



PRODUCT SPECIFICATION

KADI Model:

KD101QWU78EP

CUSTOMER Model:

■

Description:

10.1 " TFT-LCD Module

Version:

1.0

KADI	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURE			
DATE	2023.10.11	2023.10.11	2023.10.11

CUSTOMER APPROVAL	SIGNATURE	DATE

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1. General Specifications

1.1 LCM General Information

Item	Specification	Unit
LCD Size	10.1	inch
Number of Pixels	1920 (H) RGB x 1200 (V)	pixels
Display Mode	Normally Black	-
Viewing Direction	Free	o' clock
Interface	LVDS	-
Display Colors	16.7M	colors
Outline Dimension	229.52 (H) x 149.16 (V) x 4.6 (D)	mm
Active Area	217.73 (H) x 136.08 (V)	mm
Pixel Pitch	0.1134 (H) x 0.1134 (V)	mm
Driver IC	-	-
Operation Temperature	-20~70	°C
Storage Temperature	-30~80	°C

Note1:Requirements on environmental protection RoHS compliant.

2. Absolute Maximum Ratings

Item	Symbol	MIN.	MAX.	Unit	Note
Analog Supply voltage	VDD	-0.3	5.0	V	Note 1

Note 1:Permanent damage may occur to the LCD module if beyond this specification.

Functional operation should be restricted to the conditions described under normal operating conditions.



3. Electrical Characteristics

3.1 Recommended Operating Condition for TFT LCD

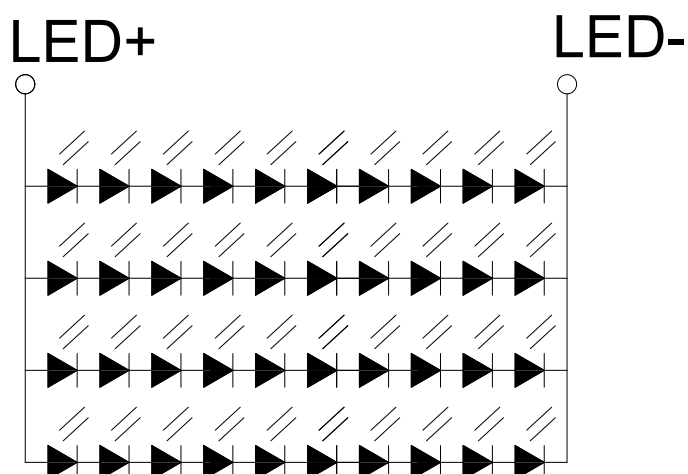
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Analog Supply voltage	VDD	3.0	3.3	3.6	V	
Analog supply current	I _{VDD}	-	TBD	-	mA	VDD=3.3V
Logic input voltage	VIH	0.7*VDD	-	VDD	V	
	VIL	GND	-	0.3*VDD	V	

3.2 Recommended Driving Condition for Backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Driving Current	I _F	-	300	-	mA	
Driving Voltage	V _F	-	12	-	V	
Power consumption	W _{BL}	-	7.65	-	W	
LED Life-Time	N/A	-	30,000	-	Hours	Ta=25℃ Note 1

Note 1:LED lifetime is defined as the module brightness decay 50% of original brightness at Ta=25 degree, typical current.

Note 2:LED circuit :





4. Interface Pin Assignment

4.1 LCM Pin Assignment

No.	Symbol	Description
1	VLEDIN	Power for LED backlight
2	VLEDIN	Power for LED backlight
3	VLEDIN	Power for LED backlight
4	PWM	PWM For LED
5	LED EN	LED ENABLE
6	GND	Ground
7	ELV3P	LVDS Positive data signal
8	ELV3N	LVDS Negative data signal
9	GND	Ground
10	ELV2P	LVDS Positive data signal
11	ELV2N	LVDS Negative data signal
12	GND	Ground
13	ELVCLKP	LVDS Positive CLK signal
14	ELVCLKN	LVDS Negative CLK signal
15	GND	Ground
16	ELV1P	LVDS Positive data signal
17	ELV1N	LVDS Negative data signal
18	GND	Ground
19	ELV0P	LVDS Positive data signal
20	ELV0N	LVDS Negative data signal
21	GND	Ground
22	OLV3P	LVDS Positive data signal
23	OLV3N	LVDS Negative data signal
24	GND	Ground
25	OLV2P	LVDS Positive data signal
26	OLV2N	LVDS Negative data signal
27	GND	Ground
28	OLVCLKP	LVDS Positive CLK signal
29	OLVCLKN	LVDS Negative CLK signal
30	GND	Ground
31	OLV1P	LVDS Positive data signal



32	OLV1N	LVDS Negative data signal
33	GND	Ground
34	OLV0P	LVDS Positive data signal
35	OLV0N	LVDS Negative data signal
36	GND	Ground
37	I2C_SDA	Data input/output for 12C
38	I2C_SCL	Clock signal for 12C
39	NC	No connection
40	EEPEN	Only test Pin
41	VDDIN	Power Supply
42	VDDIN	Power Supply
43	VDDIN	Power Supply
44	VDDIN	Power Supply
45	VDDIN	Power Supply



