



深圳众科显示有限公司

Shenzhen ZK Display Co.,Ltd

LCD MODULE SPECIFICATION

Customer: _____
Model Name: ZK1011280800IInFL40A
SPEC NO.: _____
Date: 2021.11.4
Version: 01

☒ Preliminary Specification

☐ Final Specification

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

Record of Revision

Version	Revise Date	Page	Content
1.0	2021/11/4	All	Initial Release

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1. General Specifications

No.	Item	Specification	Remark
1	LCD size	10.1 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1280 × 3(RGB) × 800	
4	Display mode	Normally Black, Transmissive	
5	Dot pitch	0.0565(W) × 0.1695(H) mm	
6	Active area	216.96(W) × 135.60(H) mm	
7	Module size	229.46(W) × 149.10(H) mm	Note 1
8	Surface treatment	HC	
9	Color arrangement	RGB-stripe	
10	Interface	LVDS	
11	IC	EK79202	

Note 1: Refer to Mechanical Drawing.

2. Pin Assignment

A 40pin connector is used for the module electronics interface. This model used 196479-40041-3 manufactured by P2 connector

Pin No.	Symbol	I/O	Function	Remark
1	NC	---	No connection	
2	VDD	P	Power Supply	
3	VDD	P	Power Supply	
4	NC	---	SPI-CS FOR INX Test	
5	NC	---	SPI-SDA FOR INX Test	
6	NC	---	SPI-SCK FOR INX Test	
7	GND	P	Ground	
8	Rxin0-	I	-LVDS Differential Data Input	R0-R5, G0
9	Rxin0+	I	+LVDS Differential Data Input	
10	GND	P	Ground	
11	Rxin1-	I	-LVDS Differential Data Input	G1~G5, B0,B1
12	Rxin1+	I	+LVDS Differential Data Input	
13	GND	P	Ground	
14	Rxin2-	I	-LVDS Differential Data Input	B2-B5,HS,VS, DE
15	Rxin2+	I	+LVDS Differential Data Input	
16	GND	P	Ground	
17	RxCLK-	I	-LVDS Differential Clock Input	LVDS CLK
18	RxCLK+	I	+LVDS Differential Clock Input	
19	GND	P	Ground	
20	Rxin3-	I	-LVDS Differential Data Input	R6, R7, G6, G7, B6, B7
21	Rxin3+	I	+LVDS Differential Data Input	
22	GND	P	Ground	
23	NC	---	No connection	
24	NC	---	No connection	
25	GND	P	Ground	
26	NC	---	No connection	

27	NC	---	No connection	
28	NC	---	No connection	
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	NC	---	No connection	
34	NC	---	No connection	
35	VGL	P	Gate OFF Voltage	
36	NC	---	No connection	
37	NC	---	No connection	
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

I: input, O: output, P: Power

3. Operation Specifications

3.1. Absolute Maximum Ratings

(Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	VDD	TBD	TBD	V	
	AVDD	TBD	TBD	V	
	V _{GH}	TBD	TBD	V	
	V _{GL}	TBD	TBD	V	
	V _{GH} -V _{GL}	TBD	TBD	V	
Operation Temperature	T _{OP}	TBD	TBD	°C	
Storage Temperature	T _{ST}	-30	80	°C	

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

3.2. Typical Operation Conditions

(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	VDD	TBD	2.5	TBD	V	Note 2
	AVDD	TBD	8.2	TBD	V	
	V _{GH}	-	15	-	V	
	V _{GL}	-	-13	-	V	
Input logic high voltage	V _{IH}	0.8 VDD	-	VDD	V	
Input logic low voltage	V _{IL}	0	-	0.2 DV _{DD}	V	

Note 1: Be sure to apply VDD and V_{GL} to the LCD first, and then apply V_{GH}

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

3.3. Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I_{GH}		TBD		uA	$V_{GH} = 22V$
	I_{GL}		TBD		uA	$V_{GL} = -7V$
	$I_{V_{DD}}$		TBD		mA	$V_{DD} = 2.5V$
	$I_{AV_{DD}}$		TBD		mA	$AV_{DD} = 8.2V$

