■ Preliminary Specification
□ Final Specification

MODELNAME:YH101THD6001

Version:CL01

Customer: Common

APPROVED BY **SIGNATURE**

Name / Title
Note

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

Approved By	Checked By	Prepared By

REVISION RECORD

REV NO	REV DATE	CONTENTS	REMARKS
V.0	2023-04-29	First Release	

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SH1.0 General description

1.1 Introduction

YH101THD6001-C01 **is model a color active matrix thin film transistor (TFT) 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 a10.1 (16:9) inch diagonally measured active display area with 720p(1280 horizontal by 720 vertical pixel array) resolution. The TFT-LCD panel used for this module is adapted for a low reflection and higher color type.**

1.2 Features

- **4 lanes LVDS Interface**
- Data enable signal mode
- 8-bit color depth,display 16.7M colors
- Low driving voltage and low power consumption
- ROHS Compliant

1.3 General information

Item		Specification	Unit	Remarks
Outline Dimension		233.5(H) x 142(V) x 4.6(body)	mm	Tolerance:tbd
Display area		222.64(W) x126.36(H)	mm	
Number of Pixel		1280(H) x RGB x 720(V)	pixels	
Pixel pitch		0.1755(H) x 0.1755(V)	mm	
Pixel arrangement		Pixels RGB stripe arrangement		
Display mode		Normally Black		
Surface treatment		IPS Film		
Weight		TBD (Typ.)	gram	
Back-light		Single LED (Side-Light type)		
Power Consumption	B/L System	2.856(Max.)	watt	
Driver IC		*EK79202		*Using IC
Polarizer : zhuyou		Up: 0° sand surface Down 90° smooth surface	pcs	

1.4 Mechanical Information

Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal(H)	233.2	233.5	233.8	mm
	Vertical(V)	141.7	142	142.3	mm
	Depth(D)	4.3	4.6	4.9	mm

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating (GND=AGND=0V)

Parameter	Symbol	Spec.			Unit	Note
		Min.	Typ.	Max.		
Interface Supply Voltage	IOVCC	-0.3	-	+3.6	V	
Logic Supply Voltage	VCI	-0.3	-	+6.6	V	
Analog Supply Voltage	VCIP	-0.3	-	+6.6	V	
High speed interface Supply Voltage	VCCH	-0.3	-	+6.6	V	
Positive Voltage input	AVDD	-0.3	-	AVDD+ 0.5	V	
Negative Voltage input	AVEE	0	-	-6.6	V	
Power Supply Voltage	VGH	-0.3	-	+25	V	
Power Supply Voltage	VGL	0	-	-16	V	
Operation Temperature	TOPR	-30	-	+80	℃	
Storage Temperature	TSTG	-30	-	+85	℃	

Note: (1) All of the Voltages listed above are whith respective to GND=0V.

2.2 TFT LCD Power Supply Voltage

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	VCI	3.2	3.3	3..3	V
	AVDD	-	-	-	V
	VGH	-	-	-	V
	VGL	-	-	-	V

2.3 Back-light Unit

Parameter	Symbol	Min	Typ	Max.	Unit	Note
LED Current	I_L	-	140	175	mA	Ta=25℃
LED Voltage	V_L	16	17	19	V	Ta=25℃
LED Life-time	h	20000	-	-	V	Ta=25℃，If=20mA

2.4 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	Topa	-30	80	℃	
Storage Temperature	Tstg	-30	85	℃	

3.0 OPTICAL CHARACTERISTICS

3.1 Optical Specifications

Item	Symbol	Temp	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle range	Horizontal	θ_L	CR > 10	75	85	--	Deg	Note (1,2)
		θ_R		75	85			
	Vertical	θ_U		75	85	--	Deg	
		θ_D		75	85			
Luminance Contrast ratio		CR	θ = 0°	1000	1300	--	--	Note (1,2)
Brightness		YL		500	550	--	Cd/cm2	Note (4,5)
Transmittance		T(%)	θ = 0°	--	4.5	--	%	
Color Gamut (C light)				--	70	--	%	
Reproduction of color （C-light）	White	Xw	θ =0°	-0.02	0.294	+0.02		Note (1,4)
		Yw			0.325			
	Red	Rx			0.665			
		Ry			0.320			
	Green	Gx			0.263			
		Gy			0.586			
	Blue	Bx			0.139			
		By			0.110			
Response Time (Rising + Falling)	Trt		Ta= 25° C θ = 0°	--	25	30	ms	Note (1,3)
Opetical View Direction			ALL					Note (1)

