

1.28" 240*240 Round IPS GC9A01 262K SPI B2B

Connector 24 Pin



- GC9A01 is driven with 18 bit color depth.
- LCD can display 262K Colors (6R:6G:6B).
- 129,600 bytes GRAM.
- Display mode:
 - Full color mode (Idle mode OFF): 262K-color (selectable color depth mode by software).
 - Reduced color mode (Idle mode ON): 8-color
- Power saving mode: Sleep mode.
- SPI Interface
 - 4 Line SPI Interface
- Power Supply
 - VDD: 2.5V - 3.3V
 - VDDIO: 1.65V - 3.3V
- IPS, all view direction.
- Normally black.
- Brightness: 400 cd/m².
- Low Profile Board to Board Mezzanine Connector.



Ordering &
Details



Support &
Community



Technical
Documentation

1 General Specifications

| No. | Feature | Specifications | Unit |
|-----|-----------------------|---------------------------|-------|
| 1 | LCD Size | 1.28 | inch |
| 2 | Panel Type | IPS | - |
| 3 | Resolution | 240RGB x 240 | Pixel |
| 4 | Display Mode | Normally Black | - |
| 5 | Number of Colors | 262k | - |
| 6 | Viewing Direction | ALL | - |
| 7 | NTSC | 60% | - |
| 8 | Contrast Ratio | 1100 | - |
| 9 | Luminance | 400 | cd/m2 |
| 10 | Module Size | 35.6 × 37.74 × (1.56±0.1) | mm |
| 11 | Panel Active Area | 32.4(H) × 32.4(V) | mm |
| 12 | Pixel Pitch | 0.135 (H) × 0.135 (V) | mm |
| 13 | Pixel Arrangement | RGB Vertical Stripe | - |
| 14 | Weight | - | g |
| 15 | Driver IC | GC9A01 | - |
| 16 | Light Source | 2 white LEDs | - |
| 17 | Interface | 4 Line SPI | - |
| 18 | Operating Temperature | -20~+70 | °C |
| 19 | Storage Temperature | -30~+80 | °C |

2 Electrical Characteristics

2.1 Absolute Maximum Ratings

| Parameter | Symbol | Min. | Max. | Unit |
|--------------------------|------------|------|------|------|
| Power Supply Voltage | V_{DD} | -0.3 | 4.6 | V |
| I/O Power Supply Voltage | V_{DDIO} | -0.3 | 4.5 | V |

