



## AO4447

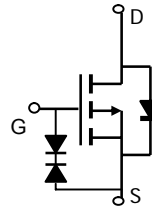
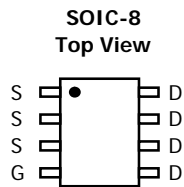
### P-Channel Enhancement Mode Field Effect Transistor

#### General Description

The AO4447 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. The device is ESD protected. *Standard Product AO4447 is Pb-free (meets ROHS & Sony 259 specifications). AO4447L is a Green Product ordering option. AO4447 and AO4447L are electrically identical.*

#### Features

$V_{DS} (V) = -30V$   
 $I_D = -15 A (V_{GS} = -10V)$   
 $Max R_{DS(ON)} < 7.5m\Omega (V_{GS} = -10V)$   
 $Max R_{DS(ON)} < 12m\Omega (V_{GS} = -4V)$   
 ESD Rating: 4KV HBM



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>A</sup>	$T_A=25^\circ C$	-15	A
	$T_A=70^\circ C$	-13.6	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	-60	
Power Dissipation <sup>A</sup>	$T_A=25^\circ C$	3.1	W
	$T_A=70^\circ C$	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 <sup>A</sup>	$R_{\theta JA}$	26	40	$^\circ C/W$
Maximum Junction-to-Ambient <sup>A</sup>		Steady-State	50	
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	14	24	$^\circ C/W$

Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V	-30			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			-1 -10	μA
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±10	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1	-1.3	-1.6	V
I <sub>D(ON)</sub>	On state drain current	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-5V	-60			A
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-15A T <sub>J</sub> =125°C		6.7 9.4	8 12	mΩ
		V <sub>GS</sub> =-4V, I <sub>D</sub> =-13A		9.2	12	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-15A		60		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V		-0.69	-1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				5.5	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f=1MHz		5500	6600	pF
C <sub>OSS</sub>	Output Capacitance			745		pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			473		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		3.1	4	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-15A		88.8	120	nC
Q <sub>g(4.5V)</sub>	Gate Charge			45.2	60	nC
Q <sub>gs</sub>	Gate Source Charge			10.1		nC
Q <sub>gd</sub>	Gate Drain Charge			19.4		nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, R <sub>L</sub> =1.7Ω, R <sub>GEN</sub> =3Ω		12		ns
t <sub>r</sub>	Turn-On Rise Time			11.5		ns
t <sub>D(off)</sub>	Turn-Off DelayTime			100		ns
t <sub>f</sub>	Turn-Off Fall Time			40		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =-15A, di/dt=100A/μs		46.6	60	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =-15A, di/dt=100A/μs		67.7		nC

A: The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The value in any a given application depends on the user's specific board design. The current rating is based on the ≤ 10s thermal resistance rating.

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

C: The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> 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<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The SOA curve provides a single pulse rating.

Rev 1. June 2006

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.