Product Type: 7″ TFT LCD Module

LCD Nunmber: 1024x600

BNX Module No.: RT070T16I-L1-B

CUSTOMER APPROVED	PREPARE BY	CHECK BY	APPROVED BY
SUPPLIER APPROVED	PREPARE BY	CHECK BY	APPROVED BY
	LOONG	YANG	LUO

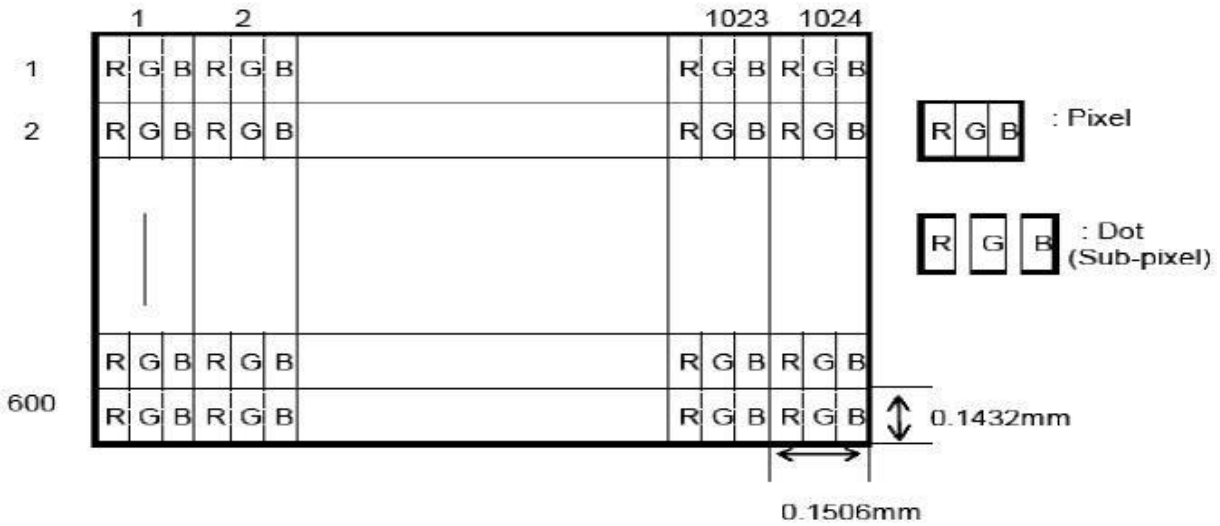
Contents

1.0 Product Information

BNX Display model RT070T16I-L1-B **is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is a transmissive type display operating in the normally white mode. This TFT LCD has a 7.0 (16:9) inch diagonally measured active display area with WSVGA (1024 horizontal by 600 vertical pixel) resolution.**

Item	Specification
Panel Size	7" inch
Display Area(mm)	154.2144(H)×85.92(V)
Number of Pixel	**1024(H) × 3(RGB)×600(V)**
Color Pixel Arrangement	0.1506(H)×0.1432(V)
Color Pixel arrangement	**RGB Vertical stripe**
Display Mode	**Normally** black
Driving Method	**TFT active matrix**
Outline Dimension	164(W)×97(H)×2.6(D)
View Direction	All FULL

LCD Cell Drawing



The LCD Products listed on this document are not suitable for use of aerospace equipment , Submarine cables , nuclear reactor control system and life support systems . If customers intend to use these LCD products for above application or not listed in "Standard " as follows , Please contact sales people in advance .

2.0 ABSOLUTE MAXIMUM RATINGS

(The following are maximum values which, if exceeded, may cause operation or damage to the unit.)

Item	Symbol	Min.	Max.	Unit	Note
LC Operating Voltage	VOP	--	4.6	V	*1,*2
Operating Temperature	T_{OP}	-20	70	℃	
Storage Temperature	T_{ST}	-30	80	℃	
Operating Ambient Humidity	H_{OP}	10	*4	RH	*3
Storage Humidity	H_{ST}	10	*4	RH	*3

Note:

*1. At 25±5℃

*2. Due to the characteristics of LC Material, the Liquid Crystal driving voltage varies with environmental temperature.

*3. Non-condensation.

*4. Temp.≤ 60℃,90%RH Max.

Temp. > 60℃,Absolute humidity shall be less than 90%RH.

3.0 Electrical Specifications

3.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	V_{DD}	3.0	3.3	3.6	V	
	V_{GH}	17.7	18	18.3	V	*1
	V_{GL}	-6.6	-6.0	-5.4	V	*2
	AV_{DD}	9.2	9.6	10.0	V	
VCOM	VCOMin	3.20	3.70	4. 20	V	*3
Data (RGB signal) Voltage	V_{sig}	0.2	-	9.5	V	
Input Current	IDD	-	16	28	mA	

Note :

*1. VGH is TFT Gate operating Voltage.

*2. VGL is TFT Gate operating Voltage.

