



深圳市希恩凯电子有限公司

SHENZHEN CNK ELECTRONIC CO.,LTD.

## APPROVAL SHEET

## 承认书

Customer 客户名称	
Part NO. 产品型号	<b>CNKT0700-14001A</b>
Product type 产品内容	Mode: Transmissive type .Normally white. TFT LCD Module
Remarks 备注栏	<input type="checkbox"/> APPROVAL FOR SEPCIFICATIONS ONLY <input checked="" type="checkbox"/> APPROVAL FOR SEPCIFICATIONS AND SAMPLE
Signature by Customer: 客户确认签章	

Issued by 制作	Checked by 审查	Approved by 核准





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## 1. General Description

CNKT0700-14001A is a 800RGB\*480 dots matrix TFT LCD module. The LCM can be easily accessed by micro-controller.

## 2. Features

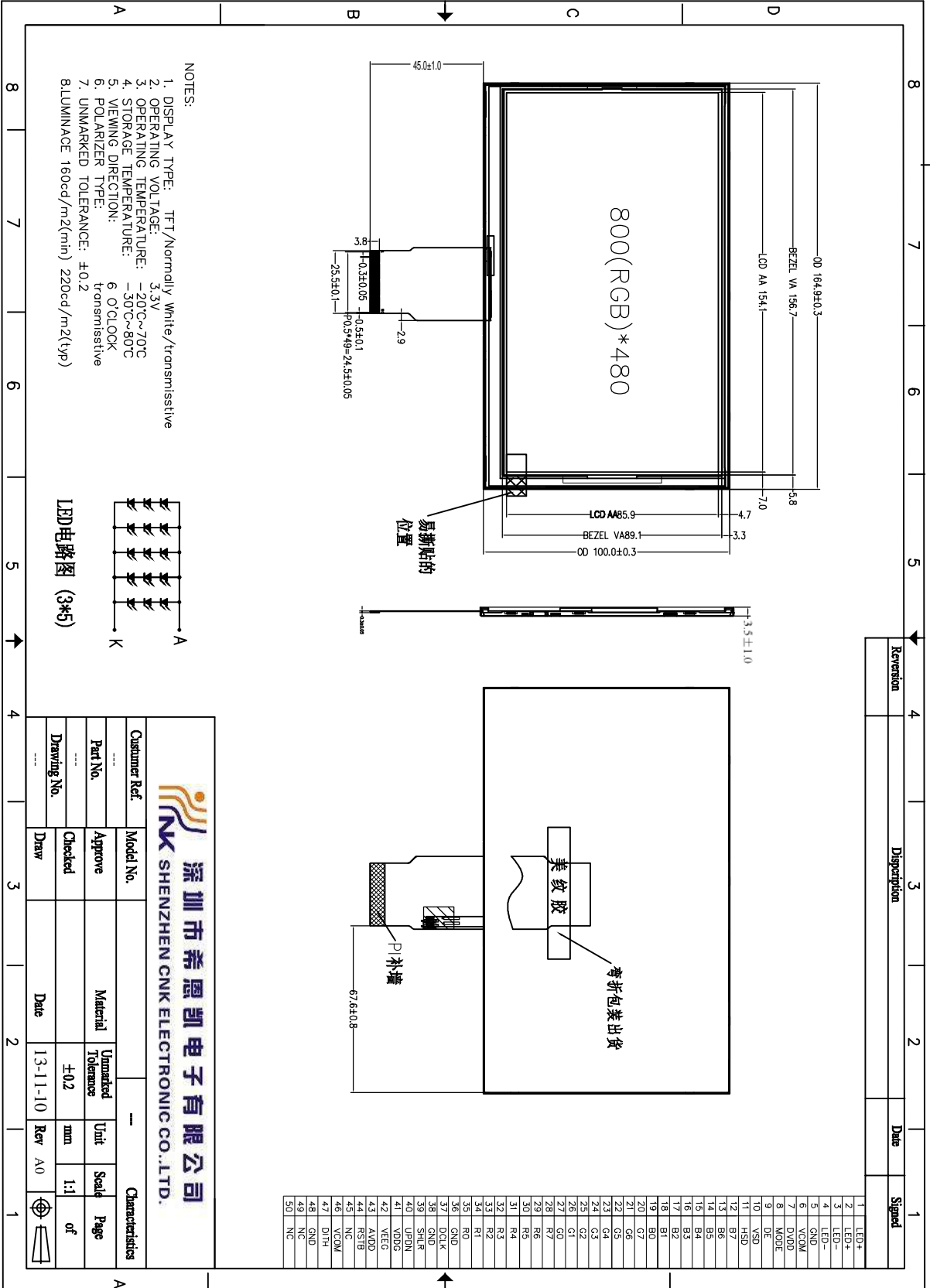
Display Mode	Trans-missive
	a-TFT
Display Format	Graphic 800RGB*480 Dot-matrix
Input Data	Parallel RGB 24-bit
Viewing Direction	6 O'clock
Driver	HX8264+HX8664

## 3. Mechanical Specification

Item	Specifications	Unit
Dimensional outline	164x100x3.5	mm
Resolution	800(H) * 3(RGB) x 480(V)	pixels
LCD Active area	154.08x85.92	mm
Pixel Pitch (mm)	0.1926(W)x 0.179(H)	mm



4. Mechanical Dimens



## 5. Maximum Ratings

ITEM	Symbol	Min	Max	Unit	Note
Digital Supply Voltage	VDD	-0.5	5	V	
Analog Supply Voltage	AVDD	-0.5	15	V	
Gate On Voltage	VDDG	-0.3	+42	V	
Gate Off Voltage	VEEG	-20	+0.3	V	
Gate On - Gate Off Voltage	VDDG-VEEG	12	40	V	
Operation Temperature	Top	-20	70	°C	Note 1
Storage Temperature	Tstg	-30	80	°C	Note 1

Note1 : If users use the product out of the environmental operation range ( temperature and humidity ) , it will have visual quality concerns.

## 6. Electrical Characteristics

### Recommended Operating Condition

ITEM	Symbol	Min	TYP	Max	Unit	Note
Digital Supply Voltage	VDD	2.7	3.3	3.6	V	
Analog Supply Voltage	AVDD	6.5	8.6	13.5	V	
Gate On Voltage	VDDG	16.5	23	24.0	V	
Gate Off Voltage	VEEG	-8.2	-7.8	-7.4	V	
Common Electrode Driving Signal	VCOM	2.6	2.8	3.0	V	

Note1 : Please adjust VCOM to make the flicker level be minimum.