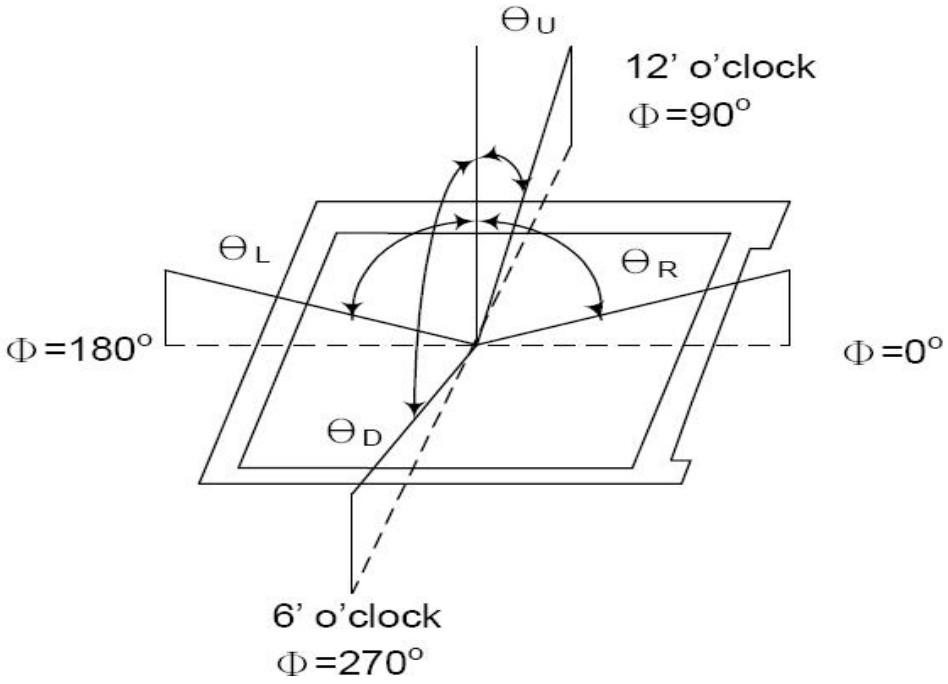
3.2 Measuring Condition

Measuring surrounding: dark room
Ambient temperature: 25±2℃
15min. warm-up time.

3.3 Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-7 for other optical characteristics. Measuring spot size: 20 ~ 21 mm

Note (1) Definition of Viewing Angle :

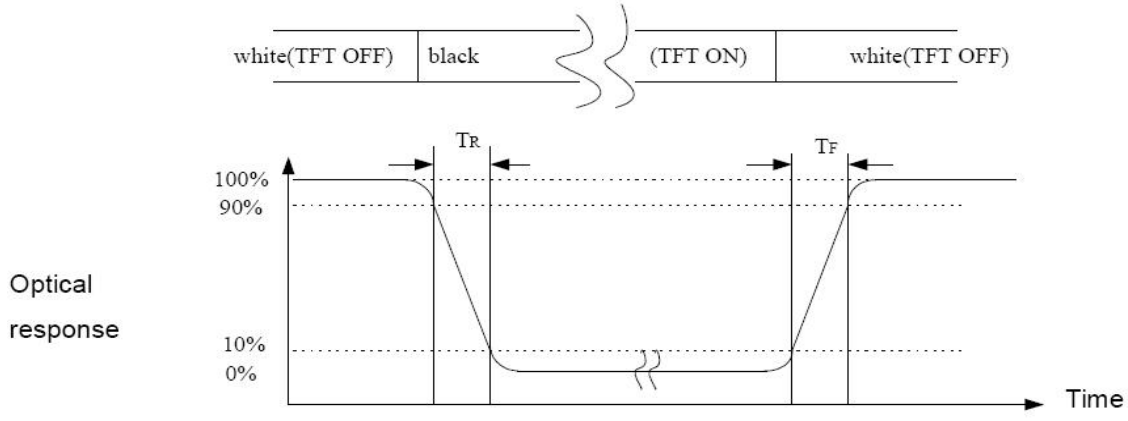


Note (2) Definition of Contrast Ratio (CR):

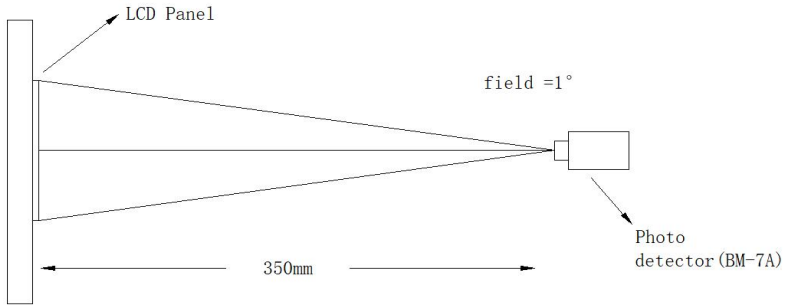
Measured at the center point of panel

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

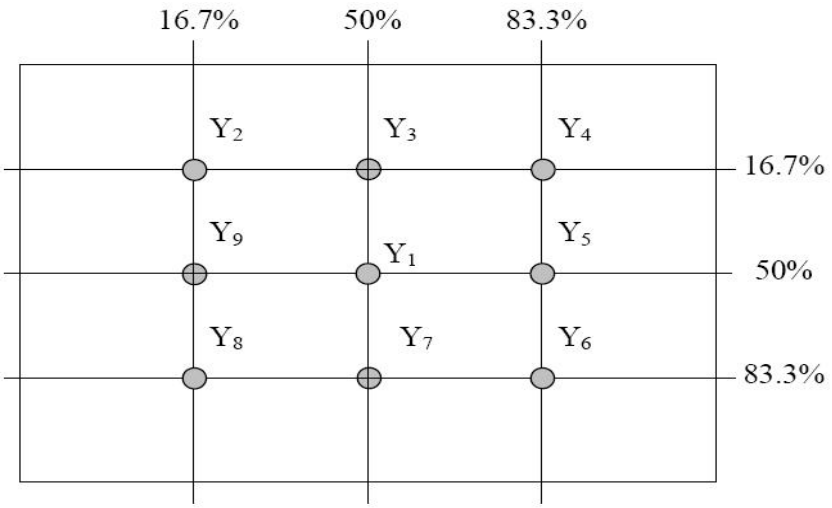
Note (3) Definition of Response Time: Sum of TR and TF



