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8 WU SLOC Product Specification

BUYER	
SUPPLIER	HEFEI BOE Optoelectronics Technology CO., LTD
FG-Code	**TV080WUM-TL0**

ITEM	BUYER SIGNATURE	DATE

ITEM	SUPPLIER SIGNATURE	DATE
Prepared		
Reviewed		
Approved		

HEFEI BOE OPTOELECTRONICS TECHNOLOGY

R2015-6013-O

REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
P.0	-	Initial Release	2019.04.09	

Contents

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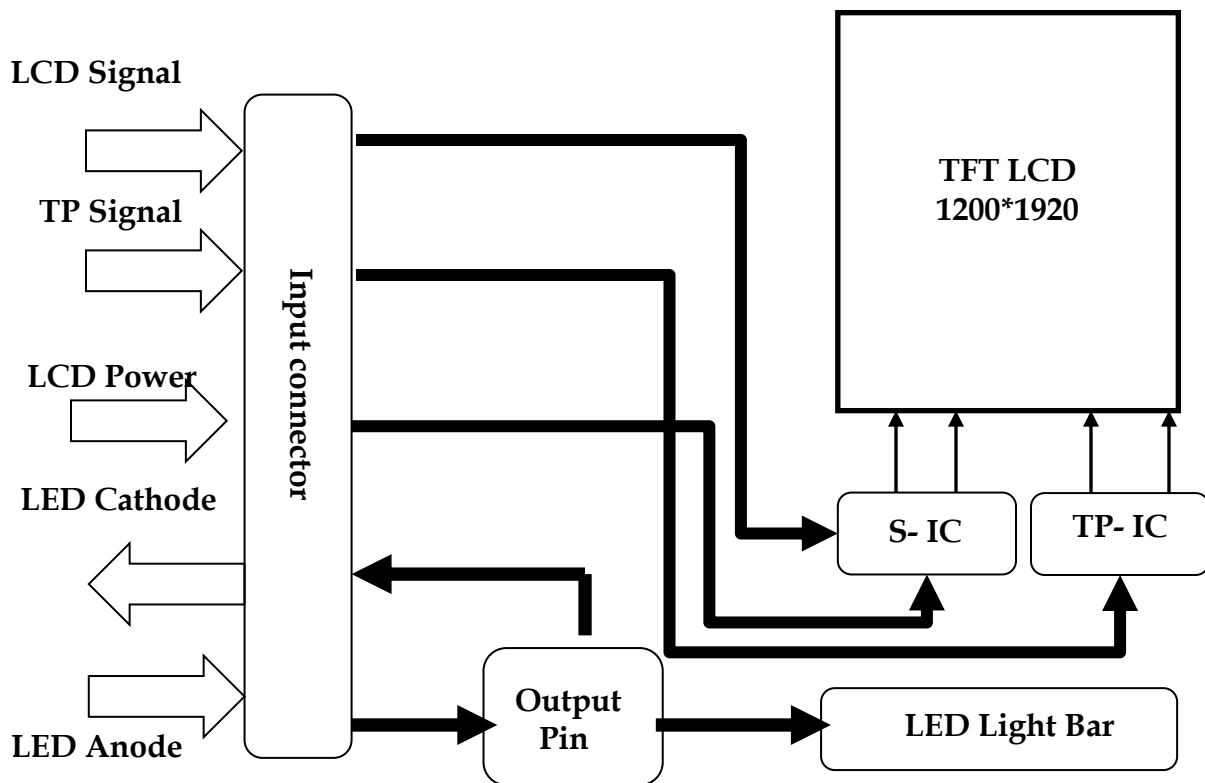| SPEC. NUMBER	PRODUCT GROUP	REV.	DATE	PAGE
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1.0. GENERAL DESCRIPTION

Block Diagram

Features

- 8-bit color depth, display 16.7M colors;
- Embedded on cell touch
- MIPI 4 Lanes;
- RoHS compliant

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1.1 LCD Specifications

Parameter	Specification	Unit	Remarks
Screen Size	8	Inch	
Active Area	107.64 x 172.224	mm	
Panel Active Area	107.64(H) x 172.224V)	mm	
Outline Dimension	117.7 x 193.28	mm	±0.05mm
Display Resolution	1200*RGB*1920	pixel	
Pixel Pitch	89.7	um	
Display Method	a-Si	-	
Display Mode	HADS	-	
Display Color	16.7M	-	
Color Gamut	60	%	NTSC
Luminance	Typ. 350 , Min. 315	nit	(Center with CG)
Contrast Ratio	Typ. 900:1	-	
Viewing Angle	80/80/80/80(CR>10)	-	Single Center Point
Pol Surface Treatment	HC	-	
Weight	Max. 150	g	@with CG
D-IC	HX8279D	-	2ea
Inversion Method	Colum	-	
LED Q'ty	24	ea	4*6
Power Consumption	500+1440	mw	Logic + Back light @ White Pattern

1.2 TP Specifications

Parameter		Specification				Remarks
TP Structure		ON-CELL				
Sensing Method		Mutual Cap.				
Number Of Touch		10				
Performance	Sensitivity(mm)	Φ6				
	Report Rate	80Hz@1Finger 70Hz@2 Finger				
	Finger Separation	17				
	Response Time	Less than 30 ms (1st touch)				
	Accuracy(mm)	Center	≤1.5	Edge	≤2.5	@Φ7
	Precision(mm)		≤0.5		≤0.5	
	Linearity(mm)		≤1.5		≤2.5	
	Jitter(mm)		≤0.5		≤0.5	
Hover		yes				
Palm & Face Rejection		yes				
Temperature Shock Self-adaption		yes				
Anti Water		yes				
Gesture Support		yes				
Power Consumption(Active)		Max. 100mW				

