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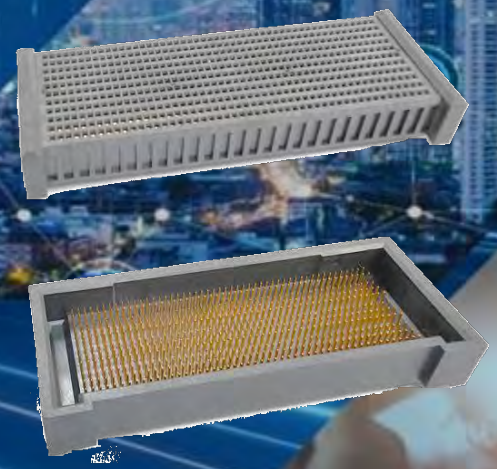
DensiStak™ Board-to-Board Connector Product Presentation



FCi Basics

FCI Basics: The Amphenol PCB Interconnect Specialist

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Leading brands, proven technology

Wire to Board


MicroSpace™


MultiPitch®


Fine Pitch Minitek®


BergStik®


Dubox®


Quickie®


Minitek®

Input Output & FFC/FPC


USB


SFW`-SFV


Universal Contacts


Latch-N-Lock®

Board to Board


MicroSpeed®


MezzoStak®


BTFW


BergStak®


Conan®

Focus Markets Segments

Investing in key markets and applications

Automotive
BMS, Lighting ,Camera, ADAS

ITDatacom
Servers, Storage, Embedded

Industrial
PLC/Controls; Energy Storage System

Consumer
Home Automation, Appliances

Focus Customers

Experienced teams to support each channel

Large OEMs
Strong relationships

Focus Growth Accounts
Knowledgeable Sales / FAE Teams

Distribution: >50%
Distribution Friendly!

Engineering
Dedicated Basics teams

DensiStak™ - Value Proposition

- DensiStak™ is designed with its **11-Row 1000+ positions High Density** pin count, **High Speed upto PCIe® Gen4 with 16Gb/s**
- DensiStak™ designs with **Reliable Dual-Beam contact system**
- DensiStak™ has **compact size with pitch 0.80mm*1.25mm**
- DensiStak™ is **USCAR-2 compliant for automotive application**
- DensiStak™ has **Open-Pin-Field design** to support protocols PCIe®, Ethernet, USB, DP, MIPI etc.
- DensiStak™ is a mezzanine connector system with **surface-mount** solder tails
- DensiStak™ connector is ideal for applications in the **Automotive: ADAS; IT/Datacom: Server/Storage/AI; Industrial: Sensing & Instrumentation** markets

DdensiStak™ - Solution Overview

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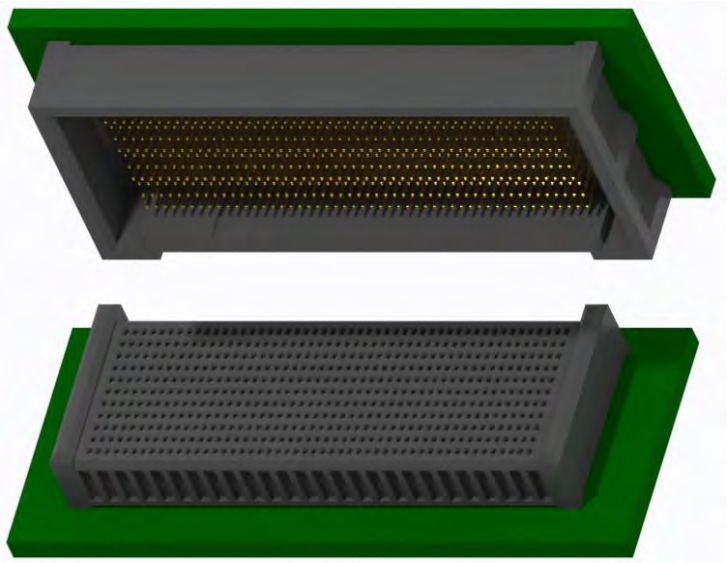
Standard Version

DensiStak™ Vertical **Header**
H2=7.0mm 198 - 1034Pos
P/N 10169063-XX**02**X**0**0LF

NEW

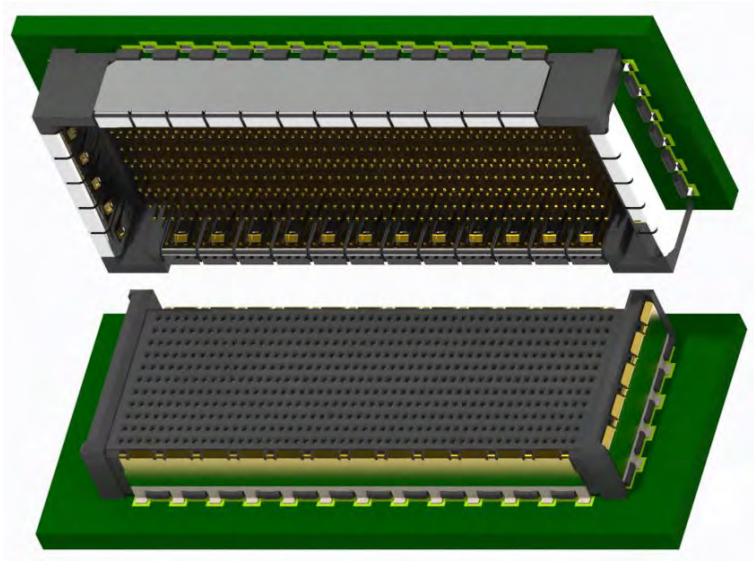


DensiStak™ Vertical **Receptacle**
R6=5.8mm 198 - 1034Pos
P/N 10169064-XX**06**X**0**0LF

