



**ALPHA & OMEGA**  
SEMICONDUCTOR

**AO4805**

**30V Dual P-Channel MOSFET**

### General Description

The AO4805 combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for load switch and battery protection applications.

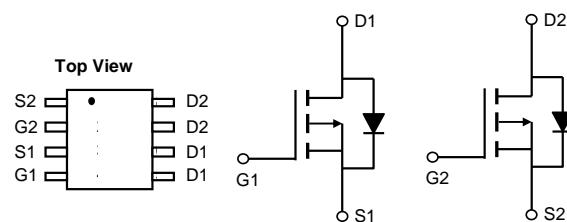
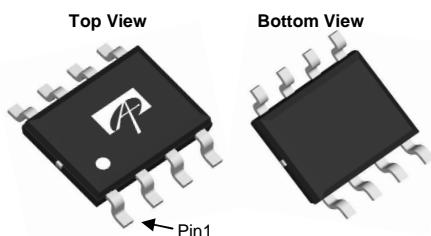
### Product Summary

$V_{DS}$	-30V
$I_D$ (at $V_{GS}=-20V$ )	-9A
$R_{DS(ON)}$ (at $V_{GS}=-20V$ )	< 15mΩ
$R_{DS(ON)}$ (at $V_{GS}=-10V$ )	< 18mΩ

100% UIS Tested  
100%  $R_g$  Tested



SOIC-8



### Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 25$	V
Continuous Drain Current <sup>A</sup>	$I_D$	-9	A
Continuous Drain Current <sup>B</sup>		-7	
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	-50	A
Avalanche Current <sup>C</sup>	$I_{AS}, I_{AR}$	33	A
Avalanche energy $L=0.1mH$ <sup>C</sup>	$E_{AS}, E_{AR}$	54	mJ
Power Dissipation <sup>B</sup>	$P_D$	2	W
Power Dissipation <sup>B</sup>		1.3	
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C

### Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JA}$	48	62.5	°C/W
Maximum Junction-to-Ambient <sup>A,D</sup>		74	90	°C/W
Maximum Junction-to-Lead	$R_{\theta JL}$	32	40	°C/W

**Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}, V_{GS}=0\text{V}$	-30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-30\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			-1 -5	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 25\text{V}$			$\pm 100$	nA
$V_{GS(\text{th})}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-1.7	-2.3	-2.8	V
$I_{D(\text{ON})}$	On state drain current	$V_{GS}=-10\text{V}, V_{DS}=-5\text{V}$	-50			A
$R_{DS(\text{ON})}$	Static Drain-Source On-Resistance	$V_{GS}=-20\text{V}, I_D=-9\text{A}$		10	15	$\text{m}\Omega$
		$V_{GS}=-10\text{V}, I_D=-8\text{A}$ $T_J=125^\circ\text{C}$		12	18	$\text{m}\Omega$
		$V_{GS}=-4.5\text{V}, I_D=-5\text{A}$		13	20	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=-5\text{V}, I_D=-9\text{A}$		27		S
$V_{SD}$	Diode Forward Voltage	$I_S=-1\text{A}, V_{GS}=0\text{V}$		-0.7	-1	V
$I_S$	Maximum Body-Diode Continuous Current				-2.5	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=-15\text{V}, f=1\text{MHz}$		2060	2600	pF
$C_{oss}$	Output Capacitance			370		pF
$C_{rss}$	Reverse Transfer Capacitance			295		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	1.2	2.4	3.6	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g$	Total Gate Charge	$V_{GS}=-10\text{V}, V_{DS}=-15\text{V}, I_D=-9\text{A}$		30	39	nC
$Q_{gs}$	Gate Source Charge			4.6		nC
$Q_{gd}$	Gate Drain Charge			10		nC
$t_{D(\text{on})}$	Turn-On Delay Time	$V_{GS}=-10\text{V}, V_{DS}=-15\text{V}, R_L=1.67\Omega, R_{\text{GEN}}=3\Omega$		11		ns
$t_r$	Turn-On Rise Time			9.4		ns
$t_{D(\text{off})}$	Turn-Off Delay Time			24		ns
$t_f$	Turn-Off Fall Time			12		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=-9\text{A}, dI/dt=100\text{A}/\mu\text{s}$		30	40	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=-9\text{A}, dI/dt=100\text{A}/\mu\text{s}$		22		nC

A. The value of  $R_{\theta JA}$  is measured with the device mounted on  $1\text{in}^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The value in any given application depends on the user's specific board design.

