

**SuperMOS – SOP8 -30V  $BV_{DSS}$ ,  $15m\Omega R_{DS(on)}$ , -10A  $I_D$  P-channel MOSFET**

**1. Description**

The AO4805 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product AO4805 is Pb-free.

**2. Features**

- -30V,  $R_{DS(ON)}=15m\Omega(Typ)$ ,  $V_{GS}=-10V$
- $R_{DS(ON)}=19m\Omega(Typ)$ ,  $V_{GS}=-4.5V$
- Fast Switching
- High density cell design for low  $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

**3. Applications**

- PWM applications **100% UIS TESTED!**
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

**4. Ordering Information**

| Part Number | Package | Marking    | Material     | Quantity per reel | Flammability Rating |
|-------------|---------|------------|--------------|-------------------|---------------------|
| AO4805      | SOP8    | ES4805/lot | Halogen free | 3,000 PCS         | UL 94V-0            |

Table-1 Ordering information

**5. Pin Configuration and Functions**


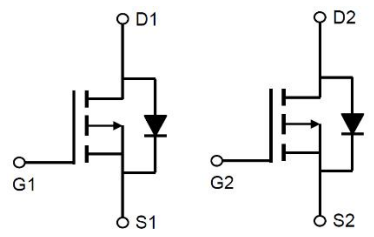
| Pin | Function | Outline   | Circuit Diagram   |
|-----|----------|---|---|
| 2   | Gate1    |  |  |
| 1   | Source1  |   |   |
| 7/8 | Drain1   |   |   |
| 4   | Gate2    |   |   |
| 3   | Source2  |   |   |
| 5/6 | Drain2   |   |   |

Table-2 Pin configuration

## 6. Specification

### Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

| Parameter                                     | Symbol     | Limit                  | Unit |
|---|------------|------------------------|------|
| Drain-Source Voltage                          | $BV_{DSS}$ | -30                    | V    |
| Gate-Source Voltage                           | $V_{GS}$   | $\pm 25$               | V    |
| Continuous Drain Current                      | $I_D$      | $T_A=25^\circ\text{C}$ | -10  |
|   |            | $T_A=75^\circ\text{C}$ | -8   |
| Maximum Power Dissipation                     | $P_D$      | $T_A=25^\circ\text{C}$ | 3.2  |
|   |            | $T_A=75^\circ\text{C}$ | 1.9  |
| Pulsed Drain Current                          | $I_{DM}$   | -40                    | A    |
| Avalanche Current, Single Pulsed <sup>a</sup> | $I_{AS}$   | 21                     | A    |
| Avalanche Energy, Single Pulsed <sup>a</sup>  | $E_{AS}$   | 66                     | mJ   |
| Operating Junction Temperature                | $T_J$      | 150                    | °C   |
| Storage Temperature Range                     | $T_{stg}$  | -55 to +150            | °C   |

#### Thermal resistance ratings

| Single Operation                       |                 |         |         |      |
|--|-----------------|---------|---------|------|
| Parameter                              | Symbol          | Typical | Maximum | Unit |
| Junction-to-Ambient Thermal Resistance | $R_{\theta JA}$ | 32      | 40      | °C/W |
| Junction-to-Lead Thermal Resistance    | $R_{\theta JL}$ | 20      | 28      |      |

Note:

