



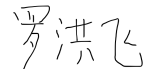
# PRODUCT SPECIFICATION

CDTECH Model: **S043QWQ101HD-DC31**

CUSTOMER Model: **-**

Description: **4.3" TFT-LCD Module with CTP**

Version: **1.0**

CDTECH	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURE			
DATE	2022.12.09	2022.12.09	2022.12.09

CUSTOMER APPROVAL	SIGNATURE	DATE





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# 1. General Specifications

## 1.1 LCM General Information

Item	Specification	Unit
LCD Size	4.3	inch
Number of Pixels	480 (H) RGB x 272 (V)	pixels
Display Mode	Normally White	-
Viewing Direction	12 O'clock	o' clock
Interface	RGB	-
Display Colors	16.7M	colors
Outline Dimension	105.5 (H) x 67.2 (V) x 2.95 (D)	mm
Active Area	95.04 (H) x 53.86 (V)	mm
Pixel Pitch	0.1980 (H) x 0.1980 (V)	mm
Driver IC	ST7282	-
Operation Temperature	-20~70	°C
Storage Temperature	-30~80	°C

## 1.2 Touch Panel Information

Item	Specification
Touch Structure	G+G
Bonding Type with LCM	Perimeter Bonding
Driver IC	FT5446iDQQ
Interface	I <sup>2</sup> C
Touch Count Max	5 Points
Surface treatment	-
Surface hardness	6H
I2C slave address	0x70
Origin of coordinate	Top Left Corner

Note1: Requirements on environmental protection RoHS compliant.

## 2. Absolute Maximum Ratings

Item	Symbol	MIN.	MAX.	Unit	Note
Analog Supply voltage	VDD	-0.3	5.0	V	Note 1

Note 1: Permanent damage may occur to the LCD module if beyond this specification.

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

## 3. Electrical Characteristics

### 3.1 Recommended Operating Condition for TFT LCD

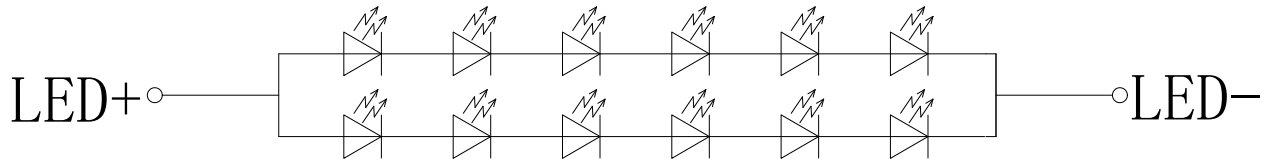
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Analog Supply voltage	VDD	3.0	3.3	3.6	V	
Analog supply current	I <sub>VDD</sub>	-	TBD	-	mA	VDD=3.3V
Logic input voltage	V <sub>IH</sub>	0.7*VDD	-	VDD	V	
	V <sub>IL</sub>	GND	-	0.3*VDD	V	

### 3.2 Recommended Driving Condition for Backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Driving Current	I <sub>F</sub>	-	40	-	mA	
Driving Voltage	V <sub>F</sub>	16.2	-	20.4	V	
Power consumption	W <sub>BL</sub>	0.648	-	0.816	W	
LED Life-Time	N/A	30,000	-	-	Hours	Ta=25°C Note 1

Note 1: LED lifetime is defined as the module brightness decay 50% of original brightness at Ta=25 degree, typical current.

Note 2:LED circuit :



### 3.3 Touch Panel

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply voltage	VDD	-	3.3	-	V	
Analog supply current	I <sub>VDD</sub>	-	TBD	-	mA	VDD=3.3V
Input high-level voltage	V <sub>IH</sub>	0.7*VDD	-	VDD	V	
Input low -level voltage	V <sub>IL</sub>	GND	-	0.3*VDD	V	

## 4. Interface Pin Assignment

### 4.1 LCM Pin Assignment

Recommended connector: FH12-40S-0.5SH manufactured by HIROSE

No.	Symbol	Description
1	VBL-	Power for LED backlight (Cathode)
2	VBL+	Power for LED backlight (Anode)
3	GND	Ground
4	VDD	Power supply
5-12	R0-R7	Data bus
13-20	G0-G7	Data bus
21-28	B0-B7	Data bus
29	GND	Ground
30	DCLK	Dot clock signal input. Latching input data at its rising edge
31	DISP	Standby mode. Normally pulled high DISP="1": Normally operation (Default) DISP="0": Timing controller, source driver will turn off ,all output are High-Z
32	HSYNC	Horizontal sync input. Negative polarity
33	VSYNC	Vertical sync input. Negative polarity
34	DE	Data enable input. Active high to enable the input data bus under "DE Mode"
35	NC	No connection
36	GND	Ground
37	XR	The right side signal of TP
38	YD	The down side signal of TP
39	XL	The left side signal of TP
40	YU	The up side signal of TP

