TECHtips

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Electronics Manufacturing Insights from ACI Technologies, Inc.

The Power Packaging Laboratory at ACI Technologies

Microelectronics is the manufacture of systems built from extremely small electronic components. In today's electronic world, devices must be portable, equipped with wireless technology and are driven by size, weight, power, and cost (SWaP-C). These system level drivers are crucial to all current and future electronic applications from personal computers and cellular telephones to military-fielded hardware, biomedical instrumentation, and space-flight hardware.

Reduced product size and weight can be realized through a decrease in the number of individual components and internal interconnects. Multilayer printed circuit boards (PCBs) with plated micro vias and embedded passives are designed to reduce the number of components. In addition to reducing size and weight, product reliability will increase due to fewer components while costs are reduced.

Innovative circuit packaging is a key technology in reducing size and space requirements. Chip scale package (CSP), package on package (POP), and fine pitch ball grid array (FBGA) all have supported high-density wiring technology and are widely used in the market. Miniaturization forced the use of new approaches in die packaging in order to achieve the smallest possible solutions.

With the reduction in chip size and increase in functionality, chips are now being converted from a wire bondable configuration to a flip chip application. The stacking of chips has been very common in the computer industry as well as in hand held devices. Stacking flash memory and static random access memory (SRAM) over an application specific integrated circuit (ASIC), with or without the use of an interposer, is widely used to reduce the size, weight and cost.

Figure 1: POP components.

The power packaging laboratory has the capability to stack package on package as well as die stacking. Using a die bonder, die can be placed at an accuracy of ±12.5 microns with a precision of three sigma. Stacking of die can be accomplished with FBGA reflowed using solder or by having metal to metal contact between the BGA and pads using epoxies. Using the 14 x 14 FBGA components in Figure 1, a POP was successfully assembled as shown schematically in Figure 2.

ACI Technologies will continue to broaden its capabilities to meet, and exceed the expectations of our customer base. The power packaging laboratory is one example of this, with its ability to handle the latest materials and assembly techniques used in microelectronics packages. The combination of best in class packaging equipment, thermal simulation, thermal measurement capability, and device level diagnostics are the foundations upon which future systems for power, RF, and advanced packaging technology will quickly advance. Designers can rapidly assess and mitigate the risks inherent in their designs of new electronic

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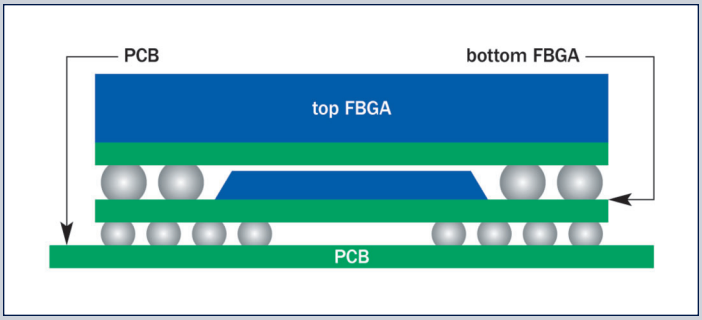

Figure 2: Schematic of POP assembly using FBGA.

packages while engineers can take advantage of the full potential of the emerging advanced power electronics technologies.

For more information regarding the power packaging lab capabilities, please contact the Helpline at 610.362.1320 or visit the ACI website at www.aciusa.org.

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