HL 海罗光电有限公司 Hello Lighting co.,LTD	Specification document
	www.hello-lighting.com

SPECIFICATION
OF
LCD MODULE

MODULE NO.: HL104T08-01

Customer Approval:

☐ **Accept** ☐ **Reject**

	SIGNATURE	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

DOCUMENT REVISION HISTORY

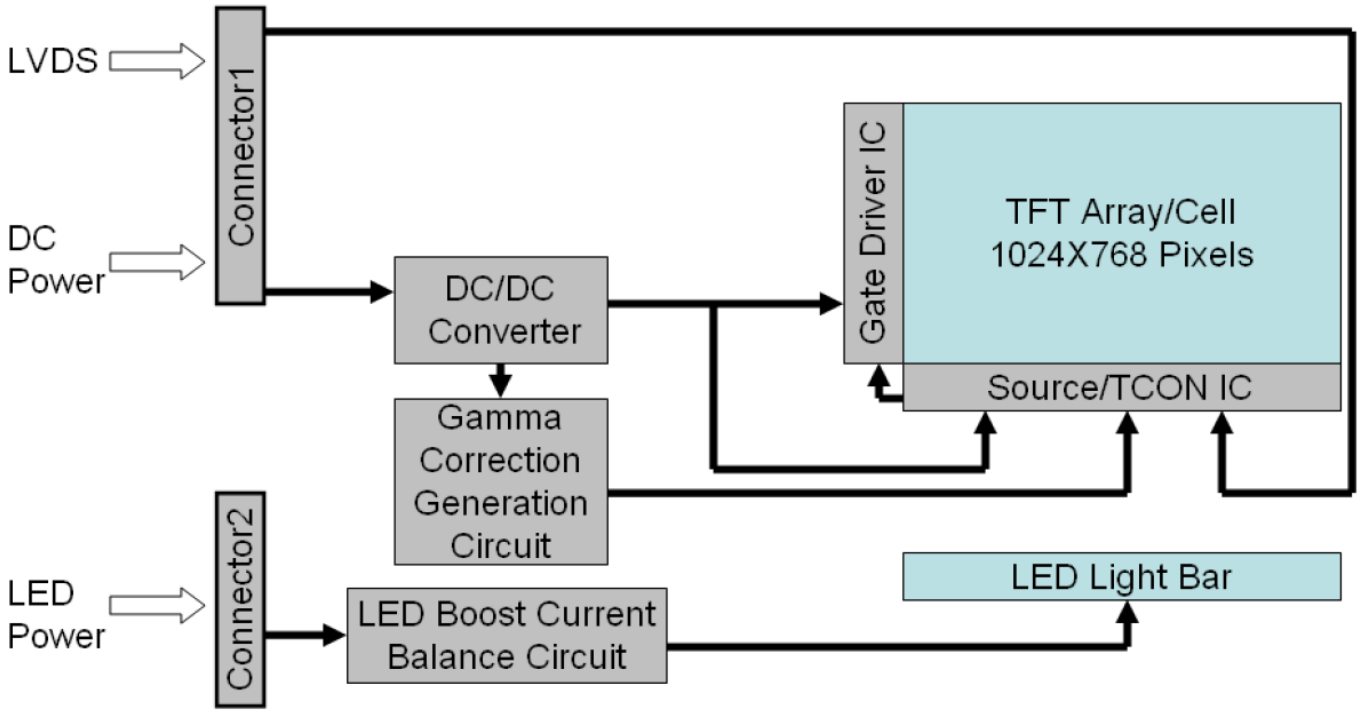
Sample Version	Doc. Version	DATE	DESCRIPTION	CHECKED BY
	A0	2021-11-10	First Release.	

1. MECHANICAL SPECIFICATIONS:

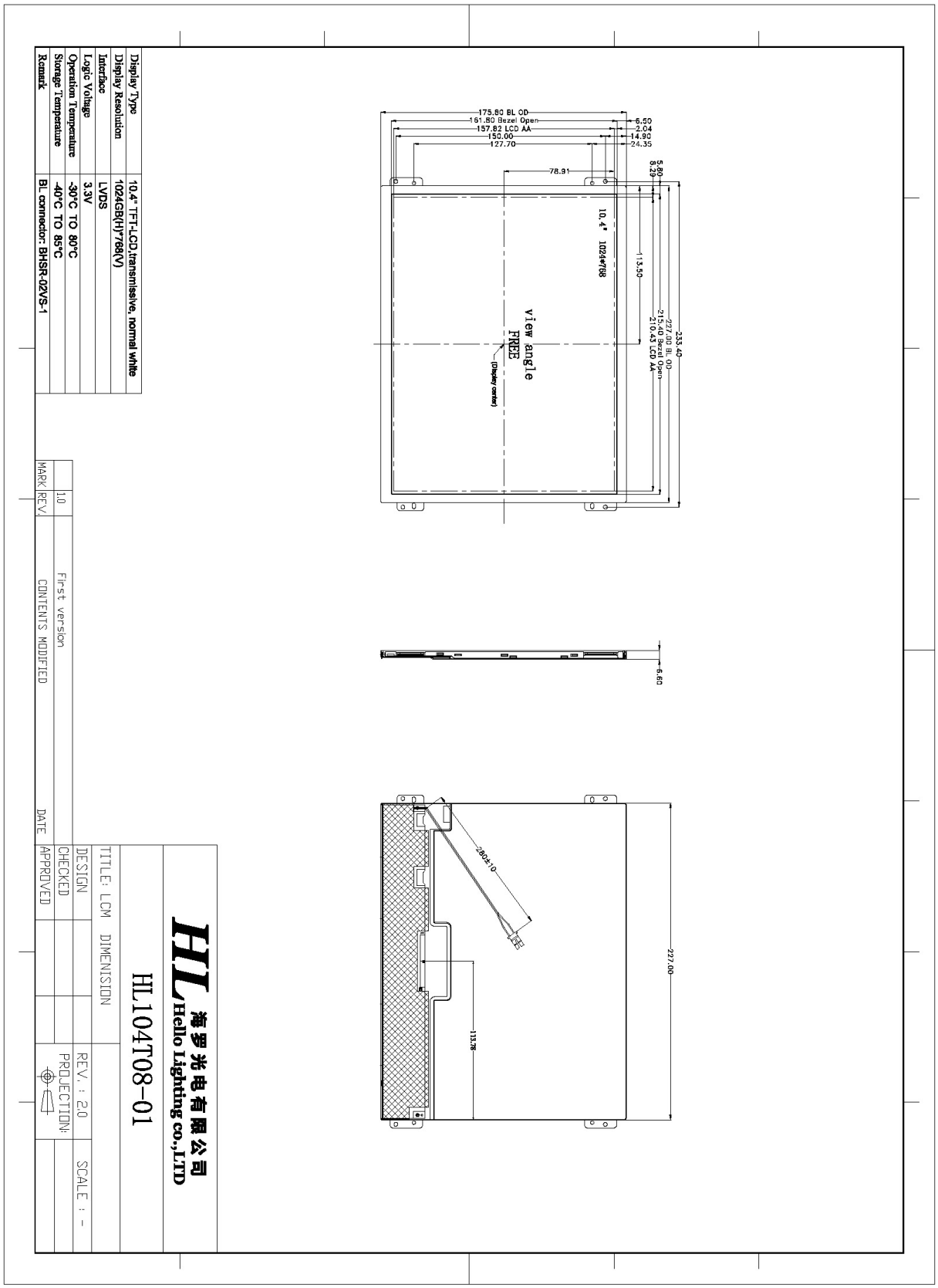
ITEM	SPECIFICATION	UNIT
OUTLINE DIMEMSIONS	227.0 (W) X175.8(H) X6(D)	mm
DISPLAY SIZE	10.4	inch
DOT PITCH	0.2055mmX0.2055mm	mm
NUMBER OF DOTS	1024*（RGB）*768	-
LCD TYPE	TFT(262K/16.7M) TRANSMISSIVE	-
INTERFACE	LVDS	
BACKLIGHT TYPE	LED White	-
VIEWING DIRECTION	FREE	-

***See attached drawing for details.**

2.BLOCK DIAGRAM:



3.DIMENSIONAL



4. PIN DESCRIPTION:

4.1 PIN MAP

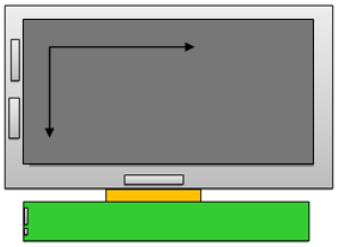
A 30pin connector of P-two 187098-30091 is used for the module electronics interface.
And a special plug needed for connecting this connector, the recommended model is P-two 187130-30xx or JAE FI-X30H.

