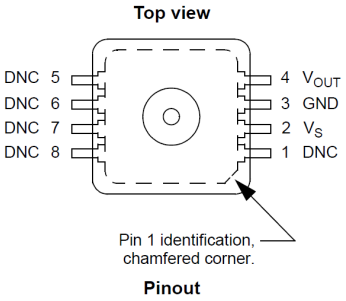
MPXHZ6130A

Datasheet

15 to 130 kPa, absolute, integrated pressure sensor

MPXHZ6130A6U
Case 98ARH99066A



Pinout

Features

- 1.5% maximum error over 0 °C to 85 °C
- Resistant to high humidity and common automotive media
- Improved accuracy at high temperature
- Ideally suited for microprocessor or microcontroller-based systems
- Temperature compensated from -40 °C to +125 °C
- Durable thermoplastic (PPS) surface mount package

Applications

- Aviation altimeters
- Industrial controls
- Engine control/manifold absolute pressure (MAP)
- Weather stations and weather reporting devices

Description

The MPXHZ6130A series sensor integrates on-chip, bipolar op amp circuitry and thin film resistor networks to provide a high output signal and temperature compensation. The sensor's packaging has been designed to provide resistance to high humidity conditions as well as common automotive media. The small form factor and high reliability of on-chip integration make this pressure sensor a logical choice for the system designer.

The MPXHZ6130A series piezoresistive transducer is a state-of-the-art, monolithic, signal conditioned, silicon pressure sensor. This sensor combines advanced micromachining techniques, thin film metallization, and bipolar semiconductor processing to provide an accurate, high level analog output signal that is proportional to applied pressure.

1 Ordering information

Table 1. **Ordering information**

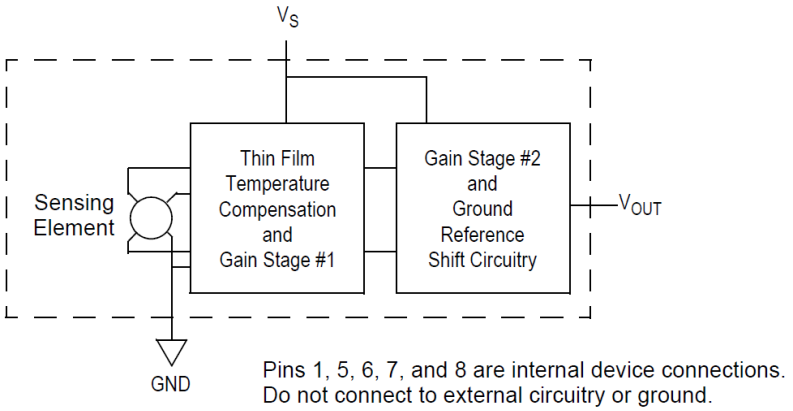
Part number	Shipping	Package	# of Ports				Pressure type		Device marking
			None	Single	Dual	Gauge	Differential	Absolute	
Small Outline Package (MPXHZ6130A series)									
MPXHZ6130A6U	Rail	98ARH99066A	•					•	MPXHZ6130A

2 General description

2.1 Block diagram

Figure 1 shows a block diagram of the internal circuitry integrated on a pressure sensor chip.

Figure 1. Fully integrated pressure sensor schematic



2.2 Pinout

Figure 2. Device pinout (top view)

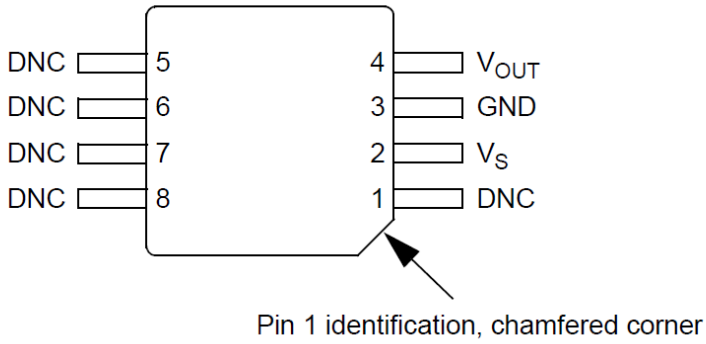


Table 2. Pin functions

Pin	Name	Function
1	DNC	Do not connect to external circuitry or ground. Pin 1 is denoted by chamfered corner.
2	V_S	Voltage supply
3	GND	Ground
4	V_{OUT}	Output voltage
5	DNC	Do not connect to external circuitry or ground.
6	DNC	Do not connect to external circuitry or ground.
7	DNC	Do not connect to external circuitry or ground.
8	DNC	Do not connect to external circuitry or ground.

