**[Product Information]**

**IMX415-AAQR**

Diagonal 6.43 mm (Type 1/2.8) CMOS Solid-state Image Sensor with Square Pixel for Color Cameras

---

**Description**

The IMX415-AAQR is a diagonal 6.4 mm (Type 1/2.8) CMOS active pixel type solid-state image sensor with a square pixel array and 8.46 M effective pixels. This chip operates with analog 2.9 V, digital 1.1 V, and interface 1.8 V triple power supply, and has low power consumption. High sensitivity, low dark current and no smear are achieved through the adoption of R, G and B primary color mosaic filters. This chip features an electronic shutter with variable charge-integration time.

(Applications: Surveillance cameras, FA cameras, Industrial cameras)

---

**Features**

- CMOS active pixel type dots
- Built-in timing adjustment circuit, H/V driver and serial communication circuit
- Input frequency: 24 MHz / 27 MHz / 37.125 MHz / 72 MHz / 74.25 MHz
- Number of recommended recording pixels: 3840 (H) × 2160 (V) approx. 8.29 M pixels
- Readout mode
  - All-pixel scan mode
  - Horizontal / Vertical 2/2-line binning mode
  - Window cropping mode
  - Horizontal / Vertical direction - Normal / Inverted readout mode
- Readout rate
  - Maximum frame rate in All-pixel scan mode: 12 bit: 60.3 frame/s, 10 bit: 90.9 frame/s
- High dynamic range (HDR) function
  - Multiple exposure HDR
  - Digital overlap HDR
- Synchronizing sensors function
- Variable-speed shutter function (resolution 1H units)
- CDS / PGA function
  - 0 dB to 30 dB: Analog Gain 30 dB (step pitch 0.3 dB)
  - 30.3 dB to 72 dB: Analog Gain 30 dB + Digital Gain 0.3 dB to 42 dB (step pitch 0.3 dB)
- Supports I/O
  - CSI-2 serial data output (2 Lane / 4 Lane), RAW10 / RAW12 output
- Recommended exit pupil distance: –30 mm to –∞

---

*STARVIS* is a trademark of Sony Corporation. The STARVIS is back-illuminated pixel technology used in CMOS image sensors for surveillance camera applications. It features a sensitivity of 2000 mV or more per 1 μm² (color product, when imaging with a 706 cd/m² light source, F5.6 in 1 s accumulation equivalent), and realizes high picture quality in the visible-light and near infrared light regions.

Sony reserves the right to change products and specifications without prior notice.

Sony logo is a registered trademark of Sony Corporation.
Device Structure

◆ CMOS image sensor
◆ Image size Diagonal 6.4 mm (Type 1/2.8) approx. 8.40 M pixels, All pixels
◆ Total number of pixels 3864 (H) × 2228 (V) approx. 8.60 M pixels
◆ Number of effective pixels 3864 (H) × 2192 (V) approx. 8.46 M pixels
◆ Number of active pixels 3864 (H) × 2176 (V) approx. 8.40 M pixels
◆ Number of recommended recording pixels 3840 (H) × 2160 (V) approx. 8.29 M pixels
◆ Unit cell size 1.45 µm (H) × 1.45 µm (V)
◆ Optical black Horizontal (H) direction: Front 0 pixel, rear 0 pixel
  Vertical (V) direction: Front 36 pixels, rear 0 pixel
◆ Dummy Horizontal (H) direction: Front 0 pixel, rear 0 pixel
  Vertical (V) direction: Front 1 pixel, rear 1 pixel
◆ Package 114 pin LGA

Image Sensor Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity (F5.6)</td>
<td>Typ. 2048 Digit 1/30 s accumulation</td>
<td>12 bit converted value</td>
</tr>
<tr>
<td>Saturation signal</td>
<td>Min. 3895 Digit 12 bit converted value</td>
<td></td>
</tr>
</tbody>
</table>

(Tj = 60 °C)

Basic Drive Mode

<table>
<thead>
<tr>
<th>Drive mode</th>
<th>Recommended number of recording pixels</th>
<th>Maximum frame rate [frame/s]</th>
<th>Output interface</th>
<th>ADC [bit]</th>
</tr>
</thead>
<tbody>
<tr>
<td>All pixel</td>
<td>3840 (H) × 2160 (V) approx. 8.29 M pixels</td>
<td>90.9</td>
<td>CSI-2</td>
<td>10</td>
</tr>
<tr>
<td>Horizontal/ Vertical 2/2-line binning</td>
<td>1920 (H) × 1080 (V) approx. 2.07 M pixels</td>
<td>90.9</td>
<td>CSI-2</td>
<td>10</td>
</tr>
</tbody>
</table>
IMX415-AAMR
Diagonal 6.43 mm (Type 1/2.8) CMOS Solid-state Image Sensor with Square Pixel for Monochrome Cameras

Description

The IMX415-AAMR is a diagonal 6.4 mm (Type 1/2.8) CMOS active pixel type solid-state image sensor with a square pixel array and 8.46 M effective pixels. This chip operates with analog 2.9 V, digital 1.1 V, and interface 1.8 V triple power supply, and has low power consumption. High sensitivity, low dark current and no smear are achieved. This chip features an electronic shutter with variable charge-integration time.

