

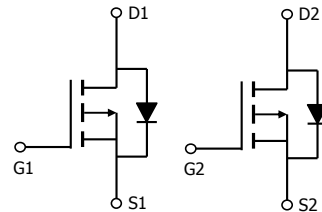
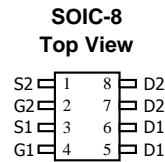
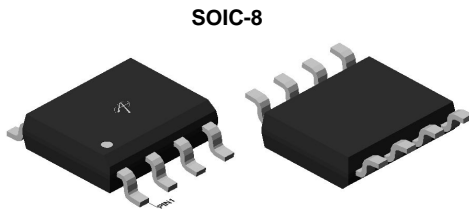
General Description

The AO4801AL combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is suitable for use as a load switch or in PWM applications.

Product Summary

V_{DS}	-30V
I_D (at $V_{GS}=-10V$)	-5.6A
$R_{DS(ON)}$ (at $V_{GS}=-10V$)	< 42m Ω
$R_{DS(ON)}$ (at $V_{GS} = -4.5V$)	< 52m Ω
$R_{DS(ON)}$ (at $V_{GS} = -2.5V$)	< 75m Ω

100% UIS Tested
 100% R_g Tested



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

Parameter	Symbol	10 Sec	Steady State	Units
Drain-Source Voltage	V_{DS}		-30	V
Gate-Source Voltage	V_{GS}		± 12	V
Continuous Drain Current	I_{DSM}	$T_A=25^\circ\text{C}$	-5.6	-4.2
		$T_A=70^\circ\text{C}$	-4.5	-3.4
Pulsed Drain Current ^C	I_{DM}		-30	A
Avalanche Current ^C	I_{AS}, I_{AR}		11	A
Avalanche energy $L=0.3\text{mH}$ ^C	E_{AS}, E_{AR}		18	mJ
Power Dissipation ^B	P_{DSM}	$T_A=25^\circ\text{C}$	2	1.4
		$T_A=70^\circ\text{C}$	1.3	0.9
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	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}		Steady-State	74	90
Maximum Junction-to-Lead	$R_{\theta JL}$	32	40	$^\circ\text{C/W}$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V T _J =55°C			-1 -5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±12V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-0.6	-0.95	-1.3	V
I _{D(ON)}	On state drain current	V _{GS} =-4.5V, V _{DS} =-5V	-25			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-5.6A T _J =125°C		34 48	42 60	mΩ
		V _{GS} =-4.5V, I _D =-3.5A		41	52	mΩ
		V _{GS} =-2.5V, I _D =-2.5A		60	75	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-5.6A		14		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.74	-1	V
I _S	Maximum Body-Diode Continuous Current				-2	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz	750	933	1120	pF
C _{oss}	Output Capacitance		75	108	140	pF
C _{rss}	Reverse Transfer Capacitance		50	81	110	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	3	6	9	Ω
SWITCHING PARAMETERS						
Q _{g(4.5V)}	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-15V, I _D =-5.6A	7.4	9.3	11	nC
Q _{gs}	Gate Source Charge		1.2	1.5	1.8	nC
Q _{gd}	Gate Drain Charge		2.2	3.7	5.2	nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-15V, R _L =2.7Ω, R _{GEN} =6Ω		5.2		ns
t _r	Turn-On Rise Time			6.8		ns
t _{D(off)}	Turn-Off DelayTime			42		ns
t _f	Turn-Off Fall Time			15		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-5.6A, dI/dt=100A/μs	16.8	21	25.2	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-5.6A, dI/dt=100A/μs	11.4	14.3	17.2	nC

A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°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°C, using ≤ 10s junction-to-ambient thermal resistance.

