■ Tentative Specification
□ Preliminary Specification
□ Approval Specification

MODELNAME:YH080BH4005

Version:LA01

Customer: Common

APPROVED BY **SIGNATURE**

Name / Title
Note

Please return 1 copy for your confirmation with your signature and comments.

Approved By	Checked By	Prepared By

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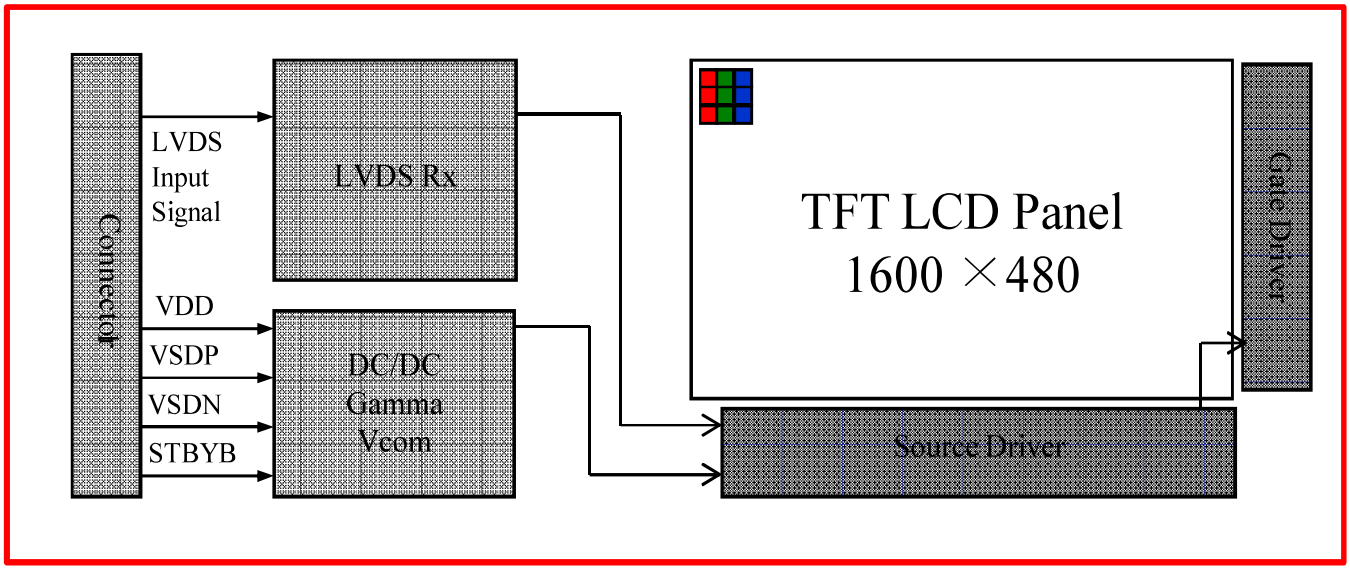
1.0 GENERAL DESCRIPTION

1.1 Introduction

8 inch Smart Rearview Mirror is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 8inch diagonally measured active area with resolutions 1600 horizontal by 480 vertical pixel array. Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors.



1.2 Features

- 1 Channel LVDS Interface with 1 pixel / clock
- DE Only mode (for LVDS Interface)
- 8-bit color depth, display 16.7M colors
- Low driving voltage and low power consumption
- RoHS Compliant

1.3 Application

- Vehicle Device

1.4 General Specification

The followings are general specifications at the model 8inch Smart Rearview Mirror (listed in Table 1.)

