

# Handling Freescale Pressure Sensors

by: William McDonald

## INTRODUCTION

Smaller package outlines and higher board densities require the need for automated placement of components. These components are supplied in embossed carrier tape on plastic reels to meet the increased demand and facilitate ease of handling. This application note is intended to provide general information and understanding for handling Freescale's surface mount pressure sensors. Equipment details are not provided in this document and it is recommended that end users contact suppliers of equipment for specific applications.

## METHODS OF HANDLING

Components can be picked from the carrier tape using either the vacuum assist or the mechanical type pick up heads. A vacuum assist nozzle type is most common due to its lower cost of maintenance and ease of operation. The recommended vacuum nozzle configuration should be designed to make contact with the device directly on the metal

cover and avoid vacuum port location directly over the vent hole in the metal cover of the device. To provide a more secure hold on the device, contact with the plastic ridge around the perimeter of the metal cover should be avoided to prevent loss of vacuum pressure. Multiple vacuum ports within the nozzle may be required to effectively handle the device and prevent shifting during movement to placement position.

Figure 1 shows two styles of multiple port vacuum nozzles for the MPXH series device as an example. Figure 2 represents the nozzle location on the device.

Vacuum pressure required to adequately support the component should be approximately 25 in Hg (85kPa). This level is typical of in-house vacuum supply.

Pick up nozzles are available in various sizes and configurations to suit a variety of component geometries. To select the nozzle best suited for the specific application, it is recommended that the customer consult their pick and place equipment supplier to determine the correct nozzle. In some cases it may be necessary to fabricate a special nozzle depending on the equipment and speed of operation.

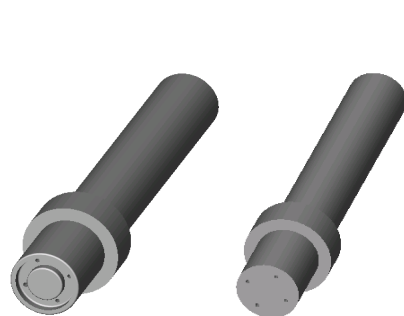


Figure 1. MPXH Series Multiple Port Vacuum Nozzles

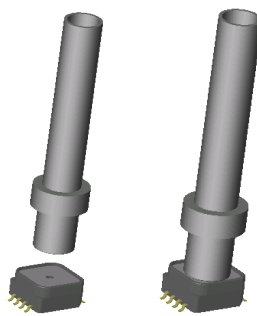


Figure 2. Nozzle Location

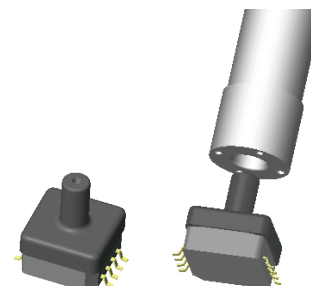


Figure 3. SSOP Axial Style Port

## AVAILABLE PACKAGES

Freescale offers several small outline surface mount device families. These are MPXA, MPXH, MPXM, and MPXY series of devices.

These devices are also available in axial ported versions to allow pressure to be interfaced to a device via a hose connection.

Pick up nozzles for these packages should be configured to apply vacuum only to the flat surface of a port base. An access clearance in the nozzle for a port shank is necessary to properly handle these device configurations. See Figure 3.



