

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.

Features

V_{DS} (V) = 80V

I_D = 3.5A

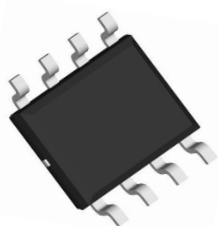
$R_{DS(ON)}$ < 75m Ω

(V_{GS} = 10V)

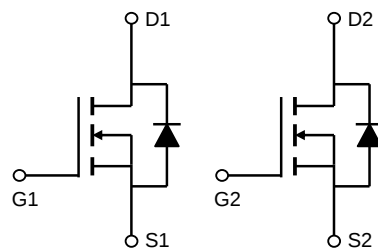
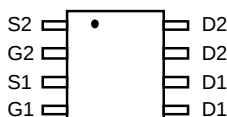
(V_{GS} = 10V)



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}	± 30	V
Continuous Drain Current	I_D	3.5	A
$T_A=25^\circ\text{C}$		2.9	
Pulsed Drain Current ^C	I_{DM}	18	A
Avalanche Current ^C	I_{AR}	16	A
Repetitive avalanche energy $L=0.1\text{mH}$ ^C	E_{AR}	12.8	mJ
Power Dissipation ^B	P_D	2	W
$T_A=25^\circ\text{C}$		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 ^A	$R_{\theta JA}$	48	62.5	$^\circ\text{C/W}$
$t \leq 10\text{s}$		74	90	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}	$R_{\theta JL}$	32	40	$^\circ\text{C/W}$
Steady-State				

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
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	μA
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 ^C				18	A
DYNAMIC PARAMETERS						
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	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	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	ns
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 1in^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 1in^2 FR-4 board with

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

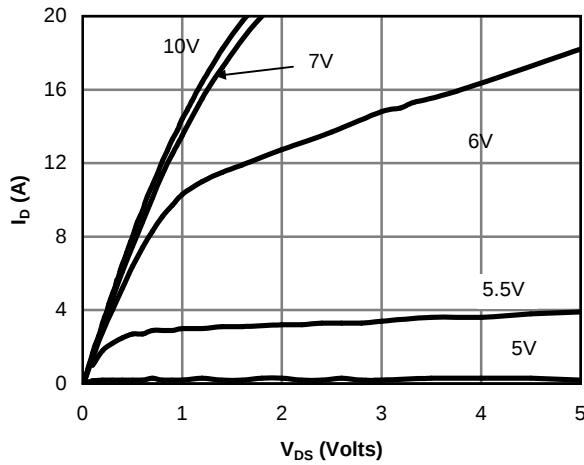


Fig 1: On-Region Characteristics (Note E)

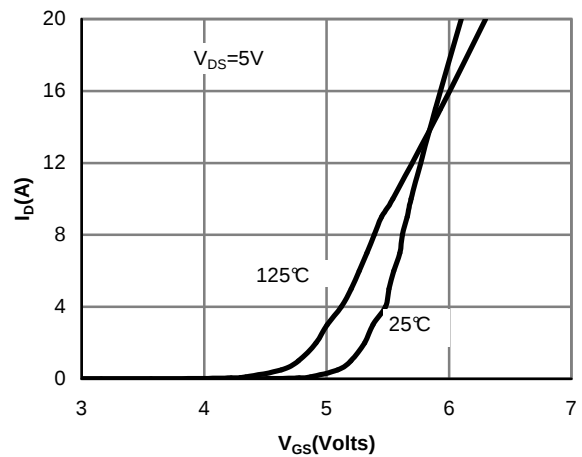


Figure 2: Transfer Characteristics (Note E)

