SPECIFICATION

Product Model: PV08019Y0150V (Rev.V0)

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	Note
V0	2016 11 30	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

TITEM	STANDARD VALUES	UNITS
LCD type	8.0"TFT	--
Dot arrangement	800×3(RGB)×480	dots
Color filter array	RGB vertical stripe	--
Display mode	Transmissive / Normally white	-
Gray Scale Inversion Direction	6 o'clock	--
Eyes Viewing Direction	12 O'clock	
Module size	192.8(W)×116.9(H)×6.4(T)	mm
Active area	176.64(W)×99.36(H)	mm
Dot pitch	0.0736(W)×0.2070(H)	mm
Interface	24-bit Parallel RGB Interface	--
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Back Light	36 White LEDS	--
Weight	TBD	g

3. External Dimensions

Notes
1.FPC connector sug
2.General tolerance:
3.The bending radius

Kingtech Group Co., Ltd.

MODEL NUMBER: PV08019V015OV

SHEET: 1 Of 1

SCALE 1:2

5.00±0.40

6.40±0.30

0.30±0.05

116.90±0.30(Outline)
103.40±0.30(Bezel open)
102.36(Top pol)
99.36(AA)
56.52
4.82
5.34
6.84

192.80±0.30(Outline)
180.10±0.30(Bezel open)
179.04(Top pol)
176.64(AA)
94.87
4.82
5.35
6.55

(20.11)
(7.61)
(24.6)
(32.1)
45.11±0.80
94.87±0.80

SEE DETAIL A

SCALE 1:2

DETAIL A
SCALE 3:1

0.15
0.35
P0.5x(50-1)=24.50±0.10
25.50±0.10
3.80
0.50±0.08

4. Interface Description

PIN	PIN NAME	DESCRIPTION
1	VLED+	LED backlight (Anode).
2	VLED+	
3	VLED-	LED backlight (Cathode).
4	VLED-	
5	GND	Power ground
6	VCOM	Common Voltage.
7	DVDD	Digital Power.
8	MODE	DE/SYNC mode select. Normally pull high. H: DE mode. L: HSD/VSD mode.
9	DE	Data Enable signal.
10	VS	Vertical sync input. Negative polarity.
11	HS	Horizontal sync input. Negative polarity.
12	B7	Blue Data Input (MSB).
13	B6	Blue Data Input.
14	B5	Blue Data Input.
15	B4	Blue Data Input.
16	B3	Blue Data Input.
17	B2	Blue Data Input.
18	B1	Blue Data Input.
19	B0	Blue Data Input (LSB).
20	G7	Green Data Input (MSB).
21	G6	Green Data Input.
22	G5	Green Data Input.
23	G4	Green Data Input.
24	G3	Green Data Input.
25	G2	Green Data Input.
26	G1	Green Data Input.
27	G0	Green Data Input (LSB).
28	R7	Red Data Input (MSB).
29	R6	Red Data Input.
30	R5	Red Data Input.
31	R4	Red Data Input.
32	R3	Red Data Input.
33	R2	Red Data Input.
34	R1	Red Data Input.
35	R0	Red Data Input (LSB).
36	GND	Power ground.
37	DCLK	Clock input.
38	GND	Power ground.

39	L/R	Left or Right Display Control.
40	U/D	Up / Down Display Control.
41	VGH	Positive Power for TFT.
42	VGL	Negative Power for TFT.
43	AVDD	Analog Power.
44	RESET	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high.(R=10KΩ, C=1μF)
45	NC.	Not connect.
46	VCOM	Common Voltage.
47	DITHB	Dithering function enable control. (Normally pull high) DITHB="L", to enable internal dithering function. DITHB="H", to disable internal dithering function.
48	GND	Power ground.
49	NC.	Not connect.
50	NC.	Not connect.

