

Wire Bond Limits

Prior to the layout of a particular microelectronic design it is important to understand the bond design limits. These are the substrate or board layout features and design limits. Going beyond these limits can incur cost, through-put, reliability, and yield penalties.

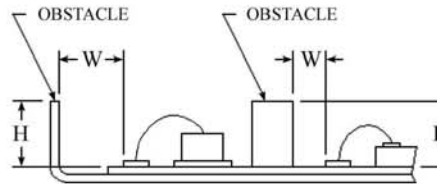
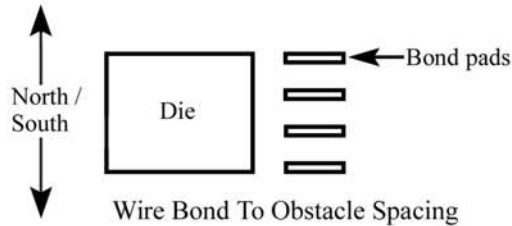
Implementing these rules prior to the first attempt at a layout will help your time-to-market. Thus, making your proof of design, prototype and production painless and fast.

For maximum production efficiency automatic lines, especially automatic wire bonders, require special layout considerations such as:

- A. Uniform wire length.
- B. A uniform homogeneous wire bond surface void of organic contamination, pits and inclusions in the surface. (An automatic wire bond machine is not selective. It will not hunt for the ideal bonding spot on a conductor metallization.)
- C. A minimum bonding pad for the first bond, (ball or wedge) of .004" x .004".
- D. A minimum second bond (typically on the substrate) of .010" x .010".
- E. A minimum step back (from the edge of the die to the second bond pad) of .015".
- F. Maximum wire length of .100" and preferred over-all wire length of .040" to .060".
- G. A minimum loop height of .008" to .010".
- H. A maximum loop height of .030".
- I. When tight pitch pads require staggered wire bonds (one bond looping over the other) the minimum distance between loops should be .010".
- J. When wires cross uncommon conductor metallization and the overall wire length is .040" or longer, the conductors being crossed should be covered with protective dielectric to prevent shorting from sagging bonds.

Wire Bond Scrub Direction & Its Impact on Layout

A tool with the same capillary tip may provide stitch bonds with different widths. A stitch bond made in the East-to-West direction will be wider than a stitch bond made in the North-South direction. This is due to the ultrasonic motion of the capillary scrubbing across the wire. A stitch bond made in the North-to-South direction will be narrower because the ultrasonic motion scrubs in-line with the wire.



| Obstacle Height H (inch) | Wire Bond-to-Obstacle Minimum Spacing W (inch) |
|-----------------------------|--|
| 0.020 | 0.040 |
| 0.040 | 0.045 |
| 0.060 | 0.050 |
| 0.080 | 0.055 |
| Over 0.100 | 0.065 |

"Your Job"
Innovation and Marketing

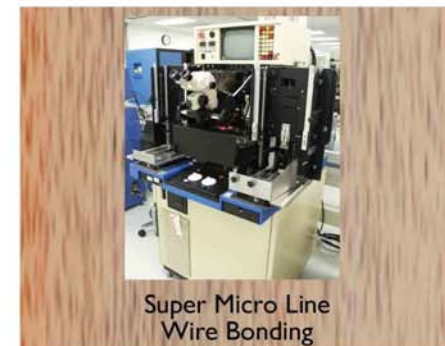
"Our Job"
Quality Manufacturing
Quick Turnaround
Low Cost

With over 25 years of microelectronics experience, Natel understands and has participated in most of the dramatic changes that have taken place in the manufacturing of products for the Defense, Medical, Opto-electronic and RF/Microwave industries, meeting the need for lower cost, high quality components produced by innovative techniques.

With automatic and, in most cases, hands-free assembly capabilities for modules, hybrids, MCM and chip-on-board, Natel has pioneered the precision capabilities necessary for 10G-40G high frequency products -- products such as DWDM, clock drivers, transmitters/receivers and limiting amplifiers.

This level of automation has allowed Natel to address the market's need for cost, performance and size with increased levels of reliability never before possible. Due to our quick response, we are able to shorten "time-to-market" for your prototype as well as "time-to-volume" for your production needs. We realize how critical it is to your success.

**Natel stands ready as your
Manufacturing Partner!**



Super Micro Line
Wire Bonding

To be placed on our mailing list to receive other issues of "Quick Reference Design Guide" simply call, fax or e-mail.

NATEL

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How can we help?

So that we can tailor an information package specific to your needs, please answer the following questions and **fax this page to Natel at 1-800-590-5764.**

For urgent need please call 1-800-590-5774.

What stage is your microcircuit module in?

- Initial design
- Prototype
- Product redesign
- Production

Would you consider packaging assistance?

- Essential
- Nice but not required
- No thank you

What type of module are you considering?

- Hybrid
- MCM
- Chip on board
- Flipchip/BGA
- Other _____

What type of package are you considering?

- Hermetic
- Non hermetic
- Metal
- Other _____

Comments:

YOUR

Name: _____

Phone: _____

email: _____

Please make necessary changes on the address label.

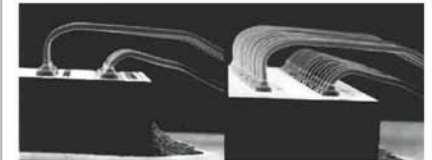
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Design Guide #3

Quick Reference Design Guide



Wire Bonding

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