深圳市晶彩世界科技有限公司

LCD MODULE
SPECIFICATION

Customer: _____

Model Name: JCH070IPS-27B

SPEC NO.: _____

Date: 2020/05/11

Version: 01

☐ **Preliminary Specification**
■ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by
TONY	CHEN TIAN LIANG	

Record of Revision

Version	Revise Date	Page	Content
Pre-Spec.01	2018/05/11	All	Initial Release

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1. OVERVIEW

JCH070IPS-27B- is 7.0” color TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, driver ICs ,control circuit and LED backlight. By applying 1024×600 images are displayed on the 7.0” diagonal screen. Display 16.7M colors by R.G.B signal input.

General specifications are summarized in the following table：

ITEM	SPECIFICATION			
Display Area (mm)	154.2144(H) × 85.92(V)			
Number of Pixels	1024(H) × 3(RGB) ×600(V)			
Pixel Pitch (mm)	0.1506(H) × 0.1432(V)			
Color Pixel Arrangement	RGB vertical stripe			
Display Mode	Normally black			
Number of Colors	16.7M			
Brightness (cd/m^2)	600nit(typ)			
Response Time (ms)	25ms(typ.)			
Contrast Ratio	800:1			
Viewing Angle (CR≧10)	160degree (Horizontal.)			
	130degree (Vertical)			
Color Saturation	50%(typ.)			
Optimum Viewing Direction	6 O'clock			
Power Consumption (W)	2.592			
Interface connection	LVDS, 40pin			
Module Size (mm)		Min.	Typ.	Max
	Horizontal (H)	164.6	164.9	165.2
	Vertical (V)	99.7	100	100.3
	Depth (D)	2.6	2.8	3.0
Module Weight (g)	TBD(Typ)			
Backlight Unit	LED			
Surface Treatment	Anti-Glare 3H			

2. ABSOLUTE MAXIMUM RATINGS

The following are maximun values which, if exceeded, may cause faulty operation or damage to the unit.

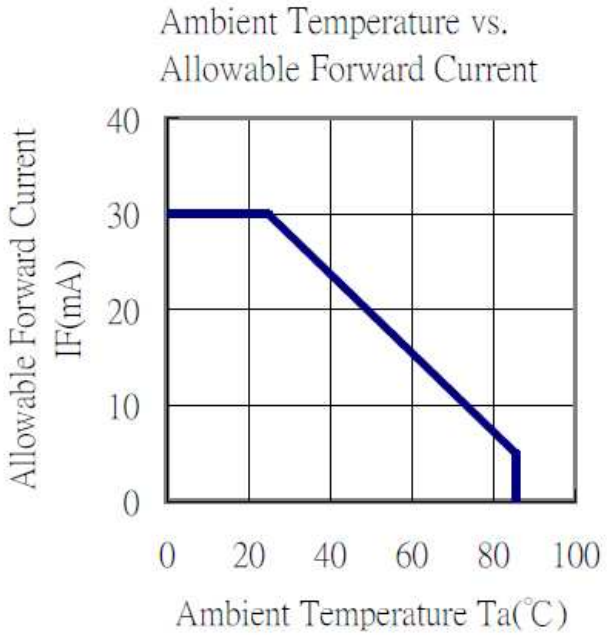
Item	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	DVDD	-0.3	+3.96	V	
Analog Supply Voltage	AVDD	-0.5	+14.85	V	
Gate On Voltage	VGH	-0.3	+40	V	
Gate Off Voltage	VGL	-20	+0.3	V	
Gate On-Gate Off Voltage	VGH-VGL	12	40	V	
Signal Input Voltage	NIND0 ~ NIND3 PIND0 ~ PIND3 NINC,PINC	-0.5	5	V	
Forward Current （per LED）	If	-	30	mA	
Reverse Voltage（per LED）	VR	-	5	V	
Pulse forward currentn（per LED）	Ifp	-	60	mA	Note *2)
Operation Temperature (LCD panel surface overall)	T_{op1}	-20	70	℃	Note *1)
Operation Temperature	T_{op}	-20	60	℃	Note *1)
Storage Temperature	T_{stg}	-30	70	℃	Note *1)

Note：

*1) If the product were used out of the operation and storage range, it will have quality issue.

*2) Ifp Conditions ： Pulse Width≦10msec，Duty≦1/10.

*3) Each one of LED operation must be follow diagram of Ambient Temperature and Allowable Forward Current.