【Note1】L/R：left or right setting

U/D：up or down setting

L/R	U/D	Data shifting
DVDD	GND	Left → Right，Up → Down(default)
GND	GND	Right → Left，Up → Down
DVDD	DVDD	Left → Right，Down → Up
GND	DVDD	Right → Left，Down → Up

Definition of scanning direction:
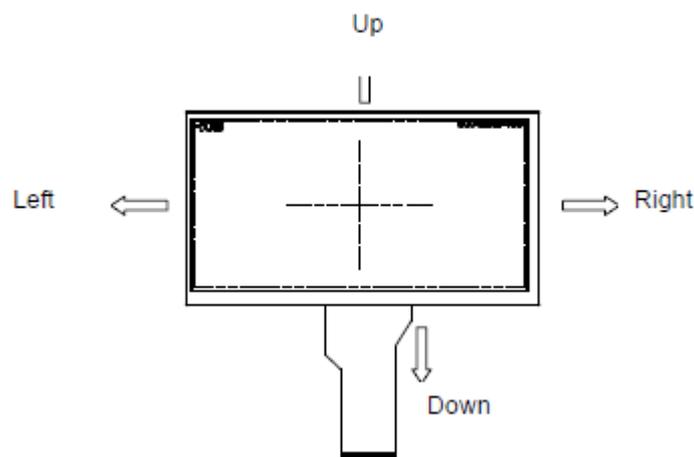
5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Digital Supply Voltage	DVDD	-0.3	5.0	V
Analog Supply Voltage	AVDD	6.5	13.5	V
Gate On Voltage	VGH	-0.3	40.0	V
Gate Off Voltage	VGL	-20.0	0.3	V
Gate On- Gate Off Voltage	VGH-VGL	-	40.0	V
Operating Temperature	T_{OP}	-30	85	°C
Storage Temperature	T_{ST}	-30	85	°C
LED Reverse Voltage	Vr	-	1.2	V
LED Forward Current	If	-	25	mA

6. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Digital Supply Voltage	DVDD	3.0	3.3	3.6	V	Note 2
Analog Supply Voltage	AVDD	10.2	10.4	10.6	V	-
Gate On Voltage	VGH	15.3	16.0	16.7	V	-
Gate Off Voltage	VGL	-7.7	-7.0	-6.3	V	-
Common Voltage	VCOM	TBD	TBD	TBD	V	-
Logic Input Voltage	VIH	0.7DVDD	-	DVDD	V	Note 3
	VIL	GND	-	0.3DVDD	V	

Note 1: Be sure to apply DVDD and VGL to the LCD first, and then apply VGH.

