Diagonal 17.6 mm (Type 1.1) CMOS solid-state Image Sensor with Square Pixel for Monochrome Cameras

**Description**

The IMX428LLJ is a diagonal 17.6 mm (Type 1.1) CMOS active pixel type solid-state image sensor with a square pixel array and 7.10 M effective pixels. This chip features a global shutter with variable charge-integration time. This chip operates with analog 3.3 V, digital 1.2 V, and interface 1.8 V triple power supply, and has low power consumption. High sensitivity, low dark current and low PLS characteristics are achieved.

(Applications: FA cameras, ITS cameras)

**Features**

- CMOS active pixel type dots
- Built-in timing adjustment circuit, H/V driver and serial communication circuit
- Global shutter function
- Input frequency
  - 37.125 MHz / 74.25 MHz / 54 MHz
- Number of recommended recording pixels: 3208 (H) × 2200 (V) approx. 7.06 M pixels
  - Readout mode
  - All-pixel scan mode
  - Vertical / Horizontal 1 / 2 Subsampling mode
  - 2 × 2 Vertical FD binning mode
  - ROI mode
  - Vertical / Horizontal - Normal / Inverted readout mode
- Readout rate
  - Maximum frame rate in
    - All-pixel scan mode: 12 bit: 51.4 frame/s
- Variable-speed shutter function (resolution 1 H units)
- 12-bit A/D converter
- CDS / PGA function
  - 0 dB to 24 dB: Analog Gain (0.1 dB step)
  - 24.1 dB to 48 dB: Analog Gain: 24 dB + Digital Gain: 0.1 dB to 24 dB (0.1 dB step)
- I/O interface
  - SLVS (4 ch / 8 ch switching) output (594 / 297 Mbps per 1 ch)
  - SLVS - EC (1 Lane / 2 Lane switching) output (2.376 / 1.188 Gbps per 1 Lane)
- Recommended lens F number: 2.8 or more (Close side)
- Recommended exit pupil distance: –100 mm to –∞

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* Pregius is a trademark of Sony Corporation. The Pregius is global shutter pixel technology for active pixel-type CMOS image sensors that use Sony’s low-noise CCD structure, and realizes high picture quality.

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Device Structure

◆ CMOS image sensor
◆ Image size  Diagonal 17.6 mm (Type 1.1)  Approx. 7.10 M pixels  All-pixel
◆ Total number of pixels  3216 (H) × 2224 (V)  Approx. 7.15 M pixels
◆ Number of effective pixels  3216 (H) × 2208 (V)  Approx. 7.10 M pixels
◆ Number of active pixels  3216 (H) × 2208 (V)  Approx. 7.10 M pixels
◆ Number of recommended recording pixels  3208 (H) × 2200 (V)  Approx. 7.06 M pixels  All-pixel
◆ Unit cell size   4.5 µm (H) × 4.5 µm (V)
◆ Optical black   Horizontal (H) direction: Front 0 pixel, rear 0 pixel
                      Vertical (V) direction: Front 16 pixels, rear 0 pixel
◆ Package   226 pin LGA

Image Sensor Characteristics (Preliminary)  
(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.</td>
<td>1613 mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/30 s accumulation</td>
</tr>
<tr>
<td>Saturation signal</td>
<td>Min.</td>
<td>1001 mV</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>3208 (H) × 2200 (V) approx. 7.06M pixels</td>
<td>51.4</td>
<td>SLVS 8 ch</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39.6</td>
<td>SLVS – EC 2 Lane</td>
<td></td>
</tr>
<tr>
<td>Vertical / Horizontal</td>
<td>1604 (H) × 1100 (V) approx. 1.76M pixels</td>
<td>133.8</td>
<td>SLVS 8 ch</td>
<td>12</td>
</tr>
<tr>
<td>1/2 subsampling</td>
<td></td>
<td>133.8</td>
<td>SLVS – EC 2 Lane</td>
<td></td>
</tr>
<tr>
<td>2 × 2 Vertical FD</td>
<td>1604 (H) × 1100 (V) approx. 1.76M pixels</td>
<td>133.8</td>
<td>SLVS 8 ch</td>
<td>12</td>
</tr>
<tr>
<td>binning mode</td>
<td></td>
<td>133.8</td>
<td>SLVS – EC 2 Lane</td>
<td></td>
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