



SHENZHEN APTUS TECHNOLOGY CO., LIMITED

PRODUCT SPECIFICATION

7.5" COLOR TFT-LCD MODULE

MODEL NAME: DBC075BEN40M100A

DOC VERSION: 1.0

TOTAL PAGES: 17

DATE: 2023/06/15

FOR CUSTOMER	
CUSTOMER APPROVED	

NOTE: THE CONTENT OF THIS SPECIFICATION IS SUBJECT TO CHANGE WITHOUT NOTICE.

ALL RIGHTS STRICTLY RESERVED. ANY PORTION OF THIS PATER SHALL NOT BE REPRODUCED, COPIED, OR TRANSFORMED TO ANY OTHER FORMS WITHOUT PERMISSION FROM APTUS INTERNATIONAL CO., LIMITED.

Contents

1. General Specifications	4
2. Absolute Maximum Ratings	4
3. Electrical Characteristics	5
4. Interface Pin Assignment	6
5. Interface Characteristics	7
6. Optical Specifications	11
7. Reliability Test Items	14
8. Mechanical Drawing	15
9. Packing	16
10. Precautions for Use of LCD modules	17

1. General Specifications

1.1 LCM General Information

Item	Specification	Unit
LCD Size	7.5	inch
Number of Pixels	800 (H) RGB x 800 (V)	pixels
Display Mode	Normally Black	-
Viewing Direction	Free	o' clock
Interface	MIPI	-
Display Colors	16.7M	colors
Outline Dimension	142.52 (H) x 148.20 (V) x 4.86 (D)	mm
Active Area	135.36 (H) x 135.36 (V)	mm
Pixel Pitch	0.1692 (H) x 0.1692 (V)	mm
Driver IC	ILI9881C-0HT00GA	-
Operation Temperature	-20~70	°C
Storage Temperature	-30~80	°C

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
Digital supply voltage	VCCIO	-0.3	3.6	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

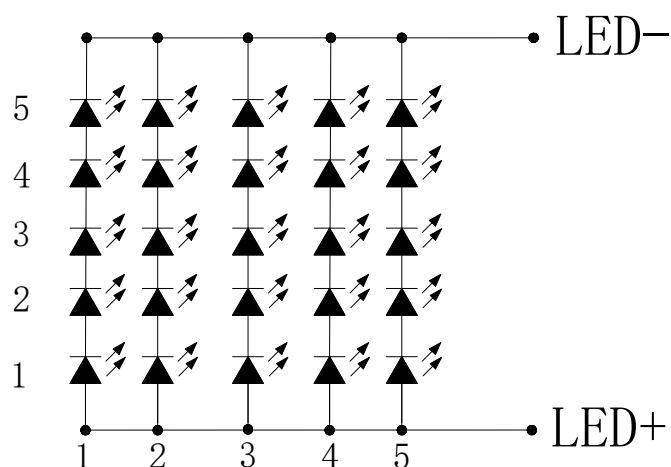
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Analog Supply voltage	VDD	3.0	3.3	3.6	V	
Analog supply current	I _{VDD}	-	TBD	-	mA	VDD=3.3V
Logic supply voltage	VCCIO	1.65	1.8	3.3	V	
Logic supply current	I _{VCCIO}	-	TBD	-	mA	VCCIO=1.8V
Logic input voltage	VIH	0.7*VCCIO	-	VCCIO	V	
	VIL	GND	-	0.3*VCCIO	V	

3.2 Recommended Driving Condition for Backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Driving Current	I _F	-	225	-	mA	
Driving Voltage	V _F	13.5	-	17.0	V	
Power consumption	W _{BL}	3.0375	-	3.8250	W	
LED Life-Time	N/A	-	50,000	-	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 :