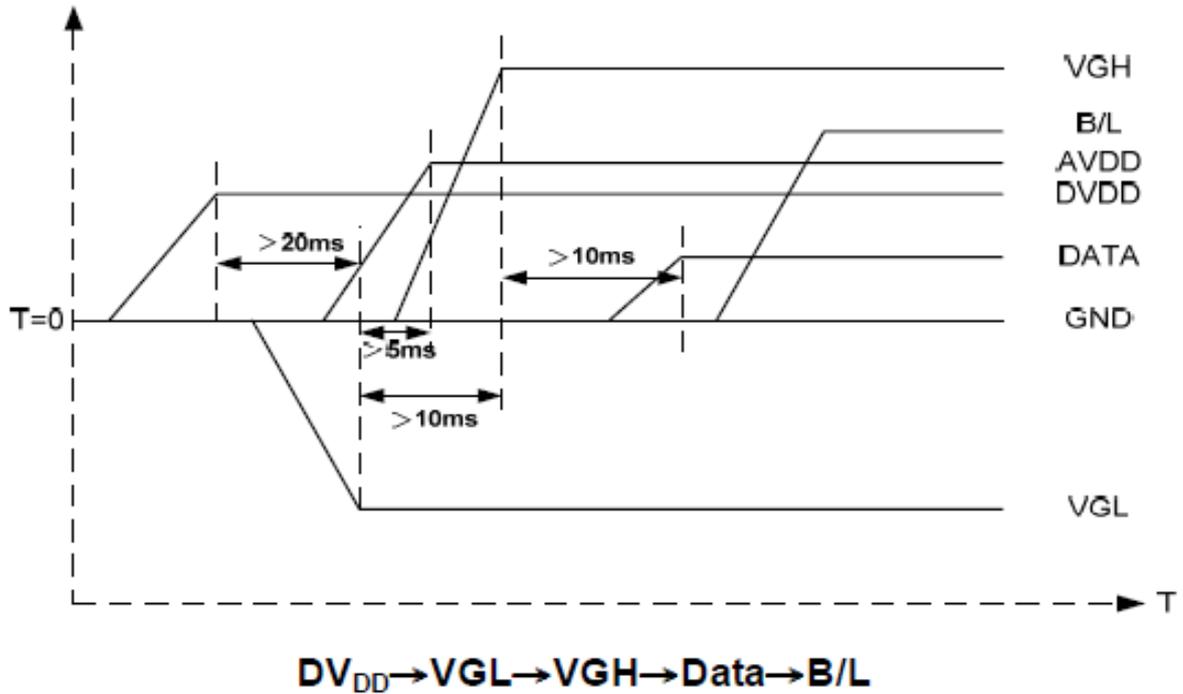Note 2: DVDD setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 3: DCLK,HS,VS,RESET,U/D, L/R,DE,R0~R7,G0~G7,B0~B7,MODE,DITHB.
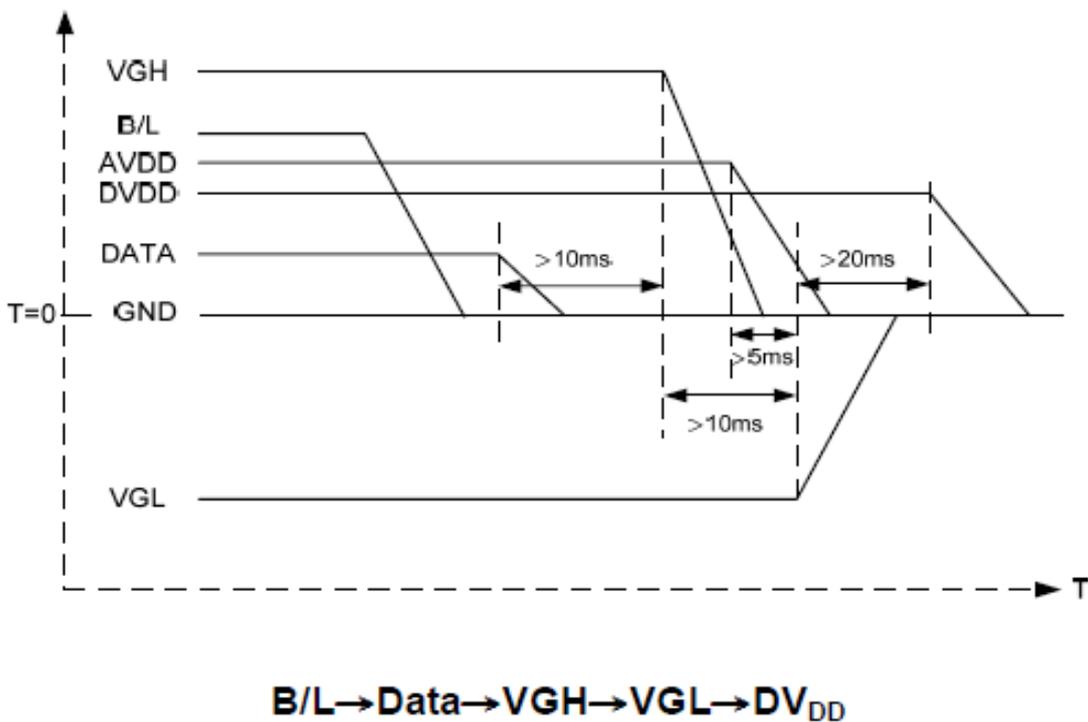
## 7. Timing Characteristics
7.1 Power Sequence

a. Power on:

$DV_{DD} \rightarrow VGL \rightarrow VGH \rightarrow Data \rightarrow B/L$

b. Power off:

$B/L \rightarrow Data \rightarrow VGH \rightarrow VGL \rightarrow DV_{DD}$

Note: Data include R0~R7, B0~B7, G0~G7, U/D, L/R, DCLK, HS,VS,DE.

