SPECIFICATION
FOR
APPROVAL

( ) **Preliminary Specification**

(●) **Final Specification**

Title	55.0” QWUXGA TFT LCD

BUYER	HKC
SET MODEL	

SUPPLIER	LG Display Co., Ltd.
*MODEL	LC550EGY
SUFFIX	SHM1 (RoHS Verified)

APPROVED BY	SIGNATURE / DATE
/	
/	
/	

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

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K.Y. Chong / Team Leader	
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H.G. Kang/ Engineer	

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

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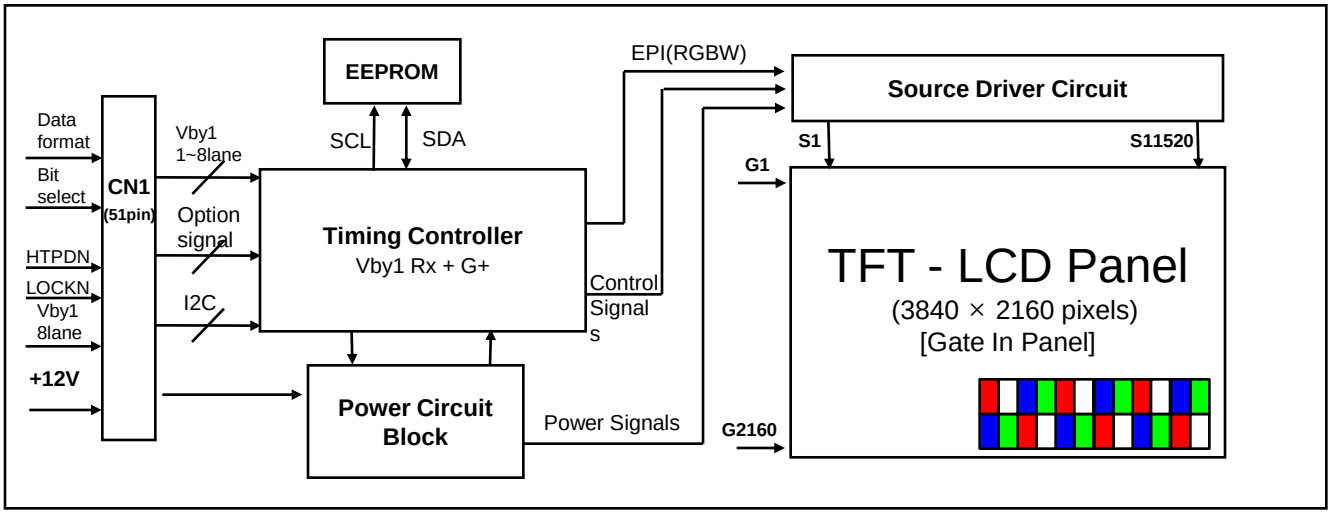
RECORD OF REVISIONS

Revision No.	Revision Date	Page	Description
0.1	May 1, 2014	-	Preliminary Specification (First Draft)
0.2	Jun. 9, 2014	19	Updated the drawing of control board assembly
1.0	Jun. 27, 2014	-	Final CAS release

1. General Description

The LC550EGY 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 QWUXGA resolution (2160 vertical by 3840 horizontal).
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 10-bit gray scale signal for each dot. Therefore, it can present a palette of more than 1.07Bilion colors.
It has been designed to apply the 10-bit 8 Lane V by One interface.
It is intended to support LCD TV, PCTV 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(1387.8mm) diagonal
Outline Dimension	1225.2 (H) x 696.7 (V) x 1.4 (D) mm(Typ.)
Pixel Pitch	0.420 mm x 0.315 mm
Resolution	3840 horiz. by 2160 vert.
Color Depth	10bit(D), 1.07Billon colors
Drive IC Data Interface	Source D-IC : 8-bit EPI, gamma reference voltage, and control signals Gate D-IC : Gate In Panel
Viewing Angle (CR>10)	Viewing angle free (R/L 178 (Min.), U/D 178 (Min.))
Weight	2.6 Kg (Typ.)
Display Mode	Transmissive mode, Normally black
Surface Treatment (Top)	Hard coating(3H), Anti-glare treatment of the front polarizer (Haze 1%(Typ.))

2. Absolute Maximum Ratings

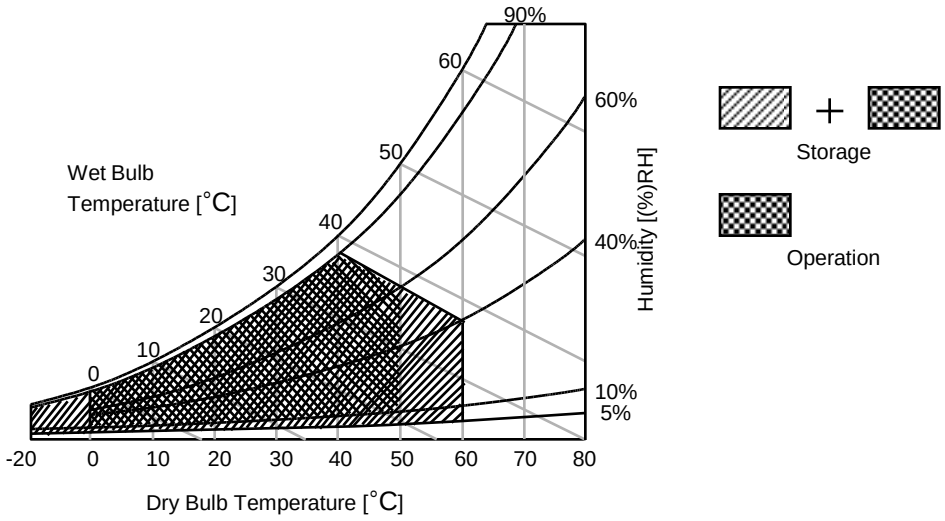
The following items are maximum values which, if exceeded, may cause faulty operation or permanent damage to the LCD module.

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

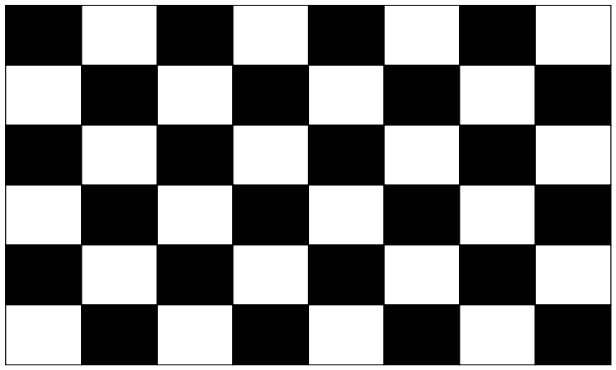
3-1. Electrical Characteristics

Table 2. ELECTRICAL CHARACTERISTICS

Parameter		Symbol	Value			Unit	Note
			Min	Typ	Max		
Circuit :							
Power Input Voltage		VLCD	10.8	12.0	13.2	VDC	
Power Input Current		ILCD	-	1185	1541	mA	1
			-	1781	2315	mA	2
T-CON Option Selection Voltage	Input High Voltage	V_{IH}	2.7	-	3.6	VDC	
	Input Low Voltage	V_{IL}	0	-	0.7	VDC	
Power Consumption		PLCD	-	14.22	18.50	Watt	1
Rush current		IRUSH	-	-	10	A	3

Note 1. The specified current and power consumption are under the V_{LCD}=12.0V, Ta=25 ± 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 ±5% of typical voltage

White : 1023 Gray
Black : 0 Gray



Mosaic Pattern(8 x 6)

3-2. Interface Connections

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

3-2-1. LCD Module

- LCD Connector(CN1): FI-RXE51S-HF(manufactured by JAE) or GT05S-51S-H38(manufactured by LSM) or IS050-C51B-C39-C (manufactured by UJU)
- Mating Connector : FI-R51HL(manufactured by JAE) or compatible

Table 3. MODULE CONNECTOR(CN1) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	VLCD	Power Supply +12.0V	27	GND	Ground
2	VLCD	Power Supply +12.0V	28	Rx0n	V-by-One HS Data Lane 0
3	VLCD	Power Supply +12.0V	29	Rx0p	V-by-One HS Data Lane 0
4	VLCD	Power Supply +12.0V	30	GND	Ground
5	VLCD	Power Supply +12.0V	31	Rx1n	V-by-One HS Data Lane 1
6	VLCD	Power Supply +12.0V	32	Rx1p	V-by-One HS Data Lane 1
7	VLCD	Power Supply +12.0V	33	GND	Ground
8	VLCD	Power Supply +12.0V	34	Rx2n	V-by-One HS Data Lane 2
9	NC	NO CONNECTION	35	Rx2p	V-by-One HS Data Lane 2
10	GND	Ground	36	GND	Ground
11	GND	Ground	37	Rx3n	V-by-One HS Data Lane 3
12	GND	Ground	38	Rx3p	V-by-One HS Data Lane 3
13	GND	Ground	39	GND	Ground
14	PWM TIN	External VBR (From System)	40	Rx4n	V-by-One HS Data Lane 4
15	PWM TOUT	External VBR (For System)	41	Rx4p	V-by-One HS Data Lane 4
16	Gplus Mode	'L' or 'NC' :Low Power, 'H' : High Luminance	42	GND	Ground
17	Gplus EN	'L': RGB Mode, 'H' or NC : Gplus Mode	43	Rx5n	V-by-One HS Data Lane 5
18	SDA	SDA (For I2C)	44	Rx5p	V-by-One HS Data Lane 5
19	SCL	SCL (For I2C)	45	GND	Ground
20	NC	NO CONNECTION (Note 3)	46	Rx6n	V-by-One HS Data Lane 6
21	Bit SEL	'H' or NC= 10bit(D) , 'L' = 8bit	47	Rx6p	V-by-One HS Data Lane 6
22	Data format	'L' : Non division, 'H' 2 division	48	GND	Ground
23	AGP or NSB	'H' or NC : AGP 'L' : NSB (No signal Black)	49	Rx7n	V-by-One HS Data Lane 7
24	GND	Ground	50	Rx7p	V-by-One HS Data Lane 7
25	HTPDN	Hot plug detect	51	GND	Ground
26	LOCKN	Lock detect	-	-	-

Note
1. All GND (ground) pins should be connected together to the LCD module's metal frame.
2. All Input levels of V-by-One signals are based on the V-by-One-HS Standard Version 1.4
3. #20 NC(No Connection) : These pins are used only for LGD (Do not connect)
4. About specific pin(#22), Please see the Appendix Ⅷ.
5. Specific pin No. #23 is used for "No signal detection" of system signal interface.
   It should be GND for NSB (No Signal Black) while the system interface signal is not.
   If this pin is "H", LCD Module displays AGP (Auto Generation Pattern).

3-3. Signal Timing Specifications

Table 4 shows the signal timing required at the input of the Vx1 transmitter. All of the interface signal timings should be satisfied with the following specification for normal operation.

Table 4. TIMING TABLE (DE Only Mode)

ITEM		Symbol	Min	Typ	Max	Unit	Note
Horizontal	Display Period	t_{HV}	480	480	480	t_{CLK}	3840/8
	Blank	t_{HB}	50	70	120	t_{CLK}	1
	Total	t_{HP}	530	550	600	t_{CLK}	
Vertical	Display Period	t_{VV}	2160	2160	2160	Lines	
	Blank	t_{VB}	40	90	600	Lines	1
	Total	t_{VP}	2200	2250	2760	Lines	

ITEM		Symbol	Min	Typ	Max	Unit	Note
Frequency	DCLK	f_{CLK}	60	74.25	78.00	MHz	594/8
	Horizontal	f_H	121.8	135	140	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

※ Timing should be set based on clock frequency.