## 7. Backlight Characteristic

Item	Symbol	Min	Typical	Max	Unit
LED module Forward voltage	V <sub>F</sub>	-	9.6V	-	V
LED module current	I <sub>F</sub>	75			mA
L/G Surface Luminance ★1	L <sub>S</sub>	2800	3100		Cd/m <sup>3</sup>
LCM Surface brightness uniform ★2	L <sub>D</sub>	80			%

★ 1 Test condition is:

- (a) Center point on active area.
- (b) Best Contrast.

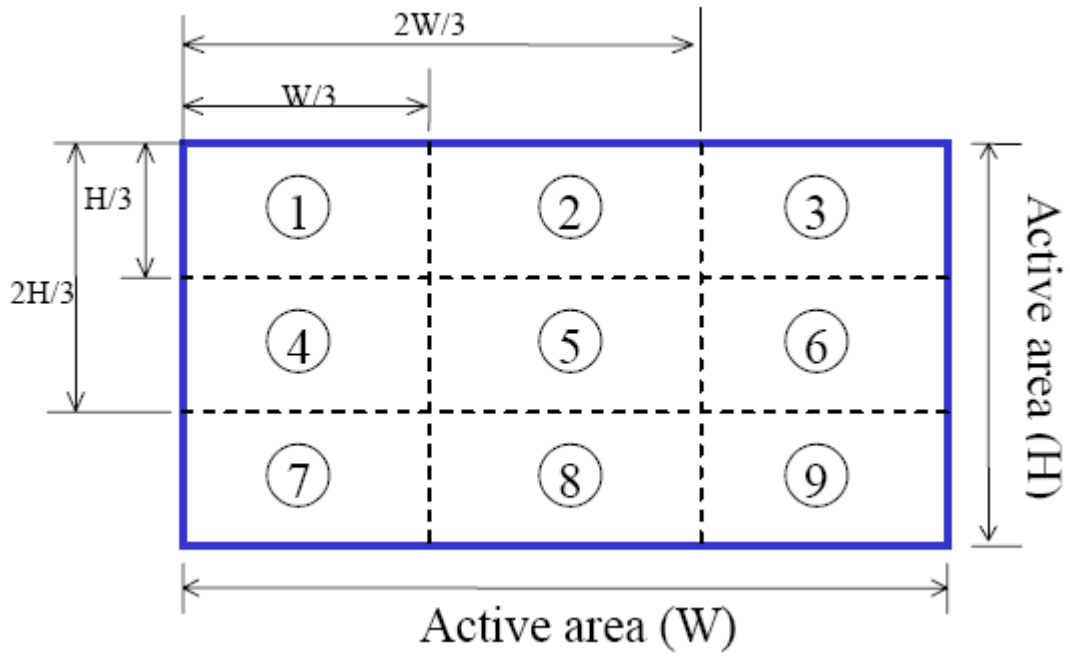
★2 Uniform measure condition:

- (1) Measure 9 point. Measure location show below;
- (2) Uniform = (Min. brightness / Max. brightness) \* 100%
- (3) Best Contrast.



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## 8. Module Function Description

### 8.1 Pin Descriptions

<i>Pin.No</i>	<i>Symbol</i>	<i>Function</i>
1,2	VLED+	Power for LED backlight (Anode)
3,4	VLED-	Power for LED backlight (Cathode)
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	VSD	Vertical sync input. Negative polarity
11	HSD	Horizontal sync input. Negative polarity
12-19	B7-R0	Blue Data
20-27	G7-G0	Green Data
28-35	R7-R0	Red Data
36	GND	Ground
37	DCLK	Clock signal
38	GND	Display on/off
39	SHLR	Left or Right Display Control
40	UPDN	Up / Down Display Control
41	VDDG	Positive Power for TFT
42	VEEG	Negative Power for TFT
43	AVDD	Analog Power
44	RSTB	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10K $\Omega$ , C=1 $\mu$ F)
45	NC	Not connect
46	VCOM	Common Voltage
47	DITH	Dithering setting DITH= " H " 6bit resolution(last 2 bit of input data truncated) DITH= " L " 8bit resolution(default setting)
48	GND	Power ground
49	NC	Not connect
50	NC	Not connect

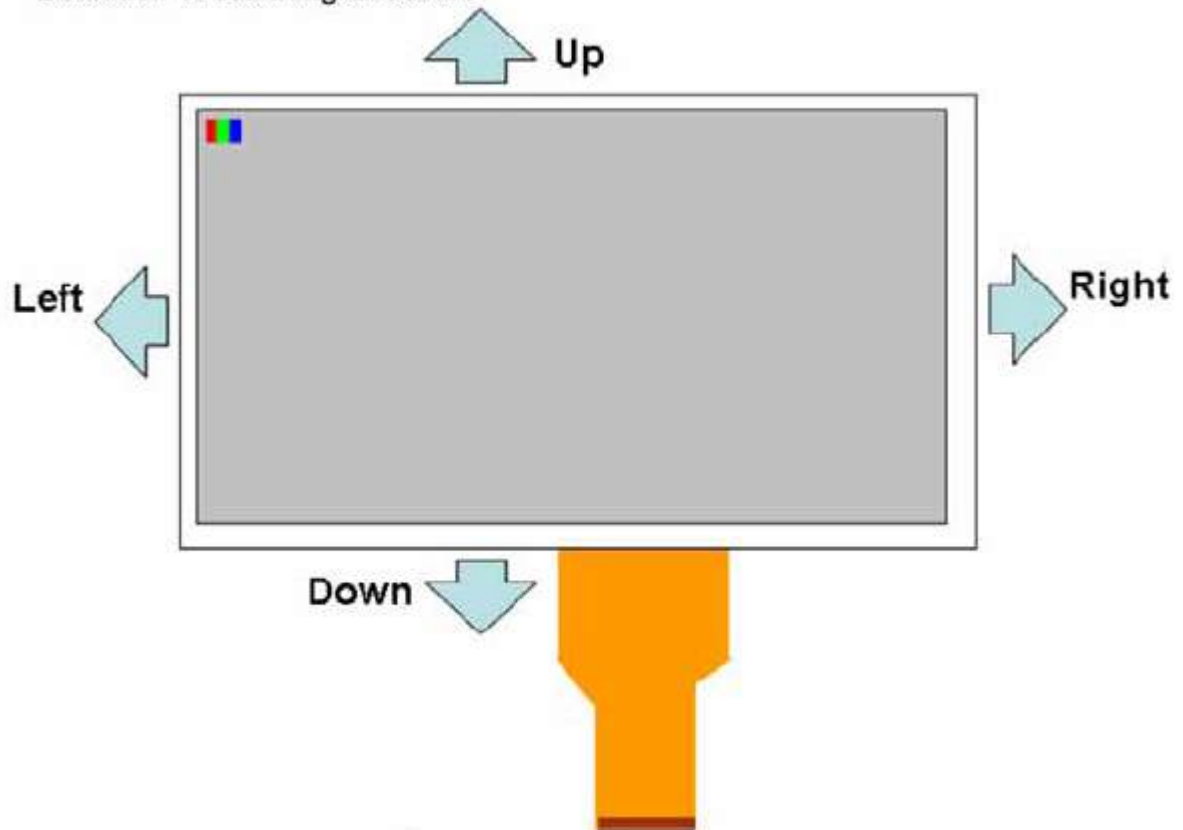




【Note1】 SHLR : left or right setting  
UPDN : up or down setting

SHLR	UPDN	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.