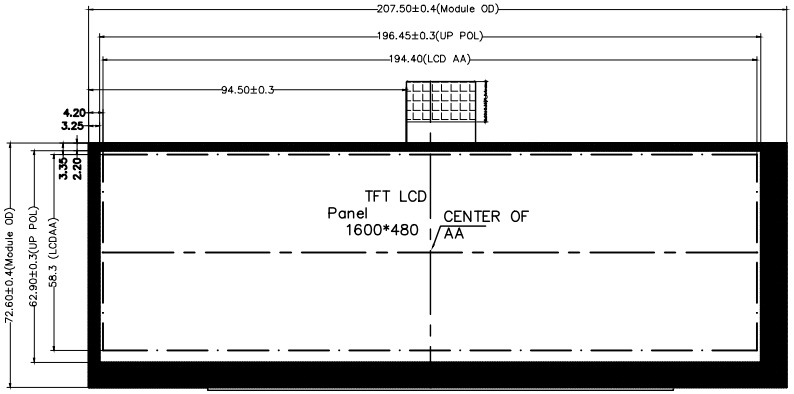
< Table 1. General Specifications >

Parameter	Specification	Unit	Remarks
Module size	207.5.0(W) ×72.6(H) ×6.22(D) mm	mm	With out POL
Active area	194.4(H) * 58.32(V)	mm	
CF Size	200.5(H) * 66(V)	mm	
C/F Polarizer	196.6(H) * 62.82(V)	mm	
TFT Polarizer	198.5(H) * 64(V)	mm	
Number of pixels	1600(H) * 480(V)	pixels	
Pixel pitch	40.5(H) * RGB * 121.5(V)	μm	
Pixel arrangement	Pixels RGB stripe arrangement		
Display colors	16.7M(8bits)	colors	
Display mode	Normal Black		
Weight	TBD	gram	
Source Driver IC	HX8249		
Gate Driver IC	HX8678		
Power Consumption	TBD	Watt	
Surface Treatment	C/F Polarizer: HC TFT Polarizer: Clear		

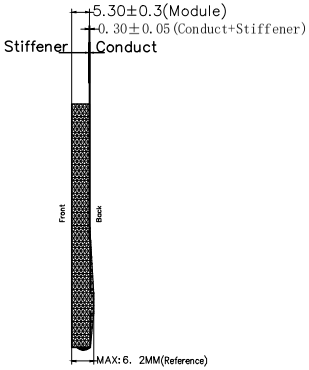
DESIGN:(设计)	CHECKED:(检查)	APPROVED:(核准)	SPECIFICATION FOR BACKLIGHT 规 格		
李 强			CUSTOMER'S CODE: (客户型号)	EDITION:(版本号)	A
Date:(日期) 2024/12/26	Page:(页数) 1/1	图纸视角:	HP MODEL NO.: (供应商料号)	EDITION:(版本号)	B

Note: The upper case window must be smaller than LCD POL 0.3mm or more,
LCD V.A is recommended for the upper lens window.

Front View

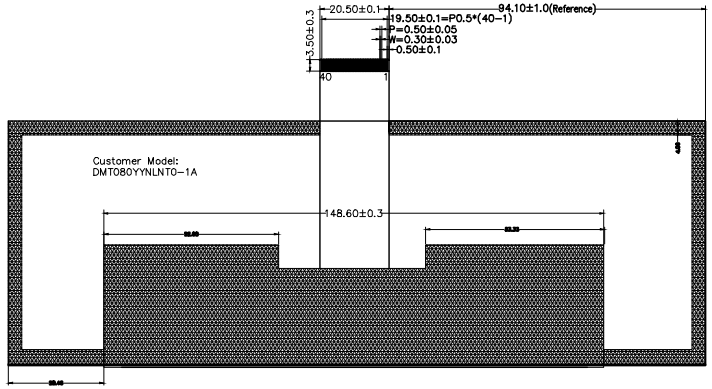


Side View



Rear View

Rear View



1. LED CIRCUIT DIAGRAM: 24LEDs

2. Unit:mm
3. Standard of the dimensions as below:

4. ※△Special characteristic,( ) reference dimension.
5. RoHs must be complied(Use Lead-free process)
6. n Modification rev.number
7. Unspecified Tolerances is :? 0.2

项目 Item		符号 Symbol	最小值 min.	典型值 typ.	最大值 max.	单位 Unit	测定条件 Condition
主屏 Main screen	亮度 Lumrinance	Lv				cd/㎡	If=75 mA (恒定电流测试)
	均匀性 Uniformity	AVG					
	色度坐标 Colour Coordinate	X					
		Y					
主屏 (含 LCD)	亮度 Lumrinance	Lv	450	500		cd/㎡	(亮度值为九点平均值; FOG? ? ? 5.1%? ? ? ? ? ?
	均匀性 Uniformity	AVG	75%				
	色度坐标 Colour Coordinate	X	0.28		0.33		
		Y	0.28		0.33		
正向电压	Forward Voltage	Vf	23.2	25.6	27.2	Voltage	
反向电流	Reverse Current	Ir			10	μA	Vr=30 V

REV (标记)	DATE (日期)	DESCRIPTION (描述)
2	2024.12.28	修正液晶屏包胶后的长宽尺寸（长208mm修正为207.5mm,宽度73修正为72.6mm）
1	2015.06.06	修改铁框开窗宽度及POL宽度