NO.	PIN NAME	Description
1	NC	Reserved, keep float
2	GND	Power ground
3	Rin3+	Positive LVDS differential data input (+)
4	Rin3-	Negative LVDS differential data input (-)
5	GND	Power ground
6	CLK+	Positive LVDS differential clock input (+)
7	CLK-	Negative LVDS differential clock input (-)
8	GND	Power ground
9	Rin2+	Positive LVDS differential data input (+)
10	Rin2-	Negative LVDS differential data input (-)
11	GND	Power ground
12	Rin1+	Positive LVDS differential data input (+)
13	Rin1-	Negative LVDS differential data input (-)
14	GND	Power ground
15	Rin0+	Positive LVDS differential data input (+)
16	Rin0-	Negative LVDS differential data input (-)
17	GND	Power ground
18	NC	No connection
19	GND	Power ground
20	SEL6/8	Selection for 6 bits/8bit LVDS data input Low or NC : 8 bit input mode High : 6 bit input mode
21	NC	Reversed as EE_WP for OTP function
22	NC	Reversed as EE_SDA for OTP function
23	NC	Reversed as EE_SCL for OTP function
24	Reverse	Reversed, scan direction selection
25	GND	Power ground
26	GND	Power ground
27	GND	Power ground
28	VDD	Power supply +3.3V
29	VDD	Power supply +3.3V
30	VDD	Power supply +3.3V

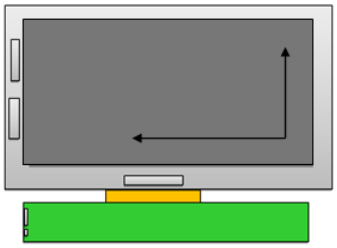
Note:

1. Pin1 is reversed as BIST function for test, don't connect signal to this pin, keep floating.
2. SEL6/8 is used for selecting 6bit/8bit LVDS data input, L or NC: 8bit; High:6bit.
3. Pin21,22,23 are used as SPI interface for OTP function, don't connect any signal to these pin, and don't short them, keep floating.
4. Reverse pin is used for selecting scanning direction.

REV = Low or NC



REV = High



4.2 LVDS Receiver

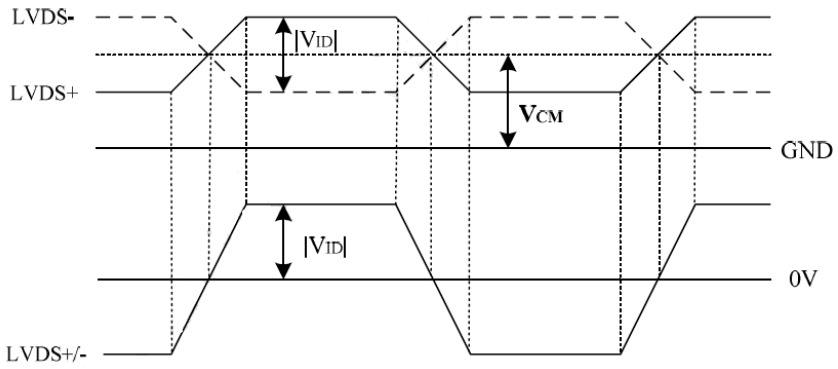
4.2.1 Signal Electrical Characteristics For LVDS Receiver

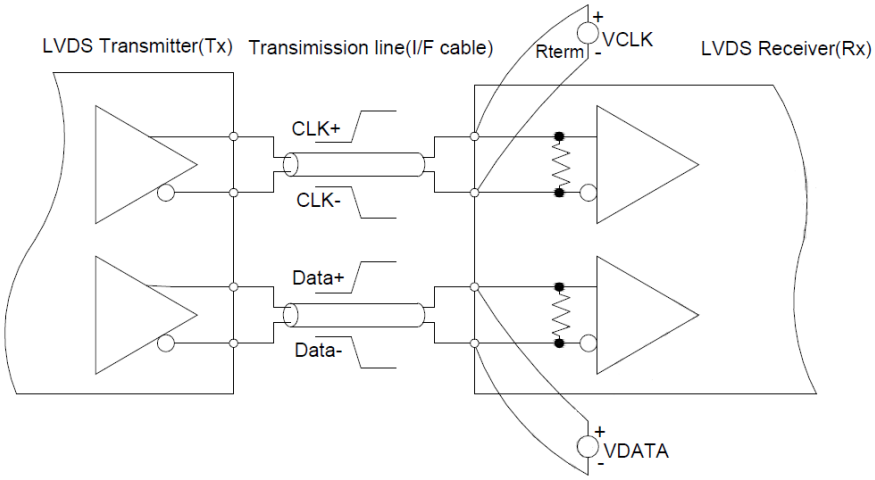
The built-in LVDS receiver is compatible with (ANSI/TIA/TIA-644) standard.

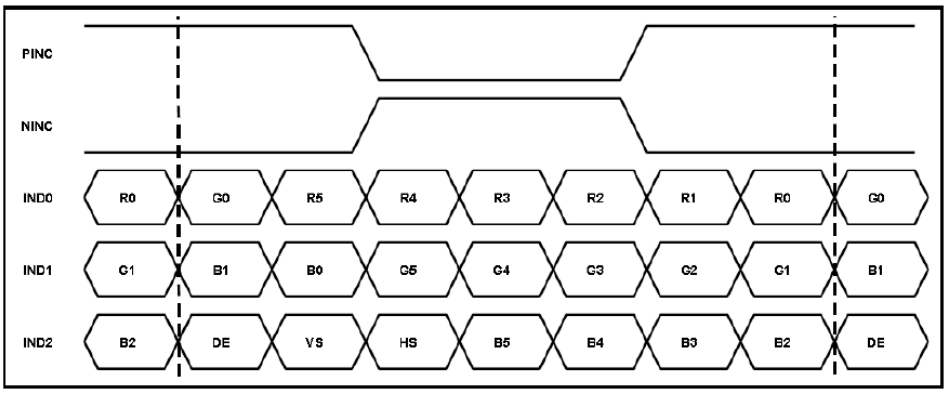
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	Vth	-	-	+100	mV	V_{CM} =+1.2V
Differential Input Low Threshold	Vtl	-100	-	-	mV	V_{CM} =+1.2V
Magnitude Differential Input	$\|V_{ID}\|$	200	-	600	mV	-
Common Mode Voltage	V_{CM}	1.0	1.2	1.4	V	Vth – Vtl=200 mV
Common Mode Voltage Offset	ΔV_{CM}	-50	-	+50	mV	Vth – Vtl=200 mV

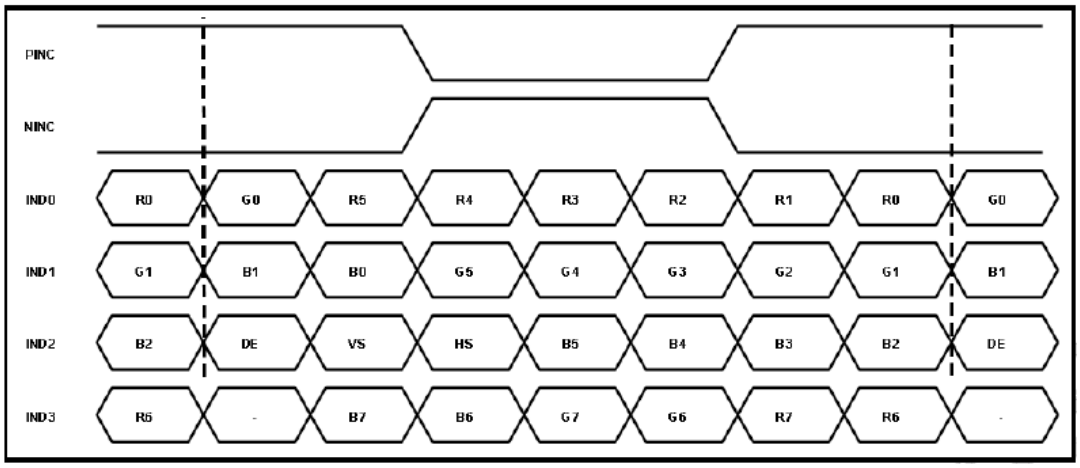
Note: (1) Input signals shall be low or Hi- resistance state when VDD is off.

(2) All electrical characteristics for LVDS signal are defined and shall be measured at the interface connector of LCD.

