




 Preliminary Specification Final Specification

SPECIFICATION

Product Model: PV07046Y0140X

DESIGNED	CHECKED	Approved
		

Ok

NG, Problem survey

Approved By _____



Table of Contents

List	Description	Page No.
	Cover	1
	Revision Record	2
	Table of Contents	3
1	Scope	4
2	General Information	4
3	External Dimensions	5
4	Interface Description	6
5	Absolute Maximum Ratings	7
6	DC Characteristics	7
7	Timing Characteristics	8
8	Backlight Characteristics	13
9	Optical Characteristics	13
10	Reliability Test Conditions and Methods	16
11	Inspection Standard	17
12	Handling Precautions	21
13	Precaution for Use	22
14	Packing Method	23



1. Scope

This specification defines general provisions as well as inspection standards for TFT module supplied by Kingtech Group Co.,Ltd.

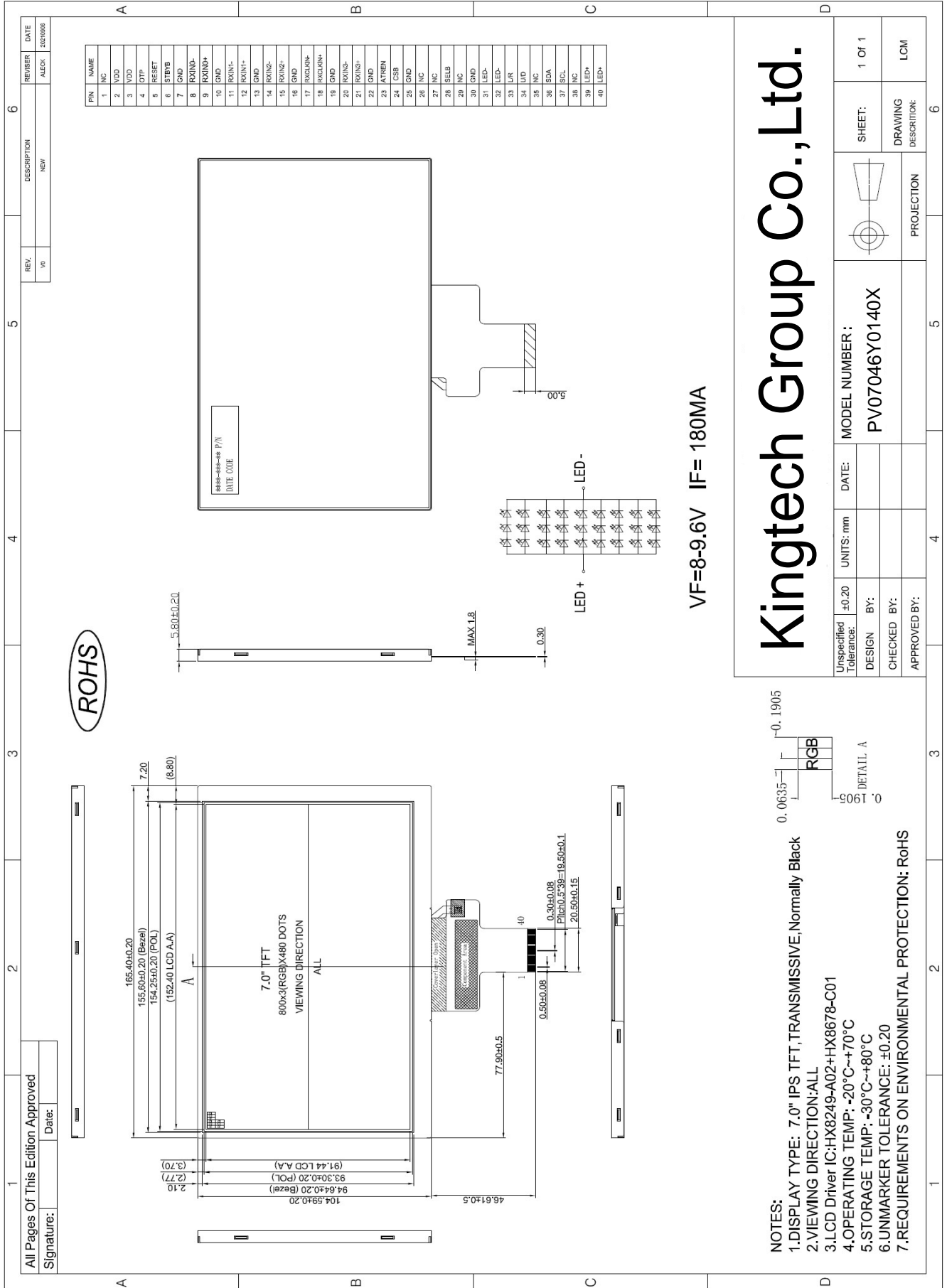
If the event of unforeseen problem or unspecified items may occur, naturally shall negotiate and agree to solution.

2. General Information

TITEM	STANDARD VALUES	UNITS
LCD type	7.0" TFT	--
Dot arrangement	800(RGB)×480	dots
Color filter array	RGB vertical stripe	--
Display mode	Normally Black	-
Eyes Viewing Direction	80/80/80/80	
Module size	165.4(W)×104.59(H)×5.8(T)	mm
Active area	152.4 (W)×91.44(H)	mm
Dot pitch	190.5(W)×190.5(H)	um
Interface	LVDS 8 bit or 6 bit	--
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Back Light	27 White LED	--
Weight	TBD	g



3. External Dimensions





4. Interface Description

PIN	PIN NAME	DESCRIPTION	Remark
1	NC	No connection	
2-3	VDD	Power Voltage for digital circuit	
4	OTP	No connection	
5	RESET	Reset pin. The chip is in reset state when RESETB=0.	
6	STBYB	Standby mode setting pin. The chip is in standby mode when STBYB=0.	
7	GND	Ground	
8	RXIN0-	-LVDS differential data input	
9	RXIN0+	+LVDS differential data input	
10	GND	Ground	
11	RXIN1-	-LVDS differential data input	
12	RXIN1+	+LVDS differential data input	
13	GND	Ground	
14	RXIN2-	-LVDS differential data input	
15	RXIN2+	+LVDS differential data input	
16	GND	Ground	
17	RXCLKIN-	-LVDS differential clock input	
18	RXCLKIN+	+LVDS differential clock input	
19	GND	Ground	
20	RXIN3-	-LVDS differential data input	
21	RXIN3+	+LVDS differential data input	
22	GND	Ground	
23	ATREN	No connector (programming by factory)	
24	CSB	No connector (programming by factory)	
25	GND	Ground	
26-27	NC	No connection	
28	SELB	Selection for 6 bit/8bit LVDS data input Low: 6bit input mode High or NC: 8bit input mode	Internal pull Hi
29	NC	No connection	
30	GND	Ground	
31-32	LED-	LED Cathode	
33	L/R	Horizontal inversion	Internal pull Hi
34	U/D	Vertical inversion	Internal pull Hi
35	NC	No connection	
36	SDA	No connector (programming by factory)	
37	SCL	No connector (programming by factory)	
38	NC	No connection	
39-40	LED+	LED Anode	