*4)If users use the product out off the environmemtal operation range（temperature and humidity）, it will

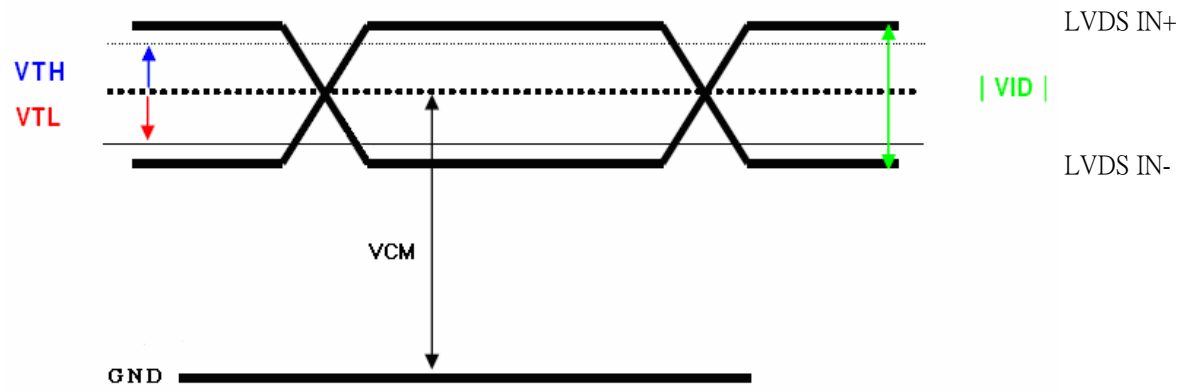
3. ELECTRICAL CHARACTERISTICS

3.1 Typical Operation Conditions

Ta=25℃

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Digital Power Supply Voltage For LCD	DVDD	3	3.3	3.6	V	
Logic Input Voltage (LVDS:IN+,IN-)	VCM	$\frac{\lvert VID \rvert}{2}$	-	$2.4-\frac{\lvert VID \rvert}{2}$	V	Note1
	$\lvert VID \rvert$	200	-	600	mV	Note1
	VTH	-	-	100	mV	VCM=1.2V Note1
	VTL	-100	-	-	mV	
Analog Power Supply Voltage	AVDD	9.4	9.6	9.8	V	
Gate On Power Supply Voltage	VGH	17	18	19	V	
Gate Off Power Supply Voltage	VGL	-6.6	-6	-5.4	V	
Common Power Supply Voltage	VCOM	3.7	3.9	4.1	V	Note2
Logic Input Voltage	VIH	0.7*DVDD	-	DVDD	V	
	VIL	GND	-	0.3*DVDD	V	

Note1 :LVDS signal



Note2 :Please adjust VCOM to make the flicker level be minimum.

3.2 Current Consumption

ITEM	SYMBOL	CONDITION	MIN	TYPE	MAX	UNIT	NOTE
Gate On Power Current	IVGH	VGH =18V	- -	0.5	1	mA	Note1
Gate Off Power Current	IVGL	VGL= -6V	- -	0.5	1	mA	Note1
Digital Power Current	IDVDD	DVDD = 3.3V	- -	30	45	mA	Note1
Analog Power Current	IAVDD	AVDD = 9.6V	- -	35	45	mA	Note1
Total Power Consumption	PC		- -	447	604	mW	Note1

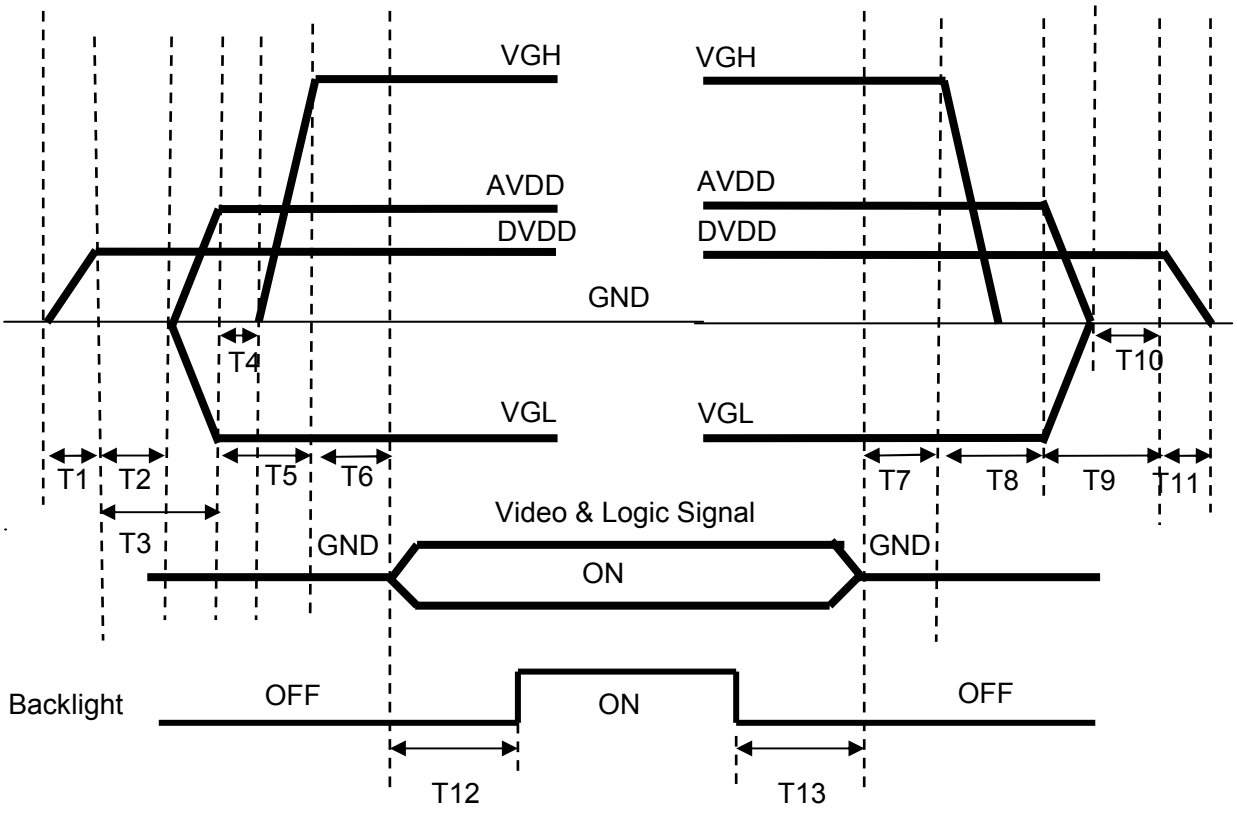
Note1: Typical: Under 256 gray pattern
Maximum: Under black pattern

