

“Zero defects” matter | The power of X-Ray in Advanced Packaging

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**ZERO
DEFECTS**



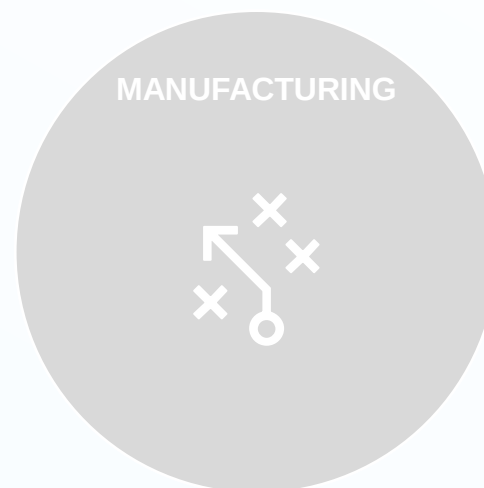
MARKET

**Win time-to-market
race**



TECHNOLOGY

Design for yield



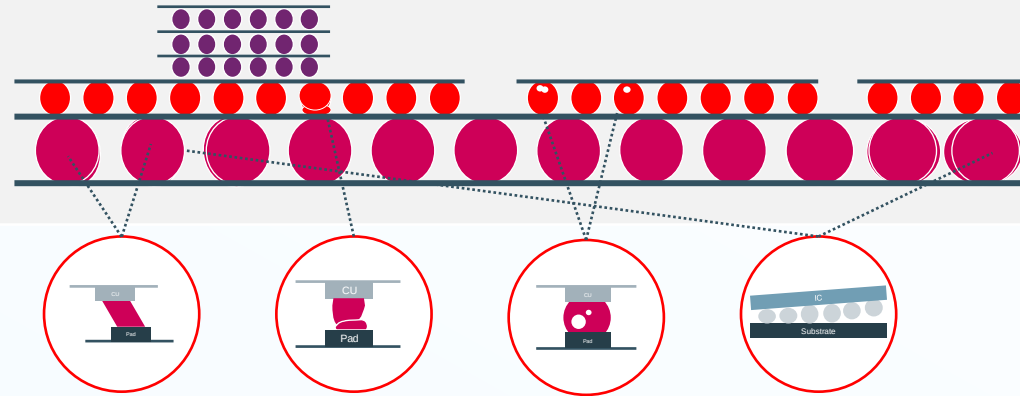
MANUFACTURING

**Accelerate process
ramp-ups time**

More **INSIGHTS**

FORESIGHT

New Test Strategies



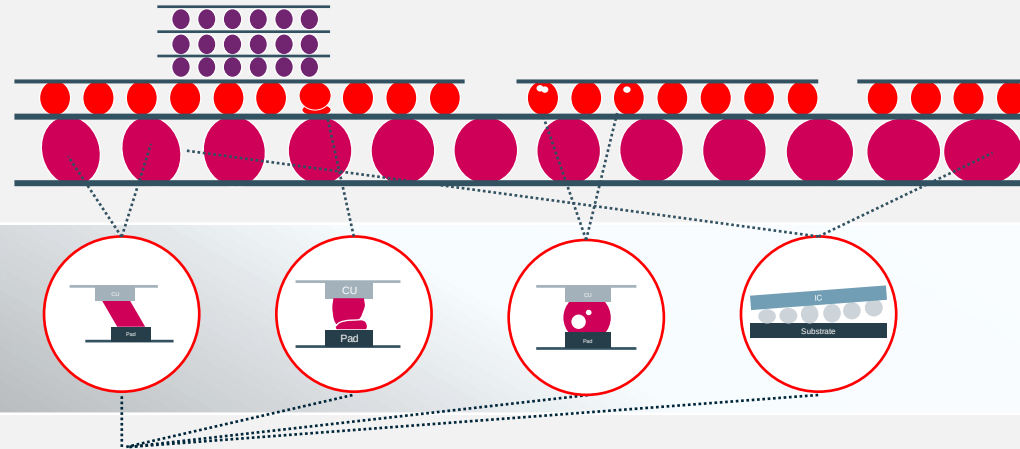
**ZERO
DEFECTS**

More **INSIGHTS**

FORESIGHT

**ZERO
DEFECTS**