3-4. V by One input signal Characteristics

3-4-1. V by One Input Signal Timing Diagram

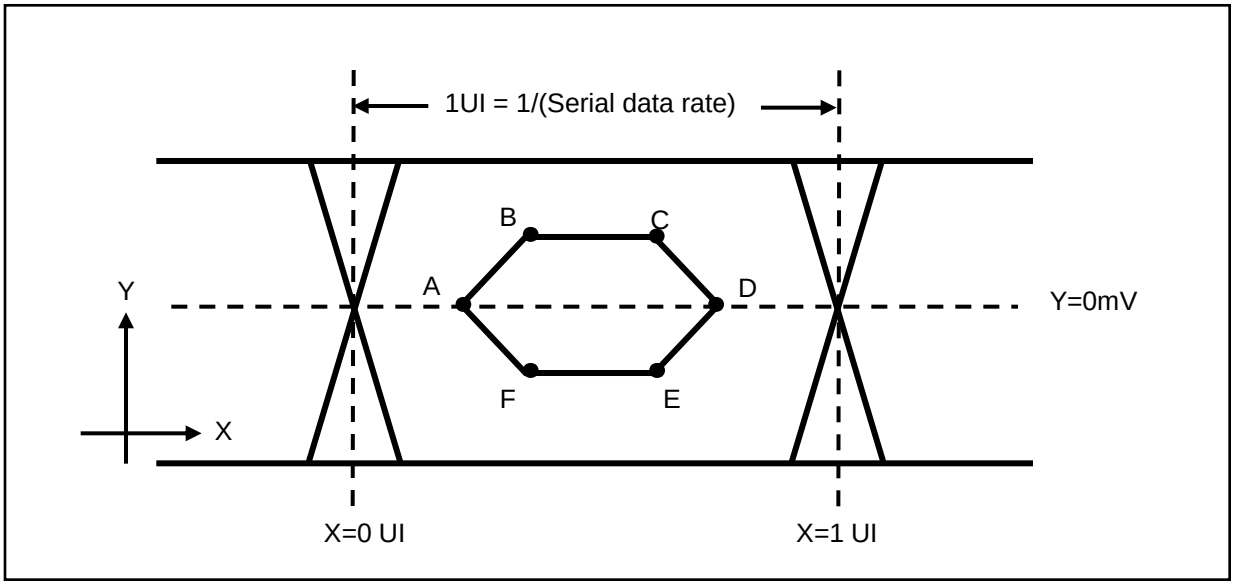


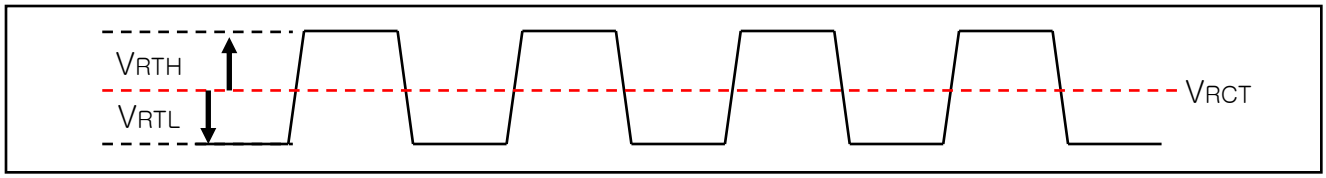
Table5. Eye Mask Specification

	X[UI]	Note	Y[mV]	Note
A	0.25 (max)	2	0	-
B	0.3 (max)	2	50	3
C	0.7(min)	3	50	3
D	0.75(min)	3	0	-
E	0.7(min)	3	l -50 l	3
F	0.3(max)	2	l -50 l	3

notes 1. All Input levels of V by One signals are based on the V by One HS Standard Ver. 1.4
2. This is allowable maximum value.
3. This is allowable minimum value.
4. The eye diagram is measured by the oscilloscope and receiver CDR characteristic must be emulated.
   - PLL bandwidth : 20 Mhz
   - Damping Factor : 1.5

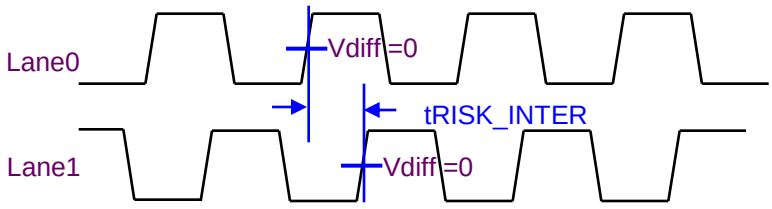
3-4-2. V by One Input Signal Characteristics

1) DC Specification

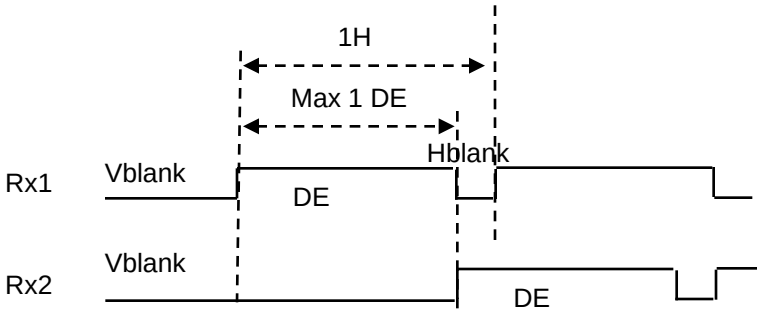


Description	Symbol	Min	Max	Unit
CML Differential input High threshold	VRTH	-	50	mV
CML Differential input Low threshold	VRTL	-50	-	mV
CML common mode Bias Voltage	VRCT	0.6	0.8	V

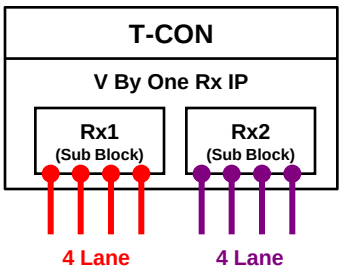
2) AC Specification



<Inter-pair Skew between two Lanes>



<Inter-pair Skew between two sub Blocks>



<TCON – VbyOne Brief Diagram >

Description	Symbol	Min	Max	Unit	notes
Allowable inter-pair skew between lanes	tRISK_INTER	-	5	UI	1,3
Allowable iner-pair skew between sub-blocks	tRISK_BLOCK	-	1	DE	1,4

Notes 1.1UI = 1/serial data rate

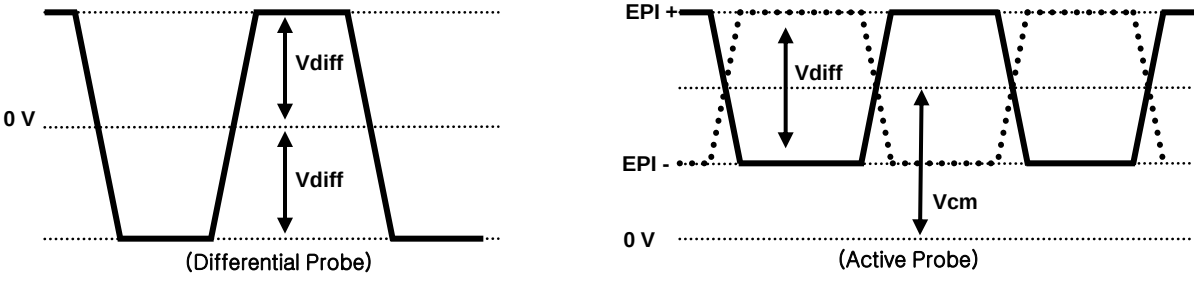
2. it is the time difference between the true and complementary single-ended signals.
3. it is the time difference of the differential voltage between any two lanes in one sub block.
4. it is the time difference of the differential voltage between any two blocks in one IP.

3-5. Intra interface Signal Specification

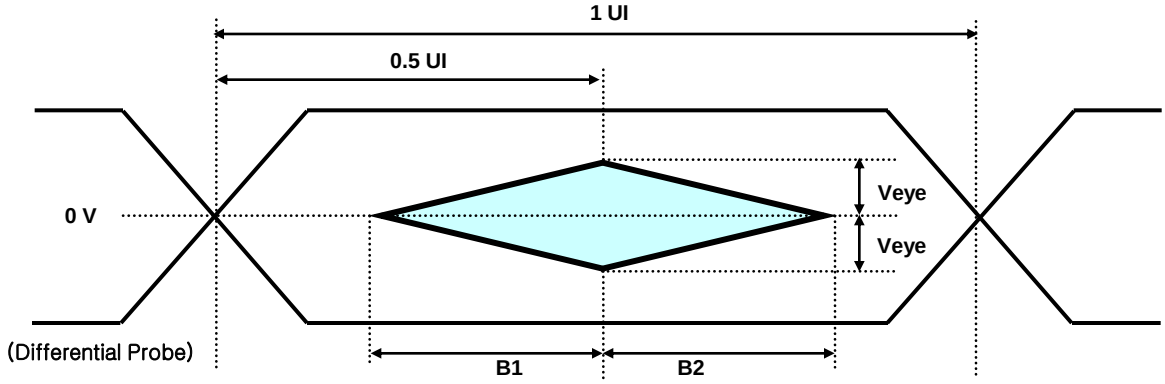
3-5-1. EPI Signal Specification

Table 6. ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit	notes
Logic & EPI Power Voltage	VCC	-	1.62	1.8	1.98	VDC	
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

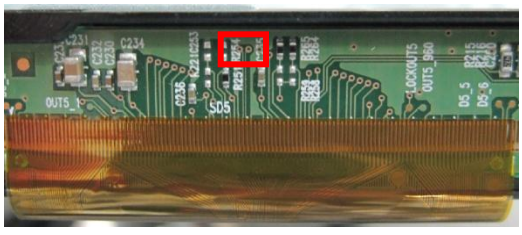


FIG. 3 Measure point

3-6. Color Data Reference

The brightness of each primary color (red, green, blue) is based on the 10bit or 8bit gray scale data input for the color. The higher binary input, the brighter the color. Table 7 provides a reference for color versus data input.