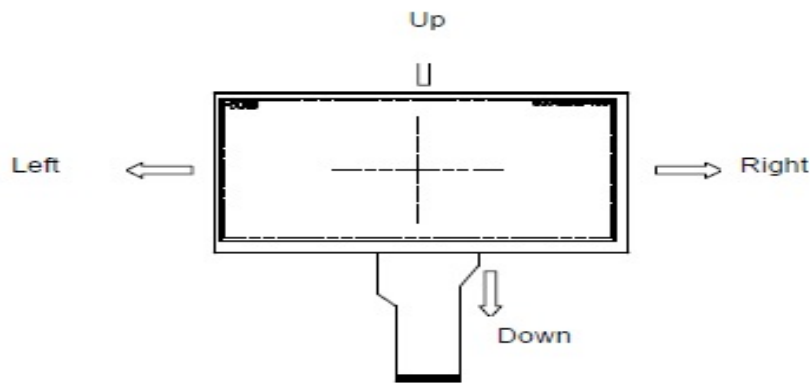


Note:

- 1. L/R: left or right setting
- U/D: up or down setting

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

Definition of scanning direction:



5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	VDD	-0.5	5	V
Operating Temperature	T _{OP}	-20	70	°C
Storage Temperature	T _{ST}	-30	80	°C

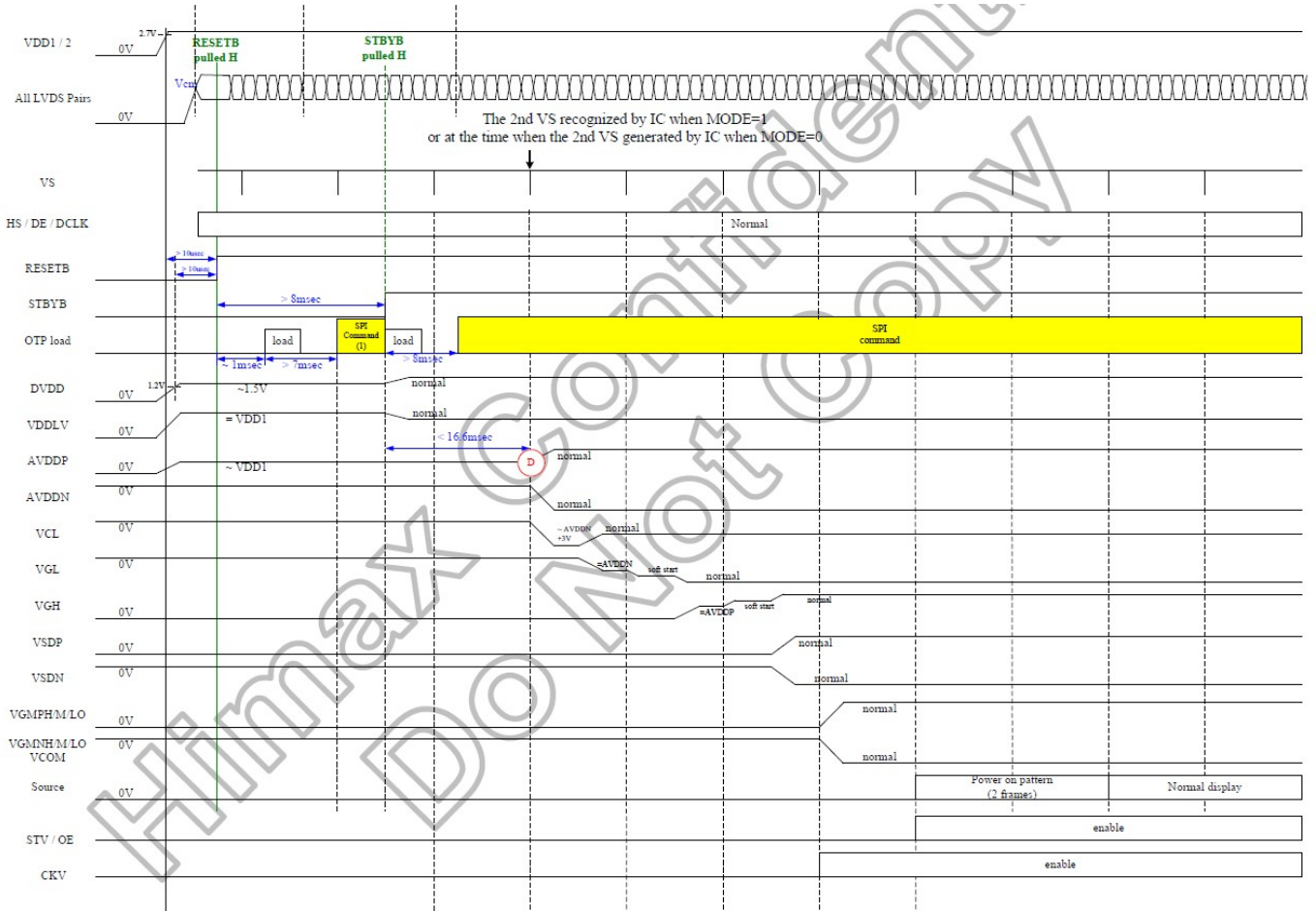
6. Operating Conditions

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Voltage	VDD	3.0	3.3	3.6	V	
Input logic high voltage	V _{IH}	0.7*VDD	-	VDD+0.3	V	
Input logic low voltage	V _{IL}	GND-0.3	-	0.3*VCC	V	
Current for Power	I _{DD}	-	100	160	mA	VDD=3.3V



