



**AOP800**

**Dual N-Channel Enhancement Mode Field Effect Transistor**

**General Description**

The AOP800 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.

**Features**

- $V_{DS}$  (V) = 30V
- $I_D$  = 9.3A
- $R_{DS(ON)} < 18m\Omega$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 28m\Omega$  ( $V_{GS} = 4.5V$ )



Preliminary

**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	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>A</sup>	$I_D$	$T_A = 25^\circ\text{C}$	A
		$T_A = 70^\circ\text{C}$	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	40	
Power Dissipation	$P_D$	$T_A = 25^\circ\text{C}$	W
		$T_A = 70^\circ\text{C}$	
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 <sup>A</sup>	$R_{\theta JA}$	$t \leq 10s$	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A</sup>		Steady-State	67	
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	33	40	$^\circ\text{C/W}$

Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=24\text{V}$ , $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 20\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	1	1.8	3	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$ , $V_{DS}=5\text{V}$	40			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$ , $I_D=9.3\text{A}$ $T_J=125^\circ\text{C}$		15.5 22.3	18 27	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=7.4\text{A}$		23	28	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=5\text{V}$ , $I_D=9.3\text{A}$		23		S
$V_{SD}$	Diode Forward Voltage	$I_S=1\text{A}$ , $V_{GS}=0\text{V}$		0.75	1	V
$I_S$	Maximum Body-Diode Continuous Current				3	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=15\text{V}$ , $f=1\text{MHz}$		1040		pF
$C_{oss}$	Output Capacitance			180		pF
$C_{rss}$	Reverse Transfer Capacitance			110		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		0.7		$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $I_D=9.3\text{A}$		19.2		nC
$Q_g(4.5\text{V})$	Total Gate Charge			9.36		nC
$Q_{gs}$	Gate Source Charge			2.6		nC
$Q_{gd}$	Gate Drain Charge			4.2		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $R_L=1.6\Omega$ , $R_{GEN}=3\Omega$		5.2		ns
$t_r$	Turn-On Rise Time			4.4		ns
$t_{D(off)}$	Turn-Off DelayTime			17.3		ns
$t_f$	Turn-Off Fall Time			3.3		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=9.3\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		16.7		ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=9.3\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		6.7		nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The value in any a given application depends on the user's specific board design. The current rating is based on the  $t \leq 10\text{s}$  thermal resistance rating.

