



SPECIFICATION

FOR

HY070BOQ01-50

Customer Confirmation column

Approved by: _____ Dept.: _____ Date: _____

Please return one of the copies of the specification with your signature to us within two weeks after you receive this document. If it is not returned, we will assume that you agree to the entire contents of this specification document.

Specification

Design: _____ Check: _____ Approval: _____

CONTENTS

- 1.0 Features
- 2.0 Mechanical Specifications
- 3.0 Dimensional Diagram
- 4.0 Interface Pin Function
- 5.0 Backlight & LED Characteristics
- 6.0 Timing Characteristics
- 7.0 Power On/Off Sequence
- 8.0 Reliability
- 9.0 Inspection Specification
- 10.0 Precautions For Using LCD Modules

1.0 Features

The Display model [HY070BOQ01-50](#) is 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 backlight system. This TFT LCD has a 7 inch diagonally measured active display area with 800*480 pixels.

2.0 Mechanical Specifications

ITEM	STANDARD VALUES	UNITS
LCD type	7"	Inch
Pixel arrangement	800 (RGB) ×480	Pixels
Outline Dimension	165×100×3.45	mm
Display area	153.84(H)×85.63(V)	mm
Pixel Pitch	0.0641 ×0.1784	mm
Display Mode	Normally white	--
Viewing Direction	6 o'clock	--
Number of Color	16.7M	--
Interface	RGB	--
LCM Luminance	200	cd/m ²

4.0 Interface Pin Function

Pin No	Symbol	Function
1	LED+	LED Anode
2	LED+	LED Anode
3	LED-	LED Cathode
4	LED-	LED Cathode
5	GND	Ground
6	VCOM	Common Voltage
7	VDD	Power supply
8	MODE	DE/SYNC mode select. Normally pull high H: DE mode. L: HSD/VSD mode
9	DE	RGB data enable signal
10	VSYNC	RGB frame synchronizing signal
11	HSYNC	RGB line synchronizing signal
12-19	B7-B0	RGB data signal
20-27	G7-G0	RGB data signal
28-35	R7-R0	RGB data signal
36	GND	Ground
37	DCLK	RGB dot clock signal
38	GND	Ground
39	SHLR	Left / Right Display Control
40	UPDN	Up / Down Display Control
41	VGH	Gate on voltage
42	VGL	Gate off Voltage
43	AVDD	Power supply for the analog power
44	RSTB	Global reset pin
45	NC	Not connection
46	VCOM	Common Voltage
47	DITH	Dithering setting DITH="H" 6bit resolution (last 2 bit of input data truncated) DITH="L" 8bit resolution (default setting)
48	GND	Ground
49	NC	Not connection
50	NC	Not connection

4.0 Absolute Maximum Ratings

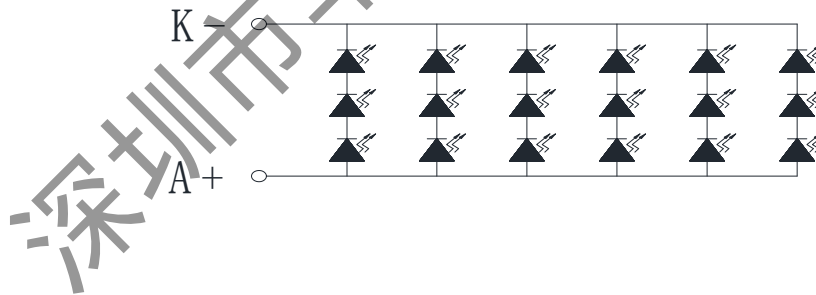
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNITS
Supply Voltage	VDD	2.8	3.3	3.6	V
Analog Power Supply Voltage	AVDD	10.1	10.3	10.5	V
Gate On Power Supply Voltage	VGH	17	18	19	V
Gate Off Power Supply Voltage	VGL	-9	-8	-7	V
Common Power Supply Voltage	VCOM	3.2	3.38	3.5	V

