



深圳市百乐奇科技有限公司

SHENZHEN BAILEQI TECHNOLOGY CO., LTD



# Product Specification 产品规格书

## YN430WQ010B

4.3" 480 (H)\*3 (RGB)\*272 (V) TFT LCD MODULE

Sep/19/ 2019

Customer: \_\_\_\_\_

Customer Approval and Feedback

BAILEQI Signature:

Prepared by	Checked by	Approved by

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REVISION HISTORY

Rev	Description	Page	Date
1.0	Initial Release	All	2019/09/19



## 1. GENERAL DESCRIPTION

### 1.1 DESCRIPTION

YN430WQ010B is a transmissive type color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT-LCD module (TFT-LCD panel, driver IC and FPC), a back-light unit and. The resolution of 4.3" contains 480RGBX272 pixels and can display up to 16.7M colors.

### 1.2 GENERAL INFORMATION

Items	Specification	Unit	Note
Display mode	TFT Transmissive, Positive, NW, TN	-	-
Drive element	a-Si TFT active matrix	-	-
LCM outline size	105.5(H) x 67.2(V) x3.0(T)	mm	Note (1) (2)
Active area	95.04(H)X53.86(V)	mm	-
Number of pixels	480*3RGB(H)X272(V)	pixels	-
Pixel arrangement	RGB stripe	-	-
Pixel size	0.066(H) x 0.198 (V)	mm	-
Display color	16.7M	color	-
Viewing direction	6 O' CLOCK	-	-
Controller / Driver	ST7282E	-	-
Data interface	24 BIT RGB	-	-
Backlight	7 White LEDs In Series	-	-
Weight	-	g	-

Notes:

- (1) Back-light unit are included.
- (2) FPC no included. (Refer to the module outline dimension for further information). Please see module specification drawing in Page10 for more details.



## 2. ABSOLUTE MAXIMUM RATING

(Ta=25±2° C, Vss=GND=0V)

Characteristics	Symbol	Min.	Max.	Unit	Notes
Power Supply Voltage 1	VDD1	2.8	3.6	V	
Power Supply Voltage 2	VDD2	-	-	V	
Power Supply Voltage 3	VDD3	-	-	V	
Power Supply Voltage 4	VDD4	-	-	V	
Power Supply Voltage 5	VSP	-	-	V	
Power Supply Voltage 6	VSN	-	-	V	
TFT Gate On voltage	VGH		-	V	
TFT Gate Off voltage	VGL	-10	-	V	
Logic Signal Input Voltage	V <sub>IN</sub>	-0.3	VDD1+0.3	V	
HS Input Voltage	V <sub>IN</sub>	-	-	V	
Backlight Forward Current	I <sub>F</sub>	-	20	mA	
Operating Temperature	T <sub>OPR</sub>	-20	+70	° C	(1), (3)
Storage Temperature	T <sub>STG</sub>	-30	+80	° C	(2), (3)
Humidity	RH	-	90	%	Max. 60 ° C

Notes:

- (1) In case of below 0° C, the response time of liquid crystal (LC) becomes slower and the color of panel becomes darker than normal one. Level of retardation depends on temperature, because of the LC characteristics.
- (2) If product is exposed to high temperatures for extended time, there is a possibility of the polarizer film damage which could degrade the optical characteristics.
- (3) Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is loaded.

Functional operation should be restricted to the conditions described under normal operating conditions.



### 3. ELECTRICAL CHARACTERISTICS

#### 3.1 LCM DC CHARACTERISTICS

(Ta=25±2° C)

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage 1	DVDD	2.8	3.3	3.6	V	
Power Supply Voltage 2	AVDD	-	6	-	V	
Power Supply Voltage 3	VGH	-	16	-	V	
Power Supply Voltage 4	VGL	-	-10	-	V	
Power Supply Voltage 5	VCOM	0	-	2.7	V	
Power Supply for MTP	VPP	-	-	-	V	
Current Consumption	I <sub>DD</sub>	-	-	-	mA	
	I <sub>DD-SLEEP</sub>		TBD		uA	Sleep mode
Input voltage "L" Level	V <sub>IL</sub>	GND	-	0.3VDD1	V	VDD1=2.8~3.6
Input voltage "H" Level	V <sub>IH</sub>	0.7VDD1	-	VDD1	V	
Output voltage "L" Level	V <sub>OL</sub>	0	-	0.2VDD1	V	I <sub>OL</sub> =1mA
Output voltage "H" Level	V <sub>OH</sub>	0.8VDD1	-	VDD1	V	I <sub>OH</sub> =-1mA

#### 3.2 BACK-LIGHT UNIT CHARACTERISTICS

The back-light system is an edge-lighting type with 7 white LEDs. The characteristics of the back-light are shown in the following tables.

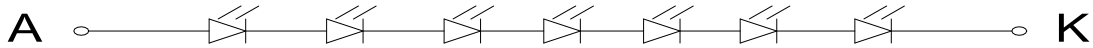
(Ta=25±2° C)

Characteristics	Symbol	Condition	Min.	Type	Max.	Unit	Notes
Forward Voltage	Vf	I <sub>L</sub> =20mA	-	22.4	-	V	-
Forward current	I <sub>L</sub>		-	20	-	mA	-

Note:

- (1) The "LED life time" is defined as the module brightness decrease to 50% of original brightness at I<sub>L</sub>=20mA. The LED life time could be decreased if operating I<sub>L</sub> is larger than 20mA.