NO.	Pin Name
1	STBYB
2	RESB
3	NC
4	VDD
5	SELB
6	GND
7	GND
8	RXIN0-
9	RXIN0+
10	GND
11	RXIN1-
12	RXIN1+
13	GND
14	RXCLKIN-
15	RXCLKIN+
16	GND
17	RXIN2-
18	RXIN2+
19	GND
20	RXIN3-
21	RXIN3+
22	GND
23	VSDN
24	VSDN
25	VSDN
26	VSDP
27	VSDP
28	VSDP
29	GND
30	RL
31	TB
32	ATREN
33	CSB
34	SCL
35	SDA
36	VDD-OTP
37	LED-
38	LED-
39	LED+
40	LED+

Customer Name: 客户名称	check by: 确认	Approved by: 承认	Please Confirm This Drawing On/Before 请 签 回 此 图

2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. LCD Module Electrical Specifications >

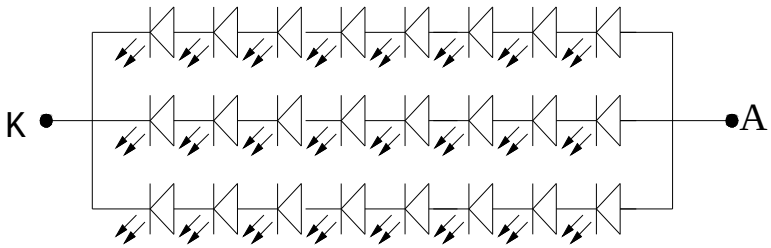
Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	2.8	3.5	V	Note
Operating Temperature	T_{OP}	-20	+70	℃	
Storage Temperature	T_{ST}	-30	+80	℃	

Notes : Permanent damage to the device may occur if maximum values are exceeded functional operation should be restricted to the condition described under normal operating conditions.

2.1 Electric Light Characteristic:

（除非特别说明，环境温度 Ta=25℃,Unless specified, The Ambient temperature Ta=25℃）

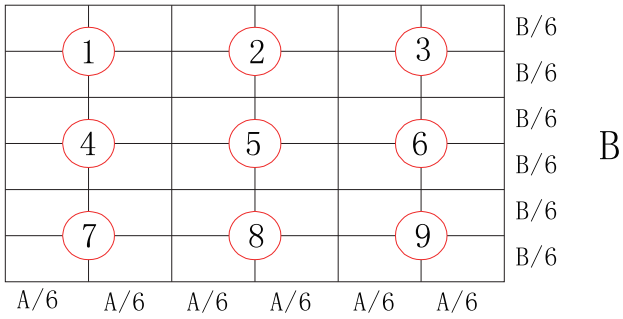
项目 Item	符号 Symbol	最小值 Min.	典型值 Typ	最大值 Max.	单位 Unit	测试条件 Condition
1.正向电压 Forward Voltage	Vf	23.2	25.6	27.2	V	IF=75mA
2.色坐标 Chromaticity Coordinate	X	0.28	0.31	0.33	---	IF=75mA
	Y	0.28	0.31	0.33	---	IF=75mA
3.亮度 Luminance	Lv	450	500	---	cd/㎡	IF=75mA
LED life time	Lv	-	30,000	---	%	IF=75mA



备注：因白色 LED 无波长特性,供货时无法做到整批颜色一致,包装时将分色包装.

Note: There is no wavelength feature for white led, and there will be a few difference of that color when producing, we will package them according to the difference.

. Test Point Space Diagram:



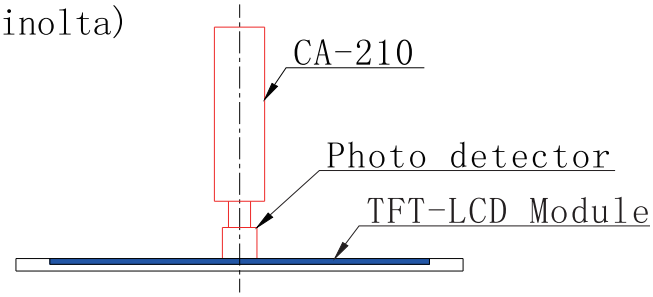
Test Condition as follow:

1. 环境温度：25±2℃
2. 环境湿度：55%±10%。
3. 使用限流电源测试：75mA(单颗 LED 灯 25mA)
4. 测量仪器：

1）恒压恒流电源：茂迪 LPS305C-TC

2）显示器色彩分析仪：CA-210(Konica Minolta)

5. 测定距离 L = 30mm
6. 测量方式：(如右图)



Absolute Maximum Rating:

项 目 Item	符 号 Symbol	条 件 Conditions	值 Rating	单 位 Unit
1 极限直流正向电流 Absolutemaximumforward current	Ifm	---	3x80	mA
2 脉冲驱动时极限正向电流 Peak forward current	Ifp	1 msec 脉冲，1/10 占空比 1 msec Plus 10% Duty Cycle	3x120	mA
3 极限功耗 Power dissipation	Pd	---	24x260	mW
4 工作温度 Operating Temperature Range	Topr	---	-20∽+80℃	℃
5 贮存温度 Storage Temperature Range	Tstg	---	-30∽+80℃	℃

