

# PRDDUCT SPECIFCATION

Model: PX070TN27160463A

CUSTOMER		
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## 1.0 General Description

### 1.1 Introduction

PX070TN27160463A is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel and a driving circuit. This TFT LCD has a 7.0 (16:9) inch diagonally measured active display area with (1024 horizontal by 600 vertical pixels) resolution.

### 1.2. Features

7 (16:9 diagonal) inch configuration  
Compatible with NTSC & PAL system  
Image Reversion: UP/DOWN and LEFT/RIGHT  
ROHS design

### 1.3. General information

Item	Specification	Unit
Outline Dimension	165.8 (H) x 105.4. (V) x 2.8 (D)	mm
Display area	153.6 (H) x 90 (V)	mm
Number of Pixel	1024 RGB (H) x 600 (V)	pixels
Pixel pitch	0.15 (H) x 0.15 (V)s	mm
Pixel arrangement	RGB Vertical stripe	
Display mode	Normally white	
Color Filter Array	RGB vertical stripes	
Backlight	White LED	
Weight	TBD	g

## 2 Absolute Maximum Ratings

### 2.1 Electrical Absolute Rating

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	$DV_{DD}$	-0.3	5.0	V	
	$AV_{DD}$	6.5	13.5	V	
	$V_{GH}$	-0.3	40.0	V	
	$V_{GL}$	-20.0	0.3	V	
	$V_{GH}-V_{GL}$	-	40.0	V	
Operation Temperature	$T_{OP}$	-20	70	°C	
Storage Temperature	$T_{ST}$	-30	80	°C	
LED Reverse Voltage	$V_R$	-	1.2	V	Each LED Note 2
LED Forward Current	$I_F$	-	25	mA	Each LED

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.

Note 2:  $V_R$  Conditions: Zener Diode 20mA

## 2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	Topa	-10	60	°C	
Storage Temperature	Tstg	-20	70	°C	

## 2.3 Back-light Unit:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
LED Current	IF	–	180	–	mA	–	–
LED Voltage	VF	9	9.9	10.5	V	–	–
Life Time		–	20000	–	Hr.	$I \leq 180\text{mA}$	–
Color	White						

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.

(2)  $T_a = 25 \pm 2^\circ\text{C}$

(3) Test condition: LED Current 180mA

### 3.0 Optical Characteristics

#### 3.1 Optical specification

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Threshold voltage	V <sub>sat</sub>		—	2.48	—	V	(1)
	V <sub>th</sub>		—	1.47	—	V	(1)
Luminous intensity			250	300		cd/m <sup>2</sup>	
Transmittance(With PZ)	T		—		—		
Contrast	CR		400	500	—		(2)(3)
Response time	Rising	T <sub>R</sub>	—	5	7	msec	(2)(4)
	Falling	T <sub>F</sub>	—	20	28		
Color gamut	S		—	49	—	%	C light
Color chromaticity (CIE1931)	White	W <sub>x</sub>	θ=0 Normal viewing angle	0.26	0.31	0.36	(2)(5) CF Glass C light
		W <sub>y</sub>		0.28	0.33	0.38	
	Red	R <sub>x</sub>		0.616	0.631	0.646	
		R <sub>y</sub>		0.327	0.342	0.357	
	Green	G <sub>x</sub>		0.306	0.321	0.336	
		G <sub>y</sub>		0.538	0.553	0.568	
	Blue	B <sub>x</sub>		0.133	0.148	0.163	
		B <sub>y</sub>		0.173	0.188	0.203	
Viewing angle	Hor.	θ <sub>L</sub>	CR>10	60	70	—	
		θ <sub>R</sub>		60	70	—	
	Ver.	θ <sub>U</sub>		40	50	—	
		θ <sub>D</sub>		50	60	—	
Brightness uniformity	B <sub>UNI</sub>	θ=0	70	—	—	%	(6)
Optima View Direction			6 O' clock				(7)

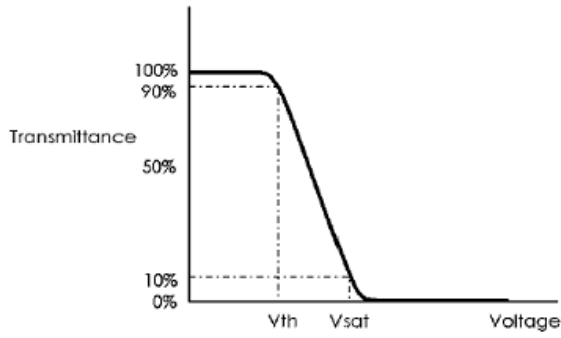
#### 3.2 Measuring Condition

- Measuring surrounding : dark room
- Ambient temperature : 25±2°C
- 30min. warm-up time.

