# ADVANCED ANALOG

## A Division of intech

# SH346/347

## HIGH SPEED TRACK/HOLD AMPLIFIERS

## FEATURES

- LASER TRIMMED-ADJUSTMENT FREE
- LOW DROOP RATE
- SMALL 14-PIN DIP
- 2.0 μSEC ACQUISITION TIME
- COMPACT-INTERNAL HOLD CAPACITOR

## DESCRIPTION

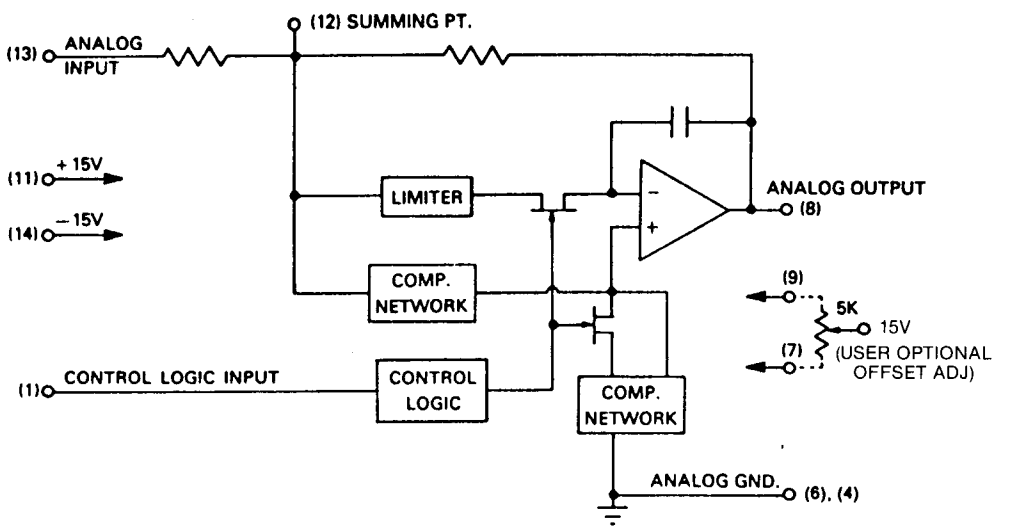
The SH346/347 high speed track/hold amplifiers are made to be adjustment free by laser trimming major error sources. The units are complete with internal hold capacitor and incorporate a compensation network to minimize the track-to-hold offset. Thus, no external components are required for use.

The SH346 acquisition time is 2 μsec to 0.01%, while the SH347 settles to 0.05% in that time, which makes these units ideal for high speed data acquisition systems. The fast acquisition time, coupled with low aperture uncertainty (typically 400 ps) makes it suitable for A/D converters digitizing signals up to 97 KHz.

High accuracy is maintained with a low droop rate, high gain linearity and low offset. Both units are available in 0.5 inch wide, 14-pin dual-in-line packages. Leads are spaced on standard 0.3 inch centers. The units are available screened and processed to MIL-STD-883.

Applications for these track/hold amplifiers include data distribution systems which operate at high speeds, multiplexed data acquisition systems with high scan rates and as DAC deglitchers. The highly stable networks used make these devices extremely well suited for military, avionics and space applications.

## BLOCK DIAGRAM




*the potentiometer can be tied to + 15V if necessary

# SPECIFICATIONS

Typical @ +25°C, supply voltage ±15, unless otherwise noted.

