



Ultralow Noise, High Speed, Precision Op Amp ($A_{VCL} \geq 5$)

AD OP-37

FEATURES

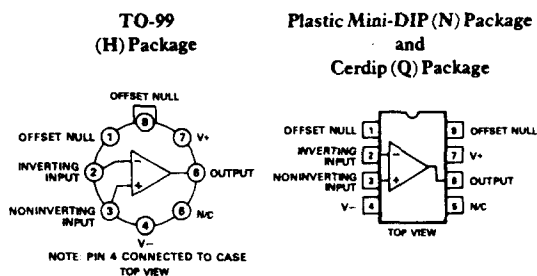
- Ultralow Noise: 80nV p-p (0.1Hz to 10Hz),
3nV/ $\sqrt{\text{Hz}}$ at 1kHz
- High Speed: 17V/ μs
- High Gain Bandwidth Product: 63MHz
- Ultralow Offset Voltage Drift: 0.2 $\mu\text{V}/^\circ\text{C}$
- High Offset Stability Over Time: 0.2 $\mu\text{V}/\text{month}$
- Low Offset Voltage: 10 μV
- High CMRR: 126dB Over $\pm 11\text{V}$ Input Voltage Range
- Fits OP-07, OP-05, OP-06, 5534, LH0044,
5130, 3510, 725, 714 and 741 Sockets
in Gains ≥ 5
- Military Grade and Plus Parts Available
- 8-Pin Plastic Mini-DIP, Cerdip or TO-99 Hermetic
Metal Can
- Available in Water-Trimmed Chip Form

PRODUCT DESCRIPTION

The AD OP-37 offers the combined features of high precision, ultralow noise and high speed in a monolithic bipolar operational amplifier. High speed, accurate amplification of very low level signals, where inherent device noise can be the limiting factor, is attainable with the AD OP-37 in applications requiring gains greater than or equal to five. This instrumentation grade op amp features industry standard dc performance; typical input offset voltages of 10 μV and typical input offset voltage temperature coefficients of 0.2 $\mu\text{V}/^\circ\text{C}$. The super low input voltage noise performance of the AD OP-37 is characterized by an e_n p-p (typ) of 80nV (0.1Hz to 10Hz), an e_n (typ) of 3.0nV/ $\sqrt{\text{Hz}}$ (at 1kHz) and a 1/f noise corner frequency of 2.7Hz. High speed performance is assured by a typical 17V/ μs slew rate and a typical 63MHz gain bandwidth product. Long-term stability is guaranteed by an input offset voltage drift specification of 0.2 $\mu\text{V}/\text{month}$.

Source resistance related input errors with the AD OP-37 are minimized by a low input bias current of $\pm 10\text{nA}$ (typ) and an input offset current of 7nA (typ). An input bias current cancellation circuit restricts bias and offset currents over the extended temperature range to $\pm 20\text{nA}$ (typ) and 15nA (typ), respectively. Other factors inducing input referred errors such as power supply variations and common-mode voltages are attenuated by a PSRR and CMRR of 120dB.

AD OP-37 CONNECTION DIAGRAMS



The AD OP-37 is available in six performance grades. The AD OP-37E, AD OP-37F and AD OP-37G are specified for operation over the -25°C to $+85^\circ\text{C}$ temperature range, while the AD OP-37A, AD OP-37B and AD OP-37C are specified for -55°C to $+125^\circ\text{C}$ operation. All devices are available in either the TO-99 hermetically sealed metal cans or the hermetically sealed cerdip packages, while the industrial grades are also available in plastic mini-DIPs.

PRODUCT HIGHLIGHTS

1. High speed accurate amplification (gains ≥ 5) of very low level low frequency voltage inputs is enhanced by a high gain bandwidth product and ultralow input voltage noise.
2. The AD OP-37 maintains high dc accuracy over an extended temperature range due to ultralow offset voltage, offset voltage drift and input bias current.
3. Internal frequency compensation, factory adjusted offset voltage and full device protection eliminate the need for additional components. Circuit size and complexity are reduced while reliability is increased.
4. Long-term stability and accuracy is assured with low offset voltage drift over time.
5. Input referred errors are greatly reduced by superior common-mode and power supply rejection characteristics.
6. Monolithic construction along with advanced circuit design and processing techniques result in low cost.

