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|-------------------|---|---------------|
| PRODUCT | : | CAMERA MODULE |
| MODULE NO. | : | C605-BK34 |
| CUSTOMER | : | |

SPECIFICATIONS

Revision 0.1

| Revision history | | | |
|------------------|------------|---------------|-------------|
| Revision NO. | Date | Description | Remark |
| 0.1 | 2021-05-01 | First release | Preliminary |
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MAIN CAMERA SPECIFICATIONS

CATEGORY: LIMITATION

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Key information

| Module No. | | Lens | Note |
|-----------------------------|-----------------------|-----------------------------------|------------------|
| Module Size | | 60mm x 55.1mm x 45.1mm | |
| Sensor Type | | IMX334 | |
| Active Size | | 3840(H) × 2160(V) | Sensor datasheet |
| Power Supply | Core | 1.2 ~ 1.3 V (1.2V normal) | Sensor datasheet |
| | Analog | 2.8 ~3.0 V (2.8V normal) | Sensor datasheet |
| | I/O | 1.7 ~1.9V (1.8V normal) | Sensor datasheet |
| Lens Size and Structure | | 1/1.8 INCH | Sensor datasheet |
| Lens F.NO | | F1.2±5% | |
| Input Clock Frequency | | 6 to 27MHz / 37.125MHz / 74.25MHz | Sensor datasheet |
| Output Format | | 10-bit RGB RAW | Sensor datasheet |
| Program Content | | AWB, LSC | |
| Maximum Image Transfer Rate | 8MP (full resolution) | 60fps | Sensor datasheet |
| Pixel Size | | 2 μm x 2 μm | Sensor datasheet |

Pin assignment

| No. | Name | Pin type | Description |
|-----|------------------------|----------|---|
| 1 | QUP15_SPI_MISO | Output | Transmit data. SPI Interface for LC898201 |
| 2 | QUP15_SPI_MOSI | Input | Received data. SPI Interface for LC898201 |
| 3 | QUP15_SPI_CLK | Input | Clock. SPI Interface for LC898201 |
| 4 | QUP15_SPI_CS_N | Input | Chip Select. SPI Interface for LC898201 |
| 5 | ZOOM_FOCUS_IRIS_RESET | Input | Reset signal input (Low active) for LC898201 |
| 6 | ZOOM_FOCUS_IRIS_BUSY | Output | Transfer busy for LC898201 |
| 7 | ZOOM_FOCUS_IRIS_VSYNC1 | Input | Video synchronizing signal input for LC898201 |
| 8 | ZOOM_FOCUS_IRIS_VSYNC2 | Input | Video synchronizing signal input for LC898201 |
| 9 | AVDD_CAM_2P9 | Power | 2.9V Analog power for IMX334 |
| 10 | AVDD_CAM_2P9 | Power | 2.9V Analog power for IMX334 |
| 11 | NC | - | No connection |
| 12 | NC | - | No connection |
| 13 | DVDD_CAM_1P2 | Power | 1.2V Digital power for IMX334 |
| 14 | DVDD_CAM_1P2 | Power | 1.2V Digital power for IMX334 |
| 15 | NC | - | No connection |
| 16 | NC | - | No connection |
| 17 | NC | - | No connection |
| 18 | MIPI_CSI0_DLN3_P_CONN | Output | MIPI TX data lane 3 positive output |
| 19 | MIPI_CSI0_DLN3_N_CONN | Output | MIPI TX data lane 3 negative output |
| 20 | NC | - | No connection |
| 21 | MIPI_CSI0_DLN1_N_CONN | Output | MIPI TX data lane 1 negative output |
| 22 | MIPI_CSI0_DLN1_P_CONN | Output | MIPI TX data lane 1 positive output |