Backlight circuit diagram shown in below:



(LED : 7LEDs Serial)

#### 4. OPTICAL CHARACTERISTICS

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room.

Measuring equipment: BM-5AS, BM-7, EZ-Contrast.

(Ta=25±2° C)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio (Center point)		C/R	-	500	700	-	-	BM-7 Note (2)
Luminance of white (Center point)		L <sub>w</sub>	B/L on	-	250	-	cd/m <sup>2</sup>	CA-210
Luminance uniformity		U <sub>w</sub>		-	-	-	%	BM-7 Note (3)
Response Time		Tr + Tf		-	20	30	ms	BM-5AS Note (4)
Color Chromaticity (CIE 1931)	White	W <sub>x</sub>	θ = 0. Normal viewing angle B/L On Note (1)	-0.03	0.297	+0.03	-	CA-210 Note (5)
		W <sub>y</sub>			0.319			
	Red	R <sub>x</sub>			0.583			
		R <sub>y</sub>			0.356			
	Green	G <sub>x</sub>			0.36			
		G <sub>y</sub>			0.602			
	Blue	B <sub>x</sub>			0.152			
		B <sub>y</sub>			0.115			
Viewing Angle	Hor.	θ <sub>L</sub>	C/R≥10	-	80	-	Deg	EZ Contrast Note (6)
		θ <sub>R</sub>		-	80	-		
	Ver.	θ <sub>U</sub>		-	60	-		
		θ <sub>D</sub>		-	70	-		
View Direction			6 O' CLOCK				Note (7)	

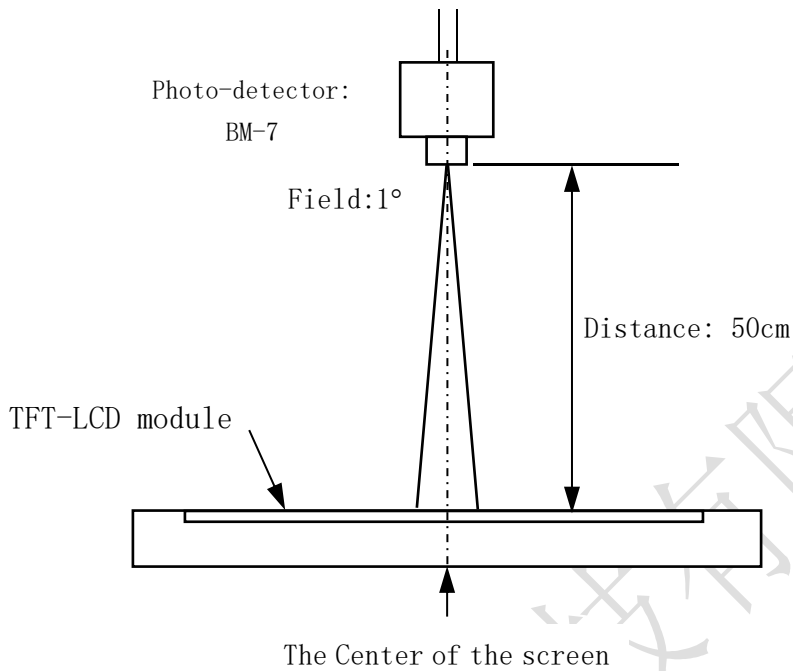
\* This condition will be changed by the evaluation circumstance. If product is exposed to high temperatures for extended time, there is a possibility of the polarizer film damage which could degrade the optical characteristics.

Notes:

(1) Test Equipment Setup: After stabilizing and leaving the panel alone at a given



temperature for 30min, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room 30min after lighting the back-light. This should be measured in the center of screen.

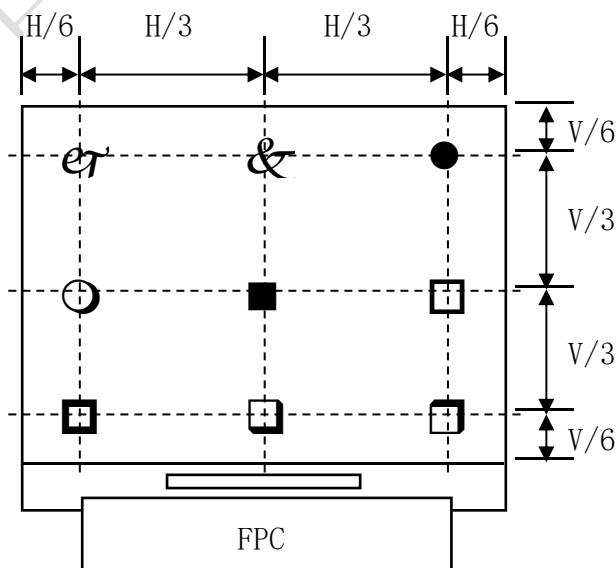


(2) Definition of Contrast Ratio (CR):

$$\text{Contrast Ratio (CR)} = \frac{\text{Luminance measured when LCD on the "white" state}}{\text{Luminance measured when LCD on the "black" state}}$$

(3) Definition of Luminance Uniformity: Active area is divided into 9 measuring areas (Shown in below), every measuring point is placed at the center of each measuring area.