3 Mechanical and electrical specifications

3.1 Maximum ratings

Table 3. Maximum ratings (1)

Rating	Symbol	Value	Units
Maximum pressure (P1 > P2)	P_{max}	400	kPa
Storage temperature	T_{stg}	-40 to +125	°C
Operating temperature	T_A	-40 to +125	°C
Output source current @ full-scale output(2)	I_o+	0.5	mAdc
Output sink current @ minimum pressure offset(2)	I_o-	-0.5	mAdc

1.Exposure beyond the specified limits may cause permanent damage or degradation to the device.

2.Maximum output current is controlled by effective impedance from V_{OUT} to Gnd or V_{OUT} to V_S in the application circuit.

3.2 Operating characteristics

Table 4. Operating characteristics (V_S = 5.0 Vdc, T_A = 25 °C unless otherwise noted, P1 > P2).

Characteristic	Symbol	Min	Typ	Max	Unit
Pressure range	P_{OP}	15	—	130	kPa
Supply voltage(1)	V_S	4.75	5.0	5.25	Vdc
Supply current	I_o	—	6.0	10	mAdc
Minimum pressure offset(2) @ V_S = 5.0 Volts (0 °C to 85 °C)	V_{off}	0.132	0.200	0.268	Vdc
Full-scale output(3) @ V_S = 5.0 Volts (0 °C to 85 °C)	V_{FSO}	4.632	4.700	4.768	Vdc
Full-scale span(4) @ V_S = 5.0 Volts (0 °C to 85 °C)	V_{FSS}	4.365	4.500	4.635	Vdc
Accuracy(5) @ V_S = 5.0 Volts (0 °C to 85 °C)	—	—	—	±1.5	$\%V_{FSS}$
Sensitivity	V/P	—	39.2	—	mV/kPa
Response time(6)	t_R	—	1.0	—	ms
Warm-up time(7)	—	—	20	—	ms
Offset stability(8)	—	—	±0.25	—	$\%V_{FSS}$

1.Device is ratiometric within this specified excitation range.

2.Offset (V_{off}) is defined as the output voltage at the minimum rated pressure.

3.Full-scale output (V_{FSO}) is defined as the output voltage at the maximum or full rated pressure.

4.Full-scale span (V_{FSS}) is defined as the algebraic difference between the output voltage at full-rated pressure and the output voltage at the minimum rated pressure.

5.Accuracy is the deviation in actual output from nominal output over the entire pressure range and temperature range as a percent of span at 25°C due to all sources of error including the following:

Linearity: Output deviation from a straight line relationship with pressure over the specified pressure range.

Temperature Hysteresis: Output deviation at any temperature within the operating temperature range, after the temperature is cycled to and from the minimum or maximum operating temperature points, with zero differential pressure applied.

Pressure Hysteresis: Output deviation at any pressure within the specified range, when this pressure is cycled to and from minimum or maximum rated pressure at 25 °C.

TcSpan: Output deviation over the temperature range of 0 °C to 85 °C, relative to 25 °C.

TcOffset: Output deviation with minimum pressure applied, over the temperature range of 0 °C to 85 °C, relative to 25 °C.

6.Response Time is defined as the time for the incremental change in the output to go from 10% to 90% of its final value when subjected to at specified step change in pressure.

7.Warm-up time is defined as the time required for the product to meet the specified output voltage after the pressure has been stabilized.

8.Offset Stability is the product's output deviation when subjected to 1000 cycles of Pulsed Pressure, Temperature Cycling with Bias Test.

4 On-chip Temperature Compensation and Calibration

Figure 5 shows the sensor output signal relative to pressure input. Typical minimum and maximum output curves are shown for operation over 0 to 85°C temperature range. The output will saturate outside of the rated pressure range.

A gel die coat isolates the die surface and wire bonds from the environment, while allowing the pressure signal to be transmitted to the sensor diaphragm. The gel die coat and durable polymer package provide a media resistant barrier that allows the sensor to operate reliably in high humidity conditions as well as environments containing common automotive media. Contact the factory for more information regarding media compatibility in your specific application.

