				3.2 寸液晶显示屏 **3.2 Inch LCD Display Screen**
File NO.		**REV**	**A/01**	

SPECIFICATION
FOR

Module:YS-T0320H23N-03C1 (V1.0)

Designed by	R&D Checked by	Quality Department by	Approved by

Approval by Customer:

OK

NG, Problem survey

Approved By_____

Revision Record

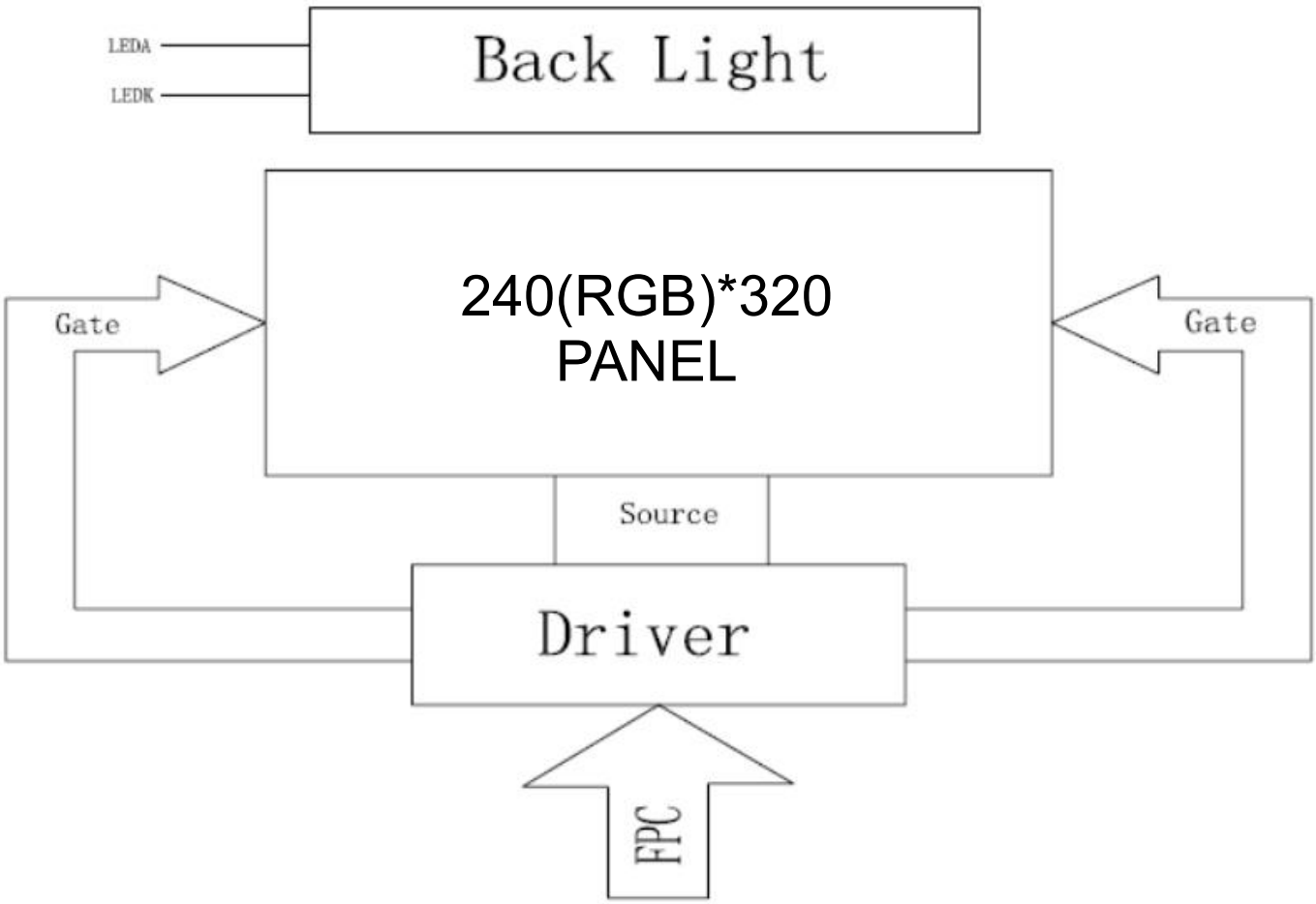
REV NO.	REV DATE	Contents Before Change	Contents After Change	Note
V1.0	2025/01/09	NEW ISSUE By GSH;		

