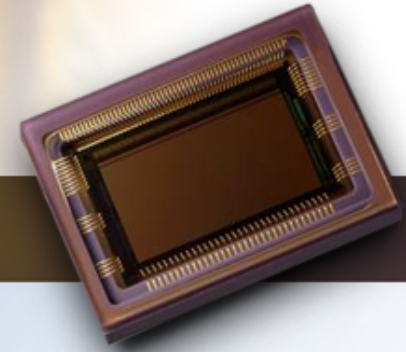


**CMV 300: Global shutter high speed VGA sensor**

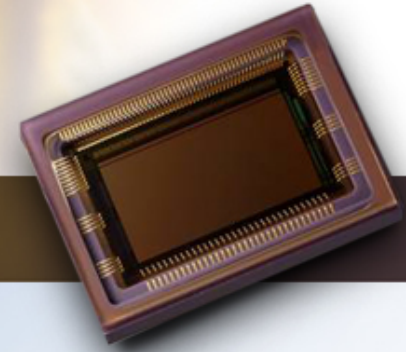
Vision 2011

# Contents

- Market demands
- CMV family common features
- CMV300 overview
- CMV300 features
- CMV300 specifications
- CMV300 technology
- CMV300 applications

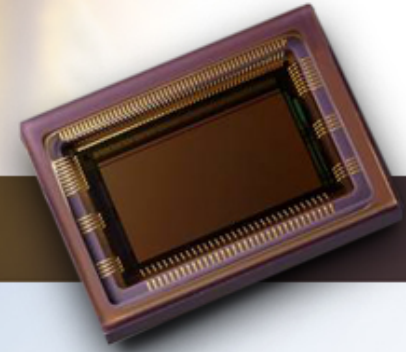


# Machine vision sensor demands



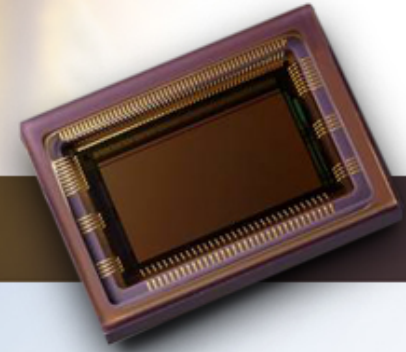
- Global shutter
  - Freeze fast moving object
  - No smear
- High sensitivity with low noise
  - Need enough image data with short exposure times
  - Low light sensitivity (apply gain if necessary)
  - Low parasitic light sensitivity
  - NIR sensitivity
- Low cost
  - Minimize overall system cost
  - High volume products

# Machine vision sensor demands



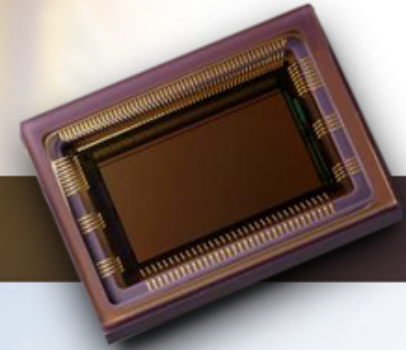
- High frame rate
  - Take a fast sequence of images to track movement
  - Exposure of an image while the previous is read out (pipelining)
- Ease of use
  - Implement on-board features
  - Programming of exposure and read-out modes using a SPI
  - Small form factor
- No image correction needed
  - No image post-processing needed
  - Useable RAW image

# CMV Common Features



- Global pipelined shutter
- True CDS: Low dark noise and low FPN
- Digital serial LVDS interface
- High electronic shutter efficiency/low parasitic light sensitivity
- High speed column ADCs
- Integrated sequencer/controller