Stack Height: 8mm
Tooled

Shield Option

DensiStak™ Vertical **Header**
H2=7.0mm 198 - 1034Pos
P/N 10169063-XX**02**X**1**0LF



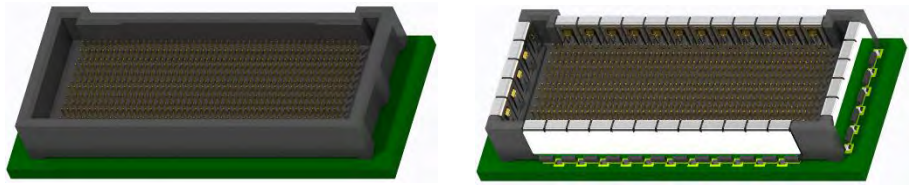
DensiStak™ Vertical **Receptacle**
R6=5.8mm 198 - 1034Pos
P/N 10169064-XX**06**X**1**0LF

Stack Height: 8mm
Upon Request

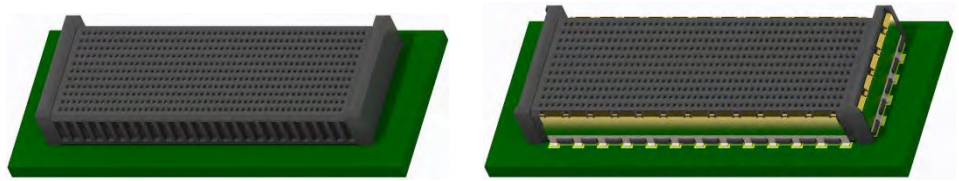
DensiStak™ - Solution Overview

- **DensiStak™** Board-to-Board Connector supports:
  - **High density**: low speed and high speed signals, upto 1034pos (1000+pos)
  - **High Speed**: signals up to PCIe Gen4
  - **Hybrid**: same low and high speed signal pins, optional power shield
  - **Open-pin-field Design:** no limitation of pin map or ground pins

STACK HEIGHT					
PRODUCT	HEADER 2	HEADER 5	HEADER 8	HEADER 14	HEADER 20
RECEPTACLE 6	8	11	14	20	26
RECEPTACLE 8	10	13	16	22	28
RECEPTACLE 10	12	15	18	24	30



Header



Receptacle

Item	Specification
Length Pitch (Signal)	0.8mm
Width Pitch (Signal)	1.25mm
Length Pitch (Shield)	3.2mm
Row Number	11
Column Number	18 ~ 94
Position Range	198 ~ 1034
Stack Height	8 ~ 30mm **(8mm standard version is tooled)**

DensiStak™ - Product Specifications

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Specifications

- Pitch: 0.80mm x 1.25mm
- Positions: 198 ~ 1034pos
- Termination: SMT
- Configurations: Vertical
- Stack Heights: 8 ~ 30mm, start with 8mm
- USCAR, UL E66906

Materials

- Housing: High temperature thermoplastic LCP, Black (UL94V-0)
- Terminal: Copper Alloy
- Shield (optional): Copper Alloy
- Plating: 3u”, 8u”, 15u” and 30u” Gold or GXT

Electrical Performances

- Operating Voltage Rating = 100 VDC
- Current Rating: 0.8A/contact; 4A/Shield spring (3.2mm pitch)
- Insulation Resistance: 1000MΩ min.
- Contact Resistance: 40m-ohms max for contact; 5m-ohms max for Shield
- Speed: Up to 16Gb/s of PCIe® Gen4 standards

Mechanical Performance

- Durability: 50/100/200/500 cycles per plating option
- Insertion Force: 0.2N max./contact; 2N max./shield spring
- Withdrawal Force: 0.16N max./contact; 1.5N max./shield spring
- Wiping length: 1.2mm min.

Environmental

- Operating Temperature: -55°C to +125°C
- Vibration and Mechanical shock: USCAR-2 V2
- Temperature life: 125°C, 1008 hours