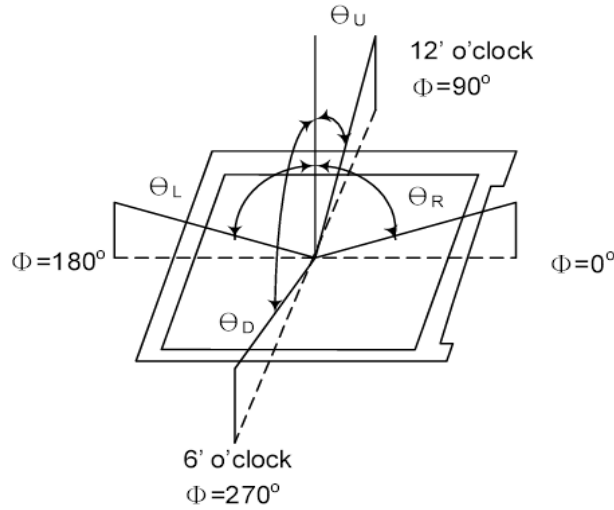
#### 3.3 Measuring Equipment

- TOPCON BM-7
- Measuring spot size : field 2°

**Note (1) Definition of Vsat and Vth (at 20°C)**



**Note (2) Definition of Viewing Angle :**

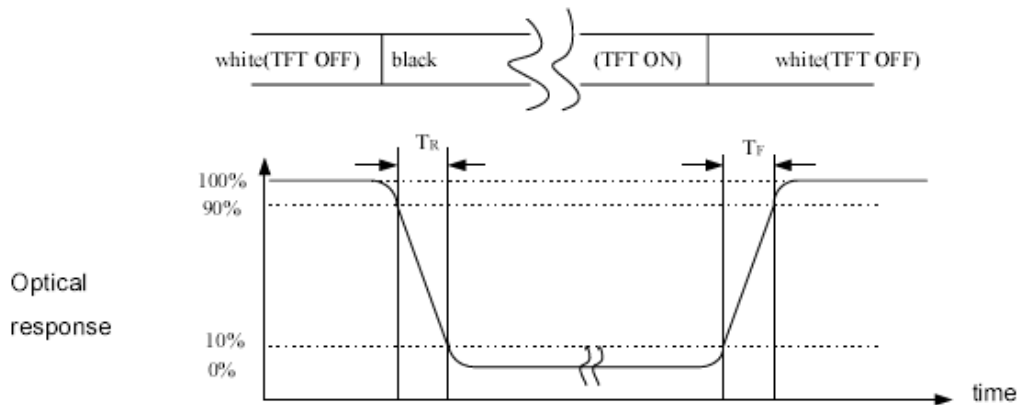


**Note (3) Definition of Contrast Ratio(CR) :**

measured at the center point of panel

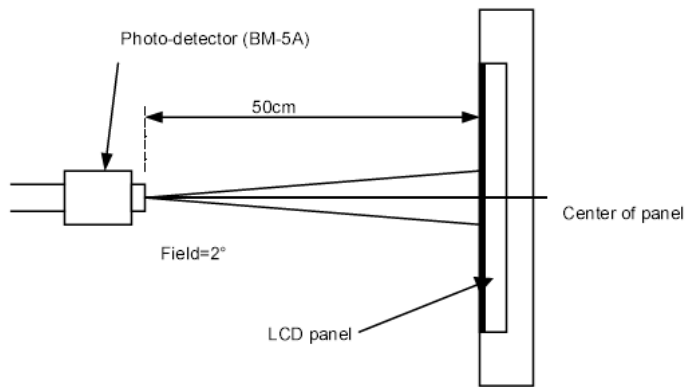
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

**Note (4) Definition of Response Time : Sum of  $T_R$  and  $T_F$**

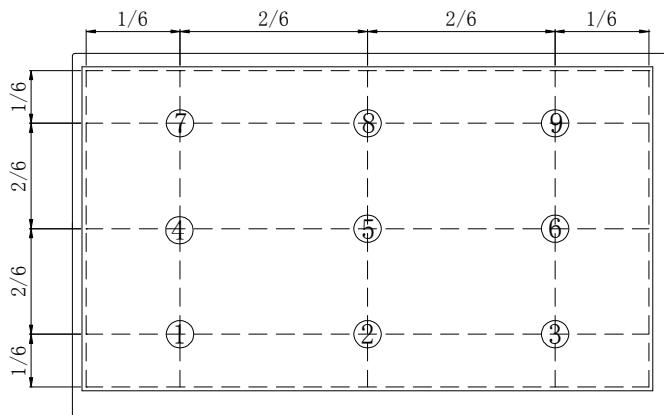




**Note (5) Definition of optical measurement setup**



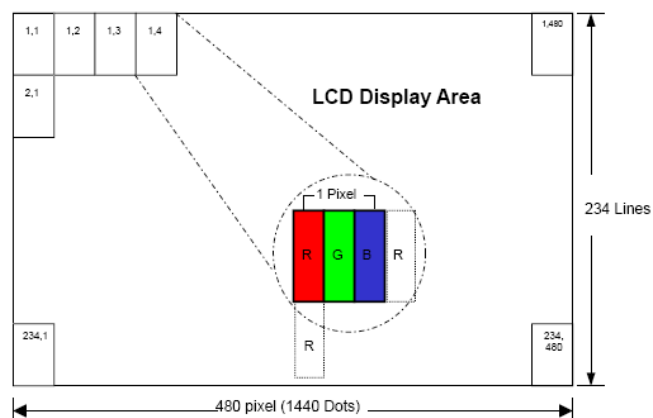
**Note (6) Definition of brightness uniformity**



