Tailorpixels

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Manufacturer Certificated

9001 CERT. No.: 282Q19070712006

14001 CERT. No.: 282E19070712007

Product Specification

Model: TTX070BHT-01

7.0″TFT Display Module (1024*600)

This module uses RoHS material

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Contents

1 Record of Revision

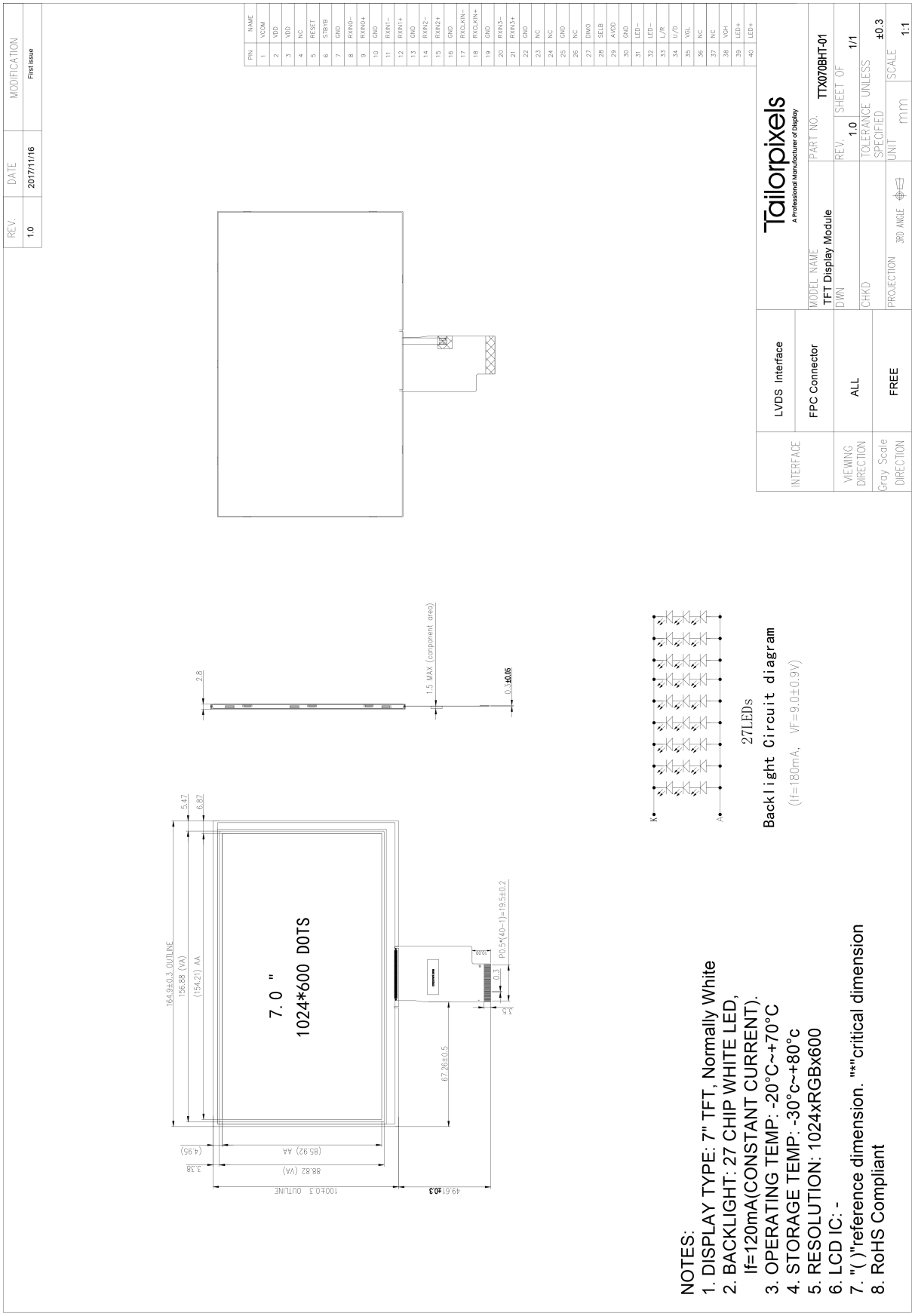
Rev	Issued Date	Description	Remark
1.0	2017/12/22	First Release.	