256 gray pattern

Black Pattern

3.3 Power、Signal Sequence

Power On：DVDD→AVDD/VGL →VGH →Video &Logic Signal→Backlight
Power Off：Backlight→Video &Logic Signal→ VGH→AVDD/VGL→DVDD



0<T1≦10ms
T2>0ms
T3>20ms
T4>0ms
T5>10ms
0<T6≦10ms
T12≧200ms

0ms<T7<50ms
0ms<T8<50ms
T9>0ms
T10>0ms
0<T11≦10ms
T13≧200ms

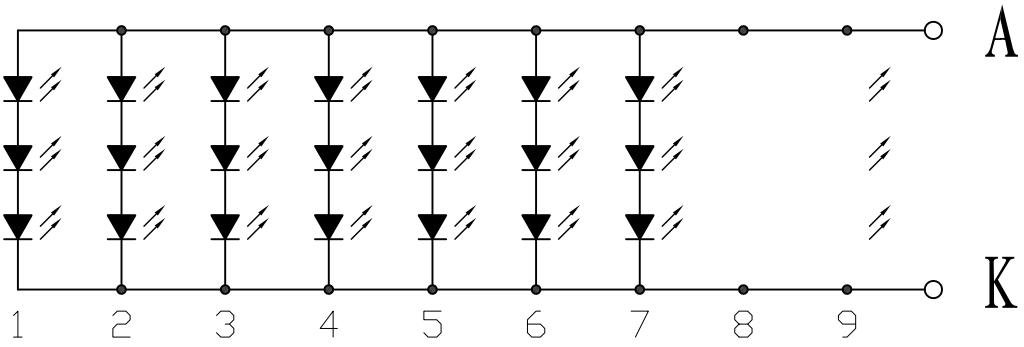
3.4 Backlight

Ta=25℃

ITEM	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
LED current	IL	Ta=25℃ Each serial=20mA	200	210	-	mA	
LED voltage	VL	Ta=25℃ Each serial=20mA	9.0	9.9	10.5	V	
Power consumption	WL	Ta=25℃ Each serial=20mA	1.62	1.98	-	W	
LED Lifetime	-	Ta=25℃ Each serial=20mA	30000			Hr	

Note :

*1)LED Circuit Diagram：



*2) A：Anode(＋)，K：Cathode(－)

*3) Suggestion: Using the constant current control to avoid the leakage light and brightness quality issue.

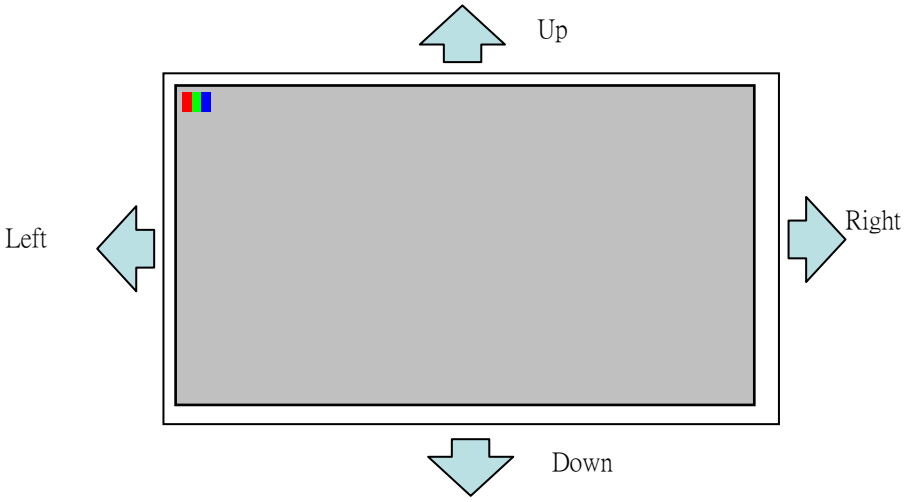
*4) Definition of Led lifetime Luminance < Initial luminance 50%.

