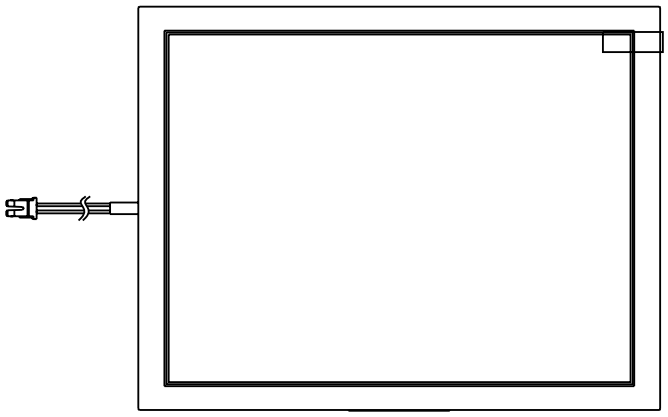
HANTRONIX

PRODUCT SPECIFICATION

HDA800S-GL

8”, TFT SVGA (800X600) COLOR LCD DISPLAY MODULE



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.: Z.W.	REV.: 1.0	HDA800S-GL	SHEET 1 OF 17 DATE: 8/19/10

1. General Description and Features

HDA800S-GL is a transmissive type color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT-LCD module, a receiver circuit and a back-light unit. Graphics and texts can be displayed on a SVGA 800 (W) x RGB x 600 (H) dots (4:3 aspect ratio) with 262,144 colors.

1.1 Features

- Transmissive and back-light with 27 LEDs are available.
- TN (Twisted Nematic) mode.
- LVDS Receiver 6 bit Interface.

1.2 LCD Module

Item	Specification	Unit
Screen Size	8.0 inches	Diagonal
Display Resolution	800 (H) x 600 (V)	Pixel
Active Area	162 (H) x 121.5 (V)	mm
Outline Dimension	183 (H) x 141 (V) x 5.8 (T)	mm
Display Mode	Normally white mode/ Transmissive	--
Pixel Arrangement	R,G,B Vertical Stripe	--
Pixel Size	0.2025 x 0.2025	mm
Surface Treatment	Anti-Glare and Hard Coating(3H)	
Display Color	262K	--
Viewing Direction	6 o'clock	--
Input Interface	LVDS Receiver 6 bit Interface	--

2. Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	--	183	--	mm	
	Vertical (V)	--	141	--	mm	
	Thickness (T)	--	5.8	--	mm	(1)
Weight		--	(TBD)	--	g	--

Note (1) Not Include Component. Refer to the Outline Dimension Drawing as attached.

3. Electrical Specifications

3.1 Absolute Max. Ratings

3.1.1 Absolute Ratings of Environment

If the operating condition exceeds the following absolute maximum ratings, the TFT LCD module may be damaged permanently.

(Ta=25±2°C, V_{SS}=GND=0)

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T_{STG}	-30	80	°C	(1)
Operating temperature	T_{OPR}	-20	70	°C	(1,2,3)

Note (1) 95 % RH Max. (40 °C ≥ Ta). Maximum wet-bulb temperature at 39 °C or less. (Ta > 40 °C) No condensation.

Note (2) In case of below 0°, the response time of liquid crystal (LC) becomes slower and the color of panel becomes darker than normal one. Level of retardation depends on temperature, because of LC's character

Note (3) Only operation is guarantied at operating temperature. Contrast, response time, another display quality are evaluated at +25°C.

3.1.2 Electrical Absolute Maximum Ratings

3.1.2.1 TFT-LCD Module

(V_{SS}=GND=0)

Parameter	Symbol	Min.	Max.	Unit	Remark
Power supply voltage	V_{CC}	-0.3	4.0	V	
input voltage	V_I	-0.3	Vcc+0.3	V	--

3.1.2.2 Backlight Unit

(V_{SS}=GND=0)

Parameter	Symbol	Min.	Max.	Unit	Remark
Current of Backlight Unit	IB	--	TBD	mA	
Voltage of Backlight Unit	VB	--	TBD	V	

3.1.3 DC Electrical Characteristics of the TFT LCD

(Ta=25±2°C, V_{SS}=GND=0)

