IMX678-AAMR1
Diagonal 8.86 mm (Type 1/1.8) CMOS Solid-state Image Sensor with Square Pixel for Monochrome Cameras

Description

The IMX678-AAMR1 is a diagonal 8.86 mm (Type 1/1.8) CMOS active pixel type solid-state image sensor with a square pixel array and 8.40 M effective pixels. This chip operates with analog 3.3 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.
(Application: Security cameras)

Features

- CMOS active pixel type dots
- Built-in timing adjustment circuit, H/V driver and serial communication circuit
- Input frequency: 13.5MHz / 18MHz / 24MHz / 27MHz / 36MHz / 37.125 MHz / 72 MHz / 74.25 MHz
- Number of recommended recording pixels: 3840 (H) × 2160 (V) approx. 8.29M pixel
- 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 frame/s, 10 bit: 72 frame/s
- High dynamic range (HDR) function
  - Digital overlap HDR
  - Clear 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 / 8Lane / 4Lane × 2ch)
  - RAW10 / RAW12 output
- AR coating on cover glass (Both sides)

STARVIS 2

* STARVIS 2 and are registered trademarks or trademarks of Sony Group Corporation or its affiliates. The STARVIS 2 is back-illuminated pixel technology used in CMOS image sensors for security 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). It also has a wide dynamic range (AD 12 bit) of more than 8 dB compared to STARVIS for the same pixel size in a single exposure, and achieves high picture quality in the visible-light and near infrared light regions.

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Device Structure

- **CMOS image sensor**
- **Image size** Diagonal 8.86 mm (Type 1/1.8) approx. 8.40 M pixels, All pixels
- **Total number of pixels** 3856 (H) × 2200 (V) approx. 8.48 M pixels
- **Number of effective pixels** 3856 (H) × 2180 (V) approx. 8.40 M pixels
- **Number of active pixels** 3856 (H) × 2176 (V) approx. 8.39 M pixels
- **Number of recommended recording pixels** 3840 (H) × 2160 (V) approx. 8.29 M pixels
- **Unit cell size** 2.0 μm (H) × 2.0 μm (V)
- **Optical black**
  - Horizontal (H) direction: Front 0 pixels, rear 0 pixels
  - Vertical (V) direction: Front 20 pixels, rear 0 pixels
- **Package** 132 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</td>
<td>Typ. 25309 Digit/lux/s</td>
<td>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>72</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>72</td>
<td>CSI-2</td>
<td>10</td>
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Image Sensors for Security Cameras: [https://www.sony.net/cis-security/]