SOP



SSOP



MPAK

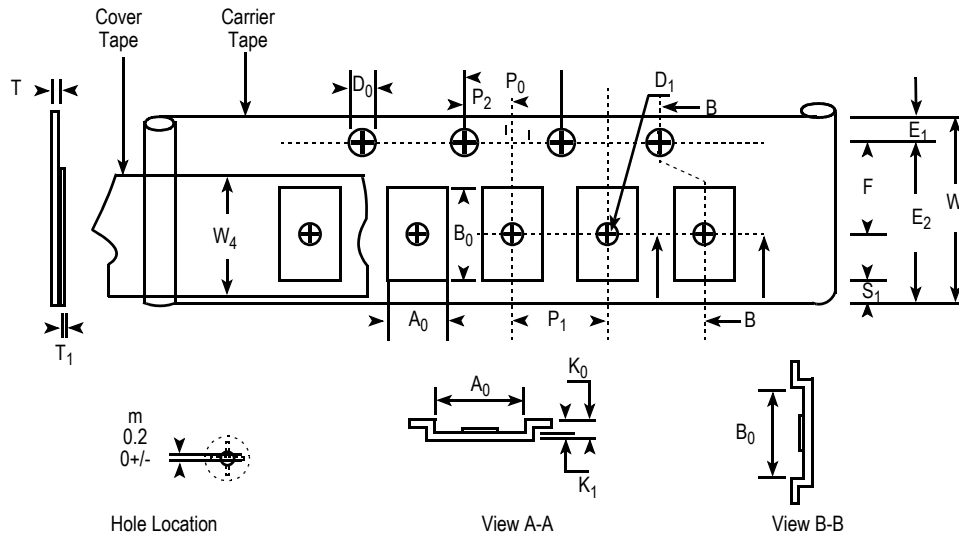


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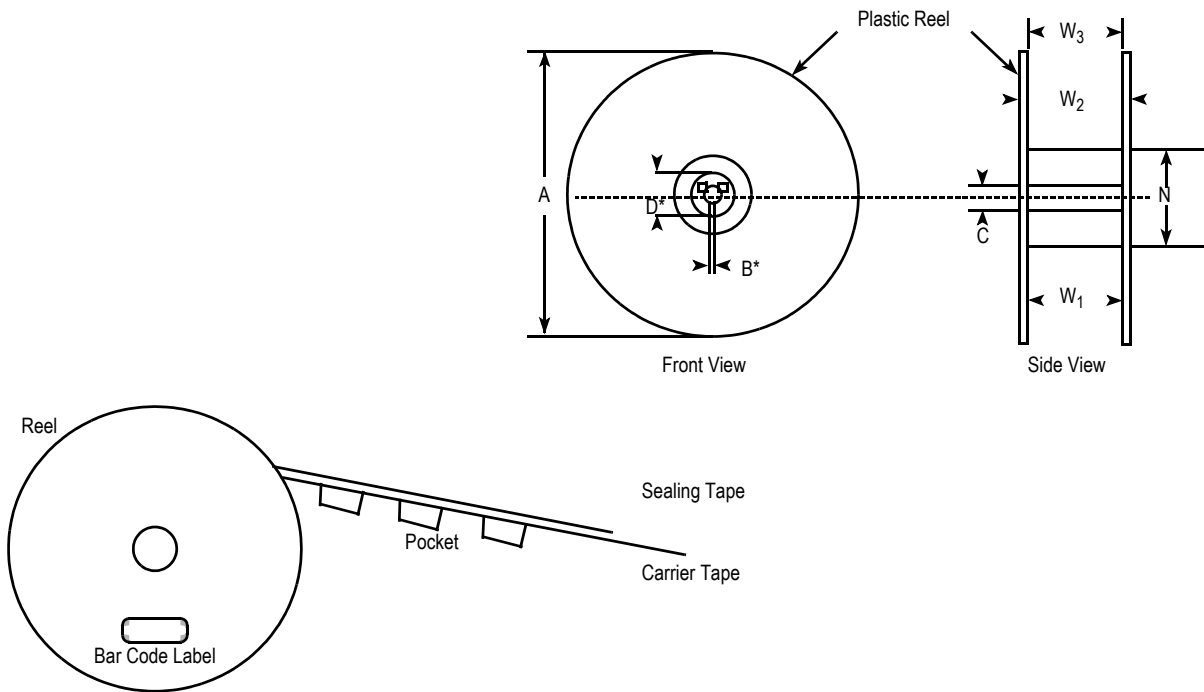
Figure 2. Available Packages

