



ALPHA & OMEGA
SEMICONDUCTOR

AO4443

P-Channel Enhancement Mode Field Effect Transistor

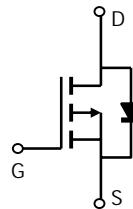
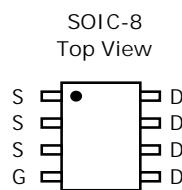


General Description

The AO4443 uses advanced trench technology to provide excellent $R_{DS(ON)}$, and ultra-low low gate charge. This device is suitable for use as a load switch or in PWM applications. *Standard Product AO4443 is Pb-free (meets ROHS & Sony 259 specifications). AO4443L is a Green Product ordering option. AO4443 and AO4443L are electrically identical.*

Features

V_{DS} (V) = -40V
 I_D = -6.5 A (V_{GS} = -10V)
 $R_{DS(ON)} < 42m\Omega$ (V_{GS} = -10V)
 $R_{DS(ON)} < 63m\Omega$ (V_{GS} = -4.5V)



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^A	I_D	-6.5	A
$T_A=70^\circ\text{C}$		-5	
Pulsed Drain Current ^B	I_{DM}	-20	
Power Dissipation ^A	P_D	3.1	W
$T_A=70^\circ\text{C}$		2	
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	$R_{\theta JA}$	24	40	°C/W
Steady-State		54	75	°C/W
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	21	30	°C/W

P-Channel 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	$I_D=-250\mu\text{A}$, $V_{\text{GS}}=0\text{V}$	-40			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{\text{DS}}=-32\text{V}$, $V_{\text{GS}}=0\text{V}$ $T_J=55^\circ\text{C}$			-1 -5	μA
I_{GSS}	Gate-Body leakage current	$V_{\text{DS}}=0\text{V}$, $V_{\text{GS}}=\pm20\text{V}$			±100	nA
$V_{\text{GS}(\text{th})}$	Gate Threshold Voltage	$V_{\text{DS}}=V_{\text{GS}}$ $I_D=-250\mu\text{A}$	-1	-1.9	-3	V
$I_{\text{D}(\text{ON})}$	On state drain current	$V_{\text{GS}}=-10\text{V}$, $V_{\text{DS}}=-5\text{V}$	-20			A
$R_{\text{DS}(\text{ON})}$	Static Drain-Source On-Resistance	$V_{\text{GS}}=-10\text{V}$, $I_D=-6\text{A}$ $T_J=125^\circ\text{C}$		33.3 54	42 68	$\text{m}\Omega$
		$V_{\text{GS}}=-4.5\text{V}$, $I_D=-5\text{A}$		48	63	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{\text{DS}}=-5\text{V}$, $I_D=-6\text{A}$		14		S
V_{SD}	Diode Forward Voltage	$I_S=-1\text{A}$, $V_{\text{GS}}=0\text{V}$		-0.75	-1	V
I_S	Maximum Body-Diode Continuous Current				-6	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{\text{GS}}=0\text{V}$, $V_{\text{DS}}=-20\text{V}$, $f=1\text{MHz}$		657		pF
C_{oss}	Output Capacitance			143		pF
C_{rss}	Reverse Transfer Capacitance			63		pF
R_g	Gate resistance	$V_{\text{GS}}=0\text{V}$, $V_{\text{DS}}=0\text{V}$, $f=1\text{MHz}$		6.5		Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge (10V)	$V_{\text{GS}}=-10\text{V}$, $V_{\text{DS}}=-20\text{V}$, $I_D=-6\text{A}$		14.2		nC
$Q_g(4.5\text{V})$	Total Gate Charge (4.5V)			7.1		nC
Q_{gs}	Gate Source Charge			2.2		nC
Q_{gd}	Gate Drain Charge			4.1		nC
$t_{\text{D}(\text{on})}$	Turn-On DelayTime	$V_{\text{GS}}=-10\text{V}$, $V_{\text{DS}}=-20\text{V}$, $R_L=3.7\Omega$, $R_{\text{GEN}}=3\Omega$		7.7		ns
t_r	Turn-On Rise Time			8		ns
$t_{\text{D}(\text{off})}$	Turn-Off DelayTime			26.5		ns
t_f	Turn-Off Fall Time			11.5		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-6\text{A}$, $di/dt=100\text{A}/\mu\text{s}$		21.9		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-6\text{A}$, $di/dt=100\text{A}/\mu\text{s}$		14.9		nC

A: The value of R_{QJA} is measured with the device mounted on 1 in² 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. The current rating is based on the $\leq 10\text{s}$ thermal resistance rating.

