SPECIFICATION FOR LCD MODULE

(Customer) : _____

(Product) : IE-TFT-0708048-RTP-4.5

(Description): _____

Compile by	Quality/Engineer	Checked	Approved

Customer Approve	QC	R&D	Approved

REVISION

REV NO	REV DATE	CONTENTS	REMARKS
A.0	2015-08-06	First Release	

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1.0 General description

1.1 Introduction

liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 7.0 (16:9) inch diagonally measured active display area with WVGA (800 horizontal by 480 vertical pixel) resolution.

1.2 Applications

Mobile NB，GPS，Digital Photo frame，Multimedia applications and Others AV system

1.3 General information

Item		Specification	Unit
Outline Dimension		164.90 x 100 x3.5(Typ.)	mm
Display area		154.08(H) x 85.92(V)	mm
Number of Pixel		800 RGB(H) x 480(V)	pixels
Pixel pitch		0.1923 x 0.1784	mm
Pixel arrangement		RGB Vertical stripe	
Display mode		Normally white	
Surface treatment		Antiglare, Hard-Coating(3H) with EWV film	
Weight		TBD (Typ.)	g
Rubbing direction		6 O'clock	
Power Consumption	B/L System	1.68(Max.)	w

1.4 Mechanical Information

item		Min.	Typ.	Max.	Unit
LCD Size	Horizontal(H)	164.7	164.9		mm
	Vertical(V)	99.8	100	100.2	mm
	Depth(D)	3.3	3.5	3.7	mm

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD

Item		Specification	Unit
Outline Dimension		164.90 x 100 x 4.5	mm
Display area		154.08(H) x 85.92(V)	mm
Number of Pixel		800 RGB(H) x 480(V)	pixels
Pixel pitch		0.0642 x 0.1790	mm
Pixel arrangement		RGB Vertical stripe	
Display mode		Normally white	
Surface treatment		Antiglare, Hard-Coating(3H) with EWV film	
Weight		TBD (Typ.)	g
Rubbing direction		6 O'clock	
Power Consumption	B/L System	1.68(Max.)	w

2.1.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Remarks
Operating Temperature	Topa	-20	+70	℃	
Storage Temperature	Tstg	-30	+80	℃	

Note:
Liquid Crystal driving voltage
Due to the characteristics of LC Material, this voltage varies with environmental

