

**New SMT Package**

**FEATURES**

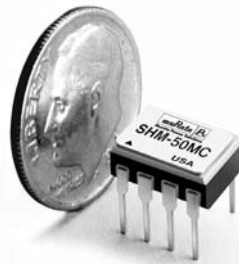
- Small 8-pin DIP or SMT package
- 30ns typical acquisition time to ±0.01%, 40ns typical acquisition time to 0.005%
- 15ns typical sample-to-hold settling time to ±0.01%
- 100MHz small signal bandwidth
- -78dB feedthrough attenuation
- ±2 picoseconds aperture uncertainty
- 85mW typical, 135mW maximum power dissipation

**GENERAL DESCRIPTION**

Murata Power Solution's SHM-50 is a high-speed, highly accurate sample/hold designed for precision, high-speed analog signal processing applications. The SHM-50 features excellent dynamic specifications including a maximum acquisition time of only 40 nanoseconds for a 2V step to ±0.01%.

Sample-to-hold settling time, to ±0.01% accuracy, is 20 nanoseconds maximum with an aperture uncertainty of ±2 picoseconds.

The SHM-50 is a complete sample/hold circuit, containing a precision MOS hold capacitor and a MOSFET switching configuration which results in faster switching and better feedthrough attenuation. Additionally, a FET input amplifier design allows faster acquisition and settling times while maintaining a considerably lower droop rate.



**INPUT/OUTPUT CONNECTIONS**

Pin	Function
1	+5v Digital Supply
2	S/H Control
3	Analog Input
4	Analog Return
5	-5v Supply
6	Analog Output
7	+5v Analog Supply
8	Power Ground

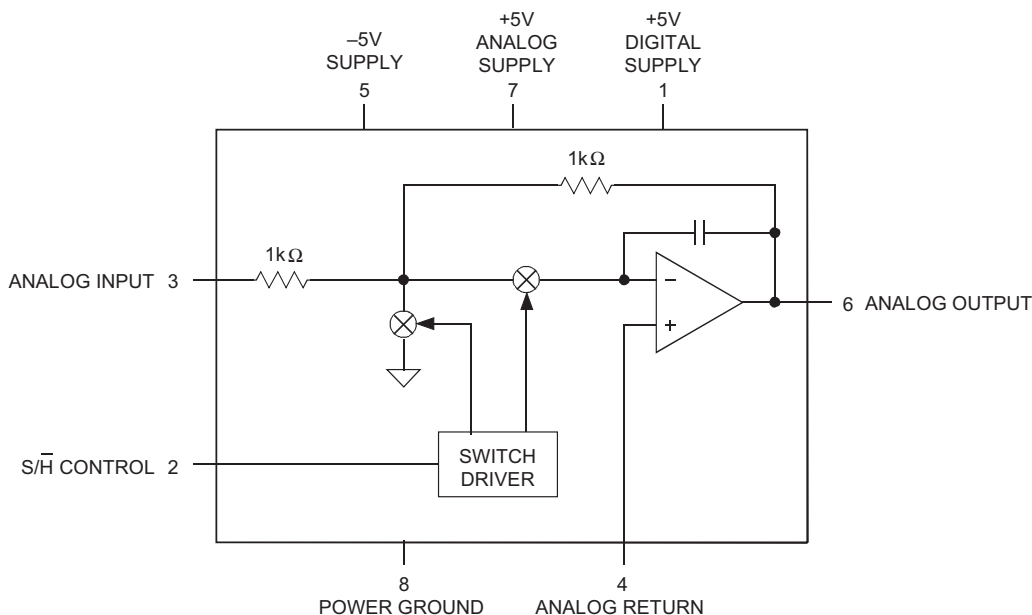


Figure 1. Functional Block Diagram



For full details go to  
[www.murata-ps.com/rohs](http://www.murata-ps.com/rohs)

### Absolute Maximum Ratings

±5V Supply Voltages	±6.6V
Analog Input	±4V
Digital Input	-0.5V to +5.5V
Output Current	±65 mA

### Functional Specifications

Apply over the operating temperature range with ±5Vdc unless otherwise specified.