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2.0 ABSOLUTE MAXIMUM RATINGS

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

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Input Voltage	VDDIO	-0.3	2.1	V	
	AVDD	-0.3	6.6	V	
	AVEE	-6.6	0.3	V	
LED Forward Current of every LED string	I_{LED}	-	20	mA	
LED string Reverse Voltage	V_R	-	18	V	
Operating Temperature	T_{OP}	-20	+60	℃	
Storage Temperature	T_{ST}	-30	+70	℃	

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3.0 Electrical Specifications

3.1 TFT LCD Module

[Ta =25±2 ℃]

Parameter	Symbol	Values			Unit	Notes
		Min	Typ.	Max		
Power Supply Input Voltage	VDDIO	1.7	1.8	2.0	V	
	AVDD	5.2	5.5	5.8	V	
	AVEE	--5.8	-5.5	-5.2	V	
Power Supply Current	IDD	-	45	50	mA	@White pattern
	IAVDD	-	20	23	mA	
	IAVEE	-	20	23	mA	
LED Forward Current of every LED string	ILED	-	20	-	mA	
Power Consumption	PD	-	300	350	W	@White pattern
	PBL	--	1344	1440	mW	Note 1
	PTotal	-	1644	1790	W	

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3.2 BACK LIGHT UNIT

The edge-lighting type of back light unit consists of 24 LEDs which is connected in serial.

Table 3.1 Electrical Characteristics Of Back Light Unit

Parameter	Symbol	Values			Units	Notes
		Min	Typ.	Max		
LED Current	I_{LED}	-	20	-	mA	
LED Forward Voltage	V_{LED}	-	2.8	3.0	V	

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3.3. LCD INTERFACE CONNECTIONS

Interface Connector：IPEX 20655-045E-01

<Table 3.2. Pin Assignments for the Interface Connector>

Pin	Symbol	Description
1	LED+	Power for LED Anode
2	LED+	Power for LED Anode
3	NC	No connection
4	LED1-	Power for LED1 Cathode
5	LED2-	Power for LED2 Cathode
6	LED3-	Power for LED3 Cathode
7	LED4-	Power for LED4 Cathode
8	NC	No connection
9	GND	Ground
10	D0+	MIPI differential data0 input (Positive)
11	D0-	MIPI differential data0 input (Negative)
12	GND	Ground
13	D1+	MIPI differential data1 input (Positive)
14	D1-	MIPI differential data1 input (Negative)
15	GND	Ground
16	CLK+	MIPI differential clock input (Positive)
17	CLK-	MIPI differential clock input (Negative)
18	GND	Ground
19	D2+	MIPI differential data2 input (Positive)
20	D2-	MIPI differential data2 input (Negative)

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<Table 3.2. Pin Assignments for the Interface Connector>

Pin	Symbol	Description
21	GND	Ground
22	D3+	MIPI differential data3 input (Positive)
23	D3-	MIPI differential data3 input (Negative)
24	GND	Ground
25	NC	No connection
26	ID0	System Hardware ID0 Select(Pull High to VDDI with 10KΩ)
27	ID1	System Hardware ID1 Select(Pull Low to GND with 10KΩ)
28	RESX	This signal will reset the device and must be applied properly to initialize the chip.
29	VDDI	1.8V input power
30	OTP	Power supply pin for the OTP memory programming. – Panel vendor use(USE Internal VPP , BOE NC)
31	VDD	3.3V input power(给竞争社2Power使用，BOE NC)
32	VDD	3.3V input power(给竞争社2Power使用，BOE NC)
33	NC	NC
34	AVDD	+5.5V input power
35	NC	No connection
36	AVEE	-5.5V input power
37	NC	No connection
38	LEDPWM_OUT	Output pin for PWM signal of LED driving.
39	GND	Ground
40	TP-VDD	3.3V input power
41	TP_SCL	Serial I2C clock signal
42	TP_SDA	Serial I2C data signal
43	TP_INT	Interrupt signal for TP
44	TP_RESX	The external reset input for TP
45	GND	Ground

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4.0. SIGNAL TIMING SPECIFICATIONS

ITEM			SYNBOL	min	typ	max	UNIT
LCD		Frame Rate	-	-	60	-	Hz
		Pixels Rate	-	-	160	-	MHz
Timing	DCLK	Frequency	fCLK	-	480	-	MHz
		Period	Tclk	-	2.08	-	ns
	Horizontal	Horizontal total time	tHP	-	1364	2047	t_{CLK}
		Horizontal Active time	tHadr		1200		t_{CLK}
		Horizontal Pulse Width	tHsync	-	24	-	t_{CLK}
		Horizontal Back Porch	tHBP	-	80	-	t_{CLK}
		Horizontal Front Porch	tHFP	-	60	-	t_{CLK}
	Vertical	Vertical total time	tvp	-	1956	2047	t_{H}
		Vertical Active time	tVadr		1920		t_{H}
		Vertical Pulse Width	tVsync	-	4	-	t_{H}
		Vertical Back Porch	tVBP	-	16	-	t_{H}
		Vertical Front Porch	tVFP	-	16	-	t_{H}
Differential Swing			VDswing	140	200	270	mV
Bit Rate			TX SPD (MBPS)	980	980	995	Mbps
Pixel Fomat				-	24	-	Data bit/ pixel
Lane				-	4	-	Lane

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4.1. MIPI Interface DC/AC Characteristic