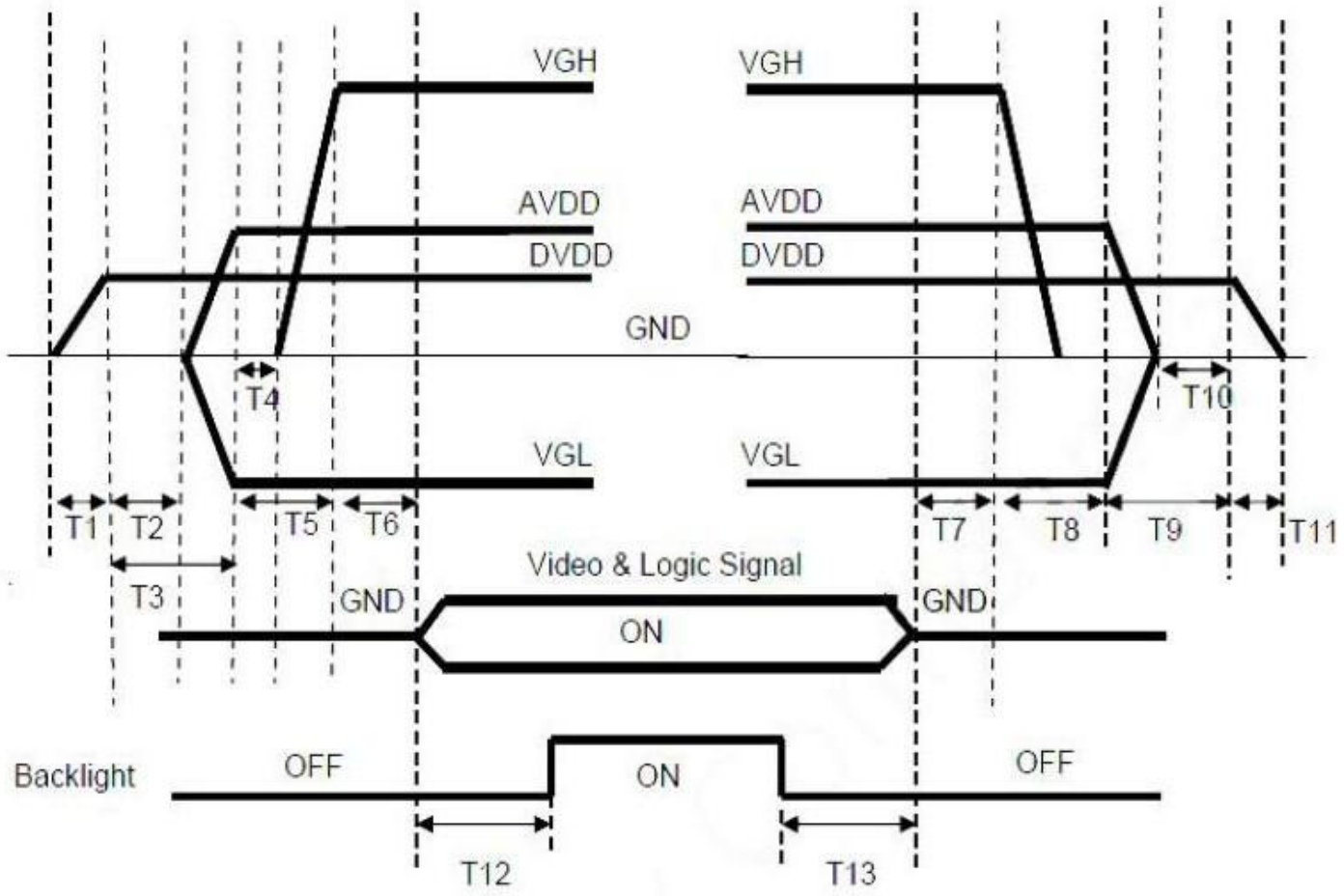
The storage structure of this model is C_{ST}(Storage on Common)

*3. Vcom must be adjusted to optimize display quality _Cross talk, Contrast Ratio and etc.

3.3 Power、Signal Sequence

Power On：DVDD→AVDD/VGL →VGH →Video &Logic Signal→Backlight

Power Off：Backlight→Video &Logic Signal→ VGH→AVDD/VGL→DVDD



0<T1≦10ms
T2>0ms
T3>20ms
T4>0ms
T5>10ms
0<T6≦10ms
T12≧200ms

T7>0ms
T8>0ms
T9>0ms
T10>0ms
0<T11≦10ms
T13≧200ms

3.4.1 Timing Characteristics

DE mode

DE mode					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd		1024		DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		600		H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