Packaging

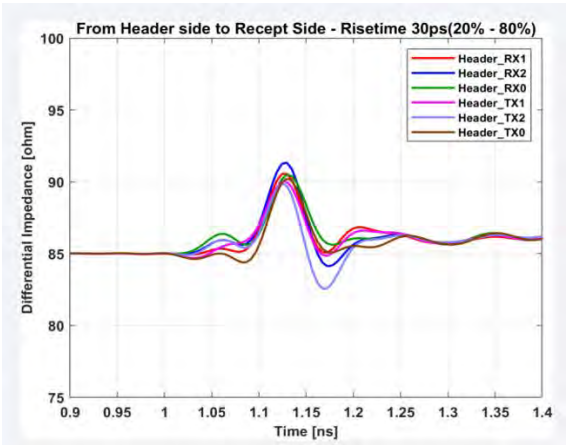
- Tape and reel

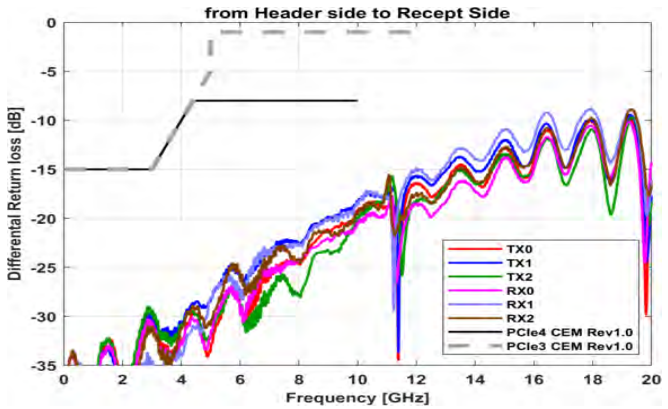
DdensiStak™ - Features and Benefits

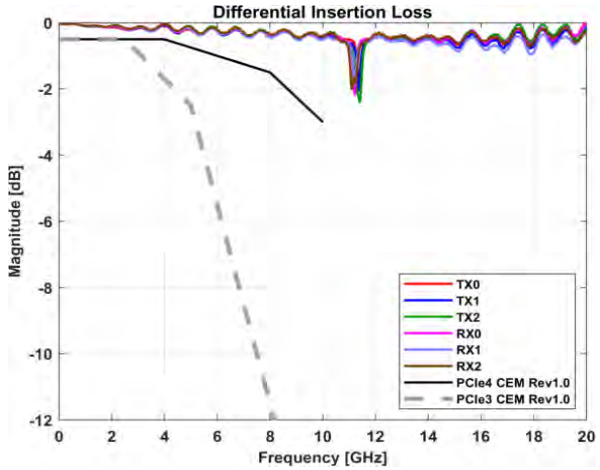
Features	Benefits
High Density 11-Row 1000+ positions	Provides solution to connect with chips with high speed, low speed and power needs
High speed performance up to 16Gb/s	Meets PCIe® Gen 4, Ethernet, USB, DP, and MIPI protocols
Dual-beam contact system	Reliable design
Compact design with 0.80mm in X direction and 1.25mm in Y direction	Saves board space
USCAR-2 compliant	Supports automotive application
Open-Pin-Field Design	Design flexibility
Surface mount soldering tails	Makes customer soldering easy
RoHS compliant, halogen and lead free	Supports blind mating and automatic assembly cost effectively
UL94V-0 high temperature LCP material	With-stand harsh environment

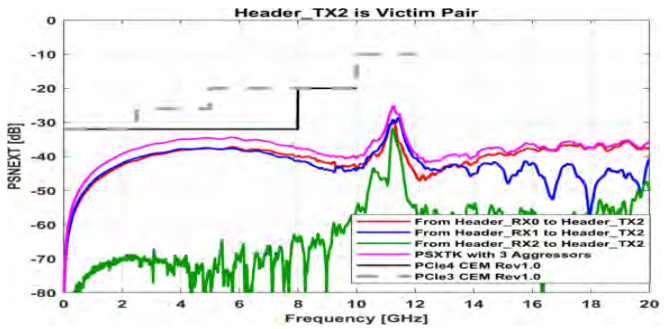
SI performance (8mm Stack height, PCIe Gen4)

TX0		TX2		RX0		RX2	
E22	E23	G	G	E26	E27	G	G
G	G	F24	F25	G	G	F28	F29
G22	G23	G	G	G26	G27	G	G
TX1				RX1			





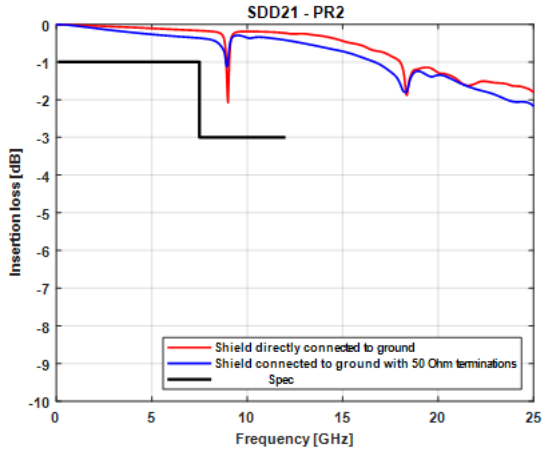


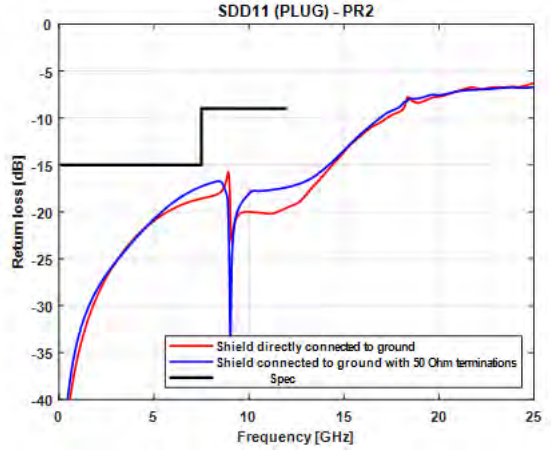


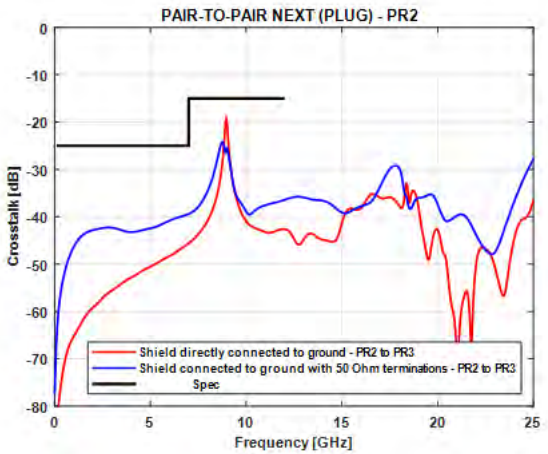
SI performance (8mm Stack height, PCIe Gen4)

