# 1. GENERAL SPECIFICATION

## 1.1 Description

The G01302AB01A2 is a color active matrix Thin Film Transistor (TFT) Liquid Crystal Display (LCD) that uses amorphous silicon(a-Si) TFT as a switching device. This model is composed of a single 1.3 inches transmissive type main TFT-LCD panel. The resolution of the panel is 240*240 pixels and can display up to 262K color.

## 1.2 Feature

-IPS type for main TFT-LCD panel

-Structure COG+FPC+BL

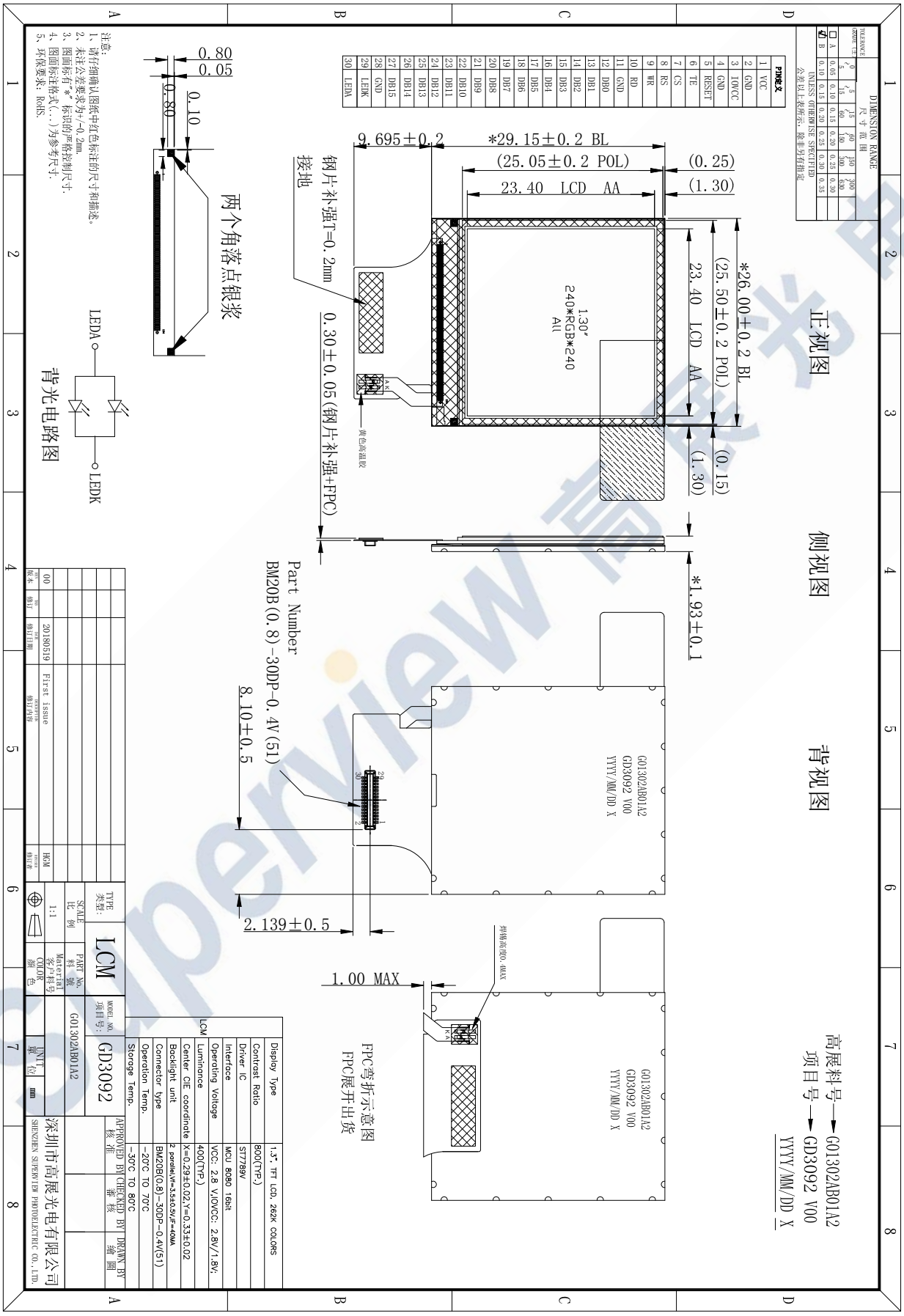
-Full, Normal (Still), Partial, Sleep, mode are available