## 4.2 Touch FPC Pin Assignment

Recommended connector: FH12-8S-0.5SH manufactured by HIROSE

No.	Symbol	Description
1	GND	Ground
2	VDD	Power Supply
3	VDD	Power Supply
4	INT	Interrupt signal from CTP
5	SDA	I2C data input and output
6	SCL	I2C clock input
7	RST	Reset pin
8	GND	Ground



## 5. Interface Characteristics

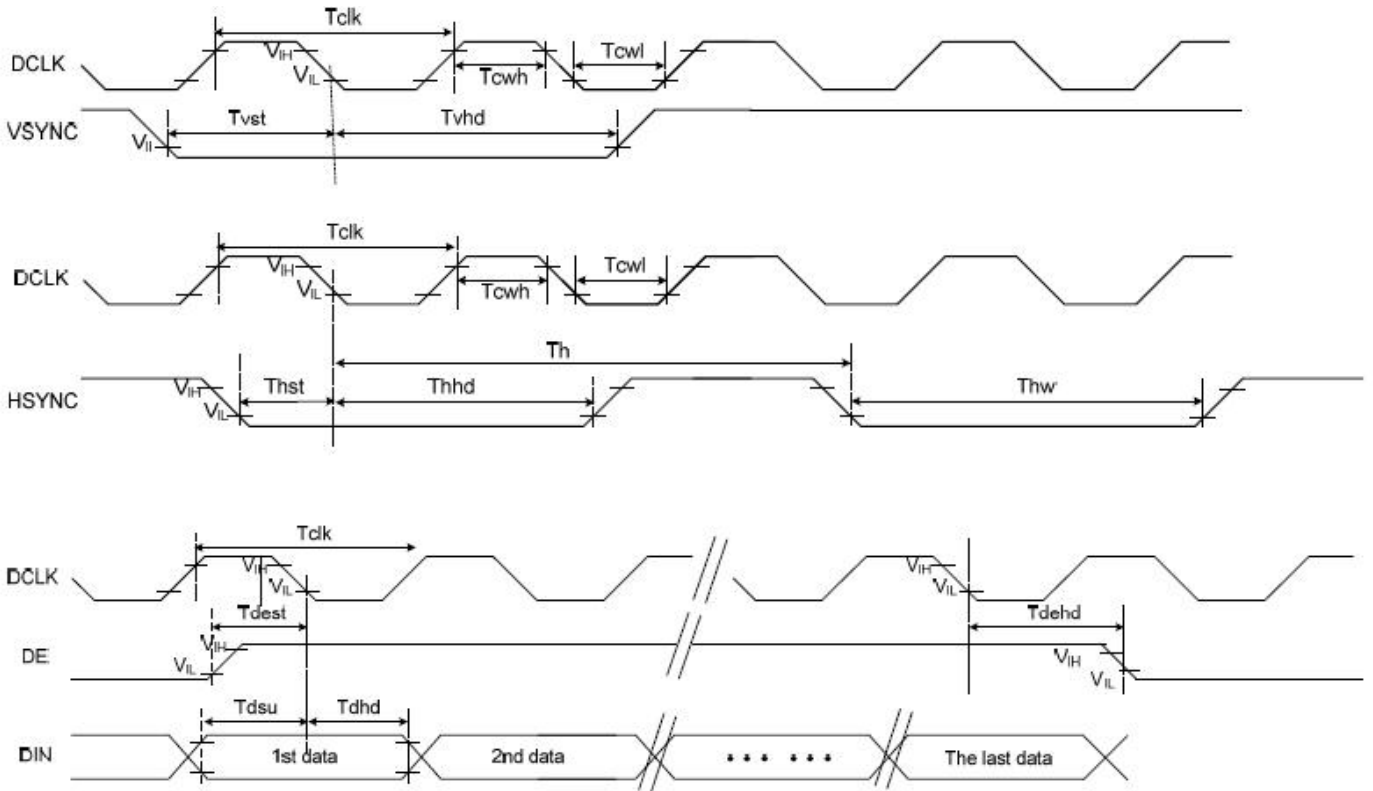
### 5.1 Input Setup Timing Setting

#### 5.1.1 Input Setup Timing Parameter Setting

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
System operation timing						
VDD power source slew time	TPOR	-	-	20	ms	From 0V to 99% VDD
GRB pulse width	tRSTW	10	50	-	us	R=10Kohm, C=1uF
Input/ Output timing						
CLK pulse duty	Tcw	40	50	60	%	
Hsync width	Thw	1	-	-	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 setup time	Tdsu	12	-	-	ns	
Data hold time	Tdhd	12	-	-	ns	
DE setup time	Tdest	10	-	-	ns	
DE hold time	Tdehd	10	-	-	ns	
SD output stable time	Tst	-	-	12	us	Output settled within +20mV Loading = 6.8k+28.2pF.
GD output rise and fall time	Tgst	-	-	6	us	Output settled (5%~95%), Loading = 4.7k+29.8pF
3-wire 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	

