AO4437
P-Channel Enhancement Mode Field Effect Transistor

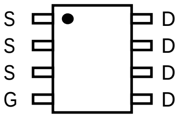
General Description

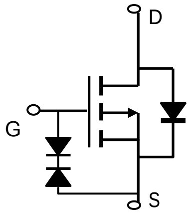
The AO4437 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications. It is ESD protected. *Standard Product AO4437 is Pb-free (meets ROHS & Sony 259 specifications). AO4437L is a Green Product ordering option. AO4437 and AO4437L are electrically identical.*

Features

V_{DS} (V) = -12V
I_D = -11 A (V_{GS} = -4.5V)
$R_{DS(ON)}$ < 16mΩ (V_{GS} = -4.5V)
$R_{DS(ON)}$ < 20mΩ (V_{GS} = -2.5V)
$R_{DS(ON)}$ < 25mΩ (V_{GS} = -1.8V)
ESD Rating: 4KV HBM

SOIC-8
Top View





Absolute Maximum Ratings T_A**=25°C unless otherwise noted**

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-12	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current [A]	T_A=25°C	I_D	-11	A
	T_A=70°C		-9	
Pulsed Drain Current [B]		I_{DM}	-20	
Power Dissipation [A]	T_A=25°C	P_D	3	W
	T_A=70°C		2.1	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	31	40	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		63	75	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	21	30	°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	-12			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-9.6V, V_{GS}=0V			-1	µA
		T_J=55°C			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±4.5V			±1	µA
		V_{DS}=0V, V_{GS}=±8V			±10	µA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250µA	-0.3	-0.55	-1	
$I_{D(ON)}$	On state drain current	V_{GS}=-4.5V, V_{DS}=-5V	-20			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V, I_D=-11A		12.4	16	mΩ
		T_J=125°C		17	21	
		V_{GS}=-2.5V, I_D=-10A		15.9	20	mΩ
		V_{GS}=-1.8V, I_D=-6A		20.4	25	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-11A		38		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.74	-1	V
I_S	Maximum Body-Diode Continuous Current				-4.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-6V, f=1MHz		3960	4750	pF
C_{oss}	Output Capacitance			910		pF
C_{rss}	Reverse Transfer Capacitance			757		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		6.9	8.5	Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=-4.5V, V_{DS}=-6V, I_D=-11A		37	47	nC
Q_{gs}	Gate Source Charge			4.5		nC
Q_{gd}	Gate Drain Charge			11		nC
$t_{D(on)}$	Turn-On Delay Time	V_{GS}=-4.5V, V_{DS}=-6V, R_L=0.55Ω, R_{GEN}=3Ω		15		ns
t_r	Turn-On Rise Time			43		ns
$t_{D(off)}$	Turn-Off Delay Time			158		ns
t_f	Turn-Off Fall Time			95		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-11A, dI/dt=100A/µs		64		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-11A, dI/dt=100A/µs		50		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°C. The value in any given application depends on the user's specific board design. The current rating is based on the t≤ 10s thermal resistance rating.

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

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

D. The static characteristics in Figures 1 to 6,12,14 are obtained using 80µs pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