4. INTERFACE CONNECTION

4.1 CN1 (Input Signal)

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	Note1
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	XON	---		
27	DIMO	O	Backlight CABC controller signal output	
28	HSD	I	6bit/8bit mode select	Note3
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	Note2
34	U/D	I	Vertical Inversion	Note2
35	VGL	P	Gate OFF Voltage	
36	CABCEN1			
37	CABCEN0			
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

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



4.2 CN2（backlight）

Pin No.	SYMBOL	FUNCTION
1	A	Anode
2	K	Cathode

Note：

Input connector : BHSR-02VS-1(JST)

Outlet connector: SM02B-BHSS-1(JST)

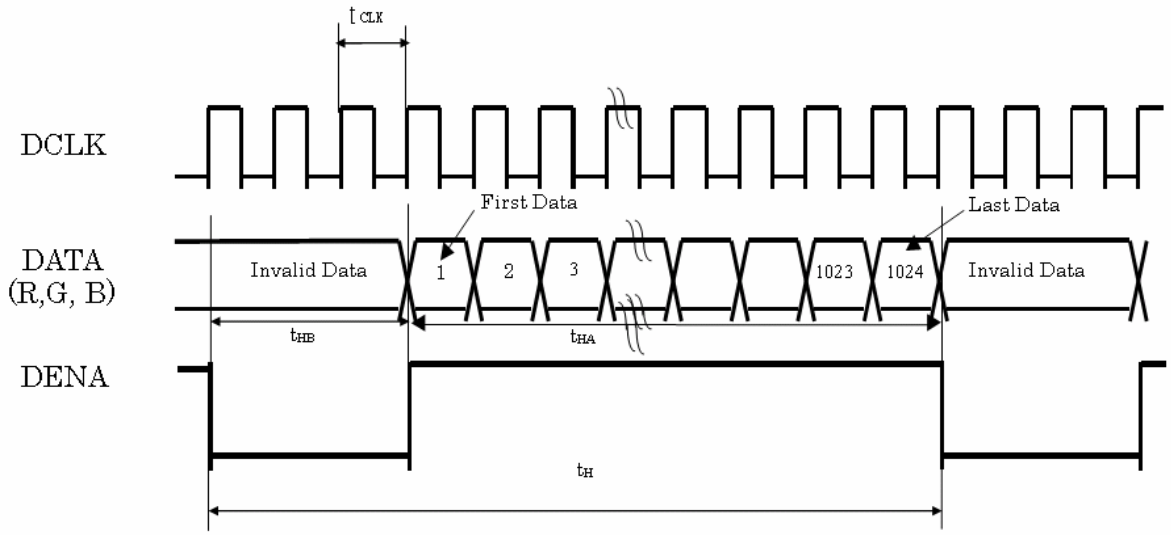
5. INPUT SIGNAL(DE ONLY MODE)

5.1 Timing Specification

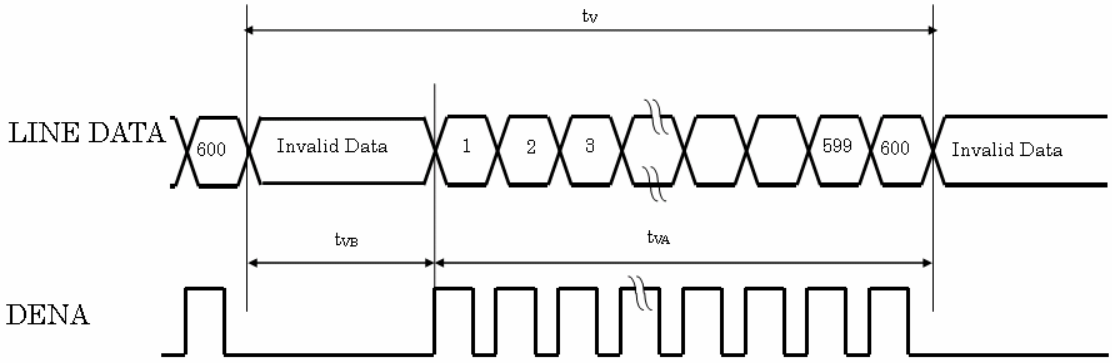
Item				Symbol	Min.	Typ.	Max.	Unit
LVDS input signal sequence	CLK Frequency			tclk	45	51.2	57	MHz
LCD input signal sequence （Input LVDS Transmitter）	DENA	Horizontal	Horizontal total Time	t_H	1324	1344	1364	tCLK
			Horizontal effective Time	t_{HA}	1024			tCLK
			Horizontal Blank Time	t_{HB}	300	320	340	tCLK
		Vertical	Vertical total Time	t_V	625	635	645	t_H
			Vertical effective Time	t_{VA}	600			t_H
			Vertical Blank Time	t_{VB}	25	35	45	t_H