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
Power supply		VCC	3.0	3.3	3.6	V	
Input Voltage for logic	Differential Input High Threshold	VTH			+100	mA	
	Differential Input Low Threshold	VTL	-100			mA	
Power Supply current		ICC	-	(220)	TBD	mA	Note 1

Note1: fv =60Hz , Ta=25°C , Display pattern : Black pattern



3.2 AC Timing Characteristic of The LCD

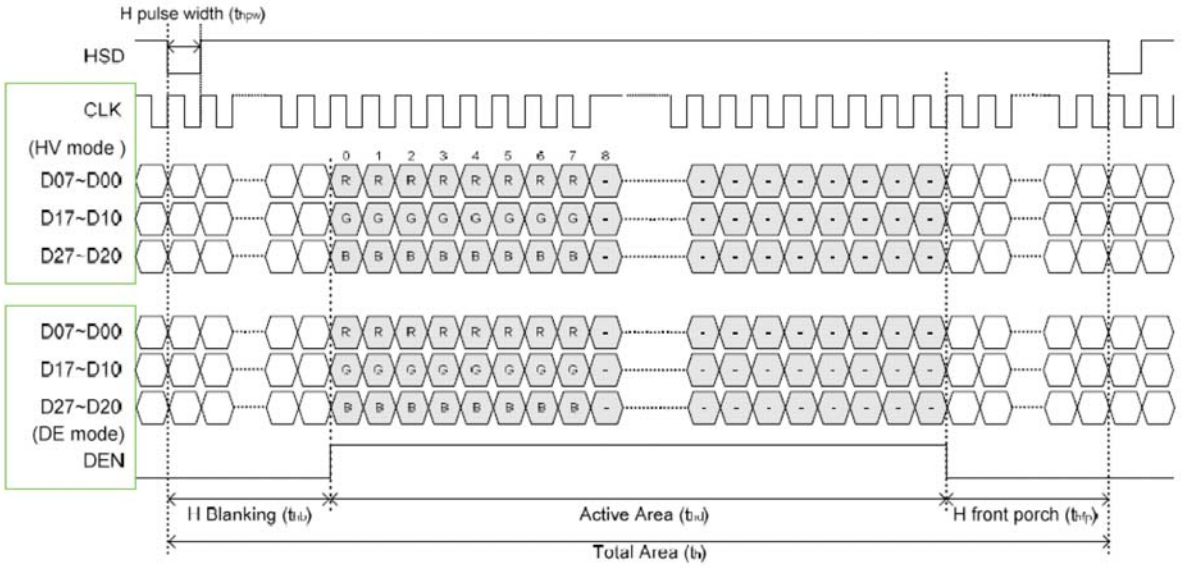
3.2.1 Timing Condition

Signal	Parameter	Symbol	Min.	Typ.	Max.	Unit.	Remark
DCLK	CLK frequency	F_{clk}	-	40	50	MHz	
	CLK period	T_{cph}	20	-	-	ns	
	CLK pulse duty	T_{cwh}	40	50	60	%	
HSYNC	Horizontal Line	T_h	862	1056	1200	CLK	
	HS Display Area	T_{hd}	-	800	-	CLK	
	HS Pulse Width	T_{hpw}	1	-	40	CLK	
	HS Back Porch	T_{hb}	-	46	-	CLK	
	HS Front Porch	T_{hfp}	16	210	354	CLK	
VSYNC	VS Display Area	T_{vd}	-	600	-	th	
	VS Period Time	T_v	624	635	700	th	
	VS Pulse Width	T_{vpw}	1	-	20	th	
	VS Back Porch	T_{vb}	-	23	-	th	
	VS Front Porch	T_{vfp}	1	12	77	th	