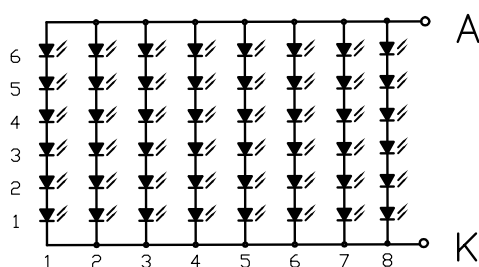
3.4 LED Backlight Characteristics

The back-light system is edge-lighting type with 48 chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	--	175	--	mA	--
Forward Voltage	V_F	18	18.6	19.2	V	--
LCM Luminance	L_v	--	550	--	cd/m2	Note3
LED life time	Hr	50000		--	Hour	Note1,2
Uniformity	AV_g	75	--	--	%	Note3

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: $T_a = 25 \pm 3^\circ C$, typical IL value indicated in the above table until the brightness becomes less than 50%.

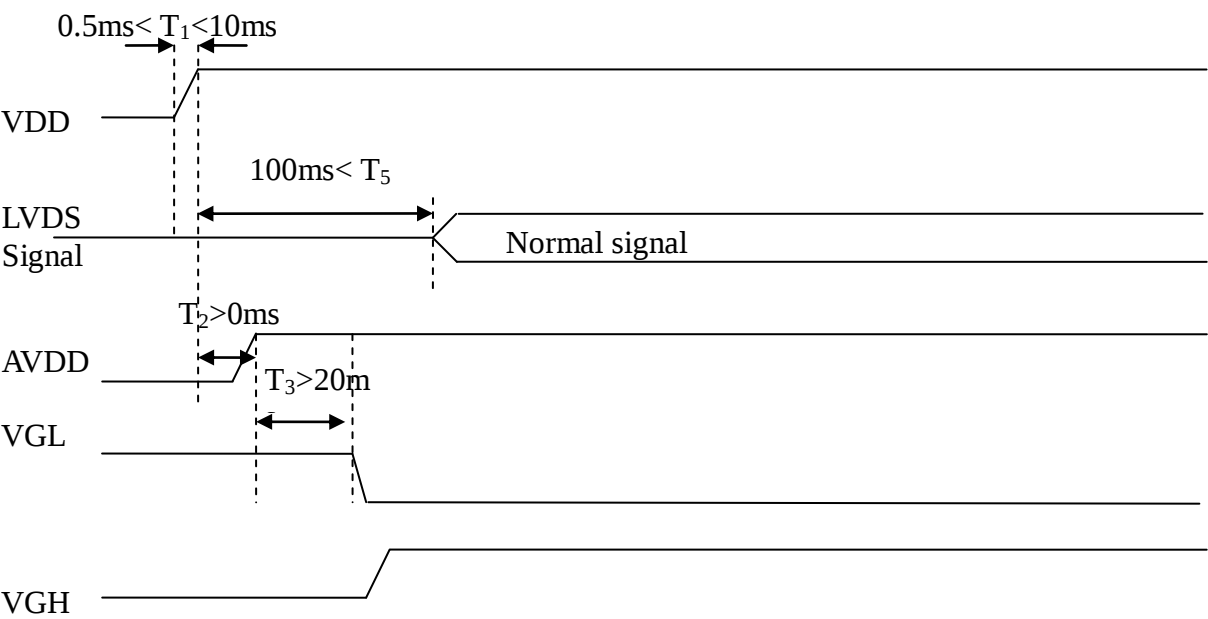
Note (2) The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a = 25^\circ C$ and $I_L = 40mA$. The LED lifetime could be decreased if operating I_L is larger than 40mA. The constant current driving method is suggested.