当工作温度高于 25℃时，Ifm,Ifp 和 Pd 必须降低；电流降低率是-0.36mA/℃(直流驱动)，或-0.86mA/℃(脉冲驱

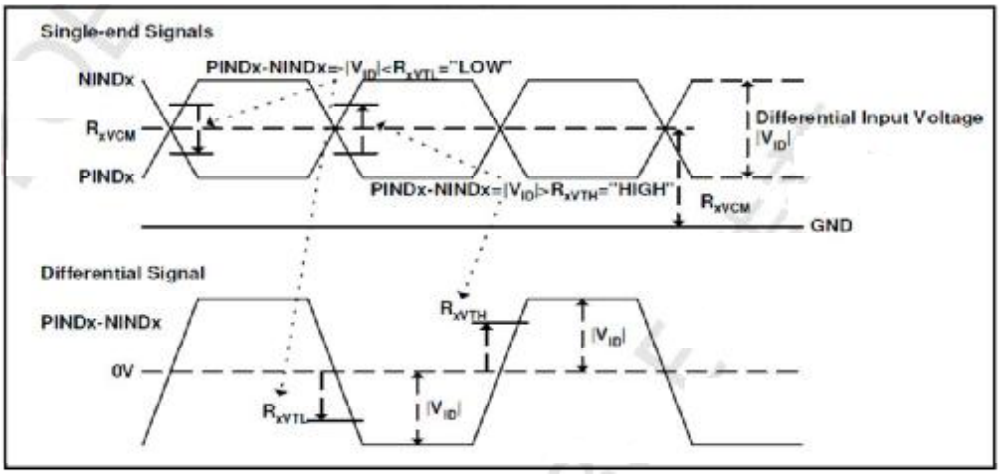
3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

< Table 3. LCD Module Electrical Specifications >

[Ta =25±2 ℃]

Parameter		Symbol	Values			Unit	Notes
			Min	Typ	Max		
Power Supply Input Voltage		VDD	3.0	3.3	3.6	Vdc	
Power Supply Ripple Voltage		VRP	-	-	50	mV	
Power Consumption		PDD	TBD	TBD	TBD	Watt	1,2
LVDS Interface	Differential Input High Threshold Voltage	VLVTH	100		300	mV	
	Differential Input Low Threshold Voltage	VLVTL	-300		-100	mV	
	Common Input Voltage	VLVC	1	1.2	1.7-|Vid|/2	V	
	Differential input voltage	|Vid|	0.2	-	0.6		
CMOS Interface	Input High Threshold Voltage	VIH	2.6	-	3.3	V	
	Input Low Threshold Voltage	VIL	0	-	0.8	V	



Notes： 1. The supply voltage is measured and specified at the interface connector of LCM.
The current draw and power consumption specified is for VDD=3.3V, Frame rate f_V=60Hz and Clock frequency = 52.59 MHz. Test Pattern of power supply current is Black.
2. The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)

3.2 Panel Electrical Specifications

< Table 4.Panel Electrical specifications >

Parameter	Symbol	Value			Unit	Remarks
		MIN	Typ	MAX		
Digital Voltage	VDD	3.0	3.3	3.6	V	
Power for Driver IC & GMA	VSDP	5.4	5.5	5.6	V	
Power for Driver IC & GMA	VSDN	-5.4	-5.5	5.6	V	

4.0 INTERFACE CONNECTION

4.1 Input Signal & Power

- LVDS Signal interface : 40Pin. The recommended model is FH12A-40S-0.5SH manufactured by Hirose

Pin No.	Symbol	I/O	Description	Remark
1	STBYB	I	Enable IC	Note 2
2	reset	I	Reset IC	
3	VDD	P	Digital power_3.3V	+3.3V@50mA MAX
4	VDD	P		
5	SELB	I	6bit/8bit mode select	Note 4
6	GND	P	Ground	
7	GND	P	Ground	
8	RXIN0-	I	Negative LVDS differential data input	PAD on bottom & pin 1on right (top view) ,LVDS pair will not cross each other.
9	RXIN0+	I	Positive LVDS differential data input	
10	GND	P	Ground	
11	RXIN1-	I	Negative LVDS differential data input	
12	RXIN1+	I	Positive LVDS differential data input	
13	GND	P	Ground	
14	RXCLKIN-	I	Negative LVDS differential data input	
15	RXCLKIN+	I	Positive LVDS differential data input	
16	GND	P	Ground	
17	RXIN2-	I	Negative LVDS differential clock input	
18	RXIN2+	I	Positive LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	Negative LVDS differential data input	
21	RXIN3+	I	Positive LVDS differential data input	
22	GND	P	Ground	
23	VSDN	P	Power for Driver IC	-5.5V@80mA MAX
24	VSDN	P		
25	VSDN	P		
26	VSDP	P	Power for Driver IC	+5.5V@80mA MAX
27	VSDP	P		
28	VSDP	P		
29	GND	P	Ground	GND
30	RL	I	Horizontal shift direction	Note 5