Figure 3. Cross-sectional diagram SSOP (not to scale)

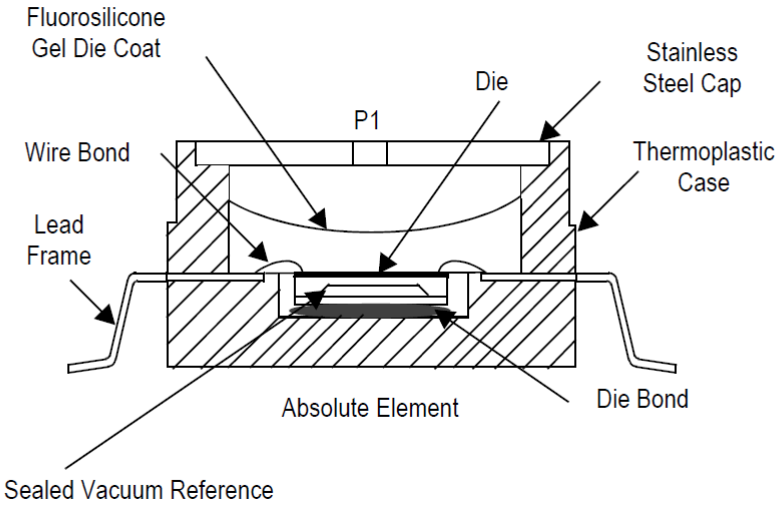


Figure 4. Recommended power supply decoupling and output filtering

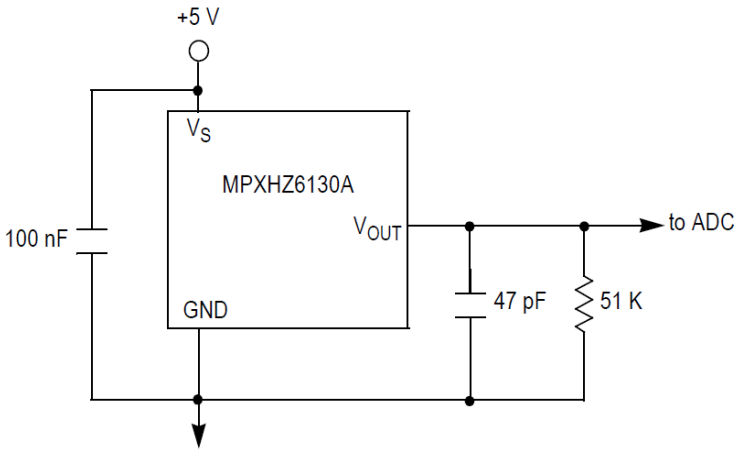


Figure 5. Output vs. absolute pressure

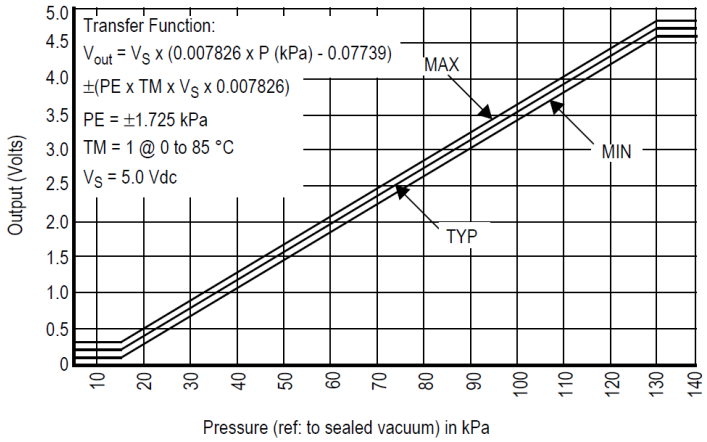
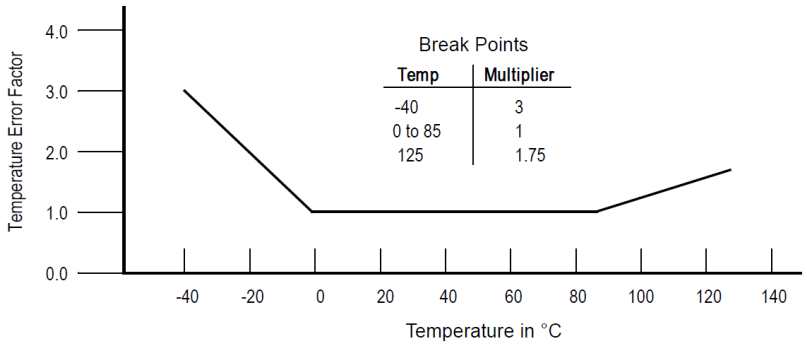


