## Introduction

This technical note is intended to provide information about Kionix's 2 x 2 mm LGA packages and guidelines for developing PCB land pattern layouts. These guidelines are general in nature and based on recommended industry practices. The user must apply their actual experiences and development efforts to optimize designs and processes for their manufacturing techniques and the needs of varying end-use applications. It should be noted that with the proper PCB footprint and solder stencil designs, the package will self-align during the solder reflow process.

## 2x2 LGA Package Marking


- Marking font type : Arial
- Font size : 1.5 Point (0.56 mm height)
- Line space : 0.1 mm
- Text information
  - 1st line – AAZ Assembly Build Lot code
  - 2nd line – ZZ Device name

Note - All text lines shall be right justified.

**Figure 1**. 2x2 mm LGA package marking information

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## 2x2 LGA Package Outline and Dimensions

The following diagrams show the outline of the Kionix's LGA packages with dimensions and tolerances. All dimensions and tolerances conform to ASME Y14.5M-1994. All dimensions are in millimeters and angles are in degrees.

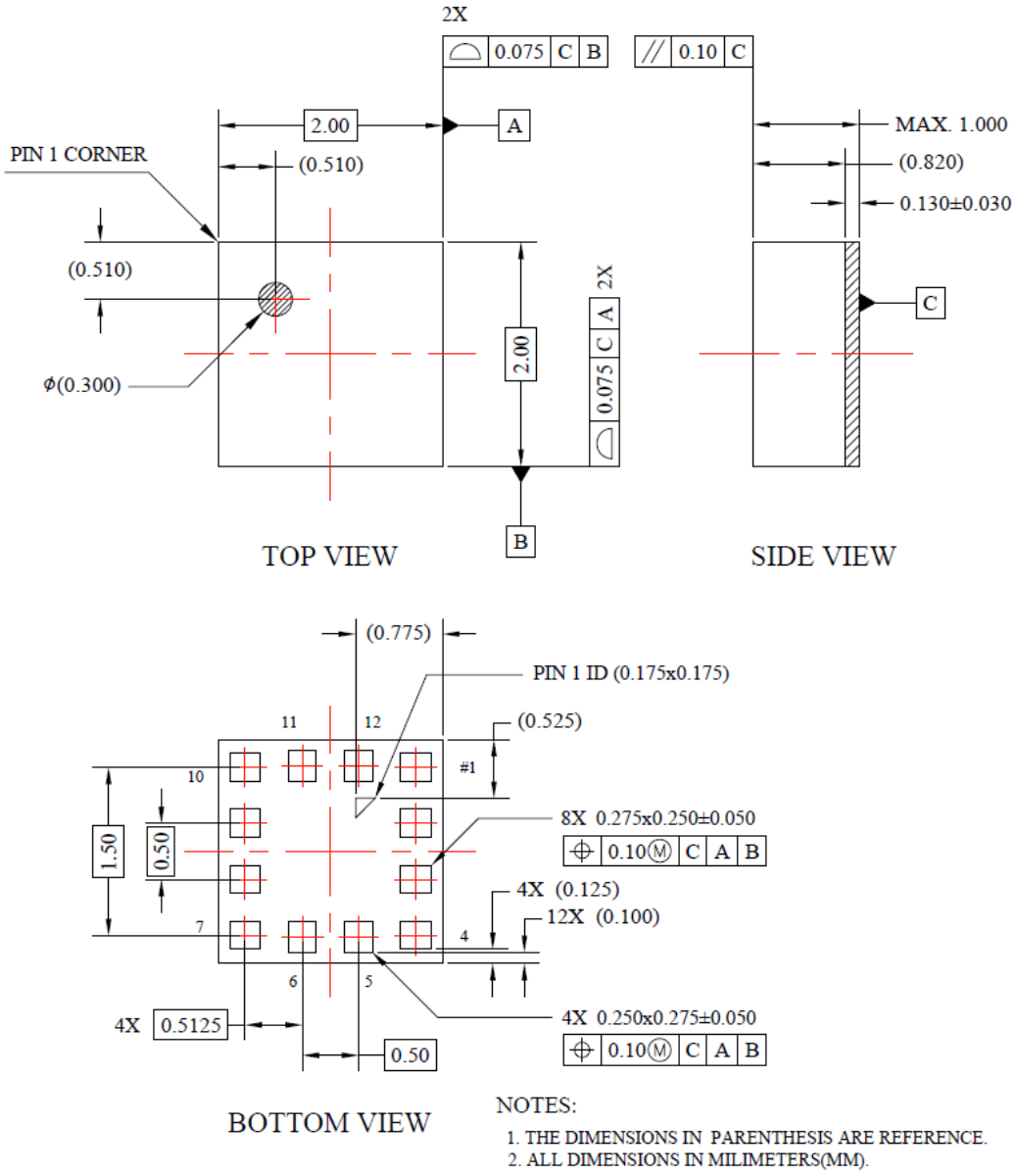


