nnnn 深圳国显科技有限公司

Shenzhen K&D Technology Co.,Ltd

SPECIFICATION
FOR
LCD MODULE

Customer : _____

Product Model: KD43G16-40NC-A3

Sample code: _____

Designed by	Checked by	Approved by

Final Approval by Customer

☐ LCM Machinery OK **Checked By** _____ ☐ LCM Display OK **Checked By** _____	☐ LCM OK ☐ NG，Problem survey: **Approved By** _____

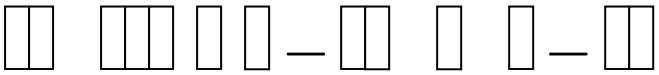
※**The specification of "TBD" should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.**

Revision History

Version	Contents	Date	Note
A	Original	2010.04.01	

Contents

1 Numbering System



No	Definition	Specifications
(1)	TFT LCM Productor No.	KD ---- Kingdisplay technologiy Co.,Ltd
(2)	Display monitor opposite angle line size	Unit :mm or mmm (size <10 inch: takes two integers ; size >=10 inch: takes three integers)
(3)	Productor Types	D ---- Digital photo frame / DVD G ----GPS M ----MP P ----Mobil-Phone 。。。
(4)	Productor Development Series No.	By two figures characters expression from 01 to 99
(5)	Interface PIN Number	By two figures characters expression from 01 to 99
(6)	With Touch Panel Or Not	T----With T/P ； N----Without T/P
(7)	LCD Type	A----AUO ； M----CMO ； C----CPT； P----PVI； L----LG； W----Wintek； H----HSD； T----Topply； Y----Hydis； I----Hitach； S----Sharp。。。
(8)	Productor Development edition No.	By The English litters : A 1~ Z9

2 Scope

This specification applies to the TFT LCD module which is designed and manufactured by LCM Factory of Shenzhen K&D Technology Co.,Ltd.

It is capable of using 262k colors mode 24bit parallel bi-directional interface.

3 Normative Reference

GB/T4619-1996 《 Liquid Crystal Display Test Method》

GB/T2424 《Basic environmental Testing Procedures for Electric and Electronic Products.》

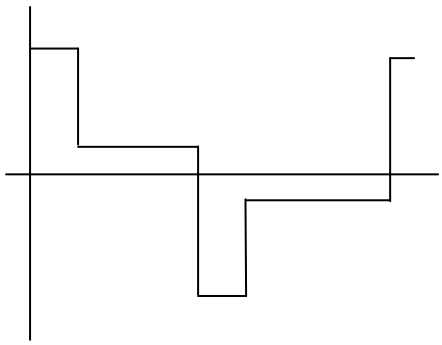
GB/T2423 《Basic Testing Procedures for Electric and Electronic Products》

IEC61747-1 《SIXTH PARTGB2828`2829-87《National Standard of PRC》

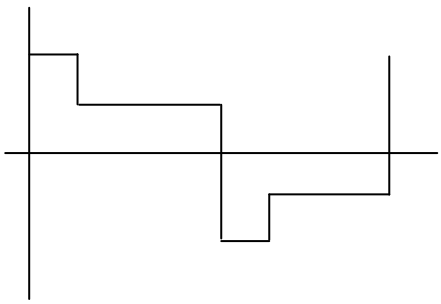
4 Definitions

4.1 Definitions of Vop

The definitions of threshold voltage Vth1, Vth2 the following typical waveforms are applied on liquid crystal by the method of equalized voltage for each duty and bias.



【 selected waveform 】



【 non-selected waveform 】

① Vth1: The voltage which the brightness of segment indicates 50% of saturated value on the conditions of selected waveform

(f_f=80Hz, Φ=10° θ=270° at 25℃)

② Vth2: The voltage which the brightness of segment indicates 50% of saturated value on the conditions of non-selected waveform

(f_f=80Hz, Φ=10° θ=270° at 25℃)

③ Vop: (Vth1(50%)+Vth2(50%))/2 (f_f=80Hz, Φ=10° θ=270° at 25℃)

4.2 Definition of Response Time Tr, Td

①Tr: The time required which the brightness of segment becomes 10% from 100% when waveform is switched to selected one from non-selected one. (f_f=80Hz, Φ=10°θ=270°at 25 ℃)

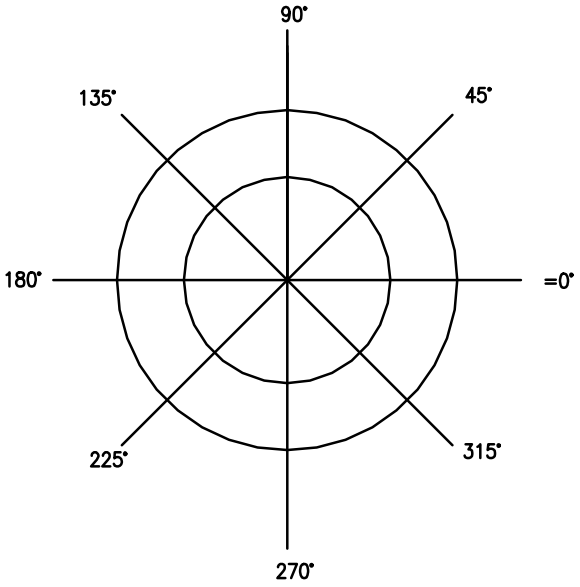
②Td: The time required which the brightness of segment becomes 90% from 10% when waveform is switched to selected one from selected one. (f_f=80Hz, Φ=10°θ=270°at 25℃)