7.2 AC Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	ns	
HS hold time	T_{hhd}	8	-	-	ns	
VS setup time	T_{vst}	8	-	-	ns	
VS hold time	T_{vhd}	8	⊢	-	ns	
Data setup time	T_{dsu}	8	-	-	ns	
Data hole time	T_{dhd}	8	-	-	ns	
DE setup time	T_{esu}	8	-	-	ns	
DE hole time	T_{ehd}	8	-	-	ns	
DV_{DD} Power On Slew rate	T_{POR}	-	-	20	ms	From 0 to 90% DV_{DD}
RESET pulse width	T_{Rst}	1	-	-	ms	
DCLK cycle time	T_{coh}	20	-	-	ns	
DCLK pulse duty	T_{cwh}	40	50	60	%	
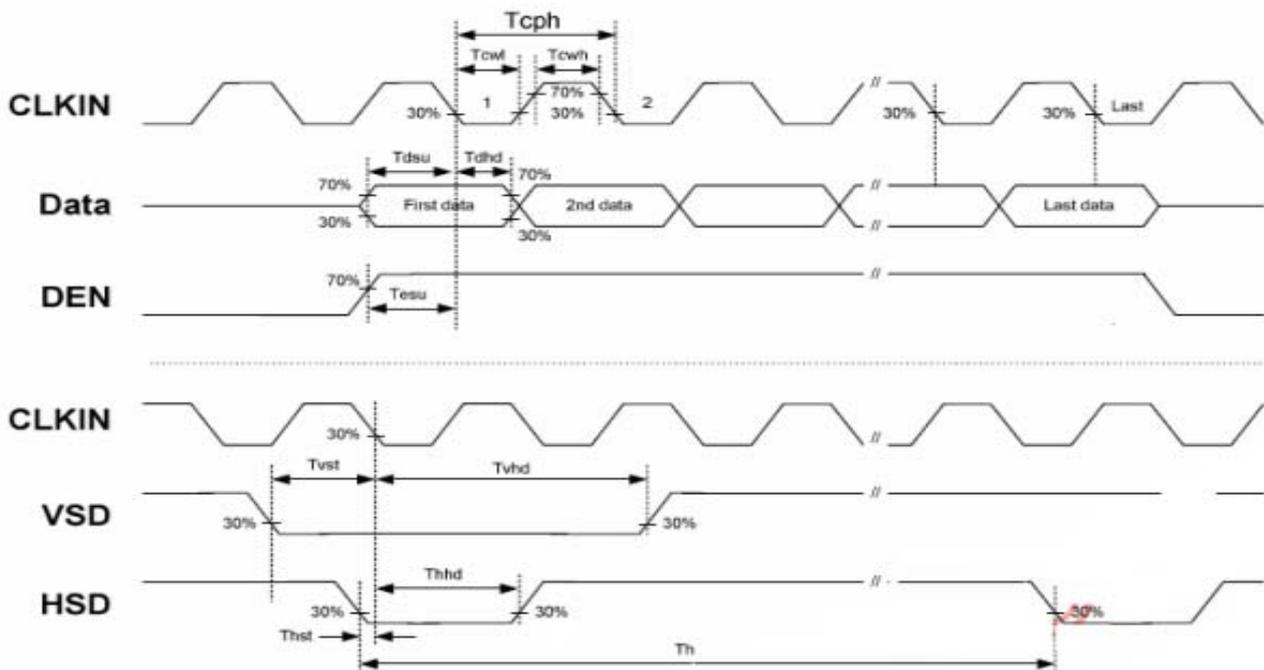
7.3 Data Input Format