Pin No.	Symbol	I/O	Description	Remark
31	TB	I	Vertical shift direction	Note 5
32	ATREN	I	Only for OTP program	NC
33	CSB	-	SPI	NC
34	SCL	-	SPI	NC
35	SDA	-	SPI	NC
36	VDD_OTP	P	7.5V for OTP program	NC
37	LED-	P	LED cathode	
38	LED-	P	LED cathode	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

Note.1

I/O definition : I---Input ; O---Output ; P---Power/Ground

Note.2

STBYB="H (3.3V)": normal operation ;

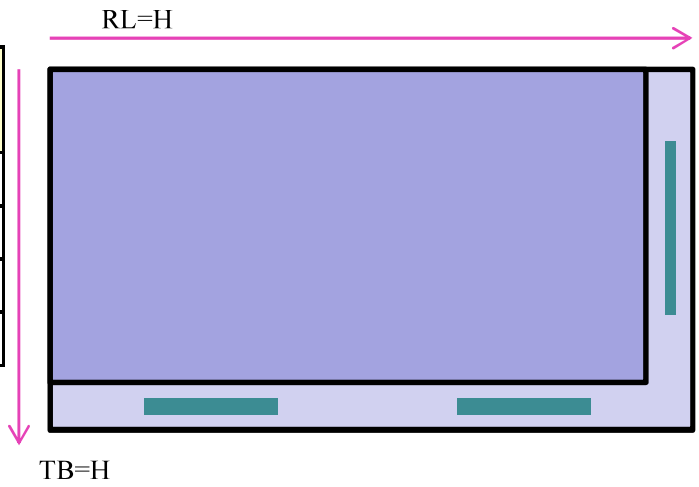
STBYB="L (GND)": timing controller, source driver will turn off, all output are High-Z

Note.4

If LVDS input data is 8 bits, SELB must be set to Hight;

Note.5

Scan Control Input		Scanning direction
RL	TB	
VDD	VDD	Up to Down, Left to Right
GND	VDD	Up to Down, Right to Left
VDD	GND	Down to Up, Left to Right
GND	GND	Down to Up, Right to Left



5.0 SIGNAL TIMING SPECIFICATIONS

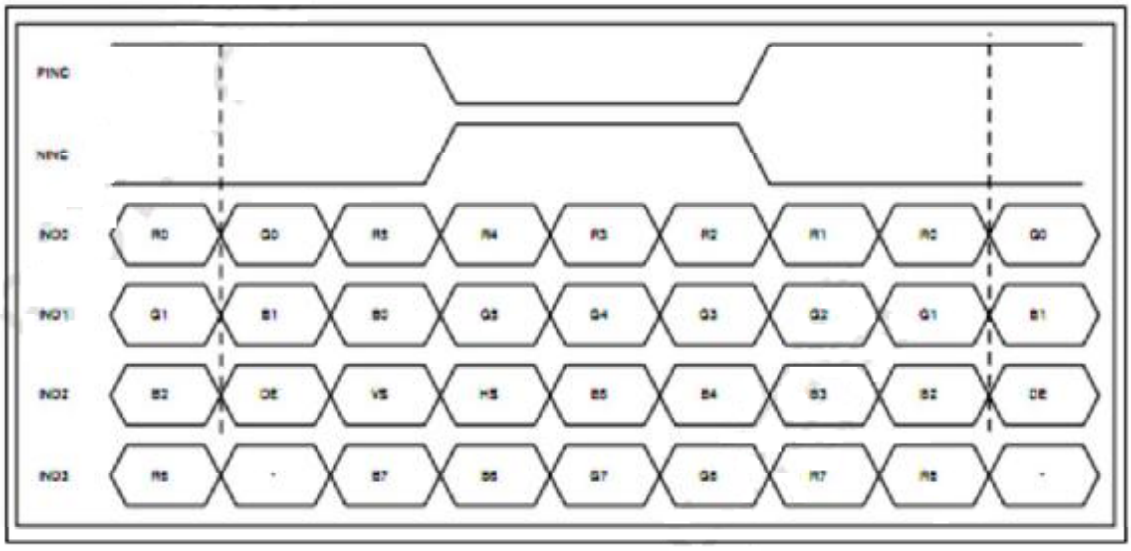
5.1 Timing Parameters (Sync mode)

