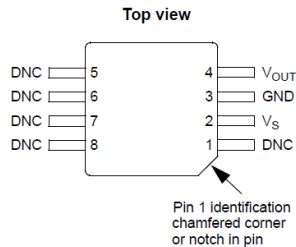




MPXA6115A6/ACx, MPXAZ6115AC6/AP MPXH6115A6/AC6, MPXHZ6115A6/AC6

Datasheet

15 to 115 kPa, absolute, integrated pressure sensor



Pinout



MPXA6115A6U/T1
Case 98ASB17756C



MPXA6115AC6U/T1
MPXAZ6115AC6T1
Case 98ASB17757C



MPXA6115AC7U
Case 98ASB17759C



MPXAZ6115AP/T1
Case 98ASA99303D



MPXH6115A6U/T1
MPXHZ6115A6U/T1
Case 98ARH99066A



MPXH6115AC6U/T1
MPXHZ6115AC6U/T1
Case 98ARH99089A

Features

- Resistant to high humidity and common automotive media
- Improved accuracy at high temperature
- Available in small and super small outline packages
- 1.5% maximum error over 0 °C to 85 °C
- Ideally suited for microprocessor or microcontroller-based systems
- Temperature compensated from -40 °C to +125 °C
- Durable Thermoplastic (PPS) Surface Mount Package

Applications

- Industrial controls
- Engine control/manifold absolute pressure (MAP)
- Weather station and weather reporting device barometers

Description

The MPXxx6115A series sensor integrates on-chip, bipolar op amp circuitry and thin film resistor networks to provide a high output signal and temperature compensation. The small form factor and high reliability of on-chip integration make the pressure sensor a logical and economical choice for the system designer.

The MPXxx6115A 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

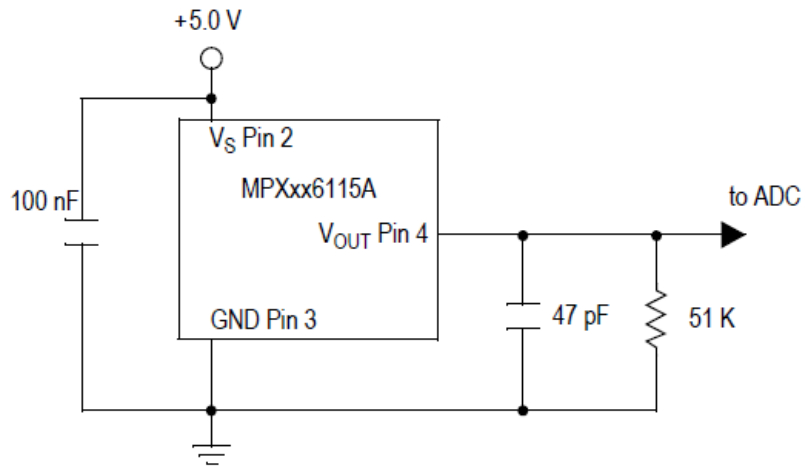
Ordering information									
Device name	Shipping	Package	# of Ports				Pressure type		Device marking
			None	Single	Dual	Gauge	Differential	Absolute	
Small outline package (MPXA6115A series)									
MPXA6115A6U	Rails	98ASB17756C	•					•	MPXA6115A
MPXA6115A6T1	Tape and Reel	98ASB17756C	•					•	MPXA6115A
MPXA6115AC6U	Rails	98ASB17757C		•				•	MPXA6115A
MPXA6115AC6T1	Tape and Reel	98ASB17757C		•				•	MPXA6115A
MPXA6115AC7U	Rails	98ASB17759C		•				•	MPXA6115A
Small outline package (Media resistant gel) (MPXAZ6115A series)									
MPXAZ6115AC6T1	Tape and Reel	98ASB17757C		•				•	MPXAZ6115A
MPXAZ6115AP	Trays	98ASA99303D		•				•	MPXAZ6115A
MPXAZ6115APT1	Tape and Reel	98ASA99303D		•				•	MPXAZ6115A
Super small outline package (MPXH6115A series)									
MPXH6115A6U	Rails	98ARH99066A	•					•	MPXH6115A
MPXH6115A6T1	Tape and Reel	98ARH99066A	•					•	MPXH6115A
MPXH6115AC6U	Rails	98ARH99089A		•				•	MPXH6115A
MPXH6115AC6T1	Tape and Reel	98ARH99089A		•				•	MPXH6115A
Small outline package (Media resistant gel) (MPXHZ6115A series)									
MPXHZ6115A6U	Rails	98ARH99066A	•					•	MPXHZ6115A
MPXHZ6115A6T1	Tape and Reel	98ARH99066A	•					•	MPXHZ6115A
MPXHZ6115AC6U	Rails	98ARH99089A		•				•	MPXHZ6115A
MPXHZ6115AC6T1	Tape and Reel	98ARH99089A		•				•	MPXHZ6115A

2 General Description

2.1 Block diagram

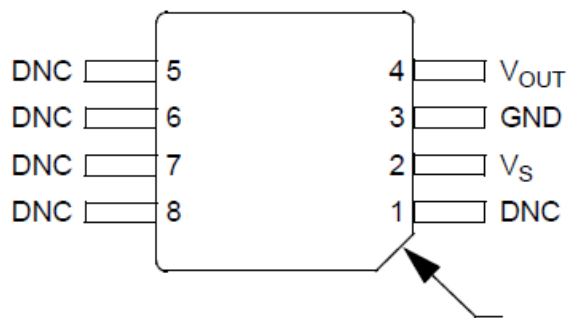
Figure 1 shows a block diagram of the internal circuitry integrated on a pressure sensor chip.