Note (4) Definition of optical measurement setup



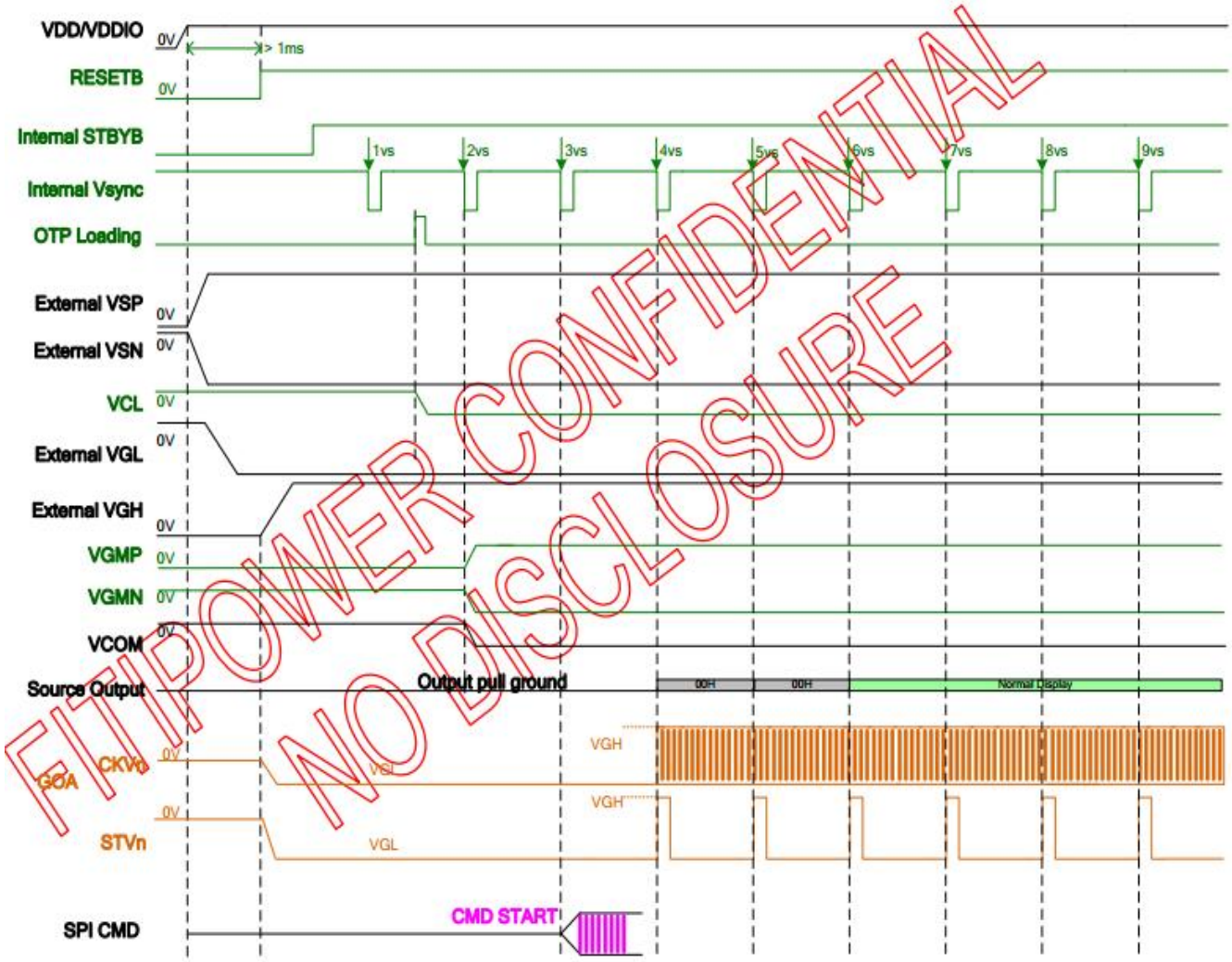
Note (5) Definition of brightness uniformity