## 8.2 Timing characteristics(RGB input mode).

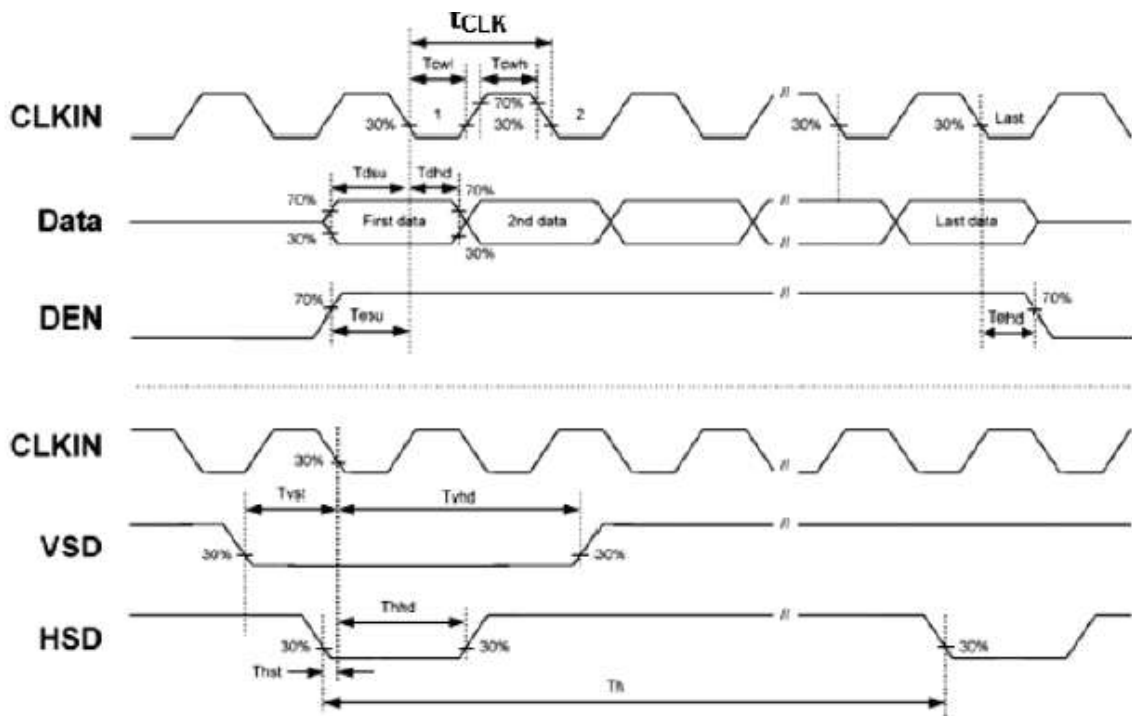
- Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd	800			DCLK
DCLK frequency	fclk	-	30	50	MHz
One Horizontal Line	th	889	928	1143	DCLK
HS pulse width	thpw	1	48	255	DCLK
HS Back Porch (Blanking)	thb	88			DCLK
HS Front Porch	thfp	1	40	255	DCLK
DE mode Blanking	th-thd	85	128	512	DCLK

- Vertical timing

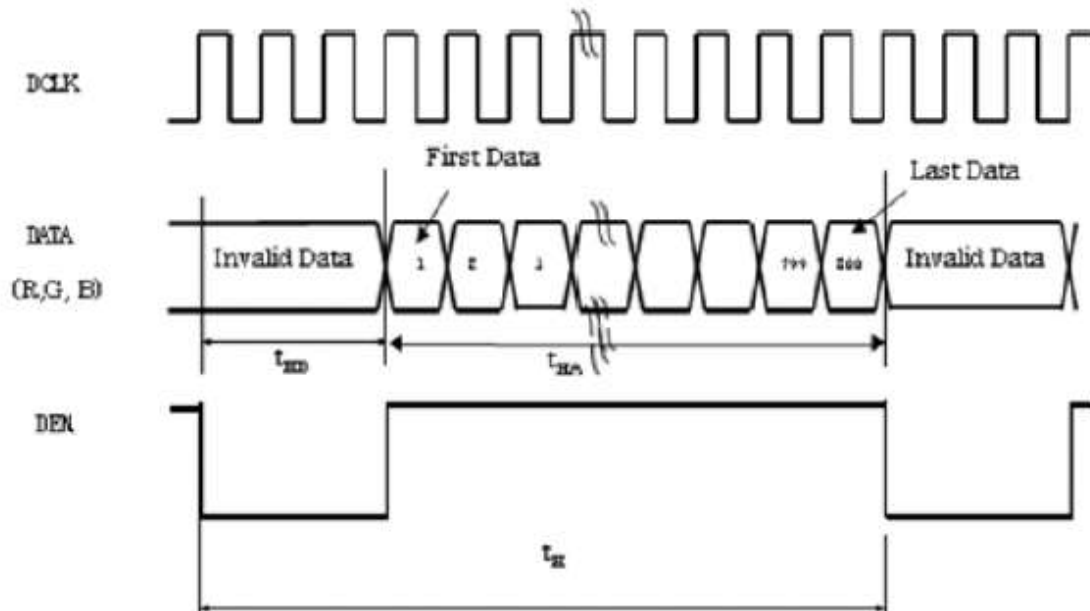
Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd	480			T <sub>H</sub>
VS period time	tv	513	525	787	T <sub>H</sub>
VS pulse width	tvpw	3	3	255	T <sub>H</sub>
VS Back Porch (Blanking)	tvb	32			T <sub>H</sub>
VS Front Porch	tvfp	1	13	255	T <sub>H</sub>
DE mode Blanking	tv-tvd	4	45	255	T <sub>H</sub>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLKIN Frequency	Fclk	-	40	50	MHz	VDD=3.0V~3.6V
CLKIN Cycle Time	Tclk	20	25	-	ns	-
CLKIN Pulse Duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso	64			CLKIN	-
Time from HSD to LD	Thld	64			CLKIN	-
Time from HSD to STV	Thstv	2			CLKIN	-
Time from HSD to CKV	Thckv	20			CLKIN	-
Time from HSD to OEV	Thoev	4			CLKIN	-
LD Pulse Width	Twld	10			CLKIN	-
CKV Pulse Width	Twckv	66			CLKIN	-
OEV Pulse Width	Twoev	74			CLKIN	-



