**Delphi Compliant Pin Technology**

**Description** – Delphi, a worldwide leader in automotive connection systems, has integrated compliant pin technology into several of its automotive connection products. This advanced technology is utilized in device connectors and integrated connector/module housings to press-fit solderless electrical contacts onto printed circuit board (PCB) assemblies. When a compliant pin is inserted into a plated-through-hole (PTH) of a PCB, it creates a reliable, gas-tight contact.

**Performance Advantages** – Solderless, lead-free compliant pins help OEMs to conform to global environmental initiatives. Additionally, solderless PCB production eliminates thermal stress, and other issues created by soldered-joints and flux residue.

Building with compliant pins reduces device costs by simplifying BOM (Build of Material) and the number of mechanical components needed. High speed, low cost assembly of the connectors improves productivity and helps to reduce overall processing costs.

Compliant pin connectors and modules, press-fit on PCBs, provide reliable electrical performance. Because the compliant pins absorb any deformation during insertion, the plated-through-hole remains completely in-tact allowing the individual pin or header to be removed and replaced to facilitate device rework.

**Typical Applications** – Compliant pin technology can be adapted to a wide range of sealed and unsealed automotive systems, including:
- telematics, infotainment, body, powertrain, and safety & security. Applications include:
  - USCAR headers
  - Engine and transmission control modules
  - Airbag control modules and ABS modules
  - Key Fobs, impact sensors, PODS,
  - BECs and bus bars
  - Single pins

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Automotive Standards – With its global engineering and manufacturing capabilities, Delphi has implemented a standard automotive compliant pin design. Eye-of-Needle (EON) technology was selected as the key automotive pin type due to its performance, reliability, manufacturability and cost.

EON design has been used in the aerospace and communication industries for more than 20 years. First introduced in the 70s to replace soldering and solid pins, EON is one of the most cost effective ways to make consistent quality products. (see EON cross sections)

Advantages of EON Compliant Pin Designs

- Environmental compliance – easily adaptable to lead-free construction
- No separate soldering process necessary
- Low thermal stress – no heat to affect other board components
- Suitable for multilayer and double-sided PCBs
- Reliable gas-tight connection, no corrosion
- Reliable performance in vibration and shock
- Low PTH distortion and damage
- Connector can use standard plastic material
- Connectors and contacts are easier to repair than soldered pins

The key to EON compliant pin technology is that the cross-section of the pin is initially greater than the diameter of the hole. The result is an overlapping of material at the contact area, whereby the pin tightly conforms—with spring-like tension—to the diameter of the hole.