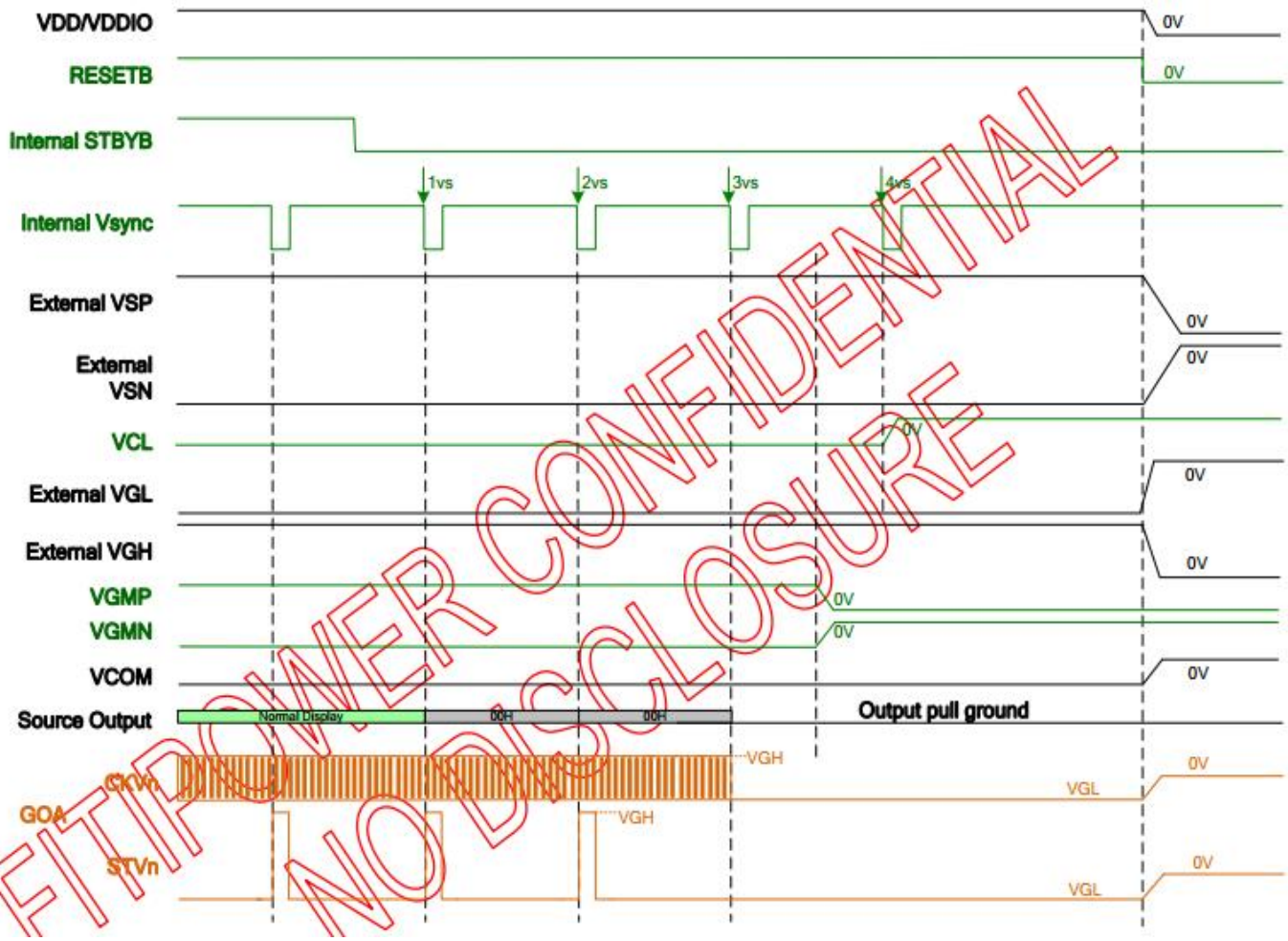


$$\text{Luminance uniformity} = \frac{\text{(Min Luminance of 9 points)}}{\text{(Max Luminance of 9 points)}} \times 100\%$$

4.0 Power On/Off Sequence

To prevent the device damage from latch up,the power on/off sequence shown Below must be followed.





Power off sequence

5.0 ELECTRICAL CHARACTERISTICS

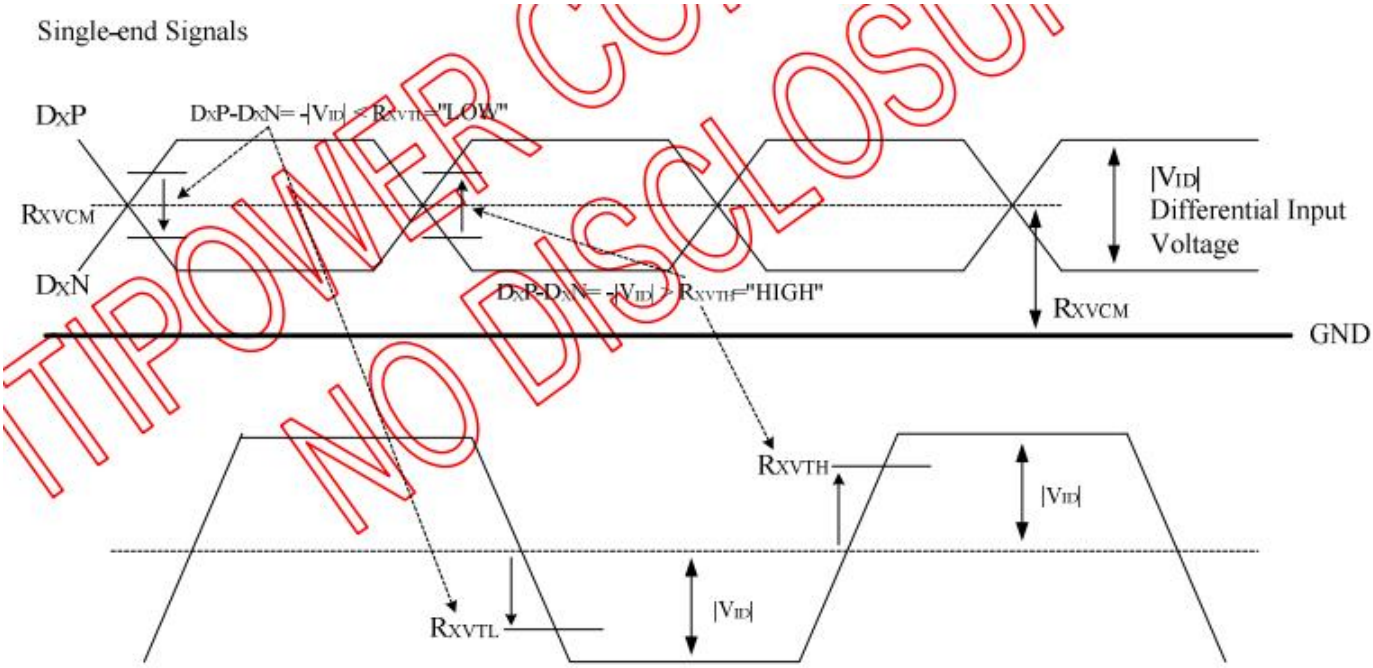
5.1 DC characteristics

(Test condition: VDD=VDDIO=VDDIF=2.3~3.6V, TA=-20℃~+85℃,VSS=VSSA=0V)

