



AO4447

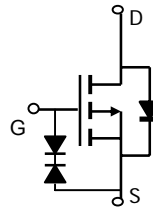
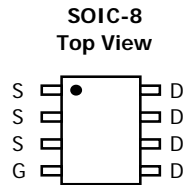
P-Channel Enhancement Mode Field Effect Transistor

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 Ω (V_{GS} = -10V)
- Max $R_{DS(ON)}$ < 12m Ω (V_{GS} = -4V)
- ESD Rating: 4KV HBM



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^A	$T_A=25^\circ\text{C}$ $T_A=70^\circ\text{C}$	I_D	-15
			-13.6
Pulsed Drain Current ^B	I_{DM}	-60	A
Power Dissipation ^A	$T_A=25^\circ\text{C}$ $T_A=70^\circ\text{C}$	P_D	3.1
			2
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	$R_{\theta JA}$	26	40	$^\circ\text{C/W}$
$t \leq 10\text{s}$				
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	50	75	$^\circ\text{C/W}$
Steady-State				
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	14	24	$^\circ\text{C/W}$

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 -10	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±20V			±10	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =-250μA	-1	-1.3	-1.6	V
I _{D(ON)}	On state drain current	V _{GS} =-10V, V _{DS} =-5V	-60			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-15A T _J =125°C		6.7	8	mΩ
				9.4	12	
		V _{GS} =-4V, I _D =-13A		9.2	12	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-15A		60		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.69	-1	V
I _S	Maximum Body-Diode Continuous Current				5.5	A
DYNAMIC PARAMETERS						
C _{ISS}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		5500	6600	pF
C _{OSS}	Output Capacitance			745		pF
C _{RSS}	Reverse Transfer Capacitance			473		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		3.1	4	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-15A		88.8	120	nC
Q _{g(4.5V)}	Gate Charge			45.2	60	nC
Q _{gs}	Gate Source Charge			10.1		nC
Q _{gd}	Gate Drain Charge			19.4		nC
t _{D(on)}	Turn-On DelayTime			12		ns
t _r	Turn-On Rise Time	V _{GS} =-10V, V _{DS} =-15V, R _L =1.7Ω, R _{GEN} =3Ω		11.5		ns
t _{D(off)}	Turn-Off DelayTime			100		ns
t _f	Turn-Off Fall Time			40		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-15A, di/dt=100A/μs		46.6	60	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-15A, di/dt=100A/μs		67.7		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 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_{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 6,12,14 are obtained using 80μs 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.

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.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