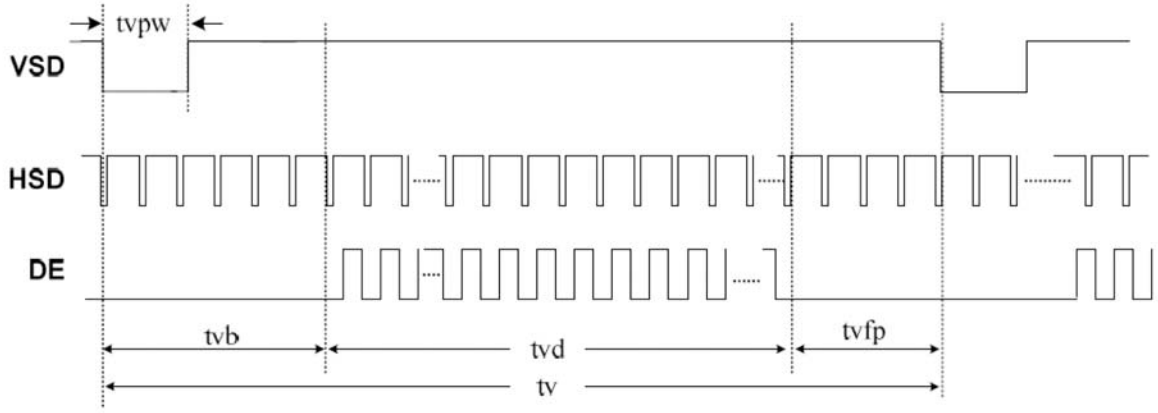
3.2.2 Timing Characteristic

3.2.2.1 Horizontal and Vertical input Timing

Horizontal input timing

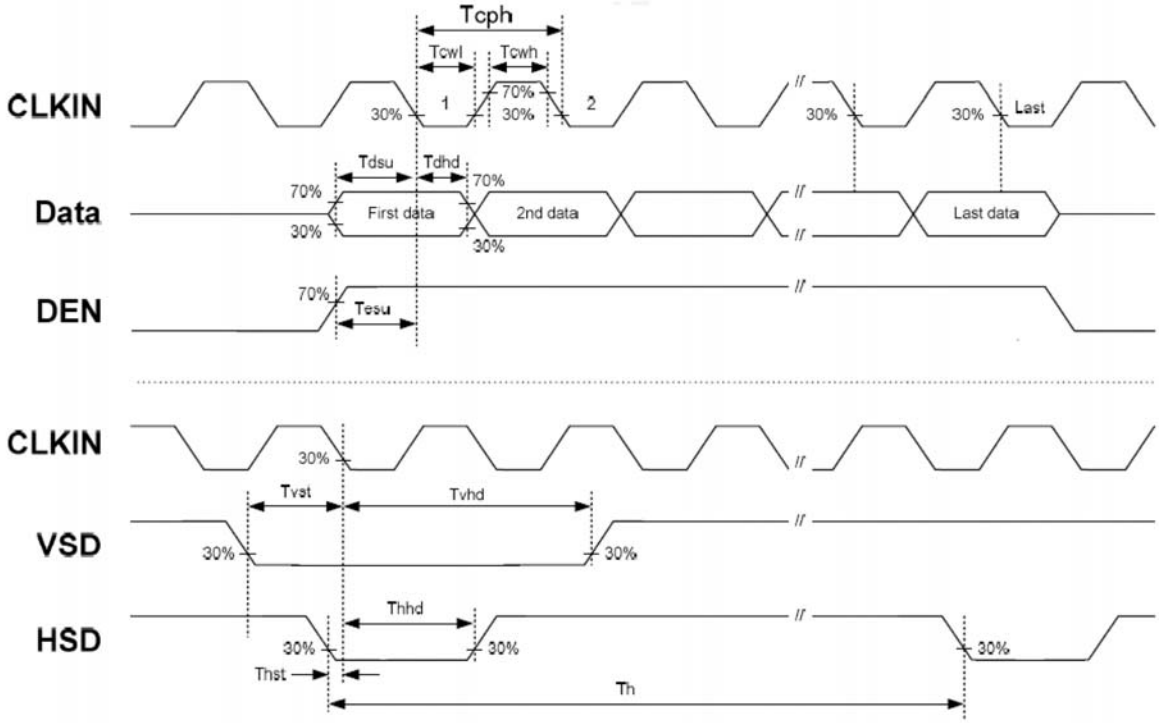


Vertical input timing



3.2.2.2 Clock and Data input waveforms

Signal	Parameter	Symbol	Min.	Typ.	Max.	Unit.	Remark
HSYNC	HS setup time	T_{hst}	8	-	-	ns	
	HS hold time	T_{hhd}	8	-	-	ns	
VSYNC	VS setup time	T_{vst}	8	-	-	ns	
	VS hold time	T_{vhd}	8	-	-	ns	
Data	Data setup time	T_{dsu}	8	-	-	ns	
	Data hold time	T_{dhd}	8	-	-	ns	
DE	DEN setup time	T_{vpw}	8	-	-	ns	
	DEN hold time	T_{vb}	8	-	-	ns	