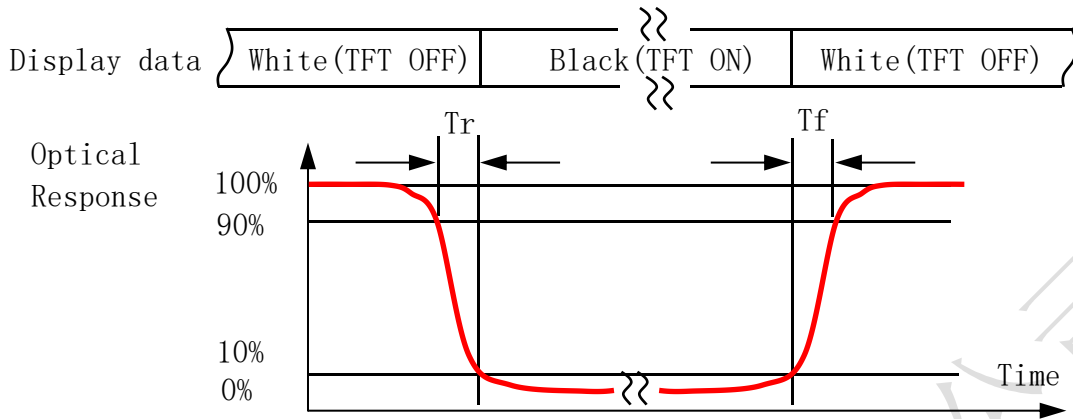
$$\text{Luminance Uniformity} = \frac{\text{Min Luminance of white among 9-points}}{\text{Max Luminance of white among 9-points}} \times 100\%$$



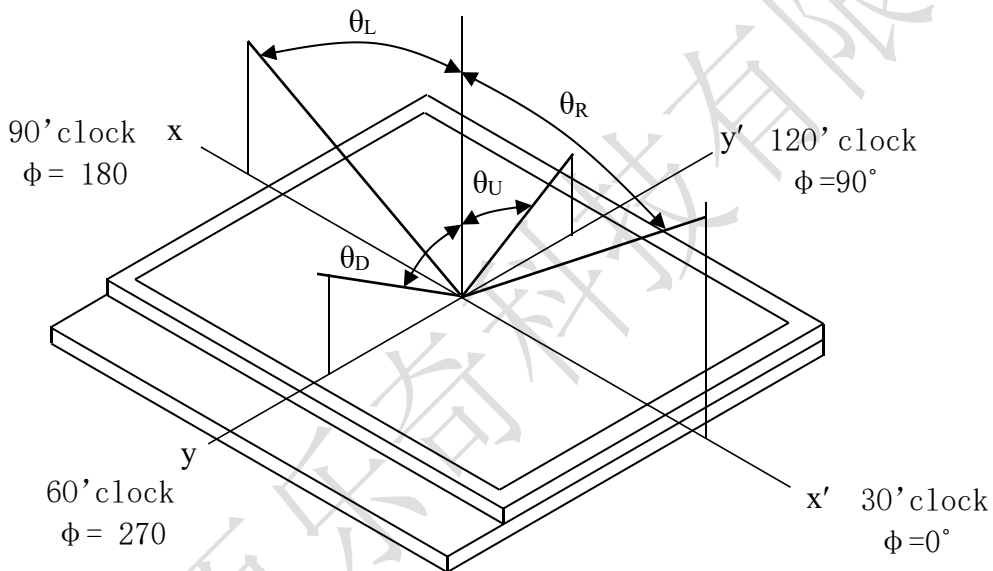
The spot locations for luminance measurement



(4) Definition of Response time: Sum of  $T_r$  and  $T_f$ .



(5) Definition of Viewing Angle: The viewing angle range that the  $CR \geq 10$ .