## 5.1.2 Input Setup Timing Diagram



## 5.2 Data Input Format

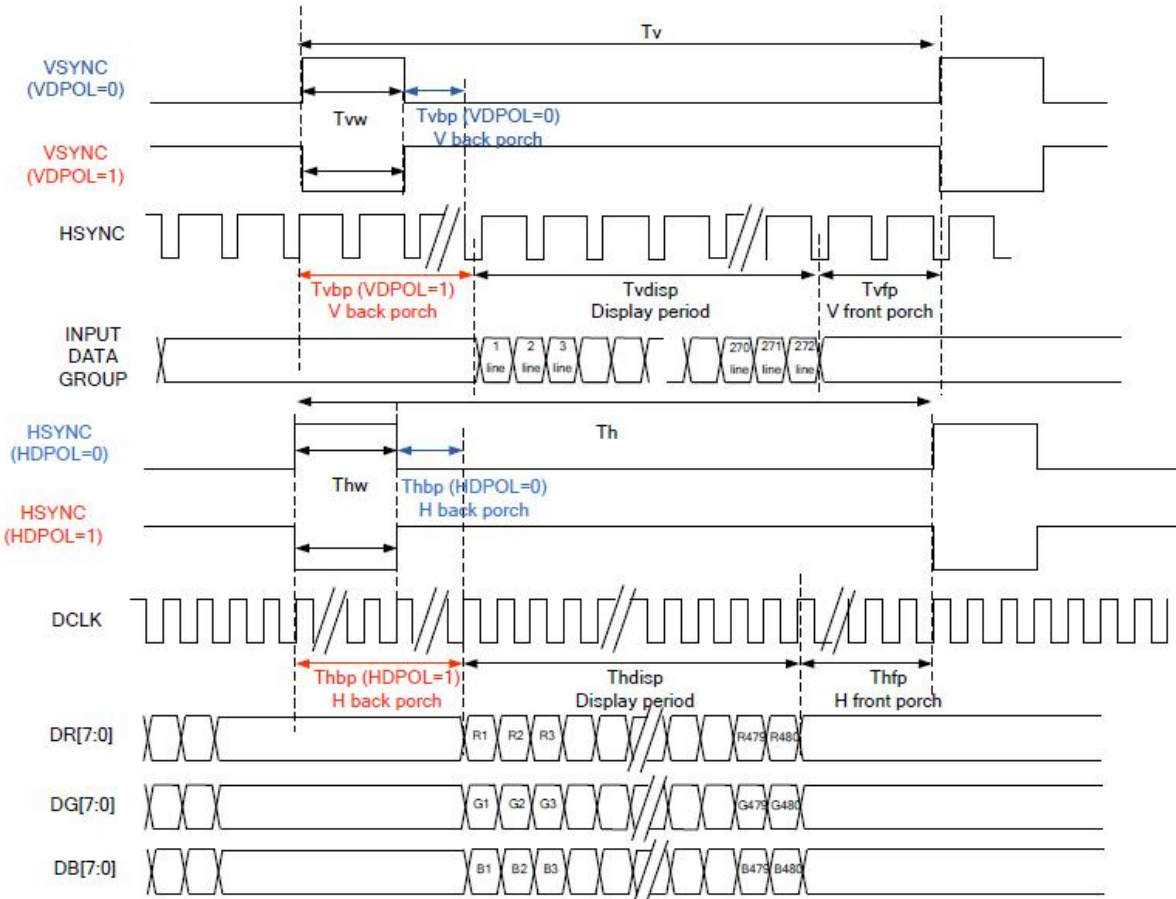
### 5.2.1 Data Input Timing Parameter Setting