| | | | |
|----|-----------------------|--------|--|
| 23 | NC | - | No connection |
| 24 | MIPI_CSI0_DCLK_P_CONN | Output | MIPI TX clock lane positive output |
| 25 | MIPI_CSI0_DCLK_N_CONN | Output | MIPI TX clock lane negative output |
| 26 | NC | - | No connection |
| 27 | MIPI_CSI0_DLN0_P_CONN | Output | MIPI TX data lane 0 positive output |
| 28 | MIPI_CSI0_DLN0_N_CONN | Output | MIPI TX data lane 0 negative output |
| 29 | NC | - | No connection |
| 30 | MIPI_CSI0_DLN2_N_CONN | Output | MIPI TX data lane 2 negative output |
| 31 | MIPI_CSI0_DLN2_P_CONN | Output | MIPI TX data lane 2 positive output |
| 32 | NC | - | No connection |
| 33 | NC | - | No connection |
| 34 | NC | - | No connection |
| 35 | VREG_CAM_3P3 | Power | 3.3V Power for IR Cut, Iris, Focus, Zoom functions |
| 36 | CAM_MCLK0 | Input | Clock input for IMX334 |
| 37 | CAM0_RST_N | Input | System reset (Low active) for IMX334 |
| 38 | NC | - | No connection |
| 39 | NC | - | No connection |
| 40 | VREG_CAM_3P3 | Power | 3.3V Power for IR Cut, Iris, Focus, Zoom functions |
| 41 | VREG_CAM_3P3 | Power | 3.3V Power for IR Cut, Iris, Focus, Zoom functions |
| 42 | VDD_OUT_PT_5V | Power | 5V Power for IR Cut, Iris, Focus, Zoom functions |
| 43 | VDD_OUT_PT_5V | Power | 5V Power for IR Cut, Iris, Focus, Zoom functions |
| 44 | OVDD_CAM_1P8 | Power | 1.8V Power for Interface for IMX334 and others |
| 45 | NC | - | No connection |
| 46 | NC | - | No connection |
| 47 | IRCUT_INA | | IR Cut Signal |

| | | | |
|----|--------------|--------|---------------|
| 48 | IRCUT_INB | | IR Cut Signal |
| 49 | CCI_I2C_SCL0 | | I2C data |
| 50 | CCI_I2C_SDA0 | | I2C Clock |
| 51 | GND | Ground | Ground |
| 52 | GND | Ground | Ground |

Electrical characteristics

1. Absolute Maximum Ratings

| Item | Symbol | Min. | Max. | Unit | Remarks |
|------------------------------------|-------------------|------|------------------------|------|------------------|
| Supply voltage (analog 1 : 2.9 V) | AV _{DD1} | -0.3 | 3.3 | V | |
| Supply voltage (analog 2 : 2.9 V) | AV _{DD2} | -0.3 | 3.3 | V | |
| Supply voltage (interface 1.8 V) | OV _{DD} | -0.3 | 3.3 | V | |
| Supply voltage (digital1 : 1.2 V) | DV _{DD1} | -0.3 | 2.0 | V | |
| Supply voltage (digital 2 : 1.2 V) | DV _{DD2} | -0.3 | 2.0 | V | |
| Input voltage | VI | -0.3 | OV _{DD} + 0.3 | V | Not exceed 3.3 V |
| Output voltage | VO | -0.3 | OV _{DD} + 0.3 | V | Not exceed 3.3 V |

