

### General Description

The AO4830 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. This device is suitable for use as a load switch or in PWM applications.

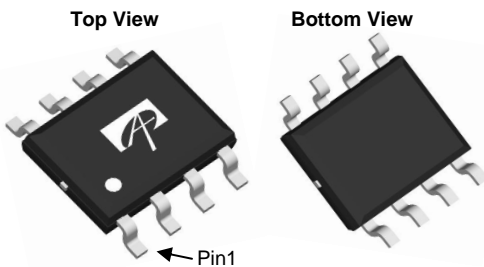
### Product Summary

$V_{DS}$  (V) = 80V  
 $I_D$  = 3.5A ( $V_{GS} = 10V$ )  
 $R_{DS(ON)} < 75m\Omega$  ( $V_{GS} = 10V$ )

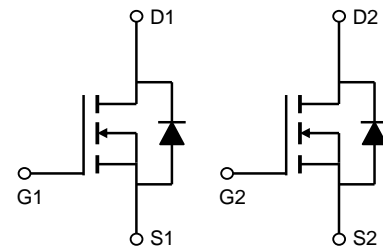
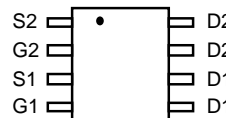
100% UIS Tested  
 100% Rg Tested



SOIC-8



Top View



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	80	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	3.5
		$T_A=70^\circ\text{C}$	2.9
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	18	A
Avalanche Current <sup>C</sup>	$I_{AR}$	16	A
Repetitive avalanche energy $L=0.1\text{mH}$ <sup>C</sup>	$E_{AR}$	12.8	mJ
Power Dissipation <sup>B</sup>	$P_D$	$T_A=25^\circ\text{C}$	2
		$T_A=70^\circ\text{C}$	1.3
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>	$R_{\theta JA}$	48	62.5	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A,D</sup>		Steady-State	74	90
Maximum Junction-to-Lead	$R_{\theta JL}$	32	40	$^\circ\text{C/W}$

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	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	80			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=80\text{V}$ , $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 30\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	3.5	4.2	5	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$ , $V_{DS}=5\text{V}$	18			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$ , $I_D=3.5\text{A}$ $T_J=125^\circ\text{C}$		62 113.0	75 135	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=5\text{V}$ , $I_D=3.5\text{A}$		15		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
$I_{SM}$	Pulsed Body-diode Current <sup>c</sup>				18	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=40\text{V}$ , $f=1\text{MHz}$	510	640	770	pF
$C_{oss}$	Output Capacitance		28	40	52	pF
$C_{rss}$	Reverse Transfer Capacitance		12	20	30	pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$	0.9	1.8	2.7	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$ , $V_{DS}=40\text{V}$ , $I_D=3.5\text{A}$	8	11	13	nC
$Q_g(4.5\text{V})$	Total Gate Charge		4	5.5	7	
$Q_{gs}$	Gate Source Charge		4	5	6	nC
$Q_{gd}$	Gate Drain Charge		0.7	1.2	1.7	nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10\text{V}$ , $V_{DS}=40\text{V}$ , $R_L=8\Omega$ , $R_{GEN}=3\Omega$		7.2		ns
$t_r$	Turn-On Rise Time			2.2		ns
$t_{D(off)}$	Turn-Off DelayTime			17		ns
$t_f$	Turn-Off Fall Time			2		ns
$t_{rr}$	Body Diode Reverse Recovery Time		$I_F=3.5\text{A}$ , $dI/dt=300\text{A}/\mu\text{s}$	14	20	26
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=3.5\text{A}$ , $dI/dt=300\text{A}/\mu\text{s}$	35	50	65	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  $T_{J(MAX)}=150^\circ\text{C}$ , using  $\leq 10\text{s}$  junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=150^\circ\text{C}$ . 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

