



Product Specification

Customer: _____

ModelName: H043BWQ40I3589-CT1 _____

Date: _____

Version: _____

☒ Preliminary Specification

☐ Final Specification

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by



Contents

1.Record of Revision.....	3
2 .General Specifications.....	4
3 .Input/Output Terminals.....	5
4. Absolute Maximum Ratings.....	6
5 .Electrical Characteristics.....	6
6 .Interface Timing.....	7
7. Optical Characteristics.....	11
8 . Environmental / Reliability Tests.....	14
9. Mechanical Drawing.....	15
1 0.Packing.....	18
11. Precautions For Use of LCD modules.....	19



1. Record of Revision

Version	Revise Date	Content	Editor
A0	2022/08/20	FirstRelease.	



2 General Specifications

Feature		Spec
Characteristics	LCD Size	4.3 inch
	Display Format	480 (RGB) × 272
	Interface	24-bit RGB
	Color Depth	16.7M
	Technology type	a-Si
	DisplaySpec.	0.1980x0.1980
	DisplayMode	Normally Black
	Driver IC	/
	Surface Treatment	HC
	ViewingDirection	ALL
	Gray Viewing Direction	FREE
Mechanical	LCM+CTP(WxHxD)(mm)	105.50*67.2*4.58
	ActiveArea(mm)	95.04x53.86
	With/WithoutTSP	With TSP
	Weight (g)	TBD
	LED Numbers	7 LEDs

Note 1: Viewing direction is following the data which measured by optics equipment.

Note 2: Requirements on Environmental Protection: RoHS



3 Input/Output Terminals

No.	Symbol	Description
1	VBLK	Backlight LED Cathode
2	VBLA	Backlight LED Anode.
3	GND	System Ground
4	VDD	Power supply for logic operation
5~12	R0~R7	Data bus
13~20	G0~G7	Data bus
21~28	B0~B7	Data bus
29	GND	System Ground
30	DCLK	Pixel clock signal
31	DISP	Display on/off control
32	HSYNC	Horizontal Sync signal
33	VSNC	Vertical Sync signal
34	EN	Data Enable
35	NC	No connect
36	GND	System Ground
37	XR/NC	TP pin XR/NC
38	YD/NC	TP pin YD/NC
39	XL/NC	TP pin XL/NC
40	YU/NC	TP pin YU/NC



4 Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	V_{DD}	-0.3	4.0	V	
Input Signal Voltage	V_{in}	-0.3	$V_{DD}+0.3$	V	
Logic Output Voltage	V_{OUT}	-0.3	$V_{DD}+0.3$	V	
Operating Temperature	T_{OPR}	-20	70	°C	
Storage Temperature	T_{STG}	-30	80	°C	

5 Electrical Characteristics

5.1 Operating conditions:

Parameter	Symbol	MIN	TYP	MAX	Unit	Remark
Power Voltage	V_{DD}	3.0	3.3	3.6	V	Note1
DigitalOperationCurrent	IDD	-	20	-	mA	
GateOnPower	V_{GH}	15	16	17	V	Note2
Gate Off Power	V_{GL}	-12	-11	-10	V	Note3
Differential input common mode voltage	V_{com}	-1.0	-0.2	0	V	

Notes :1. The supply voltage is measured and specified at the interface connector of LCM.
The current draw and power consumption specified is for 3.3V at 25 °C
Max value at Black Pattern

Note : 2. V_{GH} is TFT Gate operating voltage.

Notes: 3. V_{GL} is TFT Gate operating voltage. The low voltage level of V_{GL} signal must be fluctuate with same phase as V_{COM} , the storage capacitance structure of the product is storage on common. In order to get the optimized display quality, the setting-voltage should be changed according to customer' s developing condition.(The display quality could be changed by customer's setting-voltage.)