3.0 OPTICAL CHARACTERISTICS

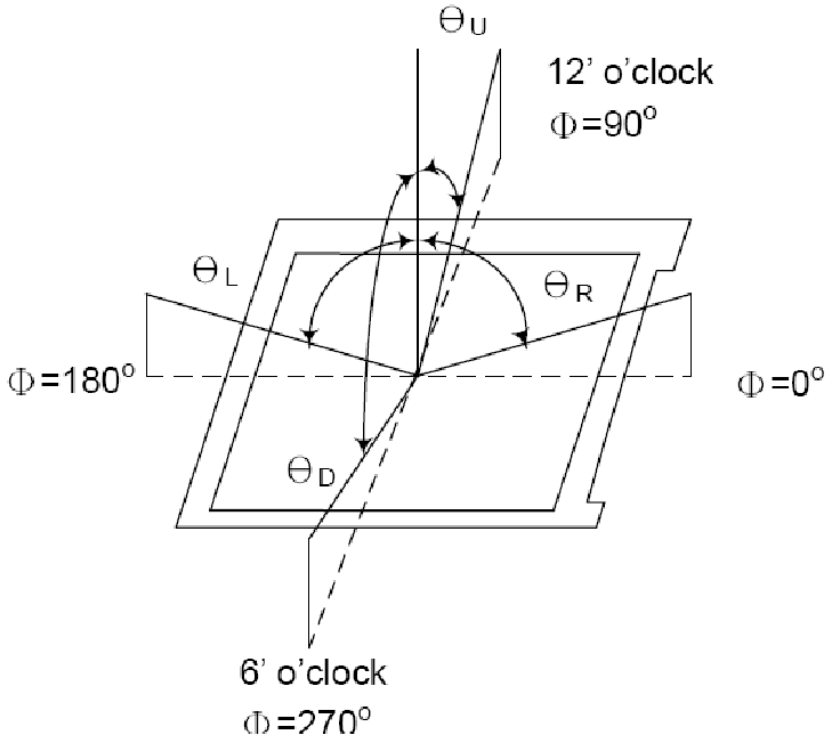
3.1 Optical Specifications

Item	Symbol	Temp	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle range	Horizontal	θ	CR > 10	75	85	--	Deg	Note 1
	Vertical	θ		125	145	--	Deg	
Brightness		YL		200	220		Cd/cm2	
Luminance Contrast ratio		CR	θ = 0°	--	--	--	--	Note 2
Transmittance		T(%)	θ = 0°	--	5.7	--	%	Note 3
Color Gamut (C light)				--	50	--	%	
White Chromaticity		Xw	θ = 0°					
		Yw						
Reproduction of color (C Light)	Red	Xr	θ = 0°					Note 4
		Yr						
	Green	Xg						
		Yg						
	Blue	Xb						
		Yb						
Threshold Voltage	Vsat				2.1		V	Figure 3
	Vth				1.1		V	
Response Time (Rising + Falling)	Trt		Ta= 25°C θ = 0°	--	25		ms	Note 5

3.2 Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics. Measuring spot size: 20 ~ 21 mm

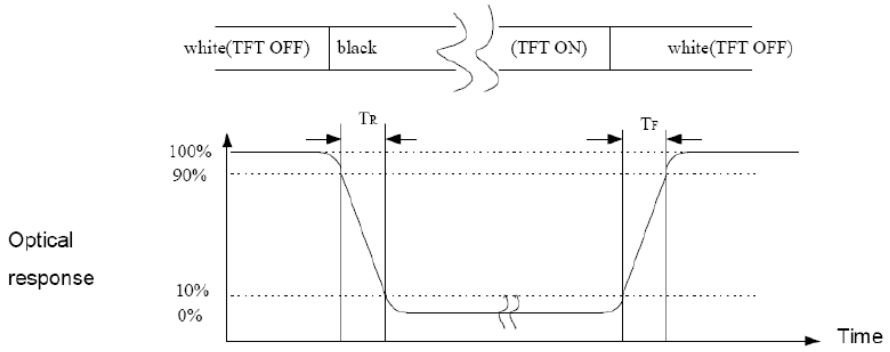
Note (1) Definition of Viewing Angle :



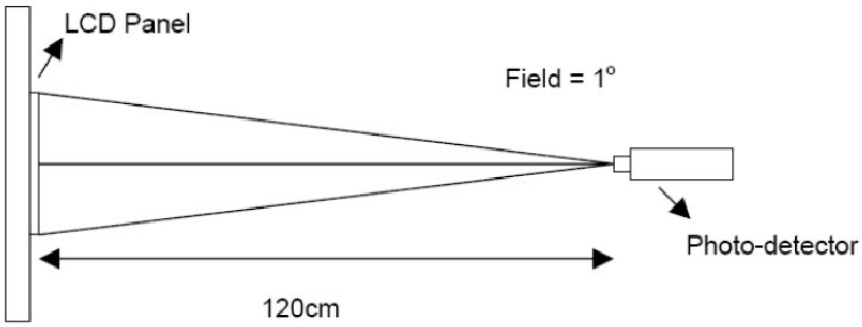
Note (2) Definition of Contrast Ratio (CR):
Measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

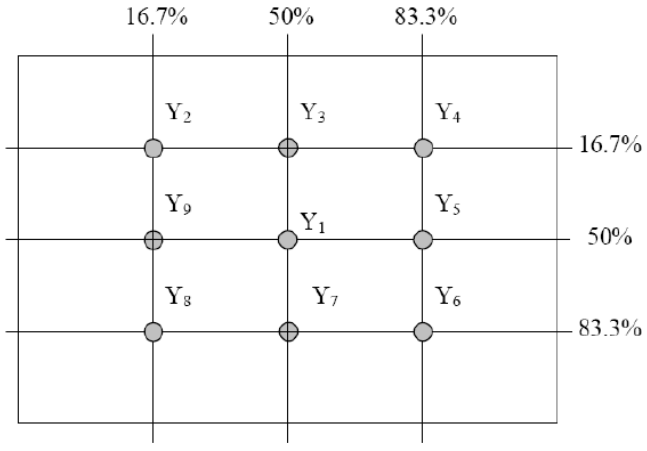
Note (3) Definition of Response Time: Sum of TR and TF