SPECIFICATIONS ($T_A = +25^\circ\text{C}$, $V_S = \pm 15\text{V}$, unless otherwise specified)

| Model Parameter | Symbol | AD OP-37G | | | AD OP-37F | | | AD OP-37E | | |
|--|-----------|--------------|------------|-----|--------------|------------|-----|--------------|------------|-----|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max |
| OPEN LOOP GAIN | A_{VO} | 700 | 1,500 | | 1,000 | 1,800 | | 1,000 | 1,800 | |
| | | 400 | 1,500 | | 800 | 1,500 | | 800 | 1,500 | |
| | | 200 | 500 | | 250 | 700 | | 250 | 700 | |
| | | 450 | 1,000 | | 700 | 1,300 | | 750 | 1,500 | |
| OUTPUT CHARACTERISTICS Voltage Swing | V_O | ± 11.5 | ± 13.5 | | ± 12.0 | ± 13.8 | | ± 12.0 | ± 13.8 | |
| | | ± 10.0 | ± 11.5 | | ± 10.0 | ± 11.5 | | ± 10.0 | ± 11.5 | |
| | | ± 11.0 | ± 13.3 | | ± 11.4 | ± 13.5 | | ± 11.7 | ± 13.6 | |
| Open-Loop Output Resistance | R_O | 70 | | 70 | | 70 | | | | |
| FREQUENCY RESPONSE Gain Bandwidth Product | GBW | 45 | 63 | | 45 | 63 | | 45 | 63 | |
| | | - | 40 | | - | 40 | | - | 40 | |
| | | 11 | 17 | | 11 | 17 | | 11 | 17 | |
| INPUT OFFSET VOLTAGE Initial | V_{OS} | 30 | 100 | | 20 | 60 | | 10 | 25 | |
| | | 55 | 220 | | 40 | 140 | | 20 | 60 | |
| | | 0.4 | 1.8 | | 0.3 | 1.3 | | 0.2 | 0.6 | |
| | | 0.4 | 2.0 | | 0.3 | 1.5 | | 0.2 | 1.0 | |
| | | ± 4.0 | | | ± 4.0 | | | ± 4.0 | | |
| INPUT BIAS CURRENT Initial | I_B | ± 15 | ± 80 | | ± 12 | ± 55 | | ± 10 | ± 40 | |
| | | ± 25 | ± 150 | | ± 18 | ± 95 | | ± 14 | ± 60 | |
| INPUT OFFSET CURRENT Initial | I_{OS} | 12 | 75 | | 9 | 50 | | 7 | 35 | |
| | | 20 | 135 | | 14 | 85 | | 10 | 50 | |
| INPUT NOISE Voltage | e_n P-P | 0.09 | 0.25 | | 0.08 | 0.18 | | 0.08 | 0.18 | |
| | | 3.8 | 8.0 | | 3.5 | 5.5 | | 3.5 | 5.5 | |
| | | 3.3 | 5.6 | | 3.1 | 4.5 | | 3.1 | 4.5 | |
| | | 3.2 | 4.5 | | 3.0 | 3.8 | | 3.0 | 3.8 | |
| | | 1.7 | - | | 1.7 | 4.0 | | 1.7 | 4.0 | |
| Current Density | i_n | 1.0 | - | | 1.0 | 2.3 | | 1.0 | 2.3 | |
| | | 0.4 | 0.6 | | 0.4 | 0.6 | | 0.4 | 0.6 | |
| INPUT VOLTAGE RANGE Common Mode | CMVR | ± 11.0 | ± 12.3 | | ± 11.0 | ± 12.3 | | ± 11.0 | ± 12.3 | |
| | | ± 10.5 | ± 11.8 | | ± 10.5 | ± 11.8 | | ± 10.5 | ± 11.8 | |
| | | 100 | 120 | | 106 | 123 | | 114 | 126 | |
| Common-Mode Rejection Ratio | CMRR | 96 | 118 | | 102 | 121 | | 110 | 124 | |
| INPUT RESISTANCE Differential | R_{IN} | 0.8 | 4 | | 1.2 | 5 | | 1.5 | 6 | |
| | | | 2 | | | 2.5 | | | 3 | |
| POWER SUPPLY Rated Performance | I_Q | ± 15 | | | ± 15 | | | ± 15 | | |
| | | $\pm (4-18)$ | | | $\pm (4-18)$ | | | $\pm (4-18)$ | | |
| | | 3.3 | 5.6 | | 3.0 | 4.6 | | 3.0 | 4.6 | |
| | | 2 | 20 | | 1 | 10 | | 1 | 10 | |
| | | 2 | 32 | | 2 | 16 | | 2 | 15 | |
| Power Consumption | P_d | 100 | 170 | | 90 | 140 | | 90 | 140 | |
| OPERATING TEMPERATURE RANGE T_{min}, T_{max} | | -25 | +85 | | -25 | +85 | | -25 | +85 | |
| | | | | | | | | | | |
| PACKAGE OPTIONS ³ Plastic Mini-DIP (N-8) Cerdip (Q-8) TO-99 (H-08) Cand G Grade Chips Also Available | | AD OP-37GN | | | AD OP-37FN | | | AD OP-37EN | | |
| | | AD OP-37GQ | | | AD OP-37FQ | | | AD OP-37EQ | | |
| | | AD OP-37GH | | | AD OP-37FH | | | AD OP-37EH | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