Figure 1. Fully integrated pressure sensor schematic



2.2 Pinout

Figure 2. Device pinout (top view)



Pin 1 identification, chamfered corner or notch in pin

Table 1. 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.



Pin	Name	Function
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 2. 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 3. 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	—	115	kPa
Supply voltage ⁽¹⁾	V _S	4.75	5.0	5.25	V _{dc}
Supply current	I _o	—	6.0	10	mAdc
Minimum pressure offset ⁽²⁾ (0 °C to 85° C) @ V _S = 5.0 Volts	V _{off}	0.133	0.200	0.268	V _{dc}
Full-scale output ⁽³⁾ (0 °C to 85° C) @ V _S = 5.0 Volts	V _{FSO}	4.633	4.700	4.768	V _{dc}
Full-scale span ⁽⁴⁾ (0 °C to 85° C) @ V _S = 5.0 Volts	V _{FSS}	4.433	4.500	4.568	V _{dc}
Accuracy ⁽⁵⁾ (0 °C to 85° C)	—	—	—	±1.5	%V _{FSS}
Sensitivity	V/P	—	45.0	—	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 a 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.

Figure 5. Output vs. absolute pressure

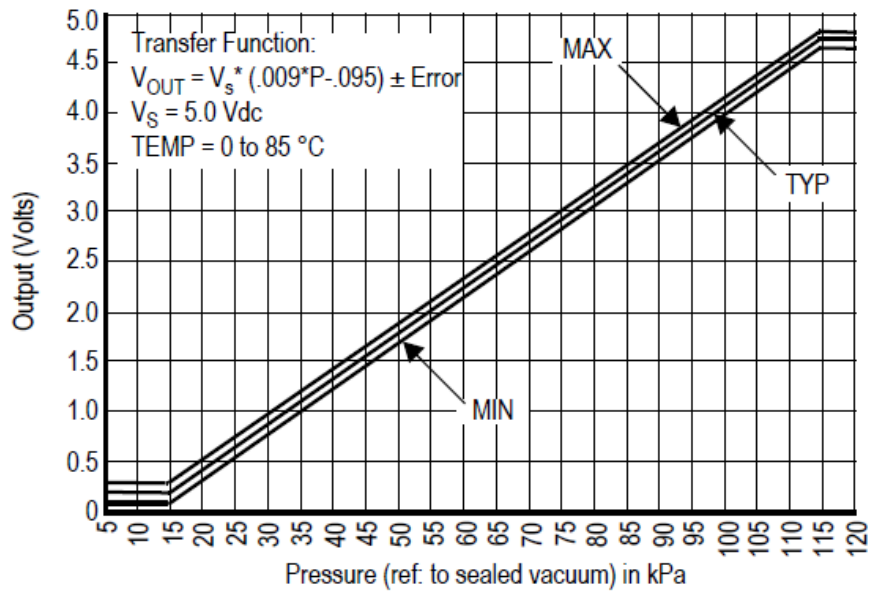
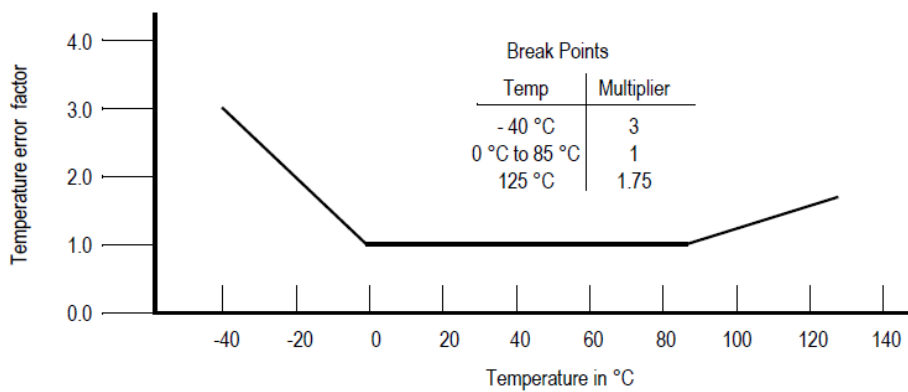


Figure 6. Transfer function

Nominal Transfer Value: $V_{OUT} = V_S \times (0.009 \times P - 0.095)$
 $\pm (\text{Pressure Error} \times \text{Temp. Factor} \times 0.009 \times V_S)$
 $V_S = 5.0 \pm 0.25 \text{ Vdc}$

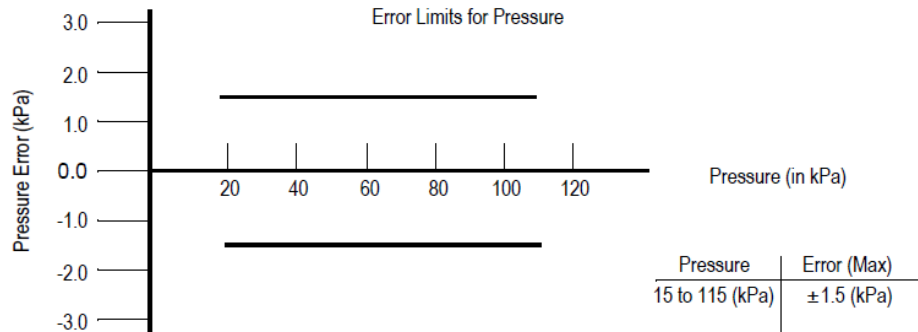
Figure 7. Temperature error band



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



5 Package Information

5.1 Minimum recommended footprint for small and 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. SOP Footprint (Case 98ASB17756C)