Rev 1 : Nov. 2010

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

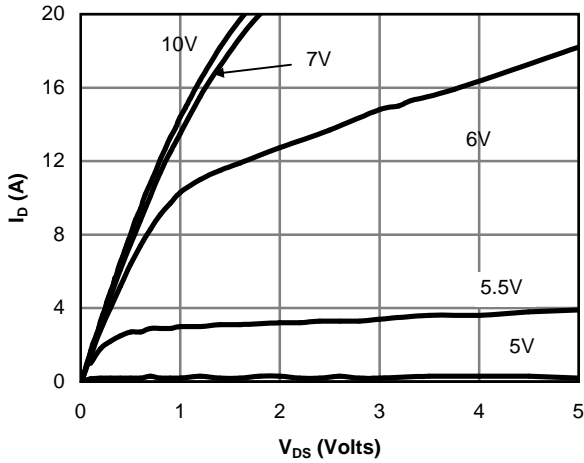


Fig 1: On-Region Characteristics (Note E)

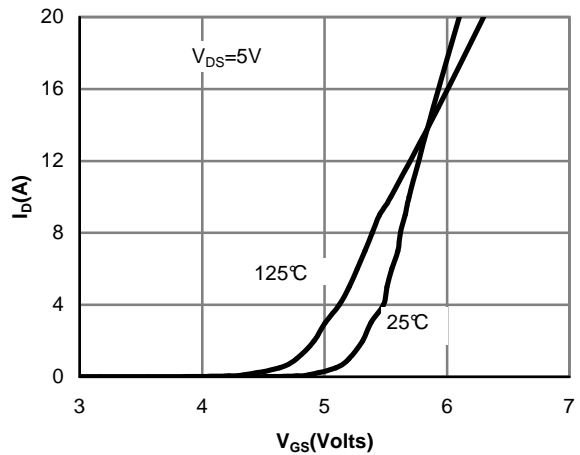


Figure 2: Transfer Characteristics (Note E)

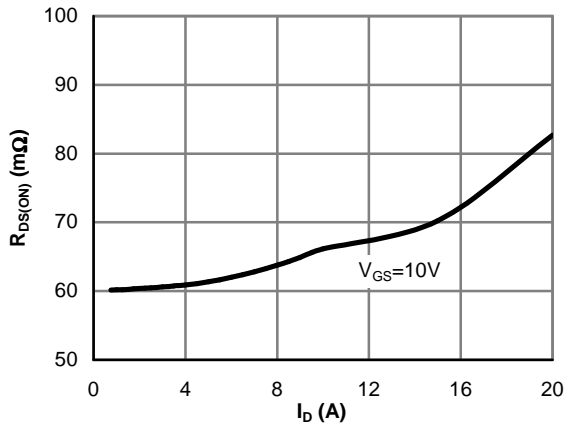


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

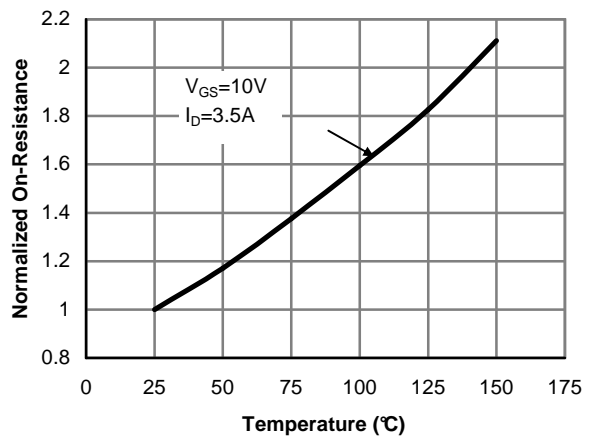


Figure 4: On-Resistance vs. Junction Temperature (Note E)