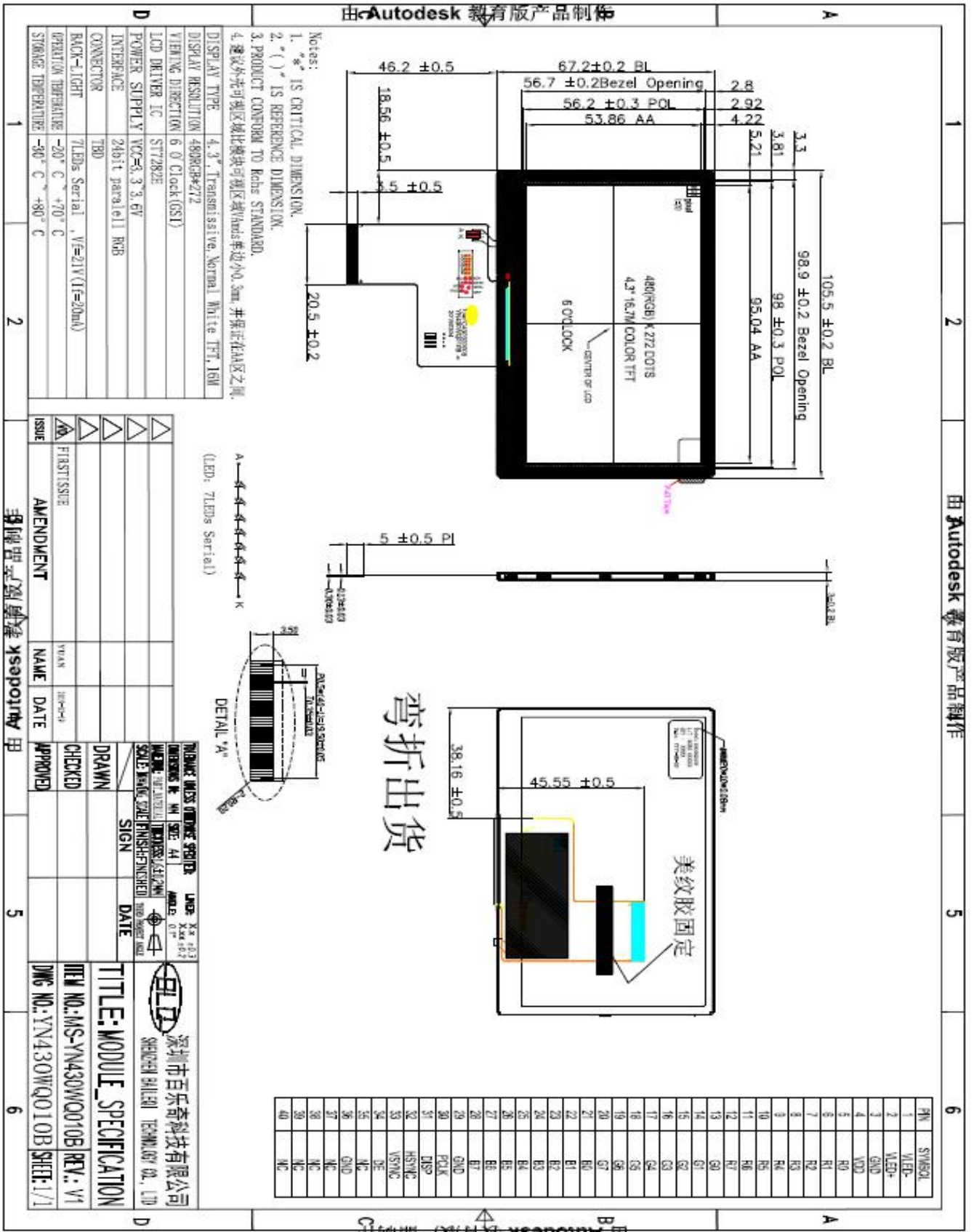
(6) Definition of Color Chromaticity (CIE 1931)

Color coordinate of white & red, green, blue at center point.

(7) The different Rubbing Direction will cause the different optima view direction.



### 5. MODULE OUTLINE DIMENSION





## 6. MODULE INTERFACE DESCRIPTION

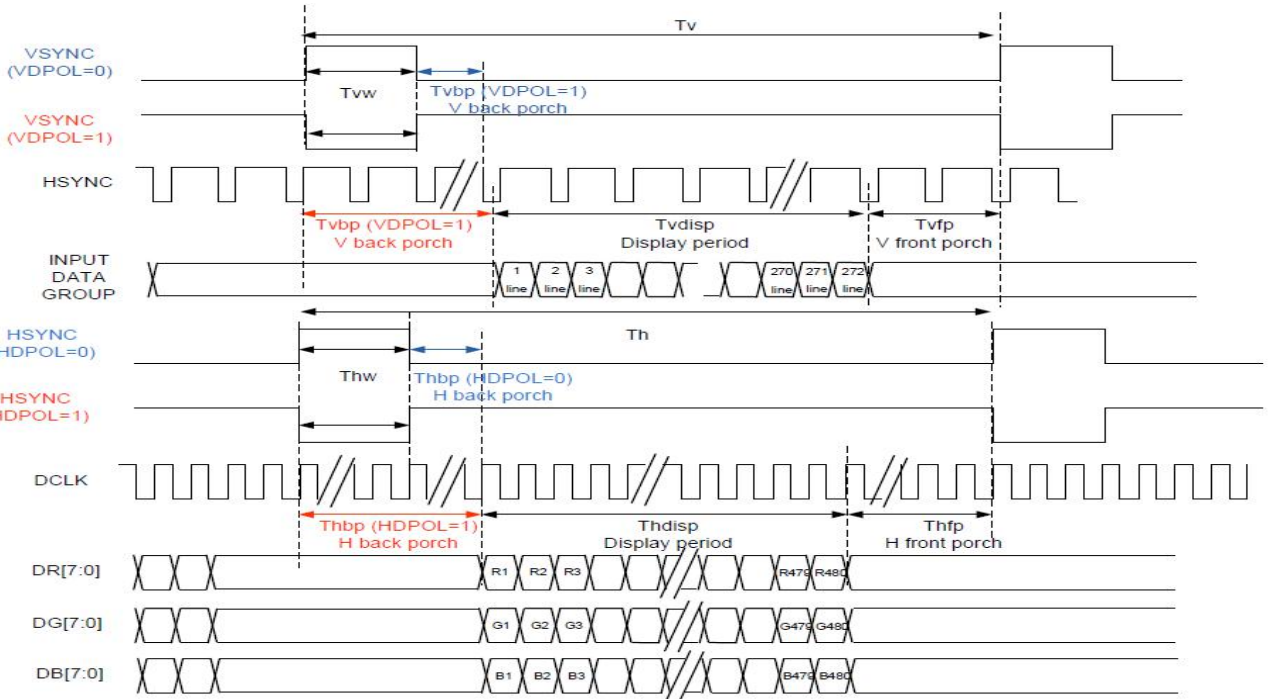
Pin No.	Symbol	Function
1	LEDK	Cathode for Backlight
2	LEDA	Anode for Backlight
3	GND	Ground
4	VDD	Power Voltage
5~12	R0~R7	Red data bus
13~20	G0~G7	Green data bus
21~28	B0~B7	Blue data bus
29	GND	Ground
30	DCLK	Clock signal for data latching
31	DISP	Display on/off mode control
32	HSYNC	Horizontal sync input with negative polarity
33	VSYNC	Vertical sync input with negative polarity
34	DE	Input data enable control
35	NC	No connection
36	GND	Ground
37	NC	No connection
38	NC	No connection
39	NC	No connection
40	NC	No connection

