



- 1 Device with different microstructures
- 2 OLED-microstructure (Analog clock)
- 3 Illuminated dot and ring (both structures switchable separately)
  - a) Ring and dot are on
  - b) Ring is off and only dot is on

## ILLUMINATED RETICLES AND MICROSTRUCTURES WITH OLED

### Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP

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#### Manufacturing partner



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### Präzisionsoptik Gera GmbH

POG Präzisionsoptik Gera GmbH develops, produces and distributes customer-specific, precision optical components, as well as systems and appliances for the whole spectral range. POG has special expertise in the development and production of sophisticated, customized optical microstructures.

The availability of all necessary technologies in house, such as layout design according to customer's specification, production of photomasks, photolithographic procedures, coatings and machining of substrates allow to produce single pieces and small batches as well as high serial quantities at a constant high quality.

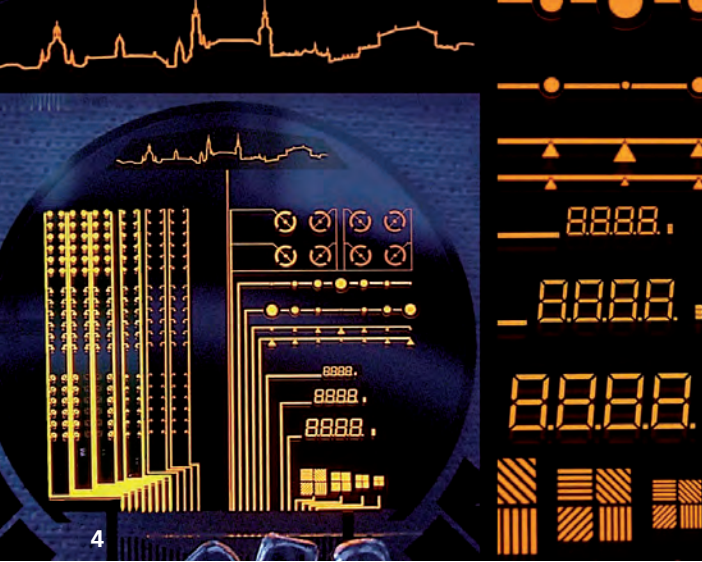
Over the last years POG introduced new technologies especially for the lithography of ITO and other conductive and passivation layers. This includes wafer level processing as well as production of custom semi fabricates for OLED elements.

### Fraunhofer FEP

Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP is working in the area of innovative vacuum coating, surface treatment and modification with electrons and plasma as well as organic semiconductors.

Fraunhofer FEP offers thus a wide range or research, development and pilot production possibilities, in particular for treatment, sterilization, structuring and enhancement of surfaces as well as for OLED micro-displays, organic and inorganic sensors, optical filters and flexible OLED lighting.

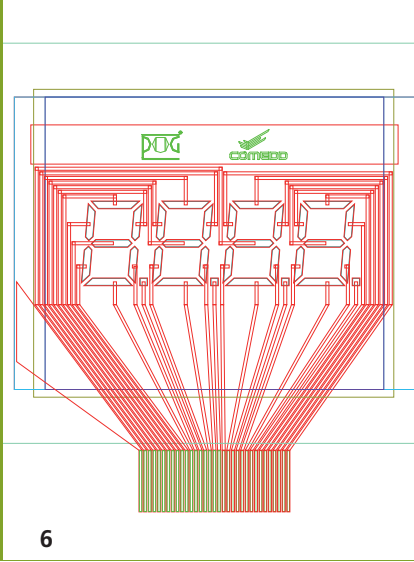
The aim is to tap the innovation potential of electron beam, plasma technology and organic electronics for novel production processes and components and to make it useful for our customers.



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### POG and Fraunhofer FEP

POG now offers the following services in the field of optical microstructures with OLED together with Fraunhofer FEP:

- Application consulting for customized OLED devices
- Layout design and minimum structure dimensions on request
- OLED top and bottom-emitting
- Realization of devices in connection with lithography on substrates with maximum size of 200 mm x 200 mm or on wafers with Ø 200 mm
- Assembly of devices: cutting and curvature, bonding with flexconductors and anisotropic adhesive, alternatively wire bonding
- Realization of control electronics, hybrid solutions

#### OLED Module: 35 x 50 mm<sup>2</sup>

##### Parameters and specification

OLED color	Voltage supply	Current efficiency
[cd/m <sup>2</sup> ]	@ 1000	@ 1000
Red	2.80 V	14.3 cd/A
Orange	2.73 V	19.6 cd/A

### Design examples

#### Variable stripes design:

- 15 segments
- Equal length (10.0 mm)
- Opening of passivation is different (10 µm, 20 µm ... 100 µm, 150 µm ... 500 µm)

#### Seven-segment display:

- 4 x seven segments and two dots
- Segments: opening of passivation is 0.45 x 2.3 mm<sup>2</sup>
- Dots: opening of passivation is 0.45 x 0.45 mm<sup>2</sup>

#### Analog clock design:

- 12 segments
- Seven-segment display for minutes
- Incl. Logo

#### Resolution test:

- 16 structures
- Opening of passivation is different

#### Stripedesign with logos:

- 31 segments
- OLED stripes are 625 µm wide
- Distance between two stripes is 25 µm

#### Recticle: module with teststructures

- Lighting panel with silhouette (Dresden, lighting area 0.75 mm<sup>2</sup> line: 18 mm)
- Dot with ring (dot: d = 150 µm)
- Dot/triangle diameter variable
  - Dots: d = 100/200/300/450 µm
  - Triangles: a = 100/150/225/300 µm
- Resolution Test
  - Opening of passivation: 50/38/25/19 µm

### Technical Data OLED Driver

- 33 contacts between µC and OLED module
- All contacts programmable separately
- 2.7 ≤ 3.3 V OLED display voltage
- ≤ 0.5 mA OLED current if all elements are on
- ≤ 20 µA OLED current if one element (example of seven-segment display)
- ≤ 2.0 mA board current if all elements are on @ 3.0 supply voltage
- Brightness setting with PWM is possible
- -20°C ... 100°C

4 Reticle with teststructures

5 Lighting reticle with OLED

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6 Layout (seven-segment display)