New Path to Narrow Pitch Burn-in Socket

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OKins Electronics Co., Ltd

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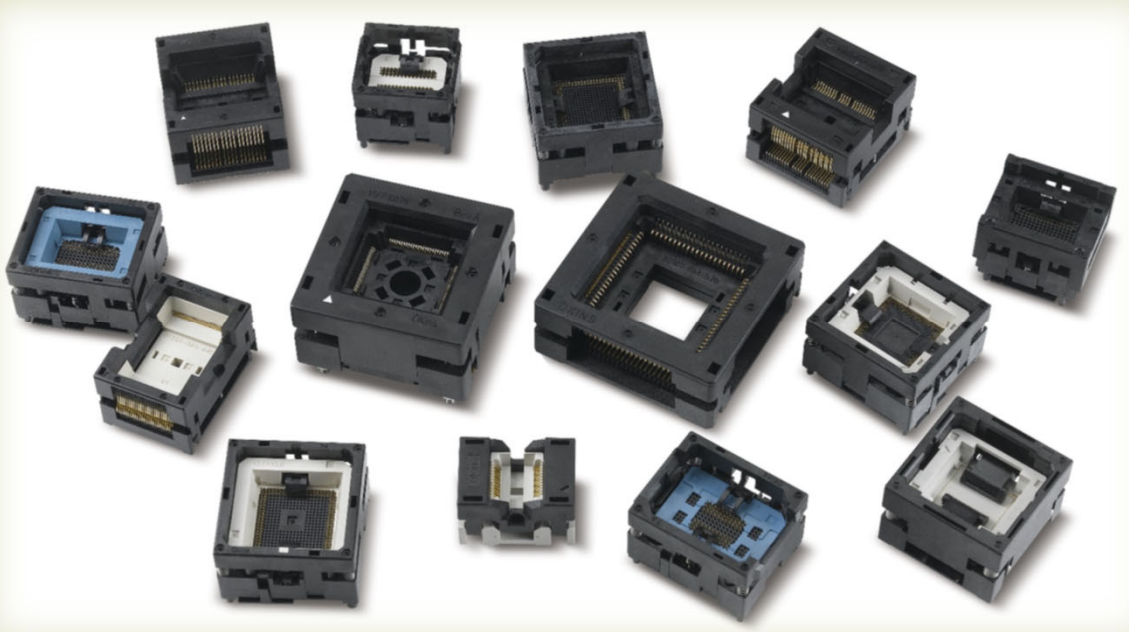
What Are We After, for Burn-in Socket?

- Smaller Pitch
  - 0.25mm & beyond
- Shorter lead time
- Lower cost

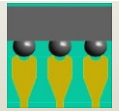
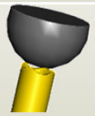


