SPECIFICATION

Product Model: PV05025Y0130W-CT

DESIGNED	CHECKED	Approved
研发部 2023.03.11 Aleck	研发部 2023.03.11 Hones	研发部 2023.03.11 Mike

For Customer's Acceptance：

Comments:	Approved by：

Revision Record

Rev NO.	Rev Date	Contents	Note
V0	2022.10.16	New Issue	

Table of Contents

1. Scope

This specification defines general provisions as well as inspection standards for TFT module supplied by Kingtech Group Co.,Ltd.
If the event of unforeseen problem or unspecified items may occur, naturally shall negotiate and agree to solution.
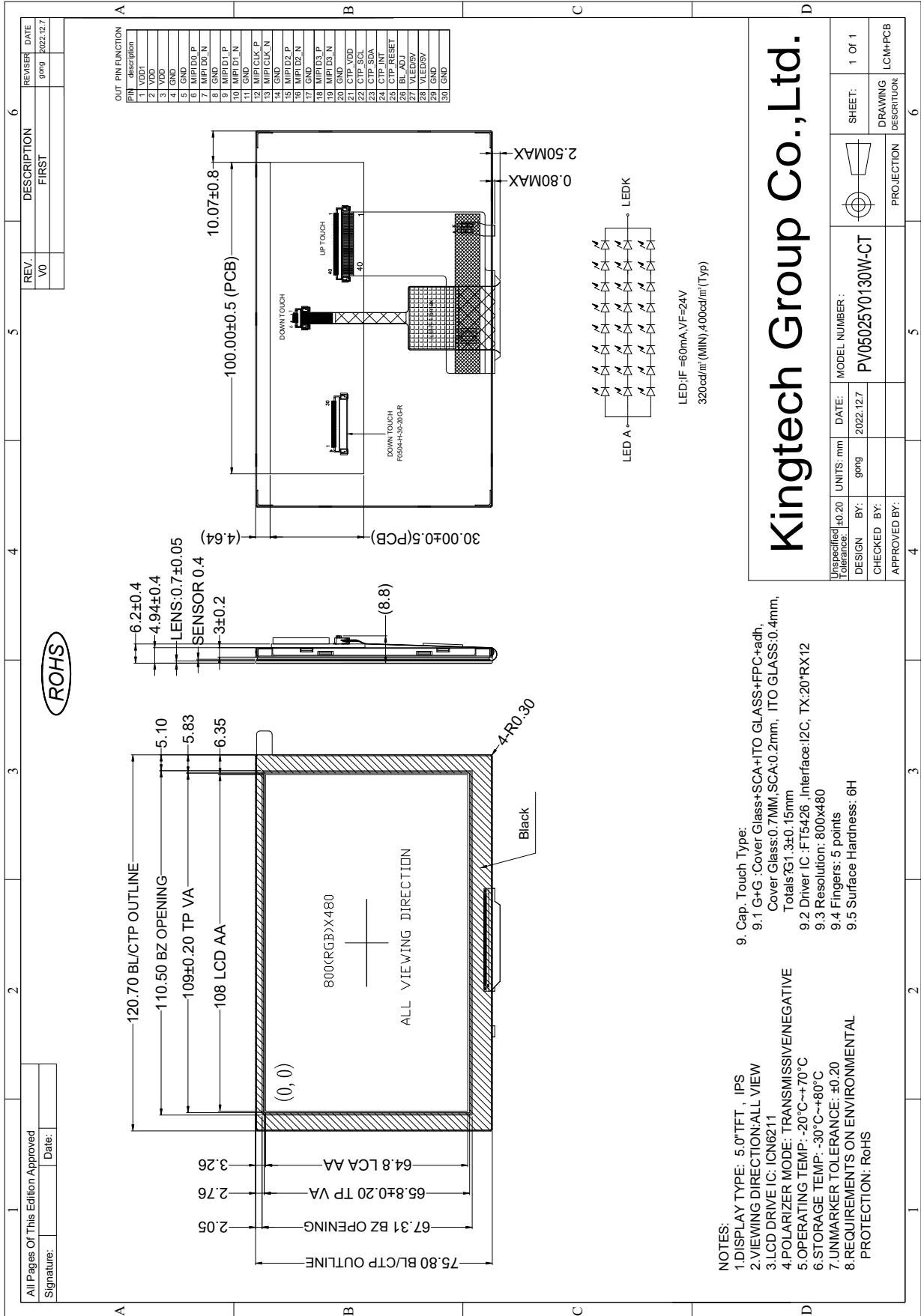
2. General Information

2.1 LCM

Item	Standard Values	Unit
LCD type	5.0" TFT	
Dot arrangement	800×R.G.B.×480	dots
Color filter array	RGB vertical stripe	
Display mode	Normally Black	
Driver IC	ICN6211	
Module size	120.7(W)×75.8(H)×8.8(T)	mm
Active area	108(W)×64.8(H)	mm
Interface	MIPI-2/4 lane	
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Weight	TBD	g

2.2 CTP

Item	Standard Values	Unit
Touch Panel Size	5.0"	
Touch type	Projective capacitive touch panel	
Input Method	Finger / 5 Points touch	
Output Interface	I2C	
Hardness	≧6H	
IC	FT5426	
I2C Address (7 Bits)	0x38	
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C

3. External Dimensions

OUT PIN FUNCTION

PIN	description
1	VDD1
2	VDD
3	VDD
4	GND
5	GND
6	MIPI D0_P
7	MIPI D0_N
8	GND
9	MIPI D1_P
10	MIPI D1_N
11	GND
12	MIPI CLK_P
13	MIPI CLK_N
14	GND
15	MIPI D2_P
16	MIPI D2_N
17	GND
18	MIPI D3_P
19	MIPI D3_N
20	GND
21	CTP_VDD
22	CTP_SCL
23	CTP_SDA
24	CTP_INT
25	CTP_RESET
26	BL_ADJ
27	VLED5V
28	VLED5V
29	GND
30	GND

LED:IF =60mA,VF=24V
320cd/m² (MIN),400cd/m²(Typ)

10.07±0.8
100.00±0.5 (PCB)
2.50MAX
0.80MAX
30.00±0.5(PCB)
(4.64)