NOTES

¹Input Offset Voltage measurements are performed by automated test equipment approximately 0.5 seconds after application of power. A and E grades are guaranteed fully warmed up.

²Long-Term Input Offset Voltage Stability refers to the average trend line of V_{OS} vs. time after the first 30 days.

³See Section 20 for package outline information.

Specifications subject to change without notice.

AD OP-37

| AD OP-37C | | | AD OP-37B | | | AD OP-37A | | | Conditions | Units |
|--------------------------------------|--------------|-----|--------------------------------------|--------------|-----|--------------------------------------|--------------|-----|---|----------------------|
| Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | | |
| 700 | 1,500 | | 1,000 | 1,800 | | 1,000 | 1,800 | | $R_L \geq 2k\Omega, V_{OUT} = \pm 10V$ | V/mV |
| 400 | 1,500 | | 800 | 1,500 | | 800 | 1,500 | | $R_L \geq 1k\Omega, V_{OUT} = \pm 10V$ | V/mV |
| 200 | 500 | | 250 | 700 | | 250 | 700 | | $R_L = 600\Omega, V_{OUT} = \pm 1V, V_S = \pm 4V$ | V/mV |
| 300 | 800 | | 500 | 1,000 | | 600 | 1,200 | | $R_L \geq 2k\Omega, V_{OUT} = \pm 10V, T_a = \text{min to max}$ | V/mV |
| ± 11.5 | ± 13.5 | | ± 12.0 | ± 13.8 | | ± 12.0 | ± 13.8 | | $R_L \geq 2k\Omega$ | V |
| ± 10.0 | ± 11.5 | | ± 10.0 | ± 11.5 | | ± 10.0 | ± 11.5 | | $R_L \geq 600\Omega$ | V |
| ± 10.5 | ± 13.0 | | ± 11.0 | ± 13.2 | | ± 11.5 | ± 13.5 | | $R_L \geq 2k\Omega, T_a = \text{min to max}$ | V |
| 70 | | | 70 | | | 70 | | | $I_{OUT} = 0A, V_{OUT} = 0V$ | Ω |
| 45 | 63 | | 45 | 63 | | 45 | 63 | | $f_c = 10kHz$ | MHz |
| - | 63 | | - | 40 | | - | 40 | | $f_c = 1MHz$ | MHz |
| 11 | 17 | | 11 | 17 | | 11 | 17 | | $R_L \geq 2k\Omega$ | V/ μs |
| 30 | 100 | | 20 | 60 | | 10 | 25 | | (Note 1) | μV |
| 70 | 300 | | 50 | 200 | | 30 | 60 | | $T_a = \text{min to max}$ | μV |
| 0.4 | 1.8 | | 0.3 | 1.3 | | 0.2 | 0.6 | | $T_a = \text{min to max}$ | $\mu V/^\circ C$ |
| 0.4 | 2.0 | | 0.3 | 1.5 | | 0.2 | 1.0 | | (Note 2) | $\mu V/\text{month}$ |
| ± 4.0 | | | ± 4.0 | | | ± 4.0 | | | $R_p = 10k\Omega$ | mV |
| ± 15 | ± 80 | | ± 12 | ± 55 | | ± 10 | ± 40 | | $T_a = \text{min to max}$ | nA |
| ± 35 | ± 150 | | ± 28 | ± 95 | | ± 20 | ± 60 | | | nA |
| 12 | 75 | | 9 | 50 | | 7 | 35 | | $T_a = \text{min to max}$ | nA |
| 30 | 135 | | 22 | 85 | | 15 | 50 | | | nA |
| 0.09 | 0.25 | | 0.08 | 0.18 | | 0.08 | 0.18 | | 0.1Hz to 10Hz | μV_{p-p} |
| 3.8 | 8.0 | | 3.5 | 5.5 | | 3.5 | 5.5 | | $f_c = 10Hz$ | nV/ \sqrt{Hz} |
| 3.3 | 5.6 | | 3.1 | 4.5 | | 3.1 | 4.5 | | $f_c = 30Hz$ | nV/ \sqrt{Hz} |
| 3.2 | 4.5 | | 3.0 | 3.8 | | 3.0 | 3.8 | | $f_c = 1000Hz$ | nV/ \sqrt{Hz} |
| 1.7 | - | | 1.7 | 4.0 | | 1.7 | 4.0 | | $f_c = 10Hz$ | pA/ \sqrt{Hz} |
| 1.0 | - | | 1.0 | 2.3 | | 1.0 | 2.3 | | $f_c = 30Hz$ | pA/ \sqrt{Hz} |
| 0.4 | 0.6 | | 0.4 | 0.6 | | 0.4 | 0.6 | | $f_c = 1000Hz$ | pA/ \sqrt{Hz} |
| ± 11.0 | ± 12.3 | | ± 11.0 | ± 12.3 | | ± 11.0 | ± 12.3 | | $T_a = \text{min to max}$ | V |
| ± 10.2 | ± 11.5 | | ± 10.3 | ± 11.5 | | ± 10.3 | ± 11.5 | | | V |
| 100 | 120 | | 106 | 123 | | 114 | 126 | | $V_{CM} = \pm 11V$ | dB |
| 94 | 116 | | 100 | 119 | | 108 | 122 | | $V_{CM} = \pm 10V, T_a = \text{min to max}$ | dB |
| 0.8 | 4 | | 1.2 | 5 | | 1.5 | 6 | | | M Ω |
| 2 | | | 2.5 | | | 3 | | | | G Ω |
| ± 15 | | | ± 15 | | | ± 15 | | | $V_S = \pm 15V$ | V |
| $\pm (4-18)$ | | | $\pm (4-18)$ | | | $\pm (4-18)$ | | | $V_S = \pm 4V \text{ to } \pm 18V$ | V |
| 3.3 | 5.6 | | 3.0 | 4.6 | | 3.0 | 4.6 | | $V_S = \pm 4.5V \text{ to } \pm 18V, T_a = \text{min to max}$ | mA |
| 2 | 20 | | 1 | 10 | | 1 | 10 | | $V_{OUT} = 0V$ | $\mu V/V$ |
| 4 | 51 | | 2 | 20 | | 2 | 16 | | | $\mu V/V$ |
| 100 | 170 | | 90 | 140 | | 90 | 140 | | | mW |
| -55 | +125 | | -55 | +125 | | -55 | +125 | | | $^\circ C$ |
| ADOP-37CQ ADOP-37CH | | | ADOP-37BQ ADOP-37BH | | | ADOP-37AQ ADOP-37AH | | | | |