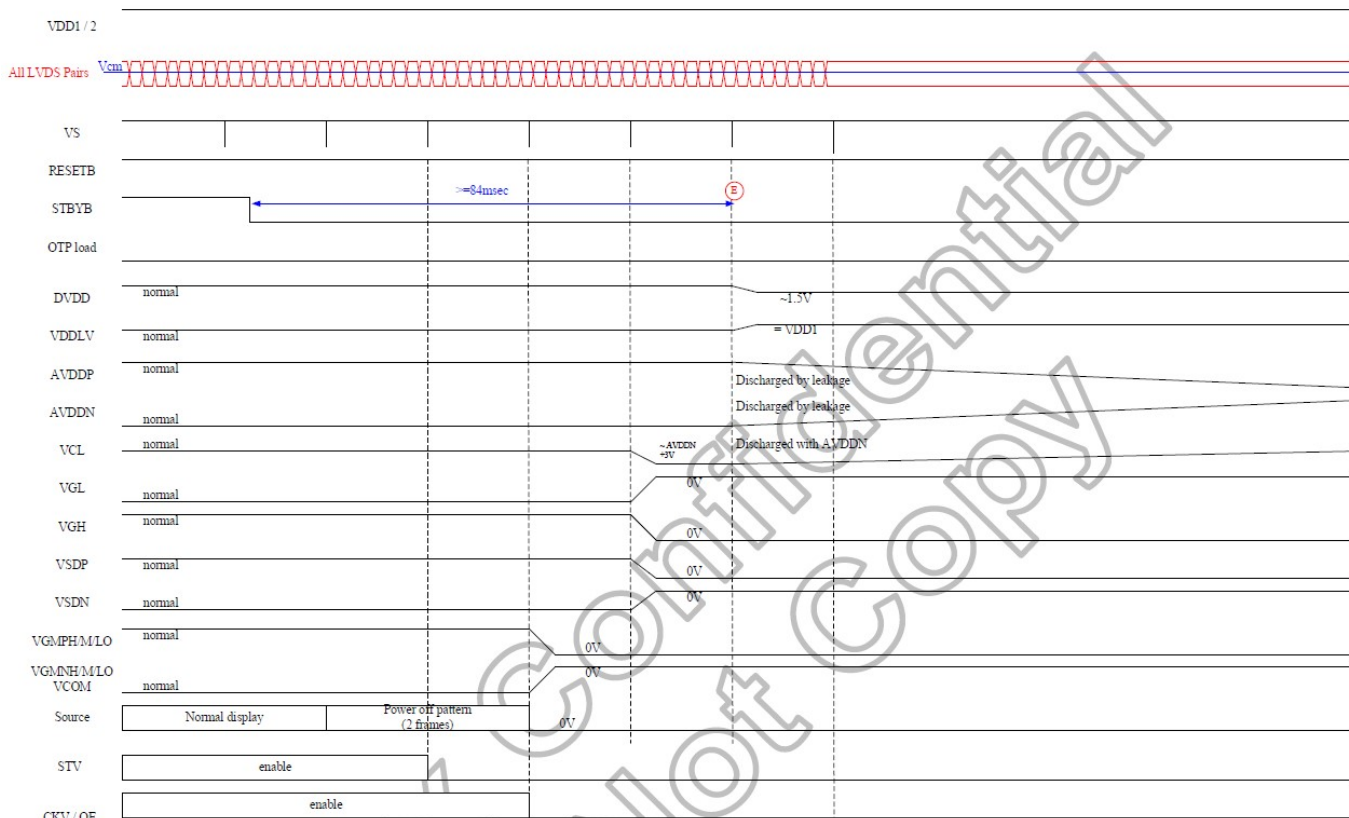
7. Timing Characteristics

7.1 Power on sequence

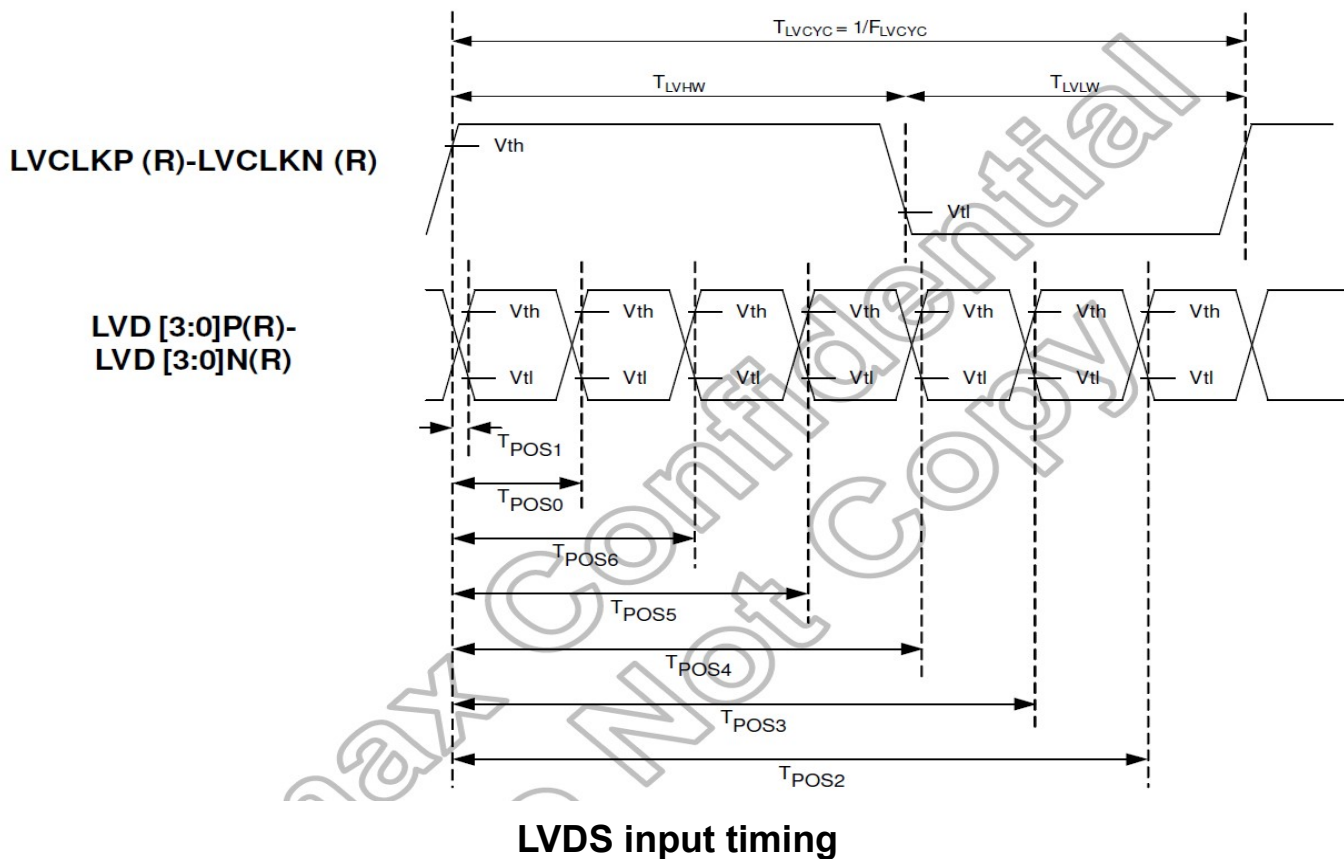


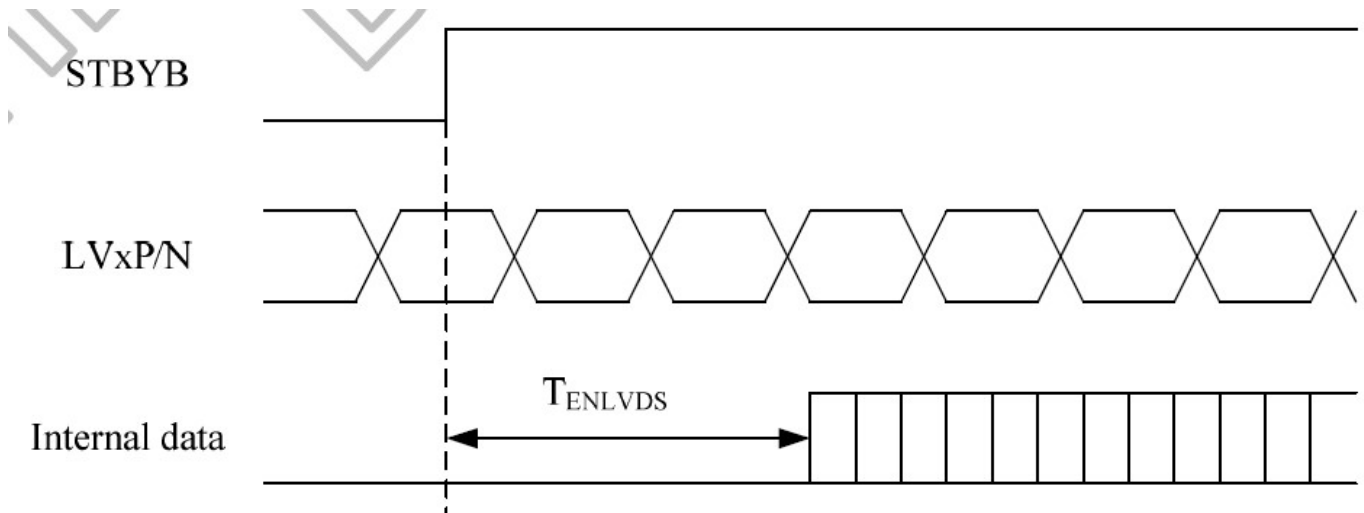


7.2 Power off sequence



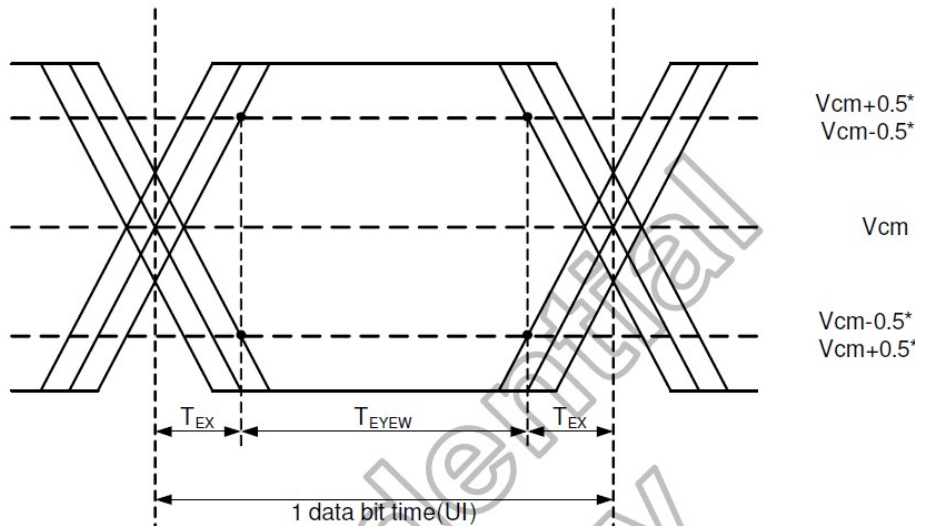
7.3 LVDS interface



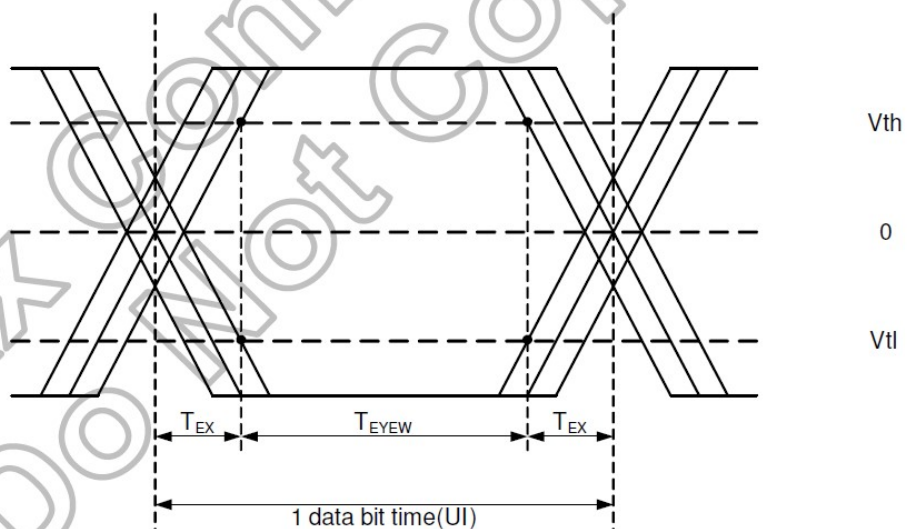


LVDS wake up time

**Single-ended:
LVD [3:0]P,
LVD [3:0]N**



**Differential:
LVD [3:0]P-LVD [3:0]N**

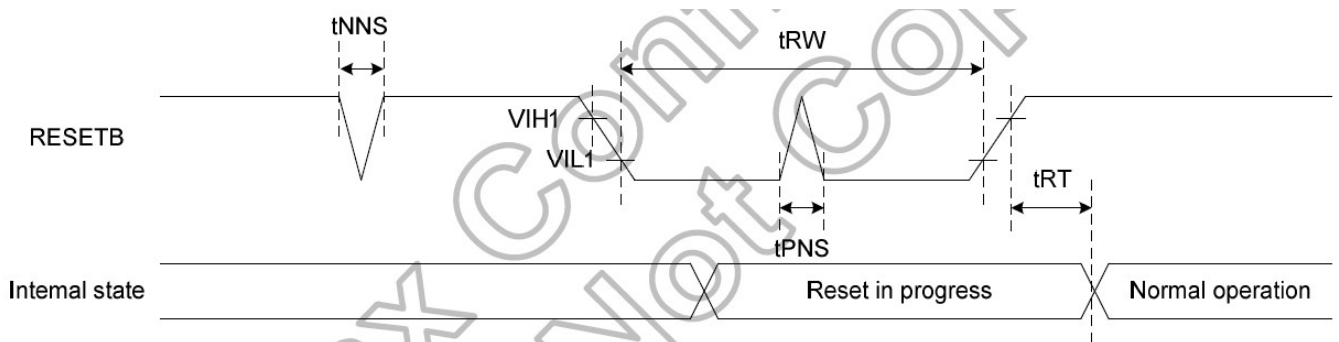


LVDS input eye diagram



Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock frequency	FLVCYC	10	-	85	MHz
Clock period	TLVCYC	11.76	-	100	nsec
1 data bit time	UI	-	1/7	-	TLVCYC
Clock high time	LVHW	2.9	4	4.1	UI
Clock low time	LVLW	2.9	3	4.1	UI
Position 1	TPOS1	-0.2	0	0.2	UI
Position 0	TPOS0	0.8	1	1.2	UI
Position 6	TPOS6	1.8	2	2.2	UI
Position 5	TPOS5	2.8	3	3.2	UI
Position 4	TPOS4	3.8	4	4.2	UI
Position 3	TPOS3	4.8	5	5.2	UI
Position 2	TPOS2	5.8	6	6.2	UI
Input eye width	TEYEW	0.6	-	-	UI
Input eye border	TEX	-	-	0.2	UI
LVDS wake up time	TENLVDS	-	-	150	μs

