Abstract

Land Grid Array packages are attractive for a number of reasons, including the small overall outline of assemblies and the ability of the user to choose the solder alloy. In general, life in thermal cycling may also not be reduced by as much as might be expected based on the standoff alone. In fact, we have shown packages soldered with SAC305 to survive as long as, or sometimes longer than, corresponding Ball Grid Array components in accelerated thermal cycling. This was found to be associated with a superior microstructure formed in the smaller solder volumes. This is, however, sensitive to materials and design parameters. So far we have been able to control it in our work. A major separate effort is focused on how to do so under general manufacturing relevant conditions.

Even assuming the solder microstructure can be controlled questions remain as to whether it is also likely to be superior under realistic service conditions, whether it remains stable over time, and whether it has disadvantages for alternative damage and failure mechanisms such as solder pad cratering. This is the focus of the present report.