Table 1. Tape and Reel Information

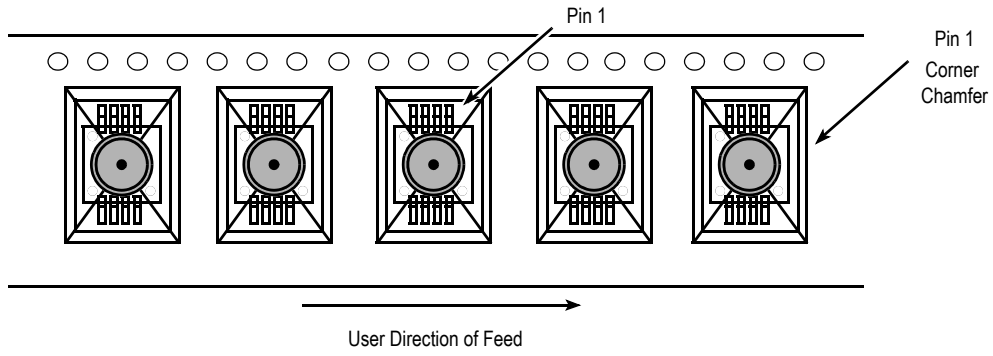
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<b>Carrier Tape</b>		<b>Chip Pak</b>	<b>SSOP</b>	<b>SSOP Ported</b>	<b>M-Pak</b>	<b>M-Pak Ported</b>	<b>SOP</b>	<b>SOP Ported</b>	<b>SOP Side Port</b>
Tape Width	W	24.0+/-0.3	24.0+/-0.3	24.0+/-0.3	24.0+/-0.3	24.0+/-0.3	32+/-0.3	32+/-0.3	32+/-0.3
Pocket Width	A <sub>0</sub>	8.5+/-0.2	7.7+/-0.1	8.8+/-0.1	6.8+/-0.1	7.2+/-0.1	11.3+/-0.1	12.0+/-0.2	12.6+/-0.2
Length	B <sub>0</sub>	14.2+/-0.2	10.7+/-0.1	11.8+/-0.1	12.6+/-0.1	13.2+/-0.1	18.9+/-0.1	18.8+/-0.2	18.8+/-0.2
Depth	K <sub>0</sub>	4.7+/-0.1	5.0+/-0.1	10.8+/-0.1	4.6+/-0.1	10.5+/-0.1	6.4+/-0.1	13.8+/-0.1	9.2+/-0.2
Sprocket Hole Pitch	P <sub>0</sub>	4.0 +/-0.1	4.0+/-0.1	4.0+/-0.1	4.0+/-0.1	4.0+/-0.1	4.0+/-0.1	4.0+/-0.1	4.0+/-0.1
Sprocket Hole Diagram	D <sub>0</sub>	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05	1.5+/-0.05	1.5+/-0.1	1.5+/-0.1
Edge to Hole	E <sub>1</sub>	1.75+/-0.1	1.75+/-0.1	1.75+/-0.1	1.75+/-0.1	1.75+/-0.1	1.75+/-0.1	1.75+/-0.1	1.75+/-0.1
Hole to Edge	E <sub>2</sub>	22.2 min	22.2 min	22.2 min	22.2 min	22.2 min	N/A	N/A	N/A
Distance between Holes	S <sub>0</sub>	N/A	N/A	N/A	N/A	N/A	28.4+/-0.1	28.4+/-0.1	28.4+/-0.1
Pocket Pitch	P <sub>1</sub>	12.0+/-0.1	12.0+/-0.1	16.0+/-0.1	12.0+/-0.1	16.0+/-0.1	16.0+/-0.1	20.0+/-0.1	24.0+/-0.1
Pocket Position	P <sub>2</sub>	2.0+/-0.1	2.0+/-0.1	2.0+/-0.1	2.0+/-0.1	2.0+/-0.1	2.0+/-0.1	2.0+/-0.1	2.0+/-0.1
	F	11.5+/-0.1	11.5+/-0.1	11.5+/-0.1	11.5+/-0.1	11.5+/-0.1	14.2+/-0.1	14.2+/-0.1	14.2+/-0.1