## 7. REFERENCE APPLICATION CIRCUIT

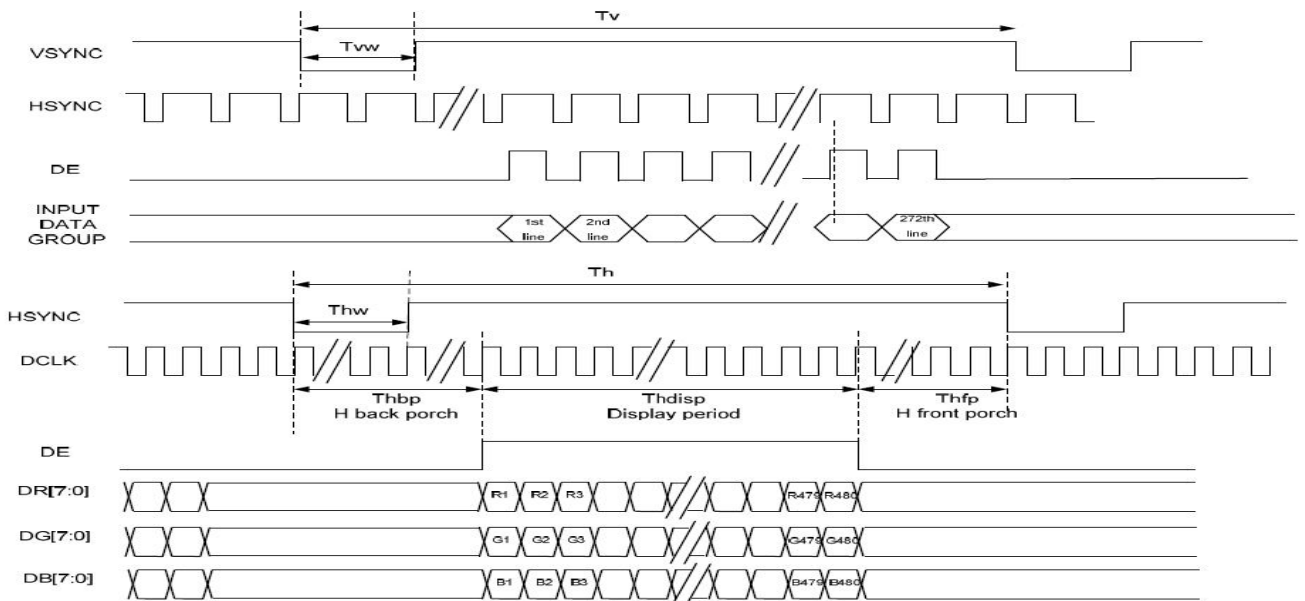
Please consult our technical department for detail information.

