



**ALPHA & OMEGA**  
SEMICONDUCTOR

**AO4850**

**Dual N-Channel Enhancement Mode Field Effect Transistor**

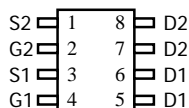


### General Description

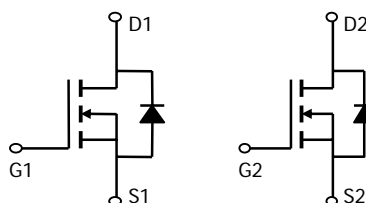
The AO4850 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. The two MOSFETs may be used in H-bridge, Inverters and other applications. AO4850 is Pb-free (meets ROHS & Sony 259 specifications).

### Features

$V_{DS}$  (V) = 75V  
 $I_D$  = 3.1A ( $V_{GS}$  = 10V)  
 $R_{DS(ON)} < 130m\Omega$  ( $V_{GS}$  = 10V)  
 $R_{DS(ON)} < 165m\Omega$  ( $V_{GS}$  = 4.5V)



**SOIC-8**



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

Parameter	Symbol	Maximum		Units
		10 Sec	Steady State	
Drain-Source Voltage	$V_{DS}$	75		V
Gate-Source Voltage	$V_{GS}$	$\pm 25$		V
Continuous Drain Current <sup>A</sup>	$T_A=25^\circ\text{C}$	3.1	2.3	A
	$T_A=70^\circ\text{C}$	2.4	1.8	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	15		
Power Dissipation	$T_A=25^\circ\text{C}$	2	1.1	W
	$T_A=70^\circ\text{C}$	1.3	0.7	
Avalanche Current <sup>B</sup>	$I_{AR}$	10		A
Repetitive avalanche energy 0.3mH <sup>B</sup>	$E_{AR}$	15		mJ
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150		$^\circ\text{C}$

### Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$t \leq 10s$	$R_{\theta JA}$	50	62.5	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A</sup>	Steady-State		82	110	$^\circ\text{C/W}$
Maximum Junction-to-Lead <sup>C</sup>	Steady-State	$R_{\theta JL}$	41	50	$^\circ\text{C/W}$

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	$I_D=10\text{mA}$ , $V_{GS}=0\text{V}$	75			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=75\text{V}$ , $V_{GS}=0\text{V}$ $T_J=55^{\circ}\text{C}$			1 5	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 25\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	1	2.3	3	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$ , $V_{DS}=5\text{V}$	15			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$ , $I_D=3.1\text{A}$ $T_J=125^{\circ}\text{C}$		105 158	130 195	m $\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=2\text{A}$		126	165	
						m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=5\text{V}$ , $I_D=3.1\text{A}$		10		S
$V_{SD}$	Diode Forward Voltage	$I_S=1\text{A}$ , $V_{GS}=0\text{V}$		0.77	1	V
$I_S$	Maximum Body-Diode Continuous Current				2.5	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=30\text{V}$ , $f=1\text{MHz}$		290	380	pF
$C_{oss}$	Output Capacitance			54		pF
$C_{rss}$	Reverse Transfer Capacitance			24		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		2.4	3.5	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$ , $V_{DS}=30\text{V}$ , $I_D=3.1\text{A}$		5.14	7	nC
$Q_g(4.5\text{V})$	Total Gate Charge			2.34		nC
$Q_{gs}$	Gate Source Charge			0.97		nC
$Q_{gd}$	Gate Drain Charge			1.18		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10\text{V}$ , $V_{DS}=30\text{V}$ , $R_L=9.7\Omega$ , $R_{GEN}=3\Omega$		4		ns
$t_r$	Turn-On Rise Time			3.4		ns
$t_{D(off)}$	Turn-Off DelayTime			14.4		ns
$t_f$	Turn-Off Fall Time			2.4		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=3.1\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		30.2	45	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=3.1\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		21.5		nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> 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. The current rating is based on the  $t \leq 10\text{s}$  thermal resistance rating.

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

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

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

E: These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}\text{C}$ . The SOA curve provides a single pulse rating.

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## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

