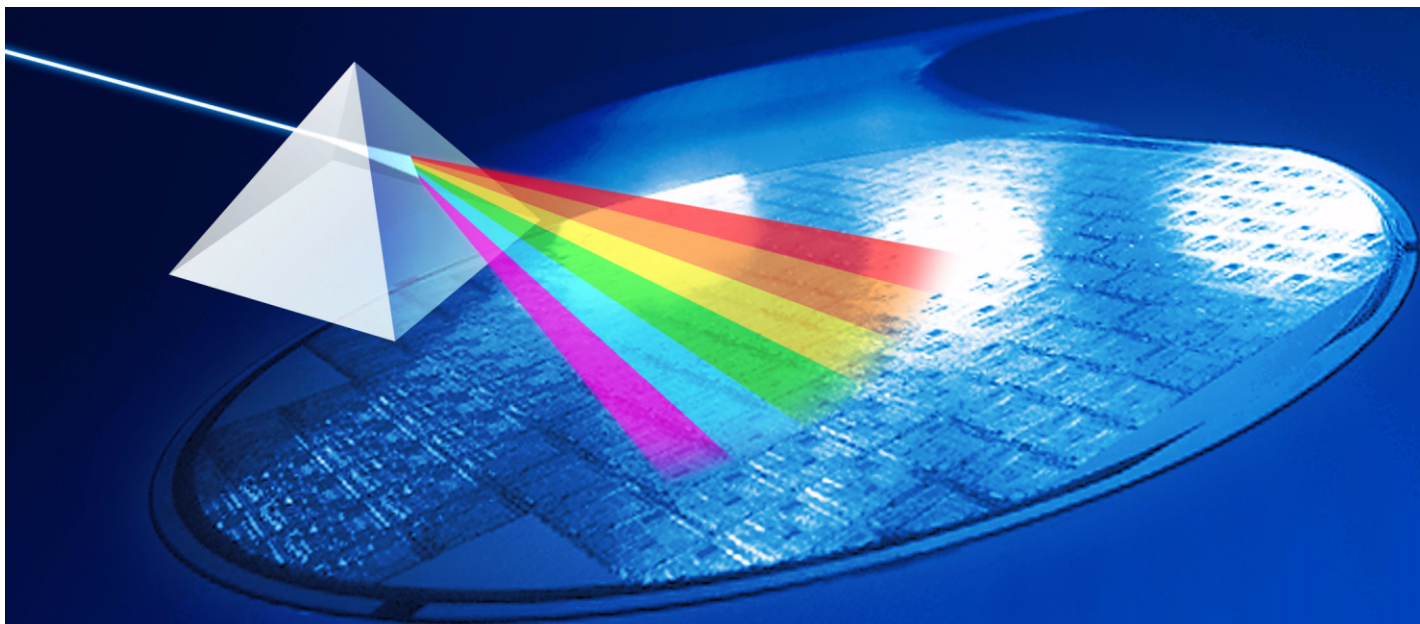


OPT 0256C

Oct/2002



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Stand-Alone UV-VIS Photo Detecting Array with ADC

The photo detecting array OPT 0256C represents a new generation of highly accurate optical sensors for integrated solutions. Each photodiode is equipped with its own A/D converter to allow precise synchronous measurements.

Exchange of data is done via a standard SPI interface. Thus, a large variety of instructions is possible.

The 24-pin devices can be connected to the parallel port of any PC or laptop providing a single-chip solution. Alternatively, stand-alone solutions can be realized by the integration of microcontrollers or DSPs.

The OPT 0256C consists of 256 photodiode channels in a 50- μm pitch. Further types with 2...1024 channels and pitches down to 25 μm are possible on request.

Measurement Features

- ◆ Broad spectral sensitivity:
 $\lambda = 190 \text{ nm} \dots 950 \text{ nm}$
- ◆ Highly sensitive measurements, full-scale photo current 2.63 nA typ. @ gain=3
- ◆ 16-bit dynamic range, higher resolution by post-decimating output data
- ◆ Integration time from 26 μs to 12.5 s
- ◆ Ultra-low noise: 4 LSB @ 75% FS and gain=0
- ◆ Integrated temperature sensor
- ◆ No cooling necessary
- ◆ No blooming effect
- ◆ No memory effect on sudden intensity changes