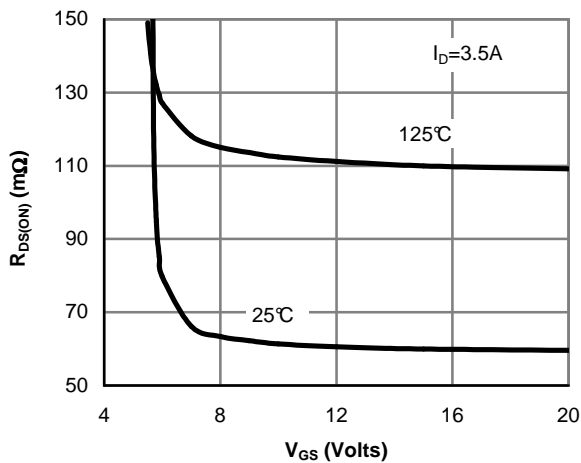


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

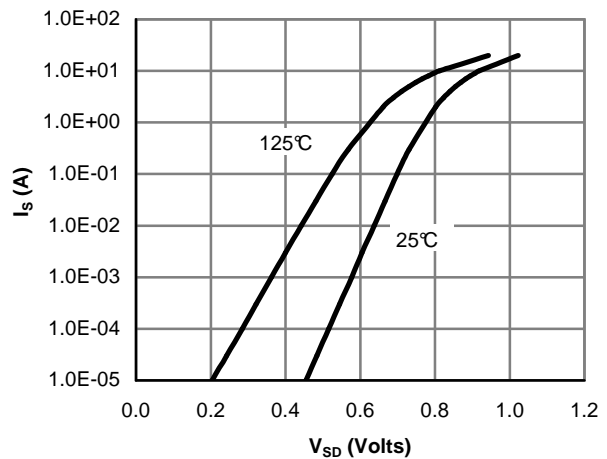


Figure 6: Body-Diode Characteristics (Note E)

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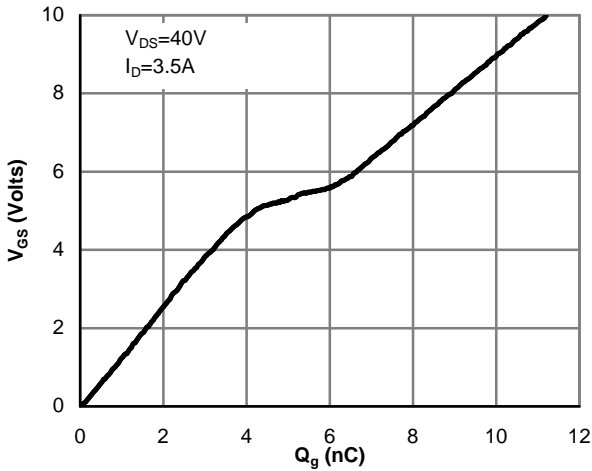


