



产品规格书

Product Specification

类 型：
Type Description: CMOS CSP CAMERA

型 号：
Product Name: NV-AA21B-009

1. Scope

This approval sheet contains the general information of NV-AA21B-009 camera module. It contains the key features of the module as well as the information for the quality inspection and reliability test purposes.

2. General Description

The Camera module NV-AA21B-009 is a high performance and highly- integrated camera solution for mobile application where low power consumption and small size are of upmost importance. The camera module includes VGA CMOS Sensor (OV9650 from Omni Vision)、Lens、Holder、Connector and other passive components.

3. Feature

- 1) High sensitivity for low-light operation
- 2) ISP(Image Signal Process) function Automatic Exposure Control(AEC), Automatic Gain Control(AGC), Automatic White Balance(AWB), Automatic Brightness Control(ABC), Color Saturation, Smooth and Edge enhancement, Defect compensation, Lens Shading Compensation and Auto De-Flicker.
- 3) Special Image Effect Function.
- 4) 2D Graphic Engine support Bit-Map Function, OSD Superimpose & Alpha Blending, Color transparency with color-key, and Resizing/ Window of Interest.
- 5) JPEG coding and decoding engine
- 6) Support TFT-LCD, CSTN-LCD, and STN-LCD Panel types
- 7) Display data format
 - 256 colors (RGB 3:3:2)
 - 4096 colors (RGB 4:4:4)
 - 64K colors (RGB 5:6:5)
 - 256K colors (RGB 6:6:6)
- 8) Gamma correction for ISP & LCD display.
- 9) Low power consumption when on preview, capture and standby mode.

4. Key Specification

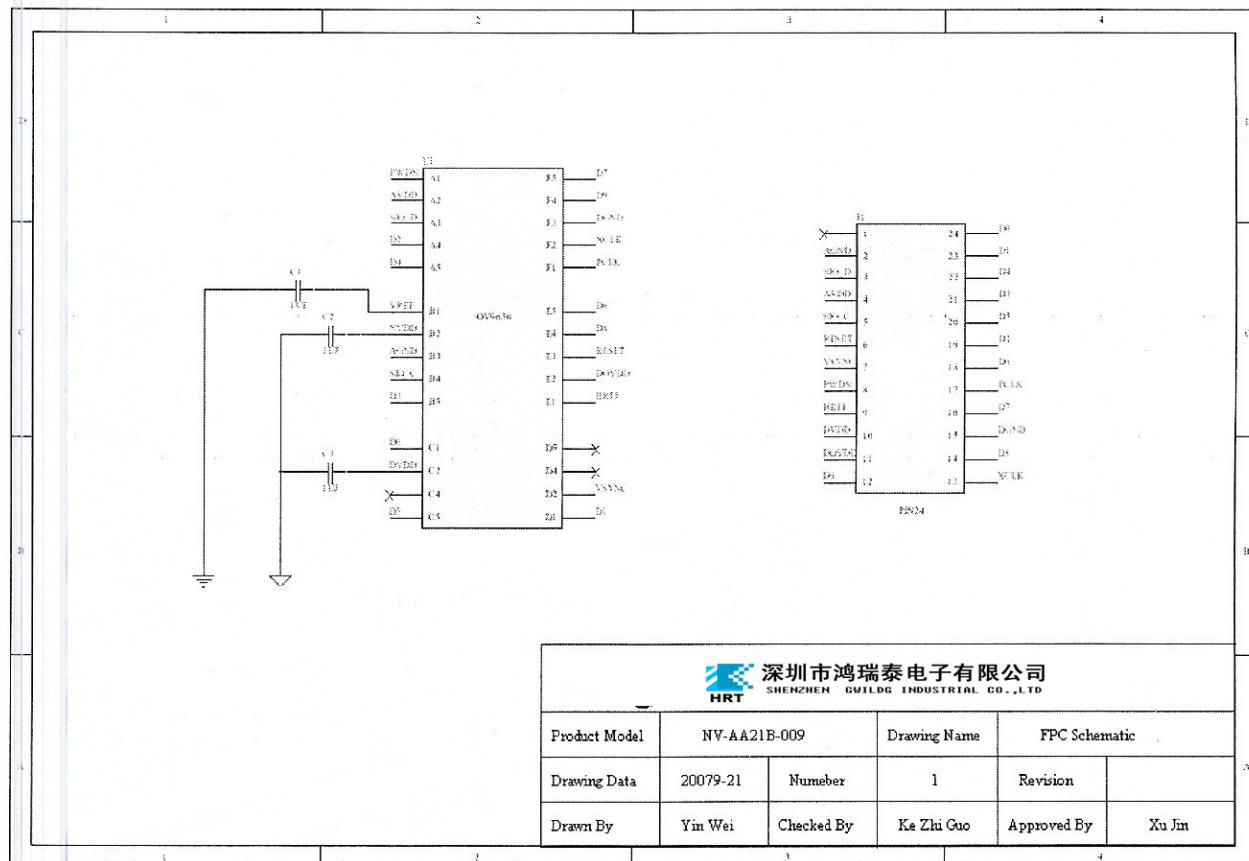
| | | |
|----------------------------------|-----------------------------|-------------------------------|
| Array Size (VGA) | | 1300 x 1028 |
| Power Supply | Digital Core | 1. 8VDC |
| | Analog | 2. 5VDC ± 3% |
| | I/O | 2. 5V to 2. 8V |
| Power Requirements | Active | 50 mW (15fps , no I/O power) |
| | Standby | 30 uW |
| Temperature Range | Operation | -20° C to 70° C |
| | Stable Image | 0° C to 50° C |
| Output Formats(8-bit) | | YUV/YCbCr 4:2:2 |
| | | RGB 4:2:2 |
| | | Raw RGB Data |
| Lens Size | | 1/4" |
| Lens Chief Ray Angle | | ~20° |
| Max Image Transfer Rate | VGA, CIF,QCIF, QQCIF | 30 fps |
| | QVGA,QQVGA | 60 fps |
| Sensitivity | | 0. 9 V/lux-sec |
| S/N Ratio | | > 40 dB (AGC off, Gamma=1) |
| Dynamic Range | | > 62 dB |
| Scan Mode | | Progressive |
| Maximum Exposure Interval | | Up to 510:1(for selected fps) |
| Gamma Correction | | Programmable |
| Pixel Size | | 3. 18 μm x 3. 18 μm |
| Dark Current | | 30 mV/s at 60° C |
| Fixed Pattern Noise | | < 0. 03% of VPEAK-TO-PEAK |
| Image Area | | 4. 13 mm x 3. 28 mm |
| Package Dimensions | | 5095mm x 5715mm |