Horizontal input timing diaqram

Vertial input timing diaqram
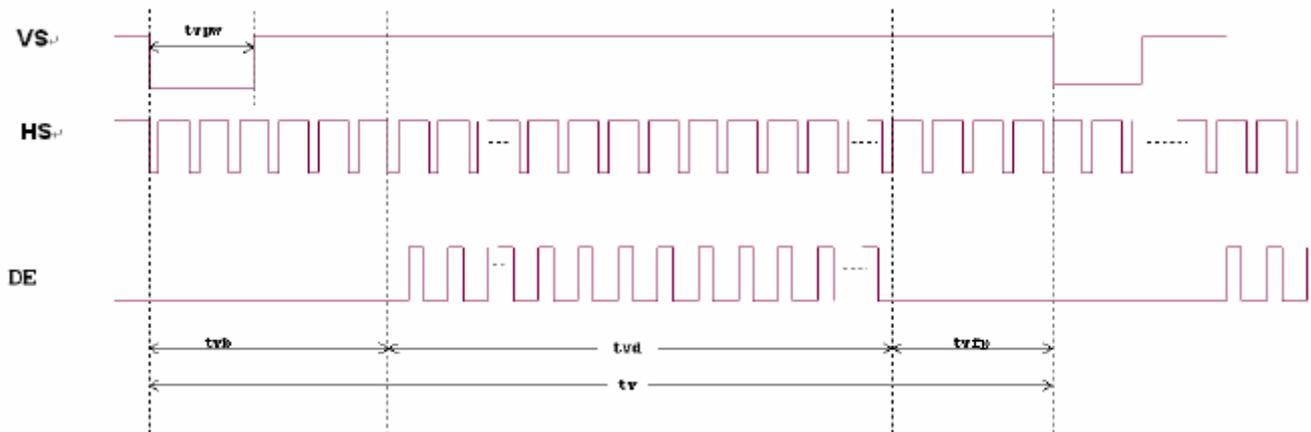
7.4 Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	26.4	33.3	46.8	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS Blanking	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	480	-	TH	
VS period time	tv	510	525	650	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Blanking	tvb	23	23	23	TH	
VS Front Porch	tvfp	7	22	147	TH	

8. Backlight Characteristic

Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	Vf	8.4	9.3	10.2	V	If=240mA
Supply Current	If	216	240	264	mA	-
Luminous Intensity for LCM	-	360	450	-	cd/m^2	If=240mA
Uniformity for LCM	-	70	75	-	％	If=240mA
Life Time	-	-	50000	-	Hr	If=240mA
Backlight Color	White					

9. Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR>10)	Horizontal	θL	-	70	-	degree	(1),(2),(6)
		θR	-	70	-		
	Vertical	θT	-	50	-		
		θB	-	70	-		
Contrast Ratio	Center		400	500	-	-	(1),(3),(6)
Response Time	Rising		-	10	-	ms	(1),(4),(6)
	Falling		-	15	-		
CF Color Chromaticity (CIE1931)	Red x		Typ. -0.05	TBD	Typ. +0.05	-	(1), (6)
	Red y			TBD		-	
	Green x			TBD		-	
	Green y			TBD		-	
	Blue x			TBD		-	
	Blue y			TBD		-	
	White x			0.31		-	
	White y			0.33		-	

