

1. GENERAL SPECIFICATION

1.1 Description

The G02404AL01A3(GD3104) 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 2.4inches 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

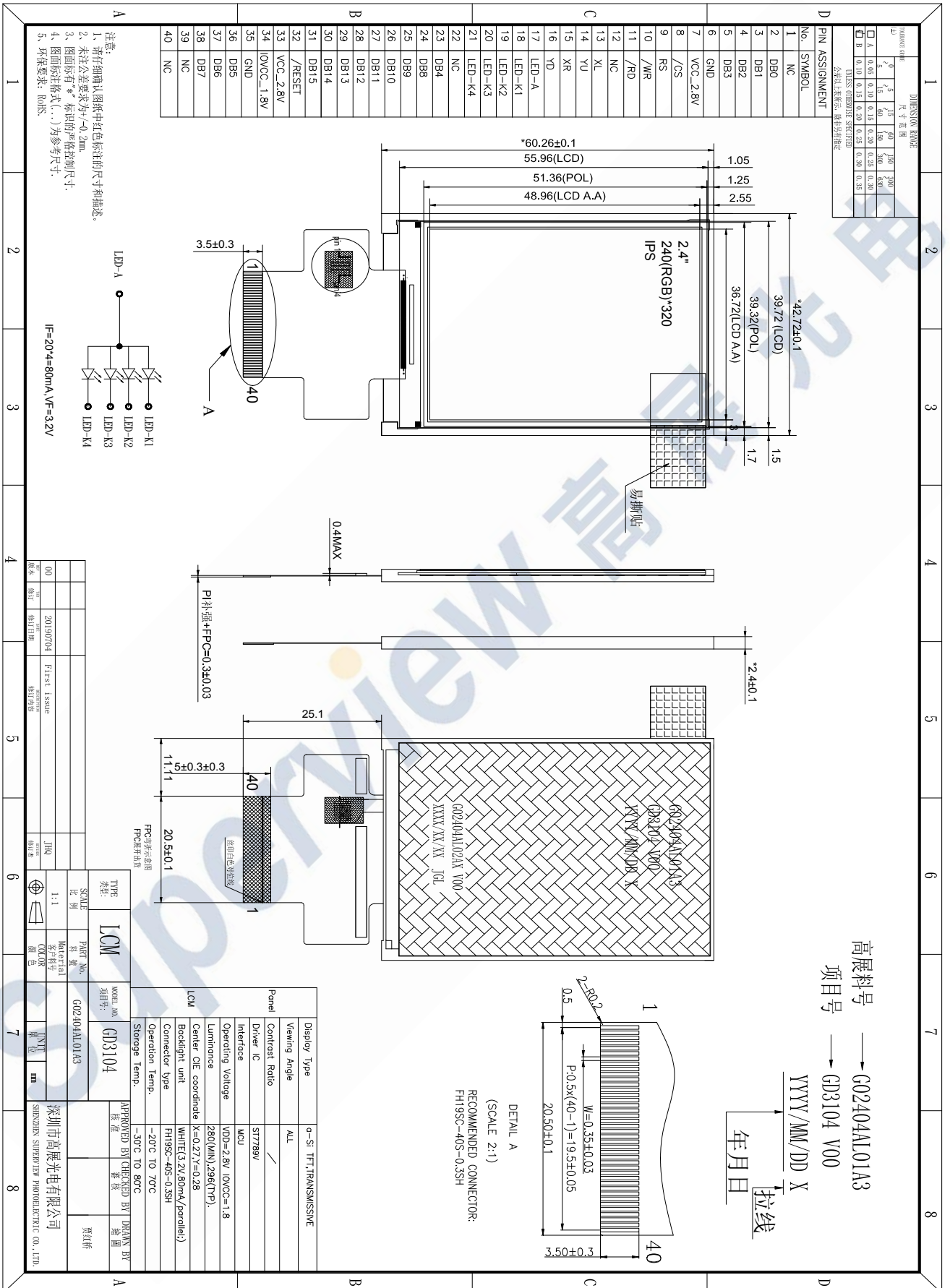
- Display terminals for Toys

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 Black, Transmissive	-	-
5	Display Number of Colors	262K	-	-
6	Viewing Direction	Best Image View: ALL	-	Note
7	Contrast Ratio	640(Min), 800(Typ)	-	-
8	Luminance	280(MIN)	cd/m2	-
9	Module Size	42.72(W) x 60.26(L) x 2.4(T)	mm	Note
10	Active Area	36.72(W) x 48.96(L)	mm	Note
11	Pixel Pitch	0.153(W) x 0.153 (L)	mm	-
12	Weight	TBD(TYP)	g	-
13	Driver IC	ST7789V	-	-
14	Light Source	4 White LEDs	-	-
15	Interface	MCU	-	-
16	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 _{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.		
MIPI 2-Lane Interface					
Normal(Still) Mode	I _{CC1}	40	60	mA	Note1
