

# SiS1-s285M



## HIGH RESOLUTION 1.45 MEGAPIXEL 14-BIT DYNAMIC SCIENTIFIC IMAGING SYSTEM



The Scientific System SIS1-s285M is a high resolution 14-bit camera system designed for all kinds of industrial and scientific applications. Square pixel with a size of  $6.45\mu\text{m} \times 6.45\mu\text{m}$ , high sensitivity with a quantum efficiency of  $>65\%$  and the very low dark current of the CCD image sensor Sony ICX285AL fit optimally to optical microscopy especially in the field of fluorescence studies. The interline transfer structure of the sensor offers a variable electronic shutter function with image integration times from  $<10\mu\text{s}$  up to minutes. The flexible timing modes of the camera incorporate in the framing mode for very fast kinetic studies and high speed multi frame operations.

Features	
<b>Highest Sensitivity</b> ▶	Highest read-out noise of $2.5e^-/\text{Pixel}/\text{s}$ rms with special "correlated double sampling" signal processing and a quantum efficiency of $>65\%$ .
<b>14-Bit Digitalization</b> ▶	Intensity resolution of 16,384 grayscales, 64 times better than 8-bit systems, important for photometric measurements and structures with low contrast. Averaging of statistical noise with image accumulation offers 15-bit dynamic.
<b>Very Low Dark Current</b> ▶	The HAD <sup>®</sup> structure (Hole Accumulation Diode) of the CCD image sensor reduces the dark current drastically down to $2e^-/\text{pixel}/\text{s}$ @ $15^\circ\text{C}$ for $\mu\text{-Lux}$ imaging.
<b>Photometric Linearity</b> ▶	Proportionality of measured counts to incoming light intensity better than 0.4%, optimizable to linearities $< 0.1\%$ with correction tables.
<b>Anti-Blooming Function</b> ▶	Blooming from one overexposed pixel to adjacent pixels will be avoided by an efficiency of an overexposure factor of $>200$ relative to the full well capacity.
<b>High Resolution</b> ▶	1.45 megapixel 2/3" inter-line-transfer CCD image sensor Sony ICX285AL with $1392 \times 1040$ square pixel with a size of $6.45\mu\text{m} \times 6.45\mu\text{m}$ .
<b>External Timing</b> ▶	Asynchronous electronic integration time control by external gate input. Integration times from $<10\mu\text{s}$ up to $>1000\text{s}$ , optionally expandable.
<b>Super Pixel Binning</b> ▶	Selectable binning of charges of adjacent pixels onto the CCD Chip with single readout increases linearly the signal to noise ratio by reduced spatial resolution.
<b>Progressive Scan CCD</b> ▶	The image zone and the storage zone of the inter-line-transfer CCD image sensor have the same size for full resolution within a single readout.
<b>Micro-Lens Structure</b> ▶	Micro lenses in front of every pixel increase the efficiency of the light collection and reduce pseudo-pattern-structures (moiré).
<b>WinSIS-Software</b> ▶	WinSIS6 for WinXP/2000/NT/9x controls all camera functions and integration timing. The concept of intuitive easy-to-use operation for all imaging and processing functions with integrated job creation and macro definition offers a fast realization of complex applications without long training periods. SDK for personal programming

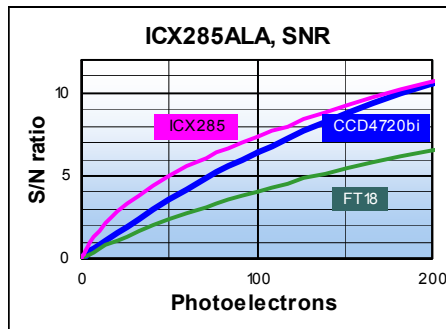
# SiS1-s285M



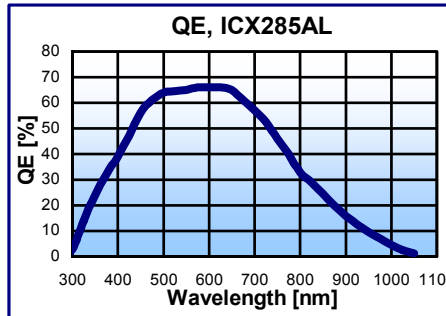
Monochrome,  
Progressive Scan  
2/3"-CCD Image Sensor  
Sony ICX285AL