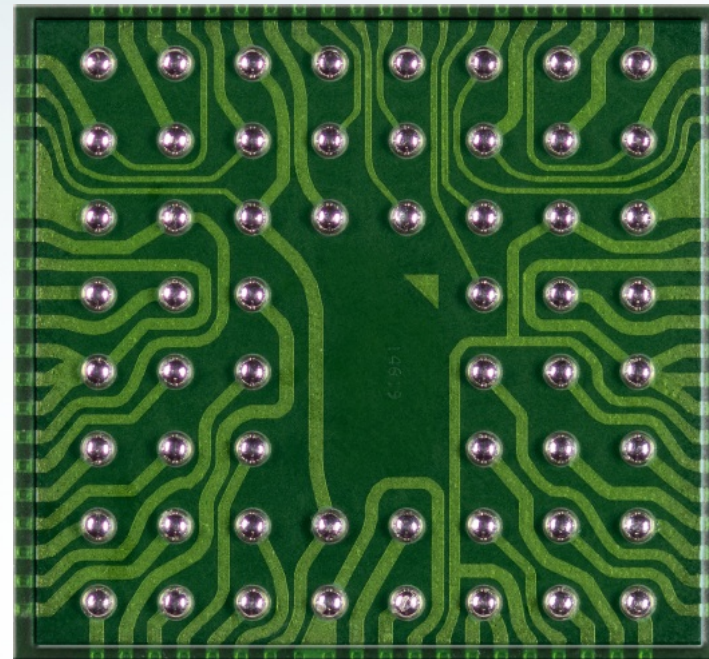
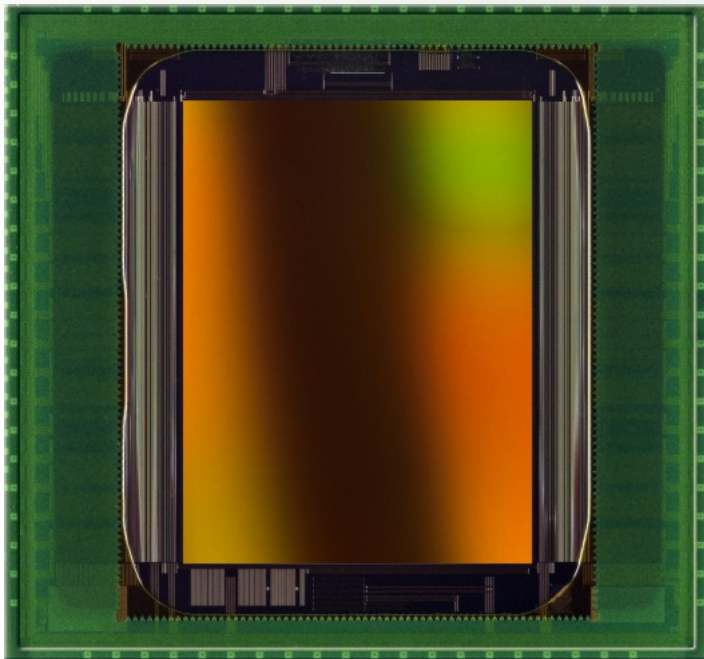
# Differences



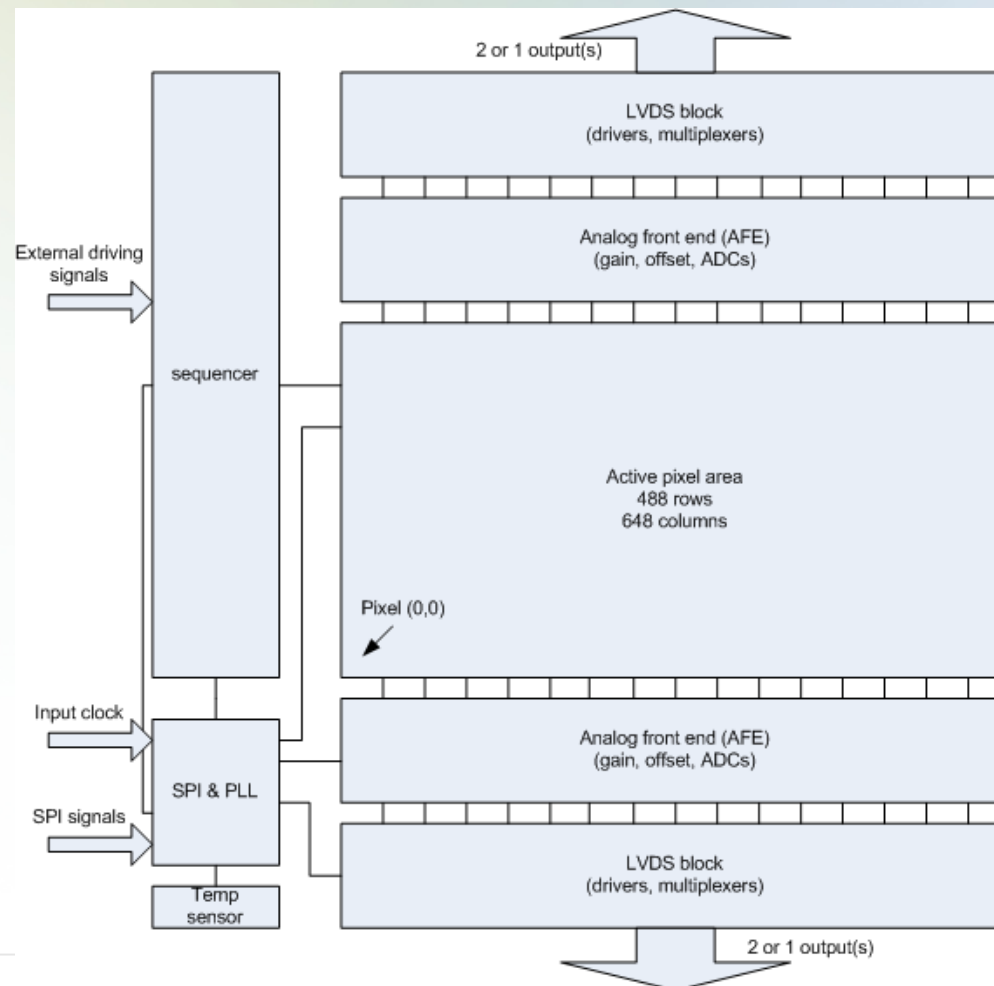
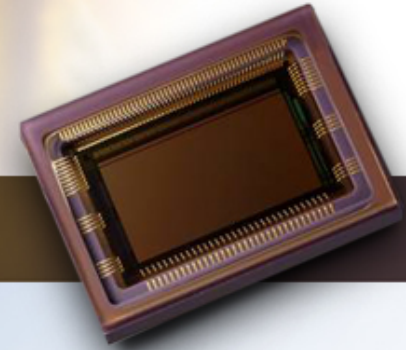
CMV type	Pixel pitch $\mu\text{m}$	Optical Format	FPS	Bits	Status
300	7,4	1/3"	600	12	Development. Samples December 2011
2000	5,5	2/3"	340 75	10 12	Production
4000	5,5	1"	180 40	10 12	Production
12000	5,5	$\varnothing$ 28,1 mm "APS"-like	180 300 360	12 10 8	Samples March 2012
X000	6,4	"35 mm"-like	x	12	Announcement end 2011