5. Electrical Specifications

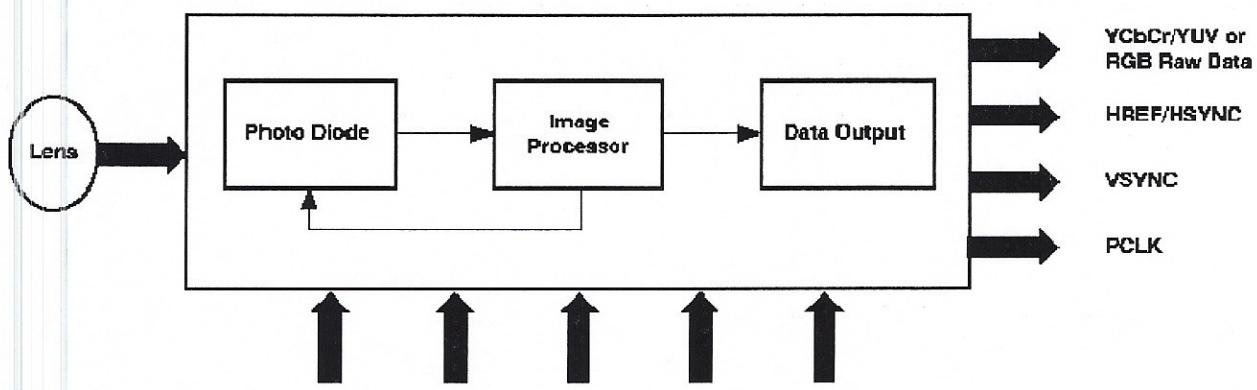
5. 1 Module Pin Assignment

| Pin Number | Name | Function/Description |
|------------|-------|---|
| 1 | NC | |
| 2 | AGND | Analog ground |
| 3 | SIO_D | SCCB serial interface data I/O |
| 4 | AVDD | Power supply (+2.5 VDC) for Analog power supply (+2.5 VDC) |
| 5 | SIO_C | SCCB serial interface clock input |
| 6 | RESET | Clears all registers and reset them to their default |
| 7 | VSYNC | Vertical sync output |
| 8 | PWDN | Power Down Mode Selection 0: Normal mode 1: Power down mode |
| 9 | HREF | HREF output |
| 10 | DVDD | Power supply (+1.8 VDC) for digital logic core |
| 11 | DOVDD | Digital power supply (+2.5 to 2.8VDC) |
| 12 | Y9 | YUV video component output bit |
| 13 | XCLK1 | System clock input |
| 14 | Y8 | YUV video component output bit |
| 15 | DGND | Digital ground |
| 16 | Y7 | YUV video component output bit |
| 17 | PCLK | Pixel clock output |
| 18 | Y6 | YUV video component output bit |
| 19 | Y2 | YUV video component output bit(LSB for 8bit) |
| 20 | Y5 | YUV video component output bit |
| 21 | Y3 | YUV video component output bit |
| 22 | Y4 | YUV video component output bit |
| 23 | Y1 | YUV video component output bit |
| 24 | Y0 | YUV video component output bit |