Contents

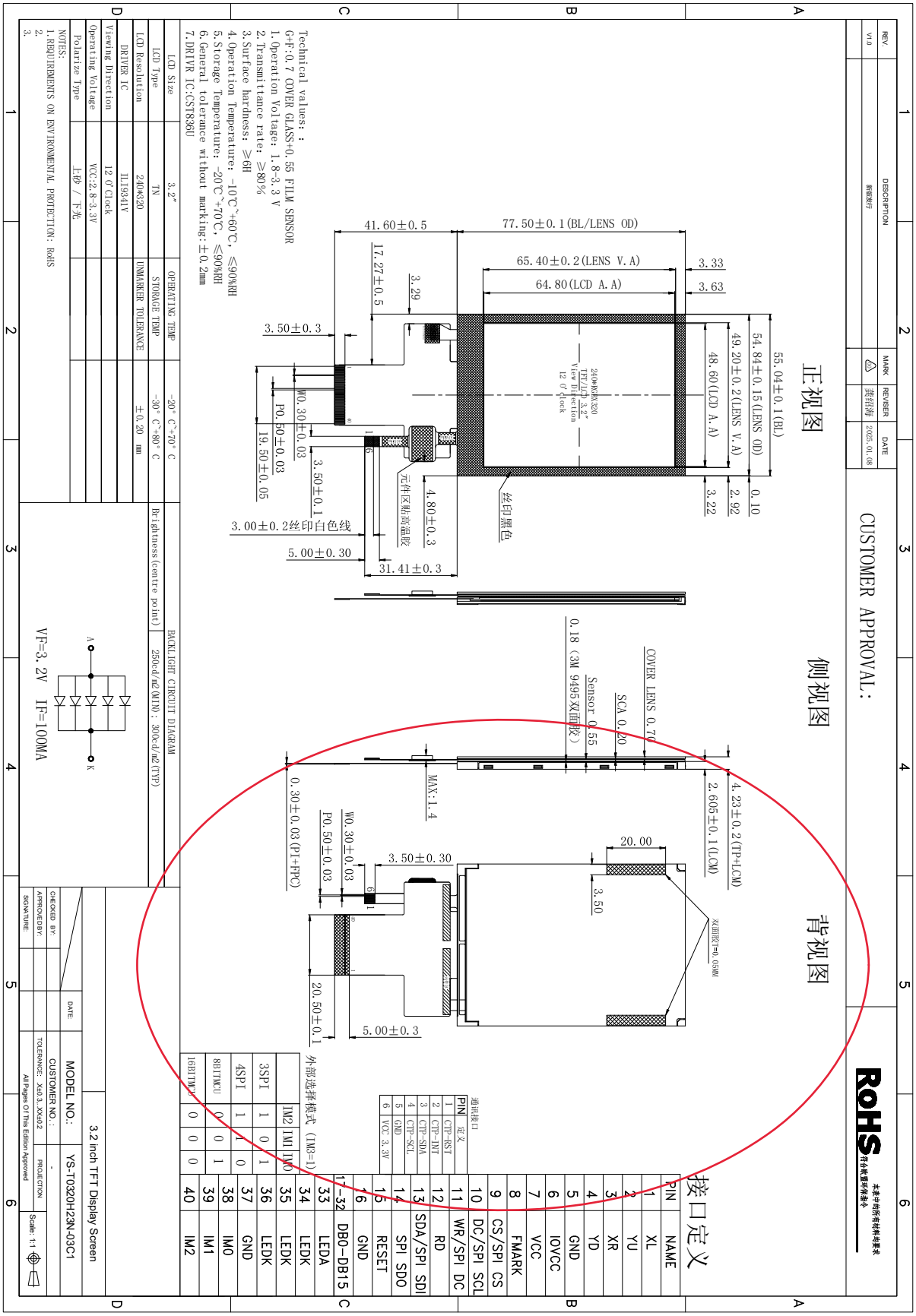
1. Technical parameters

ITEM	STANDARD VALUES	UNITS
LCD type	3.2TFT	--
Dot arrangement	240(RGB)×320	dots
Color filter array	RGB vertical stripe	--
Display mode	TN / Transmission / Normally White	-
Eyes Viewing Direction	12 O'clock	--
Driver IC	ILI9341V	--
Module size	55.04(W)×77.50(H)×4.23(T)(Exclude FPC)	mm
Active area	48.60(W)×64.80(H)	mm
Interface	MCU/SPI	--
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Back Light	White LED*5	--

2. Block Dimension



3. Outline Dimension



4. Input terminal Pin Assignment Description

PIN NO.	PIN NAME	DESCRIPTION
1	XL	TP X-
2	YU	TP Y+
3	XR	TP X+
4	YD	TP Y-
5	GND	System power ground.
6	IOVCC	IOVCC power input
7	VCC	VCC power input
8	FMARK	Tearing effect output pin to synchronize MPU to frame writing,
9	CS/SPI CS	Chip select input pin (“Low” enable).
10	DC/SPI SCL	Serves as command or parameter select.
11	WR/SPI DC	NC1.Write enable pin I80 parallel bus system interface; 2.Display data/command selection pin in 4-line serial interface;
12	RD	Read enable pin I80 parallel bus system interface.
13	SDA/SPI SDI	Serial input signal in SPI I/F.
14	SPI SDO	The data is outputted on the falling edge of the SCL signal.
15	RESET	Reset signal input terminal, active at ‘L’.
16	GND	System power ground.
17-32	DB0-DB15	Data.
33	LEDA	Power supply for backlight anode input terminal.
34-36	LEDK	Power supply for backlight cathode input terminal.
37	GND	System power ground.
38	IM0	外部选择模式（IM3=1） IM2 IM1 IM0 3SPI 1 0 1 4SPI 1 1 0 8BITMCU 0 0 1 16BITMCU 0 0 0
39	IM1	
40	IM2	

