



AOD408

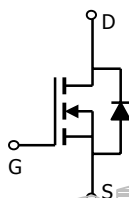
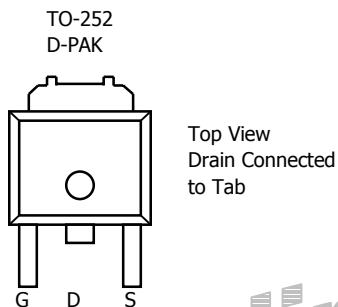
N-Channel Enhancement Mode Field Effect Transistor

General Description

The AOD408 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 = 18A
- $R_{DS(ON)} < 16m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 26m\Omega$ ($V_{GS} = 4.5V$)



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}	± 20	V
Continuous Drain Current ^G	I_D	$T_C = 25^\circ C$	A
		$T_C = 100^\circ C$	
Pulsed Drain Current ^C	I_{DM}	40	
Avalanche Current ^C	I_{AR}	18	A
Repetitive avalanche energy $L=0.1mH$ ^C	E_{AR}	16	mJ
Power Dissipation ^B	P_D	$T_C = 25^\circ C$	W
		$T_A = 100^\circ C$	
Power Dissipation ^A	P_{DSM}	$T_C = 25^\circ C$	W
		$T_A = 70^\circ C$	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	$t \leq 10s$	16.7	$^\circ C/W$
Maximum Junction-to-Ambient ^A		Steady-State	40	
Maximum Junction-to-Case ^B	$R_{\theta JC}$	1.9	2.5	$^\circ C/W$

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	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	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	μA
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	$V_{GS}=4.5\text{V}$, $V_{DS}=5\text{V}$	40			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=11\text{A}$ $T_J=125^\circ\text{C}$		13.6 18	16 22	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=10\text{A}$		20.6	26	
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=11\text{A}$		25		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				4.3	A
DYNAMIC PARAMETERS						
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		Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=18\text{A}$		19.8		nC
$Q_g(4.5\text{V})$	Total Gate Charge			9.8		nC
Q_{gs}	Gate Source Charge			2.5		nC
Q_{gd}	Gate Drain Charge			3.5		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=0.82\Omega$, $R_{GEN}=3\Omega$		4.5		ns
t_r	Turn-On Rise Time			3.9		ns
$t_{D(off)}$	Turn-Off Delay Time			17.4		ns
t_f	Turn-Off Fall Time			3.2		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=18\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		19		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=18\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		8		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C . The value in any a given application depends on the user's specific board design, and the maximum temperature fo 175°C may be used if the PCB allows it.

B: The power dissipation P_D is based on $T_{J(MAX)}=175^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C: Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=175^\circ\text{C}$.

D: The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

E: The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ pulses, duty cycle 0.5% max.

F: 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.

G: The maximum current rating is limited by bond-wires.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

