

SAPHIRA **AVALANCHE PHOTODIODE ARRAY**

The Saphira detector is designed for high speed infrared applications and is the result of a three year research and development programme alongside the European Southern Observatory on sensors for astronomical instruments. It delivers world leading photon sensitivity of <1 photon rms with Fowler sampling and high speed non-destructive readout (>10K frame/s).

Saphira is an HgCdTe avalanche photodiode (APD) array incorporating a full custom ROIC for applications in the 1 to 2.5 μ m range. A key aspect of the array is the ability to perform multiple non-destructive readouts which can allow Fowler sampling or “down the slope” sampling to significantly reduce the noise and increase the sensitivity. The architecture allows multiple, independently resettable windows and a selectable number of parallel outputs up to 32.

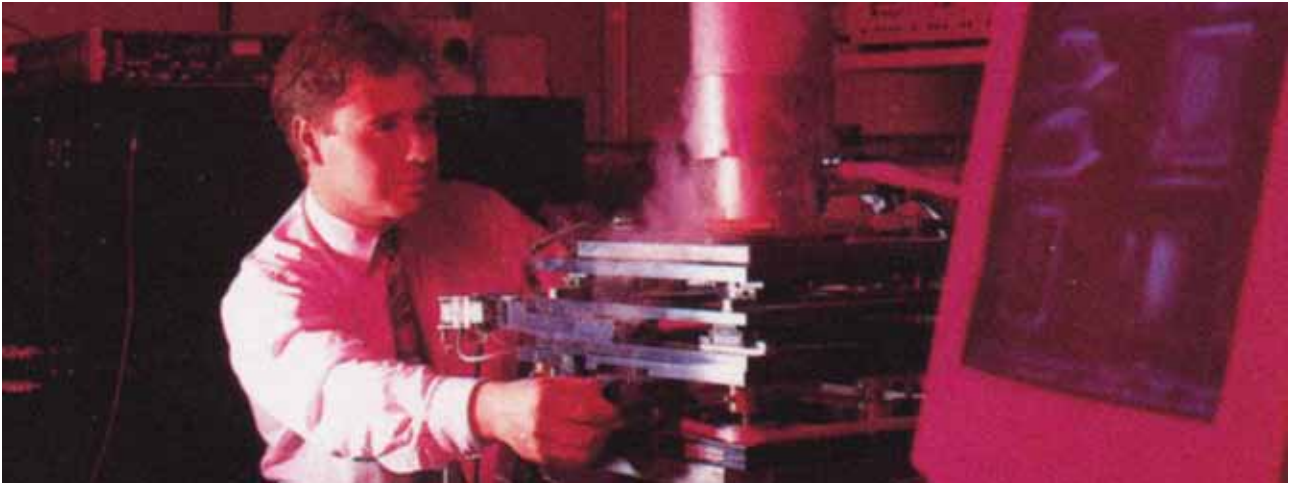
Applications include wavefront sensors, fringe trackers, spectroscopy, and imaging in any photon starved scenario.

MAIN FEATURES

- Flexible integration and readout modes
- Multiple independently resettable windows
- Selectable number of outputs up to 32
- Variable avalanche gain
- Voltage clamp function to minimise persistence
- Frame rate up to 100K frames per second with windowing
- Wavelength tuned to application
- Windowing function to 1 pixel.

KEY BENEFITS

- Combination of high sensitivity and high frame rate.



PACKAGING OPTIONS

- Currently offered in a 68 pin LCC
- IDCA with Stirling Engine possible

TECHNICAL SPECIFICATIONS

Format

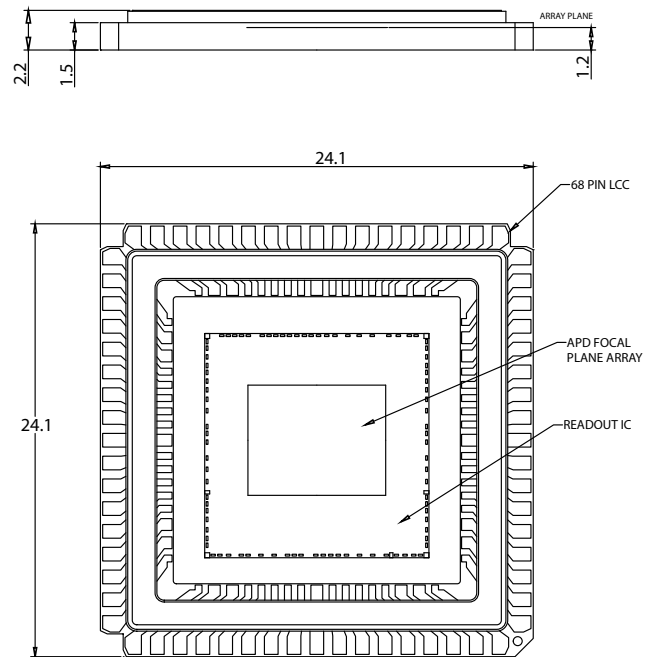
Array	320 x 256 pixels
Pixel Pitch	24µm
Active Area	7.68 x 6.14

Typical Performance

Avalanche gain range	Up to 80
Median Sensitivity	1 photon RMS (at gain of 80)
Pixel Operability	>99%
Power Consumption	30mW

Operating Parameters

Modes	Snapshot or rolling
Configuration Control	Single serial interface
Output Voltage Range	From 2.0V to 1.0V
Charge Capacity	2 x 10 ⁵ electrons
Number of Outputs	4, 8, 16 or 32
Array Operating Temperature	30K to 150K



Avalanche Photodiode Array