

SHC6120Q Automotive, 6-Channel, 3.7-kSPS, Low-Power, 16-Bit ADC with Integrated PGA and Reference

1 Features

- AEC-Q100 qualified for automotive applications
- Low Current Consumption:
As Low as 75 μ A (typ) in Duty-Cycle Mode
- Wide Supply Range: 2.7 V to 5.25 V
- Programmable Gain: 1 V/V to 128 V/V
- Programmable Data Rates: Up to 3.7 kSPS
- 50-Hz or 60-Hz Rejection at ≤ 20 SPS with Single-Cycle Settling Digital Filter
- Three Differential or Five Single-Ended Inputs
- Internal bias voltage generator
- Dual Matched Programmable Current Sources: 10 μ A to 1.5 mA
- Internal 2.048 V Reference: 8 ppm/ $^{\circ}$ C (typ) Drift
- Internal 2% Accurate Oscillator
- Internal Temperature Sensor
- SPI-Compatible Interface
- Package: TSSOP and QFN

2 Applications

- Temperature Sensor Measurements:
 - Thermistors
 - Thermocouples
 - Resistance Temperature Detectors (RTDs):
2-, 3-, or 4-Wire Types
- Resistive Bridge Sensor Measurements:
 - Pressure Sensors
 - Strain Gauges
 - Weigh Scales
- Portable Instrumentation
- Factory Automation and Process Control

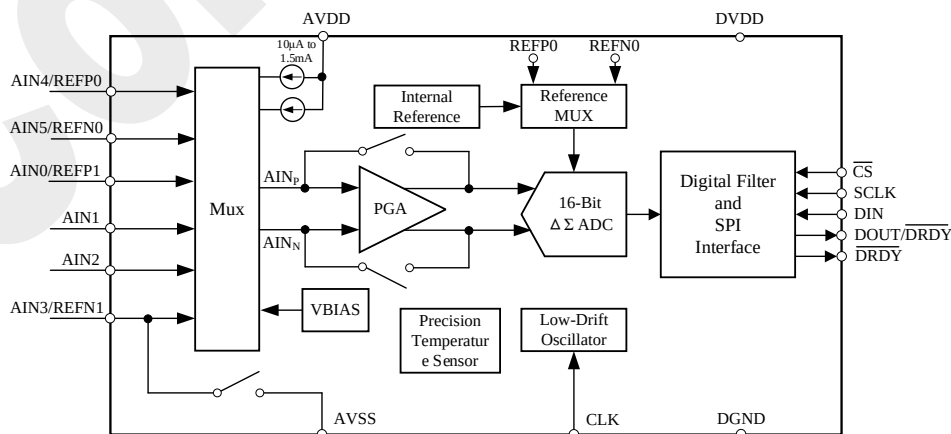
3 Description

The SHC6120Q is a precision, 16-bit, analog-to-digital converter (ADC) that offers many integrated features to reduce system cost and component count in applications measuring small sensor signals. The device features three differential or five single-ended inputs through a flexible input multiplexer (MUX), a low-noise, programmable gain amplifier (PGA), bias voltage for each channel, two programmable excitation current sources, a voltage reference, an oscillator, a low-side switch, and a precision temperature sensor. The device can perform conversions at data rates up to 3710 samples-per-second (SPS) with single-cycle settling. At ≤ 20 SPS, the digital filter offers 50-Hz or 60-Hz rejection for noisy industrial applications. The internal PGA offers gains up to 128 V/V. This PGA makes the SHC6120Q ideally suited for applications measuring small sensor signals, such as resistance temperature detectors (RTDs), thermocouples, thermistors, and resistive bridge sensors. The device supports measurements of pseudo- or fully-differential signals when using the PGA. Alternatively, the device can be configured to bypass the internal PGA while still providing high input impedance and gains up to 4 V/V, allowing for single-ended measurements. Power consumption is as low as 75 μ A when operating in duty-cycle mode with the PGA disabled. The SHC6120Q is offered in a leadless QFN-16 or a TSSOP-16 package and is specified over a temperature range of -40° C to $+125^{\circ}$ C.