(1) DC Specification

Parameter	Symbol	Min	Typ	Max	Unit	Condition
MIPI digital operation current	I_{VCCIF}	-	-	6	mA	
MIPI digital stand-by current	$I_{VCCIFST}$	-	500	-	uA	
MIPI Characteristics for High Speed Receiver						
Single-ended input low voltage	V_{ILHS}	-40	-	-	mV	
Single-ended input high voltage	V_{IHHS}	-	-	460	mV	
Common-mode voltage	V_{CMRXDC}	70	-	330	mV	
Differential input impedance	Z_{ID}	80	100	125	Ω	
HS transmit differential voltage($V_{OD}=V_{DP}-V_{DN}$)	$|V_{OD}|$	140	200	270	mV	
MIPI Characteristics for Low Power Mode						
Logic 1 input voltage	V_{IH}	880	-	-	mV	
Logic 0 input voltage	V_{IL}	0	-	550	mV	
Logic 1 output voltage	V_{OH}	1.1	1.2	1.3	V	
Logic 0 output voltage	V_{OL}	-50	-	50	mV	

High Speed Differential Signal / Low Power Single Ended Signal

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4.1. MIPI Interface DC/AC Characteristic

(2) AC Specification

Symbol·	Parameter	Min.	Typ	Max	Unit
fDSICLK	DSICLK Frequency	40	-	500	MHz
tDSIR	DSI Data Transfer Rate (Video mode）	80	-	1000	Mbps
UI INST	UI instantaneous	1.0	-	12.5	ns
tSETUP	Data to Clock Setup Time	0.15	-	-	UI INST
tHOLD	Clock to Data Hold Time	0.15	-	-	UI INST

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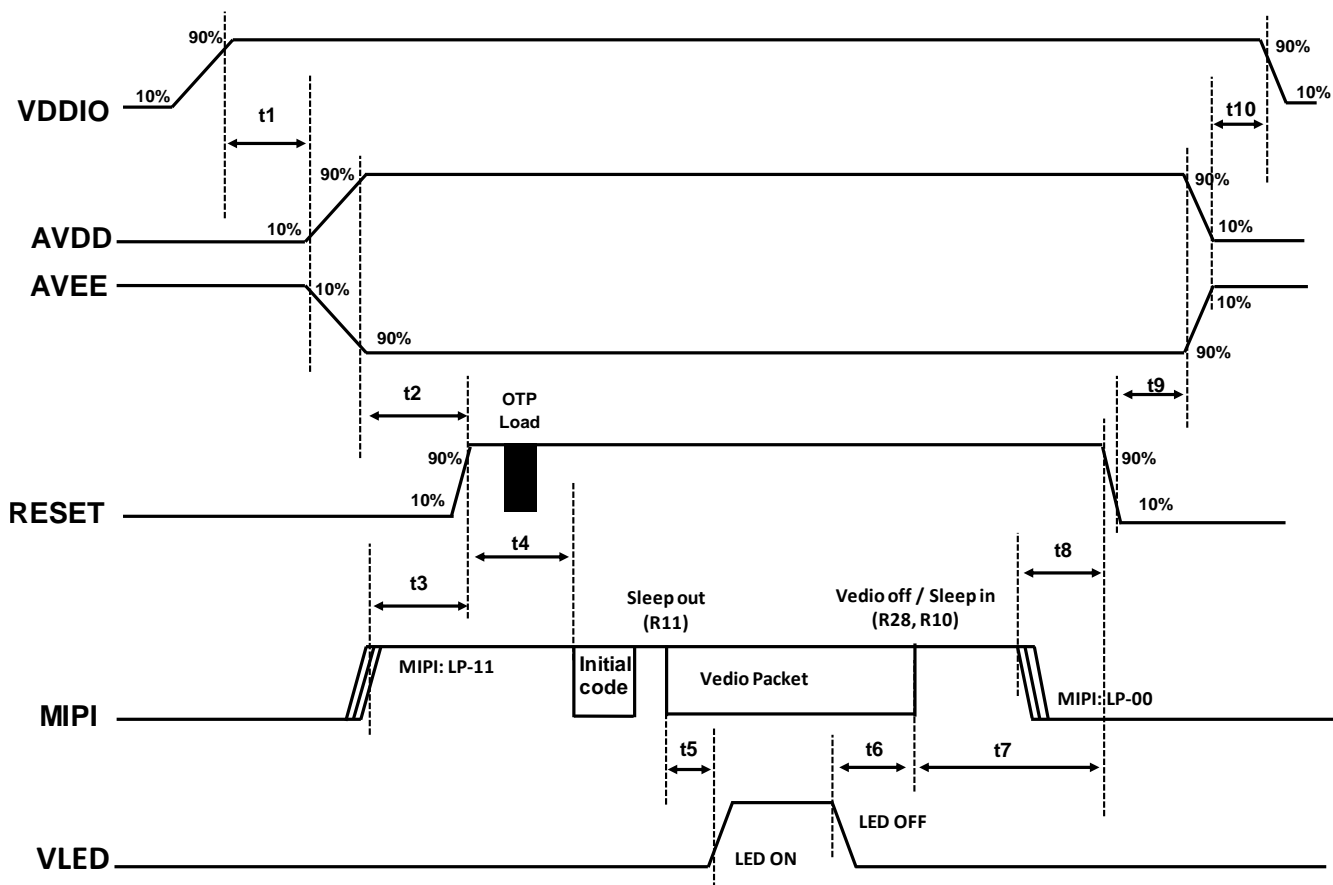| SPEC. NUMBER	PRODUCT GROUP	REV.	DATE	PAGE
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4.2. Power Sequence