Figure 6. Transfer function

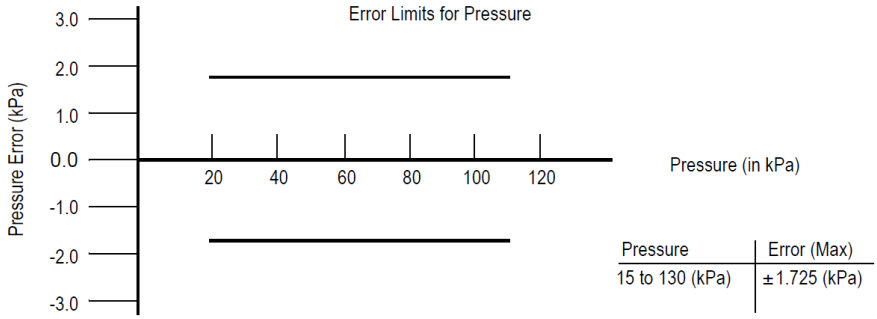
Nominal Transfer Value: $V_{OUT} = V_S \times (0.007826 \times P\ (kPa) - 0.07739)$
$\pm$ (Pressure Error x Temp. factor x 0.007826 x V_S)
$V_S = 5.0 \pm 0.25$ Vdc

Figure 7. Temperature error band



NOTE: The temperature multiplier is a linear response from 0 °C to -40 °C and from 85 °C to 125 °C

Figure 8. Pressure error band



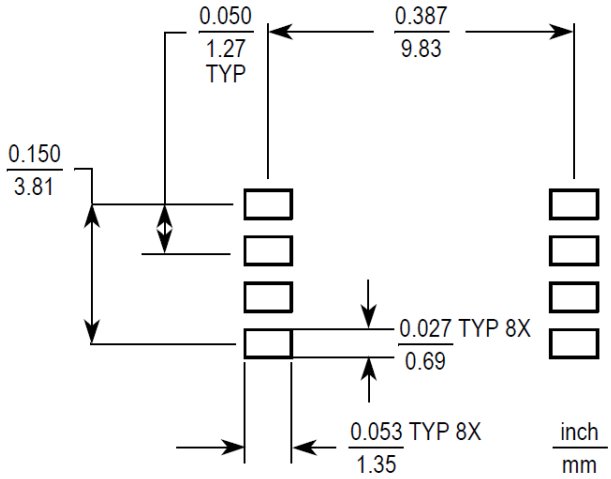
Pressure	Error (Max)
15 to 130 (kPa)	±1.725 (kPa)

5 Package information

5.1 Minimum recommended footprint for super small packages

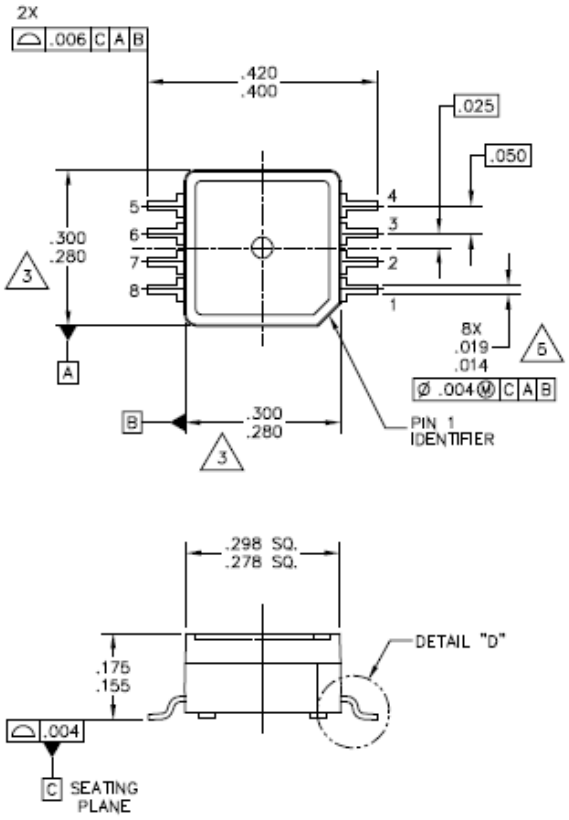
Surface mount board layout is a critical portion of the total design. The footprint for the semiconductor package must be the correct size to ensure proper solder connection interface between the board and the package. With the correct pad geometry, the packages will self-align when subjected to a solder reflow process. It is always recommended to fabricate boards with a solder mask layer to avoid bridging and/or shorting between solder pads, especially on tight tolerances and/or tight layouts.