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	

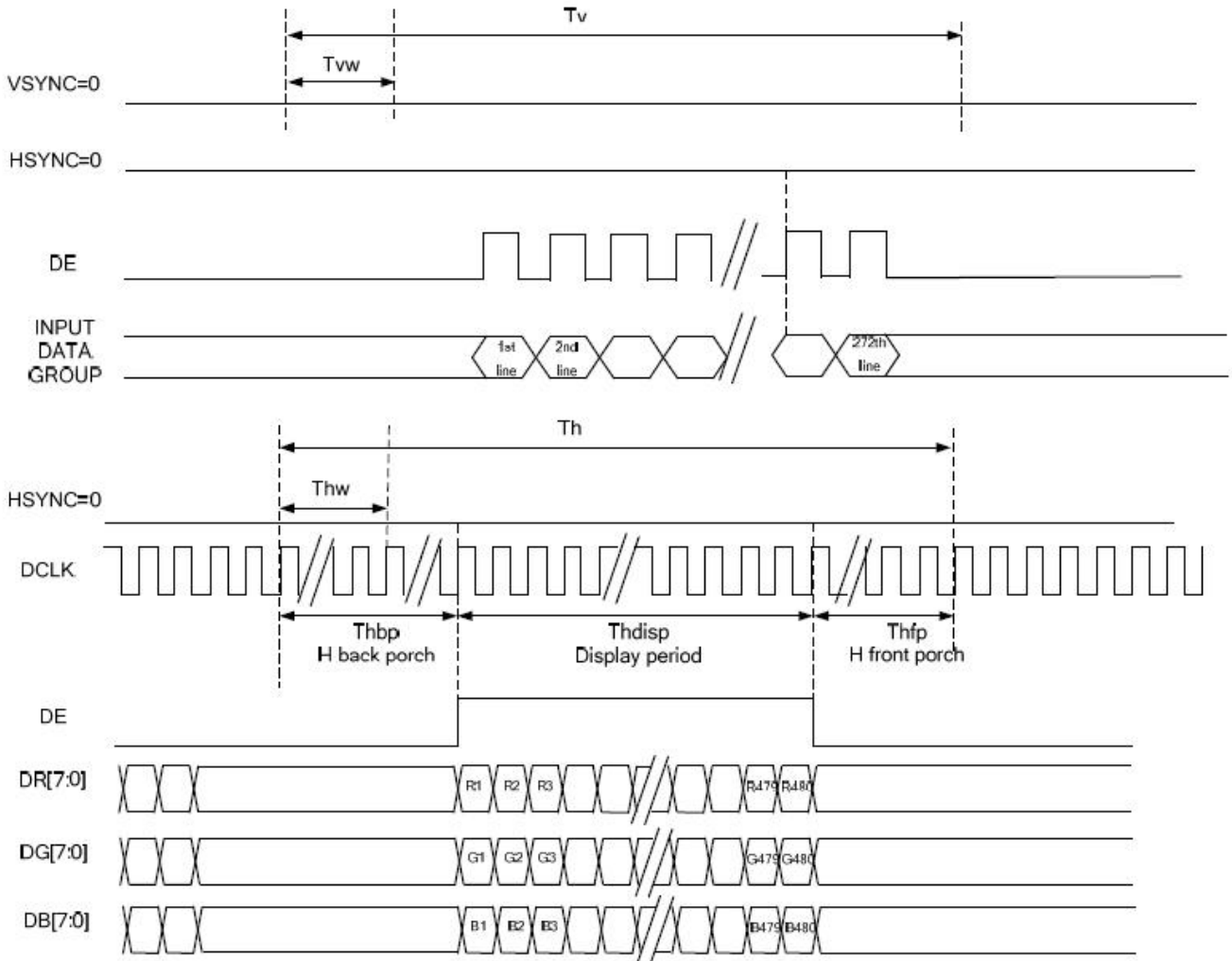
Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