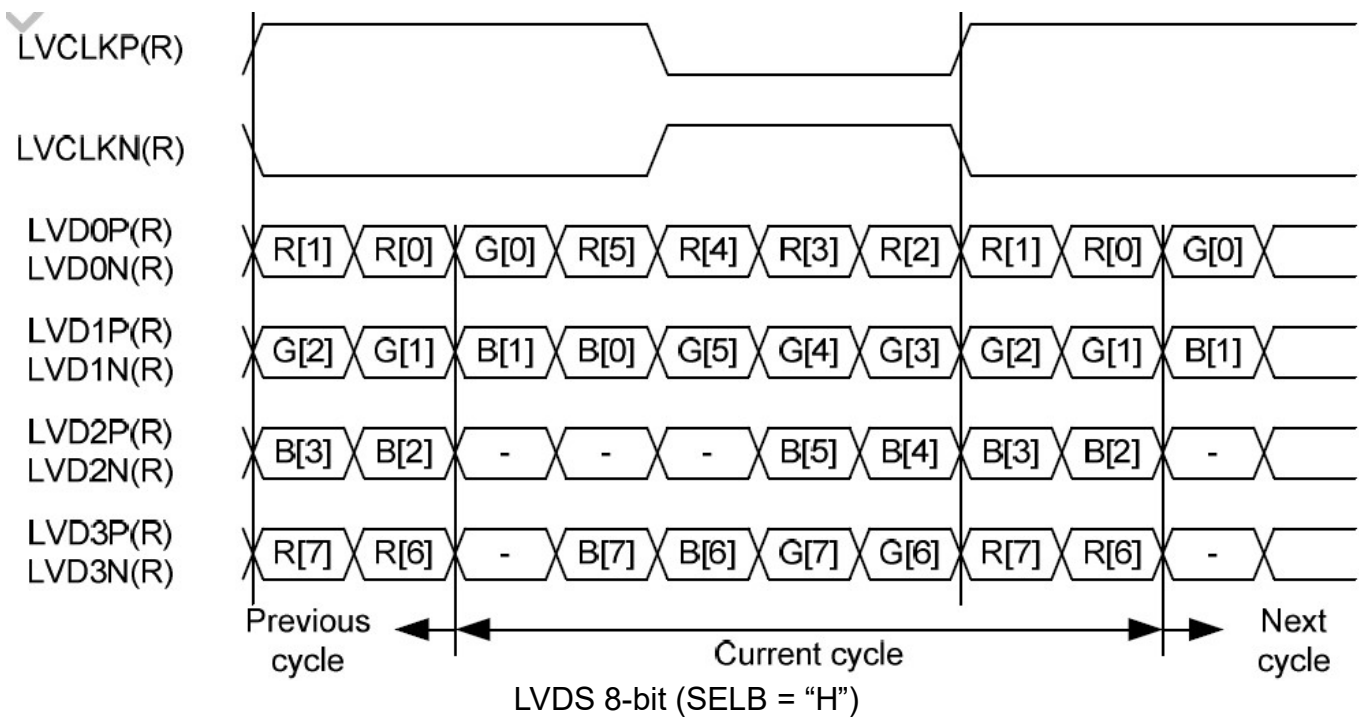
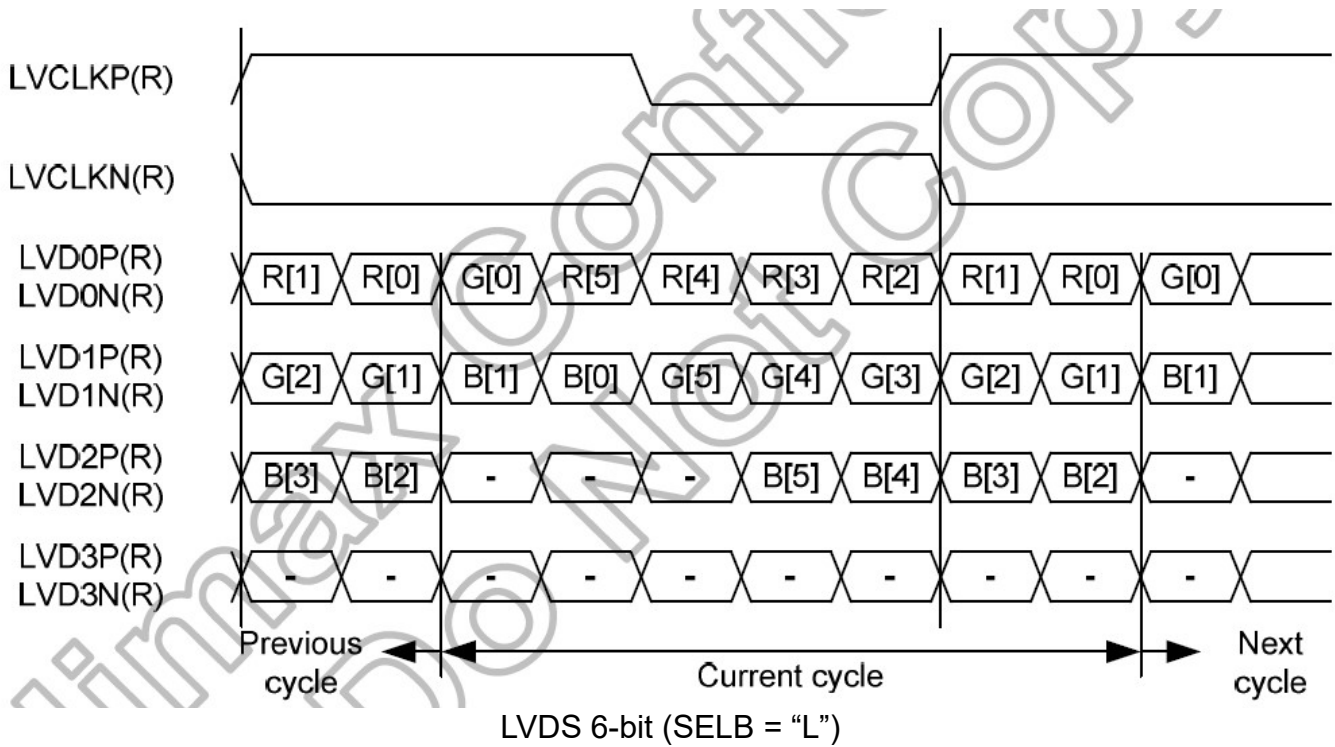
7.4 Reset timing



Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Reset pulse width	tRW	10	-	-	μs
Reset complete time	tRT	-	-	5	μs
Positive spike noise width	tPNS	-	-	100	ns
Negative spike noise width	tNNS	-	-	100	ns