4. Interface Pin Assignment

4.1 LCM Pin Assignment

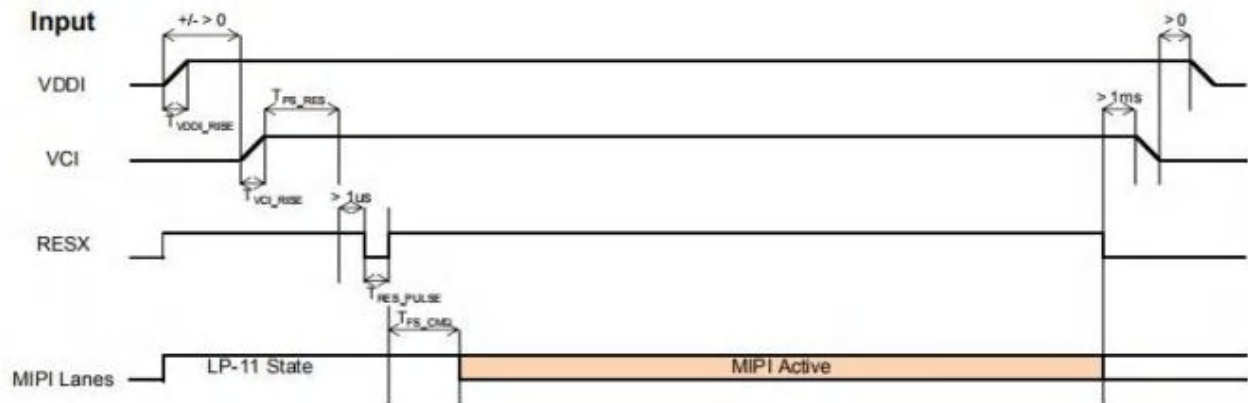
No.	Symbol	Description
1	NC	No connection
2	VDD	Power supply
3	VCCIO	Power supply
4	GND	Ground
5	RESET	Global reset pin
6	NC	No connection
7	GND	Ground
8	MIPI_0N	MIPI Negative data signal(-)
9	MIPI_0P	MIPI Positive data signal(+)
10	GND	Ground
11	MIPI_1N	MIPI Negative data signal(-)
12	MIPI_1P	MIPI Positive data signal(+)
13	GND	Ground
14	MIPI_CKN	MIPI Negative clock signal(-)
15	MIPI_CKP	MIPI Positive clock signal(+)
16	GND	Ground
17	MIPI_2N	MIPI Negative data signal(-)
18	MIPI_2P	MIPI Positive data signal(+)
19	GND	Ground
20	MIPI_3N	MIPI Negative data signal(-)
21	MIPI_3P	MIPI Positive data signal(+)
22	GND	Ground
23-24	NC	No connection
25	GND	Ground
26	ID	LCM_ID
27	NC	No connection
28	GND	Ground
29-30	LED-	Power for LED backlight (Cathode)
31	NC	No connection
32-33	LED+	Power for LED backlight (Anode)
34	TP_SCL (NC)	No connection
35	TP_SDA (NC)	No connection
36	TP_INT (NC)	No connection
37	TP_RST (NC)	No connection
38	TP_VCC (NC)	No connection
39	TP_GND (NC)	No connection
40	GND	Ground

5. Interface Characteristics

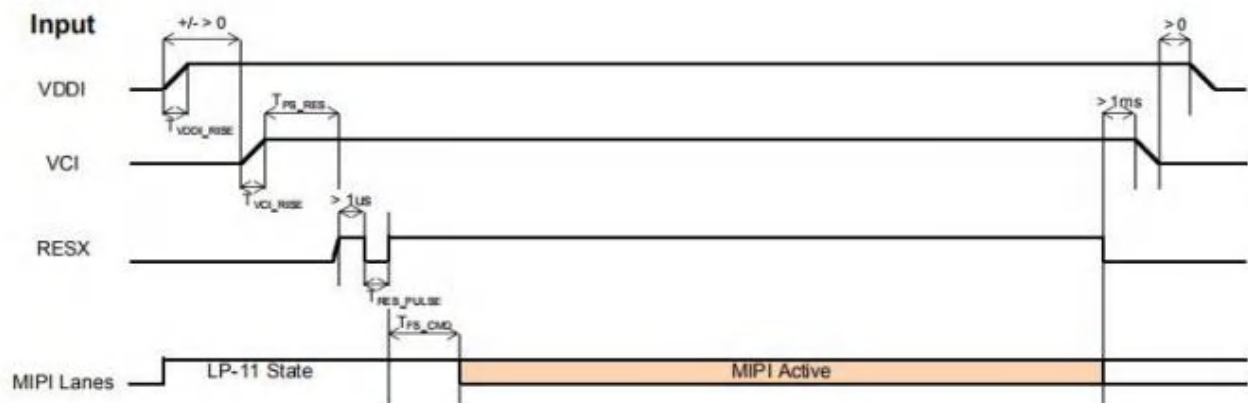
5.1 POWER ON/OFF SEQUENCE

To prevent the device damage from latch up and Improve subjective display effect, the power ON/OFF sequence shown below must be followed.