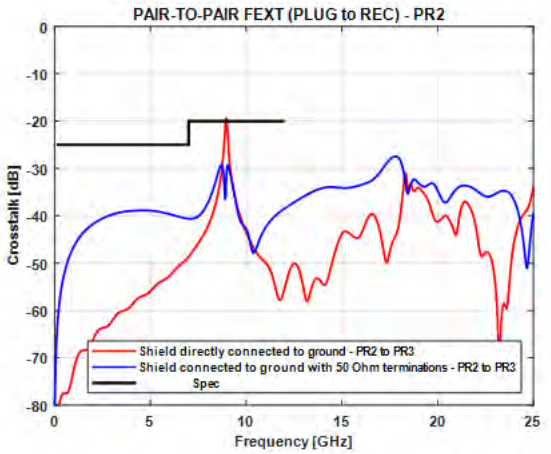
Product SI performance							
Stack Height	**PCIE 3.0**	**PCIE 4.0**	**USB 3.2 GEN2 10G**	**TC9 Ethernet**	**DP1.4**	**SGM/RGMII 1000MB**	**MIPI D PHY**
8mm	Pass	Pass	Pass	Pass	Pass	Pass	Pass

SI performance (Impact of Power Shield)





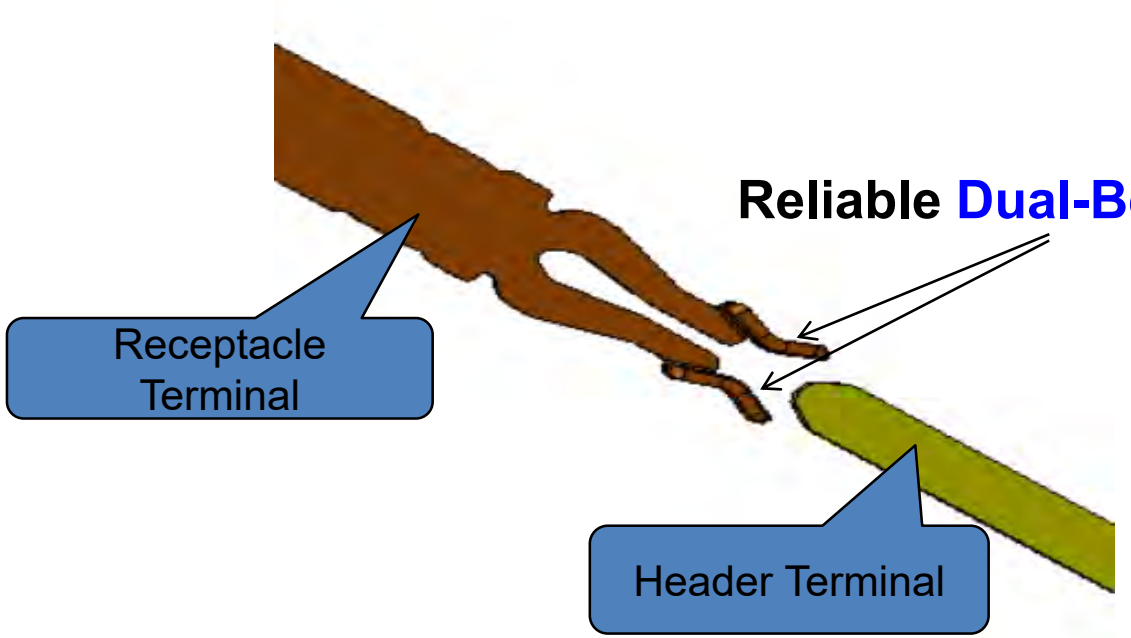




SI Simulation performance:

- Outer shield is connected by using 50 Ohm terminations to mimic the power over shield situation
- Insertion loss, Return loss performance are almost close; difference is fairly small
- Cross Talk: show big difference in lower-frequency area around -40dB, which is lower than -32dB spec line of PCIe Gen4
- **(This report compares the differences between similar products with and without power shield, for instruction purposes)**

Reliable Dual-Beam Design



5.1.4.3 Vibration Classification

Components to be tested must be assigned a class from the table below according to their intended vehicle applications. See Table 5.4.6.3A, B, and C for Vibration Schedules and Figure 5.4.6.3D for Vibration graphs.

