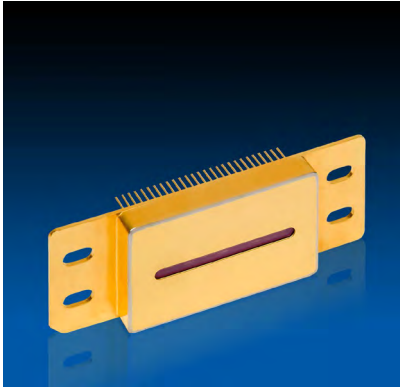


# Sensors Unlimited: LC/LSC Series



## Extended wavelength InGaAs linear photodiode arrays

High-speed LC/LSC Series InGaAs photodiode arrays for broad wavelength ranges and multichannel spectrometer designs.

### BENEFITS

- Autozero reduction of pixel variation and dark current
- Wavelength ranges of 0.8 to 2.6  $\mu\text{m}$
- Max lps 91KHz (LC); Max lps 15.5KHz (LSC)
- Four full well capacity options
- 25  $\mu\text{m}$  or 50  $\mu\text{m}$  pitch – 1 in or 1/2 in array
- Pixel heights of 25  $\mu\text{m}$ , 250  $\mu\text{m}$  or 500  $\mu\text{m}$
- Anti-blooming to prevent charge overflow from saturated pixels
- Digital serial input for mode control
- Selectable bandwidth circuit
- ESD resistant
- Integrate While Read for minimum overhead

The LC/LSC Series of InGaAs linear arrays are offered in configurations with 256, 512, and 1024 elements, featuring pixel pitches of 25 $\mu\text{m}$  or 50 $\mu\text{m}$ , and pixel heights of 25  $\mu\text{m}$ , 250  $\mu\text{m}$ , and 500  $\mu\text{m}$ . These arrays support various wavelength ranges: a standard range of 0.8 to 1.7  $\mu\text{m}$ , a shorter range of 0.8 to 1.45  $\mu\text{m}$ , and extended ranges of 1.1 to 2.2  $\mu\text{m}$  and 1.1 to 2.6  $\mu\text{m}$ .

Anti-blooming protection prevents charge flow from saturated pixels, allowing for increased dynamic range and image fidelity. An autozero function reduces dark current and non-uniformity, thereby extending the detector's operational range to higher temperatures and longer exposure times.

These photodetector arrays are hybridized with Sensor Unlimited Inc.'s (SUI) proprietary CMOS readout-integrated circuits (ROICs), ensuring maximum noise immunity and sensitivity. Optimal ROIC performance requires minimal circuitry, needing only one analog supply and three digital control lines. Four separate gains are selectable with a serial input.

The arrays, renowned for their durability and reliability are available with either a one- or two-stage thermoelectric cooler for temperature stabilization and monitoring.

### Applications

- FTIR/NIR interferometry
- NIR spectroscopy
- Biomedical analysis
- Plastic recycling
- Industrial process control

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## Electrical inputs

Parameter/description	Unit	Min.	Nom.	Max.
Power supply voltage $V_{DD}$	V	4.90	5.00	5.25
Power supply voltage $V_{SS}$	V		0	
Digital inputs clocks, high	V		5.00	$V_{DD}$
Digital inputs clocks, low			$V_{SS}$	0.8
Pixel clock frequency	MHz	0.01		12.5

## Pixel performance

Feedback capacitor	Typical gain	Typical capacity	Typical read noise <sup>1</sup>	Typical dynamic range
.01 pF	1.6 $\mu$ V/e	1.25 Me	800 e RMS	1700:1
1.0 pF	160 nV/e	12.5 Me	1 ke RMS	4300:1
10.0 pF	16 nV/e	125 Me	10 ke RMS	5000:1
20.0 pF	8 nV/e	250 Me	10 ke RMS	5000:1

<sup>1</sup>Largest photodiode, autozero off.

## Linear array comparison table (representative values)

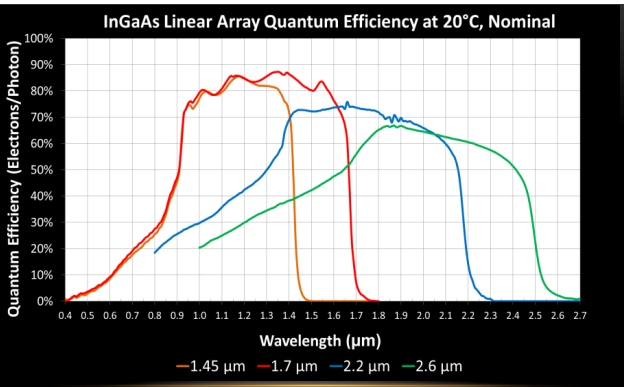
Material type	Dark current	50% QE cut-on $\lambda$ ( $\mu$ m)	50% QE cut-off $\lambda$ ( $\mu$ m)	Peak $\lambda$ ( $\mu$ m)
1.45 $\mu$ m	1.3 pA	0.91	1.415	1.17
1.7 $\mu$ m	2.3 pA	0.91	1.65	1.36
2.2 $\mu$ m	10 nA	1.3	2.155	1.67
2.6 $\mu$ m	100 nA	1.64	2.41	1.84

## Absolute maximum ratings

Parameter	Unit	Min.	Typ.	Max.
Power consumption ( $V_{DD}=5.00$ V), four outputs, high power mode	mW			350
Power consumption ( $V_{DD}=5.00$ V), one output, low power mode	mW			135
Operating temperature range	$^{\circ}$ C	-20		+80
Storage temperature range	$^{\circ}$ C	-20		+85

## Photodiode performance at -20 $^{\circ}$ C

Photodiode type	2.6 $\mu$ m, 250 $\mu$ m
Inoperable pixels, maximum	5%
Photoresponse nonuniformity (PRNU), maximum	$\pm 10\%$



Specifications subject to change without notice.



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