B. The power dissipation  $P_D$  is based on  $T_{J(\text{MAX})}=150^\circ\text{C}$ , using  $\leq 10\text{s}$  junction-to-ambient thermal resistance.

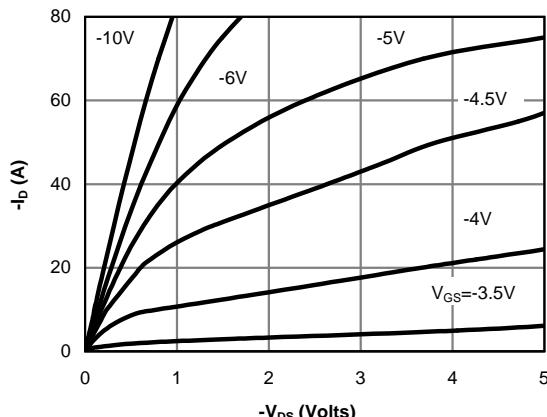
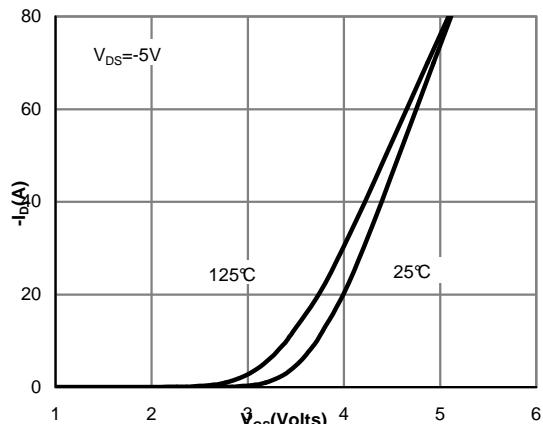
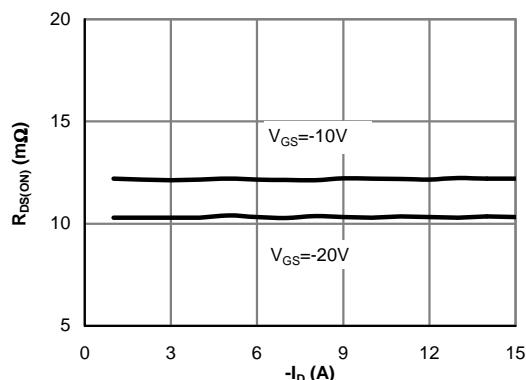
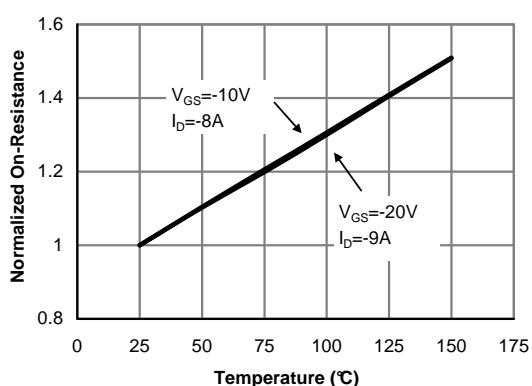
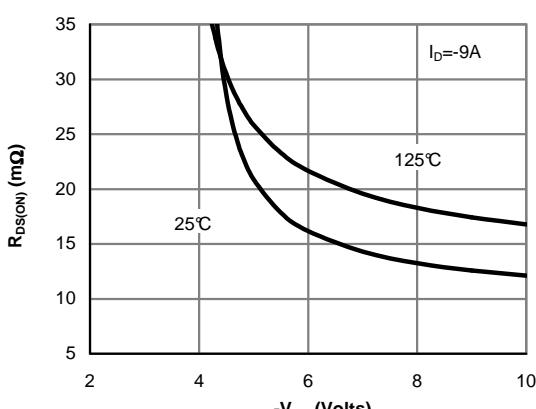
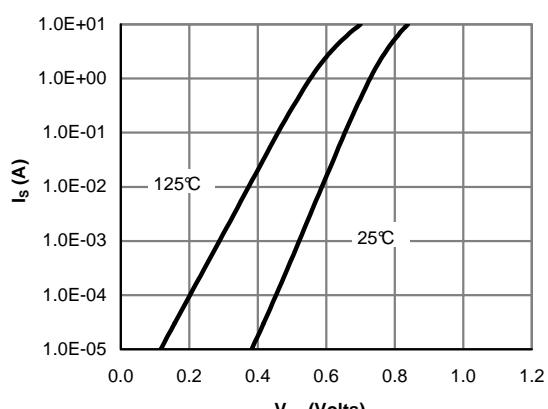
C. Repetitive rating, pulse width limited by junction temperature  $T_{J(\text{MAX})}=150^\circ\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^\circ\text{C}$ .