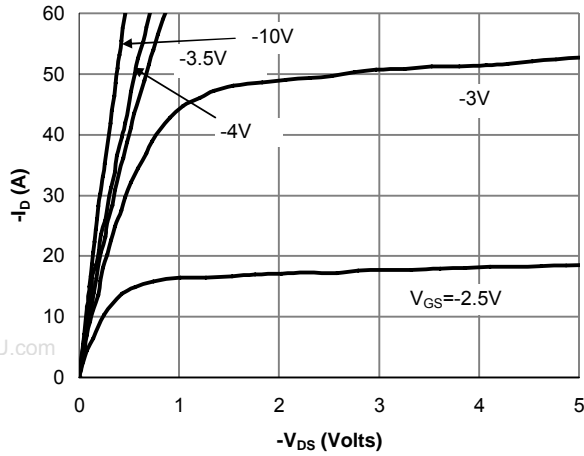


Fig 1: On-Region Characteristics

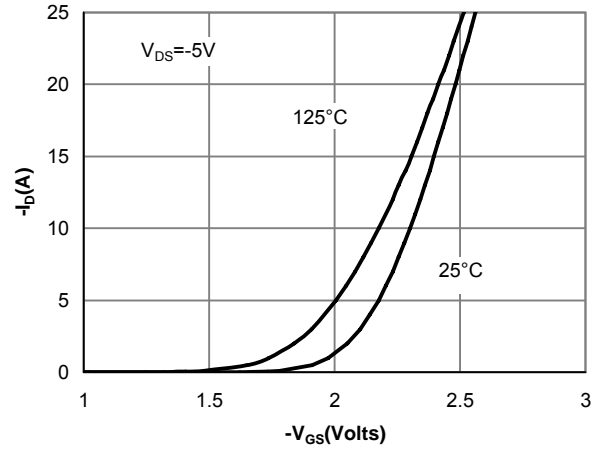


Figure 2: Transfer Characteristics

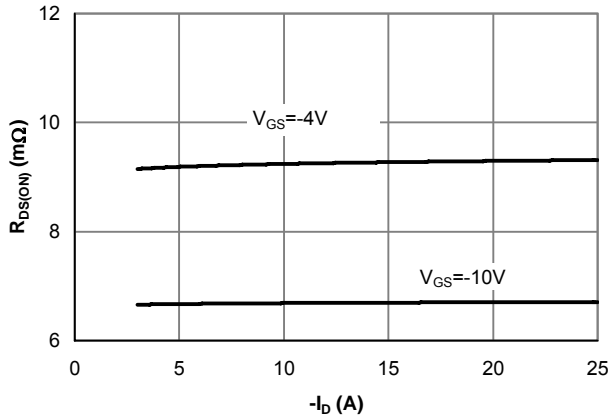


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

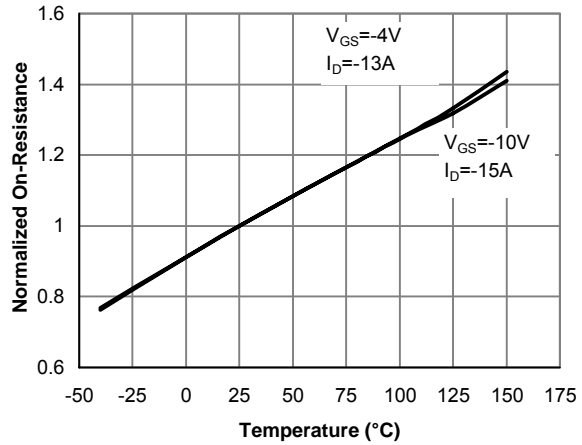


Figure 4: On-Resistance vs. Junction Temperature

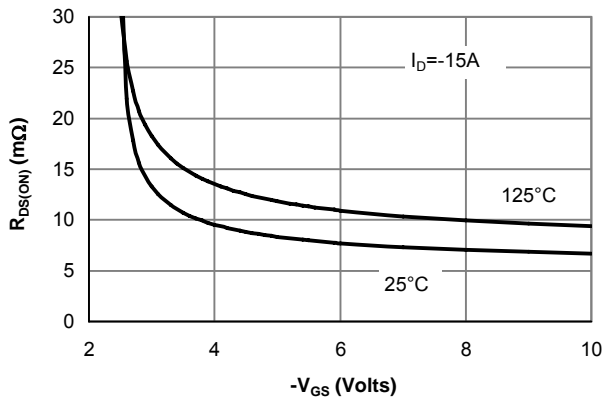


Figure 5: On-Resistance vs. Gate-Source Voltage

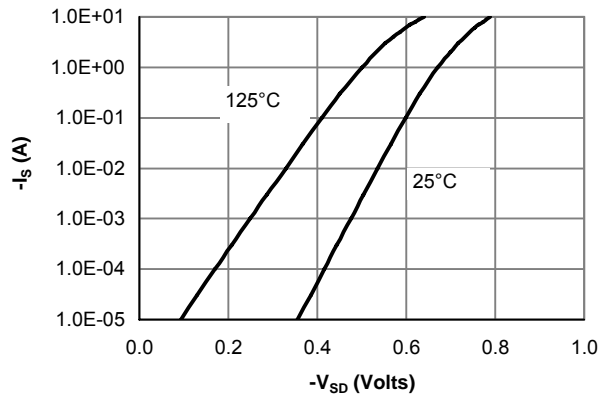


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

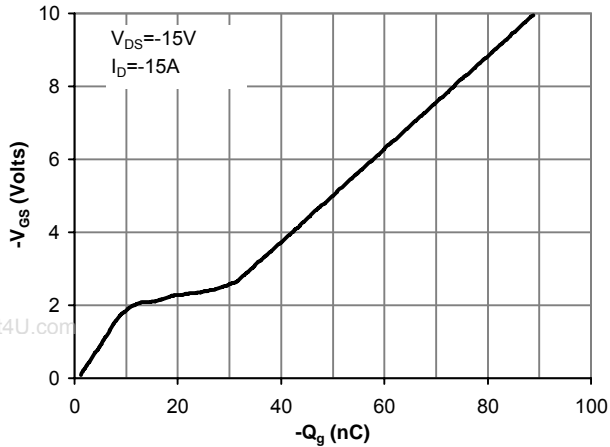


Figure 7: Gate-Charge Characteristics