Burn-in Socket Pitch

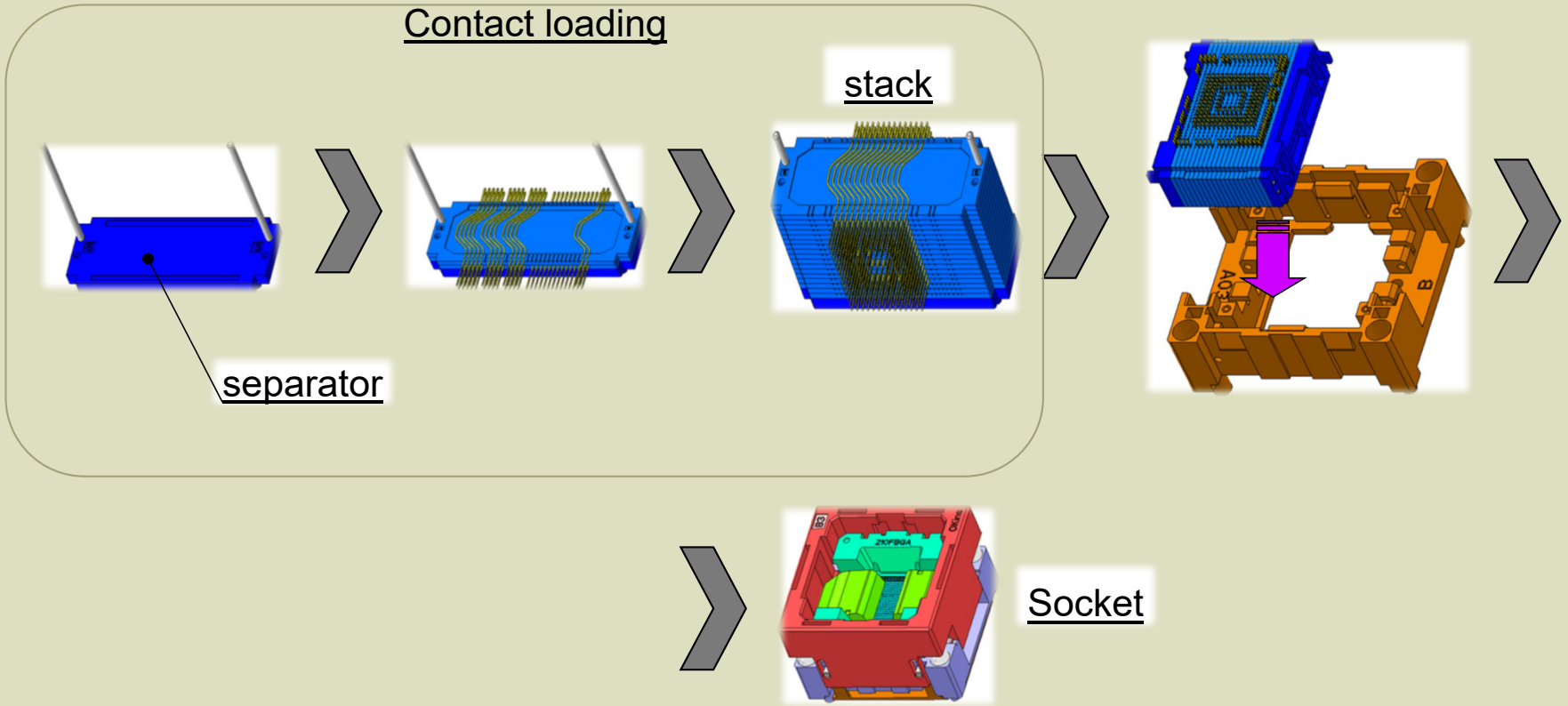
- Socket Pitch (& Device Pitch) is decreasing
  - 1mm
  - 0.8mm
  - 0.65mm
  - 0.5mm
  - 0.4mm
  - 0.35mm
  - 0.30mm
  - 0.28mm? 0.27mm?
  - …

Problem:
No solution for
0.25mm & beyond!

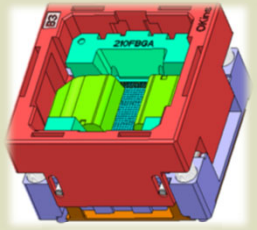
Burn-in Socket – Styles

	Contact Type	Pitch	Contact	Top View of Contact	Socket
Pinch	4 Point Pinch	0.5mm			
	Offset Tweezer	0.8mm			
	In-line Tweezer	0.4mm			
Buckle Beam	U-shape	~ 0.2x mm			
	Pointed	0.4mm			
	4 Point Crown	0.4mm			

How do we build buckle beam socket?



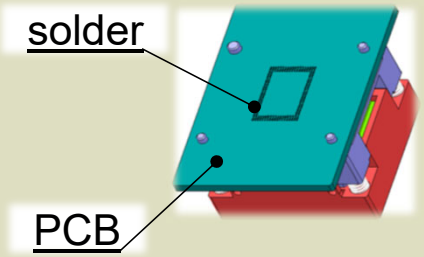
Socket + PCB Assembly

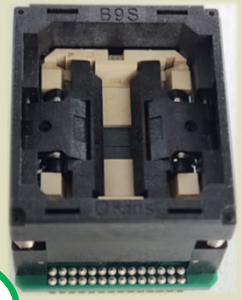


Socket

Daughter Board (PCB)