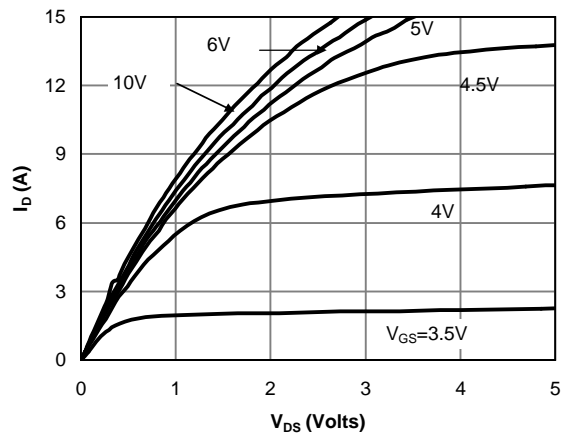


Fig 1: On-Region Characteristics

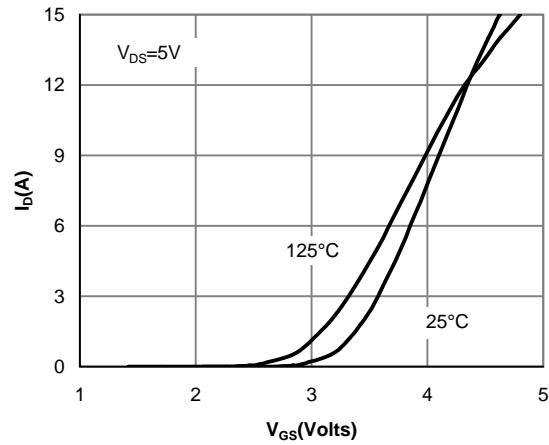


Figure 2: Transfer Characteristics

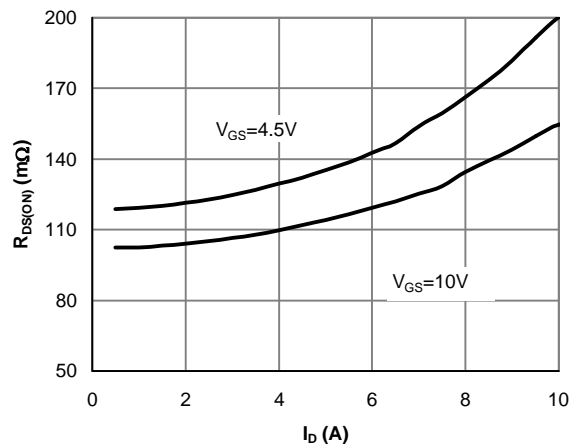


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

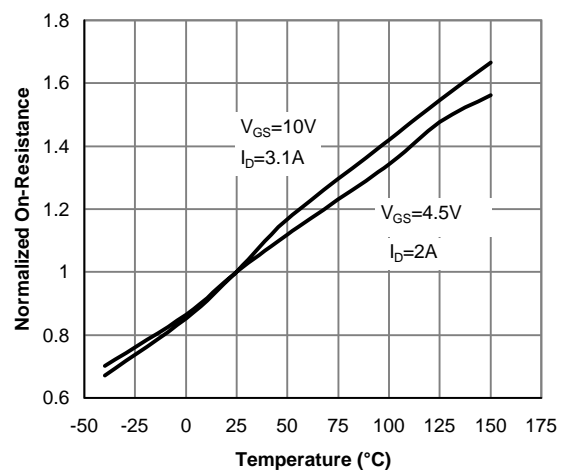


Figure 4: On-Resistance vs. Junction Temperature

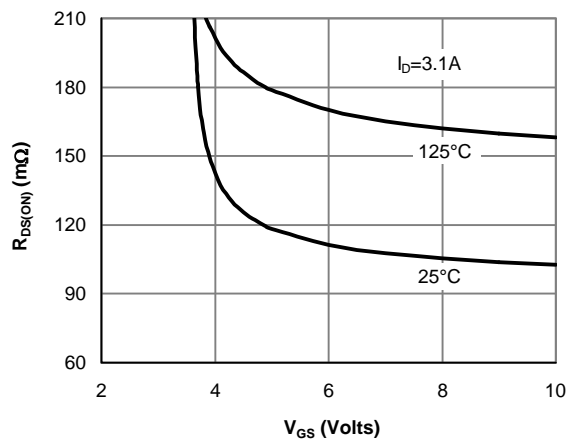


Figure 5: On-Resistance vs. Gate-Source Voltage

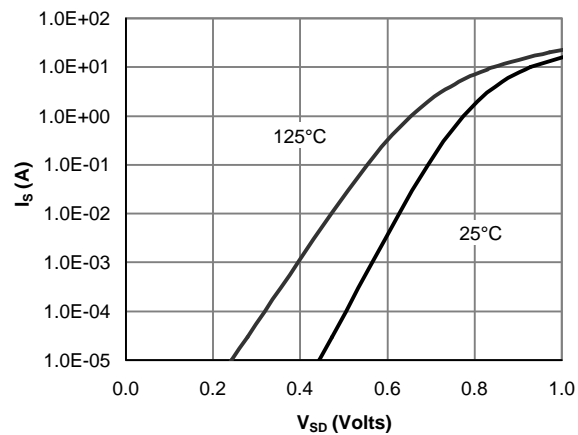


Figure 6: Body-Diode Characteristics

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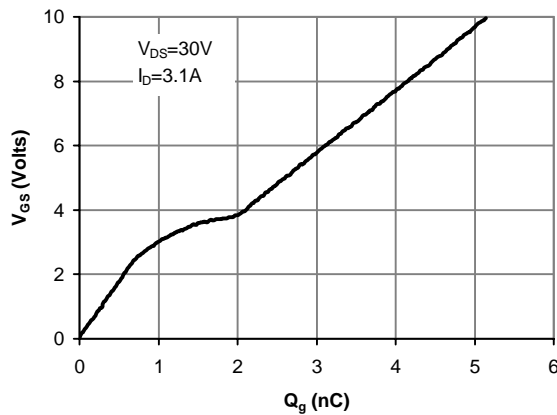