5.0 Backlight & LED Characteristics

VSS = 0V, Ta = 25°C

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	VF	9.0	9.6	10.5	V	IF= 120mA
Supply Current	IF		120	-	mA	-
Reverse Current	IR	-	-	10	uA	VR= 5V/PCS
Power dissipation	PD	-	1152	-	mW	
Luminous Intensity For LCM	IV	180	200	-	cd/m ²	IF= 20mA
Uniformity For LCM	-	70	75	-	%	IF= 20mA
Life Time	-	50000	-	-	Hr	IF= 20mA

Internal Circuit Diagram

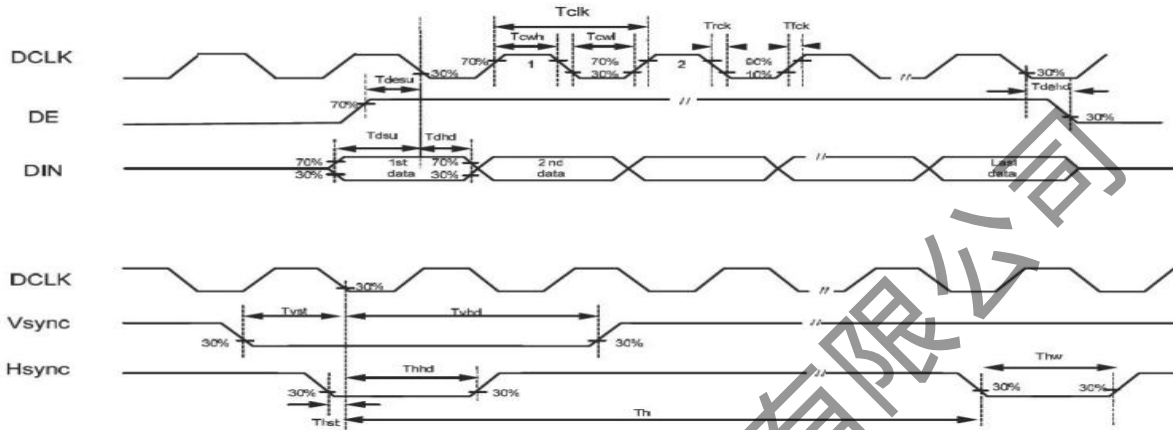


$$\text{CURRENT } I_F = 120 \text{ mA}$$

$$20 * 6 = 120 \text{ mA}$$

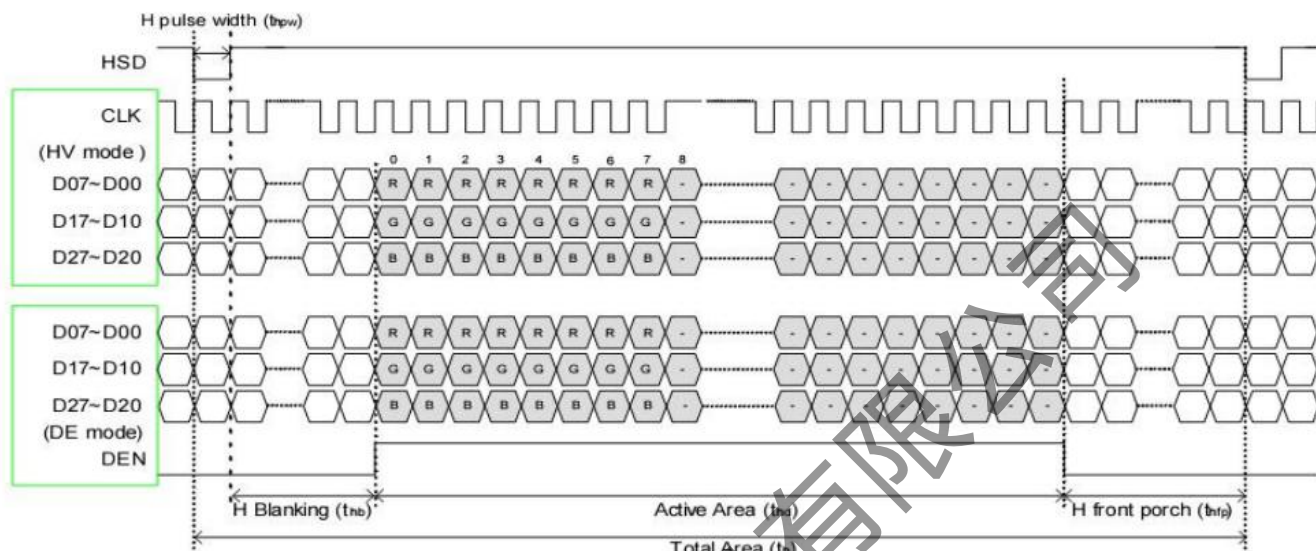
6.0. Timing Characteristics