**Figure 2.** 12-pin 2 x 2 mm LGA package outline diagram with dimensions.

Typical LGA packages expose metal traces on the package sides; so no solder material should be allowed to contact the package sides.

## Solder Pad Layer Dimensions

The solder pocket is defined by dimensions of the metal layers behind the solder pad and the solder mask around the pad.

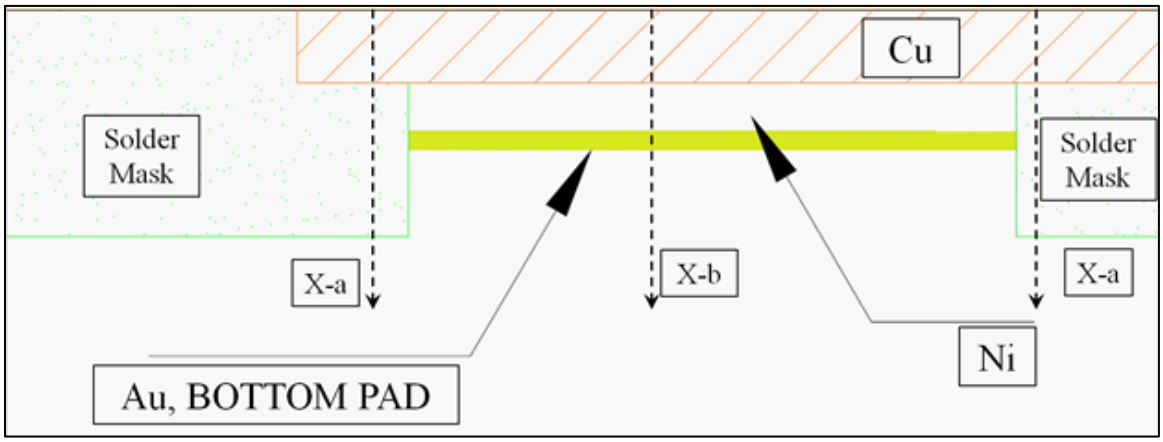


**Table 1.** For 2x2 products with 0.13mm substrates (KXTJ2, KX022)

| Solder Mask (Cross Section "X-a")(µm) | | | | Solder Pad (Cross section "X-b")(µm) | | | |
|---|---|---|---|---|---|---|---|
| Layer | Min | Nominal | Max | Layer | Min | Nominal | Max |
| S/M | 10 | 20 | 30 | NI | 3 | - | 12 |
| | | | | Au | 0.3 | - | 1.0 |

## LGA PCB Layout Recommendations

Given the above 2 x 2 mm package dimensions, the following guidelines are recommended:

The PCB should be designed with SMD (Solder Mask Defined) openings for the LGA lands. These openings should be an identical mirror image of the bottom pattern of the LGA package. The land size on the PCB should be 100% of the device land.

The next figure shows an example of a 2x2 LGA part in a multilayer PCB:

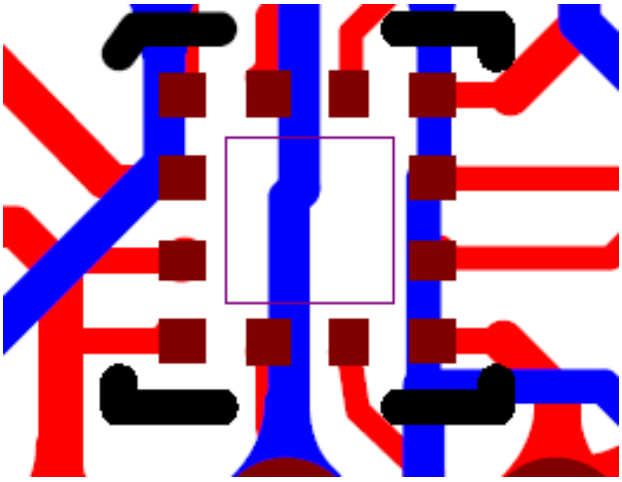

**Figure 3.** Example of a 12-pin 2 x 2 mm LGA in a multilayer PCB

## LGA Solder Stencil Guidelines

A laser-cut, stainless steel stencil with electro-polished trapezoidal walls is recommended.