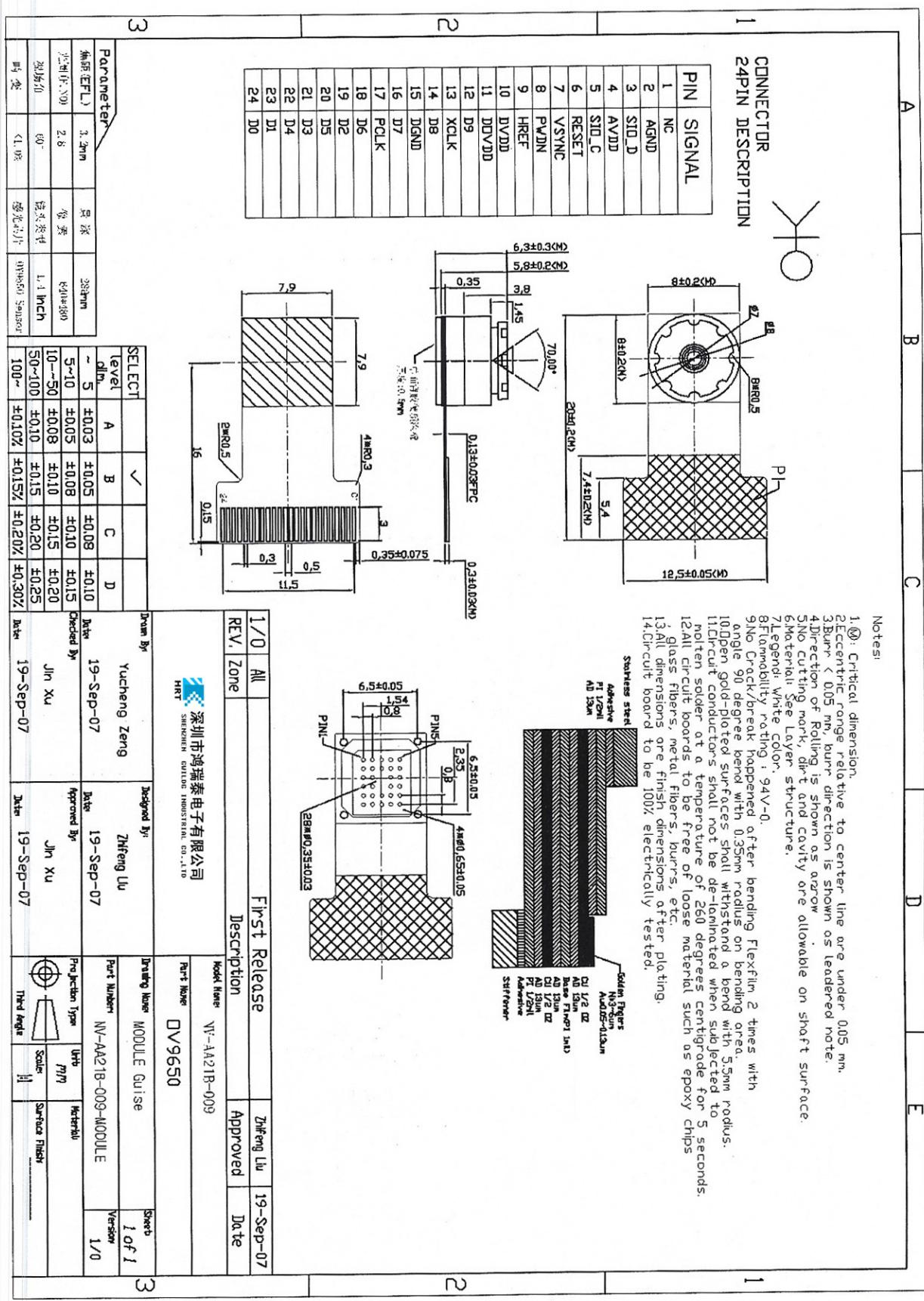
5.2 Circuit Schematic



5.3 Functional Block Diagram



6. Module Dimension





7. Quality Control

1. All product be shipped has through 100% inspection specification and sampling inspection of Q.A. plan
2. AQL standard of Q.A. plan is based on contract between customer and Darling
3. Darling will offer the inspection report per lot for ref.
4. Working temperature of product: 0° C ~ +50° C

8. Function Inspection

1. Focus distance: 57.50CM
2. The image inspect: there isn't any half screen, handstandly picture, color spot, abnormal colors in the image
3. Color speciality: testing the color plank in the standard lamp-house, the colors of RGB are up to snuff under any color temperature
4. Resolution: viewing the EIAJ TEST Chart under the whole screen of 640*480 pixels condition, the interference fringe is very clear in the mid-point, and the definition around is up to 80% of the mid-point
5. Hue: ≥ 5 scale
6. Distortion: $\leq \pm 2\%$

9. Reliability Test Report

| Test Item | Condition/Spec |
|-------------------------------------|----------------------------------|
| High Temperature Storage | 70°C; 72 hours |
| Low Temperature Storage | -20°C; 72 hours |
| High Temperature Operation | 70°C; 24 hours |
| Low Temperature Operation | -20°C; 24 hours |
| Thermal Shock | -20°C/0.5h ~ 65°C/0.5h; 24 hours |
| High Temperature & Humidity Storage | 70°C; 93%RH; 60 hours |
| Vibration | 50Hz, 2mm XYZ, each 15 min |
| Drop Test | 135cm, 26 times |
| ESD | 2K V, 100pf, 1500K Ω |
| Draught Test | 28°C, 75%; F>2Kg; 20 times |
| Switch Test | 15S alternation, 2000 times |