2 General Specifications

Feature		Spec
Characteristics	Size	7-inch
	Resolution	1024(horizontal)*600(Vertical)
	Interface	LVDS
	Color Depth	16.7M
	Technology type	a-Si
	Display Spec. Pixel pitch (mm)	0.1506(H)×0.1432(V)
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	Surface Treatment	Anti-Glare
	Viewing Direction	ALL
	Gray Viewing Direction	FREE
Mechanical	LCM (W x H x D) (mm)	164.9*100.0*2.8
	Active Area(mm)	154.21 x 85.92
	With /Without TSP	Without RTP
	Weight (g)	TBD
	LED Numbers	27 LEDs

Note 1: Viewing direction follows the data measured by optics equipment.
Note 2: Requirements on Environmental Protection: RoHS
Note 3: LCM weight tolerance: +/- 5%

3.Mechanical Drawing



4 Interface

Pin No.	Symbol	Function	
1	VCOM	Common voltage	
2-3	VDD	Power supply	
4	NC	No connection.	
5	RESET	Reset pin, normally pull high	
6	STBYB	Standby mode control pin,normally pull high	
7	GND	Ground.	
8	RXIN0-	LVDS lane0 input	
9	RXIN0+		
10	GND	Ground.	
11	RXIN1-	LVDS lane1 input	
12	RXIN1+		
13	GND	Ground.	
14	RXIN2-	LVDS lane2 input	
15	RXIN2+		
16	GND	Ground.	
17	RXCLKI	LVDS CLK input	
18	RXCLKI		
19	GND	Ground.	
20	RXIN3-	LVDS lane3 input	
21	RXIN3+		
22	GND	Ground.	
23-24	NC	No connection.	
25	GND	Ground.	
26-27	NC	No connection.	
28	SELB	SELB=0	LVDS 8 BIT
		SELB=1	LVDS 6BIT
29	AVDD	Power for analog circuit	
30	GND	Ground.	
31-32	LED-	LED Ground	
33	L/R	SHLR = “L”, S1←S2.....←S1536 SHLR = “H” , S1→S2.....→S1536	
34	U/D	Gate Up or Down scan control. UPDN = “L”, STV2 output vertical start pulse and UD pin output logical “0” to Gate driver. UPDN = “H”, STV1 output vertical start pulse and UD pin output logical “1” to Gate driver.	
35	VGL	Gate off voltage	
36-37	NC	No connection.	
38	VGH	Gate on voltage	
39-40	LED+	LED Power	

5. Absolute Maximum Ratings

5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25℃)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VDD	-0.50	3.96	V	1，2
	AVDD	-0.5	14.85	V	1，2
	VGH	-0.3	VGL+42	V	1，2
	VGL	-25	0.3	V	1，2

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.

2. V_{DD} >V_{SS} must be maintained.

5.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30℃	80℃	-20℃	70℃	1,2
Humidity	-	-	-	-	3