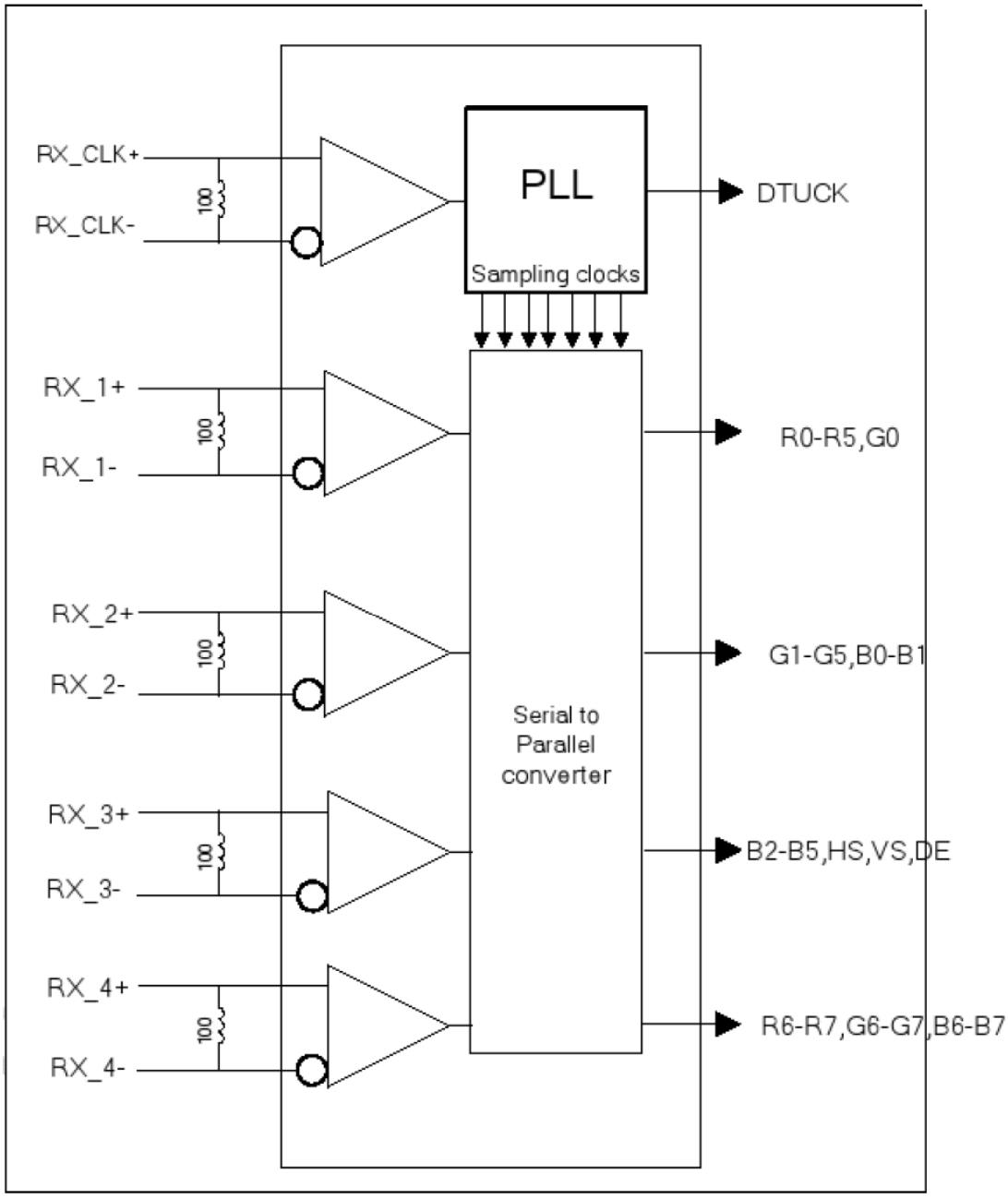








4.3 LVDS Receiver Internal Circuit


RX_CLK+
RX_CLK-
100
PLL
Sampling clocks
DTUCK
RX_1+
RX_1-
100
R0-R5,G0
RX_2+
RX_2-
100
G1-G5,B0-B1
Serial to
Parallel
converter
RX_3+
RX_3-
100
B2-B5,HS,VS,DE
RX_4+
RX_4-
100
R6-R7,G6-G7,B6-B7

5. MAXIMUM ABSOLTE LIMIT:

Item	Symbol	Value	Unit
Power supply voltage for logic	V_{DD}	-0.3~3.96	V
Input voltage	Vin	V_{DD}+0.3	V
Operating temperature	Topr	-30 to 80	°C
Storage temperature	Tstg	-40 to 85	°C
Operating Humidity	Topr	10 - 85	%RH
Storage Humidity	Tstg	10-90	%RH

Note (1): Humidity: 85%RH Max. (T<=40℃) Note static electricity. Maximum wet bulb temperature at 39℃or less. (T>40℃) No condensation.

Note (2): There is a possibility of causing deterioration in the irregularity and others of the screen and the display fineness though the liquid crystal module doesn't arrive at destruction when using it at 60~70℃or -20~0℃

Note (3): There is a possibility of causing the fineness deterioration by the prolonged use in the (high temperature) humidity environment (60% or more).
Note (4): In the operating temperature item, the low temperature side is the ambient temperature regulations. The high temperature side is the panel surface temperature regulations.

6.ELECTRICAL CHARACTERISTICS

6-1 DC Characteristics (V_{DD}=3.3V,Ta=25°C)

Item	Symbol	Min	Type	Max	Unit	Test condition
Operating voltage	V_{DD}	2.7	3.3	3.5	V	-
Supply current	I_{DD}	-	TBD	-	mA	V_{DD}=3.3V,Ta=25°C
Input voltage	V_{IH}	0.7VDD	-	VDD	V	-
	V_{IL}	0	-	0.3VDD	V	
Input leakage current	I_{IL}	-1.0	-	1.0	μA	V_{IN}=V_{DD} or V_{SS}

Note: Voltage greater than above may damage the module.

All voltages are specified relative to V_{SS}=0V.

6-2 Backlight Electrical-optical Characteristics

1. Stander Lamp Styles(Edge Lighting Type):

The LED chips are distributed over the edge light area of the illumination unit, which gives the less power consumption:

2. The Main Advantages of the LED Backlight are as following:

2.1 The brightness of the backlight can simply be adjusted by a resistor or a potentiometer.

3. Data About LED Backlight:

Item	**Symbol**	**MIN**	**TYP**	**MAX**	**UNIT**	**Test Condition**	**Note**
Supply Voltage	Vf	-	14.3	15.6	V	If=330 mA	-
Supply Current	If	-	330	-	mA	-	-
Reverse Voltage	Vr	-	-	5	V	10uA	
Power dissipation	Pd	-	4.719	-	W	-	
Uniformity for LCM	-	75	-	-	%	If=330mA	3
Life Time	-	50000	-	-	Hr	If=330 mA	-
Backlight Color	White						

NOTE:

1. Average Luminous Intensity of P1-P9
2. Uniformity = Min/Max * 100%
3. LED life time defined as follows: The final brightness is at 70% of original brightness

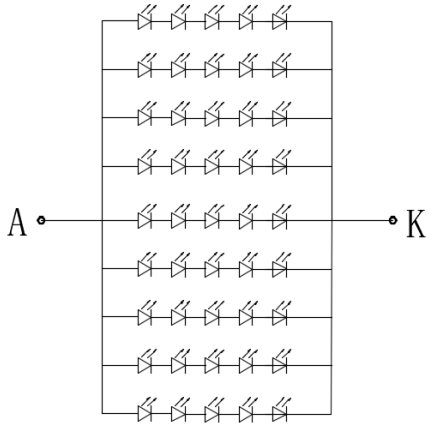
Measured Method: (X*Y: Light Area)(Left Draft as follow)

Internal Circuit Diagram(Right Draft as follow)

(Effective spatial Distribution)

Hole Diameter ø 3mm ; 1 to 9 per Position Measured Luminous

4. BL connector (BHSR-02VS-1) or equivalent, mount
   Mating Connector: (SBHT-002T-P0.5) or equivalent
5. LED configuration