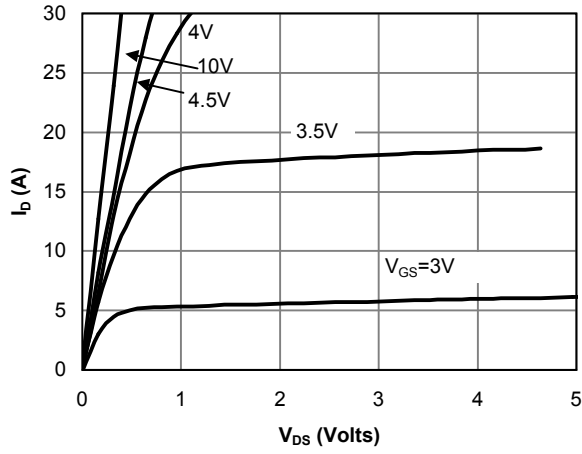


Fig 1: On-Region Characteristics

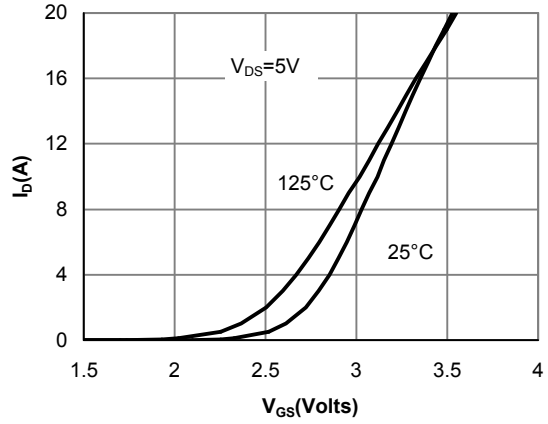


Figure 2: Transfer Characteristics

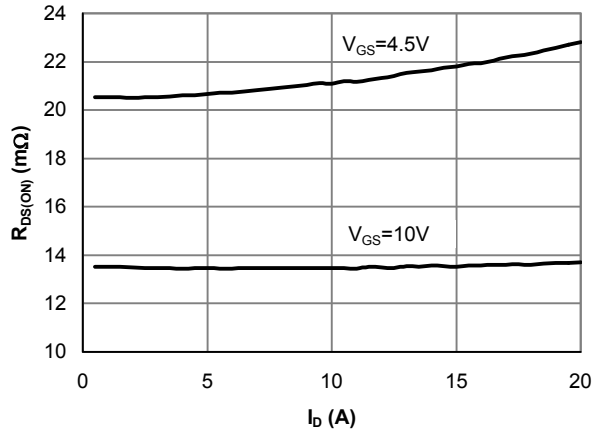


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

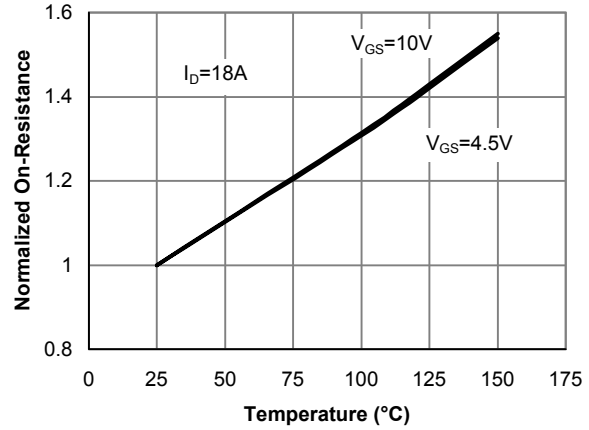


Figure 4: On-Resistance vs. Junction Temperature

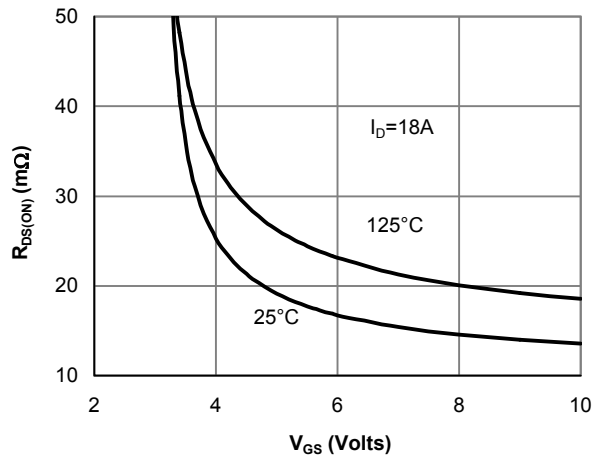


Figure 5: On-Resistance vs. Gate-Source Voltage

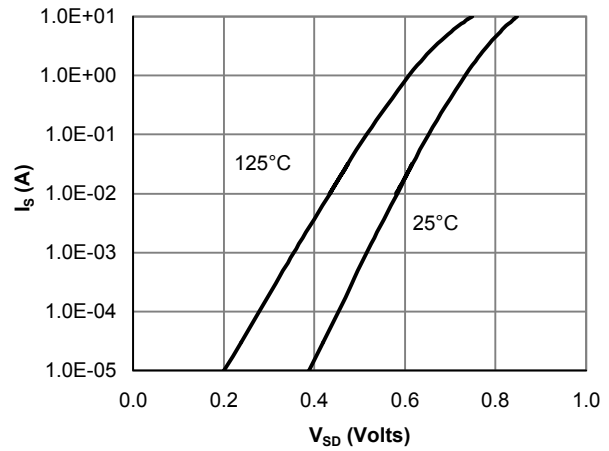


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

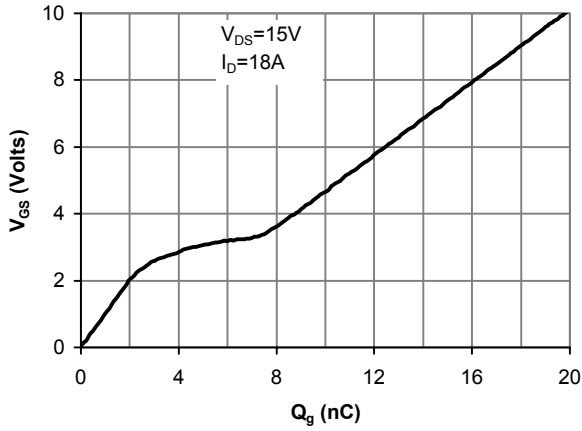


Figure 7: Gate-Charge Characteristics

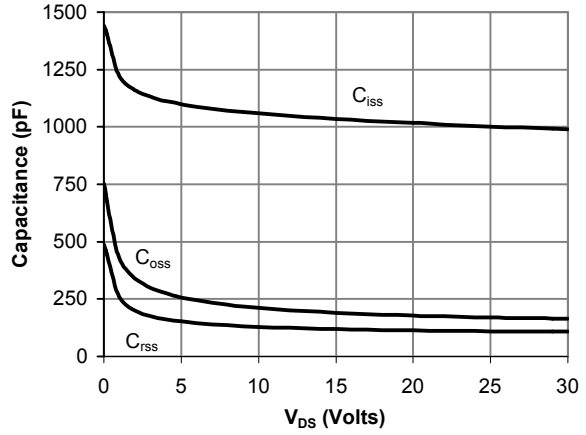


Figure 8: Capacitance Characteristics

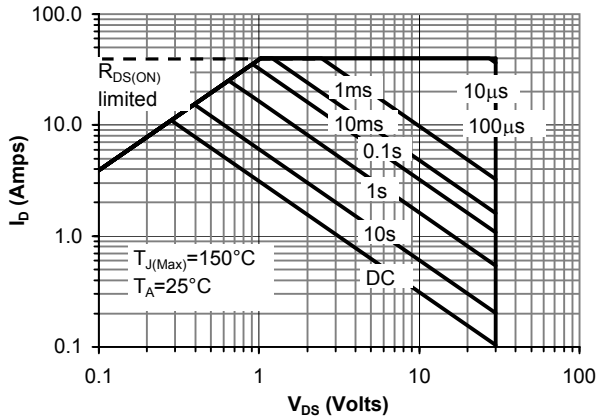


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