Parameter		Symbol	Spec.			Unit	Note
			Min.	Typ.	Max.		
VDDIO Input high level voltage		VIH	0.8 x VDDIO		VDDIO	V	
VDDIO input low level voltage		VIL	VSS		0.2 x VDDIO	V	
Input Leakage Current		Ileak	(-1)		(+1)	μA	
VGH_REG output voltage		VGH_REG	9	16	22	V	
VGL_REG output voltage		VGL_REG	-15	-10	-4.5		
VGMP output voltage		VGMP	3.5	4.24	5.8	V	
VGMN output voltage		VGMN	-5.8	-4.64	-3.5	V	
VGL output voltage		VGL	-17	-12	-6	V	
VGH output voltage		VGH	11	18	24	V	
VCL output voltage		VCL	-3	-2.8	-2.1	V	
VCOM output voltage		VCOM	-2.405	-1.5	-0.5	V	
Input terminal resistance		ZID		100		ohm	
Source output level deviation	Graycode = 0 ~ 14 Graycode = 241 ~ 255			TBD		mV	
	Graycode = 15 ~ 31 Graycode = 208 ~ 240			TBD		mV	
	Graycode = 32 ~ 207			TBD		mV	
Source output offset deviation	Graycode = 0 ~ 14 Graycode = 241 ~ 255	-		TBD		mV	
	Graycode = 15 ~ 31 Graycode = 208 ~ 240	-		TBD		mV	
	Graycode = 32 ~ 207	-		TBD		mV	
Current consumption	Analog Operating	IAOP		TBD		mA	
	Analog Stand-by	IAST		TBD		mA	
Rush current		Ivddpeak		TBD		mA	

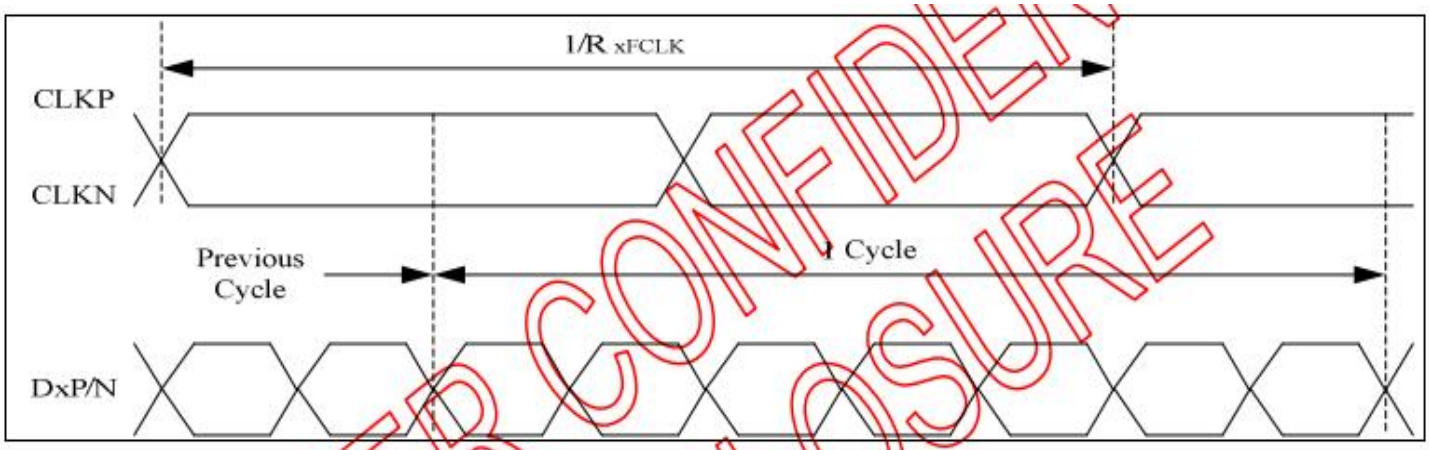
(VDD=VDDIO=VDDIF=2.3 to 3.6V, VSS=VSSA=VSS_IF=0V, TA=-20 to +85℃)

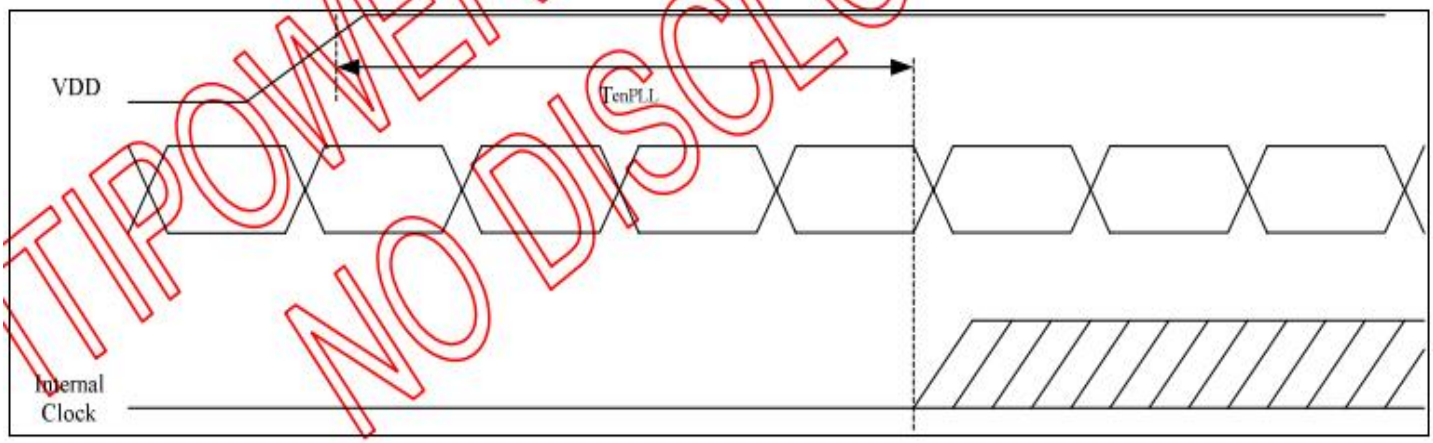
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	R_{XVTH}	+0.1	0.2	0.3	V	R_{XVCM}=1.2V
Differential input low threshold voltage	R_{XVTL}	-0.3	-0.2	-0.1	V	
Input voltage range (singled-end)	R_{XVIN}	0.7	-	1.7	V	
Differential input common mode voltage	R_{XVCM}	1	1.2	1.4	V	$\|V_{ID}\|$=0.2
Differential input impedance	Z_{ID}	80	100	125	ohm	
Differential input voltage	$\|V_{ID}\|$	0.2	-	0.6	V	
Differential input leakage current	I_{LCLVDS}	-10	-	+10	uA	
LVDS Digital Operating Current	$I_{VDDMIPI}$	-	15	20	mA	F_{DCLK}=80MHz,VDD=3.3V, Input pattern: 55h->Aah->55h->Aah
LVDS Digital Stand-by Current	I_{STMIPI}	-	-	250	uA	Clock & all Functions are stopped