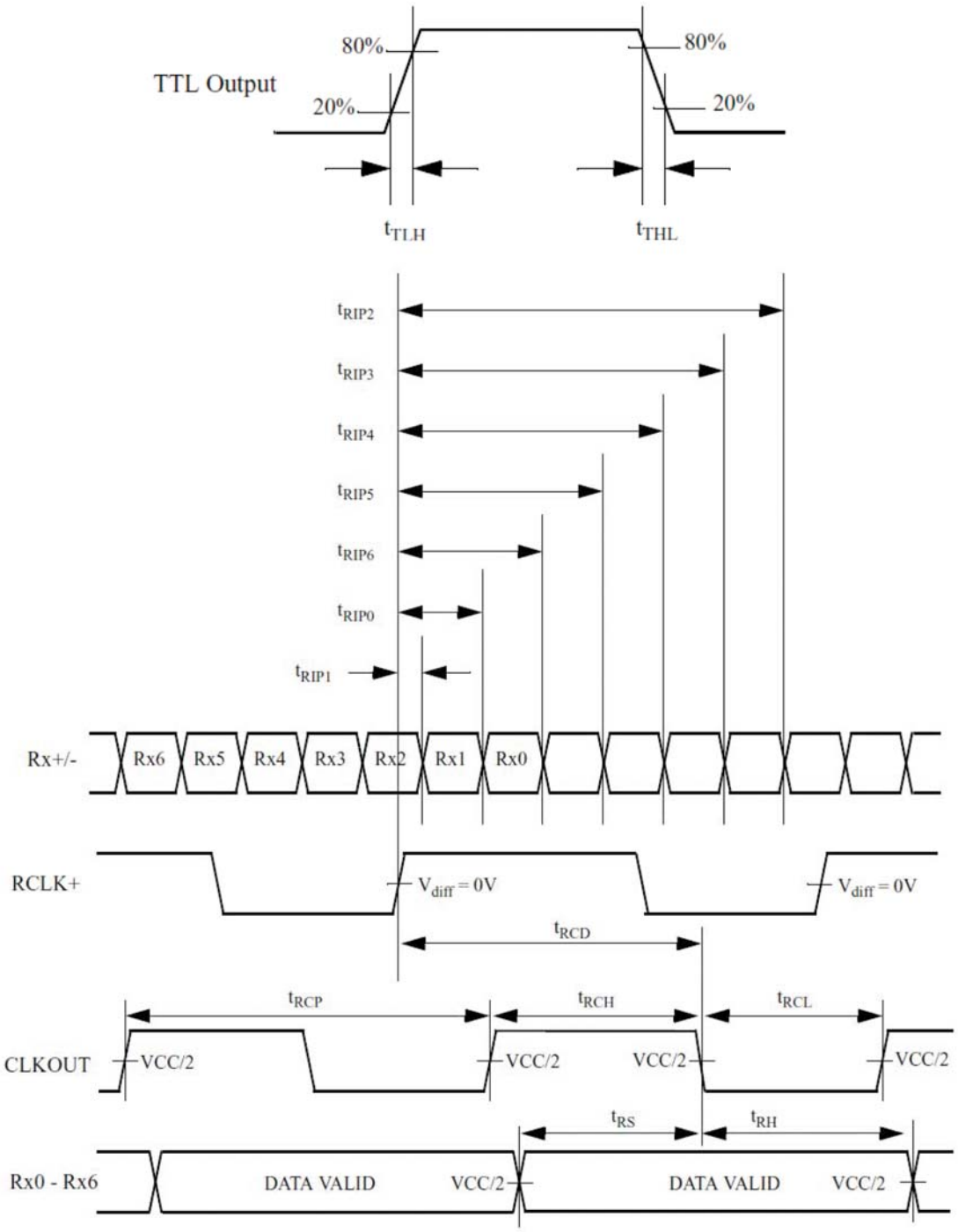


3.3 LVDS Switching Characteristics

3.3.1 LVDS Timing Condition

Symbol	Parameter		Min.	Typ.	Max.	Unit.	Note
tRCP	CLK OUT Period	VCC = 3.0 - 3.6V	11.76	T	50.0	ns	
		VCC = 2.5 - 3.6V	14.28	T	50.0	ns	
tRCH	CLK OUT High Time		-	4T/7	-	ns	
tRCL	CLK OUT Low Time		-	3T/7	-	ns	
tRCD	RCLK +/- to CLK OUT Delay		-	5T/7	-	ns	
tRS	TTL Data Setup to CLK OUT		0.35T-0.3	-	-	ns	
tRH	TTL Data Hold from CKL OUT		0.45T-1.6	-	-	ns	
tTLH	TTL Low to High Transition Time		-	2.0	3.0	ns	
tTHL	TTL High to Low Transition Time		-	1.8	3.0	ns	
tRIP1	Input Data Position0 (T = 11.76ns)		-0.4	0.0	0.4	ns	
tRIP0	Input Data Position1 (T = 11.76ns)		T/7-0.4	T/7	T/7+0.4	ns	
tRIP6	Input Data Position2 (T = 11.76ns)		2T/7-0.4	2T/7	2T/7+0.4	ns	
tRIP5	Input Data Position3 (T = 11.76ns)		3T/7-0.4	3T/7	3T/7+0.4	ns	
tRIP4	Input Data Position4 (T = 11.76ns)		4T/7-0.4	4T/7	4T/7+0.4	ns	
tRIP3	Input Data Position5 (T = 11.76ns)		5T/7-0.4	5T/7	5T/7+0.4	ns	
tRIP2	Input Data Position6 (T = 11.76ns)		6T/7-0.4	6T/7	6T/7+0.4	ns	
tRPLL	Phase Lock Loop Set				10.0	ms	

3.3.2 LVDS AC Timing



3.4 Back-Light Unit

The Back-light system is an edge-lighting type with 27 white LED (Light Emitting Diode)s. The characteristics of 27 white LEDs are shown in the following tables.

(Ta= Room Temp)