Finished Assembly

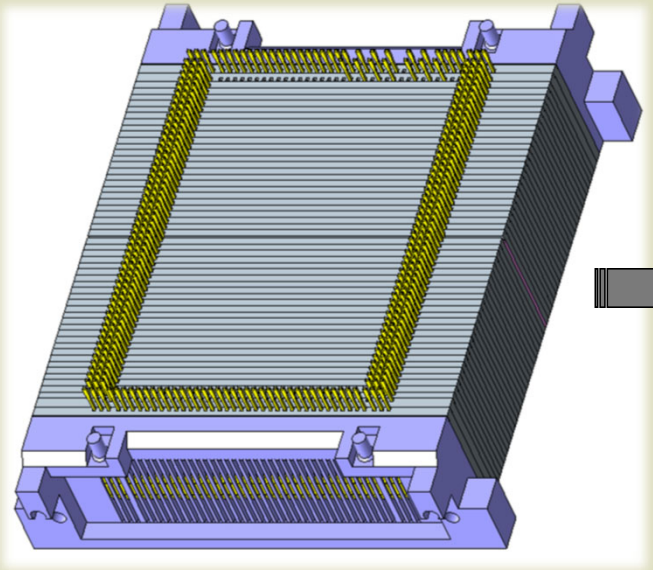


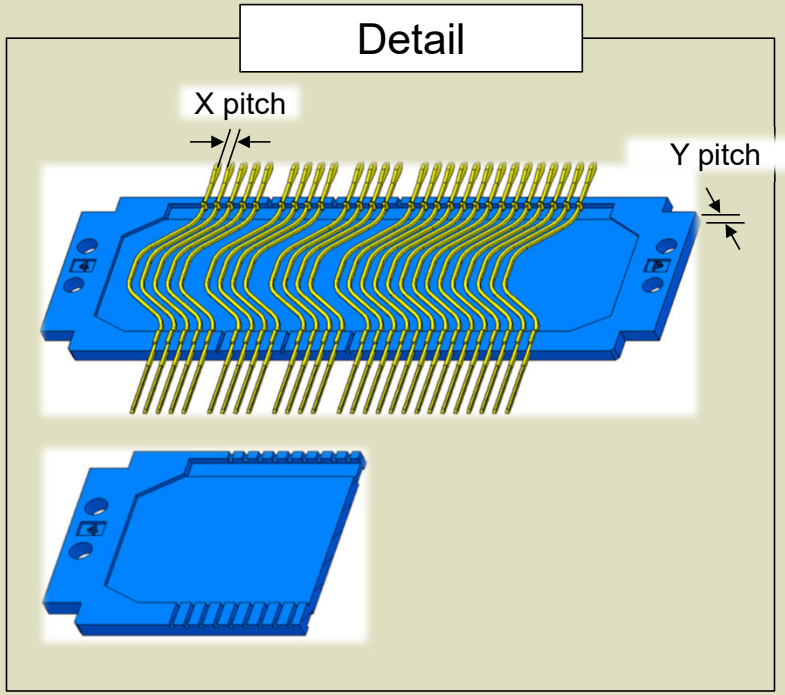


Ready for Burn-in Board.

Buckle Beam Socket – Pitch Control

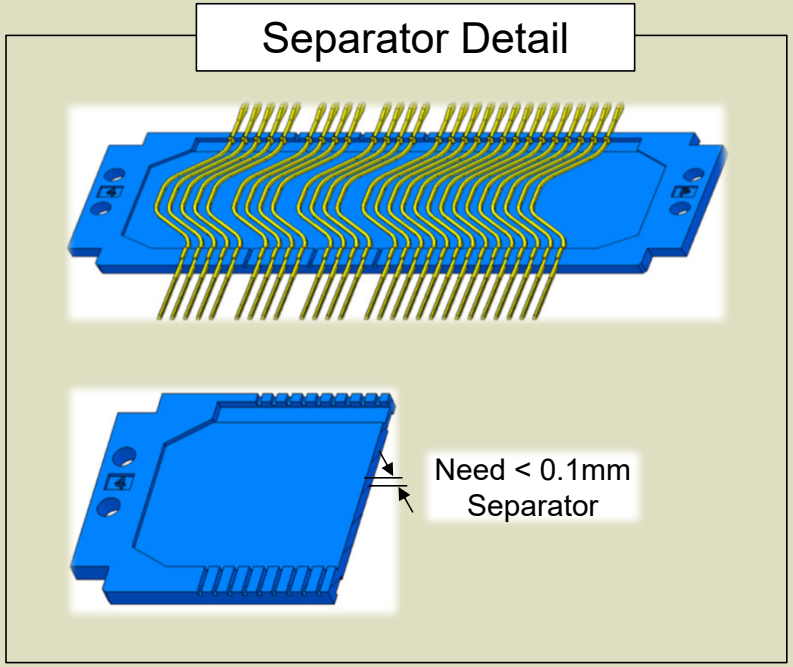
- Multiple separators control X, Y pitch





