

# 1. GENERAL SPECIFICATION

## 1.1 Description

The G02403AD01A1 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 2.4 inches transmissive type main TFT-LCD panel. The resolution of the panel is 240\*320 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

## 1.3 Application

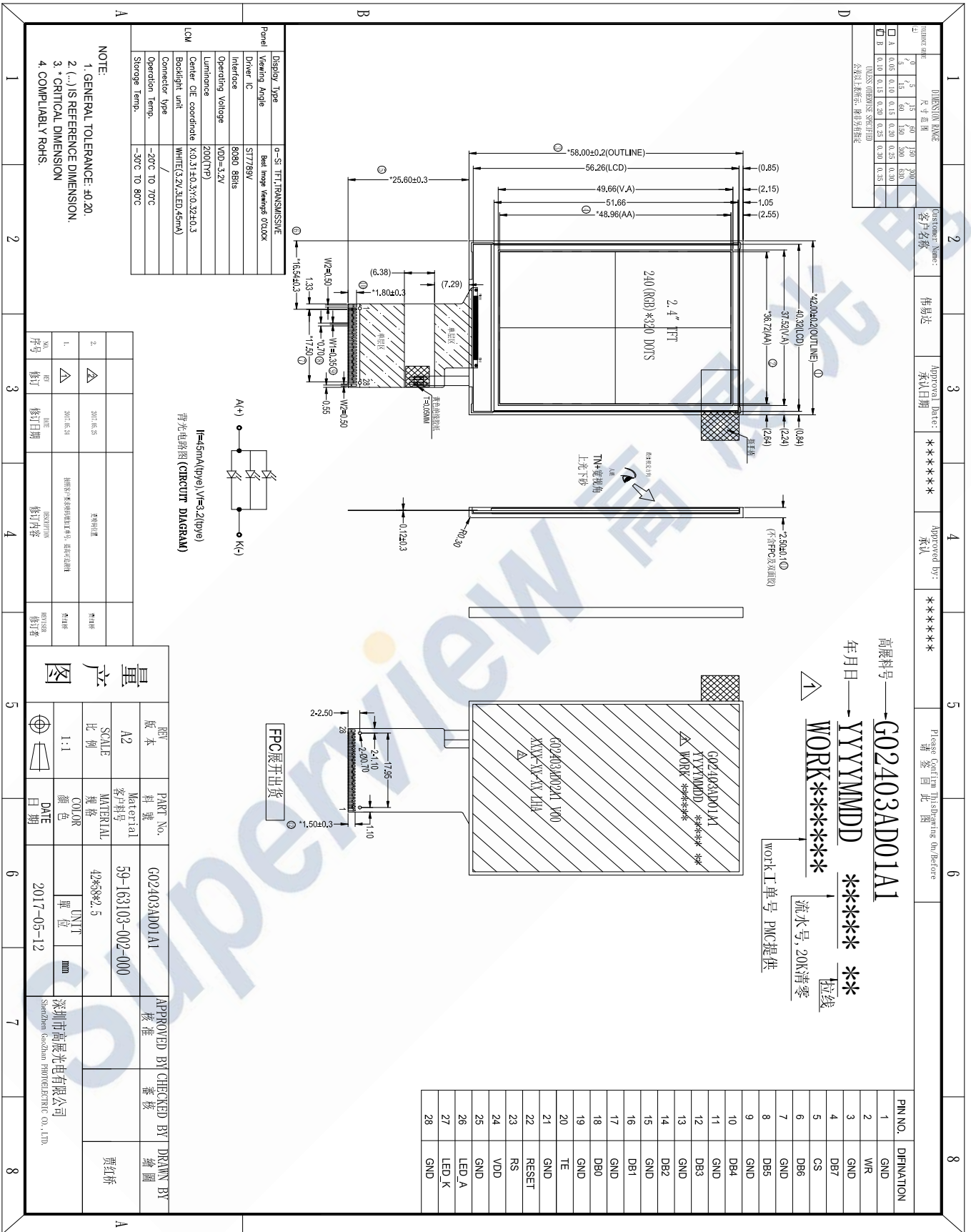
- Display terminals for Toys

## 1.4 General Specification

No.	Item	Specification	Unit	Remark
1	LCD Size	2.4	inch	-
2	Panel Type	a-Si TFT transmissive	-	-
3	Resolution	240 x (RGB) x 320	pixel	-
4	Display Mode	Normally White, Transmissive	-	-
5	Display Number of Colors	262K	-	-
6	Viewing Direction	12 点钟	-	Note
7	Luminance	200(TYP)	cd/m2	-
8	Module Size	42.0 (W)x58.0 (H) x2.5 (+/-0.2) (T)	mm	Note
9	Active Area	36.72(W) x 48.96(L)	mm	Note
10	Pixel Pitch	0.153(W) x 0.153 (L)	mm	-
11	Weight	TBD(TYP)	g	-
12	Driver IC	ST7789V	-	-
13	Light Source	4 White LEDs	-	-
14	Interface	MCU	-	-
15	Operating Temperature	-20~70	°C	-