5.2 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
LED current	I_F	-	20	—	mA	Note 1 Note 2,3
Power Consumption		—	448	—	mW	
LED Voltage	V_F	19.6	21	22.4	V	
LED Life Time	W_{BL}	25000	-	-	Hr	

Note 1 : There are 1 Groups LED



Note 2 : $T_a = 25^{\circ}\text{C}$

Note 3 : Brightness to be decreased to 50% of the initial value



6 Interface Timing

6.1 Parallel 24 bit RGB Input Timing Table

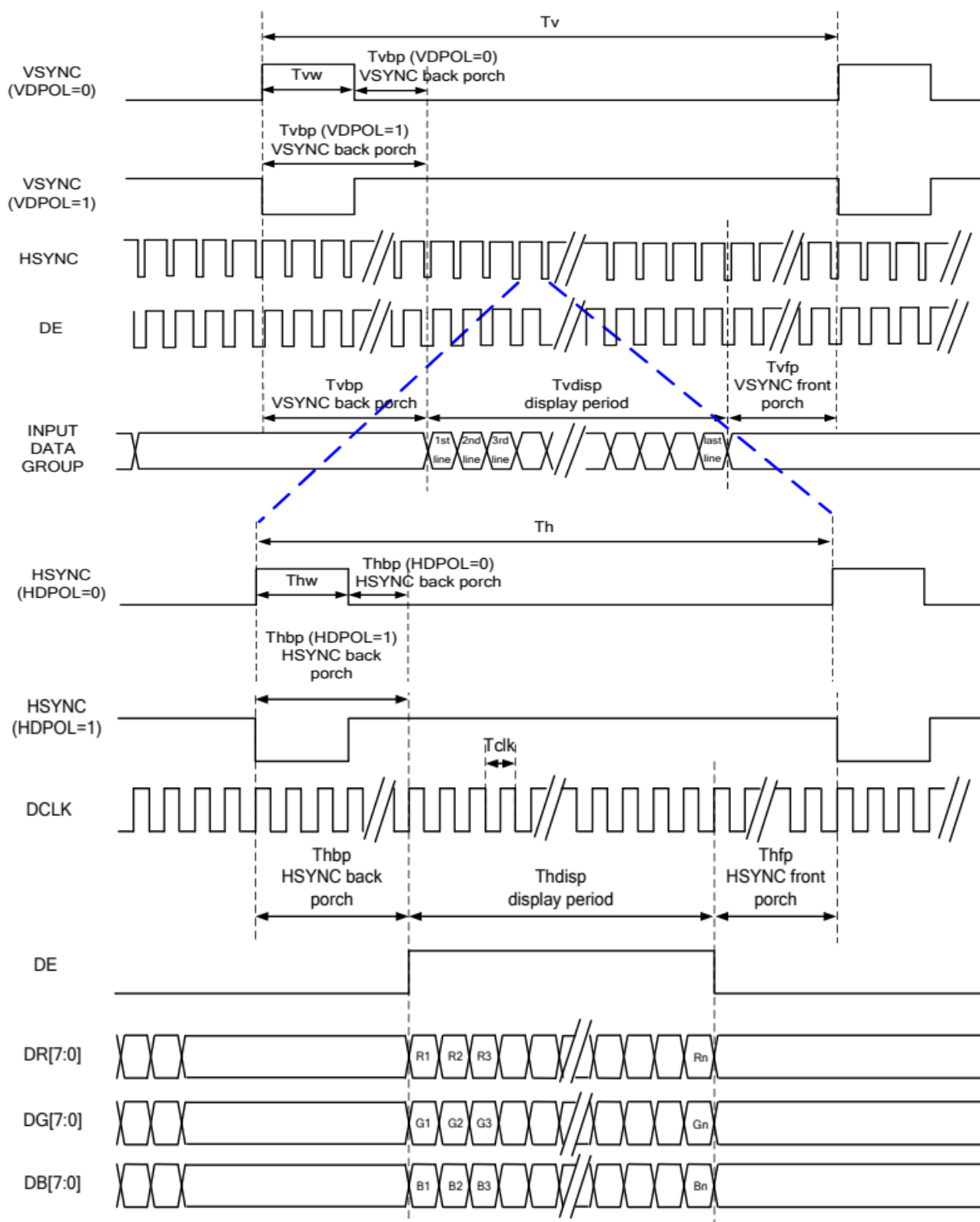
Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

480RGB X 272 Resolution Timing Table						
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
	Front Porch	Thfp	2	8	75	DCLK
	Pulse Width	Thw	2	4	43	DCLK
VSYNC	Period Time	Tv	276	292	321	HSYNC
	Display Period	Tvdisp		272		HSYNC
	Back Porch	Tvbp	2	12	12	HSYNC
	Front Porch	Tvfp	2	8	37	HSYNC
	Pulse Width	Tvw	2	4	12	HSYNC

