Gemini 8KTDI BSI TDI sCMOS Line-Scan Camera, 1 MHz at 8K, 100G/40G CoF

Model Gemini 8KTDI · waveqvanta.com/products/gemini-8ktdi-tdi-line-scan-camera

An 8K BSI TDI camera with visible or UV sensors and line rates up to 1 MHz for demanding inspection.



The Gemini 8KTDI is a back-illuminated TDI sCMOS camera with an 8208-pixel line of 5 µm pixels and up to 256 stages, offered with a visible-optimized or a UV-enhanced sensor. A 100G or 40G CoaXPress-over-Fiber interface supports 1 MHz in 8/10-bit mode and 500 kHz in 12-bit mode. Temperature-stabilized cooling keeps thermal noise low for biological and industrial inspection.

Key features

- Three models: G8KTDI V2 (visible sensor, air and liquid cooling, 100G CoF), G8KTDI-HEX-40G (visible sensor, HEX cooling) and G8KTDI-UV-HEX-40G (UV sensor, HEX cooling)
- 94.2% typical QE at 460 nm (visible sensor); 65.8% at 266 nm (UV sensor)
- 1 MHz line rate at 8/10 bit and 500 kHz at 12 bit
- 8208 Mpixel/s at 1 MHz and 8K, compared with 4590 Mpixel/s for the previous-generation 9K TDI camera at 510 kHz
- Cooling stabilized to ±0.5°C for low thermal noise and a uniform background
- PRNU/DSNU correction with hundreds of parameters for scenario-based calibration
- Up to 256 TDI stages; anti-blooming ≥ 50×; CTE ≥ 0.99993

Specifications

Sensor Type	BSI sCMOS TDI
Sensor	GLT5008BSI VIS (G8KTDI V2, HEX-40G); GLT5008BSI UV (UV-HEX-40G)
Color / Mono	Mono
Peak QE	94.2% @ 460 nm (VIS); 65.8% @ 266 nm (UV), typical
Spectral Range	180–1100 nm (G8KTDI V2, UV-HEX-40G); 300–1100 nm (HEX-40G)
Resolution	P1: 8208 pixels × 256 stages; P2: 8208 pixels × 32 stages
Pixel Size	5 µm × 5 µm
Array Diagonal	41 mm
Full-Well Capacity	16.8 ke$^-$ (typical)
Readout Noise	12.5 e$^-$ @ 10 bit; 7.4 e$^-$ @ 12 bit (typical)
Dynamic Range	62.8 dB @ 10 bit; 67.6 dB @ 12 bit (typical)
Line Rate (TDI)	1 MHz @ 8/10 bit; 500 kHz @ 12 bit
TDI Stages	P1: up to 256; P2: up to 32
Operation Mode	TDI, area; scan direction forward, reverse or trigger-controlled
Binning	1 × 2, 2 × 2, 4 × 4, 8 × 8
ROI	Supported
Cooling Method	Air and liquid cooling (G8KTDI V2); HEX cooling (HEX-40G models)
Cooling Temperature	V2: 10°C @ 22°C ambient (air), 0°C @ 22°C water; HEX: 20°C @ 25°C, 100 L/min
Dark Current	550 e$^-$/pixel/s @ 10°C (typical, corrected)

DSNU / PRNU	5 e^- @ 10 bit / 0.045% (typical, corrected)
Bit Depth	8 bit, 10 bit, 12 bit
Data Interface	QSFP28 100G CoF (G8KTDI V2); QSFP+ 40G CoF (HEX-40G models)
Trigger	Trigger input, scan direction input; strobe output (Hirose 12)
Optical Interface	M72 × 0.75; customization available
Power Supply	21 V to 27 V
Power Consumption	72 W
Dimensions	G8KTDI V2: 120 mm × 120 mm × 144.5 mm (H × W × L)
Weight	G8KTDI V2: < 3500 g
Operating Environment	Working: 0°C to 40°C, 20–80% RH; storage: -20°C to 60°C; altitude up to 2000 m
Software / SDK	C/C++ SDK; Windows 10/11 (x64), Ubuntu 20.04/22.04

Typical applications

- Wafer inspection
- Advanced packaging inspection
- Mask inspection
- Flat-panel display (FPD) inspection
- High-throughput gene sequencing
- Pathology slide scanning