# CMV300 - Overview

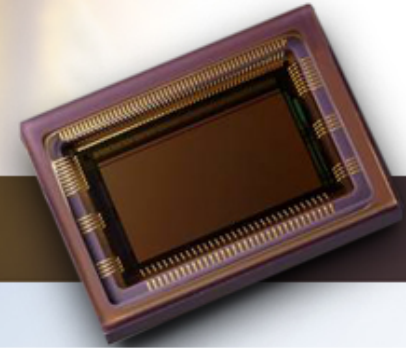
- VGA resolution
- High speed (600fps)
- Small form factor (6.9mm x 7.4mm)



# CMV300 - Overview

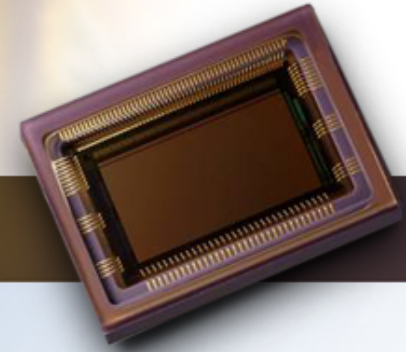


# CMV300 - Sensor features



Feature	CMV300
Resolution	648 x 488
Pixel size	7.4um x 7.4um
Frame rate	600fps @ 12 bit
Windowing	Row windowing
Image flipping	X and Y mirroring
Output	4 LVDS outputs @ 600 Mbps, 1 parallel output @ 150 fps
Multiplexing	To 2 and 1 output(s)
ADC	12 bit
High dynamic range	Piecewise linear response or dual exposure
Programming	Over SPI interface
Temperature control	On chip temperature sensor
Sequencer	On chip timing generation
Package	Chip scale package BGA