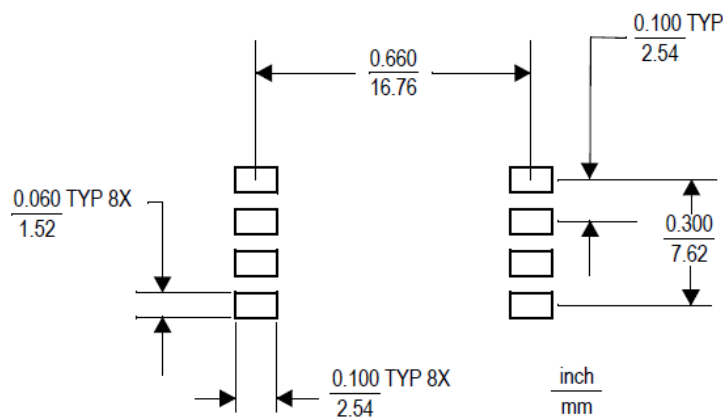
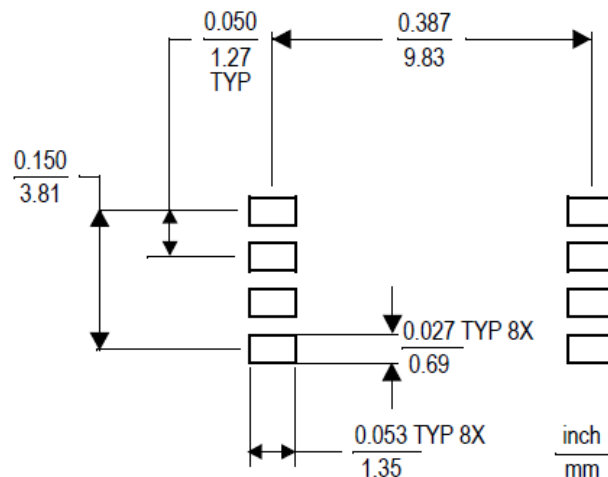
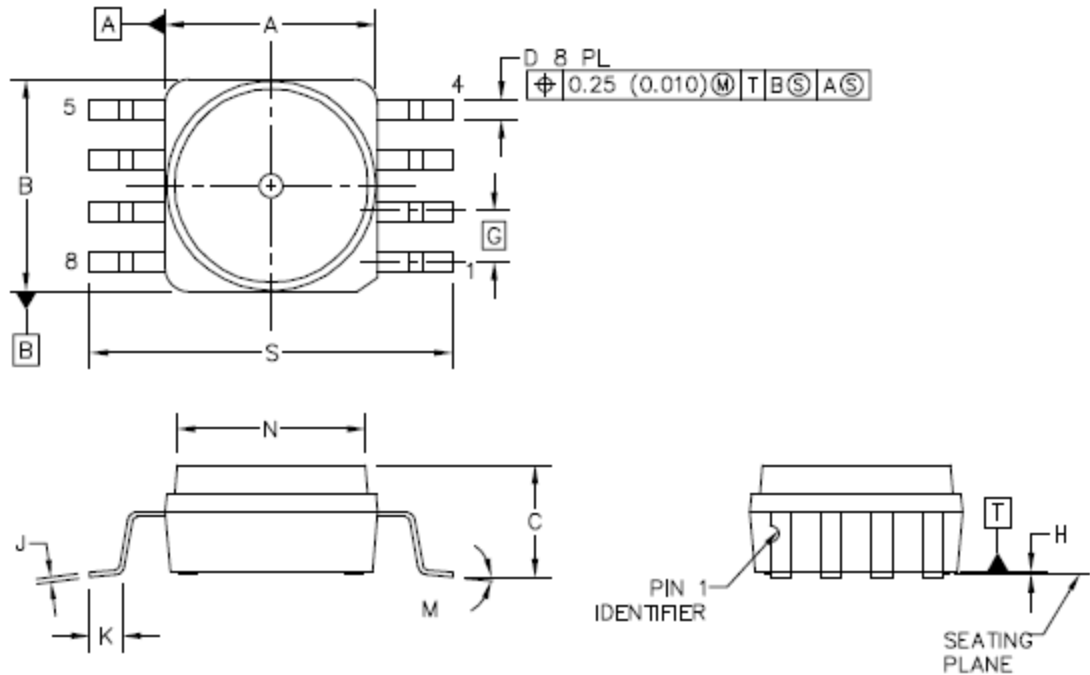


Figure 10. SSOP Footprint (Case 98ARH99066A and 98ARH99089A)