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below

Item	Time	Unit	Remark
t1	t1>0	ms	
t2	t2>5	ms	
t3	t3>0	ms	
t4	t4>6	ms	
t5	t5>100	ms	
t6	t6>50	ms	
t7	t7>100	ms	Scan Black
t8	>0	ms	
t9	>0	ms	
t10	>0	ms	

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4.3. Initial Code

delay 150	RD5 12	RB8 B5	RCE FF	RC5 E9
R10	RD6 0A	RB9 F2	RB0 0A	RC6 F5
delay 10	RD7 14	RBA 2E	RB1 14	RC7 FA
RB0 05	RD8 22	RBB 99	RB2 15	RC8 FC
RB3 52	RD9 2E	RBC 0D	RB3 1F	RC9 00
RB0 01	RDA 3D	RBD 12	RB4 34	RCA 00
RC8 00	RDB 3F	RBE 94	RB5 52	RCB 16
RC9 00	RDC 3F	RBF 18	RB6 69	RCC AF
RCC 26	RDD 3F	RC0 58	RB7 90	RCD FF
RCD 26	RDE 3D	RC1 9A	RB8 B2	RCE FF
RDC 00	RDF 2F	RC2 B5	RB9 EE	RB0 0C
RDD 00	RE0 2F	RC3 D1	RBA 2A	RB1 04
RE0 26	RE1 2F	RC4 DC	RBB 96	RB2 14
RE1 26	RE2 07	RC5 E9	RBC 09	RB3 1D
RB0 03	RB0 07	RC6 F5	RBD 0E	RB4 33
RC3 2A	RB1 14	RC7 FA	RBE 90	RB5 50
RE7 2A	RB2 15	RC8 FC	RBF 15	RB6 6A
RC5 2A	RB3 1F	RC9 00	RC0 56	RB7 93
RDE 2A	RB4 34	RCA 00	RC1 98	RB8 B6
RB0 00	RB5 52	RCB 16	RC2 B4	RB9 F4
RB6 03	RB6 69	RCC AF	RC3 D0	RBA 30
RBA 87	RB7 90	RCD FF	RC4 DC	RBB 9D
RBF 15	RB8 B2	RCE FF	RC5 E8	RBC 13
RC0 12	RB9 EE	RB0 09	RC6 F5	RBD 17
RC2 04	RBA 2A	RB1 04	RC7 FA	RBE 99
RC3 02	RBB 96	RB2 14	RC8 FC	RBF 1D
RC4 04	RBC 09	RB3 1D	RC9 00	RC0 5C
RC5 02	RBD 0E	RB4 33	RCA 00	RC1 9E
RB0 06	RBE 90	RB5 50	RCB 16	RC2 B8
RC0 A5	RBF 15	RB6 6A	RCC AF	RC3 D2
RD5 20	RC0 56	RB7 93	RCD FF	RC4 DE
RC0 00	RC1 98	RB8 B6	RCE FF	RC5 EA
RB0 02	RC2 B4	RB9 F4	RB0 0B	RC6 F6
RC0 00	RC3 D0	RBA 30	RB1 04	RC7 FA
RC1 02	RC4 DC	RBB 9D	RB2 09	RC8 FC
RC2 06	RC5 E8	RBC 13	RB3 1B	RC9 00
RC3 16	RC6 F5	RBD 17	RB4 36	RCA 00
RC4 0E	RC7 FA	RBE 99	RB5 52	RCB 16
RC5 18	RC8 FC	RBF 1D	RB6 6B	RCC AF
RC6 26	RC9 00	RC0 5C	RB7 93	RCD FF
RC7 32	RCA 00	RC1 9E	RB8 B5	RCE FF
RC8 3F	RCB 16	RC2 B8	RB9 F2	RB0 04
RC9 3F	RCC AF	RC3 D2	RBA 2E	RB5 02
RCA 3F	RCD FF	RC4 DE	RBB 99	RB6 01
RCB 3F	RCE FF	RC5 EA	RBC 0D	delay 10
RCC 3D	RB0 08	RC6 F6	RBD 12	R11
RCD 2F	RB1 04	RC7 FA	RBE 94	delay 100
RCE 2F	RB2 09	RC8 FC	RBF 18	R29
RCF 2F	RB3 1B	RC9 00	RC0 58	delay 50
RD0 07	RB4 36	RCA 00	RC1 9A	
RD2 00	RB5 52	RCB 16	RC2 B5	
RD3 02	RB6 6B	RCC AF	RC3 D1	
RD4 06	RB7 93	RCD FF	RC4 DC	

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5.0 Optical Specifications

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature $= 25\pm2℃$) with the equipment of Luminance meter system (CA-310、BM-5A) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°.

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	70	80	-	Deg.	Note 1
		Θ_9		70	80	-	Deg.	
	Vertical	Θ_{12}		70	80	-	Deg.	
		Θ_6		70	80	-	Deg.	
Color Gamut				55	60	-	%	-
Luminance Contrast ratio		CR	$\Theta = 0°$	700:1	900:1	-	-	Note 2
Luminance of White	Center Point	Y_w	$\Theta = 0°$	315	350	-	nit	Note 3
White Luminance uniformity	9 Points	ΔY9		75	80	-	%	Note 4
White balance		Wx	$\Theta = 0°$	0.275	0.305	0.335	-	Note 5
		Wy		0.290	0.320	0.350	-	
Reproduction of color	Red	R_x	$\Theta = 0°$	0.580	0.620	0.650	-	Note6
		R_y		0.315	0.345	0.375		
	Green	G_x		0.310	0.340	0.370		
		G_y		0.550	0.580	0.610		
	Blue	B_x		0.120	0.150	0.180		
		B_y		0.055	0.085	0.115		
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C $\Theta = 0°$	-	30	35	ms	Note 7

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Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).

2. Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see FIGURE 1) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. Center Luminance of white is defined as luminance values of 1point average across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 1 for a total of the measurements per display. The luminance is measured by CA310 when the LED current is set at 20mA.

4. The White luminance uniformity on LCD surface is then expressed as : ΔY = Minimum Luminance of 9points / Maximum Luminance of 9points (see FIGURE 2).

5. The color chromaticity coordinates specified shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

6. The color chromaticity coordinates specified shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

7. The electro-optical response time measurements shall be made as FIGURE 3 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

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Figure 1. Measurement Set Up

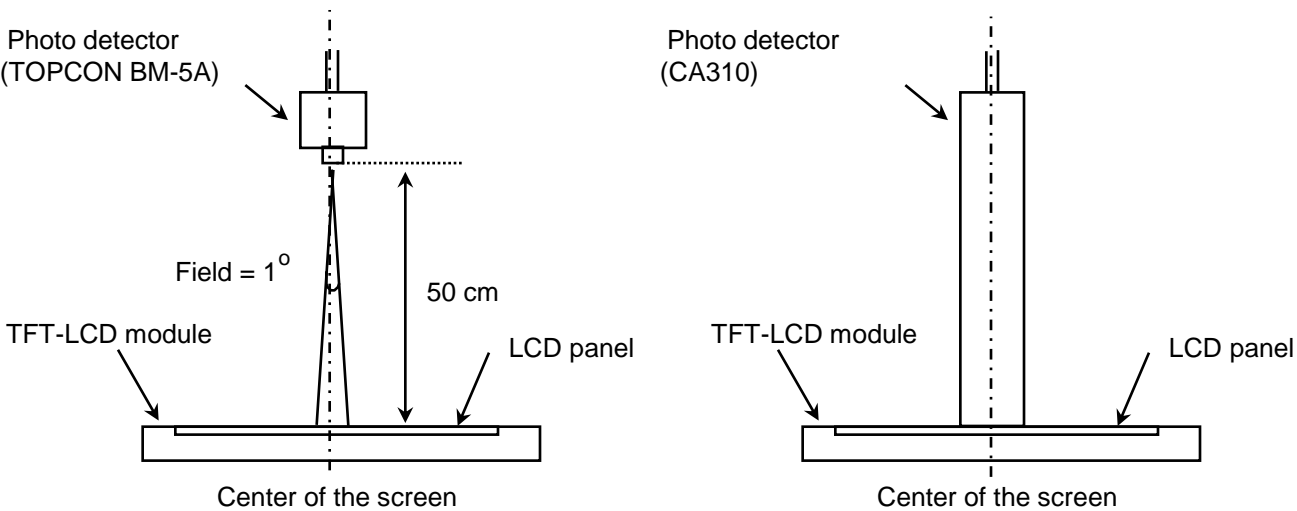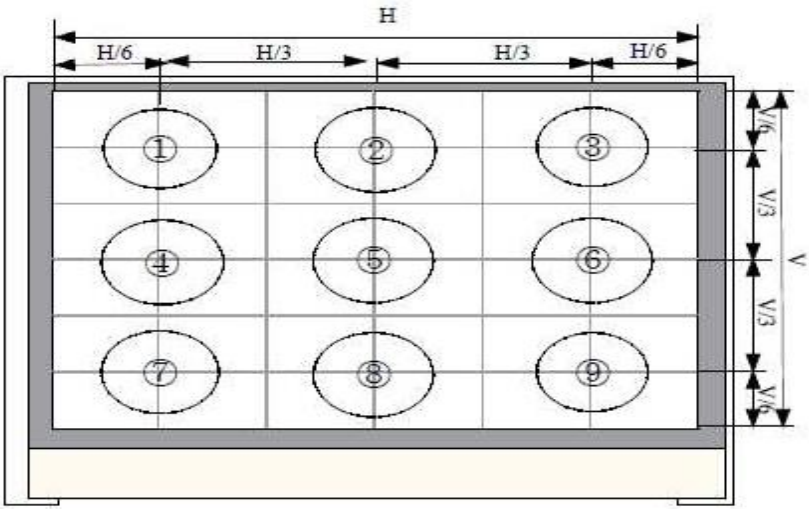View angel range measurement setup   Luminance , uniformity and color measurement setup

Figure 2. White Luminance and Uniformity Measurement Locations (9 points)
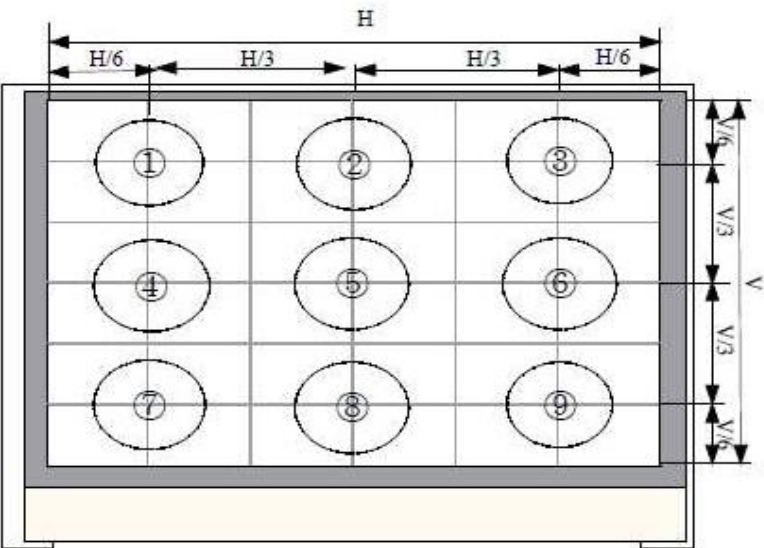