Tape Thickness	T	0.40+/-0.05	0.40+/-0.05	0.40+/-0.05	0.40+/-0.05	0.40+/-0.05	0.30+/-0.05	0.35+/-0.05	0.40+/-0.05
Distance Pocket to Edge	S <sub>1</sub>	0.6 min.	0.6 min	0.6 min	0.6 min	0.6 min	N/A	N/A	N/A
Pocket Hole Diagram	D <sub>1</sub>	N/A	1.5+/-0.1	1.5+/-0.1	1.5+/-0.1	1.5+/-0.1	2.0+/-0.1	2.0+/-0.1	2.0+/-0.1
<b>Cover Tape</b>									
Thickness	T <sub>1</sub>	0.052 +/-0.01	0.052 +/-0.01	0.052 +/-0.01	0.052 +/-0.01	0.052 +/-0.01	0.052 +/-0.01	0.052 +/-0.01	0.052 +/-0.01
Width	W <sub>4</sub>	21.1+/-0.1	21.1+/-0.1	21.1+/-0.1	21.1+/-0.1	21.1+/-0.1	21.1+/-0.1	25.5+/-0.1	25.5+/-0.1
<b>Reel</b>									
Width at Hub	W <sub>1</sub>	23.7 - 25.2	23.7 - 25.2	23.7 - 25.2	23.7 - 25.2	23.7 - 25.2	23.7 - 25.2	31.7 - 33.2	31.7 - 33.2
Width at outer flange	W <sub>3</sub>	23.7 - 28.0	23.7 - 28.0	23.7 - 28.0	23.7 - 28.0	23.7 - 28.0	23.7 - 28.0	31.7 - 36.0	31.7 - 36.0
Overall Width	W <sub>2</sub>	30.4 max.	30.4 max.	30.4 max.	30.4 max.	30.4 max.	30.4 max.	38.4 max.	38.4 max.
Hub Diagram	N	100+/-2.50	100+/-2.50	100+/-2.50	100+/-2.50	100+/-2.50	100+/-2.50	178+/-2.50	178+/-2.50
Arbor Hole Diagram	C	13.0+ 0.5/-0.2	13.0+ 0.5/-0.2	13.0+ 0.5/-0.2	13.0 +0.5/-0.2	13.0 +0.5/-0.2	13.0 +0.5/-0.2	13.0 +0.5/-0.2	13.0 +0.5/-0.2
Slot of Arbor Hole	B	1.50/2.50	1.50/2.50	1.50/2.50	1.50/2.50	1.50/2.50	1.50/2.50	1.50/2.50	1.50/2.50
Reel Diagram	A	330+/-0.76	330+/-0.76	330+/-0.76	330+/-0.76	330+/-0.76	330+/-0.76	330+/-0.76	330+/-0.76
<b>DEVICE QTY/REEL</b>	MPQ	1000	1000	300	1000	400	600	100	200