Buckle Beam Socket – Pitch Limit

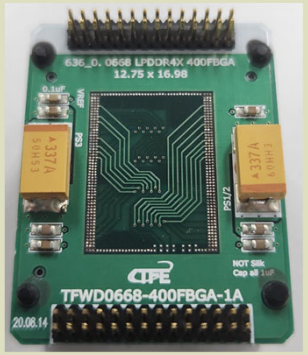
- < 0.25mm pitch burn-in socket is a challenge



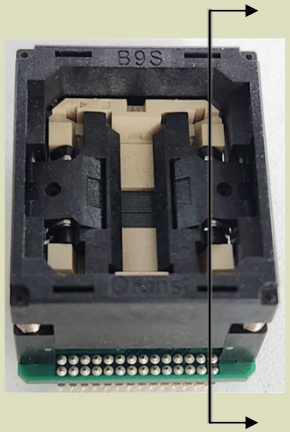
Socket Assembly - Reparability

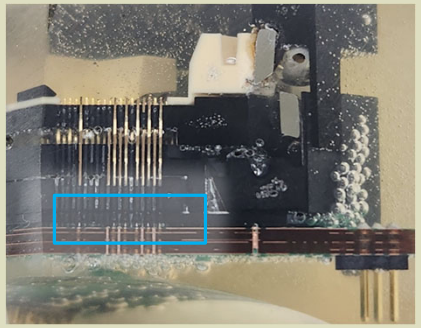
- Current Burn-in Socket:
  - Soldering (assembly) defects between socket & PCB are **not** repairable.

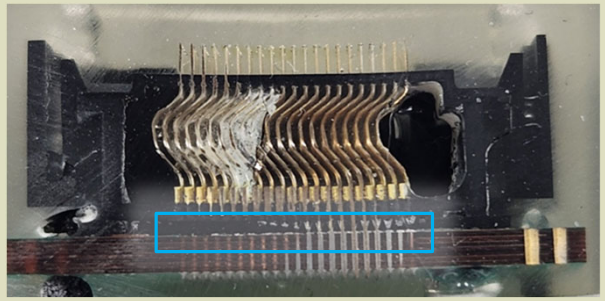
DUT Bottom: repairable



Between Socket & DUT: Non-repairable







New Path to Narrow Pitch Burn-In Socket

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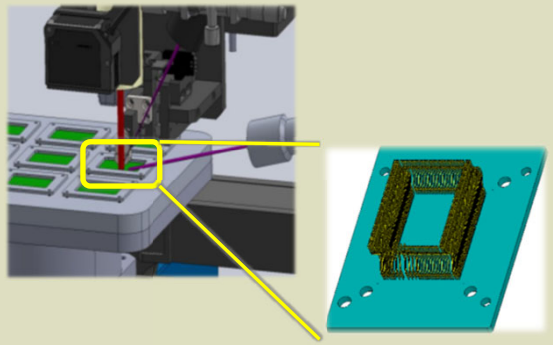
What if …

- Instead of
  - Building Socket
  - Building PCB
  - Assembling Socket & PCB
- Build socket contacts on PCB first
- Add socket housing last