Case A:



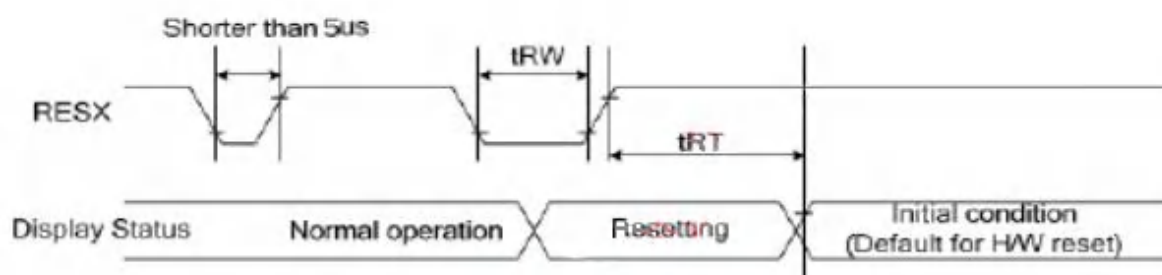
Case B:



Symbol	Characteristics	Min.	Typ.	Max.	Units
T_{VDDI_RISE}	VDDI Rise time	10	-	-	us
T_{VCI_RISE}	Case A: VCI Rise time	130	-	-	us
	Case B: VCI Rise time	40			
T_{PS_RES}	VDDI/VCI on to Reset high	5	-	-	ms
T_{RES_PULSE}	Reset low pulse time	10	-	-	us
T_{FS_CMD}	Reset to first command	10	-	-	ms

Figure 93: Power on/off sequence with Power Mode 3

5.2 Reset Timing Characteristics



Reset Timing

Reset Timing

Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		uS
	tRT	Reset cancel		TBD (note 1,5)	mS
				TBD (note 1,6,7)	mS

Notes:

1. The reset cancel also includes required time for loading ID bytes, VCOM setting and other settings from EEPROM to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.
2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the
- 3.

Reset Descript

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 10us	Reset
Between 5us and 10us	Reset starts

4. During the Resetting period, the display will be blanked (The display enters the blanking sequence, which maximum time is 120 ms, when Reset Starts in the Sleep Out mode. The display remains the blank state in the Sleep In mode.) and then return to Default condition for Hardware Reset.