(Applications: Surveillance cameras, FA cameras, Industrial cameras)

Features

◆ CMOS active pixel type dots
◆ Built-in timing adjustment circuit, H/V driver and serial communication circuit
◆ Input frequency: 24 MHz / 27 MHz / 37.125 MHz / 72 MHz / 74.25 MHz
◆ Number of recommended recording pixels: 3840 (H) × 2160 (V) approx. 8.29 M pixels
◆ Readout mode
  All-pixel scan mode
  2 × 2 adjacent pixel binning mode
  Window cropping mode
  Horizontal / Vertical direction - Normal / Inverted readout mode
◆ Readout rate
  Maximum frame rate in All-pixel scan mode: 12 bit: 60.3 frame/s, 10 bit: 90.9 frame/s
◆ High dynamic range (HDR) function
  Multiple exposure HDR
  Digital overlap HDR
◆ Synchronizing sensors function
◆ Variable-speed shutter function (resolution 1H units)
◆ CDS / PGA function
  0 dB to 30 dB : Analog Gain 30 dB (step pitch 0.3 dB)
  30.3 dB to 72 dB : Analog Gain 30 dB + Digital Gain 0.3 dB to 42 dB (step pitch 0.3 dB)
◆ Supports I/O
  CSI-2 serial data output ( 2 Lane / 4 Lane ), RAW10 / RAW12 output
◆ Recommended exit pupil distance: –100 mm to –∞

STARVIS

* STARVIS is a trademark of Sony Corporation. The STARVIS is back-illuminated pixel technology used in CMOS image sensors for surveillance camera applications. It features a sensitivity of 2000 mV or more per 1 μm² (color product, when imaging with a 706 cd/m² light source, F5.6 in 1 s accumulation equivalent), and realizes high picture quality in the visible-light and near infrared light regions.

Sony reserves the right to change products and specifications without prior notice.
Sony logo is a registered trademark of Sony Corporation.
Device Structure

◆ CMOS image sensor
◆ Image size  Diagonal 6.4 mm (Type 1/2.8) approx. 8.40 M pixels, All pixels
◆ Total number of pixels  3864 (H) × 2228 (V) approx. 8.60 M pixels
◆ Number of effective pixels  3864 (H) × 2192 (V) approx. 8.46 M pixels
◆ Number of active pixels  3864 (H) × 2176 (V) approx. 8.40 M pixels
◆ Number of recommended recording pixels  3840 (H) × 2160 (V) approx. 8.29 M pixels
◆ Unit cell size  1.45 µm (H) × 1.45 µm (V)
◆ Optical black  Horizontal (H) direction: Front 0 pixel, rear 0 pixel
Vertical (V) direction: Front 36 pixels, rear 0 pixel
◆ Dummy  Horizontal (H) direction: Front 0 pixel, rear 0 pixel
Vertical (V) direction: Front 1 pixel, rear 1 pixel
◆ Package  114 pin LGA

Image Sensor Characteristics

(Tj = 60 °C)

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity (F8)</td>
<td>Typ. 1570 Digit</td>
<td>1/30 s accumulation 12 bit converted value</td>
</tr>
<tr>
<td>Saturation signal</td>
<td>Min. 3895 Digit</td>
<td>12 bit converted value</td>
</tr>
</tbody>
</table>

Basic Drive Mode

<table>
<thead>
<tr>
<th>Drive mode</th>
<th>Recommended number of recording pixels</th>
<th>Maximum frame rate [frame/s]</th>
<th>Output interface</th>
<th>ADC [bit]</th>
</tr>
</thead>
<tbody>
<tr>
<td>All pixel</td>
<td>3840 (H) × 2160 (V) approx. 8.29 M pixels</td>
<td>90.9</td>
<td>CSI-2</td>
<td>10</td>
</tr>
<tr>
<td>2 × 2 adjacent pixel binning</td>
<td>1920 (H) × 1080 (V) approx. 2.07 M pixels</td>
<td>90.9</td>
<td>CSI-2</td>
<td>10</td>
</tr>
</tbody>
</table>