6.2±0.4
4.94±0.4
LENS:0.7±0.05
SENSOR 0.4
3±0.2
(8.8)

ROHS

5.10
5.83
6.35
4-R0.30
Black

120.70 BL/CTP OUTLINE
110.50 BZ OPENING
109±0.20 TP VA
108 LCD AA

800(RGB)×480

ALL VIEWING DIRECTION

(0, 0)

3.26
2.76
2.05
64.8 LCA AA
65.8±0.20 TP VA
67.31 BZ OPENING
75.80 BL/CTP OUTLINE

UP TOUCH
40
DOWN TOUCH
F0504-H-30-20-G-R
30
LEDK
LED A

NOTES:
1. DISPLAY TYPE: 5.0"TFT , IPS
2. VIEWING DIRECTION:ALL VIEW
3. LCD DRIVE IC: ICN6211
4. POLARIZER MODE: TRANSMISSIVE/NEGATIVE
5. OPERATING TEMP: -20°C~+70°C
6. STORAGE TEMP: -30°C~+80°C
7. UNMARKER TOLERANCE: ±0.20
8. REQUIREMENTS ON ENVIRONMENTAL
   PROTECTION: RoHS

9. Cap. Touch Type:
9.1 G+G :Cover Glass+SCA+ITO GLASS+FPC+adh,
   Cover Glass:0.7MM,SCA:0.2mm, ITO GLASS:0.4mm,
   Totals:G1.3±0.15mm
9.2 Driver IC :FT5426 ,Interface:I2C, TX:20*RX12
9.3 Resolution: 800x480
9.4 Fingers: 5 points
9.5 Surface Hardness: 6H

Kingtech Group Co.,Ltd.

Unspecified Tolerance: ±0.20	UNITS: mm	MODEL NUMBER :
DESIGN BY:	gong	DATE: 2022.12.7
CHECKED BY:		
APPROVED BY:		

MODEL NUMBER : PV05025Y0130W-CT

DATE: 2022.12.7   BY: gong

PROJECTION

SHEET: 1 Of 1

DRAWING DESCRITUON: LCM+PCB

REV.	DESCRIPTION	REVISER	DATE
V0	FIRST	gong	2022.12.7

All Pages Of This Edition Approved
Signature: Date:

4.Pin Assignment
LCM PIN: F0504-H-30-20G-R

Pin	Pin Name	Description	Remark
1	VDD1	Power supply: + 1.8V	
2	VDD	Power supply: + 3.3V	
3	VDD	Power supply: + 3.3V	
4	GND	Ground	
5	GND	Ground	
6	MIPI D0_P	DSI Data differential signal input pins. (Data lane0)	
7	MIPI D0_N	DSI Data differential signal input pins. (Data lane0)	
8	GND	Ground	
9	MIPI D1_P	DSI Data differential signal input pins. (Data lane1)	
10	MIPI D1_N	DSI Data differential signal input pins. (Data lane1)	
11	GND	Ground	
12	MIPI CLK_P	DSI CLOCK differential signal input pins	
13	MIPI CLK_N	DSI CLOCK differential signal input pins	
14	GND	Ground	
15	MIPI D2_P	DSI Data differential signal input pins. (Data lane2)	
16	MIPI D2_N	DSI Data differential signal input pins. (Data lane2)	
17	GND	Ground	
18	MIPI D3_P	DSI Data differential signal input pins. (Data lane3)	
19	MIPI D3_N	DSI Data differential signal input pins. (Data lane3)	
20	GND	Ground	
21	CTP_VDD	Power supply: + 3.3V (T/P)	
22	CTP_SCL	I_2C Clock. (T/P)	
23	CTP_SDA	I_2C Data. (T/P)	
24	CTP_INT	Output interrupt signal for host controller. (T/P)	
25	CTP_RESET	Input reset signal. (T/P)	
26	BL_ADJ	The PWM frequency output for LCD driver control.	
27	VLED/5V	Power supply: + 5V	
28	VLED/5V	Power supply: + 5V	
29	GND	Ground	
30	GND	Ground	

5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Remark
Supply Voltage	VDD	-0.3	3.66	V	
Supply Voltage	VDD1	-0.3	3.66	V	
Supply Voltage	CTP_VDD	-0.3	5.0	V	
VIN Voltage	VDD/5V	-0.3	6	V	

6. DC Characteristics
6.1 LCM Parameters

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Voltage	VDD	3.0	3.3	3.6	V	
	VDD1	1.65	1.8	1.95	V	
	VDD/5V	4.5	5.0	5.5	V	
Input logic high voltage	V_{IH}	880	-	-	mV	
Input logic low voltage	V_{IL}	-	-	550	mV	
Output High Voltage	V_{OH}	0.8*VDD	-	VDD	V	
Output Low Voltage	V_{OL}	GND	-	0.2*VDD	V	
Current for Power	I_{DD}	-	80	140	mA	VDD=3.3V
	I_{DD1}	-	5	8	mA	VDD1=1.8V
	$I_{DD/5V}$	-	300	400	mA	VDD/5V=5V
BL_ADJ Control Level	V_{IH}	1.2		VDD/5V	V	
	V_{IL}	GND		0.4	V	
BL_ADJ Control Frequency	BL_ADJ	5000		100000	Hz	

6.2 CTP Parameters

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Voltage	CTP_VDD	2.8	3.3	3.6	V	
Input logic high voltage	V_{IH}	0.7* CTP_VDD	-	CTP_VDD	V	
Input logic low voltage	V_{IL}	-0.3	-	0.3* CTP_VDD	V	
Output High Voltage	V_{OH}	0.7* CTP_VDD	-	CTP_VDD	V	
Output Low Voltage	V_{OL}	GND	-	0.3* CTP_VDD	V	