Center Luminance of white is defined as luminance values of center 9 points across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display.

$$\text{Brightness Uniformity} = \frac{\text{Minimum Photo detector output for P1-P13 with all pixels white}}{\text{Maximum Photo detector output for P1-P13 with all pixels white}}$$
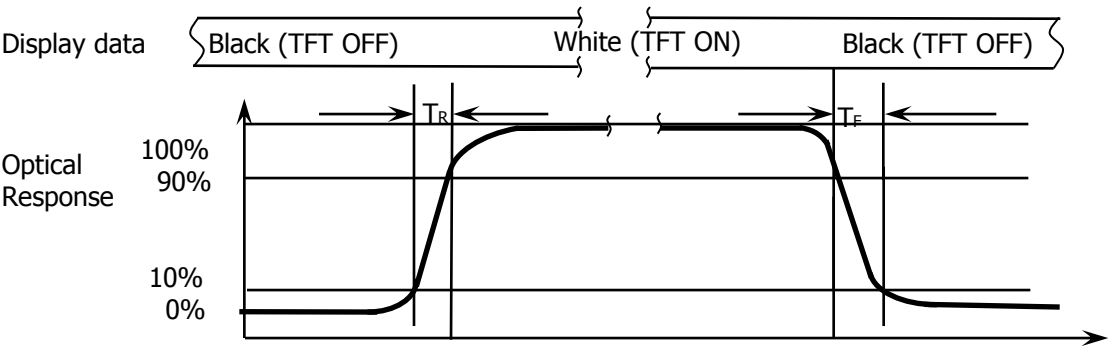
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Figure 3. Uniformity Measurement Locations (9 points)

The White luminance uniformity on LCD surface is then expressed as : ΔY9 = Minimum Luminance of 9 points /Maximum Luminance of 9 points (see FIGURE 3).
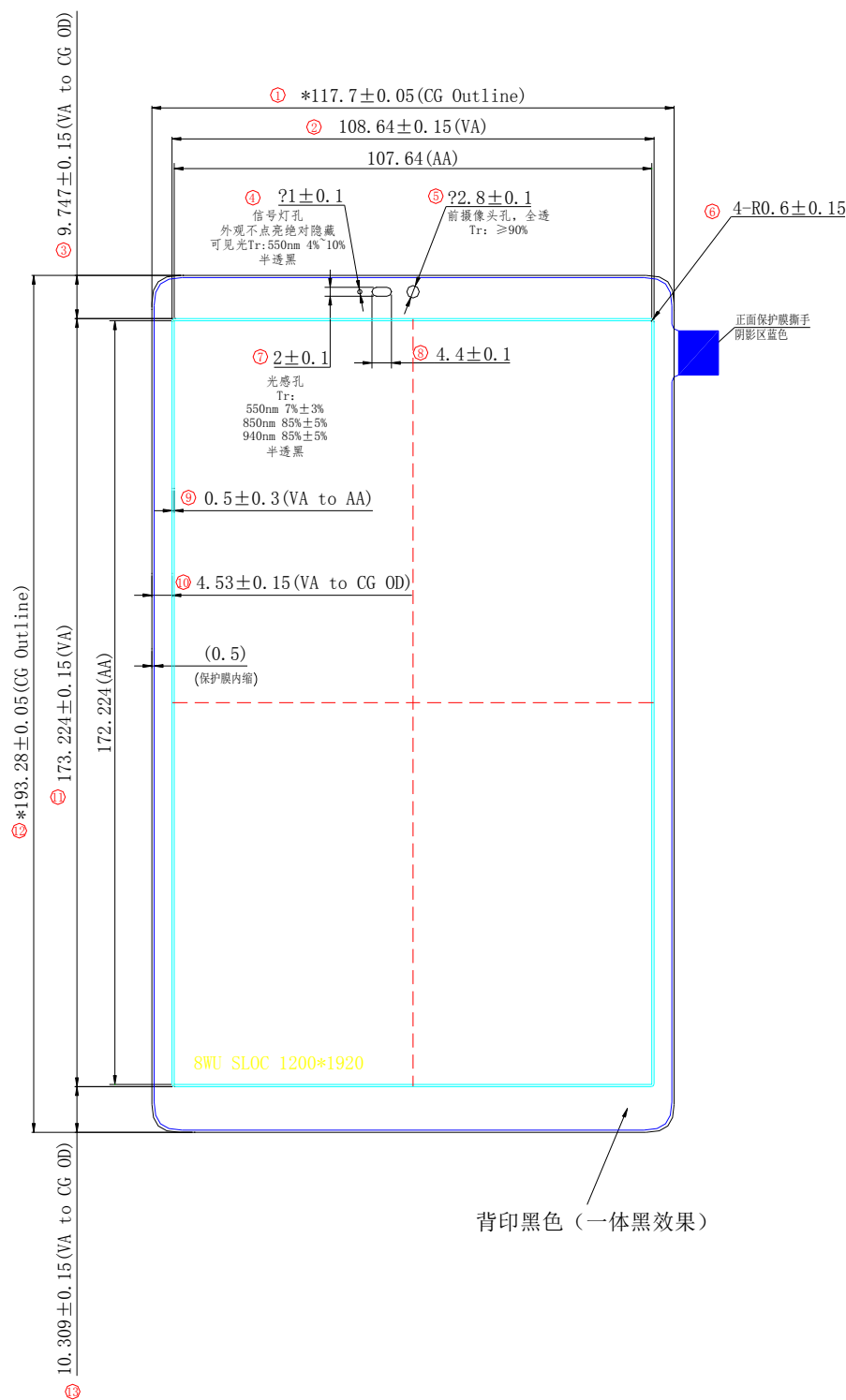
Figure 4. Response Time Testing

The electro-optical response time measurements shall be made as shown in FIGURE 4 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr and 90% to 10% is Td.