**Note (7) Rubbing Direction** (The different Rubbing Direction will cause the different optima view direction.)

## 4.0 Block Diagram

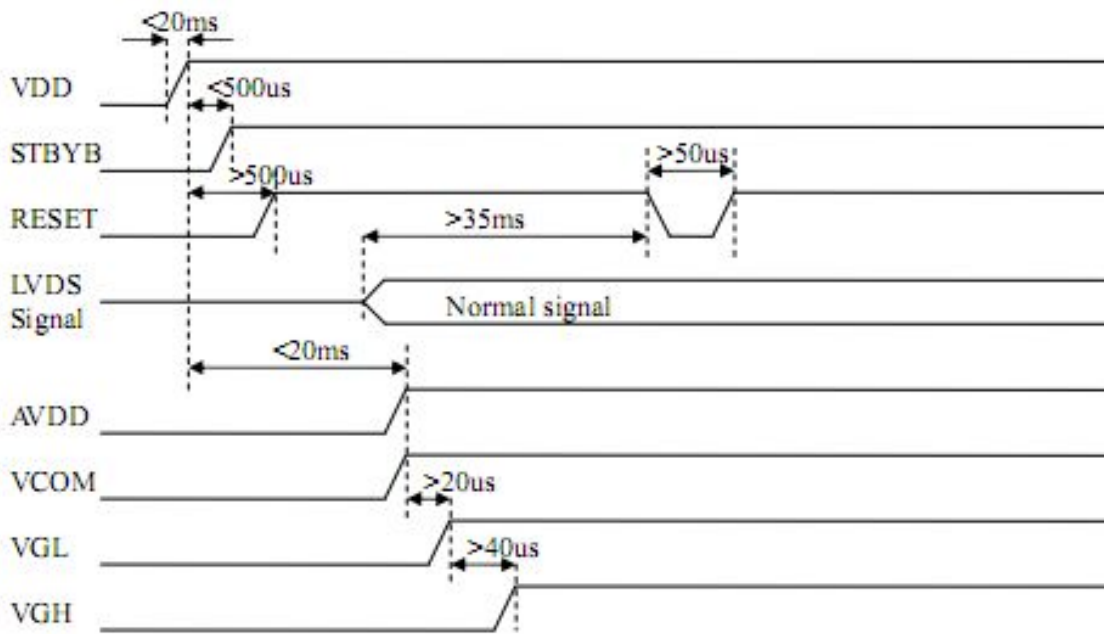
### 4.1 TFT-LCD Module



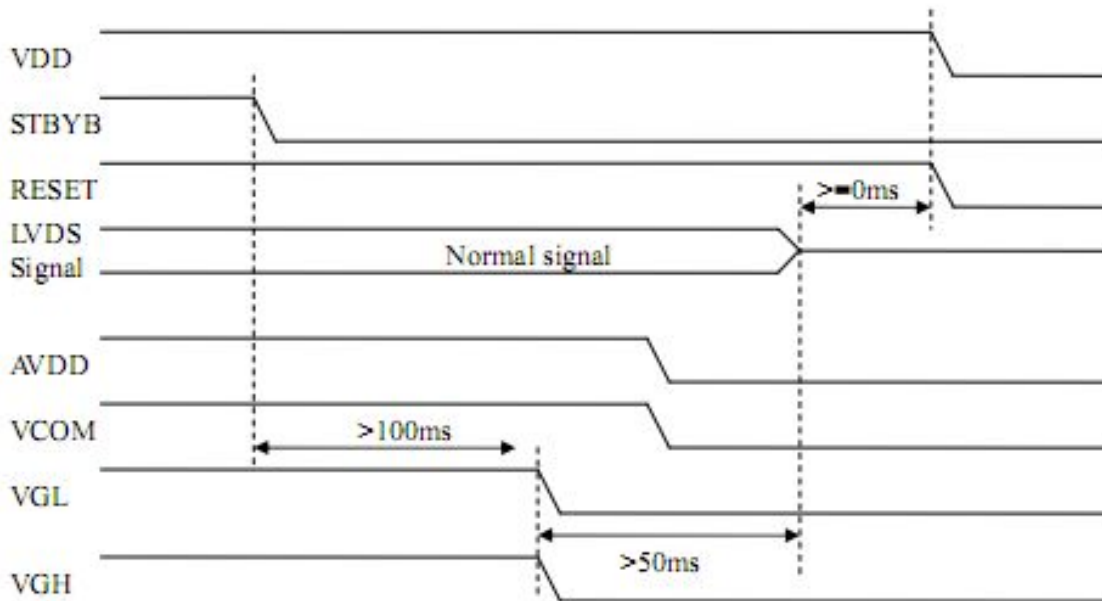
## 4.2 Relationship Between Displayed Color and input