Note (1) Measurement Setup: The LCD module should be stabilized at given temp. 25°C for 15 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 15 minutes in a windless room.
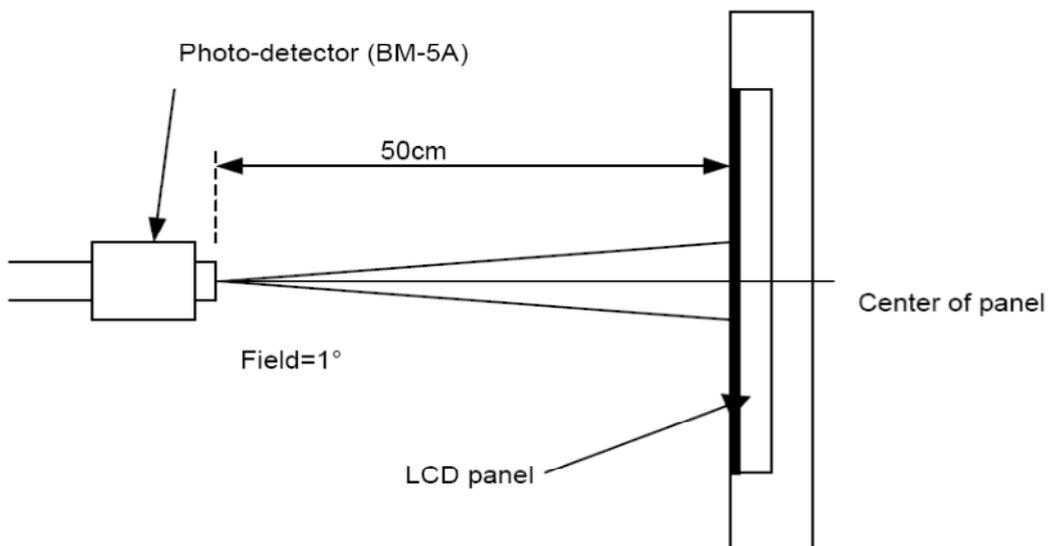
Note (2) Definition of Viewing Angle
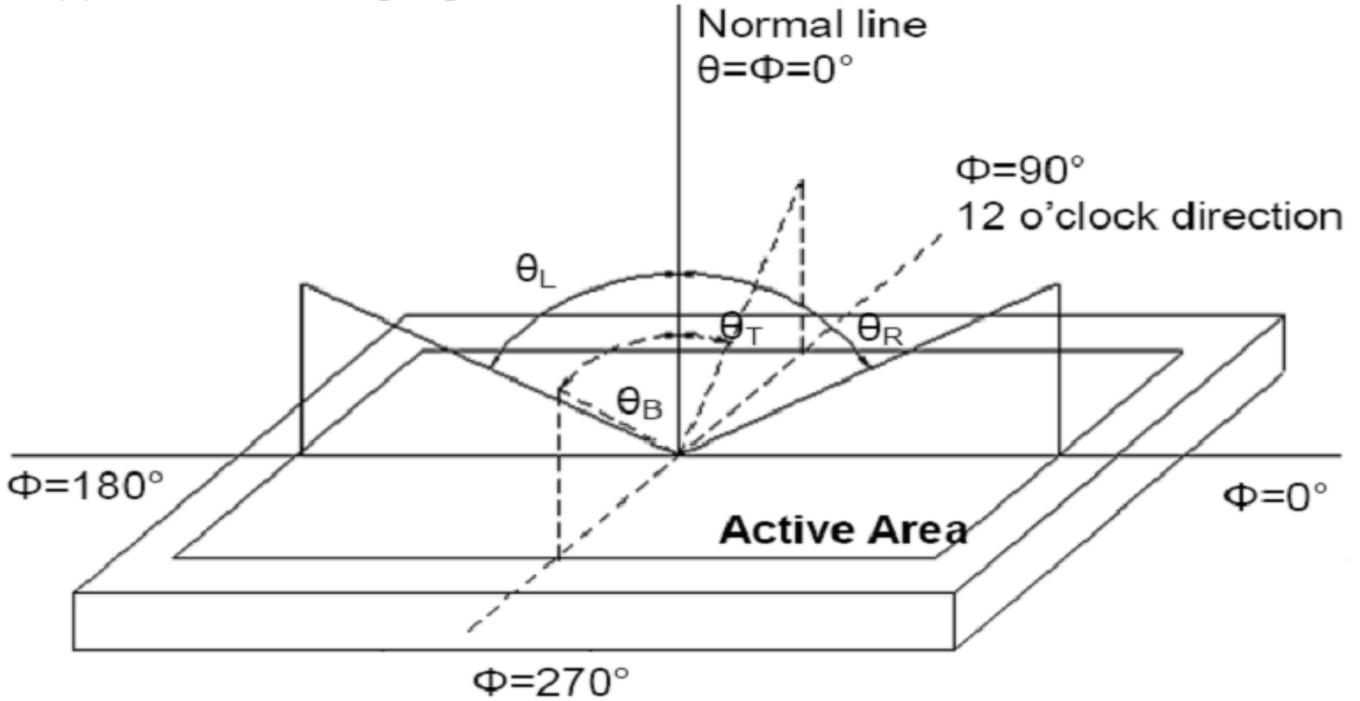
Note (3) Definition of Contrast Ratio (CR)
    The contrast ratio can be calculated by the following expression
    Contrast Ratio (CR) = L63 / L0
    L63: Luminance of gray level 63, L0: Luminance of gray level 0