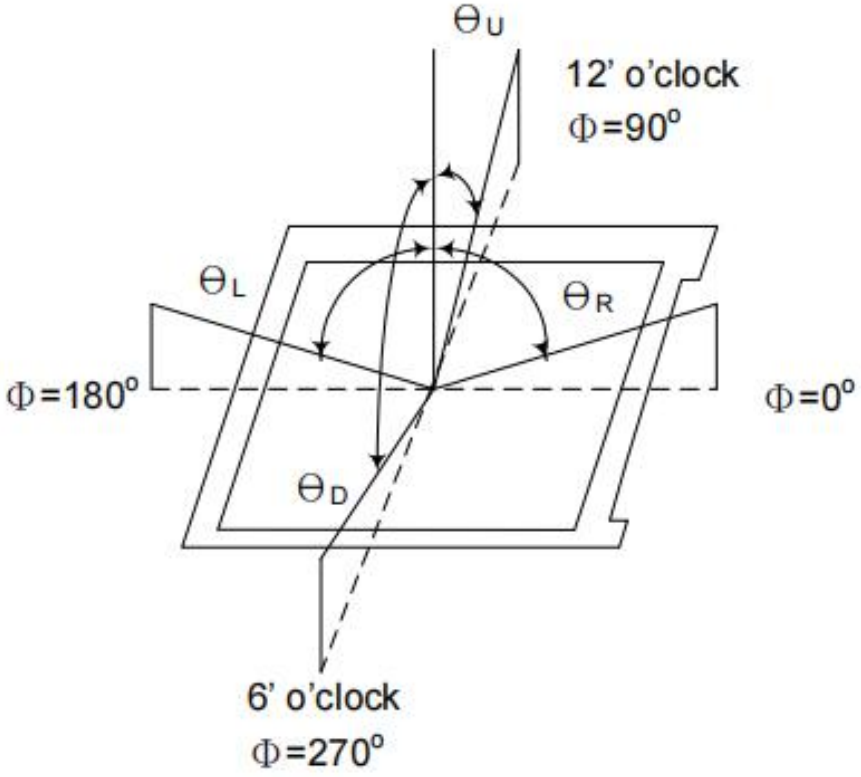
4.2 TP Pin Description

PIN NO.	PIN NAME	DESCRIPTION
1	RST	External Reset, Low is active
2	INT	External interrupt to the host
3	SDA	I2C data input and output
4	SCL	I2C clock input
5	GND	Ground for logic.
6	VDD	VDD power input

5. LCD Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Transmittance (without Polarizer)		T(%)	—	—	18.0	—	%	
Contrast Ratio		CR	Θ=0 Normal viewing angle	400	500	—	—	(1)(2)
Response Time	Rising	T_R		—	4	8	msec	(1)(3)
	Falling	T_F		—	12	24		
Color Gamut		S(%)			60		%	
Color Chromaticity (CIE1931)	White	W_x		-	TBD	-		(1)(4) CF glass
		Wy		-	TBD	-		
	Red	Rx		-	TBD	-		
		Ry		-	TBD	-		
	Green	Gx		-	TBD	-		
		Gy		-	TBD	-		
	Blue	Bx		-	TBD	-		
		By		-	TBD	-		
Viewing Angle	Hor.	$Θ_L$	CR>10	35	45	—		Viewing Angle base on using normal Polarizer，Reference Only
		$Θ_R$		35	45	—		
	Ver.	$Θ_U$		35	45	—		
		$Θ_D$		10	20	—		
Optima View Direction		12 O'clock						(5)

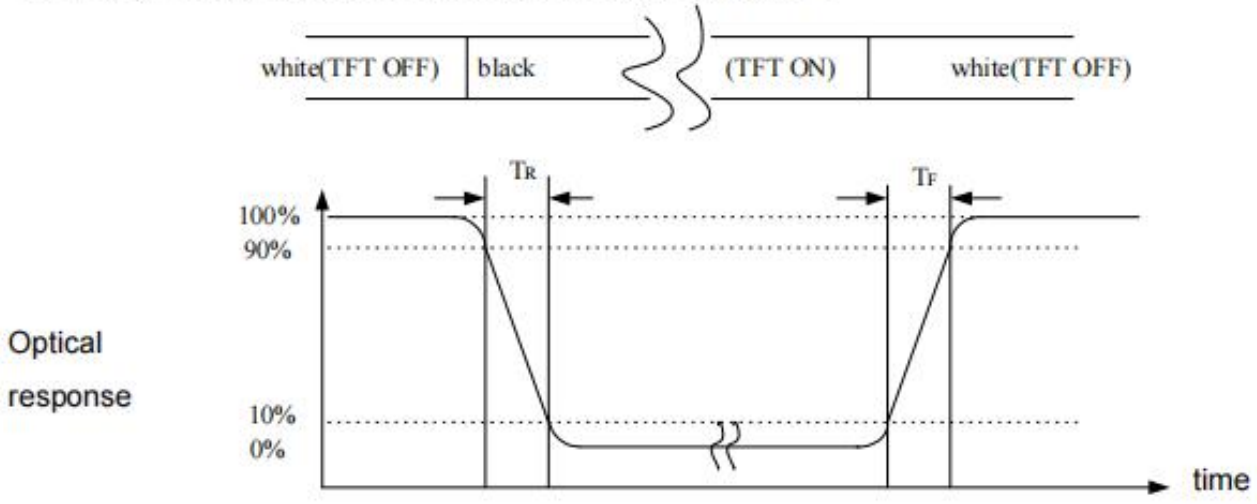
Note (1) Definition of Viewing Angle:



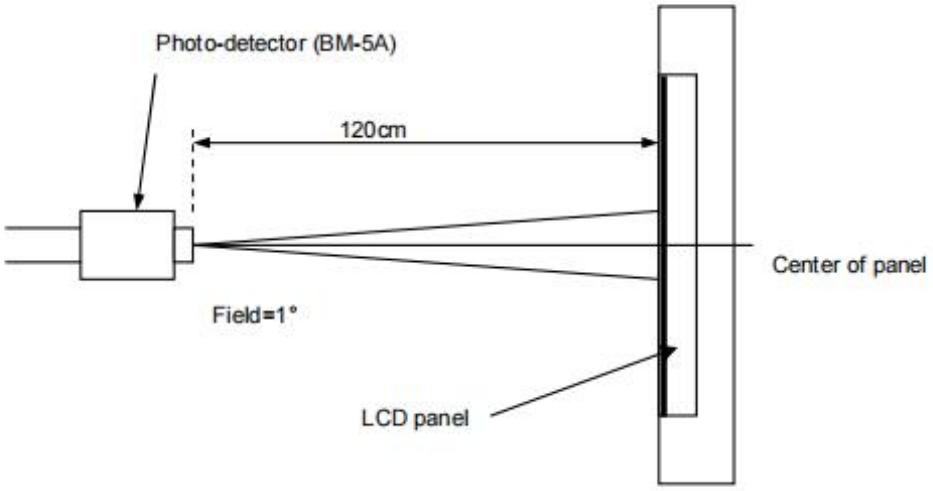
Note (2) Definition of Contrast Ratio (CR):
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

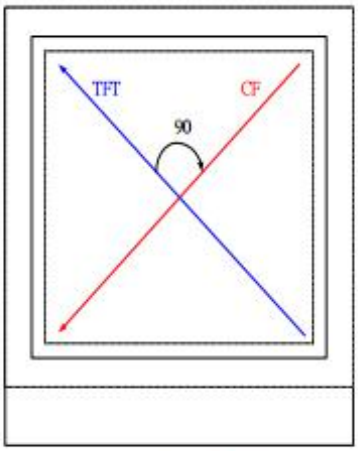
Note (3) Definition of Response Time: Sum of T_R and T_F



Note (4) Definition of optical measurement setup



Note (5) Rubbing Direction (The different Rubbing Direction will cause the different view direction.