Note (4) Definition of optical measurement setup



Note (5) Definition of brightness uniformity



$$\text{Luminance uniformity} = \frac{\text{(Min Luminance of 9 points)}}{\text{(Max Luminance of 9 points)}} \times 100\%$$

4.0 INTERFACE PIN CONNECTION

4.1 Signal of interface

Terminal No.	Symbol	Functions
1	VLED-	LED Power Cathode
2	VLED+	LED Power Anode
3	GND	Analog Ground
4	VDD	Power supply
5	R0	Input data Red
6	R1	Input data Red
7	R2	Input data Red
8	R3	Input data Red
9	R4	Input data Red
10	R5	Input data Red
11	R6	Input data Red
12	R7	Input data Red
13	G0	Input data Green
14	G1	Input data Green
15	G2	Input data Green
16	G3	Input data Green
17	G4	Input data Green
18	G5	Input data Green
19	G6	Input data Green
20	G7	Input data Green
21	B0	Input data Blue
22	B1	Input data Blue
23	B2	Input data Blue
24	B3	Input data Blue
25	B4	Input data Blue
26	B5	Input data Blue
27	B6	Input data Blue
28	B7	Input data Blue
29	DGND	Ground
30	CLK	clock signal
31	DISP	Display on/of
32	HSYNC	Horizontal sync input in RGB mode
33	VSYNC	Vertical sync input in RGB mode
34	DE	Data enble
35	NC	No Connection
36	GND	Ground
37	X_R	Touch panel X-right
38	Y_D	Touch panel Y-bottom
39	X_L	Touch panel X-left
40	Y_U	Touch panel Y-upl

5.0 ELECTRICAL CHARACTERISTICS

5.1 TFT LCD

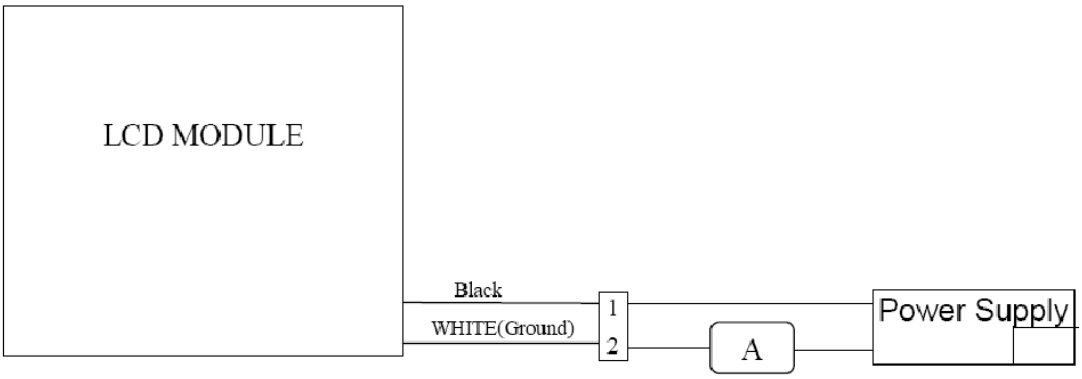
Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	3.0	3.3	3.6	V
	VGH	20.8	21	21.2	V
	VGL	-	-7	-	V
	AVDD	10.1	10.4	10.5	V
VCOM	VCOM	3.0	3.4	3.7	V
Current of power supply	IVDD	-	4.0	10	mA
	IAVDD	-	50	100	mA
	IGH	-	0.2	1.0	mA
	IGL	-	0.2	1.0	mA
Input voltage 'H' level	VIH	0.7VDD	-	VDD	V
Input voltage 'L' level	VIL	0	-	0.3VDD	V

Note (1): HSYNC, VSYNC, DE, Digital Data
Note (2): Be sure to apply the power voltage as the power sequence spec.
Note (3): DGND=AGND=0V

5.2 Back-Light Unit

The backlight system is an edge-lighting type with 14 LED.
The characteristics of the LED are shown in the following tables.

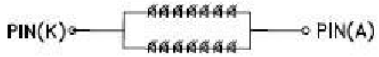
Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED current	**IL**	**-**	**40**	**-**	**mA**	**(2)**
LED Voltage	**VL**	**21**	**21.6**	**22**	**V**	
Operating LED life time	**Hr**	**10000**	**-**	**-**	**Hour**	**(1)(2)**



Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the

condition: Ta=25±3 oC, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note (2) The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL=40mA. The LED lifetime could be decreased if operating IL is larger than 120mA. The constant current driving method is suggested.