### 5.2.2 Data Input Timing Diagram

#### 5.2.2.1 Data Input Timing Diagram under SYNC Mode

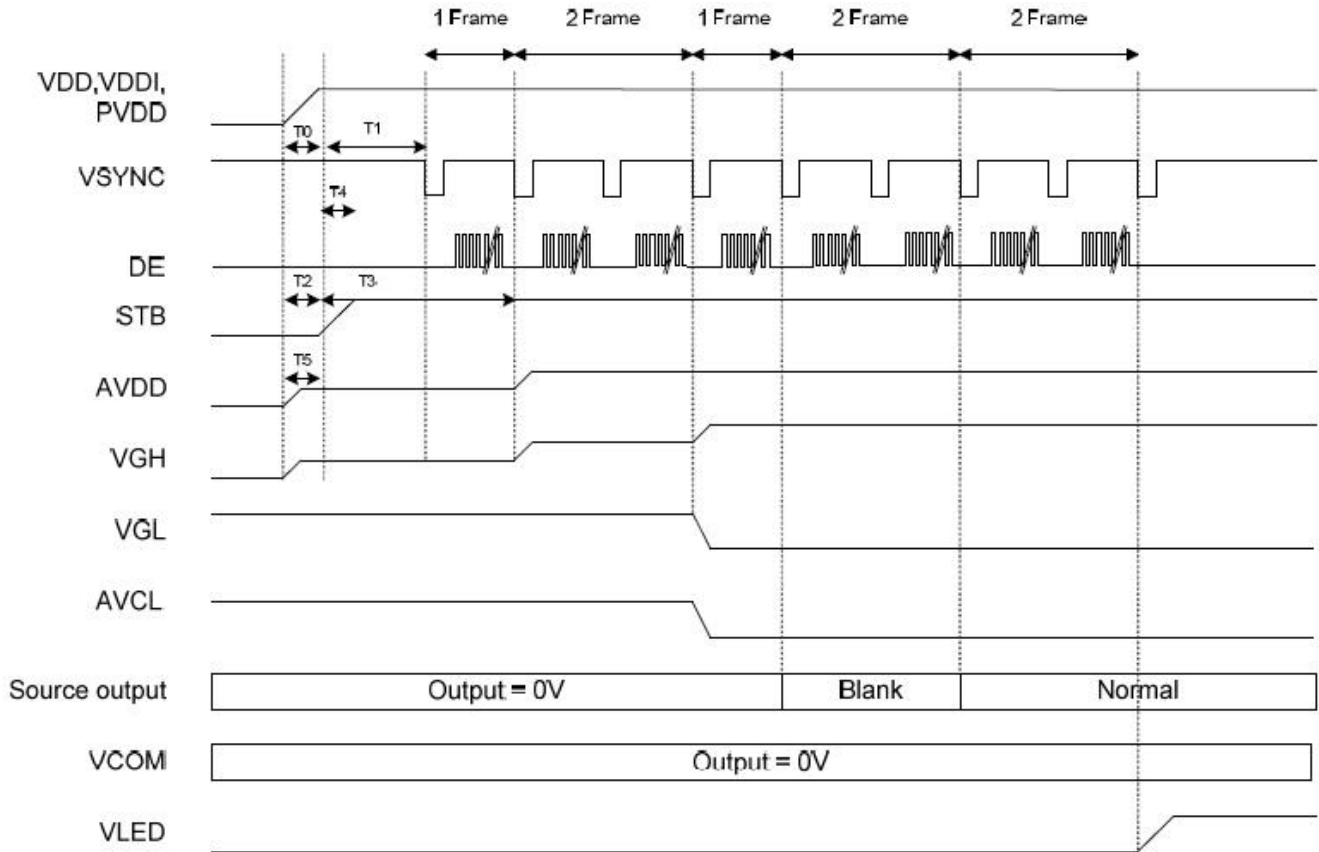


## 5.2.2.2 Data Input Timing Diagram under DE Mode



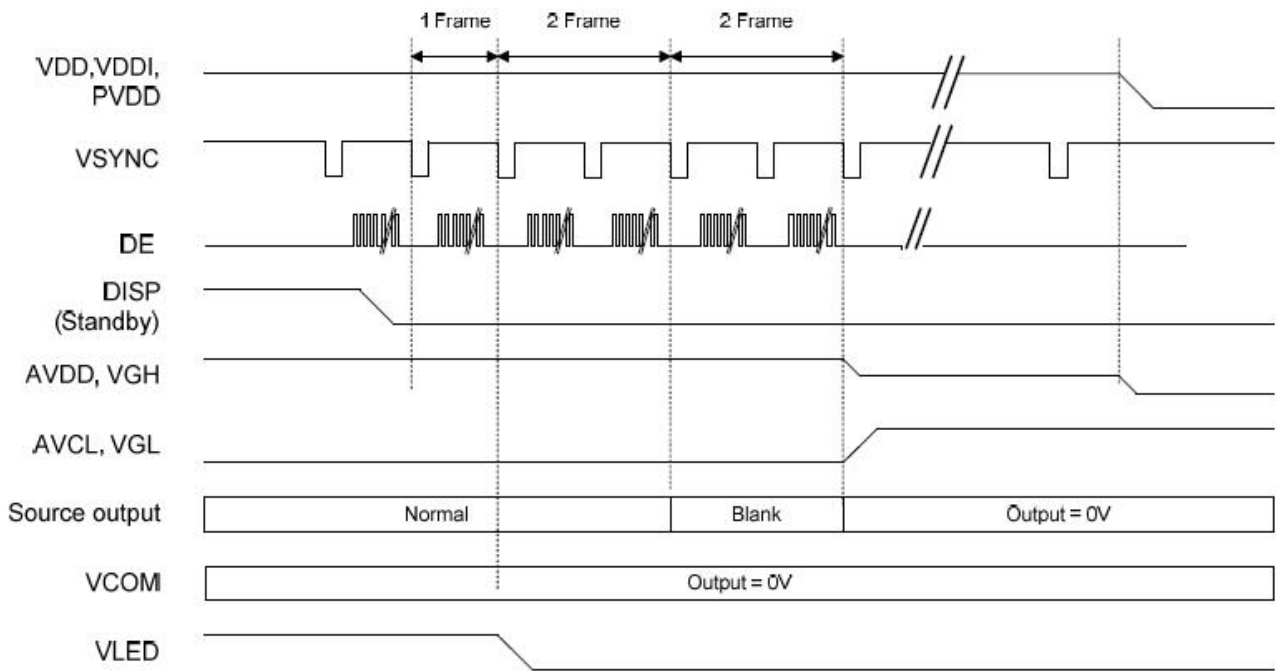
## 5.3 Power ON/OFF Sequence

### 5.3.1 Power ON Sequence



	Description	Min. Time
T0	Determined by the external power	
T1	Time from stable VDD, VDDI, PVDD set-up to the first VSYNC	T1=0
T2	Time from AVDD=0V to AVDD=3.3V	T2=T0
T3	Time from AVDD=3.3V to AVDD=6.0V	T3=T1+ (1*Frame)
T4	Time from stable VDD, VDDI, PVDD set-up to DISP asserted	T4=0
T5	Time from VGH=0V to VGH=3.3V	T5=T0