TFT Face up

6. TFT Electrical Characteristics

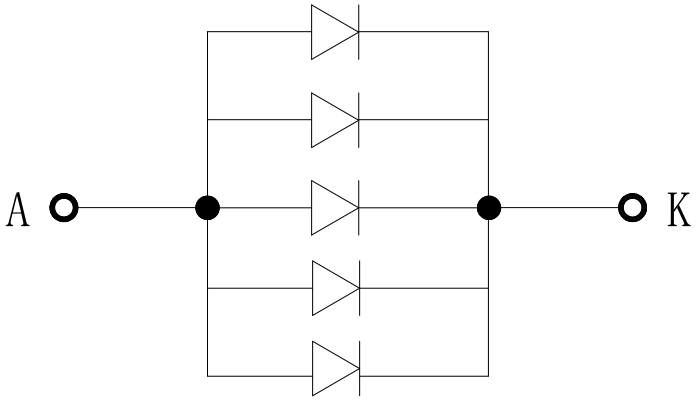
6.1 Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	VDD	-0.3	4.0	V
Input Voltage	Vin	-0.3	VDD+0.3	V
Operating Temperature	TOP	-20	70	°C
Storage Temperature	TST	-30	80	°C
Storage Humidity	HD	20	90	%RH

6.2 DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Logic Supply Voltage	VDD	2.5	2.8	3.6	V	-
Input High Voltage	V_{IH}	0.7VDD	-	VDD	V	-
Input Low Voltage	V_{IL}	GND	-	0.3 VDD	V	-
Output High Voltage	V_{OH}	0.8 VDD	-	VDD	V	-
Output Low Voltage	V_{OL}	GND	-	0.2 VDD	V	-
I/O Leak Current	ILI	-1	-	1	uA	-
Supply Current	IDD	-	TBD	-	mA	-

6.3 LED Backlight Characteristics



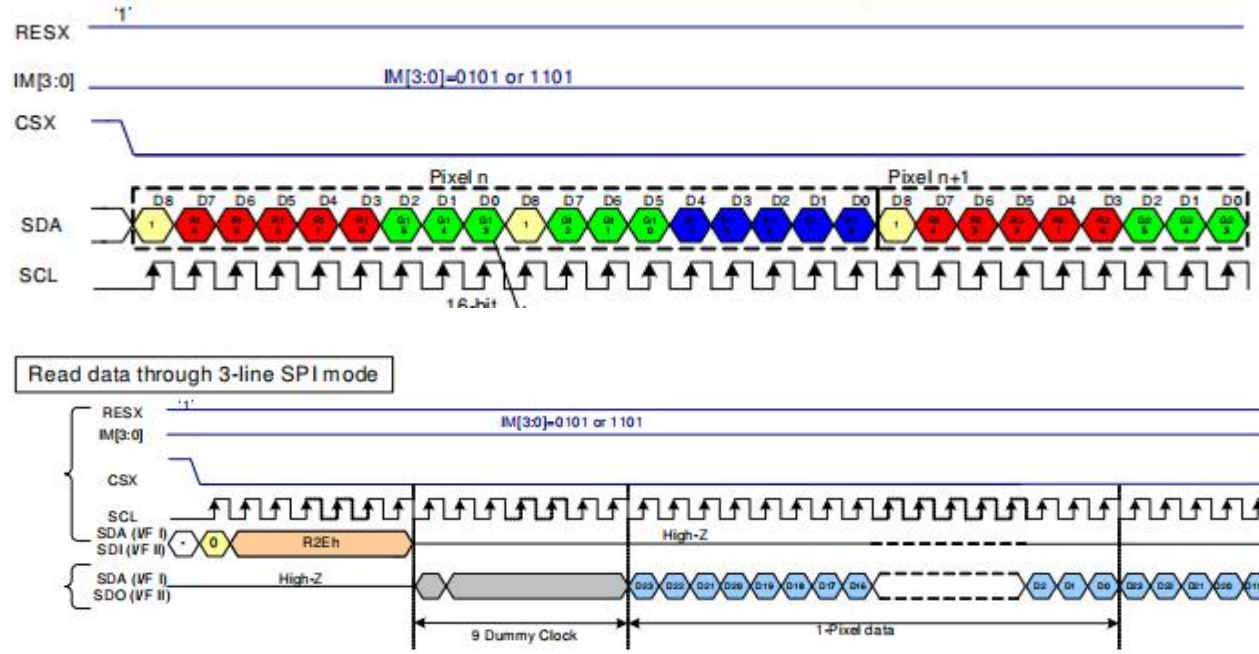
VF=3.2V IF=100MA

Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	Vf	2.8	3.2	3.6	V	If=100mA
Supply Current	If	-	100	-	mA	-
Luminous Intensity for LCM+TP	-	-	300	-	cd/m^2	If=100mA
Uniformity for LCM	-	-	60	-	%	If=100mA
Life Time	-	-	50000	-	Hr	If=100mA
Backlight Color	White					