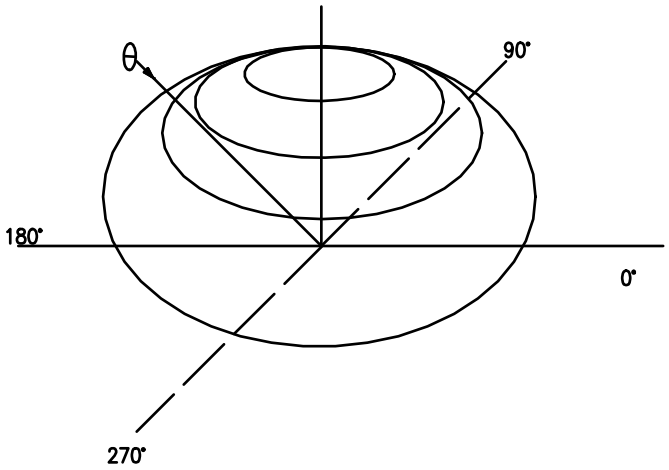
4.3 Definition of Contrast Ratio Cr

Cr=A/B

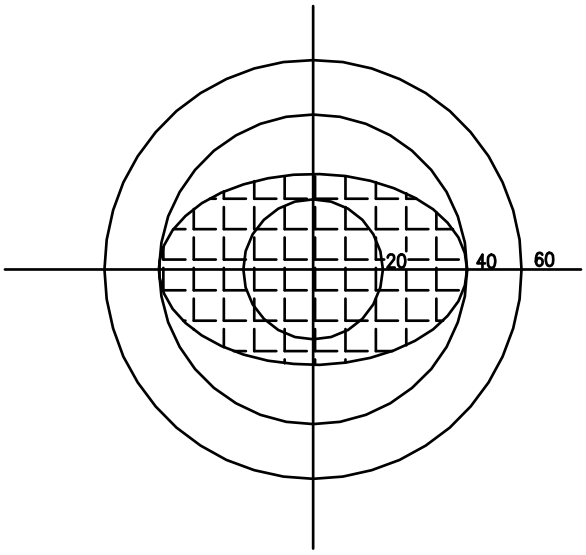
① A: Segments brightness in case of non-selected waveform
② B: Segments brightness in case of selected waveform

4.4 Definition of Angle and Viewing Range





Angular Graph: Constrast Ratio



Such as:
Viewing Angle Range:
80(Cr>2) Horizontal
70(Cr>2) Vertical

5 Technology Specifications

5.1 Feature

This single-display module is suitable for use in Multidedia Player products. The LCD adopts one backlight with High brightness 10-lamps white LED.

1) Construction: 4.3″ a-Si color TFT-LCD ,White LED backlight and FPC.
2) LCD:
   - 2.1 Amorphous-TFT 4.3-inch display, transmissive, normally white type.
   - 2.2 480(RGB)×272 dots Matrix.
   - 2.3 Narrow-contact ledge technique.
   - 2.4 LCD Driver IC: OTA5180A× 1.
3) Low cross talk by frame rate modulation.
4) 262K Color ,24bit RGB interface.
5) Video signal interface: Parallel RGB .

5.2 Mechanical Specifications

Item	Specifications	Unit
Dimensional outline	105.6(W) ×67.3(H)×2.85(T)	mm
TP outline		mm
TP(V.A)		mm
TP(A.A)		mm
Active area	95.04(W) ×53.86 (H)	mm
Pixel size	198(W) ×198(H)	um
Resolution	480(RGB) × 272	pixel

5.3 Absolute Max. Rating

Absolute Maximum Ratings

Rating	Symbol	Value			Unit
Digital supply voltage	VDDIO	-0.3	to	+4.5	V
Power Supply for Pump	VDD	-0.3	to	+4.5	V
Analog supply voltage	VDD2	-0.3	to	+7.0	V
Storage temperature	T_{STG}	-55	to	100	℃
Operating temperature	T_A	-30	to	85	℃

Note: Stresses beyond those given in the Absolute Maximum Rating table may cause operational errors or damage to the device. For normal operational conditions see AC/DC Electrical Characteristics.

Recommended Operating Range

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Charge Pump Supply Voltage	PVDD	3	3.3	3.6	V	PWR_SEL=H
	PVDD	2.25	2.5	3	V	PWR_SEL=L
Digital Supply Voltage	VDD	3	3.3	3.6	V	PWR_SEL=H
	VDD	2.25	2.5	3	V	PWR_SEL=L
Digital Interface Supply Voltage	VDDIO	1.65	1.8	VDD	V	
Digital Input Voltage	Din	0	-	VDDIO	V	
OTP Supply Voltage	V_OTP	7.4	7.5	7.6	V	
VCOM AC Voltage	VCOMH-VCOML	3.46	-	6.2	V	

DC Characteristics for Digital Circuit

VDDIO=1.8V, VDD = 3.3V, AVDD = 6V, AGND = 0V, T_A = -20℃ to 80℃

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Low Level Input Voltage	Vil	GND	-	0.3xVDDIO	V	
High Level Input Voltage	Vih	0.7xVDDIO	-	VDDIO	uA	
High Level Output Voltage	Voh	VDDIO-0.4	-	VDDIO	ohm	
Low Level Output Voltage	Vol	GND	-	GND+0.4	uA	
Input Leakage Current	Iil			±1.0		
Pull High/Low Resistor	Rp	-	100K	-	ohm	
Digital Stand-by Current	Ist		5.0	20	uA	DCLK stopped, Output Hi-Z
Digital Operating Current	Icc	-	4	-	mA	DCLK = 9MHz