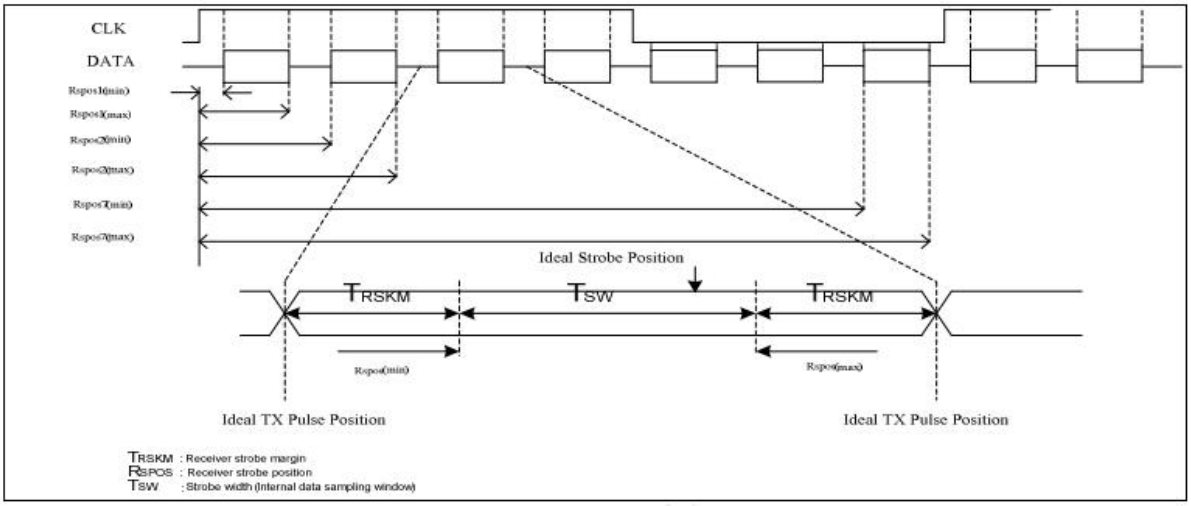


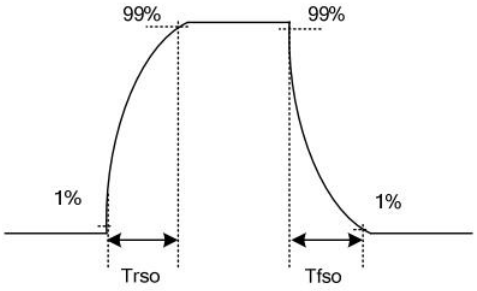
5.2 LVDS AC characteristics

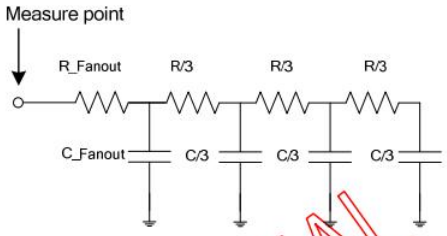
Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	T_{RSKM}	500	-	-	ps	|VID| = 200mV RxVCM = 1.2V RxFCLK = 81MHz
Clock high time	T_{LVCH}	-	4/(7* R_{xFCLK})	-	ns	
Clock low time	T_{LVCL}	-	3/(7* R_{xFCLK})	-	ns	
PLL wake-up time	T_{enPLL}	-	-	150	us	







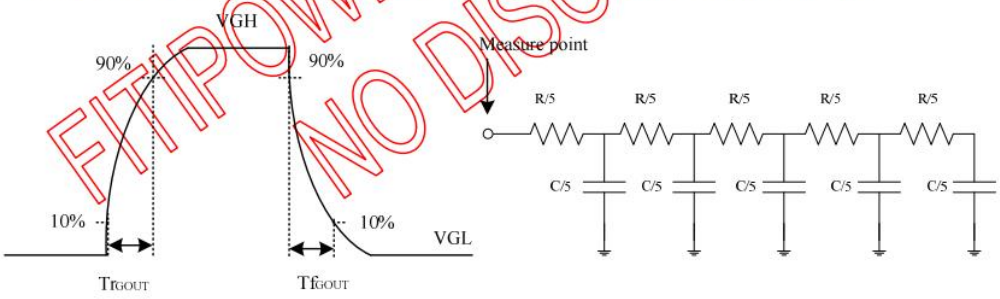




Rdata_total = 25.072k(ohm)
Cdata_total = 83 pF

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max	
Source driver rising time	Trso			3.52		μs
Source driver falling time	Tfso			2.8		μs

Panel control signal output (GOUTL[1]~GOUTL[22] , GOUTR[1]~GOUTR[22])



Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max	
Panel control signal rising time	T_{rGOUT}	TBD	-	-	TBD	μs
Panel control signal falling time	T_{fGOUT}	TBD	-	-	TBD	μs

