LG Display

SPECIFICATION
FOR
APPROVAL

(   )   **Preliminary Specification**

(●)   **Final Specification**

Title	55.0" WUXGA TFT LCD

BUYER	Hy-Line
MODEL	

SUPPLIER	LG Display Co., Ltd.
*MODEL	LC550DPY
SUFFIX	SHP1 (RoHS Verified)

*When you obtain standard approval,
 please use the above model name without suffix

APPROVED BY	SIGNATURE DATE
/	
/	
/	

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

APPROVED BY	SIGNATURE DATE
Song Hong Sung / Team Leader	
REVIEWED BY	
Kim Kyu Nam / Project Leader	
PREPARED BY	
Lee Dong Uk / Engineer	

**TV Product Development Dept.
LG Display Co., Ltd.**

Product Specification

1. General Description

The LD550DPY is a Color Active Matrix Liquid Crystal Display with an integral the Source PCB and Gate implanted on Panel (GIP). The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive type display operating in the normally black mode. It has a 54.64 inch diagonally measured active display area with WUXGA resolution (1080 vertical by 1920 horizontal pixel array). Each pixel is divided into Red, Green, Blue and White sub-pixels or dots which are arranged in vertical stripes. Gray scale or the luminance of the sub-pixel color is determined with a 8-bit gray scale signal for each dot. Therefore, it can present a palette of more than 16.7M(true) colors.
It is intended to support Commercial Display where high brightness, super wide viewing angle, high color gamut, high color depth and fast response time are important.
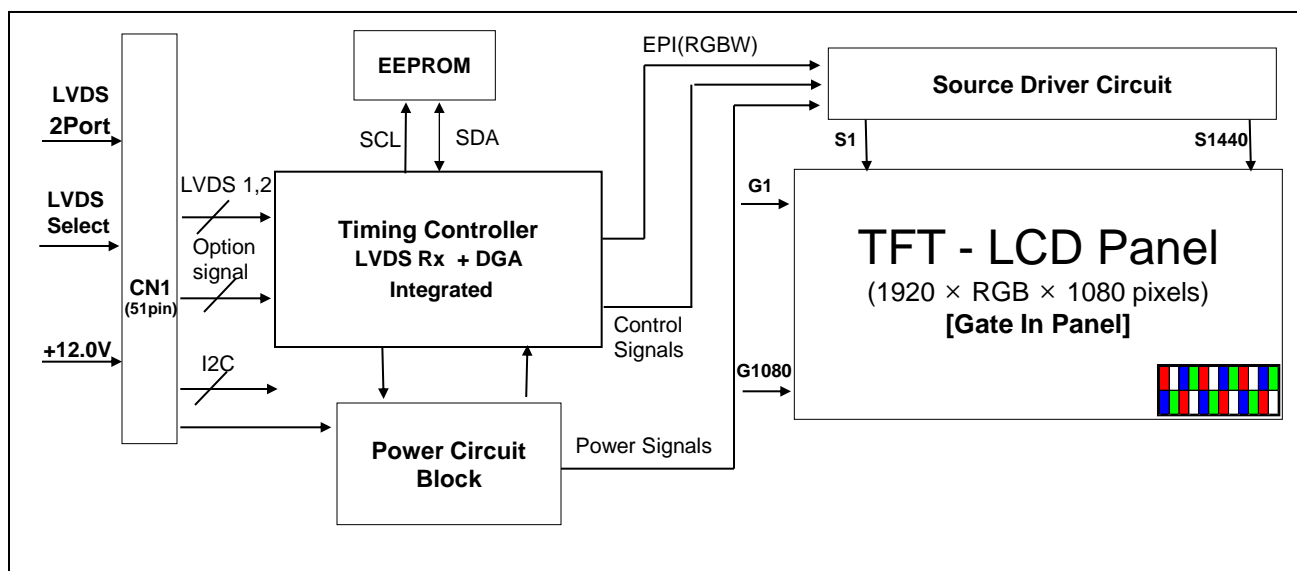
General Features

Active Screen Size	54.64 inches(1387.80mm) diagonal
Outline Dimension	1225.2(H) x 696.7 (V) x 1.4 mm(D) (Typ.)
Pixel Pitch	0.210 mm x 0.630 mm
Pixel Format	1920 horiz. by 1080 vert. Pixels, RGBW stripe arrangement
Color Depth	8-bit, 16.7 M colors
Drive IC Data Interface	Source D-IC : 8-bit EPI, gamma reference voltage, and control signals Gate D-IC : Gate In Panel
Transmittance (With POL)	10.0%(Typ.)
Viewing Angle (CR>10)	Viewing angle free (R/L 178 (Min.), U/D 178 (Min.))
Weight	2.6Kg (Typ.)
Display Mode	Transmissive mode, Normally black
Surface Treatment (Top)	Hard coating(2H), Anti-reflection treatment of the front polarizer (Reflectance 1.5%)
Possible Display Type	Landscape and Portrait Enabled

Product Specification

2. Absolute Maximum Ratings

The following items are maximum values which, if exceeded, may cause faulty operation or permanent damage to the LCD module.

Table 1. ABSOLUTE MAXIMUM RATINGS

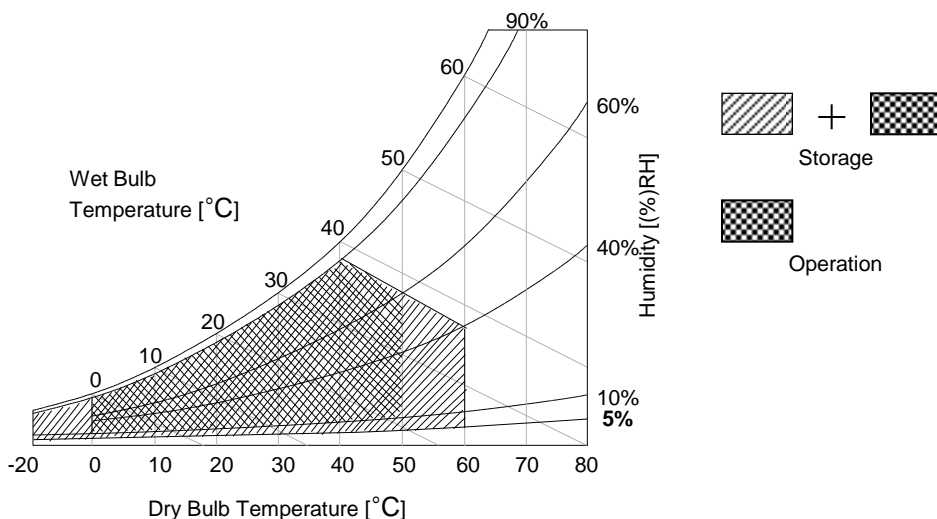| Parameter		Symbol	Value		Unit	Note
			Min	Max		
Power Input Voltage	LCD Circuit	V_{LCD}	-0.3	+14.0	V_{DC}	1
T-Con Option Selection Voltage		V_{LOGIC}	-0.3	+4.0	V_{DC}	
Operating Temperature		T_{OP}	0	+50	˚C	2,3
Storage Temperature**(without packing)**		T_{ST}	-20	+60	˚C	
Panel Front Temperature		T_{SUR}	-	+68	˚C	4
Operating Ambient Humidity		H_{OP}	10	90	%RH	2,3
Storage Humidity		H_{ST}	**5**	90	%RH	

Note1. Ambient temperature condition (Ta = 25 ± 2 ˚C)
2. Temperature and relative humidity range are shown in the figure below.
 Wet bulb temperature should be Max 39˚C, and no condensation of water.
3. Gravity mura can be guaranteed below 40˚C condition.
4. The maximum operating temperatures is based on the test condition that the surface temperature of display area is less than or equal to 68˚C with LCD module alone in a temperature controlled chamber. Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 68℃. The range of operating temperature may be degraded in case of improper thermal management in final product design.

3. Electrical Specifications

3-1. Electrical Characteristics

Table 2. ELECTRICAL CHARACTERISTICS

Parameter		Symbol	Value			Unit	Note
			Min	Typ	Max		
Circuit :							
Power Input Voltage		V$_{LCD}$	10.8	12.0	13.2	V$_{DC}$	
Power Input Current		I$_{LCD}$	-	460	595	mA	1
			-	700	910	mA	2
T-CON Option Selection Voltage	Input High Voltage	V$_{IH}$	2.7	-	3.6	V$_{DC}$	
	Input Low Voltage	V$_{IL}$	0	-	0.7	V$_{DC}$	
Power Consumption		P$_{LCD}$	-	5.52	7.17	Watt	1
Rush current		I$_{RUSH}$	-	-	5.0	A	3

Note 1. The specified current and power consumption are under the V$_{LCD}$=12.0V, Ta=25 $\pm$ 2°C, f$_V$=60Hz
condition, and mosaic pattern(8 x 6) is displayed and f$_V$ is the frame frequency.
    2. The current is specified at the maximum current pattern.
    3. The duration of rush current is about 2ms and rising time of power input is 0.5ms (min.).
    4. Ripple voltage level is recommended under $\pm$5% of typical voltage
    5. Maximum of Power Input Voltage is included with ripple.

White : 255 Gray
Black :   0 Gray
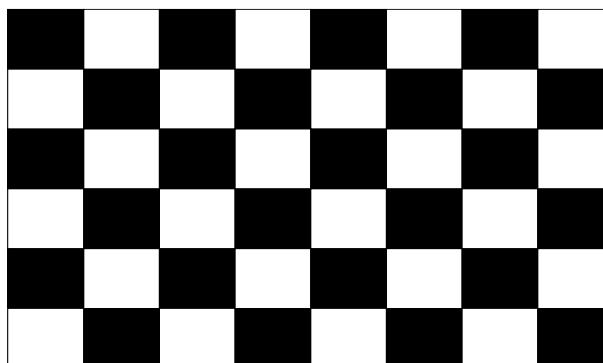
Mosaic Pattern(8 x 6)

3-2. Interface Connections

This LCD module employs two kinds of interface connection, 51-pin connector is used for the module electronics.