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

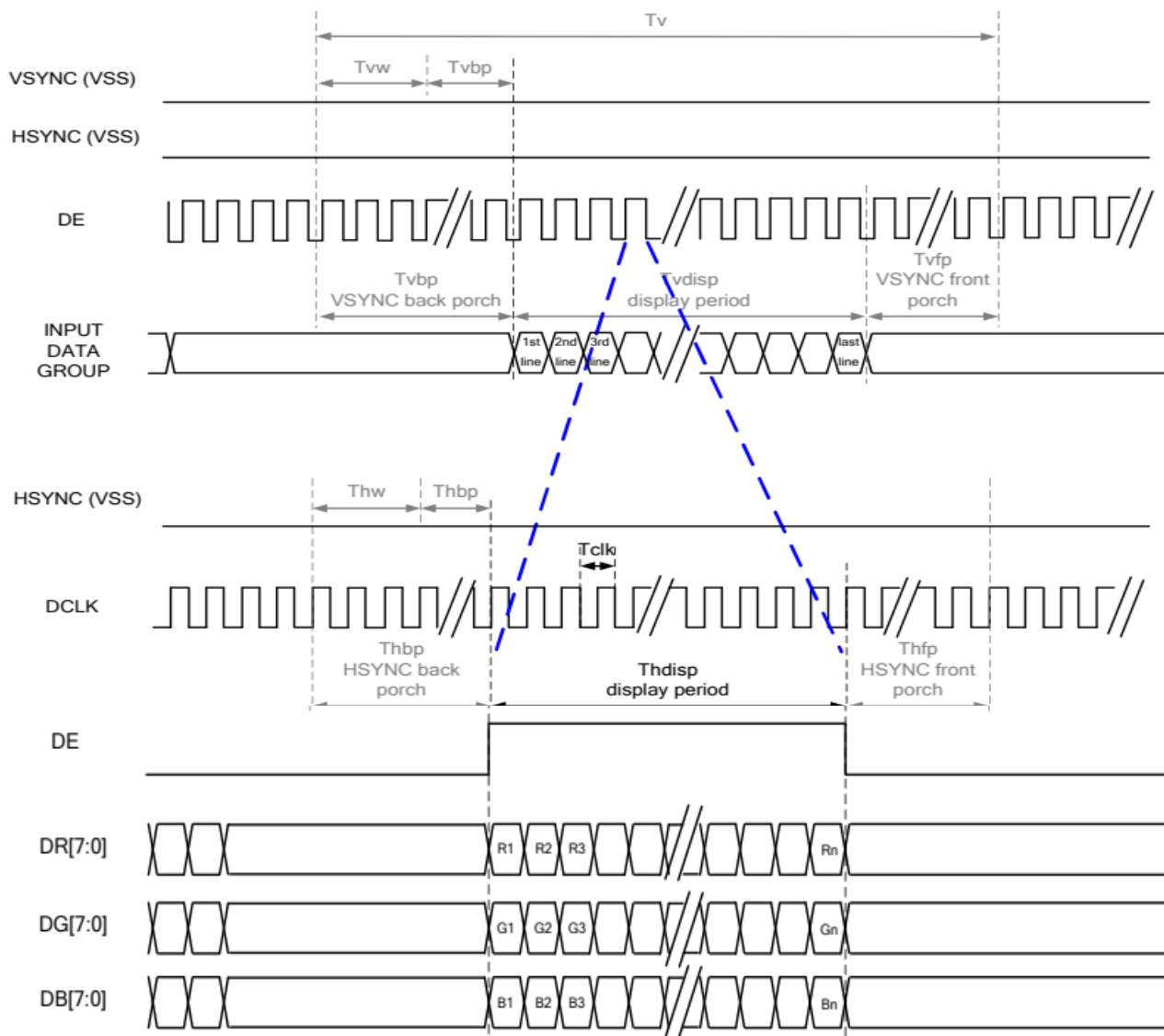


6.2 SYNC-DE Mode Timing Diagram





6.3DE Mode Timing Diagram

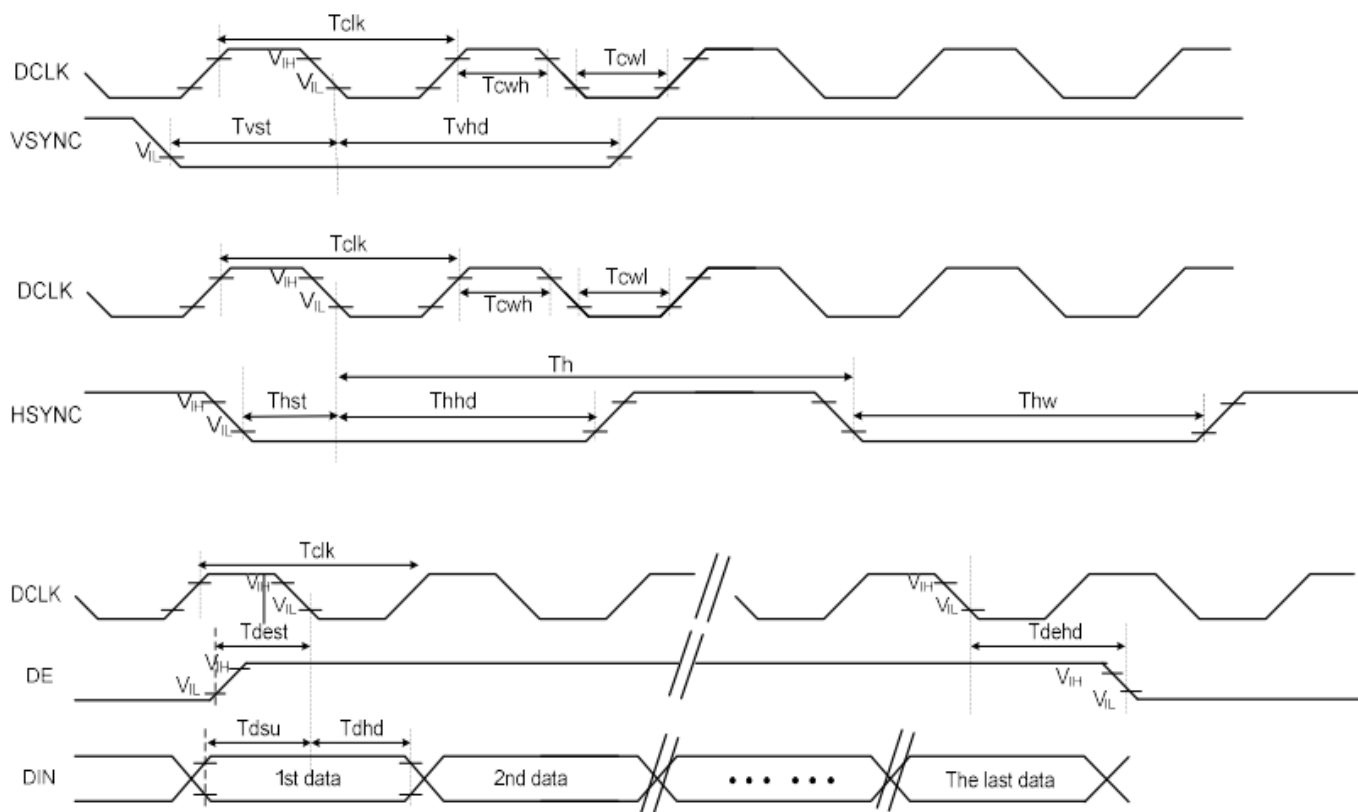


RGB Mode Selection Table	DCLK	HSYNC	VSYNC	DE
SYNC - DE Mode	Input	Input	Input	Input
SYNC Mode	Input	Input	Input	GND
DE Mode	Input	GND	GND	Input

Note: "Input" means these signals are driven by host side.