1. The response time will become lower when operated at low temperature.

2. Background color changes slightly depending on ambient temperature.
The phenomenon is reversible.

3. Ta<=40 ℃:85%RH MAX.
Ta>=40 ℃:Absolute humidity must be lower than the humidity of 85%RH at 40 ℃.

6.Electrical Characteristics

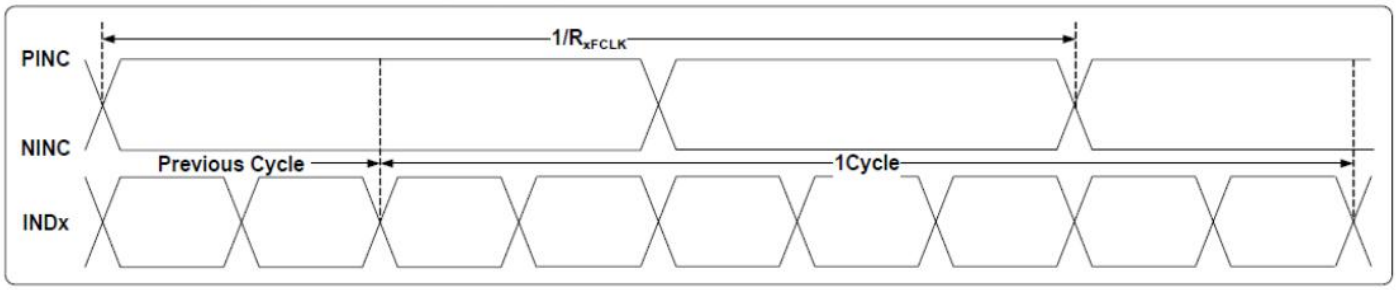
6.1 Driving TFT LCD Panel

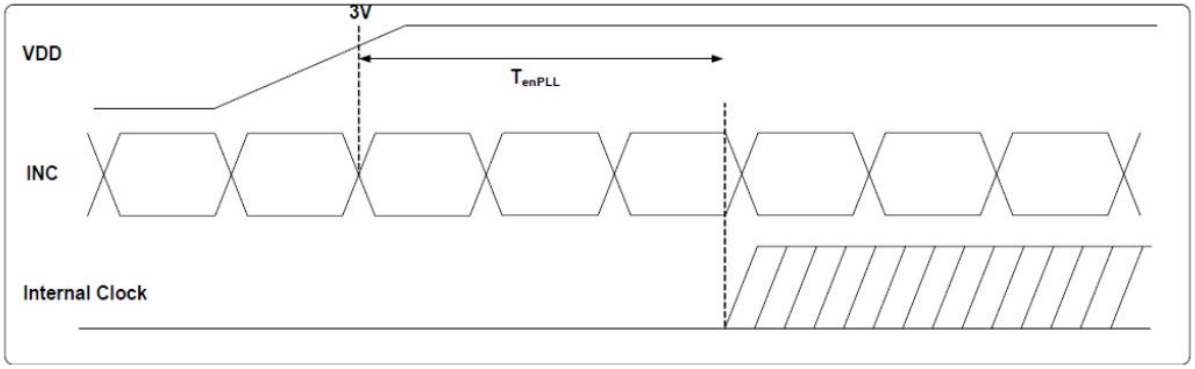
Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VDD	Ta=25℃	3.0	3.3	3.6	V	
Power supply		VGH	Ta=25℃	17	18	19	V	
Power supply		VGL	Ta=25℃	-7	-6	-5	V	
Power supply		AVDD	Ta=25℃	9.3	9.6	9.9	V	
Power supply		VCOM	Ta=25℃	3.2	3.4	3.6	V	
Input voltage	'H'	V_{IH}	V_{DD}=3.3V	0.7V_{DD}	-	V_{DD}	V	
	'L'	V_{IL}	V_{DD}=3.3V	0	-	0.3V_{DD}	V	