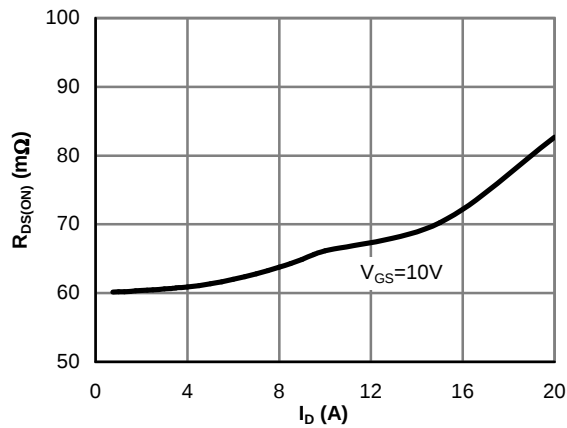


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

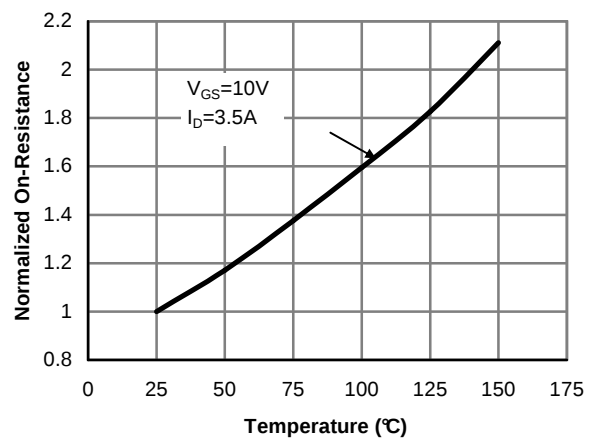


Figure 4: On-Resistance vs. Junction Temperature (Note E)

