

## 0.4mm Pitch BGA Redux

Screaming Circuits

I've written about it [before](#) [1], and again [here](#) [2].

When dealing with new technology parts, it's really important to look up all of the manufacturer's component information that is available. I'm going to quote from the [Texas Instruments document](#) [3] "PCB Design Guidelines for 0.4mm Package-On-Package (PoP) Packages", Section 10 (PDF page 8)

*"Industry reliability studies have revealed that NSMD-type pads are highly recommended for most 0.5mm pitch BGA applications. However, there is a problem with this approach at 0.4mm pitch.*

*Real-world assembly experiments with the BeagleBoard and the OMAP35x EVM revealed a tendency for solder bridging between pads when NSMD were used. There was insufficient solder mask webbing between the pads to ward off bridging. Therefore, a SMD design was used which resulted in much better assembly yields with no solder bridging."*

If you are using a 0.4mm pitch BGA with the balls aligned in a grid (as opposed to staggerd), read the design guidelines from the manufacture before laying out the board.

In a presentation about the development of the Beagleboard, Gerald Coley, Beagleboard designer, notes that their first two runs had non soldermask defined pads resulting in a 10% yield. After another run of PCBs where the pads on the PCB were the same size as the pads on the device and the PCB pads were soldermask defined, their yields went to 96%. And verify that your PCB house does in fact follow your instructions. Some will think they know better and will change the mask layout.

If you are still unsure or think your design will have different requirements, call an applications engineer at the component manufacturer and discuss your project and the layout.

Duane Benson  
Trust but verify

[SOURCE](#) [4]

**Source URL (retrieved on 03/30/2015 - 3:55am):**  
<http://www.ecnmag.com/news/2010/12/04mm-pitch-bga-redux>

**Links:**

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Published on Electronic Component News (<http://www.ecnmag.com>)

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- [1] <http://blog.screamingcircuits.com/2009/04/04mm-pitch-bga-pads.html>
- [2] <http://blog.screamingcircuits.com/2010/11/04mm-pitch-bga-land-patterns.html>
- [3] <http://focus.ti.com/lit/an/spraav1b/spraav1b.pdf>
- [4] <http://blog.screamingcircuits.com/2010/12/04mm-pitch-bga-redux.html>