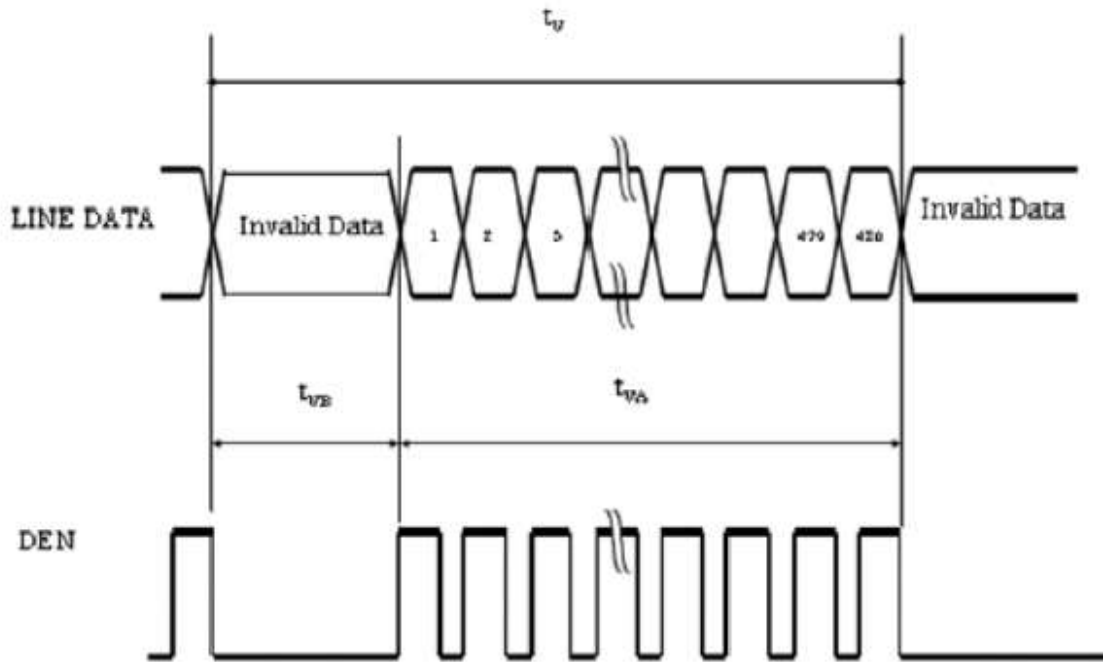
DE mode

Horizontal timing :



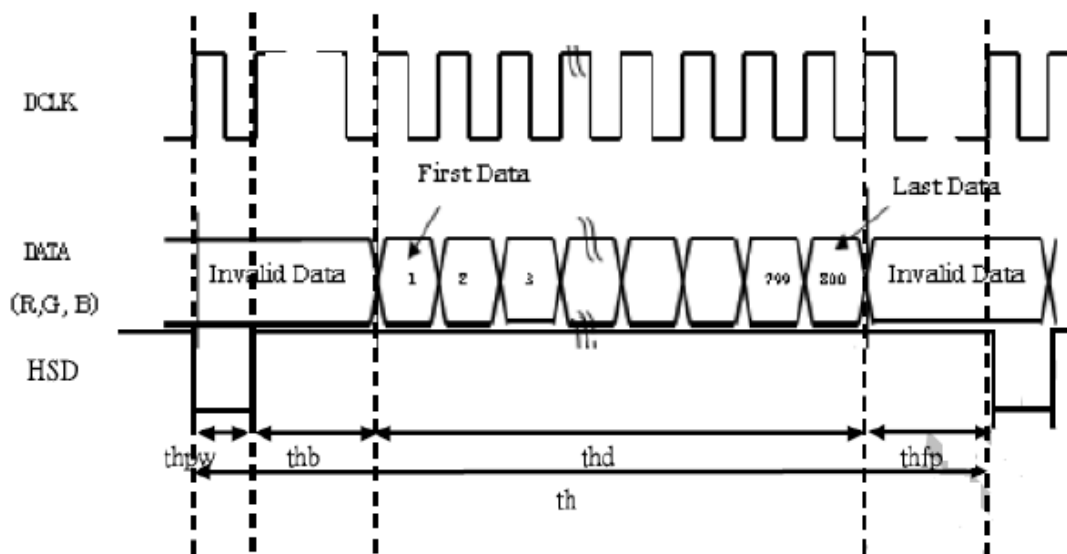


Vertical timing :



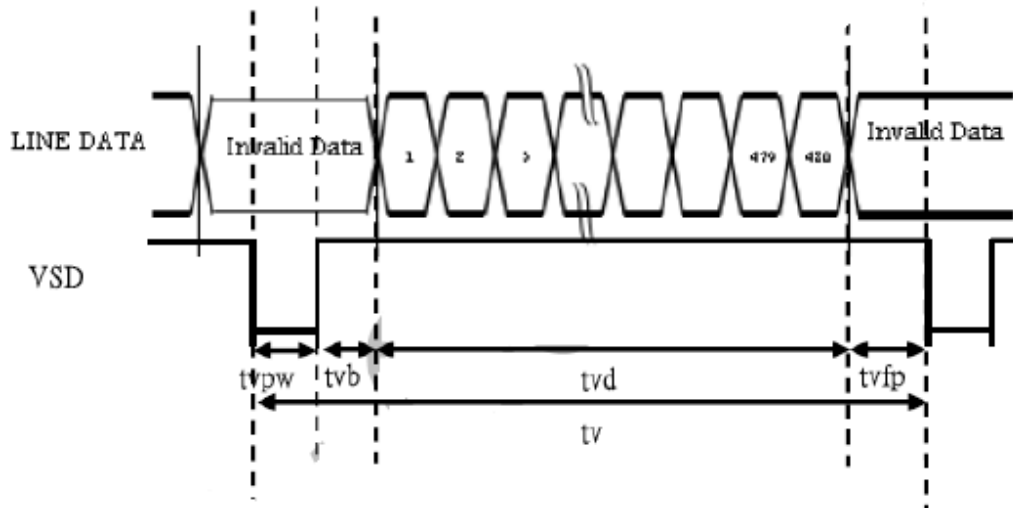
SYNC mode

Horizontal timing :





