Interplex

Press Fit Tech Bulletin

New Hybrid Design 0.4mm Press-Fit Interconnects Enable Higher Density Applications

0.4mm MiniPLX Press-Fit Uses Proven Technology in Smaller Format with Versatile Configuration Options

Overview

Press-Fit interconnects are already a key enabling technology that is widely used in the automobile industry for applications such as power module designs, and in an expanding array of other applications and industries such as medical devices, LED displays, industrial motors, consumer products, mobile devices, avionics and rugged military systems.

These industry sectors are now facing demands for higher density circuits, smaller form factors and cost-effective high-volume production requirements. Product engineers certainly still value the benefits of solder-free, automation-friendly, highly reliable Press-Fit interconnects. However, in order to cater to industry demands, they are constantly seeking out ways to use PCB real estate more efficiently and fit such interconnects into smaller products with finer pitch spacing.

This Tech Bulletin provides an overview of how Interplex's new 0.4mm Press-Fit (MiniPLX) is a hybrid-based Press-Fit that enables designers to achieve these goals.

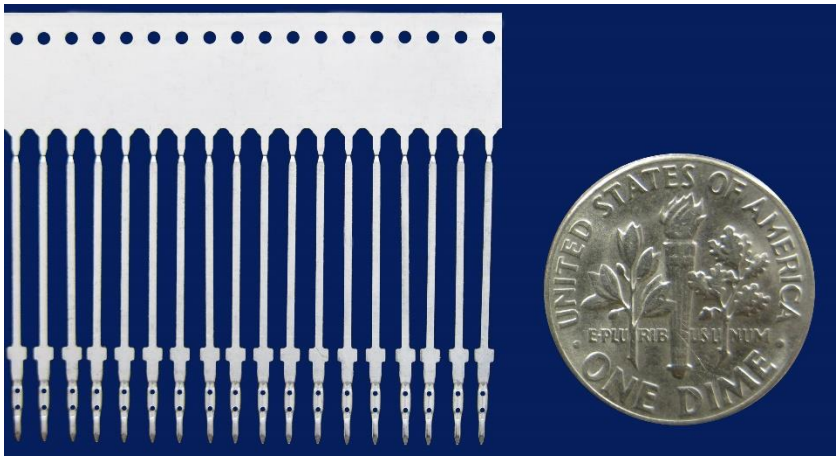

Figure 1 - Interplex's New 0.4mm Press-Fit, MiniPLX

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Product Specifications and Plating Options

The ability to eliminate soldering hassles while providing high-reliability interconnects with excellent thermal characteristics, high current-carrying capacity and configuration flexibility are valuable characteristics that make Press-Fit the preferred solution across many industries and applications.

Interplex's MiniPLX Press-Fit design combines the best of 2 styles of Press-Fit technology: the strength and retention of a web-based design, together with the assembly forgiveness found in most proven eye-of-the-needle designs. This new hybrid-based design not only enables higher density interconnect solutions, but also expands the configuration options available to product engineers.

Figure 2 - Close Up of MiniPLX Press-Fit Pins

The MiniPLX's smaller hybrid design interfaces can be implemented using a variety of materials and plating options:

Materials Available:

- CuSn
- CuNiSi

Plating Finish Options:

- Matte Sn
- Indium

Mechanical Force Profile

Maintaining sufficient retention force is critical for the long-term operational integrity of Press-Fit interconnections. Therefore, Press-Fit zone designs must be tested to meet the applications' minimum retention force requirements and operating environments, using IEC-60352-5 requirements as a baseline guide. In addition, to assure a wide process control window for assembly and to minimize deformation to the plated-through hole (PTH), it is important that Press-Fit zone designs conform to maximum insertion force parameters. The analysis of insertion and retention forces must be performed for both minimum and maximum PTH size specifications. Retention force should also be measured for both pre and post environmental stress conditions.