6.1 AC Timing Diagram

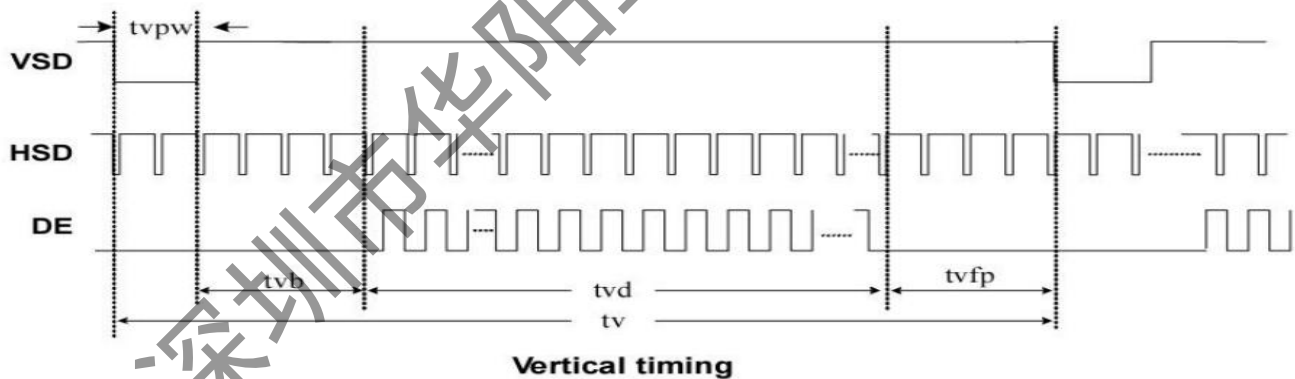


Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK period time	Tcph	83.3	111	125	ns	Parallel 18bit RGB mode
DCLK rising time	Tfck			9	ns	
DCLK falling time	Tcph			9	ns	
DCLK pulse duty	Tcwh	50	50	60	%	
DE setup time	Tdesu	12			ns	
DE hold time	Tdehd	12			ns	
HSYNC pulse width	Thwh	1			DCLK	
HSYNC setup time	Thsu	12			ns	
HSYNC hold time	Thhd	12			ns	
VSYNC pulse width	Twwh	1			Th	
VSYNC setup time	Tvsu	12			ns	
VSYNC hold time	Tvhd	12			ns	
Data setup time	Tdsu	12			ns	
Data hold time	Tdhd	12			ns	