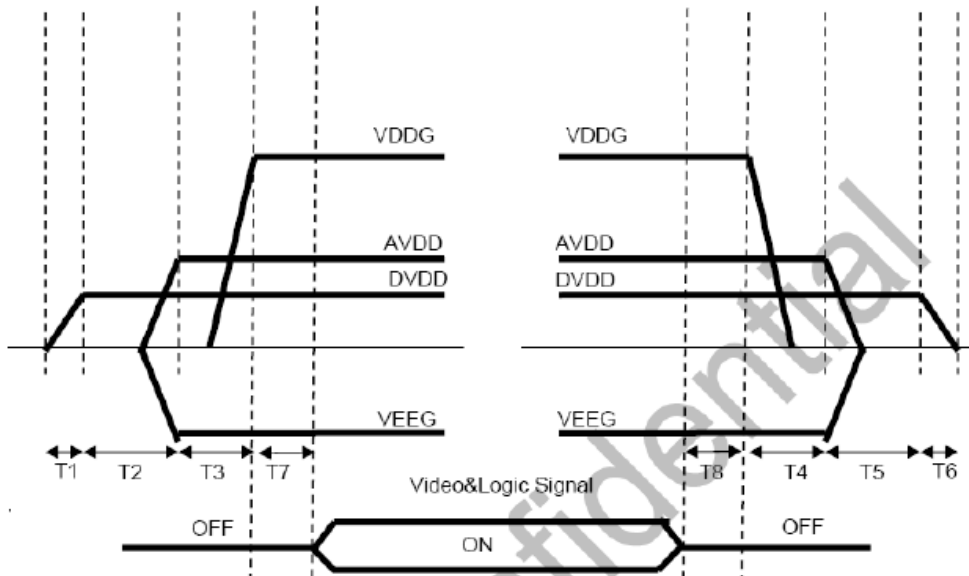
Vertical timing :



### 8.3 POWER,SIGNAL SEQUENCE

Power On : DVDD→AVDD/VEEG→VDDG→Video & Logic Signal

Power Off : Video & Logic Signal→VDDG→AVDD/VEEG→DVDD



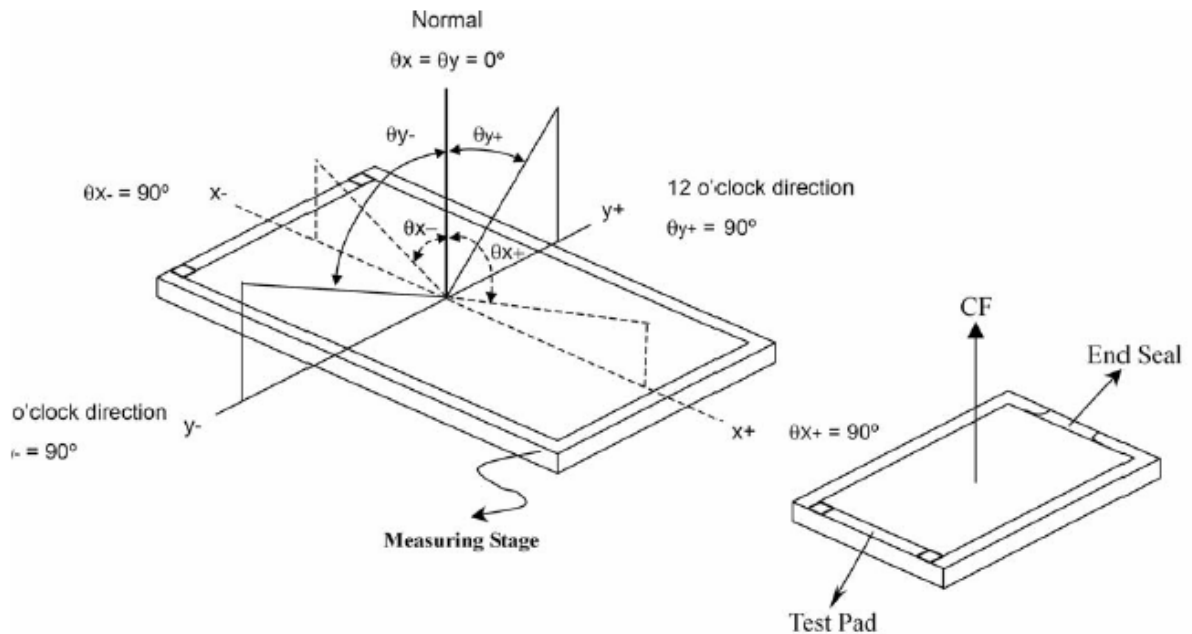
- |                           |                           |
|---------------------------|---------------------------|
| $0 < T1 \leq 10\text{ms}$ | $T5 > 0\text{ms}$         |
| $T2 > 20\text{ms}$        | $T6 > 0\text{ms}$         |
| $T3 > 10\text{ms}$        | $0 < T7 \leq 10\text{ms}$ |
| $T4 > 0\text{ms}$         | $0 < T8 \leq 10\text{ms}$ |

## 9. Electro-optical Characteristics

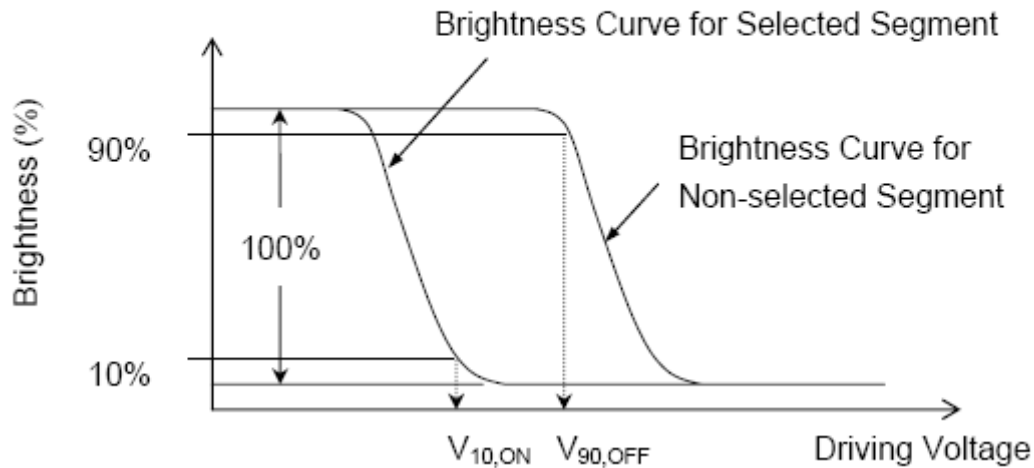
Item	Symbol	Conditions	Temp	Min.	Typ.	Max.	Unit	Note
Response Time	$T_R$	$\theta = \phi = 0$	25°C		TBD	TBD	msec	NOTE2
	$T_F$				TBD	TBD		
Viewing Angle Range	$\phi = 0^{\circ} (6'' )$	$\phi = 90^{\circ} (3'' )$		$\phi = 180^{\circ} (12'' )$		$\phi = 270^{\circ} (9'' )$		NOTE3
$\theta (25^{\circ}\text{C}) \text{ CR} \geq 10$	TBD	TBD		TBD		TBD		NOTE3

The above “viewing angle” is the measuring position with the largest contrast ratio. Not for good image quality. Viewing direction for good image quality is 6 O'clock.