5.3 MIPI-DSI Characteristics

5.3.1 High Speed Mode

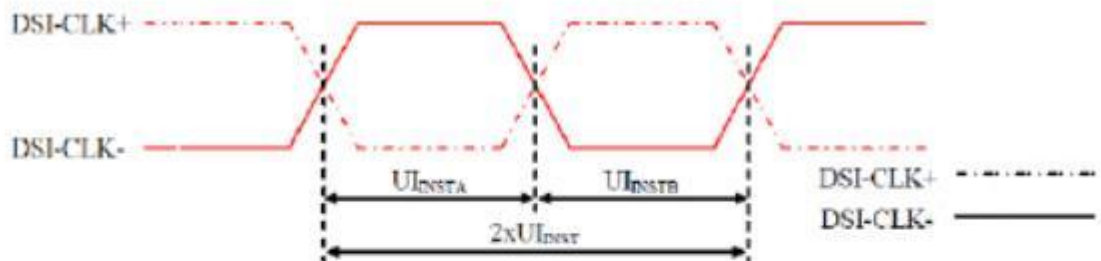
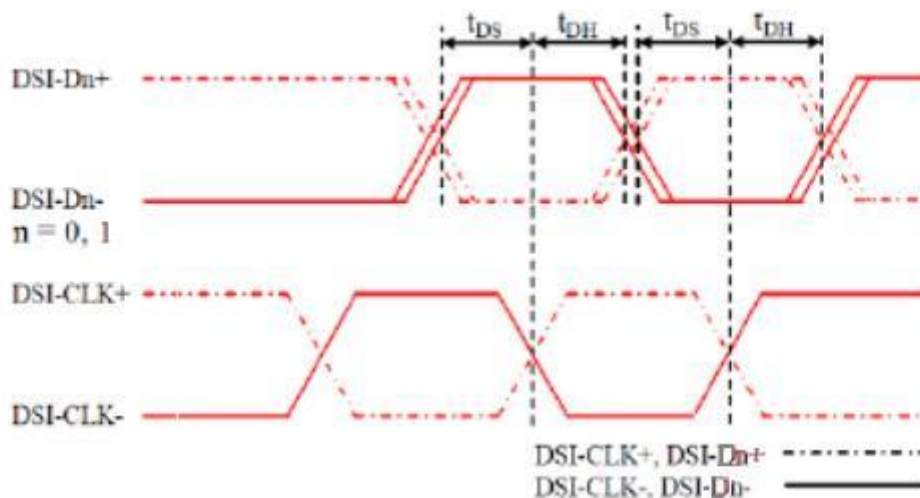


Figure 4: DSI Clock Channel Timing

DSI Clock Channel Timing

Signal	Symbol	Parameter	Min	Max	Unit
CLKP/N	$2xUI_{INST}$	Double UI instantaneous	TBD	TBD	ns
CLKP/N	UI_{INSTA}, UI_{INSTB} (Note 1)	UI instantaneous Half	TBD (Note 2)	TBD	ns

5.3.2 High Speed Mode – Data Clock Channel Timing

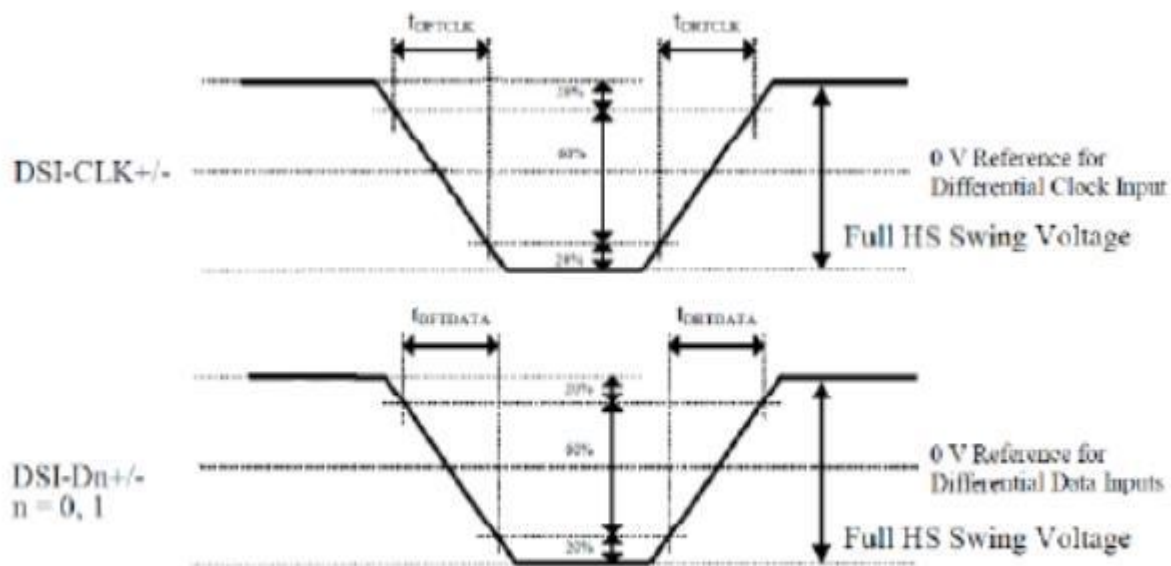


DSI Data to Clock Channel Timings

DSI Data to Clock Channel Timings

Signal	Symbol	Parameter	Min	Max
DnP/N, n=0 and 1	t_{DS}	Data to Clock Setup time	TBD	-
	t_{DH}	Clock to Data Hold Time	TBD	-