3-2-1. LCD Module

- LCD Connector(CN1): FI-RE51S-HF(manufactured by JAE) or GT05P-51S-H38(manufactured by LSM)
                       or IS050-C51B-C39-S(manufactured by UJU)
- Mating Connector : FI-R51HL(JAE) or compatible

Table 3. MODULE CONNECTOR(CN1) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	NC	No Connection (Note 4)	27	NC	No connection
2	NC	No Connection (Note 4)	28	R2AN	SECOND LVDS Receiver Signal (A-)
3	NC	No Connection (Note 4)	29	R2AP	SECOND LVDS Receiver Signal (A+)
4	NC	No Connection (Note 4)	30	R2BN	SECOND LVDS Receiver Signal (B-)
5	NC	No Connection (Note 4)	31	R2BP	SECOND LVDS Receiver Signal (B+)
6	NC	No Connection (Note 4)	32	R2CN	SECOND LVDS Receiver Signal (C-)
7	LVDS Select	'H' =JEIDA , 'L' or NC = VESA	33	R2CP	SECOND LVDS Receiver Signal (C+)
8	NC	No Connection (Note 4)	34	GND	Ground
9	NC	No Connection (Note 4)	35	R2CLKN	SECOND LVDS Receiver Clock Signal(-)
10	NC	No Connection (Note 4)	36	R2CLKP	SECOND LVDS Receiver Clock Signal(+)
11	GND	Ground	37	GND	Ground
12	R1AN	FIRST LVDS Receiver Signal (A-)	38	R2DN	SECOND LVDS Receiver Signal (D-)
13	R1AP	FIRST LVDS Receiver Signal (A+)	39	R2DP	SECOND LVDS Receiver Signal (D+)
14	R1BN	FIRST LVDS Receiver Signal (B-)	40	NC	No connection
15	R1BP	FIRST LVDS Receiver Signal (B+)	41	NC	No connection
16	R1CN	FIRST LVDS Receiver Signal (C-)	42	NC or GND	No Connection or Ground
17	R1CP	FIRST LVDS Receiver Signal (C+)	43	NC or GND	No Connection or Ground
18	GND	Ground	44	GND	Ground (Note 5)
19	R1CLKN	FIRST LVDS Receiver Clock Signal(-)	45	GND	Ground
20	R1CLKP	FIRST LVDS Receiver Clock Signal(+)	46	GND	Ground
21	GND	Ground	47	NC	No connection
22	R1DN	FIRST LVDS Receiver Signal (D-)	48	VLCD	Power Supply +12.0V
23	R1DP	FIRST LVDS Receiver Signal (D+)	49	VLCD	Power Supply +12.0V
24	NC	No connection	50	VLCD	Power Supply +12.0V
25	NC	No connection	51	VLCD	Power Supply +12.0V
26	NC or GND	No Connection or Ground	-	-	-

Note 1. All GND(ground) pins should be connected together to the LCD module's metal frame.
      2. All V_{LCD} (power input) pins should be connected together.
      3. All Input levels of LVDS signals are based on the **EIA 644** Standard.
      4. #1~#6 & #8~#10 NC (No Connection): These pins are used only for LGD (Do not connect)
      5. Specific pin No. **#44** is used for "No signal detection" of system signal interface.
         It should be GND for NSB(No Signal Black) during the system interface signal is not.
         If this pin is "H", LCD Module displays AGP(Auto Generation Pattern).

Product Specification

3-3. Signal Timing Specifications

Table 4 shows the signal timing required at the input of the LVDS transmitter. All of the interface signal timings should be satisfied with the following specification for normal operation.

Table 4. TIMING TABLE for NTSC & PAL (DE Only Mode)

ITEM		Symbol	Min	Typ	Max	Unit	notes
Horizontal	Display Period	t_{HV}	960	960	960	tCLK	1920 / 2
	Blank	t_{HB}	100	140	240	tCLK	1
	Total	t_{HP}	1060	1100	1200	tCLK	
Vertical	Display Period	t_{VV}	1080	1080	1080	Lines	
	Blank	t_{VB}	20	45	300	Lines	1
	Total	t_{VP}	1100	1125	1380	Lines	

| ITEM		Symbol	Min	Typ	Max	Unit	notes
Frequency	DCLK	f_{CLK}	60.00	74.25	78.00	MHz	
	Horizontal	f_H	57.3	67.5	70	KHz	2
	Vertical	f_V	47	60	63	Hz	2

notes: 1. The input of HSYNC & VSYNC signal does not have an effect on normal operation (DE Only Mode).
   If you use spread spectrum of EMI, add some additional clock to minimum value for clock margin.

2. The performance of the electro-optical characteristics may be influenced by variance of the vertical refresh rate and the horizontal frequency

3. Spread Spectrum Rate (SSR) for 50KHz ~ 100kHz Modulation Frequency(FMOD) is calculated by (7 – 0.06*Fmod), where Modulation Frequency (FMOD) unit is KHz.
   LVDS Receiver Spread spectrum Clock is defined as below figure

※ Timing should be set based on clock frequency.
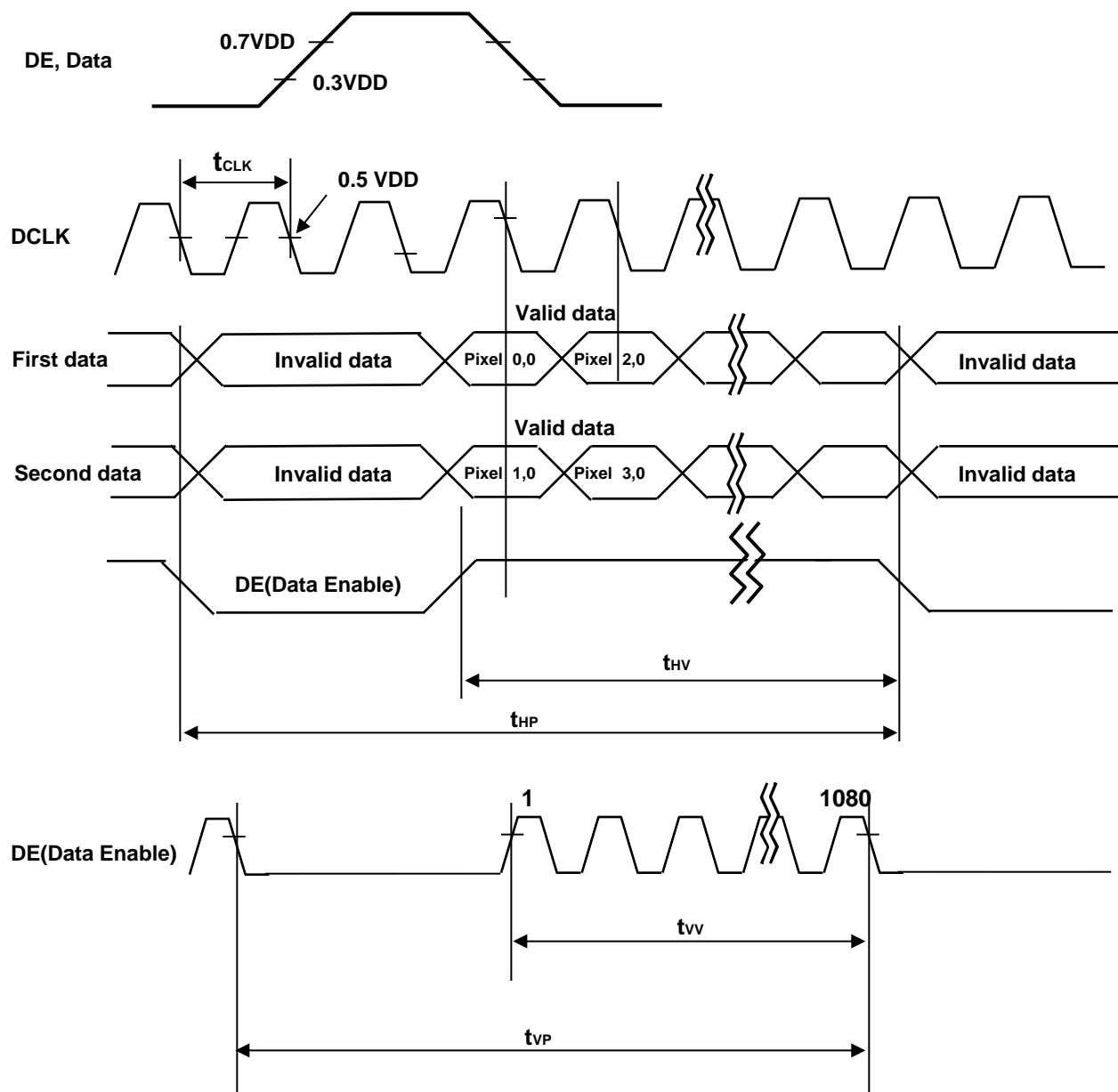
Product Specification
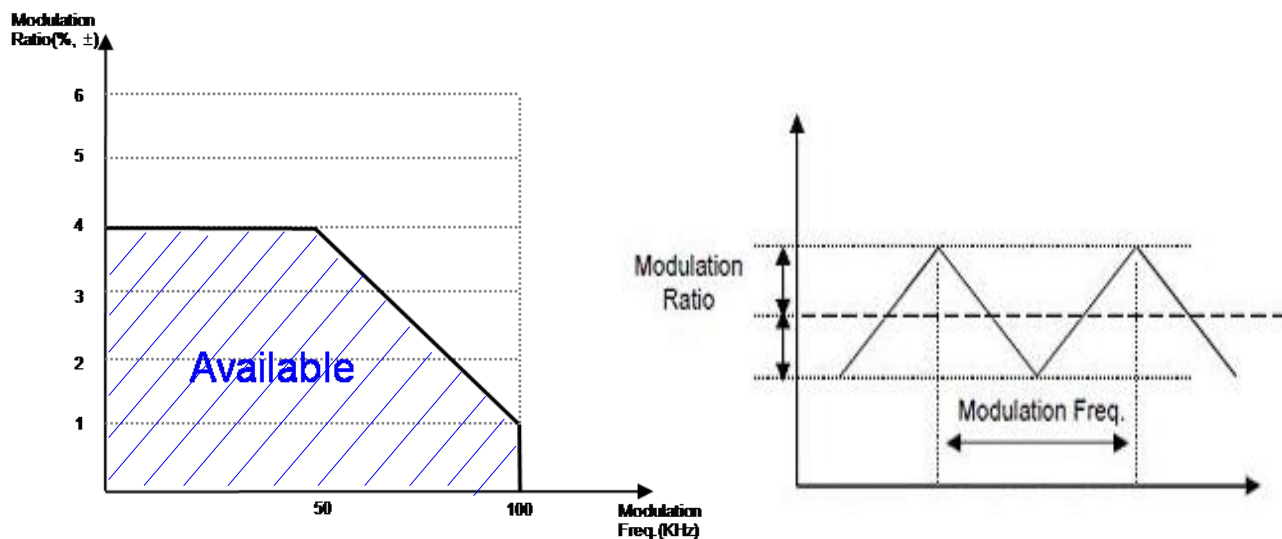
※ Please pay attention to the followings when you set Spread Spectrum Rate(SSR) and Modulation Frequency(FMOD)

1. Please set proper Spread Spectrum Rate(SSR) and Modulation Frequency (FMOD) of TV system LVDS output.

2. Please check FOS after you set Spread Spectrum Rate(SSR) and Modulation Frequency(FMOD) to avoid abnormal display. Especially, harmonic noise can appear when you use Spread Spectrum under FMOD 30 KHz.