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Voltage	VB	(9.0)	(9.9)	(10.2)	V	
Forward Current	IB	-	180	-	mA	(1)
Power Consumption	P_{BL}	-	1.782	-	W	(2)

Note (1) LEDs in 3 series x 9 parallel type.

(2) Where IB = 180mA, VB = 9.9 , P_{BL} = VB × IB

4. Optical Characteristics

4.1 Optical characteristic of the LCD

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods.

Measuring equipment: BM-7A

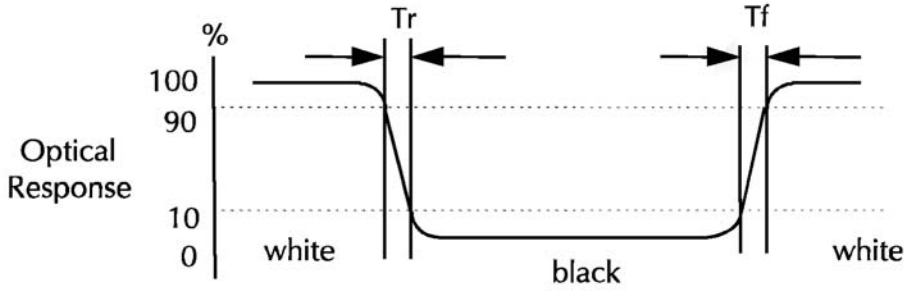
Item		Symbol	Condition	Min	Type	Max	Unit	Note
Brightness		B		(320)	(400)	--	cd/m^2	
Response time		T_r	θ=0°	--	10	--	ms	.
		T_f		--	15	--	ms	
Contrast ratio		CR	At optimized viewing angle	(400)	(500)	--	--	
Color Gamut		NTSC %	--	--	(50)	--	%	
Luminance Uniformity		ΔL		70	75		%	
Color Chromaticity (CIE 1931)	White	Wx	θ=0° Normal Viewing Angle	(0.260)	(0.310)	(0.360)	--	BM-7A
		Wy		(0.280)	(0.330)	(0.380)		
Viewing Angle (6H)	Hor.	θ_R	CR≥10	60	70	--	Degree	
		θ_L		60	70	--		
	Ver.	θ_U		40	50	--		
		θ_D		60	75	--		

a. Test equipment setup

After stabilizing and leaving the panel alone shall be warmed up for the stable operation of LCM, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7(fast) with a viewing angle of 2° at a distance of 50cm and normal direction.

b. Definition of response time: Tr and Tf

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".