Table 7. COLOR DATA REFERENCE

Packer input & Unpacker output		30bpp RGB (10bit)	24bpp RGB (8bit)
Byte0	D[0]	R[2]	R[0]
	D[1]	R[3]	R[1]
	D[2]	R[4]	R[2]
	D[3]	R[5]	R[3]
	D[4]	R[6]	R[4]
	D[5]	R[7]	R[5]
	D[6]	R[8]	R[6]
	D[7]	R[9]	R[7]
Byte1	D[8]	G[2]	G[0]
	D[9]	G[3]	G[1]
	D[10]	G[4]	G[2]
	D[11]	G[5]	G[3]
	D[12]	G[6]	G[4]
	D[13]	G[7]	G[5]
	D[14]	G[8]	G[6]
	D[15]	G[9]	G[7]
Byte2	D[16]	B[2]	B[0]
	D[17]	B[3]	B[1]
	D[18]	B[4]	B[2]
	D[19]	B[5]	B[3]
	D[20]	B[6]	B[4]
	D[21]	B[7]	B[5]
	D[22]	B[8]	B[6]
	D[23]	B[9]	B[7]
Byte3	D[24]	Don't care	
	D[25]	Don't care	
	D[26]	B[0]	
	D[27]	B[1]	
	D[28]	G[0]	
	D[29]	G[1]	
	D[30]	R[0]	
	D[31]	R[1]	

3-7. Power Sequence

3-7-1. LCD Driving circuit

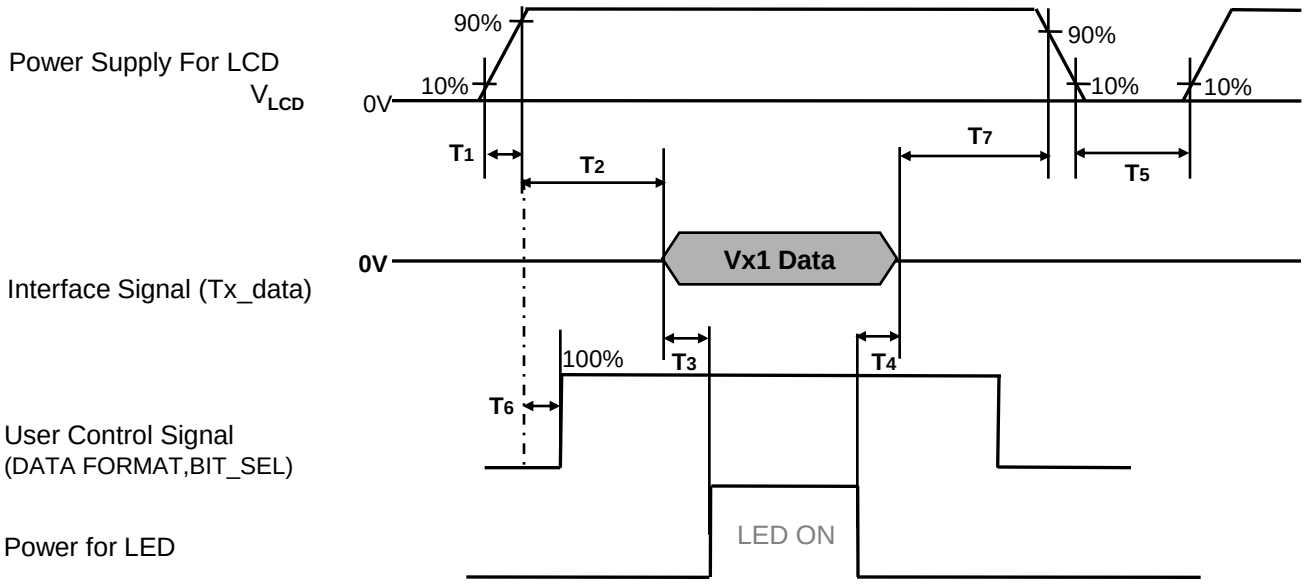


Table 8. POWER SEQUENCE

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 V by One 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±2°C. The values are specified at distance 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.

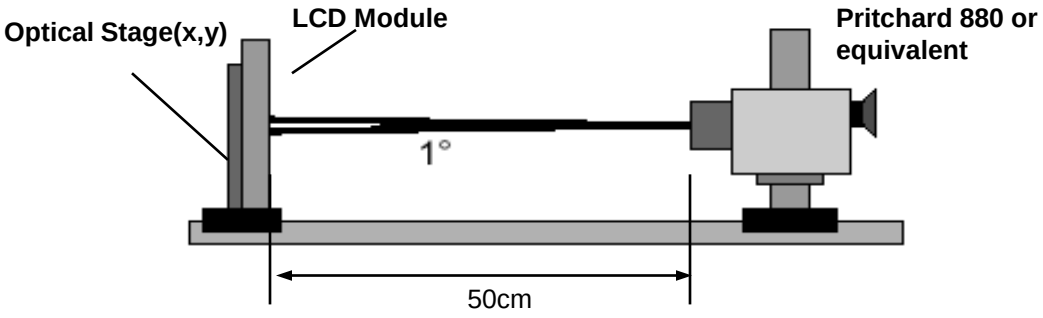


FIG. 1 Optical Characteristic Measurement Equipment and Method

Ta= 25±2°C, V_{LCD}=12.0V, fV=60Hz, Dclk=74.25MHz,
Light source : D65 standard
User Option : #16pin "L"(Low Power Mode)

Table 9. OPTICAL CHARACTERISTICS

Parameter			Symbol	Value			Unit	Note
				Min	Typ	Max		
Contrast Ratio			CR	800	1200	-		1
Response Time		Variation	G to G σ		6	9	ms	3
		Gray to Gray (BW)	G to G BW		8	12		2
Transmittance			T	7.21	8.01		%	4
Color Coordinates [CIE1931]		RED	Rx	Typ -0.03	0.651	Typ +0.03		
			Ry		0.331			
		GREEN	Gx		0.317			
			Gy		0.600			
		BLUE	Bx		0.151			
			By		0.063			
Viewing Angle	2D (CR>10)	right(ϕ=0°)	θr (x axis)	89	-	-	degree	6
		left (ϕ=180°)	θl (x axis)	89	-	-		
		up (ϕ=90°)	θu (y axis)	89	-	-		
		down (ϕ=270°)	θd (y axis)	89	-	-		
Gray Scale				-	-	-		7

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) and from any gray to black (Decay time, Tf). 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 contrast ratio is valued with operating condition of LGD's standard BLU

3. G to G_{σ} 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.

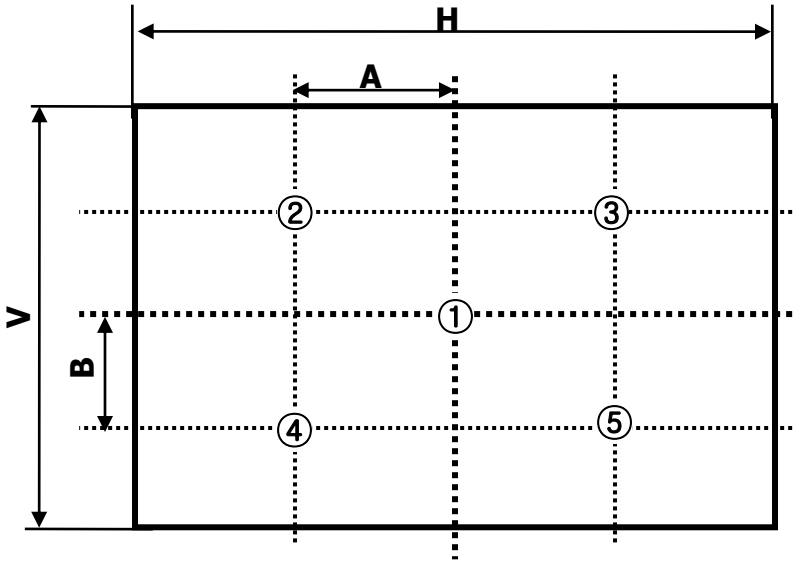
7. Gray scale specification

Gamma Value is approximately 2.2. For more information, see the Table 10.

Table 10. GRAY SCALE SPECIFICATION

Gray Level	Luminance [%] (Typ)
L0	0.083
L63	0.27
L127	1.04
L191	2.49
L255	4.68
L319	7.66
L383	11.5
L447	16.1
L511	21.6
L575	28.1
L639	35.4
L703	43.7
L767	53.0
L831	63.2
L895	74.5
L959	86.7
L1023	100

Measuring point for Contrast Ratio



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

FIG. 2 Points for Contrast Ratio Measure

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

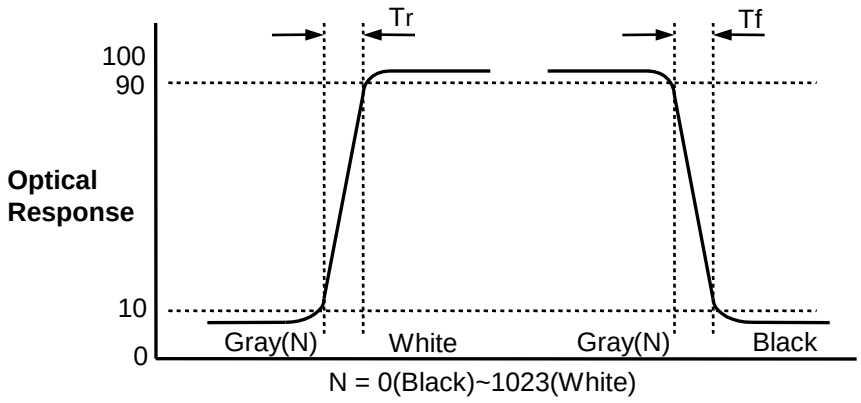


FIG. 3 Response Time

Dimension of viewing angle range

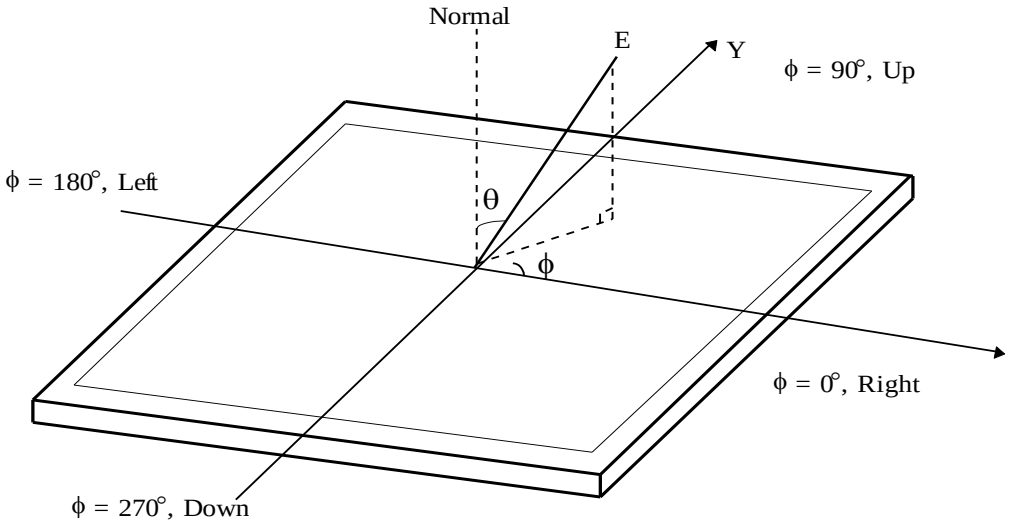


FIG. 4 Viewing Angle

5. Mechanical Characteristics

Table 11 provides general mechanical characteristics.