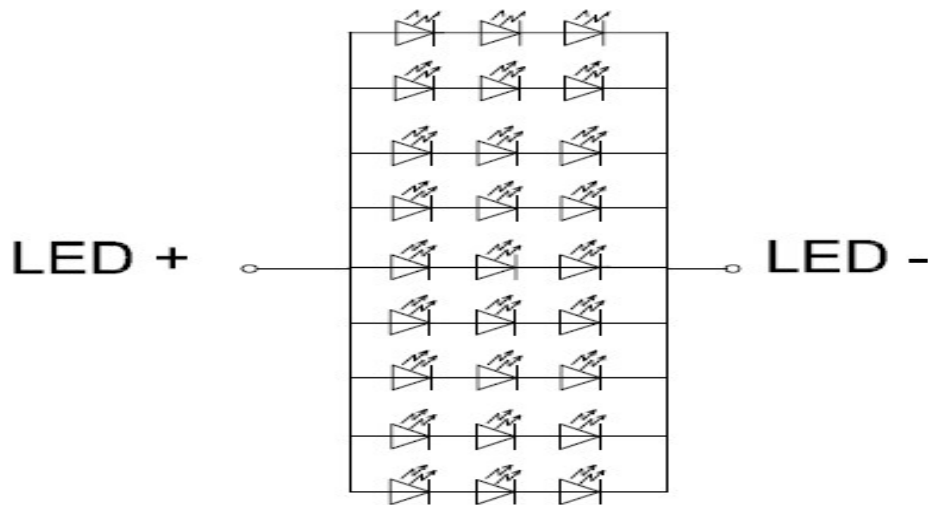


7.5 Data Input Format





8. Backlight Characteristics



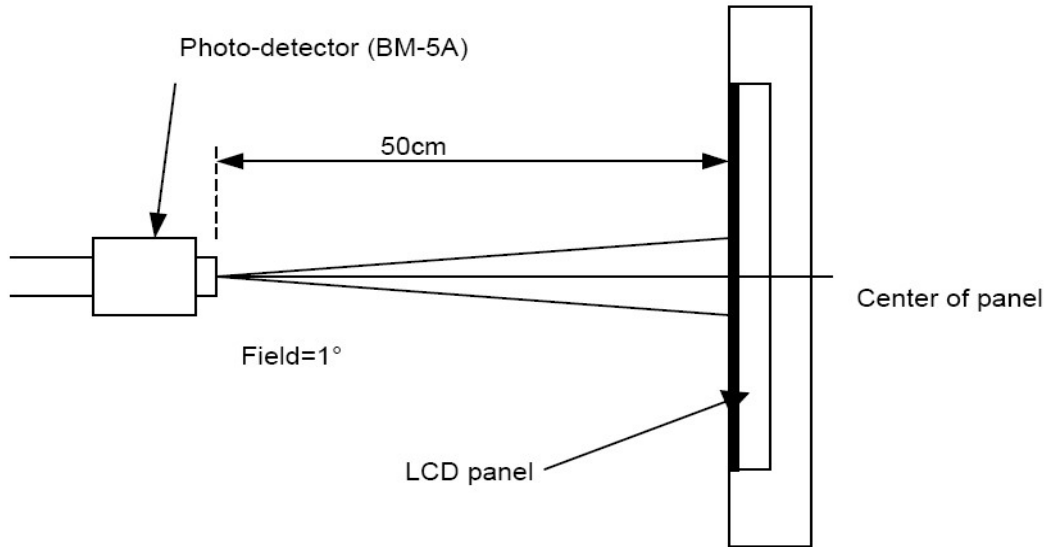
Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	VF	8.0	9.0	9.6	V	IF=180mA
Supply Current	IF	-	180	-	mA	-
Luminous Intensity for LCM	-	400	500	-	cd/m ²	IF=180mA
Uniformity for LCM	-	80	-	-	%	IF=180mA
Life Time	-	50000	-	-	Hr	IF=180mA
Backlight Color	White					

9. Optical Characteristics

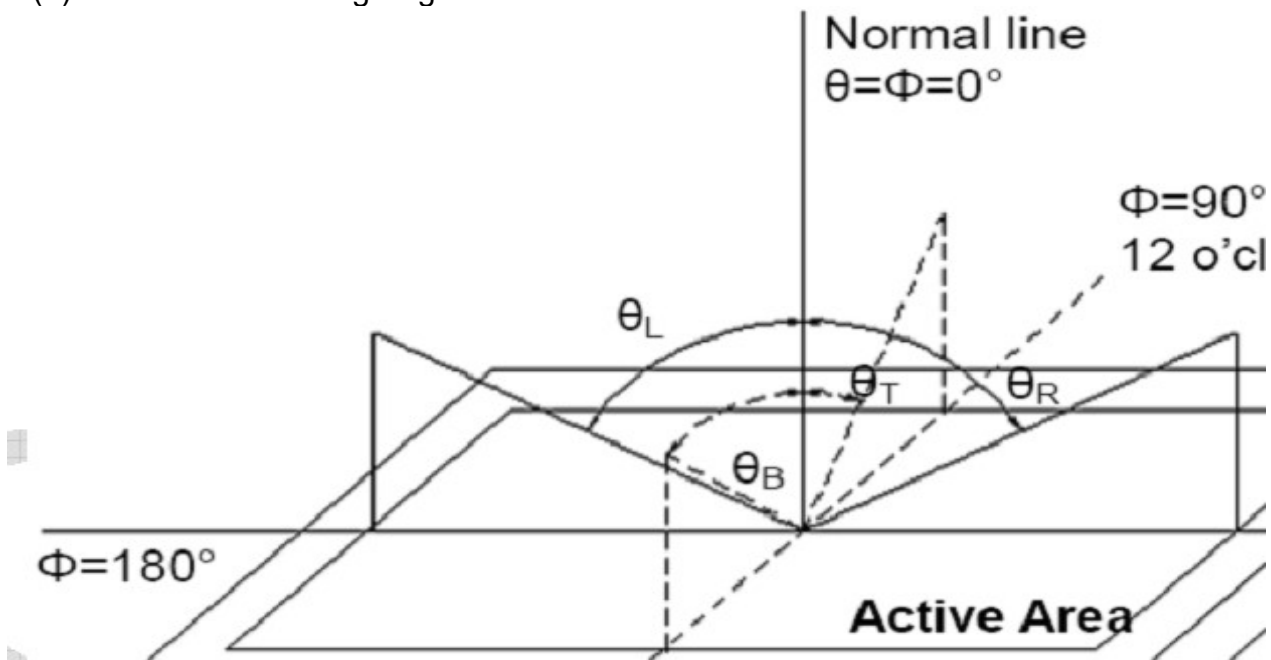
Item	Conditions	Min.	Typ.	Max.	Unit	Note	
Viewing Angle (CR>10)	Horizontal	θ_L	-	80	-	degree	(1),(2),(6)
		θ_R	-	80	-		
	Vertical	θ_T	-	80	-		
		θ_B	-	80	-		
Contrast Ratio	Center	800	1000	-	-	(1),(3),(6)	
Response Time	Tr+Tf	-	25	35	ms	(1),(4),(6)	
CF Color Chromaticity (CIE1931)	Red x	Typ. -0.05	0.63	Typ. +0.05	-	(1), (6)	
	Red y		0.36		-		
	Green x		0.30		-		
	Green y		0.64		-		
	Blue x		0.13		-		
	Blue y		0.06		-		
	White x		0.30		-		
	White y		0.34		-		



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)

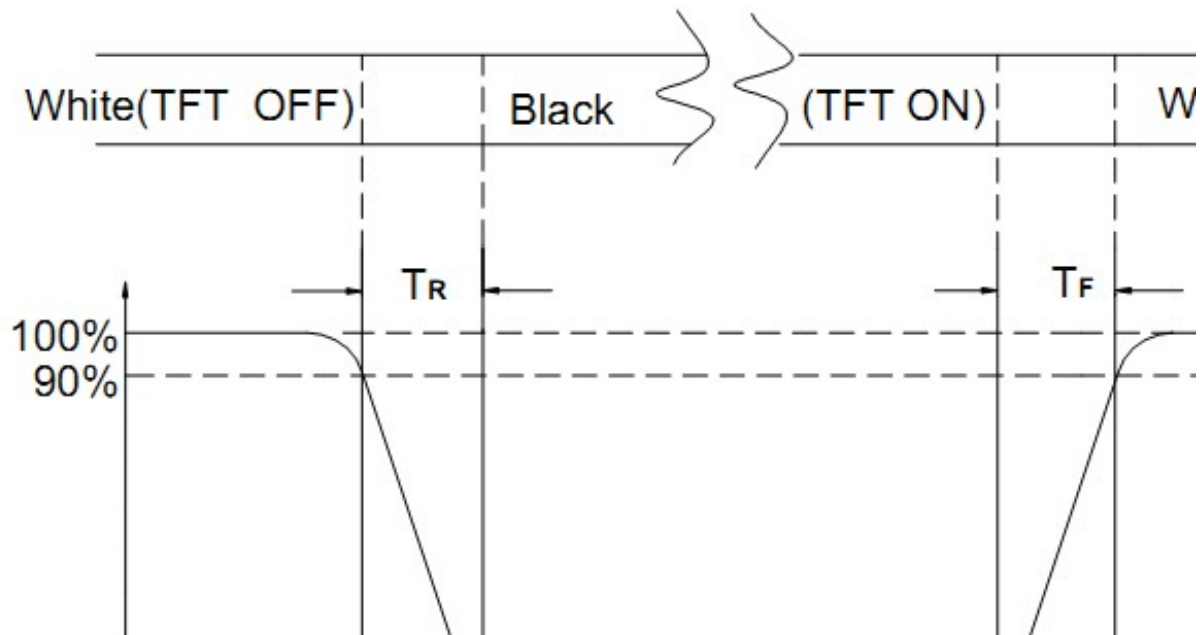
The contrast ratio can be calculated by the following expression