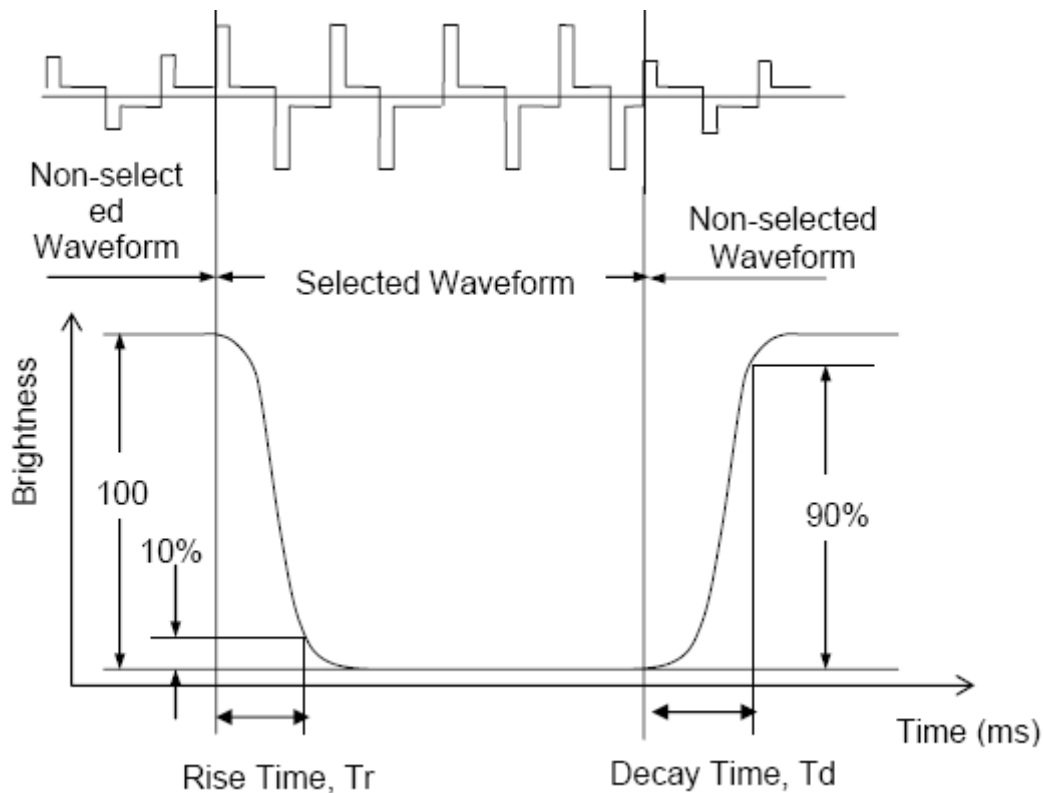
- For panel only
- Electro-Optical Characteristics Test Method



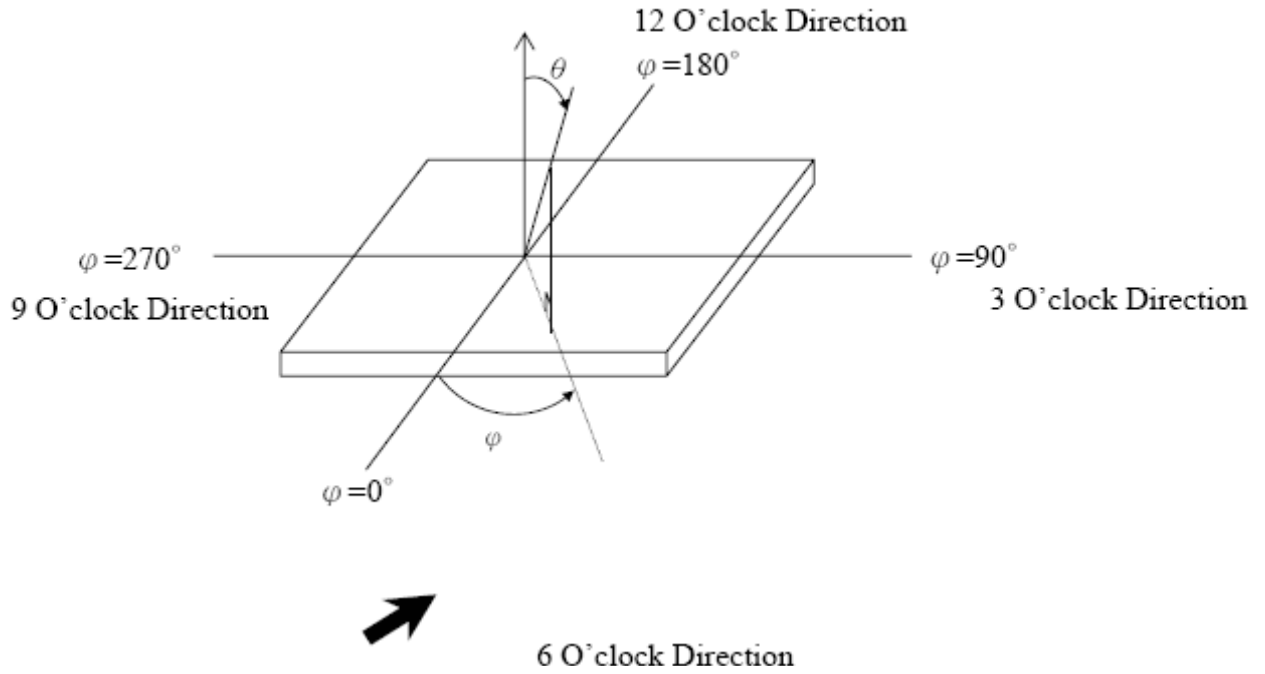
$$V_{op} = (V_{10, ON} + V_{90, OFF})/2$$