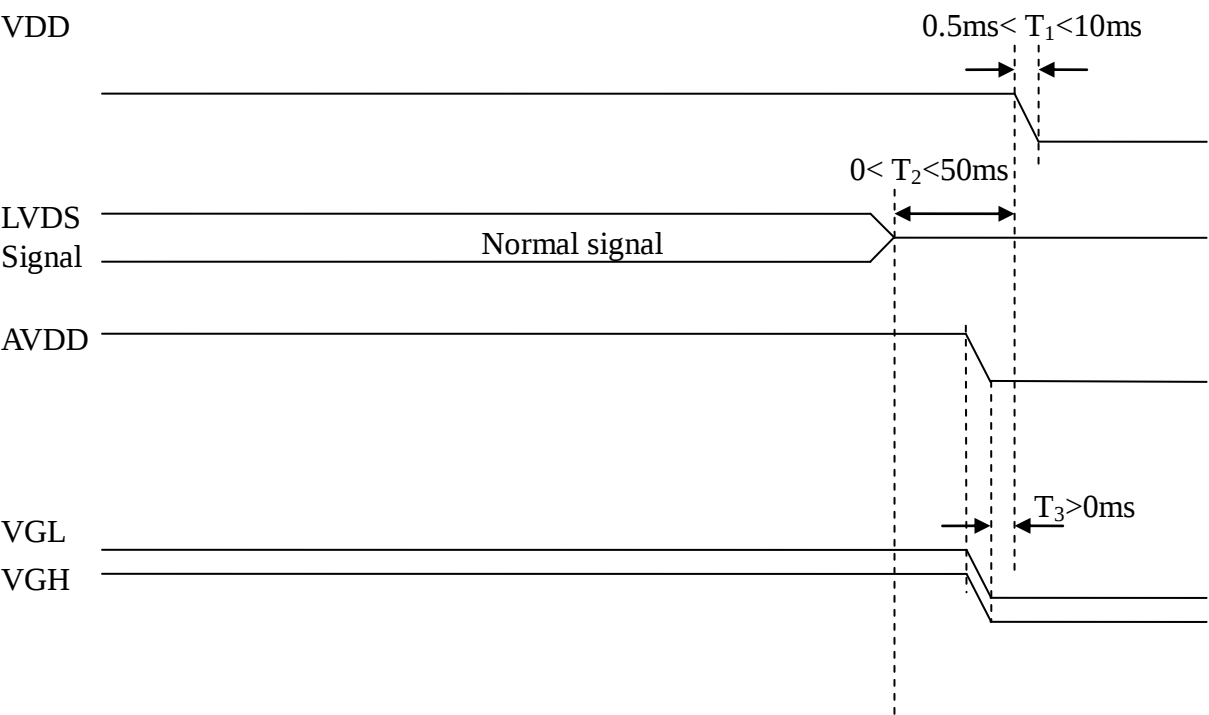
LED 电路图

3.4. Power Sequence

a. Power on:



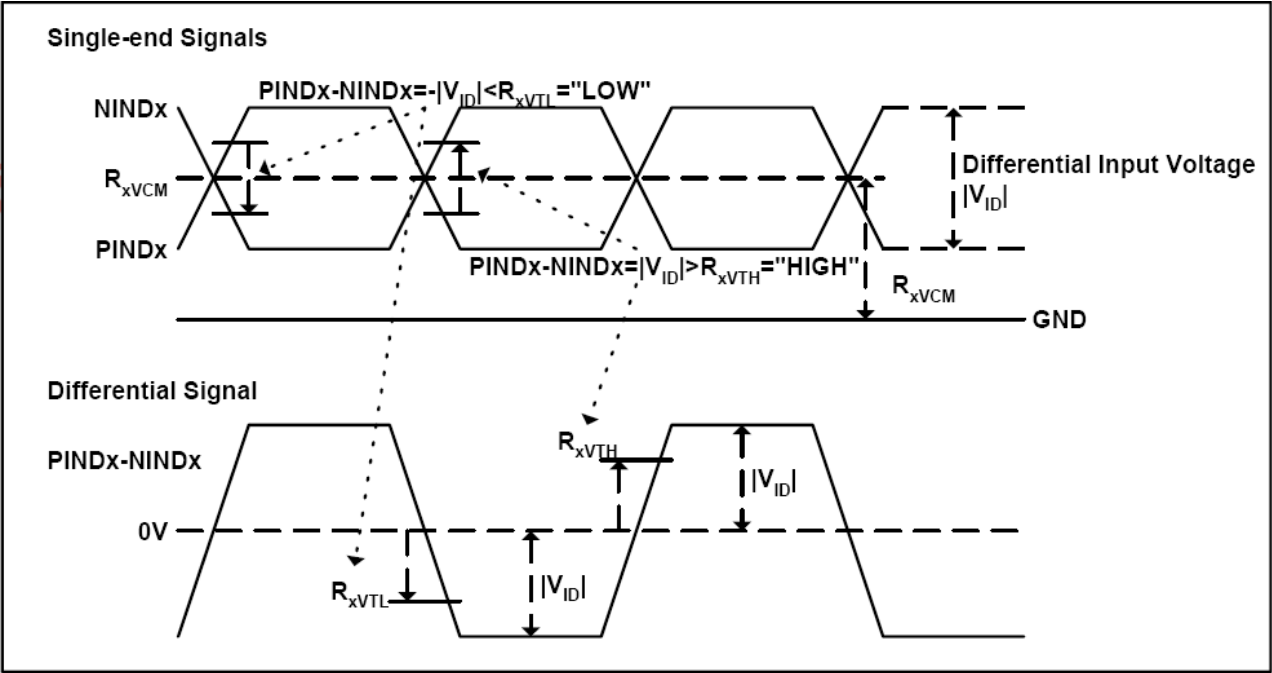
b. Power off:



3.5. LVDS Signal Timing Characteristics

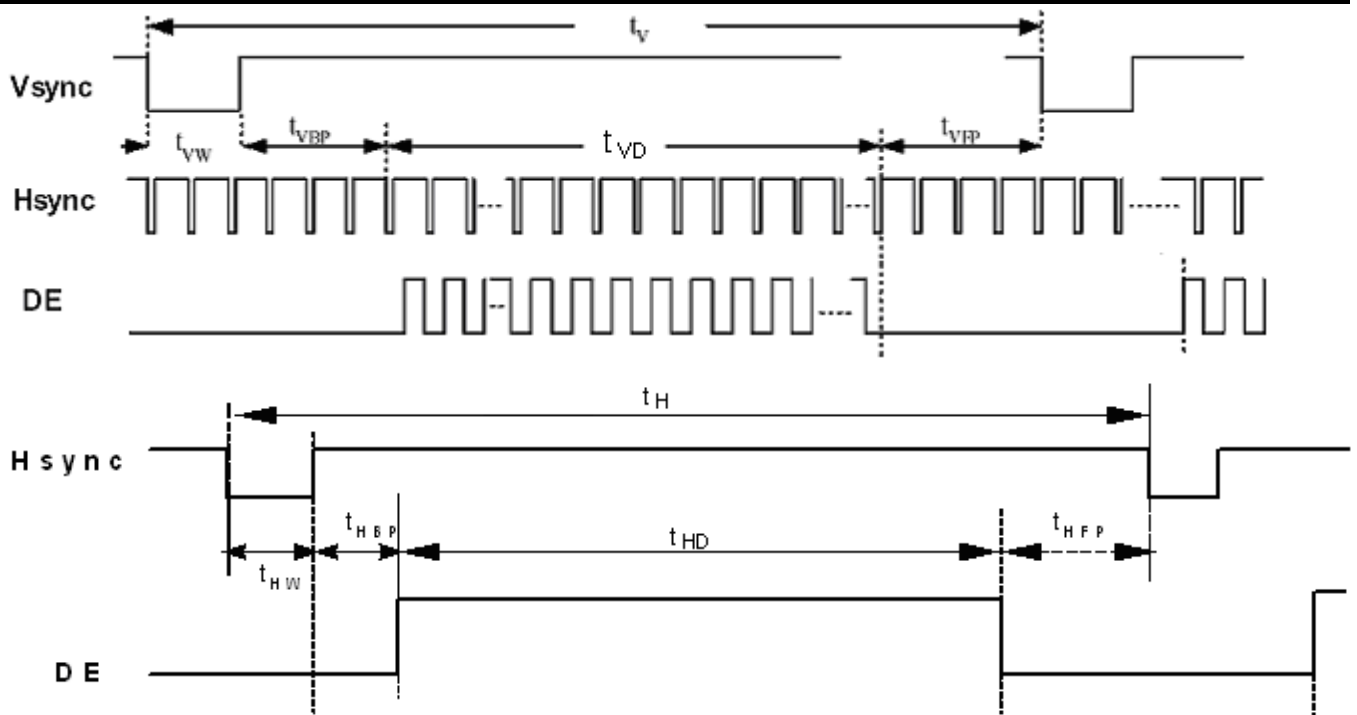
3.5.1. AC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LVDS Differential input high Threshold voltage	R_{xVTH}	-	-	+100	mV	$R_{xVCM}=1.2V$
LVDS Differential input low Threshold voltage	R_{xVTL}	-100	-	-	mV	
LVDS Differential input common mode voltage	R_{xVCM}	0.7	-	1.6	V	
LVDS Differential voltage	$ V_{ID} $	200	-	600	mV	