6.2 Timing Diagram of interface Signal



Horizontal display timing range



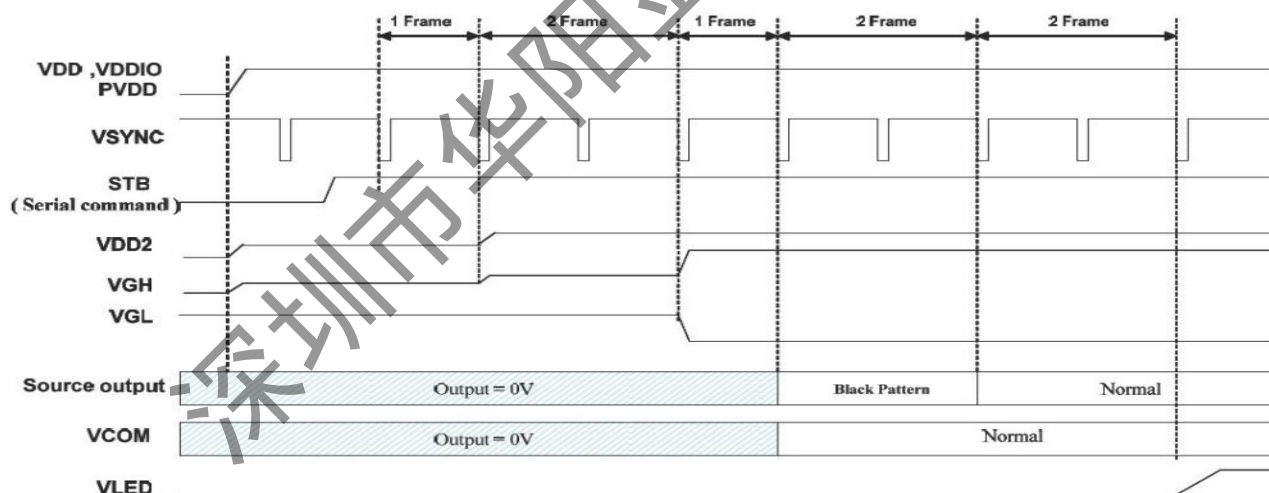
Vertical timing

6.3 Parallel RGB Input Timing Table

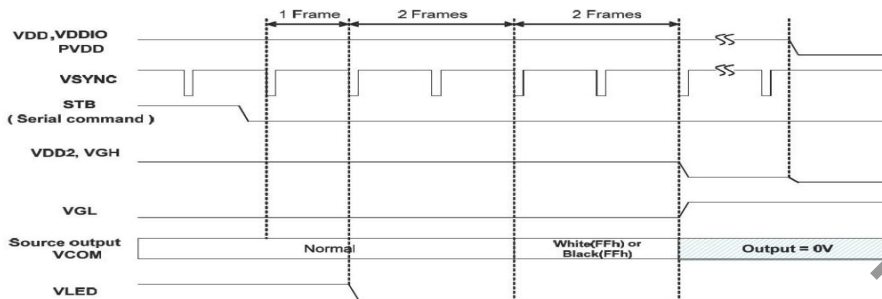
Item	Symbol	Min.	Typ.	Max.	Unit	
DCLK Frequency		Fclk	-	33.3	50	MHz
Hsync	Period Time	Th	862	1056	1200	DCLK
	Display Period	Thdisp	800			DCLK
	Back Porch	Thbp	46	46	46	DCLK
	Front Porch	Thfp	16	210	354	DCLK
	Pulse Width	Thw	1	-	40	DCLK
Vsync	Period Time	Tv	510	525	650	H
	Display Period	Tvdisp	480			H
	Back Porch	Tvbp	23	23	23	H
	Front Porch	Tvfp	7	22	147	H
	Pulse Width	Tvw	1	-	20	H

7.0 Power On/Off Sequence

7.1 Power On Sequence



7.2 Power Off Sequence



8.0 Reliability

NO.	Test Item	Test condition	Criterion
1	High Temperature Storage	60°C±2°C 96H Restore 2H at 25°C Power off	
2	Low Temperature Storage	-10°C±2°C 96H Restore 2H at 25°C Power off	
3	High Temperature Operation	50°C±2°C 96H Restore 2H at 25°C Power on	
4	Low Temperature Operation	0°C±2°C 96H Restore 2H at 25°C Power on	
5	High Temperature & Humidity Operation	40°C±2°C 90%RH 96H Power on	
6	Temperature Cycle	-10°C↔60°C 30min 30min after 10cycle, Restore 2H at 25°C Power off	Aftertesting,cosmetic and electrical defects should not happen.
7	Vibration Test	10Hz~45Hz, 100m/s2, 120min	
8	Shock Test	Half-sinewave,300m/s2,11ms	
9	Drop Test(package state)	800mm, concrete floor,1corner, 3edges, 6 sides each time	1.After testing, cosmetic and electrical defects should not happen. 2.the product should remain at initial place 3.Product uncovered or package broken is not permitted.
10	Electro Static Discharge Test (non-operation)	150pF, 330Ω, Contact:±4KV,Air:±8KV Measure point :LCD glass and metal bezel 200pF, 0Ω, ±200V contact test Measure point :IF connector pins	IEC61000-4-2 : 2001 GB/T17626.2-2006