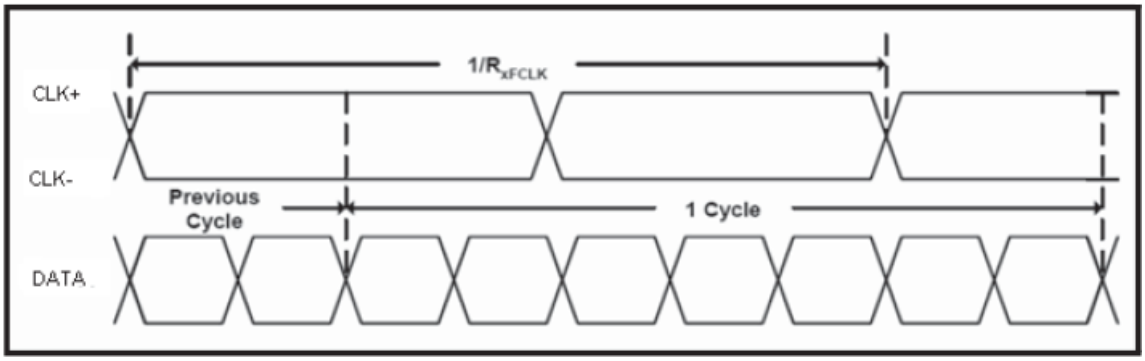
7.AC TIMING

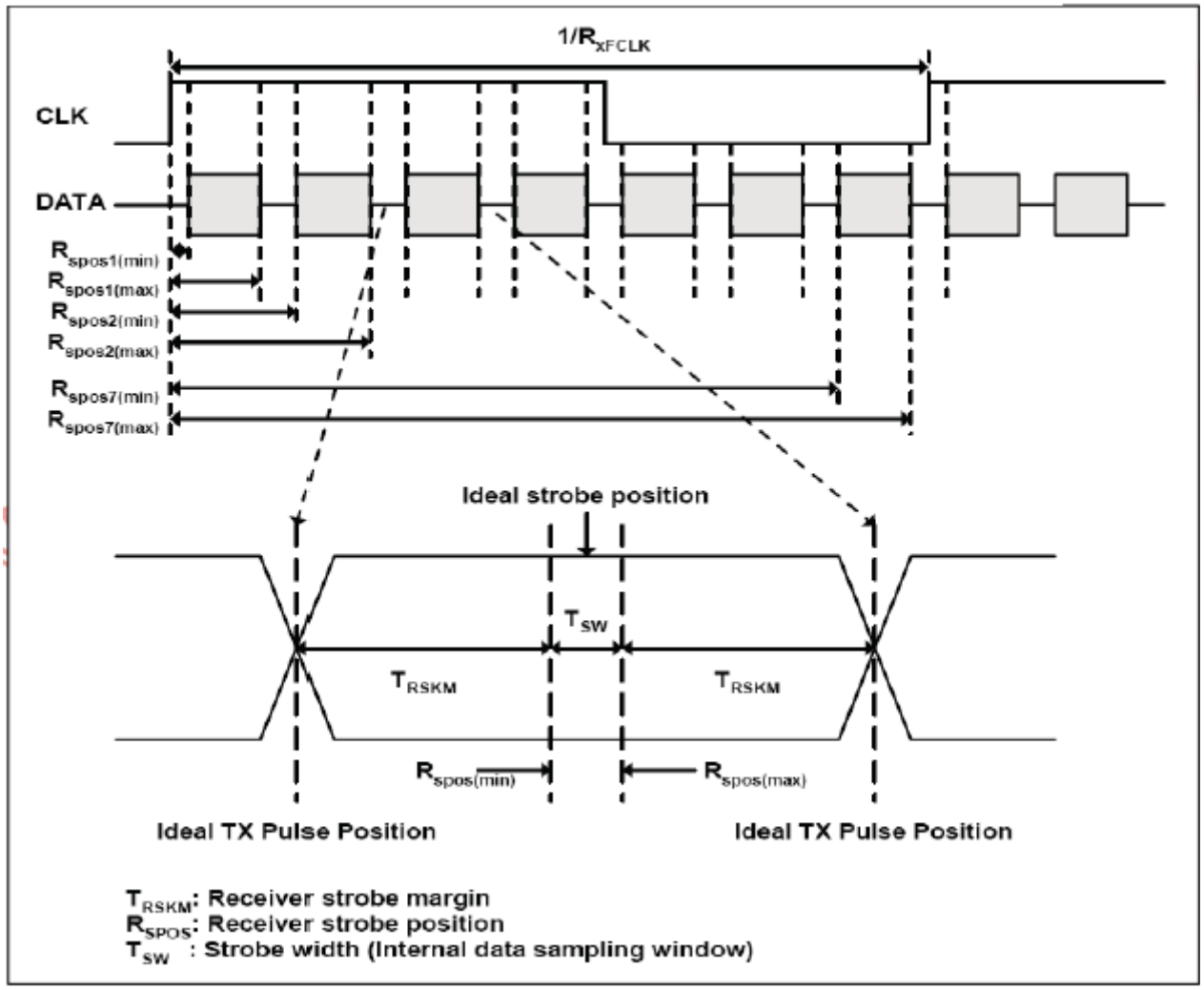
7-1 Timing Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Condition
Clock frequency	RxFCLK	26.2	51.2	71	MHz	
Input data skew margin	TRSKM	500	500	1/(2*RxFCLK)	ps	Typical value for 1024*600 resolution
Clock high time	TLVCH		4/(7xRxFCLK)		ns	|VID|=400mv RxVCM=1.2V RxFCLK=71MHz VDD_LVDS=3.3V
Clock low time	TLVCL		3/(7xRxFCLK)		ns	
VSD setup time	TenPLL	0	TenPLL	150	us	

Note: H Blanking Time and V Blanking Time can not be changed at every frame

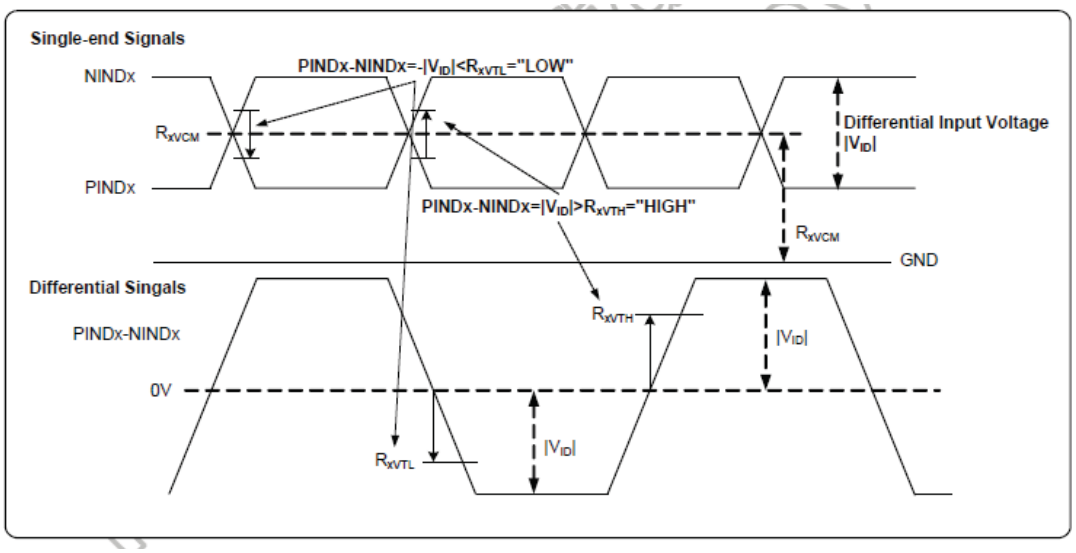
7-2 Input clock and data timing diagram





7-3 DC electrical characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LVDS Differential input high Threshold voltage	R_{xVTH}	-	-	+100	mV	R_{XVCM}=1.2V
LVDS Differential input low Threshold voltage	R_{xVTL}	-100	-	-	mV	
Input Voltage range (Singled-end)	R_{xVIN}	0	-	VDD-1.2+ $\|V_{ID}\|/2$	V	
LVDS Differential input common mode voltage	R_{xVCM}	$\|V_{ID}\|/2$	-	VDD-1.2	V	
LVDS Differential voltage	$\|V_{ID}\|$	0.2	-	0.6	V	