Specifications shown in boldface are tested on all production units at final electrical test. Results from those tests are used to calculate outgoing quality levels. All min and max specifications are guaranteed, although only those shown in boldface are tested on all production units.

ABSOLUTE MAXIMUM RATINGS

| | | | |
|---|------------|--|-----------------------------------|
| Supply Voltage | $\pm 18V$ | Differential Input Current (Note 2) | $\pm 25mA$ |
| Internal Power Dissipation (Note 1) | 500mW | Storage Temperature Range | $-65^{\circ}C$ to $+150^{\circ}C$ |
| Input Voltage | $\pm V_S$ | Operating Temperature Range | |
| Output Short Circuit Duration | Indefinite | AD OP-37A, AD OP-37B, AD OP-37C | $-55^{\circ}C$ to $+125^{\circ}C$ |
| Differential Input Voltage (Note 2) | $\pm 0.7V$ | AD OP-37E, AD OP-37F, AD OP-37G | $-25^{\circ}C$ to $+85^{\circ}C$ |
| | | Lead Temperature Range (Soldering 60sec) | $300^{\circ}C$ |

NOTES:

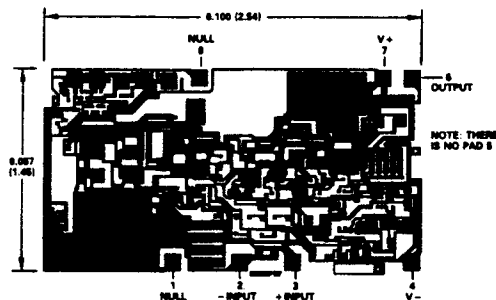
Note 1: Maximum package power dissipation vs. ambient temperature.

| Package Type | Maximum Ambient Temperature for Rating | Derate Above Maximum Ambient Temperature |
|--------------|--|--|
| TO-99 (H) | $80^{\circ}C$ | $7.1mW/^{\circ}C$ |
| Mini-DIP (N) | $36^{\circ}C$ | $5.6mW/^{\circ}C$ |
| Cerdip (Q) | $75^{\circ}C$ | $6.7mW/^{\circ}C$ |

Note 2: The AD OP-37's inputs are protected by back-to-back diodes. To achieve low noise current limiting resistors could not be used. If the differential input voltage exceeds $\pm 0.7V$, the input current should be limited to 25mA.