< Table 6. Timing Table >

Parameter	Symbol	Value			Unit	Note
		Min.	Recommend	Max.		
DCLK Frequency	F_{DCLK}	48.69	52.59	60.83	MHz	
Horizontal valid data	t_{hd}		1600		DCLK	
Hsync Pulse Width	t_{hpw}	1	2	140	DCLK	
Hsync back porch	t_{hbp}	5	16	141	DCLK	
Hsync front porch	t_{hfp}	19	44	155	DCLK	
1 Horizontal Line	t_h	1656	1660	1760	DCLK	
Vertical valid data	t_{vd}		480		H	
Vsync Pulse Width	t_{vpw}	1	2	90	H	
Vsync back porch	t_{vbp}	5	5	91	H	
Vsync front porch	t_{vfp}	5	43	91	H	
1 Vertical field	t_v	490	528	576	H	

Notes: This product is Sync mode.

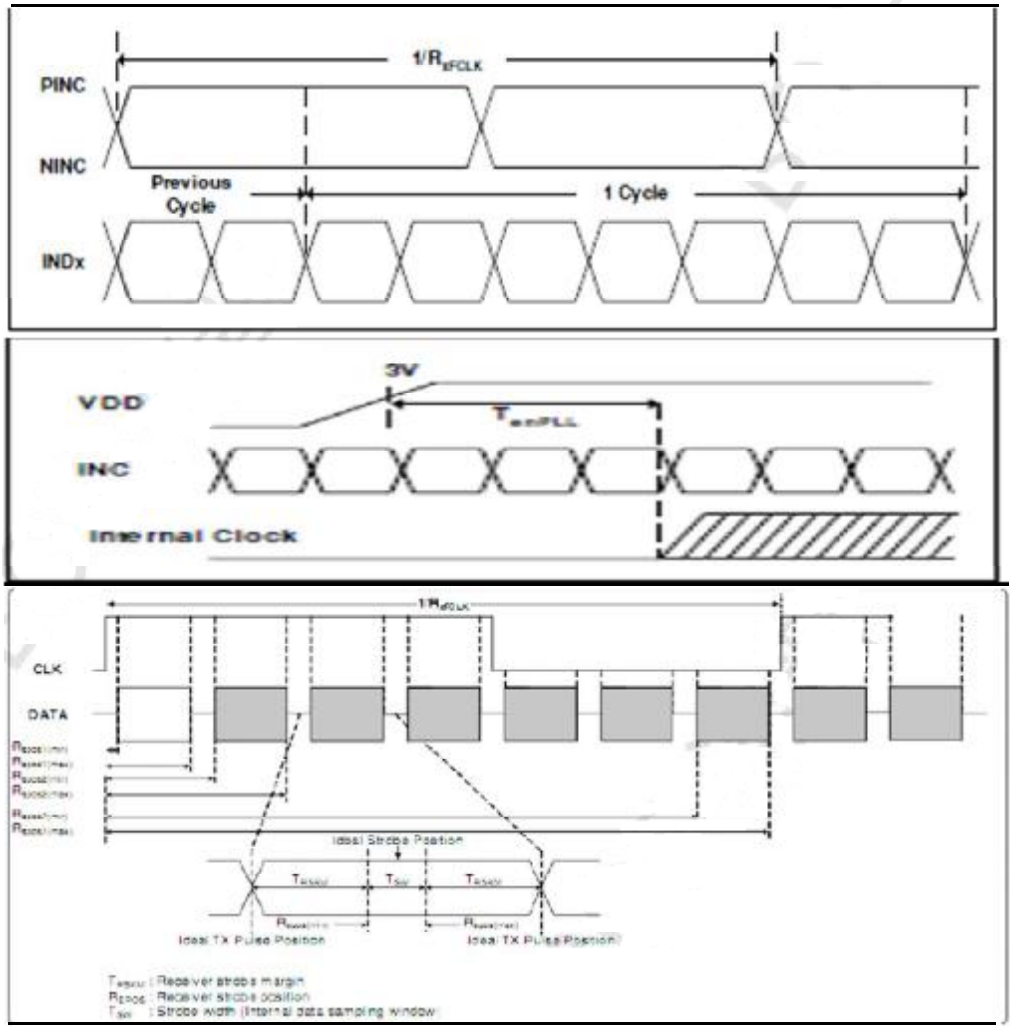
8-bit LVDS input (HSD='L')



5.2 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in Table 7.