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

D. The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs 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 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of T_{J(MAX)}=150°C. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

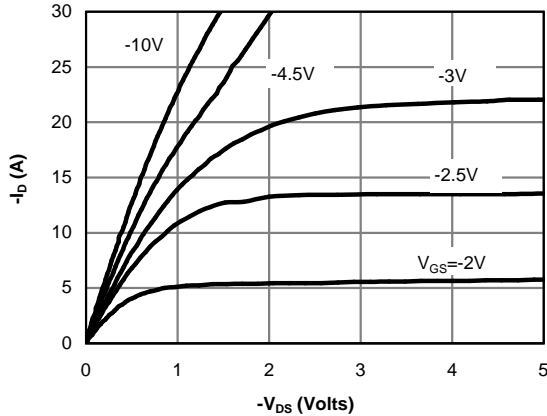


Figure 1: On-Region Characteristics (Note E)

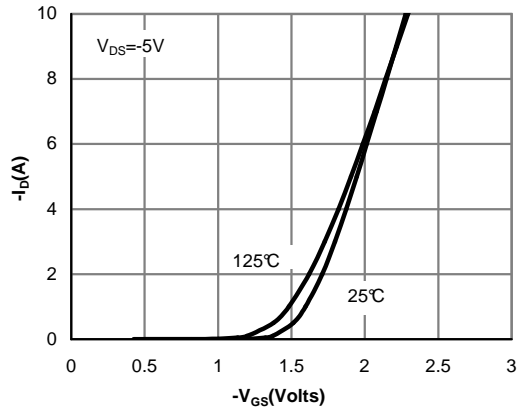


Figure 2: Transfer Characteristics (Note E)

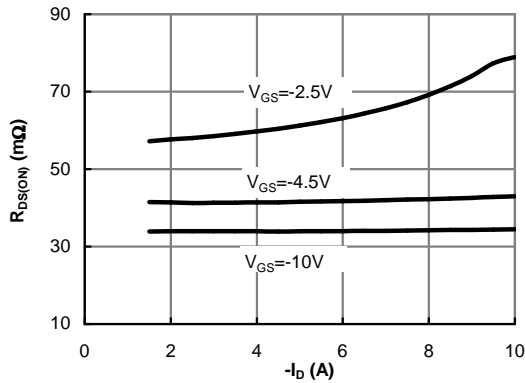


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

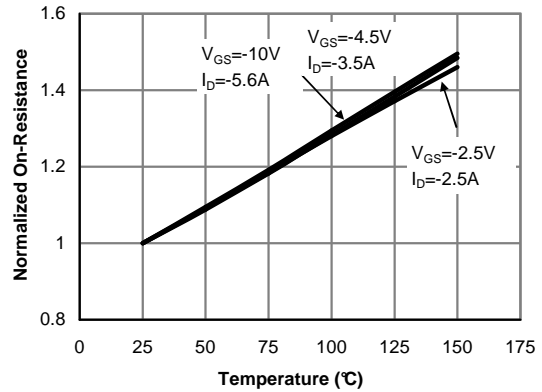


Figure 4: On-Resistance vs. Junction Temperature (Note E)