5.4 Electrical Characteristics

VDDIO=1.8V, VDD = 3.3V, AVDD = 6V, AGND = 0V, T_A = -20℃ to 80℃

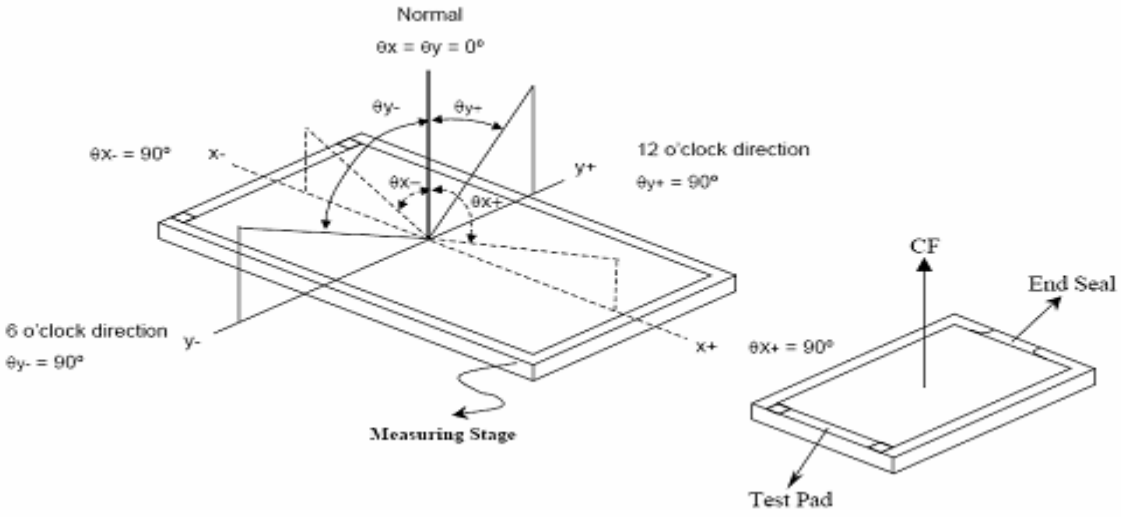
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Analog Supply Voltage	VDD2		5		V	
Positive High-voltage power	VGH	9	15	16	V	No Load. By VGH_SEL setting.
Negative High-voltage power	VGL	-11	-10	-7	V	No Load. By VGL_SEL setting.
VCOMH Output Level	VCOMH	3.26		5.8	V	By VCOMH setting.
VCOML Output Level	VCOML	-2		-0.2	V	By VCOML setting
DRV Output Voltage	VDRV	0	-	VDD	V	
DCDC Feed Back Voltage	VFB	0.28	0.6	0.79	V	By LED_VFB setting
Base Drive Current	IDRV	-	20	25	mA	By LED_VFB setting
Output Voltage Deviation	Vod	-	±20	±35	mV	V_o = 0.15V ~ 0.5V, 3.45V~3.8V
		-	±15	±20		V_o = 0.5V ~ 3.45V
Output Dynamic Range	Vdr	0.2	-	5.3		MVA Mode
		0.15		4.8		TN Mode
VCOM Low Level Output Current	IOL_{FRP}		-10		mA	VCOM AC output = 0.5V
VCOM High Level Output Current	IOH_{FRP}		-10		mA	VCOM AC output = 5.7V
Analog Standby Current	Iast	-	-	20	uA	
Analog Operation Current	IDD	-	5.0	-	mA	Without panel loading

AC Characteristics

VDDIO=1.8V, VDD = 3.3V, AVDD = 6V, AGND = 0V, T_A = -20℃ to 80℃

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK pulse duty	Tcw	40	50	60	%	
Hsync width	Thw	1.0	-	-	DCLK	
Hsync period	Th	55	60	65	us	
Vsync setup time	Tvst	12	-	-	ns	
Vsync hold time	Tvhd	12	-	-	ns	
Hsync setup time	Thst	12	-	-	ns	
Hsync hold time	Thhd	12	-	-	ns	
Data set-up time	Tdsu	12	-	-	ns	
Data hold time	Tdhd	12	-	-	ns	
DE set-up time	Tdesu	12	-	-	ns	
DE hold time	Tdehd	12	-	-	ns	
SD output stable time	Tst	-	10	12	us	
GD output rise and fall time	Tgst	-	500	1000	ns	
Serial communication						
Delay between CSB and Vsync	Tcv	1			us	
CS input setup time	Ts0	50			ns	
Serial data input setup time	Ts1	50			ns	
CS input hold time	Th0	50			ns	
Serial data input hold time	Th1	50			ns	
SCL pulse high width	Twh1	50			ns	
SCL pulse low width	Twl1	50			ns	
CS pulse high width	Tw2	400			ns	

5.5 Optical specifications



Item		Symbol	Conditions	Specifications Min.	Typ.	Max.	Unit	Note
Transmittance		T%	Viewing normal angle $\theta_X = \theta_Y = 0°$	-	6.1	-	%	All left side data are based on CMO's following condition – 6 o'clock NTSC: 50% LC: TN Light : C light (Machine:BM5A) Normal Polarizer (Linear Polarizer) Simulation data Reference Only
Contrast Ratio		CR		-	250	-	-	
Response Time		T_R		-	5	-	ms	
		T_F		-	15	-	ms	
Chromaticity	Red	X_R		0.590	0.620	0.650	-	
		Y_R		0.314	0.344	0.374	-	
	Green	X_G		0.276	0.306	0.336	-	
		Y_G		0.533	0.563	0.593	-	
	Blue	X_B		0.103	0.133	0.163	-	
		Y_B		0.119	0.149	0.179	-	
	White	X_W		0.281	0.311	0.341	-	
		Y_W		0.319	0.349	0.379	-	
Viewing Angle	Hor.	θ_{X+}	Center CR≥10	-	45	-	deg.	
		θ_{X-}		-	45	-		
	Ver.	θ_{Y+}		-	15	-		
		θ_{Y-}		-	35	-		

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

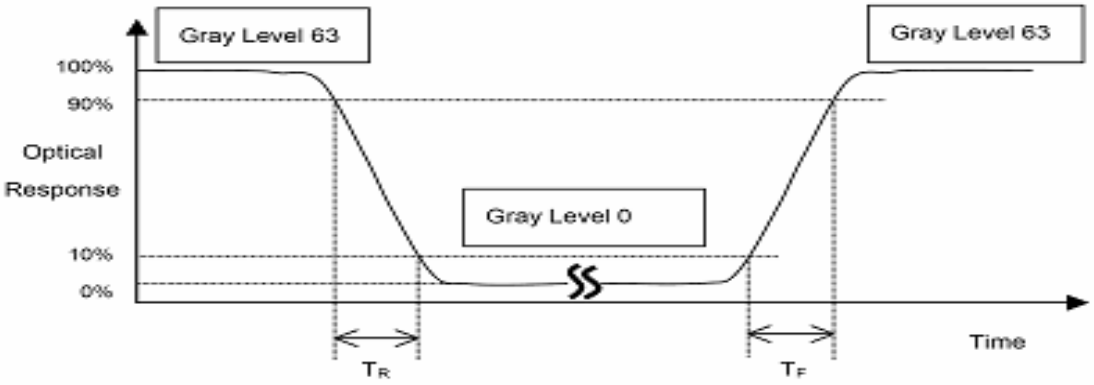
L63: Luminance of gray level 63

L0: Luminance of gray level 0

CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

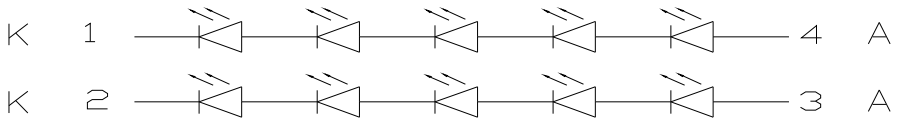
*Note (2) Definition of Response Time (TR, TF):



5.6 LED back light specification (10 White Chips)

Item	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	Vf	If=40mA	15	16	17	V
Uniformity (with L/G)	ΔB_p	If=40mA	80	-	-	%
Luminance for LCD	L_V	If=40mA	5200	-	-	cd/m^2