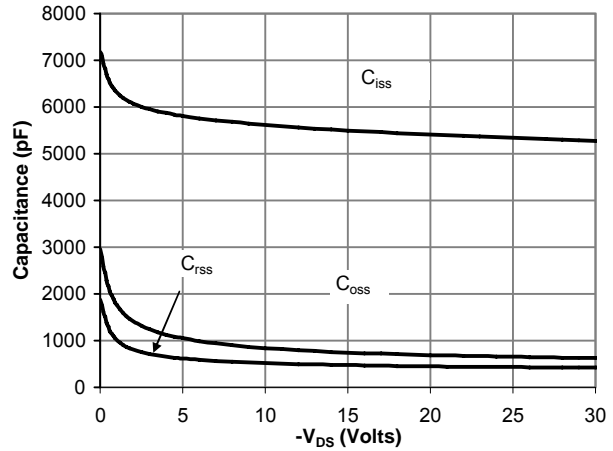


Figure 8: Capacitance Characteristics

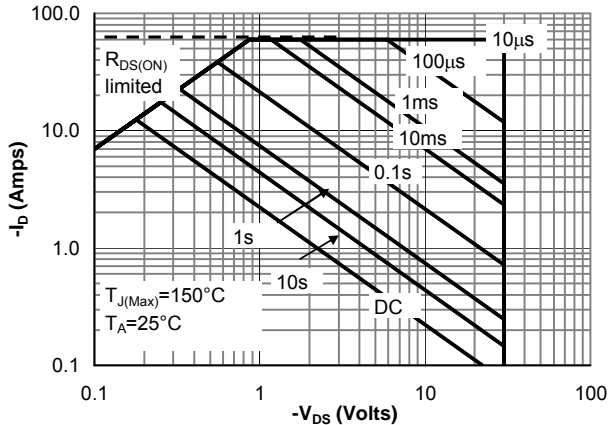


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

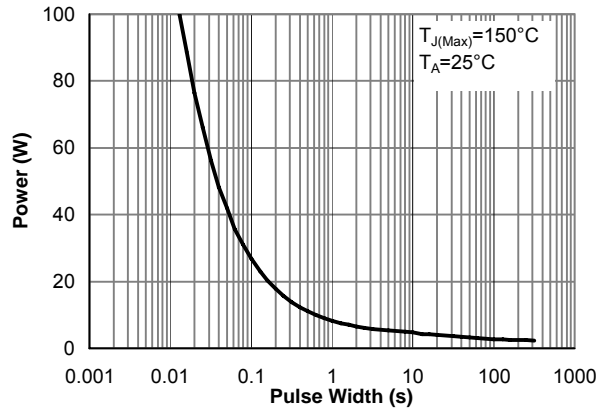


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

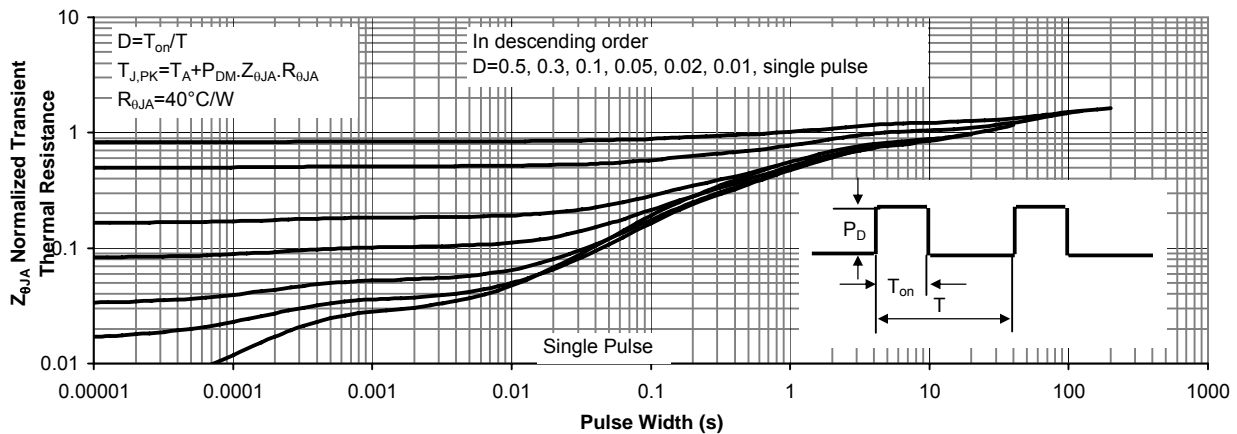
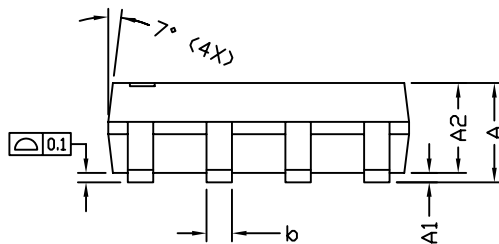
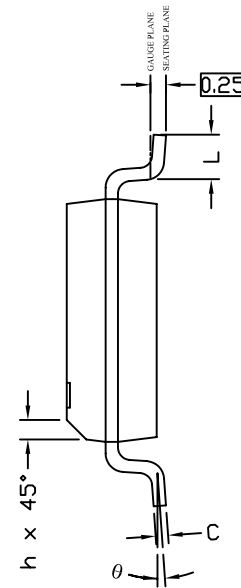
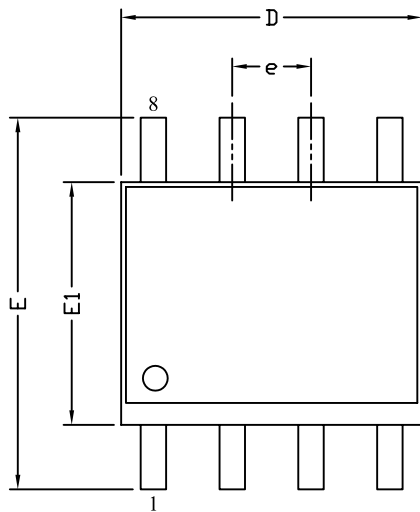


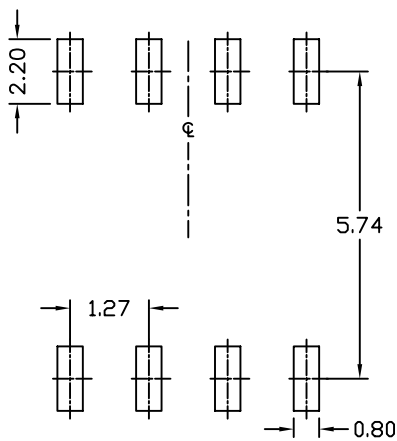
Figure 11: Normalized Maximum Transient Thermal Impedance



SO-8L PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35	1.65	1.75	0.053	0.065	0.069
A1	0.10	---	0.25	0.004	---	0.010
A2	1.25	1.50	1.65	0.049	0.059	0.065
b	0.31	---	0.51	0.012	---	0.020
c	0.17	---	0.25	0.007	---	0.010
D	4.80	4.90	5.00	0.189	0.193	0.197
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	1.27 BSC			0.050 BSC		
E	5.80	6.00	6.20	0.228	0.236	0.244
h	0.25	---	0.50	0.010	---	0.020
L	0.40	---	1.27	0.016	---	0.050
theta	0°	---	8°	0°	---	8°

UNIT: mm

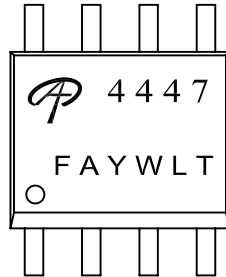
NOTE

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS.
4. DIMENSION L IS MEASURED IN GAUGE PLANE.
5. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.