Parameters	Symbols	Min	Typ	Max	Unit	Condition
Clock frequency	RxFCLK	51.02	52.59	54.17	MHz	
Input data skew margin	TRSKM	500	-	-	ps	|VID|=400mV RxVCM=1.2V RxFCLK=52.59MHz
Clock high time	TLVCH	-	4/(7*RxFCLK)		ns	
Clock low time	TLVCL		3/(7*RxFCLK)		ns	
PLL wake-up time	TenPLL			150	us	

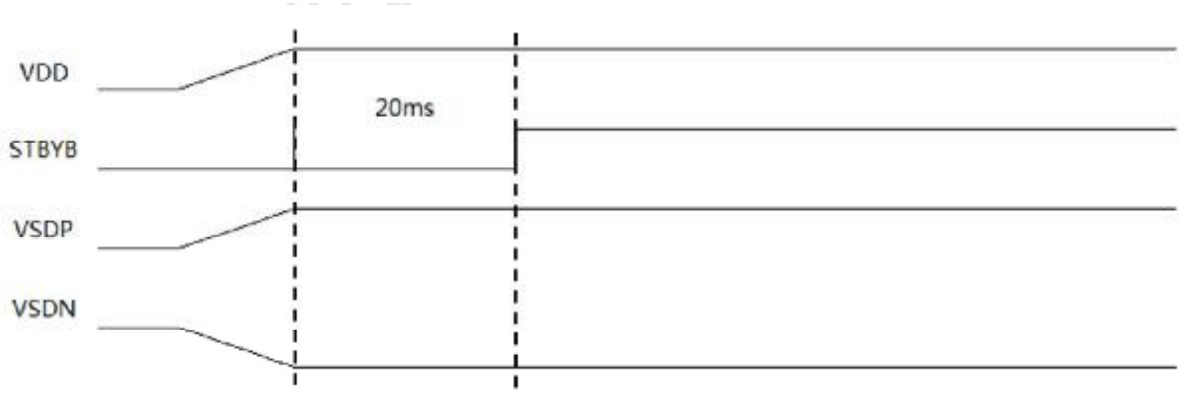


5.3 Input Signals, Basic Display Colors & Gray Scale Of Colors

Color & Gray Scale		Input Data Signal																							
		Red Data								Green Data								Blue 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
Basic Colors	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
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	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
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	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
Gray Scale of Red	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
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	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	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	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
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	▽	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	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	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
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of White	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
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	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

5.4 Power Sequence

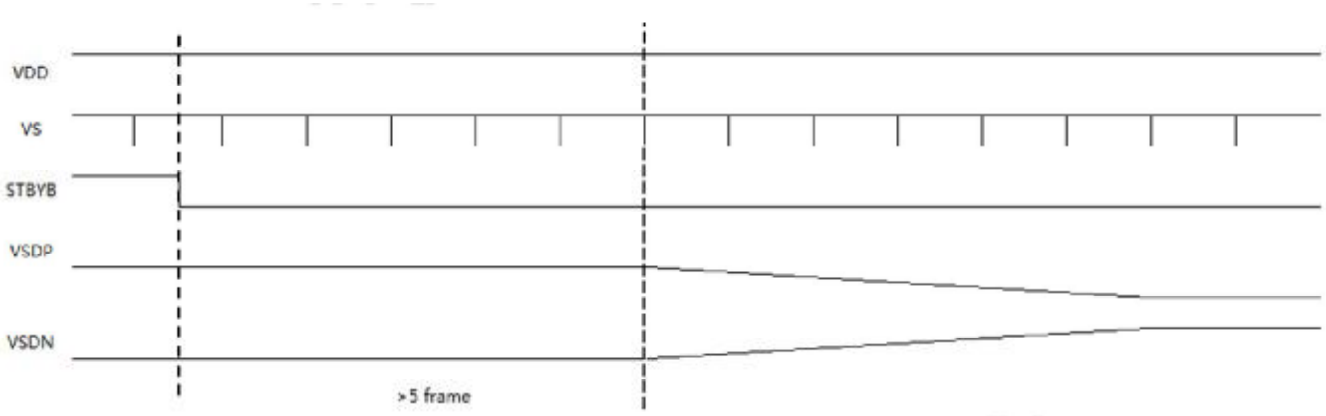
Power on Sequence



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. Back Light must be turn on after power for logic and interface signal are valid.