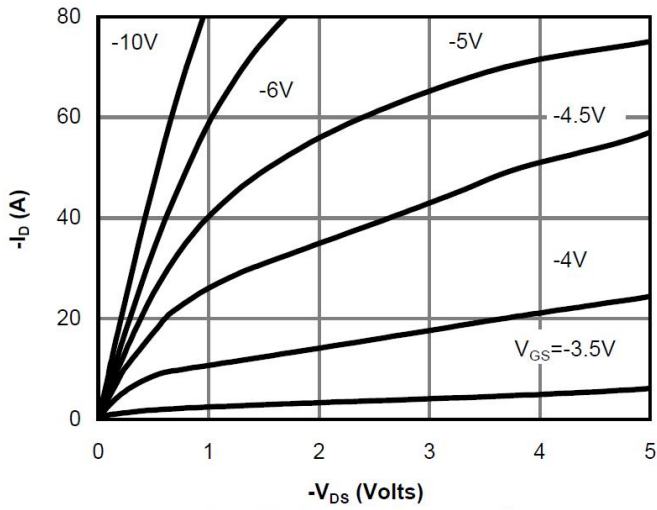
a:  $T_J=25^\circ\text{C}, V_{DD}=-30\text{V}, V_G=-10\text{V}, L=0.3\text{mH}, R_g=25\Omega$

## Electrical Characteristics

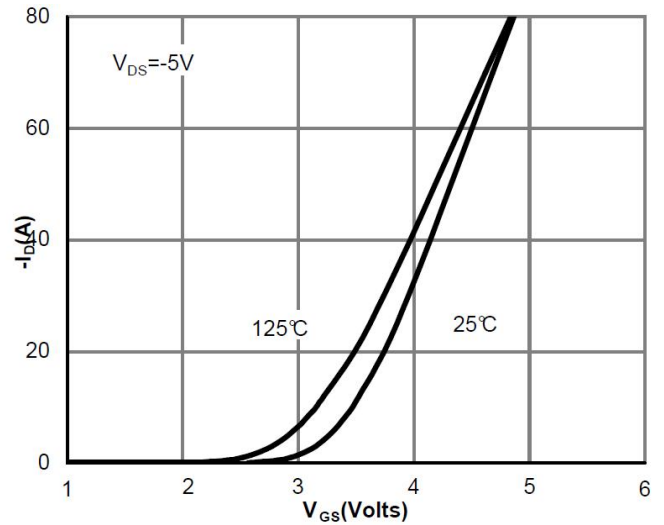
At TA = 25°C unless otherwise specified

| Parameter  | Symbol       | Test Conditions                | Min. | Typ.  | Max.      | Unit       |
|--|--------------|--------------------------------|------|-------|-----------|------------|
| <b>OFF CHARACTERISTICS</b>                       |              |                                |      |       |           |            |
| Drain-to-Source Breakdown Voltage                | $BV_{DSS}$   | $V_{GS}=0V, I_D=-250\mu A$     | -30  |       |           | V          |
| Zero Gate Voltage Drain Current                  | $I_{DSS}$    | $V_{GS}=0V, V_{DS}=-30V$       |      |       | -1        | $\mu A$    |
| Gate-to-source Leakage Current                   | $I_{GSS}$    | $V_{GS}=\pm 25V, V_{DS}=0V$    |      |       | $\pm 100$ | nA         |
| <b>ON CHARACTERISTICS</b>                        |              |                                |      |       |           |            |
| Gate Threshold Voltage                           | $V_{GS(TH)}$ | $V_{GS}=V_{DS}, I_D=-250\mu A$ | -1.0 | -1.5  | -2.0      | V          |
| Drain-to-source On-resistance                    | $R_{DS(on)}$ | $V_{GS}=-10V, I_D=-8A$         |      | 15    | 22        | m $\Omega$ |
|  |              | $V_{GS}=-4.5V, I_D=-5A$        |      | 19    | 28        |            |
| <b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b> |              |                                |      |       |           |            |
| Input Capacitance                                | $C_{ISS}$    | $V_{GS}=0V$                    |      | 2060  | 2600      | pF         |
| Output Capacitance                               | $C_{OSS}$    | $V_{DS}=-15V$                  |      | 370   |           |            |
| Reverse Transfer Capacitance                     | $C_{RSS}$    | $f=1MHz$                       |      | 300   |           |            |
| Gate Resistance                                  | $R_g$        | $f=1MHz$                       |      | 2.5   |           | $\Omega$   |
| Total Gate Charge                                | $Q_{G(TOT)}$ | $V_{GS}=-10V$                  |      | 30    | 40        | nC         |
| Gate-to-Source Charge                            | $Q_{GS}$     | $V_{DS}=-15V$                  |      | 4.5   |           |            |
| Gate-to-Drain Charge                             | $Q_{GD}$     | $I_D=-8A$                      |      | 10    |           |            |
| <b>SWITCHING CHARACTERISTICS</b>                 |              |                                |      |       |           |            |
| Turn-On Delay Time                               | $t_{d(ON)}$  | $V_{GS}=-10V$                  |      | 11    |           | ns         |
| Rise Time  | $t_r$        | $V_{DS}=-15V$                  |      | 9.5   |           |            |
| Turn-Off Delay Time                              | $t_{d(OFF)}$ | $R_L=1\Omega$                  |      | 25    |           |            |
| Fall Time  | $t_f$        | $R_G=3\Omega$                  |      | 12    |           |            |
| <b>BODY DIODE CHARACTERISTICS</b>                |              |                                |      |       |           |            |
| Forward Voltage                                  | $V_{SD}$     | $V_{GS}=0V, I_{SD}=-1.0A$      |      | -0.75 | -1.2      | V          |