Parameter	Symbol	Min.	Typ.	Max	Unit	Note
Horizontal Display Area	thd		1280		DCLK	
DCLK frequency	fclk	-	66.2	-	MHz	
HSD Period	th	-	1450	-	DCLK	
HS pulse width	thpw	-	10	-	DCLK	
HS Back Porch(Blanking)	thbp		88		DCLK	
HS Front Porch	thfp	-	72	-	DCLK	

Parameter	Symbol	Min.	Typ.	Max	Unit	Note
Vertical Display Area	tvd		720		TH	
VS period time	tv	-	760	-	TH	
VS pulse width	tvpw	-	2	-	TH	
VS Back Porch(Blanking)	tvbp		23		TH	
VS Front Porch	tvfp	-	15	-	TH	

6.0 Reliability test items

Test Item	Test Conditions	Notes
High temperature Operation	Ta= +80℃, 96hrs	
Low temperature Operation	Ta= -30℃, 96hrs	
High Temperature Storage	Ta= +85℃, 96hrs	
Low Temperature Storage	Ta= -30℃, 96hrs	
Humidity Test	60℃ ,Humidity 90% ,96hrs	
Thermal Shock Test	-20℃,30min ~ +70℃,30min (30 cycle)	
Vibration Test(Packing)	Sine Wave 1.04G, 5~500Hz, XYZ 30min/each direction	

