

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

### Description

The IMX838-AQR1 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.

(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)



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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<br>Vertical (V) direction: Front 20 pixels, rear 0 pixels |
| ◆ Package                                | 132 pin LGA                                                                                                       |

## Image Sensor Characteristics

(T<sub>j</sub> = 60 °C)

| Item              |      | Value            | Remarks                |
|-------------------|------|------------------|------------------------|
| Sensitivity       | Typ. | 16309 Digit/lx/s | 12 bit converted value |
| Saturation signal | Min. | 3895 Dight       | 12 bit converted value |

## Basic Drive Mode

| Drive mode                                  | Recommended number of recording pixels       | Maximum frame rate [frame/s] | Output interface | ADC [bit] |
|---------------------------------------------|----------------------------------------------|------------------------------|------------------|-----------|
| All-pixel                                   | 3840 (H) × 2160 (V)<br>approx. 8.29 M pixels | 72                           | CSI-2            | 10        |
| Horizontal/<br>Vertical 2/2-line<br>binning | 1920 (H) × 1080 (V)<br>approx. 2.07 M pixels | 72                           | CSI-2            | 10        |