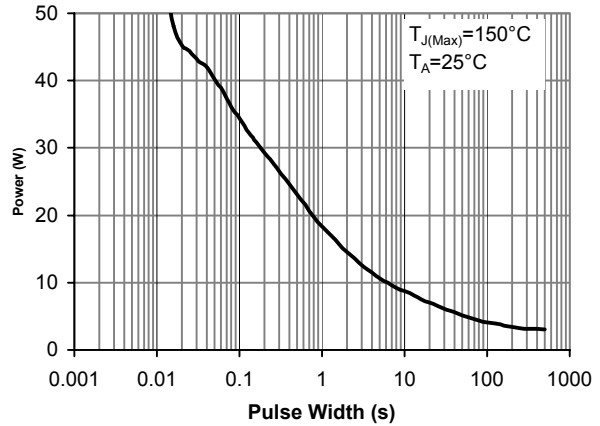


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

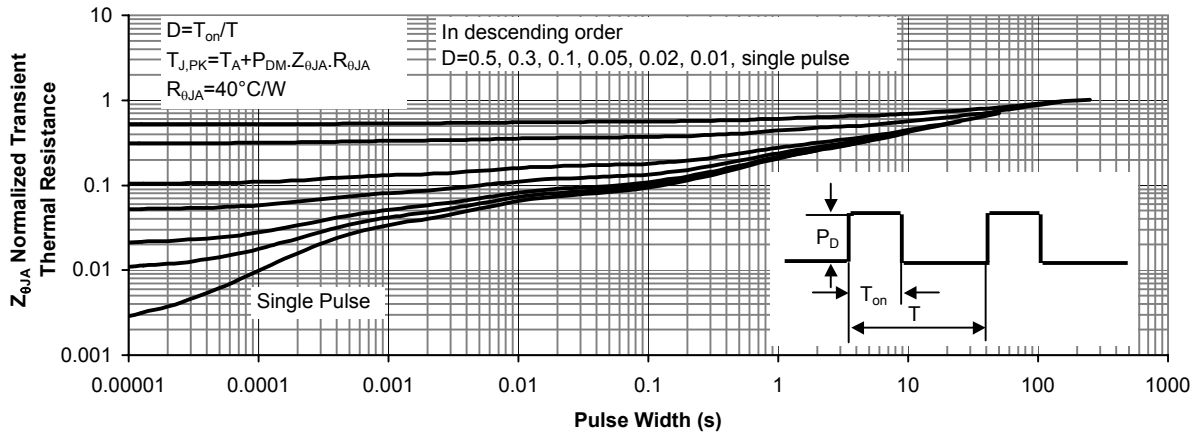
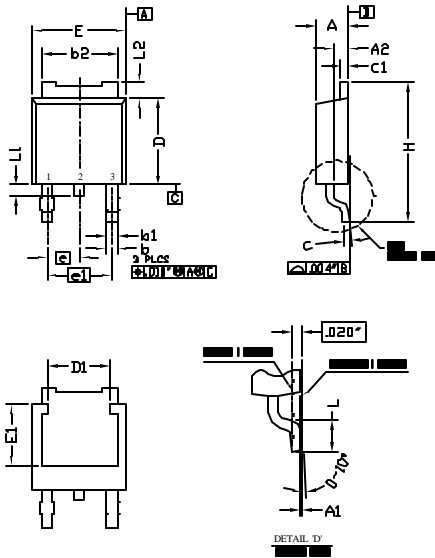


Figure 11: Normalized Maximum Transient Thermal Impedance



ALPHA & OMEGA
SEMICONDUCTOR, INC.

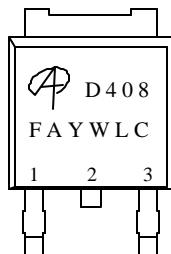
DPAK Package Data
(JEDEC TO-252)



	DIMENSION IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	2.235	2.286	2.388	0.088	0.090	0.094
A1	0.000	----	0.102	0.000	----	0.004
A2	0.889	----	1.143	0.035	----	0.045
b	0.686	0.762	0.889	0.027	0.030	0.035
b1	0.889	----	1.143	0.035	----	0.045
b2	5.207	4.45	5.461	0.205	----	0.215
c	0.457	0.508	0.559	0.018	0.020	0.022
c1	0.483	----	0.584	0.019	----	0.023
D	5.969	6.096	6.223	0.235	0.240	0.245
D1	4.318	----	5.334	0.170	----	0.210
E	6.477	6.604	6.731	0.255	0.260	0.265