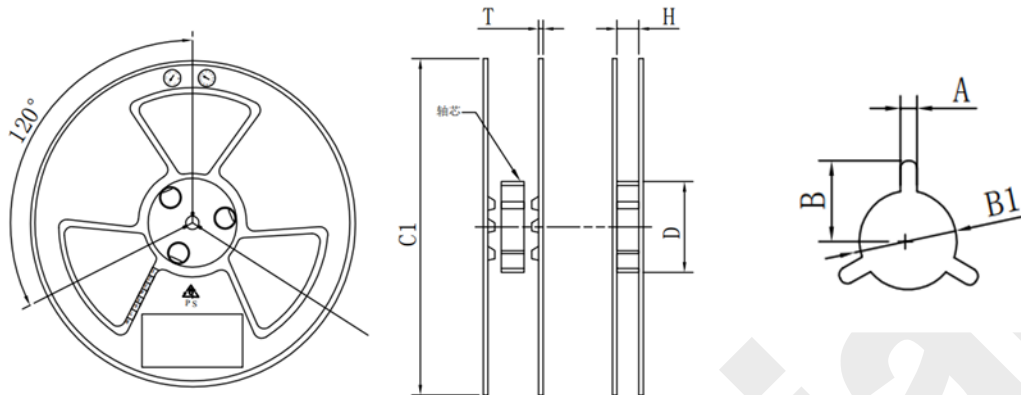
Device Information

DEVICE NAME	PACKAGE (PIN)	BODY SIZE
SHC6120Q	QFN (16)	3.50 mm $\times$ 3.50 mm
	TSSOP (16)	5.00 mm $\times$ 4.40 mm

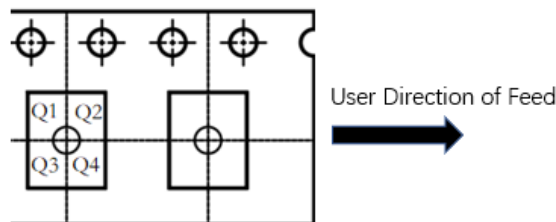
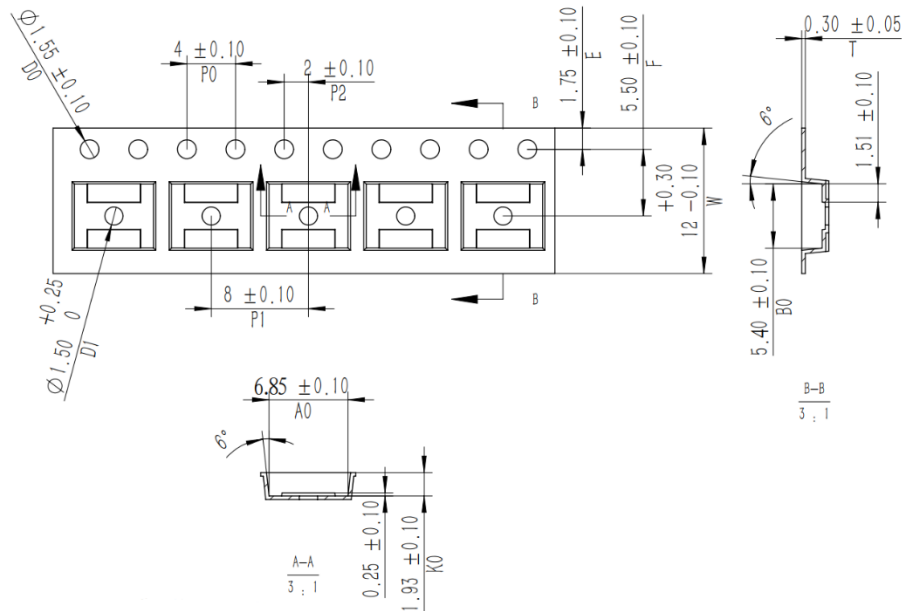
Functional Block Diagram