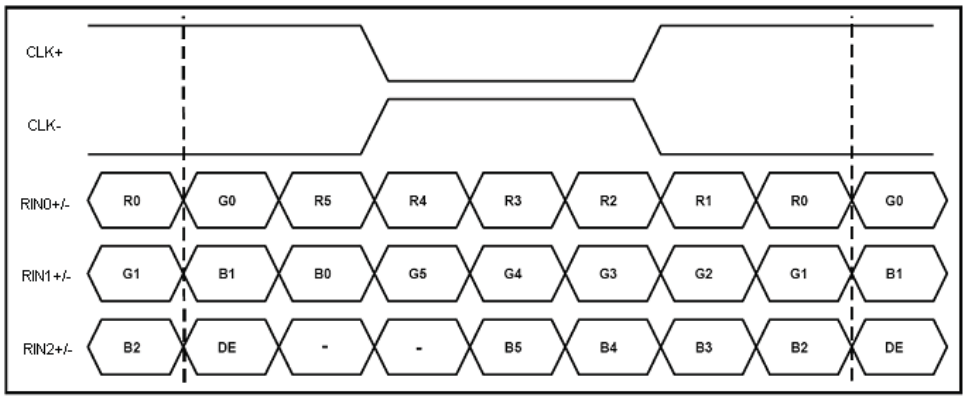


7-4 Data timing

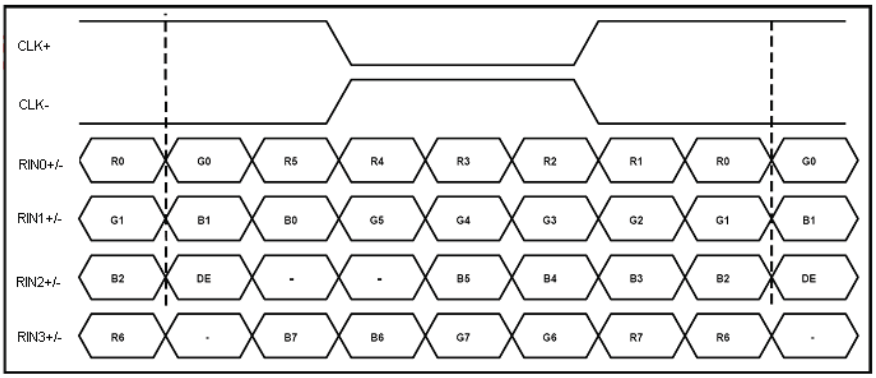
Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	52	65	71	MHz
Horizontal display area	thd		1024		DCLK
HSD period	th	1114	1344	1400	DCLK
HSD blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		768		T_H
VSD period	tv	778	806	845	T_H
VSD blanking	tvbp+tvfp	10	38	77	T_H

7-5 LVDS data input format

SEL6/8 = “High” for 6 bits LVDS Input



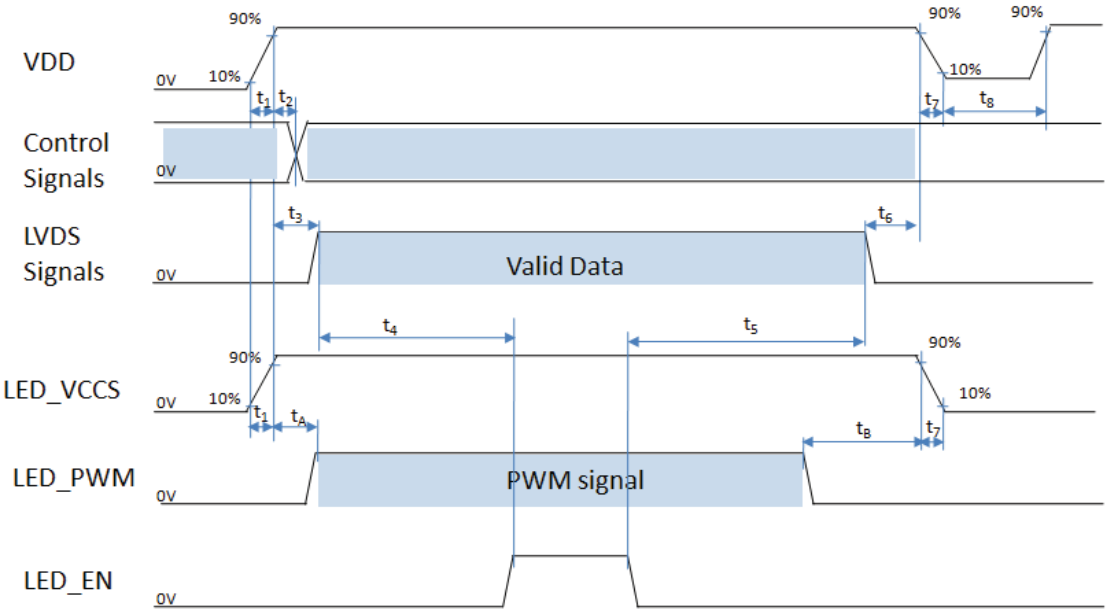
SEL6/8 = “Low” or “NC” for 8 bits LVDS Input



7-2 Power sequence

The power sequence specifications are shown as the following table and diagram

Symbol	Value		Unit
	Min.	Max.	
t_1	1	20	ms
t_2	1	5	ms
t_3	10	50	ms
t_4	200	500	ms
t_5	200	500	ms
t_6	50	200	ms
t_7	0	20	ms
t_8	500	-	ms
t_A	0	50	ms
t_B	0	50	ms



Note 1: Please don't plug the interface cable of on when system is turned on.

Note 2: Please avoid floating state of the interface signal during signal invalid period.

Note 3: It is recommended that the backlight power must be turned on after the power supply for LCD and the interface signal is valid.

Note 4: Control signals include SEL6/8 & Reverse.

8. OPTICAL CHARACTERISTICS:

Driving the backlight

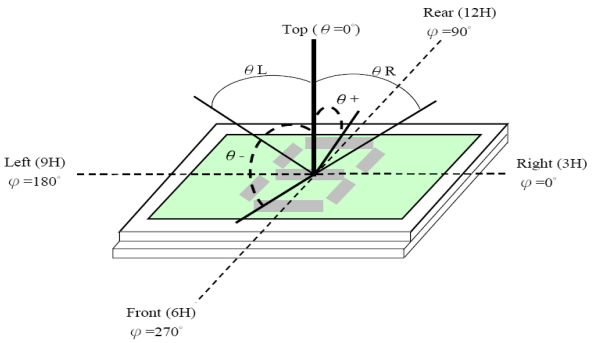
No.	ITEM		Symbol	Conditions	Specification			Unit	Note
					Min	Typ	Max		
1	Response Time		Tr+Tf	25℃	-	25	35	Ms	(1)(2)
2	Contrast Rate		Cr	θ=0, Normal viewing angle	800	1000	-	-	(1)(3)
3	Viewing Angle	Hor.	θL	CR>10	80	-	-	Deg	-
			θR		80	-	-		
		Ver.	Θ+		80	-	-		
			Θ-		80	-	-		
4	Chromaticiry	White	x	Brightness is ON	0.278	0.298	0.318		
			y		0.311	0.331	0.51		
		Red	x		0.587	0.607	0.627		
			y		0.310	0.330	0.350		
		Green	x		0.258	0.278	0.298		
			y		0.526	0.546	0.566		
		Blue	x		0.121	0.141	0.161		
			y		0.138	0.158	0.178		
5	NTSC		S		55	61.2		%	
6	luminance		L		800	1000		cd/m2	
7	Uniformity		U		75	80		%	

Measure Conditions:

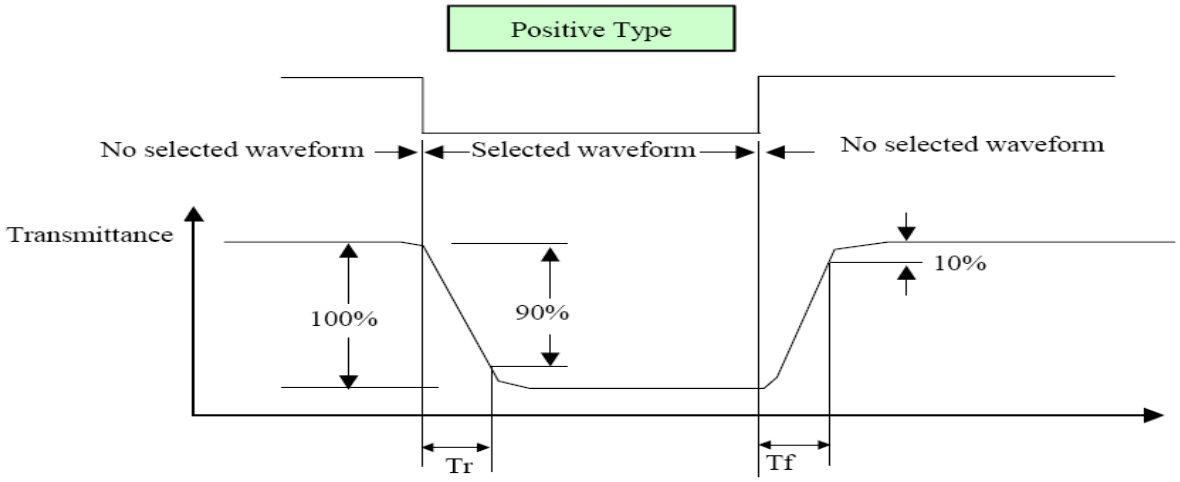
1. Measure surrounding : dark room;
2. Ambient temperature: 25±2℃;
3. 30min.warm-up time.