New Test Strategies



End-to-End Analytics



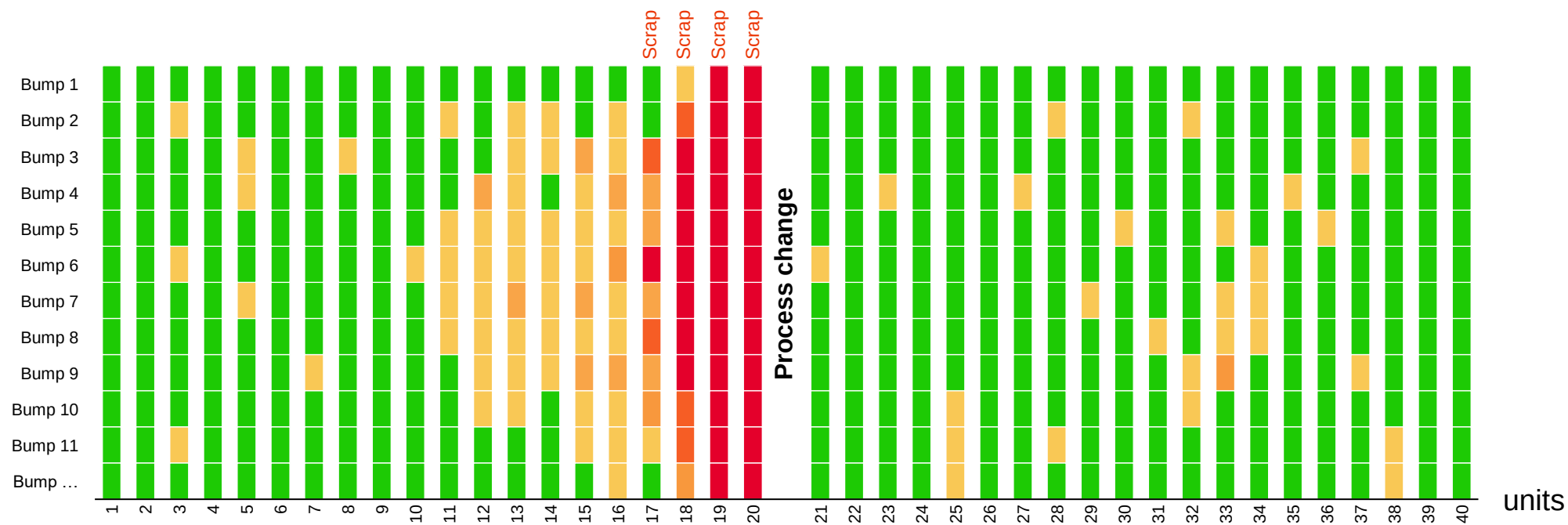
More **INSIGHTS**

FORESIGHT

Data



The icons show: 1. Wire: A wire connecting a 'Die' to a 'Pad'. 2. Flip-chip: A 'Die' with a 'Pad' on its bottom surface. 3. Wire-bond: A 'Die' connected to a 'Pad' by a wire loop. 4. Flip-chip with wire bonds: A 'Die' with 'Wire bonds' connecting it to a 'Substrate'.



From Insights to foresight (2/3)

Data



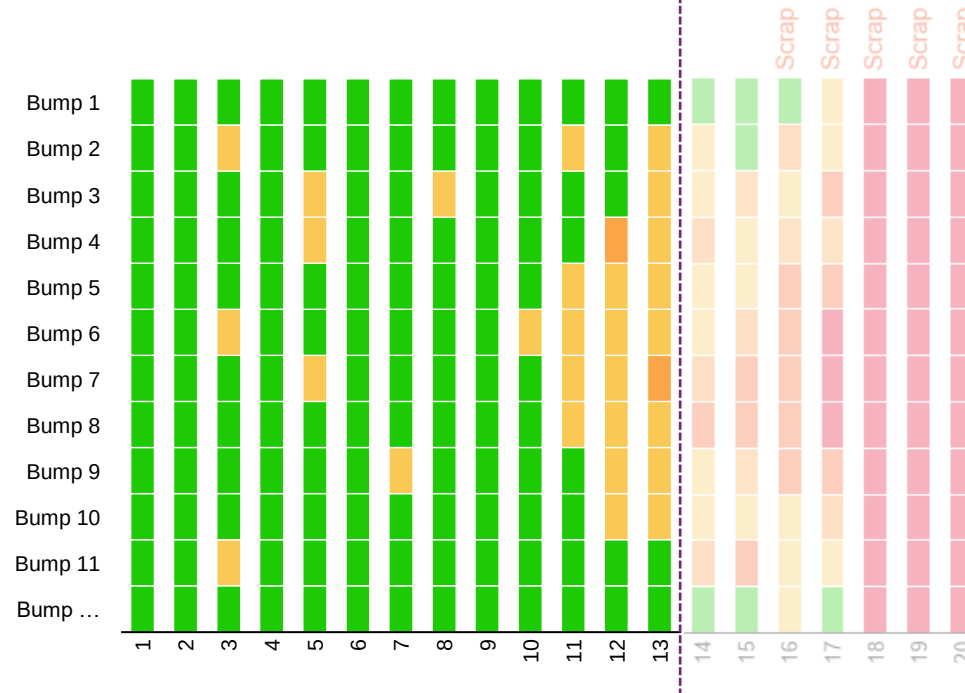
Insight ("why")
to
foresight ("when")