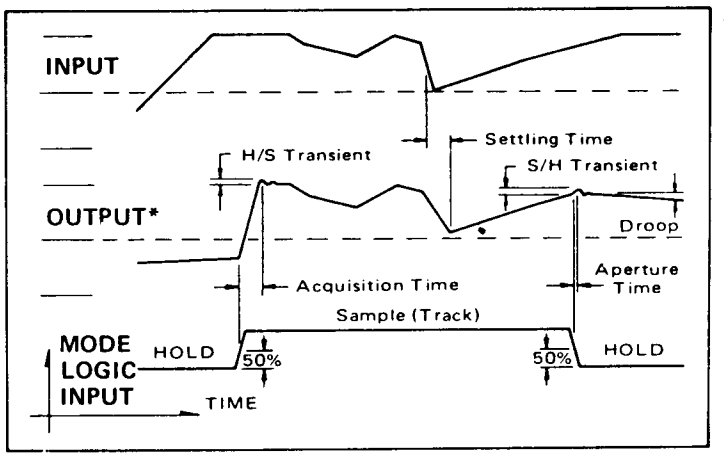
**ABSOLUTE MAXIMUM RATINGS**

| | |
|---|---|
| Operating Temperature | 0°C to +70°C |
| | −55°C to +125°C ("H" Model) |
| Storage Temperature | −65°C to +150°C |
| +15V Supply (Pin 11) | +18 Volts |
| −15V Supply (Pin 14) | −18 Volts |
| Digital Input (Pin 1) | −1.0 to +7 Volts |
| Analog Input (Pin 13) | ±15 Volts |
| Output Current (Pin 8) | (Note 2) |

| | SH346/347 | SH346 | | SH347 | | |
|---|---|---|---|---|---|---|
| **ANALOG INPUT** | **MIN.** | **TYP.** | **MAX.** | **TYP.** | **MAX.** | **UNITS** |
| Voltage Range | | ±10.0 | | ±10.0 | | Volts |
| Input Impedance | | 3.0 | | 3.0 | | kΩ |
| **DIGITAL INPUT (NOTE 3)** | | | | | | |
| "0" Input Threshold Voltage (Hold Mode) | | | +0.8 | | +0.8 | Volts |
| "1" Input Threshold Voltage (Sample Mode) | +2.0 | | | | | Volts |
| "0" Input Current | | | 150.0 | | 150.0 | μA |
| "1" Input Current | | | 1.0 | | 1.0 | μA |
| **TRANSFER CHARACTERISTICS** | | | | | | |
| Gain | | −1.0 | | −1.0 | | |
| Gain Error | | ±0.01 | ±0.02 | ±0.03 | ±0.05 | % |
| Gain Error 0 to +70°C | | ±0.03 | ±0.05 | ±0.06 | ±0.1 | % |
| Gain Error −55 to +125°C ("H" Models) | | ±0.03 | ±0.05 | ±0.06 | ±0.1 | % |
| Voltage Offset, Sample Mode (Note 1): +25°C | | ± 1 | ± 3 | ± 2 | ± 5 | mV |
| 0 to +70°C (−55 to +125°C for "H" Model) | | ±6 | ±20 | ±6 | ±20 | mV |
| Pedestal: +25°C | | ± 2 | ± 4 | ± 4 | ± 8 | mV |
| 0 to +70°C | | ± 8 | ±20 | ± 8 | ±20 | mV |
| −55 to +125°C ("H" Model) | | ±10 | ±20 | ±10 | ±20 | mV |
| Droop Rate +25°C | | 0.1 | 0.5 | 0.5 | 1.5 | mV/mSec |
| +70°C | | 20 | 60 | 60 | 150 | mV/mSec |
| +125°C | | 200 | 700 | 700 | 1500 | mV/mSec |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Full Power Bandwidth | | | | | | |
| $V_{OUT}$ = +10 Volt, −3DB | | 1.4 | | 1.4 | | MHz |
| Output Slew Rate | | 50 | | 50 | | V/μSec |
| Acquisition Time | | | | | | |
| To ±.05% 10V Step | | 1.0 | 2.0 | 1.0 | 2.5 | μSec |
| To ±.05% 20V Step | | 1.6 | 2.5 | 1.6 | 3.5 | μSec |
| Aperture Delay | | 30 | 60 | 30 | 60 | μSec |
| Aperture Uncertainty | | .4 | | .4 | | μSec |
| Settling Time | | | | | | |
| Sample Mode (10V Step) | | 1.0 | 2.0 | 1.5 | 2.5 | μSec |
| Sample to Hold | | 150 | 500 | 150 | 500 | μSec |
| Feed Thru (Hold Mode) @ 1 KHz | | 0.005 | 0.02 | 0.005 | 0.02 | % |
| Transients Peak Amplitude | | | | | | |
| Sample/Hold/Sample | | ±40 | | ±40 | | mV |
| Noise DC - 10MHz @+25°C | | | | | | |
| Sample or hold mode | | 150μV | 300μV | 150μV | 300μV | RMS |
| **ANALOG OUTPUT** | | | | | | |
| Output Voltage Swing (Note 4) | ±10.0 | | | | | Volts |
| Output Current (Note 2) | ± 3.0 | | | | | mA |
| **POWER REQUIREMENTS** | | | | | | |
| Range of Supplies (Note 4) | | | | | | |
| $+V_{CC}$ | +12 | +15 | +18 | +15 | +18 | Volts |
| $-V_{CC}$ | −12 | −15 | −18 | −15 | −18 | Volts |
| Power Supply Rejection Ratio | | | | | | |
| $+V_{CC}$ | | 100 | | 100 | | μV/V |
| $-V_{CC}$ | | 100 | | 100 | | μV/V |
| Current Drains | | | | | | |
| $+V_{CC}$ | | 20 | 28 | 20 | 28 | mA |
| $-V_{CC}$ | | −17 | −25 | −17 | −25 | mA |
| Power Consumption | | 640 | 795 | 640 | 795 | mW |