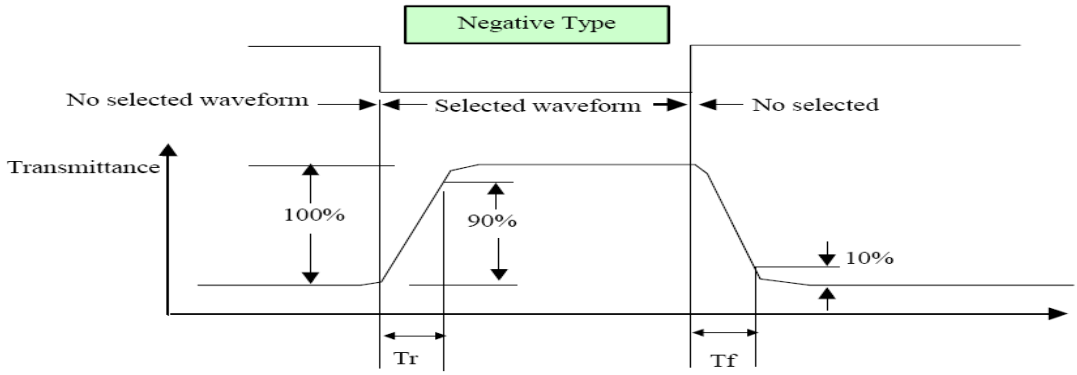
Note Definition:

Note(1)Viewing angle range:

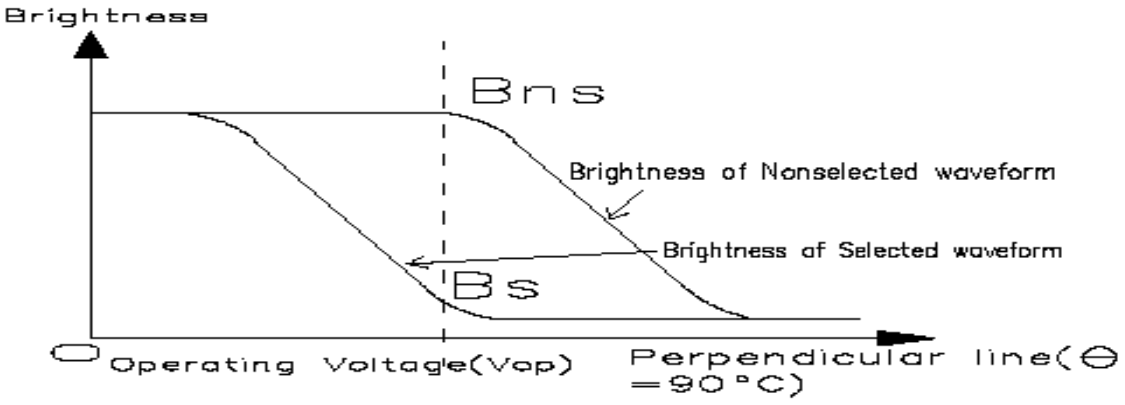


Note(2)Response Time:



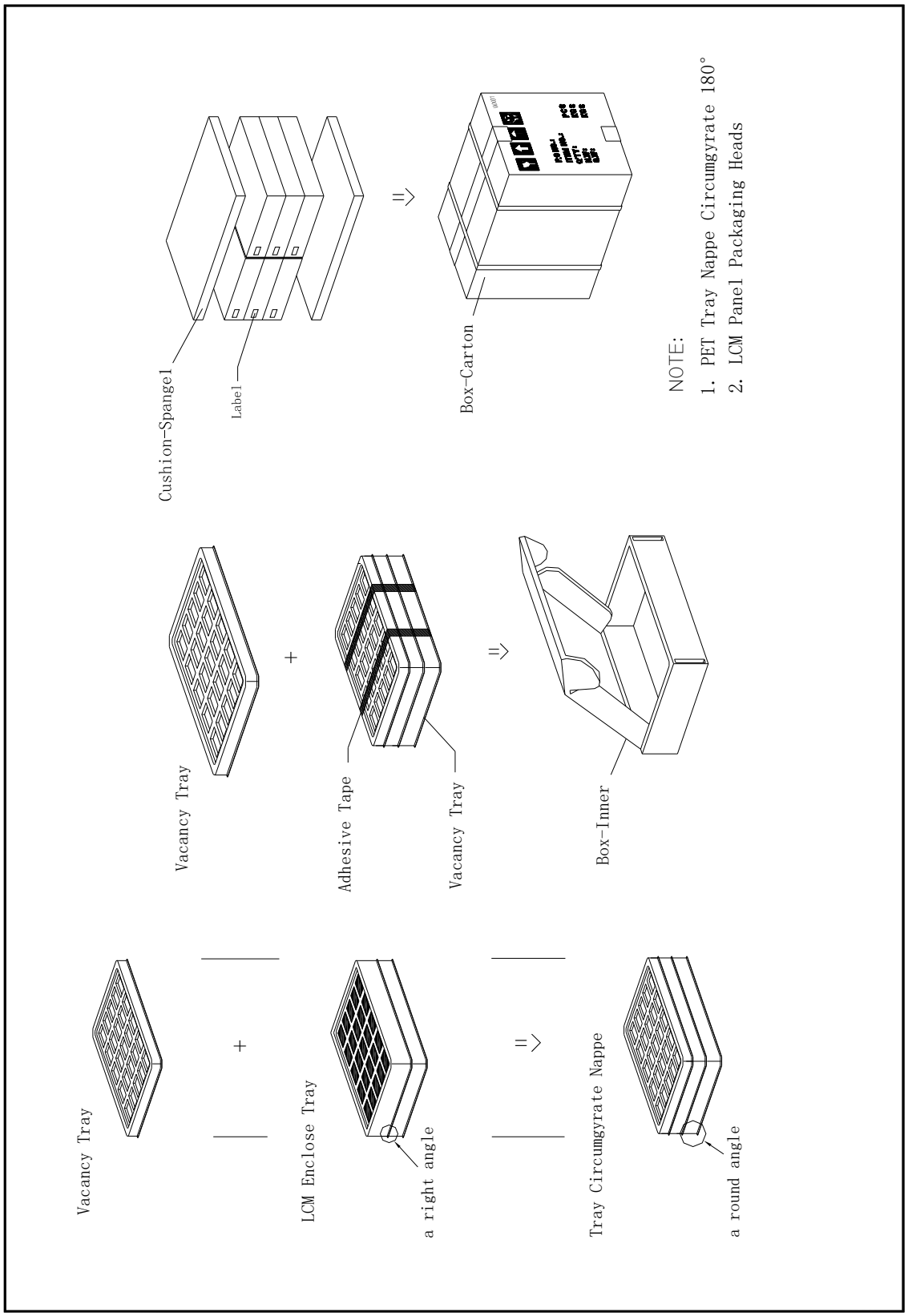


Note(3)Contrast Ratio Definition:



Contrast Ratio (Cr)= Luminance with all pixel white / Luminance with all pixel black

9.PACKAGE.


Cushion-Spangel
Label
Box-Carton
NOTE:
1. PET Tray Nappe Circumgyrate 180°
2. LCM Panel Packaging Heads
Vacancy Tray
Adhesive Tape
Vacancy Tray
Box-Inner
Vacancy Tray
LCM Enclose Tray
a right angle
Tray Circumgyrate Nappe
a round angle

10. STANDARD SPECIFICATION FOR RELIABILITY:

Item	Condition		Time (hrs)	Assessment
High temp. Storage	85°C		120	No abnormalities in functions and appearance
High temp. Operating	80°C		120	
Low temp. Storage	-40°C		120	
Low temp. Operating	-30°C		120	
Humidity	40°C/ 90%RH		120	
Thermal Shock Temp. Cycle	-30°C ← →80°C (0.5hour ← → 0.5 hour)		10cycles	
ESD Testing	HBM:	±8KV		330Ω/150PF
	MM:	±200V		200PF/0Ω

Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (25±10℃), normal humidity (45±20% RH), and in area not exposed to direct sun light. (Life time of backlight, please refer to Data about backlight.)

Testing Conditions and Inspection Criteria:

For the final test the testing sample must be stored at room temperature for 24 hours, after the tests listed in up Table, Standard specifications for Reliability have been executed in order to ensure stability.