comet
yxlon

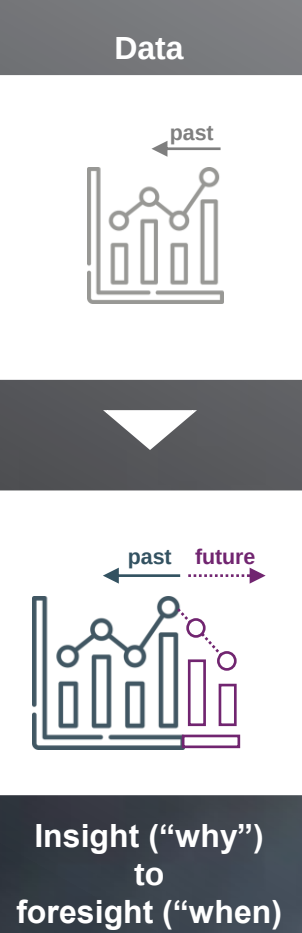
Insights for BumpInspect



past future
Alert prediction



From Insights to foresight (3/3)

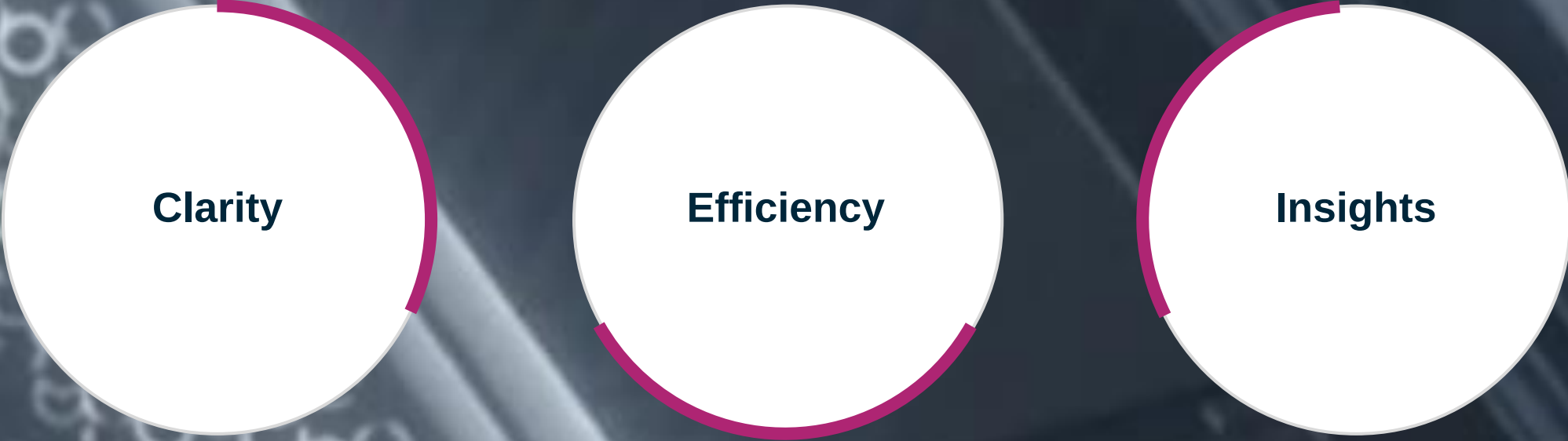


The power of Xray in advanced packaging

To see better. Faster. More.