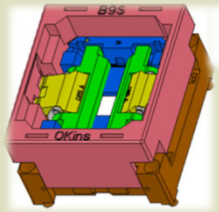
→ **IF Socket**: Inside First

IF Socket – Build Process

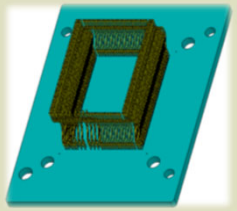
Assemble Contacts on PCB First



Housing

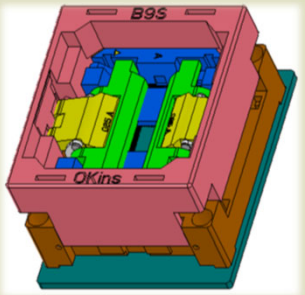


Add Housing



Finished Assembly

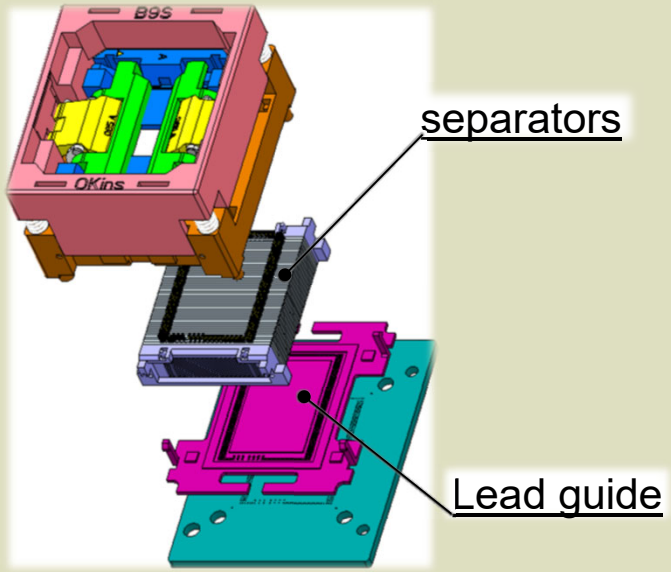
(socket + PCB)



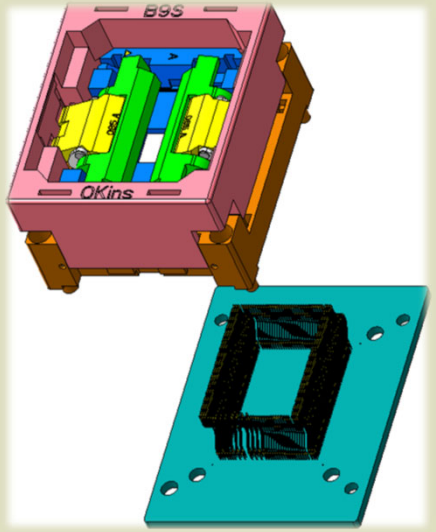
IF Socket – Reduced Parts, Reduced Cost

- Reduce parts
- Reduce process steps

Current Burn-in socket



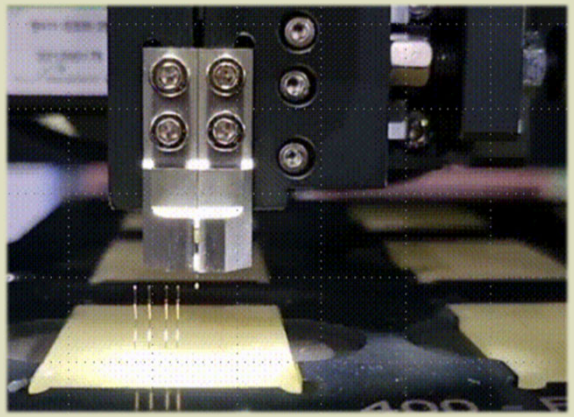
IF socket



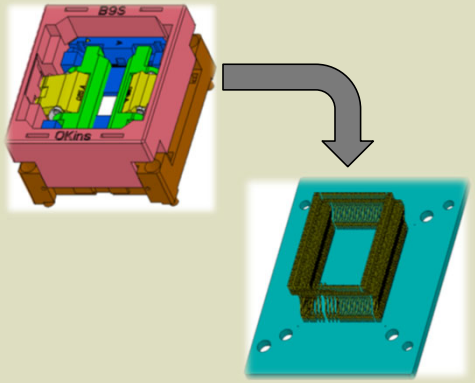
IF Socket – Short Lead Time

#1 Self Alignment

#2 Contact Bonding



#3 Housing Assembly



1 day socket!