Power off Sequence



6.0 OPTICAL SPECIFICATIONS

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. We refer to $\theta_{Ø=0}$ (=θ_3) as the 3 o'clock direction (the "right"), $\theta_{Ø=90}$ (= θ_{12}) as the 12 o'clock direction ("upward"), $\theta_{Ø=180}$ (= θ_9) as the 9 o'clock direction ("left") and $\theta_{Ø=270}$(= θ_6) as the 6 o'clock direction ("bottom"). While scanning θ and/or Ø, the center of the measuring spot on the Display surface shall stay fixed. The measurement shall be executed after 30 minutes warm-up period. VDD shall be 12.0V +/-10% at 25°C. Gray scale reversal occur in 6 o 'clock direction. Optimum viewing angle direction is 12 o'clock,.

. [VDD = 3.3V, Frame rate = 60Hz, Ta =25±2 ℃]

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Θ_3	CR > 10	-	85	-	Deg.	Note 1
		Θ_9		-	85	-	Deg.	
	Vertical	Θ_{12}		-	85	-	Deg.	
		Θ_6		-	85	-	Deg.	
Color Gamut		-	-	45	50	-	%	NTSC
Contrast ratio		CR	Θ = 0° (Center C-source) Normal Viewing Angle	700	900	-	-	Note 2
Transmittance		Trans.		4.6%	5.1%	5.6%	-	Note 3
Reproduction of color	White	W_x		TYP. - 0.03	0.304	TYP. + 0.03		Note 5
		W_y			0.336			
	Red	R_x			0.613			
		R_y			0.338			
	Green	G_x			0.280			
		G_y			0.547			
	Blue	B_x			0.140			
		B_y			0.155			
Response Time		T_g		-	25	35	Ms	Note 6
Gamma Scale					2.2			

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.
2. Contrast measurements shall be made at viewing angle of θ= 0° and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See FIGURE 1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Center Luminance of white is defined as the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display.
4. The White luminance uniformity on LCD surface is then expressed as : ΔY =Minimum Luminance of 9 points / Maximum Luminance of 9 points.
(see FIGURE 2 and FIGURE 3).
5. The color chromaticity coordinates specified in Table 4. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.
6. The electro-optical response time measurements shall be made as FIGURE 3 shown in Appendix by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Td, and 90% to 10% is Tr. The

7.0 MECHANICAL CHARACTERISTICS

7.1 Dimensional Requirements

FIGURE 4 (located in Appendix) shows mechanical outlines for the model 8inch
Other parameters are shown in Table 12.

<Table 12. Dimensional Parameters>

Parameter	Specification	Unit
Module size	207.5(W) ×72.6(H) ×6.22(D) mm	mm
Weight	TBD	gram
Active area	194.4(H) ×58.32(V)	Mm
Pixel pitch	40.5(H)×RGB×121.5(V)	μm
Number of pixels	1600(H) ×480(V) (1 pixel = R + G + B dots)	pixels

7.2 AG and Polarizer Hardness.

The surface of the LCD has an AG coating to minimize reflection and a coating to reduce scratching.

8.0 RELIABLITY TEST

The Reliability test items and its conditions are shown in below.

<Table 13. Reliability Test Parameters >

No	Test Items	Conditions
1	High temperature storage test	Ta = 80℃, 240 hrs
2	Low temperature storage test	Ta = -30℃, 240 hrs
3	High temperature & high humidity operation test	Ta = 60 ℃, 90%RH, 240hrs
4	High temperature operation test	Ta = 80 ℃, 240hrs
5	Low temperature operation test	Ta = -20℃, 240hrs
6	Thermal shock	Ta = -30℃ ↔ 80 ℃ (0.5 hr), 100 cycle
7	Image Sticking	6*8 check pattern , 25 ℃ ± 2 ℃ ; Aging Time:2hrs; Recovery Time:5min @127/256 Gray Level

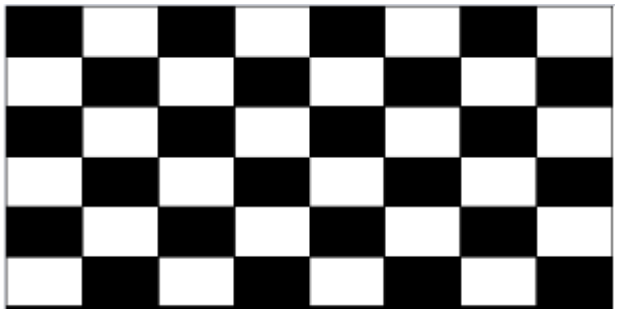


Image Sticking –pattern

Lv127 Gray pattern

Condition of Image Sticking test：25 ℃± 2 ℃
Operation with test pattern sustained for 2 hrs, then change to gray pattern immediately.
After 5 mins, the mura must be disappeared completely .