5. Interface Characteristics

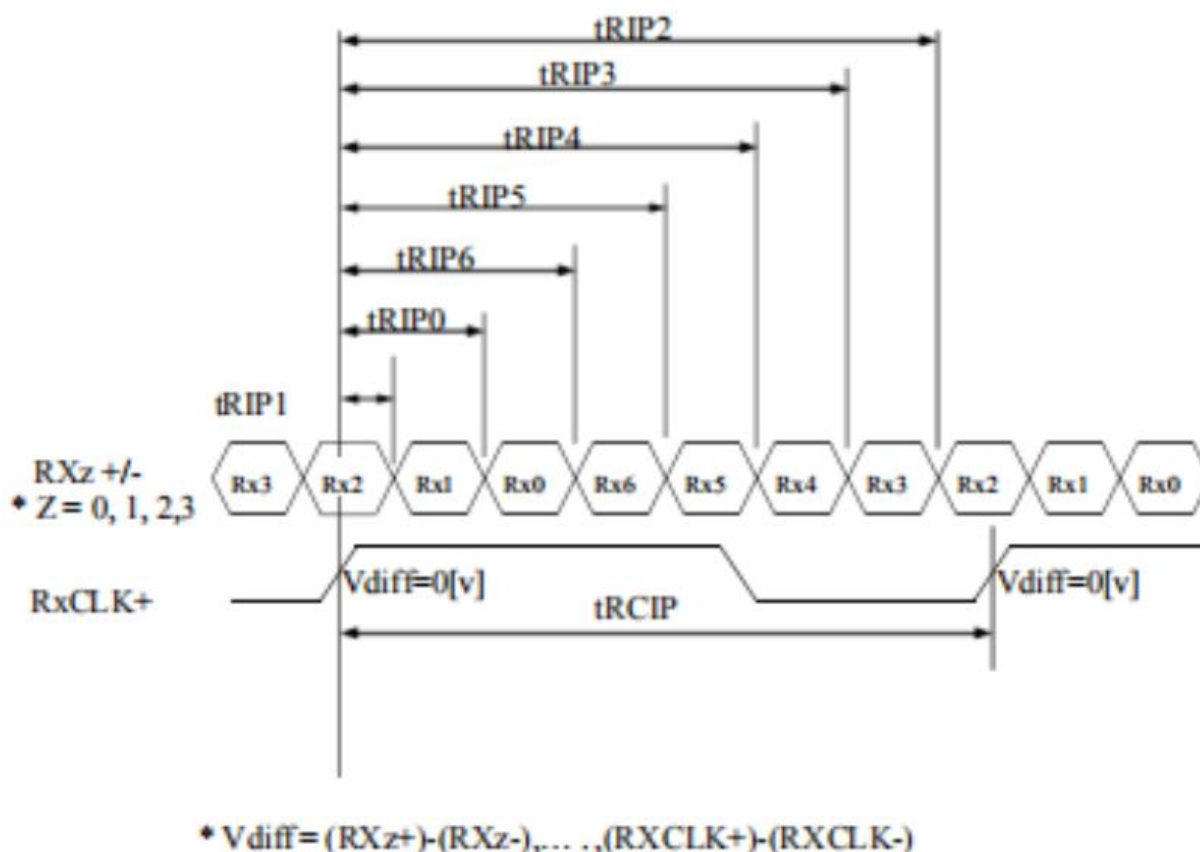
5.1 SIGNAL TIMING SPECIFICATION

5.1.1 LVDS Rx Interface Timing

The specification of the LVDS Rx interface timing parameter is shown in Table8.

Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	TBD	TBD	TBD	nsec	
Input Data 0	tRIP1	TBD	TBD	TBD	nsec	
Input Data 1	tRIP0	$tRCIP/7-0.4$	$tRCIP/7$	$tRCIP/7+0.4$	nsec	
Input Data 2	tRIP6	$2 \times tRCIP/7-0.4$	$2 \times tRCIP/7$	$2 \times tRCIP/7+0.4$	nsec	
Input Data 3	tRIP5	$3 \times tRCIP/7-0.4$	$3 \times tRCIP/7$	$3 \times tRCIP/7+0.4$	nsec	
Input Data 4	tRIP4	$4 \times tRCIP/7-0.4$	$4 \times tRCIP/7$	$4 \times tRCIP/7+0.4$	nsec	
Input Data 5	tRIP3	$5 \times tRCIP/7-0.4$	$5 \times tRCIP/7$	$5 \times tRCIP/7+0.4$	nsec	
Input Data 6	tRIP2	$6 \times tRCIP/7-0.4$	$6 \times tRCIP/7$	$6 \times tRCIP/7+0.4$	nsec	

