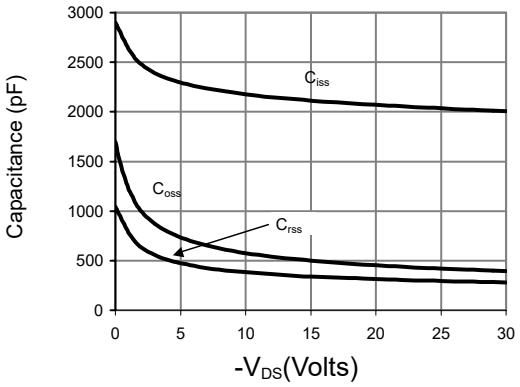



Figure 8: Capacitance Characteristics

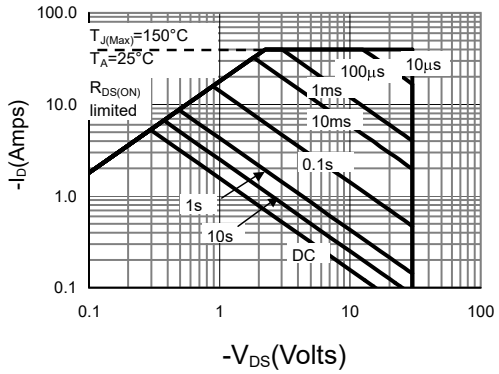



Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

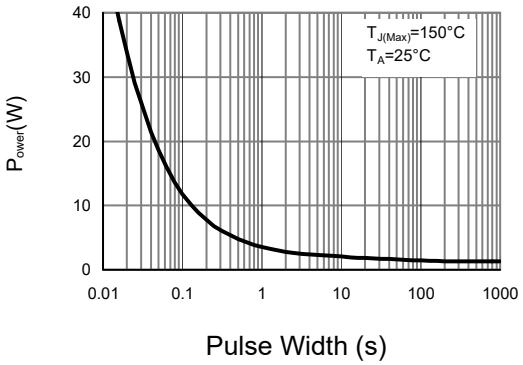



Figure 10: Single Pulse Power Rating Junction-to -Ambient (Note E)

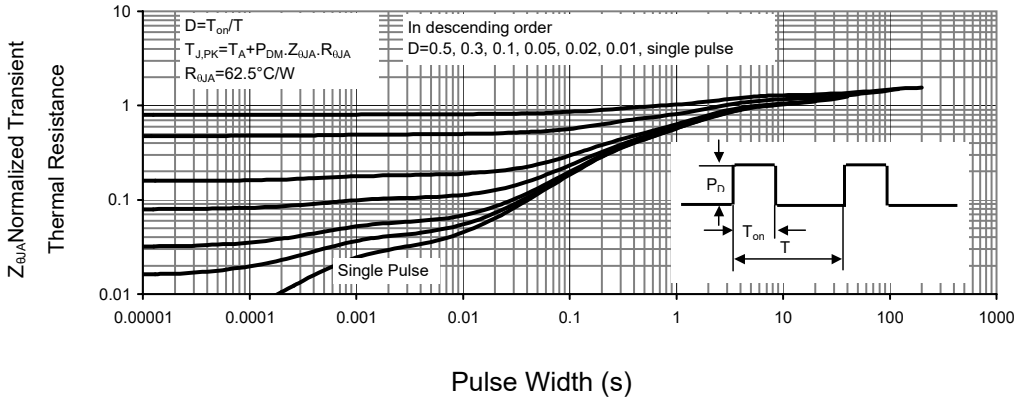
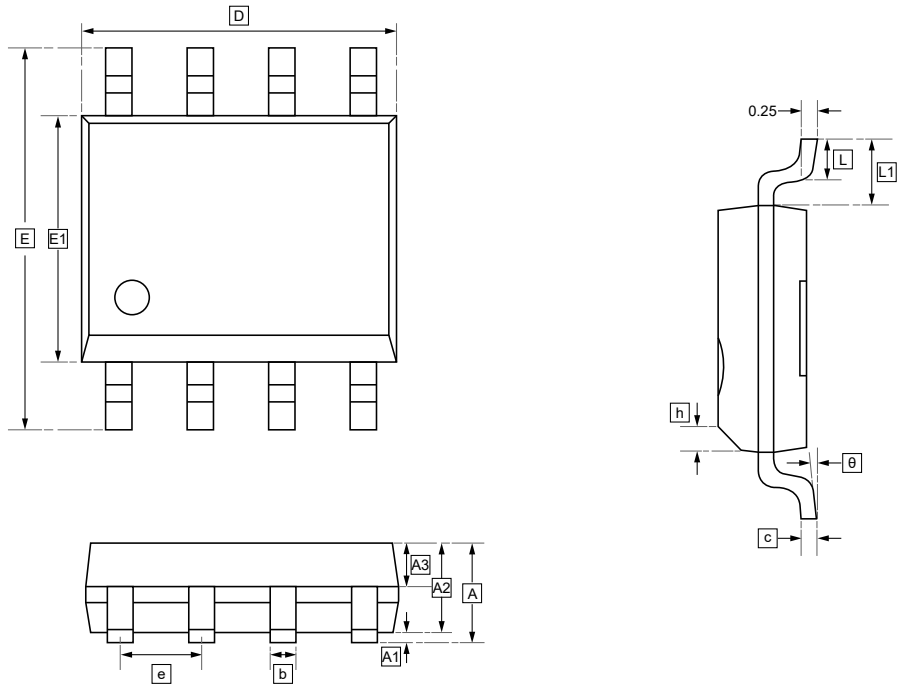



Figure 11: Normalized Maximum Transient Thermal Impedance

## 8.SOP-8 Package Outline Dimensions

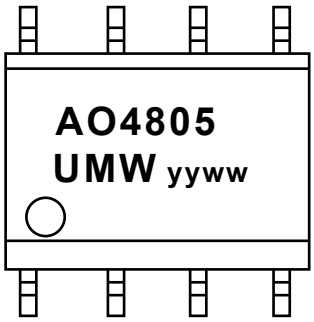



**DIMENSIONS (mm are the original dimensions)**

| Symbol | A | A1 | A2 | 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 AO4805 | SOP-8 | 3000 | Tape and reel |

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