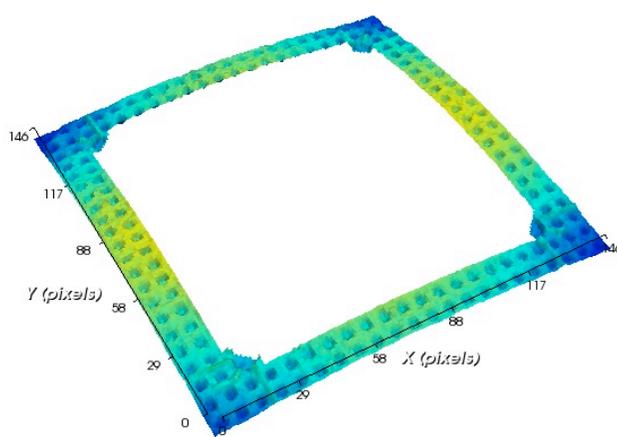


## Akrometrix Applications – Package on Package (PoP)

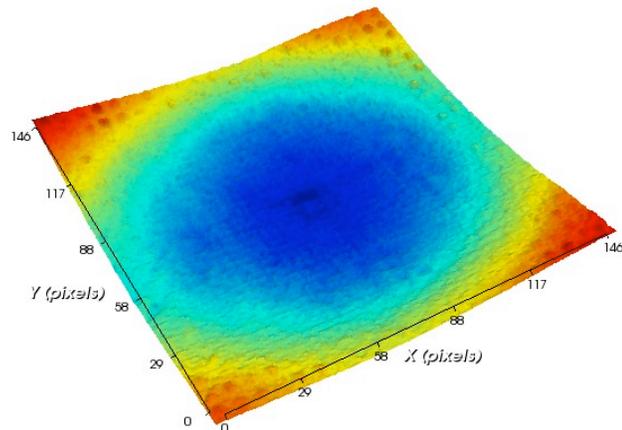
Package on Package (PoP) components, along with other 3D packaging and TSV (Through Silicon Via) technologies are becoming increasingly common, particularly in mobile devices. The trend for these package types continues toward thinner packages with higher ball pitch. As these trends increase the need for accurate warpage characterization is becoming ever more critical.

Akrometrix systems are capable of testing a range of PoP surfaces. In particular the shadow moiré approach is well designed to test these sample types in high volumes through thermal cycling. Testing throughput and repeatability is increased with the addition of the Part Tracking feature in Surface Measurement, which allows automatic location, rotation, and cropping of large sample quantities in a single reflow profile.

The below 3D surface plots show the shape of bottom and top components at the same elevated temperature. The topside of the bottom component is measured and, in this case, only the attaching perimeter of the sample is analyzed. The second picture shows the bottom-side of the top (memory) component. Here we see that the direction and magnitude of warpage is similar for the connection between these components. This will not always be the case. Direction of warpage is important to consider when analyzing PoP attachment.



SignedWarpage = 65 microns



SignedWarpage = -114 microns

The Akrometrix Interface Analysis software allows the automatic orientation and analysis of attaching surfaces as would be the case with the above plots. 3D packaging presents a unique opportunity for use of the Interface Analysis software. The bottom PoP component will actually contain two attach surfaces in one component. The bottom surface will attach to a PCB and the top surface will attach to the top memory component. Below are plots from Interface Analysis showing the top (shown in wire frame) and bottom surfaces for a PoP sample, as well as a “Gap” surface showing the difference between the two surfaces. Here the direction of warpage is opposite for the two packages resulting in larger gaps in the package corners.