5.3.3 High Speed Mode – Rising And Falling Timings



Rising and Falling Timings on Clock and Data Channels

Rise and Fall Timings on Clock and Data Channels

Parameter	Symbol	Condition	Specification		
			Min	Typ	Max
Differential Rise Time for Clock	t_{ORTCLK}	CLKP/N	TBD	-	TBD (Note)
Differential Rise Time for Data	$t_{ORTDATA}$	DnP/N $n=0$ and 1	TBD	-	TBD (Note)
Differential Fall Time for Clock	t_{ORTCLK}	CLKP/N	TBD	-	TBD (Note)
Differential Fall Time for Data	$t_{ORTDATA}$	DnP/N $n=0$ and 1	TBD	-	TBD (Note)

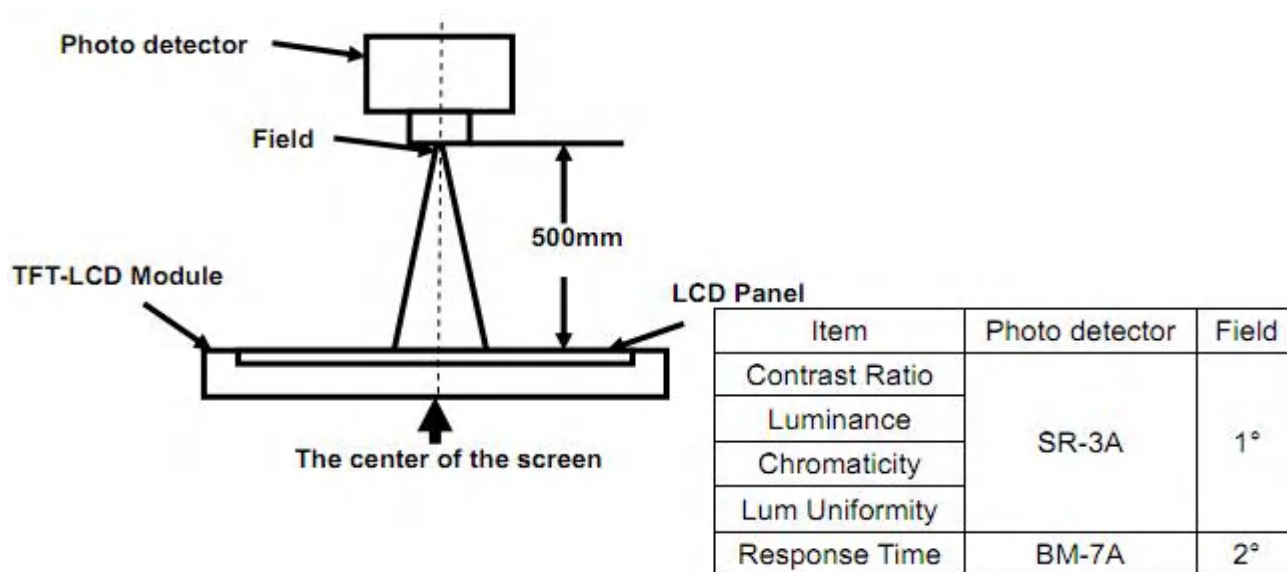
Note: The display module has to meet timing requirements, which are defined for the transmitter (MCU) on MIPI D-Phy standard.

6. Optical Specifications

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR $\geq$ 10) B/L ON	θ_T	$\Phi=90^\circ$ (12 o'clock)	75	80	-	deg	Note2
	θ_B	$\Phi=270^\circ$ (6 o'clock)	75	80	-	deg	Note2
	θ_L	$\Phi=180^\circ$ (9 o'clock)	75	80	-	deg	Note2
	θ_R	$\Phi=0^\circ$ (3 o'clock)	75	80	-	deg	Note2
Response Time	T_{ON}	Normal $\theta=\Phi=0^\circ$	-	15	-	msec	Note4
	T_{OFF}		-	15	-	msec	Note4
Contrast Ratio	CR		800	1000	-	-	Note1 Note3
Color Chromaticity	W_X		0.254	0.304	0.354	-	Note1 Note5
	W_Y		0.270	0.320	0.370	-	Note1 Note5
Luminance	L		900	1000	-	cd/m ²	Note1 Note7
Luminance Uniformity	Y_U		75	80	-	%	Note1 Note6
NTSC	-		55	60	-	%	-

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).