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

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

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

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

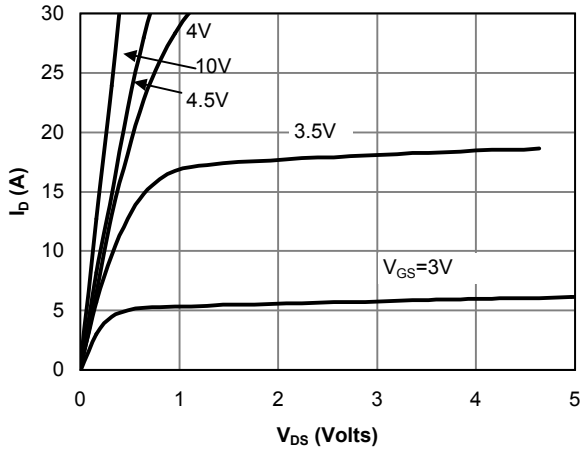


Fig 1: On-Region Characteristics

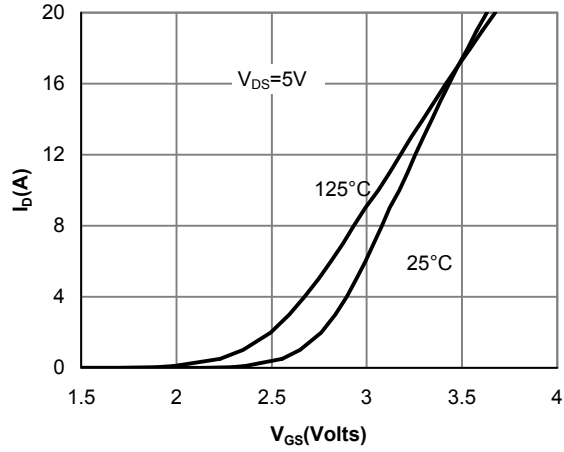


Figure 2: Transfer Characteristics

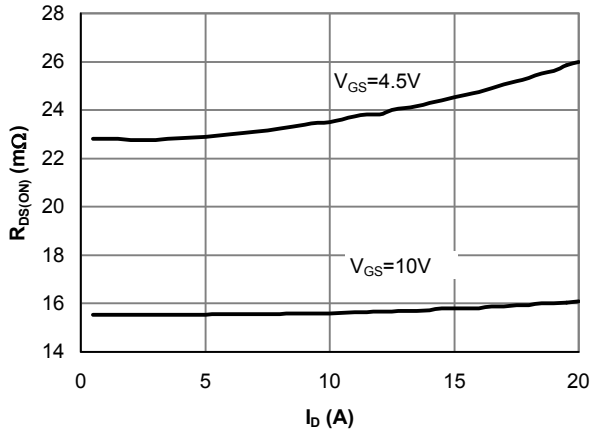


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

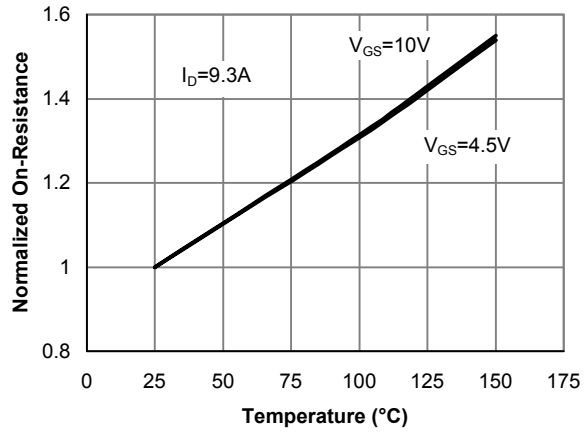


Figure 4: On-Resistance vs. Junction Temperature

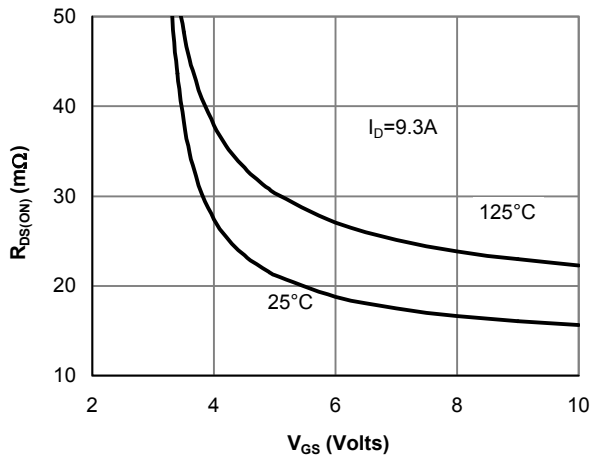


Figure 5: On-Resistance vs. Gate-Source Voltage

