

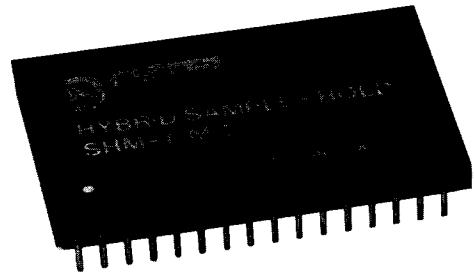
FEATURES

- 0.02% Accuracy
- 2.0 Microseconds acquisition time
- 2 Nanoseconds aperture uncertainty
- 5 MHz Bandwidth, small signal
- 25 mA Output current
- Gain-programmable from ± 1 to ± 10

GENERAL DESCRIPTION

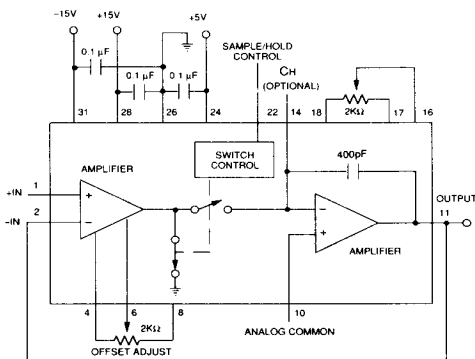
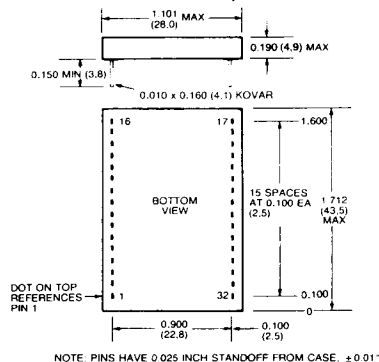
DATEL's SHM-6 is a high-speed, high accuracy sample-hold circuit manufactured with thin-film hybrid technology. This design offers the speed and performance of modular sample-holds with the compactness and integrity of advanced hybrid techniques. The unit's excellent high-speed characteristics include a guaranteed acquisition time of 700 nanoseconds to 0.1% accuracy and 2.0 microseconds to 0.02% for a 10 volt change.

The SHM-6 is a complete sample-hold containing a precision MOS holding capacitor. The input amplifier is an open loop transductance amplifier which can be externally connected for closed loop gains from ± 1 to ± 10 . In addition to its speed, accuracy and selectable gain, the SHM-6 has an output capability of 25 mA. These features allow this unit to offer an unusual degree of adaptability.

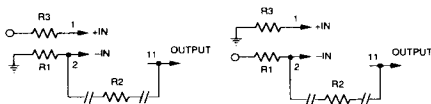


MECHANICAL DIMENSIONS

INCHES (MM)



Non-Inverting Sample/Hold Configuration, Gain = +1



Non-Inverting Sample/Hold Configuration, Gain = $1 + R2/R1$

Inverting Sample/Hold Configuration, Gain = $-R2/R1$

INPUT/OUTPUT CONNECTIONS

PIN	FUNCTION	PIN	FUNCTION
1	+IN	17	S/H STEP ADJUST.
2	-IN	18	S/H STEP ADJUST.
3	NC	19	NC
4	OFFSET ADJUST	20	NC
5	NC	21	NC
6	OFFSET ADJ. (Wiper)	22	DIGITAL CONTROL
7	NC	23	NC
8	OFFSET ADJUST	24	+V dc
9	NC	25	NC
10	ANALOG COMMON	26	POWER GROUND
11	OUTPUT	27	NC
12	NC	28	+15V dc
13	NC	29	NC
14	C.H. (OPTIONAL)	30	NC
15	NC	31	-15V dc
16	S/H ADJ. (Wiper)	32	NC

ABSOLUTE MAXIMUM RATINGS	
Positive Supply	+18V
Negative Supply	-18V
Logic Supply	+7.0V
Digital Input Voltage	+5.5V
Analog Input Voltage	±Vs
Differential Input Voltage	±30V

FUNCTIONAL SPECIFICATIONS
Typical at 25°C, ±15V and +5V supplies unless otherwise noted.

