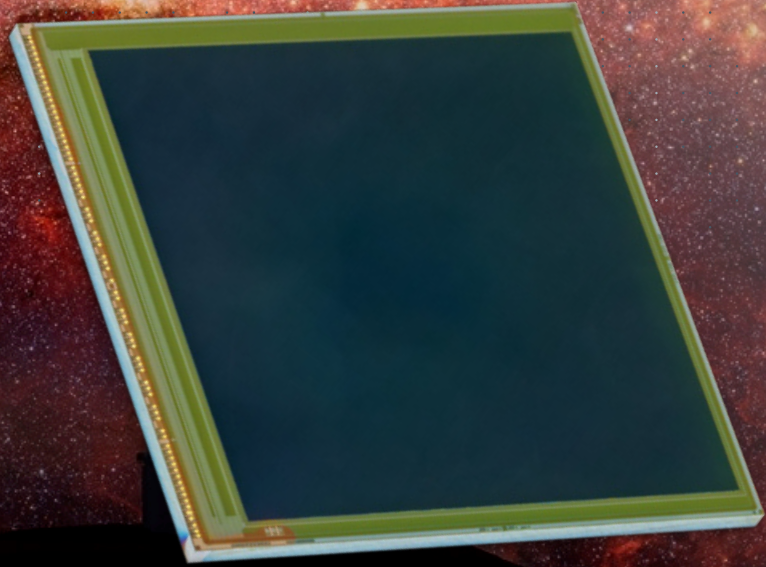


IKE PONO 1KX1K DETECTOR



Ike Pono is a 1kx1k infrared detector aimed at ultra-low flux astronomical imaging. It provides avalanche gain at these very low photon flux levels and consequently sets a new standard in sensitivity for astronomy. This not only allows for fainter objects to be observed, it allows shorter integration times for the same signal-to-noise thereby maximising the science return on large telescopes. Many future astronomy projects depend on photon counting-level sensitivity including the imaging of faint objects and spectral lines.

Ike Pono is the product of many years research and development alongside the University of Hawaii, Institute of Astronomy on avalanche photodiode sensors for astronomical imaging. The aim is to perform long integration times and use multiple non-destructive readout frames so minimising the self-luminescence (glow) is an important objective. Extensive reference pixels and outputs are designed to control drift in long exposures.

Despite 15 micron pixel size the crosstalk and inter-pixel capacitance are very low due to the mesa architecture of the photodiode array. The array is not designed for high speed readout but can achieve 32 frames per second with 16 parallel outputs.

The performance of the Ike Pono detector is determined by the HgCdTe avalanche photodiodes and is under continuous development with the University of Hawaii. Currently, an avalanche gain of 10x can be applied at the photon arrival rate of 1 photon per 100 seconds per pixel. This same detector has a dark current of $1e-3$ electrons per second per pixel at 70K. A read noise of 1 electron rms has been measured setting a new standard in sensitivity by almost an order.

MAIN FEATURES

- Designed for ultra-low flux imaging
- Flexible integration and readout modes
- Multiple independently resettable windows
- Enhanced sensitivity due to avalanche photodiodes
- Multiple reference features
- Windowing function to 1x16 pixels

KEY BENEFITS

- Very high sensitivity

PACKAGING OPTIONS

- Currently offered as a bare array or in customer package
- Please contact us to discuss packaging options

TECHNICAL SPECIFICATION

Physical Parameters

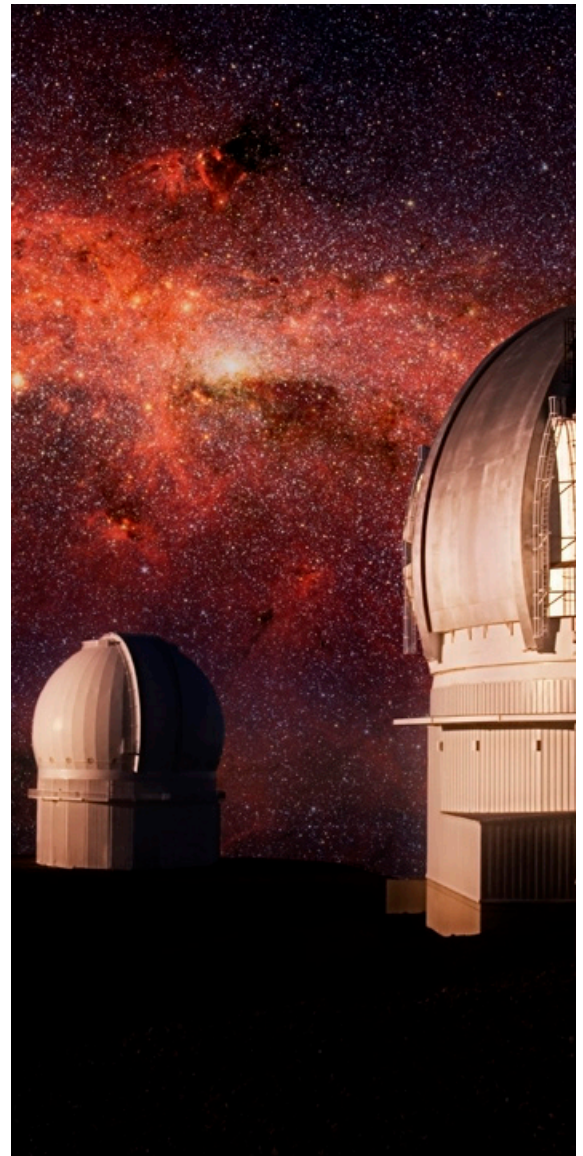
Active array	1024x1028
Pixel pitch	15um

ROIC operation

Reset modes	Global or rolling
CDS modes	Rolling or Read-Reset-Read per row
Control and operation	Single serial interface and clock
Power consumption	30mW
Number of outputs	16
Maximum frame rate	30 frames per second
Windowing	Multiple window options
Avalanche gain control	Single -ve power supply up to 18V

Infrared imaging

Infrared sensor	HgCdTe avalanche photodiodes
Waveband for full gain	0.8 to 2.5um (partial to 3.5um)
Typical read noise	1e- at a gain of x25
Noise figure	<1.2
Maximum gain	100x
Operating temperature	40 to 140K
Dark current	0.001 e/s/pixel at 70K



For more information:
infomarketing@leonardo.com

Leonardo Electronics
Sigma House-Christopher Martin Road-Basildon-Essex SS14 3EL -United Kingdom
T +44 (0) 1268 522822

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