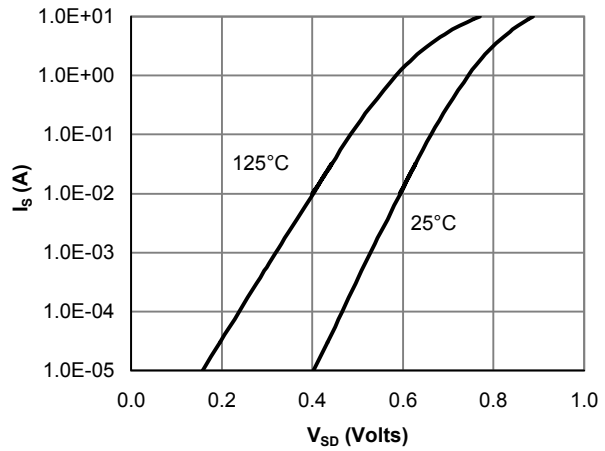


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

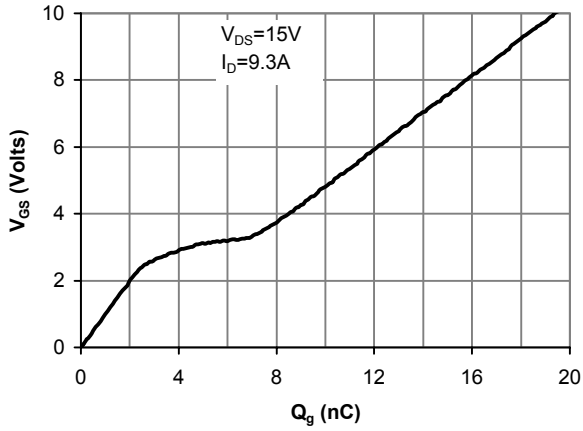


Figure 7: Gate-Charge Characteristics

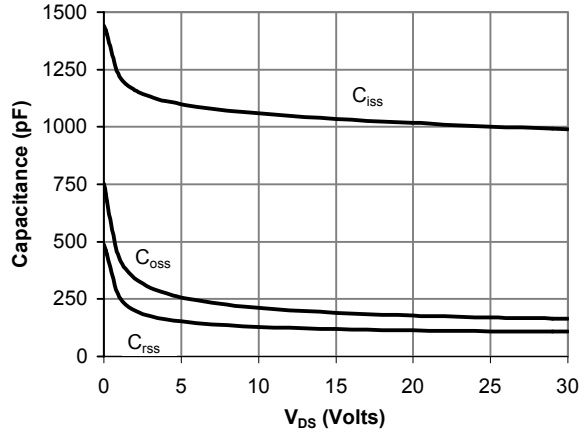


Figure 8: Capacitance Characteristics

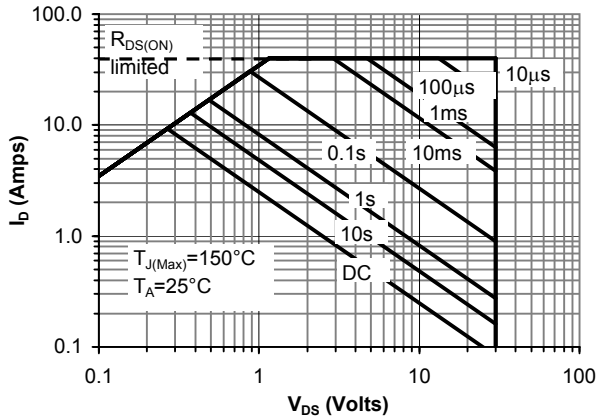


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

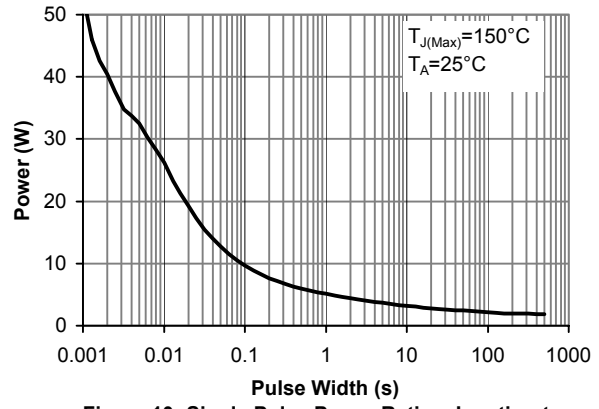


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

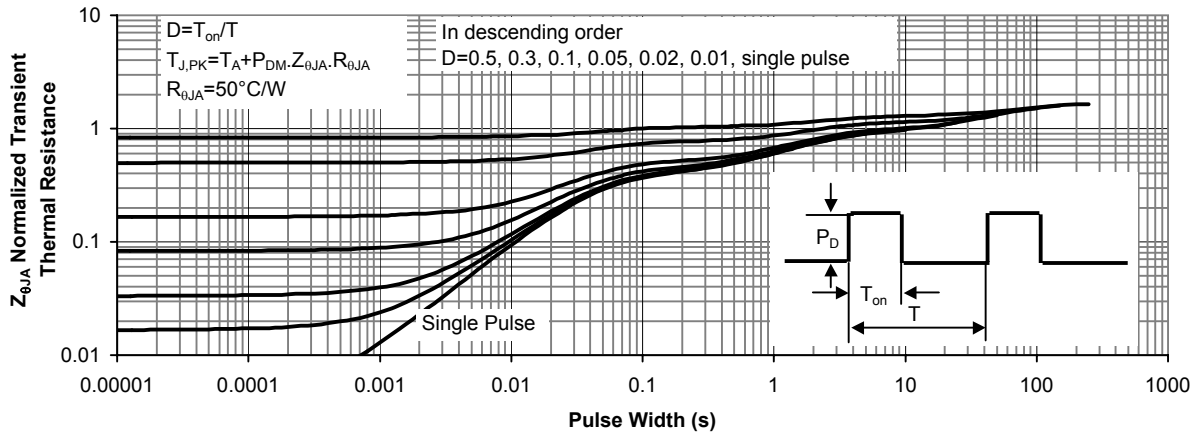
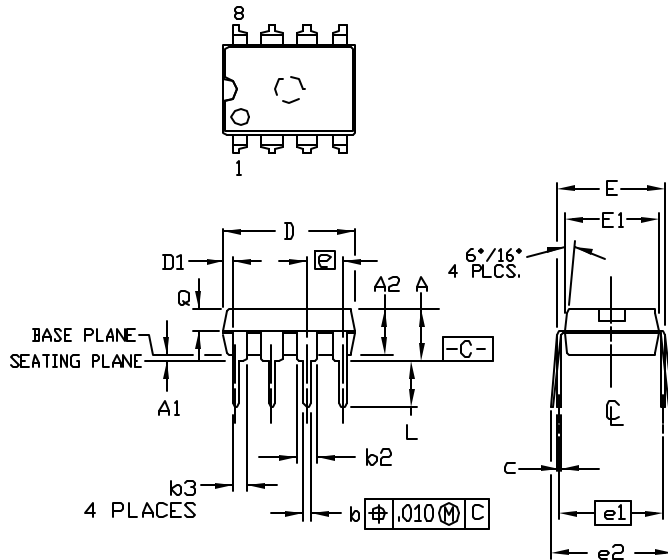


Figure 11: Normalized Maximum Transient Thermal Impedance



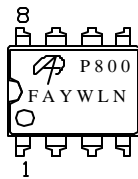
**PDIP-8 (300) Package Data**



Symbol	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A			4.32			.170
A1	.38			.015		
A2	2.92	3.30	4.95	.115	.130	.195
b	0.41	0.46	0.51	.016	.018	.020
b1	0.36	0.46	0.51	.014	.018	.020
b2	1.40	1.52	1.65	.055	.060	.065
b3	0.76	0.99	1.14	.030	.039	.045
c	0.20	0.25	0.30	.008	.010	.012
C1	0.20	0.25	0.28	.008	.010	.011
D	9.14	9.27	9.65	.360	.365	.380
D1	0.46	0.58	0.71	.018	.023	.028
E	7.62		8.26	.300		.325
E1	6.10	6.40	6.60	.240	.252	.260
e	2.54 BSC			.100 BSC		
e1	7.62 BSC			.300 BSC		
e2				.430		
L	3.18		3.43	.125		.135
N	8			8		
Q	1.40	1.52	1.65	.055	.060	.065

