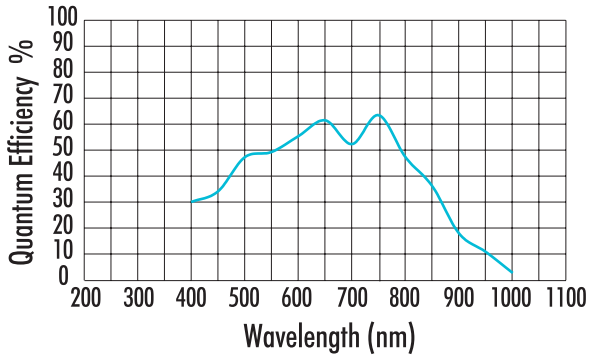
DATASHEET

CASCADE SYSTEM



Note: Typical QE for a virtual-phase CCD is shown.

Cascade:650
Photometrics
653 x 492 imaging array
7.4 x 7.4-µm pixels

The Photometrics Cascade:650 digital imaging system offers very high sensitivity through the use of on-chip multiplication gain technology. The CCD camera's 16-bit digitization at 10 MHz provides wide dynamic range at video frame rates and higher, while the fine pitch of the detector's pixels, 7.4 x 7.4 microns, is ideally matched to the resolution of optical microscopes. The thermoelectrically cooled system represents an excellent solution for low-light-level applications such as single-molecule fluorescence (SMF), intracellular ion imaging, and biological fluid flow measurements.

FEATURES	BENEFITS
On-chip multiplication gain	Very high sensitivity Low-noise, impact-ionization process
653 x 492 imaging array 7.4 x 7.4-µm pixels	Resolves fine detail Ideally matched to optical microscope
10-MHz readout 5-MHz readout	Good for high-speed image visualization Perfect for high-precision photometry
16-bit digitization	Wide dynamic range allows detection of both bright and dim signals in the same image
Frame-transfer CCD	100% duty cycle to collect continuous data
Virtual-phase CCD	Offers higher sensitivity compared to typical front-illuminated CCD cameras
Thermoelectric cooling	Reduces background for high sensitivity
C-mount	Easily attaches to microscopes, standard lenses, or optical equipment
PCI interface	Works with Windows® operating systems (98SE and later)
Enhanced PVCAM® Circular buffers Device sequencing	Compatibility with numerous third-party software packages Provides real-time focus Enables precise integration with shutters, filter wheels, etc.

Cascade™ Photometrics

DATASHEET

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ROI size	Frames per second
512 x 492	25
256 x 256	48
128 x 128	92
64 x 64	171
32 x 32	296
16 x 16	455

Note: Data taken at 10 MHz.

SPECIFICATIONS

CCD image sensor	Texas Instruments TC253; frame-transfer CCD with on-chip multiplication gain
CCD format	653 x 492 imaging pixels; 7.4 x 7.4-µm pixels; 4.9 x 3.7-mm imaging area (optically centered)
Linear full well single pixel	27,000 e- (without on-chip multiplication gain)
Readout bits/speed	16 bits @ 10 MHz and 5 MHz
On-chip multiplication gain	software selectable; 200x minimum achievable gain
Read noise	30 e- rms @ 10 MHz and 5 MHz (without on-chip multiplication gain); ~1 e- rms @ 10 MHz and 5 MHz (with on-chip multiplication gain)
Frame readout	39 ms/frame
CCD temperature	-25 to -35°C (regulated)
Dark current	0.6 e-/p/s @ -35°C
Binning	Full binning capabilities in parallel direction; no hardware binning in serial direction
Video output	RS170/PAL selectable
Operating environment	0 to 30°C ambient, 0 to 80% relative humidity noncondensing

Note: Specifications are subject to change.

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