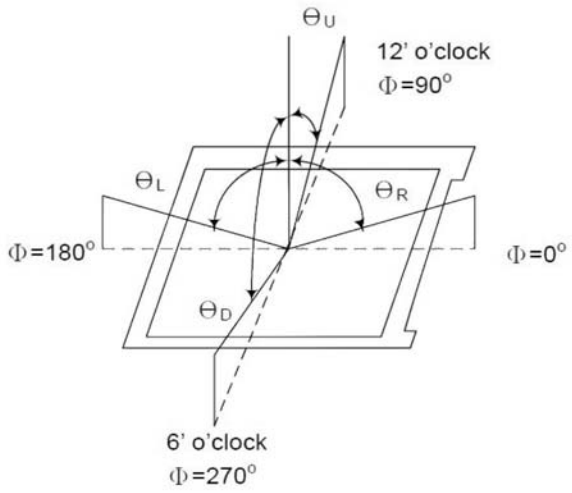


c. Definition of contrast ratio:

$$\text{Contrast Ratio (CR)} = \frac{\text{Brightness measured when LCD is at "white state"}}{\text{Brightness measured when LCD is at "black state"}}$$

d. Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

e. View Angle



f. Definition of Luminance of White: Luminance of white at the center points

Light Source of Back-Light Unit	LED Type

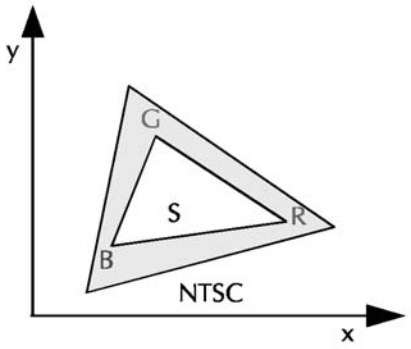
g. Definition of White Uniformity

$$\text{White Uniformity} = \frac{\text{Min. luminance of white among 9-points}}{\text{Max. luminance of white among 9-points}} \times 100\%$$

h. The definition of Color Gamut -Color Chromaticity CIE 1931

Color coordinate of white & red, green, blue at center point.

Color Gamut : NTSC(%) = (RGB Triangle Area / NTSC Triangle Area) x 100



5. I/O Terminal

5.1 Pin Assignment (connector part No: MSB24013P20A or equivalent.)

Pin No.	Symbol	I/O	Function	Remark
1	VCC	P	Power Supply +3.3V	
2	VCC	P	Power Supply +3.3V	
3	GND	P	Ground	
4	GND	P	Ground	
5	RXIN0-	I	Negative LVDS differential data input	
6	RXIN0+	I	Positive LVDS differential data input	
7	GND	P	Ground	
8	RXIN1-	I	Negative LVDS differential data input	
9	RXIN1+	I	Positive LVDS differential data input	
10	GND	P	Ground	
11	RXIN2-	I	Negative LVDS differential data input	
12	RXIN2+	I	Positive LVDS differential data input	
13	GND	P	Ground	
14	CLK-	I	Negative LVDS differential clock input	
15	CLK+	I	Positive LVDS differential clock input	
16	GND	P	Ground	
17	NC	-	NO Connect	
18	NC	-	NO Connect	
19	GND	P	Ground	
20	GND	P	Ground	