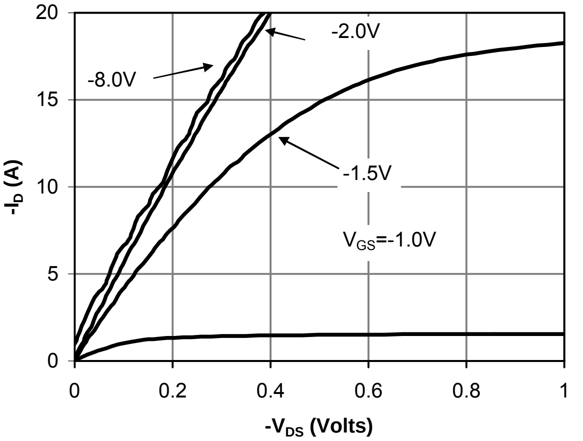

Fig 1: On-Region Characteristics

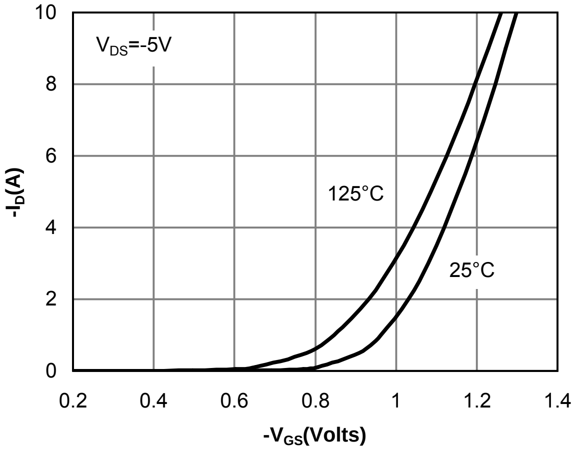

Figure 2: Transfer Characteristics

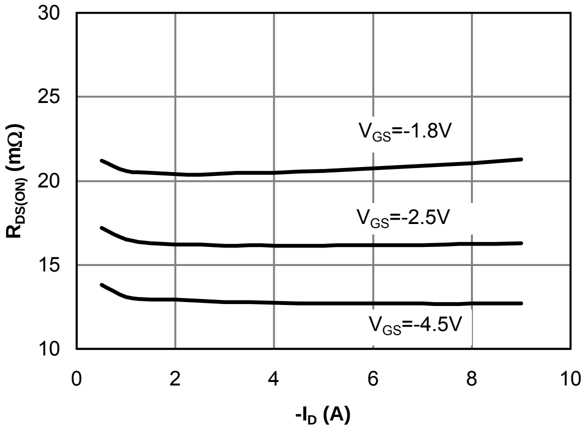

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

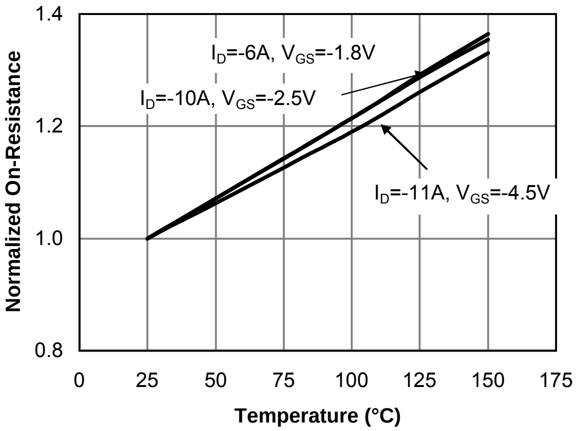

Figure 4: On-Resistance vs. Junction Temperature

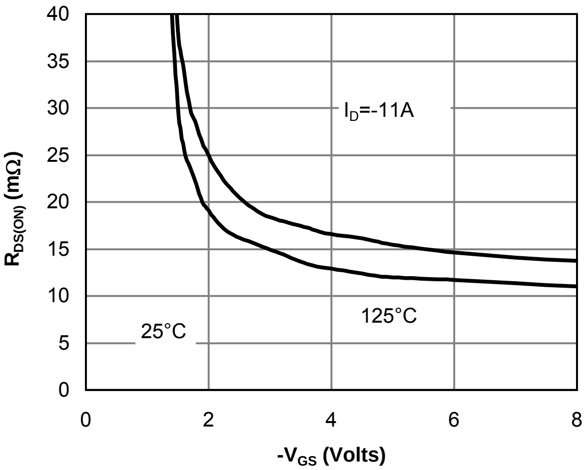

Figure 5: On-Resistance vs. Gate-Source Voltage

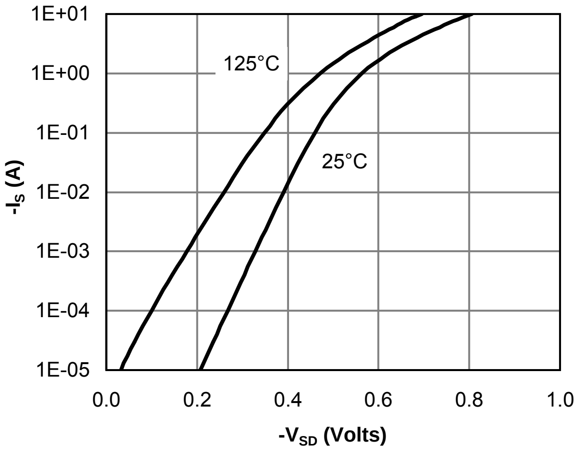

Figure 6: Body-Diode Characteristics