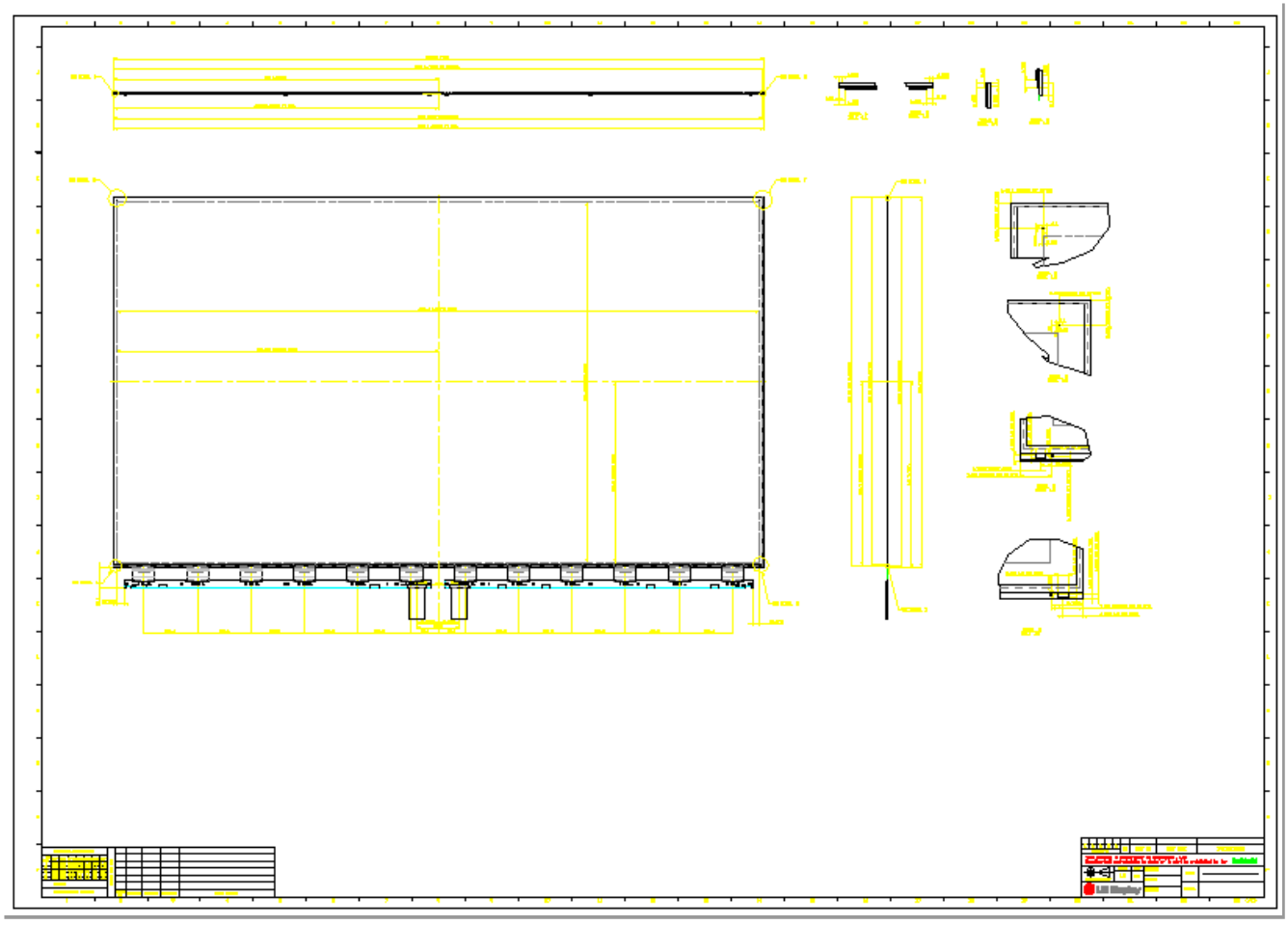
Table 11. MECHANICAL CHARACTERISTICS

Item	Value	
Outline Dimension (Only Glass)	Horizontal	1225.2 mm
	Vertical	696.7 mm
	Depth	1.4 mm
Active Display Area	Horizontal	1209.6 mm
	Vertical	680.4 mm
Weight	2.6Kg (Typ.)	
Surface Treatment	Hard coating(3H), Anti-glare treatment of the front polarizer : Haze 1%(typ.)	

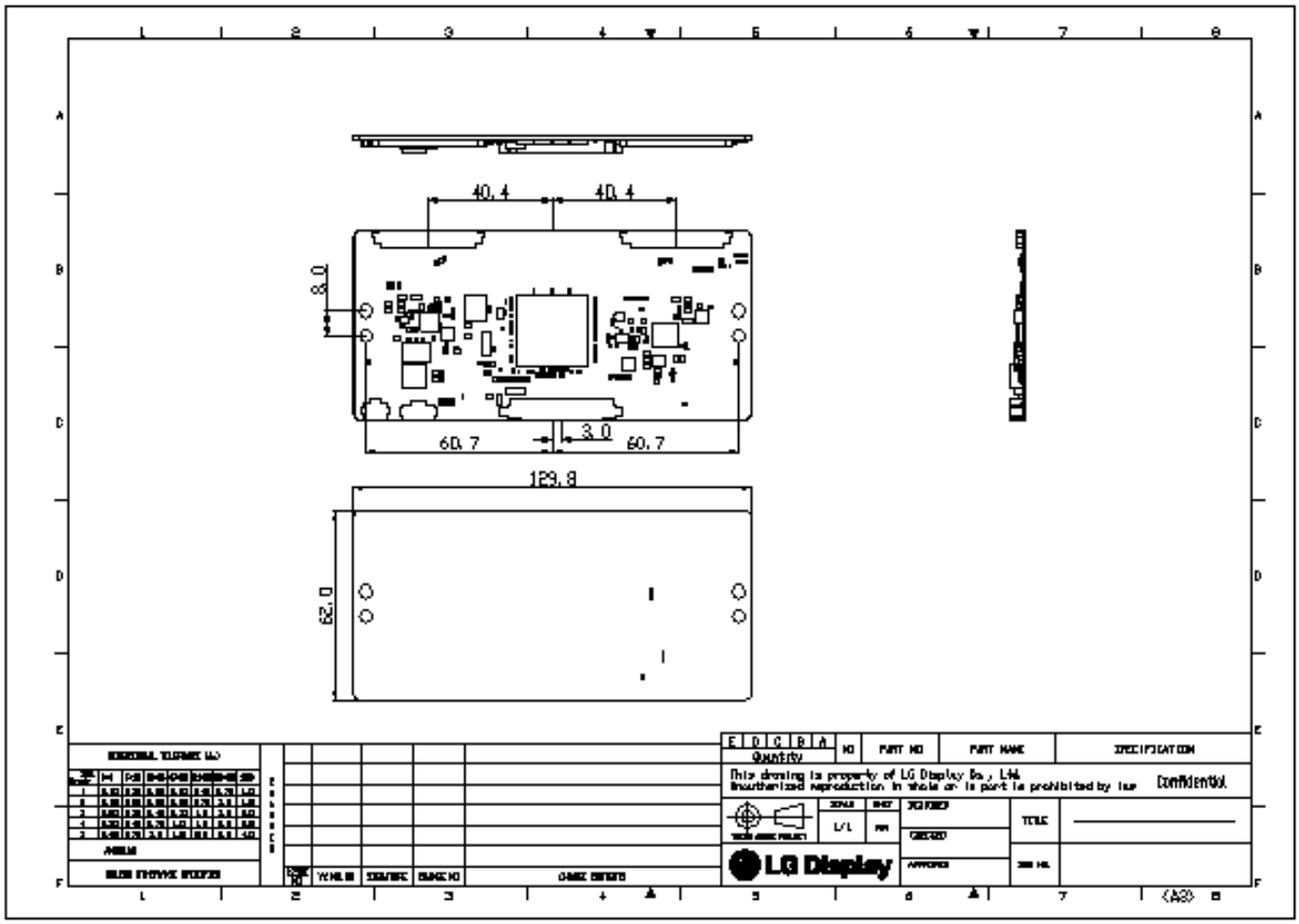
Note : Please refer to a mechanic drawing in terms of tolerance at the next page.

6. Mechanical Dimension

6-1. Board Assembly Dimension



6-2. Control Board Assembly Dimension



7. Reliability

Table 12. 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 : 120 pcs

b) Pallet Size : 1390 mm(W) X 890 mm(D) X 1090 mm(H)

10. Precautions

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

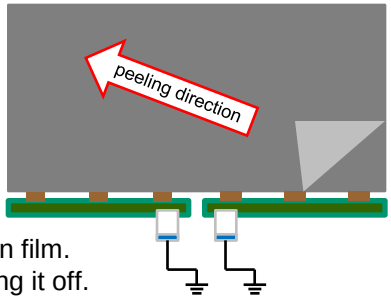
10-1. Handling Precautions

(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.

10-3. Protection Film



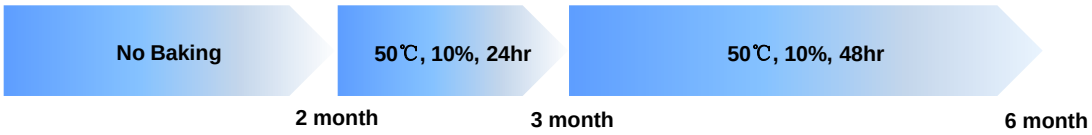
(1) Please keep attaching the protection film before assembly.
(2) Please peel off the protection film slowly.
(3) Please peel off the protection film just like shown in the Fig.1
(4) Ionized air should be blown over during the peeling.
(5) Source PCB should be connected to the ground when peel off the 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



< Fig. 2 >

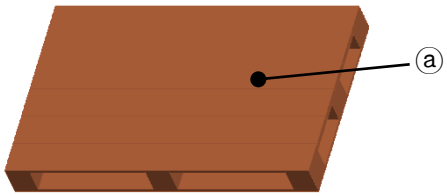
10-5. Packing Precautions

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

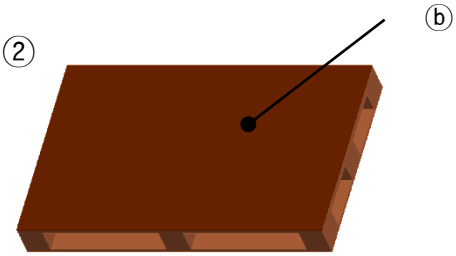
APPENDIX- Ⅰ-1

■ Pallet Ass'y

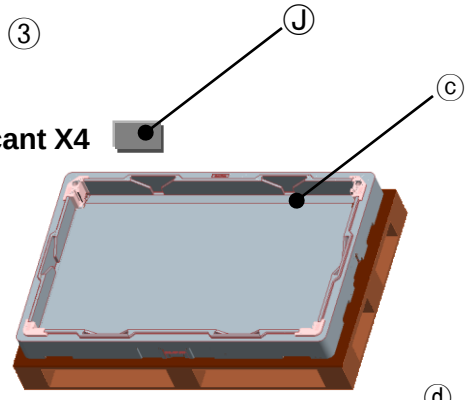
①



②

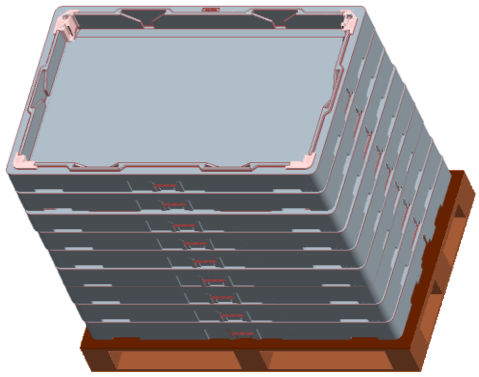


③

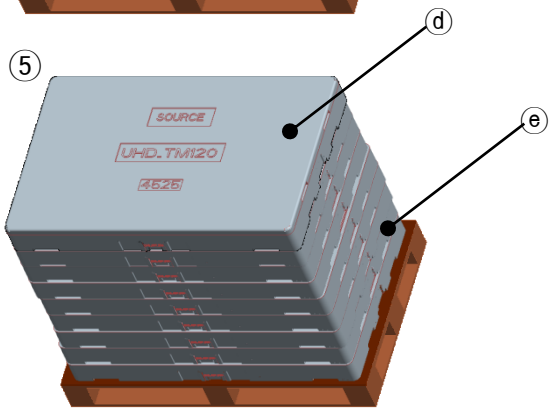


Desiccant X4

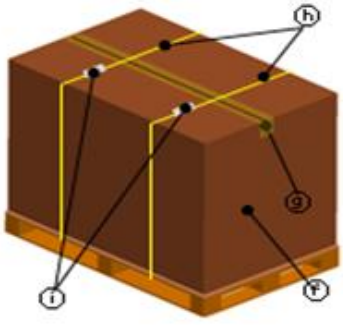
④



⑤



⑥



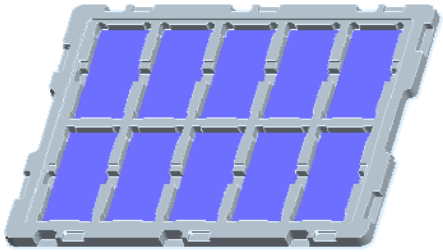
No.	Description	Material
ⓐ	Pallet	Plywood
ⓑ	Carton Plate	Single Wall
ⓒ	PE Sheet	Carbon
ⓓ	Top Packing	EPS
ⓔ	Bottom Packing	EPS
ⓕ	Angle Packing	Single Wall
ⓖ	Tape	OPP
ⓗ	Band	PP
ⓘ	Clip	Steel
Ⓙ	Desiccant	Power dry