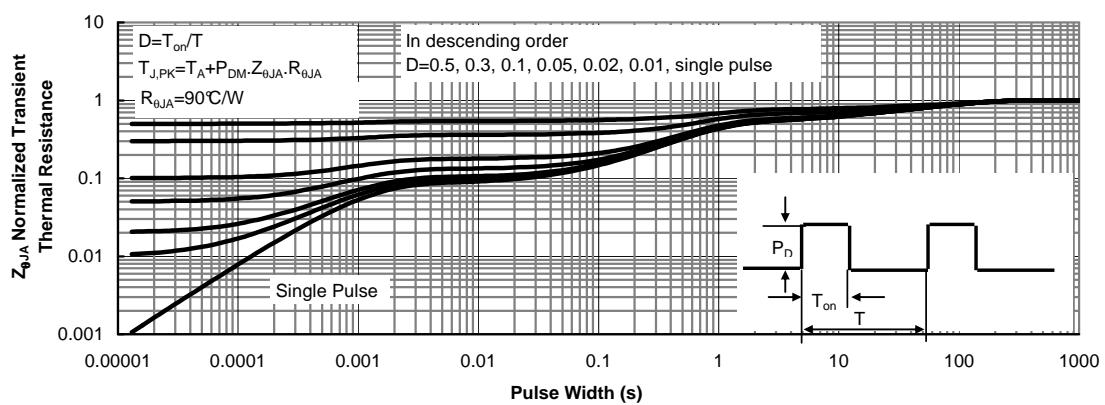
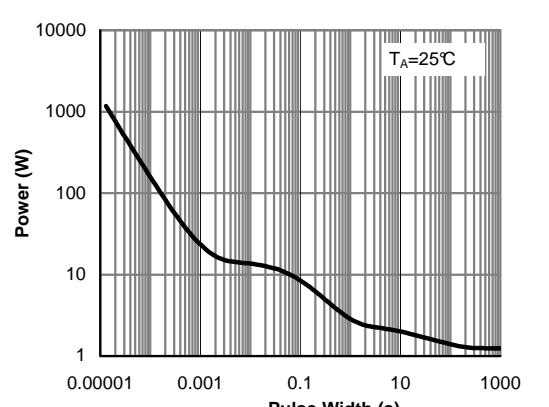
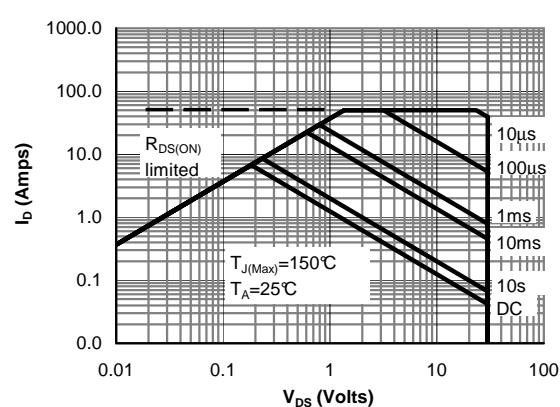
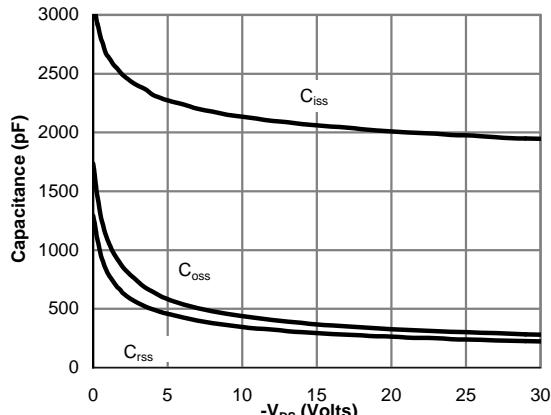
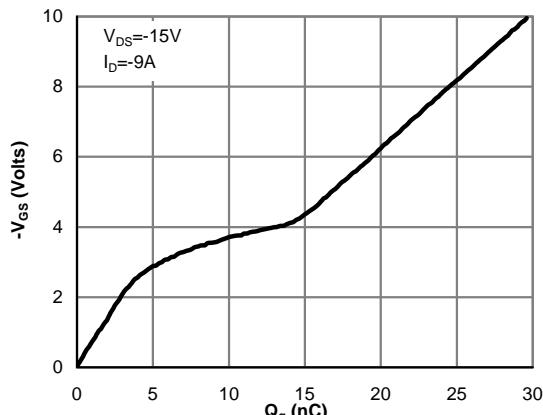
D. The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to lead  $R_{\theta JL}$  and lead to ambient.