Note (4) Definition of response time
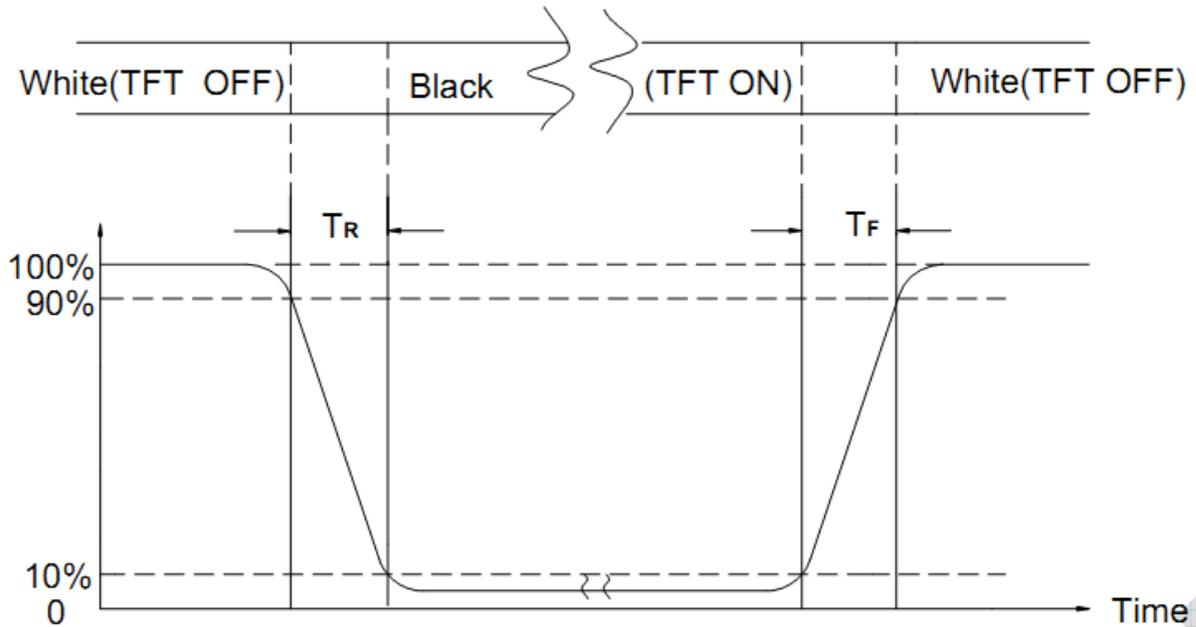
Note (5) Definition of Transmittance (Module is without signal input)
    Transmittance = Center Luminance of LCD / Center Luminance of Back Light x 100%

Note (6) Definition of color chromaticity (CIE1931)

    Color coordinates measured at the center point of LCD

10. Reliability Test Conditions and Methods

NO.	TEST ITEMS	TEST CONDITION	
①	High Temperature Storage	Keep in 80°C ±5℃ 240 hrs Surrounding temperature, then storage at normal condition 4hrs.	
②	Low Temperature Storage	Keep in -30°C ±5℃ 240 hrs Surrounding temperature, then storage at normal condition 4hrs.	
③	High Temperature / High Humidity Storage Test	Keep in 50 ℃ / 90% R.H duration for 240 hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)	
④	Temperature Cycling Storage Test	-20°C → +25℃ → 70°C → +25℃ (30mins)　(5mins)　(30mins)　(5mins) 10 Cycle Surrounding temperature, then storage at normal condition 4hrs.	
⑤	ESD Test	Air Discharge: Apply 2 KV with 5 times Discharge for each polarity +/-	Contact Discharge: Apply 250 V with 5 times discharge for each polarity +/-
		1.　Temperature ambiance : 15℃～35℃ 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%)	
⑥	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	
⑦	Drop Test (Packaged)	<table><tr><td>Packing Weight (Kg)</td><td>Drop Height (cm)</td></tr><tr><td>0 ~ 45.4</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 AMSON 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 SINGLE PLAN.

CLASS	AQL(%)
CRITICAL	0.4 %
MAJOR	0.65 %
MINOR	1.5 %
TOTAL	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 INFORM SELLER OF IT WITHIN SEVEN DAYS. BUT FIRST SHIPMENT WITHIN FOURTEEN DAYS.

11.1.3. WARRANTY POLICY

AMSON WILL PROVIDE ONE-YEAR WARRANTY FOR THE PRODUCTS ONLY IF UNDER SPECIFICATION OPERATING CONDITIONS. AMSON WILL REPLACE NEW PRODUCTS FOR THESE DEFECT PRODUCTS WHICH UNDER WARRANTY PERIOD AND BELONG TO THE RESPONSIBILITY OF AMSON.

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 AND USING 2 PCS. OF 20W FLUORESCENT LAMP.