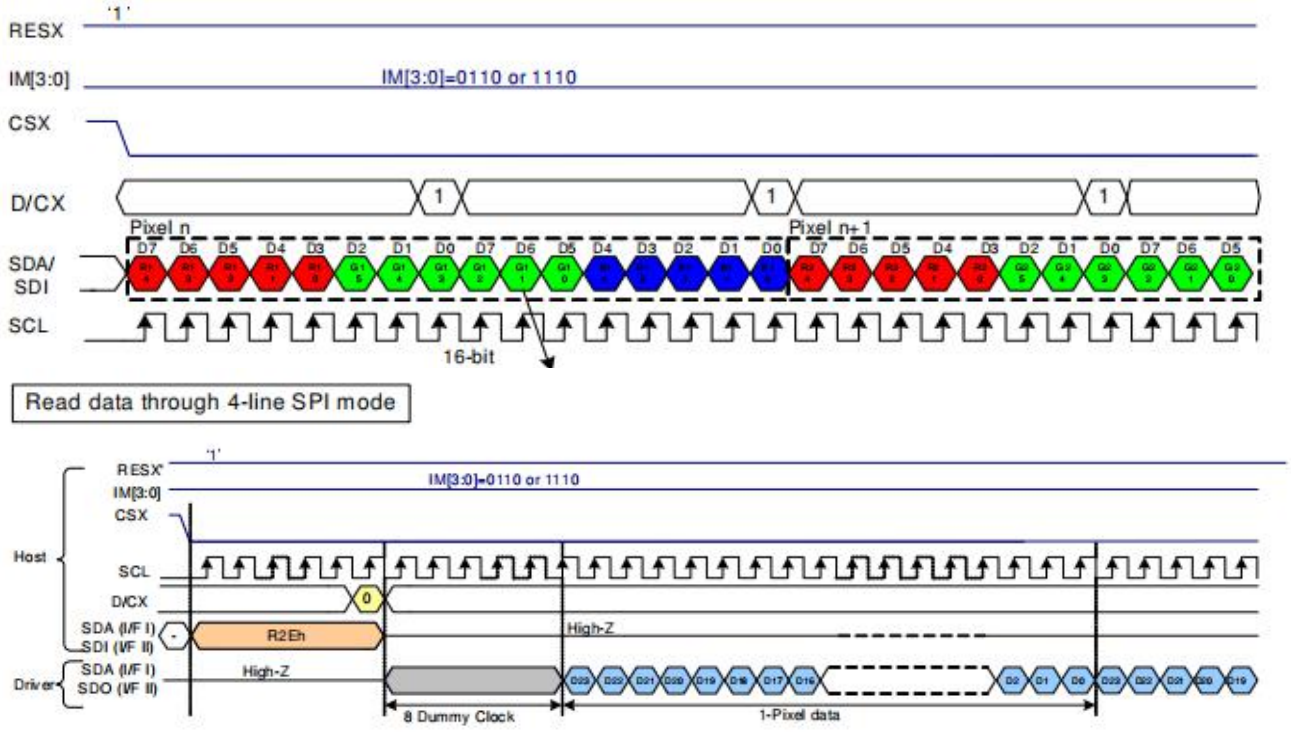
7. Timing Characteristics

7.1 TFT Timing Characteristics

7.1.1 Display Serial Interface Timing Characteristics (system3-line Serial Interface)



7.1.2 Display Serial Interface Timing Characteristics (4-line Serial Interface)



7.1.3 Display Serial Interface Timing Characteristics (MCU 8080 system)

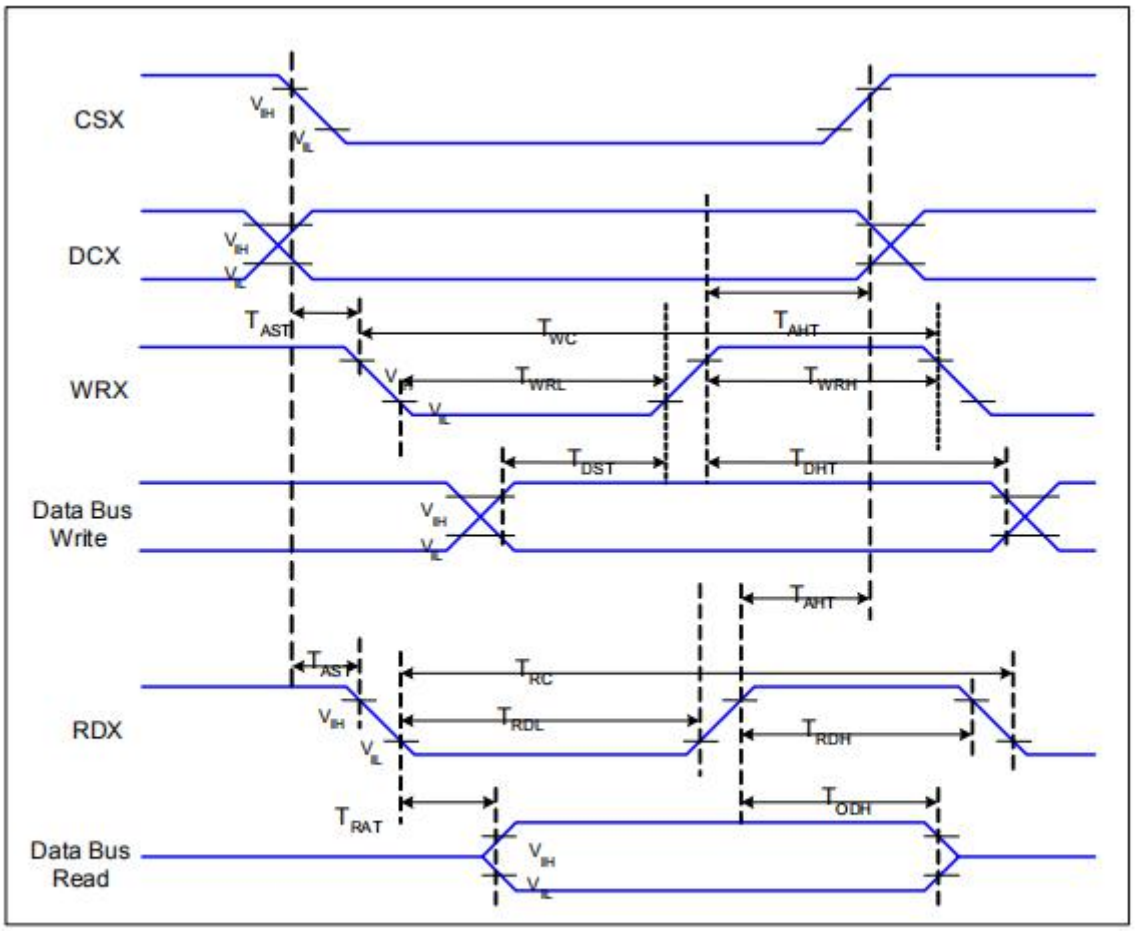


Figure 2 Parallel Interface Timing Characteristics (8080-Series MCU Interface)

VDDI=1.65 to VDD, VDD=2.5 to 3.3V, AGND=DGND=0V, Ta=25 ℃

Signal	Symbol	Parameter	Min	Max	Unit	Description
DCX	TAST	Address Setup Time	0	--	ns	
	TAHT	Address Hold Time (Write/Read)	2	--	ns	
WRX	TWC	Write Cycle	75	--	ns	
	TWRH	Control Pulse "H" Duration	25	--	ns	
	TWRL	Control Pulse "L" Duration	30	--	ns	
RDX	TRC	Read Cycle (ID)	450	--	ns	When Read ID Data
	TRDH	Control Pulse "H" Duration (ID)	250	--	ns	
	TRDL	Control Pulse "L" Duration (ID)	170	--	ns	

Signal	Symbol	Parameter	Min	Max	Unit	Description
DB[17:0]	TDST	Data Setup Time	20	--	ns	TRAT, TRATFM: 3K ohm Pull up or Down and 30pF Parallel Cap. To GND. TODH: 3K ohm Pull up or Down.
	TDHT	Data Hold Time	10	--	ns	
	TRAT	Read Access Time (ID)	--	150	ns	
	TODH	Output Disable Time	10	--	ns	

Table 3 8080 Parallel Interface Characteristics

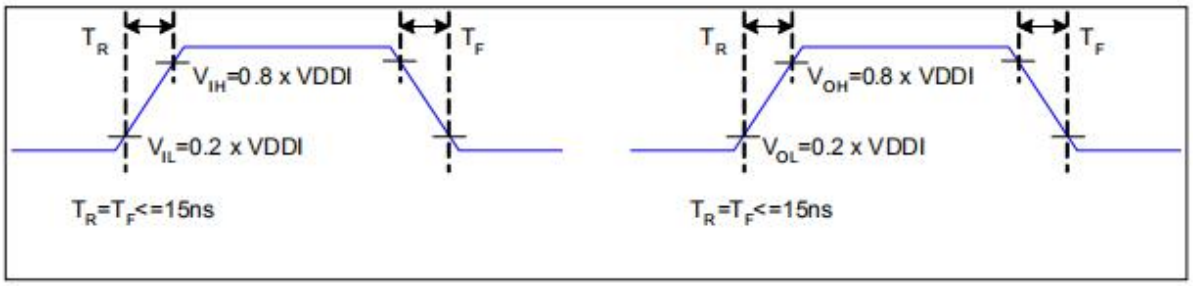
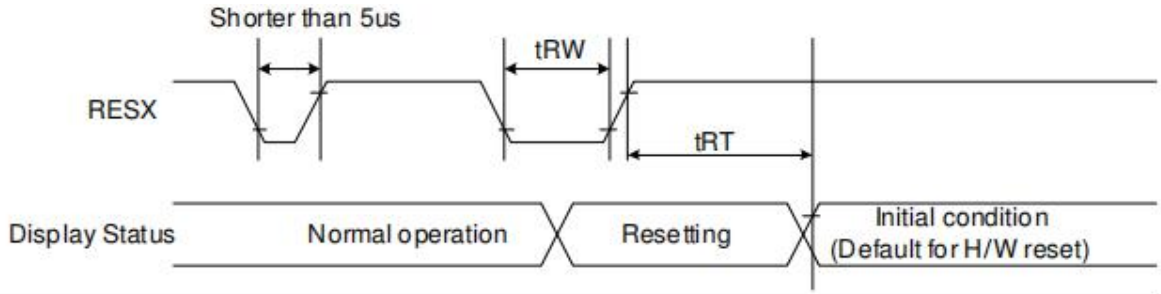


Figure 3 Rising and Falling Timing for I/O Signal

Note: The rising time and falling time (Tr, Tf) of input signal and fall time are specified at 15 ns or less. Logic high and low levels are specified as 20% and 80% of VDDI for Input signals.

