

Hybrid high speed, low noise digital, multi-line scan CMOS image sensor



Key benefits

- High speed, dual resolution configurable line scan family of sensors
- Two pixel arrays in a single chip
- Very flexible, supporting a variety of alternative configuration modes
- Multiple exposure/readout modes are supported, including single line or multi-line readout modes with independent exposure start and duration control for each line
- Special dual line mode that allows exposing and reading out two lines at the same time with maximum DR
- Sensor logic enables operating up to 4 rows in rolling or global shutter mode, and up to 8 rows in special modes
- Allows exposure during readout
- On chip Correlated Double Sampling (CDS) ensuring Dynamic Range of 68dB
- Square or rectangular aperture modes selectable by reconfiguration
- High sensitivity pixels with high QE x FF from $\lambda = 300\text{nm}$ to 900nm
- 16k and 8k resolution
- Rolling and global shutter support with programmable exposure time
- PWC and Single Edge trigger modes
- Monochrome and RGB on a single chip
- NIR filter also available on demand

Typical applications

- Food sorting
- Document scanning, print inspection
- Flat panel display
- Check scanning
- Electronics manufacturing
- Medical (OCT, tissue diagnostics etc.)

Sensor overview

ELITE sensors are a hybrid high speed, low noise, digital multi-line scan CMOS image sensor designed to excel in monochrome and color automatic optical inspection tasks. This includes print inspection, check scanning, electronics manufacturing, food sorting, and medical (OCT, tissue diagnostics etc.).

The ELITE family of sensors includes two models, a 16k/8k array and 4k/2k array of pixels based on high sensitivity, low noise pinned photodiodes, and a high speed readout path. The sensor has been designed to be very flexible and supports a variety of alternative configuration modes including two horizontal spatial resolutions in each model, square or rectangular pixel size, and one or multiple line operation in one device.

Sensor characteristics

Sensor		
	16k	8k
Resolution	16,384 x 8	8,196 x 8
Pixel pitch (µm)	3.75 x 5.78	7.50 x 7.50
	3.75 x 11.56	7.50 x 15.0
Sensitivity (e-/µJ/cm²) (CIE A illumination of 2,854K + CM500 IR filter)	2.35 x 10 ⁵	9.5 x 10 ⁵
	4.7 x 10 ⁵	1.9 x 10 ⁶
Electronic shutter type	Rolling shutter Global shutter	
Max. S/N ratio (dB)	41	
DR (dB, lineal integration)	68	
Readout channel		
Architecture	Column parallel	
Max. frame rate (fps)	100,000	200,000
Optical black columns	256	128

System		
Timing generation	Internal	
External clock frequency (MHz)	9.8304MHz	
Supply voltage	1.8V for on chip analog and digital circuitry, 3.3V for analog circuitry, I/O digital PADs and pixel-control circuitry	
Power consumption (mW)	≤2500 @ 100kfps	≤1250 @ 100kfps ≤2500 @ 200kfps
Number of outputs	33 LVDS data pairs + 5 LVDS for clock + 5 LVDS for synch	

Configuration	
Analog gain control	Configurable
Offset control	Configurable
Integration mode	Linear
Triggers modes	PWC, Single Edge
Exposure time	Programmable exposure time

Mechanical	
Package	µPGA, COB
Package size (mm2)	75.60 x 27.90 (ceramic) 73.00 x 40.00 (COB)