7. Timing Characteristics
7.1 DSI Lane Merging
Following figure illustrates the lane merging function for 4-lane, 2-lane separately.
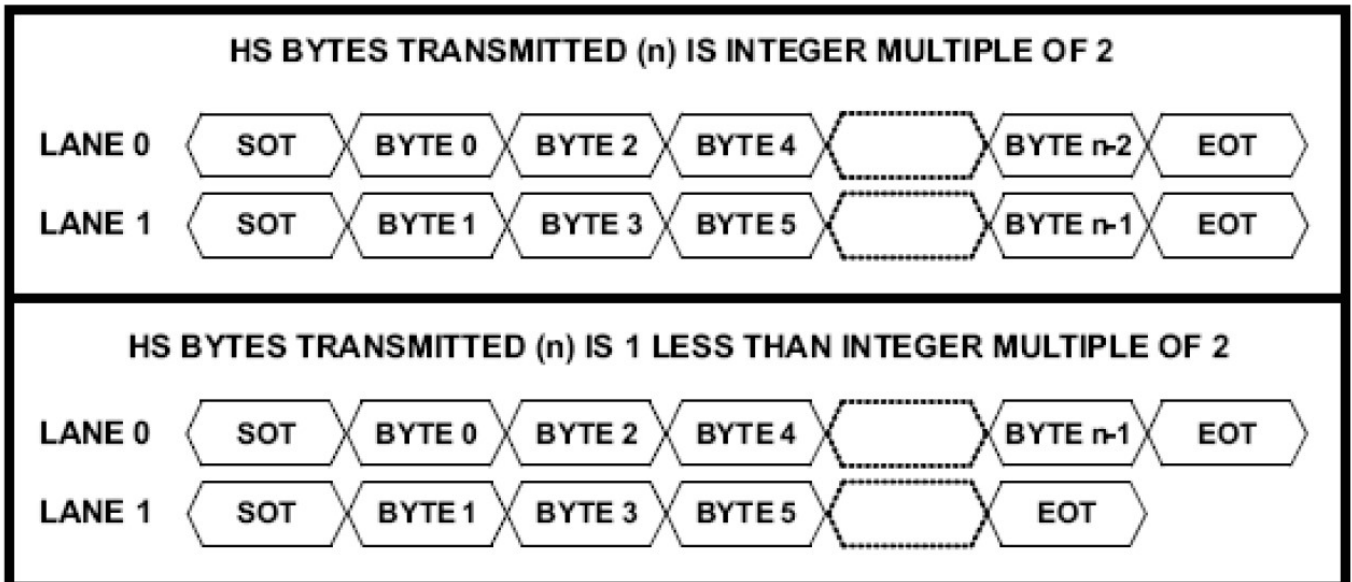
2 DSI Data Lane Configuration

HS BYTES TRANSMITTED (n) IS INTEGER MULTIPLE OF 4

LANE 0	SOT	BYTE 0	BYTE 4	BYTE 8		BYTE n-4	EOT
LANE 1	SOT	BYTE 1	BYTE 5	BYTE 9		BYTE n-3	EOT
LANE 2	SOT	BYTE 2	BYTE 6	BYTE 10		BYTE n-2	EOT
LANE 3	SOT	BYTE 3	BYTE 7	BYTE 11		BYTE n-1	EOT
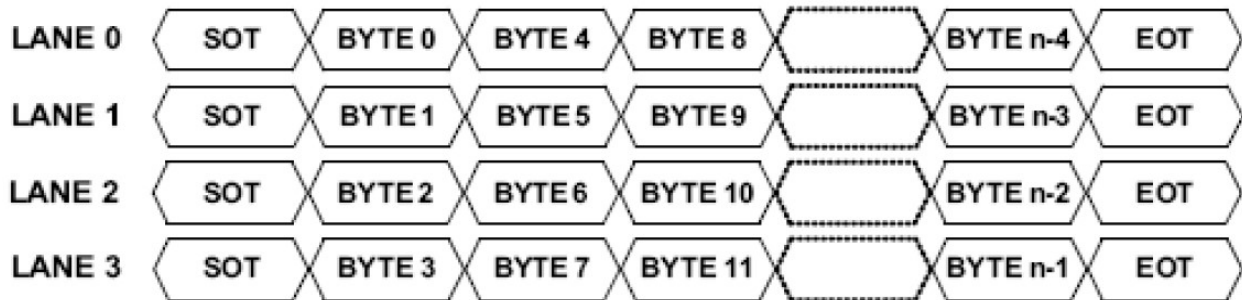
HS BYTES TRANSMITTED (n) IS 1 LESS THAN INTEGER MULTIPLE OF 4

LANE 0	SOT	BYTE 0	BYTE 4	BYTE 8		BYTE n-3	EOT
LANE 1	SOT	BYTE 1	BYTE 5	BYTE 9		BYTE n-2	EOT
LANE 2	SOT	BYTE 2	BYTE 6	BYTE 10		BYTE n-1	EOT
LANE 3	SOT	BYTE 3	BYTE 7	BYTE 11		EOT	
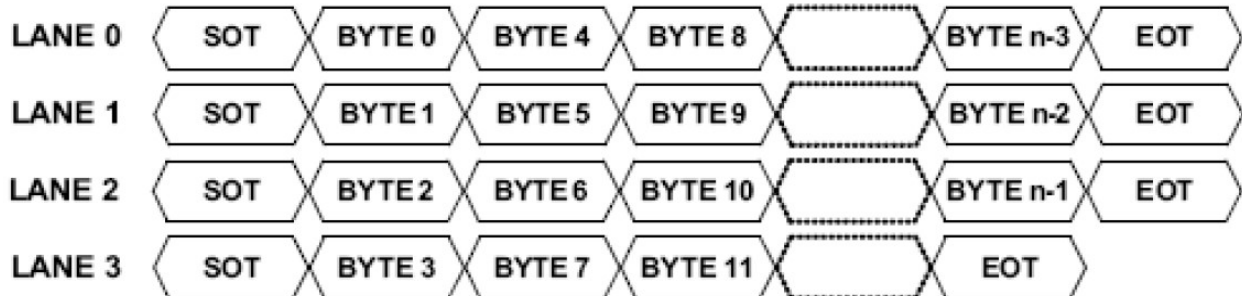
HS BYTES TRANSMITTED (n) IS 2 LESS THAN INTEGER MULTIPLE OF 4