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

C. The R_{QJA} is the sum of the thermal impedance from junction to lead R_{QJL} and lead to ambient.

D. The static characteristics in Figures 1 to 6, 12, 14 are obtained using 80 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 $T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: P-CHANNEL

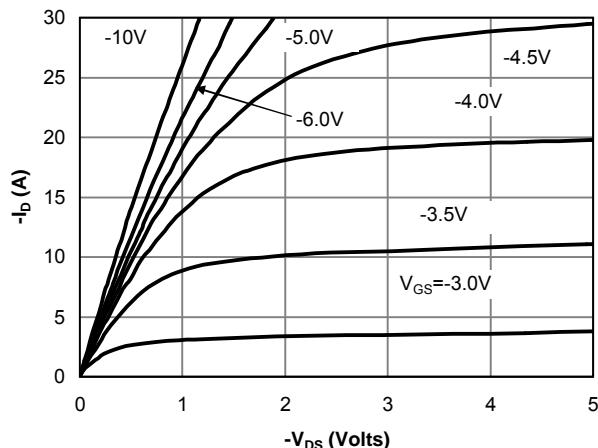


Fig 1: On-Region Characteristics

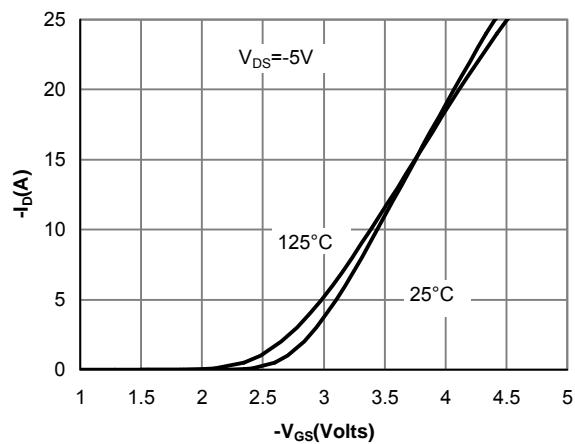


Figure 2: Transfer Characteristics

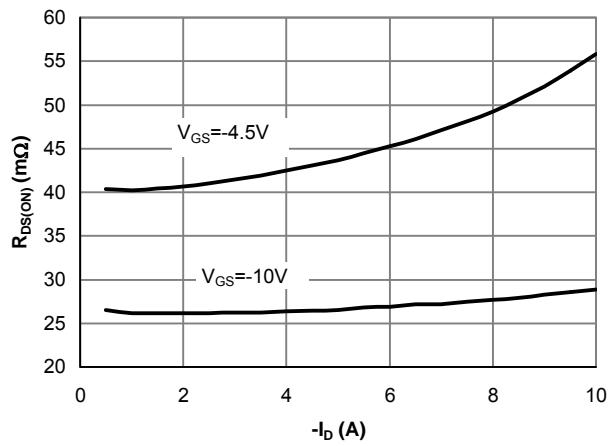


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

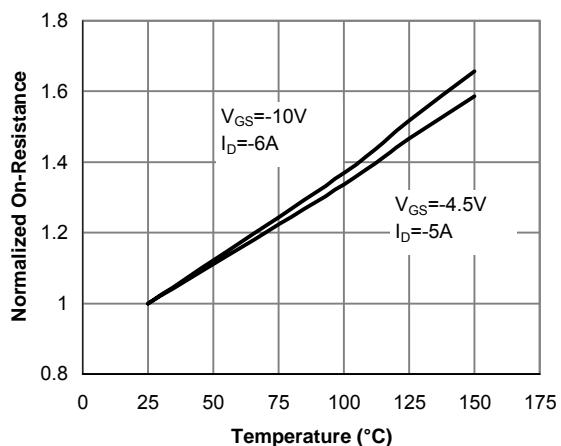


Figure 4: On-Resistance vs. Junction Temperature

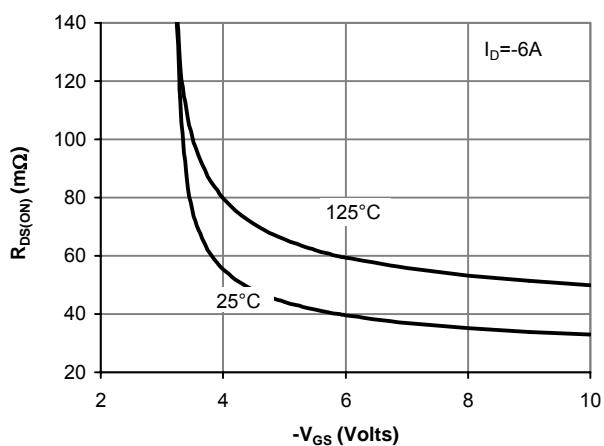


Figure 5: On-Resistance vs. Gate-Source Voltage

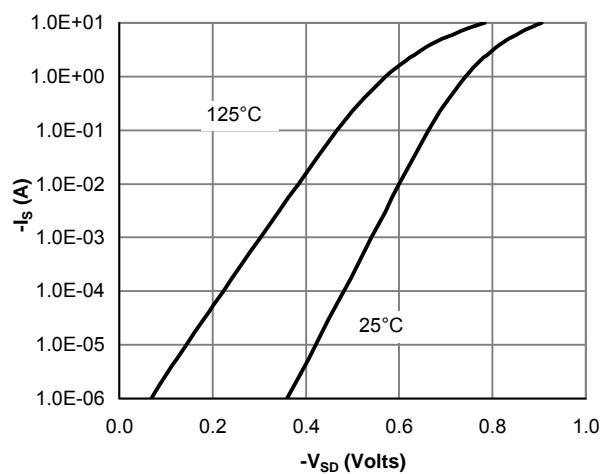


Figure 6: Body-Diode Characteristics

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