## 5.3.2 Power OFF Sequence



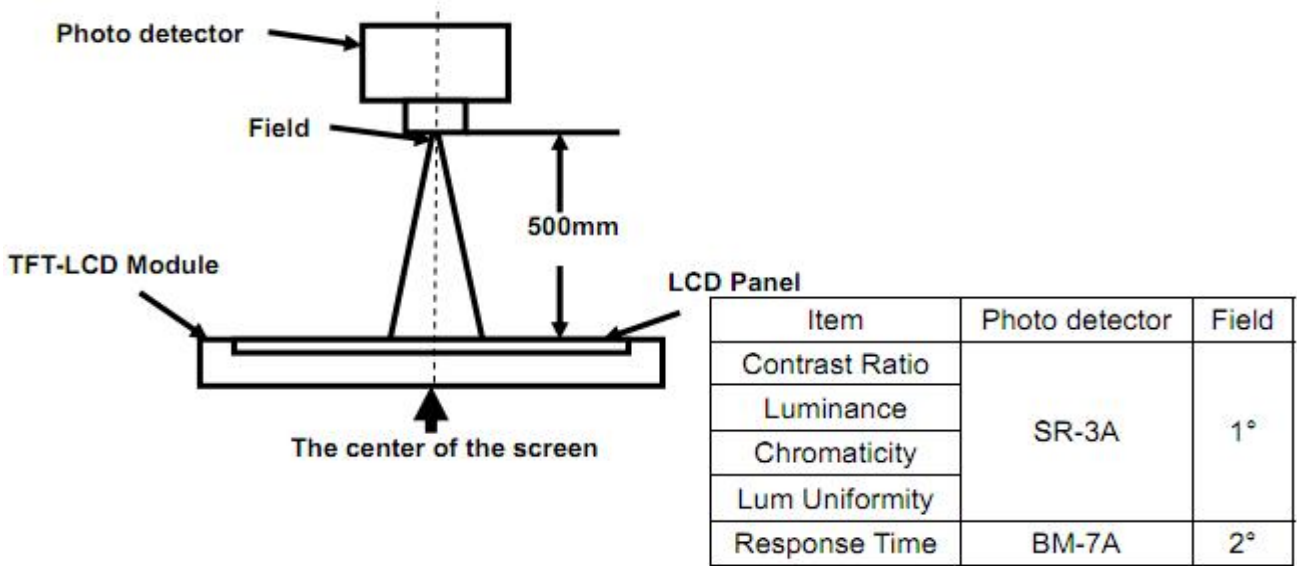


## 6. Optical Specifications

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR≥10) B/L ON	$\theta_T$	$\Phi=90^\circ$ (12 o'clock)	45	50	-	deg	Note2
	$\theta_B$	$\Phi=270^\circ$ (6 o'clock)	65	70	-	deg	Note2
	$\theta_L$	$\Phi=180^\circ$ (9 o'clock)	65	70	-	deg	Note2
	$\theta_R$	$\Phi=0^\circ$ (3 o'clock)	65	70	-	deg	Note2
Response Time	$T_{ON}$	Normal $\theta=\Phi=0^\circ$	-	12	25	msec	Note4
	$T_{OFF}$		-	12	25	msec	Note4
Contrast Ratio	CR		-	500	-	-	Note1 Note3
Color Chromaticity	$W_X$		0.265	0.315	0.365	-	Note1 Note5
	$W_Y$		0.276	0.326	0.376	-	Note1 Note5
Luminance	L		450	500	-	cd/m <sup>2</sup>	Note1 Note7
Luminance Uniformity	$Y_U$		75	80	-	%	Note1 Note6
NTSC	-		-	55.4	-	%	-

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).