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

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)

$$\text{Transmittance} = \text{Center Luminance of LCD} / \text{Center Luminance of Back Light} \times 100\%$$

Note (6) Definition of color chromaticity (CIE1931)

Color coordinates measured at the center point of LCD

Note (7) Transmittance is the Value with WV Polarizer and BLU



10. Reliability Test Conditions and Methods

NO.	Test Items	Test Condition											
①	High Temperature Storage	Keep in $80^{\circ}\text{C} \pm 2^{\circ}\text{C} \times 240\text{Hrs}$ Surrounding temperature, then storage at normal condition 4hrs.											
②	Low Temperature Storage	Keep in $-30^{\circ}\text{C} \pm 2^{\circ}\text{C} \times 240\text{Hrs}$ Surrounding temperature, then storage at normal condition 4hrs.											
③	High Temperature Operating Test	$70^{\circ}\text{C} \pm 2^{\circ}\text{C} \times 240\text{Hrs}$											
④	Low Temperature Operating Test	$-20^{\circ}\text{C} \pm 2^{\circ}\text{C} \times 240\text{Hrs}$											
⑤	High Temperature / High Humidity Storage Test	Keep in $60^{\circ}\text{C} \pm 5^{\circ}\text{C} \times 90\% \text{RH} \times 240\text{Hrs}$ Surrounding temperature, then storage at normal condition 4hrs.											
⑥	Temperature Cycling Storage Test	$ \begin{array}{ccccccc} & -30^{\circ}\text{C} & \rightarrow & +25^{\circ}\text{C} & \rightarrow & 80^{\circ}\text{C} & \rightarrow & +25^{\circ}\text{C} \\ & (30\text{mins}) & & (5\text{mins}) & & (30\text{mins}) & & (5\text{mins}) \\ & & & \leftarrow & & \rightarrow & & \\ & & & & & & & 30 \text{ Cycle} \end{array} $ Surrounding temperature, then storage at normal condition 4hrs.											
⑦	ESD Test	Air Discharge: Apply 4 KV with 5 times Discharge for each polarity +/-	Contact Discharge: Apply 2K V with 5 times discharge for each polarity +/-										
		1. Temperature ambience : $15^{\circ}\text{C} \sim 35^{\circ}\text{C}$ 2. Humidity relative : 30%~60% 3. Energy Storage Capacitance (Cs + Cd): $150\text{pF} \pm 10\%$ 4. Discharge Resistance (Rd): $330\Omega \pm 10\%$ 5. Discharge, mode of operation: Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : $\pm 5\%$)											
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 2Hrs											
⑨	Drop Test (Packaged)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Packing Weight (Kg)</th> <th>Drop Height (cm)</th> </tr> </thead> <tbody> <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> </tbody> </table>		Packing Weight (Kg)	Drop Height (cm)	0 ~ 45	122	45.4 ~ 90.8	76	90.8 ~ 454	61	Over 454	46
		Packing Weight (Kg)	Drop Height (cm)										
0 ~ 45	122												
45.4 ~ 90.8	76												
90.8 ~ 454	61												
Over 454	46												
		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

11.1.1. THE METHOD OF PRESERVING GOODS

AFTER DELIVERY OF GOODS FROM AMSON TO PURCHASER. PURCHASER SHALL STORE GOODS AT -10°C TO 40°C ,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 TIME WITHIN FOURTEEN DAYS.

11.1.3. WARRANTY POLICY

AMSON WILL PROVIDE ONE-YEAR WARRANTY FOR THE PRODUCTS ONLY IF UNDER NORMAL OPERATING CONDITIONS. AMSON WILL REPLACE NEW PRODUCTS FOR THESE DEFECTS



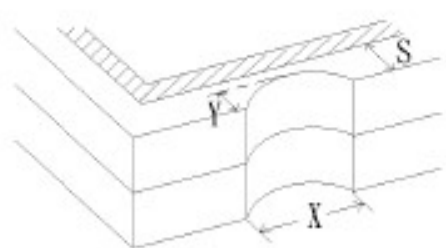
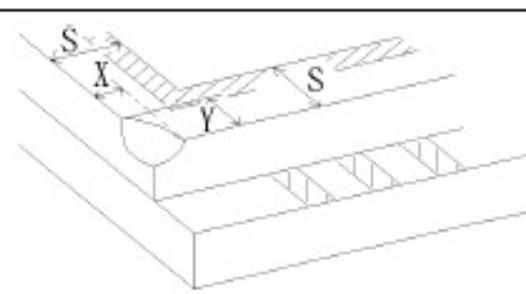
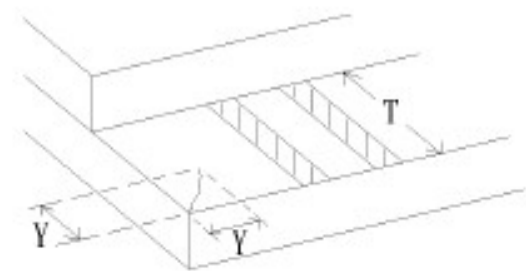
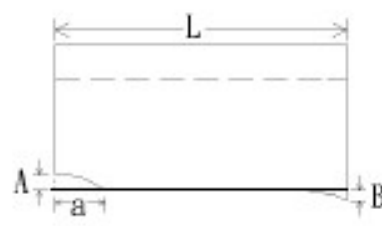
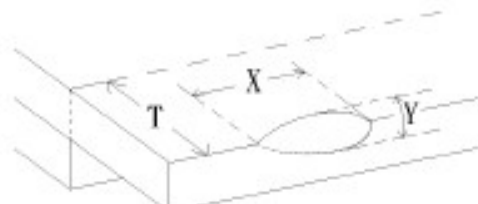
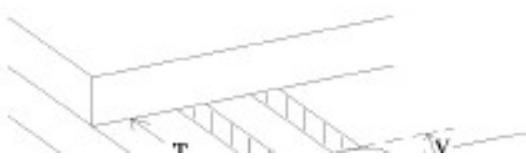
11.3. INSPECTION PLAN :

CLASS	ITEM	JUDGEMENT
PACKING & INDICATE	1. OUTSIDE AND INSIDE PACKAGE	"MODEL NO." , "LOT NO." AND "Q SHOULD INDICATE ON THE PACI
	2. MODEL MIXED AND QUANTITY	OTHER MODEL MIXED.....RE QUANTITY SHORT OR OVER.....RE
	3. PRODUCT INDICATION	"MODEL NO." SHOULD INDICATE THE PRODUCT
ASSEMBLY	4. DIMENSION, LCD GLASS SCRATCH AND SCRIBE DEFECT.	ACCORDING TO SPECIFICATION DRAWING.
APPEARANCE	5. VIEWING AREA	POLARIZER EDGE OR LCD'S SEAL IS VISABLE IN THE VIEWING AREREJECTED
	6. BLEMISH · BLACK SPOT · WHITE SPOT IN THE LCD AND LCD GLASS CRACKS	ACCORDING TO STANDARD OF V INSPECTION(INSIDE VIEWING AR
	7. BLEMISH · BLACK SPOT WHITE SPOT AND SCRATCH ON THE POLARIZER	ACCORDING TO STANDARD OF V INSPECTION(INSIDE VIEWING AR
	8. BUBBLE IN POLARIZER	ACCORDING TO STANDARD OF V INSPECTION(INSIDE VIEWING AR
	9. LCD'S RAINBOW COLOR	STRONG DEVIATION COLOR (OF RING) OF LCD.....REJECTED. OR ACCORDING TO LIMITED SAM (IF NEEDED, AND INSIDE VIEWIN
	10. ELECTRICAL AND OPTICAL CHARACTERISTICS (CONTRAST· VOP ·	ACCORDING TO SPECIFICATION DRAWING . (INSIDE VIEWING AR