6.4. System Bus Timing for RGB Interface



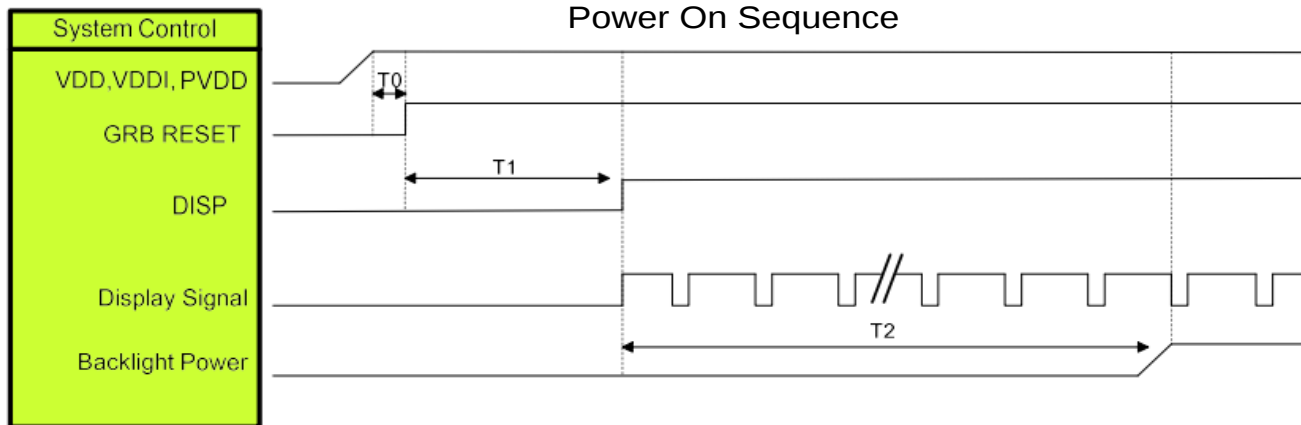
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK Pulse Duty	T_{cw}	40	50	60	%	
HSYNC Width	T_{hw}	2	-	-	DCLK	
HSYNC Period	T_h	55	60	65	us	
VSYNC Setup Time	T_{vst}	12	-	-	ns	
VSYNC Hold Time	T_{vhd}	12	-	-	ns	
HSYNC Setup Time	T_{hst}	12	-	-	ns	
HSYNC Hold Time	T_{hhd}	12	-	-	ns	
Data Setup Time	T_{dsu}	12	-	-	ns	
Data Hold Time	T_{dhd}	12	-	-	ns	
DE Setup Time	T_{dest}	12	-	-	ns	
DE Hold Time	T_{dehd}	12	-	-	ns	

*Please refer to IC specification for details



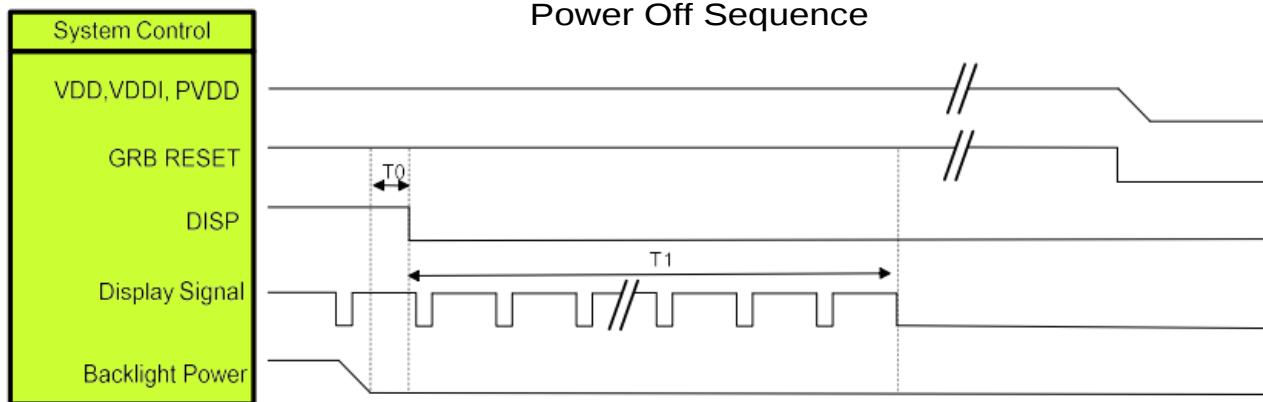
6.5 POWER SEQUENCE

Power On Sequence



Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET= "High" to DISP="High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms

Power Off Sequence



Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP="Low"	5	ms
T1	DISP="Low" to IC internal voltage discharge complete	80	ms