APPENDIX- Ⅰ - 2

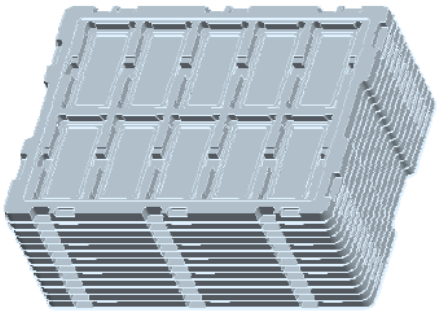
■ Control PCB Packing Ass'y

a) Control PCB Qty / Box : 120 pcs
b) Tray Qty / Box : 13Tray(Upperst Tray Is empty)
c) Tray Size : 453 X 353 X 16
d) Box size : 468 X 355 X 165

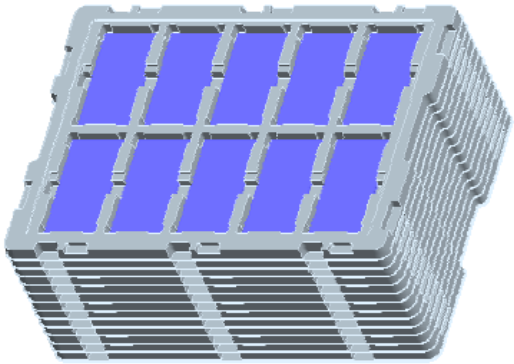
[10pcs/Tray]



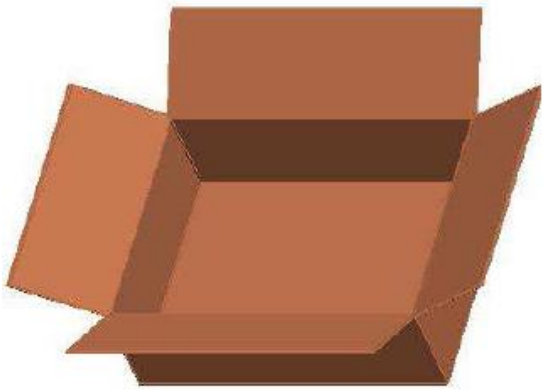
[12Tray+Empty Tray]



[12Tray]

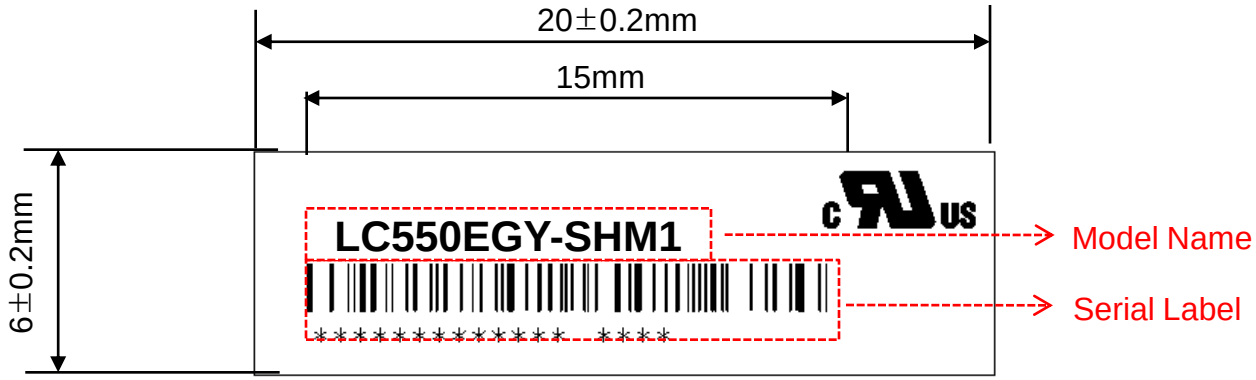


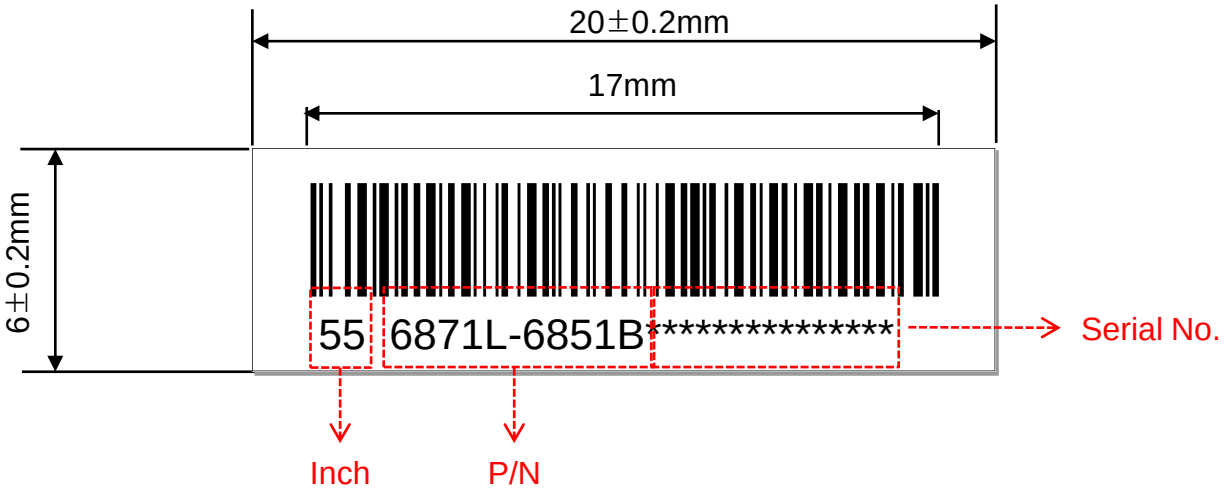
[Inserting into Box]



