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NEOSCALE 56 GBPS HIGH-SPEED MEZZANINE SYSTEM

NeoScale 56 Gbps High-Speed Mezzanine System Delivers Tall Stack of Benefits

Modular Triad Wafer Mezzanine Solution Delivers Industry's Cleanest Signal Integrity, Solder Charge Technology for Customized PCB Routing in Ultra-High-Density Applications

BUSINESS CHALLENGE

Performance Matters - Rising data demands in telecommunications and networking equipment create challenges to achieving performance specifications within printed circuit board (PCB) space constraints. High-density board-to-board mezzanine connectors allow design engineers to optimize space, while achieving the bandwidth needed to pair with high-powered processing chips. Signal degradation in high-density applications can compromise equipment performance. Finding a reliable mezzanine solution that achieves clean data rates up to 56 Gbps has not always been possible.

Does Height Matter? Board-to-board mezzanine connectors come in a range of different mated stack heights, which defines the distance created by a mezzanine connector between the PCB layers. There is a common fallacy in the industry that soldering a taller stack height connector will not yield optimal results. The process of heating up the termination, soldering flux, case and component will always be faster working with shorter components. The physicality of a taller connector may require slightly longer processing time in the reflow chamber to bring it up to temperature, but with proper parameters can be processed just as easily as a shorter stack height. Moreover, an elegant reflow process does not translate into connector performance or affordability. A taller mezzanine form factor may offer significant advantages in high-density applications.

SOLUTION

The Molex NeoScale High-Speed Mezzanine Connector System achieves lightning fast data rates up to 56 Gbps and the industry's cleanest signal integrity in high-density telecommunications and data networking applications, including hubs, servers, NAS towers and rack mount servers.

In a stack height design, the slightly taller NeoScale form factor may be advantageous. A standard lower-profile mezzanine system, with two headers soldered onto the PCB, typically uses an interposer portion of variable height to achieve the mezzanine stack. While the reduced height may shorten solder reflow time, any three-piece connector will increase component cost and degrade signal integrity. Two-piece mezzanine systems are more affordable than threepiece systems—and offer better signal integrity in high-density applications. NeoScale connectors comprise a vertical plug and vertical receptacle, and features Solder Charge Technology using a proven surface mount technology (SMT) attachment method for highly reliable and robust solder joints. The two-piece design makes the system more affordable, while giving system architects the ability to expand functionality by stacking boards to conserve space on each PCB layer.

Designed for customized PCB routing in one or two layers for 4- and 6-pair housings, the NeoScale mirror-image triad wafer layout isolates each differential pair for optimal signal integrity. The isolated differential pair triads with dedicated ground shields help protect against crosstalk. The honeycomb housing routes each triad out of the PCB in one or two layers for additional protection. Overall system costs are lower by effectively decreasing the number of PCB layers required for signal routing.







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CUSTOMER BENEFITS

The NeoScale solution fills a number of voids in the connector industry for a flexible mezzanine solution that supports the full range of high-speed, high-density signal design needs.

Design Flexibility – Most standard mezzanine connectors offer high-speed differential pairs at only 85 Ohm or 100 Ohm or 90 to 92 Ohm to accommodate an 85 to 100 Ohm range. The NeoScale system features multiple height options and flexible pin counts for greater design flexibility and value. They are available in 12.00 to 42.00mm stack heights, circuit sizes of 8 to 300 triad wafers in 2-, 4-, 6-, 8- and 10-row configurations and 85 or 100 Ohm impedance.

Fully Customizable – NeoScale connectors have an ultra-high-density of 82 differential pairs per square inch. The system design allows any combination of high-speed signal, low-speed signal, single-ended signals and power (up to 8A per triad) to run through a single connector. The high-speed triad wafers comprise three pins per differential pair—two signal pins and one shielded ground pin—providing stand-alone 56 Gbps fully-shielded differential pairs with dedicated grounds. Each triad is a standalone, shielded, 56 Gbps-capable differential pair or an 8A power feed. A fully customized NeoScale connector can potentially replace multiple connectors, which translates into additional cost and space savings.

Next-Generation Future-Proofing – The pace of technology only increases. While a lower profile form factor takes slightly less time to solder, a standard mezzanine connector designed for 16 to 25 Gbps may need to be replaced with a higher bandwidth solution as data rates rise. The NeoScale system offers flexible tooling for servers, switches, rack servers and other high-density applications—and meets demand for next-generation with clean data rates in the 25 to 56 Gbps range.

Superior Reliability Assurance – Connector solder reflow processing parameters are dictated by many factors, including mated stack height, PCB size and thickness and number of components on the board that need to be soldered. Molex provides expert guidance on solder reflow profiles and attachment recommendations to assure the smallest to the tallest mated stack height mezzanine connectors are processed with superior reliability.

To learn more www.molex.com/link/neoscale.html

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