电路图：7*2=14 I=40mA

5.3 AC Characteristics

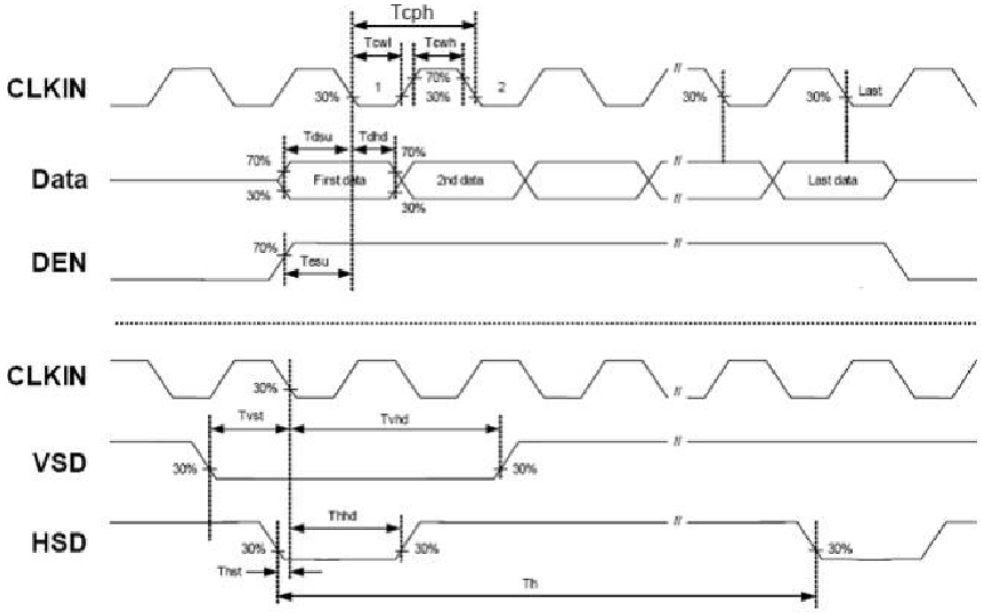
Horizontal timing

Parameter	Symbol	Min.	Typ.	Max	Unit	Note
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK frequency	fclk	-	30	50	MHz	
One Horizontal Line	th		928		DCLK	
HS pulse width	thpw		48		DCLK	
HS Back Porch(Blanking)	thbp		88		DCLK	
HS Front Porch	thfp		40		DCLK	
DE Mode Blanking	th-thd		128	-	DCLK	

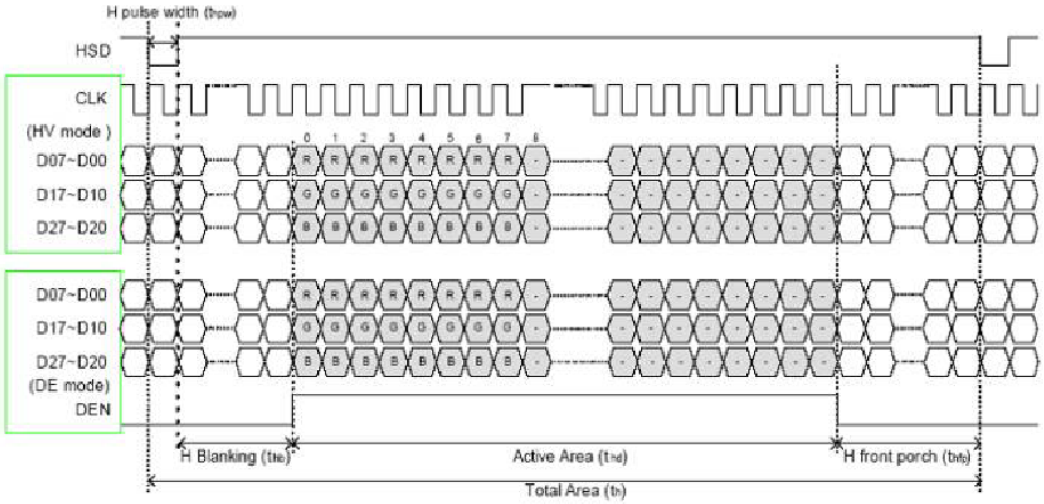
Vertical timing

Parameter	Symbol	Min.	Typ.	Max	Unit	Note
Vertical Display Area	tvd	-	480	-	th	
VS period time	tv		525		th	
VS pulse width	tvpw		3		th	
VS Back Porch(Blanking)	tvbp		32		th	
HS Front Porch	tvfp		13		th	
DE Mode Blanking	tv-tvd		45	-	th	

