



## OXYGEN® RD0092

### Dual-Band, Dual-Polarity

### 8 $\mu\text{m}$ Pitch, 1280 x 720 DROIC

The Oxygen® RD0092 is an advanced off-the-shelf DROIC with cutting-edge performance that can be used with any industry-standard direct-injection compatible detector technology. The solution was designed to optimize FPA performance through state-of-the-art integrated features and multiple operating modes that offer flexibility for a wide range of high-performance application requirements.

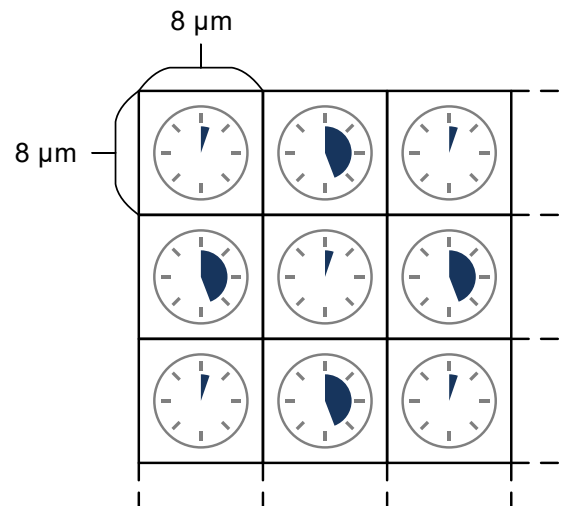
#### Features

- ◆ 8  $\mu\text{m}$  dual-gain pixels with 260 ke- or 3.4 Me- capacity
- ◆ Low power direct injection detector bias for both polarities
- ◆ Dual-band (2-color) or single-band operation
- ◆ Integrate-while-read and integrate-then-read operation
- ◆ Asynchronous or synchronous global shutter (snapshot)
- ◆ High dynamic range (>120dB)
- ◆ 14-bit column-parallel conversion
- ◆ Over 500 fps at full frame, serialized to 16-bits/pixel
- ◆ Unlimited 32 x 32 windows at 8,895 fps per window
- ◆ Selectable 2, 4, 8 or 16 LVDS output ports
- ◆ SPI control interface (SenSPI®) and DDR master clock

#### High Dynamic Range Dual-Integration Capability

The Oxygen RD0092 can run two different integration times simultaneously on a checkerboard pattern of pixels across the array. This mode leverages the small 8  $\mu\text{m}$  pitch focal plane sampling to achieve high dynamic range without loss of event data for infrared systems with typical Airy disk diameters.

The diagram below illustrates a segment of an array of 8  $\mu\text{m}$  pixels with a graphic representation of the pixel well capacity. Each adjacent pixel has accumulated a different level of charge by operating in the High Dynamic Range Dual Integration mode.



## Advanced Operating Modes

### **Readout Oversampling**

The high-speed readout engine may be used to achieve superior low-noise performance through readout oversampling. Each row is oversampled by a programmable number of samples and the uncorrelated read noise will improve by the square root of the oversamples.

### **Sample-up-the-Ramp**

For very low signal, stable scenes and long integration time, the DROIC can perform multiple readouts without resetting the pixel array. This performs a sample-up-the-ramp operation and provides another method to improve signal-to-noise ratios.

### **Choice of Frame and Integration Control**

There are a wide range of control features including free-run mode, command word trigger or external asynchronous integration and readout clock. In the asynchronous case, the start and stop of integration time are completely asynchronous with only a propagation delay between clock input and pixel operation.

### **External Correlated Doubling-Sampling**

High-gain mode utilizes correlated double-sampling (CDS) to remove the reset noise from the small integration capacitors. The DROIC provides sequential reset and signal frames for external CDS at the flip of a bit.

### **Multiple High-Speed Windows**

The integrated signal may be held over multiple readout frames, enabling multiple windows per frame. Coupled with the high-speed readout engine, this allows very high-speed interrogation and tracking of objects and events.

## Availability and Contact Information

Part number (full wafer): RD0092-Do8x-WSP  
Part number (quarter wafer): RD0092-Do8x-QSP  
Available to order now  
Contact sales for pricing information:  
[products@senseker.com](mailto:products@senseker.com)

## Applications

### **Surveillance / Reconnaissance**

High Dynamic Range Dual Integration mode runs two integration patterns simultaneously on a checkerboard pattern of pixels for optimal threat detection. Enhanced SNR using External Correlated Double-Sampling and multiple oversampling methods.



### **Infrared Search and Track**

Global shutter (snapshot) mode with unlimited small windows is ideal for multi-object tracking. Dual-band 2-color support.



### **Range-Gated Imaging**

Supports Time-of-Flight (TOF) through asynchronous integration with only a propagation delay between clock input and pixel operation. Global shutter operation and > 36,000 fps possible for small windows.



### **Infrared Astronomy**

Sample-up-the-ramp mode for very low signal stable scenes and long integration times. Multiple readouts are possible without resetting the pixel array. Optimization of SNR through multiple oversampling methods.