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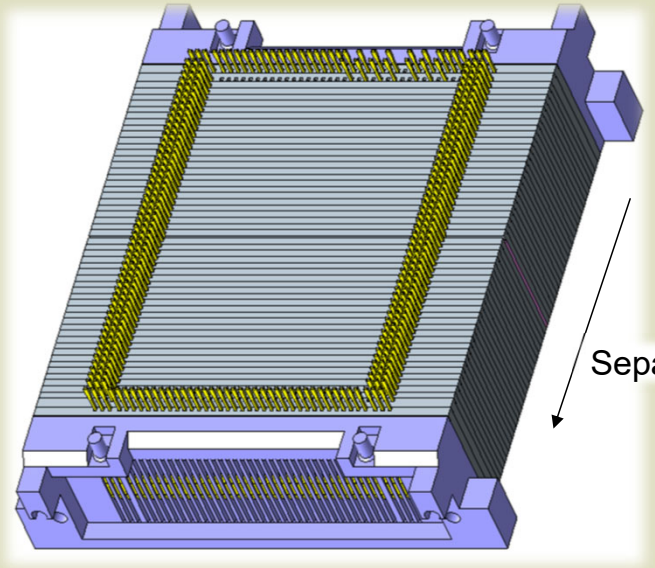
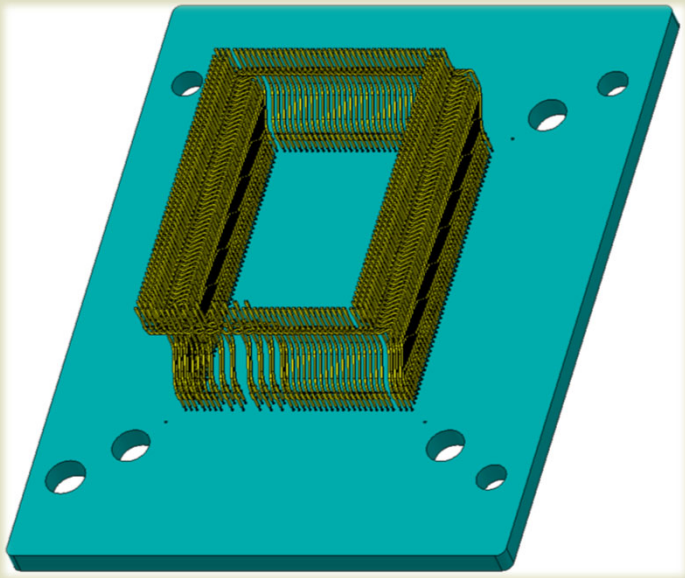
IF Socket – Nimble Pitch Change

Current BI socket



- Current BI socket: Mixed pitch requires multiple mixed separator plates (injection molded)

