

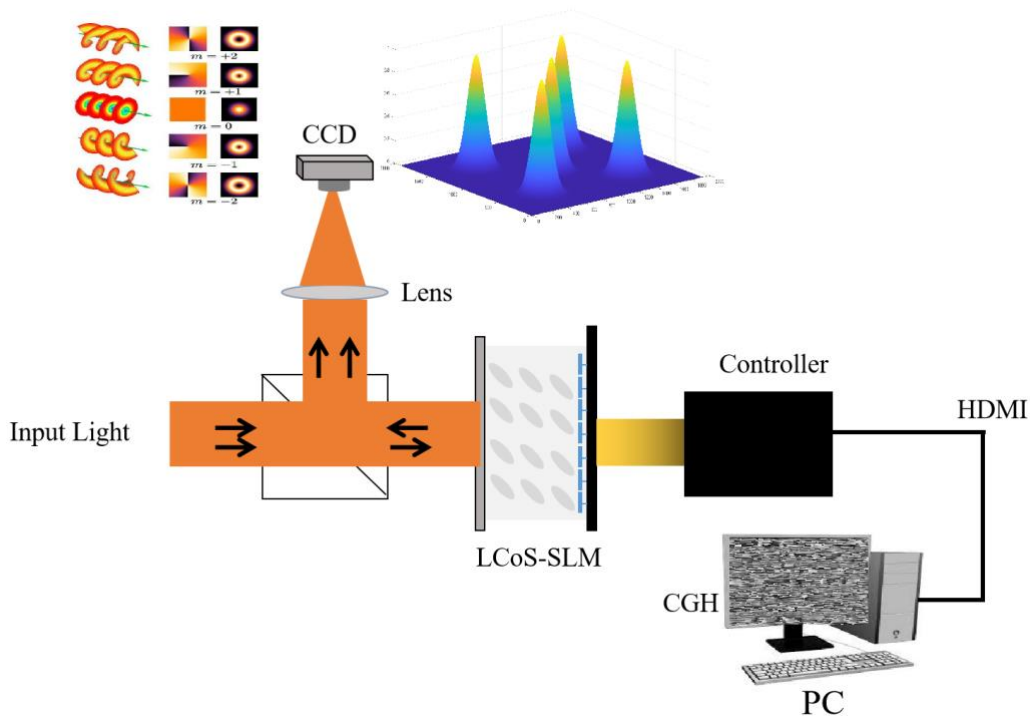
■ Features

- Liquid Crystal on Silicon
- Spatial Light Modulator
- High diffraction efficiency
- High linear modulation
- High reflectivity

■ Applications

- Laser Processing
- Wavelength Selective Switch
- Display application
- Holographic projection
- Laser Beam Shaping

Introduction



Liquid Crystal on Silicon (LCoS) Spatial Light Modulators (SLM), consist of a high resolution (1920×1200 or 1920×1080) reflective LCoS device and a driver board, which a computer generated hologram (CGH) can be loaded to the LCoS device through the HDMI interface.

This technology combines the unique light-modulating properties of Liquid Crystal (LC) materials with the advantages of high-performance silicon Complementary Metal Oxide Semiconductor (CMOS) technology through dedicated LCoS assembly process.

The optimal optical design of CamOptics LCoS-SLM minimizes light loss and achieves high diffraction efficiency. The water-cooled version of LCoS-SLM can maintain the operating temperature of the device on a level of 0.1°C and is suitable for high power applications such as laser processing etc.

Specifications

Model	CONIR-LASE80 for 1064nm applications	CONIR-TELCO80 for 1550nm applications
Pixel pitch	8 μm	8 μm
Fill factor	>95%	>95%
Pixel resolution	1920 x 1200 or 1920 x 1080	1920 x 1200 or 1920 x 1080
Max. phase modulation	$\geq 2\pi$ @1100 nm	$\geq 2\pi$ @1550 nm
Wavelength range	1000-1100 nm	1525 - 1565 nm
Bit depth	8-bit (256 grey scales)	8-bit (256 grey scales)
Reflectivity	90 \pm 2% @1064nm	90 \pm 2% @1550nm
Phase flicker	<0.2% rms	<0.4% rms
Diffraction Efficiency	94.7% @16-pixel pitch grating	93.3% @16-pixel pitch grating
Storage Temperature	0 to 60°C	0 to 60°C
Operating Temperature	10 to 60°C	10 to 60°C

Electrical and optical characteristics

- High linear phase modulation

CamOptics LCoS-SLM can achieve more than 2π phase modulation. Prior to shipment, LCoS-SLM is calibrated at a target wavelength to obtain accurate phase control and high linear phase modulation characteristics.