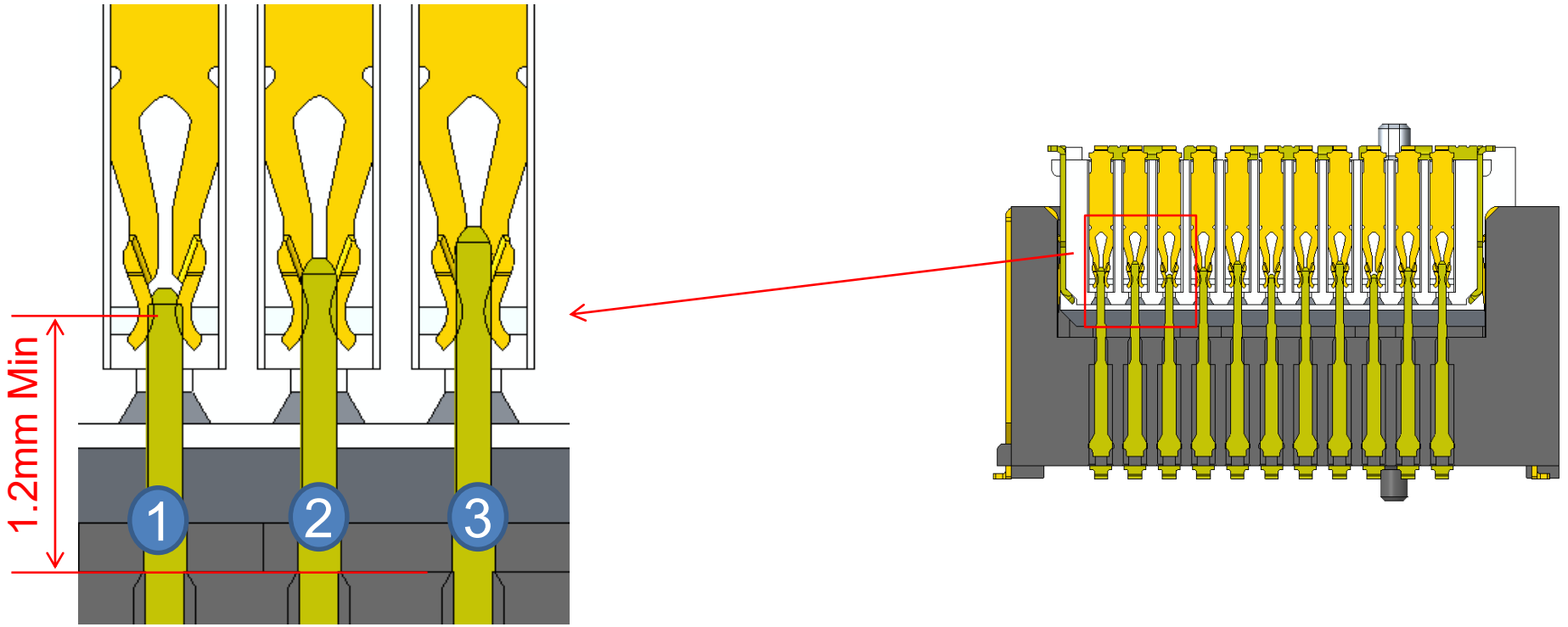
Class	Common Name	Typical Application	Other Requirements Met
V1	Chassis Profile	Components on sprung portions of vehicle not coupled to Engine	None
V2	Engine Profile	Components coupled to Engine with no severe vibration possible	Pass on V2 => pass also for V1
V3	Severe On-Engine	Components subject to severe vibration	Pass on V3 => pass also for V1 and V2
V4	Extreme Vibration	Used as needed to correlate to extreme vibration areas	Pass on V4 => pass also for V1 and V2 and V3
V5	Unsprung Component	Wheel-mounted components	None

TABLE5.1.4.3: COMPONENT VIBRATION CLASSES

Comment:

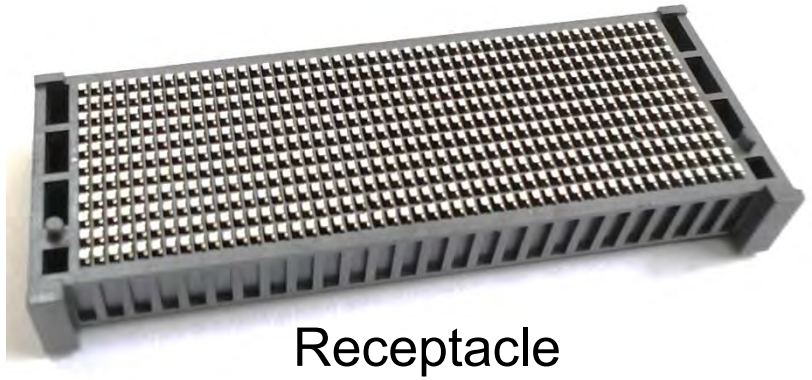
By utilizing a dual-beam Receptacle terminal design, the reliability is enhanced, particularly in harsh environments, providing an even safer level of redundancy

Reliable Dual-Beam Design



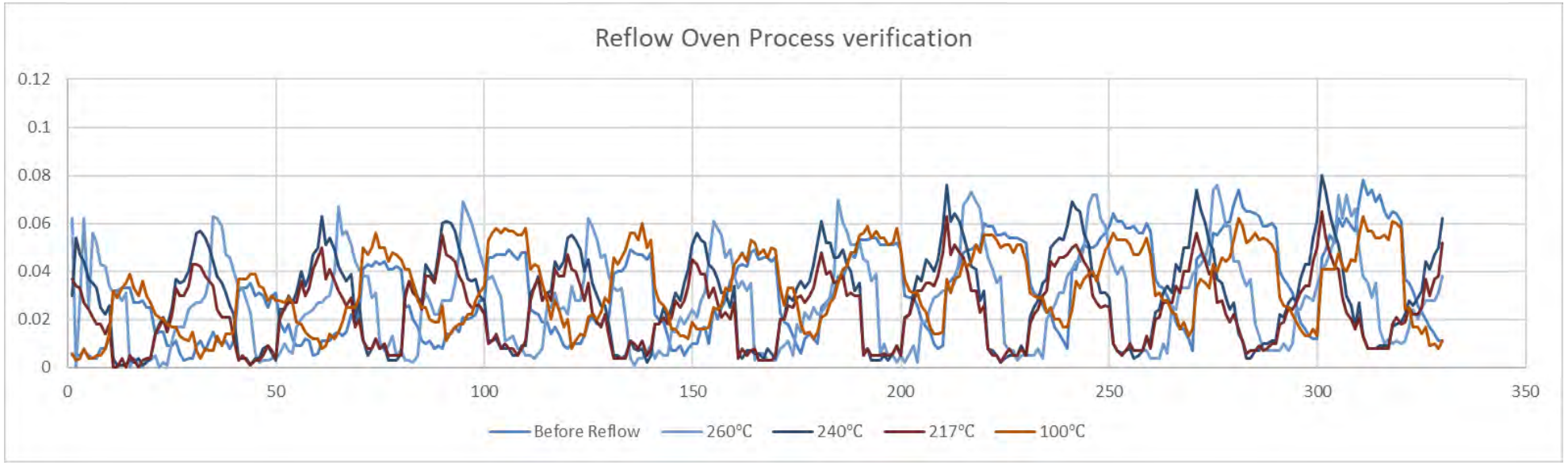
Comments:
1. Wipe length 1.2mm minimum
2. Design three different lengths of header terminals to reduce the insertion force during mating