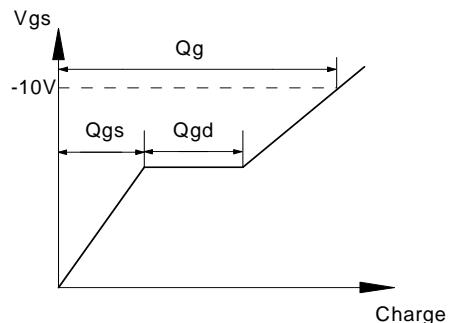
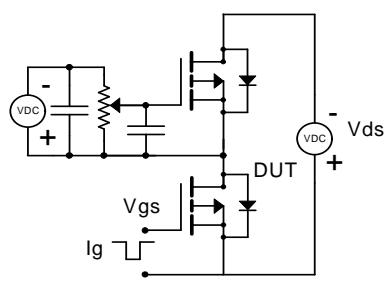
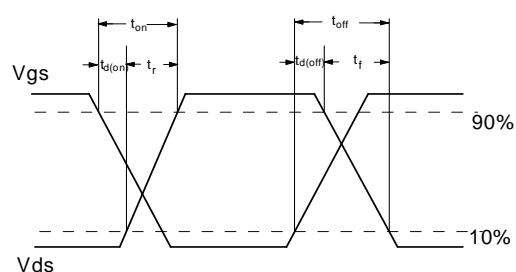
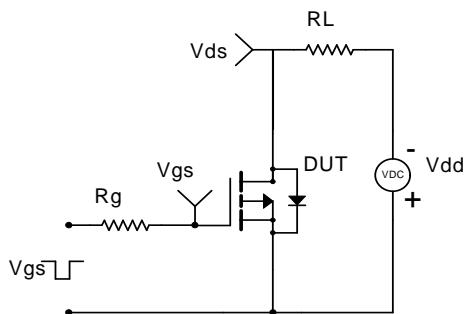
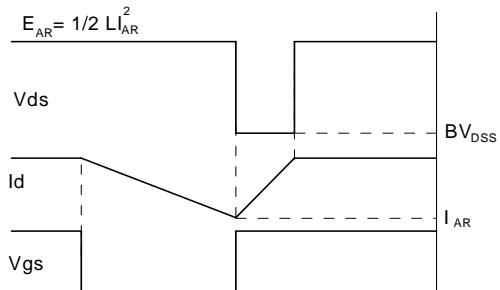
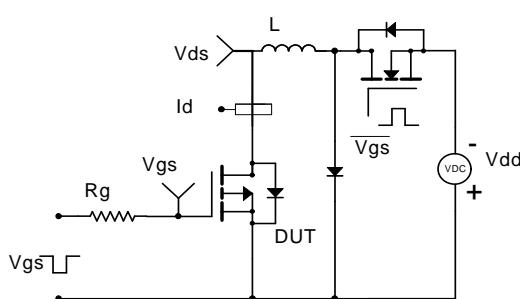
E. The static characteristics in Figures 1 to 6 are obtained using  $<300\mu\text{s}$  pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on  $1\text{in}^2$  FR-4 board with 2oz. Copper, assuming a maximum junction temperature of  $T_{J(\text{MAX})}=150^\circ\text{C}$ . The SOA curve provides a single pulse rating.

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**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

**Fig 1: On-Region Characteristics (Note E)**

**Figure 2: Transfer Characteristics (Note E)**

**Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)**

**Figure 4: On-Resistance vs. Junction Temperature (Note E)**

**Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)**

**Figure 6: Body-Diode Characteristics (Note E)**

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**


**Gate Charge Test Circuit & Waveform**

**Resistive Switching Test Circuit & Waveforms**

**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**

**Diode Recovery Test Circuit & Waveforms**