Item	Test Model	In section Criteria
Current Consumption	Refer To Specification	The current consumption should conform to the product specification.
Contrast	Refer To Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
Appearance	Visual inspection	Defect free.

11.SPECIFICATION OF QUALITY ASSURANCE:

11.1 Purpose

This standard for Quality Assurance should affirm the quality of LCD Module products to supply.

11.2 Standard for Quality Test

a. Inspection:

Before delivering, the supplier should take the following tests, and affirm the quality of product.

b. Electro-Optical Characteristics:

According to the individual specification to test the product.

c. Test of Appearance Characteristics:

According to the individual specification to test the product.

d. Test of Reliability Characteristics:

According to the definition of reliability on the specification for testing products.

e. Delivery Test:

Before delivering, the supplier should take the delivery test.

(i) Test method: According to MIL-STD105E.General Inspection Level Ⅱ take a single time.

(ii) The defects classify of AQL as following:

Major defect: AQL = 0.65

Minor defect: AQL = 2.5

Total defects: AQL = 2.5

11.3. Nonconforming Analysis & Deal With Manners

a. Nonconforming Analysis:

(i) Purchaser should supply the detail data of non- conforming sample and the non- conforming.

(ii) After accepting the detail data from purchaser, the analysis of nonconforming should be finished in two weeks.

(iii) If supplier can not finish analysis on time, must announce purchaser before two weeks.

b. Disposition of nonconforming:

(i) If find any product defect of supplier during assembly time, supplier must change the good product for every defect after recognition.

(ii) Both supplier and customer should analyze the reason and discuss the disposition of nonconforming when the reason of nonconforming is not sure.

11.4. Agreement items

Both sides should discuss together when the following problems happen.

a. There is any problem of standard of quality assurance, and both sides think that it must be modified.

b. There is any argument item which does not record in the standard of quality assurance.

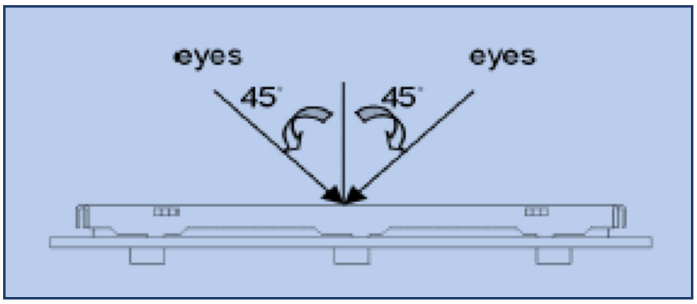
c. Any other special problem.

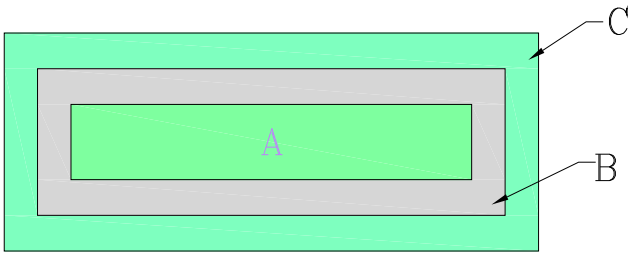
11.5 Standard of The Product Appearance Test

a. Manner of appearance test: This specification should be applied for both light on and off situation.

(i) The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30±5cm.

(ii) When test the model of transmissive product must add the reflective plate.
(iii)The test direction is base on about around 10° of vertical line (Left graph)
(iiii)Temperature: 25±5℃ Humidity: 65±10%RH





(iv) Definition of area (Right graph)
A. Area: Viewing area. B. Area: Out of viewing area.(Outside viewing area)
b. Basic principle:
(i) It will accord to the AQL when the standard can not be described.
(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.
(iii) Must add new item on time when it is necessary.
c. Standard of inspection: (Unit: mm)

Allowable limits defined in follow Dot defect Table should be met for each white, black , R, G, B raster. The limits apply to the entire area. Missing white in 60% or more of typical (one color, R or G or B) pixel aperture is defined as a bright defect, less than 60% is acceptable .Black spot in 60% or more of typical pixel aperture is defined as a dark defect, less than 60% is acceptable.

Dot defect table:

Item		White dot defect	Black dot defect	Total
1	Defect counts	3	3	3
2	Combined defect Counts	No combined dot defect allowed. Two Single dot defect that within 5mm during each dot defect should becounted as combined dot defect.		

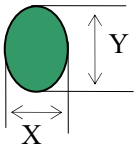
11.6 Inspection specification

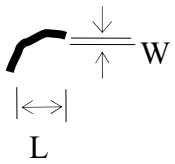
AQL inspection standard

Sampling method: MIL-STD-105E, Level II, single sampling

Classify	Item		Note	AQL
Major	Display state	Short or open circuit	1	0.65
		Contrast defect (dim, ghost)		
		LC leakage		
		Flickering		
		No display		
		Wrong viewing direction	2	
		Wrong Back-light	7	
	Non-display	Flat cable or pin reverse	9	
		Wrong or missing component	10	
Minor	Display state	Background color deviation	2	2.5
		Black spot and dust	3	
		Line defect	4	
		Scratch		
		Rainbow	5	
		Pin hole	6	
	Polarizer	Bubble and foreign material	3	
		Scratch	4	
	PCB,FPC	Scratch	4	
	Soldering	Poor connection	8	
	Wire	Poor connection	9	
	LCD	CHIP OUT	11	

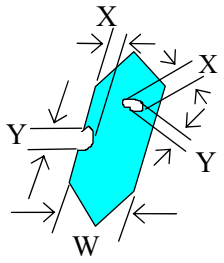
Note on defect classification:

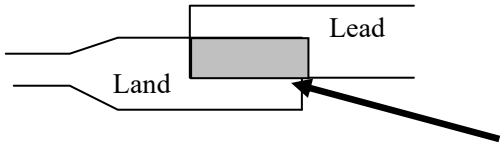
<table>
<tr><th>No.</th><th>Item</th><th>Criterion</th></tr>
<tr><td rowspan="6">1</td><td>Short or open circuit</td><td rowspan="6">Not allow</td></tr>
<tr><td>LC leakage</td></tr>
<tr><td>Flickering</td></tr>
<tr><td>No display</td></tr>
<tr><td>Wrong viewing direction</td></tr>
<tr><td>Wrong Back-light</td></tr>
<tr><td rowspan="2">2</td><td>Contrast defect</td><td rowspan="2">Refer to approval sample</td></tr>
<tr><td>Background color deviation</td></tr>
<tr><td>3</td><td>Point defect,
Black spot, dust
(incl. Polarizer) ex.:
dirt under polarizer,
Pinhole of
reflector ,glass
scratch, dirt under
glass,scratch on
polarizer
ϕ = (X+Y)/2</td><td> 

<table>
<tr><td>Point</td><td>Acceptable Qty.</td></tr>
<tr><td>Size</td><td></td></tr>
<tr><td>ϕ≤0.20</td><td>Disregard</td></tr>
<tr><td>0.20<ϕ≤0.25</td><td>3</td></tr>
<tr><td>0.25<ϕ≤0.30</td><td>2</td></tr>
<tr><td>ϕ>0.30</td><td>0</td></tr>
</table>
Unit：mm</td></tr>
<tr><td>4</td><td>Line defect</td><td> 

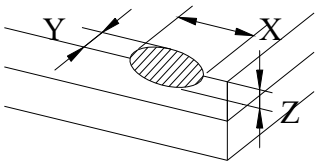
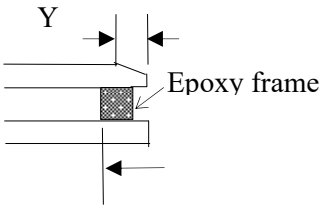
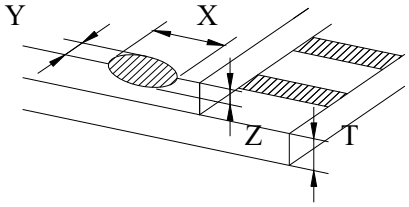
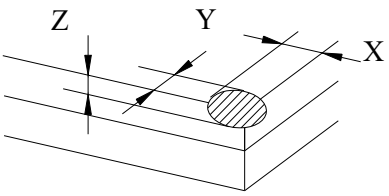
<table>
<tr><td></td><td>Line</td><td>Acceptable Qty.</td></tr>
<tr><td>L</td><td>W</td><td></td></tr>
<tr><td>---</td><td>0.015≥W</td><td>Disregard</td></tr>
<tr><td>3.0≥L</td><td>0.03≥W</td><td rowspan="2">2</td></tr>
<tr><td>2.0≥L</td><td>0.05≥W</td></tr>
<tr><td>1.0≥L</td><td>0.1 > W</td><td>1</td></tr>
<tr><td>---</td><td>0.05<W</td><td>Applied as point defect</td></tr>
</table>
Unit: mm</td></tr>
<tr><td>5</td><td>Rainbow</td><td>Not more than two color changes across the viewing area</td></tr>
</table>