Terminal soldering tail – Surface Mount Design



Receptacle

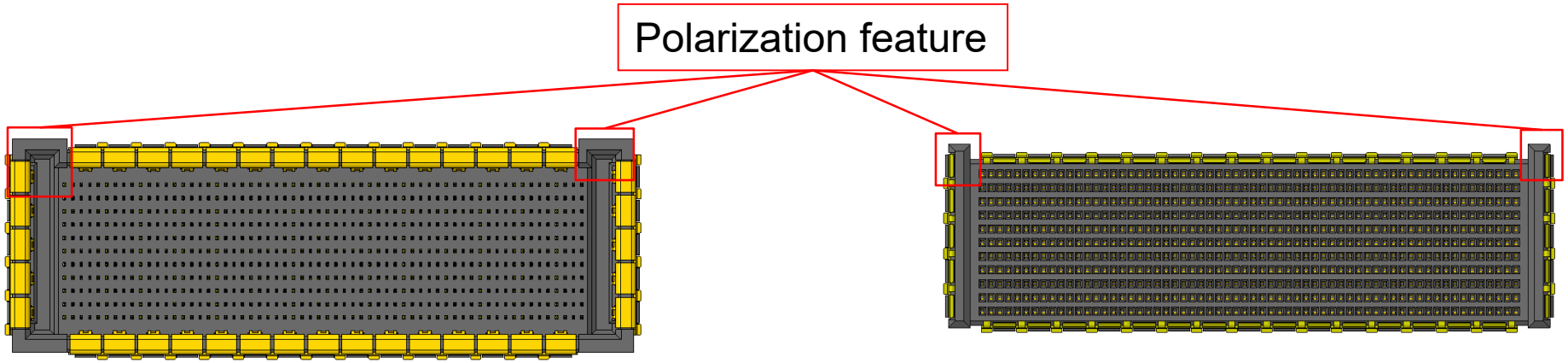
Header



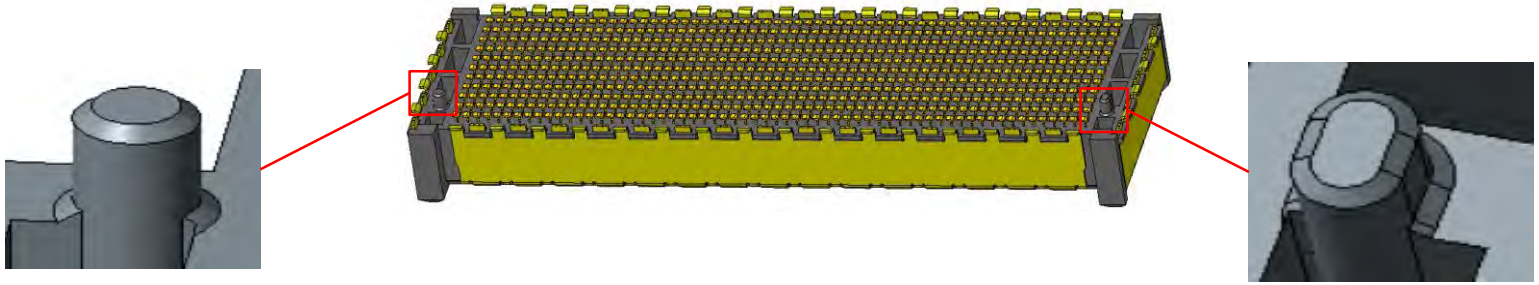
Comments:

1. Common SMT Soldering tails (Non-BGA) makes soldering easy in production
2. Verified Reflow oven process with coplanarity <0.1mm