5.2 Package dimensions

Figure 11. Case 98ASB17756C, Small outline package



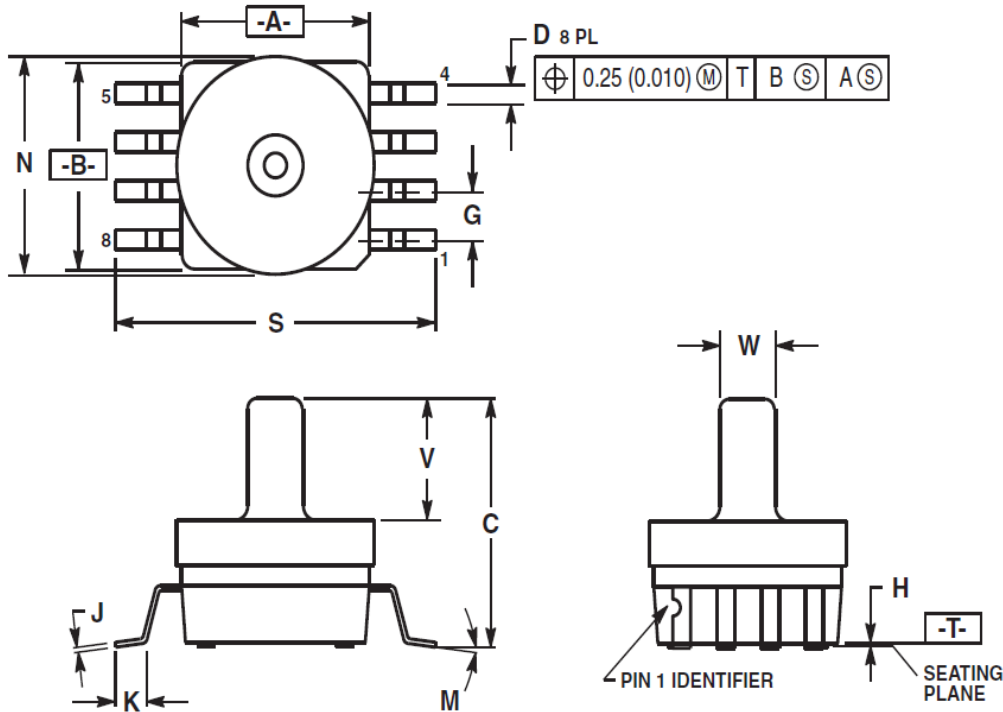
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.54	10.79	0.415	0.425
B	10.54	10.79	0.415	0.425
C	5.38	5.84	0.212	0.230
D	0.96	1.07	0.038	0.042
G	2.54 BSC		0.100 BSC	
H	0.05	0.25	0.002	0.010
J	0.23	0.28	0.009	0.011
K	1.55	1.80	0.061	0.071
M	0'	7'	0'	7'
N	10.29	10.54	0.405	0.415
S	18.01	18.41	0.709	0.725

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION "A" AND "B" DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006).
5. ALL VERTICAL SURFACES 5° TYPICAL DRAFT.

	MECHANICAL OUTLINE	PRINT VERSION NOT TO SCALE
TITLE: 8 LD SENSOR SOP	DOCUMENT NO: 98ASB17756C	REV: A
	STANDARD: NON-JEDEC	
	10 JAN 2013	

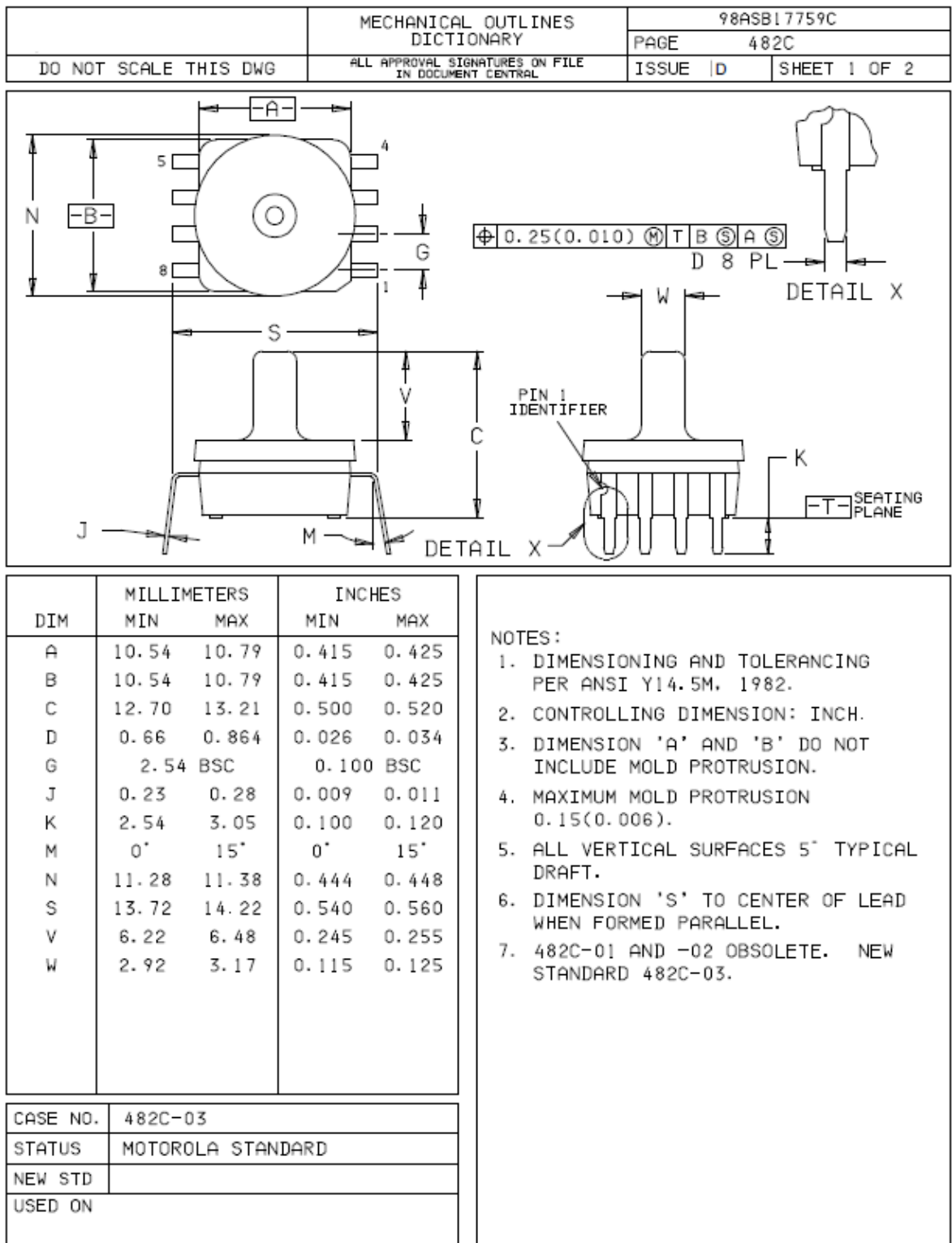
Figure 12. Case 98ASB17757C, small outline package