9.0 INSPECTION STANDARDS

9.1 Purpose

This incoming inspection standard shall be applied to TFT-LCD supplied by MAN ZHENG to its customer.

9.2 Scope

This inspection standard contains Cosmetic Specifications and Electrical Specifications.

9.3 Classification of defects

9.3.1 Major defect.

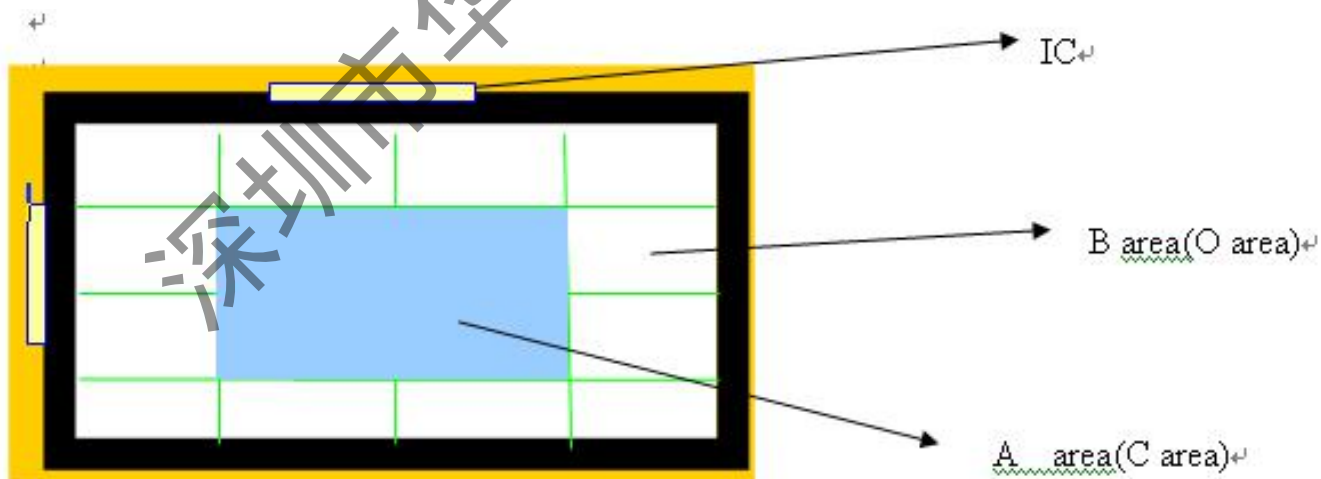
The major defect is a defect that is likely to result in product failure or reduction in Product's intended usage.

9.3.2 Minor defect.

The minor defect is a defect that has little bearing on the effective use or Operation of the product.