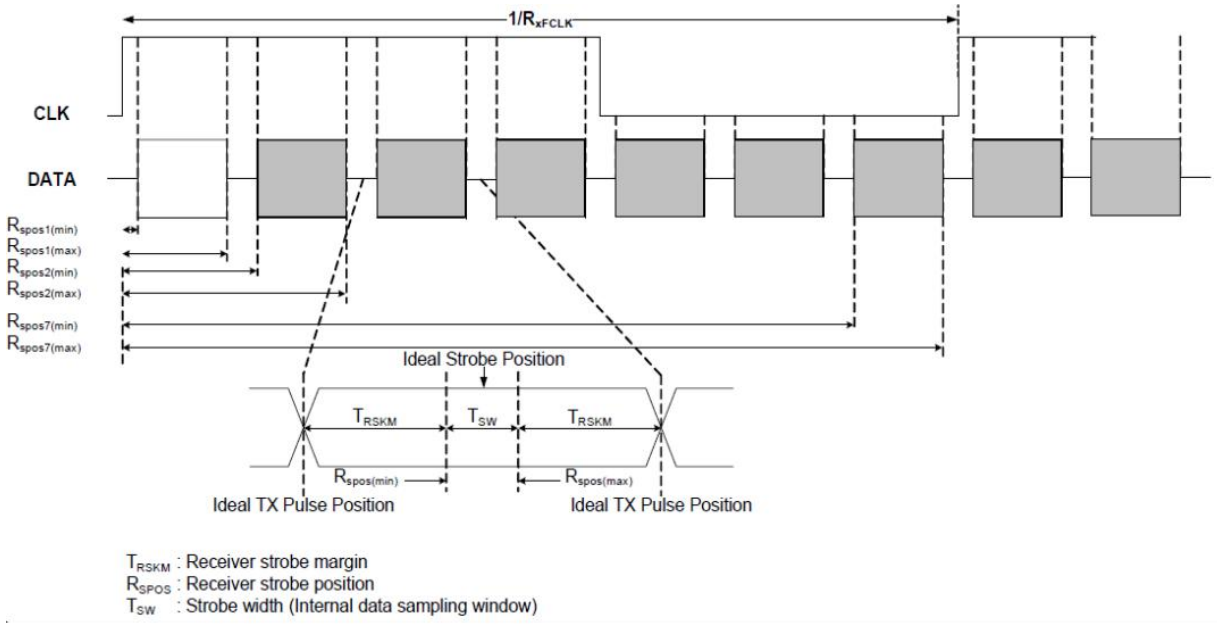
6.2 Interface Timing

6.2.1 AC Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Clock frequency	RxFCLK	40.8	51.2	67.2	MHz	
Input data skew margin	TRSKM	500	-	-	ps	|VID|=400mV RxVCM=1.2V RxFCLK=51.2MHz
Clock high time	TLVCH	-	4/ (7*RxFCLK)		ns	
Clock low time	TLVCL		3/ (7*RxFCLK)		ns	
PLL wake-up time	TenPLL			150	us	





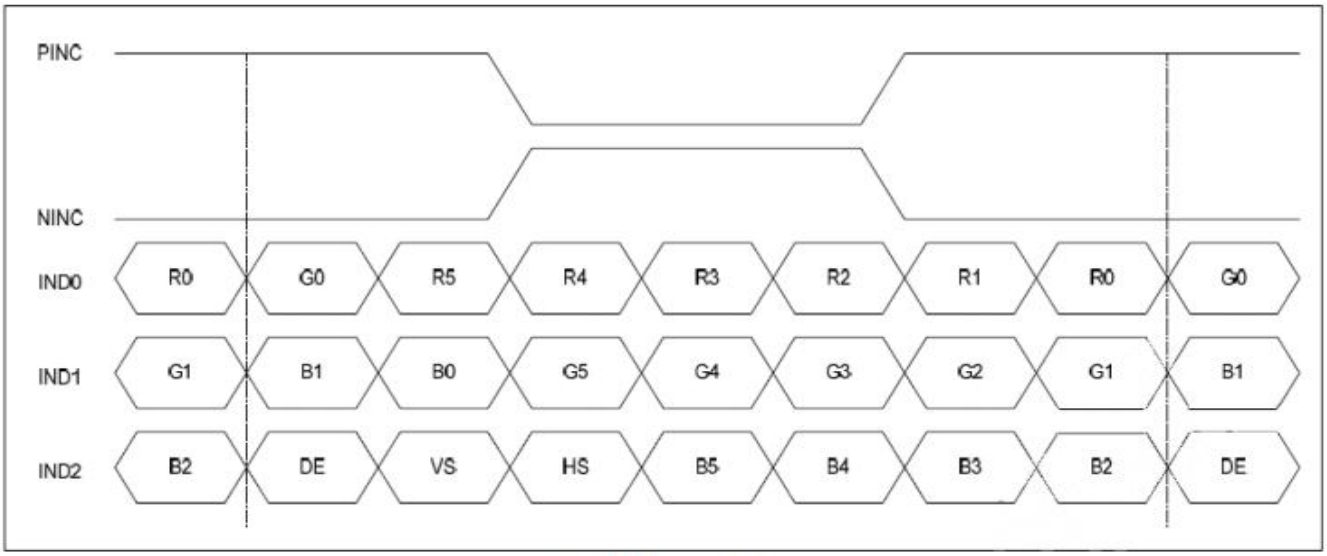


T_{RSKM} : Receiver strobe margin
R_{SPOS} : Receiver strobe position
T_{SW} : Strobe width (Internal data sampling window)