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6.0 TLCM Display Module Drawing

(1) Front

① *117.7±0.05(CG Outline)
② 108.64±0.15(VA)
107.64(AA)
③ 9.747±0.15(VA to CG OD)
④ ?1±0.1
信号灯孔
外观不点亮绝对隐藏
可见光Tr:550nm 4%~10%
半透黑
⑤ ?2.8±0.1
前摄像头孔，全透
Tr：≥90%
⑥ 4-R0.6±0.15
正面保护膜撕手
阴影区蓝色
⑦ 2±0.1
光感孔
Tr:
550nm 7%±3%
850nm 85%±5%
940nm 85%±5%
半透黑
⑧ 4.4±0.1
⑨ 0.5±0.3(VA to AA)
⑩ 4.53±0.15(VA to CG OD)
(0.5)
(保护膜内缩)
⑫ *193.28±0.05(CG Outline)
⑪ 173.224±0.15(VA)
172.224(AA)
8WU SLOC 1200*1920
背印黑色（一体黑效果）
10.309±0.15(VA to CG OD)
⑬

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6.0 TLCM Display Module Drawing

(2) Side

⑭ *3.3±0.2(TLCM Thickness,卡尺测)

0.7±0.05(CG VA Thickness)

0.2±0.03(OCA Thickness)

2.4±0.15(LCM Thickness)

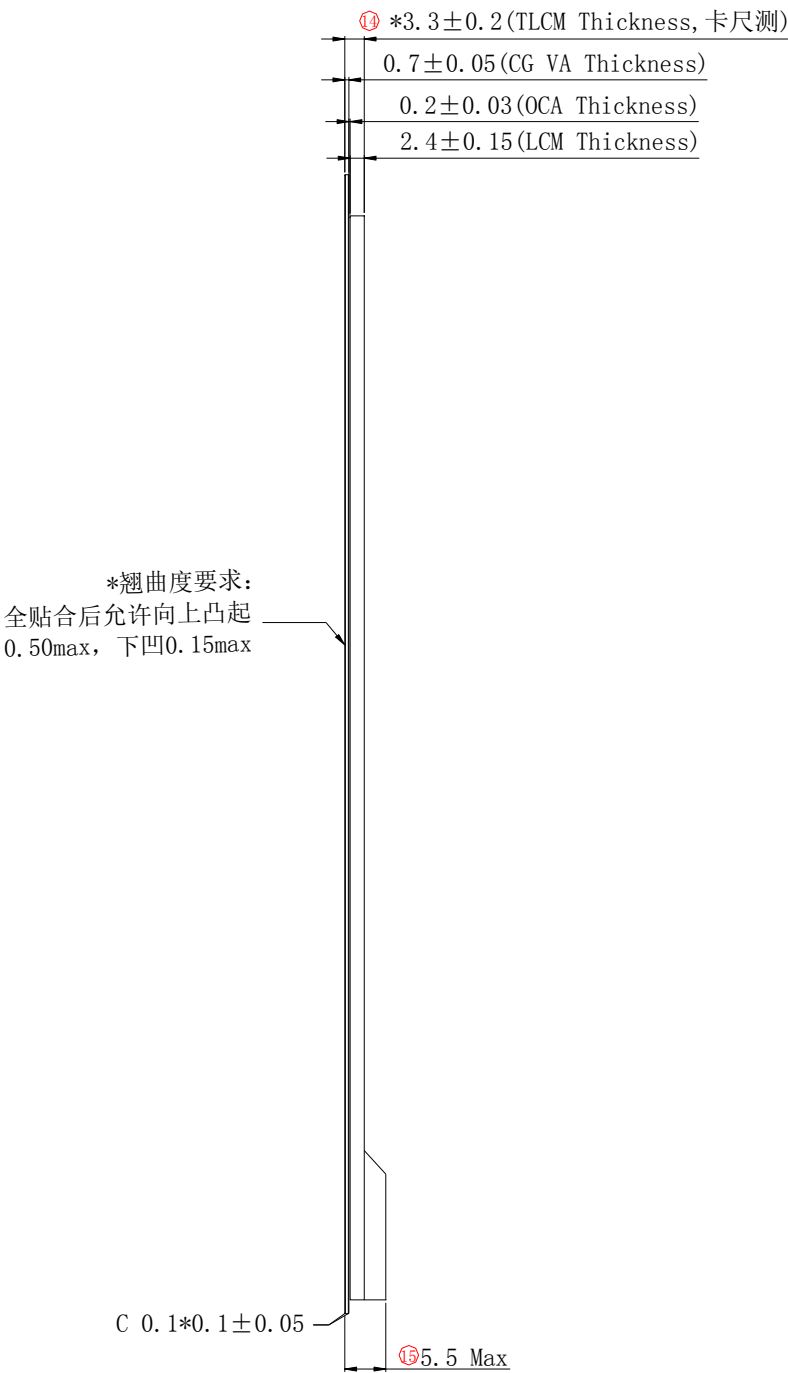*翘曲度要求：
全贴合后允许向上凸起
0.50max，下凹0.15max

C 0.1*0.1±0.05

⑮5.5 Max

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6.0 TLCM Display Module Drawing

