AH001-D

DATA AND SPECIFICATIONS
DESCRIPTION AND INSTRUCTIONS
PIN FOR PIN REPLACEMENT FOR OEI
AC300 AND HARRIS HA-3-5033-5

Optical Electronics Incorporated

LINEAR VOLTAGE FOLLOWER AND CURRENT BOOSTER

FEATURES

- HIGH SLEW RATE: ±1000V/μs MIN
- HIGH OUTPUT: ±100mA min at ±10V
- WIDE POWER BANDWIDTH: DC to 39 MHz
- FAST SETTLING: 50ns to 0.1%
- LOW HARMONIC DISTORTION .05%

APPLICATIONS

- VIDEO LINE DRIVER
- FLASH A/D INPUT BUFFER
- HIGH SPEED BUFFER
- CURRENT BOOSTER
- ISOLATION BUFFER
- SAMPLE AND HOLD

DESCRIPTION

The AH001-D Video Current Booster is a high performance, low cost voltage follower designed to replace the AC300 for use in high frequency applications requiring high output current, wide bandwidth, exceptional slew rate with fast recovery and settling times.

These features make the AH001-D useful for a wide range of applications from sample and hold circuits to A/D and D/A conversion and especially as a video line driver.

The AH001-D specifies a minimum output current of ±100ma into a 100Ω load at a typical output frequency of 24 MHz; furthermore the AH001-D is capable of ±1V output into 100Ω load to 39 MHz. This capability makes the AH001-D an excellent choice for booster applications in the feedback loop of high speed op amps. The composite configuration increases the effective full power bandwidth of the op amp in which the AH001-D is used in conjunction with. See Applications Notes.

The voltage gain of the AH001-D unloaded is typically .96 but can drop to .9 when loaded. The gain between units is within .5% when unloaded which corresponds to a voltage difference of 50mV including offset (Vin = +10VDC) which is specified at ±20mv max.

The voltage drift is specified at ±100μV/°C max from 0° - – 70°C. The gain change vs temperature from 0 - 100°C is typically 500μV/°C including voltage offset drift (Vin = ±10VDC). Along with these specifications the AH001-D has a low 5ma max quiescent current which is much better than the older OEI part AC300 (Iq = 25ma max). This low quiescent current makes the AH001-D a good choice for systems in which power consumption is a major consideration.

TYPICAL PERFORMANCE CURVES

(T_A = +25°C and V_{CC} = ±15V DC unless otherwise noted)

AH001-D SPECIFICATIONS

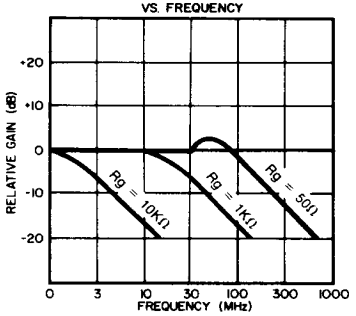
Specifications at T_A = +25°C and V_{CC} = ±15V DC unless otherwise noted.

MODEL		AH001-D			
PARAMETER	**CONDITIONS**	**MIN**	**TYP**	**MAX**	**UNITS**
INPUT					
Voltage			±12		
Offset Voltage			±5	±20	mV
Offset Voltage Drift				±100	μV
Bias Current			±20		μA
Resistance			500		K
OUTPUT					
Voltage Gain		.90	.96		V/V
Voltage Swing	I_o = ±100ma	±10			V
Max Load Current	V_o = ±10V	±100			mA
Output Resistance				20	Ω
Max Load Capacitance				10	nf
THD(Total Harmonic Distortion	±5Vp @ 1Khz		.05		%
FREQUENCY RESPONSE					
Slew Rate	R_L = 1KΩ		1500		V/μs
Full Power Bandwidth	V_o = ±10Vp, R_L = 100Ω		24		MHz
Bandwidth	V_{IN} = ±1Vp, R_L = 100Ω		39		MHz
Overload Recovery Time			100		ns
Settling Time to 0.1%			100		ns
TEMPERATURE ENVIRONMENT					
Thermal Resistance	8 Pin Package		175		°C/W
Quiescent Temp. Rise			5		°C
TEMPERATURE RANGE					
Operating		0		+70	°C
Storage		−55		+150	°C
POWER REQUIREMENTS					
Voltage		±6	±15	±18	V
Quiescent Supply Current	V_{CC} = ±15			5	mA

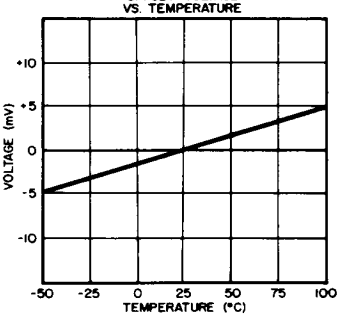
TYPICAL PERFORMANCE CURVES

(T_A = +25°C and V_{CC} = ±15V DC unless otherwise noted)