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 °C	-0.3	2.8	3.6	V
Power Supply for Digital IO	IOVCC	Ta=25 °C	-0.3	1.8	3.6	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 °C	2.5	2.8	3.6	V
Power Supply for Digital IO	IOVDD	Ta=25 °C	1.65	1.8	3.6	V
Input Signal "H" Level	V <sub>IH</sub>	-	0.7IOVDD	-	IOVDD	V
Input Signal "L" Level	V <sub>IL</sub>	-	0	-	0.3IOVDD	V
Output Signal "H" Level	V <sub>OH</sub>	I <sub>OH</sub> =-1.0mA	0.8IOVDD	-	IOVDD	V
Output Signal "L" Level	V <sub>OL</sub>	I <sub>OL</sub> =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**

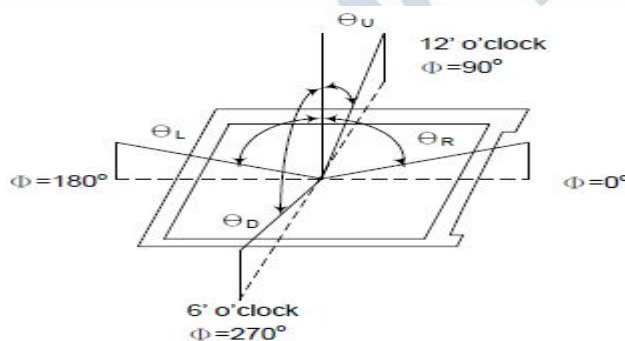
Item	Symbol	Values		Unit	Remark
		type	Max.		
MIPI 2-Lane Interface					
Normal(Still) Mode	I <sub>CC1</sub>	40	60	mA	Note1
Standby Mode	I <sub>CC1</sub>	-	150	uA	Note2

4.OPTICAL CHA

( $T_a=+25^{\circ}\text{C}$ ,  $V_{CI}=+2.85\text{V}$   $\text{IOVCC}=+1.8\text{V}$ ,  $I_B=20\text{mA}$ )

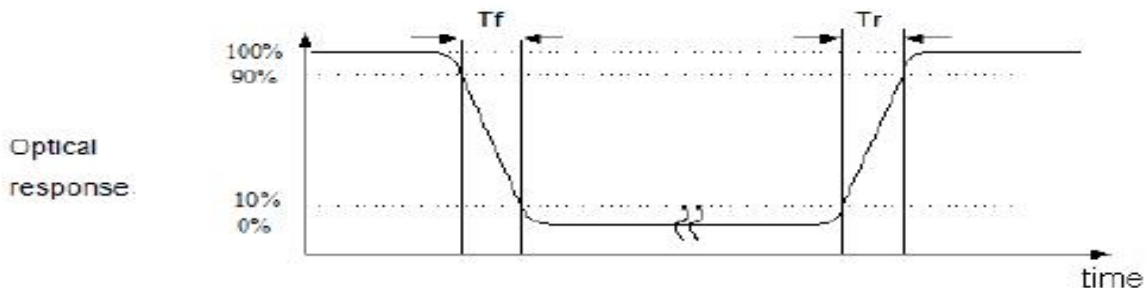
Item	Symbol	Condition	Values			Unit	Remark	
			Min.	Typ.	Max.			
Viewing Angle Range	Left	$\theta_L$	$\text{CR} \geq 10$	40	45	-	degree	Note 1
	Right	$\theta_R$		40	45	-		
	Top	$\Phi_T$		45	50	-		
	Bottom	$\Phi_B$		15	20	-		
Response Time	$T_{\text{on}} + T_{\text{off}}$	Normal $\theta = \Phi = 0^{\circ}$	-	30	-	ms	Note 2	
Contrast Ratio	CR	Normal $\theta = \Phi = 0^{\circ}$	-	250	-	-	Note 3	
Luminance	L	Normal $\theta = \Phi = 0^{\circ}$	-	200	--	$\text{cd/m}^2$	Note 4	
Color Chromaticit	White	X	Normal $\theta = \Phi = 0^{\circ}$	-0.02	0.310	+0.02	-	Note 5
		Y		0.320				
Transmittance	Trans		-	5%		-	Note7 Normal POL	

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 luminance

Measured at the center area of the panel when LCD panel is driven at "white" state.

Note 5: 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 7:

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