The stencil can be a 4 mil stencil (0.102 mm).

If improved solder release is required, aperture walls can be trapezoidal and the corners rounded.

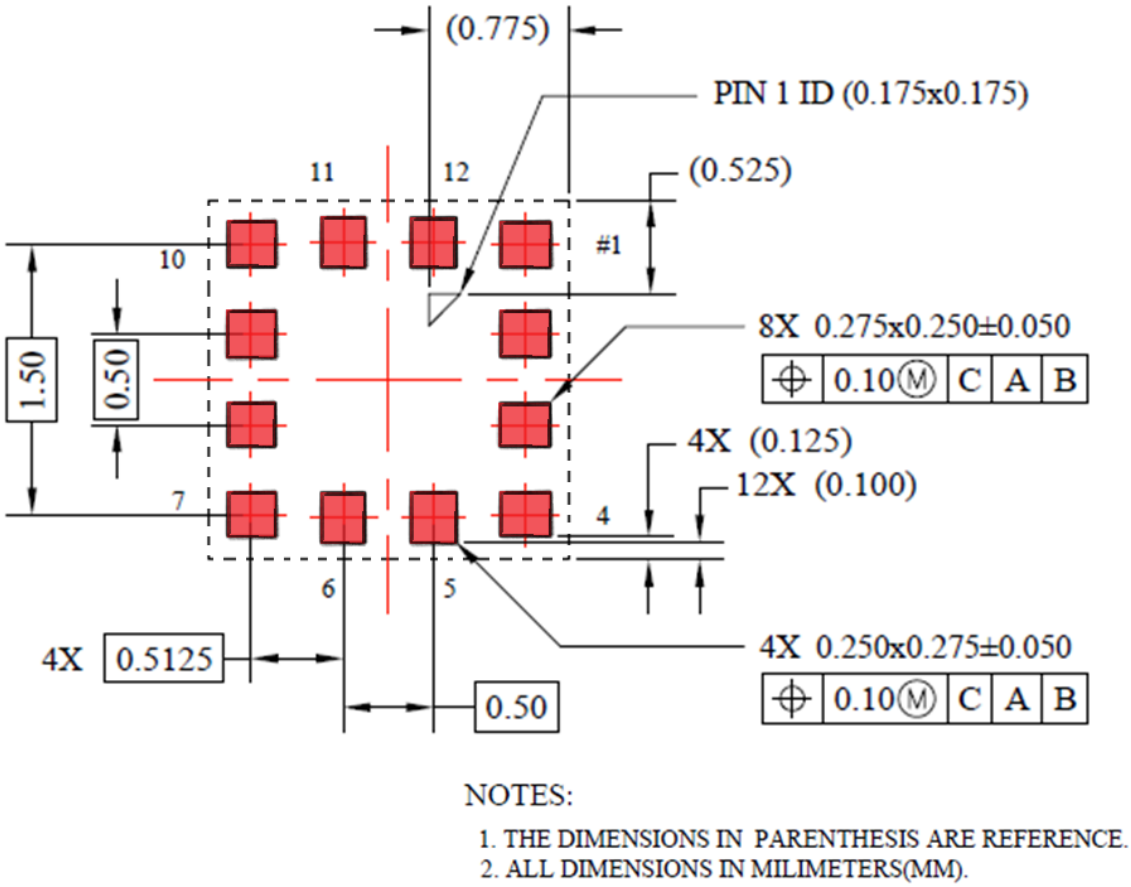


**Figure 4.** Example of a 12-pin 2 x 2 mm LGA solder stencil layout

## PCB Via and Trace Placement

Vias are not needed for thermal dissipation, as our part doesn't generate much heat. Therefore, only electrical vias are needed. If vias are not in the land pads, then capped, plugged, tented, un-capped or un-plugged vias can be used. To ensure optimal performance, vias and traces should not be placed on the top layer directly beneath the accelerometer. The following figures illustrate an example of proper PCB via and trace placement. Obviously, each product will present its own physical limitations for accelerometer placement and trace routing. Therefore, these guidelines are general in nature. Engineering judgment should be used to try to avoid placement directly beneath the accelerometer. Generally there is a recommended 2mm keep-out area around the device that applies to vias. No extra copper is required under device.