5.2 Timing sequence(Timing chart)

5.2.1 Horizontal Timing Sequence

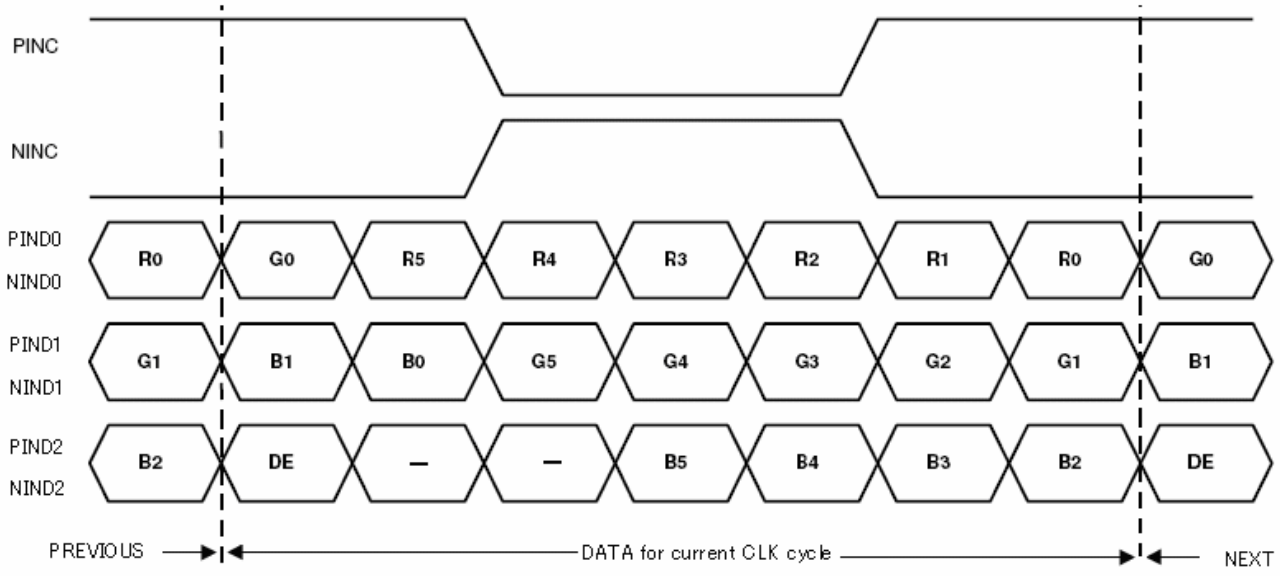


5.2.2 Vertical Timing Sequence

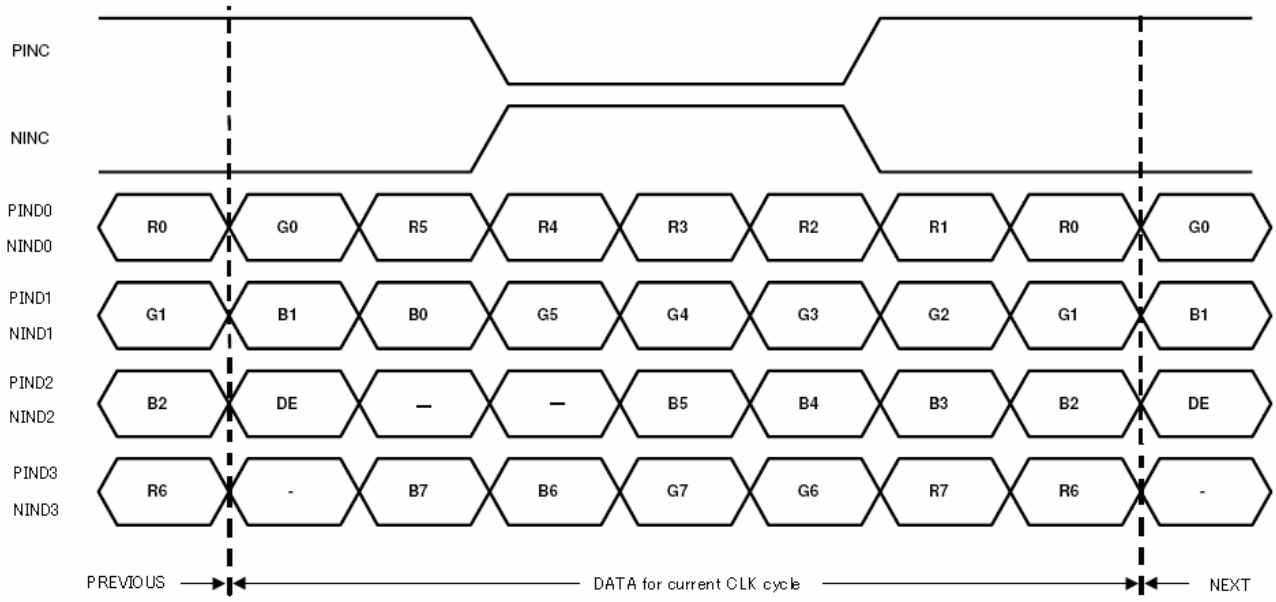


5.2.3 LVDS Input Data mapping

6 Bit LVDS input



8 Bit LVDS input



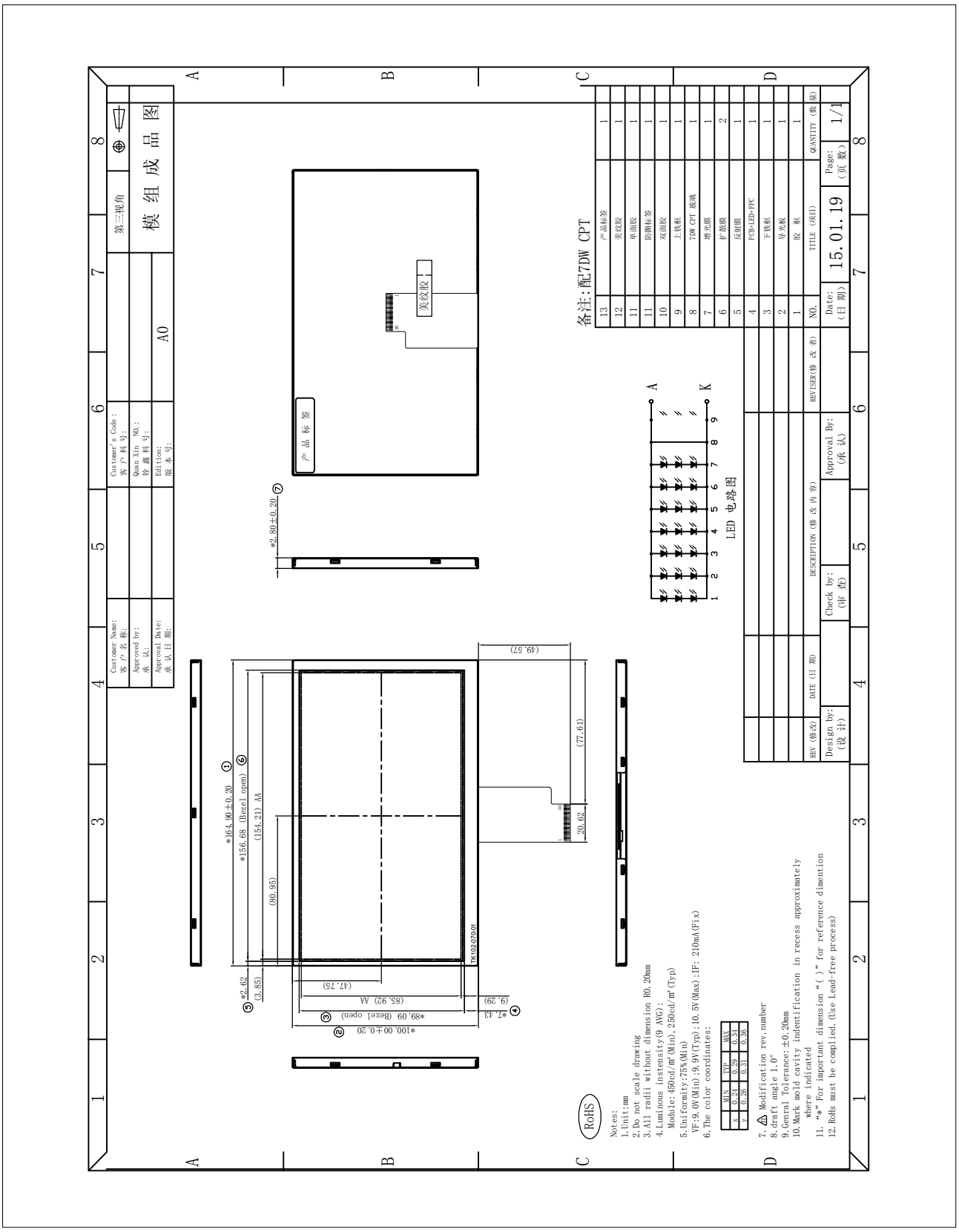
5.2.4 Color Data Reference

COLOR	INPUT DATA	R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB							LSB	MSB							LSB	MSB							LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Note :

1) Gray level:
   Color(n)：n is level order; higher n means brighter level.
2) DATA:
   1: high，0: low