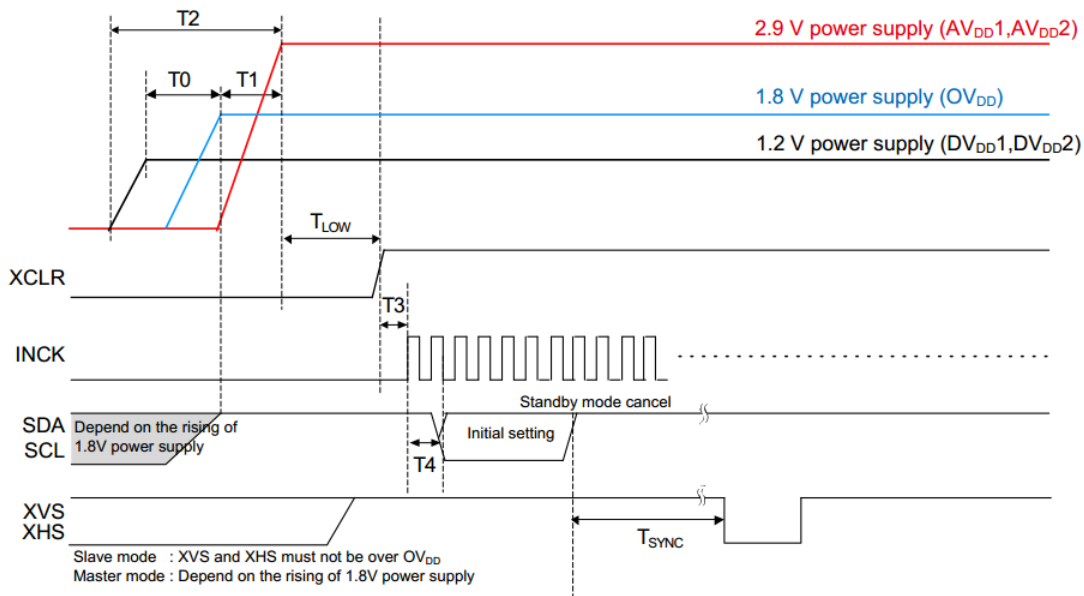
2. Image Sensor DC Characteristics

DC Characteristics

| Item | Pins | Symbol | Condition | Min. | Typ. | Max. | Unit | |
|------------------------|---|---|--------------------------|-----------------------|------|---------------------|------|---|
| Supply voltage | Analog1 | VDDSUB VDDHCP VDDHDA VDDHCM | AV _{DD1} | | 2.80 | 2.90 | 3.00 | V |
| | Analog2 | VDDHPX | AV _{DD2} | | 2.80 | 2.90 | 3.00 | V |
| | Interface | VDDMIO | OV _{DD} | | 1.70 | 1.80 | 1.90 | V |
| | Digital1 | VDDL _{CN} VDDL _{SC} VDDL _{PL1} | DV _{DD1} | | 1.10 | 1.20 | 1.30 | V |
| | Digital2 | VDDL _{PL2} VDDL _{PL3} VDDL _{LIF} | DV _{DD2} | | 1.10 | 1.20 | 1.30 | V |
| Digital input voltage | XHS XVS XCLR INCK XMASTER XTRIG SLAMODE0,1 SDA SCL TEST2 | VIH | XVS / XHS Slave Mode | 0.8OV _{DD} | — | — | V | |
| | | VIL | | — | — | 0.2OV _{DD} | V | |
| Digital output voltage | XHS XVS TOUT TEST1 | VOH | XVS / XHS Master Mode | OV _{DD} -0.2 | — | — | V | |
| | | VOL | | — | — | 0.2 | V | |

3. Power-on sequence

- Turn On the power supplies so that the power supplies rise in order of 1.2 V power supply (DVDD1, DVDD2) → 1.8 V power supply (OVDD) → 2.9 V power supply (AVDD1, AVDD2). In addition, all power supplies should finish rising within 200 ms.
- The register values are undefined immediately after power-on, so the system must be cleared. Hold XCLR at Low level for 500 ns or more after all of the power supplies have finished rising. (The register values after a cleared system are the default values.)
- The cleared system is applied by setting XCLR to High level. The master clock input after setting the XCLR pin to High level.
- Make the sensor setting by register communication after the cleared system.