LANE 0	SOT	BYTE 0	BYTE 4	BYTE 8		BYTE n-2	EOT
LANE 1	SOT	BYTE 1	BYTE 5	BYTE 9		BYTE n-1	EOT
LANE 2	SOT	BYTE 2	BYTE 6	BYTE 10		EOT	
LANE 3	SOT	BYTE 3	BYTE 7	BYTE 11		EOT	
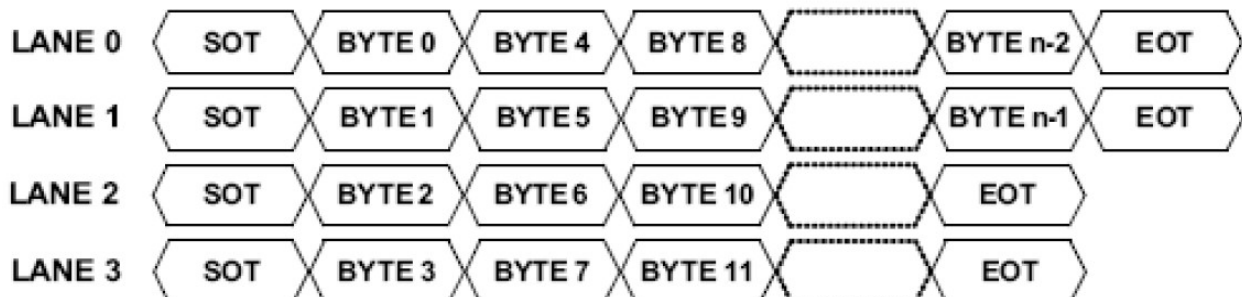
HS BYTES TRANSMITTED (n) IS 3 LESS THAN INTEGER MULTIPLE OF 4

LANE 0	SOT	BYTE 0	BYTE 4	BYTE 8		BYTE n-1	EOT
LANE 1	SOT	BYTE 1	BYTE 5	BYTE 9		EOT	
LANE 2	SOT	BYTE 2	BYTE 6	BYTE 10		EOT	
LANE 3	SOT	BYTE 3	BYTE 7	BYTE 11		EOT	
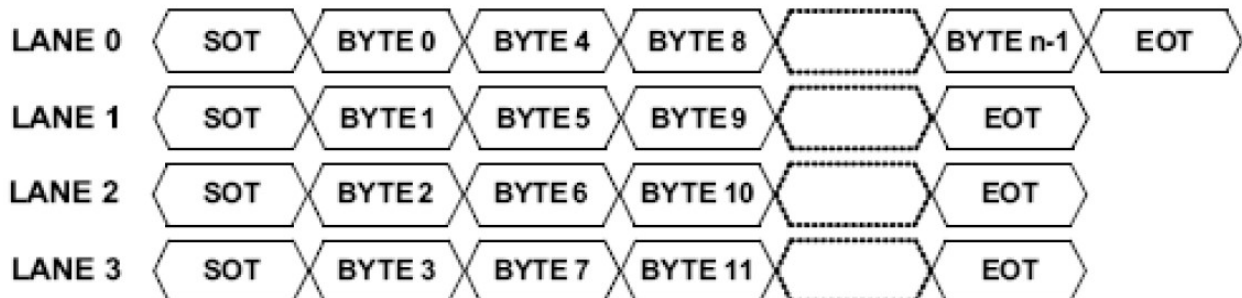
4 DSI Data Lane Configuration (default)