E1	4.318	----	0.170	----	----	----
e	2.286 BSC.			0.090 BSC.		
e1	4.572 BSC.			0.180 BSC.		
H	9.779	----	10.414	0.385	----	0.410
L	1.270	----	2.032	0.050	----	0.080
L1	0.635	----	1.016	0.025	----	0.040
L2	0.889	----	1.270	0.035	----	0.050

- NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS
 2. DIMENSION L IS MEASURED IN GAGE PLANE
 3. TOLERANCE 0.10 mm UNLESS OTHERWISE SPECIFIED
 4. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
 5. FOLLOWED FROM JEDEC TO-252 (AA)

PACKAGE MARKING DESCRIPTION

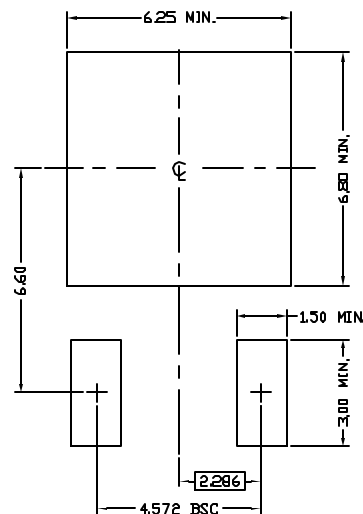


- NOTE:
- AOS LOGO
 - D408 - PART NUMBER CODE.
 - F - FAB LOCATION
 - A - ASSEMBLY LOCATION
 - Y - YEAR CODE
 - W - WEEK CODE.
 - L C - ASSEMBLY LOT CODE

DPAK PART NO. CODE

PART NO.	CODE
AOD408	D408

RECOMMENDED LAND PATTERN



UNIT: mm