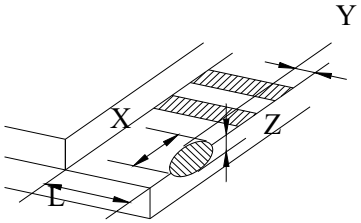
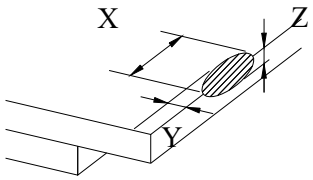
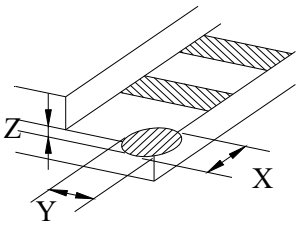
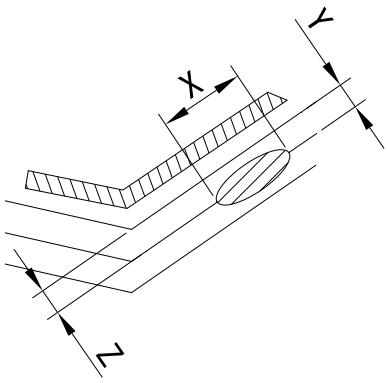
No.	Item	Criterion

<table>
<tr><td>6</td><td>Segment pattern
W = Segment width
ϕ = (X+Y)/2</td><td>(1) Pin hole
ϕ < 0.10mm is acceptable.
 

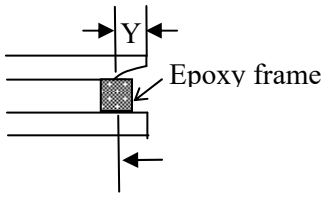
<table>
<tr><td>Point Size</td><td>Acceptable Qty</td></tr>
<tr><td>ϕ≤1/4W</td><td>Disregard</td></tr>
<tr><td>1/4W< ϕ≤1/2W</td><td>1</td></tr>
<tr><td>ϕ > 1/2W</td><td>0</td></tr>
</table>
Unit: mm</td></tr>
<tr><td>7</td><td>Back-light</td><td>(1) The color of backlight should correspond its specification.
(2) Not allow flickering</td></tr>
<tr><td>8</td><td>Soldering</td><td>(1) Not allow heavy dirty and solder ball on PCB or FPC.
(The size of dirty refer to point and dust defect)
(2) Over 50% of lead should be soldered on Land.
 

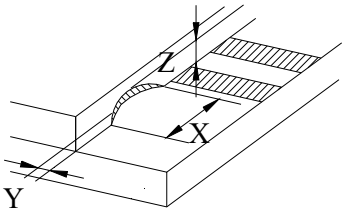
50% lead</td></tr>
<tr><td>9</td><td>Wire</td><td>(1) Copper wire should not be rusted
(2) Not allow crack on copper wire connection.
(3) Not allow reversing the position of the flat cable.
(4) Not allow exposed copper wire inside the flat cable.</td></tr>
<tr><td>10</td><td>PCB,FPC</td><td>(1) Not allow screw rust or damage.
(2) Not allow missing or wrong putting of component.</td></tr>
</table>

11	LCD	**2.1.1 chip on the surface**     Note: A:LCD Length X / Y / Z >1/8A / ≤0.3mm / ≤1/2T ≤1/8A / Not enter into epoxy frame / ≤T ≤1/8A / Not enter into the inner edge of epoxy / ≤1/2T

11	**LCD**	**2.1.2 Chip on the terminal**    X: >1/8A, ≤0.3mm, ≤1/2T ≤1/8A, ≤1/2L, ≤T ≤1/8A&≤1mm, ≤L, ≤T ≤1/8A&≤2mm, ≤L, ≤1/2T Note: A:LCD Length. the distance between crack and contact pad must be greater than the width of 1st contact pad. **2.1.3 Chip out on between side** 

11	**LCD**	

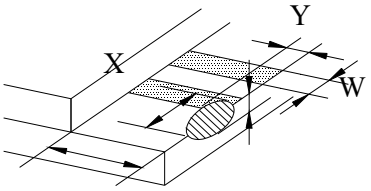




X	Y	Z
≤ 1/8A	Not enter into epoxy frame	Z≤2T
	Not enter into 1/2 epoxy frame	Z≤1/2T

Note: A : LCD Length

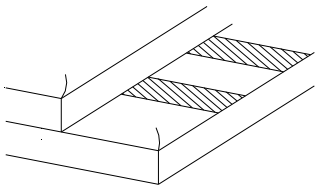
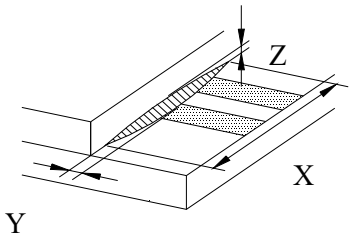
2.1.4 including corner chip and side chip



L

Note: A:LCD Length

X	Y	Z
>1/8A	≤1/6L	≤1/2T
≤1/8A	≤1/3L	
≤1/4W	≤2/3L	

<table>
<tr><td rowspan="2">11</td><td rowspan="2">LCD</td><td>2.2 Chip out
 
1) Chip out is that crackles extend to inner edge.
2) Crackles round epoxy frame will be rejected.
3) Chip out on the terminal will be rejected: Z=T length >1mm or Z<T length >2mm
4) The chip out at ITO will be rejected.</td></tr>
<tr><td>2.3 Poor cutting
 

<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>>1/8 A</td><td>≤0.3</td><td>≤1/2T</td></tr>
<tr><td>≤1/8 A</td><td>According to drawing</td><td>1/2T≤Z≤T</td></tr>
</table>
Note : A: LCD Length.</td></tr>
<tr><td>12</td><td>SMT</td><td>According to the <Acceptable of electronic assemblies>
IPC-A-610C class 2 stander. Component missing or function defect are Major defect ,the others are Minor defect.</td></tr>
<tr><td colspan="3">Any one out of the specification will be rejected.</td></tr>
</table>

12. GENERAL PRECAUTIONS

(1) Mounting Method

The panel of the LCD Module consists of two thin glass plates with polarizers which easily get damaged since the Module is fixed by utilizing fitting holes in the printed circuit board. Extreme care should be taken when handling the LCD Modules.

(2) Caution of LCD handling & cleaning

When cleaning the display surface, use soft cloth with solvent (recommended below) and wipe lightly.

- Isopropyl alcohol
- Ethyl alcohol
- Trichlorotrifloroethane

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface. Do not use the following solvent:

- Water
- Ketone
- Aromatics

(3) Caution against static charge

The LCD Module use C-MOS LSI drivers, so we recommend that you connect any unused input terminal to VDD or VSS, do not input any signals before power is turned on. And ground your body, Work/assembly table. And assembly equipment to protect against static electricity.

(4) Packaging

Modules use LCD elements, and must be treated as such. Avoid intense shock and falls from a height.

- To prevent modules from degradation. Do not operate or store them exposed directly to sunshine or high temperature/humidity.

(5) Caution for operation

- It is indispensable to drive LCD's within the specified voltage limit since the higher voltage than the limit shorten LCD life. An electrochemical reaction due to direct current causes LCD deterioration, Avoid the use of direct current drive.
- Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color in them.

However those phenomena do not mean malfunction or out of order with LCD's which will come back in the specified operating temperature range.

- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- As light dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal

open circuit.

Usage under the relative condition of 40°C, 50%RH or less is required.

(6) Storage

In the case of storing for a long period of time (for instance, for years) for the purpose or replacement use, The following ways are recommended.

- Storage in a polyethylene bag with sealed so as not to enter fresh air outside in it, And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light is.

Keeping temperature in the specified storage temperature range.

- Storing with no touch on polarizer surface by the anything else. (It is recommended to store them as they have been contained in the inner container at the time of delivery)

(7) Safety

- It is recommendable to crash damaged or unnecessary LCD into pieces and wash off liquid crystal by using solvents such as acetone and ethanol which should be burned up later.
- When any liquid crystal leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water.

Hello Lighting co., ltd reserves the right to change this specification.
www.hello-lighting.com
- END -