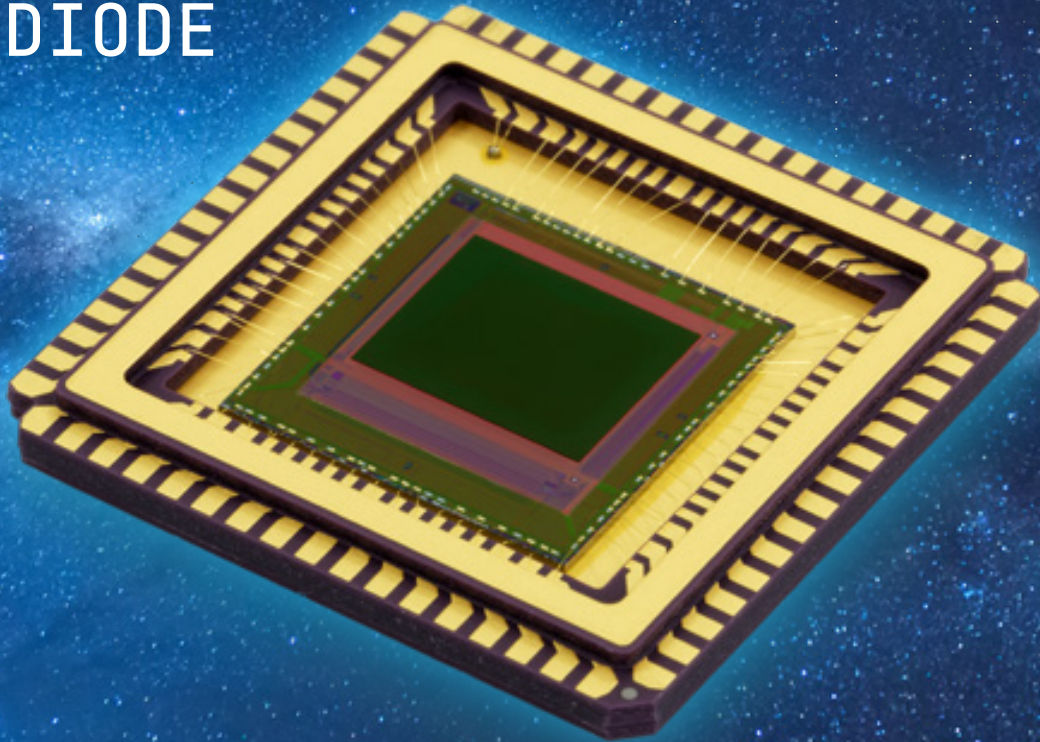


# SAPHIRA

## AVALANCHE PHOTODIODE ARRAY



The Saphira detector is designed for high speed, photon-starved infrared applications, such as wavefront sensing, fringe tracking, spectroscopy and even astronomical imaging.

It is the result of a collaboration between the European Southern Observatory and the University of Hawaii to raise the sensitivity of infrared sensors for astronomical instruments. Together with high-speed, non-destructive readout and advanced signal processing Saphira can deliver photon counting performance at 10,000 frames a second.

Saphira has been designed specifically for HgCdTe avalanche photodiodes that can achieve gains of over 300x at very low dark current in the infrared band 0.8 to 2.5 $\mu\text{m}$ .

The architecture is designed for flexibility to cover a wide range of applications. There are options for multiple independent windows for resetting and readout. The readout mode can be selected for the best noise reduction.

The number of parallel outputs can be adjusted for optimum speed versus power. Special circuits have been incorporated to suppress persistence, crosstalk and self-luminescence (glow).

### 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 200K frames per second with windowing
- Wavelength tuned to application
- Windowing function to 1x32 pixels

### KEY BENEFITS

- Combination of high sensitivity and high frame rate

## PACKAGING OPTIONS

- Currently offered in a 68 pin LCC
- Please contact us to discuss packaging options

## TECHNICAL SPECIFICATION

### Physical Parameters

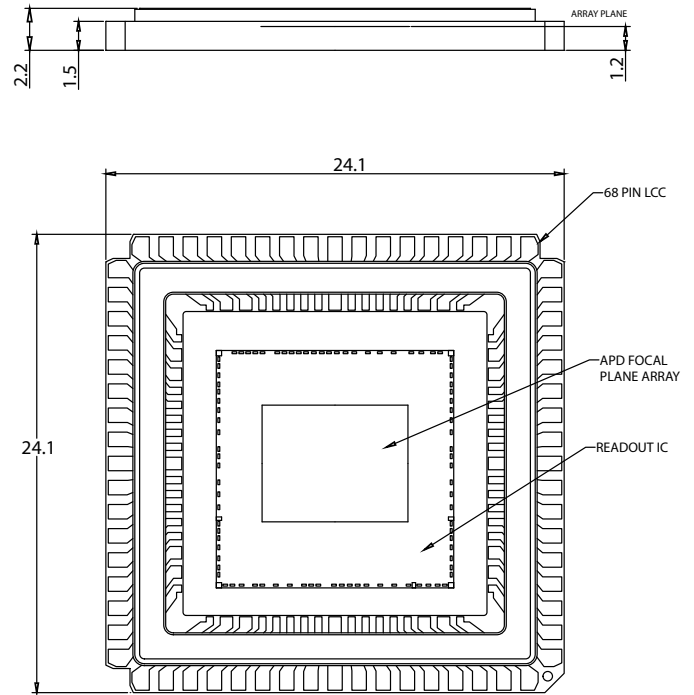
|              |         |
|--------------|---------|
| Active array | 320x256 |
| Pixel pitch  | 24um    |

### 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                               |
| Non-destructive readout | 1 e-glow per 1000 frames           |
| Number of outputs       | 4, 8, 16 or 32                     |
| Maximum frame rate      | 3k 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     | 0.5 e- at a typical gain of x80 |
| Noise figure           | <1.2                            |
| Maximum gain           | 300x                            |
| Operating temperature  | 40 to 140K                      |



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LDO\_UK023\_00180 07-23