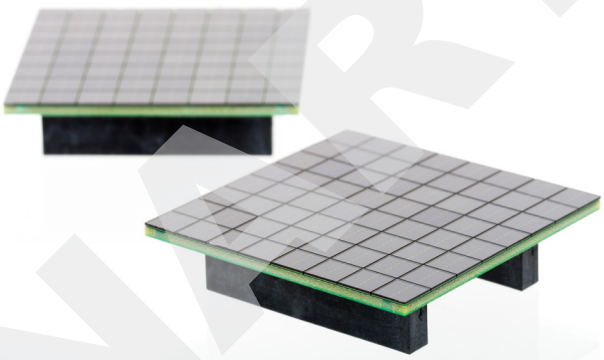
High Fill Factor Arrays of TSV-Packaged SiPM Sensors

SensL's custom range of J-Series TSV SiPM sensors have been used to create high fill-factor, scaleable arrays. The sensors are mounted onto PCB boards with minimal dead space. The ArrayJ products are available in a variety of formats and formed of either 3mm or 6mm pixels. Details of the arrays available are given in the table below and in the **Ordering Information** section.



The back of the larger ArrayJ products has one or more multi-way connectors that allow access to the *fast** output and *standard* I/O from each pixel in the array, and a *common* I/O from the summed substrates of the pixels. The ArrayJ connectors can be used to interface with the user's own readout via the mating connector, or to SensL's Breakout Boards (BOBs). The BOBs allow for easy access to the pixel signals and performance evaluation of the arrays. For certain arrays, a summed BOB is also available, that allows all of the pixel outputs to be summed together to create a single, large-area sensor.
The smaller ArrayJ-60035-4P has a BGA (ball grid array) in place of a connector, and only provides access to the *standard* and *common* I/Os with no access to the *fast* output.

ARRAY DETAILS

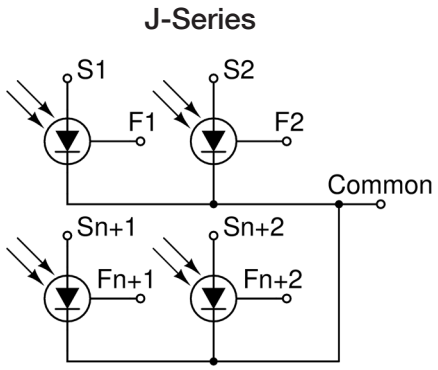
SensL SiPM sensors are unique in offering an additional *fast* output* that carries a signal with fast rise times and narrow pulse widths, allowing for precision timing and fast count rates.

Each SiPM pixel in the ArrayJ therefore has three electrical connections;

- Fast output*
- Standard I/O
- Common I/O

All pixel *common* I/O (cathode) are summed together, but each individual *fast** output and *standard* I/O (anode) will be routed to its own output pin.

ArrayJ products are available in variety of configurations (see table below), using J-Series TSV-packaged sensors. For intrinsic pixel-level performance data the J-Series datasheet should be consulted.



Array Format	Pixel Size	Microcell Size	Breakout Boards Available **
2x2	6mm	35um	Standard
8x8			Standard & summed
4x4	3mm	20um	Standard
		35um	Standard
8x8		20um	Standard
		35um	Standard

** The fast output is not available on the 2x2 array (ArrayJ-60035-4P).*
*** The 'standard' BOB allows the readout of individual pixels, the 'summed' BOB sums all of the pixel signals together, giving a single output.*

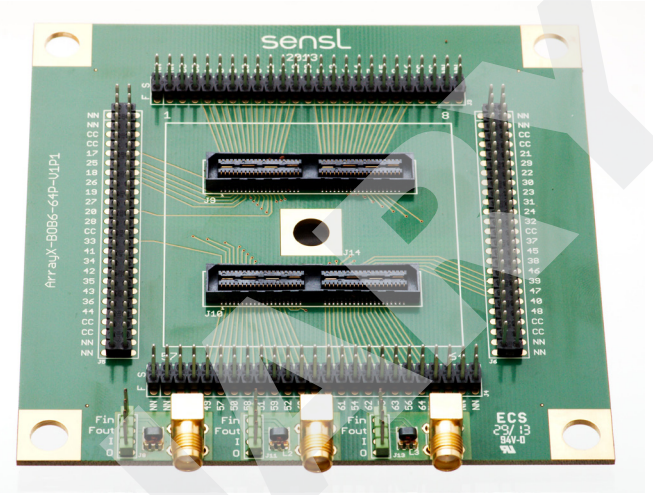
BREAKOUT BOARDS

To facilitate easy testing and performance evaluation of the ArrayJ products with connectors, SensL have developed corresponding Breakout Boards (BOBs).

The ArrayJ connectors plug into the mating connectors located on the BOB. The *fast* output and *standard* I/O from each pixel, along with the *common* I/O (which consists of all of the substrate connections connected together) are routed to header pins for easy access.

Each BOB has three SMA connectors that can be used for supplying bias voltage and accessing signals. To interface signals from the array header pins to the SMA connectors, each connector has a 4-pin header. In addition, each SMA has an optional balun transformer in close proximity for impedance matching of the signals from the fast output.

For certain ArrayJ products there is a summed BOB available that allows all of the pixel outputs to be easily summed together to create one single-channel, large-area sensor.



Evaluation Boards (EVBs) are available for ArrayJ products with BGA. The array is reflow soldered onto the EVB and therefore is permanently attached. Each EVB can only be used to evaluate the ArrayJ supplied with it, and that array cannot then be removed to use elsewhere. The EVB for the ArrayJ-60035-4P has 8, DIL-socket-compatible pins and does not provide access to the fast output.

ORDERING INFORMATION

Product Code	Microcell size (Total number per pixel)	Array Size	I/O Interface
6mm Sensor Arrays			
ArrayJ-60035-4P-BGA	35um (22,292 microcells)	2x2	BGA
ArrayJ-60035-64P-PCB		8x8	Connector
3mm Sensor Arrays			
ArrayJ-30035-16P-PCB	35um (5,676 microcells)	4x4	Connector
ArrayJ-30035-64P-PCB		8x8	Connector
ArrayJ-30020-16P-PCB	20um (14,850 microcells)	4x4	Connector
ArrayJ-30020-64P-PCB		8x8	Connector
Optional Breakout Boards *			
ArrayX-BOB6-64P	Breakout board with connectors for use with the ArrayJ-60035-64P-PCB		
ArrayJ-BOB3-16P	Breakout board with connectors for use with the ArrayJ-300XX-16P-PCB		
ArrayJ-BOB3-64P	Breakout board with connectors for use with the ArrayJ-300XX-64P-PCB		
Optional Summed Breakout Boards			
ArrayX-BOB6-64S	Summed breakout board with connectors for use with the ArrayJ-60035-64P-PCB		
Evaluation Board with ArrayJ Permanently Attached			
ArrayJ-60035-4P-EVB	Evaluation board with a permanently attached ArrayJ-60035-4P-BGA		

www.sensl.com
sales@sensl.com
+353 21 240 7110 (International)
+1 650 641 3278 (North America)

All specifications are subject to change without notice