Figure 7: Gate-Charge Characteristics

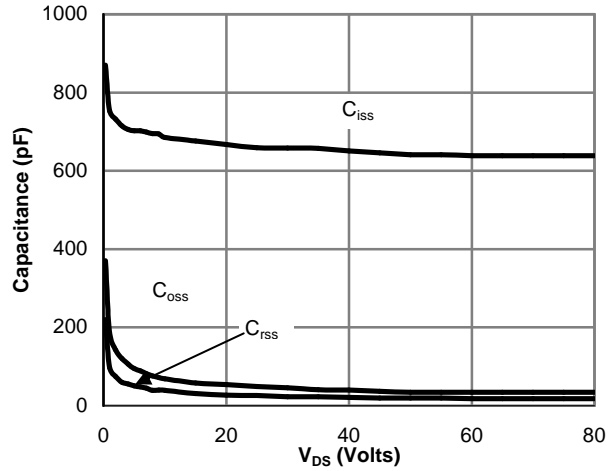


Figure 8: Capacitance Characteristics

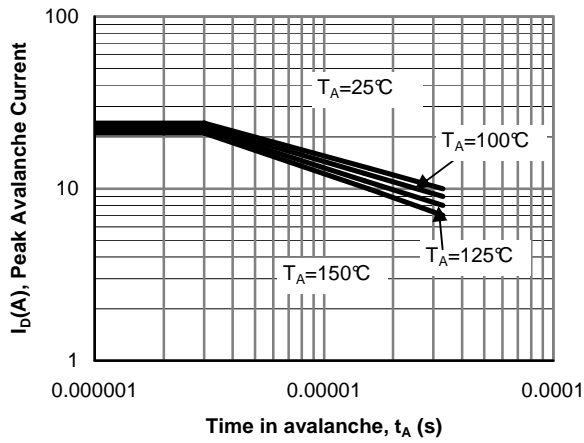


Figure 12: Single Pulse Avalanche capability

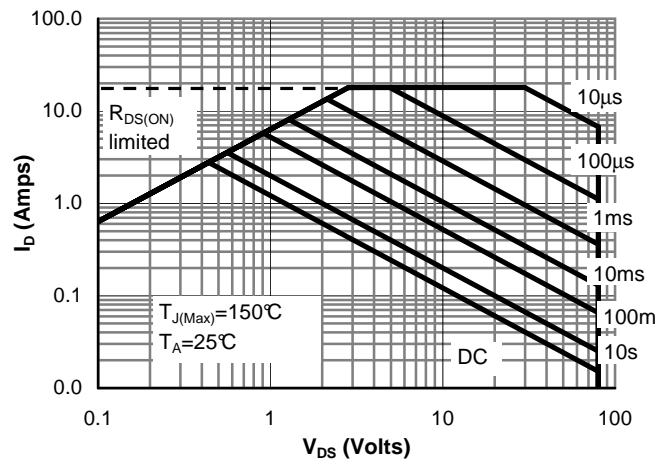


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

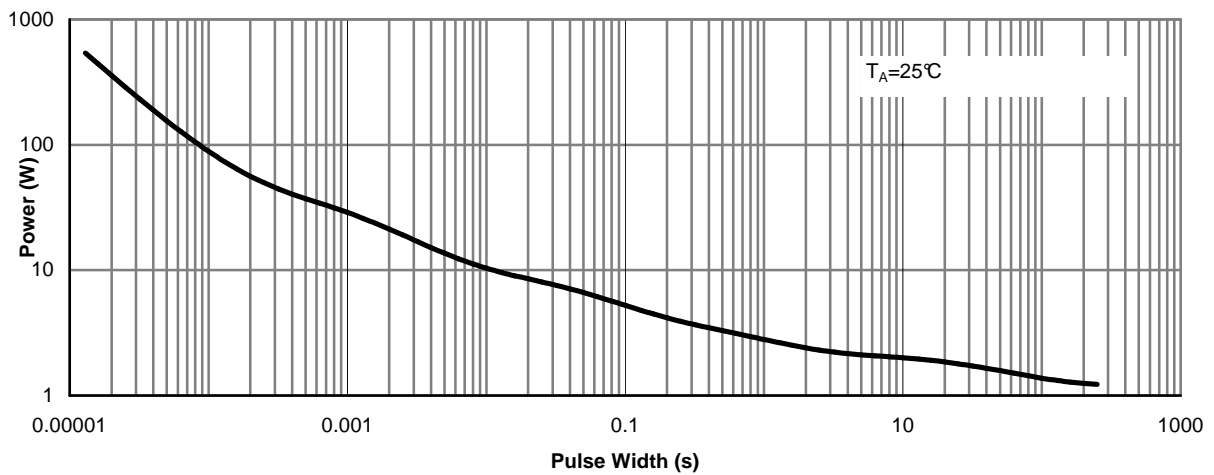


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