LED CIRCUIT

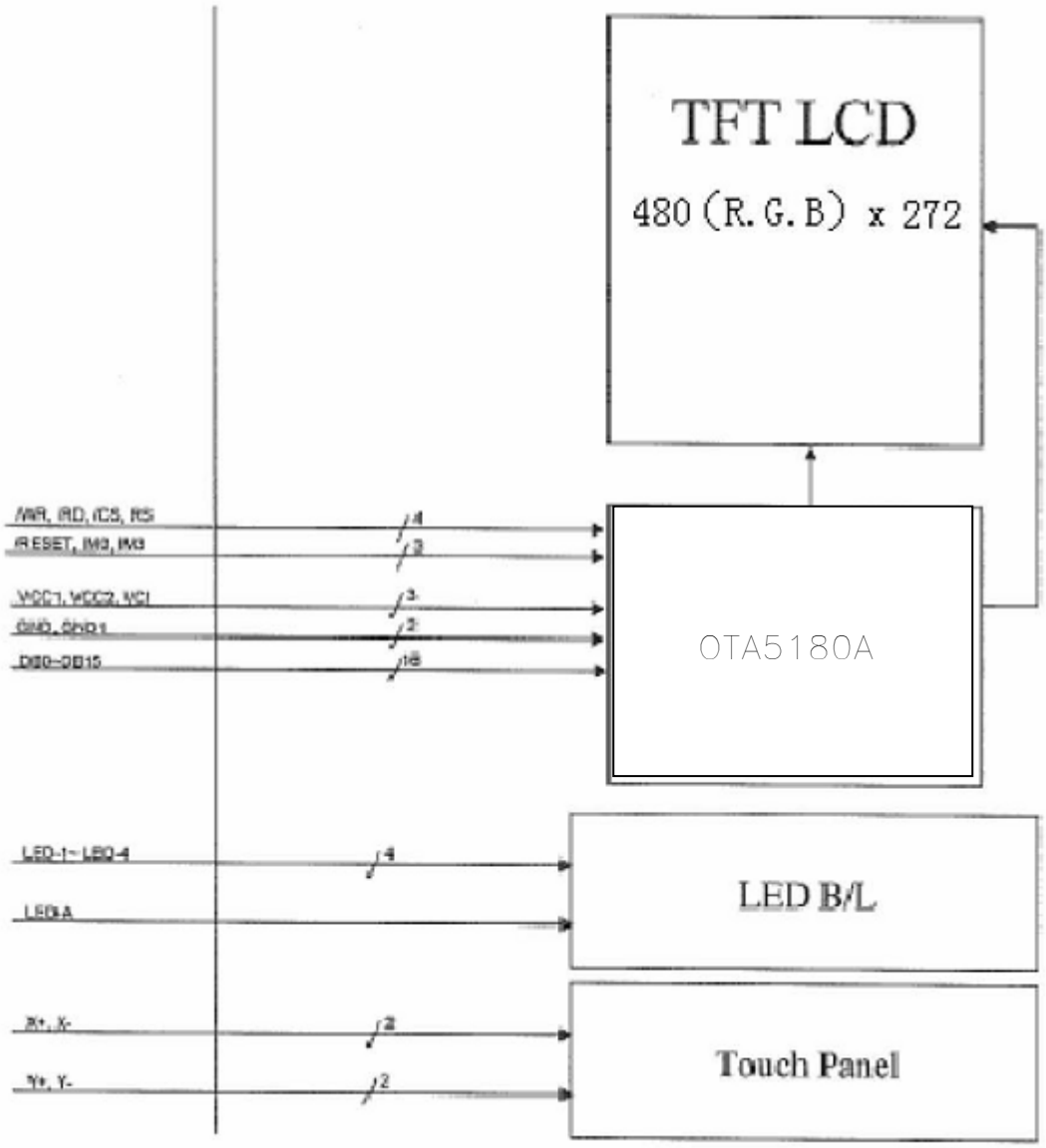


5.7 Interface Pin Connections

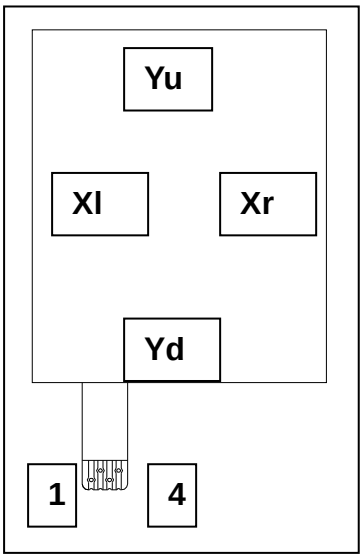
PIN NO.	Symbol	Description
1	LED-K	LED backlight(Cathode)
2	LED-A	LED backlight(anode)
3	GND	Ground
4	VCC	Power supply (Digital +3.0V)
5-12	R0-R7	Red Data
13-20	G0-G7	Green Data
21-28	B0-B7	Blue Data
29	GND	Ground
30	CLK	Clock signal
31	DISP	Display on/off
32	HSYNC	Horizontal sync input in RGB mode (short to GND if not used)
33	VSYNC	Vertical sync input in RGB mode (short to GND if not used)
34	DEN	Data Enable
35	NC	NC
36	GND	Ground
37	NC	NC
38	NC	NC
39	NC	NC
40	NC	NC

