

General Description

The AO4438 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.

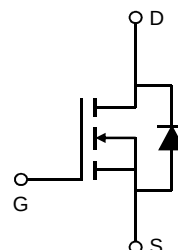
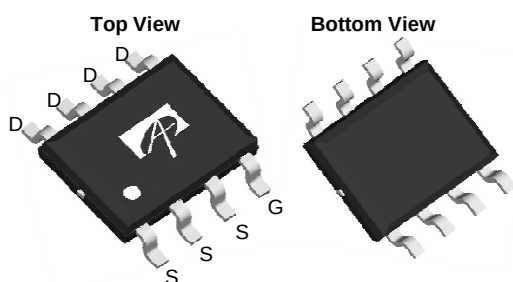
Product Summary

$V_{DS} (V) = 60V$
 $I_D = 8.2A (V_{GS} = 10V)$
 $R_{DS(ON)} < 22m\Omega (V_{GS} = 10V)$
 $R_{DS(ON)} < 27m\Omega (V_{GS} = 4.5V)$

100% UIS Tested
 100% Rg Tested



SOIC-8



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^A	I_D	8.2	A
$T_A=25^\circ C$			
$T_A=70^\circ C$		6.6	
Pulsed Drain Current ^B	I_{DM}	40	
Power Dissipation	P_D	3.1	W
		2	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	24	40	$^\circ C/W$
$t \leq 10s$				
Maximum Junction-to-Ambient ^A		54	75	$^\circ C/W$
Steady-State				
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	21	30	$^\circ C/W$
Steady-State				

N Channel 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	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±20V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =250μA	2	2.3	3	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =8.2A T _J =125°C		16.3 30	22 40	mΩ
		V _{GS} =4.5V, I _D =7.6A		20	27	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =8.2A		24		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.74	1	V
I _S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, f=1MHz		1920	2300	pF
C _{oss}	Output Capacitance			155		pF
C _{rss}	Reverse Transfer Capacitance			116		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		0.65	0.8	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =8.2A		47.6	58	nC
Q _g (4.5V)	Total Gate Charge			24.2	30	nC
Q _{gs}	Gate Source Charge			6		nC
Q _{gd}	Gate Drain Charge			14.4		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =30V, R _L =3.6Ω, R _{GEN} =3Ω		8.2		ns
t _r	Turn-On Rise Time			5.5		ns
t _{D(off)}	Turn-Off DelayTime			29.7		ns
t _f	Turn-Off Fall Time			5.2		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =8.2A, dI/dt=100A/μs		34	41	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =8.2A, dI/dt=100A/μs		53		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. The current rating is based on the t ≤ 10s thermal resistance rating.