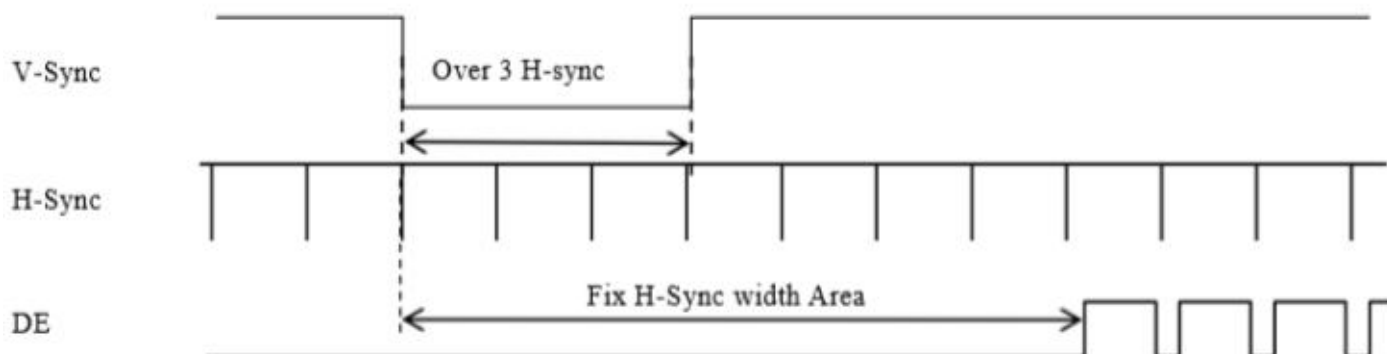
< Table 8. The LVDS Rx interface timing parameter





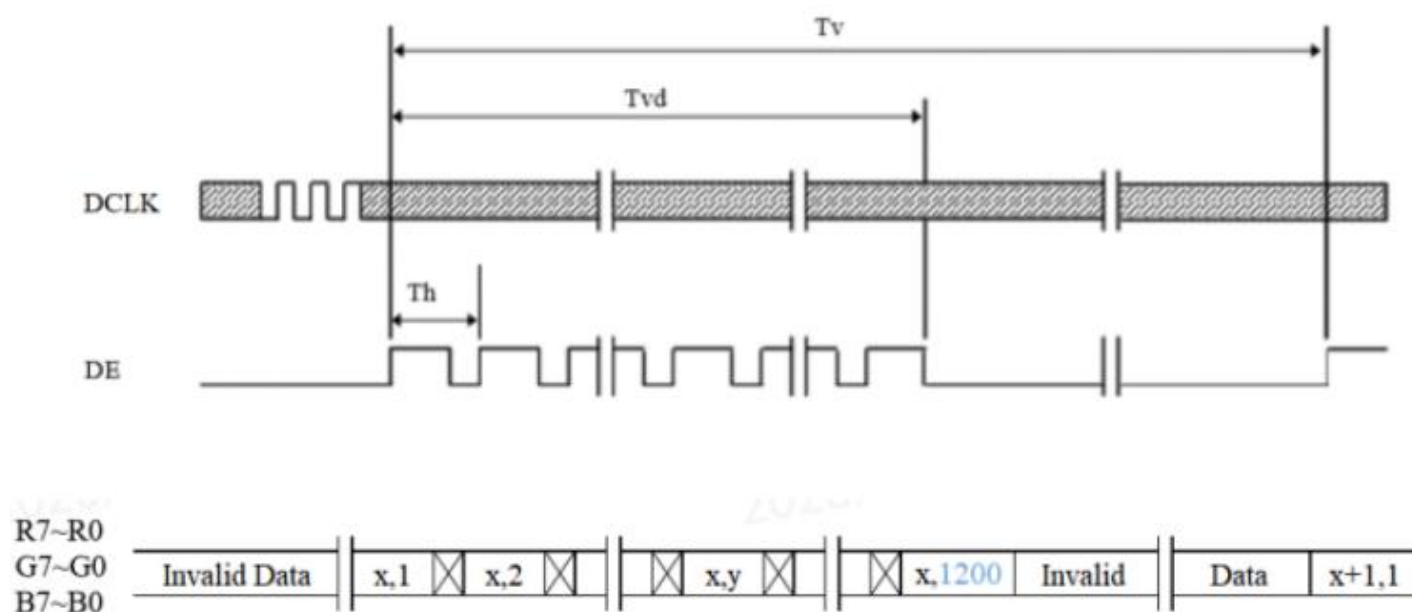
5.2 SIGNAL TIMING WAVEFORMS OF INTERFACE SIGNAL