11.3. INSPECTION PLAN :

CLASS	ITEM	JUDGEMENT	CLASS
PACKING & INDICATE	1. OUTSIDE AND INSIDE PACKAGE	"MODEL NO." , "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 NO." 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 VISABLE 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 OF 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.
11.4.2	MINOR	BUBBLE IN POLARIZER DENT ON POLARIZER	unit : mm.
11.4.3	MINOR	Dot Defect	

(A) ROUND TYPE: unit : mm.

DIAMETER (mm.)		ACCEPTABLE Q'TY
Φ	≤ 0.2	DISREGARD
$0.2 <$ Φ	≤ 0.4	3 (Distance>5mm)
$0.4 <$ Φ		0

NOTE: $\Phi = (LENGTH+WIDTH)/2$

(B) LINEAR TYPE: unit : mm.

LENGTH	WIDTH		ACCEPTABLE Q'TY
------	W	≤ 0.05	DISREGARD
$L \leq 5.0$	$0.05 <$ W	≤ 0.08	3 (Distance>5mm)
------	$0.08<$ W		FOLLOW ROUND TYPE

unit : mm.

DIAMETER		ACCEPTABLE Q'TY
Φ	≤ 03	DISREGARD
$03 <$ Φ	≤ 0.6	3 (Distance>7mm)
$0.6 <$ Φ		0

×

Items	ACC. Q'TY
Bright dot	$N \leq 5$
Dark dot	$N \leq 5$

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.

NO.	CLASS	ITEM	JUDGEMENT	
11.4.4	MINOR	LCD GLASS CHIPPING		$Y > S$ Reject
11.4.5	MINOR	LCD GLASS CHIPPING		X or $Y > S$ Reject
11.4.6	MAJOR	LCD GLASS GLASS CRACK		$Y > (1/2) T$ Reject
11.4.7	MAJOR	LCD GLASS SCRIBE DEFECT		1. $a > L/3$, $A > 1.5$mm. Reject 2. B : ACCORDING TO DIMENSION
11.4.8	MINOR	LCD GLASS CHIPPING (ON THE TERMINAL AREA)		$\Phi = (x+y)/2 > 2.5$ mm Reject
11.4.9	MINOR	LCD GLASS CHIPPING (ON THE TERMINAL SURFACE)		$Y > (1/3) T$ Reject
11.4.10	MINOR	LCD GLASS CHIPPING		$Y > T$ Reject
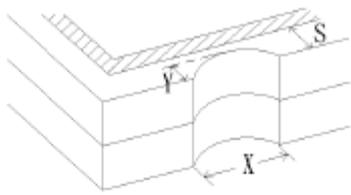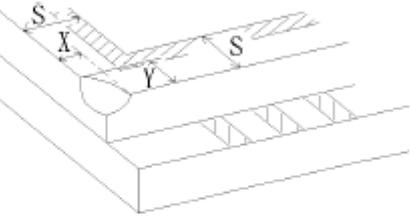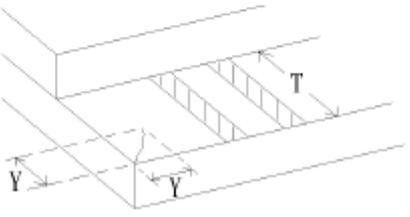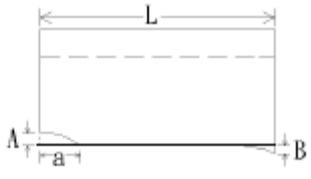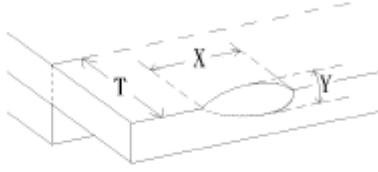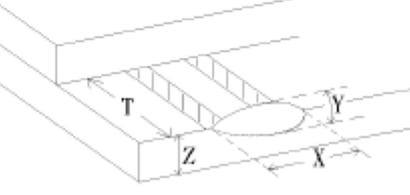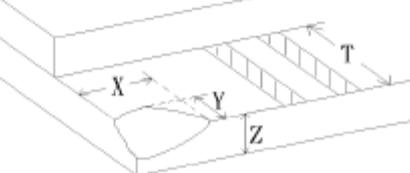
12. Handling Precautions

12.1 Mounting method

The LCD panel of Kingtech 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.

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 (CI) , 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 (CI), 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 this specifications
- When an 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