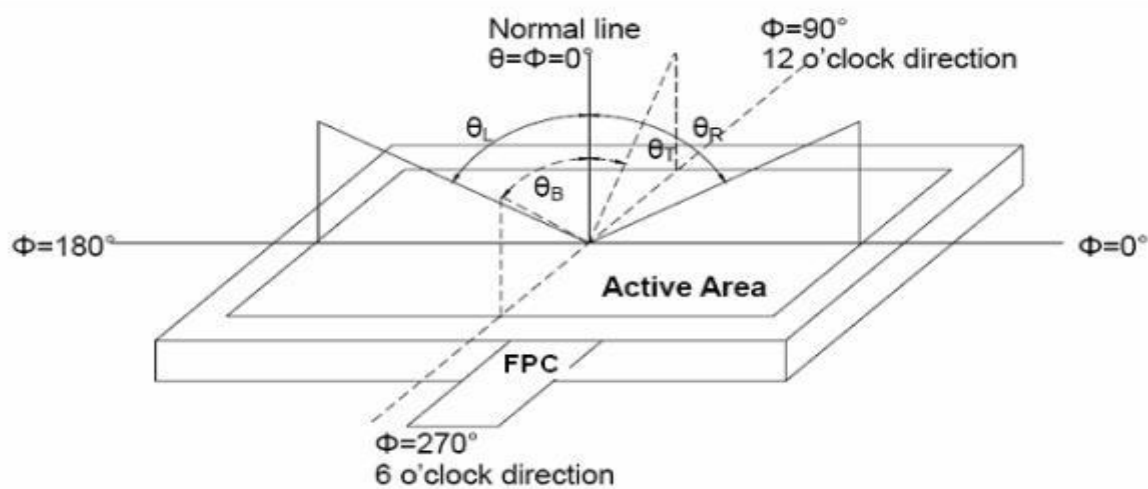


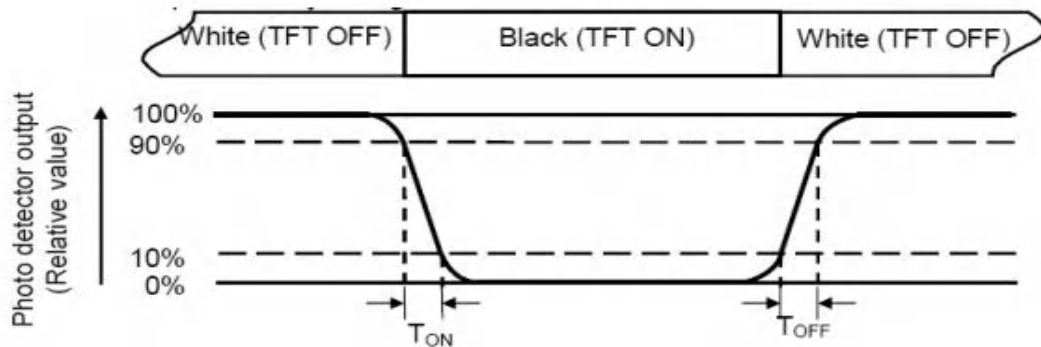
Fig. 1 Definition of viewing angle

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.

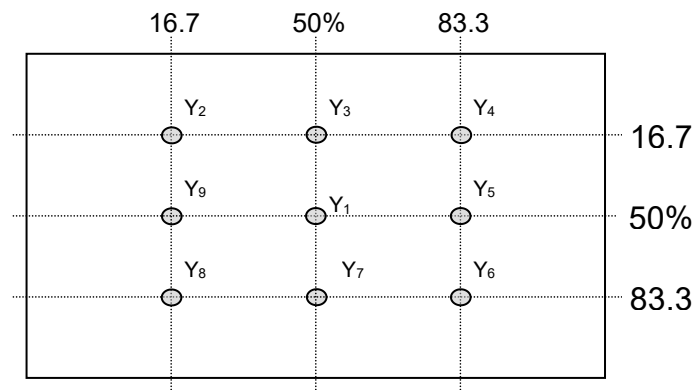


Fig. 2 Definition of points

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($P_1, P_2, P_3, \dots, P_n$).