5.2.1 Sync Timing Waveforms



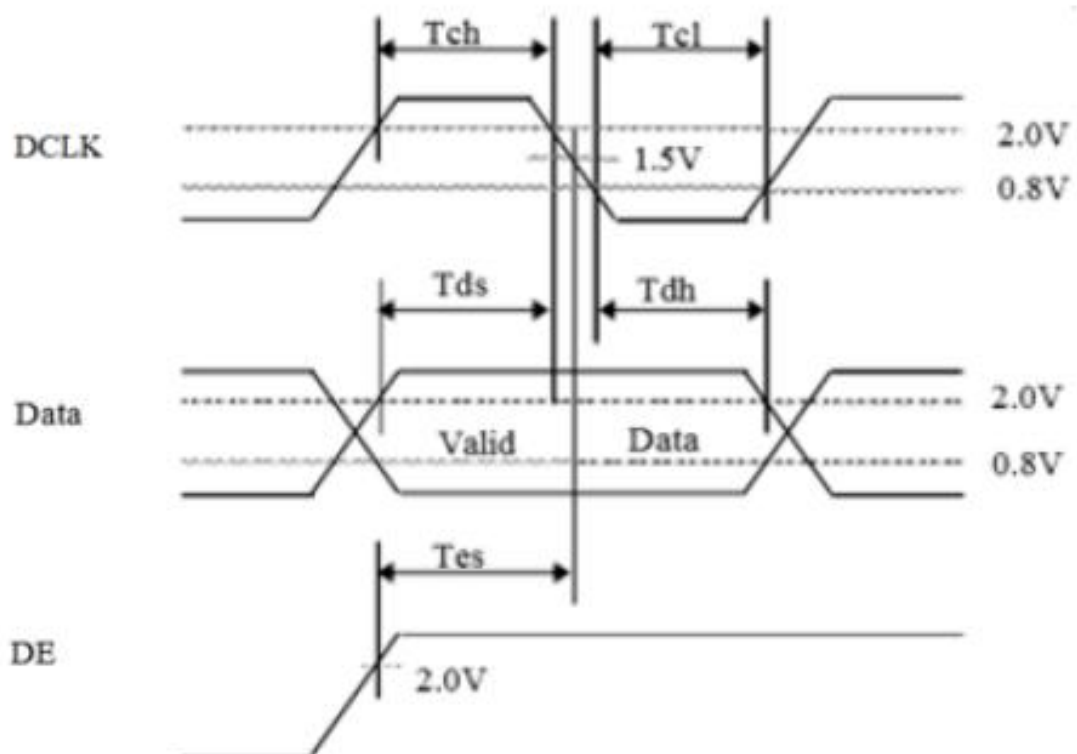
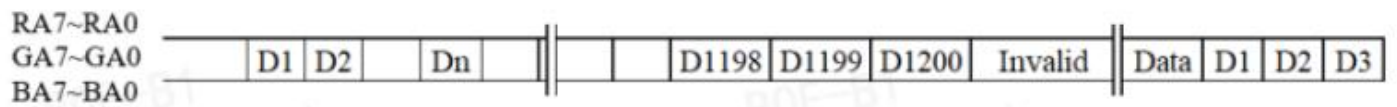
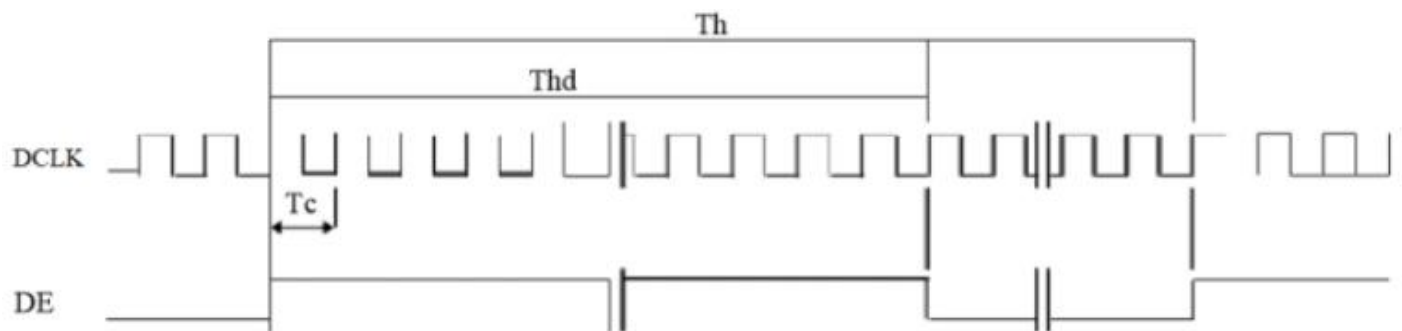
- 1) Need over 3 H-Sync during V-Sync Low
- 2) Fix H-Sync width from V-Sync falling edge to first rising edge