## 8. TIMINGS FOR 24-bit RGB Interface

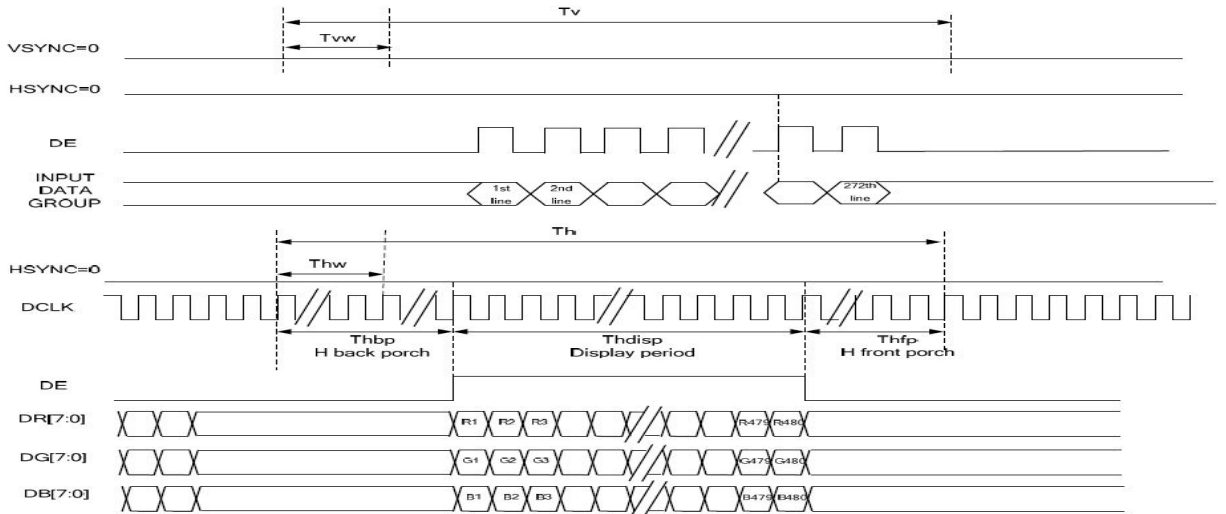
### 8.1 SYNC mode Timing Diagram



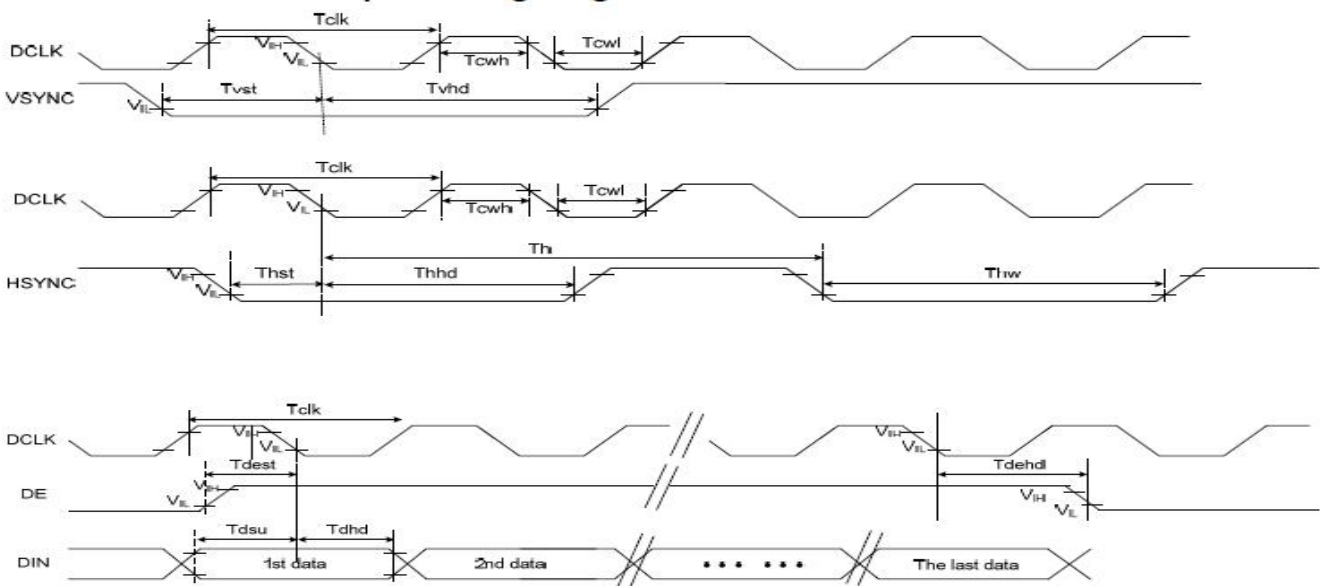
## 8.2 SYNC-DE Mode Timing Diagram



## 8.3 DE Mode Timing Diagram



### 8.4 Clock and Data Input Timing Diagram





Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	ns	
HSYNC	Period Time	Th	485	531	598	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	By H_Blanking setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	75	DCLK	
VSYNC	Period Time	Tv	276	292	321	H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12	12	H	By V_Blanking setting
	Front Porch	Tvfp	2	8	37	H	
	Pulse Width	Tvw	2	4	37	H	

Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

## 9. RELIABILITY TEST CONDITIONS

No.	Test Item	Test Condition	Notes
1	High Temperature Storage	+80° C /240hrs	Inspection after 2~4h storage at room temperature, the sample shall be free from defects: 1. Air bubble in the LCD; 2. Seal leak; 3. Non-display; 4. Missing segments; 5. Glass crack; 6. The surface shall be free from damage. 7. The electrical characteristics requirements shall be satisfied.
2	Low Temperature Storage	-30° C /240hrs	
3	High Temperature Operating	+70° C /240hrs	
4	Low Temperature Operating	-20° C /240hrs	
5	Temperature Cycle	Ta=-10°C~+25~+50°C, 10 Cycle, per30min	
6	High Temperature /Humidity storage	60°C, 90%RH/240hrs	
7	Vibration Test	Frequency: 10Hz~55Hz~10Hz Amplitude:1.5mm, 2 hours for each direction of X, Y, Z	
8	Packing Drop Test	Drop to the ground from 1m height, 1 corner, 3 edges, 6 surfaces.	
9	ESD test	Voltage:±8KV R: 330Ω C: 150pF Air discharge, 10time	

### Remarks:

- (1) The test samples should be applied to only one test item.
- (2) Sample size for each test item is 5~10pcs.