3-4. LVDS Signal Specification

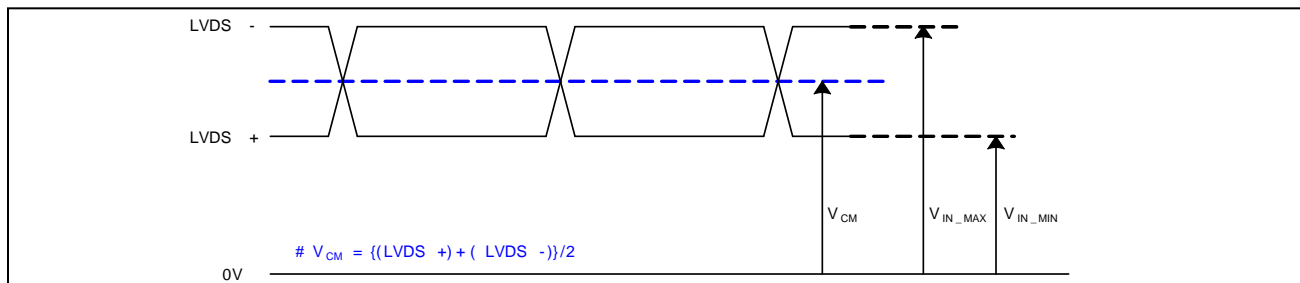### 3-4-1. LVDS Input Signal Timing Diagram

Product Specification

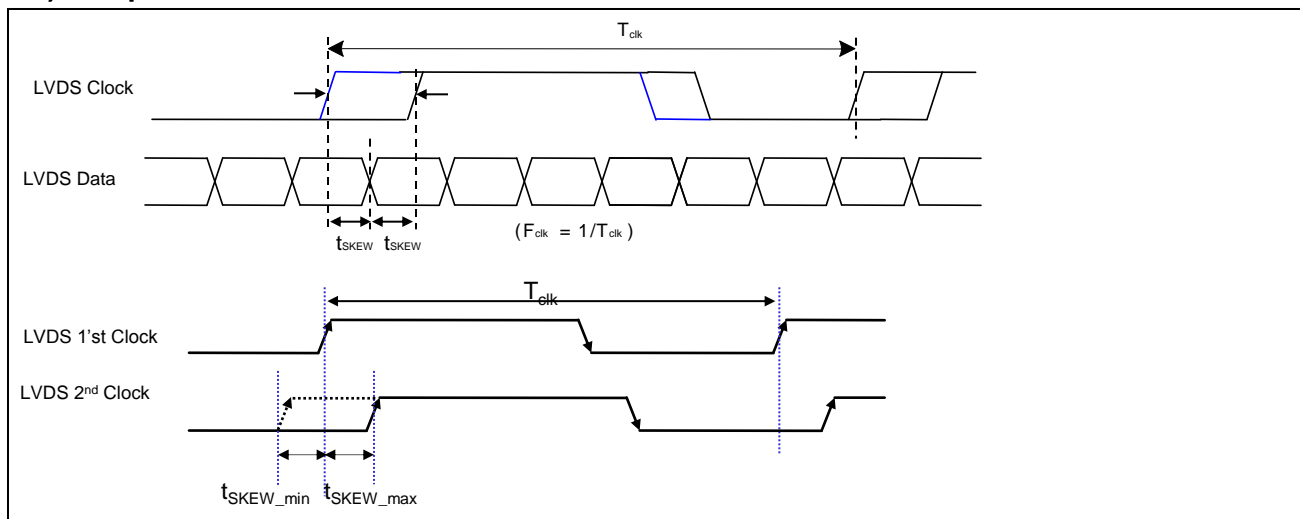### 3-4-2. LVDS Input Signal Characteristics

1) DC Specification

$V_{CM} = \{(LVDS\ +) + (\ LVDS\ -)\}/2$

Description	Symbol	Min	Max	Unit	Note
LVDS Common mode Voltage	V_{CM}	1.0	1.5	V	-
LVDS Input Voltage Range	V_{IN}	0.7	1.8	V	-
Change in common mode Voltage	ΔVCM	-	250	mV	-

2) AC Specification

$(F_{clk} = 1/T_{clk})$

Description	Symbol	Min	Max	Unit	notes
LVDS Differential Voltage	V_{TH}	100	600	mV	Tested with Differential Probe
	V_{TL}	-600	-100	mV	2
LVDS Clock to Data Skew	t_{SKEW}	-	$\|(0.2*T_{clk})/7\|$	ps	-
Effective time of LVDS	t_{eff}	$\|\pm360\|$	-	ps	-
LVDS Clock to Clock Skew (Even to Odd)	t_{SKEW_EO}	-	$\|1/7* T_{clk}\|$	ps	-

notes 1. All Input levels of LVDS signals are based on the EIA 644 Standard.
2. LVDS Differential Voltage is defined within **t_{eff}**

Product Specification

LVDS Data

0.5tui

tui

360ps

VTH

0V
(Differential)

VTL

360ps

teff

LVDS CLK

tui : Unit Interval

0V
(Differential)

* This accumulated waveform is tested with differential probe
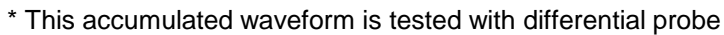
Product Specification

3-5. Intra interface Signal Specification

3-5-1. EPI Signal Specification

Table 5. ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit	notes
Logic & EPI Power Voltage	VCC	-	1.62	1.8	1.98	V_{DC}	
EPI input common voltage	VCM	LVDS Type	0.8	VCC/2	1.3	V	
EPI input differential voltage	Vdiff	-	150	-	500	mV	
EPI Input eye diagram	Veye	-	90	-	-	mV	
Effective Veye width time	B1&B2		0.25	-	-	UI	
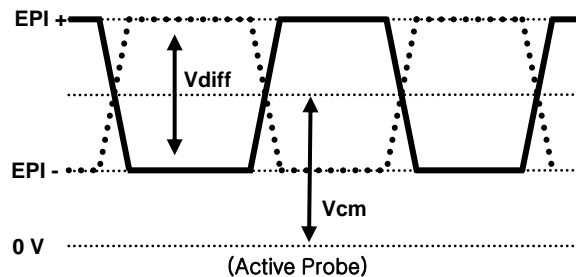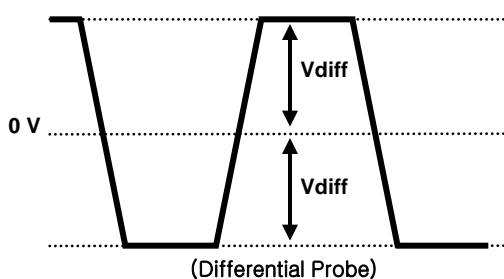
EPI Differential signal characteristics
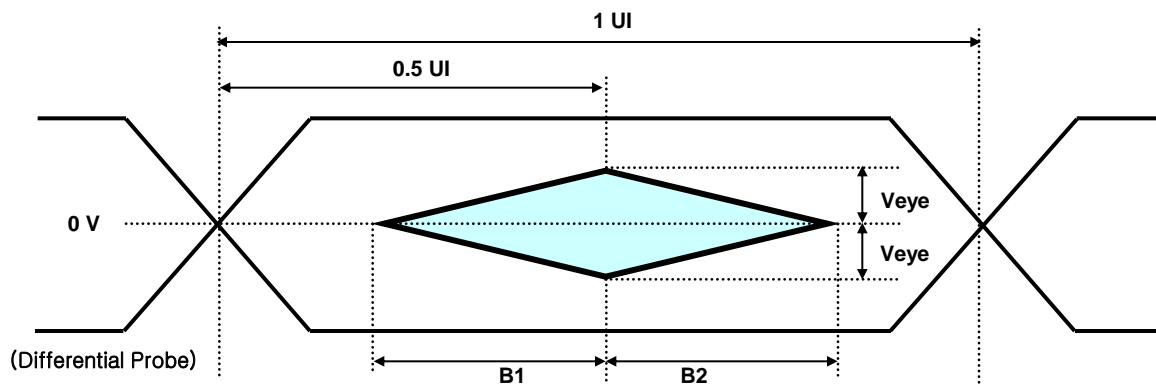
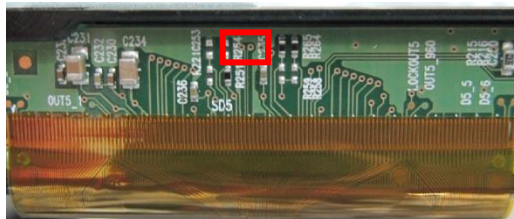**Eye Pattern of EPI Input**

＊Source PCB

FIG. 3 Measure point

Product Specification

3-6. Color Data Reference

The brightness of each primary color(red,green,blue) is based on the 8bit gray scale data input for the color.
The higher binary input, the brighter the color. Table 6 provides a reference for color versus data input.

Table 6. COLOR DATA REFERENCE

| Color		Input Color Data		
		RED **M**SB **L**SB R7 R6 R5 R4 R3 R2 R1 R0	**GREEN** **M**SB **L**SB G7 G6 G5 G4 G3 G2 G1 G0	**BLUE** **M**SB **L**SB B7 B6 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 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 (000)	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 (001)	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 (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 (000)	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 (001)	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 (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 (000)	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 (001)	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 (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

3-7. Power Sequence

3-7-1. LCD Driving circuit
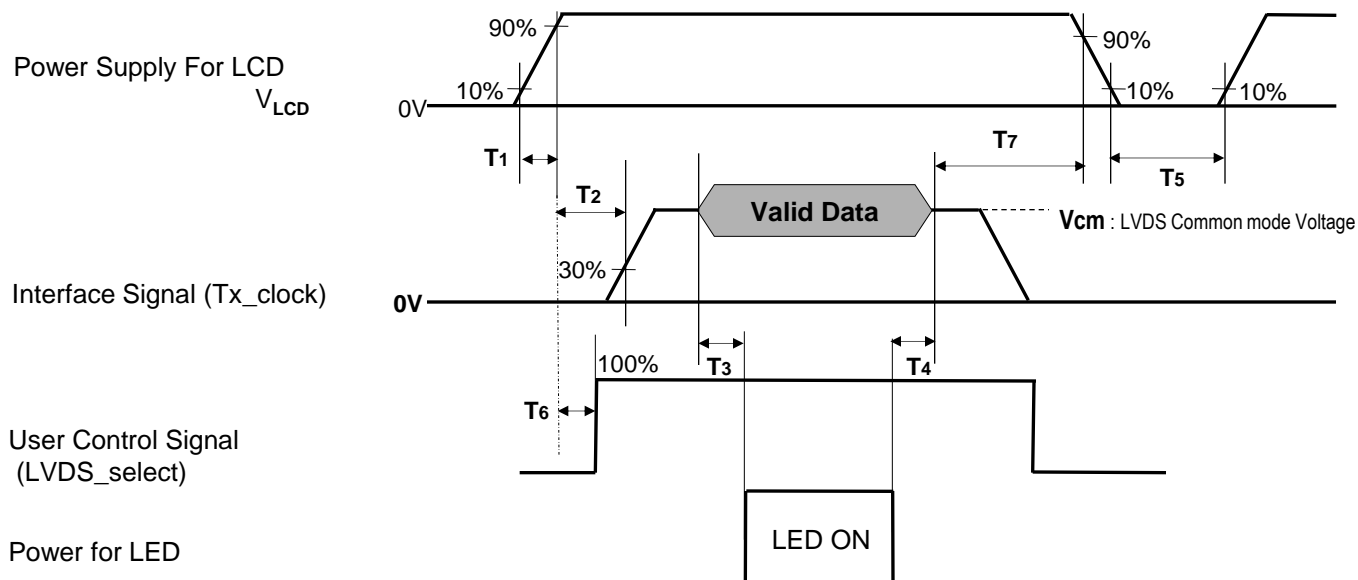
Table 7. POWER SEQUENCE

Parameter	Value			Unit	Notes
	Min	**Typ**	**Max**		
T1	0.5	-	20	ms	1
T2	0	-	-	ms	2
T3	400	-	-	ms	3
T4	**100**	-	-	ms	3
T5	1.0	-	-	s	4
T6	0	-	T2	ms	5
T7	0	-	-	ms	6

Note :
1. Even though T1 is over the specified value, there is no problem if I2T spec of fuse is satisfied.
2. If T2 is satisfied with specification after removing LVDS Cable, there is no problem.
3. The T3 / T4 is recommended value, the case when failed to meet a minimum specification, abnormal display would be shown. There is no reliability problem.
4. T5 should be measured after the Module has been fully discharged between power off and on period.
5. If the on time of signals (Interface signal and user control signals) precedes the on time of Power (V_{LCD}), it will be happened abnormal display. When T6 is NC status, T6 doesn't need to be measured.
6. It is recommendation specification that T7 has to be 0ms as a minimum value.
※ Please avoid floating state of interface signal at invalid period.
※ When the power supply for LCD (VLCD) is off, be sure to pull down the valid and invalid data to 0V.