5.2.2 Vertical Timing Waveforms





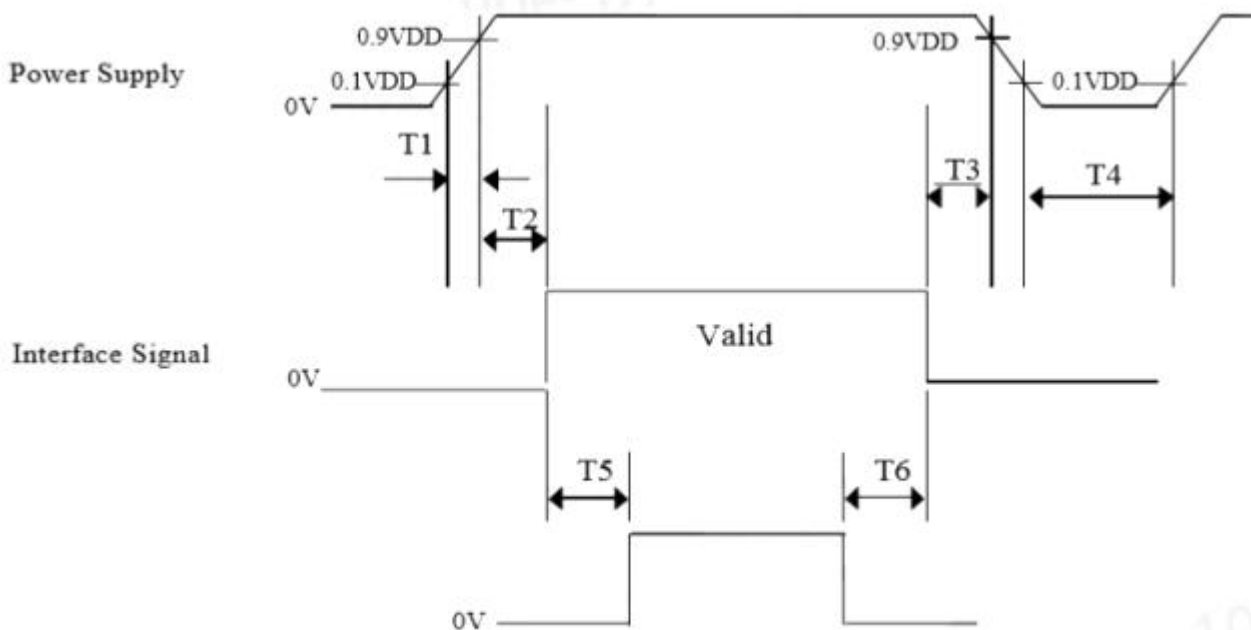
5.2.3 Horizontal Timing Waveforms





5.3 POWER SEQUENCE

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below.



Back-light

$$0.5 \text{ ms} \leq T1 \leq 10 \text{ ms}$$

$$0 \leq T2 \leq 50 \text{ ms}$$

$$0 < T3 \leq 50 \text{ ms}$$

$$1 \text{ sec} \leq T4$$

$$200 \text{ ms} \leq T5$$

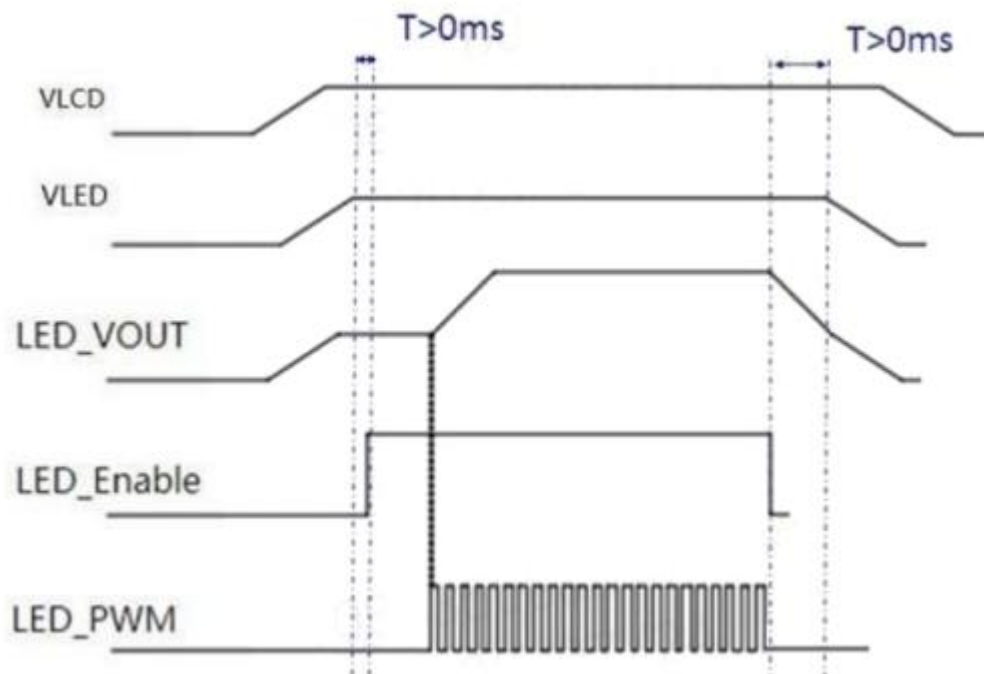
$$200 \text{ ms} \leq T6$$

Notes:

1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on
3. Back Light must be turn on after power for logic and interface signal are valid.
4. If T3=0ms, there is a risk of flicker when power On/Off
5. If T6=0ms, there is a risk of abnormal display when power off



To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below.





