ALPHA & OMEGA
SEMICONDUCTOR

Green Product

RoHS Compliant

AOD486A
## N-Channel Enhancement Mode Field Effect Transistor

General Description

The AOD486A uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge.This device is suitable for use in PWM, load switching and general purpose applications.

-RoHS Compliant
-Halogen Free*

Features

V_{DS} (V) = 40V
I_D = 50 A (V_{GS} = 10V)
$R_{DS(ON)}$ < 9.8 mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 13 mΩ (V_{GS} = 4.5V)

ESD Protected!
100% UIS Tested!
100% Rg Tested!

TO-252
D-PAK

Top View   Bottom View
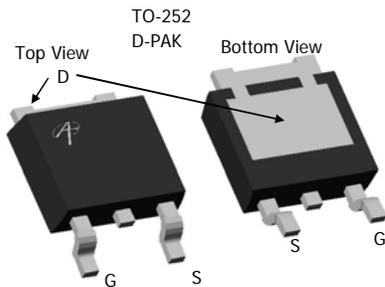
Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [G]	T_C=25°C	I_D	50	A
	T_C=100°C		36	
Pulsed Drain Current [C]		I_{DM}	100	
Avalanche Current [C]		I_{AR}	30	A
Repetitive avalanche energy L=0.3mH [C]		E_{AR}	135	mJ
Power Dissipation [B]	T_C=25°C	P_D	50	W
	T_C=100°C		25	
Power Dissipation [A]	T_A=25°C	P_{DSM}	2	W
	T_A=70°C		1.3	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	17.4	30	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		45	60	°C/W
Maximum Junction-to-Case [B]	Steady-State	$R_{\theta JC}$	1.2	3	°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		40			V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=40V, V$_{GS}$=0V				1	µA
			T$_J$=55°C			5	
I$_{GSS}$	Gate-Body leakage current	V$_{DS}$=0V, V$_{GS}$=±20V				±100	µA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250µA		1.75	2	3	V
I$_{D(ON)}$	On state drain current	V$_{GS}$=10V, V$_{DS}$=5V		100			A
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V, I$_D$=20A			8.1	9.8	mΩ
			T$_J$=125°C		12.15	16	
		V$_{GS}$=4.5V, I$_D$=5A			10.8	13	mΩ
g$_{FS}$	Forward Transconductance	V$_{DS}$=5V, I$_D$=20A			47		S
V$_{SD}$	Diode Forward Voltage	I$_S$=1A, V$_{GS}$=0V			0.76	1	V
I$_S$	Maximum Body-Diode Continuous Current					50	A
DYNAMIC PARAMETERS							
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=20V, f=1MHz			1600	1920	pF
C$_{oss}$	Output Capacitance				320		pF
C$_{rss}$	Reverse Transfer Capacitance				100		pF
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, f=1MHz			3.4		Ω
SWITCHING PARAMETERS							
Q$_g$(10V)	Total Gate Charge	V$_{GS}$=10V, V$_{DS}$=20V, I$_D$=20A			22		nC
Q$_g$(4.5V)	Total Gate Charge				10.5		nC
Q$_{gs}$	Gate Source Charge				4.2		nC
Q$_{gd}$	Gate Drain Charge				4.8		nC
t$_{D(on)}$	Turn-On DelayTime	V$_{GS}$=10V, V$_{DS}$=20V, R$_L$=1Ω, R$_{GEN}$=3Ω			6.5		ns
t$_r$	Turn-On Rise Time				12.5		ns
t$_{D(off)}$	Turn-Off DelayTime				33		ns
t$_f$	Turn-Off Fall Time				16		ns
t$_{rr}$	Body Diode Reverse Recovery Time	I$_F$=20A, dI/dt=100A/µs			31		ns
Q$_{rr}$	Body Diode Reverse Recovery Charge	I$_F$=20A, dI/dt=100A/µs			33		nC

A: The value of R$_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with
T$_A$=25°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 given
application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.
B. The power dissipation P$_D$ is based on T$_{J(MAX)}$=175°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°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 µs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a
maximum junction temperature of T$_{J(MAX)}$=175°C.
G. The package is limited to a maximum of 25A continuous current.
H. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T$_A$=25°C. The SOA
curve provides a single pulse rating.
*This device is guaranteed green after data code 8X11 (Sep 1ST 2008).
Rev2: Sep. 2008