Housing Polarization Feature

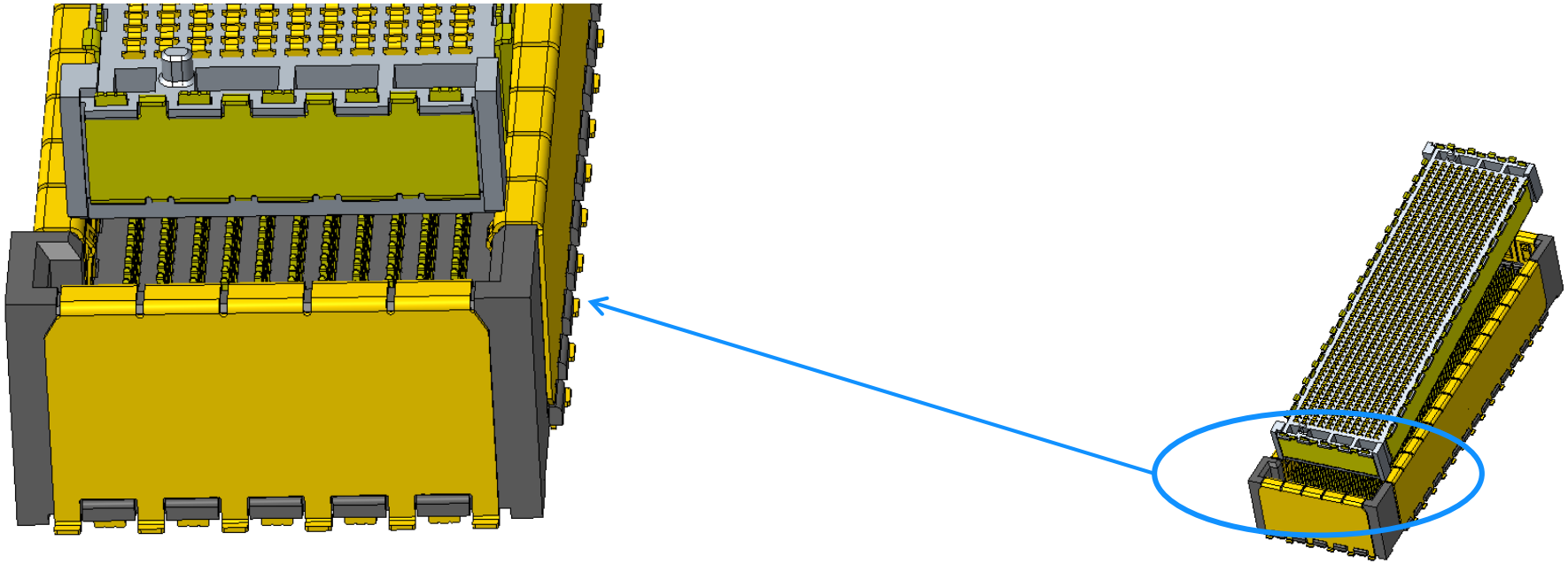


1. The design effectively prevents reverse insertion at the interface



2. The same to prevent incorrect installation on SMD process

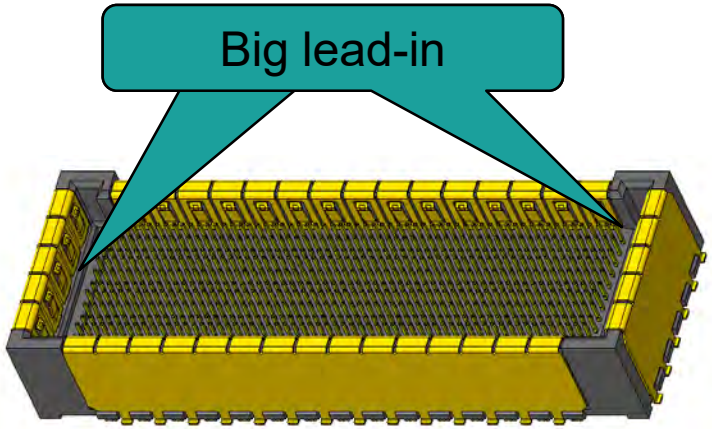
Terminal anti-touch protection

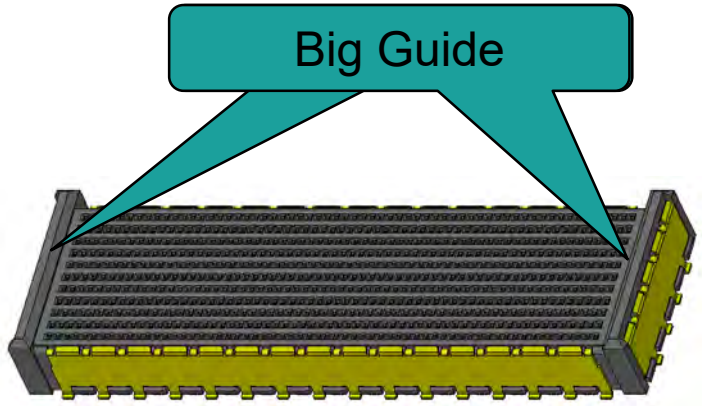


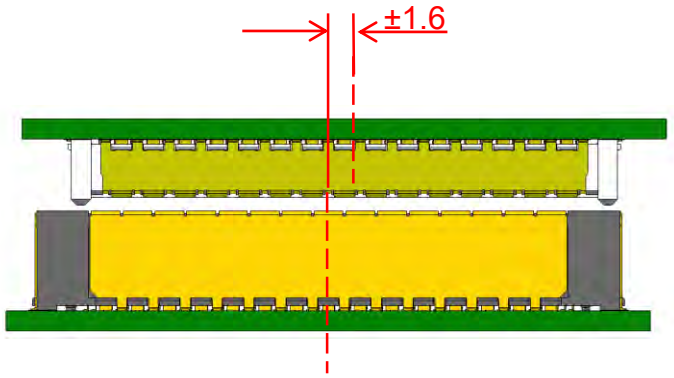
Comment:

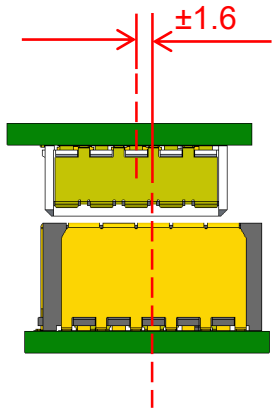
- Reliable extended guide on receptacle, to avoid header terminal deforming if deflective mating