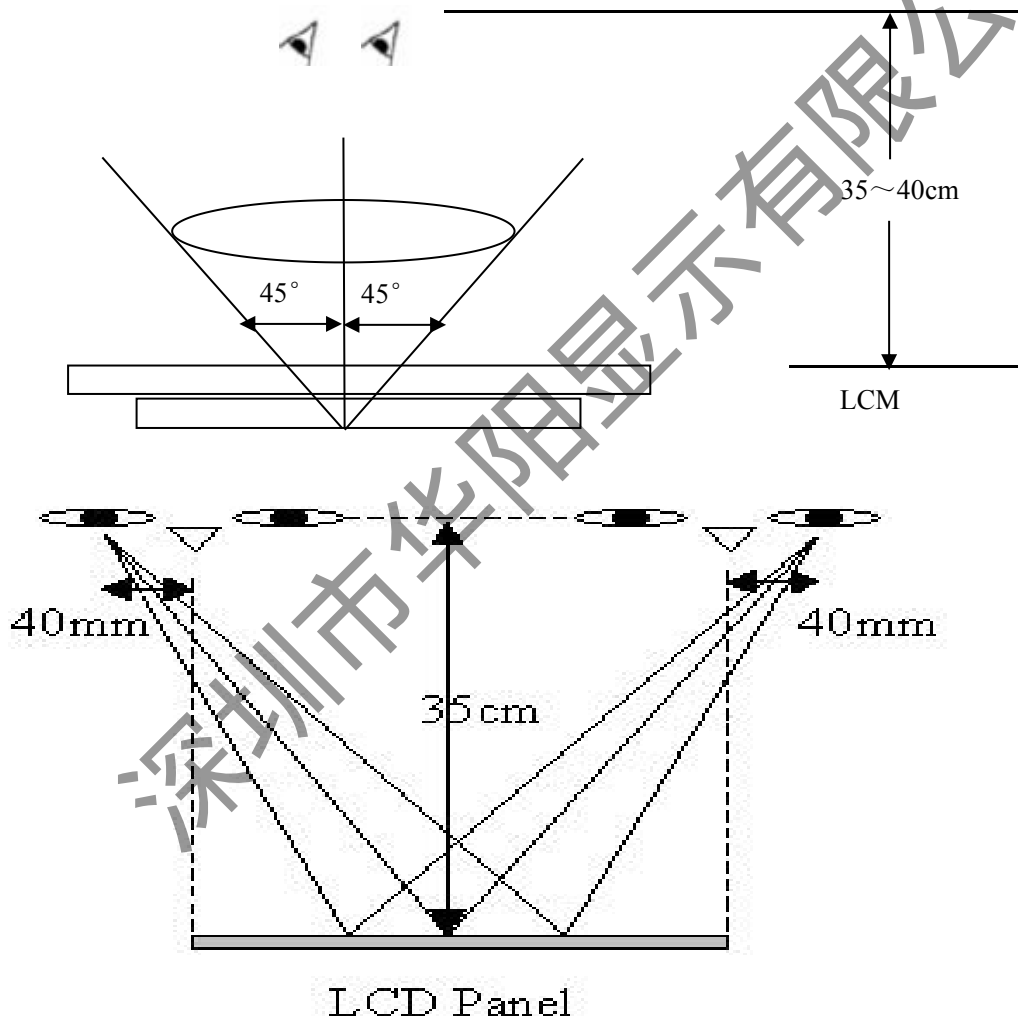
9.4 Definition

9.4.1 Display area definition



9.5 Inspection conditions is as follows

- 9.5.1 Viewing distance is approximately 35-40 cm
- 9.5.2 Viewing angle is normal to the LCD panel as 45°
- 9.5.3 Ambient temperature is approximately $25\pm 5^\circ\text{C}$
- 9.5.4 Ambient humidity is $60\pm 5\% \text{RH}$
- 9.5.5 Ambient luminance is from 300-500 Lux.
- 9.5.6 Input signal timing should be typical value(3s-5s).
- 9.5.7 Mura & Light leakage inspection at ND-Filter 6%.