## 1.3General Specification

| No. | Item | Specification | Unit | Remark |
|---|---|---|---|---|
| 1 | LCD Size | 1.3 | inch | - |
| 2 | Panel Type | a-Si TFT transmissive | - | - |
| 3 | Resolution | 240 x (RGB) x 240 | pixel | - |
| 4 | Display Mode | Normally Black | - | - |
| 5 | Display Number of Colors | 262K | - | - |
| 6 | ViewingDirection | All | - | Note |
| 7 | Contrast Ratio | 800(Typ) | - | - |
| 8 | Luminance | 400(Typ) | cd/m2 | - |
| 9 | Module Size | 26(W ) x29.15(L) x1.93(T) | mm | Note |
| 10 | Active Area | 23.40 (W) x23.40(L) | mm | Note |
| 11 | Pixel Pitch | 0.0975(W ) x 0.0975（L） | mm | - |
| 12 | Driver IC | ST7789V | - | - |
| 13 | Driver IC Size | 15155X700X300 | um | - |
| 14 | Light Source | 2 White LEDs | - | - |
| 15 | Interface | MCU_16Bit(TFT) | - | - |
| 16 | Operating Temperature | -20~70 | ℃ | - |
| 17 | Storage Temperature | -30~80 | ℃ | - |

Note: Please refer to the mechanical drawing.

## 2. MECHANICAL DRAWING



# 3. ELECTRICAL SPECIFICATION for TFT

## 3.1. TFT ABSOLUTE MAXIMUM RATINGS

| ITEM | SYMBOL | CONDITION | STANDARD VALUE | | | UNIT |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| Power Supply for Analog | VCC | Ta=25 ºC | -0.3 | - | 5.5 | V |
| Power Supply for Digital IO | IOVCC | Ta=25 ºC | -0.3 | - | 3.5 | V |

Note: Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is applied.

## 3.2. TFT TYPICAL OPERATION CONDITION

3.2.1 TFT DC Characteristics

| ITEM | SYMBOL | CONDITION | STANDARD VALUE | | | UNIT |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| Power Supply for Analog | VDD | Ta=25 ºC | 2.5 | 2.8 | 3.5 | V |
| Power Supply for Digital IO | IOVDD | Ta=25 ºC | 1.65 | 1.8 | 3.3 | V |
| Input Signal “H” Level | $V_{IH}$ | - | 0.7IOVDD | - | IOVDD | V |
| Input Signal “L” Level | $V_{IL}$ | - | 0 | - | 0.3IOVDD | V |
| Output Signal “H” Level | $V_{OH}$ | $I_{OH}$=-1.0mA | 0.8IOVDD | - | IOVDD | V |
| Output Signal “L” Level | $V_{OL}$ | $I_{OL}$=1.0mA | 0 | - | 0.2IOVDD | V |
| Frame Frequency | FRAME | - | 50 | 70 | 80 | Hz |

Note: To prevent IC latch up or DC operation in LCD panel, the power on/off sequence should follow the driver IC specification.

3.2.2 TFT Current Consumption

| Item | Symbol | Values | | Unit | Remark |
|---|---|---|---|---|---|
| | | type | Max. | | |
| MCU_8080_16BIT Interface | | | | | |
| Normal(Still) Mode | $I_{CC1}$ | 40 | 60 | mA | Note1 |
| Standby Mode | $I_{CC1}$ | - | 150 | uA | Note2 |

Note1: Test Condition

Typ: IOVCC=VCI=2.85V

Display Pattern: All Pixel White

Frame Rate=60Hz at 2-dot Inversion

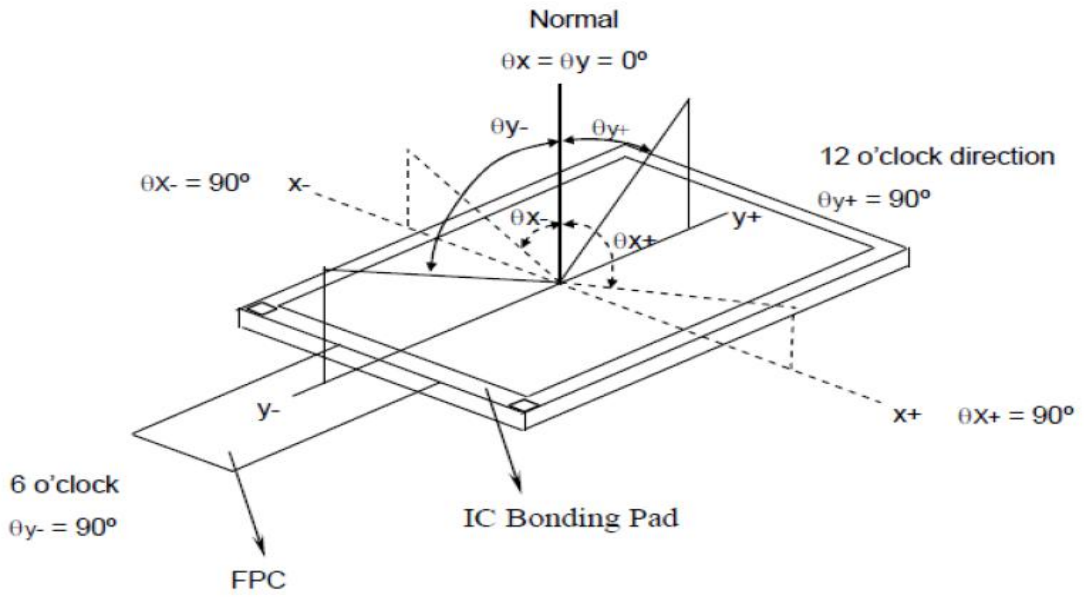
Note2: In the standby mode, all the internal display operations are suspended including the internal R-C oscillator.