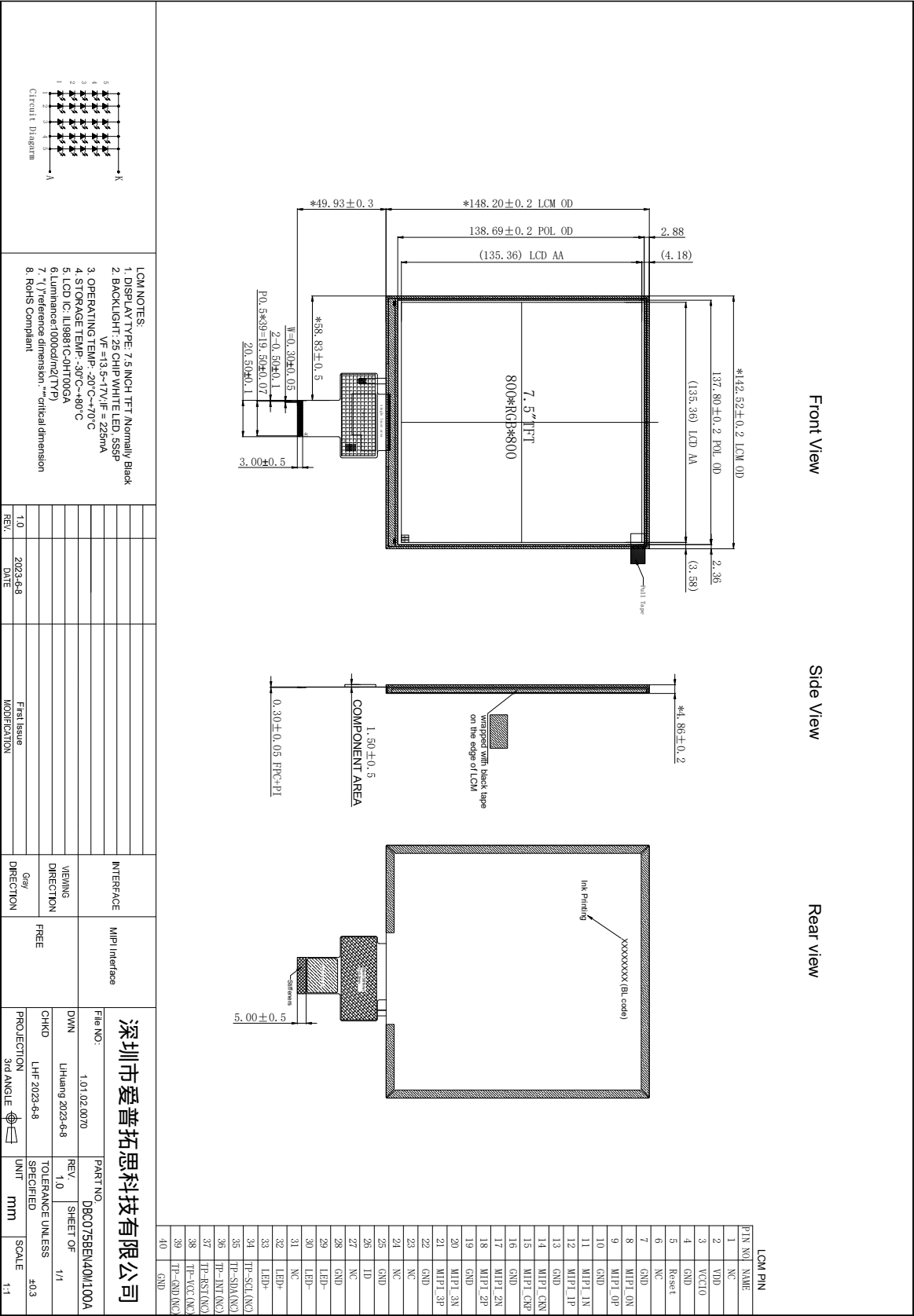
7. Reliability Test Items

Test Item	Test Conditions
High Temperature Storage	Ta= +80℃ 96hrs
Low Temperature Storage	Ta= -30℃ 96hrs
High Temperature Operation	Ta= +70℃ 96hrs
Low Temperature Operation	Ta= -20℃ 96hrs
High Temperature and Humidity Storage	Ta= +60℃, 90% RH 96hrs
Thermal Shock (Non-operation)	-30℃/30 min ~ +80℃/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:

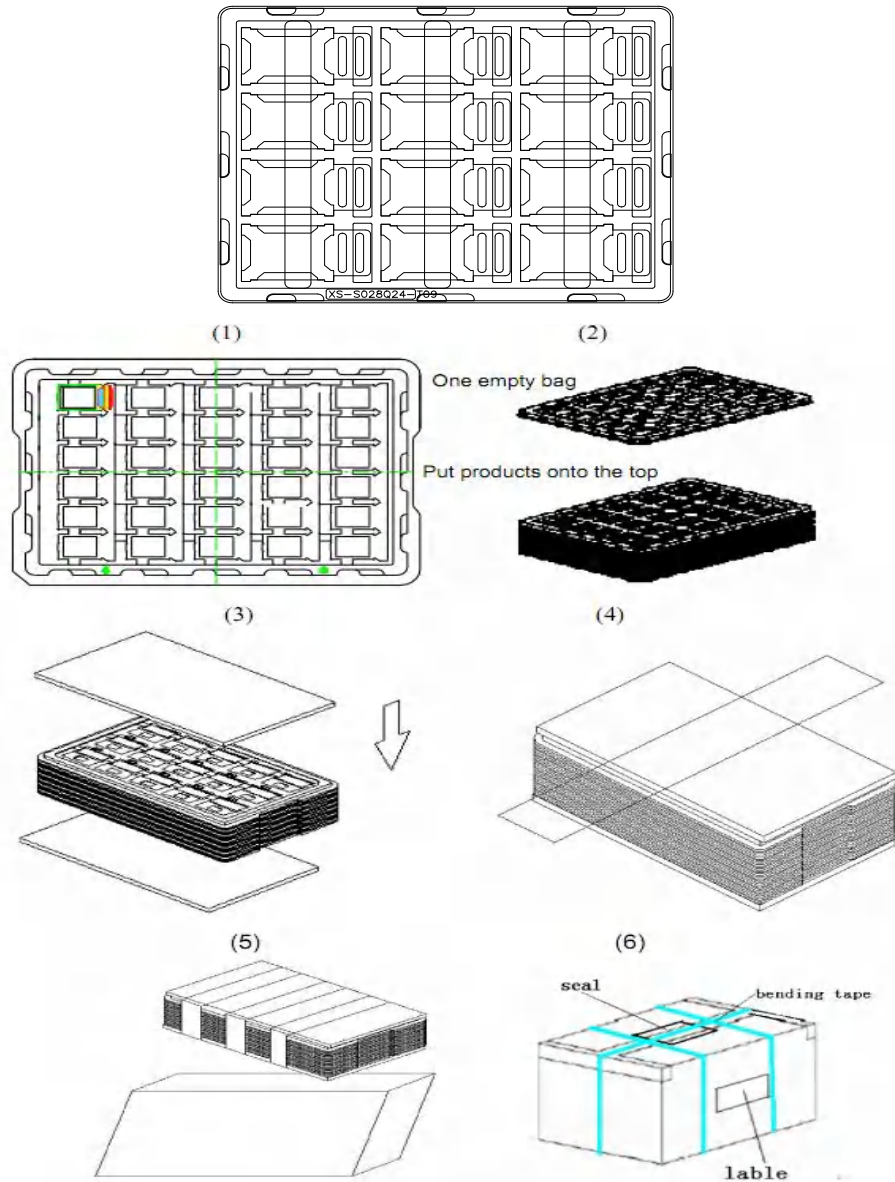
- 1). Air bubble in the LCD
- 2). Seal leak or Glass crack
- 3). Non display or abnormal display
- 4). Brightness reduction >50%

8. Mechanical Drawing



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.