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
 4. MAXIMUM MOLD PROTRUSION 0.15 (0.006).
 5. ALL VERTICAL SURFACES 5° TYPICAL DRAFT.

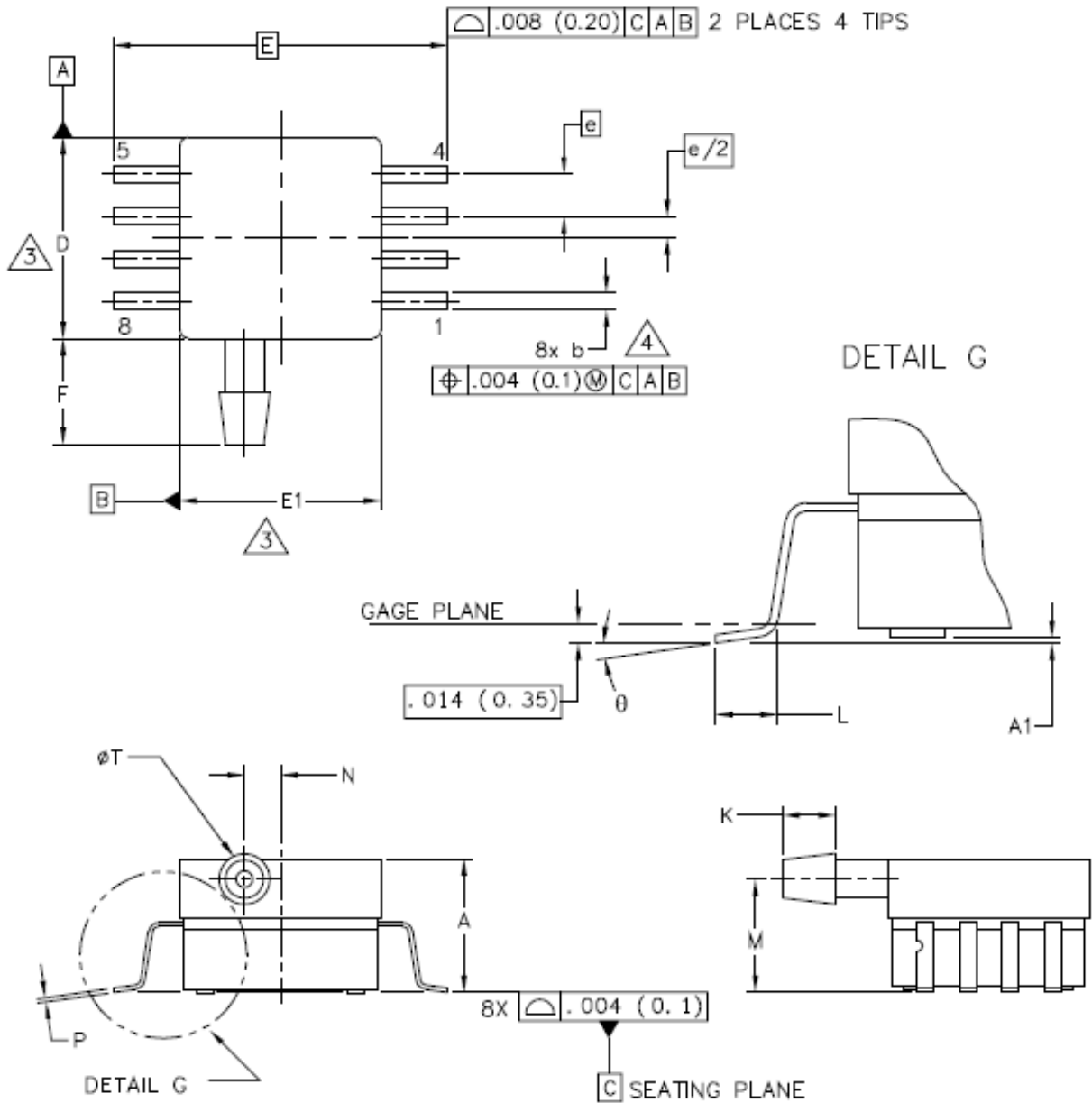
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.415	0.425	10.54	10.79
B	0.415	0.425	10.54	10.79
C	0.500	0.520	12.70	13.21
D	0.038	0.042	0.96	1.07
G	0.100 BSC		2.54 BSC	
H	0.002	0.010	0.05	0.25
J	0.009	0.011	0.23	0.28
K	0.061	0.071	1.55	1.80
M	0°	7°	0°	7°
N	0.444	0.448	11.28	11.38
S	0.709	0.725	18.01	18.41
V	0.245	0.255	6.22	6.48
W	0.115	0.125	2.92	3.17