6. Optical Specifications

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR≥10) B/L ON	θ_T	$\Phi=90^\circ$ (12 o'clock)	80	85	-	deg	Note2
	θ_B	$\Phi=270^\circ$ (6 o'clock)	80	85	-	deg	Note2
	θ_L	$\Phi=180^\circ$ (9 o'clock)	80	85	-	deg	Note2
	θ_R	$\Phi=0^\circ$ (3 o'clock)	80	85	-	deg	Note2
Response Time	T_{ON}	Normal $\theta=\Phi=0^\circ$	-	15	17	msec	Note4
	T_{OFF}		-	15	17	msec	Note4
Contrast Ratio	CR		800	1200	-	-	Note1 Note3
Color Chromaticity	W_X		TBD	TBD	TBD	-	Note1 Note5
	W_Y		TBD	TBD	TBD	-	Note1 Note5
Luminance	L		800	1000	-	cd/m ²	Note1 Note7
Luminance Uniformity	Y_U		75	80	-	%	Note1 Note6
NTSC	-		59	64	-	%	-

Note 1:Definition of optical measurement system

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.

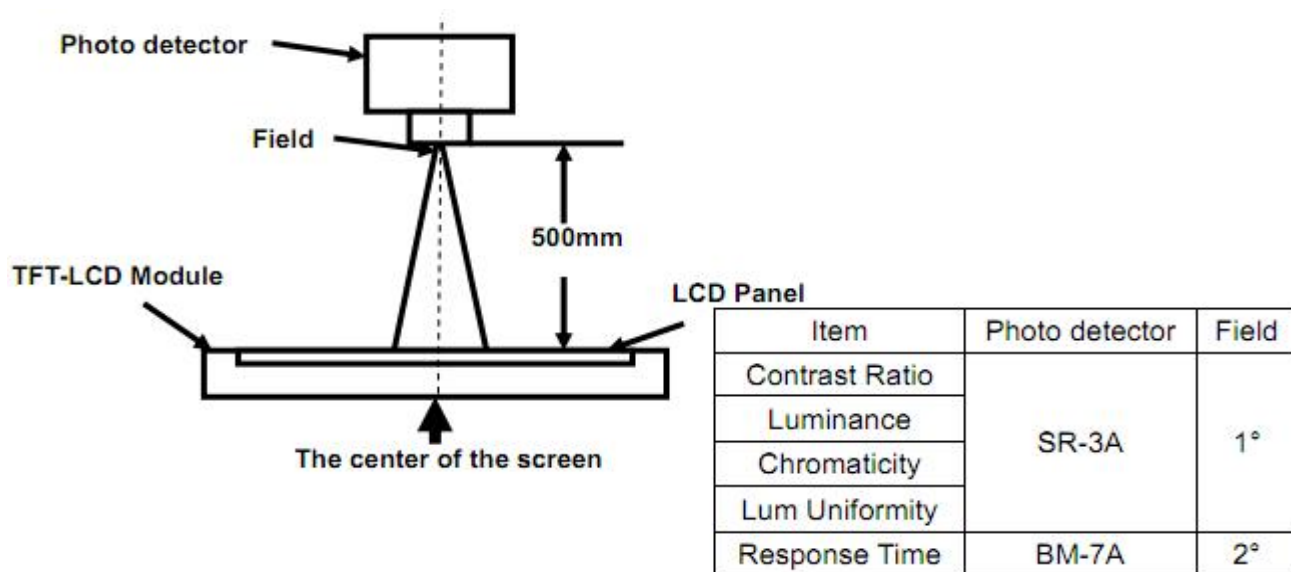


Fig 1

Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).