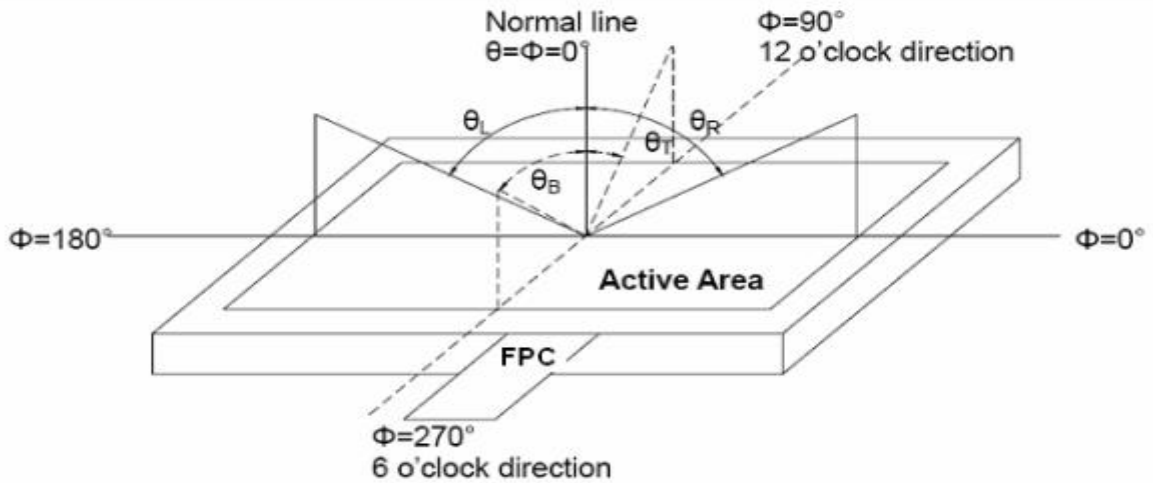


Fig. 1 Definition of viewing angle

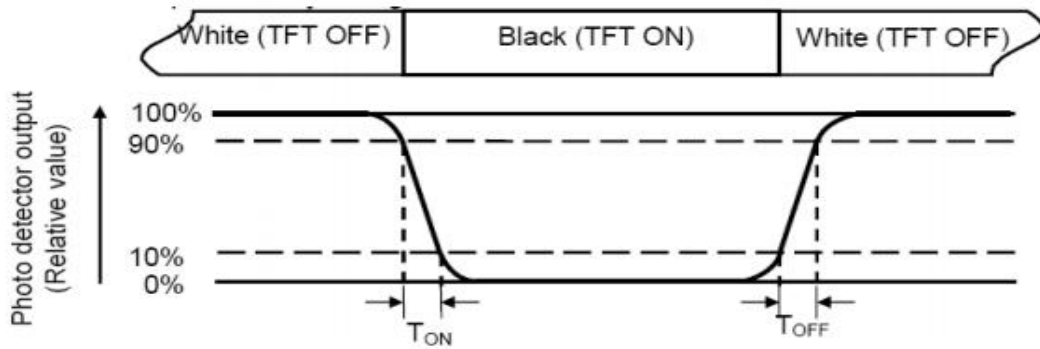
Note 3: Definition of contrast ratio

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



**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 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.



**Note 5: Definition of color chromaticity (CIE1931)**

Color coordinates measured at center point of LCD.

**Note 6: Definition of Luminance Uniformity**

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance. For more information see FIG.2.

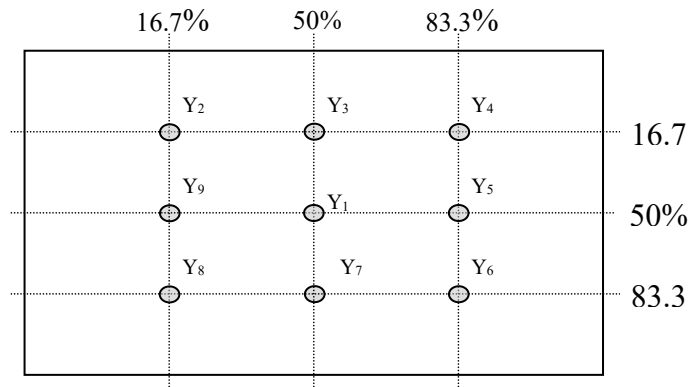


Fig. 2 Definition of points

**Note 7: Definition of Luminance (Refer Fig. 2)**

Surface luminance is the luminance with all pixels displaying white.

$L_v$  = Average Surface Luminance with all white pixels( $P_1, P_2, P_3, \dots, P_n$ ).