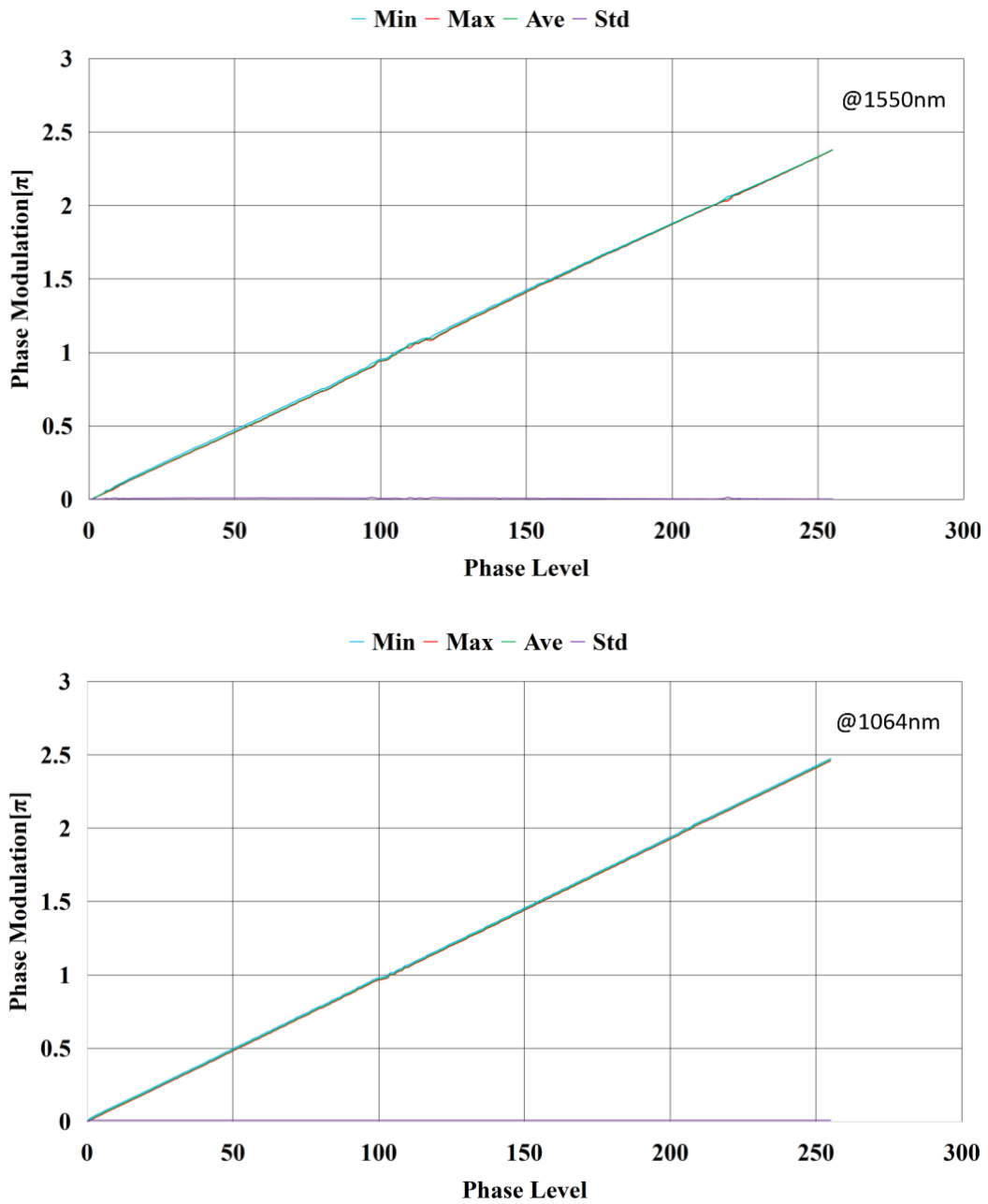


Fig 1 Phase measurement (T= 30°C)