Document No.	PD-00427
Version	B
Title	AO4447 Marking Description

SO-8 PACKAGE MARKING DESCRIPTION



Standard product



Green product

NOTE:

- LOGO - AOS Logo
- 4447 - Part number code
- F - Fab code
- A - Assembly location code
- Y - Year code
- W - Week code
- L&T - Assembly lot code

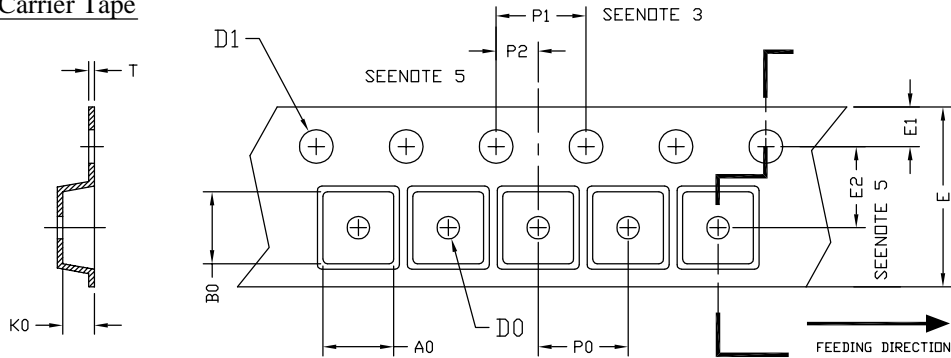
PART NO.	DESCRIPTION	CODE
AO4447	Standard product	4447
AO4447L	Green product	<u>4447</u>



ALPHA & OMEGA
SEMICONDUCTOR, LTD.

SO-8 Tape and Reel Data

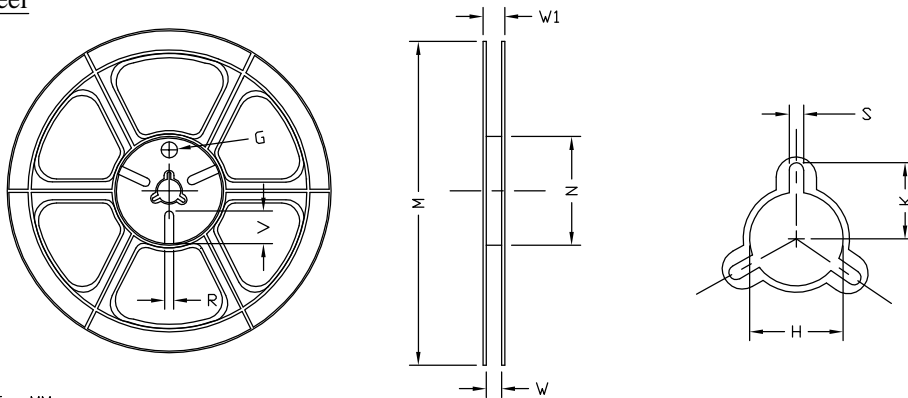
SO-8 Carrier Tape



UNIT: MM

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SD-8 (12 mm)	6.40 ±0.10	5.20 ±0.10	2.10 ±0.10	1.60 ±0.10	1.50 +0.10	12.00 ±0.30	1.75 ±0.10	5.50 ±0.05	8.00 ±0.10	4.00 ±0.10	2.00 ±0.05	0.25 ±0.05

SO-8 Reel



UNIT: MM

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
12 mm	ø330	ø330.00 ±0.50	ø97.00 ±0.10	13.00 ±0.30	17.40 ±1.00	ø13.00 +0.50 -0.20	10.60	2.00 ±0.50	---	---	---

SO-8 Tape

Leader / Trailer & Orientation