(3) Back

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7.0 Reliability Test

No	Test Item	Test Condition	Remark
1	High temperature storage test	Ta = 80 ℃, 240 hrs	
2	Low temperature storage test	Ta = -30℃, 240 hrs	
3	Thermal Shock Test	-40℃/1hr → 60℃/1hr ×30Cycle	-
4	High temperature Operate test	Ta = 60℃, 240hrs,	
5	Low temperature Operate test	Ta = -20 ℃, 240hrs	
6	High temperature High humidity	Ta = 60 ℃, 90%, 240hrs	

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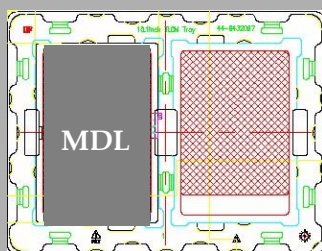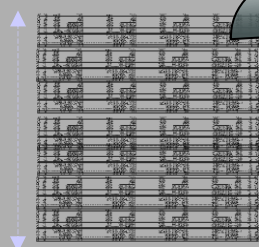| SPEC. NUMBER	PRODUCT GROUP	REV.	DATE	PAGE
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8.0. Package

-. 将 21pcs TLCM平放入Tray,
 CG侧向下放置;
-. 产品下放1pcs垫片

-. 将21pcs PET Tray 平放入PE Bag
-. Tray 无需旋转码放
-. 顶部1pcs 空Tray

MDL

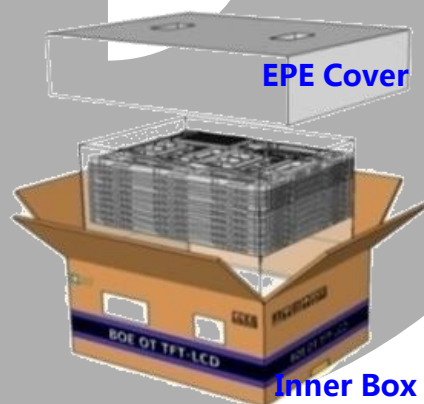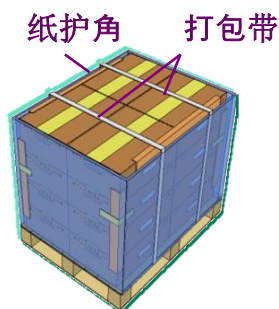**21层**

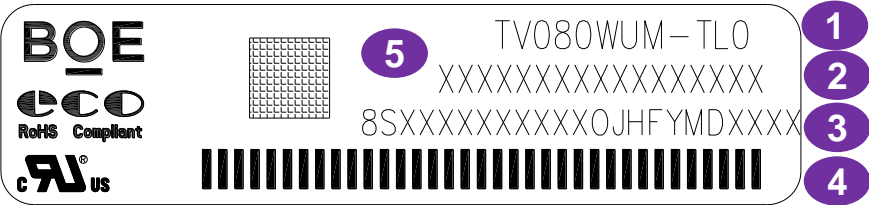**PE Bag**

-. 每个Pallet上放3层Box
 1层4箱,共计12ea Box
-. Pallet外进行缠膜包装
-. 480pcs Panel / Pallet

- .将PET Tray堆码后平放入Inner Box

上下放置EPE Cover. 40pcs/Box

纸护角   打包带

EPE Cover

Inner Box

8.1 MDL label

Label Size: 48mm × 12mm / 厚度: 0.075mm

1.FG-CODE：TV080WUM-TL0

2. MDL ID

3.8S码：SD68C54108

4. MDL ID对应条形码

5.8S码对应二维码

MDL ID 编码规则

序列号	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
代码	X	X	X	3	X	X	X	3	8	p	0	X	X	X	X	X	X
描述	GBN代码		等级	B3	年份		月	FG Code后四位				序列号					

8S 编码规则

序列号	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
代码	8	S	S	D	6	8	C	5	4	1	0	8	O	J	H	F	Y	M	D	X	X	X	X
描述	固定值	产品客户端物料号											版本号	B3代码	供应商产地		年月日			序列号			

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8.2 BOX label

```
┌─────────────────────────────────────────────┐
│  BOE  BOE Technology Group Co., Ltd.        │
│                                              │
│  MODEL: TV080WUM-TL0    ①   QTY: 40  ②      │
│                                              │
│  SERIAL NO: XXXXXXXXXXXX ③   DATE: 20XX.XX ④│
│                                              │
│  ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖             │
│                                      eco      │
│    SD68C54108   ⑥          38P0  ⑤  RoHS     │
│                                       cULus   │
└─────────────────────────────────────────────┘
```

1. **FG-CODE**

2. **Box 产品数量**

3. **Box ID, 编码规则如下**

4. **Box Packing 日期**

5. **FG-CODE 后四位:38P0**

6. **8S 码:SD68C54108**

Box ID编码规则

序列号	1	2	3	4	5	6	7	8	9	10	11	12	13
代码	X	X	X	X	X	X	X	X	X	X	X	X	X
描述	GBN代码		等级	B3	年份		月	Rev			序列号		

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9.0 Handing & Cautions

(1) Cautions when taking out the module
- Pick the pouch only, when taking out module from a shipping package.

(2) Cautions for handling the module
- As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
- As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD module should be avoided.
- As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
- Do not pull the interface connector in or out while the LCD module is operating.
- Put the module display side down on a flat horizontal plane.
- Handle connectors and cables with care.

(3) Cautions for the operation
- When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.

(4) Cautions for the atmosphere
- Dew drop atmosphere should be avoided.
- Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

(5) Cautions for the module characteristics
- Do not apply fixed pattern data signal to the LCD module at product aging.
- Applying fixed pattern for a long time may cause image sticking.

(6) Other cautions
- Do not disassemble and/or re-assemble LCD module.
- Do not re-adjust variable resistor or switch etc.
- When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

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