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	$I_{GH}$	-	0.25	1.0	mA	$V_{GH} = 20V$
	$I_{GL}$	-	0.25	1.0	mA	$V_{GL} = -6.8V$
	$IDV_{DD}$	-	38	60	mA	$DV_{DD} = 3.3V$
	$I_{AV_{DD}}$	-	20	30	mA	$AV_{DD} = 11V$

**a. Power on:**



**b. Power off:**



## 5.0 Interface Pin Connection

Pin No.	Symbol	I/O	Function	Remark
1	VCOM	P	Common Voltage	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	---	No connection	
5	Reset	I	Global reset pin	
6	STBYB	I	Standby mode, Normally pulled high STBYB = "1", normal operation STBYB = "0", timing controller, source driver will turn off, all output are High-Z	
7	GND	P	Ground	
8	RXIN0-	I	- LVDS differential data input	
9	RXIN0+	I	+ LVDS differential data input	
10	GND	P	Ground	
11	RXIN1-	I	- LVDS differential data input	
12	RXIN1+	I	+ LVDS differential data input	
13	GND	P	Ground	
14	RXIN2-	I	- LVDS differential data input	
15	RXIN2+	I	+ LVDS differential data input	
16	GND	P	Ground	
17	RXCLKIN-	I	- LVDS differential clock input	
18	RXCLKIN+	I	+ LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	- LVDS differential data input	
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	DIMO	O	Backlight CABC controller signal output	
28	SELB	I	6bit/8bit mode select	Note1
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	L/R	I	Horizontal inversion	Note3
34	U/D	I	Vertical inversion	Note3
35	VGL	P	Gate OFF Voltage	
36	CABCEN1	I	CABC H/W enable	Note2
37	CABCEN0	I	CABC H/W enable	Note2
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

I: input, O: output, P: Power

Note1: If LVDS input data is 6 bits ,SELB must be set to High;

If LVDS input data is 8 bits ,SELB must be set to Low.

Note2: When CABC\_EN="00", CABC OFF.

When CABC\_EN="01", user interface image.

When CABC\_EN="10", still picture.

When CABC\_EN="11", moving image.

When CABC off, don't connect DIMO, else connect it to backlight.

Note3: When L/R="0", set right to left scan direction.

When L/R="1", set left to right scan direction.

When U/D="0", set top to bottom scan direction.

When U/D="1", set bottom to top scan direction.