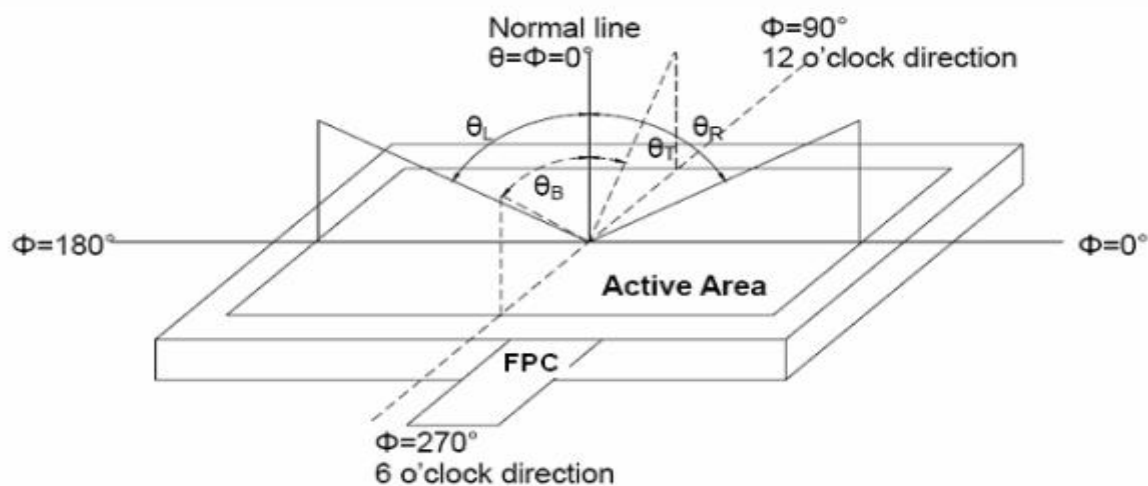


Fig 2 Definition of viewing angle

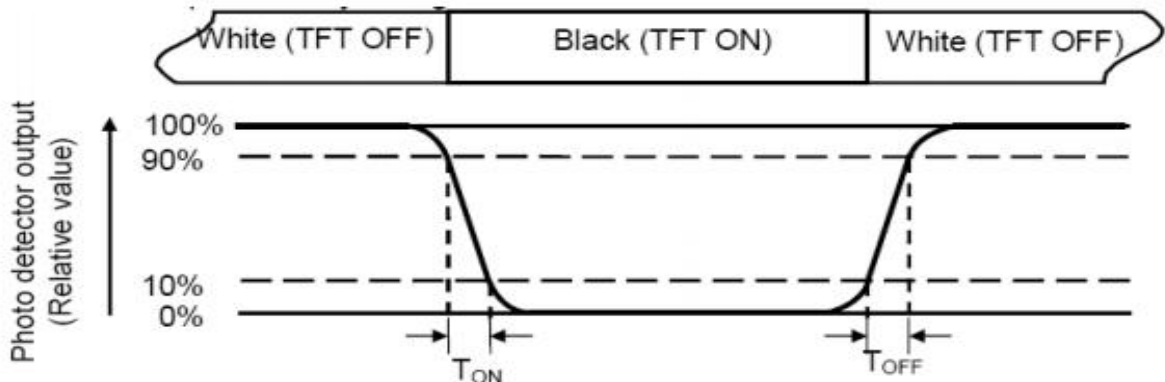
Note 3: Definition of contrast ratio

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$



Note 4: 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%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance. For more information see FIG.3-a/b

Note 7: Surface luminance is the luminance with all pixels displaying white.

L_v = Average Surface Luminance with all white pixels ($P_1, P_2, P_3, \dots, P_n$)

For more information see FIG.3-a/b

Note 8: Size : $S \leq 5"$ (see Figure a) A : 5 mm B : 5 mm. H, V : Active area

Light spot size $\varnothing = 5\text{mm}$ (BM-5) or $\varnothing = 7.7\text{mm}$ (BM-7) 50cm distance or test spot position : see Figure a.

measurement instrument : TOPCON's luminance meter SR-3A or BM-7 or compatible (see Figure 1).

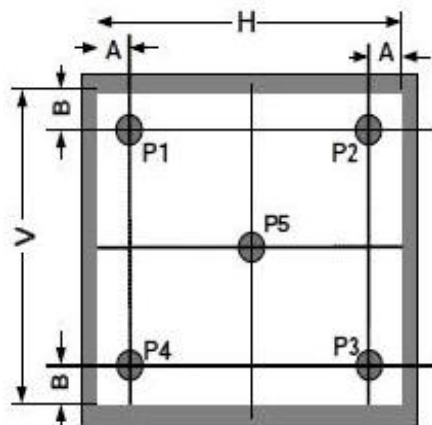


Fig. 3-a Definition of points



5" < S ≤ 12.3" (see Figure b) . H, V : Active area

Light spot size $\varnothing = 5\text{mm}$ (BM-5) or $\varnothing = 7.7\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCD surface to detector lens. test spot position : see Figure b.

measurement instrument : TOPCON's luminance meter SR-3A or BM-7 or compatible (see Figure 1).

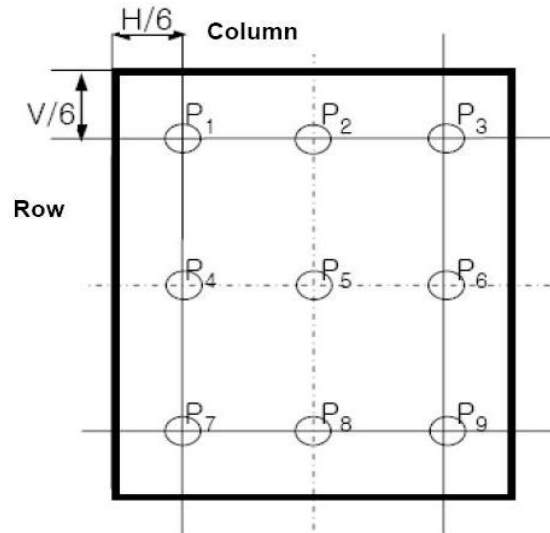


Fig. 3-b Definition of points



7. Reliability Test Items

Test Item	Test Conditions
High Temperature Storage	Ta= +80℃ 96hrs
Low Temperature Storage	Ta= -30℃ 96hrs
High Temperature Operation	Ta= +70℃ 96hrs
Low Temperature Operation	Ta= -20℃ 96hrs
High Temperature and Humidity Storage	Ta= +60℃, 90% RH 96hrs
Thermal Shock (Non-operation)	-30℃/30 min ~ +80℃/30 min for 20 cycles Start with cold temperature end with high temperature
Electro Static Discharge	Contact = ± 4 kV, class B Air = ± 8 kV, class B R=330Ω,C=150pF
Vibration	Sweep: 10Hz~55Hz~10Hz Stroke: 1.5mm 2 hrs for each direction of X .Y. Z.
Mechanical Shock	60G 6ms,±X,±Y,±Z 3 times for each direction
Package Drop Test	Height: 60 cm 1 corner, 3 edges, 6 surfaces