**Figure 3. Carrier Tape**

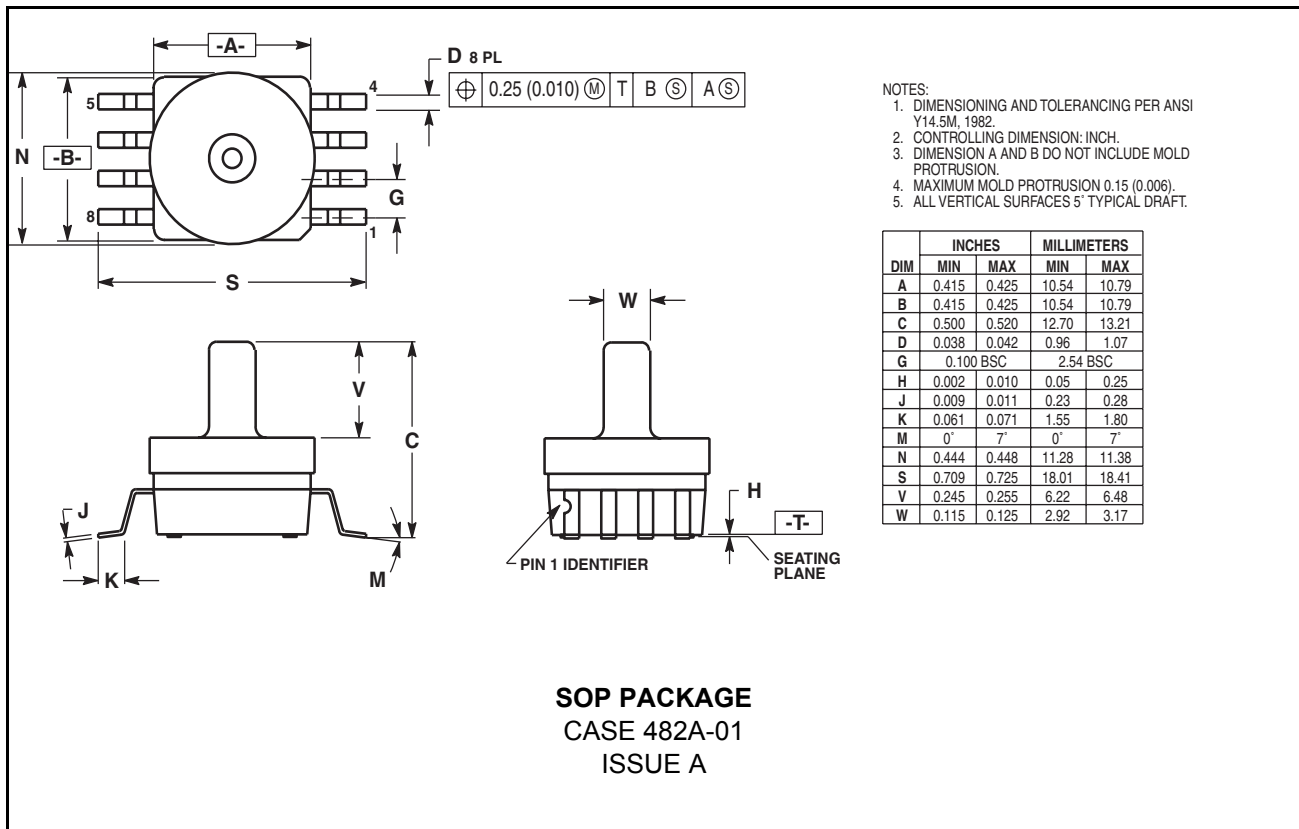
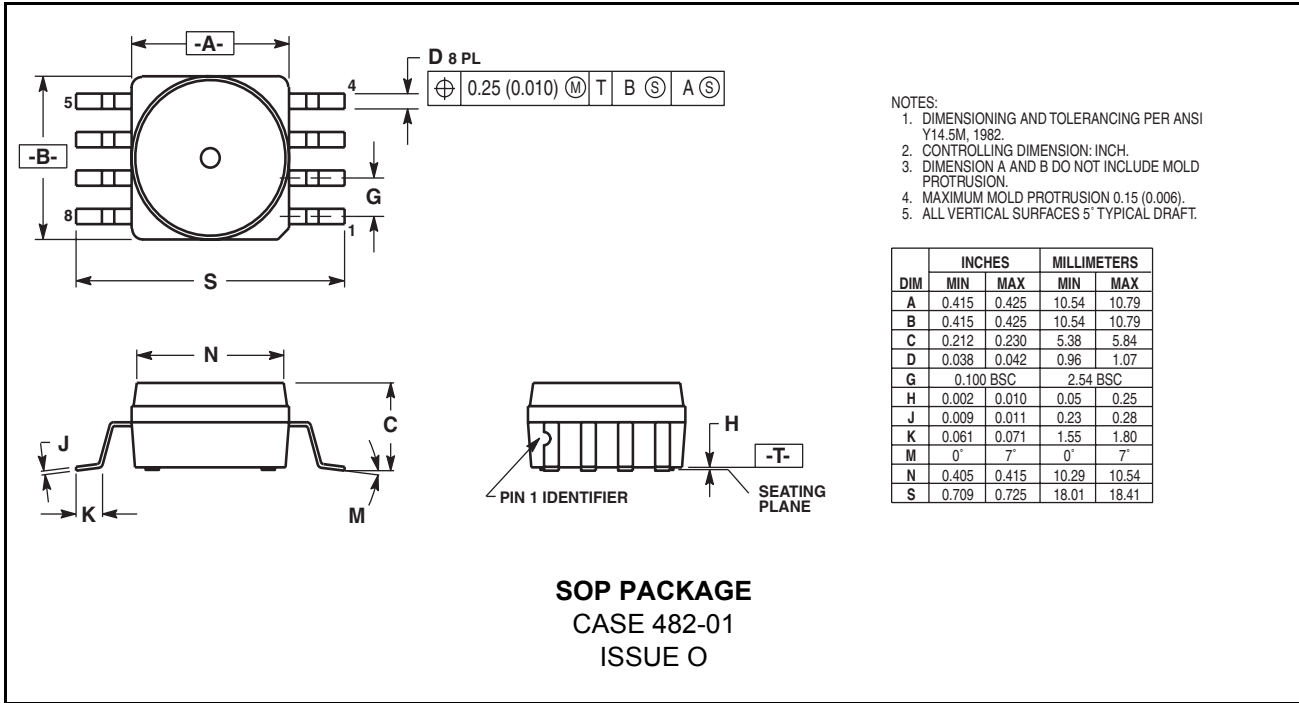