NOTES: 1.) Offset externally adjustable to zero.
2.) Output current should be limited to ±15mA.
3.) When the digital input is logic "1", the amplifier will be in the sample mode.
4.) Maximum output swing is 4 volts less than supply.

## SAMPLE/HOLD OPERATION




*Note: Output signal displayed non-inverted for clarity.*

**ACQUISITION TIME**—The total time required, upon application of the sample command, for the sample/hold to capture the input signal and settle within a specified percentage of final value.

**DROOP RATE**-The rate at which the sample/hold output drifts when in the hold mode. This is primarily due to the leakage currents of the switch and the bias current flowing through the holding capacitor.

**SETTLING TIME**—The time interval between the application of an input signal and the output settling to within a specified range of its final value.

**APERTURE TIME**—The time required to switch from sample to hold.

**VOLTAGE OFFSET—SAMPLE MODE**—The voltage appearing at the output of the sample/hold while in the sample mode, with the analog input grounded.

**VOLTAGE OFFSET—HOLD MODE**—The voltage appearing at the output of the sample/hold while in hold mode with the analog input grounded.

### PART NUMBER

**SH 34X H/B**

Model number

Data acquistion
6 - 2 μs to ±0.01%
7 - 2 μs to ±0.05%

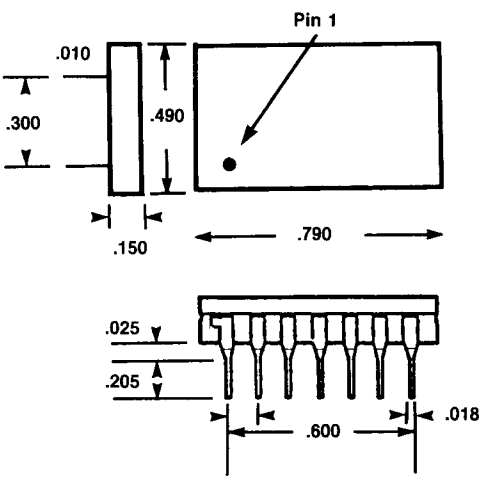
MIL-STD-883 screening. Omit for comm'l and industrial.

−55 °C to +125 °C operation. Omit to get standard 0 °C to +70 °C grade.

## PIN DESIGNATION

| | | | | |
|---|---|---|---|---|
| DIGITAL INPUT | 1 | | 14 | −15V |
| N/C | 2 | | 13 | ANALOG INPUT |
| N/C | 3 | | 12 | SUMMING PT. |
| ANALOG GND | 4 | (Top) | 11 | +15V |
| N/C | 5 | | 10 | N/C |
| ANALOG GND | 6 | | 9 | OFFSET ADJ |
| OFFSET ADJ | 7 | | 8 | ANALOG OUTPUT |

## MECHANICAL OUTLINE



The information in this data sheet has been carefully checked and is believed to be accurate, however, no responsibility is assumed for possible errors. The specifications are subject to change without notice.

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**ADVANCED ANALOG**

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