7.2 DSI Pixel Stream Packets
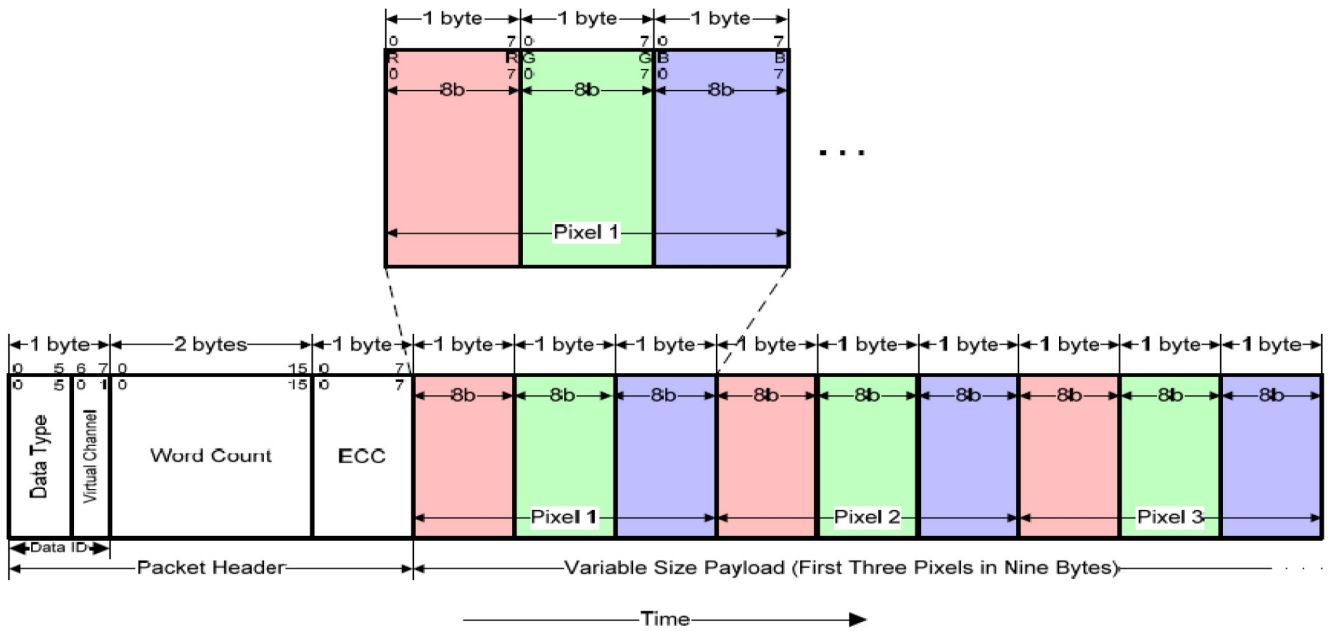
Figure 6-4 DSI RGB888 Color format, Long Packet

7.3 DSI Video Transmission sequence

For all three sequences, the first line of a video frame shall start with a VSS packet, and all other lines start with VSE or HSS. The position of the synchronization packets in time is of utmost importance since this has a direct impact on the visual performance of the display panel; that is, the LVDS output video timing(HS-Horizontal sync and VS-Vertical sync) are generated based on the synchronization.
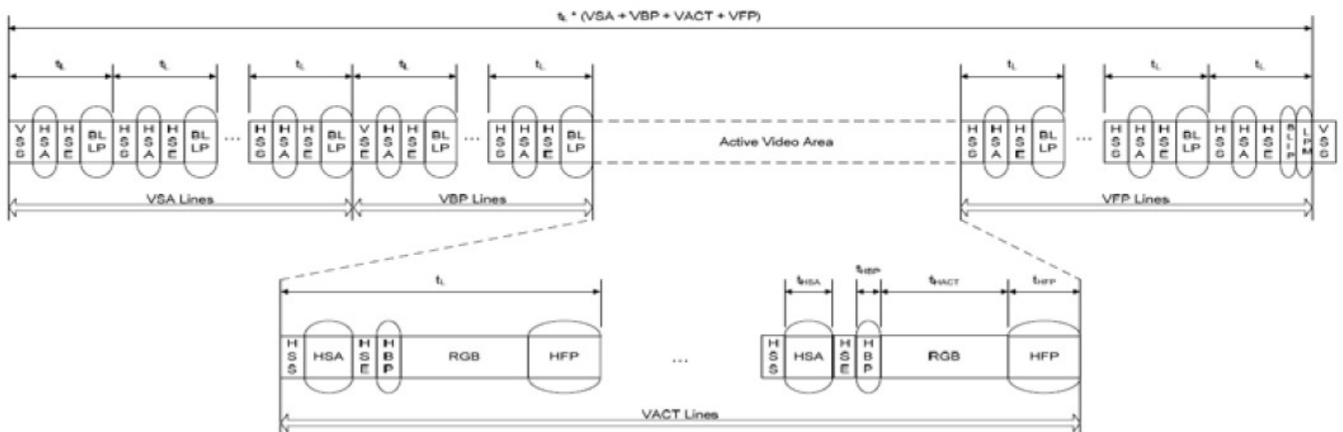
Figure 6-5 Non-Burst Mode with Sync Pulses
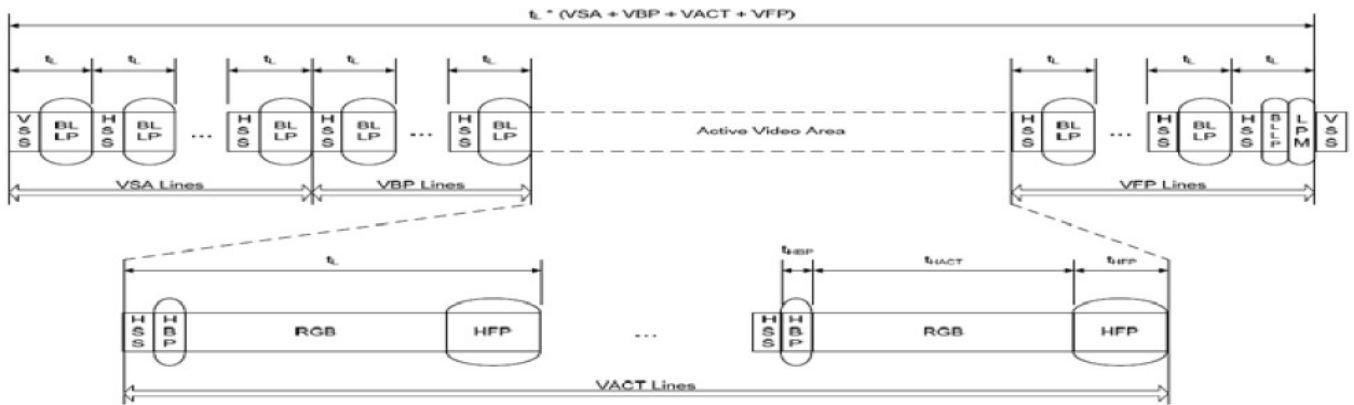
Figure 6-6 Non-Burst Mode with Sync Events
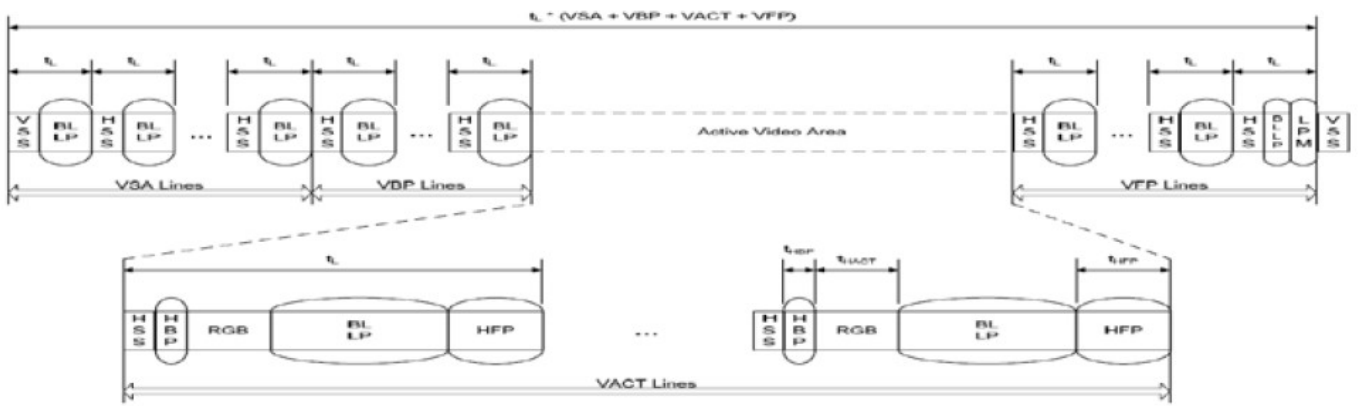
Figure 6-7 Burst mode