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

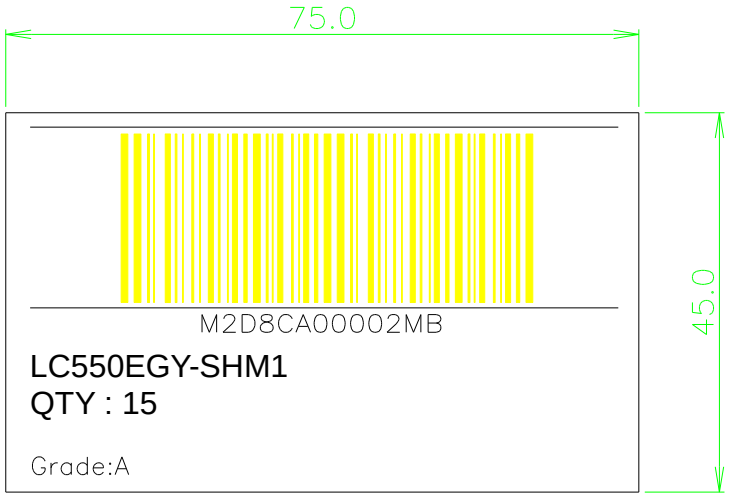
 # APPENDIX-Ⅱ-1


20±0.2mm
15mm
6±0.2mm
LC550EGY-SHM1
Model Name
Serial Label

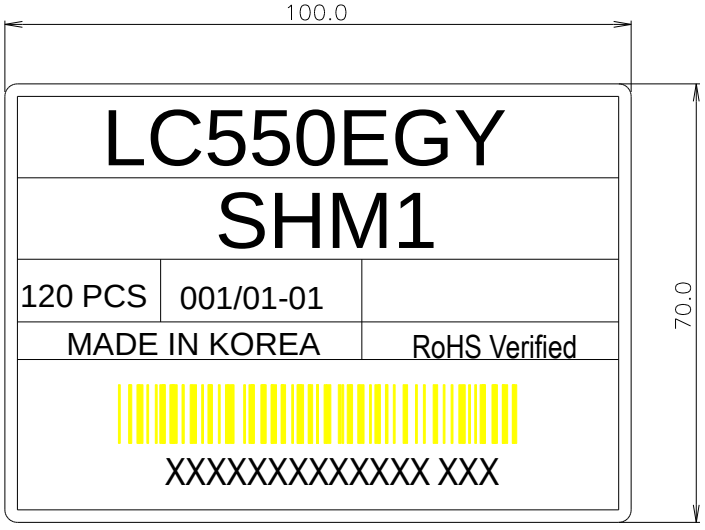

20±0.2mm
17mm
6±0.2mm
55
6871L-6851B
Serial No.
Inch
P/N

 # APPENDIX-Ⅱ-2

■ BOX Label

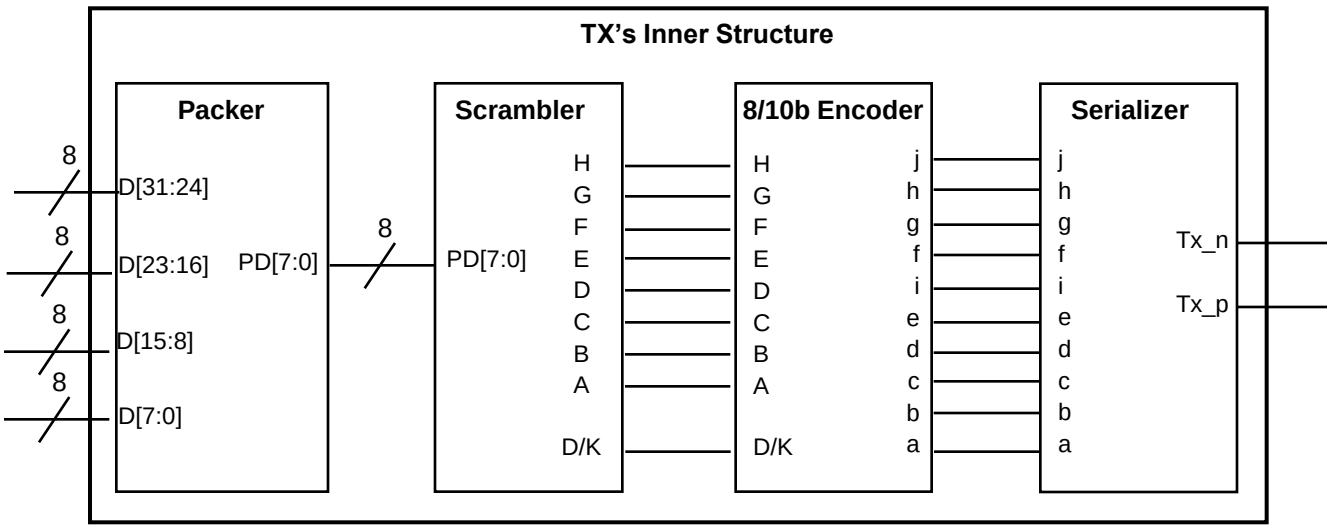


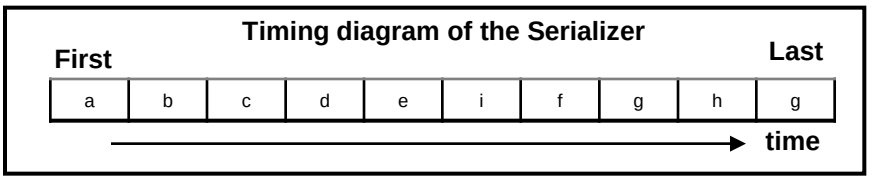
■ Pallet Label

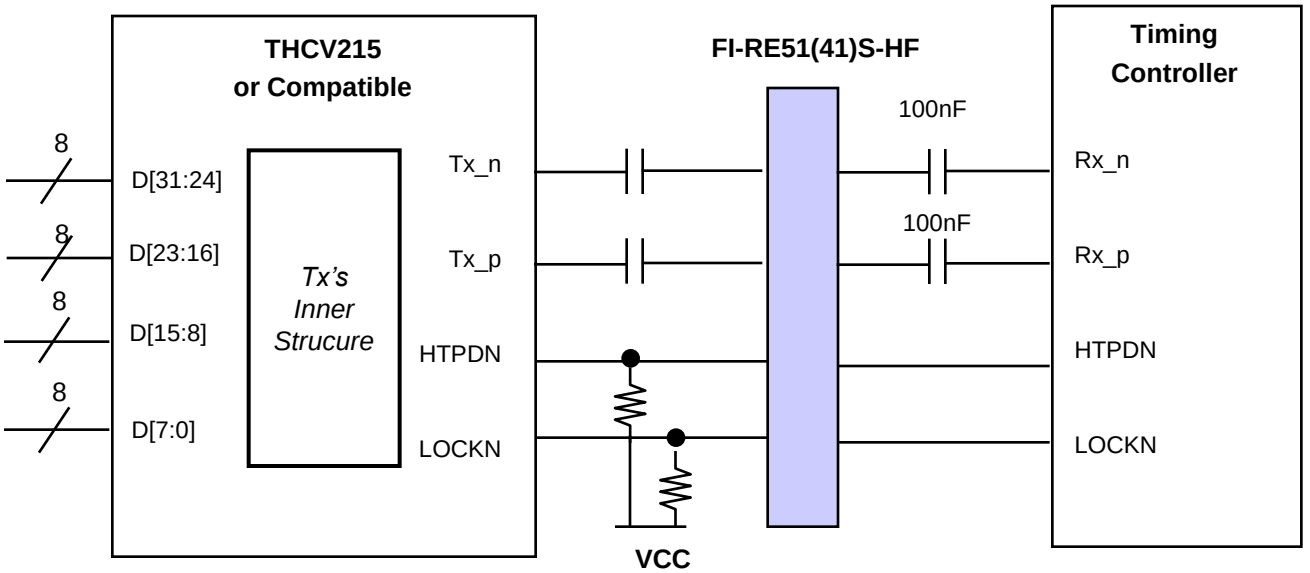


APPENDIX- Ⅲ

■ Required signal assignment for Flat Link (Thine : THCV215) Transmitter





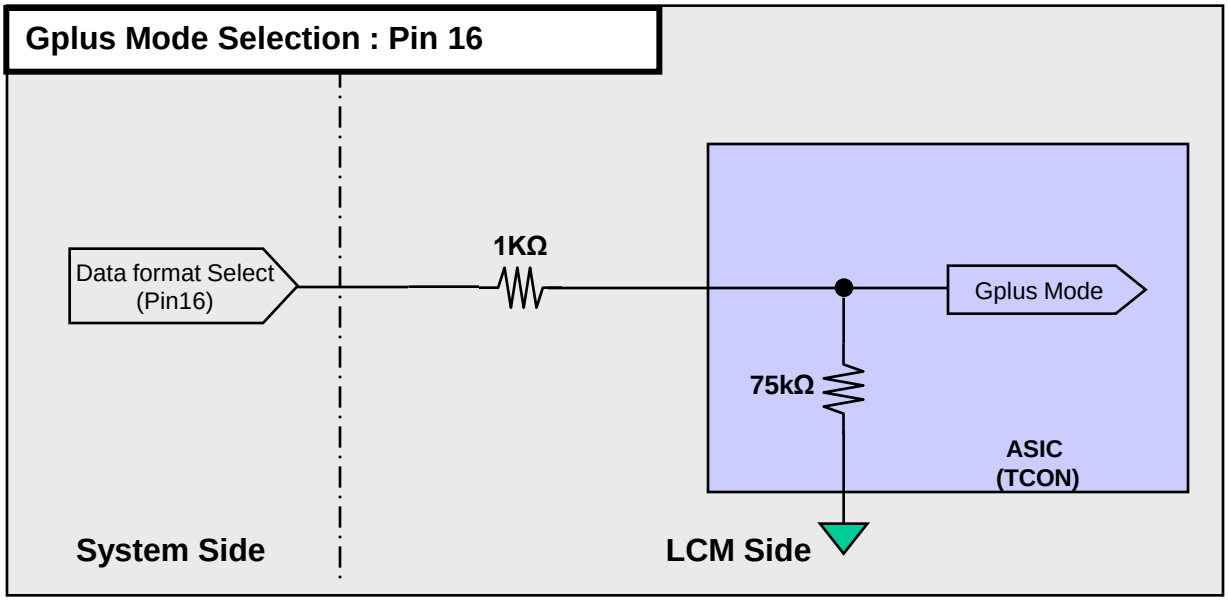


notes: 1. The LCD module uses a 100 nF capacitor on positive and negative lines of each receiver input.
2. Refer to Vx1 Transmitter Data Sheet for detail descriptions. (THCV215 or Compatible)
3. About Module connector pin configuration, Please refer to the Page 7.

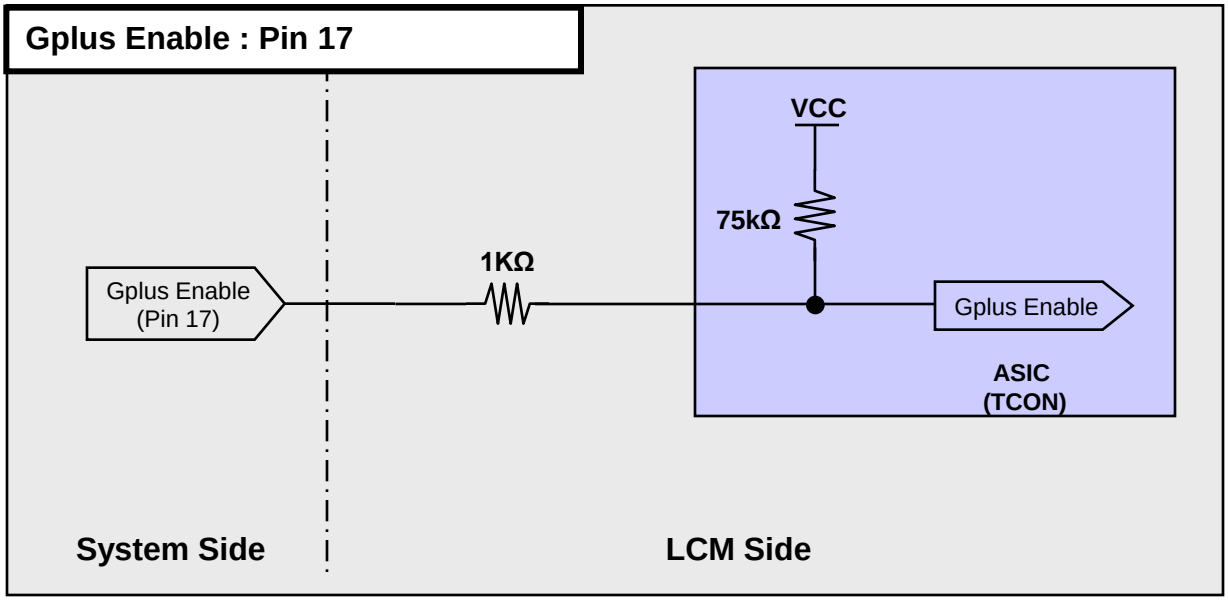
APPENDIX- Ⅳ-1

■ Option Pin Circuit Block Diagram

1) Circuit Block Diagram of Gplus Mode Selection pin



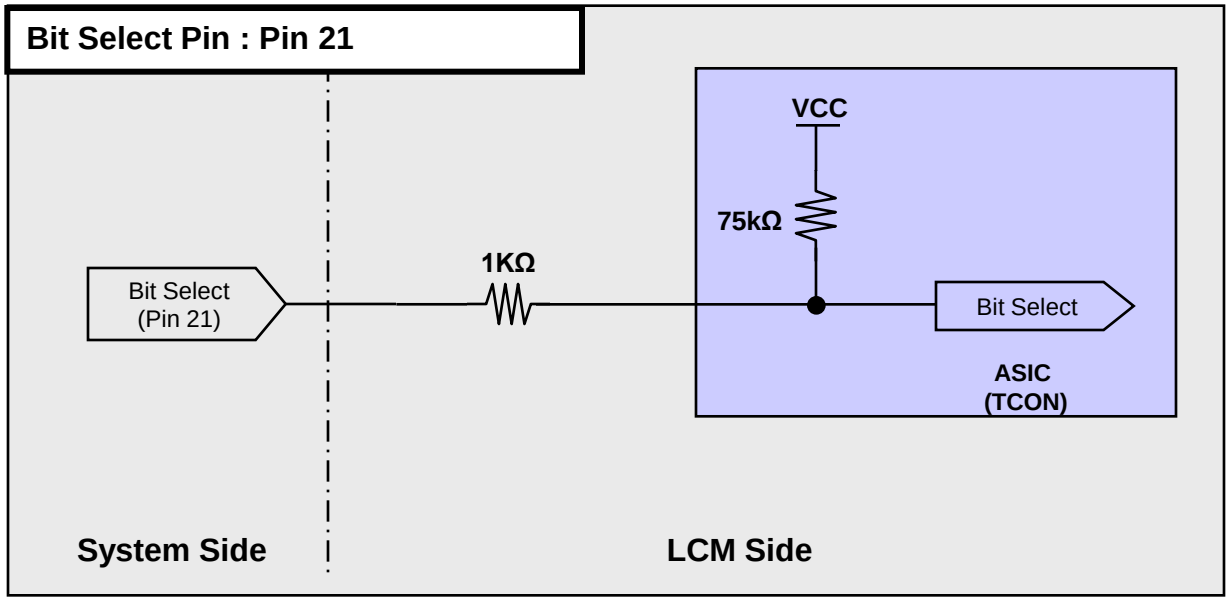
2) Circuit Block Diagram of Gplus Enable pin