4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable in a dark environment at $25\pm2°C$.
The values are specified at 50cm from the LCD surface at a viewing angle of Φ and θ equal to 0 °.
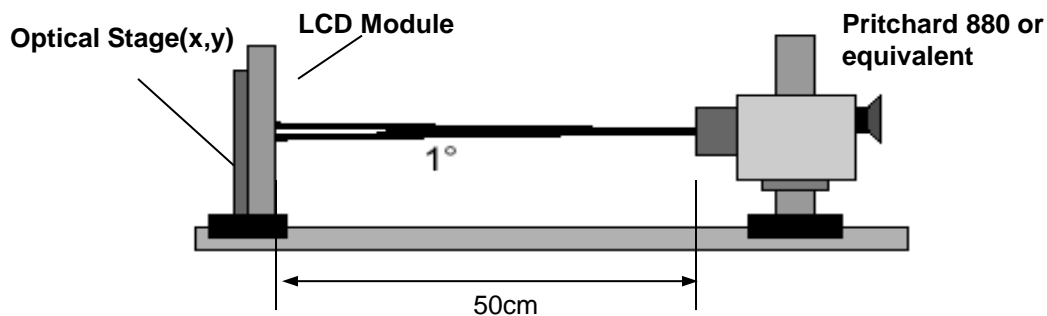FIG. 1 shows additional information concerning the measurement equipment and method.

FIG. 1 Optical Characteristic Measurement Equipment and Method

Table 8. OPTICAL CHARACTERISTICS

Ta= $25\pm2°C$, V_{LCD}=12.0V, fV=60Hz, Dclk=74.25MHz, Light Source : D65 Standard

Parameter		Symbol	Value			Unit	Note
			Min	Typ	Max		
Contrast Ratio		CR	700	1000	-		1
Response Time	Variation	G to G $_\sigma$		6	9		3
	Gray to Gray (BW)	G to G BW		9	13	ms	2
Transmittance		T	9.0	10.0		%	4
Color Coordinates [CIE1931]	RED	Rx		0.647			
		Ry		0.333			
	GREEN	Gx	Typ -0.03	0.315	Typ +0.03		
		Gy		0.600			
	BLUE	Bx		0.152			
		By		0.066			
Viewing Angle (CR>10)							
	x axis, right(ϕ=0°)	θr	89	-	-		
	x axis, left (ϕ=180°)	θl	89	-	-	degree	4
	y axis, up (ϕ=90°)	θu	89		-		
	y axis, down (ϕ=270°)	θd	89	-	-		
Gray Scale			-	2.2	-		5

Product Specification

Note : 1. Contrast Ratio(CR) is defined mathematically as :

CR(Contrast Ratio) = Maximum CRn (n=1, 2, 3, 4, 5)

$$CRn = \frac{\text{Surface Luminance at position n with all white pixels}}{\text{Surface Luminance at position n with all black pixels}}$$

n = the Position number(1, 2, 3, 4, 5). For more information, see FIG 2.

The contrast ratio is valued with operating condition of LGD's standard BLU

2. Response time is the time required for the display to transit from any gray to white (Rise Time, Tr_R) and from any gray to black (Decay time, Tr_D). For additional information see the FIG. 3.
   ※ G to G_{BW} Spec stands for average value of all measured points.
   Photo Detector : RD-80S / Field : 2 °

The response time is valued with operating condition of LGD's standard BLU

3. G to G $_\sigma$ is Variation of Gray to Gray response time composing a picture

$$G \text{ to } G (\sigma) = \sqrt{\frac{\Sigma(Xi - u)^2}{N}}$$

Xi = Individual Data
u = Data average
N : The number of Data

4. The value of transmittance should be extracted using the standard light source of D65

5. The value of color coordinates should be extracted using the standard light source of D65

6. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD module surface. For more information, see the FIG. 4.

7. Gray scale specification
   Gamma Value is approximately 2.2. For more information, see the Table 9.

Table 9. GRAY SCALE SPECIFICATION

Gray Level	Luminance [%] (Typ)
L0	0.10
L15	0.27
L31	1.04
L47	2.49
L63	4.68
L79	7.66
L95	11.5
L111	16.1
L127	21.6
L143	28.1
L159	35.4
L175	43.7
L191	53.0
L207	63.2
L223	74.5
L239	86.7
L255	100

Product Specification

Measuring point for Contrast Ratio

A : H / 4 mm
B : V / 4 mm
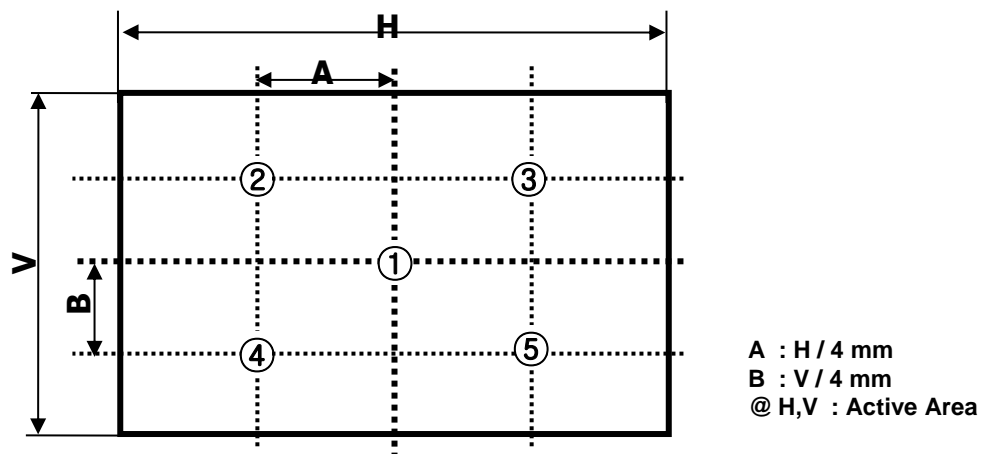@ H,V : Active Area

FIG. 2 5 Points for Contrast Ratio

Response time is defined as the following figure and shall be measured by switching the input signal for "Gray(N)" and "Black or White".
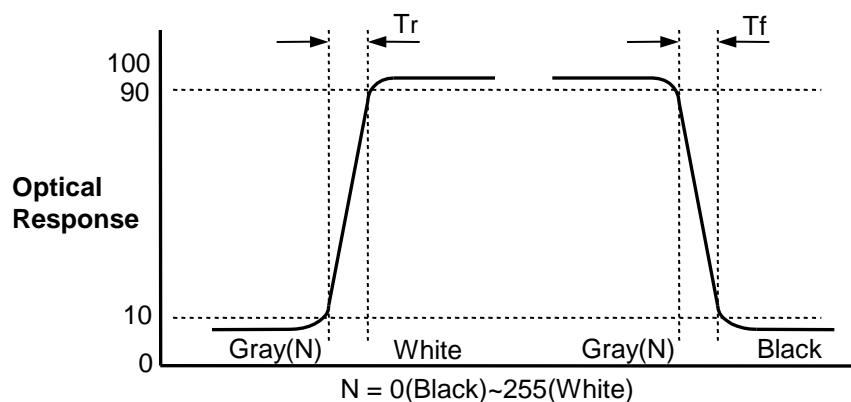

N = 0(Black)~255(White)

FIG. 3 Response Time
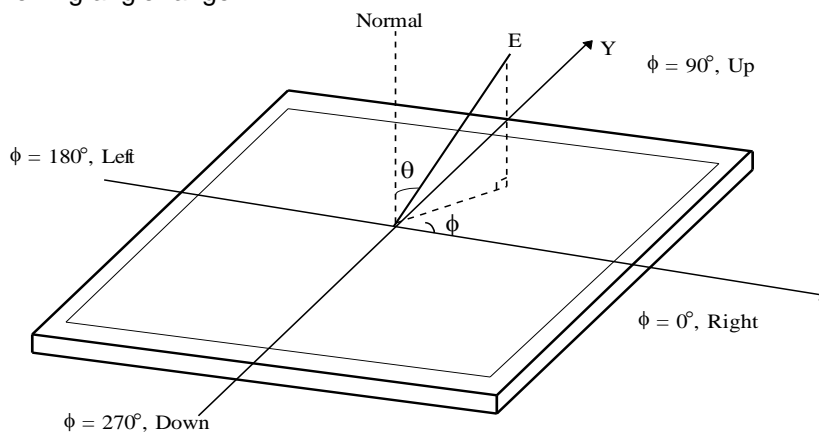
Dimension of viewing angle range

FIG. 4 Viewing Angle

Product Specification

5. Mechanical Characteristics

Table 10 provides general mechanical characteristics.

Table 10. MECHANICAL CHARACTERISTICS

Item	Value	
Outline Dimension (Only Glass)	Horizontal	1225.2mm
	Vertical	696.7mm
	Thickness	1.4 mm
Active Display Area	Horizontal	1209.6mm
	Vertical	680.4mm
Weight	2,600g(Typ.), 2,750g(Max)	
Surface Treatment	Hard coating(2H), Anti-reflection treatment of the front polarizer (Reflectance 1.5%)	

Note : Please refer to a mechanical drawing in terms of tolerance at the next page.
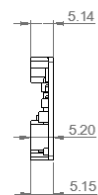
6. Mechanical Dimension