- (3) For High Temperature/Humidity storage test, pure water (resistance $>10M\Omega$ ) should be used.
- (4) In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.
- (5) Failure judgment criterion: basic specification, electrical characteristic, mechanical characteristic, optical characteristic.

## 10. PACKING SPECIFICATION

TBD.

## 11. Quality Assurance

### 11.1 Sample Method

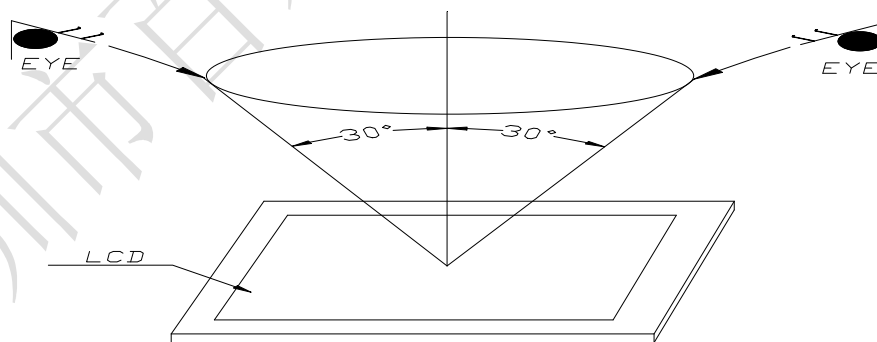
Unless otherwise agreed upon in writing, the sample inspection shall be applied to the Customer's incoming inspection.

- 11.1.1. Lot size :Quantity per shipment lot
- 11.1.2. sampling type :Normal inspection, Single sampling
- 11.1.3. inspection level :II
- 11.1.4. Sampling table :MIL-STD-105E

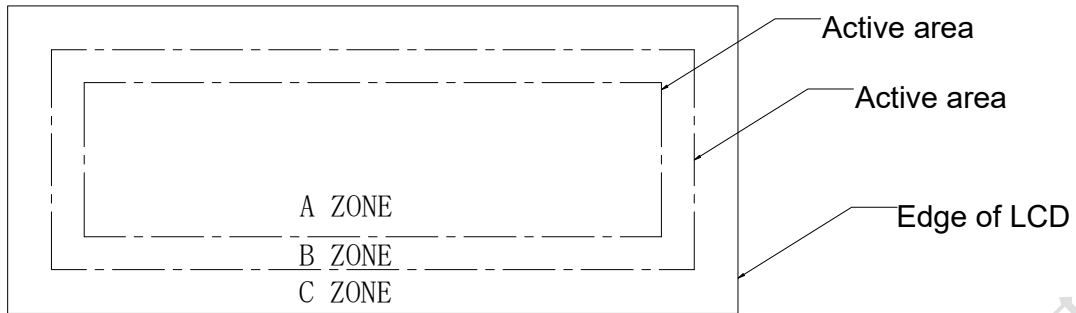
### 11.2 Appearance Inspection

Appearance inspection should be done under the following condition.

- (1) In the dark room.
- (2) The distance from eyes to LCD must be 30cm.
- (3) Viewing direction must be within 30 degrees to vertical line of LCD center.



### 11.3 Definition of A zone, B zone and C zone



### 11.4 Appearance Criterion

Customer and supplier should hold a discussion when there is any problem about standard quality assurance or special quality assurance is needed.

NO	Item	Criterion	Zone	AQL															
1	Stains Black spots Foreign particles	<p>Line shape:</p> <table border="1"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acceptable Q' ty</th> </tr> </thead> <tbody> <tr> <td>-</td> <td><math>W \leq 0.1</math></td> <td>Disregard</td> </tr> <tr> <td><math>0 &lt; L &lt; 5</math></td> <td><math>0.1 &lt; W &lt; 0.2</math></td> <td>4</td> </tr> </tbody> </table> <p>Round shape:</p> <table border="1"> <thead> <tr> <th>Diameter</th> <th>Acceptable Q' ty</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.15</math></td> <td>Disregard</td> </tr> <tr> <td><math>0.15 &lt; D &lt; 0.2</math></td> <td>3</td> </tr> </tbody> </table> <p>Any defect wiped out easily is acceptable.</p>	Length	Width	Acceptable Q' ty	-	$W \leq 0.1$	Disregard	$0 < L < 5$	$0.1 < W < 0.2$	4	Diameter	Acceptable Q' ty	$D \leq 0.15$	Disregard	$0.15 < D < 0.2$	3	A, B	2.5
Length	Width	Acceptable Q' ty																	
-	$W \leq 0.1$	Disregard																	
$0 < L < 5$	$0.1 < W < 0.2$	4																	
Diameter	Acceptable Q' ty																		
$D \leq 0.15$	Disregard																		
$0.15 < D < 0.2$	3																		
2	Scratch	<table border="1"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acceptable Q' ty</th> </tr> </thead> <tbody> <tr> <td>-</td> <td><math>W \leq 0.05</math></td> <td>Disregard</td> </tr> <tr> <td><math>0 &lt; L &lt; 10</math></td> <td><math>0.05 &lt; W &lt; 0.1</math></td> <td>3</td> </tr> </tbody> </table>	Length	Width	Acceptable Q' ty	-	$W \leq 0.05$	Disregard	$0 < L < 10$	$0.05 < W < 0.1$	3	A, B	2.5						
Length	Width	Acceptable Q' ty																	
-	$W \leq 0.05$	Disregard																	
$0 < L < 10$	$0.05 < W < 0.1$	3																	
3	Bubbles	<table border="1"> <thead> <tr> <th>Diameter</th> <th>Acceptable Q' ty</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.25</math></td> <td>Disregard</td> </tr> <tr> <td><math>0.25 &lt; D &lt; 0.4</math></td> <td>2</td> </tr> </tbody> </table>	Diameter	Acceptable Q' ty	$D \leq 0.25$	Disregard	$0.25 < D < 0.4$	2	A	2.5									
Diameter	Acceptable Q' ty																		
$D \leq 0.25$	Disregard																		
$0.25 < D < 0.4$	2																		
4	Dent	<table border="1"> <thead> <tr> <th>Diameter</th> <th>Acceptable Q' ty</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.25</math></td> <td>Disregard</td> </tr> <tr> <td><math>0.25 &lt; D &lt; 0.5</math></td> <td>4</td> </tr> </tbody> </table>	Diameter	Acceptable Q' ty	$D \leq 0.25$	Disregard	$0.25 < D < 0.5$	4	A, B	2.5									
Diameter	Acceptable Q' ty																		
$D \leq 0.25$	Disregard																		
$0.25 < D < 0.5$	4																		