6 Signal timing diagram and Circuit block diagram

6.1 Circuit block diagram



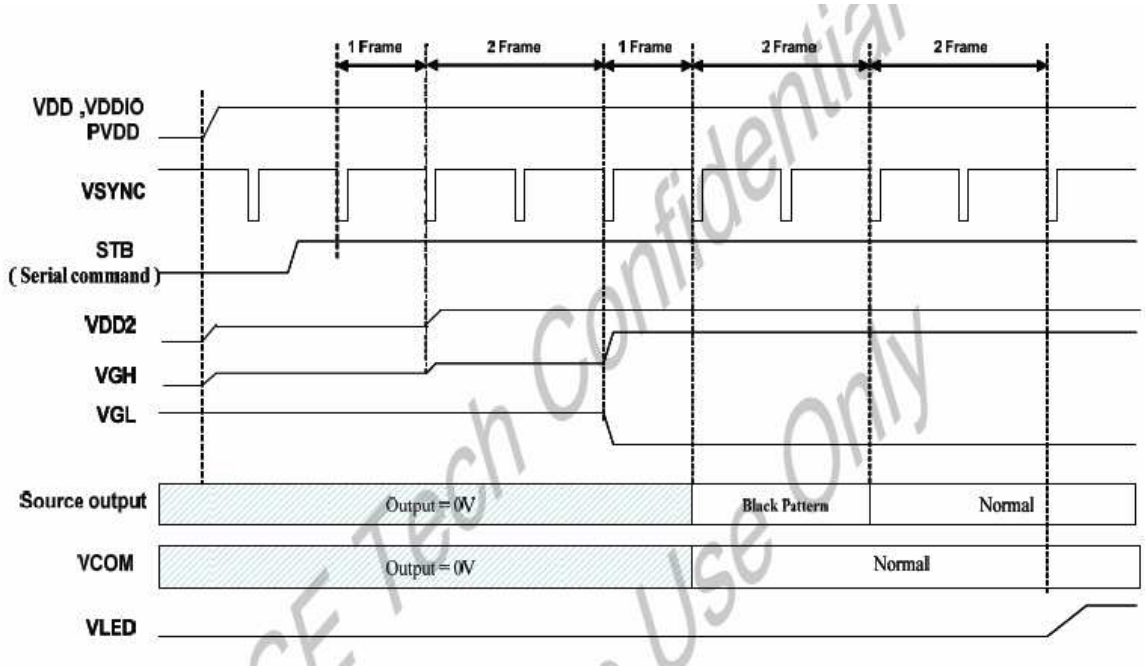
TP Circuit



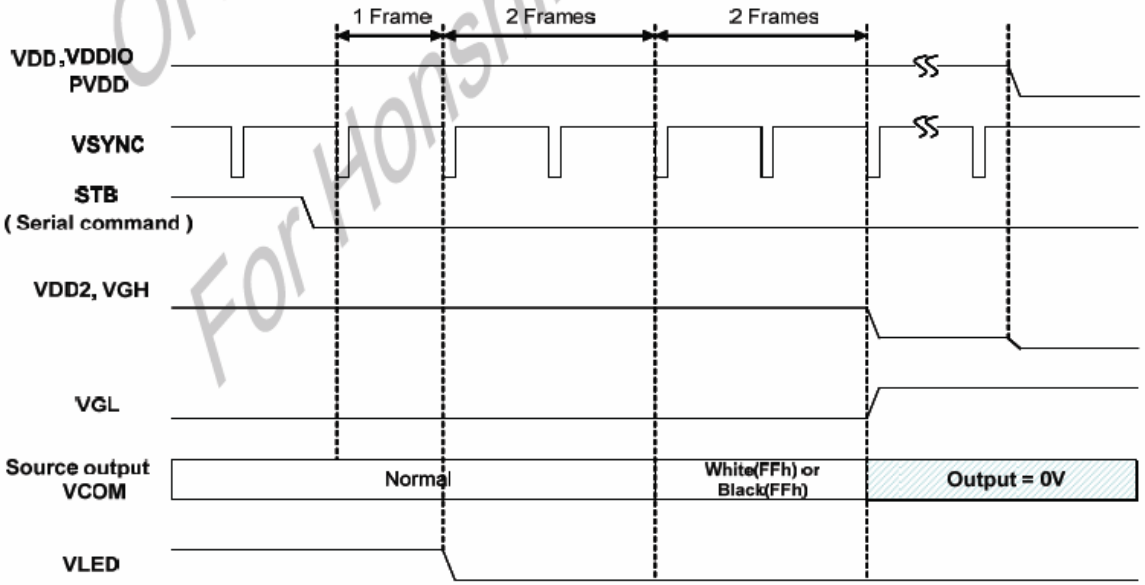
1	Y+(YU)
2	X+(XL)
3	Y-(YD)
4	X-(XR)