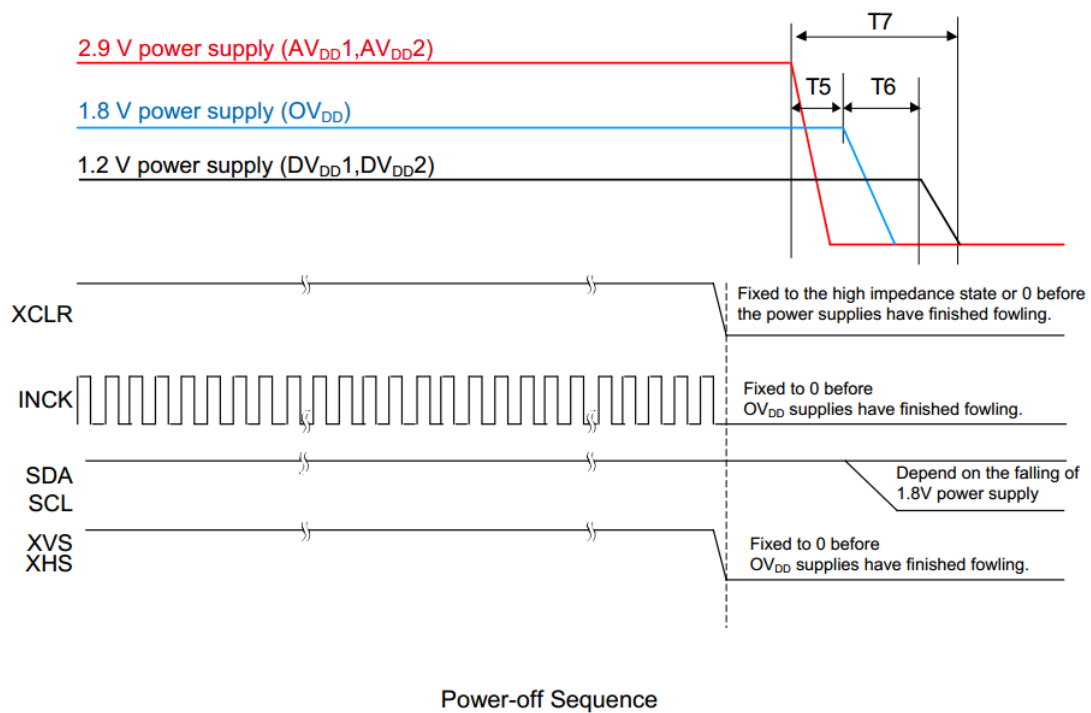
Power-on Sequence

| Item | Symbol | Min. | Max. | Unit |
|---|-------------------|------|------|------|
| 1.2 V power supply rising → 1.8 V power supply rising | T ₀ | 0 | — | ns |
| 1.8 V power supply rising → 2.9 V power supply rising | T ₁ | 0 | — | ns |
| Rising time of all power supply | T ₂ | — | 200 | ms |
| 2.9 V power supply rising → Clear OFF | T _{LOW} | 500 | — | ns |
| Clear OFF → INCK rising | T ₃ | 0 | — | μs |
| Clear OFF → Communication start | T ₄ | 20 | — | μs |
| Standby OFF (communication) → External input XHS,XVS (slave mode only) | T _{SYNC} | 18 | — | ms |

Figure 1. Power-on sequence

4. Power-off sequence

- Turn Off the power supplies so that the power supplies fall in order of 2.9 V power supply (AVDD1, AVDD2) → 1.8 V power supply (OVDD) → 1.2 V power supply (DVDD1, DVDD2). In addition, all power supplies should finish falling within 200 ms. Set each digital input pin (INCK, SDA, SCL, XCLR, XMASTER, XVS, XHS) to 0 V before the 1.8 V power supply (OVDD) falls.



| Item | Symbol | Min. | Max. | Unit |
|---|--------|------|------|------|
| 2.9 V power shut down → 1.8 V power shut down | T5 | 0 | — | ns |
| 1.8 V power shut down → 1.2 V power shut down | T6 | 0 | — | ns |
| Shut down time of all power supply | T7 | — | 200 | ms |

Figure 2. Power-off sequence

5. Slew Rate Limitation of Power-on Sequence

- Conform to the slew rate limitation shown below when power supply changes from 0 V to each voltage (0 % to 100 %) in power-on sequence.

