# oToBrite

*driving easier and safer*

# Datasheet

oToBrite Electronics, Inc



# oToCAM236-C89M

| Revision | Description | Release Date |
|----------|-------------|--------------|
| 1.0 | First Release | April, 19, 2020 |
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# 1. General Description

The oToCAM236-C89M is an automotive grade camera for the application of autonomous driving and CMS. It uses high sensitive CMOS sensor to perform good image quality for the detection purpose of the system product.

# 2. Product specification

| No. | Item | Specification |
|-----|------|---------------|
| 1 | Image sensor | CMOS (Sony ISX 019) |
| 2 | Camera Number of pixels (default) | 1280(H) ×720 (V) (default setting) |
| 3 | View angle (H/V) | HFOV：89.3° ; VFOV: 51.6° |
| 4 | Resolution (Center/Corner) | TV line ≧ 500 |
| 5 | Color filter array | RGGB |
| 6 | Output Interface | GMSL with POC |
| 7 | Output Formats | Parallel 8-bit YCbCr data (uyvy) |
| 8 | Lens structure | 4G+2GM+IR |
| 9 | Lens F No. | F2.1 |
| 10 | Power over coaxial (POC) | DC 6~12V |
| 11 | Startup time of power in | Within 500ms |
| 12 | Frame rate (default) | 30 fps (default setting) |
| 13 | Exposure Control | DOL3 |
| 14 | Serializer | Maxim MAX96705 |
| 15 | Camera Current Consumption | Below 120mA @6V |
| 16 | Operating Temperature | -40°C ~ +85°C |
| 17 | Storage temperature Range | -40°C ~ +95°C |
| 18 | Waterproof | IP 67 |
| 19 | Dimension(mm) | 28.6*24.6*32 mm (exclude FRAKA connector) |
| 20 | Weight | < 30g |

# 3. Outline Drawing (Unit: mm)
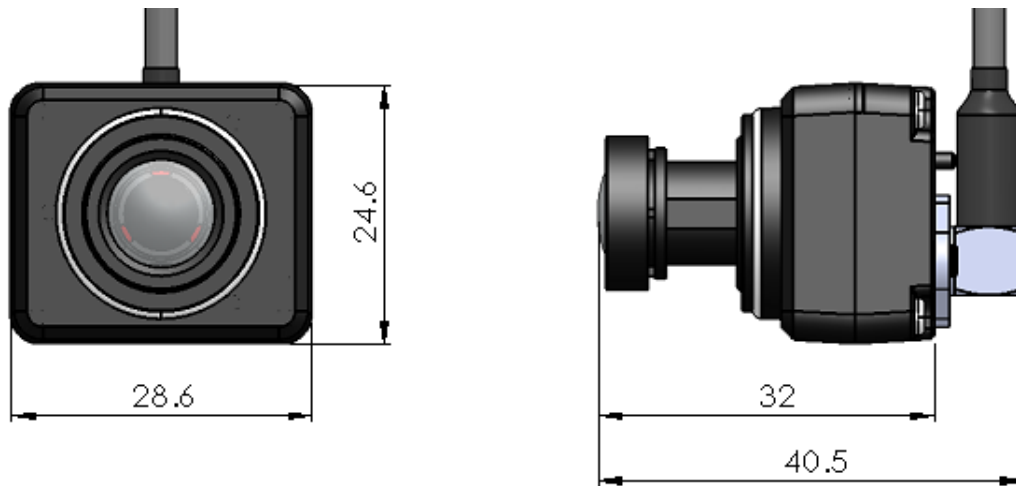


Figure 1. oToCAM236-C89M Diagram (the bracket is optional and different for different car models)

# 4. Interface, Cables and Connectors (Male and Female)
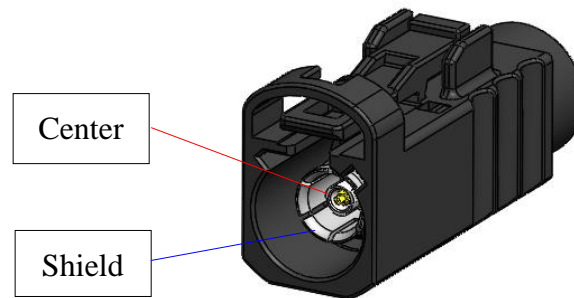## 4.1 Connectors of pigtail cable



Figure 2.1    DEREN 6A0103-026R

## 4.2 LVDS cable (POC) with FAKRA connector
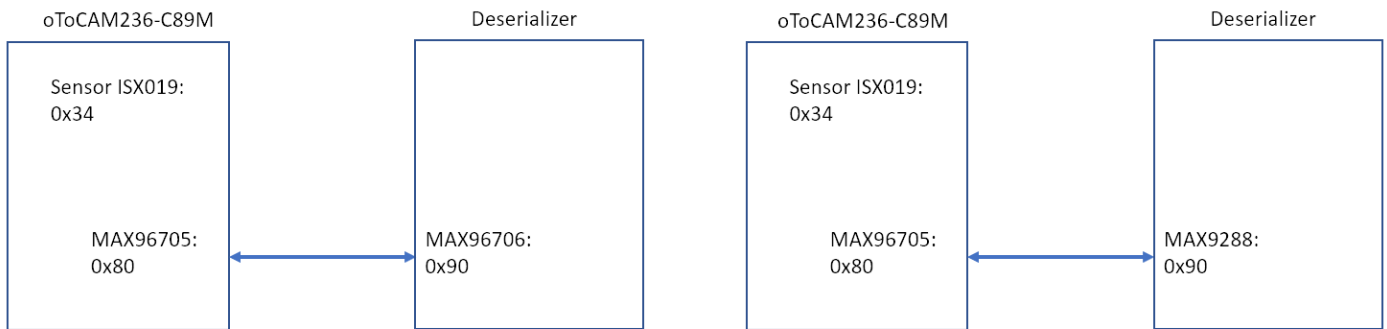Cable length: 150mm (+10/0_mm)
Connector type: DEREN 6A0104-005R



