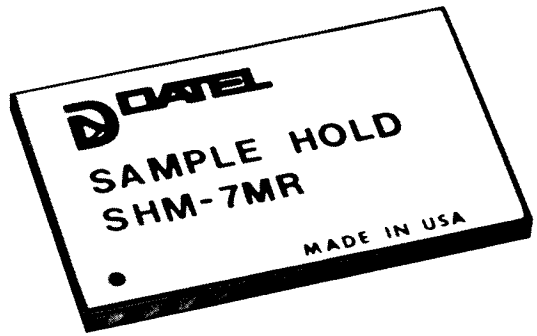
SHM-7
Video Speed Sample-hold

FEATURES

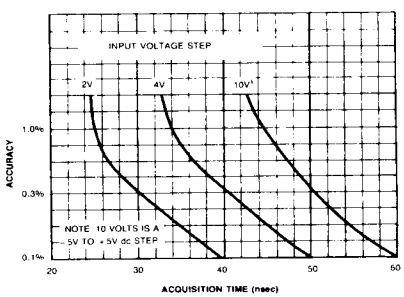
- **40 Nanoseconds acquisition time**
- **Dual outputs**
- **10 Picoseconds aperture uncertainty**
- **40 MHz Bandwidth**
- **30 mA Output current**

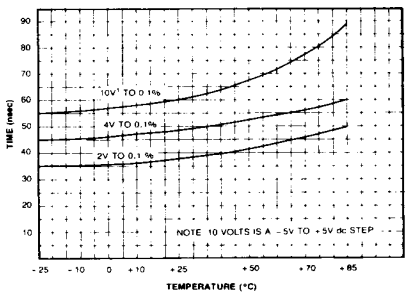


GENERAL DESCRIPTION

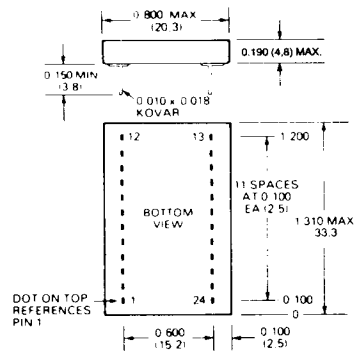
DATEL's SHM-7 is an ultra-fast sample and hold designed for high-speed analog signal processing applications. The SHM-7 acquires a 2V dc input change to 0.1% in only 40 nanoseconds and aperture uncertainty time is less than 10 picoseconds. Sample-mode bandwidth is 40 MHz.

The SHM-7 is a complete sample-hold, containing an input buffer amplifier, a precision 53 pF MOS holding capacitor, and two output buffer amplifiers. The sampling switch is controlled by a series 10,000 complementary ECL input. An ECL differential line driver can be conveniently used for the sample control inputs.

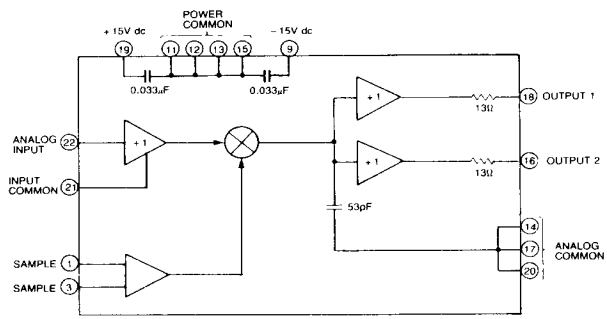




MECHANICAL DIMENSIONS
INCHES (MM)



NOTE: PINS HAVE 0.025 INCH STANDOFF FROM CASE. ±0.01"



INPUT/OUTPUT CONNECTIONS

PIN	FUNCTION	PIN	FUNCTION
1	SAMPLE	13	POWER COM.
2	N.C.	14	ANALOG COM.
3	SAMPLE	15	POWER COM.
4	N.C.	16	OUTPUT 2
5	N.C.	17	ANALOG COM.
6	N.C.	18	OUTPUT 1
7	N.C.	19	+15V dc
8	N.C.	20	ANALOG COM.
9	-15V dc	21	INPUT COM.
10	N.C.	22	ANALOG INPUT
11	POWER COM.	23	N.C.
12	POWER COM.	24	N.C.

FUNCTIONAL SPECIFICATIONS

Typical at 25°C, ±15V dc Supplies Unless Otherwise Noted.

INPUTS	
Input Voltage Range[1], minimum	±2.5V dc
maximum	±5V dc
Input Bias Current	50 μA
Input Impedance, minimum	10 kΩ
Maximum Source Impedance[2]	50Ω
Sample Control Inputs[3]	Differential ECL 10,000 Positive Pulse on Pin 3 and Negative Pulse on Pin 1 gives Hold Mode.