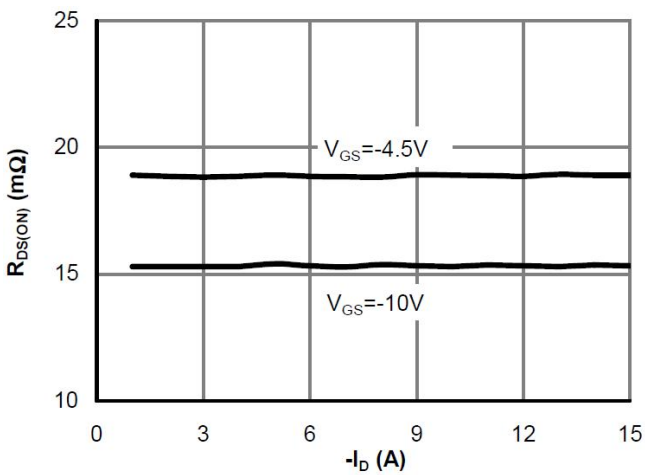
**7. Typical Characteristic**



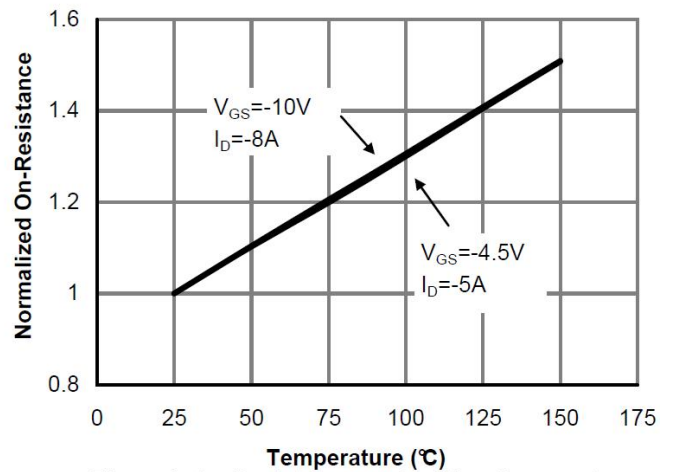
**Fig 1: On-Region Characteristics**



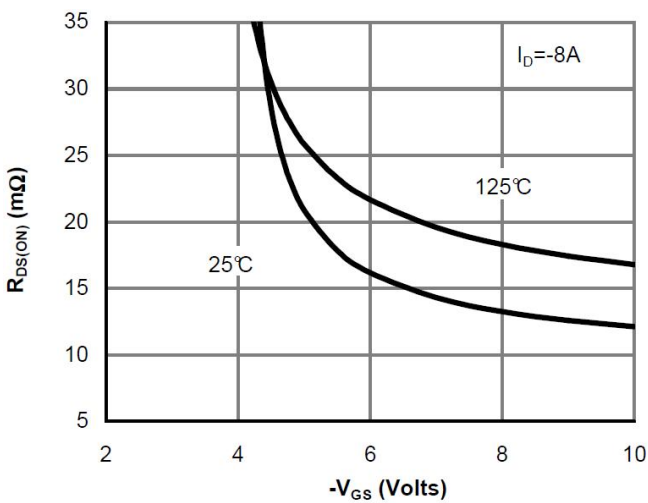
**Figure 2: Transfer Characteristics**



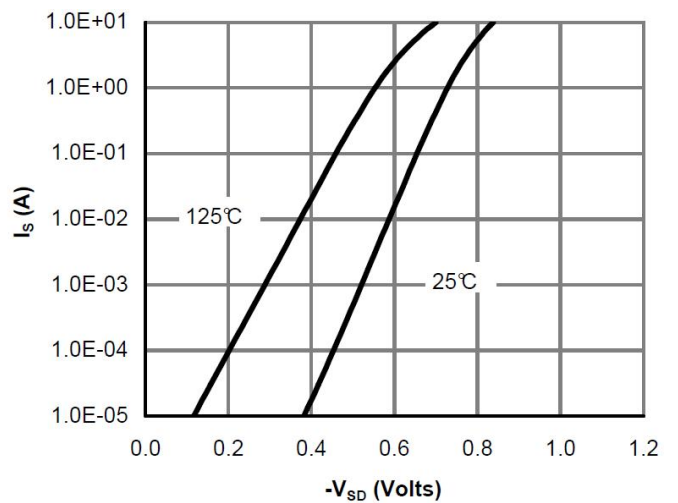