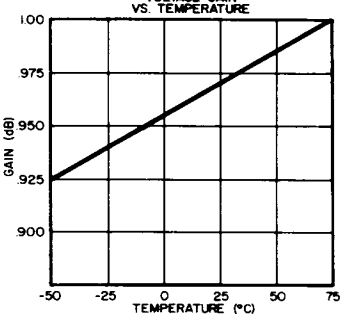
RELATIVE GAIN VS. FREQUENCY



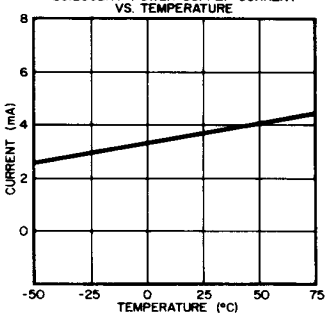
OFFSET VOLTAGE VS. TEMPERATURE



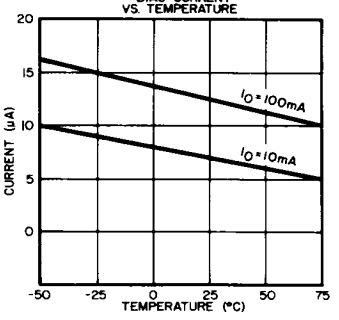
VOLTAGE GAIN VS. TEMPERATURE



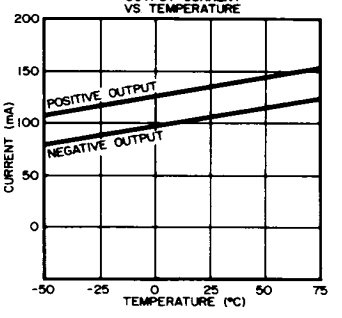
QUIESCENT POWER SUPPLY CURRENT VS. TEMPERATURE



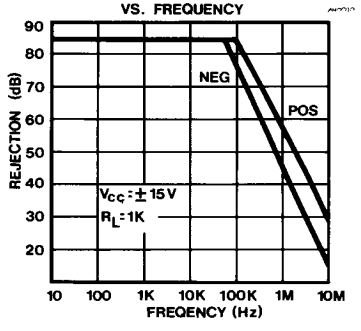
BIAS CURRENT VS. TEMPERATURE



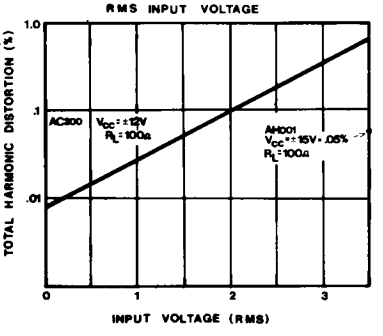
OUTPUT CURRENT VS TEMPERATURE



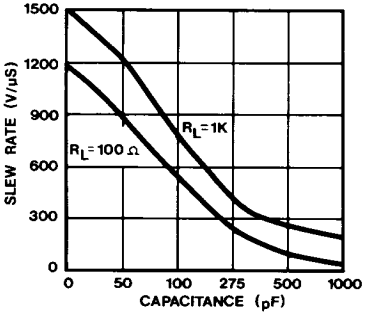
POWER SUPPLY REJECTION VS. FREQUENCY



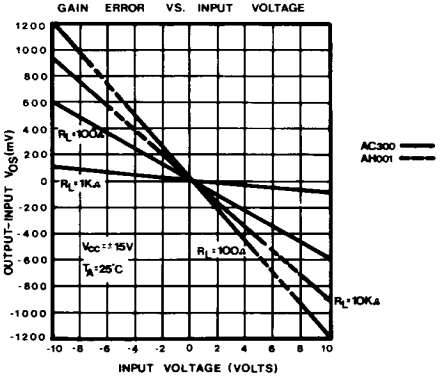
TOTAL HARMONIC DISTORTION VS. RMS INPUT VOLTAGE



SLEW RATE VS LOAD CAPACITANCE

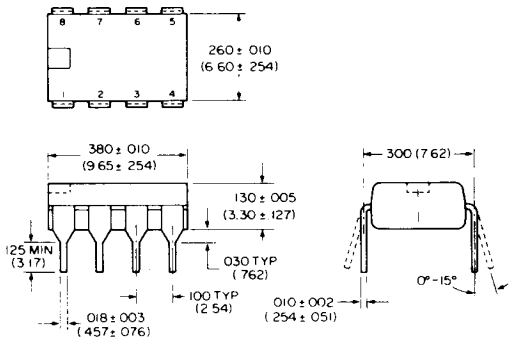


GAIN ERROR VS. INPUT VOLTAGE



Mechanical Description

The AH001-D package is a standard 8-pin plastic mini-dip.