6. MECHANICAL DIMENSIONC

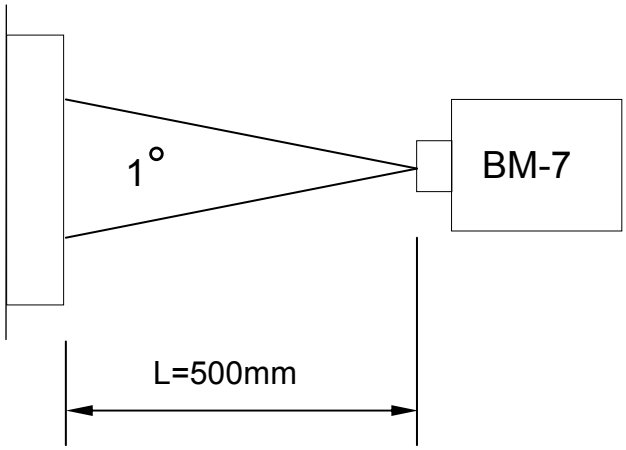


7. OPTICAL CHARACTERISTICS

Ta = 25°C, VCC=3.3V

ITEM		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
Constrast Ratio		CR	Point-5	640	800		--	1, 2, 3
Luminance(CEN)		Lw Point-5		450	500		cd/m^2	1, 3
Luminance Uniformity		ΔL		70	80		%	1, 3
Response Time (White - Black)		Tr +Tf	Point-5	-	25	40	ms	1, 3, 5
NTSC		-	Point-5	45	50	-	%	1, 4
Viewing Angle	Vertical	Upper(θ)	CR≧10 Point-5		85	--	°	1, 4
		Down(θ)			85		°	1, 4
	Horizontal	Left(ϕ)			85		°	1, 4
		Right(ϕ)			85		°	1, 4
Color Coordinate	White	Wx Wy	Point-5	0.264 0.295	0.304 0.335	0.344 0.375	--	1, 3
	Red	Rx Ry		0.549 0.301	0.589 0.341	0.629 0.381		
	Green	Gx Gy		0.294 0.571	0.334 0.611	0.374 0.651		
	Blue	Bx By		0.115 0.066	0.155 0.106	0.195 0.146		

Note1: Measure condition：25℃±2℃，60±10%RH，under10 Lux in the dark room.BM-5A (TOPCON)，viewing angle2°，IL=180mA（Backlight current），measurement after lighting on 10 mins.



Note2: Definition of contrast ratio：

Contrast Ratio (CR)= (White) Luminance of ON ÷ (Black) Luminance of OFF

Definition of luminance：Measure white luminance on the point 5 as figure.7-1

△L = [L(MIN)/L(MAX)]×100

Note3: Definition of luminance：Measure white luminance on the point 5 as figure.7-1
Definition of Luminance Uniformity: Measure white luminance on the point1~9 as figure.7-1
△L = [L(MIN)/L(MAX)]×100