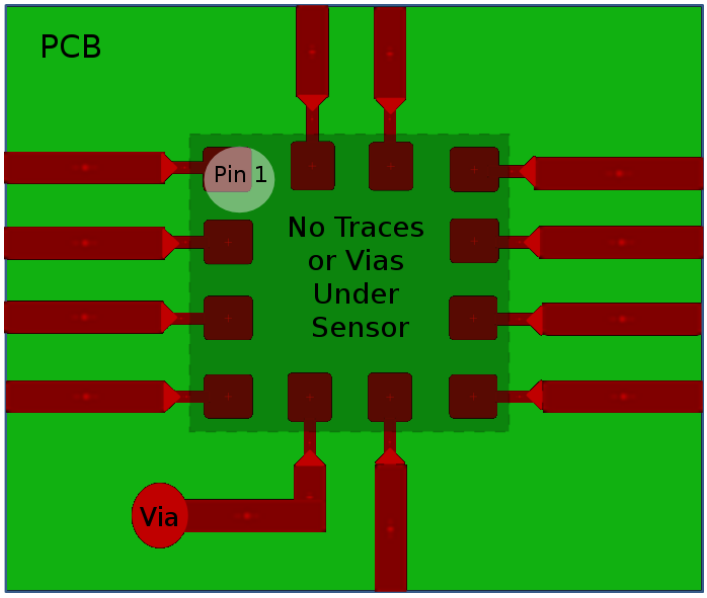


**Figure 5.** Via and Trace "2 mm Keepout area" (Top Vew)

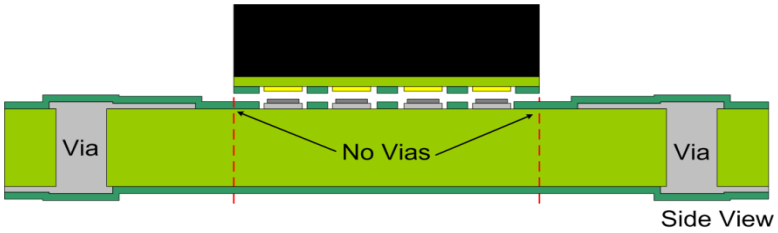


**Figure 6.** Via and Trace "2 mm Keepout" (Side View)

## Tape and Reel Dimensions

The following section provides information on the tape and reel used for shipping Kionix's 2 x 2 mm LGA accelerometers.

| Package | Tape Width | Component Pitch | Hole Pitch | Reel Diameter |
|---|---|---|---|---|
| LGA (2x2) | 8mm | 8mm | 4mm | 330mm |