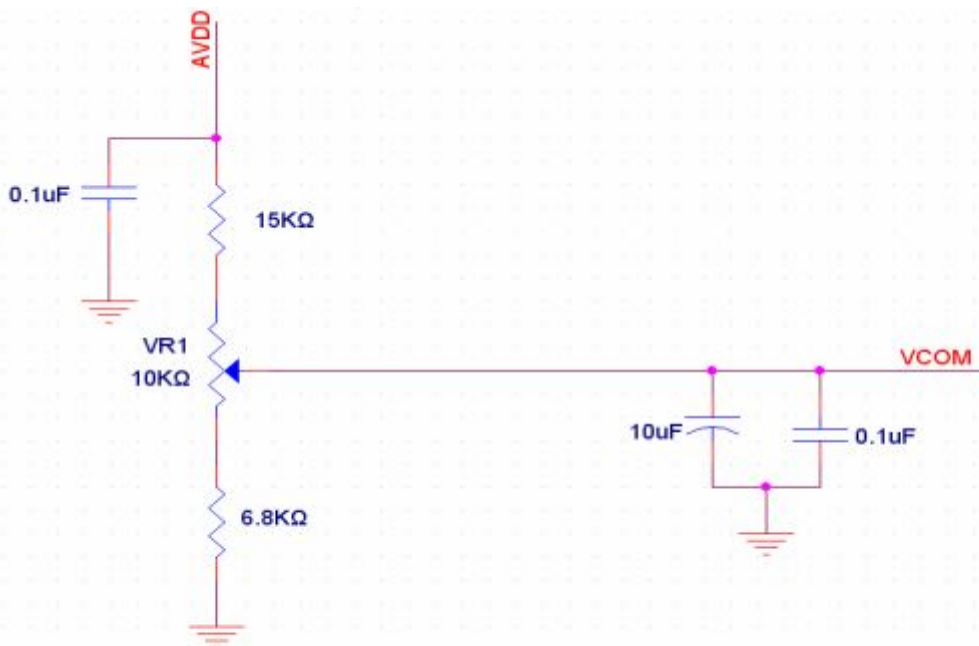
## 6. Electrical Characteristics

### 6.1 TFT LCD Module

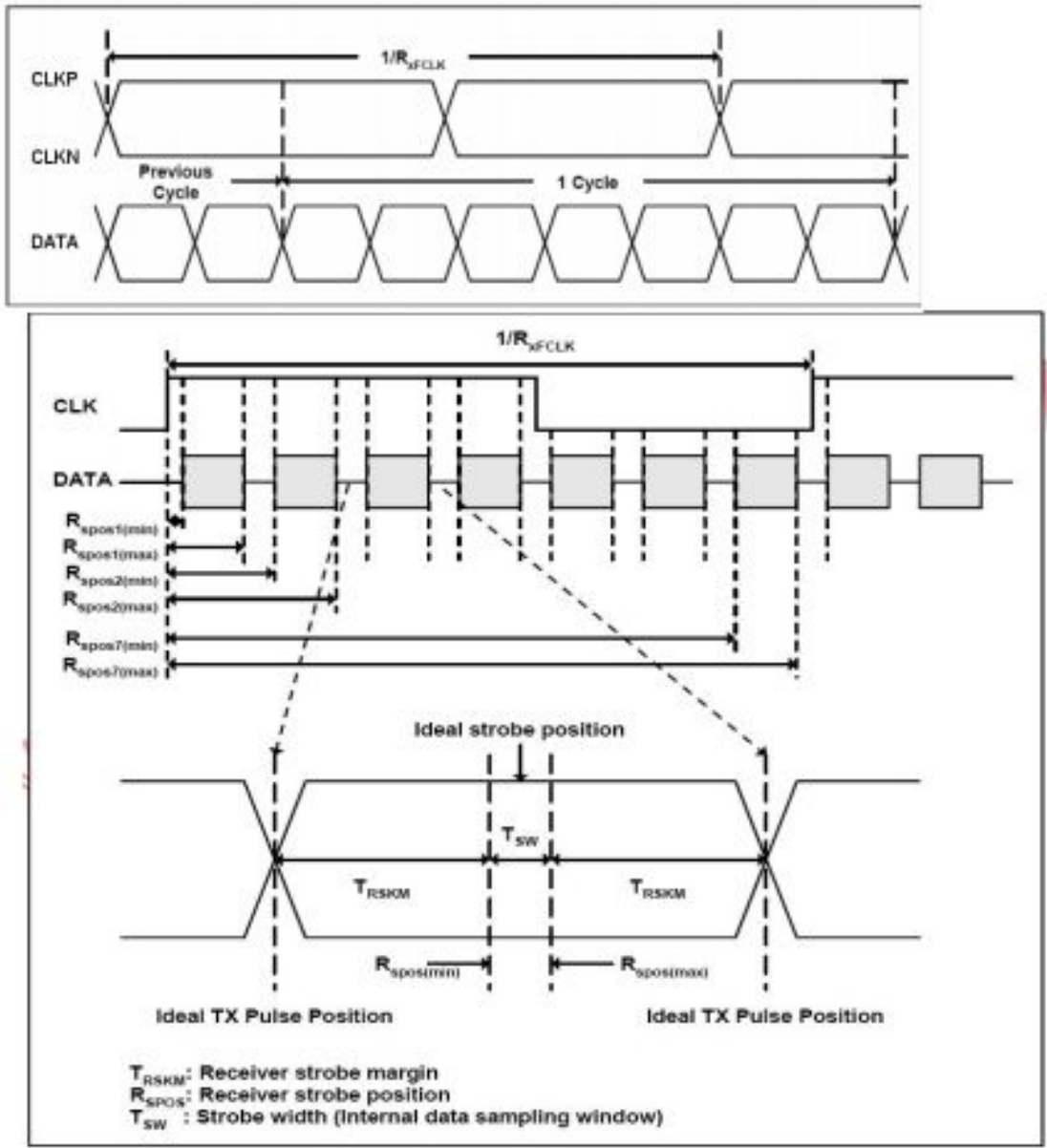
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	V <sub>dd</sub>	3.0	3.3	3.6	V	
	V <sub>GH</sub>	18.9	19.1	19.3	V	
	V <sub>GL</sub>	-9.5	-9.4	-9.3	V	
	AV <sub>DD</sub>	9.6	9.7	9.8	V	
	V <sub>COM</sub>	2.9	3.0	3.1	V	
Video signal amplitude (V <sub>R</sub> ,V <sub>G</sub> ,V <sub>B</sub> )	V <sub>IA</sub>	-	-	AV <sub>DD</sub> -0.4	V	
	V <sub>IAC</sub>	-	-	-	V	AC component,
	V <sub>IDC</sub>	-	AV <sub>DD</sub> /2	-	V	DC component
V <sub>COM</sub>	V <sub>CAC</sub>	-	-	-	VP-P	AC component
	V <sub>CDC</sub>	-	-	-	V	DC component, (1)
Input signal voltage	V <sub>IH</sub>	0.7DV <sub>DD</sub>	-	DV <sub>DD</sub>	V	(2)
	V <sub>IL</sub>	0	-	0.3DV <sub>DD</sub>	V	(2)
Current of power supply	I <sub>DD</sub>	-	4.0		mA	V <sub>CC</sub> =3.3V
	I <sub>ADD</sub>	-	20		mA	AV <sub>DD</sub> =9.7V
	I <sub>GH</sub>	-	0.2		uA	V <sub>GH</sub> =19.1V
	I <sub>GL</sub>	-	0.2		mA	V <sub>GL</sub> =-9.4V

Note (1): The brightness of LCD panel could be changed by adjusting the AC component of V<sub>COM</sub>.