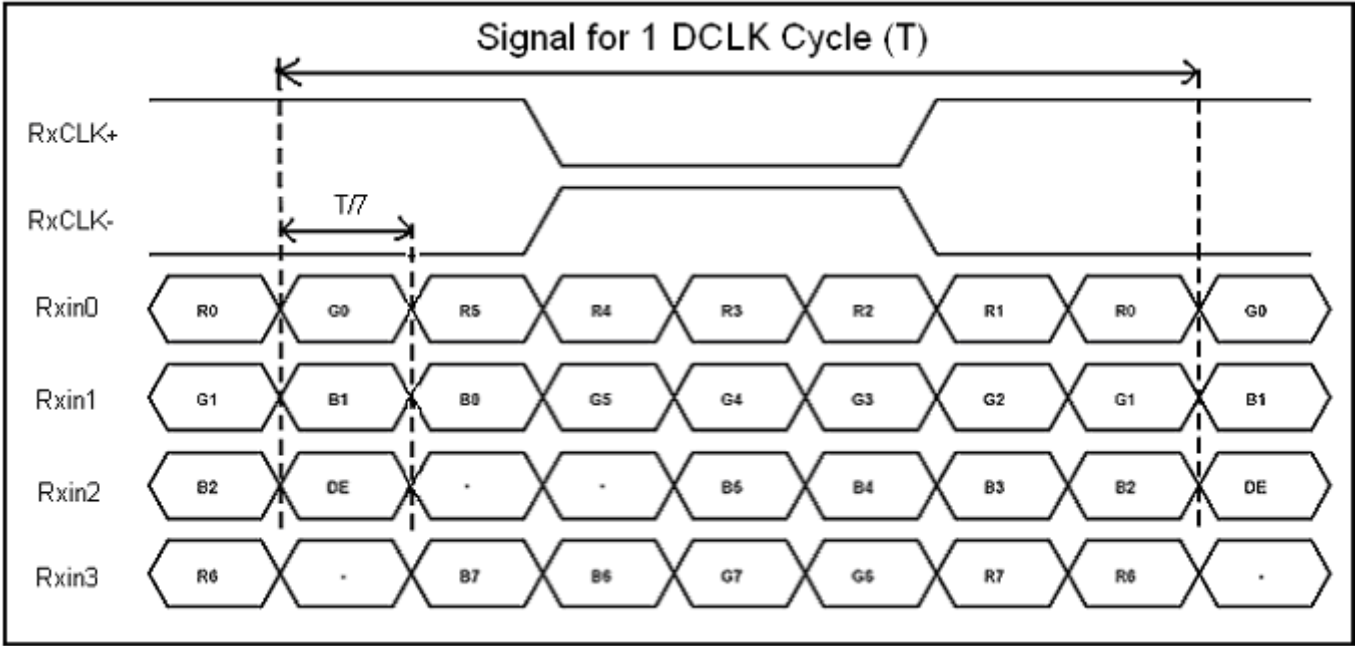


3.5.2. Timing Table

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	1/Tc	68.9	71.1	73.4	MHz	Frame rate =60Hz
Horizontal display area	t _{HD}	1280				
HS period time	t _H	1410	1440	1470	Tc	
HS Width +Back Porch +Front Porch	t _{HW} + t _{HBP} +t _{HFP}	60	160	190	Tc	
Vertical display area	t _{VD}	800				
VS period time	t _V	815	823	833	t _H	
VS Width +Back Porch +Front Porch	t _{VW} + t _{VBP} +t _{VFP}	15	23	33	t _H	