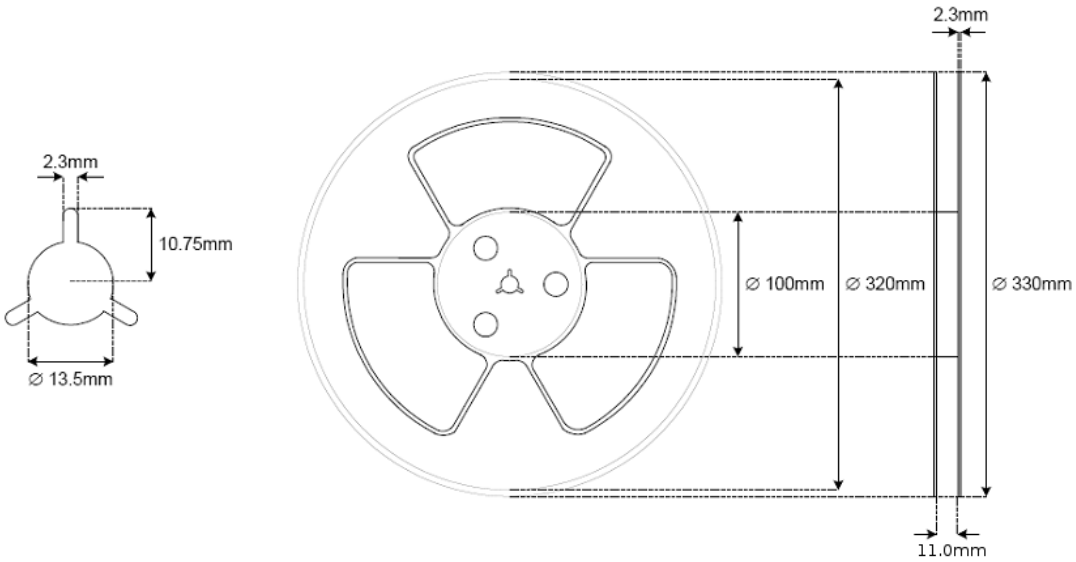


**Figure 7.** Dimensions of the reel

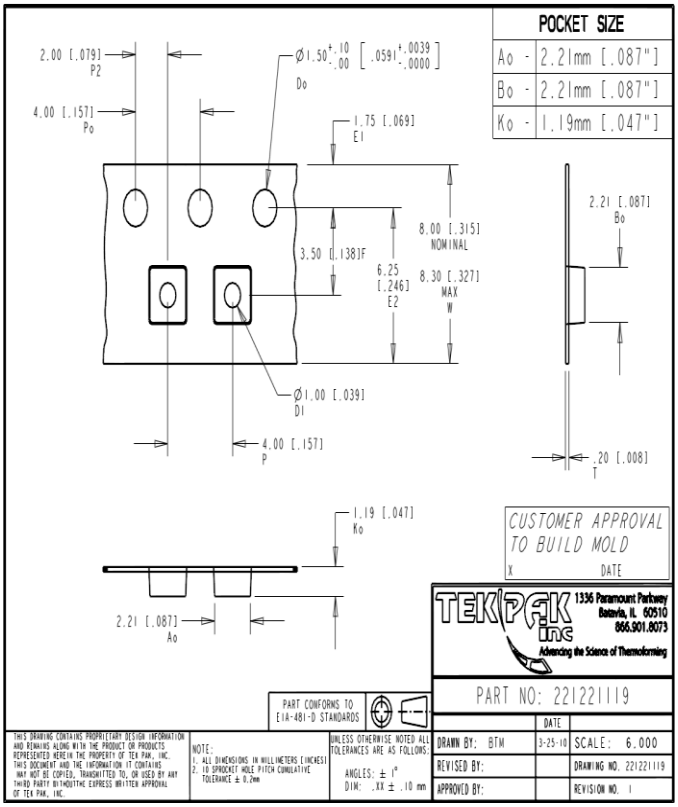


**Figure 8.** Carrier tape description for 2x2 mm LGA parts

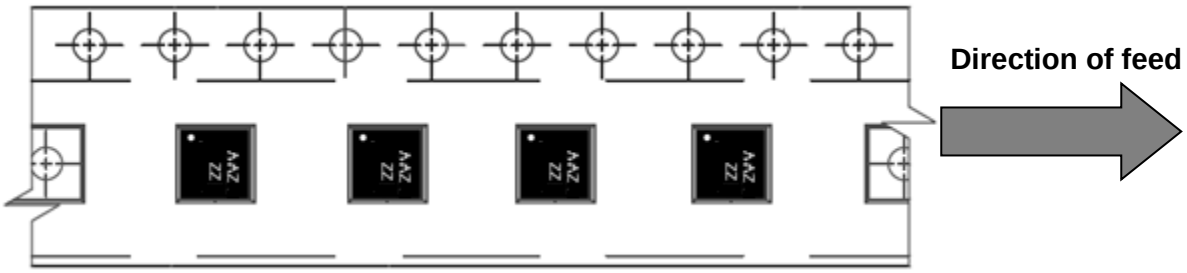


**Figure 9.** Orientation of the parts in the carrier tape and direction of feed

## Revision History

| Rev | Date | Description of Change |
|---|---|---|
| - | 20-Apr-2012 | Initial Release |
| 1 | 27-Aug-2013 | Added part orientation in carrier tape and direction of feed. |
| 2 | 12-Jun-2014 | Improved Solder Stencil Layout. Added Reel dimensions. Added Solder pad layer dimensions |
| 3 | 15-Oct-2014 | Added No solder on side of package recommendation. |
| 4 | 02-Apr-2015 | Updated package outline diagram with dimensions figure and solder stencil layout figure. |
| 5 | 10-July-2015 | Renamed the document |