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



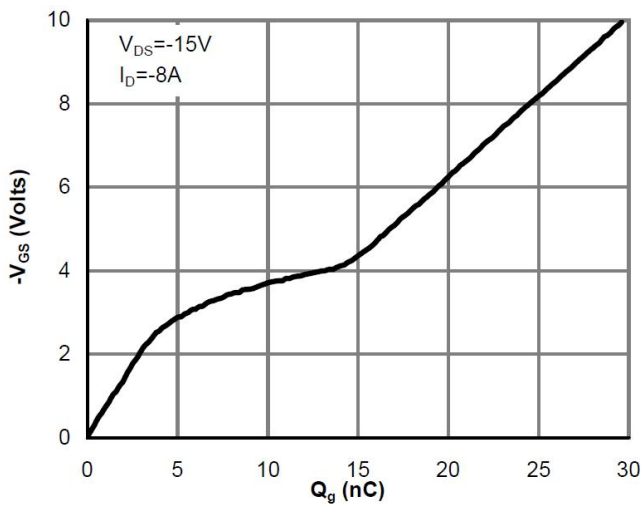
**Figure 4: On-Resistance vs. Junction Temperature**



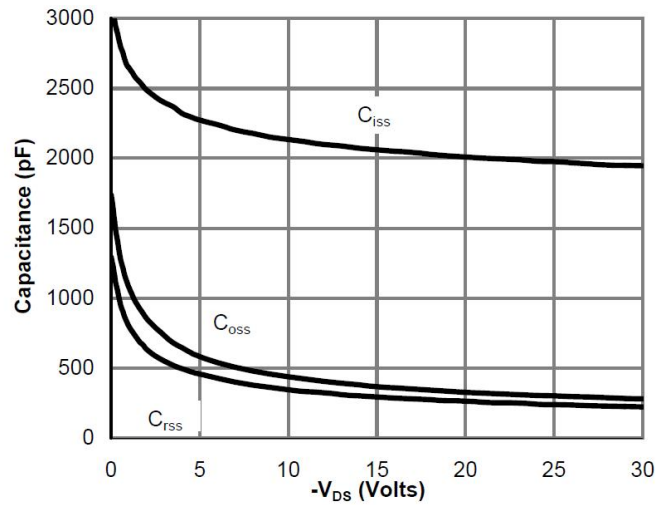
**Figure 5: On-Resistance vs. Gate-Source Voltage**