5	Display quality	<ul style="list-style-type: none"> <li>● Viewing angle defect.</li> <li>● Contrast ratio defect.</li> <li>● Missing lines.</li> <li>● Malfunction.</li> <li>● Power consumption exceeds specification.</li> </ul>	A	0.65												
6	Color tone Color uniformity	To be judged by Arima Display Corporation.	A	2.5												
7	Bright Dot Dark Dot	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Type</th> <th style="width: 33%;">Acceptable Q' ty</th> <th style="width: 33%;">Distance Between Defect Dot</th> </tr> </thead> <tbody> <tr> <td>Bright Dot</td> <td style="text-align: center;">2</td> <td style="text-align: center;"><math>\geq 15\text{mm}</math></td> </tr> <tr> <td>Dark Dot</td> <td style="text-align: center;">4</td> <td style="text-align: center;"><math>\geq 5\text{mm}</math></td> </tr> <tr> <td>Total Bright and Dark Dot</td> <td style="text-align: center;">4</td> <td style="text-align: center;"><math>\geq 5\text{mm}</math></td> </tr> </tbody> </table>	Type	Acceptable Q' ty	Distance Between Defect Dot	Bright Dot	2	$\geq 15\text{mm}$	Dark Dot	4	$\geq 5\text{mm}$	Total Bright and Dark Dot	4	$\geq 5\text{mm}$	2.5	
Type	Acceptable Q' ty	Distance Between Defect Dot														
Bright Dot	2	$\geq 15\text{mm}$														
Dark Dot	4	$\geq 5\text{mm}$														
Total Bright and Dark Dot	4	$\geq 5\text{mm}$														
8	Light guide	Criterion is same as No.1	A, B	2.5												

## 12. GENERAL PRECAUTIONS

### 12.1 HANDING

- (1) When the module is assembled, it should be attached to the system firmly. Be careful not to twist and bent the module.
- (2) Refrain from strong mechanical shock and / or any force to the module. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
- (3) Note that display modules are very fragile and could be easily damaged. Do not press or scratch the surface harder than a HB pencil lead.
- (4) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, straining and discoloration may occur.
- (5) If the display module surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, should be wiped by moisten cloth with isopropyl alcohol or ethyl alcohol solvents, DO NOT with water, ketone type materials (e.g. acetone), aromatic, toluene, ethyl acid or methyl chloride, and so on.
- (6) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.
- (7) Use finger-stalls with sort gloves in order to keep display clean during the incoming inspection and assembly process.



- (8) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
- (9) Do not touch directly conductive parts such as the CMOS LSI pad and the interface terminals with bare hands, therefore operations should be grounded whenever he/she comes into contact with the modules.
- (10) Do not exceed the absolute maximum rating value. (The supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on), otherwise the module may be damaged.

## 12.2 SOLDERING

- (1) Use soldering irons with proper grounding and no leakage.
- (2) For No RoHS Product: soldering temperature is 290~350° C, soldering time is 3~5s; for RoHS Product: soldering temperature is 340~370° C, soldering time is 3~5s.
- (3) If soldering flux is used, be sure to remove any remaining flux after soldering (This does not apply in the case of a non-halogen type of flux).

## 12.3 STORAGE

- (1) DO NOT leave the module in high temperature and high humidity for a long times, keep the temperature from 0° C to 35° C and relative humidity of less than 60%.
- (2) It is highly recommended to store the module in a dark place. The Liquid crystal is deteriorated by ultraviolet, DO NOT leave it in direct sunlight and strong ultraviolet ray for many hours.
- (3) The polarizer surface should not come in contact with any other objects.

## 13. Printing

### 13.1 Printing(on product)

Module No., Lot No., manufactory and the place of production will be printed on the rear of product or FPC as below.

**Model : YN430WQ010B**  
**L/NO : FL 20191012**



### 13.2 Lot No. Definition

