

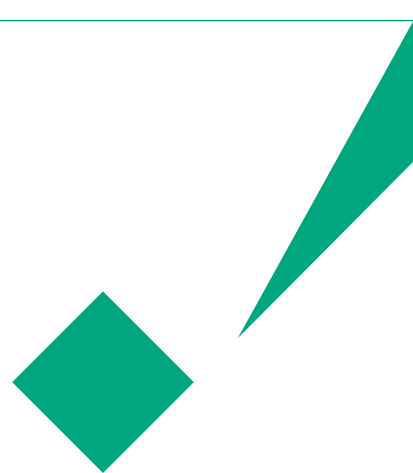
# See your future in our Direct Write Exposure Solution

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Direct Write Exposure Systems



Ushio's DE-2 and DE-8





## DE-2

### 2µm L/S Direct Write Exposure System

DE-2 W300 for 300mm (12") Wafer

DE-2 P600 for 600 x 600mm Panel December 2021 Debut

- ◆ Maskless Direct Imaging for Fan-Out WLP & PLP and High Precision Packaging
- ◆ Minimum Line/Space = 2/2µm imaging capability
- ◆ Overlay accuracy ≤ 1µm
- ◆ Optional Deca's Adaptive Patterning™ connectivity



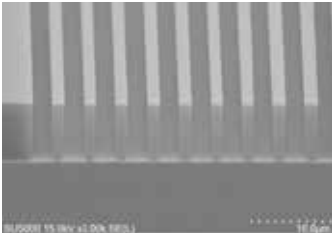
## DE-8

### Direct Write Exposure System for FO-WLP/PLP

DE-8 W300 for 300mm (12") Wafer

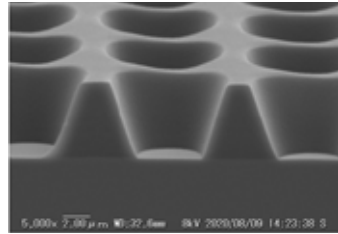
DE-8 P600 for 600 x 600mm Panel

- ◆ Maskless Direct Imaging for FAN-OUT WLP & PLP
- ◆ Minimum Line/Space = 8/8µm imaging capability
- ◆ Overlay accuracy ≤ 7µm
- ◆ Optional Deca's Adaptive Patterning™ connectivity



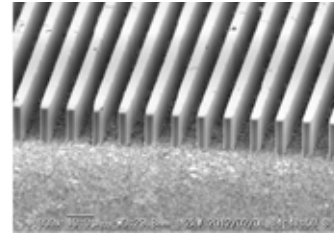
L/S 2/2µm

Liquid Photo-sensitive Resist  
7µm thick



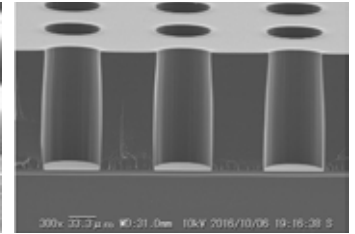
Via opening 5µm dia. 10µm Pitch

Liquid Photo-sensitive Polyimide  
7µm thick



L/S 5/5µm

Dry Film Resist  
15µm thick



Opening 70µm dia. 140µm Pitch

Dry Film Resist  
160µm thick

# Adaptive Patterning™

by DECA

As a product moves through the manufacturing process, Adaptive Patterning™ (AP) customizes each lithographic layer on a device-by-device basis to ensure the highest possible yield.

### 1. DESIGN

Create nominal design with instructions for AP (one-time for each new product)

3<sup>rd</sup> PARTY EDA

### 2. ADAPT

Execute real-time design optimization during manufacturing for each device on every panel

ADAPTIVE ALIGNMENT TO CHIPLET A

ADAPTIVE ROUTING BETWEEN CHIPLETS

ADAPTIVE ALIGNMENT TO CHIPLET B

### 3. EXPOSE

Implement optimized design with LDI on each device on every panel

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