

Cyan Systems CS-3

2040 (H) x 1156 (V)

2.4 Mpixel Small Unit Cell ROIC

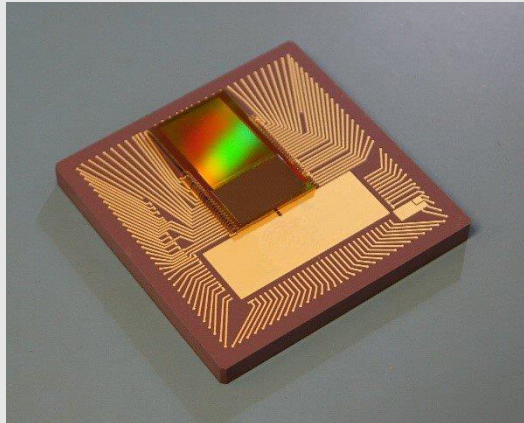


Figure 1. CS-3 Readout Integrated Circuit

Key Features

- 2.4M active unit cells (2040 H x 1156 V)
- Small unit cell pitch (5 μm)
- Multiple detector type compatibility
- Direct Injection unit cell preamplifier
- Effective noise suppression
- Multiple operating modes
- Dim target, low observable detection
- False alarm suppression
- Mitigation of turbulence effects
- Extended target detection range
- Full frame rate 60 Hz (typ), 100 Hz (max)
- SPI-based command & control interface

Typical Applications

- ISR
- Missile defense
- Security and surveillance
- Scientific imaging

Overview

Leading-edge HD+ small unit cell ROIC enables dim target, low observable detection.

The CS-3 small unit cell event detection ROIC has a 2040 x 1156 format and 5 μm unit cell.

The unit cell based direct injection (DI) preamplifier will interface with most P-on-N polarity detector arrays with impedances typical of SWIR, MWIR, and LWIR detectors.

The ROIC supports multiple operating modes including standard video, noise averaging, pixel threshold correlation, dynamic background suppression, low observable detection, and dim target spatial processing.

Resolution and sensitivity is increased dramatically with the small unit cell pitch, enabling detection of much dimmer objects compared to larger pixel image sensors.

In addition, the input circuit incorporates spatial and temporal correlative sampling providing effective noise suppression resulting in high quality imagery.

The ROIC employs a programmable spatial oversampling algorithm that improves the signal to noise ratio, mitigates atmospheric turbulence effects and aliasing, and extends target detection range.

Table 1. Key Performance Parameters

Parameter	Value	Parameter	Value
Resolution (full frame)	2040 (H) x 1156 (V)	Output channels	
Unit cell size (square)	5 μm	Analog	12 + 1 reference
Optical size	10.2 mm x 5.8 mm	Digital	12
Unit cell preamplifier	DI w/ adj. reset level	Readout mode	Full frame ITR
Detector type	P-on-N	Input master clk. freq.	20 MHz (max)
Pixel noise ¹ (det to col)	< 150 μV	Supply voltages	
Frame rate (full frame)	60 Hz (typ) 100 Hz (max)	Analog	2.5-3.4, 1.3-2.0 V
Pixel rate	20 Mpps (max) with < 300 pF load	Digital	1.1-2.0 V
Clocks	5	Analog output swing (ADC input impedance)	1.3 Vpp (>100 Kohm)
Biases	8-9	Power (full frame)	105 mW at 60 Hz
		Operating temperature	80 K (typ) to 200 K

Notes: 1. Long, temporal avg., low flux ($1\text{E}14 \text{ ph/cm}^2\text{s}$)



Figure 2. MWIR image of CS-3 ROIC hybridized to nBn detector material operating at 150 K



For Additional Information

Cyan Systems, Inc.
 5385 Hollister Avenue, Suite 105
 Santa Barbara, CA 93111 USA
 Phone: +1.805.453.0582
cyan_sales@cyan-systems.com
www.cyan-systems.com