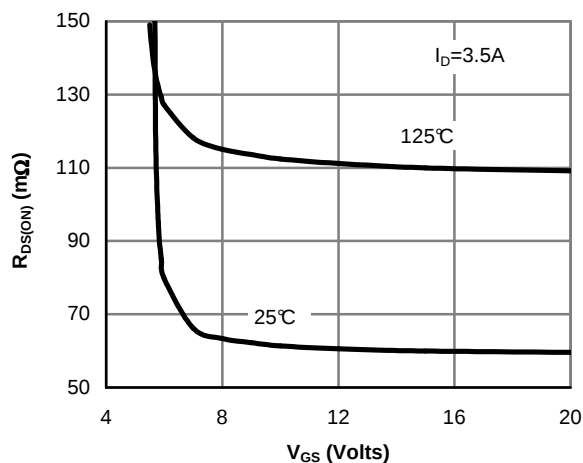


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

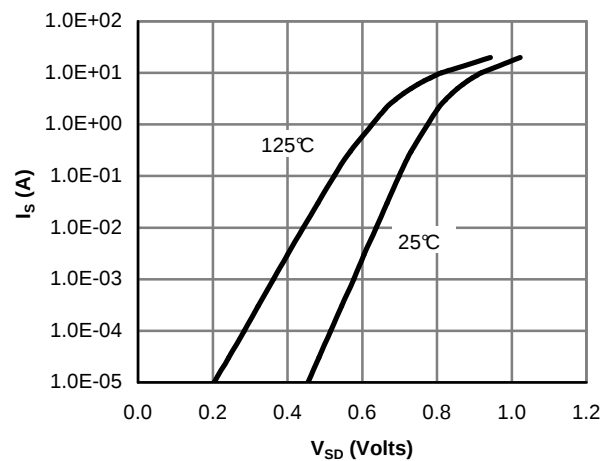
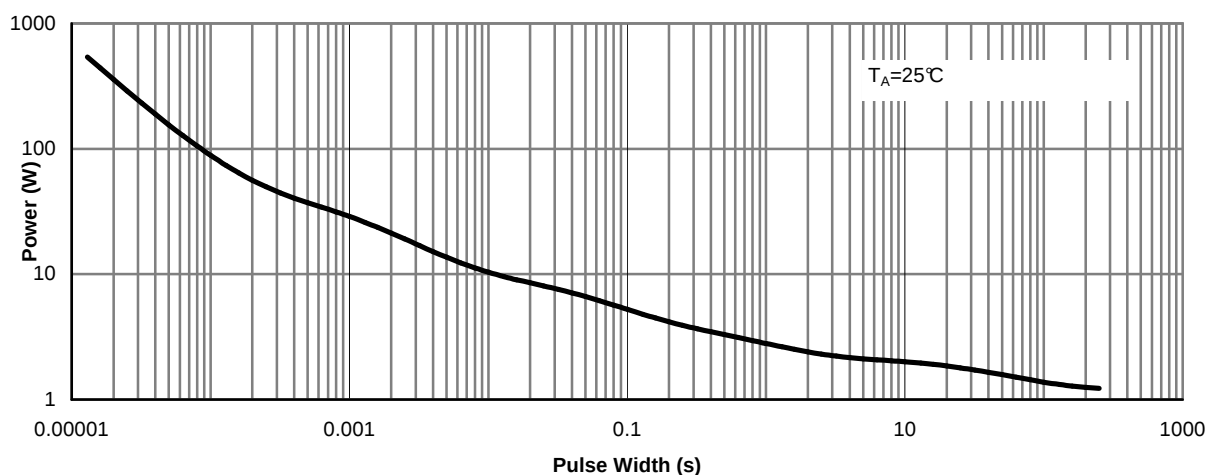
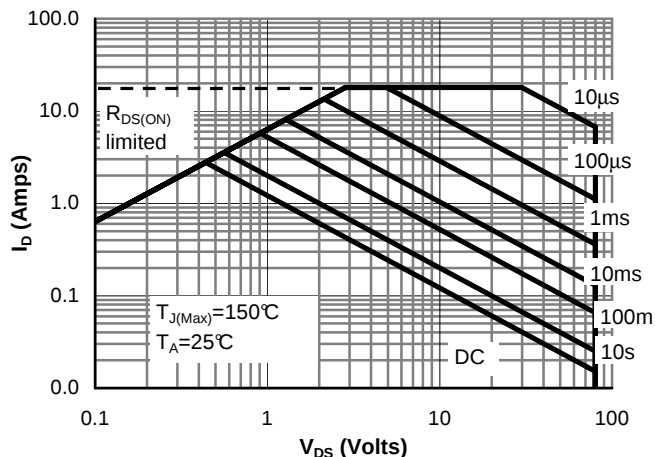
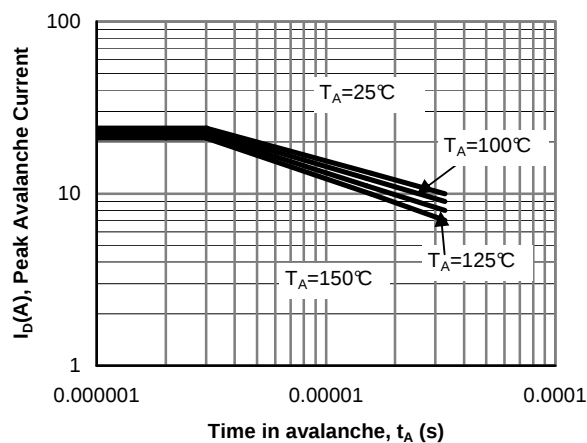
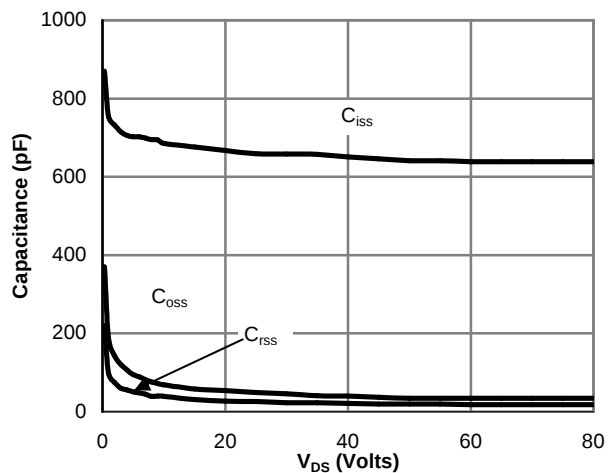
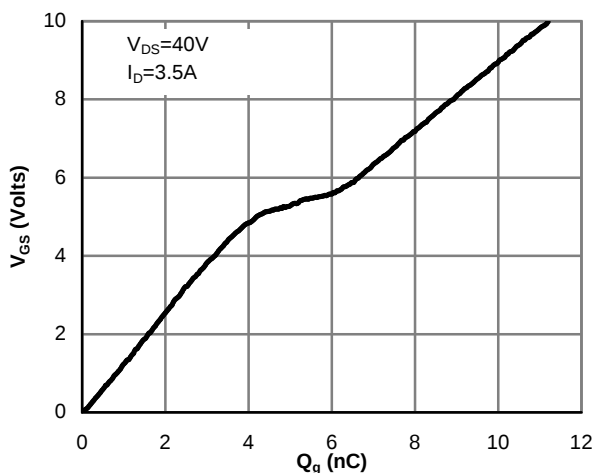
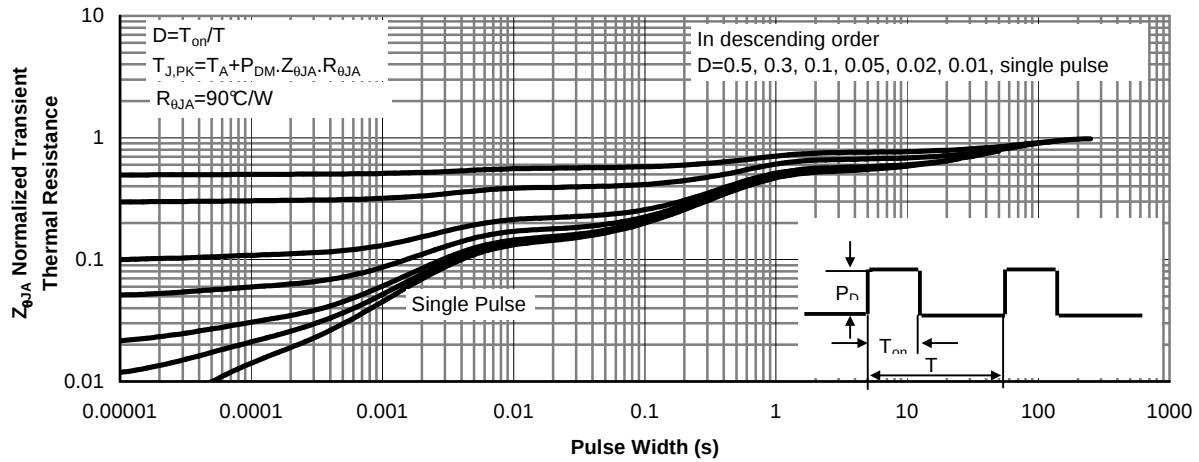


