

## LC/LSC Series

### High Speed InGaAs Linear Photodiode Arrays

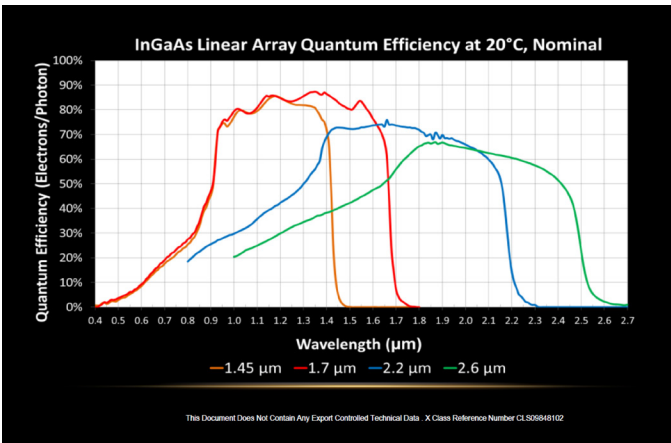
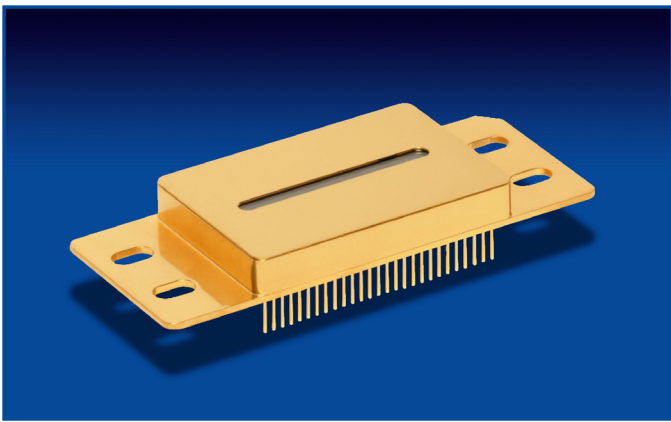
The high-speed LC/LSC Series linear InGaAs photodiode arrays are designed for broad wavelength range, multi-channel spectrometer designs. The proprietary readout integrated circuit design contains functions that reduce dark current for applications that demand the highest performance.

The LC/LSC Series InGaAs linear arrays are available with 256, 512 and 1024 elements on a 25 $\mu$ m or 50 $\mu$ m pixel pitch with pixel heights of 25, 250 and 500  $\mu$ m. Standard wavelength range of 0.8 to 1.7  $\mu$ m, a shorter range of 0.8 to 1.45  $\mu$ m or extended wavelength range of 1.1 to 2.2  $\mu$ m and 1.1 to 2.6  $\mu$ m is available. Anti-blooming protection prevents charge flow from saturated pixels, allowing for increased and intra-scenic dynamic range. The autozero function reduces dark current and non-uniformity, extending the detector's utility to higher temperatures and longer exposure times.

The photodetector arrays are hybridized with CMOS readout integrated circuits (ROIC) of SUI's exclusive design to offer maximum noise immunity and sensitivity. Operating circuit designs need only provide for one analog supply and three digital control lines for optimum ROIC performance. Four separate gains are selectable with a serial input. The array is available with a one or two-stage thermoelectric cooler for temperature stabilization and monitoring. The SUI LC/LSC Series photodiode arrays are rugged, reliable, and available in volume.

#### FEATURES

- Autozero reduction of pixel variation and dark current
- Wavelength ranges of 0.8 to 2.6  $\mu$ m
- Max Ips 91KHz (LC); Max Ips 15.5KHz (LSC)
- 4 Full Well capacity options
- 25  $\mu$ m or 50  $\mu$ m pitch – One inch or one-half inch array
- Pixel heights of 25  $\mu$ m, 250  $\mu$ m or 500  $\mu$ m
- Antiblooming to prevent charge overflow from saturated pixels
- Digital serial input for mode control
- Selectable bandwidth circuit
- ESD Resistant
- Integrate-while-read for minimum overhead



ELECTRICAL INPUTS				
Parameter/Description	Unit	Min.	Nom.	Max.
Power supply voltage $V_{DD}$	V	4.90	5.00	5.25
Power supply ground $V_{SS}$	V		0	
Digital inputs and clocks, high	V		5.0	$V_{DD}$
Digital inputs and 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
0.1 pF	1.6 $\mu\text{V}/\text{e}$	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.

PHOTODIODE PERFORMANCE AT -20°C	
Photodiode type	2.6 $\mu\text{m}$ , 250 $\mu\text{m}$
Inoperable pixels, maximum	5%
Photoresponse nonuniformity (PRNU), max.	$\pm 10\%$

ABSOLUTE MAXIMUM RATINGS				
Parameter	Unit	Min.	Typ	Max.
Power consumption ( $V_{DD}=5.00\text{ V}$ ), 4 outputs, high power mode	mW			350
Power consumption ( $V_{DD}=5.00\text{ V}$ ), 1 output, low power mode	mW			135
Operating temperature range	$^{\circ}\text{C}$	-20		+80
Storage temperature range	$^{\circ}\text{C}$	-20		+85

LINEAR ARRAY COMPARISON TABLE (Representative Values)				
Material type	Dark Current	50% QE Cut-on $\lambda$ ( $\mu\text{m}$ )	50% QE Cut-off $\lambda$ ( $\mu\text{m}$ )	Peak $\lambda$ ( $\mu\text{m}$ )
1.45 $\mu\text{m}$	1.3 Pa	0.91	1.415	1.17
1.7 $\mu\text{m}$	2.3 pA	0.91	1.65	1.36
2.2 $\mu\text{m}$	10 nA	1.3	2.155	1.67
2.6 $\mu\text{m}$	100 nA	1.64	2.41	1.84