CHIP DIMENSIONS AND BONDING DIAGRAM

Contact factory for latest dimensions.
Dimensions shown in inches and (mm).



THE AD OP-37 IS AVAILABLE IN WAFER-TRIMMED CHIP FORM. CONSULT THE FACTORY FOR DETAILS.

AD OP-37 ORDERING GUIDE¹

| Model | Package Options ² | Temperature Range ($^{\circ}C$) | Max Initial Offset (μV) | Max Offset Drift ($\mu V/^{\circ}C$) |
|------------|------------------------------|-----------------------------------|--------------------------------|--|
| AD OP-37GH | TO-99 | -25 to $+85$ | 100 | 1.8 |
| AD OP-37GN | Mini-DIP | -25 to $+85$ | 100 | 1.8 |
| AD OP-37GQ | Cerdip | -25 to $+85$ | 100 | 1.8 |
| AD OP-37FH | TO-99 | -25 to $+85$ | 60 | 1.3 |
| AD OP-37FN | Mini-DIP | -25 to $+85$ | 60 | 1.3 |
| AD OP-37FQ | Cerdip | -25 to $+85$ | 60 | 1.3 |
| AD OP-37EH | TO-99 | -25 to $+85$ | 25 | 0.6 |
| AD OP-37EN | Mini-DIP | -25 to $+85$ | 25 | 0.6 |
| AD OP-37EQ | Cerdip | -25 to $+85$ | 25 | 0.6 |
| AD OP-37CH | TO-99 | -55 to $+125$ | 100 | 1.8 |
| AD OP-37CQ | Cerdip | -55 to $+125$ | 100 | 1.8 |
| AD OP-37BH | TO-99 | -55 to $+125$ | 60 | 1.3 |
| AD OP-37BQ | Cerdip | -55 to $+125$ | 60 | 1.3 |
| AD OP-37AH | TO-99 | -55 to $+125$ | 25 | 0.6 |
| AD OP-37AQ | Cerdip | -55 to $+125$ | 25 | 0.6 |

NOTES

¹C and G grade chips also available.

²See Section 20 for package outline information.

APPLICATION NOTES FOR THE AD OP-37

The AD OP-37 can be used in the sockets of many of the popular precision bipolar input operational amplifiers on the market. Elimination of external frequency compensation or nulling circuitry may be possible in many cases. In 741 replacement situations, if nulling has been implemented, it should be modified or removed for correct AD OP-37 performance.

In applications where the initial factory adjusted input offset voltage provides insufficient accuracy, further offset trimming can be accomplished with the resistor network shown in Figure 1. The adjustment range attainable using a 10k Ω potentiometer will be ± 4 mV. If a smaller adjustment range is required, the sensitivity of the nulling can be increased by using a smaller potentiometer in series with fixed resistor(s). For example, a 1k Ω pot in series with two 4.7k Ω resistors will yield a $\pm 280\mu$ V range.

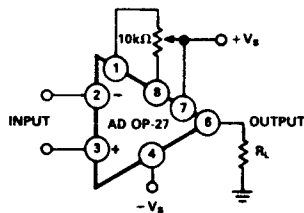


Figure 1. Optional Offset Nulling Circuit

Zeroing the initial offset with potentiometers other than 10k Ω , but between 1k Ω and 1M Ω , will introduce an additional input offset voltage temperature drift error of from 0.1 to 0.2 μ V/ $^{\circ}$ C. Additionally, by intentionally trimming in a dc level shift a voltage dependent offset drift will be created. It will be approximately the input offset voltage at 25 $^{\circ}$ C divided by 300 (in μ V/ $^{\circ}$ C).

Parasitic thermocouple EMF's can be generated where dissimilar metals meet the contacts to the input terminals of the AD OP-37. These temperature dependent voltages can manifest themselves as drift type errors. Optimized temperature performance will be obtained when both contacts are maintained at the same temperature.