7.1.2 Reset Timing Characteristics



Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		uS
	tRT	Reset cancel		5 (note 1,5)	mS
				120 (note 1,6,7)	mS

7.1.3 Power on/off timing sequence
check the IC datasheet!

7.2 TP Timing Characteristics

TBD

8. Inspection Standard

8.1 Incoming Inspection and Standard:

The below incoming inspection are applied to the TFT LCM Modules supplied by ShenZhen Yes-Display International Technology CO.,LTD. The customers should inspect the LCM within 14 days after receiving the goods. The result of inspection should be notified to the Seller in the writing copy promptly, if the customer do not send them within 14 days, the seller has the right to judge as acceptance of goods. The inspection lot size is treated as the quantity per shipment and per model. The sampling plan shall be inspected under MIL-STD015E in Level II by single sampling. The acceptable quality level (AQL) are categorized as below grades:

CRITICAL= 0.4%, MAJOR= 0.65%, MINOR= 1.5%

8.2 Inspection condition and Warranty policy:

The delivered LCM should be stored properly, ideally under climate-controlled environment at 25 (±5) degree Celsius as well as 60% (±10) Relative Humidity. The LCM shall be inspected in the viewing angle of 45 degree from the four major angles (U/D/L/R) under the single fluorescent lamp of 20W (equal to 300 to 500 lux). For warranty, ShenZhen Yes-Display International Technology CO.,LTD. will provide 12 months of warranty period as standard, and provide the new replacement for the defective products which belong to the Seller's responsibility verified by the quality department.