9.6 Sampling method

9.6.1 According to the MIL-STD-105E general inspection level , II Sampling plan.

9.6.2 AQL: MA 0.65 MI 1.0

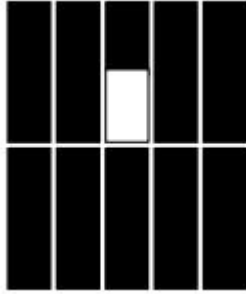
9.7 Inspection Criteria

DEFECT TYPE		LIMIT			Defect	Note	
VISUAL DEFECT	SCRATCH		W ≤ 0.05mm and L ≤ 5mm		Ignore	Ma j NOTE1	
			0.05mm < W ≤ 0.2mm L ≤ 10mm		N ≤ 4		
			10mm < L, 0.1mm < W		N = 0		
	INTERNAL	SPOT		Φ ≤ 0.2mm			Ignore
				0.2mm < Φ ≤ 0.5mm			N ≤ 4
				Φ > 0.5mm			N = 0
		FIBER		0.1mm ≤ W ≤ 0.2mm L ≤ 2.5mm			N ≤ 4
				0.2mm < W, 2.5mm < L			N = 0
		POLARIZER BUBBLE		Φ ≤ 0.25mm			Ignore
				0.25mm < Φ ≤ 0.5mm			N ≤ 4
				Φ > 0.5mm			N = 0
		DENT		Φ < 0.25mm			Ignore
	0.25mm ≤ Φ ≤ 0.5mm			N ≤ 4			
Φ > 0.5mm				N = 0			
ELECTRICAL DEFECT	BRIGHT DOT		C Area	O Area	Total	Ma j NOTE2 NOTE3	
			N ≤ 4 (contain C area and O area)		N ≤ 4		
	DARK DOT		N ≤ 5 (contain C area and O area)		N ≤ 5		
	TWO ADJACENT DOT		N ≤ 1	N ≤ 2	N ≤ 3		
	THREE OR MORE ADJACENT DOT		NOT ALLOWED				
	LINE DEFECT		NOT ALLOWED				

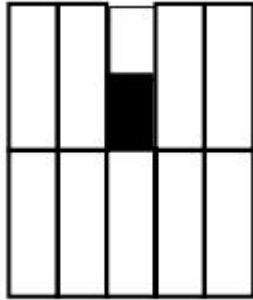
Note1: Minimum distance between dot defects and spot is 5mm;

Note2: The definition of Bright dot and Dark dot

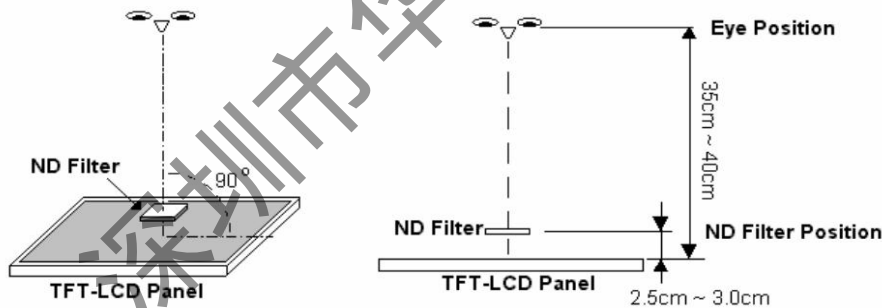
-bright area is more than 50% of one dot



-dark area is more than 50% of one dot



-The bright dot shall be visible under ND-Filter 5% as following:



NOTE3:

- A bit rate(bright dot model) $\leq 10\%$;
- Class Chipping but not affect the function of quality OK;
- Polarizing film appearance does not affect the function OK;

10.0 Precautions For Using LCD Modules

Handling Precautions

- (1) The display panel is made of glass and polarizer. As glass is fragile, it tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.
 - (2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.
 - (3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).
 - (4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on.
- Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming is contacting with room temperature air.

(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents

- Isopropyl alcohol

- Ethyl alcohol

Do not scrub hard to avoid damaging the display surface.

(6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.

- Water

- Ketone

- Aromatic solvents Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contacting oil and fats.

(7) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high humidity environment.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD module.

(10) NC terminal should be open. Do not connect anything.

(11) If the logic circuit power is off, do not apply the input signals.

(12) Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.

- Do not alter, modify or change the shape of the tab on the metal frame.
- Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
- Do not damage or modify the pattern writing on the printed circuit board.
- Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.
- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- Do not drop, bend or twist LCM.

Storage Precautions

When storing the LCD modules, the following precaution is necessary.

- (1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for the dessicant.
- (2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C.
- (3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the container in which they were shipped).



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Others

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature. If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability. To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

- Exposed area of the printed circuit board.
- Terminal electrode sections.