ANALOG INPUT/OUTPUT	MIN.	TYP.	MAX.	UNITS
Input/Output Voltage Range	-3.5	—	+3.5	Volts
Input Impedance	—	1000	—	Ω
Output Current	—	—	±65	mA
Output Impedance	—	0.1	—	Ω
Capacitive Load	100	250	—	pF
<b>DIGITAL INPUT</b>				
Input Logic Levels				
Logic 1	+2.0	—	+5.0	Volts
Logic 0	0	—	+0.8	Volts
Loading				
Logic 1	—	—	+5	μA
Logic 0	—	—	-5	μA
<b>TRANSFER CHARACTERISTICS</b>				
Gain	—	-1	—	V/V
Gain Error, +25°C	—	±0.05	±0.25	%
Linearity Error ①	—	±0.0035	±0.005	%FS
Sample Mode Offset, +25°C	—	±2	7	mV
Sample-to-Hold Offset (Pedestal), +25°C ②	—	±30	60	mV
Gain Drift	—	±1	±15	ppm/°C
Sample Mode Offset Drift ①	—	±3	±15	ppm of FSR/°C
Sample-to-Hold Off. (Pedestal) Drift	—	±5	±20	ppm of FSR/°C
<b>DYNAMIC CHARACTERISTICS</b>				
<b>Acquisition Time</b>				
2V to ±0.005%FS (±100μV)				
+25°C	—	40	50	ns
-55 to +125°C	—	70	TBD	ns
2V to ±0.01%FS (±200μV)				
+25°C	—	30	40	ns
-55 to +125°C	—	40	50	ns
2V to ±0.1%FS (±2mV)	—	25	30	ns
<b>Sample-to-Hold Settling Time</b>				
2V to ±0.005%FS (±100μV)	—	15	25	ns
2V to ±0.01%FS (±200μV)	—	10	20	ns
<b>Sample-to-Hold Transient</b>				
Aperture Delay Time	—	100	—	mVp-p
Aperture Uncertainty (Jitter)	—	2	4	ns
Aperture Uncertainty (Jitter)	—	±2	±4	ps
Output Slew Rate	600	±650	—	V/μs
Small Signal BW (-3dB)	90	100	—	MHz
<b>Output Droop</b>				
+25°C	—	±0.2	±1.0	μV/nS
0 to +70°C	—	±0.3	±1.0	μV/nS
-55 to +125°C	—	±5.0	±12.0	μV/nS
Feedthrough Rejection	—	-78	—	dB

POWER REQUIREMENTS	MIN.	TYP.	MAX.	UNITS
<b>Voltage Range</b>				
+5V Supply	+4.75	+5.0	+5.25	Volts
-5V Supply	-4.75	-5.0	-5.25	Volts
<b>Power Supply Rejection Ratio</b>				
Quiescent Current Drain	—	±0.5	±1	mV/V
+5V Analog Supply	—	+7	+12	mA
-5V Supply	—	-10	-15	mA
<b>Power Consumption</b>				
	—	85	135	mW
<b>PHYSICAL/ENVIRONMENTAL</b>				
<b>Operating Temp. Range, Case</b>				
SHM-50MC				0 to +70°C
SHM-50MM				-55 to +125°C
<b>Storage Temperature Range</b>				
-65 to +150°C				
<b>Thermal Impedance</b>				
θjc				15°C/W
θca				35°C/W
<b>Package Type</b>				
8-pin ceramic DIP or SMT				

### Footnotes:

- ① Full Scale (FS) = 2V. Full Scale Range (FSR) = 4V.
- ② Sample-to-hold offset error (pedestal) is constant regardless of input/output level.

### Ordering Information

MODEL	OPERATING TEMP. RANGE	PACKAGE
SHM-50MC	0 to +70°C	DIP
SHM-50MM	-55 to +125°C	DIP
SHM-50GC	0 to +70°C	SMT
SHM-50GM	-55 to +125°C	SMT

For availability of high-reliability versions of the SHM-50, contact Murata Power Solutions.