Although the AD OP-37 features high-power supply rejection, the effects of noise on the power supplies may be minimized by bypassing the power supplies as close to Pins 4 and 7 of the AD OP-37 as possible, to load ground with a good quality 0.01 μ F ceramic capacitor as shown in Figure 1.

High closed loop gain and excellent linearity can be achieved by operating the AD OP-37 within an output current range of ± 10 mA. Minimizing output current will provide the highest linearity.

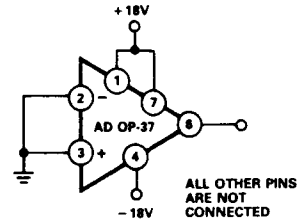


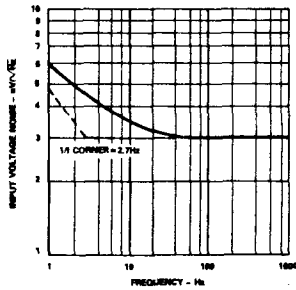
Figure 2. Burn-In Circuit

CAUTION: NOISE MEASUREMENTS

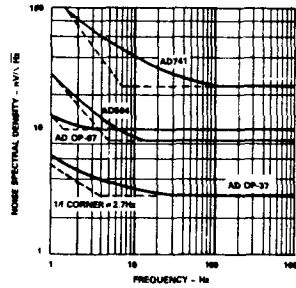
Precise measurement of the extremely low input noise associated with the AD OP-37 is a difficult task. In order to observe the rated noise in the 0.1Hz to 10Hz frequency range the following cautions should be exercised.

- (1) The test time to measure 0.1Hz to 10Hz noise should not exceed 10 seconds. As shown in the noise test frequency response plot in this data sheet the 0.1Hz corner is only defined by a single zero. A test time of 10 seconds acts as an additional zero to eliminate noise contributions from frequencies lower than 0.1Hz.
 - (2) Warm-up for a least five minutes will eliminate temperature induced effects. During the first few minutes the offset voltage typically increases 4 μ V. In a 10 second measurement interval prior to temperature stabilization the reading could include several nanovolts of warm-up offset error in addition to the noise.
 - (3) For reasons similar to (2) the device under test should be well shielded from air currents or other heat sinks to eliminate the possibility of temperature changes over time invalidating the measurements. Sudden motion in the vicinity or physical contact with the package can also increase the observed noise.
- An input voltage noise spectral density test is recommended when measuring noise on a large number of units. Because the 1/f noise corner frequency is around 3Hz, a 1kHz noise voltage density measurement combined with a 0.1Hz to 10Hz peak-to-peak noise reading will guarantee 1/f and white noise performance over the rated frequency spectrum.

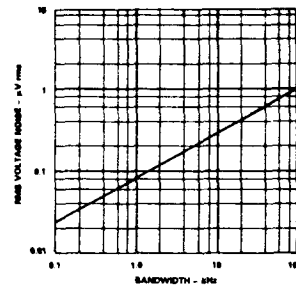
Typical Performance Curves (@ $T_A = +25^\circ\text{C}$, $V_S = \pm 15\text{V}$)



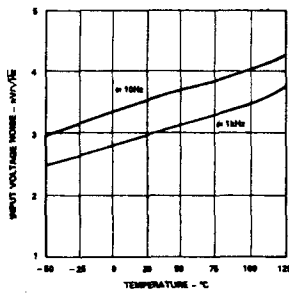
Input Voltage Noise Spectral Density



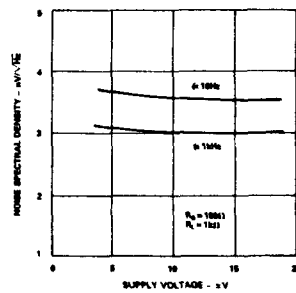
Comparison of Op Amp Input Voltage Noise Spectrums



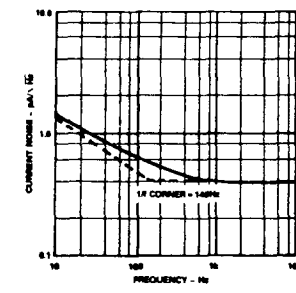
Input Wideband Noise vs. Bandwidth (0.1Hz to Frequency Indicated)