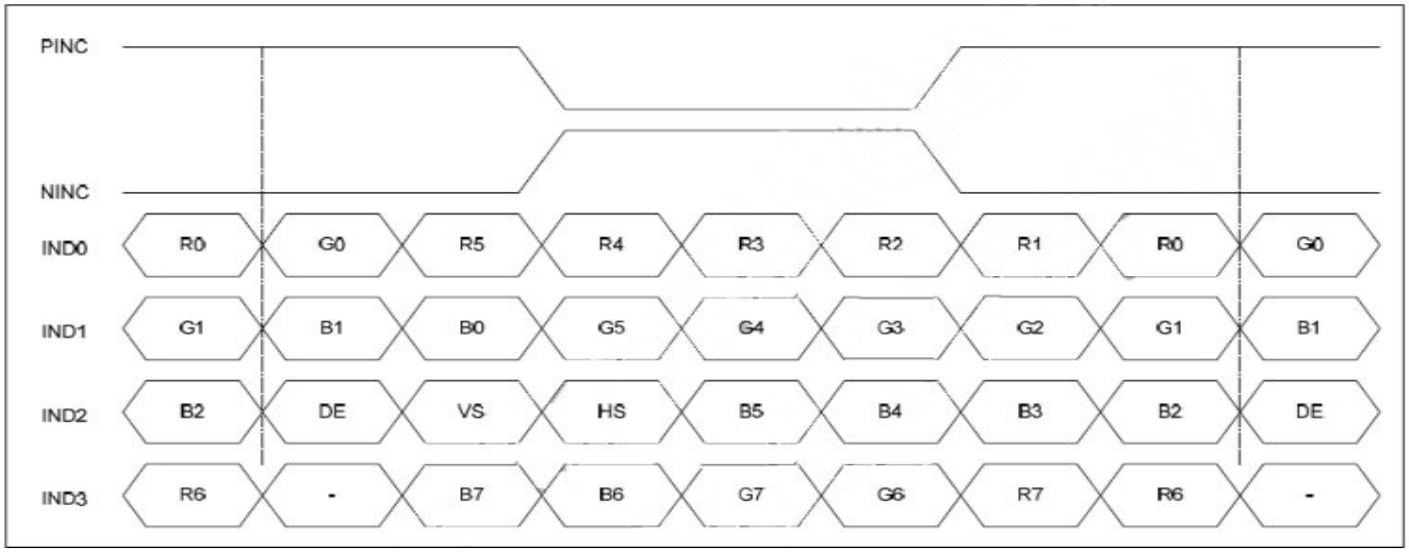
6.2.2 Input timing table

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	40.8	51.2	67.2	MHz	Frame rate =60Hz
Horizontal display area	thd		1024		DCLK	
HS period time	th	1114	1344	1400	DCLK	
HS Blanking	thb	90	320	376	DCLK	
Vertical display area	tvd		600		H	
VS period time	tv	610	635	800	H	
VS Blanking	thb	10	35	200	H	

6.2.3 DATA INPUT FORMAT



6-bit LVDS input

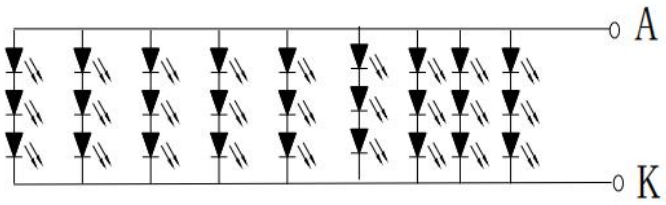


8-bit LVDS Input

6.3 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	180	-	mA	Note1 Note2 Note3
Forward Voltage	V_F	8.1	9.0	9.9	V	
Life Time	time	20000	-	-	hours	

Note 1: Each LED: IF =20 mA, VF =3.0V.
Note 2: Optical performance should be evaluated at Ta=25℃ only.
Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating lifetime is estimated data.