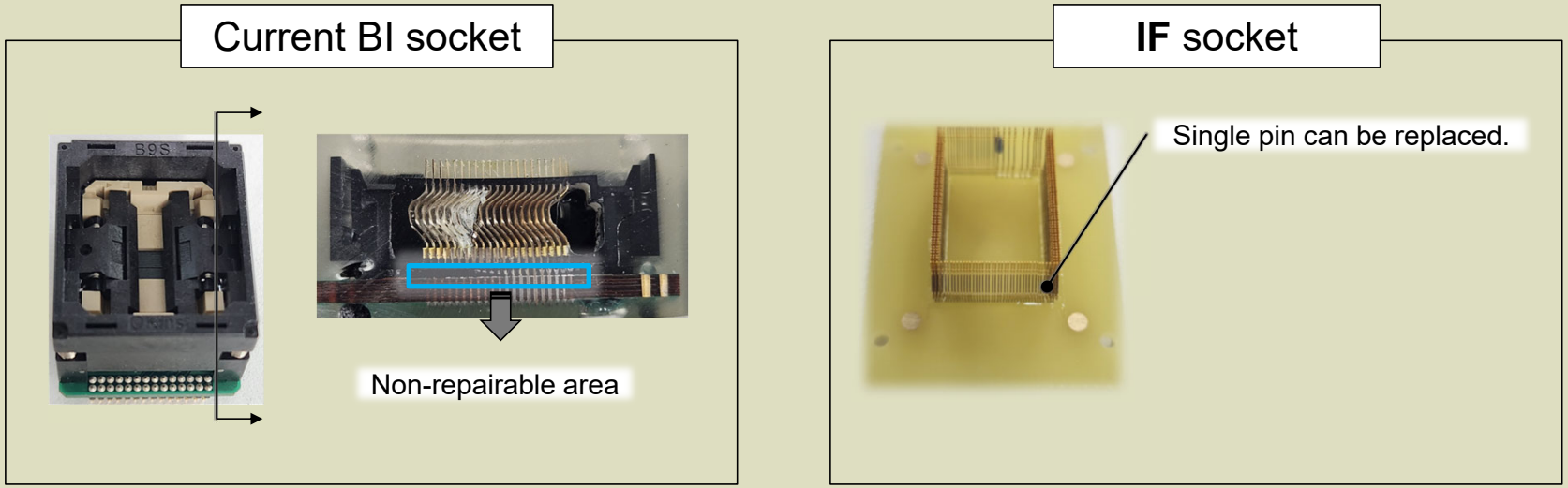
IF socket



- Can build mixed pitch & pin layout

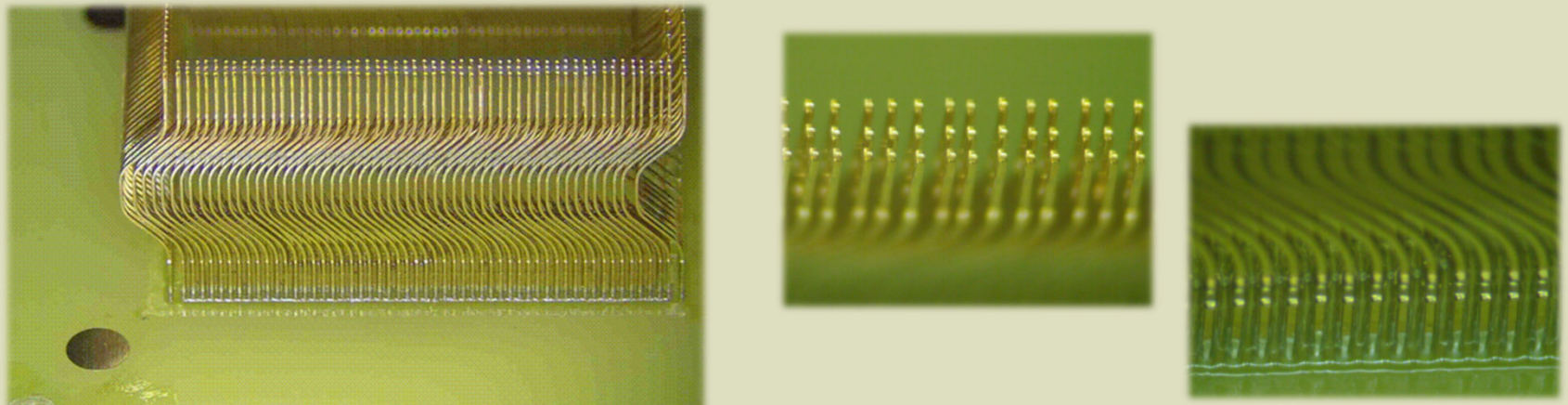
IF Socket – Repairable

- Current burn-in sockets will have high defects at < 0.25mm pitch
- **IF** Socket: Any defect can be repaired at single pin level.