● **Low phase flicker**

Table 1 Phase flicker measurement result (T= 30°C)

Model	Max phase	Std. Deviation	Peak-to-Peak
1550 series	2.6π	< 0.012	< 0.031
1064 series	2.8π	< 0.0058	< 0.010

● **High diffraction efficiency**

CamOptics LCoS-SLM offers high diffraction efficiency close to the theoretical value. Diffraction efficiency is as:

$$\text{Diffraction efficiency} = \frac{I_{1st}}{I_{ave}} \quad [\%]$$

Where, I_{1st} refers to the first order light energy when a grating is loaded, I_{ave} refers to the mean intensity of 0 to 255 gray scales.

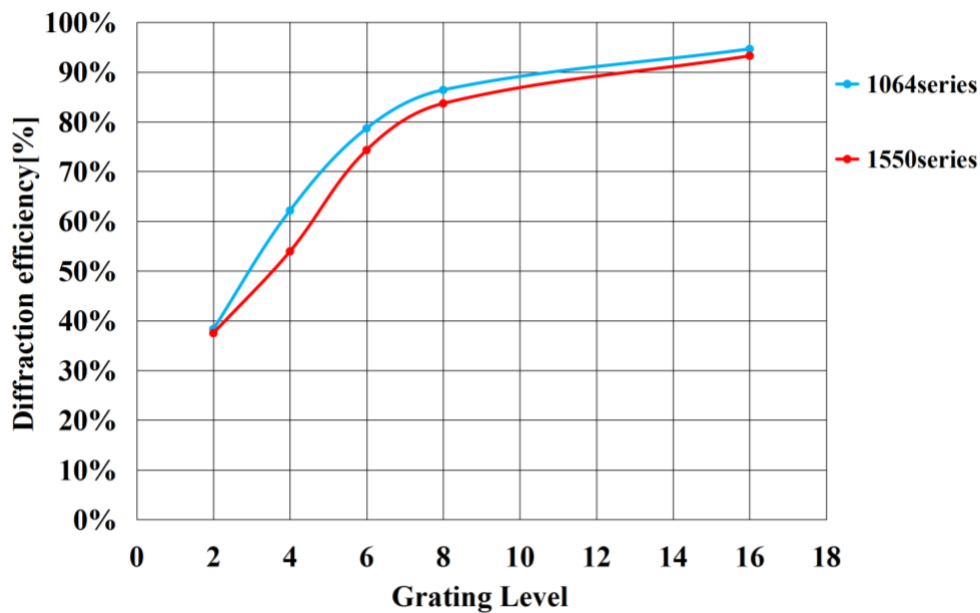


Fig 2 Diffraction efficiency (T= 30°C)

● Reflectivity & Response time

The reflectivity of CamOptics LCoS-SLM is defined as the ratio of 0th order reflected light intensity to the reflected light intensity off the gold coated mirror. The reflectivity of the gold mirror at the corresponding wavelength is more than 96%, so CamOptics LCoS-SLM has more than 90% reflectivity, and it has a high light utilisation rate. The LCoS rise time and fall time is defined as in the table below.

Table 2 LCoS Electro-Optical characteristic (T= 30°C)

Model	Reflectivity	rise time	fall time
1064 series	92.65%	59ms ^{*1}	109ms ^{*1}
1550 series	91.52%	74ms ^{*2}	135ms ^{*2}

* T = 30°C

* R_{gold} > 96% (1064–1550nm)

¹: Time change between 10% and 90% of max phase modulation (1064 series:2.8π)

²: Time change between 10% and 90% of max phase modulation (1550 series:2.6π)