Figure 13. Case 98ASB17759C, small outline package



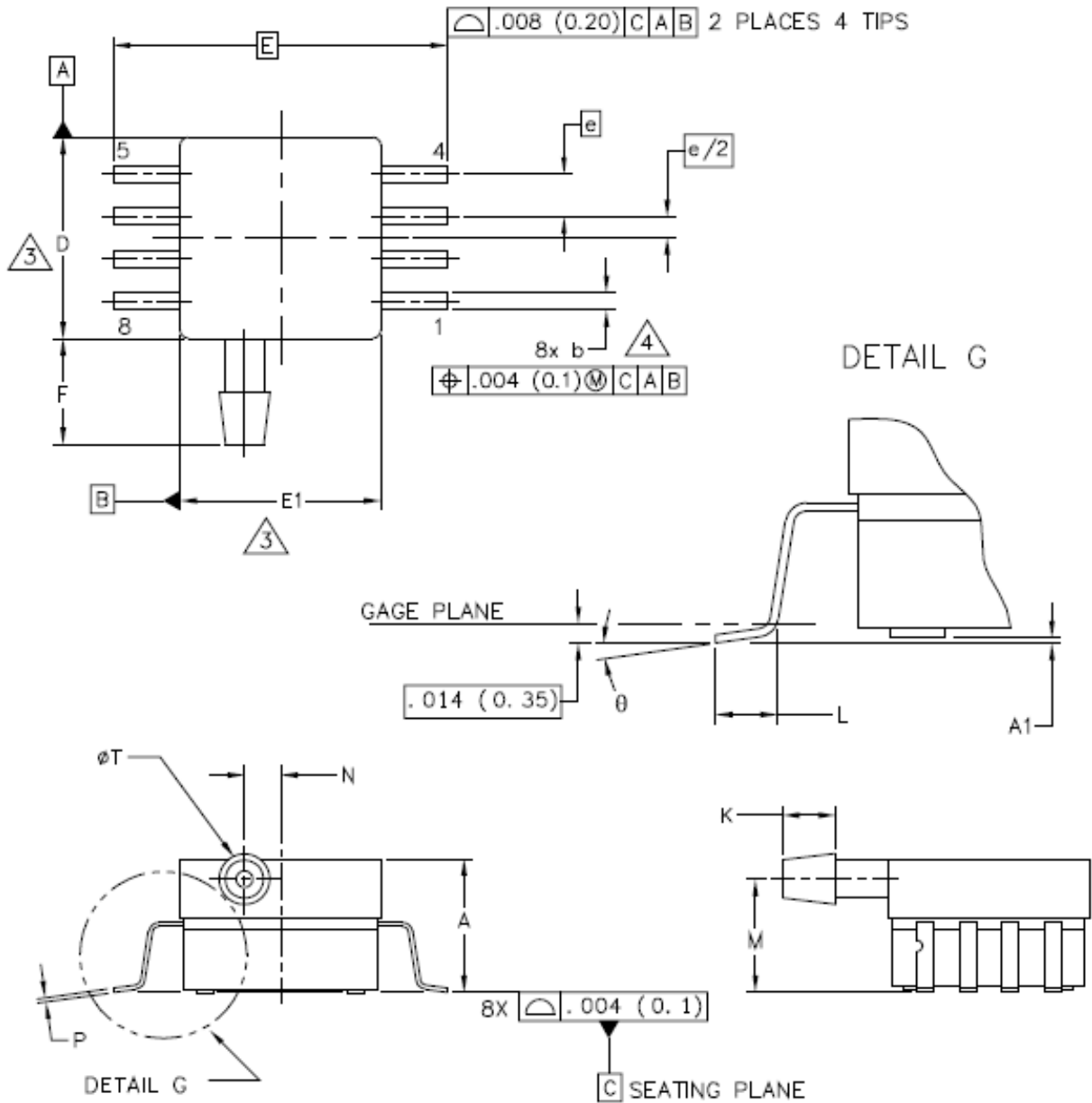
ELECTRONIC VERSIONS ARE UNCONTROLLED EXCEPT WHEN ACCESSED DIRECTLY FROM WWC.
 PRINTED VERSIONS ARE UNCONTROLLED, EXCEPT WHEN STAMPED "CONTROLLED COPY" IN RED.