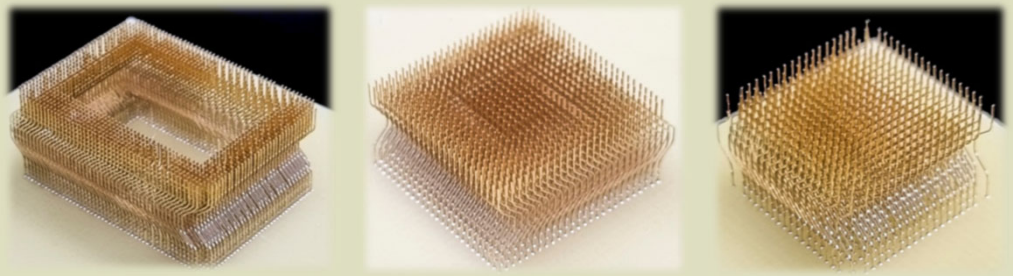


IF Socket Demo 1

- 0.3mm pitch 400FBGA LPDDR5 Socket



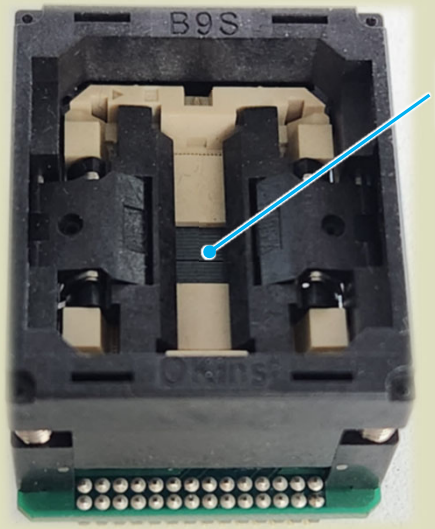
- Socket Samples:



IF Socket Demo 2

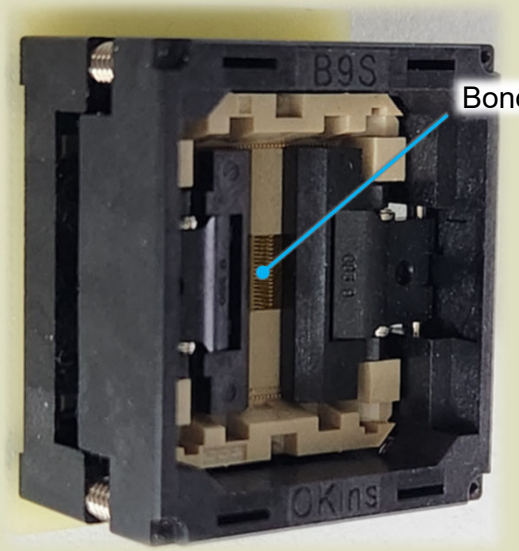
- 0.3mm pitch 400FBGA LPDDR5 Socket Comparison

Current BI socket



Built with Separators

IF Socket



Bonded Contacts

Summary - IF Socket

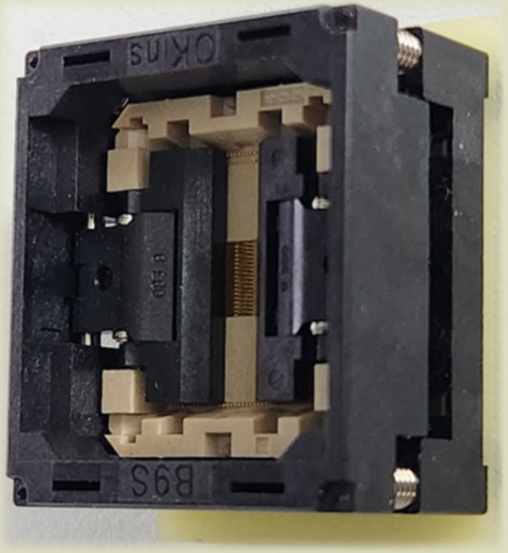
- Smaller Pitch ✓
  - 0.25mm & beyond
- Shorter lead time ✓
- Lower cost ✓
  - Reduced parts
  - Reduced process steps
  - Repairable

Up to 0.1mm pitch

1 day!

What Next?

- New burn-in socket for narrow pitch: **IF** Socket
- Other applications:
  - Die testing in socket?
  - Probe card interposer?
  - Wafer level probing?



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