Figure 9. SSOP footprint



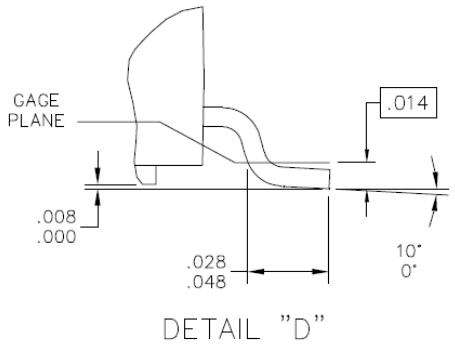
6 Package dimensions

Figure 10. **Case 98ARH99066A, 8-lead super small outline package**



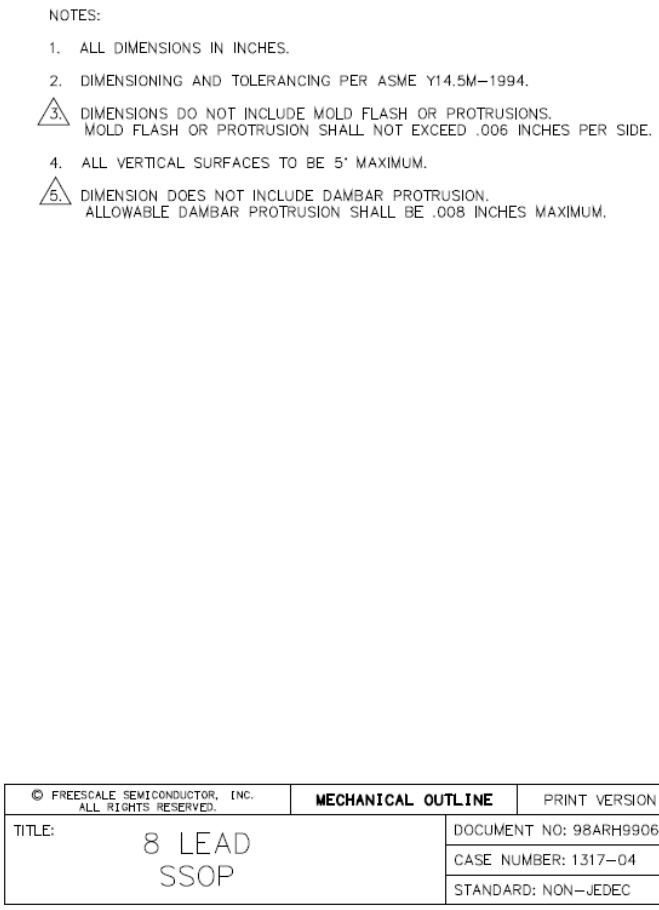
© FREESCALE SEMICONDUCTOR, INC. ALL RIGHTS RESERVED.	MECHANICAL OUTLINE	PRINT VERSION NOT TO SCALE
TITLE: 8 LEAD SSOP	DOCUMENT NO: 98ARH99066A	REV: H
	CASE NUMBER: 1317-04	13 APR 2012
	STANDARD: NON-JEDEC	

Figure 11. Case 98ARH99066A, 8-lead super small outline package



© FREESCALE SEMICONDUCTOR, INC. ALL RIGHTS RESERVED.	MECHANICAL OUTLINE	PRINT VERSION NOT TO SCALE	
TITLE: 8 LEAD SSOP	DOCUMENT NO: 98ARH99066A	REV: H	
	CASE NUMBER: 1317–04	13 APR 2012	
	STANDARD: NON–JEDEC		

Figure 12. Case 98ARH99066A, 8-lead super small outline package



Revision history

Table 5. **Document revision history**

Date	Revision	Changes
24-Jun-2026	1	Initial release from ST, rebranded NXP document

Contents

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice.

In the event of any conflict between the provisions of this document and the provisions of any contractual arrangement in force between the purchasers and ST, the provisions of such contractual arrangement shall prevail.

The purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgment.

The purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of the purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

If the purchasers identify an ST product that meets their functional and performance requirements but that is not designated for the purchasers' market segment, the purchasers shall contact ST for more information.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.