## Specifications

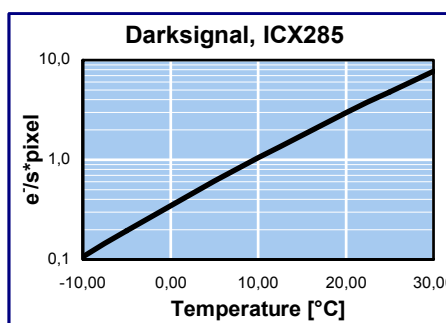
CCD Image Sensor	Sony ICX285AL
Sensor Type	Progressive Scan, Lens on chip, inter-line-transfer
Sensor Format	4 : 3, 2/3"- Image Sensor
Image Size	9mm x 6.7mm, 11.2mm diagonal
Pixel Size	6.45µm x 6.45µm
Pixel Count	1392 (H) x 1040 (V)
Electron Capacity	18,000e <sup>-</sup> Binning 30,000e <sup>-</sup>
Readout Noise, rms	2.5e <sup>-</sup>
Dynamic	7,200 : 1
Dark Current @ 15°C	< 2e <sup>-</sup> / pixel / s
Quantum Efficiency	> 65%
Anti-Blooming	> 200 x e <sup>-</sup> capacity
Binning	horizontal, vertical
Digitalization	14-bit, 16,384 grayscales
Readout Frequency	6 MHz; 3 MHz (14-bit) 1 MHz (16(18)-bit)
Integration Time	<10µs to >1000s
Frame Rates	4 Hz, 2 Hz
Trigger	external, asynchronous
Optical Mount	c-mount
Mech. Dim. ( BxHxL )	100mm x 80mm x 165mm
Weight	800g
Operational Temperature	0 ... +40°C



At low level lighting the Signal to Noise Ratio SNR is determined by the readout noise and by the quantum efficiency (ICX285: 2.5e<sup>-</sup>, QE > 60%) of the CCD image sensor. The chart shows the graph of the FT18 (green, QE >30%) and CCD4720bi (blue, QE >90%) frame transfer sensors for comparison.



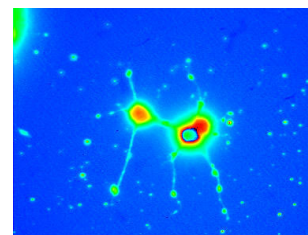
The quantum efficiency QE is defined as the percentage of the incoming photons, which generate an electronic charge.



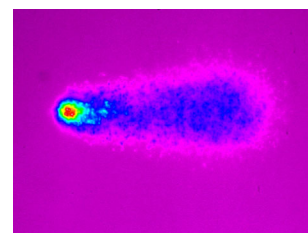
The temperature depending dark current of a CCD image sensor results from the thermal generation of electrons. The increase of the temperature of 6°C to 9°C doubles the dark current.

## Applications

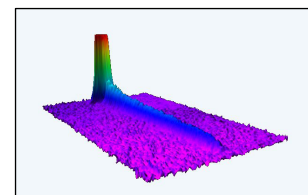
- ▶ LowLightLevel Imaging
- ▶ Fluorescence
- ▶ Luminescence
- ▶ Chemiluminescence
- ▶ Comet Assay
- ▶ FISH
- ▶ Spectroscopy
- ▶ Electrophoresis
- ▶ Gel-applications
- ▶ Astronomy
- ▶ Combustion processes
- ▶ Quality control
- ▶ Process control
- ▶ BEC



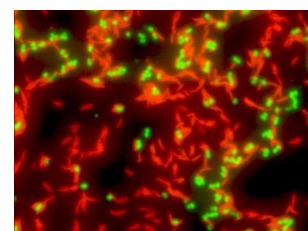
FURA, calciumfluorescence of a cancer cell



DAPI, Comet Assay



Absorption, atom laser beam



FISH Megaapex

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