## 7. Reliability Test Items

Test Item	Test Conditions
High Temperature Storage	Ta= +80°C 96hrs
Low Temperature Storage	Ta= -30°C 96hrs
High Temperature Operation	Ta= +70°C 96hrs
Low Temperature Operation	Ta= -20°C 96hrs
High Temperature and Humidity Storage	Ta= +60°C, 90% RH 96hrs
Thermal Shock (Non-operation)	-30°C/30 min ~ +80°C/30 min for 20 cycles Start with cold temperature end with high temperature
Electro Static Discharge	Contact = ± 4 kV, class B Air = ± 8 kV, class B R=330Ω,C=150pF
Vibration	Sweep: 10Hz~55Hz~10Hz Stroke: 1.5mm 2 hrs for each direction of X .Y. Z.
Mechanical Shock	60G 6ms,±X,±Y,±Z 3 times for each direction
Package Drop Test	Height: 60 cm 1 corner, 3 edges, 6 surfaces

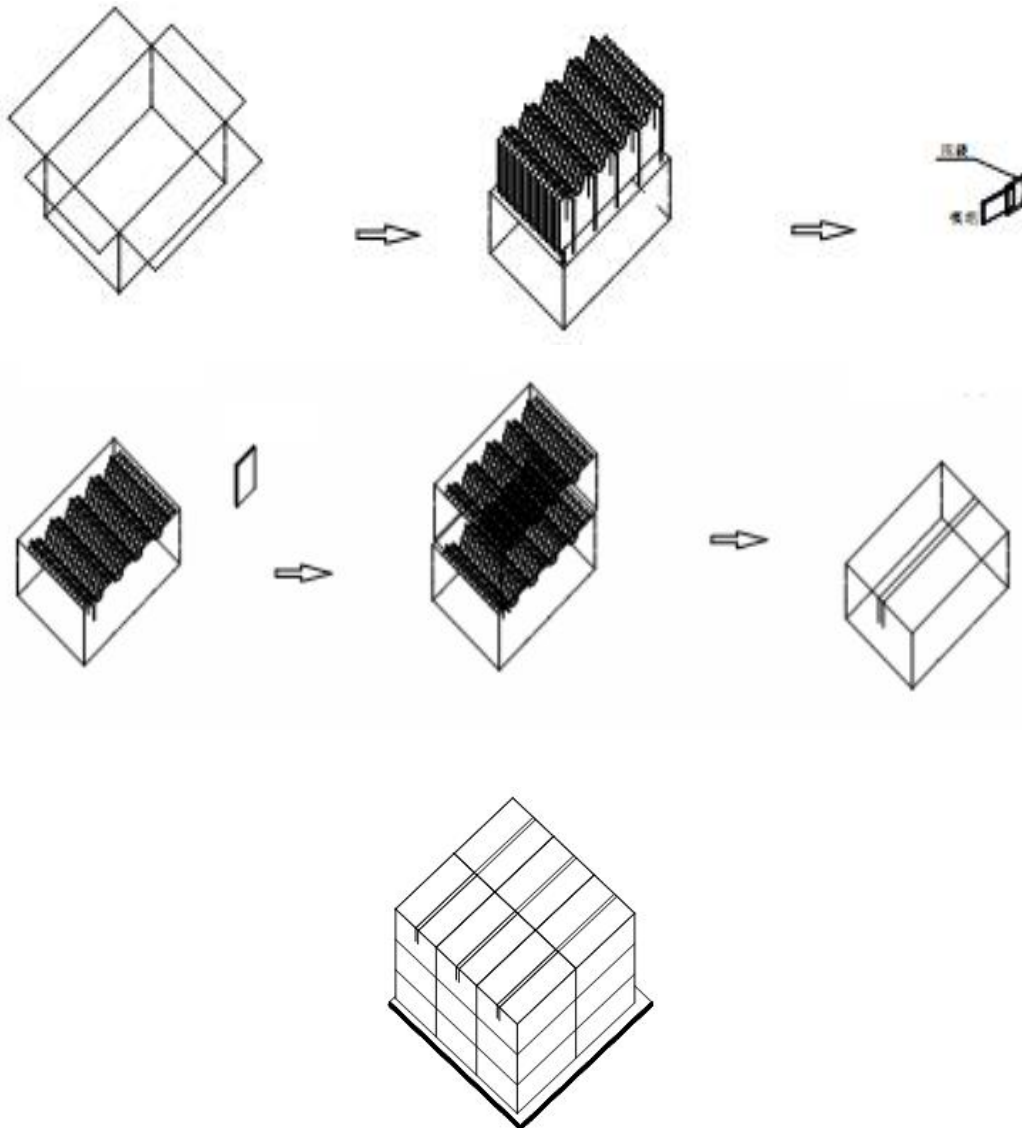
Notes: The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

- 1). Air bubble in the LCD
- 2). Seal leak or Glass crack
- 3). Non display or abnormal display
- 4). Brightness reduction >50%



## 9. Packing

### Packing Method



#### Steps:

1. Put module into tray cavity
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above
4. Fix the cardboard to the tray stack with adhesive tape
5. Put the tray stack into carton
6. Carton sealing with adhesive tape

## 10. Precautions for Use of LCD modules

### 10.1 Handling Precautions

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

10.1.2. 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.

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

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

10.1.5. 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

10.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

10.1.8.4. 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.

### 10.2 Storage Precautions

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

10.2.2. 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°C ~40°C    Relatively humidity: ≤80%

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

### 10.3 Transportation Precautions

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