Dhyana 9KTDI Pro BSI TDI sCMOS Line-Scan Camera, 600 kHz at 9K, 256 Stages

Model Dhyana 9KTDI Pro · waveqvanta.com/products/dhyana-9ktdi-pro-tdi-line-scan-camera

A cooled BSI TDI camera for UV-to-NIR low-light line scanning in semiconductor and life-science inspection.



The Dhyana 9KTDI Pro combines back-thinned sCMOS technology with time delay integration (TDI) of up to 256 stages and covers 180 nm to 1100 nm. Its 9072-pixel line of 5 µm pixels runs at up to 600 kHz over a CoaXPress-over-Fiber link, while stable cooling keeps the background uniform. It is aimed at wafer and material defect inspection and gene sequencing, and a Pro-UV version with a deep-UV sensor is also offered.

Key features

- Two versions: Dhyana 9KTDI Pro (GLT5009BSI, 82% QE at 550 nm) and Dhyana 9KTDI Pro-UV (GLT5009BSI-DUV, 50% QE at 266 nm)
- Spectral response from 180 to 1100 nm for UV (such as 193, 266 and 355 nm), visible and near-infrared imaging
- Selectable TDI stages from 4 to 256 to raise signal-to-noise ratio in low-light scanning
- 600 kHz line rate at 8 and 10 bit (299 kHz at 12 bit), about 5400 Mpixel/s, over 10× a typical sCMOS camera at 100 fps and 4.2 MP
- CoaXPress-over-Fiber interface via QSFP+
- Air or liquid cooling: 20°C below ambient or 35°C below water temperature, for low dark noise and stable data
- CTE ≥ 0.99993; TDI and area modes; forward, reverse or trigger-controlled scan direction

Specifications

Sensor Type	BSI sCMOS TDI
Sensor	GLT5009BSI (Pro); GLT5009BSI-DUV (Pro-UV)
Color / Mono	Mono
Peak QE (Pro)	82% @ 550 nm; 50% @ 350 nm; 38% @ 800 nm
Peak QE (Pro-UV)	50% @ 266 nm
Spectral Range	180 nm to 1100 nm
Resolution	9072 (H) × 256 (V)
Pixel Size	5 µm × 5 µm
Effective Area	45.36 mm × 1.28 mm
Array Diagonal	45.4 mm
Full-Well Capacity	14 ke$^-$ @ 10 bit and 12 bit (typical)
Readout Noise	10.5 e$^-$ @ 10 bit; 6.2 e$^-$ @ 12 bit (typical)
Dynamic Range	63.6 dB @ 10 bit; 68 dB @ 12 bit (typical)
Line Rate (TDI)	600 kHz @ 8 bit and 10 bit; 299 kHz @ 12 bit
TDI Stages	4, 8, 16, 32, 64, 96, 128, 160, 192, 224, 240, 248, 252, 256
Operation Mode	TDI, area; scan direction forward, reverse or trigger-controlled
Binning	1 × 2 (sensor); 2 × 2, 4 × 4, 8 × 8 (FPGA)
ROI	Supported
Cooling Method	Air cooling, liquid cooling

Cooling Temperature	20°C below ambient (at 20°C); 35°C below water temperature (at 20°C)
DSNU / PRNU	4 e^- @ 10 bit, 1.6 e^- @ 12 bit / 0.3% (typical)
Bit Depth	8 bit, 10 bit, 12 bit
Data Interface	QSFP+ (CoaXPress-over-Fiber)
Trigger	Trigger input, scan direction input; strobe output (Hirose HR10A-7R-4S)
Optical Interface	M72; customization available
Power Supply	12 V / 8 A
Power Consumption	< 75 W
Dimensions	100 mm × 100 mm × 145 mm (H × W × L)
Weight	1800 g
Operating Environment	Working: 0°C to 40°C, 0–85% RH; storage: 0°C to 60°C, 0–90% RH
Software / SDK	C++ SDK (GenICam standard); Windows, Linux

Typical applications

- Semiconductor wafer defect inspection
- Semiconductor material defect detection
- Flat-panel display (FPD) inspection
- UV line-scan inspection
- Gene sequencing