**Figure 4. Reel**

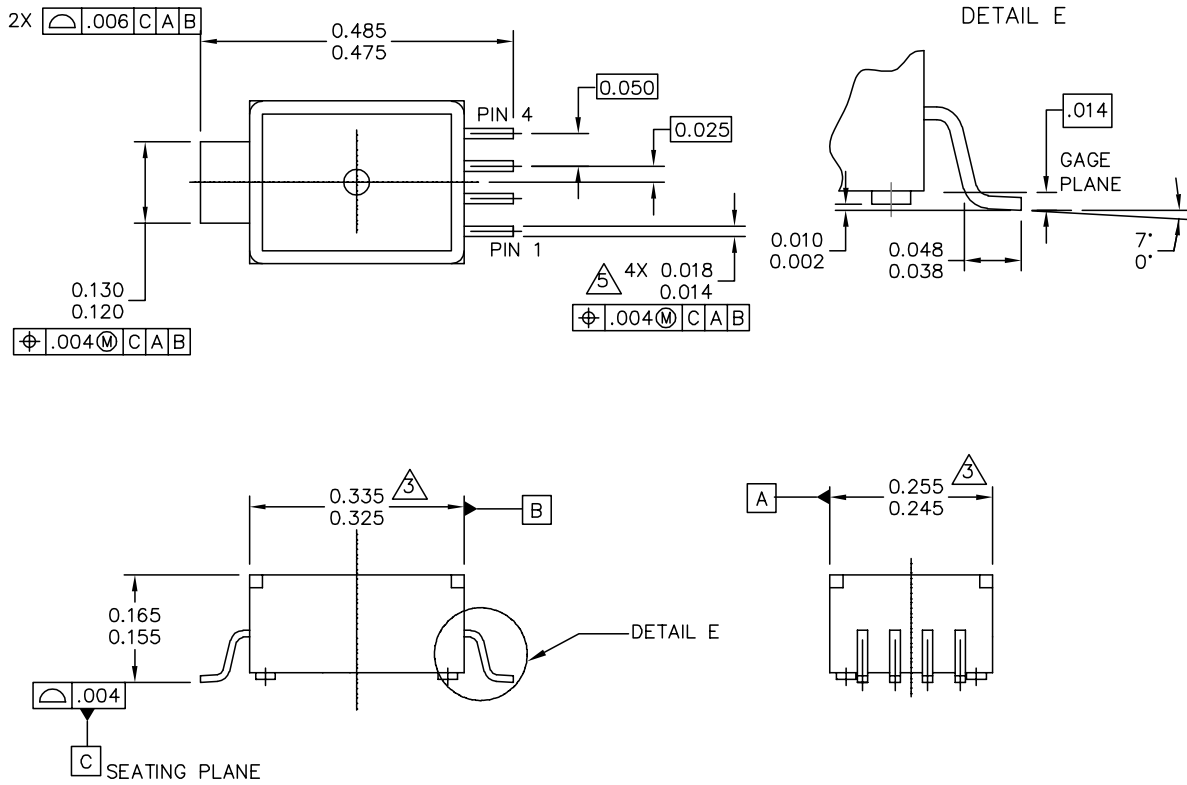


**Figure 5. Orientation of Small Outline Package Sensor Device**

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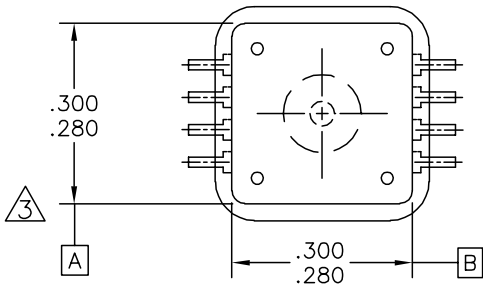
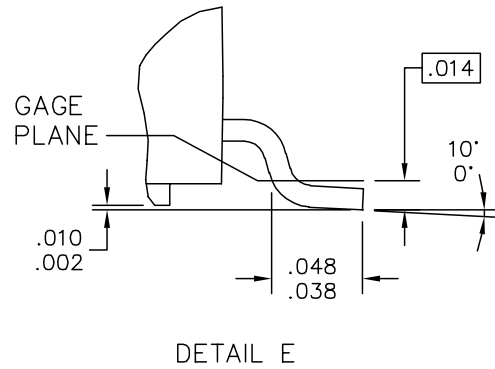