7 Optical Characteristics

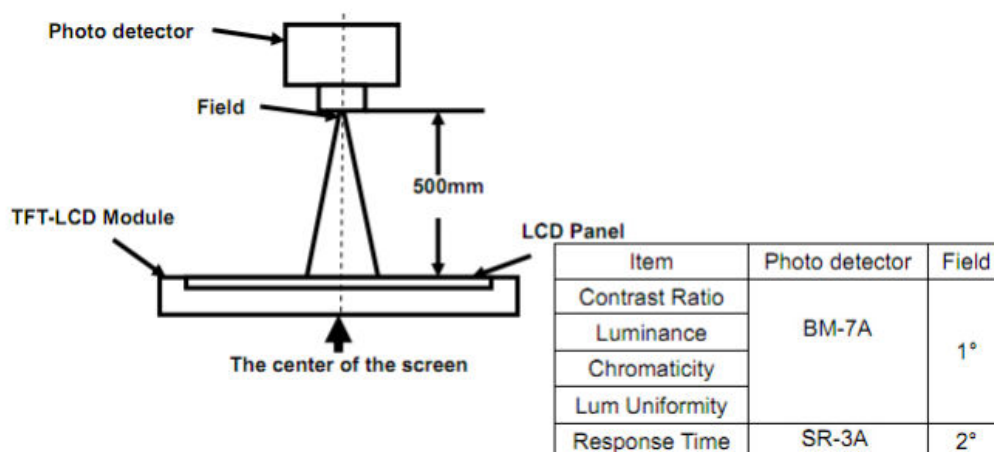
Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10	80	85	-	Degree.	Note2
		θ_B		80	85	-		
		θ_L		80	85	-		
		θ_R		80	85	-		
Contrast Ratio		CR	$\Theta =0$	800	1000		-	Note1, Note3
Response Time		T _{ON}	25° C	-	30	45	ms	Note1, Note4
		T _{OFF}		-	30	45		
Chromaticity	White	X _W	Backlight is on	0.275	0.305	0.335	-	Note1, Note5
		Y _W		0.306	0.336	0.336	-	
	Red	X _R		0.573	0.603	0.633	-	
		Y _R		0.277	0.307	0.337	-	
	Green	X _G		0.284	0.314	0.344	-	
		Y _G		0.527	0.557	0.587	-	
	Blue	X _B		0.115	0.145	0.175	-	
		Y _B		0.123	0.153	0.183	-	
Uniformity		U		80	-	-	%	Note1, Note6
NTSC					50		%	Note5
Luminance		L		250	300		cd/m2	Note1, Note7

Test Conditions:

1. IF= 20Ma (one channel),the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical Properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Note 2: Definition of viewing angle range and measurement system.