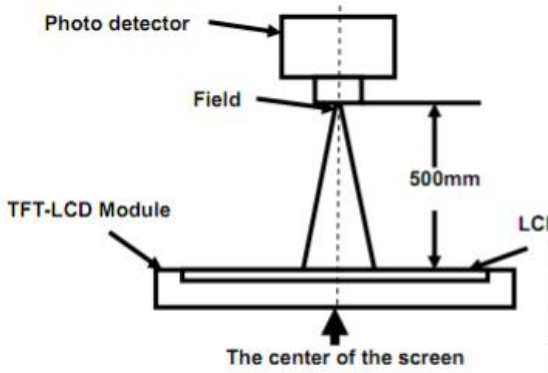
3X9=27LED 9.0V 20mAX9=180mA

7 Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	Θ = 0°	600	800	-		Note1 Note4
Luminance		YL		300	350	-	cd/m2	Note1 Note6 Note7
Luminance Uniformity		IV-M		80	85		%	
Response Time (Rising + Falling)		TRT	Ta= 25℃ Θ = 0°	-	25	50	ms	Note1 Note3
Viewing Angle range	Left	Θ	CR > 10	-	85	-	degree	Note2
	Right	Θ		-	85	-	degree	
	Up	Φ		-	85	-	degree	
	Down	Φ		-	85	-	degree	
Color Chromaticity (CIE1931)	White	x		0.270	0.300	0.330		Note1 Note5 Note7
		y		0.310	0.340	0.370		
	Red	x		0.585	0.615	0.645		
		y		0.290	0.320	0.350		
	Green	x		0.266	0.296	0.326		
		y		0.539	0.569	0.599		
	Blue	x		0.112	0.142	0.172		
		y		0.144	0.174	0.204		
NTSC				45	50		%	

Test Conditions:
1. IF= 20mA (one channel), the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.
The optical characteristics should be measured in the darkroom. After 5 minutes of 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.



Item	Photo detector	Field
Contrast Ratio	BM-7A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	SR-3A	2°

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).

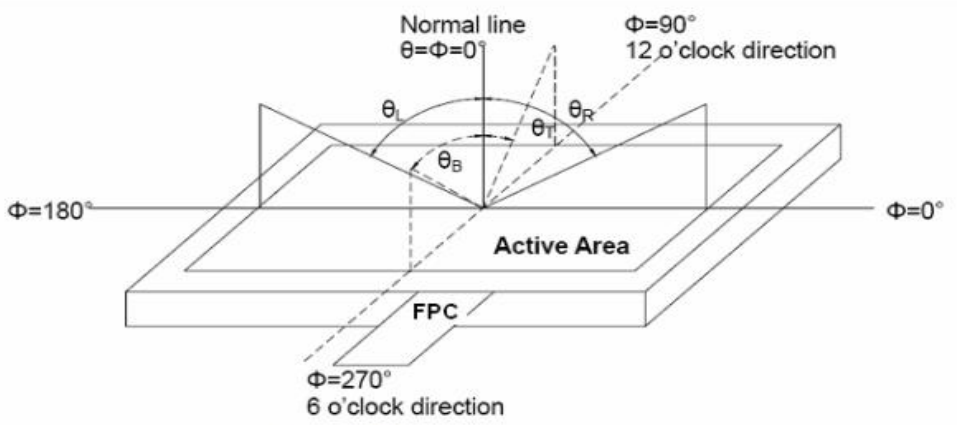
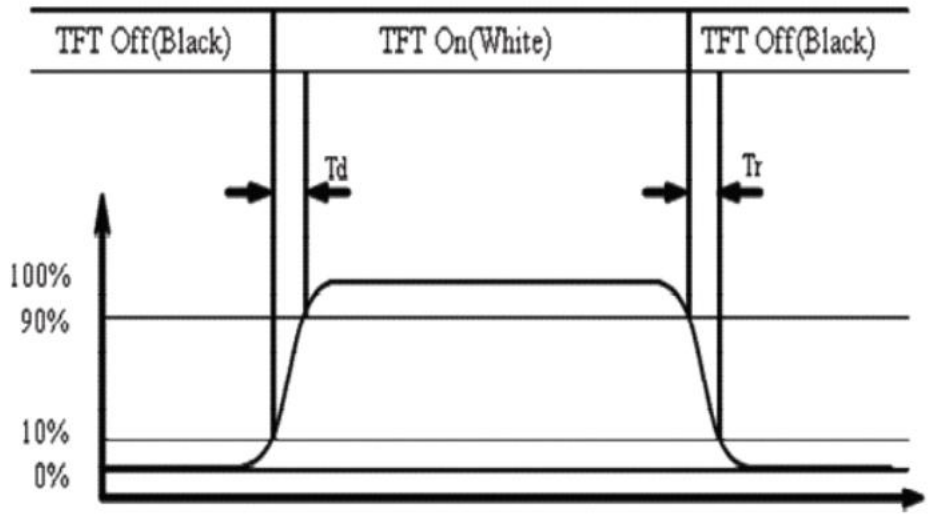