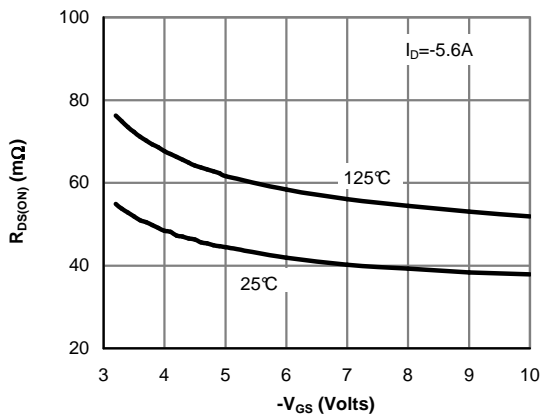


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

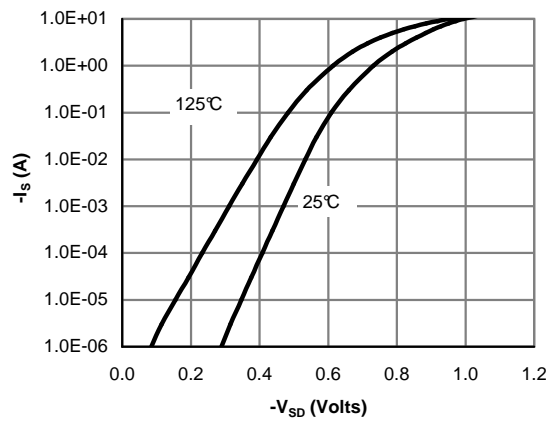


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

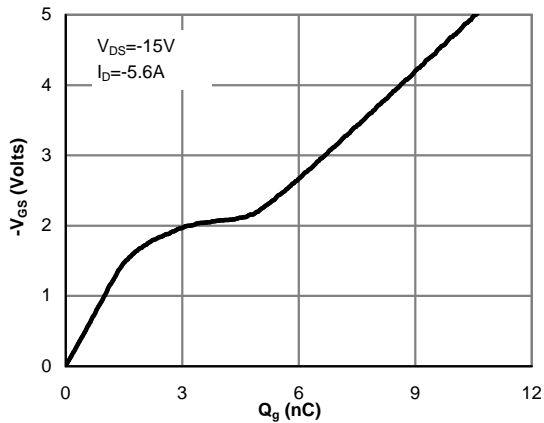


Figure 7: Gate-Charge Characteristics

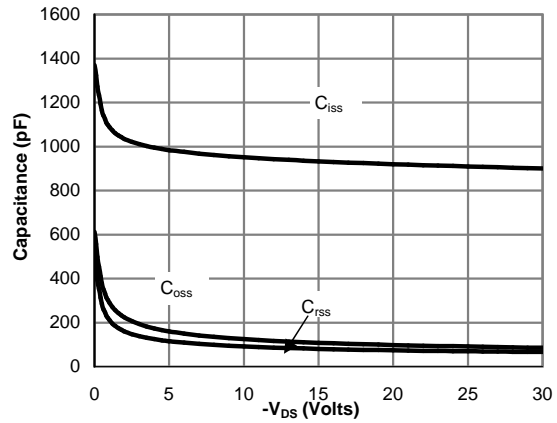


Figure 8: Capacitance Characteristics

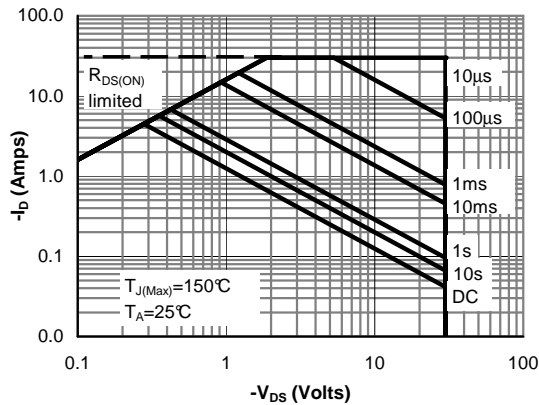


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

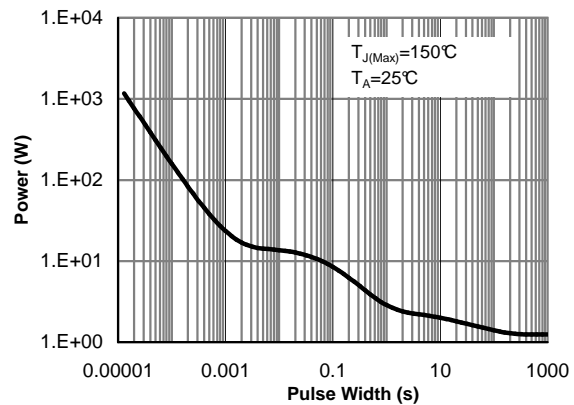


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