10. Packaging

1. Every module is placed into a tray until all empty slots of a tray are filled.
Each tray contains 100 modules.
2. A stack have ten trays.
3. Each stack use an anti-static bag to prevent the module from moisture by partially sucking out the air from the stack.
4. Insert a stack into a inner box.
5. Insert 4 inner boxes into a outside box.
6. Attach the label onto the outside box.

11. Precaution and Handling

1. Please take extra care when handling module because module is composing of precise electronic parts and optical parts.
2. Care should be taken to prevent module from being damaged by static electricity when handling module.
3. After the protected layer on the lens has been removed, Handlers should prevent the finger print from contaminating the lens and cause image noise.
4. Handlers should prevent optical parts from being damaged by a mechanical impact and so on.
5. Never shot at direct sunlight, since intensive light exposure can damage the sensor.
6. The procedure for module installation:
Align and install the module head lightly into the assigned position without pressing on the FPC.
Load the connector into its matching connector.
7. Since EMI is system dependent, agency approval is to be obtained by customer.
8. Series regulator or LDO is recommended. In case of using a switching regulator, make sure that the regulator does not cause noise in CMOS sensor or in the display.
9. Module is designed to be used in cell phone under normal use by customer.
We do not guarantee performance under extreme condition such as moving constant vibration.