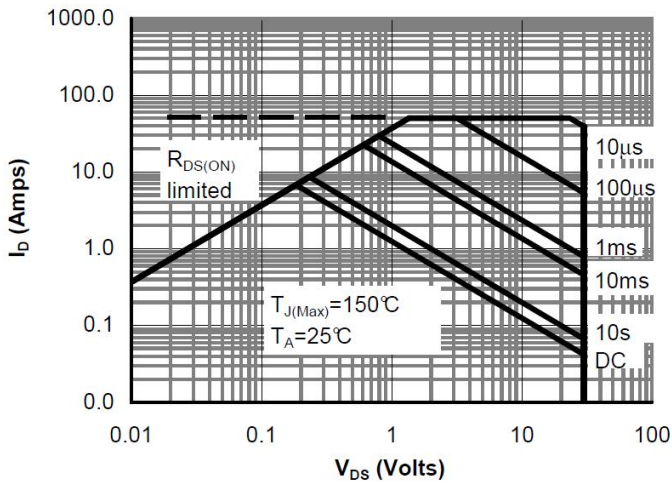
**Figure 6: Body-Diode Characteristics**



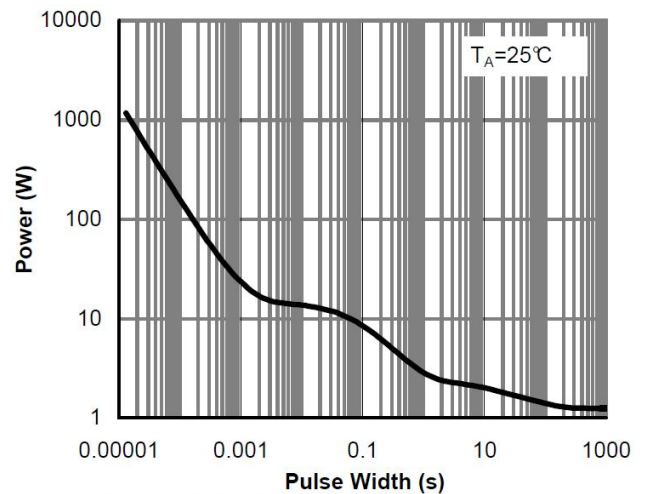
**Figure 7: Gate-Charge Characteristics**



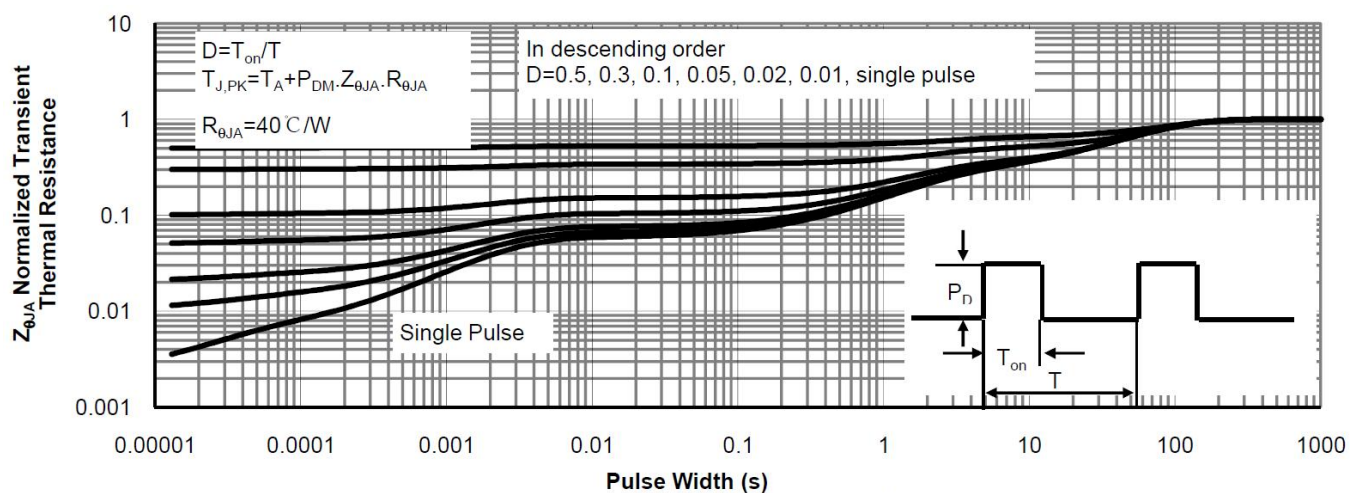
**Figure 8: Capacitance Characteristics**