6.2 Signal Timing Diagram

6.2.1 Power ON Sequence

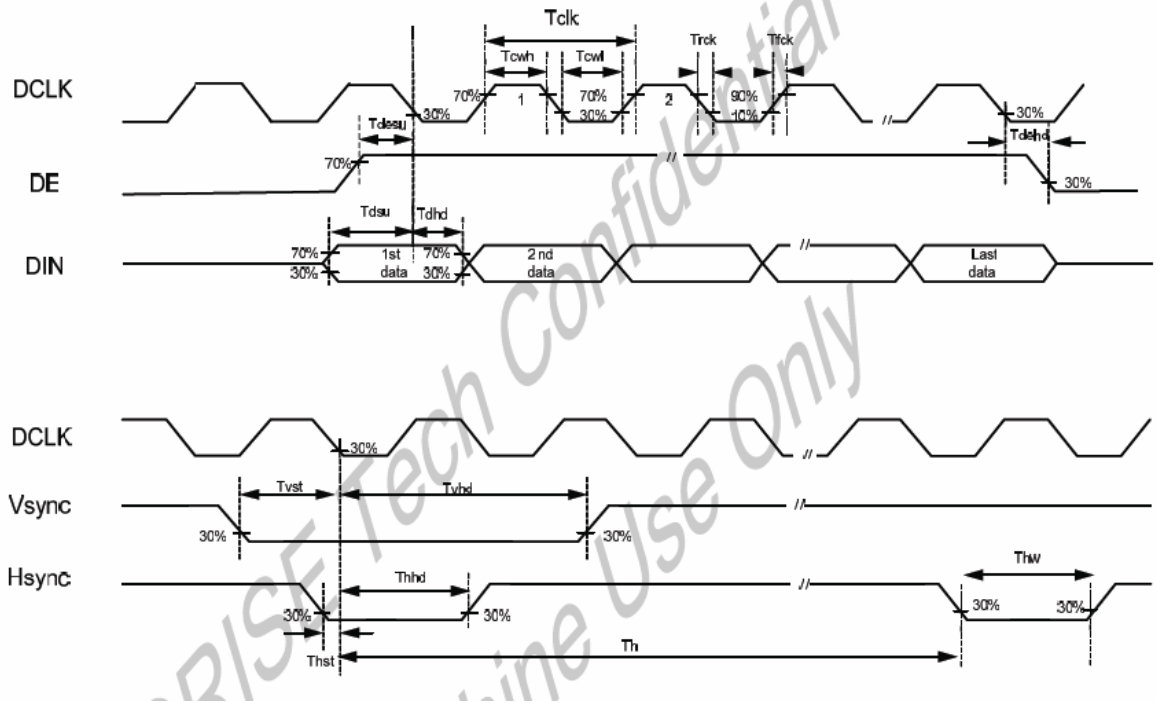


6.2.2 Power OFF Sequence



6.2.3 Timing Diagram of interface Signal

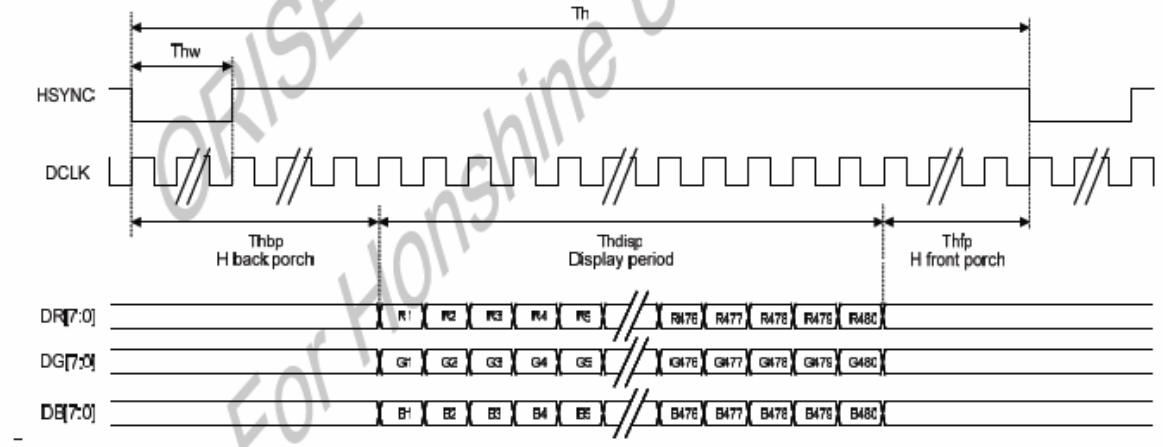
Clock and Data Input Timing Diagram

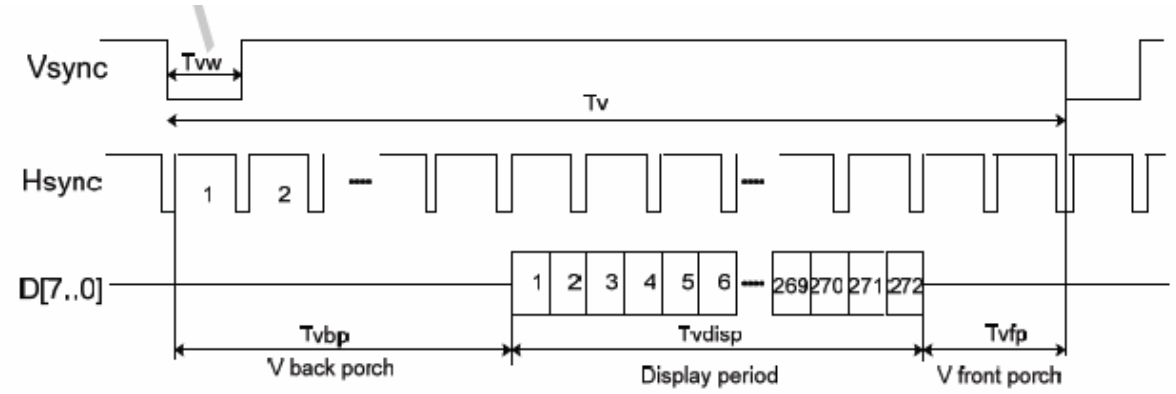


6.2.4 Input setup Timing requirement

Item		Symbol	Min.	Typ.	Max.	Unit	
DCLK Frequency		Fclk	5	9	12	MHz	
DCLK Period		Tclk	83	110	200	ns	
Hsync	Period Time	Th	490	531	605	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	8	43		DCLK	By H_BLANKING setting
	Front Porch	Thfp	2	8		DCLK	
	Pulse Width	Thw	1			DCLK	
Vsync	Period Time	Tv	275	288	335	H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12		H	By V_BLANKING setting
	Front Porch	Tvfp	1	4		H	
	Pulse Width	Tvw	1	10		H	