NO.	CLASS	ITEM	JUDGEMENT																				
11. 4. 1	MINOR	BLACK AND WHITE SPOT FOREIGN MATERIEL DUST IN THE CELL BLEMISH SCRATCH	<p>(A) ROUND TYPE:</p> <table border="1"> <thead> <tr> <th>DIAMETER (mm.)</th> <th>ACCEPTABLE</th> </tr> </thead> <tbody> <tr> <td>$\varnothing \leq 0.15$</td> <td>Distance</td> </tr> <tr> <td>$0.15 < \varnothing \leq 0.3$</td> <td>2 (Distance)</td> </tr> <tr> <td>$0.3 < \varnothing$</td> <td>0</td> </tr> </tbody> </table> <p>NOTE: $\varnothing = (\text{LENGTH} * \text{WIDTH}) / 2$</p> <p>(S) ROUND TYPE:</p> <table border="1"> <thead> <tr> <th>LENGTH</th> <th>WIDTH</th> <th>ACCEPTABLE</th> </tr> </thead> <tbody> <tr> <td>$L \leq 4.0$</td> <td>$W \leq 0.03$</td> <td>Distance</td> </tr> <tr> <td></td> <td>$0.03 < W \leq 0.05$</td> <td>2 (Distance)</td> </tr> <tr> <td></td> <td>$0.05 < W$</td> <td>FOLLOW</td> </tr> </tbody> </table> <p>NOTE: $\varnothing = (\text{LENGTH} * \text{WIDTH}) / 2$</p>	DIAMETER (mm.)	ACCEPTABLE	$\varnothing \leq 0.15$	Distance	$0.15 < \varnothing \leq 0.3$	2 (Distance)	$0.3 < \varnothing$	0	LENGTH	WIDTH	ACCEPTABLE	$L \leq 4.0$	$W \leq 0.03$	Distance		$0.03 < W \leq 0.05$	2 (Distance)		$0.05 < W$	FOLLOW
DIAMETER (mm.)	ACCEPTABLE																						
$\varnothing \leq 0.15$	Distance																						
$0.15 < \varnothing \leq 0.3$	2 (Distance)																						
$0.3 < \varnothing$	0																						
LENGTH	WIDTH	ACCEPTABLE																					
$L \leq 4.0$	$W \leq 0.03$	Distance																					
	$0.03 < W \leq 0.05$	2 (Distance)																					
	$0.05 < W$	FOLLOW																					
11. 4. 2	MINOR	BUBBLE IN POLARIZER DENT ON POLARIZER	<table border="1"> <thead> <tr> <th>DIAMETER</th> <th>ACCEPTABLE</th> </tr> </thead> <tbody> <tr> <td>$\varnothing < 0.2$</td> <td>Distance</td> </tr> <tr> <td>$0.2 < \varnothing \leq 0.3$</td> <td>2 (Distance)</td> </tr> <tr> <td>$0.3 < \varnothing$</td> <td>0</td> </tr> </tbody> </table>	DIAMETER	ACCEPTABLE	$\varnothing < 0.2$	Distance	$0.2 < \varnothing \leq 0.3$	2 (Distance)	$0.3 < \varnothing$	0												
DIAMETER	ACCEPTABLE																						
$\varnothing < 0.2$	Distance																						
$0.2 < \varnothing \leq 0.3$	2 (Distance)																						
$0.3 < \varnothing$	0																						
11. 4. 3	MINOR	Dot Defect	<table border="1"> <thead> <tr> <th>Items</th> <th>ACC. Q'T</th> </tr> </thead> <tbody> <tr> <td>Bright dot</td> <td>$N \leq 2$ (Distance)</td> </tr> <tr> <td>Dark dot</td> <td>$N \leq 3$ (Distance)</td> </tr> </tbody> </table> <p>Pixel Define :</p> <p>Note</p> <p>1: The definition of dot: The size of dot over 1 of whole dot is regarded as one dot. <u>Definition:</u> <1/2 dot and visible by 50%</p>	Items	ACC. Q'T	Bright dot	$N \leq 2$ (Distance)	Dark dot	$N \leq 3$ (Distance)														
Items	ACC. Q'T																						
Bright dot	$N \leq 2$ (Distance)																						
Dark dot	$N \leq 3$ (Distance)																						



NO.	CLASS	ITEM	JUDGEMENT
11.4.4	MINOR	LCD GLASS CHIPPING	 <p>Y ></p>
11.4.5	MINOR	LCD GLASS CHIPPING	 <p>X or</p>
11.4.6	MAJOR	LCD GLASS GLASS CRACK	 <p>Y ></p>
11.4.7	MAJOR	LCD GLASS SCRIBE DEFECT	 <p>1. 2. l</p>
11.4.8	MINOR	LCD GLASS CHIPPING (ON THE TERMINAL AREA)	 <p>Φ =</p>
11.4.9	MINOR	LCD GLASS CHIPPING (ON THE TERMINAL AREA)	 <p>Y ></p>



12. Handling Precautions

12.1 Mounting method

The LCD panel of KINGTECH TFT module consists of two thin glass plates with polarizers which easily be damaged. And since the module is 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 uses C-MOS LSI drivers, so we recommend 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 than the limit causes 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 than the operating temperature range and on the other hand at higher temperature LCD's show 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.

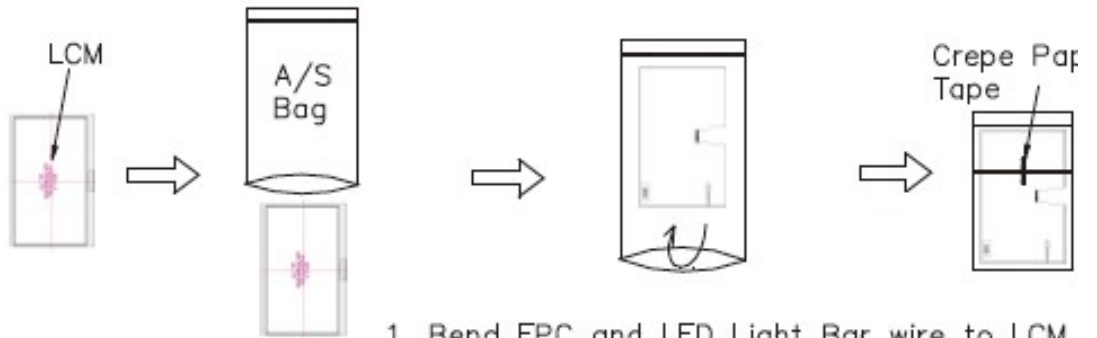
13.2

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



1. Bend FPC and LED Light Bar wire to LCM backside.
2. Fix with crepe paper tape .
3. Put LCM into A/S BAG .

Partition + Corrugated Bar*2 

Corrugated paper

DUST-PROOF-BAG 