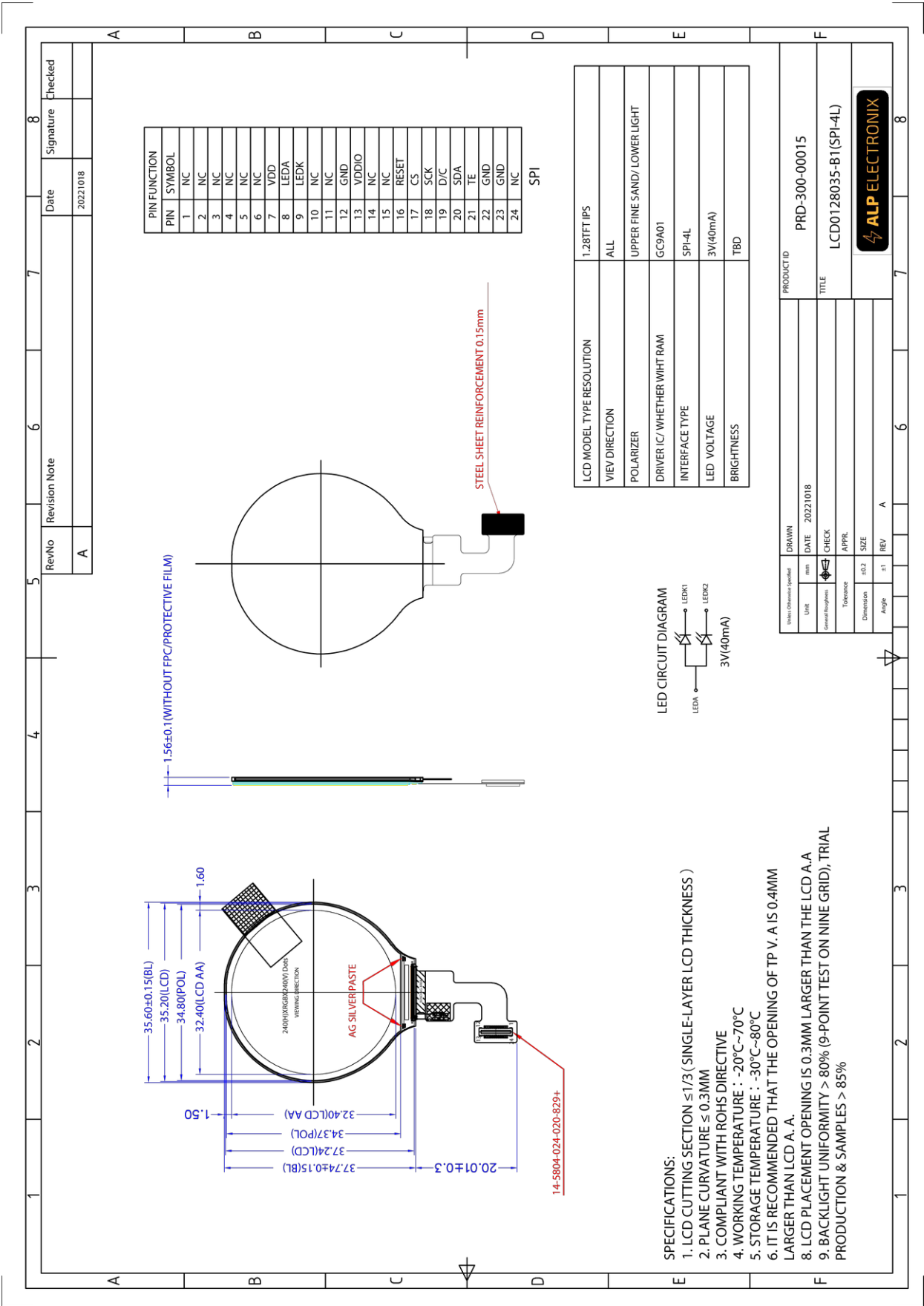
2.2 Driving TFT LCD Panel

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|--------------------------|------------|----------------------|------|----------------------|------|
| Power Supply Voltage | V_{DD} | 2.5 | 2.8 | 3.3 | V |
| I/O Power Supply Voltage | V_{DDIO} | 1.65 | 2.8 | 3.3 | V |
| Input Voltage | V_{IH} | $0.8 \cdot I_{OVCC}$ | - | I_{OVCC} | V |
| | V_{IL} | 0 | - | $0.2 \cdot I_{OVCC}$ | V |
| Output Voltage | V_{OH} | $0.8 \cdot I_{OVCC}$ | - | I_{OVCC} | V |
| | V_{OL} | 0 | - | $0.2 \cdot I_{OVCC}$ | V |

2.3 Backlight Unit

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|-------------------|----------|------|------|------|------|
| LED Current | I_B | - | 40 | - | mA |
| LED Voltage | V_F | 2.8 | 3.0 | 3.2 | V |
| Power Consumption | P_{BL} | - | 120 | - | mW |

3 Mechanical Drawing



4 Pin Definition

| Pin no. | Symbol | Description |
|---------|---------------------------|--|
| 1~6 | NC | No Connection. |
| 7 | VDD | Power supply pin. VDD=2.5~3.2V |
| 8 | LEDA | Backlight LED anode pin. |
| 9 | LEDK | Backlight LED cathode pin. |
| 10~11 | NC | No connection. |
| 12 | GND | Ground pin. |
| 13 | VDDIO | Power supply for interface logic VDDIO = 1.65~3.3V. |
| 14~15 | NC | No connection. |
| 16 | $\overline{\text{RESET}}$ | Reset signal. Active low. |
| 17 | $\overline{\text{CS}}$ | SPI chip select input pin. Active low. |
| 18 | SCK | SPI interface clock. |
| 19 | D/C | Data/command selection. |
| 20 | SDA | SPI interface input/output pin. |
| 21 | TE | Tearing effect output pin to synchronize MCU to frame writing. |
| 22~23 | GND | Ground pin. |
| 24 | NC | No Connection. |

5 Optical Characteristics

| Item | Symbol | Measuring Conditions | | Min. | Typ. | Max. | Unit |
|------------------------------|--------------------|------------------------------------|------|---------------|-------|------|--------|
| Viewing Angle | θ_T | CR \geq 10 | 25°C | - | 85 | - | Degree |
| | θ_B | | | - | 85 | - | |
| | θ_L | | | - | 85 | - | |
| | θ_R | | | - | 85 | - | |
| Contrast Ratio | CR | $\theta=0^\circ$ $\phi=0^\circ$ | 25°C | - | 1100 | - | TYP. |
| Response Time | $T_{ON} + T_{OFF}$ | $\theta=0^\circ$ $\phi=0^\circ$ | 25°C | - | 30 | 40 | mS |
| Luminance | L | $\theta=0^\circ$ $\phi=0^\circ$ | | | 400 | | cd/m2 |
| Color Chromaticity (CIE1931) | White | X | 25°C | | 0.310 | - | - |
| | | Y | 25°C | - | 0.342 | - | |
| | Red | X | 25°C | - | 0.653 | - | |
| | | Y | 25°C | - | 0.330 | - | |
| | Green | X | 25°C | - | 0.321 | - | |
| | | Y | 25°C | - | 0.572 | - | |
| | Blue | X | 25°C | - | 0.134 | - | |
| | | Y | 25°C | - | 0.119 | - | |
| Flicker | - | - | | 1. \leq 20% | | | - |