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

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

D: The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: N-CHANNEL

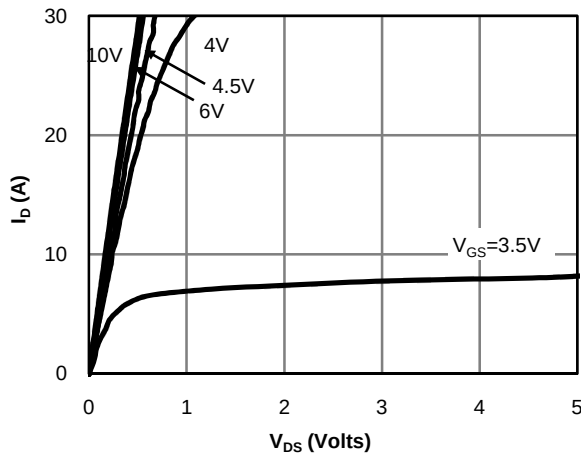


Fig 1: On-Region Characteristics

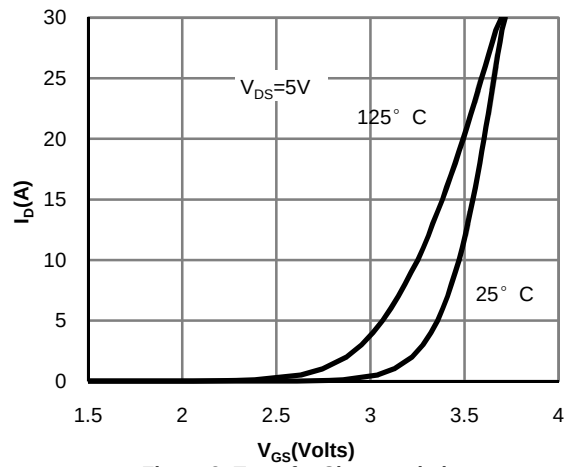


Figure 2: Transfer Characteristics

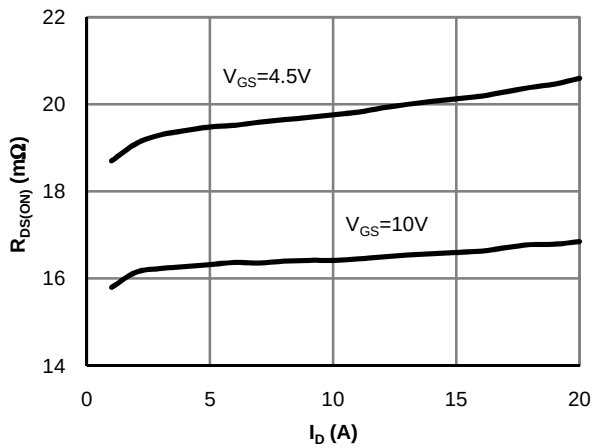


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

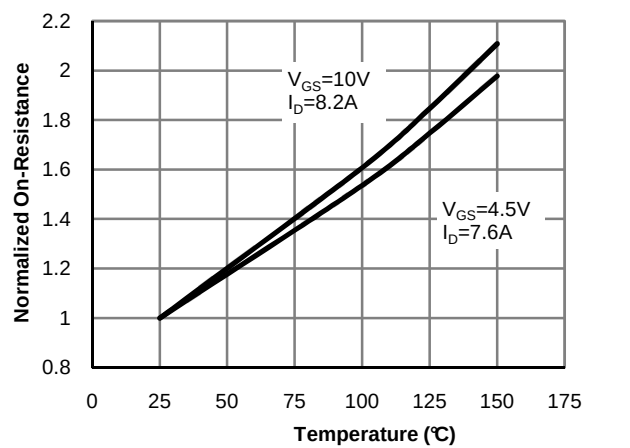


Figure 4: On-Resistance vs. Junction Temperature

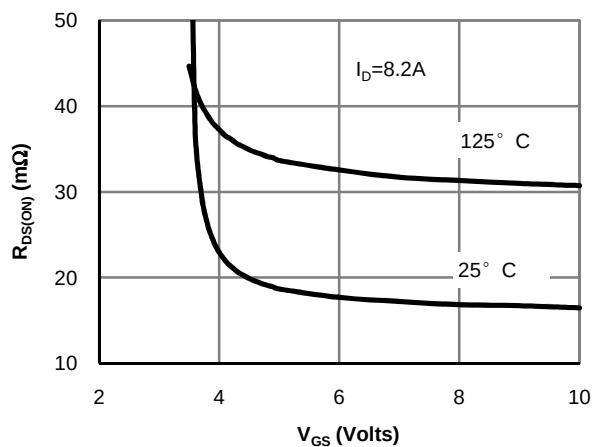


Figure 5: On-Resistance vs. Gate-Source Voltage

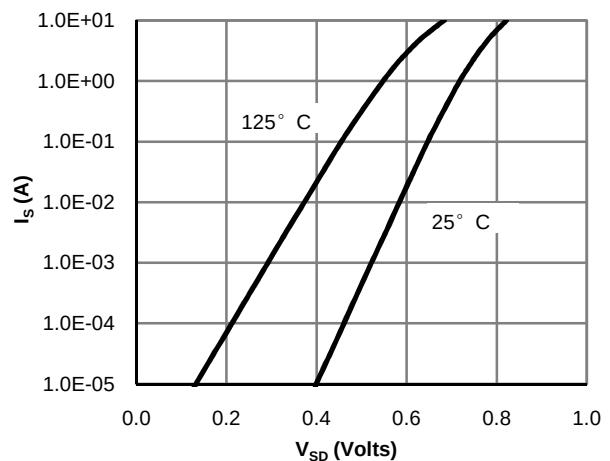


Figure 6: Body-Diode Characteristics



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: N-CHANNEL