I: Input, P: Power

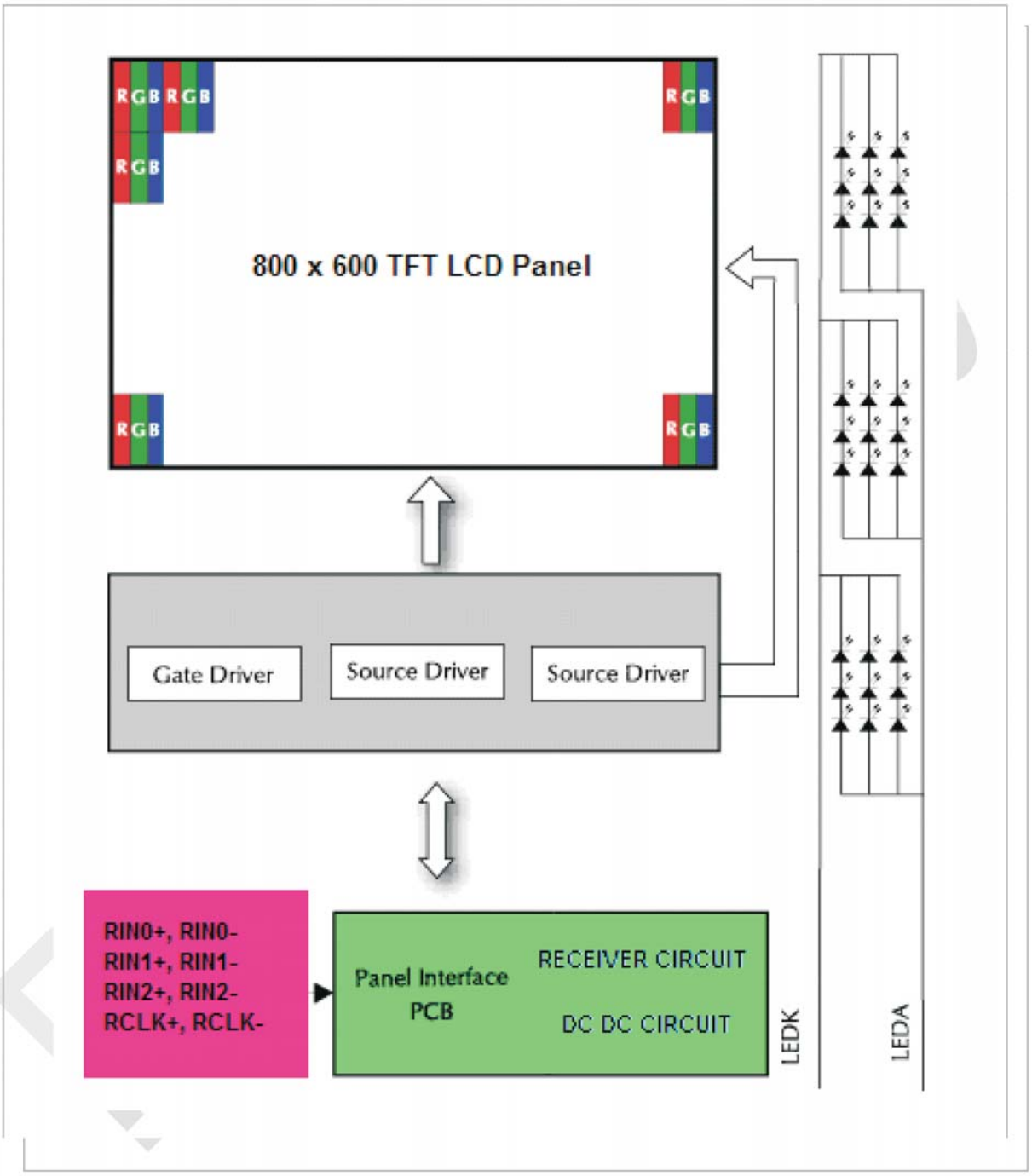
Notes:

1) NC Pin must be retained; this pin can't contact GND or other signal.
2) GND Pin must ground contact, can't be floating.

5.2 Back Light Unit (Connector Part No: JST:BHSR-02VS-01(N) or equivalent.)

Pin No.	Symbol	Function	Remark
1	LEDA	Power Supply for LED backlight	RED
2	LEDK	GND for LED backlight	BLACK

5.3 Block Diagram



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6. Displayed Color and Input Data

	Color & Gray Scale	Data Signal																	
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(0)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green(0)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue(0)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	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
Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(62)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(61)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(31)	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(1)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(0)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(62)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green(61)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(31)	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(1)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green(0)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(31)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue(0)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

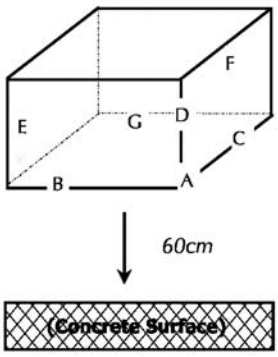
0 : Low level voltage, 1 :High level voltage

Each basic color can be displayed in 64 gray scales from 6 bit data signals. With the combination of total 18 bit data signals, the 262,144-color display can be achieved on the screen.