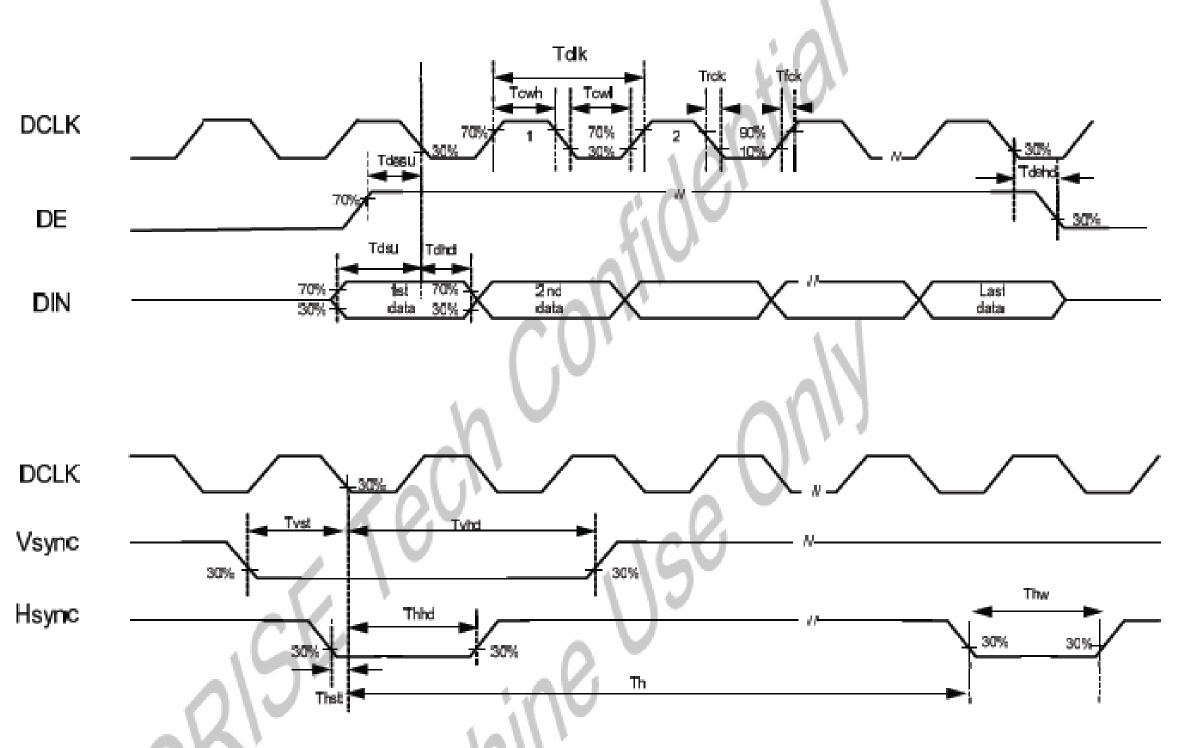
9.1.2 SYNC Mode Timing Diagram





7 Initial code

8 Write/ReadSPI Timing

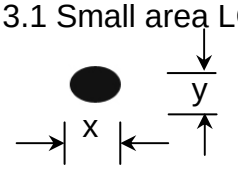


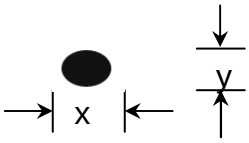
9 Reliability Test Conditions And Methods

NO	Item	Condition	Method
1	High / Low Temperature Storage	80℃/-30℃ 120hrs	Check and record every 48Hrs
2	High / Low Temperature Life	70℃/-20℃ 120hrs (operating mode)	Check and record every 48Hrs
3	High Temperature、High Humidity Operating	60℃,90% RH, 96Hrs	Check and record every 48hrs
4	Thermal Shock	-30℃(30Min) → 25℃(5Min) → 80℃(30Min) (conversion time, : 5 sec) 20 cycles	Each 10 cycles end , check

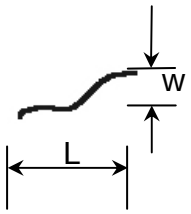
5	Vibration	10Hz~55Hz~10Hz Amplitude: 1.5mm 2hrs for each direction(X,Y,Z)	Each direction end, Check the Appearance and Electrical Characteristics
6	Static Electricity	Gap mood: ±1KV~±8KV (10 times air discharge with positive/negative voltage voltage gap : 1kv) Touch mood: ±1KV~±4KV	Each discharge end, Check the Electrical Characteristics
7	Curve	60 Thousand times, 40 times/min 150°(according to die if exist)	Check and record every 2~4 thousand times
8	Slump	Free faller movement for each side、cording、angle (75cm High、6 sides、2 angle、2 cording)	End

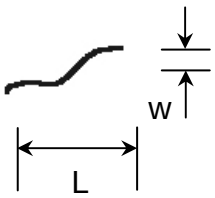
10 Inspection standard

<table>
<tr><th>No</th><th>Item</th><th>Criterion</th><th></th></tr>
<tr><td>01</td><td>Outline Dimension</td><td>In accord with drawing</td><td></td></tr>
<tr><td>02</td><td>Position-finding Dimension Assemble Dimension</td><td>In accord with drawing</td><td></td></tr>
<tr><td rowspan="2">03</td><td rowspan="2">LCD black spots, white spots (Round type)</td><td>Round type: non display
3.1 Small area LCD Unit : mm
 

<table><tr><th>Dimension</th><th>Qualified Quantity</th></tr><tr><td>D≤0.1</td><td>Ignore</td></tr><tr><td>0.1＜D≤0.15</td><td>2</td></tr><tr><td>D＞0.15</td><td>0</td></tr></table></td><td></td></tr>
<tr><td>3.2Large area LCD
 

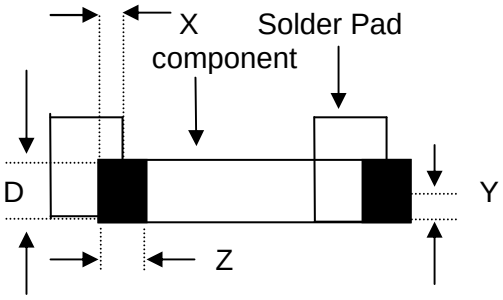
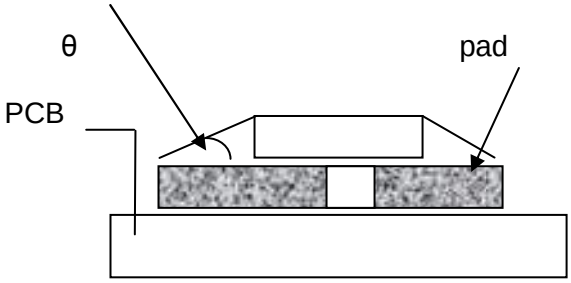
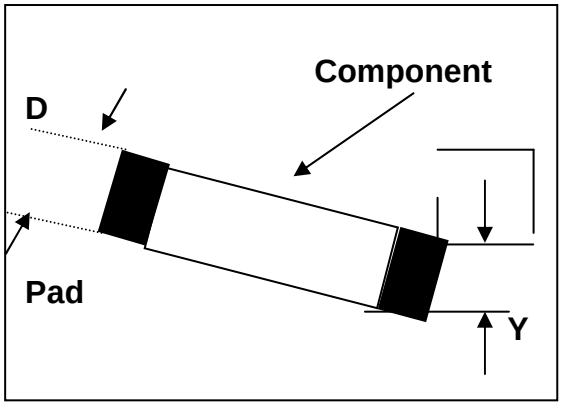
<table><tr><th>Dimension</th><th>Qualified Quantity</th></tr><tr><td>D≤0.1</td><td>Ignore</td></tr><tr><td>0.1＜D≤0.15</td><td>2</td></tr><tr><td>0.15＜D≤0.20</td><td>1</td></tr><tr><td>D＞0.20</td><td>0</td></tr></table>C-STN : if D＞0.1 , unqualified</td><td></td></tr>
</table>

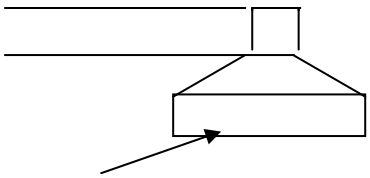
<table>
<tr><td rowspan="2">04</td><td rowspan="2">LCD black spots, white spots (Line Style)</td><td>4.1 Small area LCD
Unit : mm
 