# 4. OPTICAL CHARACTERISTICS(MAIN SCREEN)

($T_a$=+25ºC, VCI=+2.85V IOVCC=+1.8V, $I_B$=20mA)

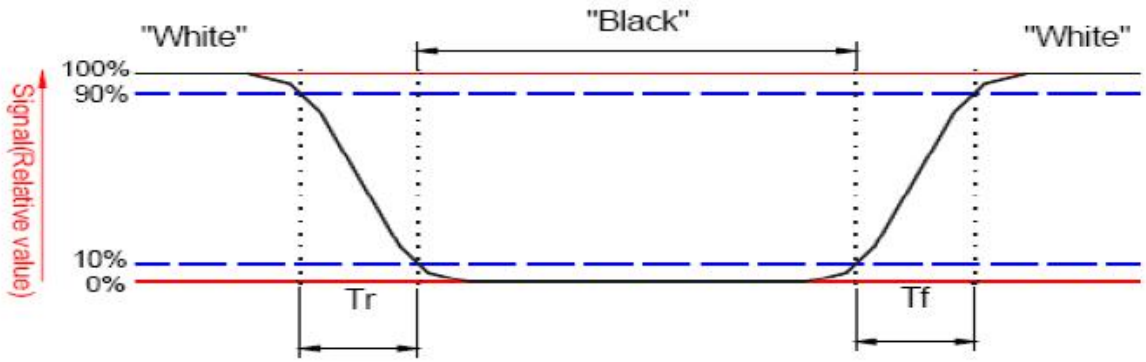
| Item | | Symbol | Condition | Values | | | Unit | Remark |
|---|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | | |
| Viewing Angle Range | Left | $\theta_L$ | CR≧10 | - | 80 | - | degree | Note 1 |
| | Right | $\theta_R$ | | - | 80 | - | | |
| | Top | $\Phi_T$ | | - | 80 | - | | |
| | Bottom | $\Phi_B$ | | - | 80 | - | | |
| Response Time | | $T_{on}$ +$T_{off}$ | Normal θ=Φ=0˚ | - | 30 | 35 | ms | Note 2 |
| Contrast Ratio | | CR | Normal θ=Φ=0˚ | 640 | 800 | - | - | Note 3 |
| Color Chromaticity (CIE1931) | White | X | Normal θ=Φ=0˚ | 0.27 | 0.29 | 0.31 | - | Note 4 |
| | | Y | | 0.31 | 0.33 | 0.35 | | |
| Transmittance | | Trans | | - | 4.65% | | - | Note5 |

Note 1: Definition of viewing angle range




Note 2: Definition of response time

The output signals of TRD-100 are measured when the input signals are changed to “White” (falling time) and from “White” to Black” (rising time). respectively. The interval is between the 10% and 90% of amplitudes. Refer to figure as below.




Note 3: Definition of contrast ratio

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

Note 4: Definition of color chromaticity (CIE1931)

Color coordinates measured at the center point of LCD when panel is driven at “White”, “Red”, “Green” and “Blue” state respectively.

Note 5:

CDY shipping status is cell without polarizer. Transmittance of Specification is cell with polarizer

# 5.RELIABILITY TESTS

| ITEM | CONDITION | CRITERION |
|---|---|---|
| Operating Temperature Test | High Temperature: +70 ºC, 96 hrs | No defects in display and operational functions |
| | Low Temperature: -20 ºC,96 hrs | |
| Storage Temperature Test | High Temperature: +80 ºC, 96 hrs | No defects in display and operational functions |
| | Low Temperature: -30 ºC, 96 hrs | |
| Humidity Endurance Test | 60ºC, 90%RH, 96 hrs | No defects in display and operational functions |
| Thermal Shock Test | -20 ºC (30mins)～<br>+70 ºC (30mins) 10 cycles | No defects in display and operational functions |
| Electro Static Discharge | ± 4KV, Human BodyMode,150pF/330Ω;<br>± 8KV,Air Mode,150pF/330Ω | No defects in display and operational functions |

NOTE:

1) The samples must be free from defect before test, must be restored at room condition at least for 2 hours after reliability test before any inspection.

2) Before test the function of TP, the sample must be placed in room temperature for 24hrs after RA test.