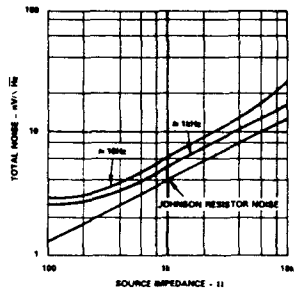
Input Voltage Noise vs. Temperature



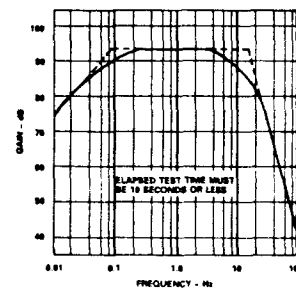
Input Voltage Noise vs. Supply Voltage



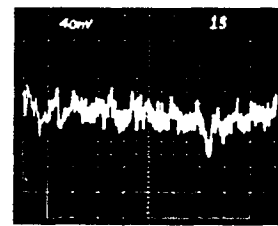
Input Current Noise Spectral Density



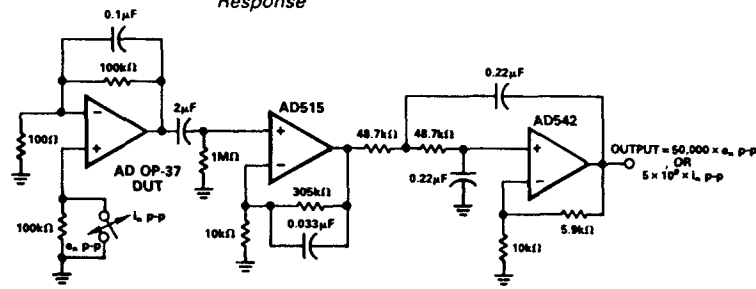
Total Noise vs. Source Impedance



0.1Hz to 10Hz Noise Test Frequency Response

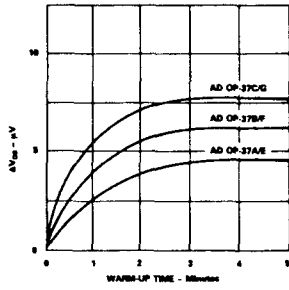


0.1Hz to 10Hz p-p Voltage Noise

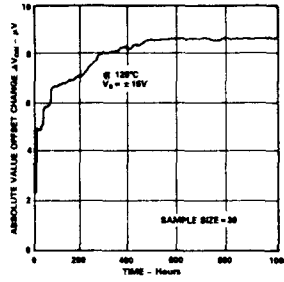


NOTE: ALL CAPACITORS MUST BE NONPOLARIZED

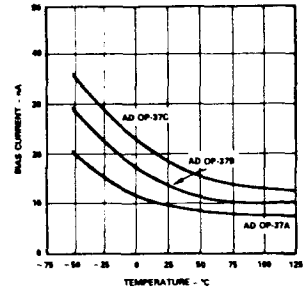
0.1Hz to 10Hz Noise Test Bandpass Filter (Voltage Gain = 50,000)



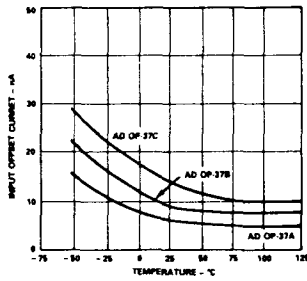
Input Offset Voltage Turn-On Drift vs. Warm-Up Time



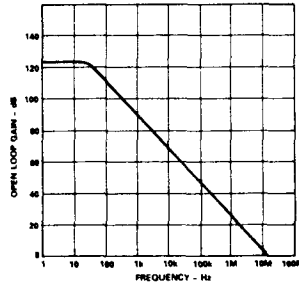
Long Term Offset Stability @ Temperature



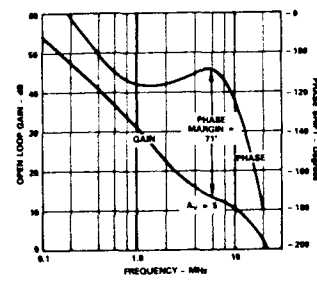
Input Bias Current vs. Temperature



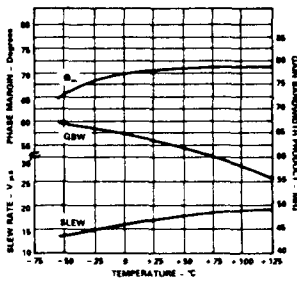
Input Offset Current vs. Temperature



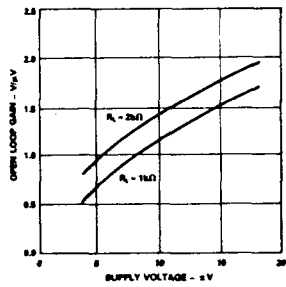
Open-Loop Frequency Response



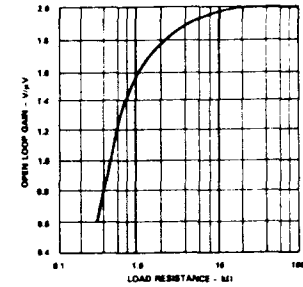
Open-Loop Gain and Phase Shift vs. Frequency