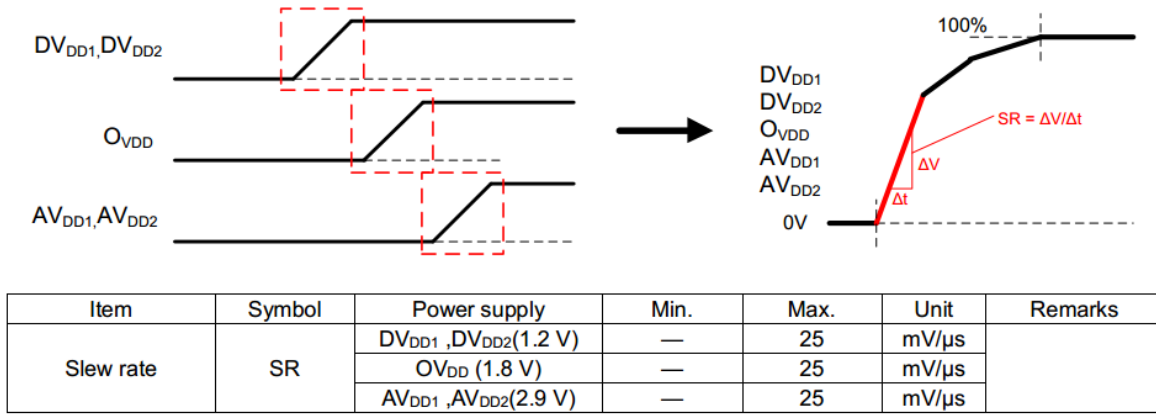


Figure 3. Slew Rate Limitation of Power-on Sequence

Mechanical drawing

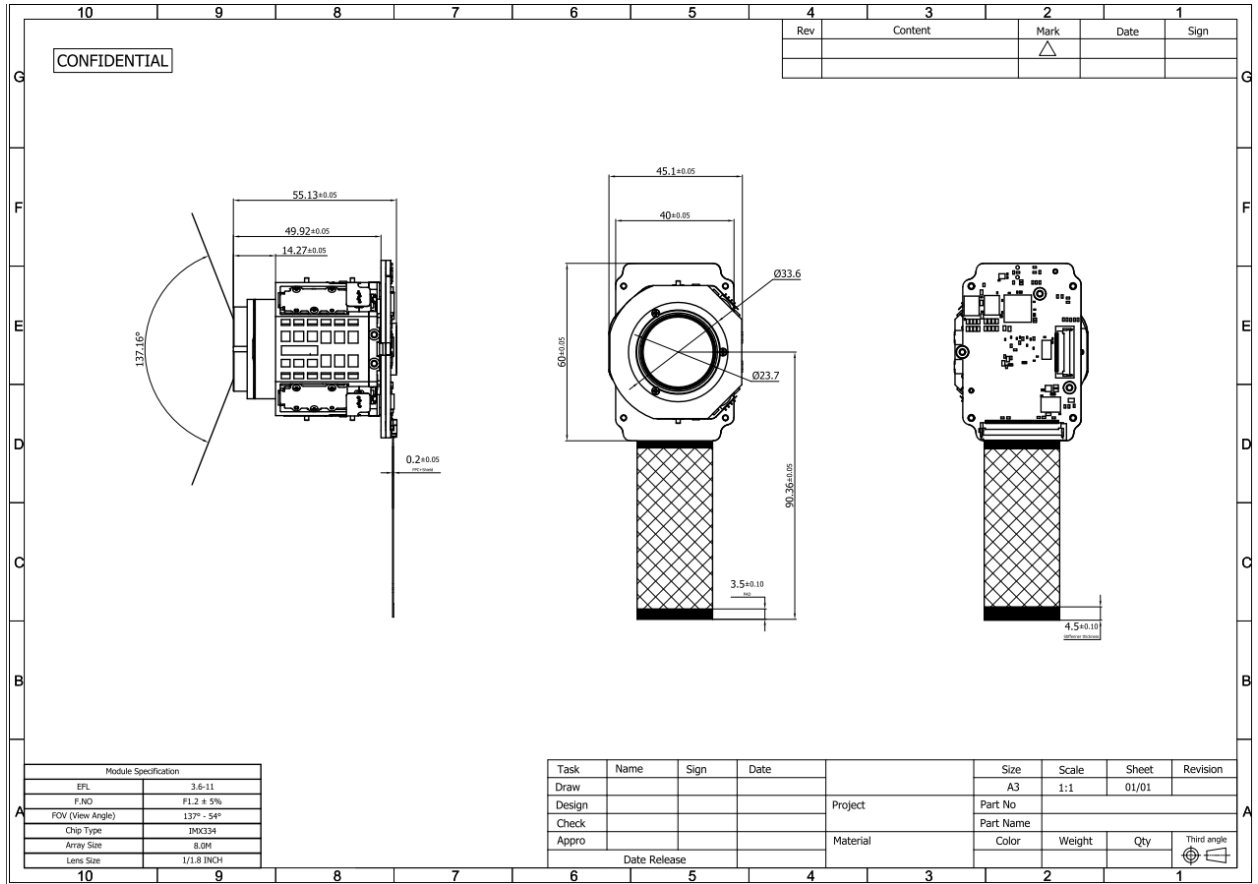


Figure 4. Mechanical drawing