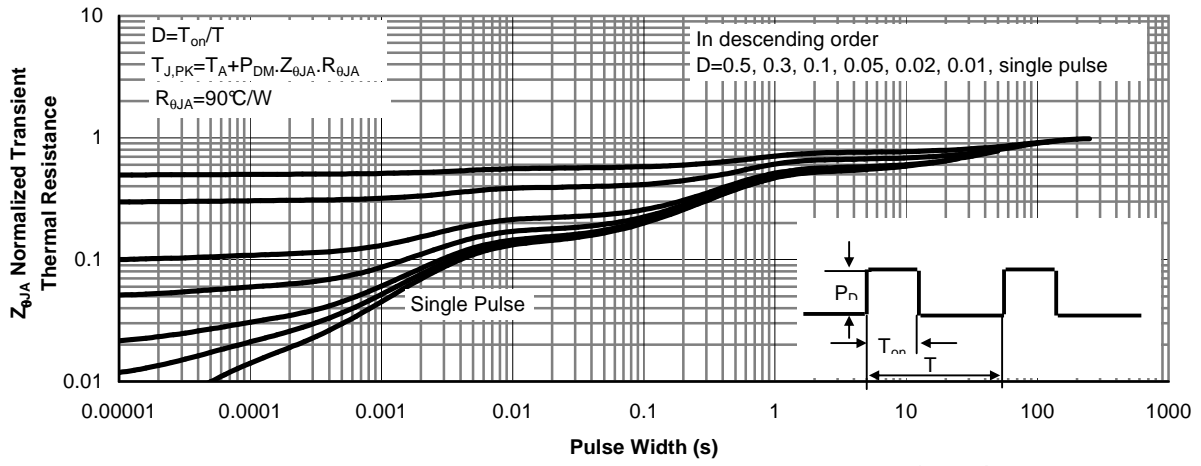
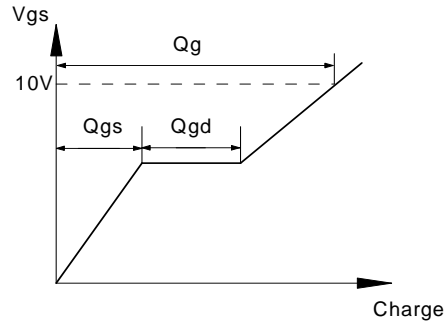
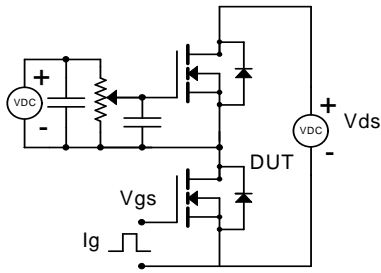
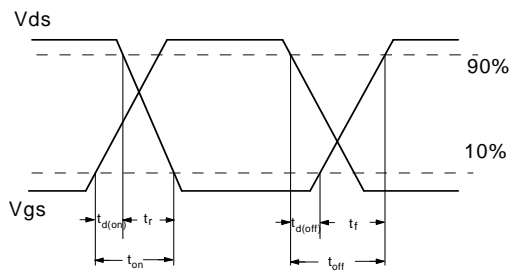
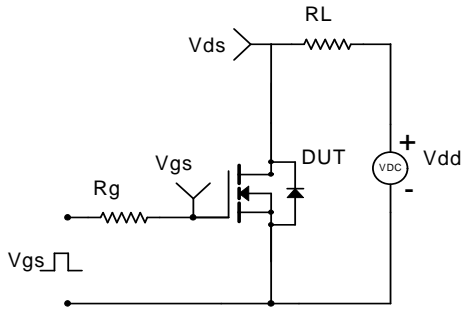


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

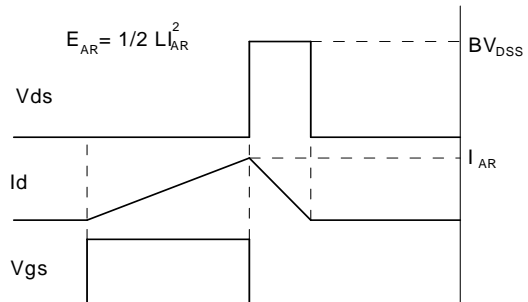
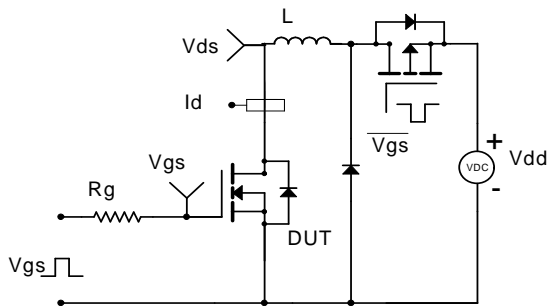
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