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

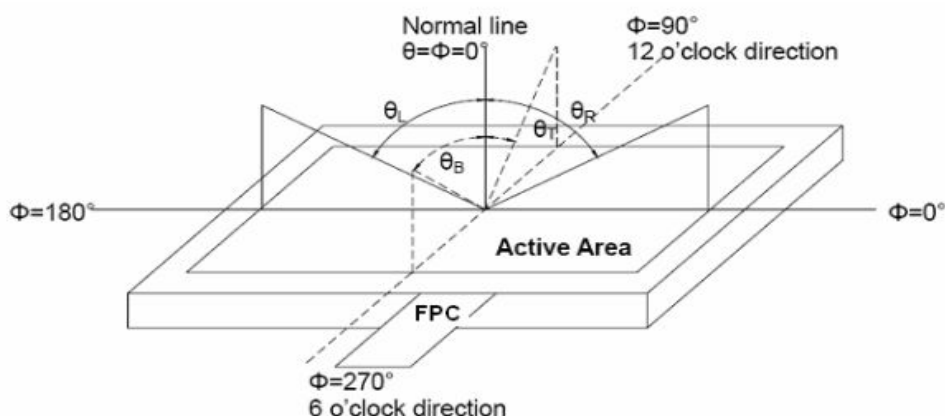


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

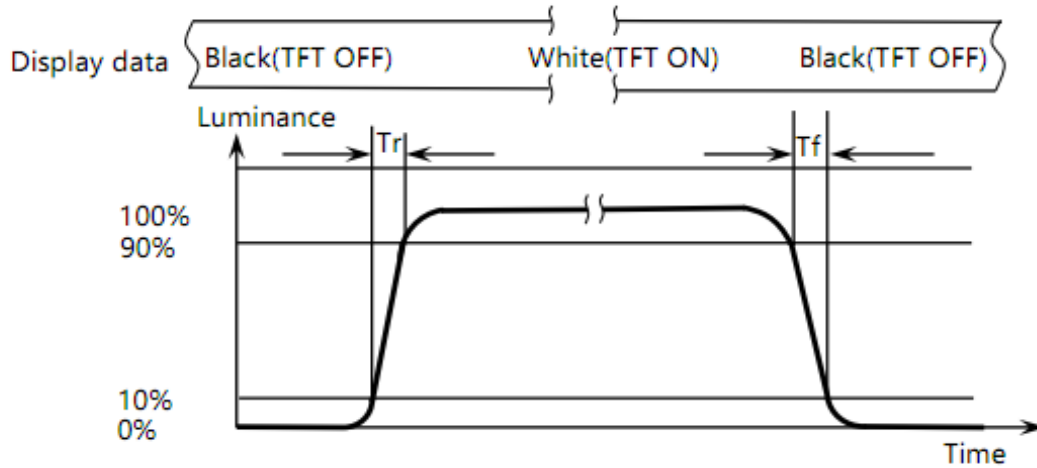
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval

Between "White" state and "Black" state. Rise time (TON) is the time between Photo detector output intensity changed from 10% to 90%. And fall time (TOFF) is

The time between photo detector output intensity changed from 90% to 10%



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the Center of each measuring area

Luminance Uniformity (U) = $L_{min} / L_{max} \times 100\%$

L-----Active area length W----- Active area width

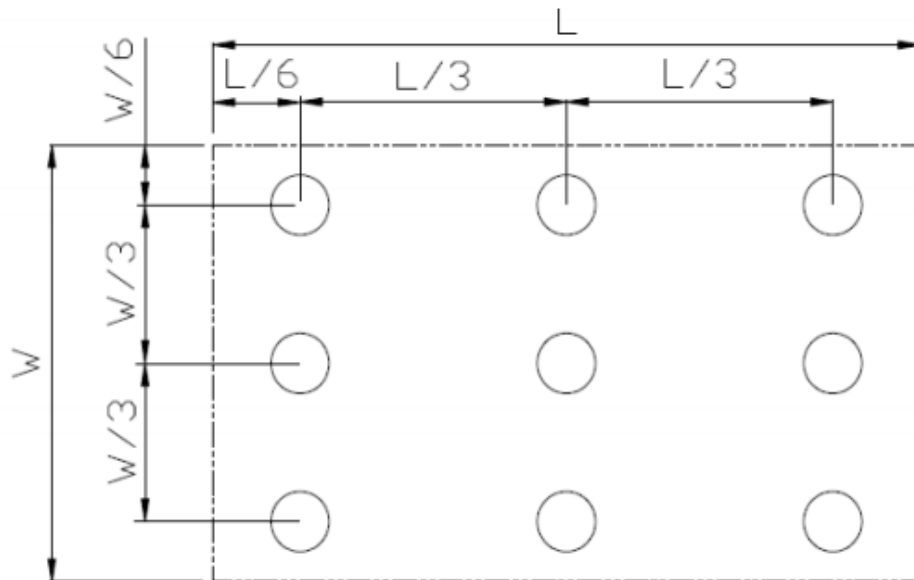


Fig. 2 Definition of uniformity

L_{max} : The measured maximum luminance of all measurement position.

L_{min} : The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.



8 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	T _s = +70℃,96hrs	
2	Low Temperature Operation	T _a = -20℃,96hrs	
3	High Temperature Storage	T _a = +80℃,96hrs	
4	Low Temperature Storage	T _a = -30℃, 96hrs	
5	High Temperature & Humidity Storage	T _a = +60℃,90%RHmax,96 hours	
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Changetime:5min,10Cycle	
7	Electro Discharge (Operation) Static	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	
10	Package Drop Test	Height: 60 cm, 1 corner, 3 edges, 6 surfaces	

Note: 1. T_s is the temperature of panel's surface.
2. T_a is the ambient temperature of sample.

9 Mechanical Drawing



深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

1 0.Packing

Packing Method

TBD



11. Precautions for Use of LCD modules

11.1 Handling Precautions

11.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

11.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

11.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

11.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

11.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

Water ; Ketene ; Aromatic solvents

11.1.6. Do not attempt to disassemble the LCD Module.

11.1.7. If the logic circuit power is off, do not apply the input signals.

11.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

11.1.8.1. Be sure to ground the body when handling the LCD Modules.

11.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

11.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

11.1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

11.2 Storage Precautions

11.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

11.2.2. The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ~ 40℃ Relatively humidity: ≤80%

11.2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

11.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.