Notes: The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

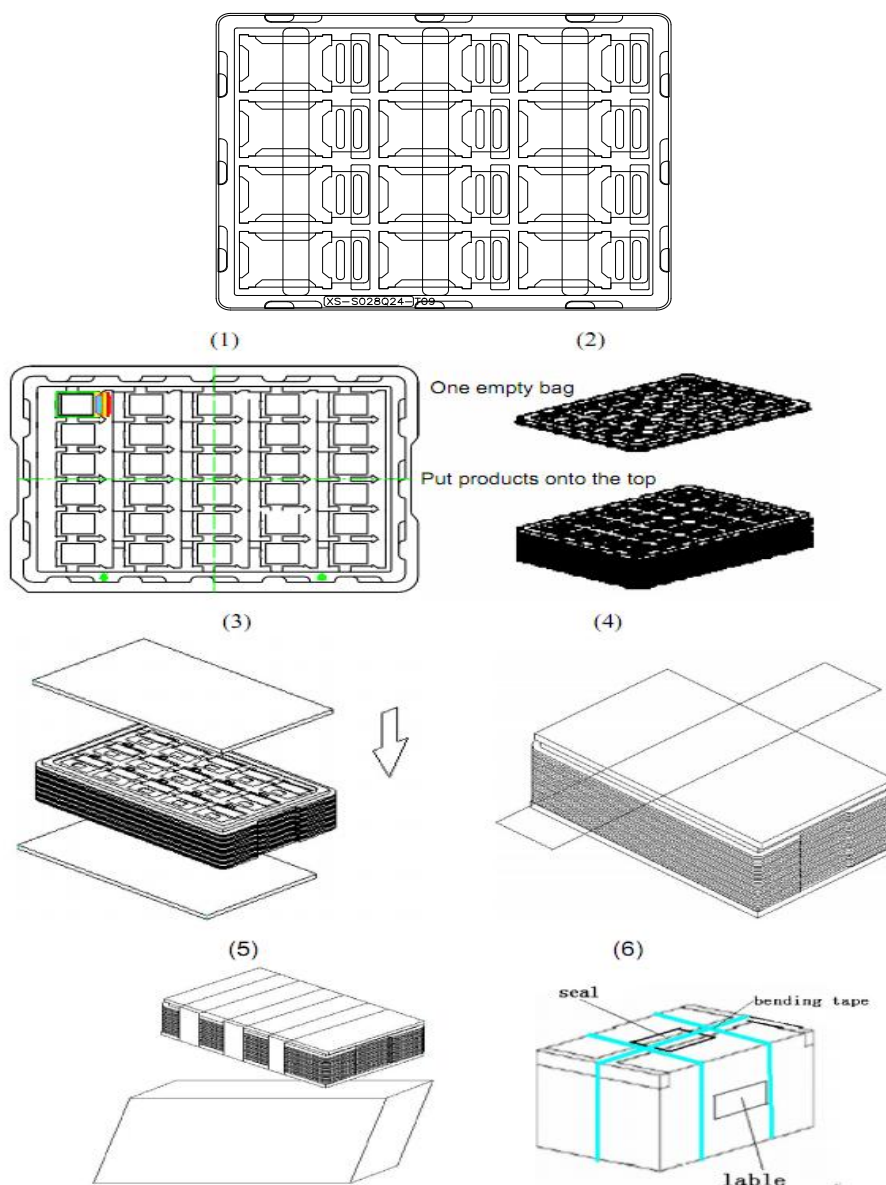
- 1). Air bubble in the LCD
- 2). Seal leak or Glass crack
- 3). Non display or abnormal display
- 4). Brightness reduction >50%





9. Packing

Packing Method



Steps:

1. Put module into tray cavity
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above
4. Fix the cardboard to the tray stack with adhesive tape
5. Put the tray stack into carton
6. Carton sealing with adhesive tape



10. Precautions for Use of LCD modules

10.1 Handling Precautions

10.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

10.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

10.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

10.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

10.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketene
- Aromatic solvents

10.1.6. Do not attempt to disassemble the LCD Module.

10.1.7. If the logic circuit power is off, do not apply the input signals.

10.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

10.1.8.1. Be sure to ground the body when handling the LCD Modules.

10.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

10.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

10.2 Storage Precautions

10.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

10.2.2. The LCD modules should be stored under the storage temperature range if the LCD modules will be stored for a long time, the recommend condition is :

Temperature : 0℃ ~40℃ Relatively humidity: ≤80%

10.2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

10.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.