6-1. Board Assembly Dimension
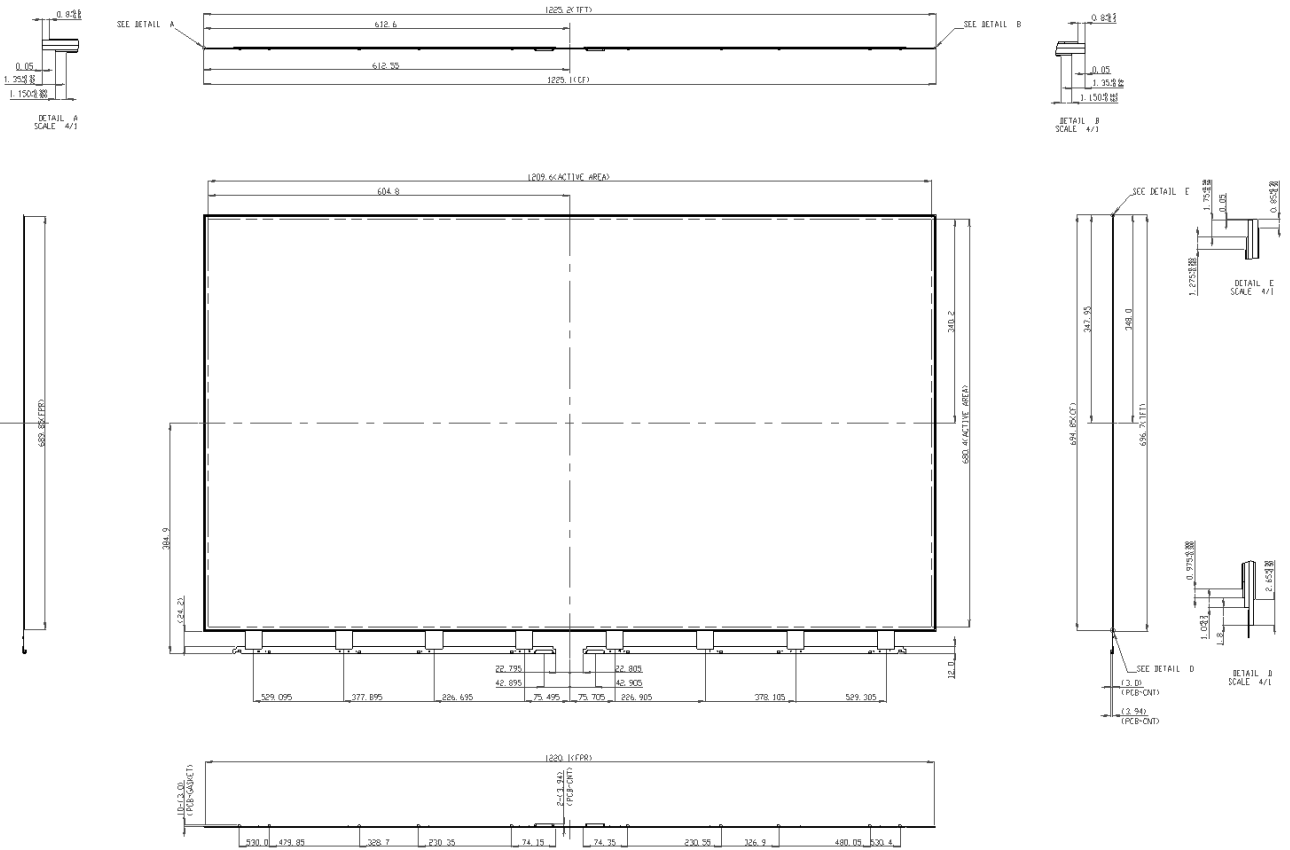
Date	Version
2014. 7. 16	1.0
2015. 1. 9	1.1

Product Specification

6-2. Control Board Assembly Dimension
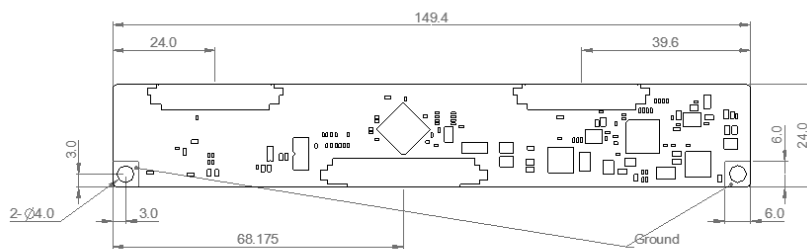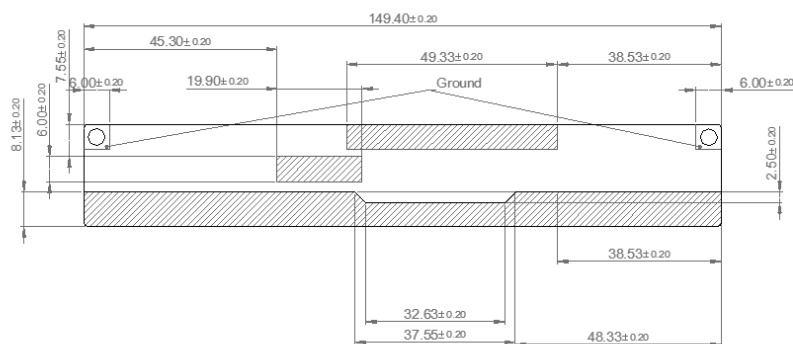
Date	Version
2014.7.16	1.0

NOTE
1. This drawing describes the necessary dimension in control board to assembly with customer's backlight system.
2. The specified dimension non-specified dimension and its tolerances can be changeable, and hence values are used for reference only.
3. Hatching area describes as below;
   ; Ground area
   ; Silk screen area

Product Specification

7. Reliability

Table 11. ENVIRONMENT TEST CONDITION

No.	Test Item	Condition
1	High temperature storage test	Ta= 60°C 90% 240h
2	Low temperature storage test	Ta= -20°C 240h
3	High temperature operation test	Ta= 50°C 50%RH 500h
4	Low temperature operation test	Ta= 0°C 500h
5	Humidity condition Operation	Ta= 40 °C ,90%RH
6	Altitude operating storage / shipment	0 - 16,400 ft 0 - 40,000 ft

Note : Before and after Reliability test, LCM should be operated with normal function.

8. International Standards

8-1. Safety

a) UL 60065, Underwriters Laboratories Inc.
   Audio, Video and Similar Electronic Apparatus - Safety Requirements.

b) CAN/CSA C22.2 No.60065:03, Canadian Standards Association.
   Audio, Video and Similar Electronic Apparatus - Safety Requirements.

c) IEC 60065, The International Electrotechnical Commission (IEC).
   Audio, Video and Similar Electronic Apparatus - Safety Requirements.

8-2. Environment

a) RoHS, Directive **2011/65/EU** of the European Parliament and of the council of **8 June 2011**

9. Packing

9-1. Packing Form

a) Package quantity in one Pallet : 70 pcs

b) Pallet Size : 1390 mm(W) X 890 mm(D) X 1080 mm(H)

Product Specification

10. Precautions

Please pay attention to the followings when you use this TFT LCD module.

10-1. Handling Precautions

(1) Please attach the surface transparent protective film to the surface in order to protect the polarizer.
Transparent protective plate should have sufficient strength in order to the resist external force.
(2) Acetic acid type and chlorine type materials for the cover case are not desirable because the former
generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break
by electro-chemical reaction.
(3) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB
pencil lead. And please do not rub with dust clothes with chemical treatment.
Do not touch the surface of polarizer for bare hand or greasy cloth.(Some cosmetics are detrimental
to the polarizer.)
(4) After removing the protective film, when the surface becomes dusty, please wipe gently with absorbent
cotton or other soft materials like chamois soaks with petroleum benzine.
Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
(5) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes
deformations and color fading.
(6) Since a module is composed of electronic circuits, it is not strong to electrostatic discharge.
Make certain that treatment persons are connected to ground through wrist band etc. And don't touch
interface pin directly. Panel ground path should be connected to metal ground.
(7) Please make sure to avoid external forces applied to the Source PCB and D-IC during the process of
handling or assembling the TV set. If not, It causes panel damage or malfunction.
(8) Panel and BLU should be protected from the static electricity. If not, it causes IC damage.
(9) Do not pull or fold the source D-IC which connect the source PCB and the panel.
(10) Panel(board ass'y) should be put on the BLU structure precisely to avoid mechanical impact.
(11) FFC Cable should be connected between System board and Source PCB correctly.
(12) Mechanical structure for backlight system should be designed for sustaining board ass'y safely.
(13) Surface temperature of the Source D-IC should be controlled under 100℃ with TV Set status.
If not, problems such as IC damage or decrease of lifetime could occur.

10-2. Operating Precautions

(1) Response time depends on the temperature.(In lower temperature, it becomes longer.)
(2) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
And in lower temperature, Stable time(required time that brightness is stable after turned on)
becomes longer
(3) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or
electrical contacted parts. And after fading condensation, smear or spot will occur.
(4) When fixed patterns are displayed for a long time, remnant image is likely to occur.
(5) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be
done by system manufacturers. Grounding and shielding methods may be important to minimized the
interference.

Product Specification

10-3. Protection Film

(1) Please keep attaching the protection film before assembly.
(2) Please peel off the protection film slowly.
(3) Please peel off the protection film just like shown in the Fig.1
(4) Ionized air should be blown over during the peeling.
(5) Source PCB should be connected to the ground when peel off the protection film.
(6) The protection film should not be contacted to the source D-IC during peeling it off.
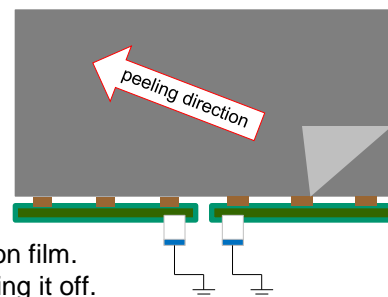
< Fig. 1 >

10-4. Storage Precautions

When storing modules as spares for a long time, the following precautions are necessary.

(1) Temperature : 5 ~ 40 ℃
(2) Humidity : 35 ~ 75 %RH
(3) Period : 6 months
(4) Control of ventilation and temperature is necessary.
(5) Please make sure to protect the product from strong light exposure, water or moisture. Be careful for condensation.
(6) Please keep the modules at a circumstance shown below Fig. 2

No Baking	50℃, 10%, 24hr	50℃, 10%, 48hr
2 month	3 month	6 month
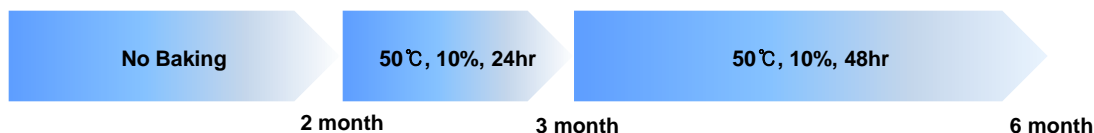
< Fig. 2 >

10-5. Packing Precautions

Product assembled into module should be stored in the Al-bag(cover case).

