The IMX678-AAQR1 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 through the adoption of R, G and B primary color mosaic filters. This chip features an electronic shutter with variable charge-integration time.

(Applications: 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

Sony reserves the right to change products and specifications without prior notice.
“Sony”, “SONY” logo are registered trademarks or trademarks of Sony Group Corporation or its affiliates.
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
◆ Dummy Horizontal (H) direction: Front 0 pixels, rear 0 pixels Vertical (V) direction: Front 0 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 (F5.6)</td>
<td>Typ. 15886 Digit/lx/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>
</tr>
</tbody>
</table>
Comparison Image under 0.2 lux

Gain setting of IMX334 is 4 times of IMX678, however they can get same output brightness.

Condition: F1.6, exposure time 33.3 ms, gain 60 dB
Condition: F1.6, exposure time 33.3 ms, gain 48 dB

Comparison Image under NIR at 850 nm

Condition: F1.6, exposure time 33.3 ms, gain 0 dB
Condition: F1.6, exposure time 33.3 ms, gain 0 dB

Image Sensors for Security Cameras:
https://www.sony.net/cis-security/