

# Hires-CMOS 0504

## 19.5 Megapixels CMOS Image Sensor

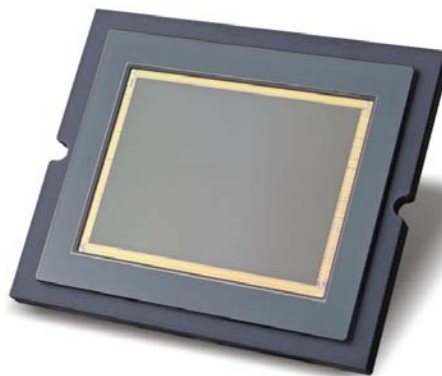
Preliminary Short Form Datasheet

2 x 12 bit rolling shutter HDR

- 16 fps @ full resolution
- 77 dB intra-scene dynamic range

2 x 10 bit global shutter HDR

- 25 fps @ full resolution
- 71 dB intra-scene dynamic range



Applications:

- Aerial mapping
- Security and surveillance
- Industrial Inspection

### Sensor Description:

Designed for high-resolution high-speed applications, Hires-CMOS 0504 offers 19.5 mega pixels and maximum 25 fps at full resolution. Hires-CMOS 0504 supports both global shutter and rolling shutter operation, which makes it ideal for industrial inspection, aerial mapping, and high-end surveillance.

Hires-CMOS 0504 provides both color version with standard Bayer CFA, and monochrome version with excellent NIR (Near Infrared) sensitivity. With an optimal microlens design, the sensor reaches peak QE of more than 60%. Using a 7.4  $\mu\text{m}$  pinned-photodiode pixel structure, Hires-CMOS 0504 offers a very low dark noise of 4.1  $e^-$  in rolling shutter mode and 11  $e^-$  in global shutter mode. In addition, the HDR option of Hires-CMOS 0504 offers an astonishing linear full well capacity of 61  $ke^-$ . An important feature for Hires-CMOS 0504 in global shutter mode is that it supports multiple ROIs with individual exposure time control. Hires-CMOS 0504 is mounted in a 263-pin PGA ceramic package with excellent heat dissipation and reliability.

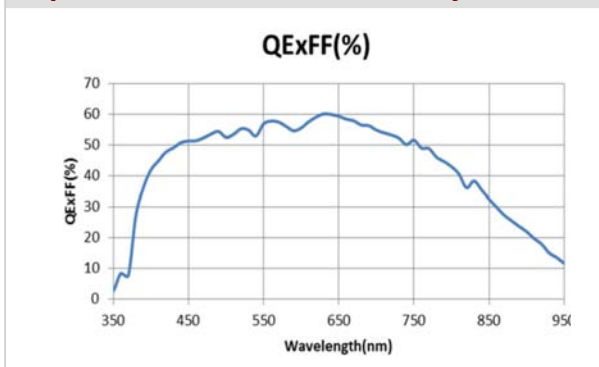
### Features:

- Resolution 5144 (H) x 3800 (V)
- 7.4  $\mu\text{m}$  square pinned photodiode pixel
- Photo-sensitive area 38 mm x 28.1 mm
- 16 fps at full frame in rolling shutter HDR
- 25 fps at full frame in global shutter HDR
- ROI windowing capability with enhanced frame rate (row-based only), and individual exposure time control for each ROI
- Low dark noise of 4.1  $e^-$
- QE x FF > 60% @ 630 nm and > 40 % @ 800 nm
- Electronic rolling shutter & global shutter
- 2 x 12 bit on-chip ADC in rolling shutter
- 2 x 10 bit on-chip ADC in global shutter
- 80 LVDS output pairs
- On-chip temperature sensor
- On-chip SPI control and on-chip PLL
- Excellent anti-blooming capability
- Monochrome and RGB with microlens array

Rolling Shutter 2 x 12 bit HDR	Pixel High Gain		Pixel Low Gain	
	PGA = x 9.3	PGA = x 1.2	PGA = x 9.3	PGA = x 1.2
Gain setting	PGA = x 9.3	PGA = x 1.2	PGA = x 9.3	PGA = x 1.2
Noise	4.1 e <sup>-</sup>	12.6 e <sup>-</sup>	8.8 e <sup>-</sup>	29.7 e <sup>-</sup>
FWC	3.5 ke <sup>-</sup>	27.8 ke <sup>-</sup>	8.1 ke <sup>-</sup>	63.9 ke <sup>-</sup>
Intra-scene dynamic range	76.5 dB		77.2 dB	
PRNU (half saturation)	0.9 %	0.8 %	1 %	0.9 %
FPN	4.8 e <sup>-</sup>	10.5 e <sup>-</sup>	12.3 e <sup>-</sup>	26.7 e <sup>-</sup>
Dark current @ 37 °C die temperature	98.7 e <sup>-</sup> / pix / s		272.5 e <sup>-</sup> / pix / s	
Lag	< 4 e <sup>-</sup>			

Rolling Shutter 2 x 10 bit HDR	Pixel High Gain		Pixel Low Gain	
	PGA = x 4.9	PGA = x 0.8	PGA = x 4.9	PGA = x 0.8
Gain setting	PGA = x 4.9	PGA = x 0.8	PGA = x 4.9	PGA = x 0.8
Noise @ 46 °C die temperature	10.7 e <sup>-</sup>	39.6 e <sup>-</sup>	20 e <sup>-</sup>	77 e <sup>-</sup>
FWC	5.2 ke <sup>-</sup>	40.3 ke <sup>-</sup>	13 ke <sup>-</sup>	56.5 ke <sup>-</sup>
Intra-scene dynamic range	71.5 dB		69 dB	
PRNU (half saturation)	1.5 %	1.0 %	1.5 %	1.0 %
FPN @ 46 °C die temperature	1.27 %	0.22 %	0.6 %	0.16 %
Dark current @ 46 °C die temperature	1581.8 e <sup>-</sup> / pix / s		1583.7 e <sup>-</sup> / pix / s	
Lag	< 1 e <sup>-</sup>			

**Spectral Quantum Efficiency:**



**Design Specifications:**

Number of LVDS	40 (top) + 40 (bottom)
LVDS channel speed	300 Mbps
Power consumption	< 2.8 W (global shutter) < 2.3 W (rolling shutter)
Power supplies	3.3 V / 2 V
PGA gain	x 0.8 - x 9.3 (8 stages)
On-chip ADC	10 bit or 12 bit
Operation temperature	-40 °C - 55°C

**Package:**