7. Reliability Condition

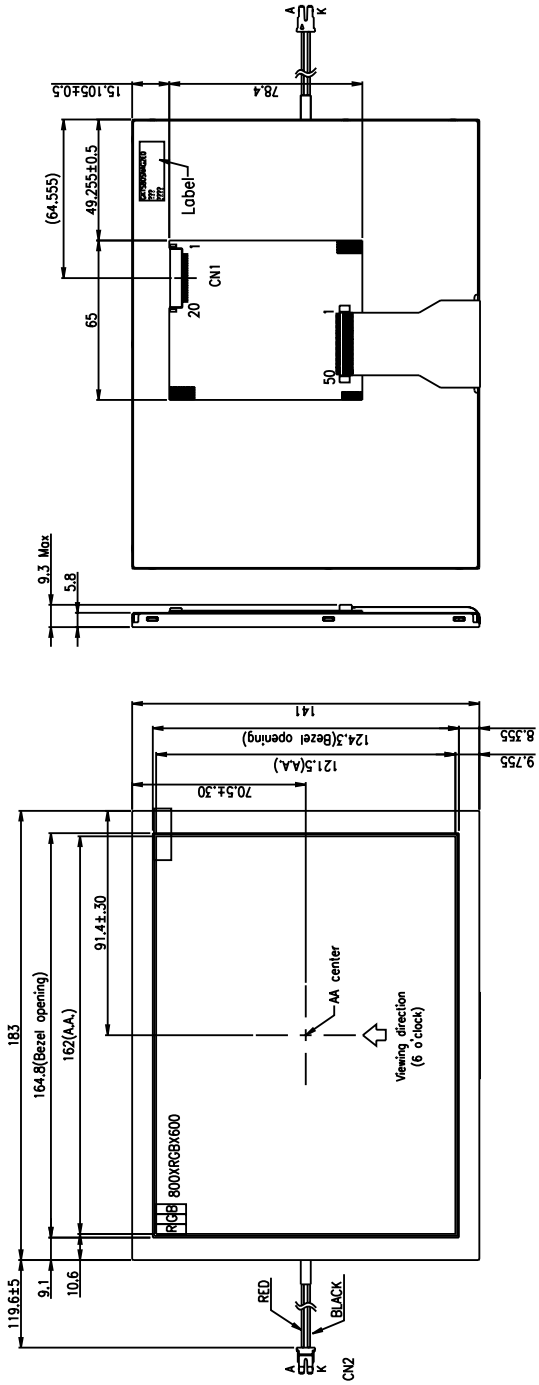
No change on display and in operation under the following test condition.

Condition: Unless otherwise specified, tests will be conducted under the following condition.
Temperature: 20±5°C.
Humidity: 65±5%RH.
Tests will be not conducted under functioning state.

No.	Parameter	Condition	Notes
1	High Temperature Operating	70°C±2°C, 240hrs (Operation state).	
2	Low Temperature Operating	-20°C±2°C, 240hrs (Operation state).	1
3	High Temperature Storage	80°C±2°C, 240hrs.	2
4	Low Temperature Storage	-30°C±2°C, 240hrs.	1,2
5	High Temperature and High Humidity Operation Test	60°C±2°C, 90%, 240hrs.	1,2
6	Vibration Test	Total fixed amplitude: 1.5mm. Vibration Frequency: 10~55Hz. One cycle 60 seconds to 3 direction of X, Y, Z each 15 minutes.	3
7.	Drop Test	To be measured after dropping from 60cm high on the concrete surface in packing state.  *Dropping method corner dropping:* *A corner: Once edge dropping.* *B, C, D edge: Once face dropping.* *E, F, G face: Once.*	

Notes:
1. No dew condensation to be observed.
2. The function test shall be conducted after 4 hours storage at the normal temperature and humidity after removed from the test chamber.
3. Vibration test will be conducted to the product itself without putting I in a container.

8. Dimensional Outlines



CN1 : MSB24013P20A

CN2 : JST BHSR-02VS-1 or compatible

No:	PIN NAME
1	VCC
2	VCC
3	GND
4	GND
5	RXIN0-
6	RXIN0+
7	GND
8	RXIN1-
9	RXIN1+
10	GND
11	RXIN2-
12	RXIN2+
13	GND
14	CKIN-
15	CKIN+
16	GND
17	NC
18	NC
19	GND
20	GND

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