INPUT AMPLIFIER SPECIFICATIONS	
Offset Voltage	±2 mV
Offset Voltage Tempco	±100 μ V/°C
Offset Current	1 nA maximum
Offset Current vs. Temp.	Doubles every 10°C
Bias Current	10 nA maximum
Input Resistance	10 ⁸ Ω
Common Mode Voltage Range	±10V minimum
Common Mode Rejection Ratio	74 dB minimum
Open Loop Gain	10 ⁶ V/V
Gain Bandwidth Product	5 MHz
Power Supply Rejection Ratio	0.004%/ % Supply
DIGITAL INPUT CHARACTERISTICS	
Digital Control Logic	DTL, TTL
Input Logic Level, Sample Mode	0V to +0.8V at -3.2 mA
Input Logic Level, Hold Mode	+2.0V to +5.0V at +80 μ A
ANALOG OUTPUT CHARACTERISTICS	
Output Voltage Range	±10V minimum
Output Current	±25 mA maximum
Output Resistance	0.1 Ω maximum
SAMPLE/HOLD CHARACTERISTICS (Noninverting unity gain)	
Acquisition Time, 10V Step to 0.1%	700 nsec. maximum
Acquisition Time, 10V Step to 0.02%	1.5 μ sec. typical 2 μ sec. maximum
Aperture Delay Time	20 nsec.
Aperture Uncertainty Time	2 nsec.
Sample to Hold Error	Adjustable to Zero
Hold Mode Voltage Droop	10 μ V/ μ sec. maximum
Hold Mode Feedthrough	0.02% maximum
Offset	Adjustable to Zero
Gain	±1 to ±10
Gain Error	0.01% maximum
Nonlinearity, $V_{OUT} = \pm 10V$	0.02% maximum
Full Power Bandwidth, $V_{OUT} = \pm 10V$	500 KHz
Slew Rate	40 V/ μ sec.
POWER REQUIREMENTS	
Positive Supply	+15V dc ±0.5V at 55 mA
Negative Supply	-15V dc ±0.5V at 60 mA
Logic Supply	+5V dc ±0.5V at 30 mA
PHYSICAL/ENVIRONMENTAL	
Operating Temperature Ranges	
SHM-6MC	0°C to +70°C
SHM-6MM	-55°C to +100°C
Storage Temperature Range	-65°C to +150°C
Package Type	32 Pin Ceramic
Pins	Kovar (0.010 x 0.018)
Weight	0.5 Ounce (14 grams)

TECHNICAL NOTES

1. It is essential that the +15V, -15V, and +5V supplies, pins 28, 31, and 24 respectively, each be bypassed to ground with a 0.1 μ F ceramic capacitor connected as close to the pins as possible.
2. Digital Common, pin 26, and Analog Common, pin 10, are not connected together internally, therefore they must be connected externally as directly as possible.
3. An external holding capacitor can be added to decrease hold mode voltage droop but with consequently long acquisition time.
4. In the inverting unity gain operating mode, the feedback and input resistors should be carefully matched or trimmed to yield the desired gain of one. In general, the operating parameters are the same as the noninverting unity gain configuration, except that the sampling bandwidth is reduced by a factor of two. For applications of the SHM-6 with gain greater than one, sampling bandwidth is inversely proportional to gain.
5. Capacitive loads on the output should be limited to 100 pF to maximize acquisition time. The SHM-6 has a ±25 mA current drive capability.
6. The adjustment procedures for the SHM-6 are as follows. Ground the input pin and connect the output to a D.V.M.; operate the offset adjustment potentiometer to yield an output of zero as read on the D.V.M. The sample-hold step adjustment is performed with the input pin grounded and the output connected to an oscilloscope set to 1 mV/cm sensitivity. The digital input pin is driven with a compatible square wave at approximately 250 KHz and the sample-hold step adjustment potentiometer is operated to produce a flat-line output on the oscilloscope.
7. Trim pots should be 100 ppm/°C cermet type. Gain Resistors should be 100 ppm/°C, or better, metal film type.

ORDERING INFORMATION

MODEL	OPERATING TEMP. RANGE	SEAL
SHM-6MC	0 to +70 °C	Hermetic
SHM-6MM	-55 to +100 °C	Hermetic