Figure 14. Case 98ASA99303D, Small Outline Package



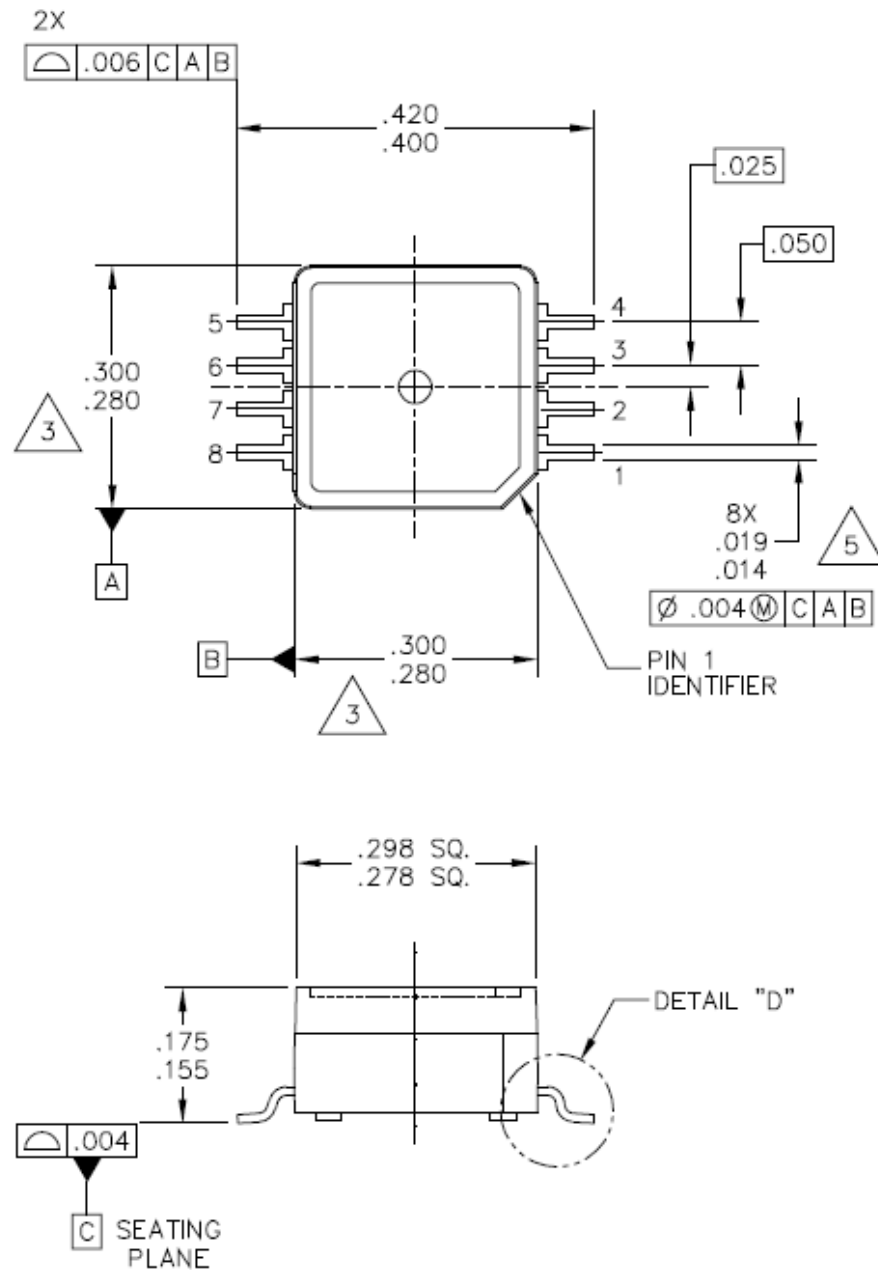
	MECHANICAL OUTLINE	PRINT VERSION NOT TO SCALE	
TITLE: 8 LD SOP, SIDE PORT	DOCUMENT NO: 98ASA99303D	REV: D	
	CASE NUMBER: 1369-01	13 DEC 2010	
	STANDARD: NON-JEDEC		

Figure 15. Case 98ASA99303D, Small outline package



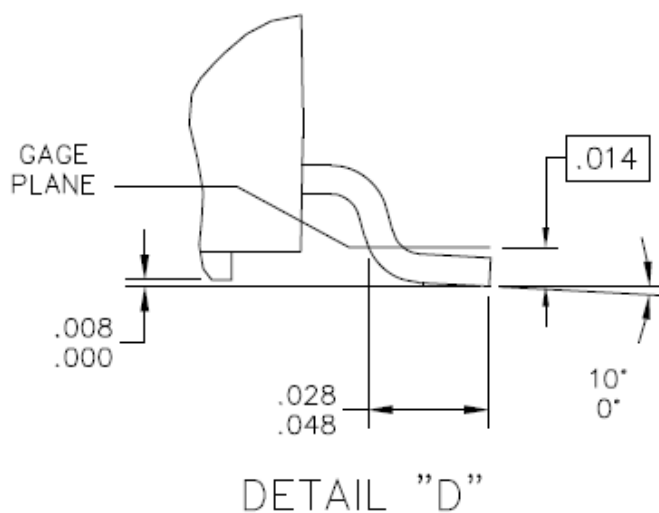
	MECHANICAL OUTLINE	PRINT VERSION NOT TO SCALE	
TITLE: 8 LD SOP, SIDE PORT	DOCUMENT NO: 98ASA99303D	REV: D	
	CASE NUMBER: 1369-01	13 DEC 2010	
	STANDARD: NON-JEDEC		

Figure 16. Case 98ARH99066A, Super small outline package



		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 17. Case 98ARH99066A, Super small outline package