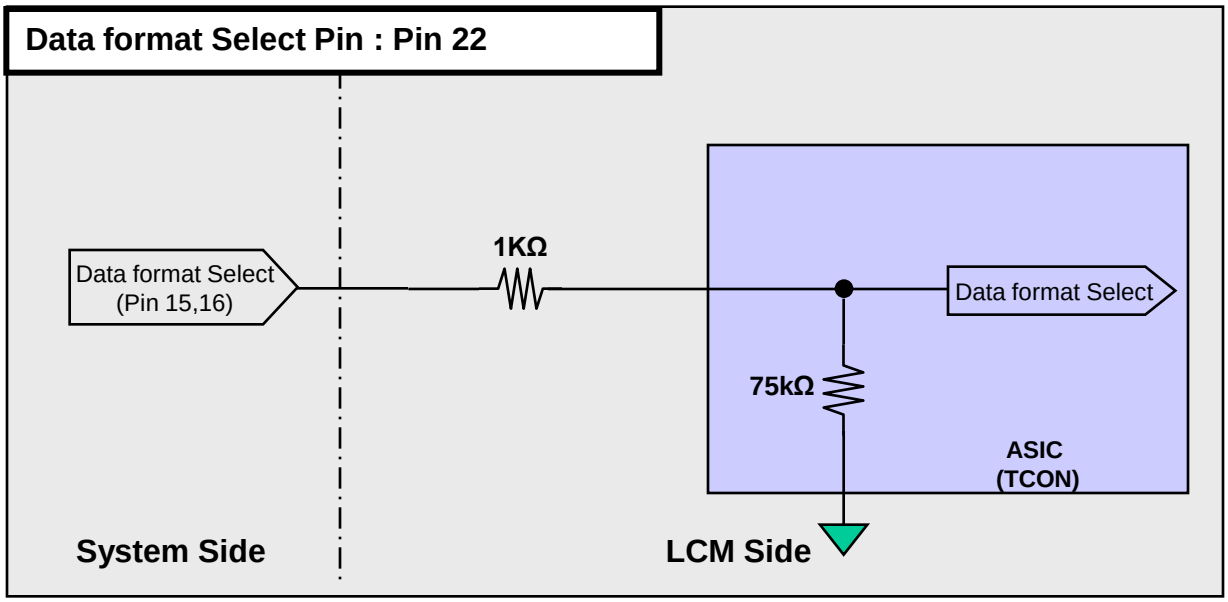
APPENDIX- Ⅳ-2

■ **Option Pin** Circuit Block Diagram

3) Circuit Block Diagram of Bit Selection pin



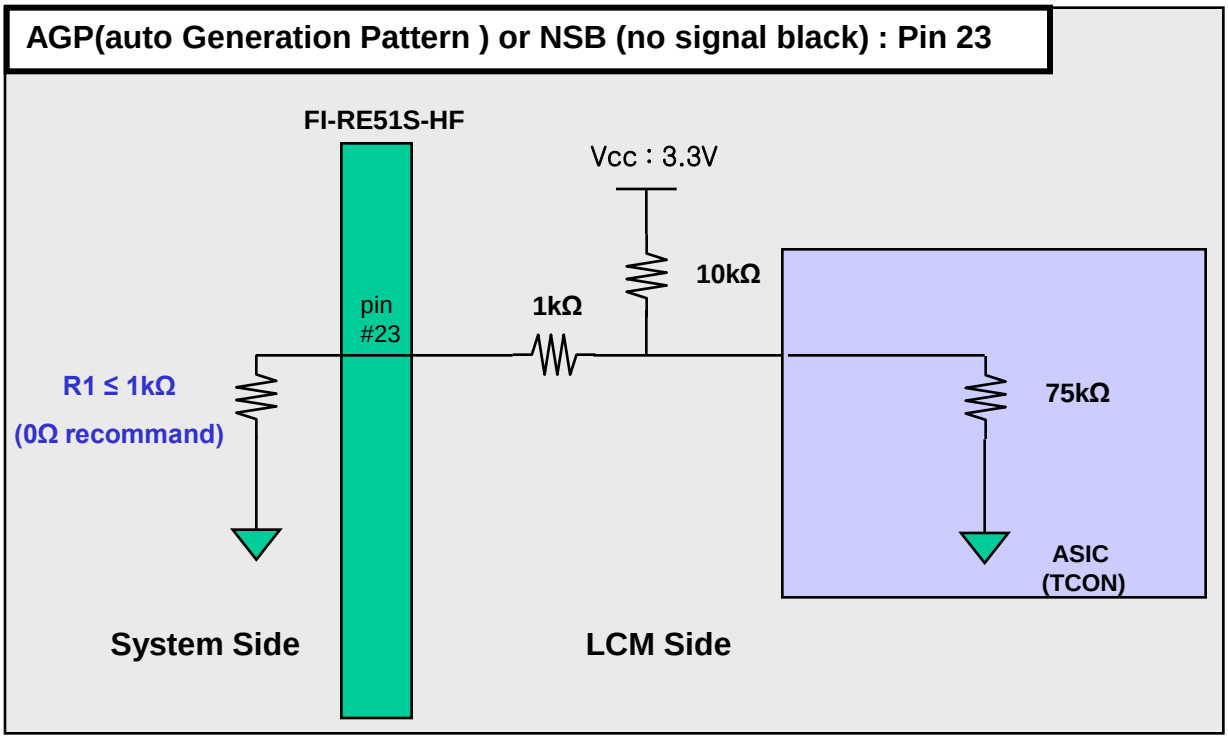
4) Circuit Block Diagram of Data format Selection pin



APPENDIX- Ⅳ-3

■ Option Pin Circuit Block Diagram

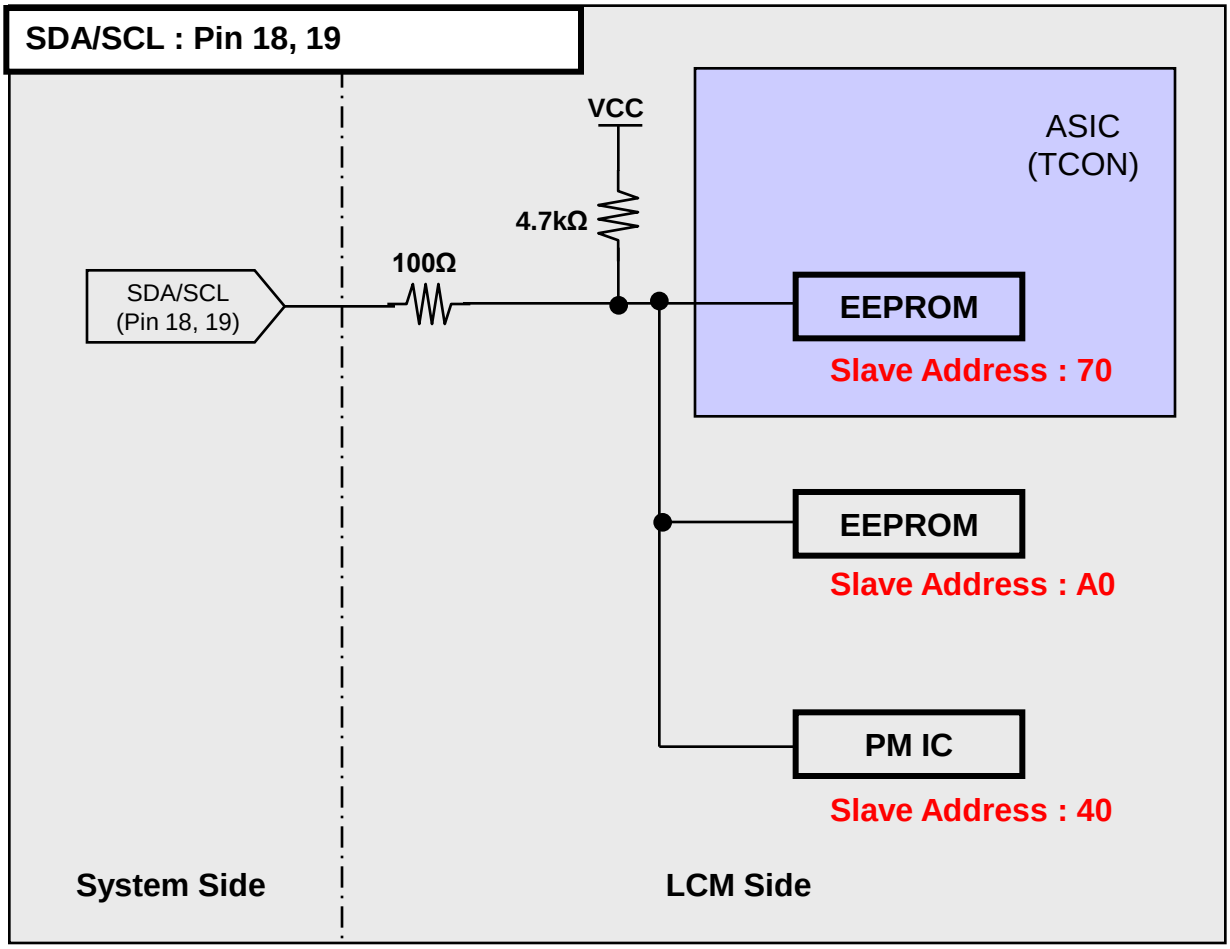
5) Circuit Block Diagram of AGP Selection pin



APPENDIX- Ⅳ-4

■ **Option Pin** Circuit Block Diagram

6) I2C (SDA/SCL) Selection Pin



Note : I2C Line of Set Soc avoid using slave address 40, 70, A0 because LCD module uses those

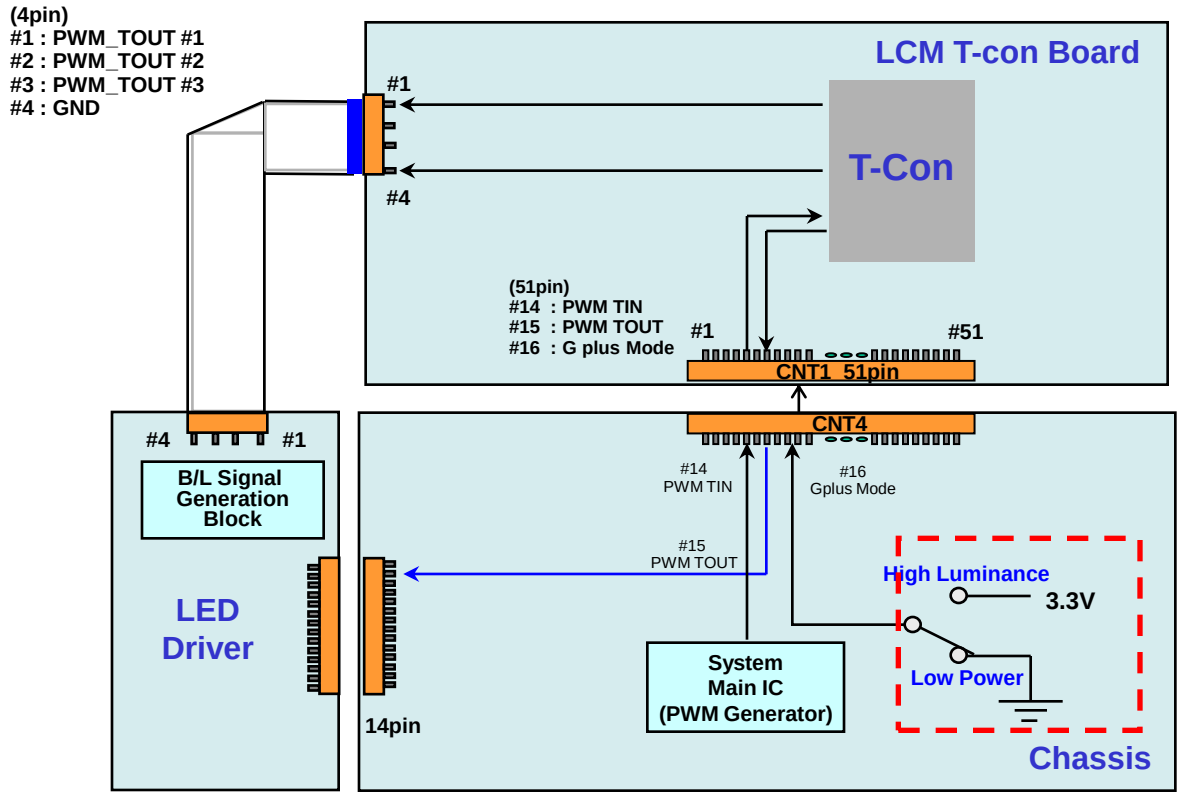
APPENDIX- V

■ **Scanning and Gplus Mode** Design Guide

◇ When Gplus Enable is “L", PWM TOUT = System Dimming.

PWM TOUT signals are synchronized with V-Sync Freq. of System in T-Con Board.

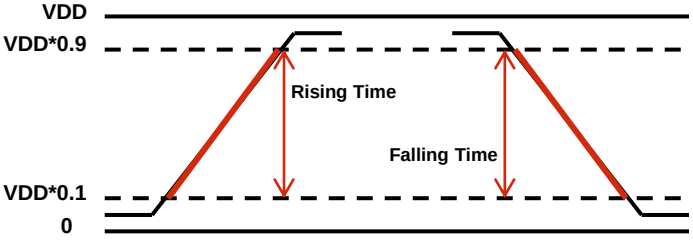
#15 PWM TOUT Pin must be connected to LED Driver, In case of non-Scanning mode.