7.4 Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Interface Timing Table						
Item		**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**	**Remark**
DCLK Frequency		Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	816	896	DCLK	
	Display Period	Thdisp		800		DCLK	
	Back Porch	Thbp	4	8	48	DCLK	
	Front Porch	Thfp	4	8	48	DCLK	
	Pulse Width	Thw	2	4	8	DCLK	
VSYNC	Period Time	Tv	496	512	528	HSYNC	
	Display Period	Tvdisp		480		HSYNC	
	Back Porch	Tvbp	8	16	24	HSYNC	
	Front Porch	Tvfp	8	16	24	HSYNC	
	Pulse Width	Tvw	2	4	8	HSYNC	

8. Backlight Characteristic

Item	Symbol	Min	Typ	Max	Unit	Remark
Luminous Intensity for LCM and TP	-	320	400	-	cd/m2	
Luminance uniformity	-	80	-	-	％	
Life Time	-	30000	-	-	Hr	
Color	White					

9. Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Remark
Viewing Angle (CR>10)	Horizontal	θ_L	-	80	-	degree	Note 1
		θ_R	-	80	-		
	Vertical	θ_T	-	80	-		
		θ_B	-	80	-		
Contrast Ratio	Center		800	1000	-	-	Note 2
Response Time	Rising		-	30	40	ms	Note 3
	Falling			30	40	ms	
CF Color Chromaticity (CIE1931)	Red x			-		-	Note 4
	Red y			-		-	
	Green x			-		-	
	Green y			-		-	
	Blue x			-		-	
	Blue y			-		-	
	White x			0.30		-	
	White y			0.32		-	
NTSC			-	50	-	%	Note 4

Note:
1. Definition of Viewing Angle:
    Viewing angles are measured by BM5A
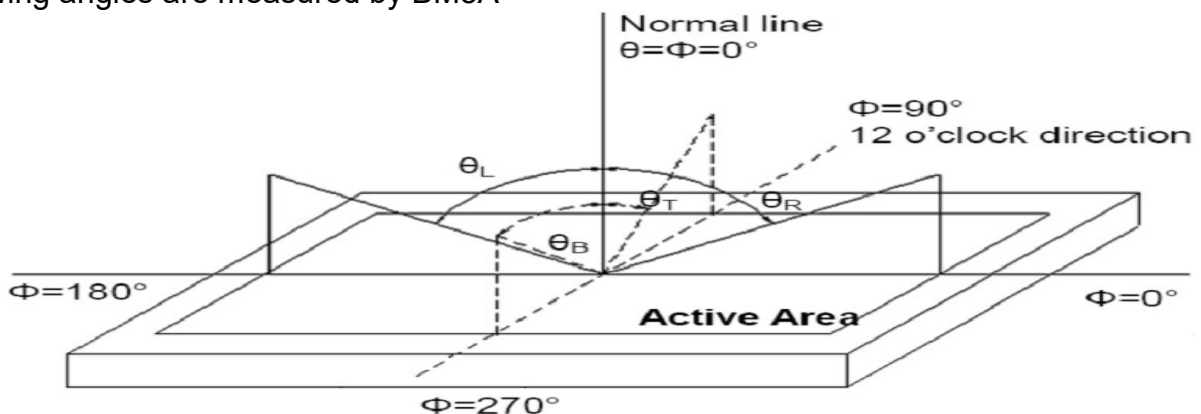
2. Definition of Contrast Ratio (CR):
   The contrast ratio can be calculated by the following expression.
   Contrast Ratio (CR) = L255 / L0
   L255: Luminance of gray level 255
   L 0: Luminance of gray level
   CR = CR (5), where CR (X) is corresponding to the Contrast Ratio of the point X at the figure in