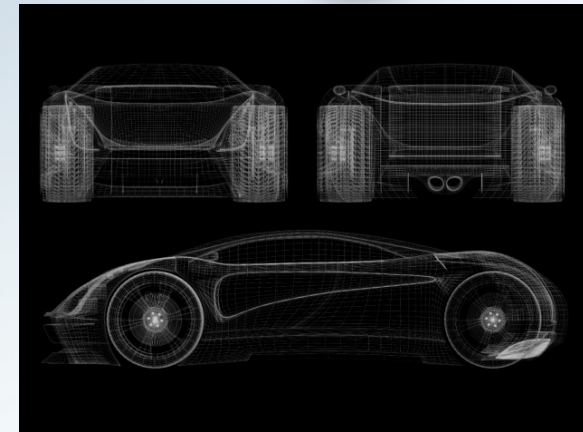
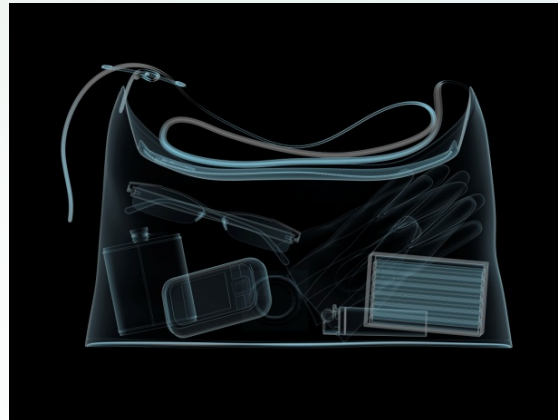
# CMV300 - Sensor specifications



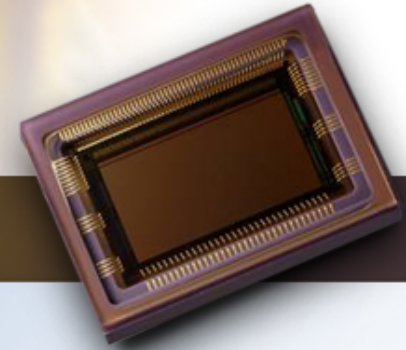
Specification	Value	Unit
Full Well charge	32	Ke <sup>-</sup>
Sensitivity	6	V/lux.s (550nm)
Dark noise	20	e <sup>-</sup>
Conversion factor	0.1	LSB/e <sup>-</sup>
SNR	64	dB
Parasitic light sensitivity	1/ 50 000	
Dark current	100	e <sup>-</sup> /s (@ room temp)
Fixed pattern noise (10 bit)	<0.1	%
Power consumption	<300	mW

# CMV300 - Typical Applications

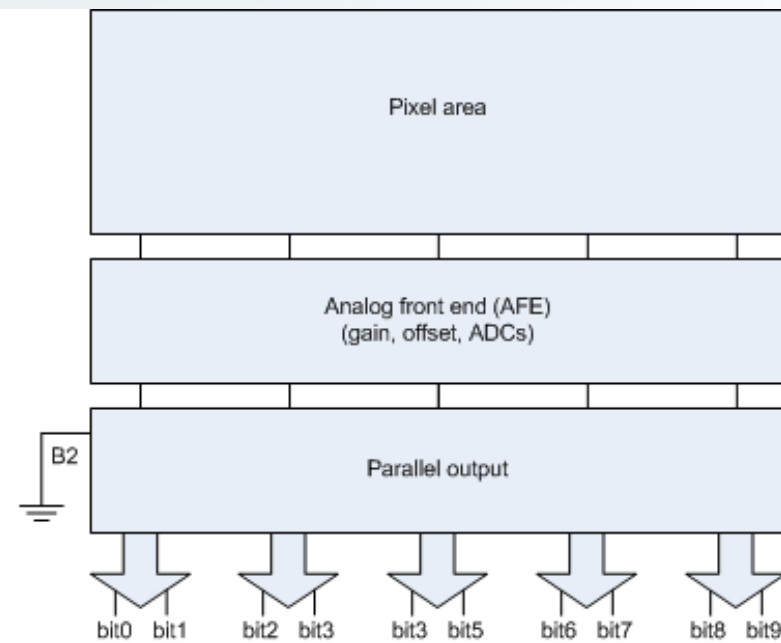
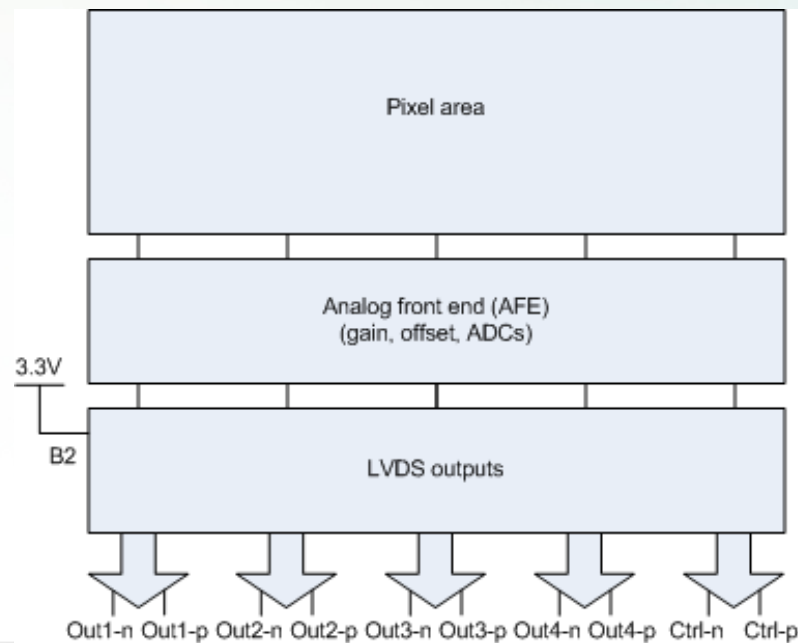
- High speed machine vision
- Motion control
- High speed inspection