8.3 Inspection Criteria:

8.3.1 Critical defect

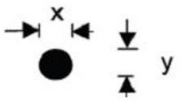
Item No.	Inspection content	Judgement
8.3.1.1	Functional defects	No display, abnormal display, short circuit, missing line, off-contrast and chromaticity, Touch Panel non-function
8.3.1.2	Model mixed	Other model mixed

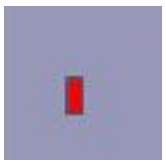
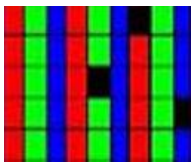
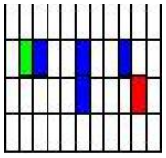
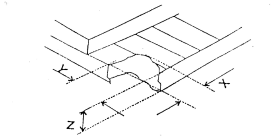
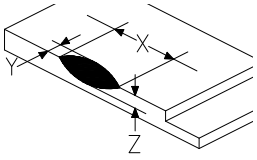
8.3.2 Major defect:

Item No.	Inspection content	Judgement
8.3.2.1	Product indication	Missing model no. and wrong model no. is indicated on the LCM.
8.3.2.2	Glass cracking	The LCD and touch panel glass crack or breakage

8.3.2.3	Missing component	The function component missing such as connector, cable, etc.

8.3.3 Minor defect (LCD) :

Item No.	Inspection content	Judgement
8.3.3.1	Black/White spot Foreign particles Dust in the cell	$\varphi=(x+y)/2$  Diameter (mm) / Acceptable Q'ty Φ ≦ 0.1 : Ignore 0.1 < Φ ≦ 0.25 : 3 (Distance>5mm) 0.25 < Φ : Not allowed
8.3.3.2	Linear defect Black/white line Black/white scratch	Length(mm) / Width (mm) / Acceptable Q'ty — / W ≦0.03 / Ignore L≦ 5.0 / 0.03 <W≦0.07 / 3 — / 0.07 <W / Follow 8.3.3.1
8.3.3.3	Polarizer Bubbles Dent on polarizer	Diameter (mm) / Acceptable Q'ty Φ ≦ 0.2 : Ignore 0.2 < Φ ≦ 0.5 : 2 (Distance>5mm) 0.5 < Φ : Not allowed

8.3.3.4	Electrical Dot defect	**Bright dot and Dark dot definition:**  or   (Two adjacent dot) **Inspection pattern: black, white, red, green, and blue screen.** Items: Bright dot — Acceptable Q'ty: N ≦ 4 (Distance >5mm) Items: Dark dot — Acceptable Q'ty: N ≦ 4 (Distance >5mm)
8.3.3.5	Glass Defect-Corner chipping	 Size(mm): X≦3mm, Y≦S , Z≦ T (S= ITO length, T=Single glass thickness) — Judgement: Accept
8.3.3.6	Glass Defect-Side fragment	 Size(mm): X≦2 mm, Y≦ border edge; Z≦T (T= single glass thickness) — Judgement: Accept

8.3.4 Minor defect (Touch Panel)

Item No.	Inspection content	Judgement

8.3.4.1 Scratch, dust, particles, foreign materials in "linear type"

Size (mm)	Acceptable Q'ty
W≦0.05mm, L≦10mm	Ignore
0.05mm<W ≦ 0.07mm, L ≦ 10mm	3
W>0.07mm	Reject

8.3.4.2 Scratch, dust, particles, foreign materials in "round type"

Diameter (mm)	Acceptable Q'ty
Φ≦ 0.25mm	Ignore
0.25mm<Φ≦ 0.35mm	5
Φ > 0.35mm	Reject

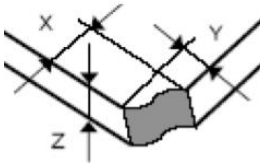
8.3.4.3 Air bubbles

Diameter (mm)	Acceptable Q'ty
Φ≦ 0.2mm	Ignore
0.2mm<Φ≦ 0.5mm	3
Φ > 0.5mm	Reject

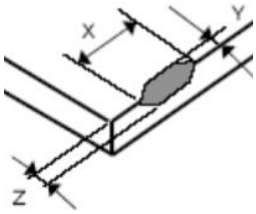
8.3.4.5 Scratch on printing area

Size (mm)	Acceptable Q'ty
W≦0.03mm, L≦5 mm	Ignore
0.03mm<W≦0.05mm, L≦5mm	3
W>0.05mm or L> 5mm	Reject

8.3.4.6 Corner chipping



Size(mm)	Judgement
X≦2mm, Y≦2mm Z<1/2T (T= single glass thickness)	Accept

8.3.4.7	**Edge chipping**	

Size(mm)	**Judgement**
X≦3 mm, Y≦3 mm **Z≦1/2 T** **(T= single glass thickness)**	**Accept**