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

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 (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) 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
Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the Center of each measuring area
Luminance Uniformity (U) = Lmin/ Lmax X100%
L-------Active area length W----- Active area width

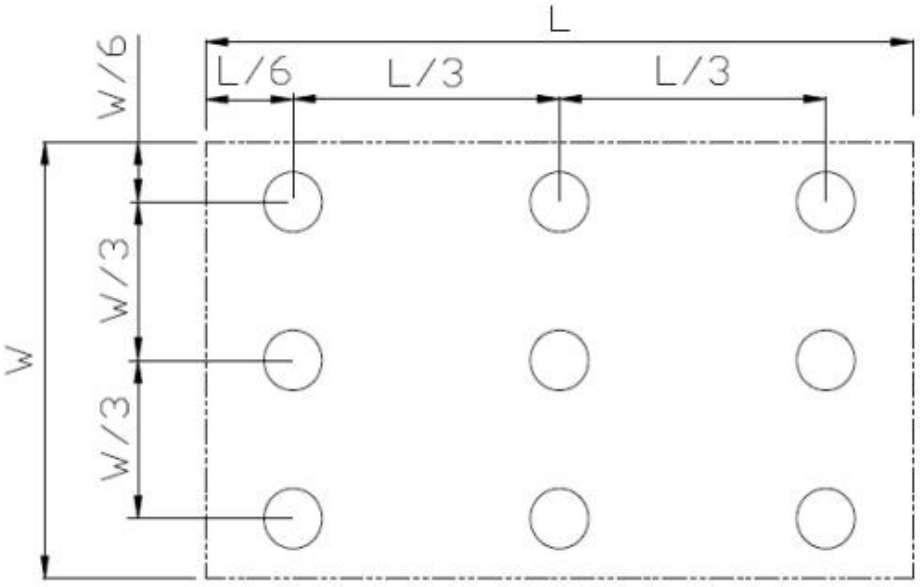


Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.
Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:
Measure the luminance of white state at center point.

8 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -20℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Operation)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X.Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y, ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T_S is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.

9 Precautions For Use of LCD modules

9.1 Handling Precautions

9.1.1The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.2 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.

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

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

9.1.5 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 the 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

9.1.6 Do not attempt to disassemble the LCD Module.

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

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

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

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

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

9.1.8.4The LCD Module is coated with a film to protect the display surface. Be careful when peeling off this protective film since static electricity may be generated.

9.2 Storage Precautions

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

9.2.2. The LCD modules should be stored under the storage temperature range If the LCD modules will be stored for a long time, the recommended condition is:

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

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

9.3 Transportation Precautions

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