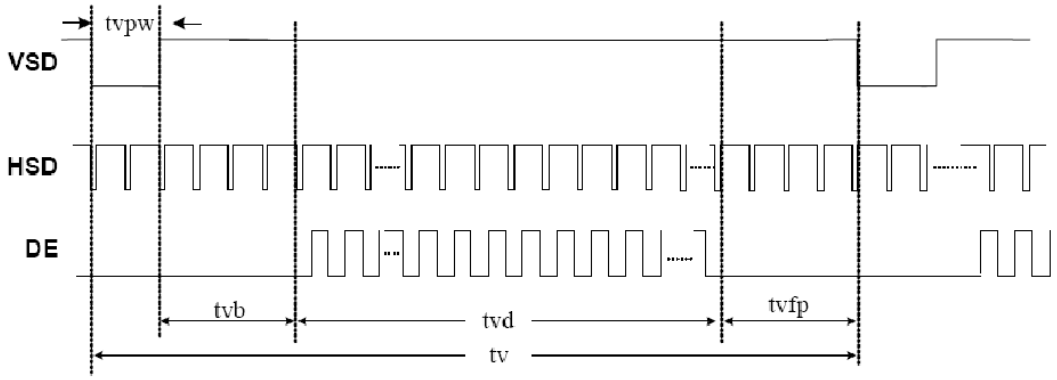
5.4 Timing Diagram of Interface Signal



Sampling clock timing



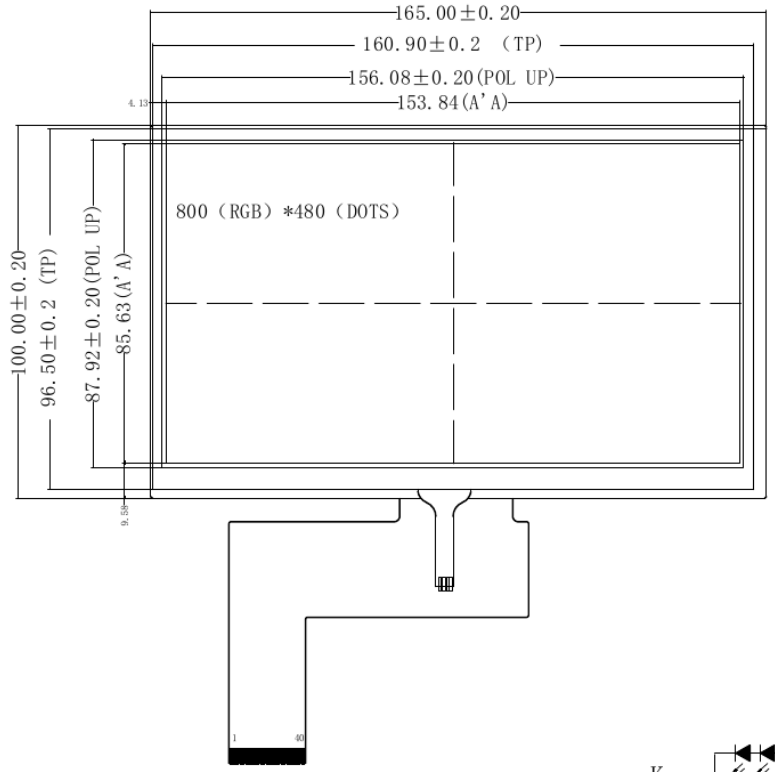
Horizontal display timing range

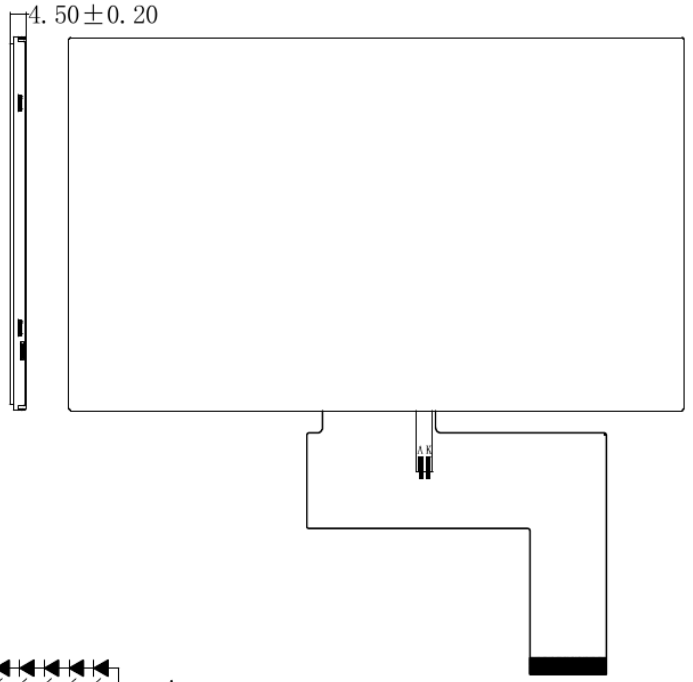


Vertical timing

6.0 Reliability test items

Test Item	Test Conditions	Notes
High temperature Operation	Ta= +70℃, 240hrs	
Low temperature Operation	Ta= -30℃, 240hrs	
High Temperature Storage	Ta= +80℃, 240hrs	
Low Temperature Storage	Ta= -20℃, 240hrs	
Humidity Test	40℃ ,Humidity 80% ,120hrs	
Thermal Shock Test	-30℃,30min～+70℃,30min (200 cycle)	
Vibration Test(Packing)	Sine Wave 1.04G, 5~500Hz, XYZ 30min/each direction	
Static Electricity	Half-Sine, 100G, 6ms, ±XYZ, 3 cycle	





Terminal No.	Symbol
1	VLED-
2	VLED+
3	GND
4	Vcc
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	DGND
30	CLK
31	DISP
32	HSYNC
33	VSYNC
34	DE
35	NC
36	GND
37	X_R
38	Y_D
39	X_L
40	Y_U

7*2=14 LED
If=40mA Iv=21.6V

Notes:
1. Unit: mm.
2. Do not scale drawing.
3. All radii without dimension R0.2.
4. ⚠ Modification Mark.
5. draft angle: 1°
6. Backlight luminance : cd/m^2 (Min)
7. Luminace uniformity: 80% (min) (min/max*100%)
8. UnSpecified Tolerance is ±0.2
9. Operation conditions : If= mA, Vf=V (MAX)
   Color coordinate: X=0.27-0.31, Y=0.27-0.31
10. All materials comply with RoHS
11. The measured value of luminace and color coordinate bases SHL's BM-7

				LCM		IE-TFT-0708048-RTP-4.5	
				mm	1:1		
				1 1	01		
				2015-08-06	A4		

8. General precaution

8.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life threatening or otherwise catastrophic.

8.2 Disassembling or Modification

Do not disassemble or modify. It may damage sensitive parts inside LCD , and may cause scratches or dust on the display. Does not warrant, if customers disassemble or modify.