Applications

- ◆ Spectrometry
- ◆ Pattern recognition
- ◆ Motion control

Miscellaneous

- ◆ Synchronous detection of whole frame
- ◆ On-chip compensation of fixed pattern noise
- ◆ Four gain factors for each channel
- ◆ Excellent UV stability (degradation $< 1.5 \times 10^{-9} \text{ m}^2/\text{Ws}$ @ $\lambda = 200 \text{ nm}$)
- ◆ Current adder for diagnostics
- ◆ Industry standard package

Modes

- ◆ Continuous mode
- ◆ External start mode
- ◆ External start/stop mode
- ◆ Hold mode

Evaluation Support

- ◆ Evaluation board
 - to be connected to PC or laptop
 - Windows[®] software

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Interfacing

Communication and data transfer with an external DSP or PC is achieved by means of a four-wire serial interface (SPI, serial peripheral interface). It is possible to cascade a number of ICs to a single SPI interface.

Apart from a few blocking and filtering capacitors, no external analog circuitry is necessary. All internal reference voltages are derived from an on-chip integrated reference voltage source.

Geometrical Characteristics

Symbol	Parameter	Value	Unit
N_C	Number of channels	256	–
d_H	Pixel height of photodiode	1600	μm
d_P	Channel pitch	50	μm
d_G	Gap between photodiodes	5	μm
l_{die}	Chip length	14.6	mm
h_{die}	Chip height	4.1	mm

Power Supply

Operation of the chip requires two supply voltages: 5 V for the analog part and 3.3 V for the digital part, respectively. Power dissipation is held as low as possible and typically amounts to 130 mW.

System Architecture

The hardware of the OPT 0256C consists of 256 photodiodes each having its own 16-bit ADC, a settable accumulation counter for wide accumulation range, a temperature sensor with ADC, and a digital control block with an SPI-compatible serial interface.

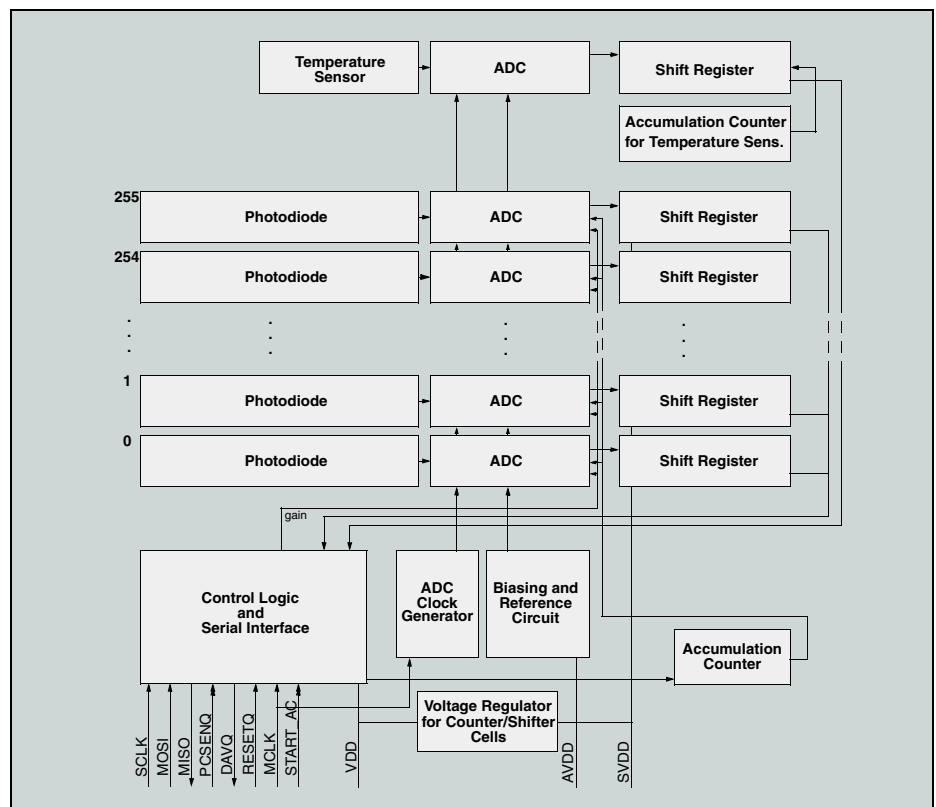


Fig. 1: Block diagram of the OPT 0256C

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