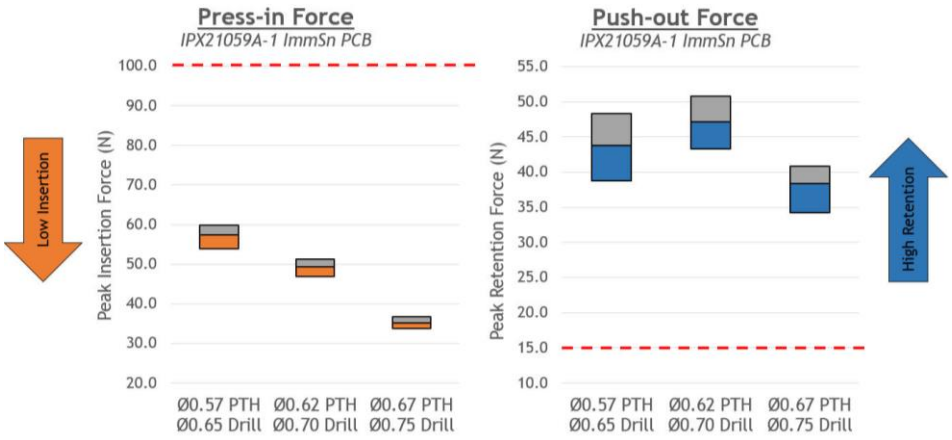

Figure 3 - Insertion and Retention Force Testing Results

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Plated-through Hole (PTH) Parameters and Cross-Section Analysis

Maintaining PTH integrity is one of the most important factors to assure success with Press-Fit interconnects. The MiniPLX pin's specified PCB hole size is Ø0.60 ± 0.05 mm and the MiniPLX pin is designed to engage the PCB hole throughout almost the entire depth of the hole, unlike other pin styles that typically only engage 50 – 75% of this depth. This sizeable contact area is crucial for signal integrity in large data connector systems applications.

Cross-section analysis is used to prove the basic integrity of Press-Fit pins for use within specified production parameters. This should be done in a test program that addresses all aspects of environmental stress, including but not limited to: thermal shock, exposure to high/low temperatures, vibration, climatic cycling, temperature and humidity cycling, and other similar test requirements.

When evaluating any Press-Fit pin application, it is important to confirm that the supplier has conducted post-environmental stress test cross-section analysis in conformance with IEC-60352-5, and that hole deformation is within specified limits.

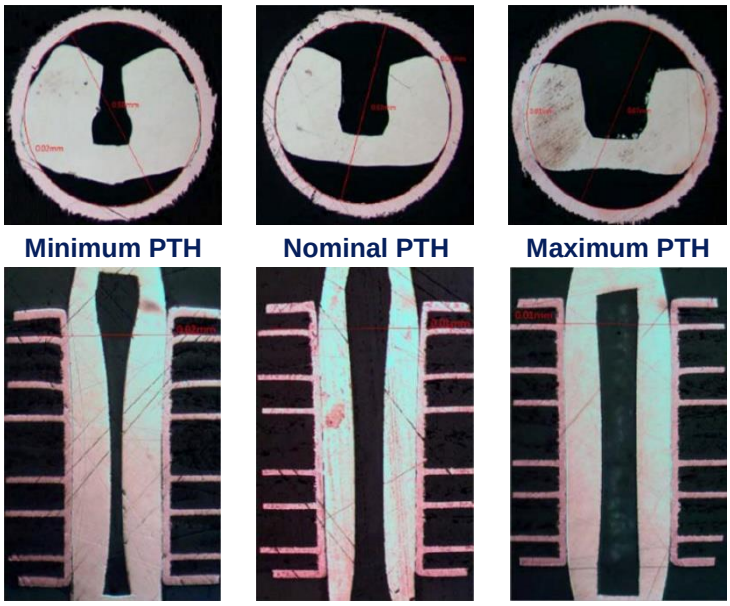

Figure 4 - Cross-Sections of MiniPLX in PTH

In addition to the cross-section analysis, rigorous environmental testing confirms MiniPLX performance and reliability across a full array of operating conditions, with different stress factors and environmental parameters.

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Configuration Versatility

The MiniPLX is designed to accommodate usage in a variety of connector design applications. It can be packaged as separate individual pins in a reeled format or on stamped strips. The latter delivers the pins in a continuous-stamped configuration that can be used in the automated assembly of multi-pin connector arrays. This gives designers the flexibility to create virtually any pin-out configuration (e.g. number of pins, rows, spacing, etc.) that is required by their specific application. The resultant connectors incorporate all the solder-free, high-reliability and low-cost benefits of Press-Fit technology, custom-designed into a unique application-specific part.

Figure 5 - Continuous-stamped MiniPLX Pins with Hybrid Design Interfaces

Summary

Built on a legacy of established Press-Fit technology leadership, the MiniPLX hybrid design combines a long-standing track record of reliability and performance within a versatile form factor.

Interplex's new hybrid product offering is paving the way for higher density pin spacing and opens the doors to a myriad of new solder-free connector designs for various end applications. The MiniPLX will help fuel the next generation of smaller, high-density, more feature-rich products, significantly expanding the application possibilities across a wide range of industry segments.

For more information about our Press-Fit interconnect technologies, visit our Press-Fit website, or drop us an email at communications@interplex.com.

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