8.3 Breakage of LCM Panel

8.3.1.If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

8.3.2. If liquid crystal contacts mouth or eyes, rinse out with water immediately.

8.3.3. If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

8.3.4. Handle carefully with chips of glass that may cause injury, when the glass is broken.

8.4 Electric Shock

8.4.1. Disconnect power supply before handling LCM .

8.4.2. Do not pull or fold the LED cable.

8.4.3. Do not touch the parts inside LCD s and the fluorescent LED's connector or cables in order to prevent electric shock.

8.5 Absolute Maximum Ratings and Power Protection Circuit

8.5.1. Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD may be damaged.

8.5.2. Please do not leave LCM in the environment of high humidity and high temperature for a long time.

8.5.3. It's recommended to employ protection circuit for power supply.

8.6 Operation

8.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.

8.6.2 Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCM for incoming inspection or assembly.

8.6.3 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

8.6.4 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.

8.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

8.7 Mechanism

Please mount LCM by using mouting holes arranged in four corners tightly.

8.8 Static Electricity

8.8.1 Protection film must remove very slowly from the surface of LCM to prevent from electrostatic occurrence.

8.8.2. Because LCM use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the should be grounded through adequate methods.

8.9 Strong Light Exposure

The shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

8.10 Disposal

When disposing LCM , obey the local environmental regulations.