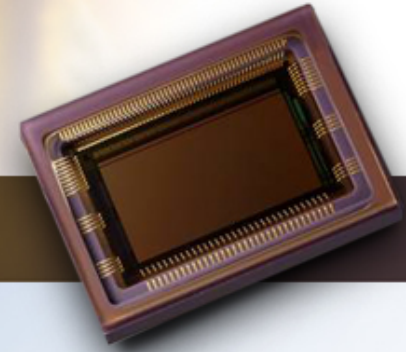
# CMV300 – Differentiating technology



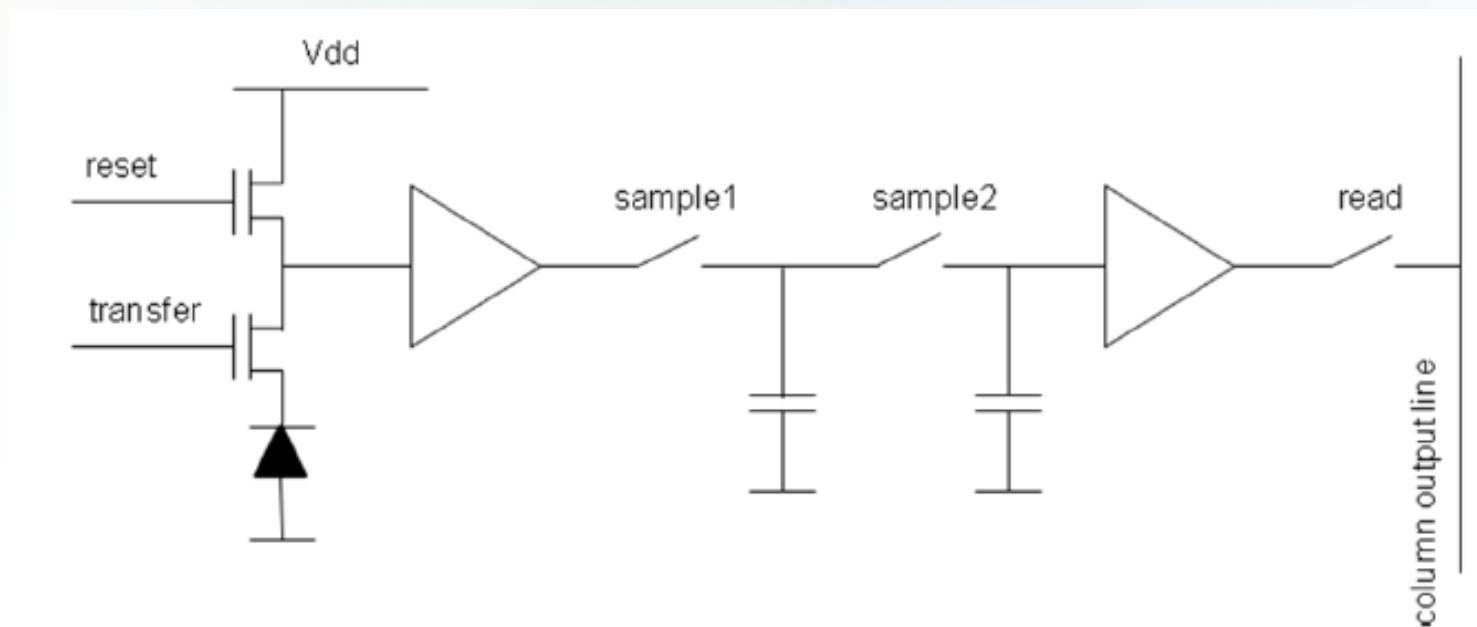
- LVDS and parallel CMOS outputs
  - Same device can do either parallel or LVDS
  - Output mode selectable by enable/disable signal
  - Same device supports low-end/low-budget AND high-end market