AH001-D Pinout

1) $+V_{cc}$
2) No Connection (NC)
3) NC
4) Input
5) $-V_{cc}$
6) Substrate
7) NC
8) Output

ABSOLUTE MAXIMUM RATINGS

Supply	±20VDC
Input Voltage	Equal to supplies
Storage Temperature Range	−65°C to +150°C
Operating Temperature Range	−55°C to +125°C

Application Information

Basic Operation

Figure 1 shows the basic connections for the AH001-D. To fully utilize the wide bandwidth of the AH001-D requires that high frequency layout procedures be followed. Whenever possible, a ground plane should be used, covering as much of the circuit board as possible to provide low resistance and low impedance paths for all signal and power common returns.

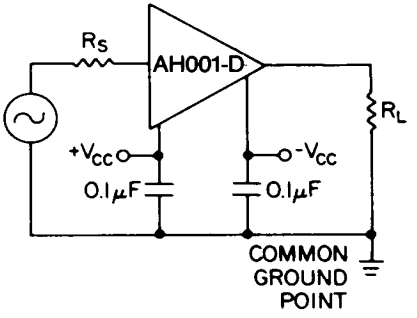


FIGURE 1: Basic Connections

If a ground plane is not practical, we recommend use of a single point ground, where the signal and power common returns are made. This will help eliminate ground loops or common current paths which could cause signal modulation or distortion.

For optimum performance, we recommend that the power supplies be bypassed to ground as close as possible to the supply pins on the AH001-D. Capacitors from 0.01μF to 0.1μF will minimize high frequency variations in supply voltage, while 1μF or larger will optimize low frequency performance.

On the AH001-D, pin 6 is internally connected to the chip substrate. Although this pin can float or be connected to either supply without damage, we recommend that this pin be grounded.

Current Limiting

The AH001-D does not have internal current limiting, and can be destroyed relatively quickly by short circuits or overloads.

Figure 2 shows how to use external components to limit current into the AH001-D supply pins. This circuit uses the base to emitter voltages of two transistor pairs to limit current across the resistors, R_{CL}. With R_{CL} = 10Ω, the base to emitter voltage of 0.6V on Q_2 and Q_4 limits the supply current to 100mA.

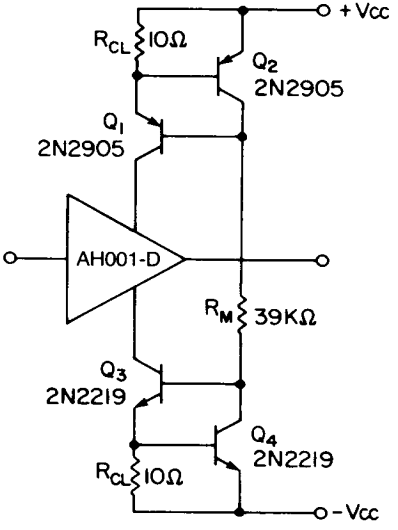


FIGURE 3: Coaxial Cable Driver—50Ω System

Typical Circuits

The AH001-D is designed to drive video signals over coaxial cable, and Figure 3 shows such a circuit. For signals below 2V RMS, this circuit can operate well in excess of 10MHz without observable distortion.

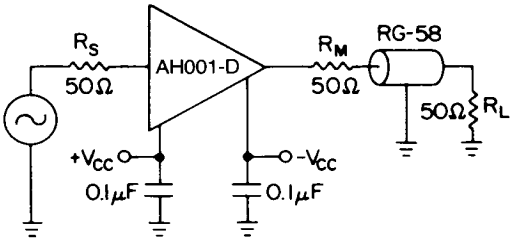


FIGURE 2: Current Limiting Using a Current Source

The AH001-D is also well suited as a current booster in the feedback loop of a wideband amplifier, to provide a circuit with gain and high drive capability.

Figure 4 shows the use of the AH001-D with an AH0008 op amp to provide gain and drive a coaxial line. This circuit can actually drive ±10V across the 150Ω load (R_M + R_L) and, for a pulse input, will typically settle to within 0.1% in 300ns. R_D(50Ω) between the AH0008 and the AH001-D promotes stability.

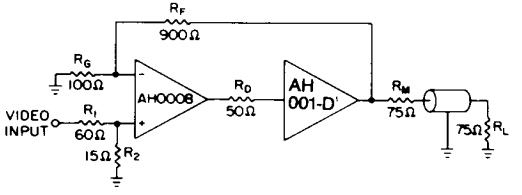


FIGURE 4: Video Signal With Gain