Notes:

1. Definition of Viewing Angle:

Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

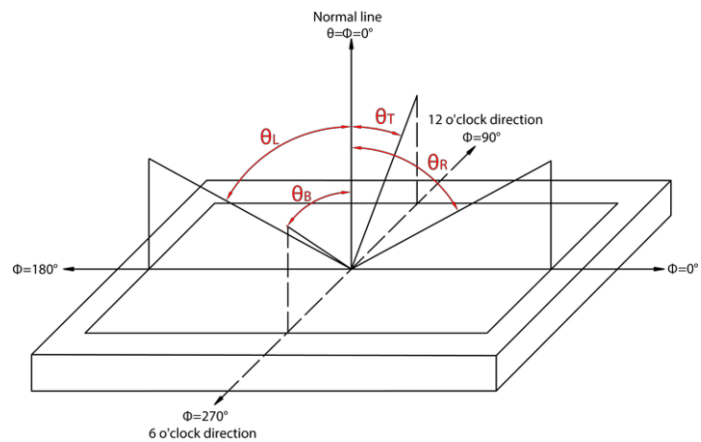


Figure 1: Definition of viewing angle

2. Definition of Contrast Ratio (CR): measured at the center point of panel

$$\text{Contrast Ratio (CR)} = \frac{\text{Luminance measured when LCD is on the White state}}{\text{Luminance measured when LCD is on the Black state}}$$

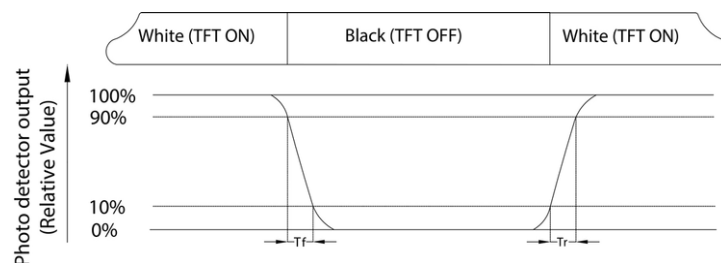
“White state “: The state is that the LCD should be driven by V_{white}.

“Black state”: The state is that the LCD should be driven by V_{black}.

V_{white}: To be determined V_{black}: To be determined.

3. Definition of Response Time:

Contrast Ratio (CR) is defined mathematically as:



Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white.

4. Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

5. Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = \frac{L_{min}}{L_{max}}$$

L=Active area length W=Active area width

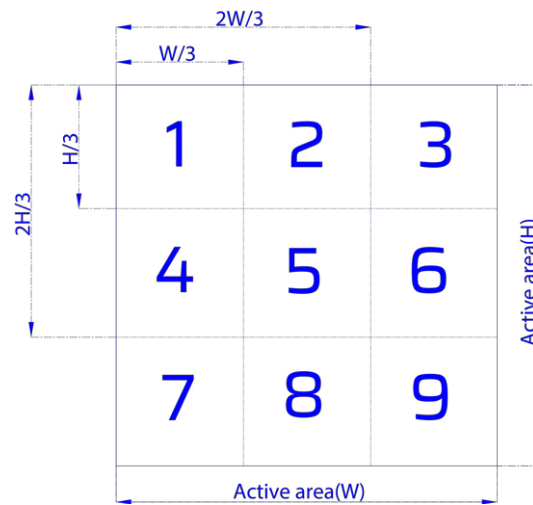


Figure 2: Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

6. Definition of Luminance: Measure the luminance of white state at center point.

6 Environmental / Reliability Test

6.1 Contents of Reliability Tests

| Item | Condition | Time (hrs) | Assessment |
|------------------------------|--|------------|---|
| High temp. Storage | $80 \pm 3^{\circ}\text{C}$ | 24 | Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Glass crack; 4. The electrical characteristics requirements shall be satisfied. |
| High temp. Operating | $70 \pm 3^{\circ}\text{C}$ | 24 | |
| Low temp. Storage | $-30 \pm 3^{\circ}\text{C}$ | 24 | |
| Low temp. Operating | $-20 \pm 3^{\circ}\text{C}$ | 24 | |
| Humidity | $50 \pm 3^{\circ}\text{C} / 90 \pm 3\%\text{RH}$ | 24 | |
| Thermal Shock(Non-operation) | $-30^{\circ}\text{C}/0.5\text{h} \sim +80^{\circ}\text{C}/0.5\text{h}$ | 24cycles | |
| Vibration Test | Frequency10Hz~55Hz~10HzAmplitude: 1.5mm, X, Y, Z direction for total 1H; (Packing condition) | | |
| ESD test | $\pm 8\text{KV}$, Air Mode,150pF/330Ω; | | |

7 Revision History

| Revision | Details |
|----------|------------------------------|
| 1.0 | Initial Release - 01.01.2023 |

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