3.5.3. LVDS Data Input Format



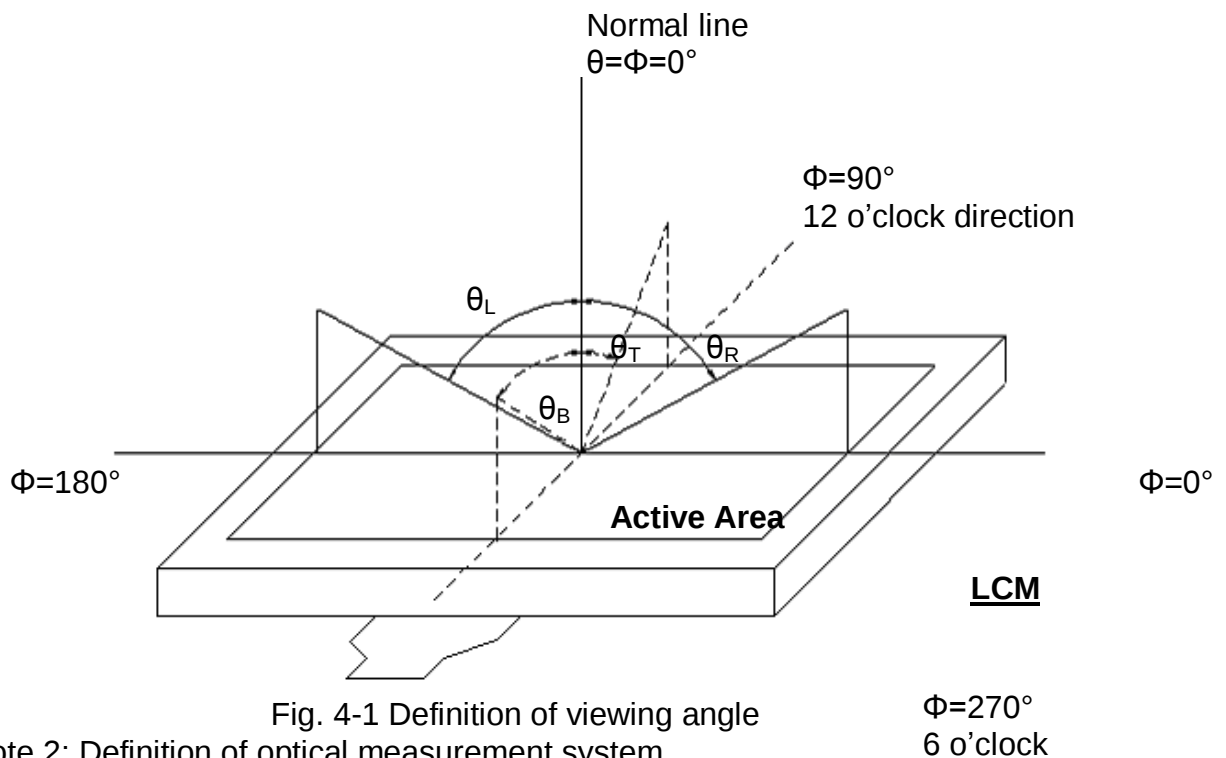
4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	75	85	-	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	75	85	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	75	85	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	75	85	-		
Response time	T_{ON}	Normal $\theta=\Phi=0^\circ$	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	CR		600	800	-	-	Note 4
Color chromaticity	W_X		0.24	-	0.34	-	Note 2 Note 5 Note 6
	W_Y		0.25	-	0.35	-	
Uniformity	%					-	

Test Conditions:

1. VDD=2.5V,, the ambient temperature is 25°C ..
2. The test systems refer to Note 2.
3. The optical specificalitons are measured base on Innolux LCM

Note 1: Definition of viewing angle range



Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm, Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/ Field of view: 1° /Height: 500mm.)