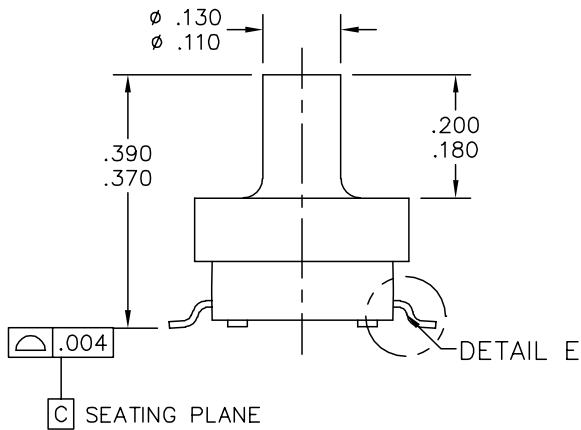
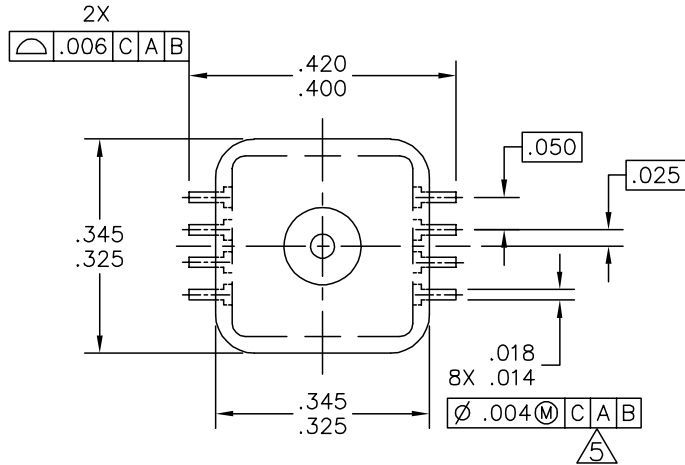
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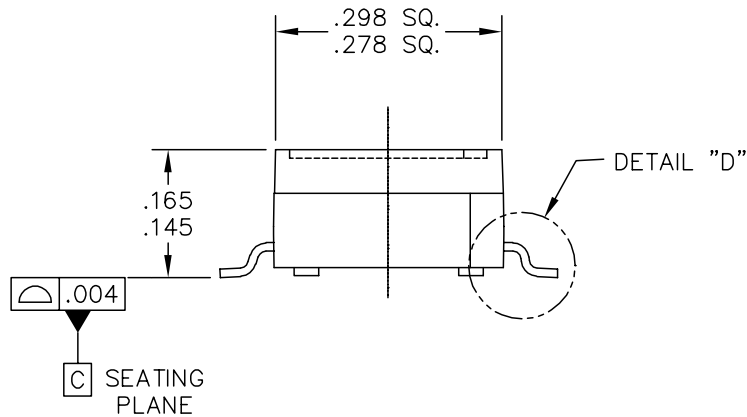
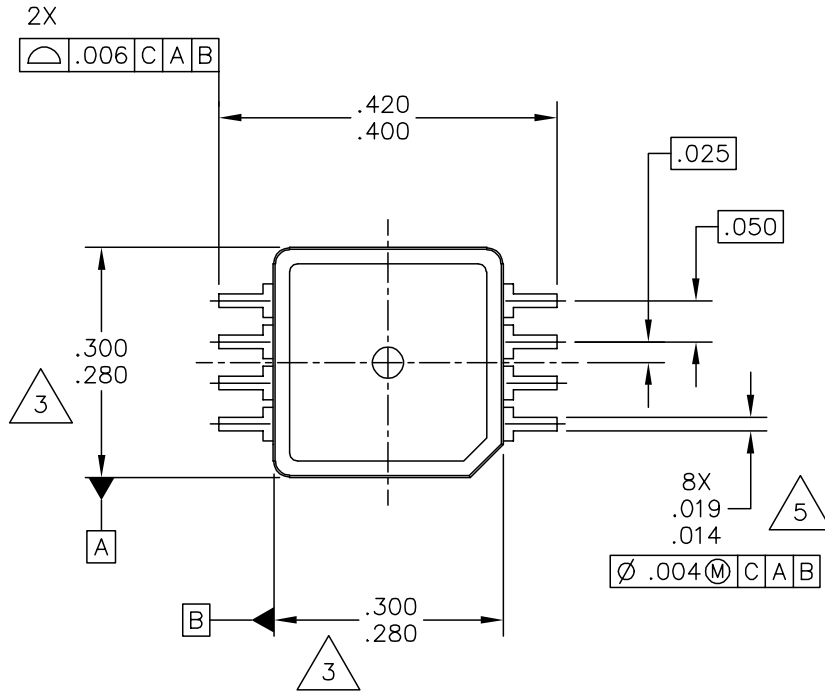
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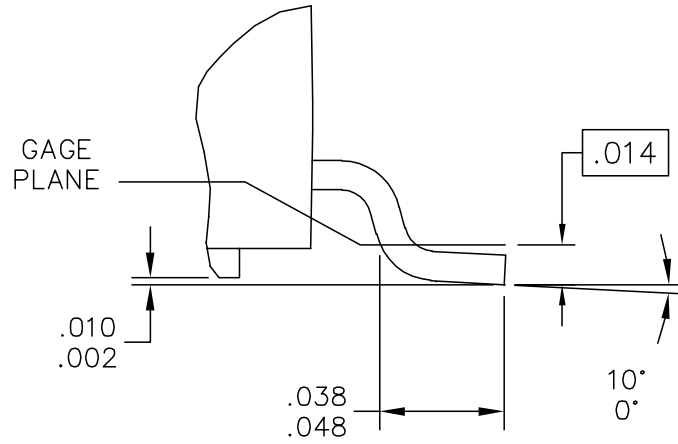