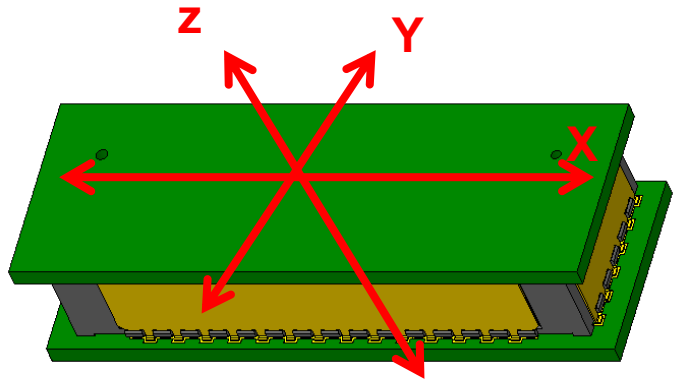
Self-alignment Design









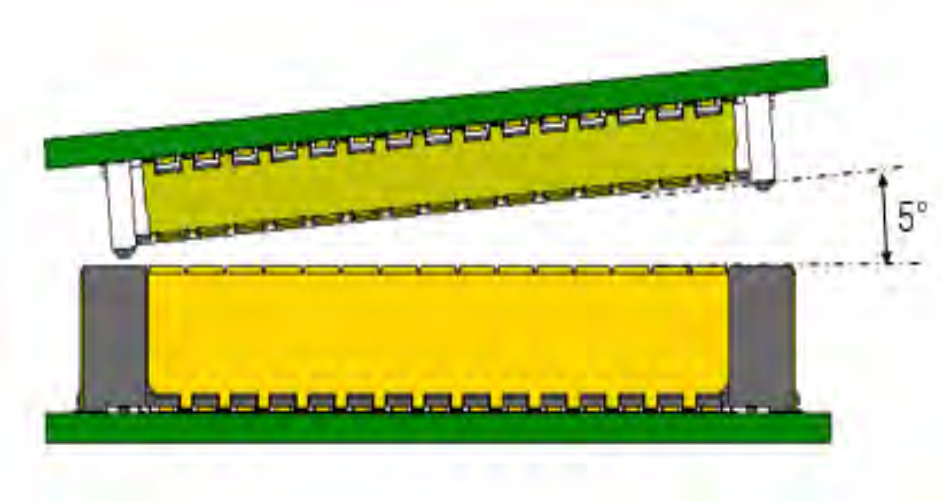


Comment:

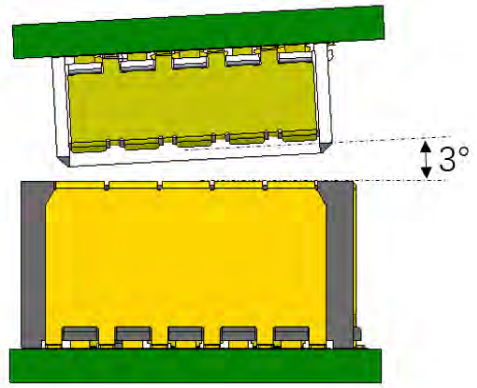
- There are ±1.6mm Self-alignment for insertion on X / Y axis directions, in order to have a perfect Blind Mate

Allowance guiding angle (550Pos)

Length direction ±5°



Width direction ±3°



Allowance guiding angle of mating and un-mating

DensiStak™ - Part Numbers

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10169063 — XX XX X X X LF — Lead-free compatibility

Column Number:
Pin Number = 11 X Column Number
(Increase by every 4 columns for shield version
Increse by every 2 columns for no shield version)

18	11 X 18 min.
64	11 X 64 (example)
94	11 X 94 max.

Mylar and Date Code

0	With mylar and without date code

Shield Status

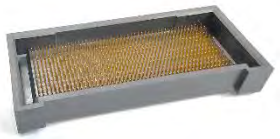
0	No sheild
1	With sheild

Plating Option: Contact Area and Solder Tail

1	3µin Gold on contact area 80µin–160µin Tin on solder tail
2	8µin GXT® or Gold on contact area 80µin–160µin Tin on solder tail
3	15µin GXT® or Gold on contact area 80µin–160µin Tin on solder tail
4	30µin GXT® or Gold on contact area 80µin–160µin Tin on solder tail

Header Type for Stack Height

02	Header 2 (Tooled)
05	Header 5 (Upon request)
08	Header 8 (Upon request)
14	Header 14 (Upon request)
20	Header 20 (Upon request)



Header

10169064 — XX XX X X X LF — Lead-free compatibility

Column Number:
Pin Number = 11 X Column Number
(Increase by every 4 columns for shield version
Increse by every 2 columns for no shield version)

18	11 X 18 min.
64	11 X 64 (example)
94	11 X 94 max.

Mylar and Date Code

0	With mylar and without date code

Shield Status

0	No sheild
1	With sheild

Plating Option: Contact Area and Solder Tail

1	3µin Gold on contact area 80µin–160µin Tin on solder tail
2	8µin GXT® or Gold on contact area 80µin–160µin Tin on solder tail
3	15µin GXT® or Gold on contact area 80µin–160µin Tin on solder tail
4	30µin GXT® or Gold on contact area 80µin–160µin Tin on solder tail

Receptacle Type for Stack Height

06	Receptacle 6 (Tooled)
08	Receptacle 8 (Upon request)
10	Receptacle 10 (Upon request)

Receptacle

NEW

PART NUMBERS

Description	Part Numbers
DensiStak™ Header, H2, 0.80mm x 1.25mm, 550 position 11 x 50, 3µin on contact, 8mm stack height	10169063-5002100LF
DensiStak™ Header, H2, 0.80mm x 1.25mm, 616 position 11 x 56, 3µin on contact, 8mm stack height	10169063-5602100LF
DensiStak™ Receptacle, R6, 0.80mm x 1.25mm, 550 position 11 x 50, 3µin on contact, 8mm stack height	10169064-5006100LF
DensiStak™ Receptacle, R6, 0.80mm x 1.25mm, 616 position 11 x 56, 3µin on contact, 8mm stack height	10169064-5606100LF

DensiStak™ - Markets and Applications

Automotive

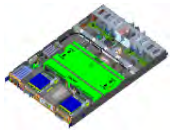
- ADAS

Industrial

- Sensing & Instrumentation

IT/ Datacenter

- Server
- Storage
- AI



DensiStak™ - Marketing Tools

- Samples available (check with sample room Tatabanya : samples.global@amphenol-eu.com)
- Website quick link: Landing Page
- Available on website
  - Drawings
  - 3D Models
  - Datasheet
  - Product specifications
  - Product presentation

If you have any enquires, please contact to us:
PM Contact USA: Gregory.Smith@amphenol-tcs.com
PLM Contact: Feagle.Pan@fci.com

Thank You

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