### TECHNICAL NOTES

1. All ground pins should be tied together and connected to system analog ground as close to the package as possible. It is recommended to use a ground plane under the device and solder ground pins directly to it. Take care to ensure that no ground potentials can exist between ground pins. A single +5V supply can be used for both +5V Digital Supply (pin 1) and +5V Analog Supply (pin 7).
2. External 0.1μF to 4.7μF tantalum bypass capacitors are required in critical applications.
3. A logic 1 on S/H puts the unit in the sample mode. A logic 0 puts the unit in hold mode.
4. Gain and offset adjusting can be accomplished using the external circuitry shown in Figure 2. Adjust offset with a 0V input. Adjust gain with a ±FS input. Adjust so that the output in the hold mode matches the input.

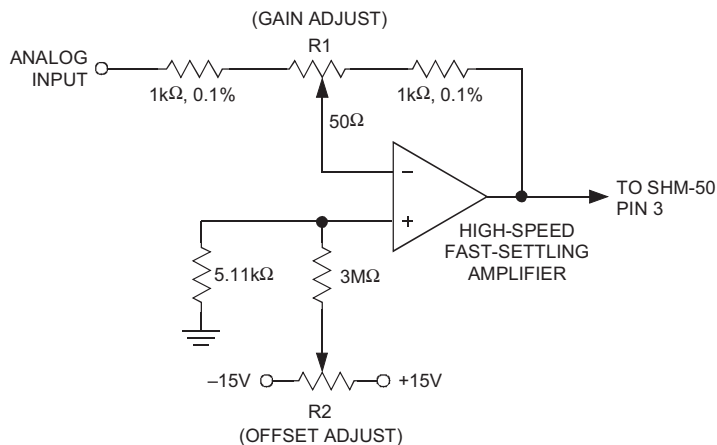
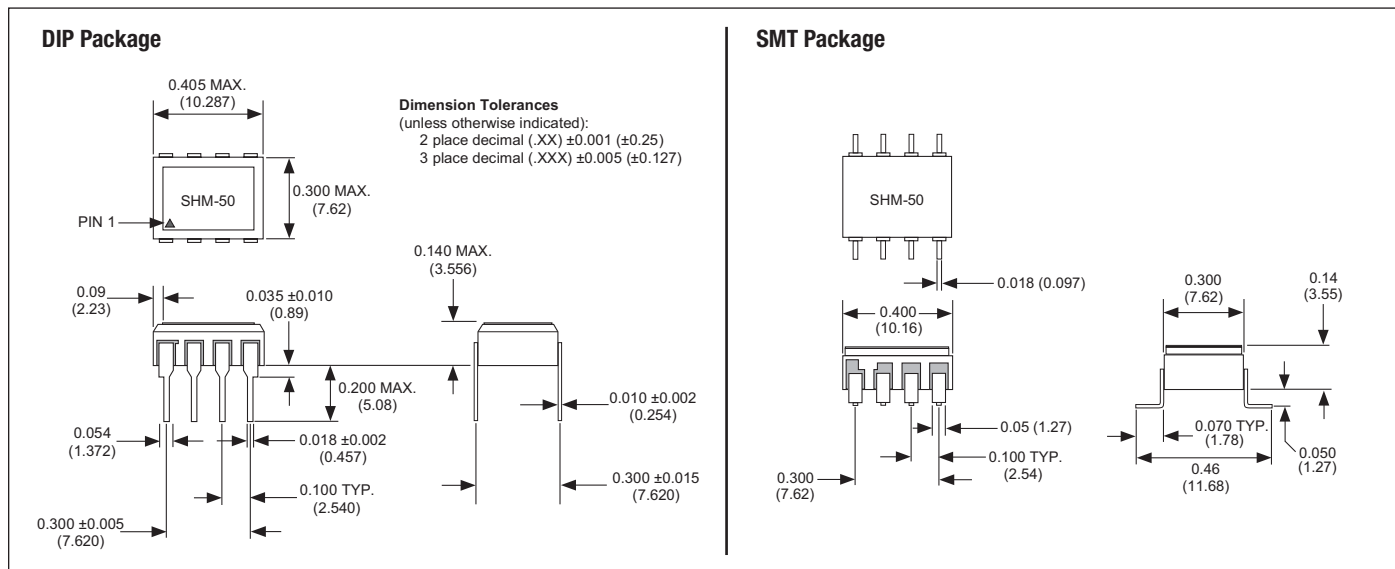


Figure 2. Offset and Gain Adjustments

**MECHANICAL DIMENSIONS** Inches (mm)



**ISO 9001**  
REGISTERED

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