**.Note2.Definition of Optical Response Time:**

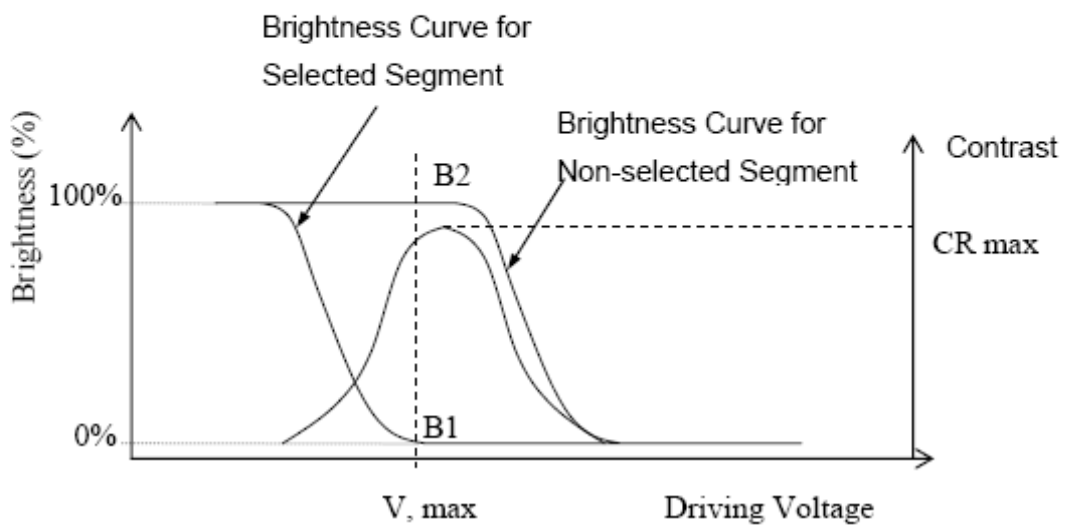


**.Note3.Definition of Viewing Angle  $\theta$  and  $\phi$  :**



**Note4.Definition of Contrast ratio (CR):**

$$CR = \frac{\text{Brightness of Non-selected Segment (B2)}}{\text{Brightness of Selected Segment (B1)}}$$





## 10. Reliability

### Test condition

NO.	ITEM	CONDITION	CRITERION
1	High Temperature Non-Operating Test	80°C*240Hrs	。 No Defect Of Operational Function In Room Temperature Are Allowable 。 IDD of LCM in Pre-and Post-Test Should Follow Specification
2	Low Temperature Non-Operating Test	-30°C*240Hrs	
3	High Temperature/Humidity Operating Test	60°C*90%RH*96Hrs	
4	High Temperature Operating Test	70°C*96Hrs	
5	Low Temperature Operating Test	-20°C*96Hrs	
6	Thermal Shock Test	-20°C (30Min) ↔70°C (30Min) *10CYCLES	

Notes:

1. Judgments should be made after exposure in room temperature for two hours.
2. The distill water is used for the high temperature/humidity test.
3. The sample above is individually for every reliability tests condition.

## 11. Inspection standards

### 1. AQL(Acceptable Quality Level)

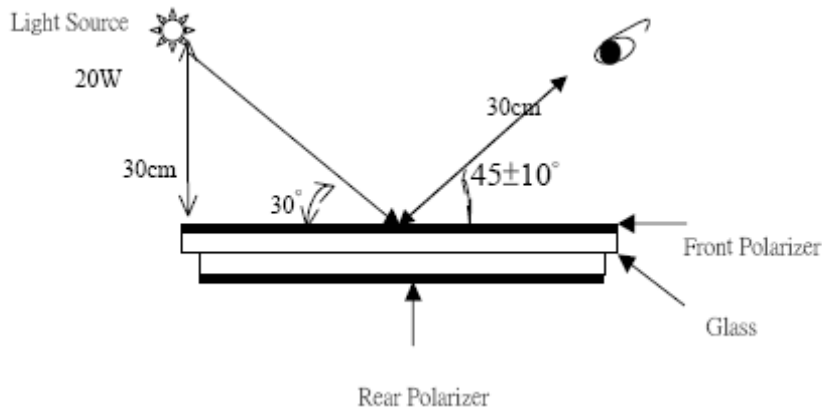
AQL of major and minor defect.

	MAJOR DEFECT	MINOR DEFECT
AQL	0.65	1.5

### 2. Basic conditions for inspection

The LCM face to us, in normal environment, the lux is  $1000 \pm 200$ . (Darkroom's lux:  $100 \pm 50$ ), About an angle of incidence 30, a distance of 30 cm with an angle of 45 degree to check the products without uncovering the film!


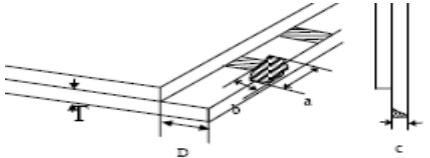
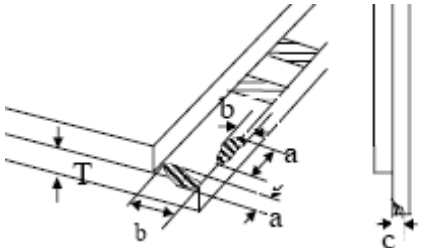
(As shown below)

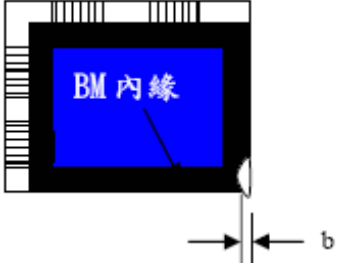


### 3. Inspection item and criteria

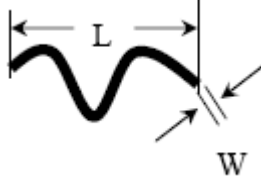
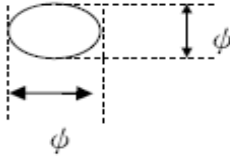
#### 3.1 Visual inspection criterion in immobility

##### 3.1.1 Glass defect

NO	Defect item	Criteria	Remark
1	Dimension Unconformity (Major defect)	By Engineering Drawing	
2	Cracks (Major defect)	1. Linear cracks panel 【Reject】 2. Nonlinear crack contrast by limited sample	
3	Glass extrude the conductive area (minor defect)	a: disregards and no influence assemblage. 1) $b \leq 1/3$ Pin width (non bonding area) 【Accept】 2) bonding area $\leq 0.5$ mm 【Accept】	A: Length, b: Width
4	Pin-side ,conductive area damaged (minor defect)	(a c: disregards) $b \leq 1/3$ of effective length for bonding electrode 【Accept】	a: length, b: Width, c: Thickness 
5	Pin-side, non-conductive area damaged (minor defect)	1) Damage area don't touch the ITO (Including contraposition mark, except scribing mark) 【Accept】 2) $C < T$ $b \cong BM/3$ of width 【Accept】 3) $c = T$ b not touch the seal glue	a: Length, b: Width c: Thickness 


		<b>【Accept】</b>	
		4)a disregards	
6	Non-pin-side damage (minor defect)	$c < T$ 1)b exceeds 1/3Bm  <b>【Reject】</b>  $c = T$ b not touch the seal glue  <b>【Reject】</b>	c: Thickness b: width of  

