AR0237IR Face ID for Security Solution

3D imaging for Intelligent Access Control and Smart Video Security
AR0237IR Introduction
AR0237 RGB-IR: 2.1Mp 1/2.7” 1080p

**Features**
- 1/2.7” optical format
- 1928 (H) x 1088 (V) [16:9]
- 3.0um FSI pixel, dual conversion gain
- 4 x 4 RGB-IR
- Electronic Rolling Shutter and GRR support
- HiSPI and parallel interface support
- <190mW 1080p30 linear mode
- Onboard temperature sensor
- -30°C to 85°C (Tj) operation
- mPLCC packaging

**Key System Capabilities and Benefits**
- HiSPI support for highest frame rate [60fps]
- Line interleaved T1/T2 High Dynamic Range [30fps] support through off-chip ISP
- Enhanced Near Infra Red [28% QE at 850nm] sensitivity for improved night vision
- Slave mode for multi-camera synchronization
- Tuned with select Image Signal Processor platforms

**Key Applications**
- 1080p60 video monitoring
- Video recording and streaming
- High dynamic range imaging

**Orderable Part Numbers**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Product Description</th>
<th>Orderable Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR0237IRSC12SHRA0-DR</td>
<td>2Mp 1/2.7” CIS RGB-IR 12°C CRA, mPLCC Package, HiSPI</td>
<td>Dry Pack</td>
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AR0237 RGB-IR: AR0237 RGB-IR deploys a 4x4 kernel which results in a 50% (8/16) spatial density for Green pixels, equivalent to that of RGB Bayer.

- The 4x4 kernel has a reduction in spatial density of the Red and Blue pixels used for the Chroma channel compared to RGB Bayer and 2x2 RGB-IR.

- 4x4 RGB-IR Kernel:
  - \( R = 2 \) of 16
  - \( G = 8 \) of 16
  - \( B = 2 \) of 16
  - \( IR = 4 \) of 16

- 2x2 RGB Bayer:
  - \( R = 4 \) of 16
  - \( G = 8 \) of 16
  - \( B = 4 \) of 16

- 2x2 RGB-IR Kernel:
  - \( R = 4 \) of 16
  - \( G = 4 \) of 16
  - \( B = 4 \) of 16
  - \( IR = 4 \) of 16

Public Information
AR0237 RGBIR Has High QE Response
Target Application

- Access Control
- Security Panel
- Smart Video Lock
- Video Door Bell
3D Imaging For Antispoofing Feature

• 2D Face Recognition is not enough
• Adding 3D imaging for antispoofing feature

• Using VCSEL Structure light for 3D depth information
Structure Light Solution Today

Existing Market Solution

- **Cost**: High
- **Complexity**: High
- **Manufacturability**: High

2*image sensor, 2*lens, 1*depth ASIC, 1*SOC Chip

More power, 3 elements needs to do the alignment in the system

On/Amba Solution

- **Cost**: Low
- **Complexity**: Low
- **Manufacturability**: Low

1*image sensor, 1*lens, 0*depth ASIC, 1*SOC Chip

Less power, 2 elements needs to do the alignment in the system
AR0237IR/Amba CV25m – An Innovative Solution

**4x4 RGB-IR Kernel:**
- \( R = 2 \text{ of } 16 \)
- \( G = 8 \text{ of } 16 \)
- \( B = 2 \text{ of } 16 \)
- \( IR = 4 \text{ of } 16 \)

*Column Readout Direction*
*Row Readout Direction*(0, 0)

**RGB data**

**Application Logics**

- **Combine:**
  - **Face Recognition results**
  - **Liveness results**

**Application Combines**
- **Improved Manufacturability**
- **Much boosted AI performance**
- **Much lower power consumption**

**Features:**
- **RGB and IR camera 2-in-1**
- **3D depth ASIC**
- **2MP**
- **VGA**
- **Improved Manufacturability**
- **Much boosted AI performance**
- **Much lower power consumption**
Janus 3D Sensing Platform

Solution Detail
- ON Semiconductor AR0237IR CMOS image Sensor
- Ambarella CV25M AI Vision SoC
  - 10nm ultra-low power
  - Advanced ISP
  - Depth processing
  - H.265/H.264 video encoder
- Lumentum VCSEL powered structured-light
Data Flow and Process

1. Crystal-Optech

- Projector
- RGB-IR sensor
- Lens w dual-band filter
- 940nm IR-LEDs

NN Partners
3D algo partners

Face Recognition, anti-haiking

Point Cloud

3D Face Recognition
Liveness detection

Public Information