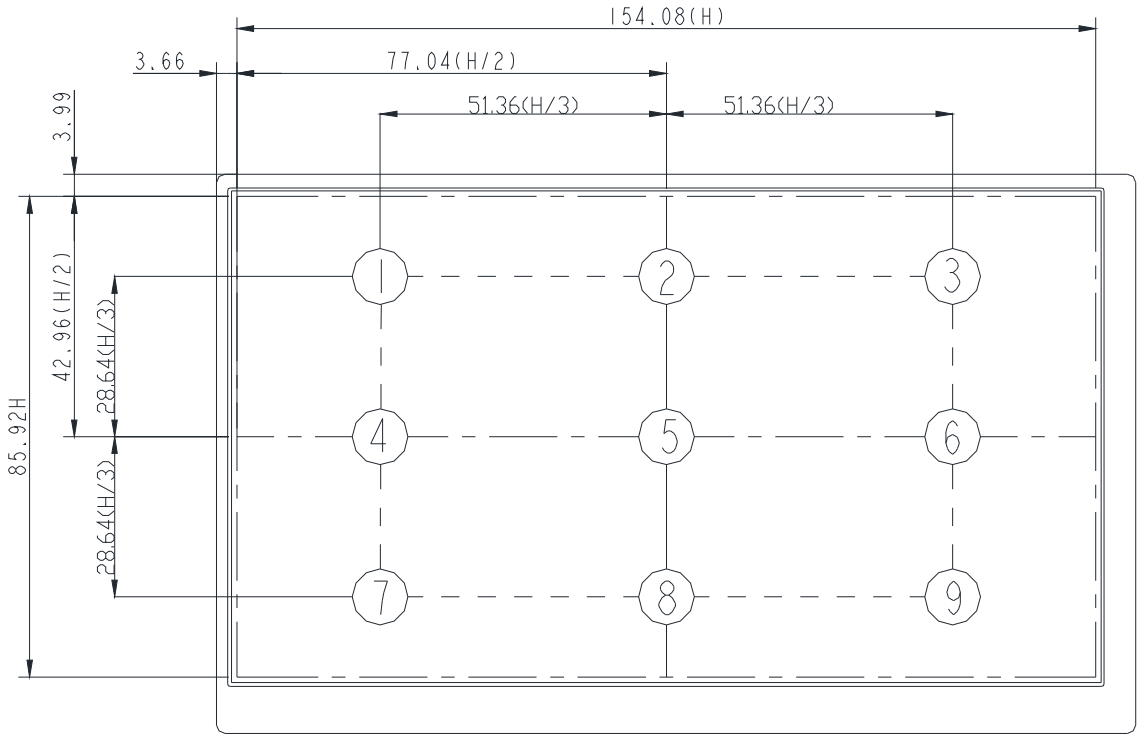


Fig.7-1 Measuring point

Note 4: Definition of Viewing Angle(θ,ψ),refer to Fig.7-2 as below：

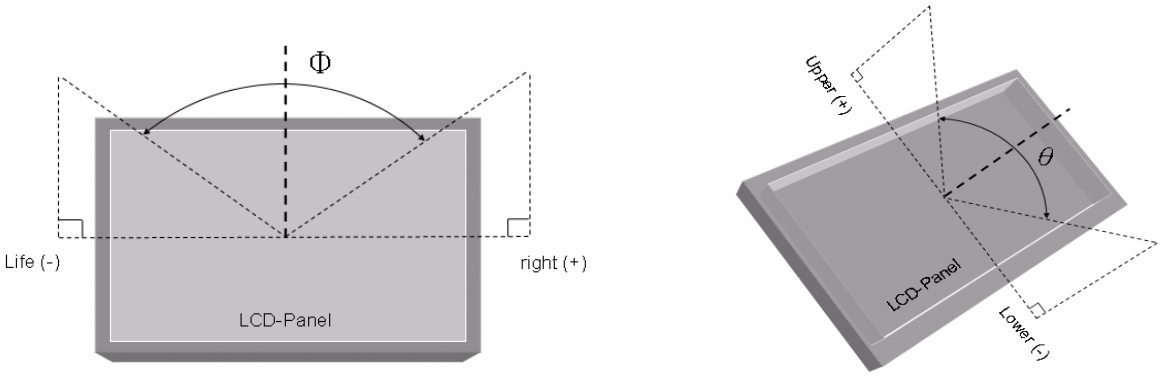


Fig.7-2 Definition of Viewing Angle

Note5: Definition of Response Time.(White-Black)

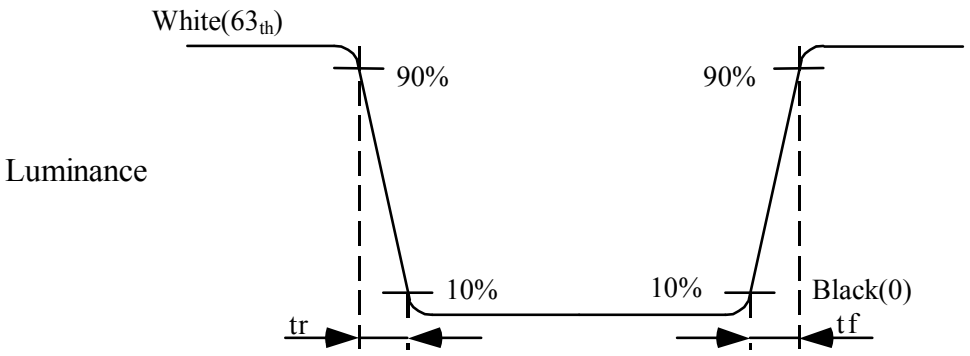


Fig.7-3 Definition of Response Time(White-Black)

8. RELIABILITY TEST

8.1 Temperature and Humidity

TEST ITEMS	CONDITIONS	NOTE
High Temperature Operation	60℃ ; 240hrs	
High Temperature Operation	70℃Tp ; 240hrs	Note1
High Temperature Storage	80℃ ; 240hrs	
High Temperature High Humidity Operation	60℃ ; 90%RH ; 240hrs	
Low Temperature Operation	-20℃ ; 240hrs	
Low Temperature Storage	-30℃ ; 240hrs	
Thermal Shock	–20℃(0.5hr) ~ 60℃(0.5hr) ; 100 Cycles	Non-Operating
Image Sticking	25℃ ; 4hrs	Note 2
MTBF	20000 Hrs	

Note 1：. Tp: panel surface temperature overall.

Note 2.：

Condition of Image Sticking test：25 ℃± 2 ℃

Operation with test pattern sustained for 4 hrs, then change to mid-gray pattern immediately.

After 5 mins, the mura must be disappeared completely .

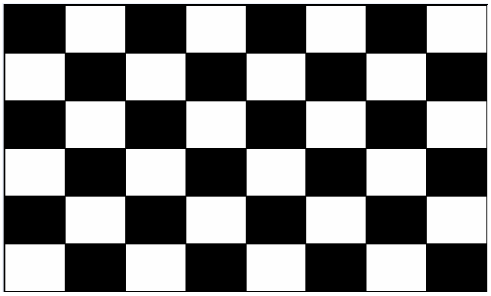


Image Sticking –pattern

Mid-Gray pattern

8.2 Shock and Vibration

ITEMS	CONDITIONS
Shock (Non-Operation)	● Shock level： 980m/s^2(equal to 100G). ● Waveform： 1/2 Sine wave,6msec ● ±X，±Y，±Z，each axis 1 times
Vibration (Non-Operation)	● Frequency range：8~33.3Hz ● Stoke：1.3 mm ● Vibration： sinusoidal wave, perpendicular axis (both x, z axis:2Hrs, y axis 4Hrs). ● Sweep： 2.9G, 33.3 Hz -400 Hz ● Cycle： 15 min

8.3 Electrostatic Discharge

TEST ITEM	CONDITIONS	NOTE
ESD	150pF，330Ω，±8kV&±15kV Air& Contact test	1
	200pF，0Ω，±200V Contact test	2

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins

8.4 Judgment Standard

The Judgment of the above test should be made as follow:

Pass：Normal display image and no line defect.

Partial transformation of the module parts should be ignored.

Fail： No display image, function NG, or line defects.

9. PACKING

TBD

10. WARRANTY

TBD