Product Specification

APPENDIX-I-1

■ Pallet Ass'y

①

②

③

④

⑤

⑥
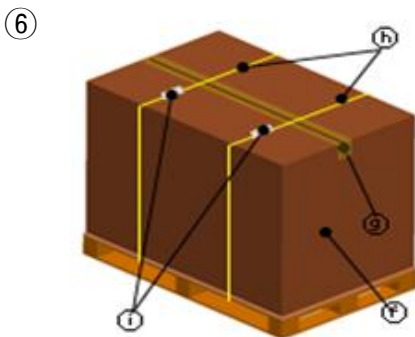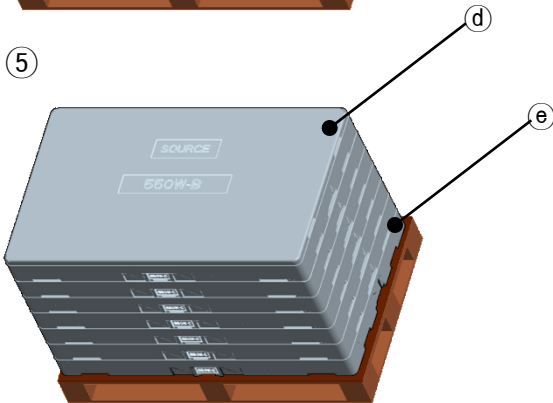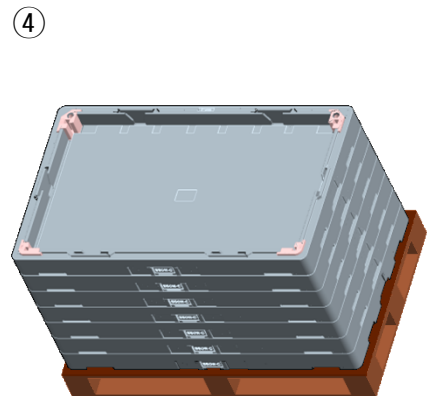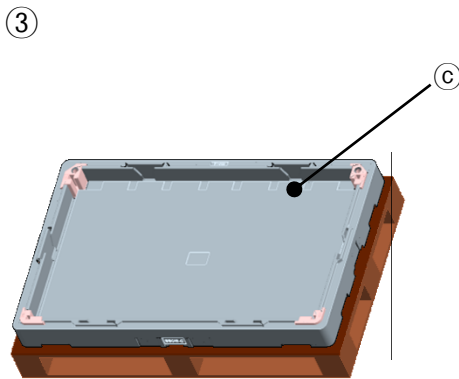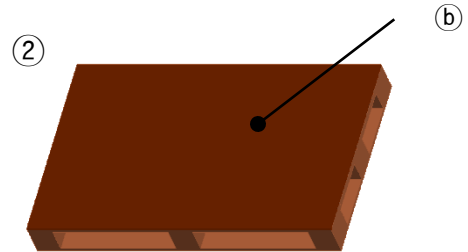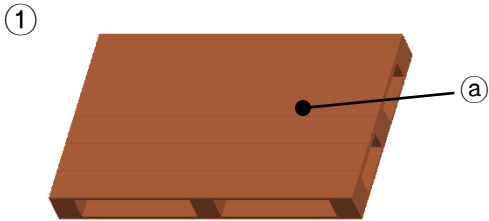
No.	Description	Material
ⓐ	Pallet	Plywood
ⓑ	Carton Plate	Single Wall
ⓒ	PE Sheet	Carbon
ⓓ	Top Packing	EPS
ⓔ	Bottom Packing	EPS
ⓕ	Angle Packing	Single Wall
ⓖ	Tape	OPP
ⓗ	Band	PP
ⓘ	Clip	Steel

Product Specification

APPENDIX-I-2

■ Control PCB Packing Ass'y

a) Control PCB Qty / Box : 70 pcs
b) Tray Qty / Box : 8Tray (Upperst Tray Is empty)
c) Tray Size : 353 X 353 X 16
d) Box size : 368 X 355 X 98

[10pcs/Tray]

[7 Tray+Empty Tray]

[7Tray]

[Inserting into Box]
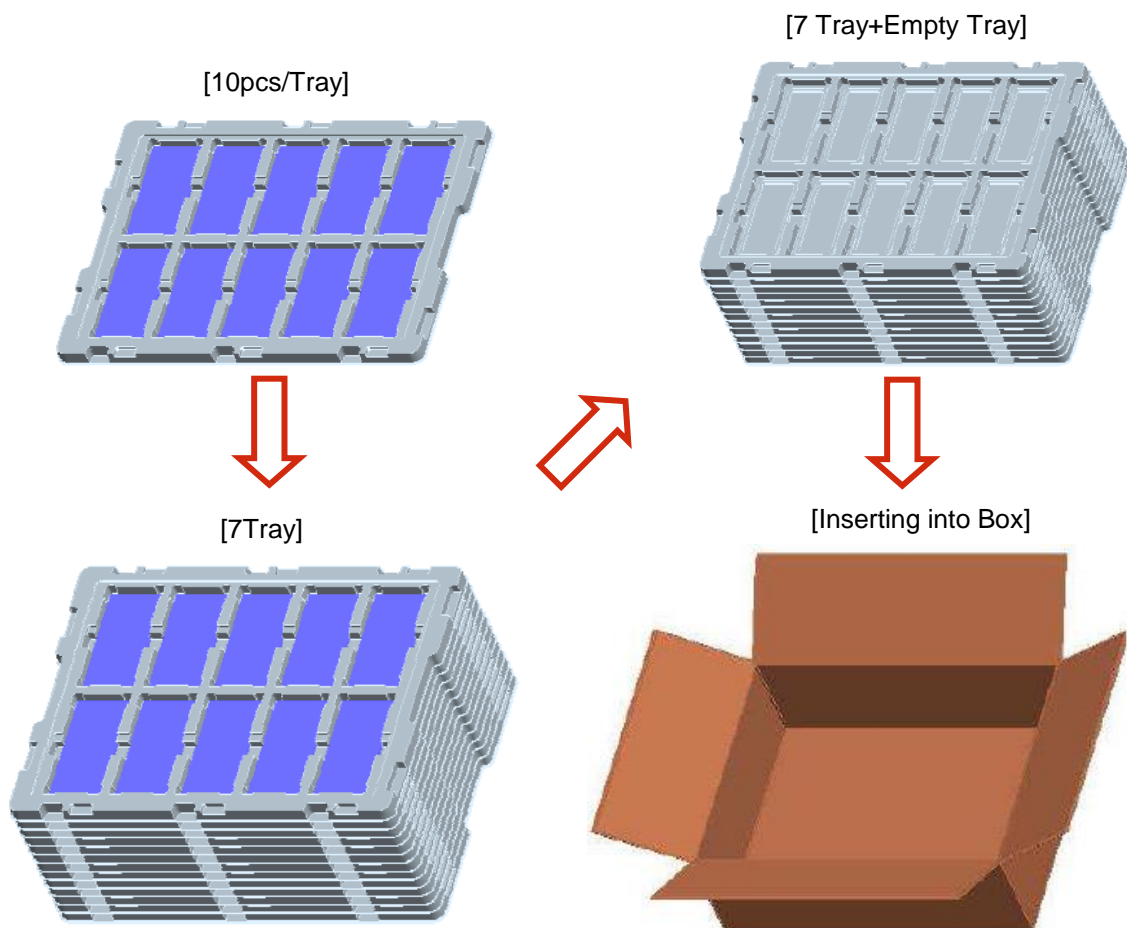
NO.	DESCRIPTION	MATERIAL
1	PCB Packing A,ssy	-
2	Tray	PET
3	Box	SWR4

APPENDIX- II-1

■ Serial Label
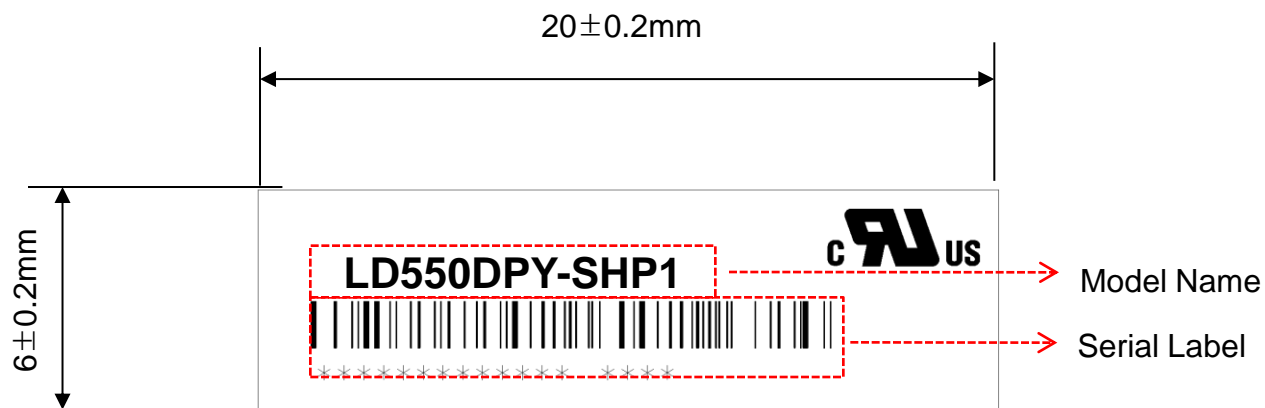
Product Specification

APPENDIX- II-2

■ BOX Label

75.0

45.0

M2D8CA00002MB

LD550DPY-SHP1
QTY : 10

Grade:A

■ Pallet Label

100.0

70.0

LD550DPY

SHP1

| 70 PCS | 001/01-01 | |
| MADE IN KOREA | | RoHS Verified |

XXXXXXXXXXXXX XXX
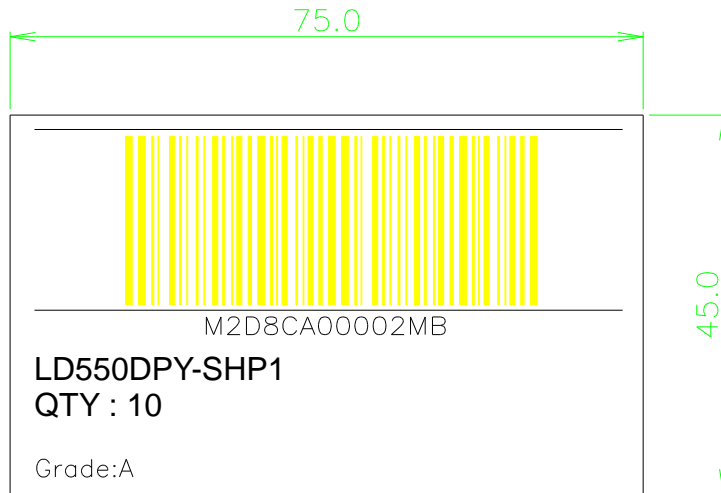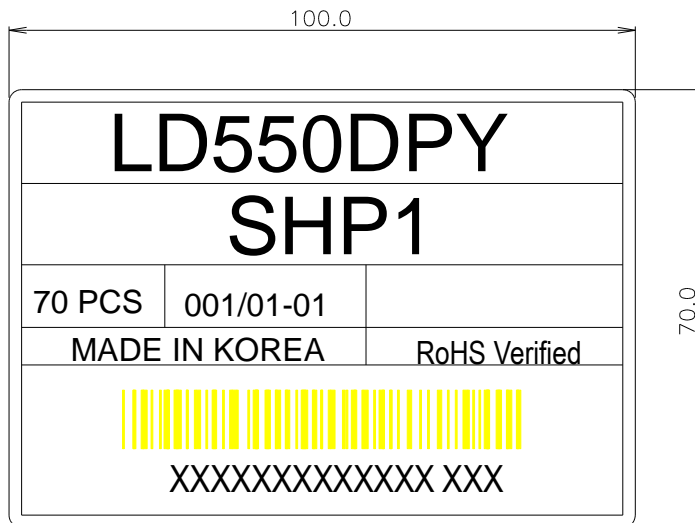
Product Specification

APPENDIX- III-1

■ Required signal assignment for Flat Link (Thine : THC63LVD103) Transmitter(Pin7= **"L" or "NC"**)

Host System 24 Bit		THC63LVD103 or Compatible			FI-RE51S-HF			Timing Controller
RED0		33						
RED1		34						
RED2		35						
RED3		36						
RED4		37	TA-	31	12			RO0N
RED5		38	TA+	30	13	100Ω		RO0P
RED6		59						
RED7		61	TB-	29	14			RO1N
		4	TB+	28	15	100Ω		RO1P
		5						
GREEN0		40						
GREEN1		41	TC-	25	16			RO2N
GREEN2		42	TC+	24	17	100Ω		RO2P
GREEN3		44						
GREEN4		45	TCLK-	23	19			ROCLKN
GREEN5		46	TCLK+	22	20	100Ω		ROCLKP
GREEN6		62						
GREEN7		63						
		6	TD-	21	22			RO3N
		8	TD+	20	23	100Ω		RO3P
BLUE0		48						
BLUE1		49						
BLUE2		50						
BLUE3		52						
BLUE4		53						
BLUE5		54			7			**VESA**/ JEIDA
BLUE6		64						
BLUE7		1						
		9						
		11						
Hsync		55	GND					**LCM Module**
Vsync		57						
Data Enable		58						
CLOCK		12						

Note: 1. The LCD module uses a 100 Ohm[Ω] resistor between positive and negative lines of each receiver input.