Specimen: Advanced Packages		Tools for inspection / failure analysis			
		Optical	X-Ray		FIB-SEM
			2D	Next Gen 3D	
Tilt		✓	✓	✓	✓
Missing bump		✓	✓	✓	✓
Bridge		✓	✓	✓	✓
Bulge/big-bump		✓	✓	✓	✓
Small bump / non-wet			✓	✓	✓
Shift			✓	✓	✓
Void			✓	✓	✓
Missing/ Small via connect				✓	✓
Head in pillow				✓	✓
Substrate cracks				✓	✓
		Speed Detail recognition			

What is needed to support the Advanced Packaging challenges through X-Ray?

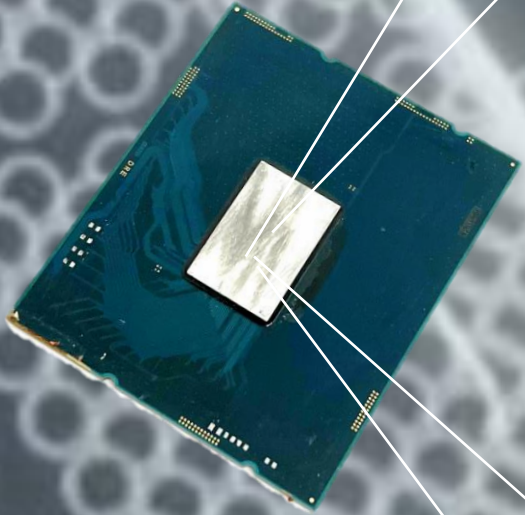