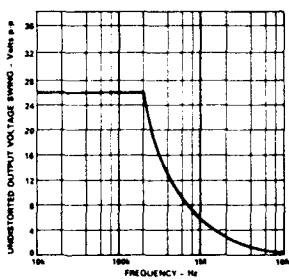
Slew Rate, Gain Bandwidth Product and Phase Margin vs. Temperature



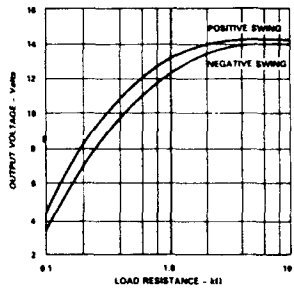
Open-Loop Gain vs. Supply Voltage



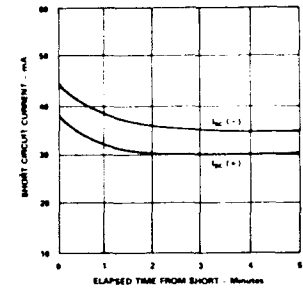
Open-Loop Gain vs. Load Resistance



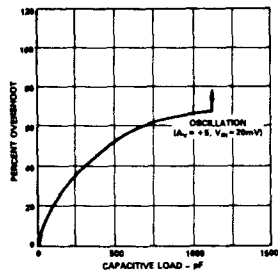
Undistorted Output Voltage Swing vs. Frequency



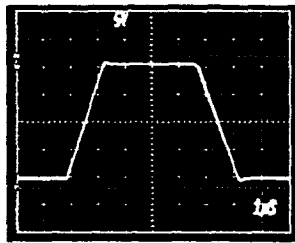
Output Swing vs. Load Resistance



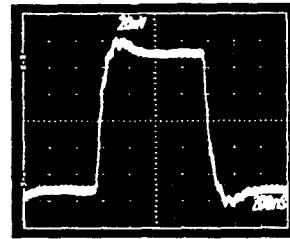
Output Short Circuit Current vs. Time



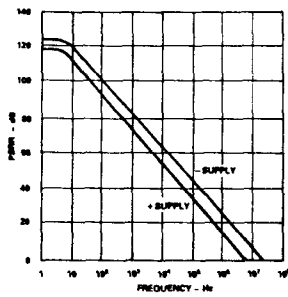
Small Signal Overshoot vs. Capacitive Load



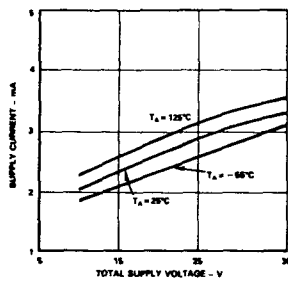
Large Signal Pulse Response ($A_V = 5, R_L = 2k$)



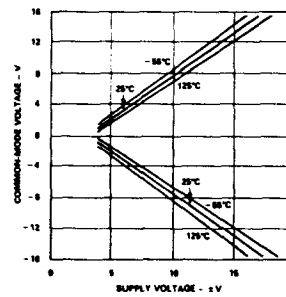
Small Signal Pulse Response ($A_V = 5, R_L = 2k$)



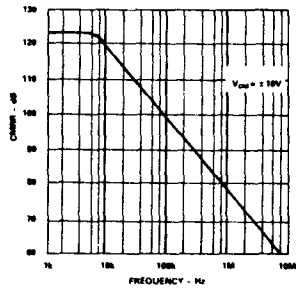
Power Supply Rejection Ratio vs. Frequency



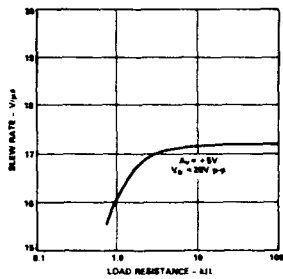
Supply Current vs. Supply Voltage



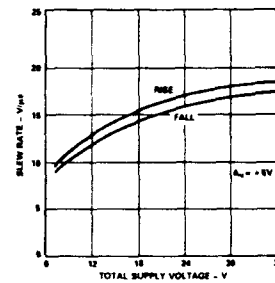
Common-Mode Input Range vs. Supply Voltage



CMRR vs. Frequency



Slew Rate vs. Resistive Load



Slew Rate vs. Supply Voltage