◇ PWM Specification (VDD = 3.3V)

1. PWM High Voltage Range : 2.5V~3.6V
2. PWM Low Voltage Range : 0.0V~0.7V

EXTVBR-B Frequency	50 Hz for PAL 60 Hz for NTSC
Rising Time	MAX 10.0 μs
Falling Time	MAX 10.0 μs

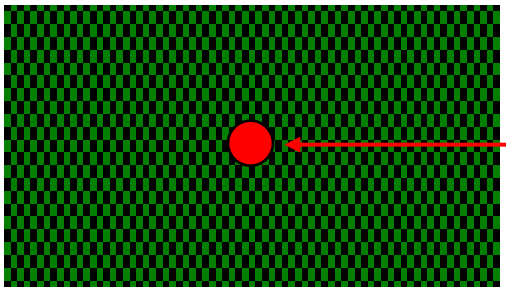


APPENDIX- Ⅵ-1

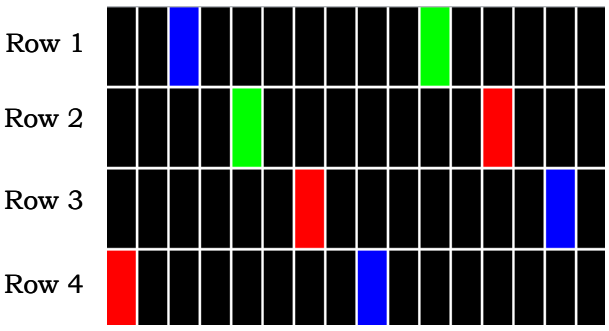
■ Flicker Adjustment

1) Gplus EN(#17) must be 'L'(RGB Mode) for flicker adjustment

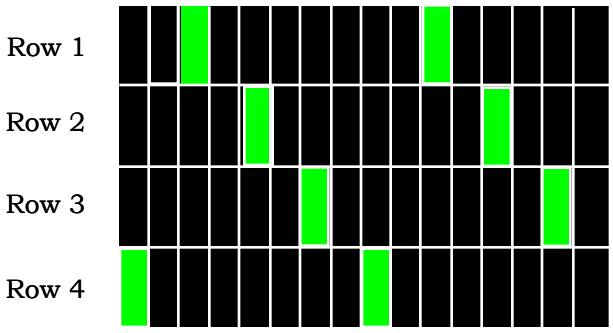
Parameter	Unit	Min	Typ	Max	Note
Inversion Method	-	V2-Dot Inversion			
Adjust Pattern / Gray Level	-	V2Dot Full Flicker / 511Gray			60Hz
Position	-	Center			
Voltage range	V	4.734	5.56	6.371	



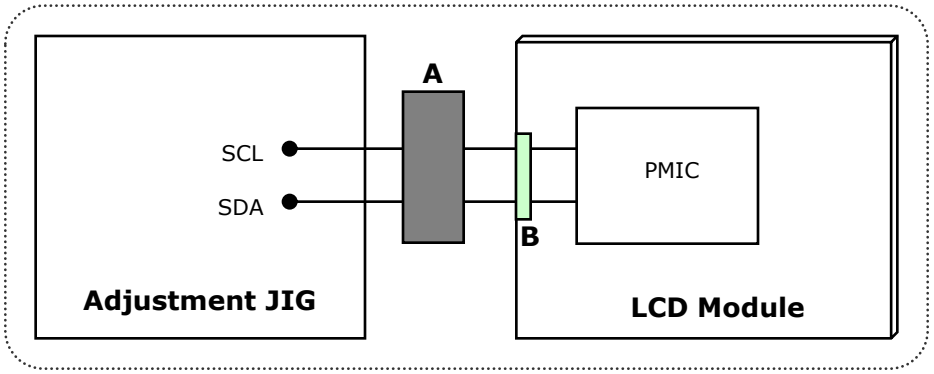
Tune the V-com level till the flicker level became stable on center position.



<Input data>



<G+ Panel>



A : Pull-up Resistors (If it is necessary)

B : I2C Connector (Refer to Appendix IX)

 # APPENDIX- VI -2

Vcom Adjustment

MODULE 51 Pin CNT(CN1) PIN CONFIGURATION

Pin No	Description	Note
1~15	-	
17	Gplus EN	'L': RGB Mode, "H":Gplus Mode
18	SDA	
19	SCL	
20	NC	
21~51	-	

LC550EGY-SHM1 Control PCB Assembly uses TI PWM IC(TPS65178).
PWM IC (Slave) Address is 40h (01000000), Vcom Register address is 0x16.

If you need detailed information, Please refer to TI PWM IC(TPS65178) Data Sheet or contact with TI company.

APPENDIX- Ⅶ

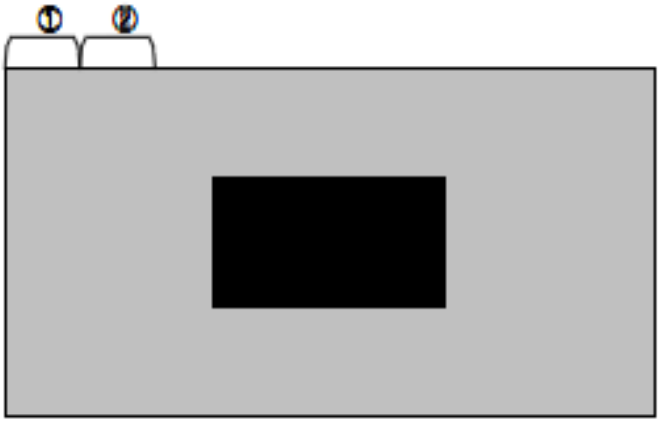
■ The reference method of BL dimming

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

 # APPENDIX- Ⅷ

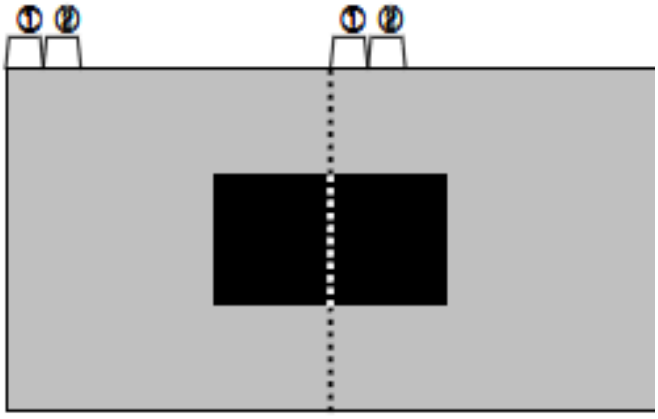
■ input mode of pixel data

Mode 1 : Non-Division



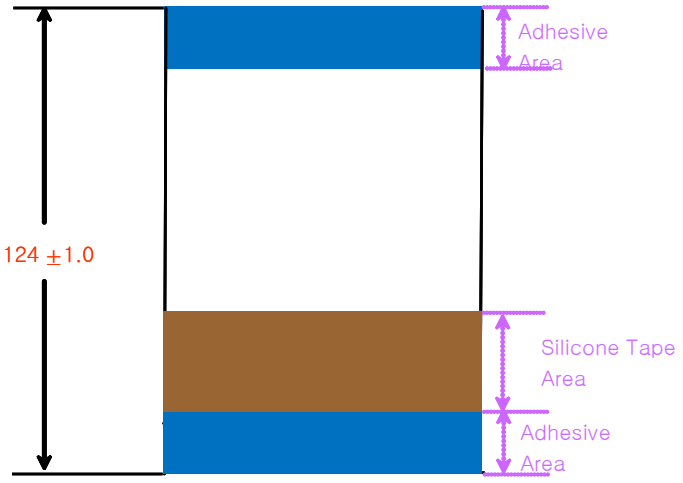
Lane	1st Data	2nd Data	Data#
Lane0	1	9	3833
Lane1	2	10	3834
Lane2	3	11	3835
Lane3	4	12	3836
Lane4	5	13	3837
Lane5	6	14	3838
Lane6	7	15	3839
Lane7	8	16	3840

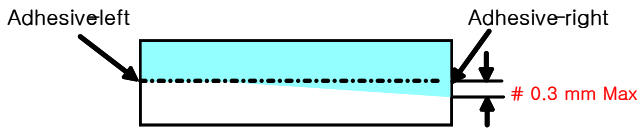
Mode 2 : 2 Division

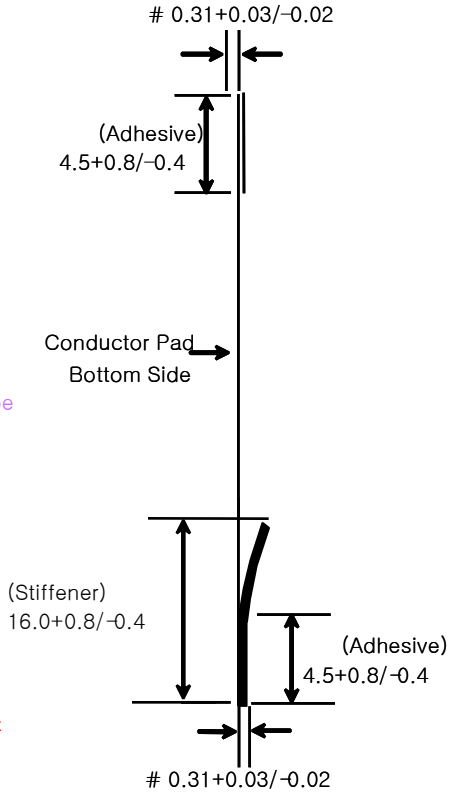


Lane	1st Data	2nd Data	Data#
Lane0	1	5	1917
Lane1	2	6	1918
Lane2	3	7	1919
Lane3	4	8	1920
Lane4	1921	1925	3837
Lane5	1922	1926	3838
Lane6	1923	1927	3839
Lane7	1924	1928	3840

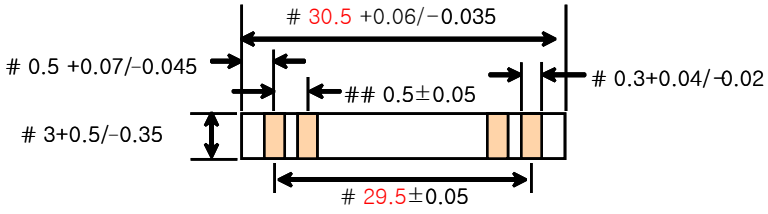
APPENDIX-Ⅸ







< Pad Detail- 60Pin >



- Material List

APPLICATION	STANDARD	MATERIAL	REFERENCE
1. CONDUCTOR	GOLD PLATED COPPER WIRE	1. 99.99% COPPER 2. GOLD PLATED	1. Tolerance - 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 : 3 MICRON/SUNEUN
2. INSULATION	POLYESTER FILM (PET/PET)	1. POLYESTER BASE FILM : 0.025 mm 2. POLYESTER HOTMELT ADHESIVE : 0.035 mm TOTAL THICKNESS : 0.060 mm	UL VW-1 FLAME Width : 120mm Length : 500M UNIT : ROLL * MAKER : SHINCHANG HOTMELT/ COSMOAMT
3. SUPPORTING TAPE	POLYESTER FILM	1. POLYESTER BASE FILM : 0.188 mm 2. POLYESTER HOTMELT ADHESIVE : 0.027 mm TOTAL THICKNESS : 0.215 mm	Width : 20.5mm Length : 250M Unit : ROLL *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