OXYGEN® RD0092
Dual-Band, Dual-Polarity
8 µm 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 µm 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 µm 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 µm 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.

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.

Availability and Contact Information

Part number: RD0092-D080-WS
Available unit: full wafer
Available to order now
Contact sales for pricing information:
products@senseeker.com

©2021 Senseeker Engineering Inc. www.senseeker.com RD0092-D080_Brief