	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	



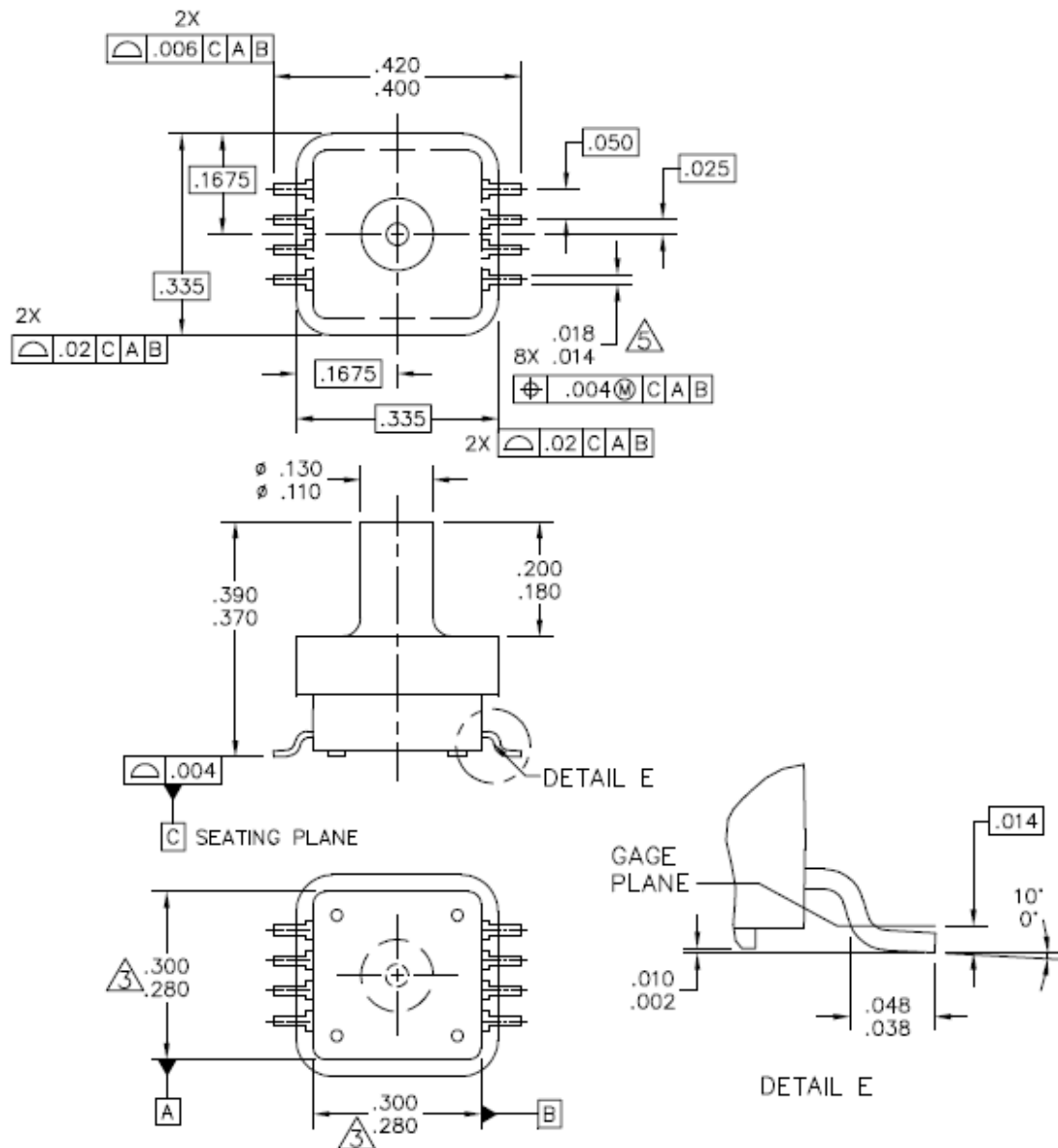
Figure 18. Case 98ARH99066A, Super small outline package

NOTES:

1. ALL DIMENSIONS IN INCHES.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSION SHALL NOT EXCEED .006 INCHES PER SIDE.
4. ALL VERTICAL SURFACES TO BE 5° MAXIMUM.
5. DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
ALLOWABLE DAMBAR PROTRUSION SHALL BE .008 INCHES MAXIMUM.

	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 19. Case 98ARH99089A, Super small outline package



MECHANICAL OUTLINE		PRINT VERSION NOT TO SCALE	
TITLE: 8 LD, PORTED SSOP	DOCUMENT NO: 98ARH99089A	REV: D	
	CASE NUMBER: 1317A-04	26 OCT 2006	
	STANDARD: NON-JEDEC		



Figure 20. Case 98ARH99089A, Super small outline package

NOTES:

1. ALL DIMENSIONS IN INCHES.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSION SHALL NOT EXCEED .006 INCHES PER SIDE.
4. ALL VERTICAL SURFACES TO BE 5° MAXIMUM.
5. DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
ALLOWABLE DAMBAR PROTRUSION SHALL BE .008 INCHES MAXIMUM.

	MECHANICAL OUTLINE	PRINT VERSION NOT TO SCALE	
TITLE: 8 LD, PORTED SSOP	DOCUMENT NO: 98ARH99089A	REV: D	
	CASE NUMBER: 1317A-04	26 OCT 2006	
	STANDARD: NON-JEDEC		



Revision history

Table 1. Document revision history

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



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