Note (2): STHL, STHR, OEH, L/R, CPH1~CPH3, STVD, STVU, OEV, CKV, U/D

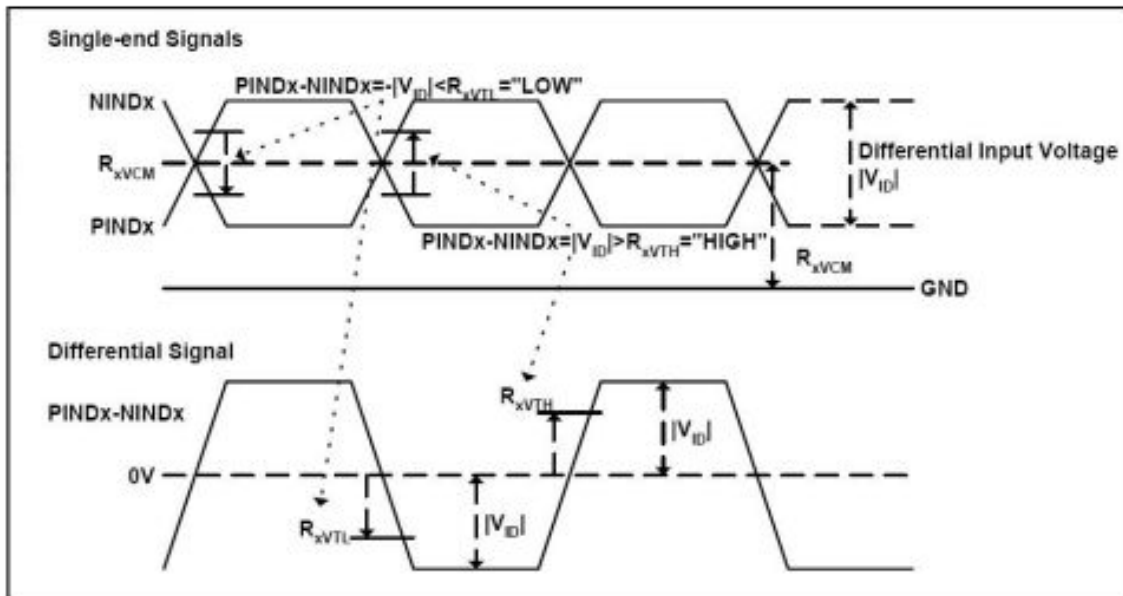


## 6.2 Input Clock and Data Timing Diagram



### 6.3 DC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Differential input high Threshold voltage	$R_{xVTH}$	-	-	+0.1	V	$R_{xVCM}=1.2V$
Differential input low Threshold voltage	$R_{xVTL}$	-0.1	-	-	V	
Input voltage range (singled-end)	$R_{xVIN}$	0	-	2.4	V	
Differential input common mode voltage	$R_{xVCM}$	$ V_{ID} /2$	-	$2.4- V_{ID} /2$	V	
Differential voltage	$ V_{ID} $	0.2	-	0.6	V	
Differential input leakage current	$R_{V_{iiz}}$	-10	-	+10	$\mu A$	