Figure 6: Body-Diode Characteristics (Note E)

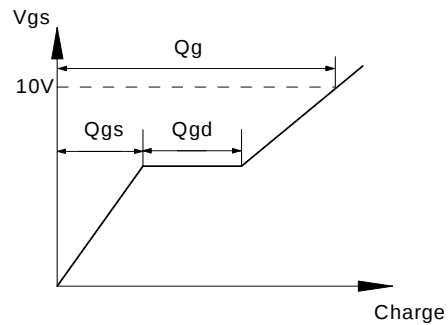
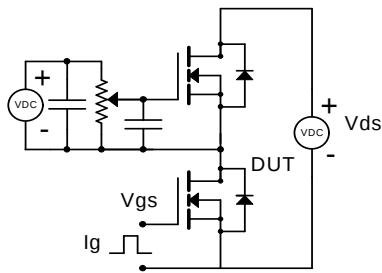
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



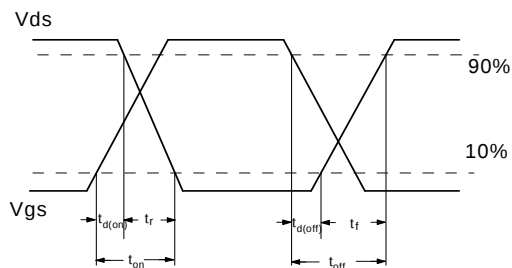
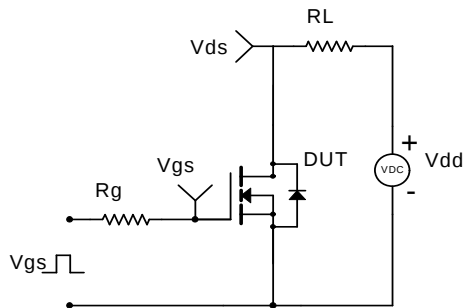
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



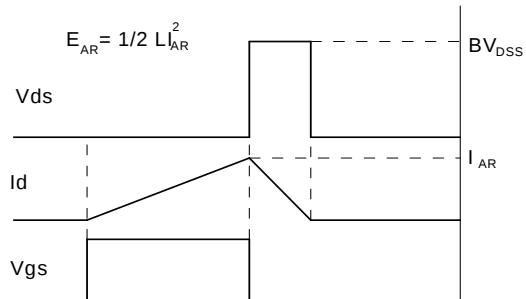
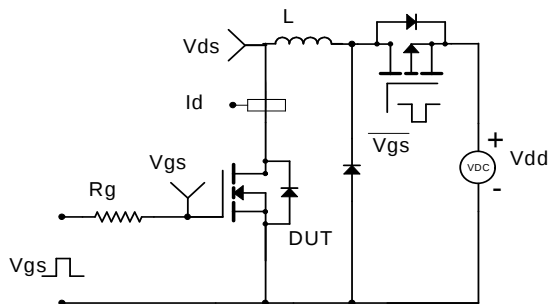
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