**Figure 9: Maximum Forward Biased Safe Operating Area**

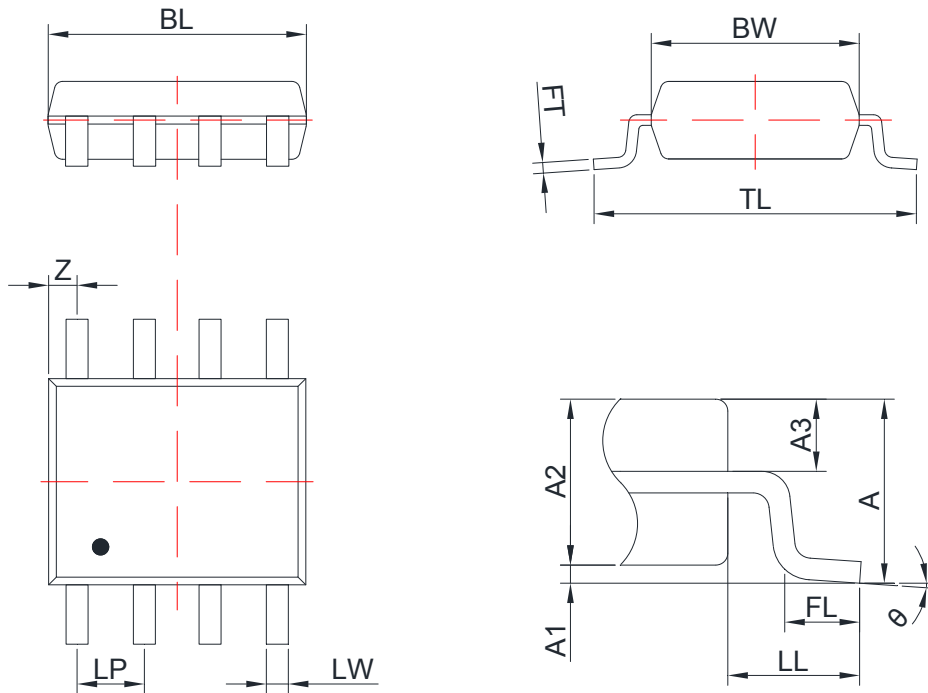


**Figure 10: Single Pulse Power Rating Junction-to-Ambient**



**Figure 11: Normalized Maximum Transient Thermal Impedance**

**8. Dimension and Patterns (SOP8)**



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

| Symbol | Dimensions |      | Symbol | Dimensions |      |
|--------|------------|------|--------|------------|------|
|        | Min.       | Max. |        | Min.       | Max. |
| A      | 1.75       |      | FL     | 0.50       | 0.80 |
| A1     | 0.05       | 0.15 | LP     | 1.25       | 1.30 |
| A2     | 1.40       | 1.50 | LL     | 1.1 BSC    |      |
| A3     | 0.623 BSC  |      | LW     | 0.38       | 0.43 |
| BL     | 4.92       | 5.80 | TL     | 5.90       | 6.10 |
| BW     | 3.70       | 4.10 | Z      | 0.54       |      |
| FT     | 0.20       | 0.21 | θ      | 0°         | 8°   |

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