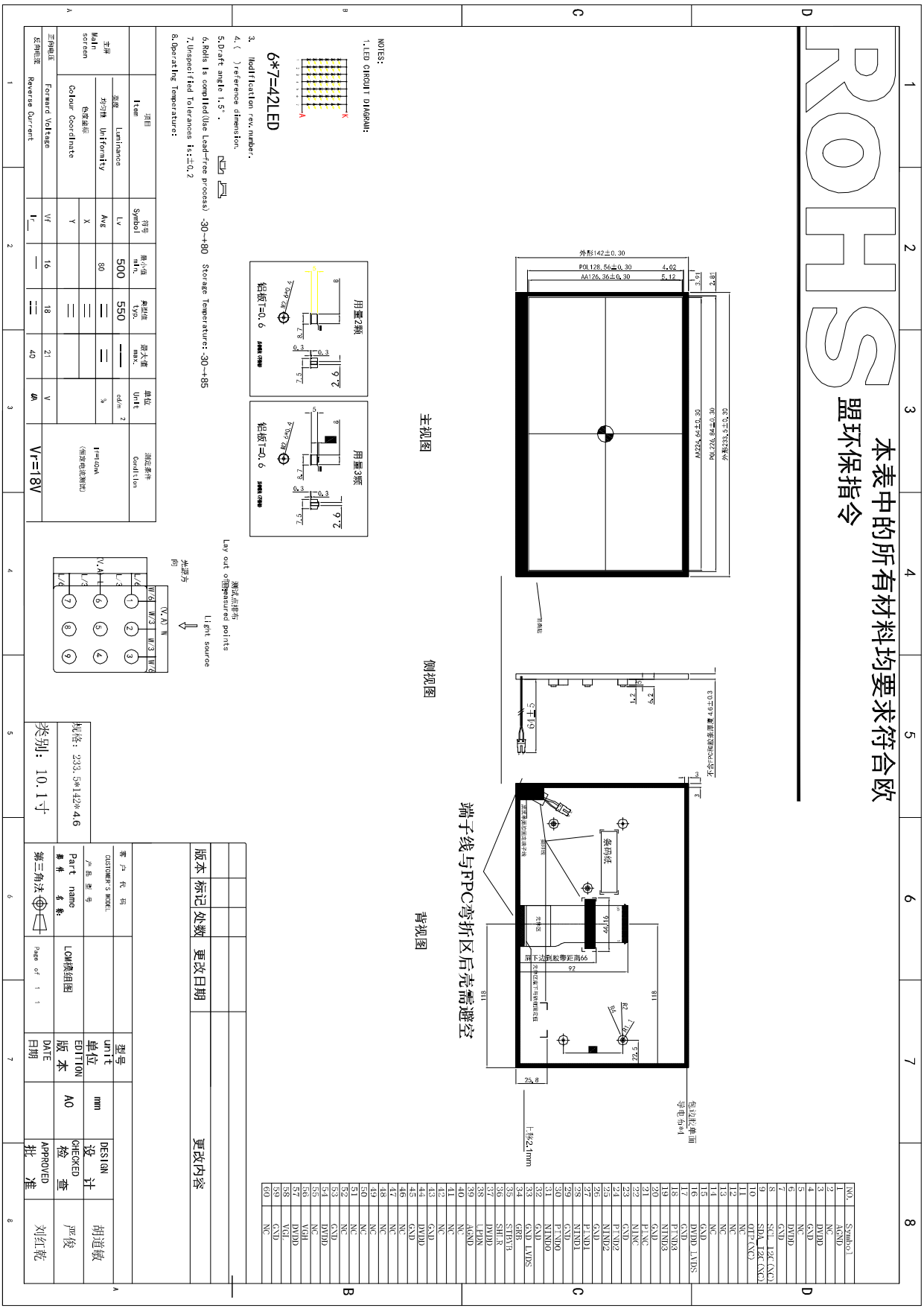
7.0 INTERFACE PIN CONNECTION

Signal of interface

Terminal No.	Symbol	I/O	Functions
1	AGND	P	Analog Ground
2	NC	P	NC
3	DVDD	P	Power for Digital Circuit
4	GND	P	Ground
5	NC	P	NC
6	DVDD	P	Power for Digital Circuit
7	GND	P	Ground
8	NC	I	NC
9	NC	I	NC
10	NC	I	NC
11	NC	I	NC
12	NC	I	NC
13	NC	I	NC
14	NC	I	NC
15	GND	P	Ground
16	NC	N	NC
17	GND	P	Ground
18	RXIN3+	I	Positive LVDS differential data inputs
19	RXIN3-	I	Negative LVDS differential data inputs
20	GND	P	Ground
21	RXCLKIN+	I	Positive LVDS differential clock inputs
22	RXCLKIN-	I	Negative LVDS differential clock inputs
23	GND	P	Ground
24	RXIN2+	I	Positive LVDS differential data inputs
25	RXIN2-	I	Negative LVDS differential data inputs
26	GND	P	Ground
27	RXIN1+	I	Positive LVDS differential data inputs
28	RXIN1-	I	Negative LVDS differential data inputs
29	GND	P	Ground
30	RXIN0+	I	Positive LVDS differential data inputs
31	RXIN0-	I	Negative LVDS differential data inputs
32	GND	P	Ground
33	GND_LVDS	P	LVDS Ground

34	RESET	I	Global reset pin.
35	STBYB	I	Standby mode,normally pull high STBYB="1", normally opration STBYB="0", timing control,source driver will turn off
36	L/R	I	Left / right selection
37	DVDD	P	Power for Digital Circuit
38	U/D	I	Up/down selection
39	AGND	P	Analog Ground
40	NC	P	NC
41	NC	P	NC
42	NC	I	NC
43	GND	P	Ground
44	DVDD	P	Power for Digital Circuit
45	GND	P	Ground
46	NC	I	NC
47	NC	I	NC
48	NC	I	NC
49	NC	I	NC
50	NC	I	NC
51	NC	I	NC
52	NC	I	NC
53	GND	P	Ground
54	DVDD	P	Power for Digital Circuit
55	NC	P	NC
56	VGH	P	Gate ON Voltage
57	DVDD	P	Power for Digital Circuit
58	VGL	P	Gate OFF Voltage
59	GND	P	Ground
60	NC	N	No connection

8.0 OUTLINE DIMENSION

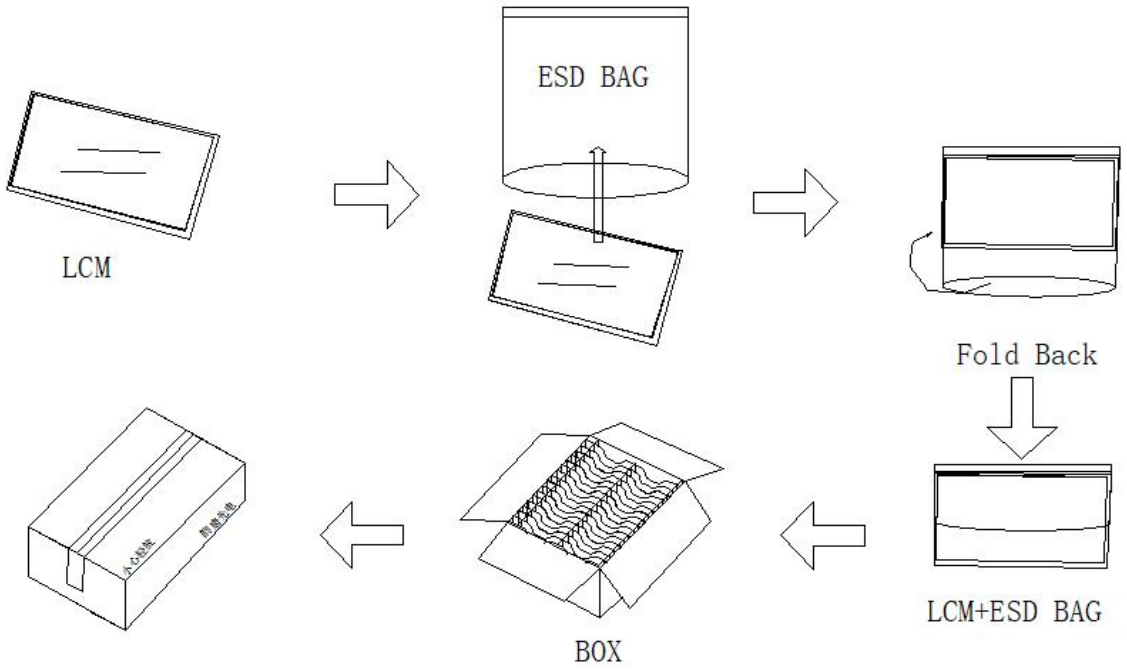


9.0 Pakcage Specification

9.1 Packing form

LCM Moudle	LCM Qty. in the box	Box size	Note
	pcs/box		

9.2 Packing assembly drawing



	Material	Notice
Box	Corrugated Paper Board	(AB Flute)
Partition/Pad	Corrugated Paper Board	(B Flute)
Corner Pad	Corrugated Paper Board	(AB Flute)
ESD bag	PE	

10.0 General precaution

10.1 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.

10.2 Disassembling or Modification

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

10.3 Breakage of LCD Panel

10.3.1.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.

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

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

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

10.4 Electric Shock

10.4.1. Disconnect power supply before handling LCD module.

10.4.2. Do not pull or fold the LED cable.

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

10.5 Absolute Maximum Ratings and Power Protection Circuit

10.5.1. 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 module may be damaged.

10.5.2. Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

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

10.6 Operation

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

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

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

10.6.4 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.

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

10.7 Mechanism

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

10.8 Static Electricity

10.8.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

10.8.2. Because LCD module 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 module should be grounded through adequate methods.

10.9 Strong Light Exposure

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

10.10 Disposal

When disposing LCD module, obey the local environmental regulations.