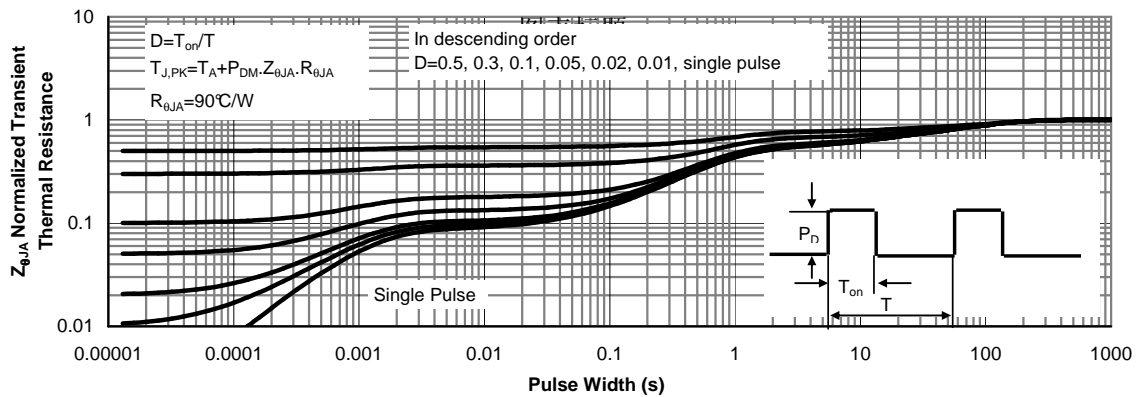
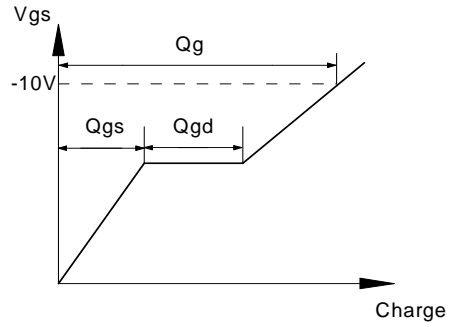
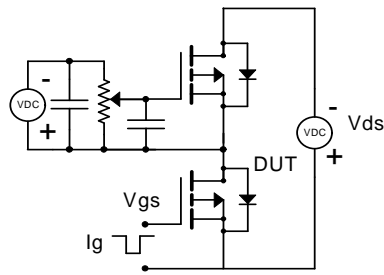
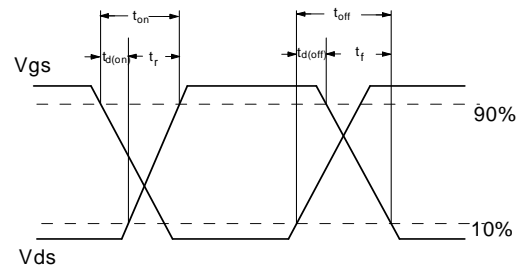
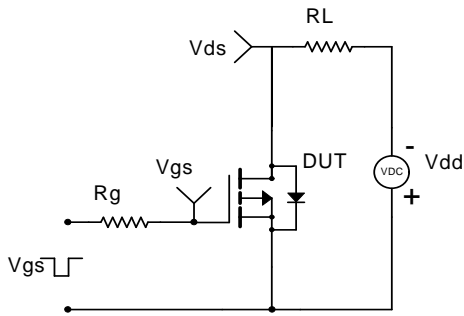


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

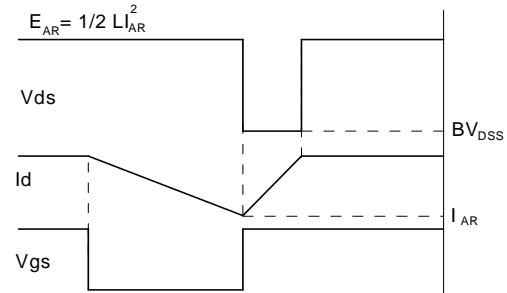
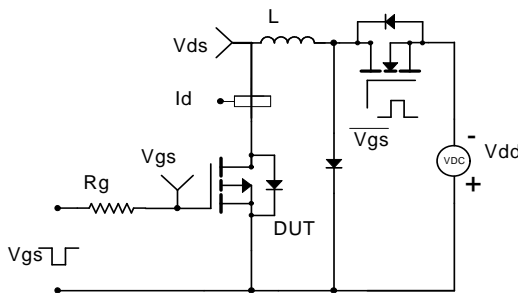
Gate Charge Test Circuit & Waveform



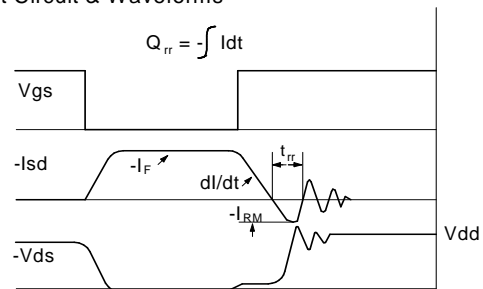
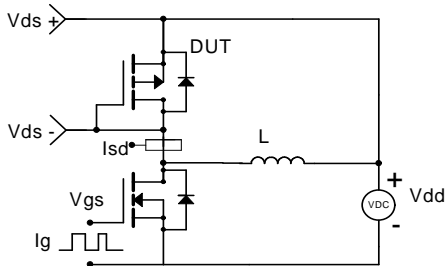
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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