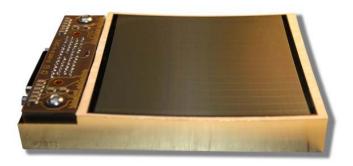


Curved High Resolution CCD Sensors – Overview

Preliminary Short Form Datasheet v0.1 dtd. 18. April 2013



Spherical 4k x 4k Front Illuminated CCD (Concave)

Motivation:

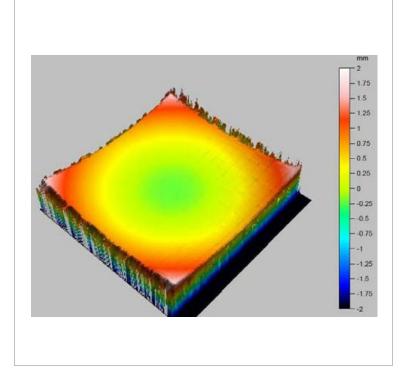
- Curved image planes and wavefronts are often a reality, but image sensors have still been flat despite
- Considerable simplification of complex multilens systems for scientific applications possible
- Best effect at high F-number lenses (large open aperture and small focal length)
- Increased light Intensity at the sensor surface by lower number of optical lens elements and less air-glass transitions
- Better image quality and reduction of vignetting effects at the lens edges possible
- Potentially significant cost savings on complex lens-systems

Design Considerations:

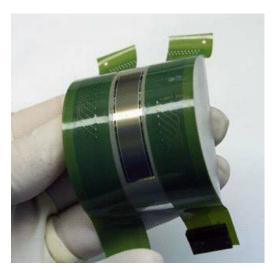
A curved image sensor can be designed as a one-dimensional cylindrical curvature or as a two-dimensional spherical curvature (convex or concave). As part of customized projects, scientific front illuminated 4k x 4k (16 Mpixels) - image sensors with convex and concave surfaces have already been realized. The applied vacuum technology (also usable on back side illuminated CCDs) has not created any measurable increase in detector noise or the number of cosmetic defects compared to the conventional flat image sensor with identical electro-optical properties. Cyclic mechanical stress testing has shown good results as well.

Spherical, curved image sensors are currently not yet available as standard devices, but could be developed on custom request, based on earlier project experience.

Profile of Spherical Concave CCD







Cylindrically Curved CCD (Convex)

First possible standards for Curved CCDs:

- 4k x 4k Front illuminated (FI) spherical concave CCD based on our CCD2900 or CCD4150; Radius 500mm
- 4k x 4k Back illuminated (BI) spherical concave CCD based on our CCD4150; Radius 500mm
- 10k x 10k Back illuminated (BI) spherical concave CCD based on our CCD1600LN (low noise), Radius 500mm

Required Specifications for Curved CCD Development:

To provide you with a quote for the development of your custom curved CCD, we ask you to provide the following data:

Trigonometrical CCD-specification

- 1- (cylindrical) or 2-dimensional (spherical) curvature
- Convex or concave
- Radius of curvature + allowed deviation from that value
- **Application**

Electro Optical CCD-specification

For instance exisiting flat (uncurved) CCDtype to base the curved design on

Sensor Package Requirements

Any additional requirements important for your application

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