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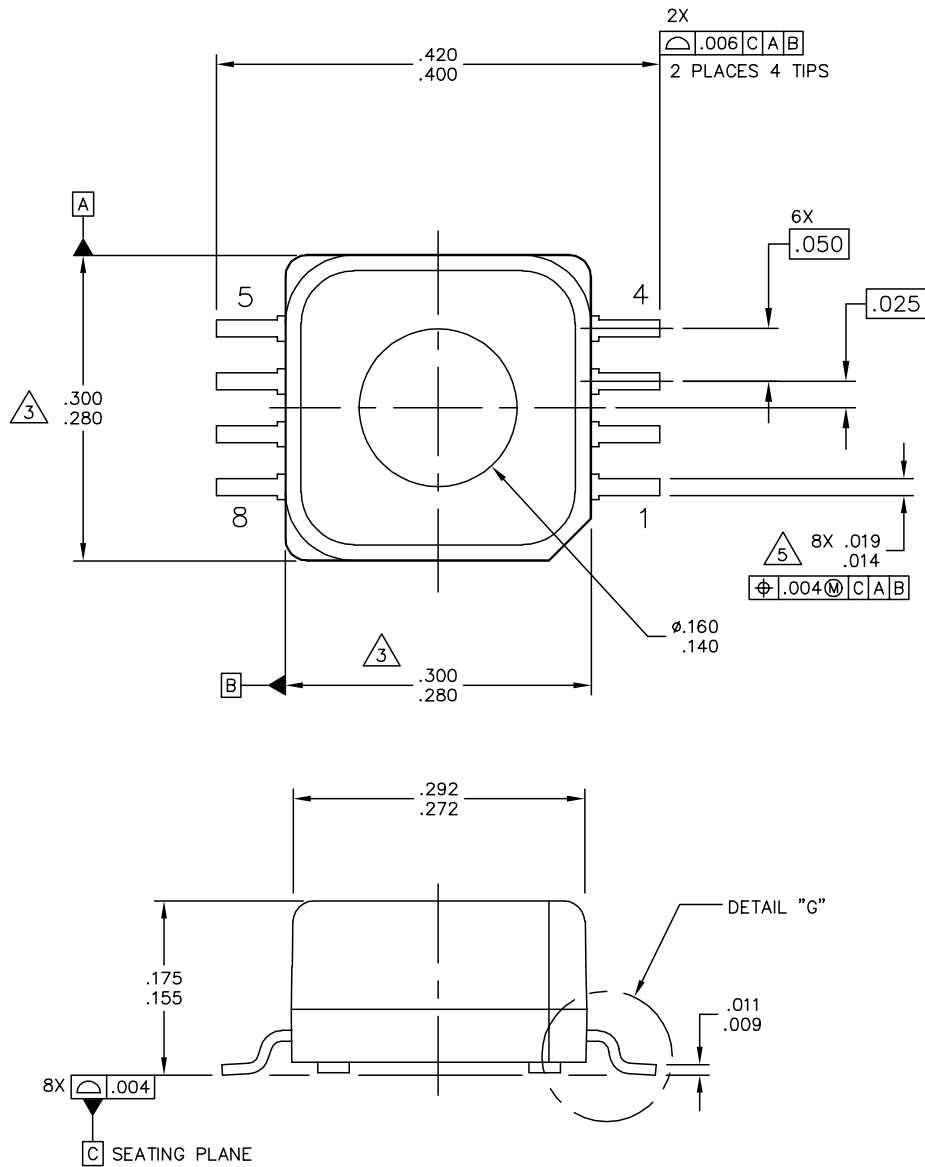
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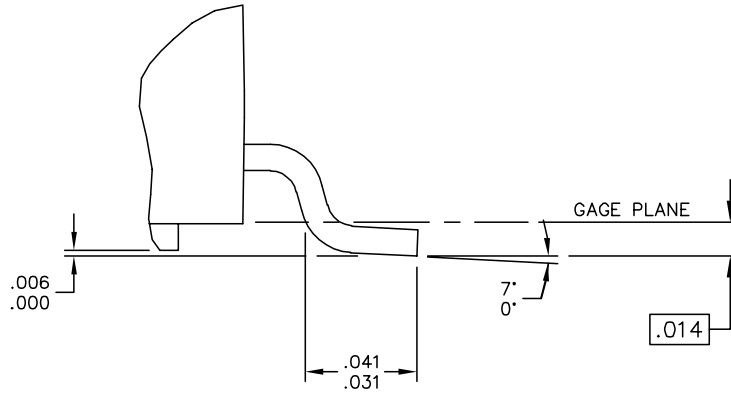
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