OUTPUTS	
Output Voltage Range[1], minimum	±2.5V dc
maximum	±5V dc
Output Current[4]	±30 mA
Output Impedance[4]	1Ω

PERFORMANCE	
Linearity ±2.5V input volt. range	0.1%
±5V input volt. range	0.2%
Gain	+0.995
Gain Tempco, maximum	±33 ppm/°C
Sample-to-Hold Offset Error, maximum	40 mV
Sample-Mode Offset Voltage, maximum	±20 mV
Sample-to-Hold Offset Voltage Drift	75 μV/°C
Sample-Mode Offset Voltage Drift	±250 μV/°C
Hold Mode Feedthrough, maximum	−66 dB
Hold Mode Droop	100 μV/microseconds

DYNAMIC CHARACTERISTICS	
Acquisition Time, 2V to 0.1%	40 nanoseconds
2V to 1%	25 nanoseconds
4V to 0.1%	50 nanoseconds
4V to 1%	35 nanoseconds
10V to 0.1%[6]	60 nanoseconds
10V to 1%[6]	45 nanoseconds
Aperture Delay Time	3 nanoseconds
Aperture Uncertainty Time, maximum	10 picoseconds
Hold Mode Settling Time	20 nanoseconds
Sample-Mode Bandwidth; −3 dB	40 MHz
Sampling Rate[5]	17 MHz

POWER REQUIREMENTS	
Positive Supply, Pin 19	+15V dc ±0.5V dc at 60 mA
Negative Supply, Pin 9	−15V dc ±0.5V dc at 60 mA

PHYSICAL/ENVIRONMENTAL	
Operating Temperature Ranges SHM-7MC	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Package Type	24 Pin, hermetically sealed, ceramic.
Pins	0.010 x 0.018 Inch Kovar

FOOTNOTES:

1. The SHM-7MC has a maximum input/output voltage range of ±5V.
2. Should be purely resistive. See technical note 3.
3. Input logic voltage levels are V_{in} "0" = −1.5V to −1.4V, and V_{in} "1" = −0.7V to −1.05V.
4. Specified for each output, both outputs may be tied together for decreased output impedance and increased output current.
5. For a ±2V input.
6. 10V is a step from −5V to +5V dc.

ABSOLUTE MAXIMUM RATINGS	
Positive Supply	+18V dc
Negative Supply	−18V dc
Digital Input Voltage	±5V dc
Analog Input Voltage	±5V dc

TECHNICAL NOTES

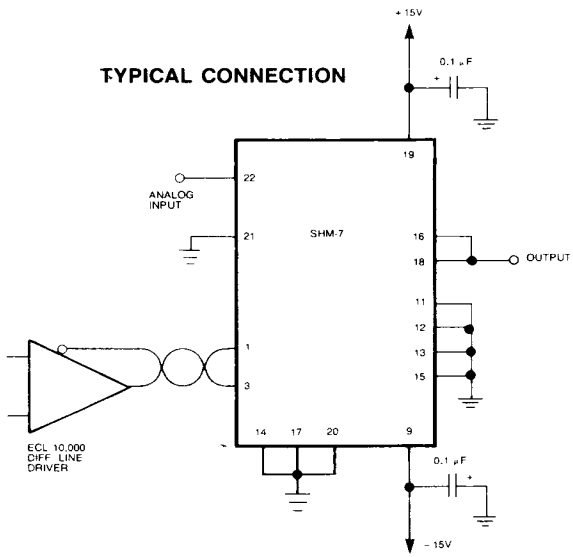
1. The use of good high frequency circuit board layout techniques is required for rated performance. The power common, analog common, and input common pins are not connected internally and therefore must be connected externally as directly as possible thorugh a low inductance, low resistance path. The extensive use of a ground plane for all common connections is highly recommended.

2. Although they are internally bypassed with 0.033 μF capacitors the supply pins should be externally bypassed with 0.1 μF ceramic chip capacitors mounted as close to the supply pins as possible.

3. The SHM-7 inputs and outputs are sensitive to unusual loading or long lines. The analog input must be non-reactive so that leads should be short and purely resistive. Also, the complementary ECL driver should be as close as possible to pins 1 and 3 to minimize lead lengths to these pins.

4. The maximum, differential, digital input voltage is ±5V. For example, if pin 3 is at a potential of -5V, pin 1 may not exceed 0V.

TYPICAL CONNECTION



ORDERING INFORMATION

MODEL NO.	OPERATING TEMP. RANGE
SHM-7MC	0 to +70 °C