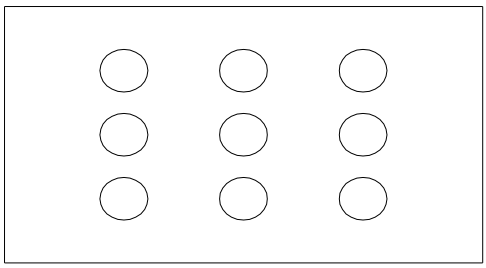
<table><tr><th>Length</th><th>Width</th><th>Qualified Quantity</th></tr><tr><td>-</td><td>≤0.015</td><td>Ignore</td></tr><tr><td>≤1.0</td><td rowspan="2">0.015＜W≤ 0.025</td><td>2</td></tr><tr><td>≤2.0</td><td>1</td></tr><tr><td>≤1.0</td><td>0.025＜W≤ 0.05</td><td>1</td></tr><tr><td>-</td><td>D＞0.05</td><td>According to circle</td></tr></table></td><td></td></tr>
<tr><td>4.2Large area LCD
 

<table><tr><th>Length</th><th>Width</th><th>Qualified Quantity</th></tr><tr><td>-</td><td>≤0.015</td><td>Ignore</td></tr><tr><td>≤2.0</td><td>0.015＜W≤ 0.025</td><td>2</td></tr><tr><td>≤1.0</td><td>0.025＜W≤ 0.05</td><td>1</td></tr><tr><td>-</td><td>D＞0.05</td><td>According to circle</td></tr></table>CSTN : If W ≥ 0.015 , unqualified
Ignore beyond viewing area</td><td></td></tr>
<tr><td>05</td><td>LCD Scratch 、 Threadlike Fiber</td><td colspan="2">Same to NO.3 circle
sightline and surface of LCD is vertical
(2)Same to NO.3 line style</td><td></td></tr>
<tr><td>06</td><td>POL</td><td colspan="2">It is not admissible that POL is beyond the edge of glass, else, unqualified.
It is essential that POL is over the 50 percent of width of frame , else ,unqualified.
According to the drawing in case of special definition.</td><td></td></tr>
<tr><td>07</td><td>IC/FPC Bonding</td><td>Scratch</td><td>Reject</td><td></td></tr>
</table>

		Intensity Of Adhesion	If lower than specification, reject	
		Gold Fold Twist	Reject	
07	IC/FPC Bonding	Silicon	According to outline, no gold outside, seal can not be higher than LCD	
		FPC Gold Sever	Reject	
08	SMT	Lack of Component、Polarity Inverse	If exist, reject	
		Leak Solder、Virtual Solder	If exist, reject	
		Short Circuit In Solder Point	If exist, reject	
		Tin Ball	If exist, reject	
		Tin Acumination	If visual, reject	
		Height Solder Point	If higher 0.5mm than component. reject	
		Height of component	Either side higher 0.5mm than component, reject	

		Component Shift	 X<3/4Z reject y＞1/3D reject	
08	SMT	Few Tin	 If θ≤20° reject	
		Component Deflection	 If Y >1/3D reject	
		Component Carcass Sideways	Reject	

		Component Carcass Sideways	If exist with visual inspection , reject	
		Lot Tin	A: Tin accrete the solder side completely , hollowly ,Ok B: Tin accrete the solder side completely , full circle arc , ok C: Jointing include whole solder side, height of tin>50 percent of height of component, reject	
		Few Tin	A: Tin accrete the solder side completely , hollowly ,Ok B: height of tin > 1/3 of solder side of component , ok C: height of tin ≤ 1/3 of solder side of component, reject	
08	SMT	Normal  Jointing side		
09	Light	Short circuit 、 Open circuit	Forbid	
		Quality of CSTN Display	1、Rolling strake with visual inspection, forbid 2、Differentness of color in viewing area with visual inspection (full white、red、green、blue), forbid 3 、 Display change with visual inspection , forbid	

<table>
<tr><td>10</td><td>Color Of CIE Coordinate</td><td><table><tr><td></td><td>x</td><td>y</td></tr><tr><td>white</td><td>±0.05</td><td>±0.05</td></tr><tr><td>Red</td><td>±0.05</td><td>±0.05</td></tr><tr><td>Green</td><td>±0.05</td><td>±0.05</td></tr><tr><td>Blue</td><td>±0.05</td><td>±0.05</td></tr></table>According to the specification or sample customer have approved</td><td colspan="2">Drive LCD under normal condition, 25℃ Φ=0 Θ=0
Test white、red、green blue with DMS Record</td><td></td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">Brightness</td><td rowspan="2">In accord with product specification</td><td>Drive condition is according to specification
Measure location is in Follow Picture 3、Adjust brightness instrument tozero , burrow against the surface of LCD , press “measure” , record when the display is steady.
(YOKOGAWA-3298)</td><td></td></tr>
<tr><td> 
Measure location</td><td></td></tr>
<tr><td>12</td><td>CR (Max)</td><td>According to specification</td><td colspan="2">According to product specification
Measure instrument (DMS-501)</td></tr>
<tr><td>13</td><td>Response time</td><td>According to specification</td><td colspan="2">According to product specification
Measure instrument (DMS-501)</td></tr>
<tr><td>14</td><td>Viewing angle</td><td>According to specification</td><td colspan="2">According to product specification
Measure instrument (DMS-501)</td></tr>
<tr><td>15</td><td>Vibration、Ring</td><td>Compare with the sample customer supply</td><td colspan="2">Compare with the sample customer supply when assemble</td></tr>
<tr><td>16</td><td>Frequency Of FPC Bend</td><td>According to the use of product (main FPC of foldaway cell phone ≥6 thousand)</td><td colspan="2">Measure instrument
Bend angle : 150°
Fix FPC in the casement when customer supply</td></tr>
</table>

11 Handling Precautions

11.1 Mounting method

The LCD panel of Daxian LCD module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

11.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent [recommended below] and wipe lightly

- Isopropyl alcohol
- Ethyl alcohol

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

Do not use the following solvent:

- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (Cl) , Salfur (S)

If goods were sent without being sili8con coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (CI), Salfur (S) from customer, Responsibility is on customer.

11.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended 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 areas, assembly equipment to protect against static electricity.

11.4 packing

- Module employ 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 direct to sunshine or high temperature/humidity

11.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how 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

operation temperature.

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

Usage under the maximum operating temperature, 50%Rh or less is required.

11.6 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 the opening 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's keeping the 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 from us

11.7 Safety

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

12 Precaution for use

12.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

12.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to Daxian , and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

13 Dimensional Outline