2. Refer to LVDS Transmitter Data Sheet for detail descriptions. (THC63LVD103 or Compatible)

3. '7' means MSB and '0' means LSB at R,G,B pixel data.

Product Specification

APPENDIX- III-2

■ Required signal assignment for Flat Link (Thine : THC63LVD103) Transmitter(Pin7= **"H"**)

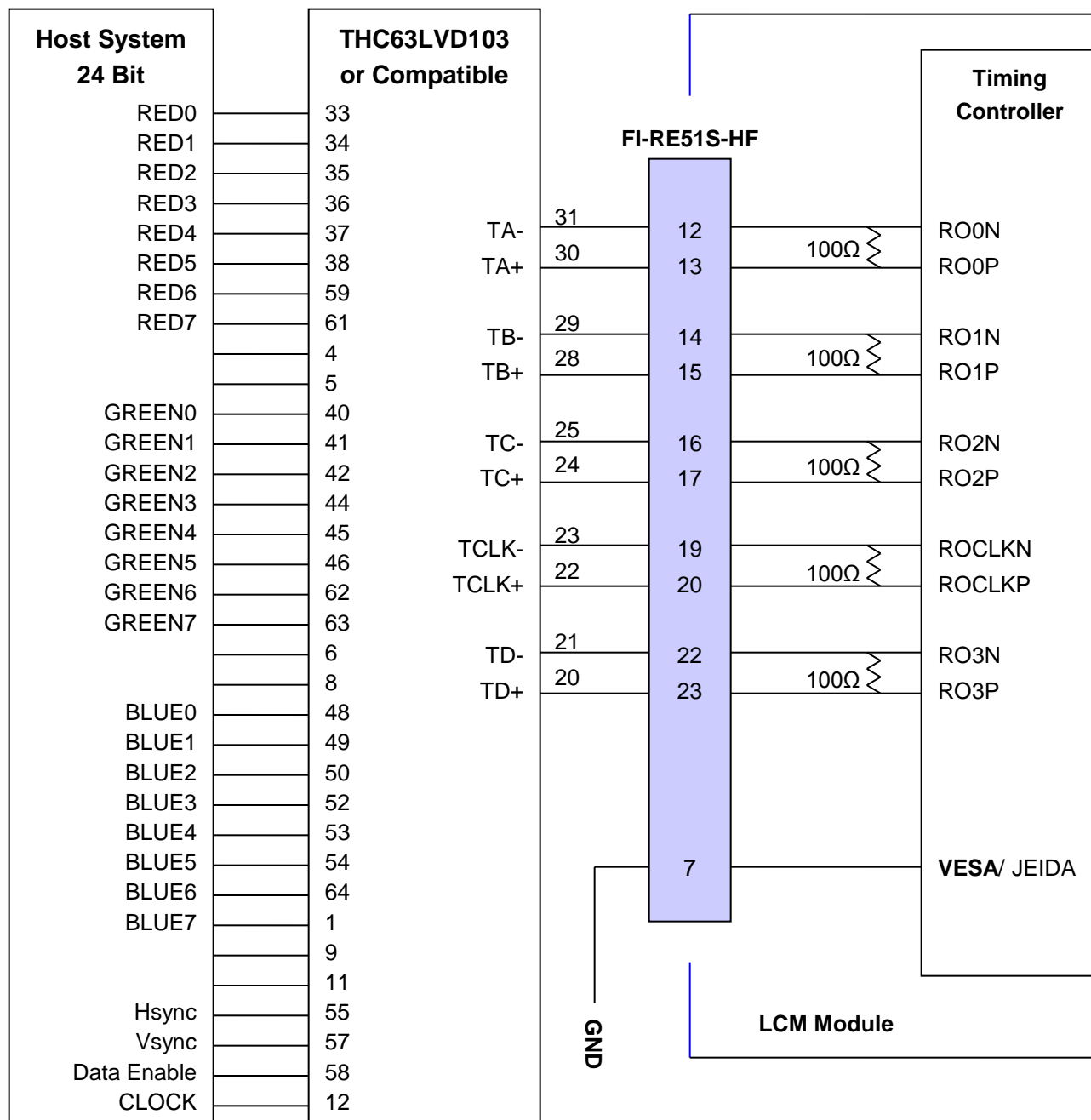| Host System 24 Bit	THC63LVD103 or Compatible	FI-RE51S-HF	Timing Controller
RED0	4		
RED1	5		
RED2	59		
RED3	61		
RED4	33	TA- 31 → 12 → 100Ω	RO0N
RED5	34	TA+ 30 → 13	RO0P
RED6	35		
RED7	36	TB- 29 → 14 → 100Ω	RO1N
	37	TB+ 28 → 15	RO1P
	38		
GREEN0	6		
GREEN1	8	TC- 25 → 16 → 100Ω	RO2N
GREEN2	62	TC+ 24 → 17	RO2P
GREEN3	63		
GREEN4	40	TCLK- 23 → 19 → 100Ω	ROCLKN
GREEN5	41	TCLK+ 22 → 20	ROCLKP
GREEN6	42		
GREEN7	44		
	45	TD- 21 → 22 → 100Ω	RO3N
	46	TD+ 20 → 23	RO3P
BLUE0	9		
BLUE1	11		
BLUE2	64		
BLUE3	1		
BLUE4	48		
BLUE5	49	7	VESA /**JEIDA**
BLUE6	50		
BLUE7	52		
	53		
	54		
Hsync	55	VCC	**LCM Module**
Vsync	57		
Data Enable	58		
CLOCK	12		

Note :1. The LCD module uses a 100 Ohm[Ω] resistor between positive and negative lines of each receiver
input.

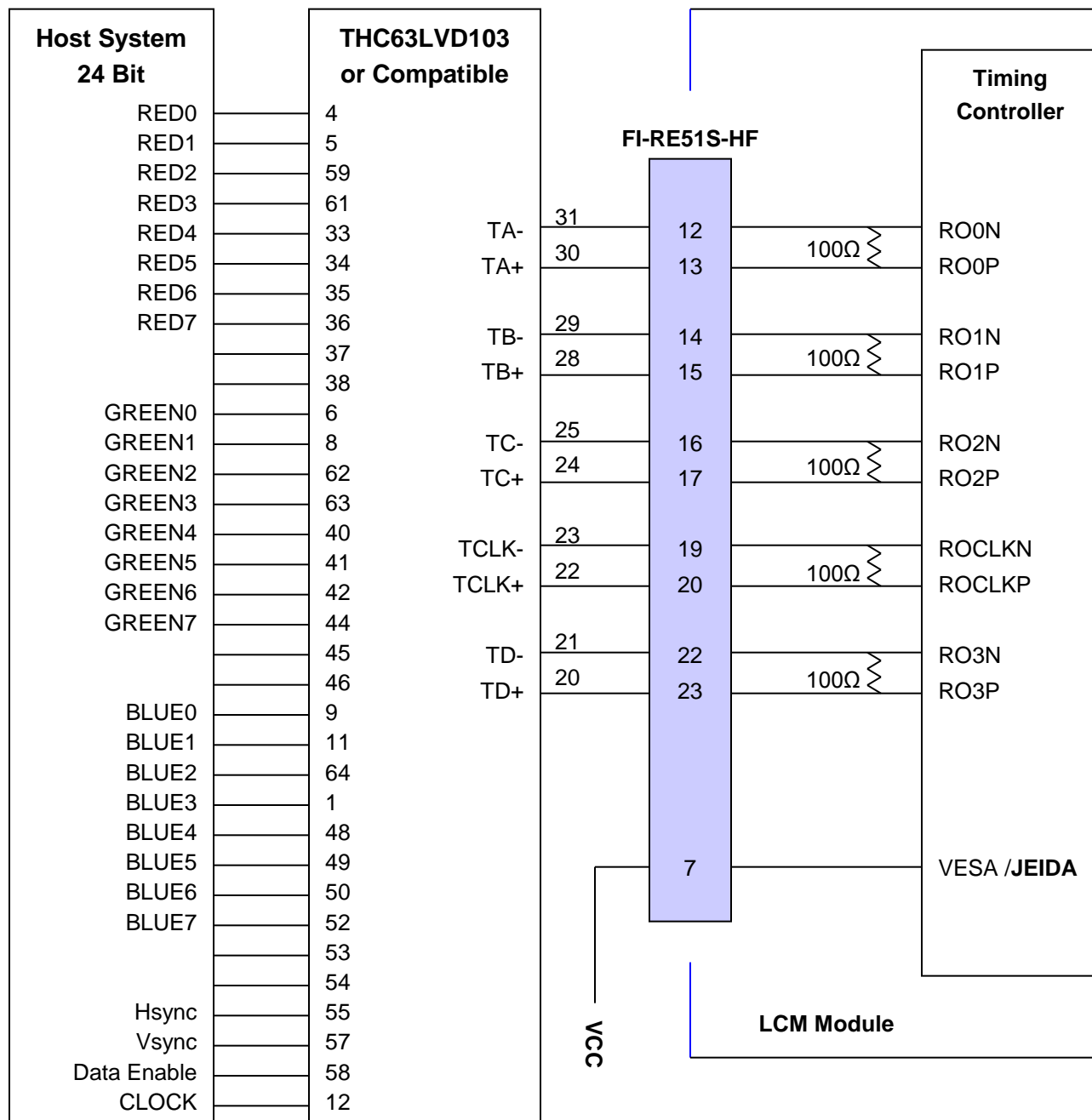   2. Refer to LVDS Transmitter Data Sheet for detail descriptions. (THC63LVD103 or Compatible)
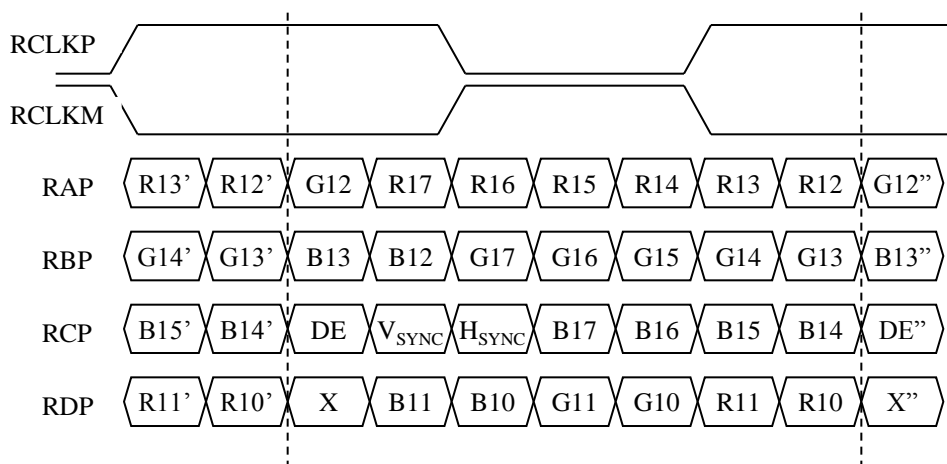
    3. '7' means MSB and '0' means LSB at R,G,B pixel data.