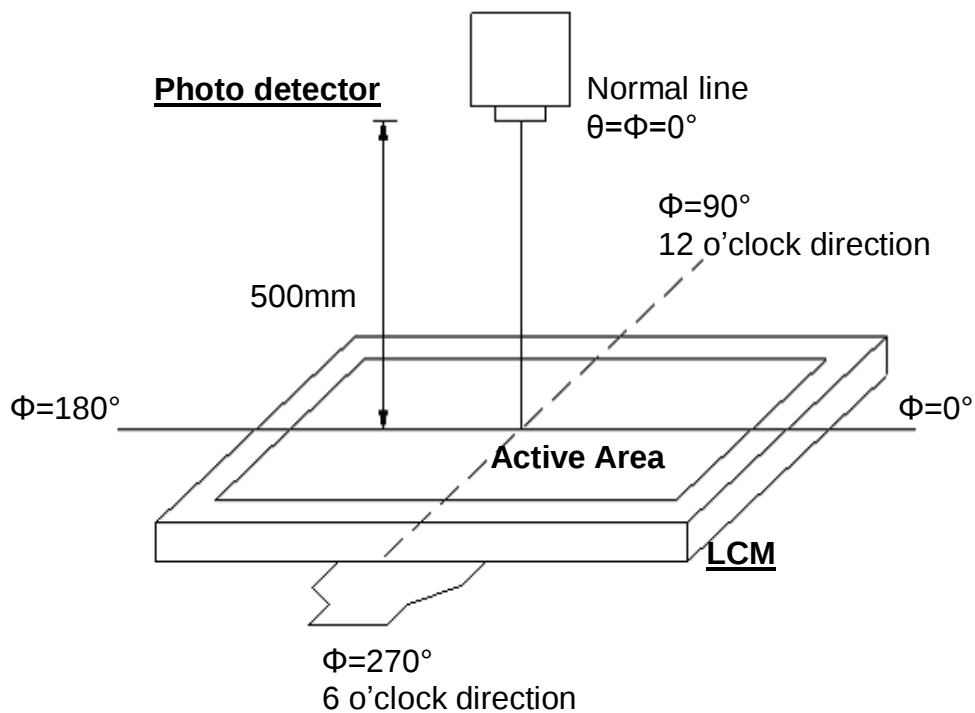


Fig. 4-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

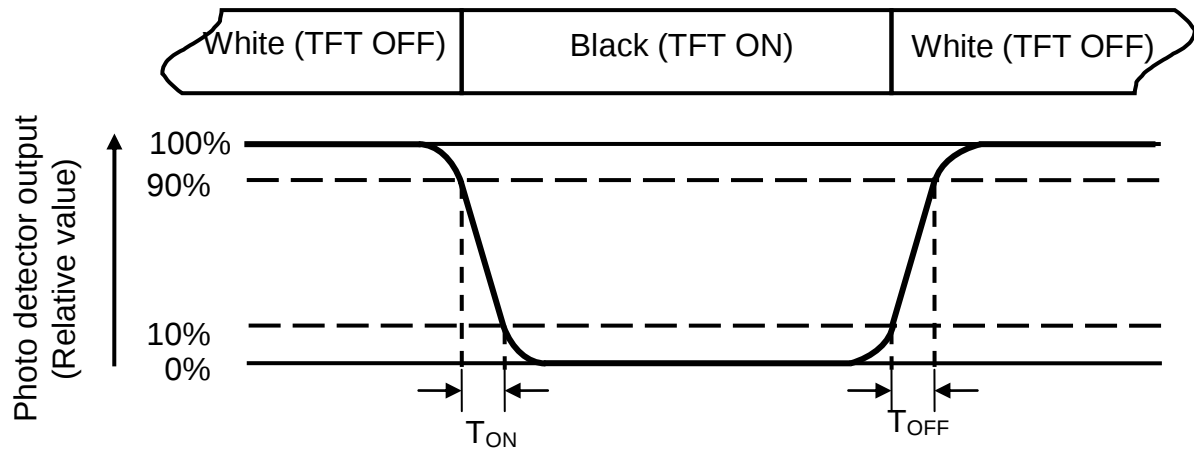


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel.

Note 7: Base on backlight structure of LCM is Diffuser+ BEF +BEF. The color rank of LED is Sa627.

5. Reliability Test Items

Item	Test Conditions		Remark
High Temperature Storage	Ta = 80℃	120hrs	Note 1 、 2 、 3
Low Temperature Storage	Ta = -30℃	120hrs	Note 1 、 2 、 3
High Temperature Operation	Ts = 70℃	120hrs	Note 1 、 2 、 3
Low Temperature Operation	Ta = -20℃	120hrs	Note 1 、 2 、 3
Operate at High Temperature and Humidity	+40℃ , 90%RH	120hrs	Note 1 、 2 、 3
Thermal Shock	-0℃/30 min ~ +50℃/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.		Note 1 、 2 、 3
Package Vibration Test	Random Vibration : ISTA-3A 1Hz~200Hz, Grms=0.53 Half hours for direction of Z.		Note 2
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces		Note 2
Electro Static Discharge	± 2KV, Human Body Mode, 100pF/1500Ω		Note 2

Note 1: The test samples have recovery time need more than 2 hours at room temperature before the function check. In the standard conditions , there is no abnormal display function occurred .

Note 2: After the reliability test , the product only guarantees operational function , but don't guarantee all of the cosmetic specification.

Note 3: Under no condensation of dew.

