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The technical content of this CMOSIS / AWAIBA document is still valid.

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CMV300

VGA high speed global shutter image sensor

SENSOR DESCRIPTION

The CMV300 is a global shutter CMOS image sensor with 640 by 480 pixels in a 1/3″ optical format. The image array consists of 7.4 µm by 7.4 µm pipelined global shutter pixels, which allow exposure during read out while performing CDS operation reducing fixed pattern and dark noise significantly. The CMV300 has 4 12-bit digital LVDS outputs (serial) each running at 480 Mbps or one 10-bit parallel CMOS output. The image sensor also integrates a programmable gain amplifier and offset regulation. Each channel runs at 480 Mbps maximum, which results in 480 fps frame rate at full resolution in 12-bit mode. Higher frame rates can be achieved in row-windowing mode or row-subsampling mode. All operation modes are all programmable using a SPI interface. A programmable on-board sequencer generates all internal exposure and read out timings. External triggering and exposure programming is also possible. Extended optical dynamic range can be achieved by multiple integrated high dynamic range modes.

APPLICATION FIELDS

- Machine vision
- Motion analysis
- High speed inspection
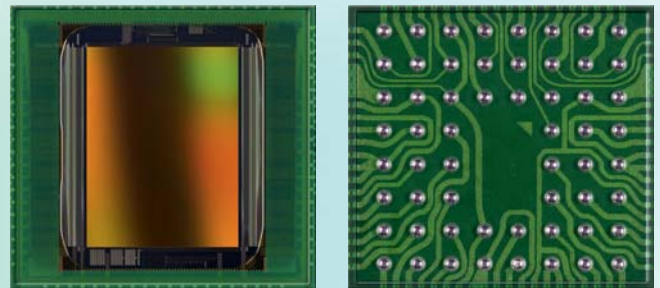
SENSOR FEATURES

- Pipelined global shutter with CDS correction
- 640 (H) x 480 (V) active pixels on a 7.4 µm pitch
- Optical format of 1/3″
- 480 frames/sec at full resolution in 12-bit mode (LVDS)
- 120 frames/sec at full resolution in 10-bit mode (CMOS)
- Dark reference rows and columns
- ROI windowing capability (row based only)
- X-Y mirroring function
- Master clock: 10 - 40 MHz
- 4 LVDS-outputs @ 480 Mbps (480 fps) multiplexable to 2 (240 fps) and 1 (120 fps) outputs
- One 10 bit parallel CMOS output running at maximum 40 MHz (120 fps)
- Multiple High Dynamic Range modes supported
- On chip temperature sensor
- On chip timing generation
- On chip black reference
- SPI-control
- 3.3 V and 1.8 V signaling
- Monochrome and Bayer (RGB) configuration
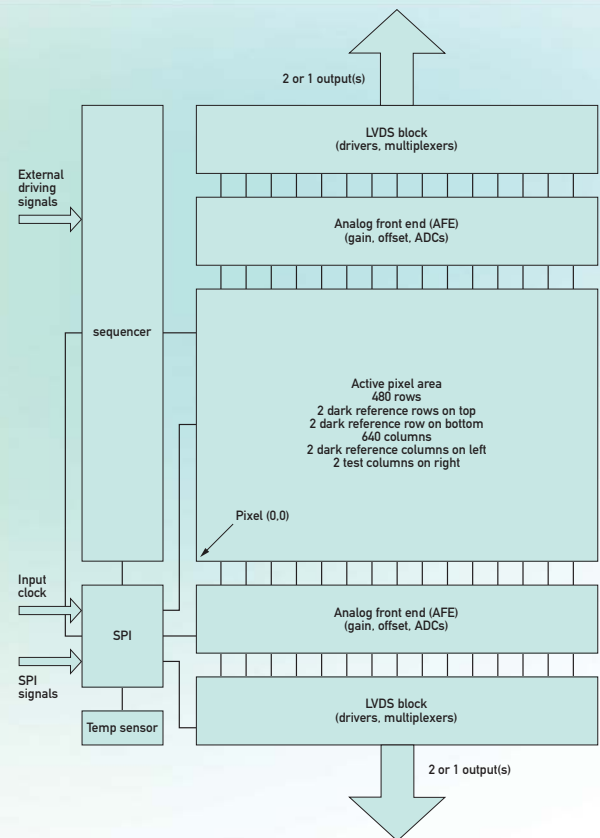- Chip scale package

CMV300

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SENSOR SPECIFICATIONS

Specification	Value
Resolution	0.3 MP - 640 (H) x 480 (V)
Pixel size	7.4 x 7.4 µm²
Optical Format	1/3''
Shutter Type	Pipelined global shutter with true CDS
Frame Rate	480 fps (12 bit)
Master clock	10 - 40 Mhz
Output Interface	4 LVDS outputs @ 480 Mbps - 10-bit CMOS output @ 40 Mhz (120 fps)
Sensitivity	6 V/lux.s
Conversion gain	0.2 LSB/e- (12 bit)
Full well charge	20,000 e-
Dark noise	20 e- (RMS)
Dynamic range	60 dB
SNR max	43 dB
Parasitic light sensitivity	1/50000
Extended dynamic range	Yes, up to 90 dB
Dark current	125 e-/s (25°C)
Fixed pattern noise	< 4 LSB (12-bit) (<0.1 % of full swing)
Chroma	Mono and RGB
Supply voltage	1.8 V / 3.3 V
Power	700 mW
Operating temperature range	-30°C to +70°C (TBC)
RoHS compliance	Yes (TBC)
Package	58 pins BGA
Micro lens	Yes
Glass	plain

Block diagram labels:

2 or 1 output(s)

LVDS block (drivers, multiplexers)

External driving signals

Analog front end (AFE) (gain, offset, ADCs)

sequencer

Active pixel area
480 rows
2 dark reference rows on top
2 dark reference row on bottom
640 columns
2 dark reference columns on left
2 test columns on right

Pixel (0,0)

Input clock

SPI

SPI signals

Analog front end (AFE) (gain, offset, ADCs)

Temp sensor

LVDS block (drivers, multiplexers)

2 or 1 output(s)

ORDERING INFORMATION

CMV300	Description
CMV300-4E7M1WP	Monochrome version
CMV300-4E7C1WP	RGB Bayer Color version