APPENDIX- IV
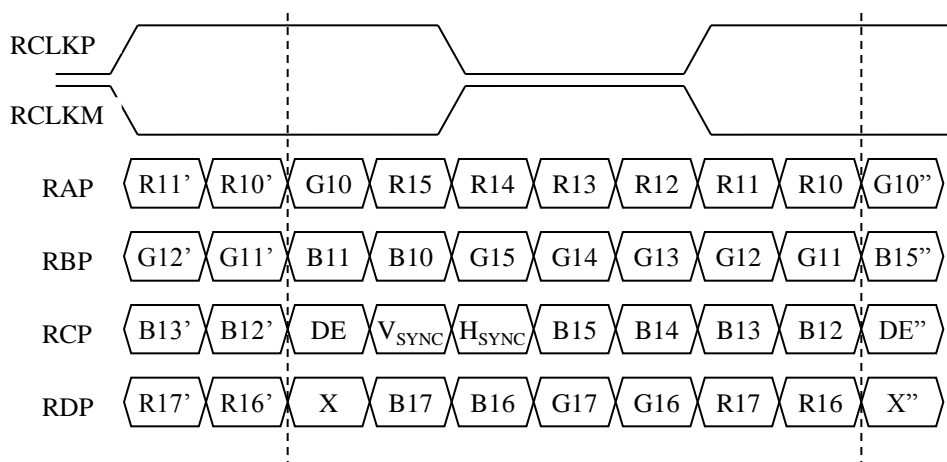
■ LVDS Data-Mapping Information (**8 Bit**)

1) LVDS Select : "**H**" Data-Mapping (**JEIDA format**)

RCLKP									
RCLKM									
RAP	R13'	R12'	G12	R17	R16	R15	R14	R13	R12	G12"
RBP	G14'	G13'	B13	B12	G17	G16	G15	G14	G13	B13"
RCP	B15'	B14'	DE	V_{SYNC}	H_{SYNC}	B17	B16	B15	B14	DE"
RDP	R11'	R10'	X	B11	B10	G11	G10	R11	R10	X"

2) LVDS Select : "**L**" Data-Mapping (**VESA format**)

RCLKP									
RCLKM									
RAP	R11'	R10'	G10	R15	R14	R13	R12	R11	R10	G10"
RBP	G12'	G11'	B11	B10	G15	G14	G13	G12	G11	B15"
RCP	B13'	B12'	DE	V_{SYNC}	H_{SYNC}	B15	B14	B13	B12	DE"
RDP	R17'	R16'	X	B17	B16	G17	G16	R17	R16	X"

Product Specification

APPENDIX- V

■ **Option Pin** Circuit Block Diagram

1) Circuit Block Diagram of **LVDS Format** Selection pin

Product Specification
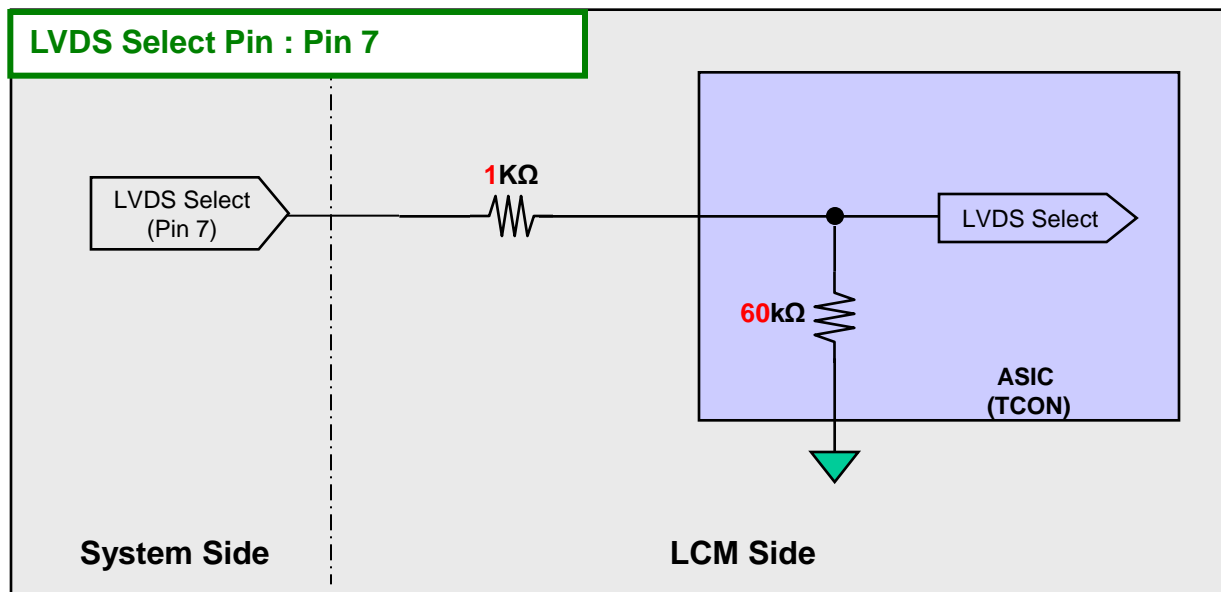
APPENDIX-Ⅷ

■ The reference method of BL dimming

It is recommended to use synchronous V-sync frequency to prevent waterfall
(Vsync * 2 =P-Dim Frequency)

Product Specification

APPENDIX-IX

0.31+0.03/-0.02

Adhesive Area

(Adhesive)
4.5+0.8/-0.4

55±1.0

Conductor Pad
Bottom Side

Silicone Tape Area

Adhesive Area

Adhesive - left

Adhesive - right

0.3 mm Max

(Stiffener)
16.0+0.8/-0.4

(Adhesive)
4.5+0.8/-0.4

0.31+0.03/-0.02

< Pad Detail– 50Pin >

◆ CTQ
25.5 +0.06/-0.035

◆ CTQ
0.5 +0.07/-0.045

◆ CTQ
0.5±0.05

0.3+0.04/-0.02

3+0.5/-0.35

24.5±0.05
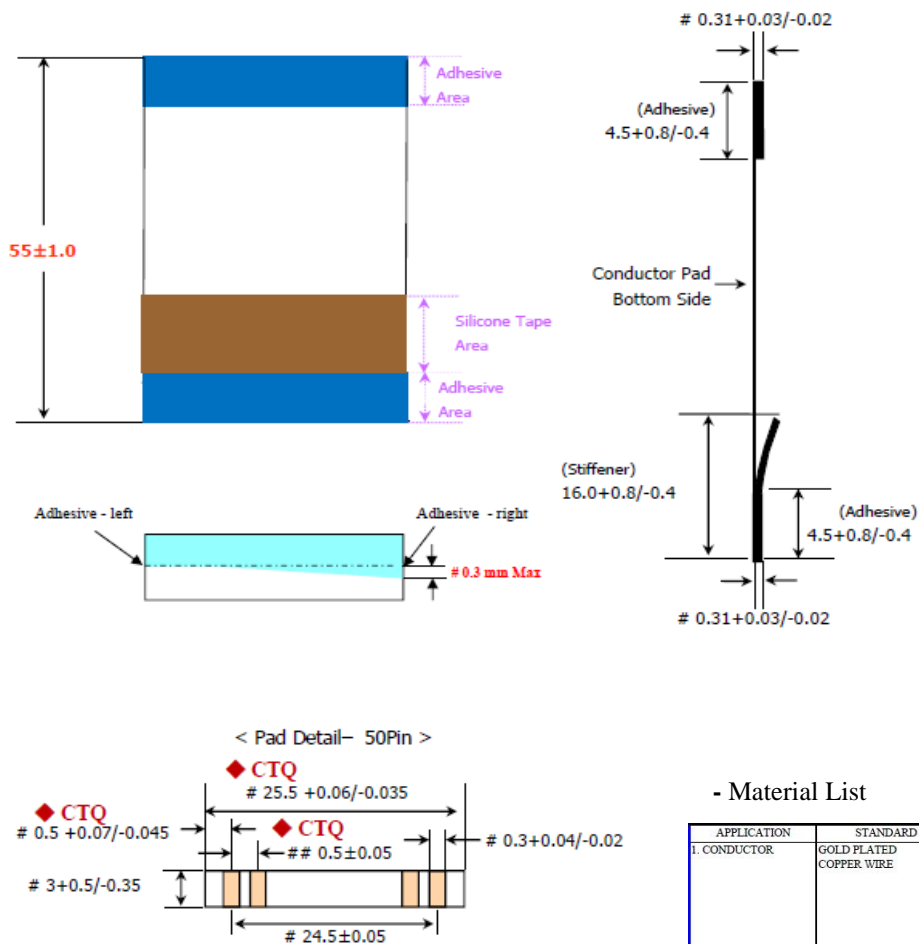
- Material List

APPLICATION	STANDARD	MATERIAL	REFERENCE
1. CONDUCTOR	GOLD PLATED COPPER WIRE	1. 99.99% COPPER	1. Tolerance
		2. GOLD PLATED	- THICKNESS: ±0.01
			- WIDTH: +0.04 -0.02
			2. ELOGATION(%) :
			10 MORE THAN
			3. TENSION :
			(KGF) 0.2 MORE THAN
			4. GOLD THICKNESS : 0.05 μm MIN
			*MAKER : TAIHAN ELECTRIC plating process : J MICRON/SUNEUN
2. INSULATION	POLYESTER FILM (PET/PET)	1. POLYESTER BASE FILM : 0.025 mm	UL VW-1 FLAME Width : 120mm
		2. POLYESTER HOTMELT ADHESIVE : 0.035 mm	Length : 500M UNIT : ROLL
		TOTAL THICKNESS 0.060 mm	* MAKER : SHINCHANG HOTMELT/ COSMOAMT
3. SUPPORTING TAPE	POLYESTER FILM	1. POLYESTER BASE FILM : 0.188 mm	Width : 20.5mm
		2. POLYESTER HOTMELT ADHESIVE : 0.027 mm	Length : 250M Unit : ROLL
		TOTAL THICKNESS : 0.215 mm	*MAKER : SUNGSHIN Trading/ COSMOAMT
4. SILICON TAPE (BROWN)		TOTAL THICKNESS : 0.065 mm	*MAKER : DAEHYUN ST

◈ Note
- Pad : GOLD Plating
- # ≥ Cpk 1.0
- ## ≥ Cpk 1.33
- Stiffener color : Sky Blue
- H-F
- Dimensions unit : mm