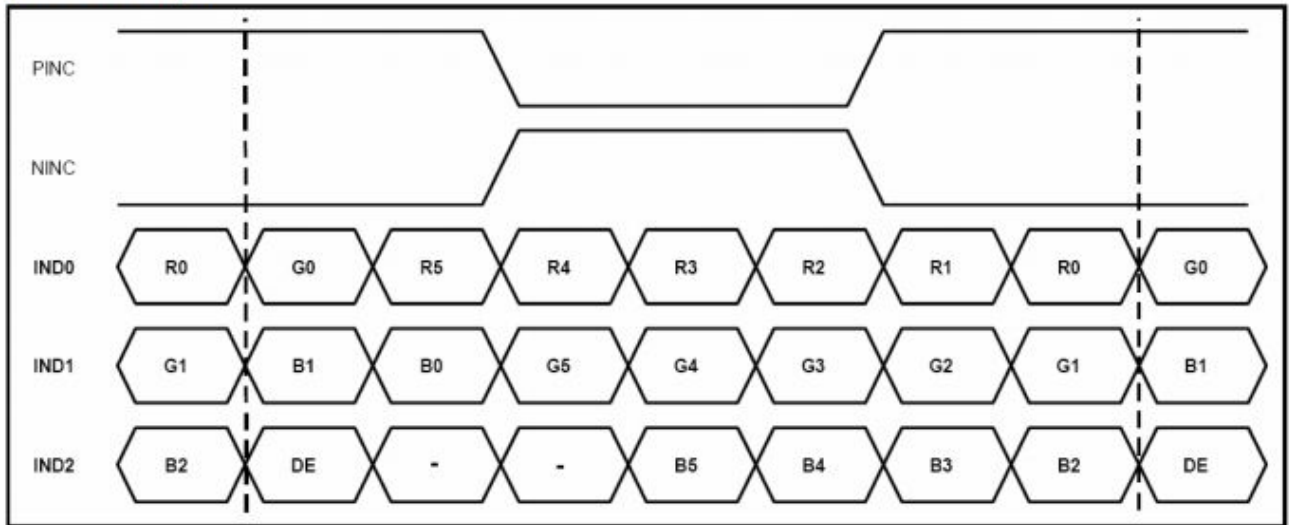


## 6.4 Timing

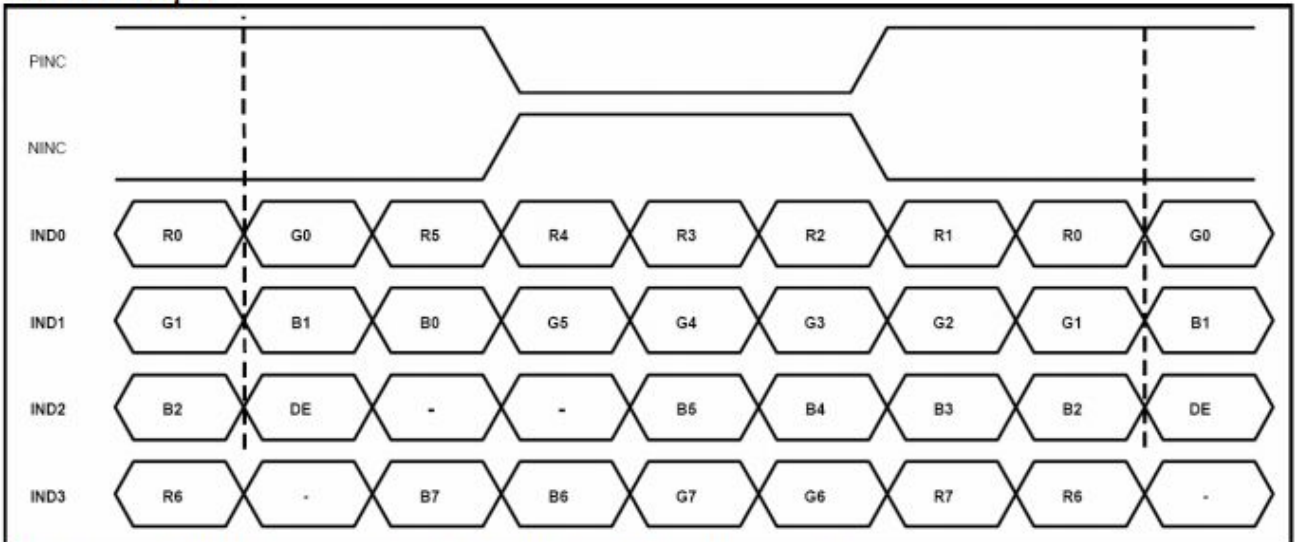
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	40.8	51.2	67.2	MHz	Frame rate =60Hz
Horizontal display area	thd	1024			DCLK	
HS period time	th	1114	1344	1400	DCLK	
HS Blanking	thb	90	320	376	DCLK	
Vertical display area	tvd	600			H	
VS period time	tv	610	635	800	H	
VS Blanking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

## 6.5 Data Input Format

### 6bit LVDS input



### 8bit LVDS input



Note: Support DE timing mode only, SYNC mode not supported.