3. Definition of Response Time (TR, TF):
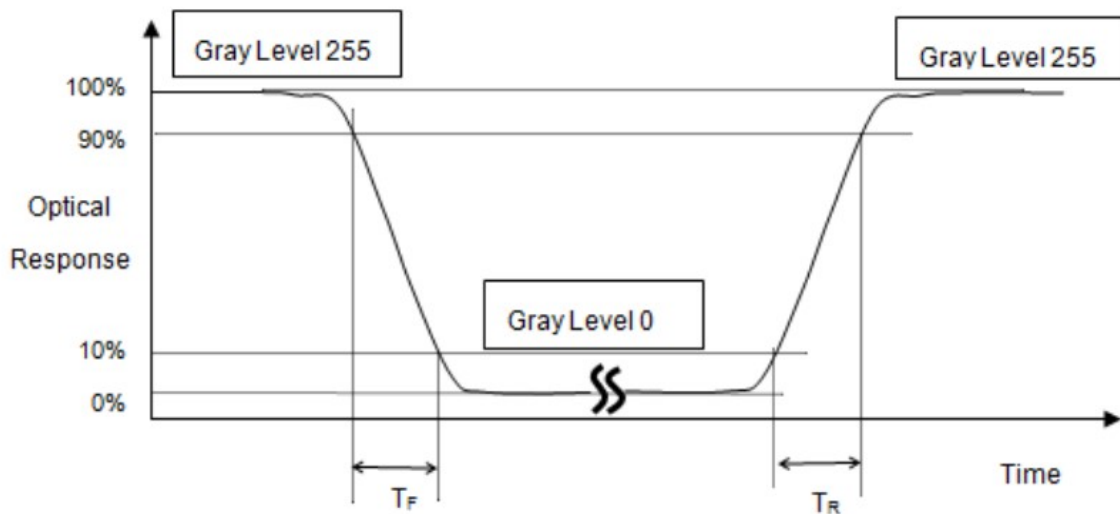
4. Measurement Setup:
   The LCD assembly should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a windless room.
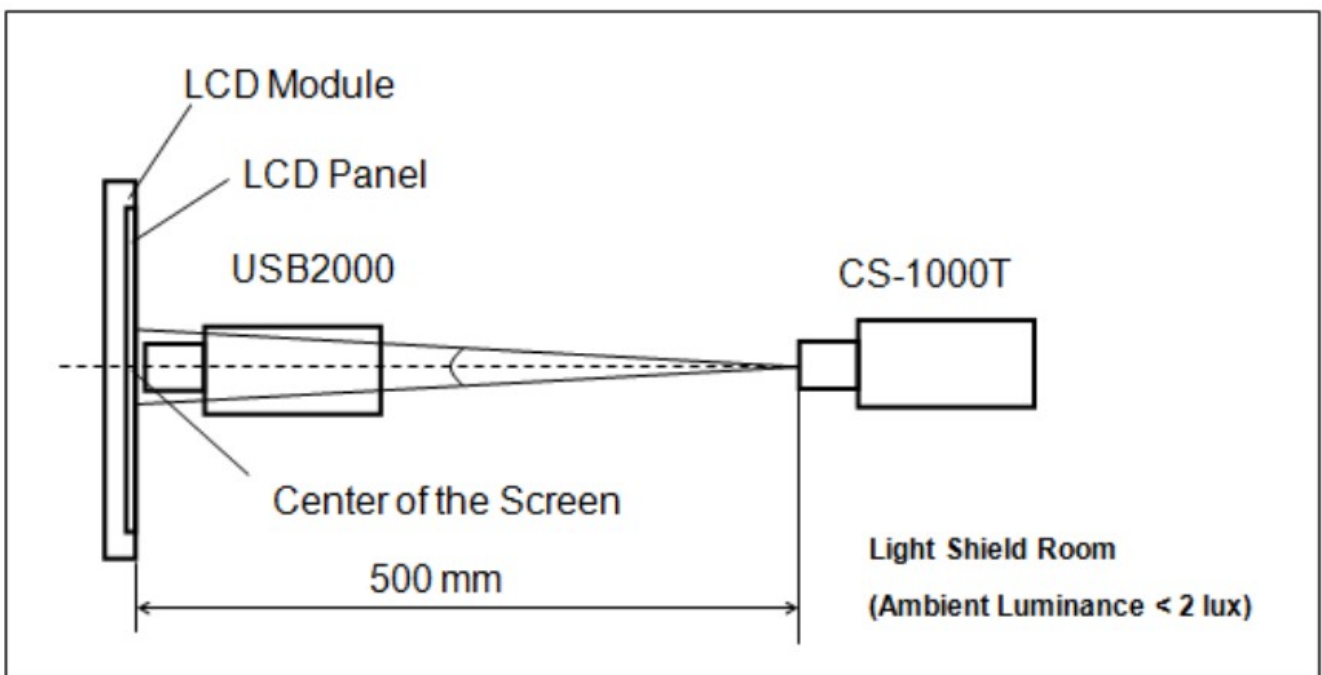
10. Reliability Test Conditions and Methods

NO.	Test Items	Test Condition
①	High Temperature Storage	Keep in 80°C±2°C×240Hrs Surrounding temperature, then storage at normal condition 4hrs.
②	Low Temperature Storage	Keep in -30°C±2°C×240Hrs Surrounding temperature, then storage at normal condition 4hrs.
③	High Temperature Operating	70°C±2°C×240Hours
④	Low Temperature Operating	-20°C±2°C×240Hours
⑤	High Temperature / High Humidity Storage Test	Keep in 60°C±5°C×90%RH×240Hrs Surrounding temperature, then storage at normal condition 4hrs.
⑥	Temperature Cycling Storage Test	-30°C → +25°C → 80°C → +25°C (30mins) (5mins) (30mins) (5mins) ←————— 30 Cycle —————→ Surrounding temperature, then storage at normal condition 4hrs.
⑦	ESD Test	**Air Discharge:** Apply 8 KV with 5 times Discharge for each polarity +/-	**Contact Discharge:** Apply 250 V with 5 times discharge for each polarity +/- 1. Temperature ambiance : 15°C～35°C 2. Humidity relative : 30%～60% 3. Energy Storage Capacitance (Cs + Cd): 150pF±10% 4. Discharge Resistance (Rd): 330Ω±10% 5. Discharge, mode of operation: Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : ±5%)
⑧	Vibration Test (Packaged)	1. Sine wave 10 ~ 55 Hz frequency (1 min/sweep) 2. The amplitude of vibration :1.5 mm 3. Each direction (X、Y、Z) duration for 2 Hrs
⑨	Drop Test (Packaged)	<table><tr><td>Packing Weight (Kg)</td><td>Drop Height (cm)</td></tr><tr><td>0 ~ 45</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table> Drop Direction: ※1 corner / 3 edges / 6 sides each 1time

11. Inspection Standard

11.1. Quality:

The quality of goods supplied to purchaser shall come up to the following standard.

11.1.1. The method of preserving goods.

After delivery of goods from Kingtech to purchaser. Purchaser shall control the LCM AT -10 TO 40, and it might be desirable to keep at the normal room temperature and humidity until incoming inspection or throwing into process line.

11.1.2. Incoming inspection

(A) The method of inspection.

If purchaser make an incoming inspection, a sampling plan shall be applied on the condition that quality of one delivery shall be regarded as one lot.

(B) The standard of quality.

ISO-2859-1 (SAME AS MIL-STD-105E), LEVEL: II

Class	AQL (%)
Critical	0.4 %
Major	0.65 %
Minor	1.5 %

Every item shall be inspected according to the class.

(C) Measure

If as the result of above receiving inspection, a lot out is discovered. Purchaser shall be informed seller of it within seven days. But first shipment within fourteen days.

11.1.3. Warranty policy

Kingtech will provide one-year warranty for the products only if under specification operating conditions. Kingtech will replace new products for these defect products which under warranty period and belong to the responsibility of Kingtech.