9. Reliability Test Conditions and Methods

9.1 Reliability Test Conditions and Methods:

NO.	TEST ITEMS	TEST CONDITION	INSPECTION AFTER TEST
①	High Temperature Storage	80°C±2°C×96Hours	Inspection after 2~4hours storage at room temperature, the samples should be free from defects: 1, Air bubble in the LCD. 2, Seal leak. 3, Non-display. 4, Missing segments. 5, Glass crack. 6, Current IDD is twice higher than initial value. 7, The surface shall be free from damage. 8, The electric characteristic requirements shall be satisfied.
②	Low Temperature Storage	-30°C±2°C×96Hours	
③	High Temperature Operating	70°C±2°C×96Hours	
④	Low Temperature Operating	-20°C±2°C×96Hours	
⑤	Temperature Cycle(Storage)	-20°C ⟺ 25°C ⟺ 70°C (30min) (5min) (30min) 1cycle Total 10cycle	
⑥	Damp Proof Test (Storage)	50°C±5°C×90%RH×96Hours	
⑦	Vibration Test	Frequency:10Hz~55Hz~10Hz Amplitude:1.5MM X,Y,Z direction for total 3hours (packing condition test will be tested by a carton)	
⑧	Drooping Test	Drop to the ground from 1M height one time every side of carton. (packing condition test will be tested by a carton)	
⑨	ESD Test	Voltage:±8KV,R:330Ω,C:150PF,Air Mode,10times	

REMARK:

1, The Test samples should be applied to only one test item.

2, Sample side for each test item is 5~10pcs.

3,For Damp Proof Test, Pure water(Resistance＞10MΩ)should be used.

4,In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.

5, EL evaluation should be accepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.

6, Failure Judgment Criterion: Basic Specification Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

10. Cautions and Handling Precautions

10.1 Mounting method

The LCD panel of TFT module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

10.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent

[Recommended below] and wipe lightly

- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:

- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (Cl) , Sulfur (S)

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (Cl), Sulfur (S) from customer, Responsibility is on customer.

10.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:

Connect any unused input terminal to power or ground, do not input any signals before power is turned on, and ground your body, work/assembly areas, and assembly equipment to protect against static electricity.

10.4 packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

10.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- Slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

10.6 storing

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it. And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.

[It is recommended to store them as they have been contained in the inner container at the time of delivery from us

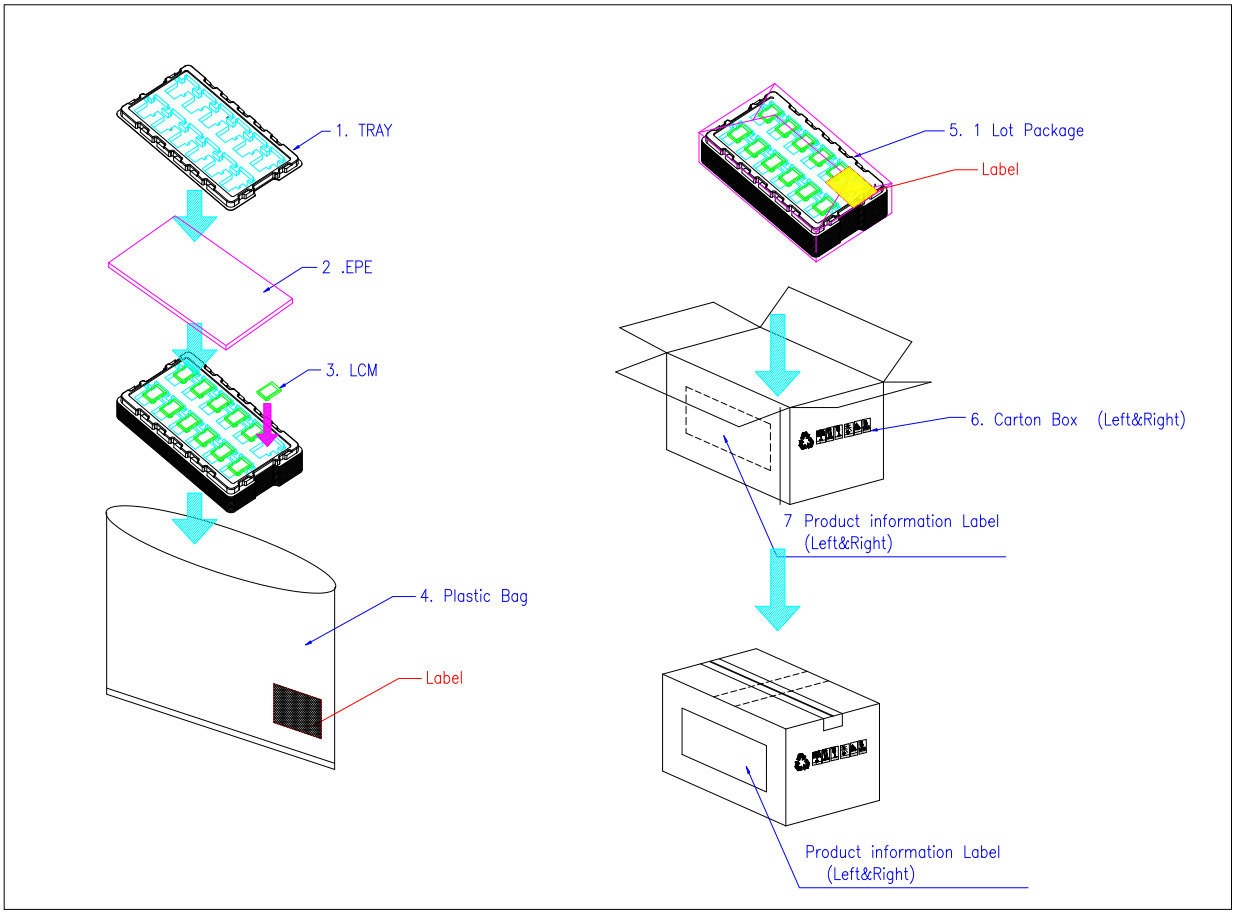
10.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.

- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water

11. Packing Method

11.1 Method



11.2 Packing Label

TBD