Figure 7: Gate-Charge Characteristics

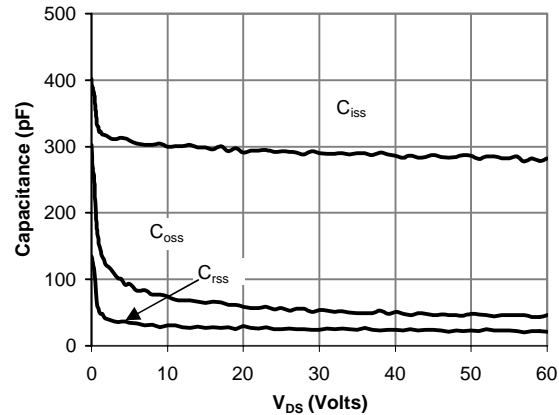


Figure 8: Capacitance Characteristics

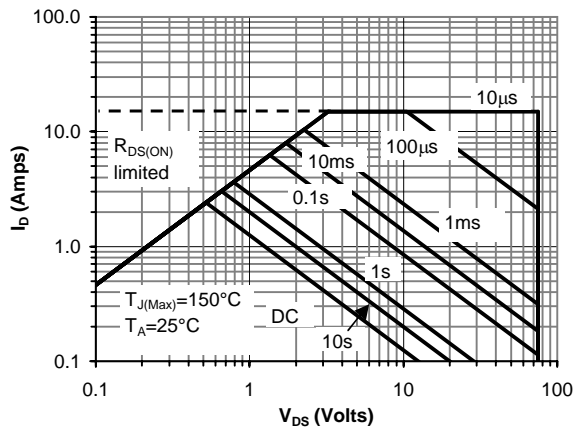


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

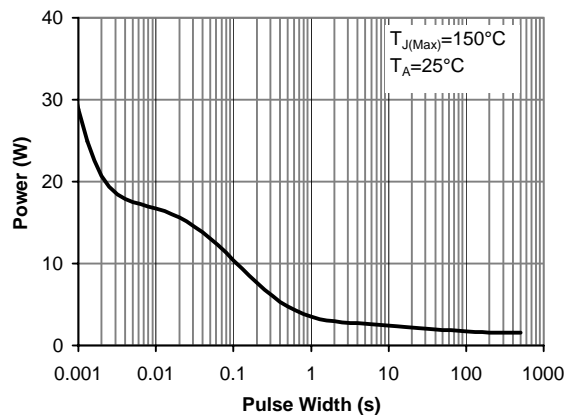


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

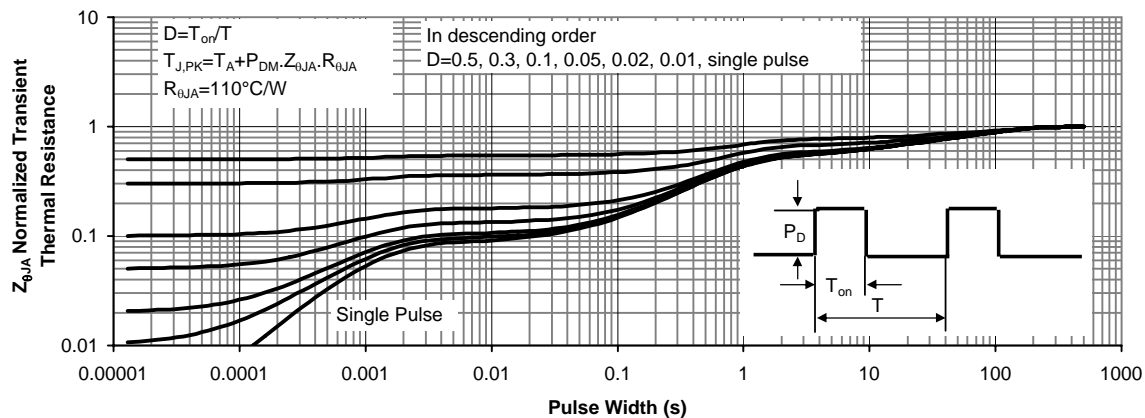


Figure 11: Normalized Maximum Transient Thermal Impedance