- NOTE:  
 1. LEAD FINISH: 150 MICROMETERS ( 3.8 um) MIN. THICKNESS OF Tin/Lead (SOLDER) PLATED ON LEAD  
 2. TOLERANCE  $\pm 0.100$  mm (4 mil) UNLESS OTHERWISE SPECIFIED  
 3. COPLANARITY : 0.1000 mm  
 4. DIMENSION L IS MEASURED IN GAGE PLANE

PACKAGE MARKING DESCRIPTION

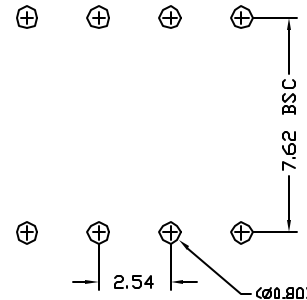


- NOTE:  
 - AOS LOGO  
 P800 - PART NUMBER CODE.  
 F - FAB LOCATION  
 A - ASSEMBLY LOCATION  
 Y - YEAR CODE  
 W - WEEK CODE.  
 L N - ASSEMBLY LOT CODE

PDIP-8 PART NO. CODE

PART NO.	CODE
AOP800	P800

RECOMMENDED LAND PATTERN



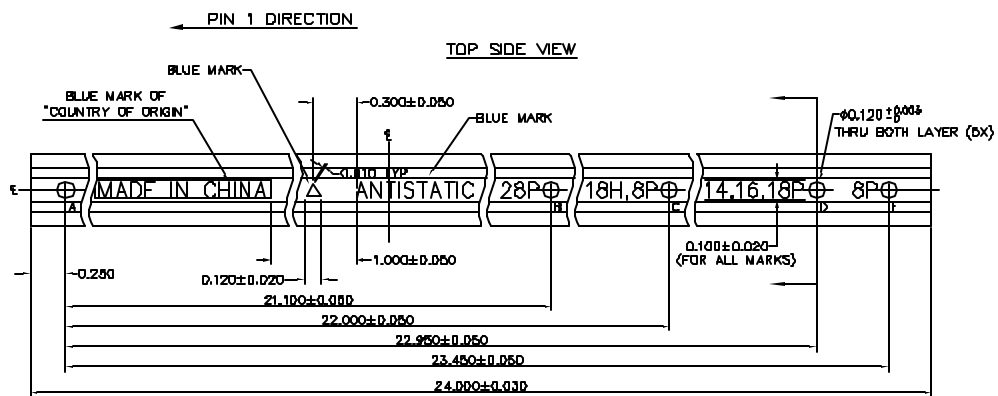
UNIT: mm



**ALPHA & OMEGA**  
SEMICONDUCTOR, INC.

## PDIP-8 (300) Tube Data

### PDIP-8 Tube



#### NOTES:

1. PLASTIC CARRIER THERMAL REQUIREMENTS TO 125F WITHOUT DISTORTION OR DETERIORATION IN ANTI-STATIC PROPERTIES.
2. CLARITY : PARTS IN TUBE TO BE CLEARLY VISIBLE IN DAYLIGHT TO THE NAKED EYE.
3. TUBE TO BE COATED (INSIDE AND OUT) WITH ANTI-STATIC AGENTS (PI-23820) AND THE SURFACE RESISTIVITY SHALL BE BETWEEN  $10^8$  TO  $10^{12}$  OHM/CM<sup>2</sup>.
4. MATL : MODIFIED ACRYLIC OR RIGID PVC.
5. FLATNESS : TUBE TO BE FLAT WITH 1/32 INCH.
6. BLUE MARK OF "Δ ANTISTATIC 28P 8P 14, 16, 18P" SHALL BE PUT ON TOP SURFACE OF TUBE AND SHALL PASS COTTON BRUSH TEST. (5 CYCLES)\*
7. TUBE WITH RIPPLE SURFACE AT PACKAGE LOADING AREA THAT AFFECT PACKAGE VISIBILITY SHALL BE REJECTABLE.
8. ALL DIMENSION ARE IN INCH.