11.2. Checking condition:

11.2.1. Checking direction shall be in the 45 degree area to face the sample.

11.2.2. Checker shall see over 300±25 mm. With bare eyes far from sample.

11.3.3. Inspection Plan:
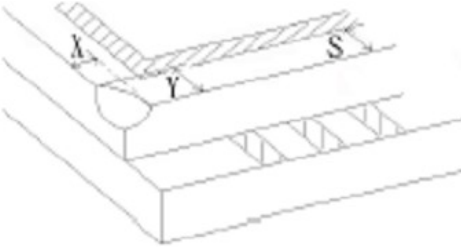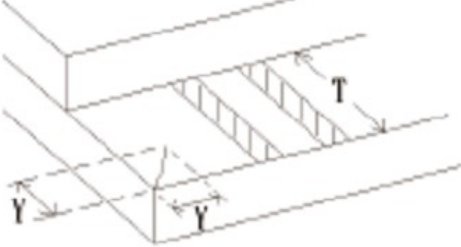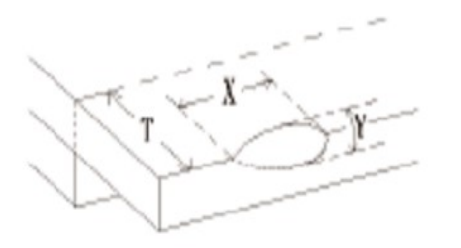
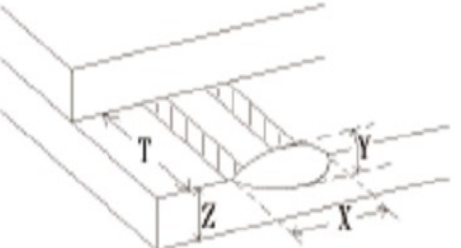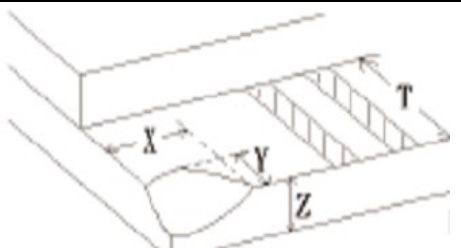| Class	Item	Judgement	Class
Packing & Indicate	1. Outside and inside package	"Model On.", "Lot No." and "Quantity" Should indicate on the package.	Minor
	2. Model mixed and quantity	Other model mixed…….rejected Quantity short or over……..rejected	Critical
	3. Product indication	"Model On." Should indicate on the product	Major
Assembly	4. Dimension, LCD glass scratch and scribe defect.	According to specification or drawing.	Major
Appearance	5. Viewing area	Polarizer edge or LCD's sealing line is visible in the viewing area……..rejected	Minor
	6. Blemish, Black spot, White spot in the LCD and LCD glass cracks	According to standard of visual inspection(inside viewing area)	Minor
	7. Blemish, Black spot, White spot and scratch on the polarizer	According to standard of visual inspection (inside viewing area)	Minor
	8. Bubble in polarizer	According to standard of visual inspection (inside viewing area)	Minor
	9. LCD's rainbow color	Strong deviation color (or newton ring) of LCD……..rejected. Or according to limited sample (if needed, and inside viewing area)	Minor
Electrical	10. Electrical and optical characteristics (contrast, VOP, chromaticity…ETC)	According to specification or drawing. (Inside viewing area)	Critical
	11. Missing line	Missing dot, line, character……..rejected	Critical
	12. Short circuit wrong pattern display	No display, Wrong pattern display, Current consumption out of specification……..rejected	Critical
	13. Dot defect (for color and TFT)	According to standard or visual inspection	Minor

11.4. Standard of visual inspection

No	Class	Item	Judgement
11.4.1	Minor	Black and white spot foreign materiel dust in the cell blemish scratch.	(A) Round type: unit: mm <table><tr><td>Diameter (mm)</td><td>Acceptable Q'ty</td></tr><tr><td>Ø ≦ 0.1</td><td>Disregard</td></tr><tr><td>0.1 < Ø ≦ 0.25</td><td>3(Distance > 5mm)</td></tr><tr><td>0.25 < Ø</td><td>0</td></tr></table>Note: Ø=(Length + Width)/2 (B) Linear type: unit: mm <table><tr><td>Length</td><td>Width</td><td>Acceptable Q'ty</td></tr><tr><td>-</td><td>W ≦ 0.03</td><td>Disregard</td></tr><tr><td>L ≦5.0</td><td>0.03 < W ≦ 0.07</td><td>3(Distance > 5mm)</td></tr><tr><td>-</td><td>0.07 < W</td><td>Follow round type</td></tr></table>
11.4.2	Minor	Bubble in polarizer dent on polarizer.	unit: mm <table><tr><td>Diameter (mm)</td><td>Acceptable Q'ty</td></tr><tr><td>Ø ≦ 0.2</td><td>Disregard</td></tr><tr><td>0.2 < Ø ≦ 0.5</td><td>2(Distance > 5mm)</td></tr><tr><td>0.5 < Ø</td><td>0</td></tr></table>
11.4.3	Minor	Dot Defect	<table><tr><td>Items</td><td>ACC. Q'TY</td></tr><tr><td>Bright dot</td><td>N ≦ 4</td></tr><tr><td>Dark dot</td><td>N ≦ 4</td></tr></table>Pixel Define: Note 1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot. Note 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern. Note 3: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue pattern.
11.4.4	Minor	LCD glass chipping	 Y > S

11.4.5	Minor	LCD glass chipping		X or Y > S
11.4.6	Minor	LCD glass Glass crack		$Y > (1/2)\,T$
11.4.7	Minor	LCD glass Scribe defect		1. a > L/3, A > 1.5mm 2. B: According to dimension
11.4.8	Minor	LCD glass Chipping (on the terminal area)		$\Phi=(X+Y)/2 > 2.5mm$
11.4.9	Minor	LCD glass Chipping (on the terminal surface)		$Y > (1/3)T$
11.4.10	Minor	LCD glass chipping	 If touch the electrode lines, the need to retain the two-thirds electrode lines.	$Y > T$

12. Handling Precautions

12.1 Mounting method

The LCD panel 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.

12.2 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 happens by miss-handling or using some materials such as Chlorine (Cl), Sulfur (S) from customer, Responsibility is on customer.

12.3 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.

12.4 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

12.5 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.

12.6 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.

12.7 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.

13. Precaution for Use

13.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

13.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification.
- When a new problem is arisen which is not specified in these specifications.
- When inspection specifications change or operating condition change in customer is reported to Kingtech TFT, and some problem is arisen in this specification due to the change.
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

14. Packing Method

TBD