9 Tape and Reel Information



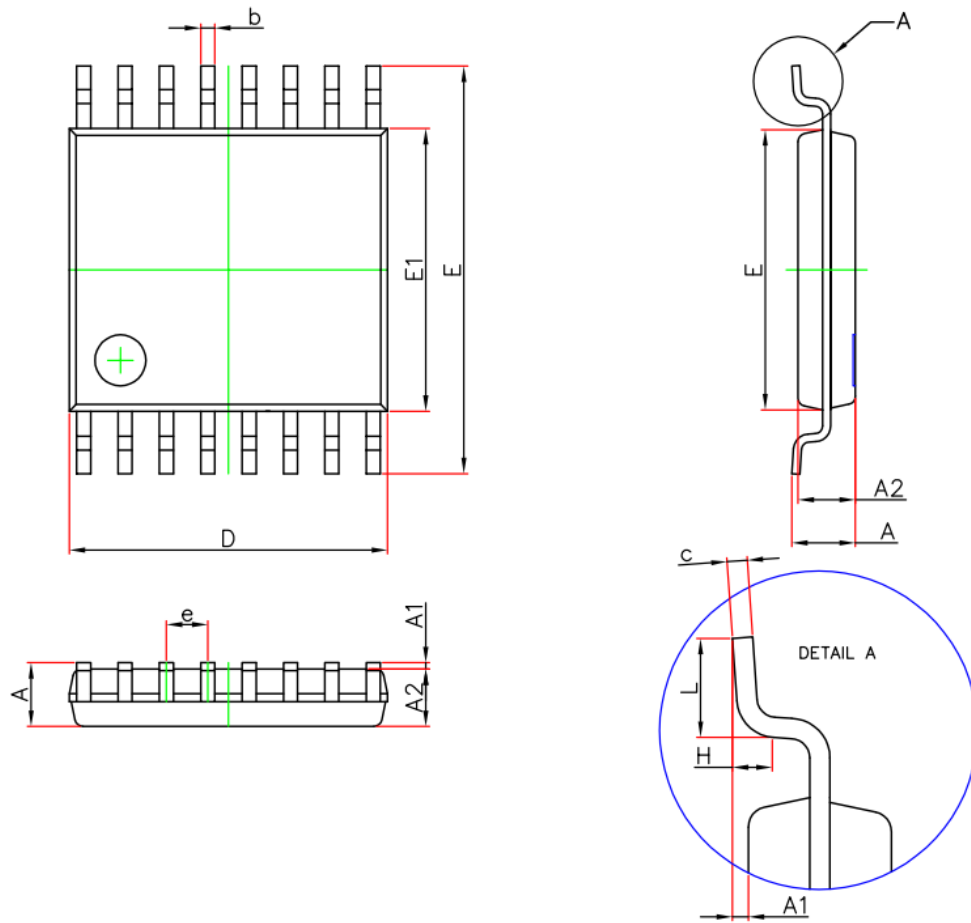
C1	330±3	178±3
H	12.5±0.5	12.8±0.5
A	2.3±0.3	2.6±0.3
B	10.75±0.3	22.5±0.3
B1	Ø13.0 +0.5/-0.2	Ø13.5±0.3
T	2±0.2	1.2±0.2
D	Ø100±1	Ø60±0.5
SPQ	2000	300
Pin1 Quadrant	Q1	Q1



Note: Q1~Q4 is Pocket Quadrants

10 Package Information

TSSOP16 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	—	1.200	—	0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.000	0.031	0.039
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.900	5.100	0.193	0.201
E	6.250	6.550	0.246	0.258
E1	4.300	4.500	0.169	0.177
e	0.650(BSC)		0.026(BSC)	
L	0.500	0.700	0.020	0.028
H	0.250(TYP)		0.010(TYP)	

10.1 Ordering Guide

Orderable Device	Package	Package Qty	MSL-Peak-Temp	Lead Fish Plating	Op Temp (°C)	RoHS (Pb Free)
SHC6120QTSPiR	TSSOP-16	2000	Level 1-260°C	100%Sn	-40 to 125°C	Yes
SHC6120QTSPiT	TSSOP-16	300	Level 1-260°C	100%Sn	-40 to 125°C	Yes
SHC6120QRTTiR	QFN-16	2000	Level 1-260°C	NIPDAU	-40 to 125°C	Yes
SHC6120QRTTiT	QFN-16	300	Level 1-260°C	NIPDAU	-40 to 125°C	Yes