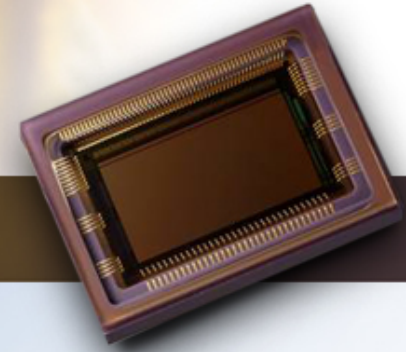
# CMV300 – Differentiating technology



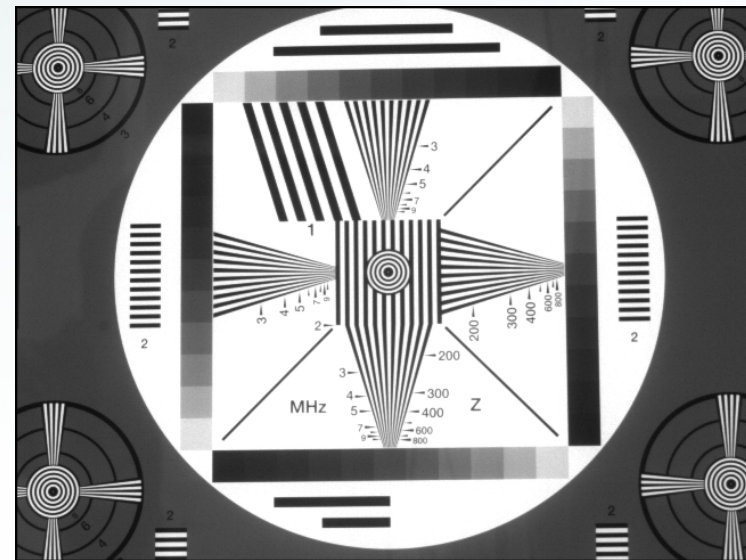
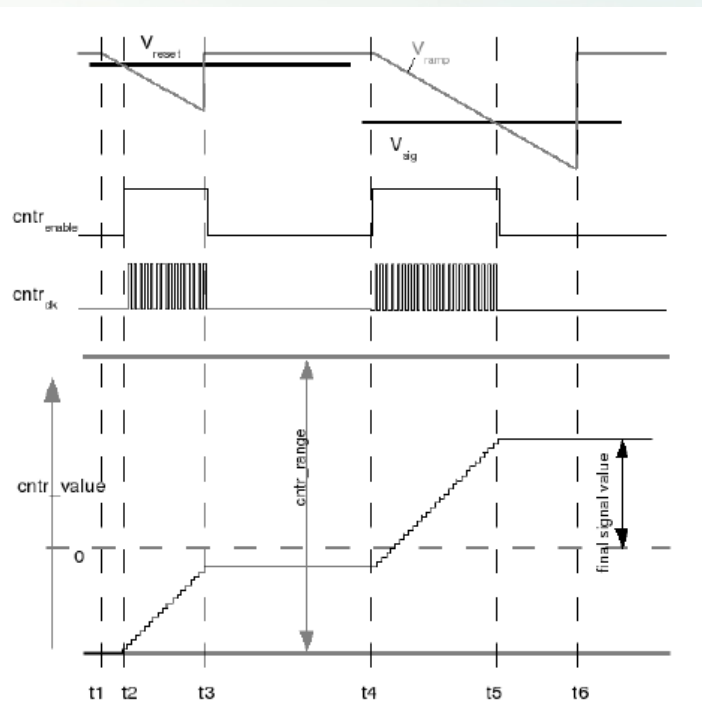
- Patented 8T true CDS global shutter pixel
  - True correlated double sampling
  - Greatly reduces pixel FPN and read noise
  - Pipelined global shutter capability (exposure during read-out)



# CMV300 – Differentiating technology



- Patented dual ramp high speed column ADC
  - Second CDS stage
  - Remove all column non-uniformity
  - Results in high speed FPN free images



## Further information

- Sales support: [info@cmosis.com](mailto:info@cmosis.com)
- Technical support: [techsupport@cmosis.com](mailto:techsupport@cmosis.com)
- Live demo: Hall 4, booth 4D78