Standby Mode	I _{CC1}	-	150	uA	Note2

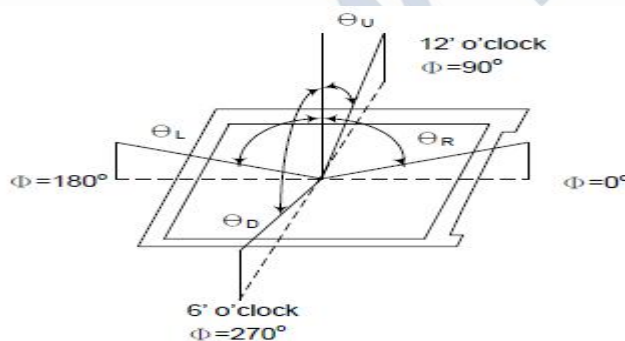
Fig 3.3.2. 8080-Series Parallel Bus Protocol, Write to Register or Display RAM

4.OPTICAL CHA

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

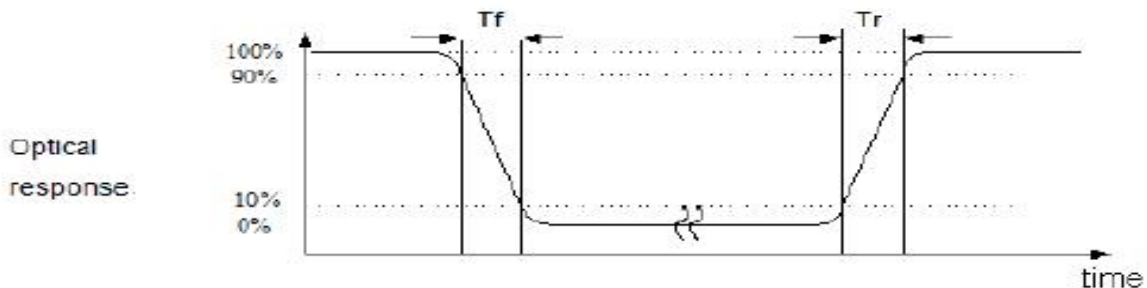
Item	Symbol	Condition	Values			Unit	Remark	
			Min.	Typ.	Max.			
Viewing Angle Range	Left	θ_L	$CR \geq 10$	40	45	-	degree	Note 1
	Right	θ_R		40	45	-		
	Top	Φ_T		45	50	-		
	Bottom	Φ_B		15	20	-		
Response Time		$T_{on} + T_{off}$	Normal $\theta = \Phi = 0^{\circ}$	-	25	40	ms	Note 2
Contrast Ratio		CR	Normal $\theta = \Phi = 0^{\circ}$	350	500	-	-	Note 3
Luminance		L	Normal $\theta = \Phi = 0^{\circ}$		330	--	cd/m ²	Note 4
Color Chromaticit	White	X	Normal $\theta = \Phi = 0^{\circ}$	-0.03	0.299	+0.03	-	Note 5
		Y			0.330			
Transmittance		Trans		-	5.1%		-	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