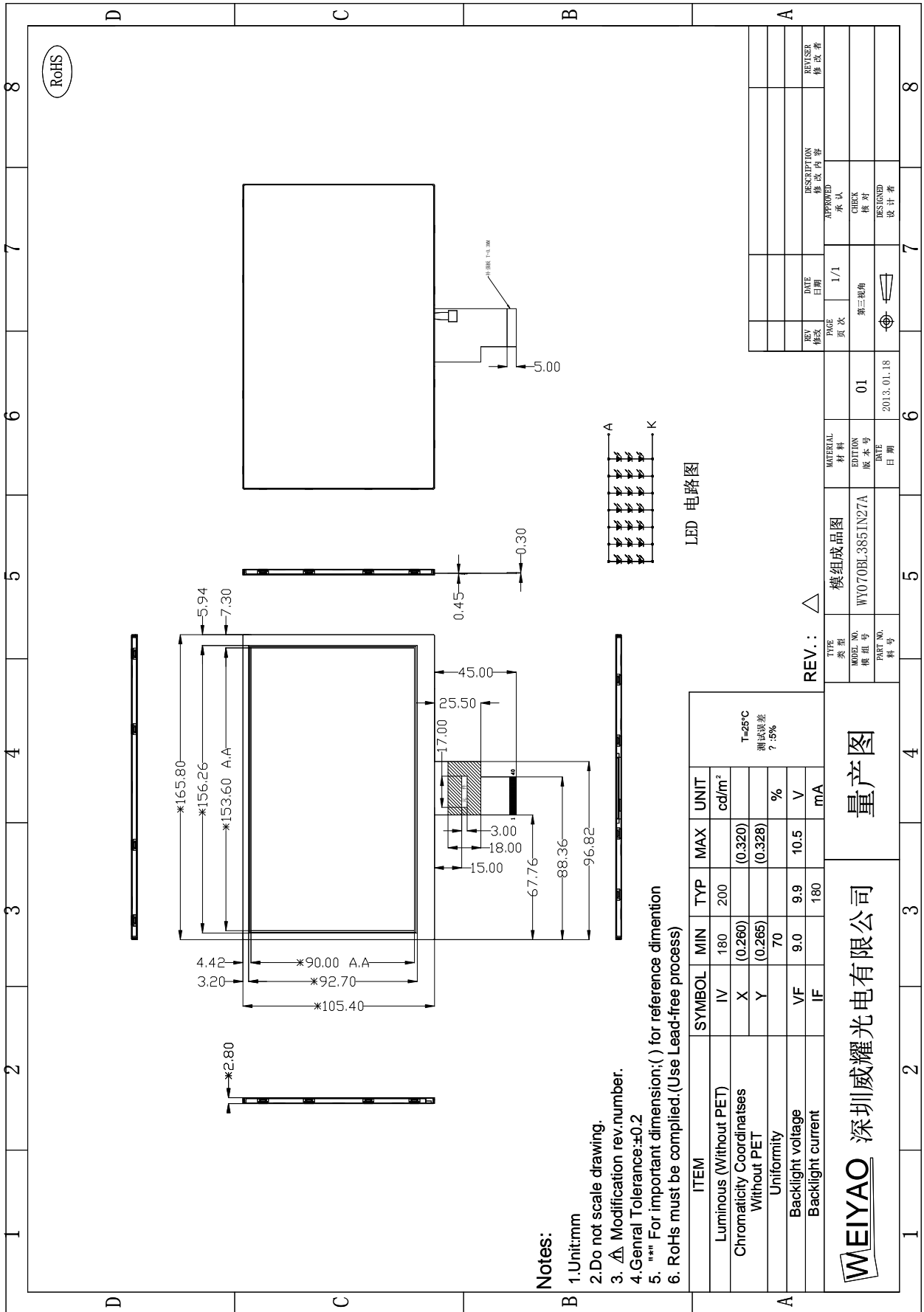
## 7.0 Reliability test items

NO	Item	Conditions	Remark
1	High Temperature Storage	Ta=70°C,24hrs	
2	Low Temperature Storage	Ta=-20°C,24hrs	
3	High Temperature Operation	Ta=60°C,24hrs	
4	Low Temperature Operation	Ta=-20°C,24hrs	
5	High Temperature and High Humidity (operation)	Ta=+40°C,90%RH,24hrs	
6	Thermal Cycling Test (non operation)	-20°C(0.5hr)→+70°C(0.5hr),100cycles	
7	Shock	100G,6ms, ±X, ±Y, ±Z 3 time for each direction	JIS C7021, A-10 (Condition A)
8	Vibration (with carton)	3G,10 to 200 Hz, sine wave	
9	Drop (with carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces	JIS Z0202
10	Electrostatic Discharge	±200V,200PF,0Ω1 time/each terminal	

Note: All tests above are practiced at module type.

There is no display function NG issue occurred, All the cosmetic specification is judged before the reliability stress.

# 8.0 Outline dimension



- Notes:**
1. Unit:mm
  2. Do not scale drawing.
  3.  $\Delta$  Modification rev.number.
  4. Genral Tolerance:±0.2
  5. "\*" For important dimension;() for reference dimension
  6. RoHs must be complied.(Use Lead-free process)

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Luminous (Without PET)	IV	180	200		cd/m <sup>2</sup>
Chromaticity Coordinates Without PET	X	(0.260)		(0.320)	T=25°C 测试误差 ? ±5%
	Y	(0.265)		(0.328)	
Uniformity		70			%
Backlight voltage	VF	9.0	9.9	10.5	V
Backlight current	IF		180		mA

REV. : $\Delta$		模组成品图		材料	
TYPE 类型	MODEL NO. 模组号	EDITION 版本号	CHECK 校对	APPROVED 承认	REV/SER 修改者
WY070BL3851N27A	01	2013.01.18	DESIGN/D 设计者		
DATE 日期					

**WEIYAO** 深圳威耀光电有限公司

量产图

LED 电路图