### 3.1.2 LCD appearance defect(View area)

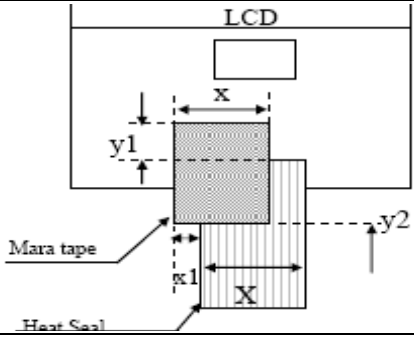
NO	Defect item	Criteria		Remark
		Specification	Allowable	
1	Fiber、glass cratch、polarizer scratch/folded (minor defect)	$W \leq 0.03\text{mm}$	disregard	note1:L: Length, W: Width note2: disregard if out of AA  
		$0.03\text{mm} < W \leq 0.05\text{mm};$ $L \leq 3.0\text{mm}$	2	
		$0.05\text{mm} < W \leq 0.1\text{mm};$ $L \leq 3.0\text{mm}$	1	
		$W > 0.1\text{mm}; L > 3.0\text{mm}$	0	
2	Polarizer bubble、 concave and convex (minor defect)	$\phi \leq 0.2\text{mm}$	disregard	note1: $\phi = (L+W)/2$ , L:Length, W :Width note2:disregard if out of AA
		$0.2\text{mm} < \phi \leq 0.3\text{mm}$	2	
		$0.3\text{mm} < \phi \leq 0.5\text{mm}$	1	
		$0.5\text{mm} < \phi$	0	
3	Black dots、dirty dots、 impurities、eye winker (minor defect)	$\phi \leq 0.15\text{mm}$	disregard	note2:disregard if out of AA  
		$0.15\text{mm} < \phi \leq 0.25\text{mm}$	2	
		$0.25\text{mm} < \phi \leq 0.3\text{mm}$	1	
		$0.3\text{mm} < \phi$	0	
4	Polarizer prick (minor defect)	$\phi \leq 0.1\text{mm}$	disregard	note1: $\phi = (L+W)/2$ , L=Length, W=Width note2:the distance between two dots>5mm
		$0.1\text{mm} < \phi \leq 0.25\text{mm}$	3	
		$\phi > 0.25\text{mm}$	0	

### 3.1.3 FPC

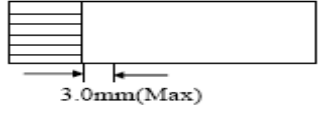
NO	Defect item	Criteria	Remark
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1	Copper screen peel (minor defect)	Copper screen peel <b>【Reject】</b>		
2	No release tape or peel	No release tape or peel <b>【Reject】</b>		
3	Dirty dot and impurity of FPC for customer using side (minor defect)	Specification	Allowable	Note1: Cannot have stride ITO impurities
		$\phi \leq 0.25\text{mm}$	2	
		$\phi > 0.25$	0	

### 3.1.4 Black tape & Mara tape

NO	Defect item	Criteria	Remark
1	FPC or H/S black tape (minor defect)	1. shift spec: 1) glue to the polarize <b>【Reject】</b> 2) IC bare <b>【Reject】</b> 2. left-and-right spec: 1) exceed of FPC edge or H-S edge <b>【Reject】</b> 2) IC bare <b>【Reject】</b>	
2	No black tape (major defect)	No black tape <b>【Reject】</b>	
3	Tape position mistake (minor defect)	Not by engineering drawing	
4	Mara tape defect (minor defect)	Peel before pulling the protecting film <b>【Reject】</b>	

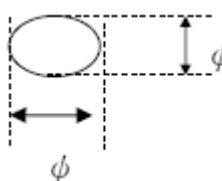
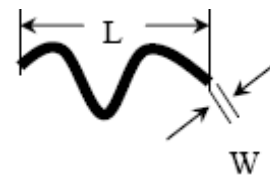
### 3.1.5 Silicon and Taffy glue

NO	Defect item	Criteria	Remark
1	Quantity of silicon (major defect)	Uncover the ITO and circuit area <b>【Reject】</b>	note: compared by engineering
2	Taffy glue (major defect)	1. Uncover the reveal copper area <b>【Reject】</b> 2. Cover layer 0.3mm(Min)~3.0mm(Max) <b>【Reject】</b>	note: if customer has special requirement, refer to the technical document 
3	Depth of glue covering	Depth of glue covering overtop front	Except of the special requirement



	(major defect)	Polarizer	【Reject】
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3.2 Electrical criteria

NO	Defect item	Criteria	Remark	
1	No display (major defect)	No display 【Reject】		
2	Missing line (major defect)	Missing line 【Reject】		
3	Seg-com light and dark (major defect)	Seg-com light and dark 【Reject】	ND filter 2% test	
4	No display in immobility (major defect)	No display in immobility 【Reject】		
5	Flicker of Pattern (major defect)	Flicker of Pattern 【Reject】		
6	Mura (major defect)	ND filter 2% test		
7	Over current (major defect)	Over current 【Reject】		
8	Voltage out of specification (major defect)	Voltage out of specification 【Reject】		
9	Pattern blur, error code (major defect)	Pattern blur, error code 【Reject】		
10	Dark light, Flicker (major defect)	Dark light, Flicker 【Reject】		
11	Black/white dots 、 Dirty dots、 eye winker (major defect)	Specification	Allowable	Note1:disregard if out of AA 
		$\phi \leq 0.15\text{mm}$	disregard	
		$0.15\text{mm} < \phi \leq 0.25\text{mm}$	2	
		$0.25\text{mm} < \phi \leq 0.3\text{mm}$	1	
		$0.3\text{mm} < \phi$	0	
12	Fiber、glass crutch、Polarizer scratch/folded (major defect)	$W \leq 0.03\text{mm}$	disregard	Note1:L: Length, W: Width Note2: disregard if out of AA 
		$0.03\text{mm} < W \leq 0.05\text{mm}$ $L \leq 3.0\text{mm}$	2	
		$0.05\text{mm} < W \leq 0.1\text{mm}$ $L \leq 3.0\text{mm}$	1	
		$W > 0.1\text{mm}; L > 3.0\text{mm}$	0	

## 12. Precautions for using LCD modules.

### 12.1 Safety

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

### 12.2 Storage Conditions

- (4) Store the panel or module in a dark place where the temperature is  $23 \pm 5^{\circ}\text{C}$  and the humidity is below  $45 \pm 20\% \text{RH}$ .
- (5) Store in anti-static electricity container.
- (6) Store in clean environment, free from dust, active gas, and solvent.
- (7) Do not place the module near organics solvents or corrosive gases.
- (8) Do not crush, shake, or jolt the module.

### 12.3 Handling Precautions

- (9) Avoid static electricity, which can damage the CMOS LSI.
- (10) The polarizing plate of the display is very fragile, please handle it very carefully.
- (11) Do not give external shock.
- (12) Do not apply excessive force on the surface.
- (13) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (14) Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (15) Do not operate it above the absolute maximum rating.
- (16) Do not remove the panel or frame from the module.

### 12.4 Warranty

The period is within twelve months since the date of shipping out under normal using and storage conditions.

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