6.General Precautions

6.1.Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

6.2.Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

6.3.Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

6.4.Storage

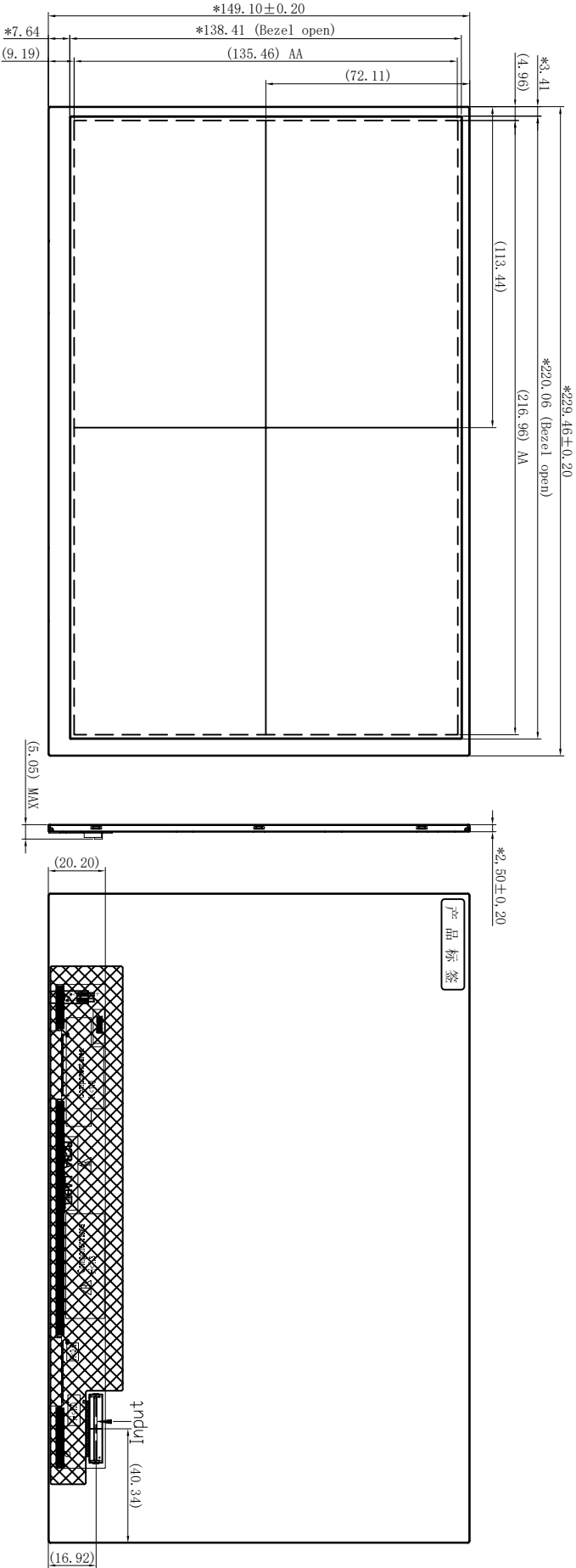
1. Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

6.5.Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

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Customer Name:	客户名称:	Customer's Code:	客户料号:	第三视角	
Approved by:	承认:	Module NO.:	模组料号:	ZK10112808001InFL40A	模 组 成 品 图
Approval Date:	承认日期:	Edition:	版本号:	A0	



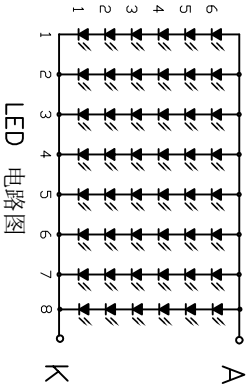
RoHS

Notes:

1. Unit:mm
2. Do not scale drawing
3. All radii without dimension R0.20mm
4. Luminous intensity (9 AVG) :
- Module: 550cd/m² (Typ)
5. Uniformity: 75% (Min)
- VF: 18.0V (Min) ; 18.6V (Typ) ; 19.2V (Max) ; IF: 175mA (Fix)
6. The color coordinates:

	MIN	TYP	MAX
x	0.24	0.24	0.34
y	0.25	0.25	0.35

7. Modification rev. number
8. draft angle 1.0°
9. General Tolerance: ±0.20mm
10. Mark mold cavity identification in recess approximately where indicated
11. “*” For important dimension “()” for reference dimension
12. Rolls must be complied. (Use Lead-free process)



LED 电路图

REV (修改)	DATE (日期)	DESCRIPTION (修改内容)	REVISER (修改者)	Date: (日期)	21.11.4	Page: (页数)	1/1
Design by: (设计)	Check by: (审查)	Number (编号)					

8.Package

TBD