Clarity

Efficiency

Insights

CPU

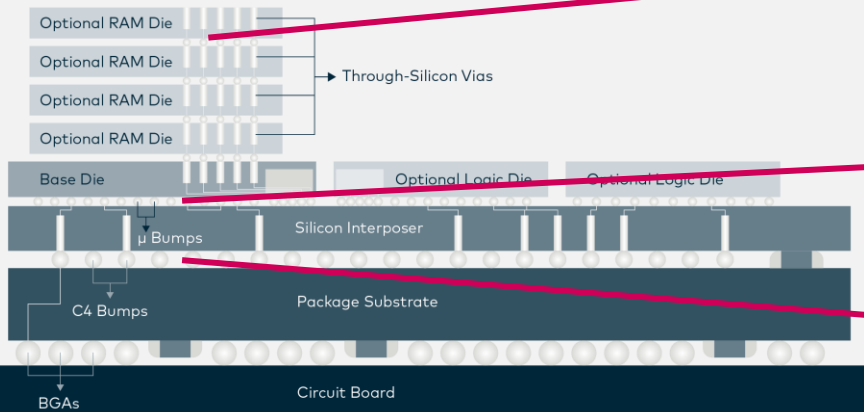


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Looking at 3D slice

Integrated Circuit (IC)/Microchip

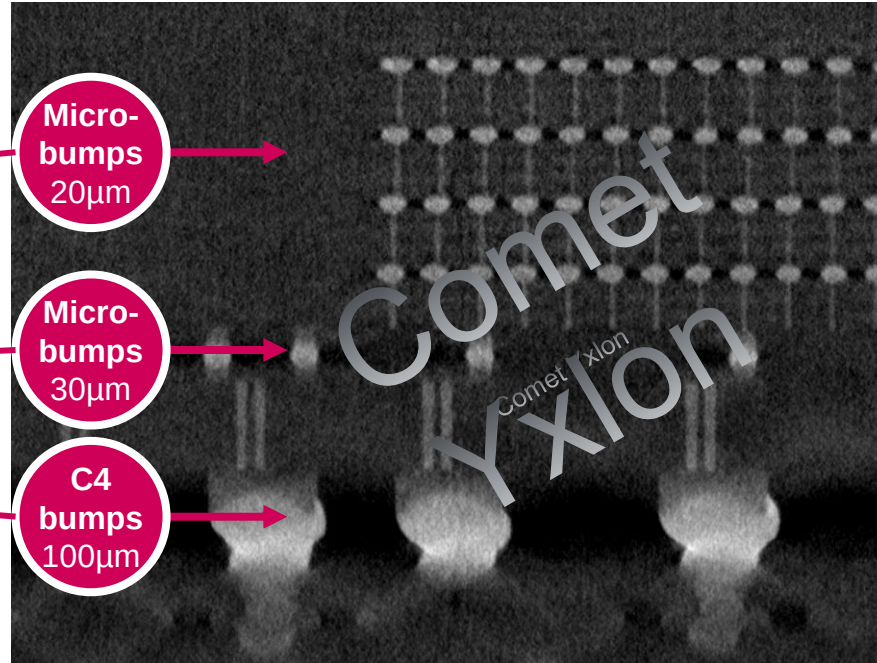
typical structure



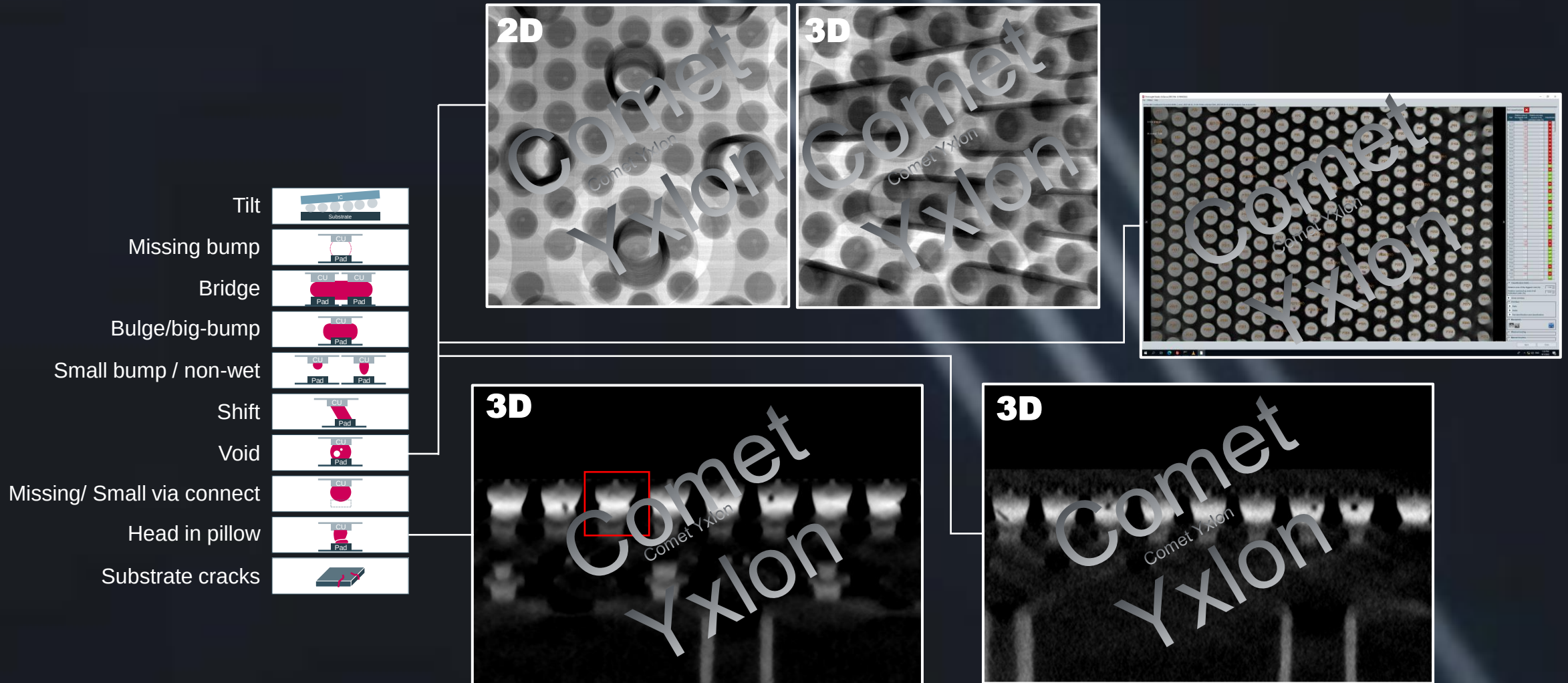
Micro-bumps
20 μ m

Micro-bumps
30 μ m

C4 bumps
100 μ m

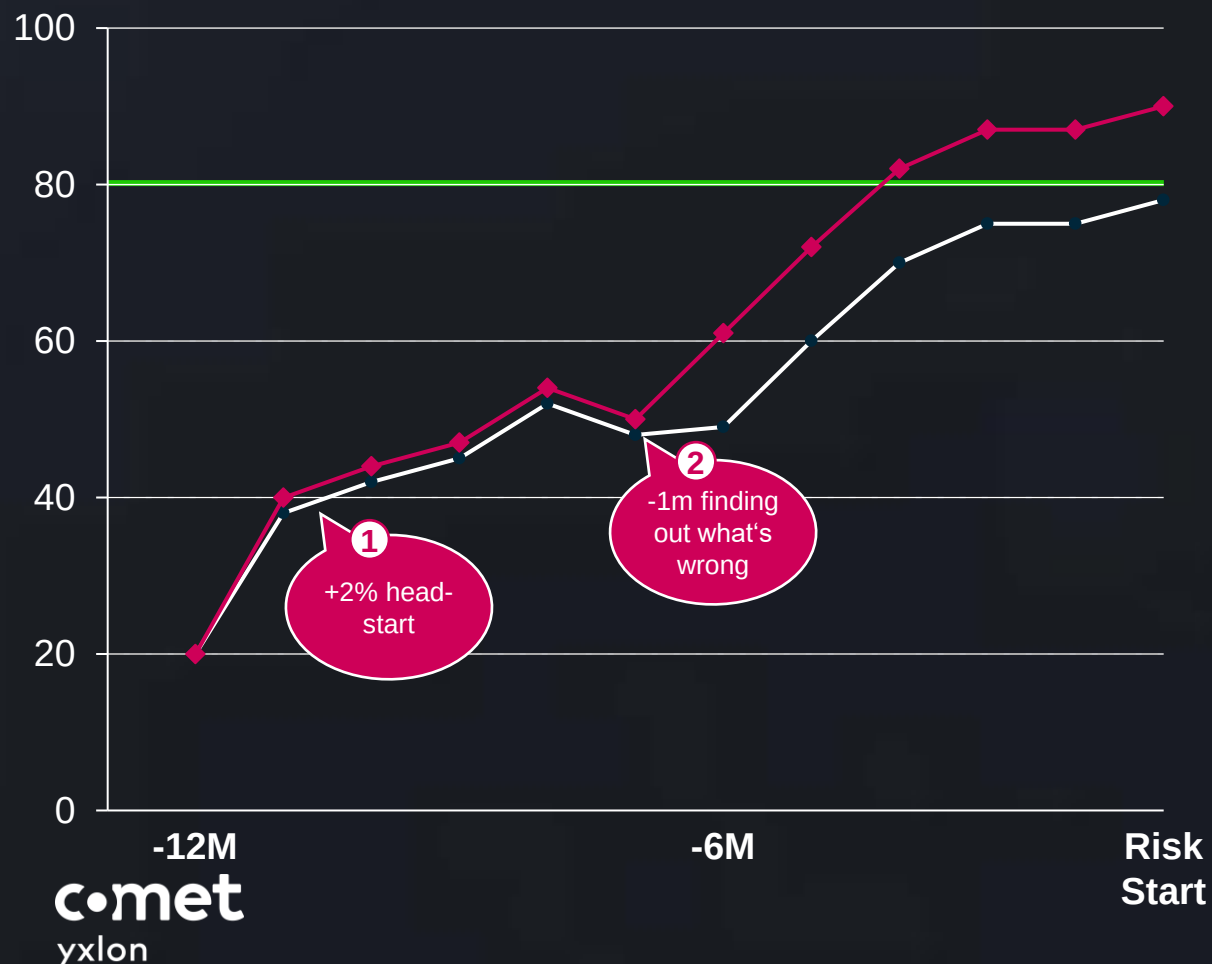


Looking at bumps



How 3D X-Ray inspection significantly supports 3D IC process development.

Yield in %



1

Speed-up ramp-up

Speed-up failure analysis in implementation phase through X-Ray inspection

2

Speed-up failure analysis

Finding critical issues with real-time information and automated defect recognition



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Thank you for your attention.

Please feel free to contact me if you have any questions.

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