Figure 2.2    DEREN 6A0104-005R

Pin definition:

| Pin No. | Signal Name | Operation Voltage and Current |
|---------|-------------|-------------------------------|
| Center  | DOUT        | Min. 0.375V, Max. 0.625V      |
|         | PWR         | Typ. 90mA @6V / 25°C          |
| Shield  | Shield GND  |                               |

# 5. Applications

## 5.1. I2C ID Address

| oToCAM236-C89M | Deserializer | oToCAM236-C89M | Deserializer |
|---|---|---|---|
| Sensor ISX019: 0x34 | | Sensor ISX019: 0x34 | |
| MAX96705: 0x80 | MAX96706: 0x90 | MAX96705: 0x80 | MAX9288: 0x90 |

## 5.2. Initialization

Initial MAX96705/96706 setting

Initial MAX96705/9288 setting

## 5.3. Deserializer Settings

### MAX96706 Settings:
1. Reference document "oToCAM236-C89M EE spec" de-serializer H/W setting
2. MAX96706, Select GMSL input 0x0F bit7=0:Select IN0+/-; 0x0F bit7=1:Select IN1+/-
3. MAX96706, mode config(0x07) (DBL=1, DRS=0, BWS=0, ES=1, HIBW=1, HVEN=1, CXTP=1)

   (The registers file will be provided under NDA and/or samples purchased)

### MAX9288 Settings:
1. Reference document "oToCAM236-C89M EE spec" de-serializer H/W setting
2. Crossbar setting for MAX96705 to MAX9288 data format transfer
3. MAX9288, Disable audio
4. MAX9288, VC=0, INPUTBW=1, YUV422-8bit

   (The registers file will be provided under NDA and/or samples purchased)

## 5.4. Sensor (ISX019) Register Settings

   Sensor setting will be loaded from on-board SPI flash automatically after power up.

# 6. Special Note

ISX019 is System On Chip image sensor with ISP (Image Signal Processor) . Image are captured and transmitted with 8-bit YCbCr data from camera through coax cable.
Usually, Gamma curve is applied to get 8-bit image to improve dynamic range for application.
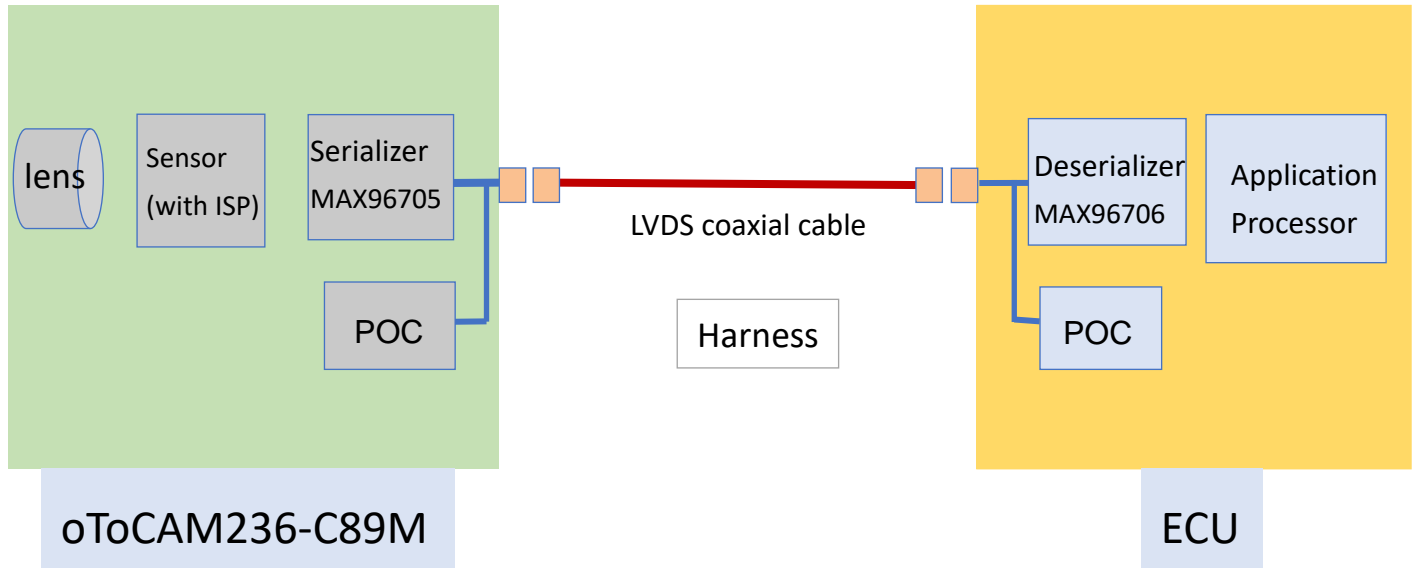
# 7. System Configuration (TBD)



Figure 3. System Configuration

Maxim GMSL Max96706 / Max9288 Deserializer must be used as receiver in ECU for connecting oToCAM236-C89M.