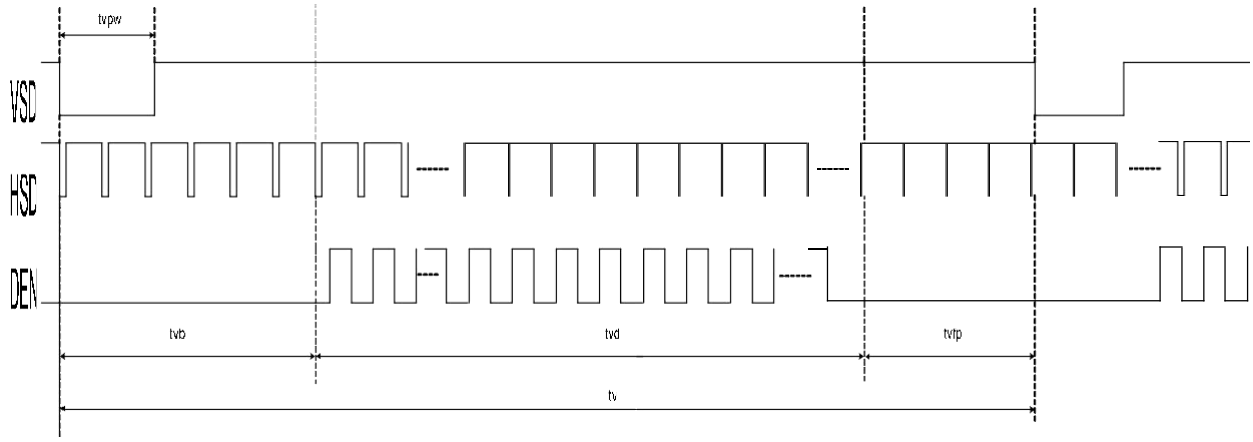
HV mode(1)

HV mode Horizontal input timing						
Parameter		Symbol	Value			Unit
Horizontal display area		thd	1024			DCLK
DCLK frequency@ Frame rate=60hz		fclk	Min.	Typ.	Max.	
			44.9	51.2	63	Mhz
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw	1			
	Typ.		—			
	Max.		140			
HSYNC back porch		thbp	160	160	160	
HSYNC front porch		thfp	16	160	216	

HV mode(2)

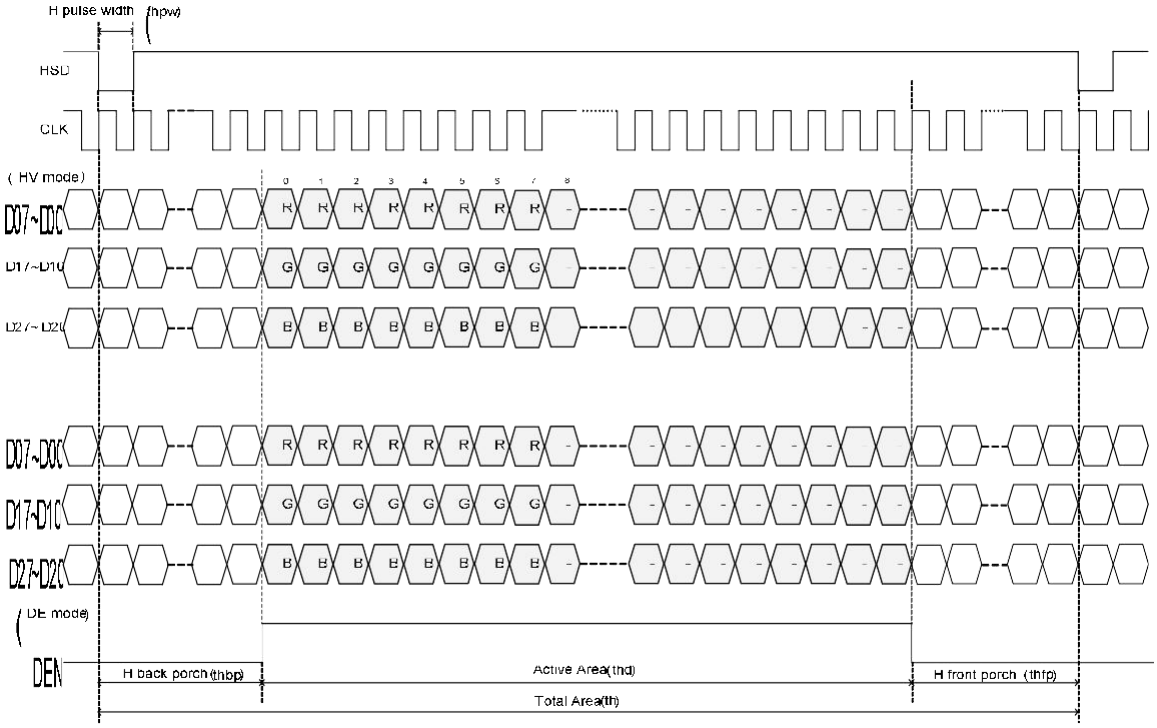
Vertical input timing					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd		600		H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	tvpw	1	—	20	H
VSYNC back porch	tvb	23	23	23	H
VSYNC front porch	tvfp	1	12	127	H

LTD 3.4.2 Vertical input timing



Vertical input timing

3.4.2 Horizontal input timing



Horizontal input timing

4.0. Pin Assignment

FPC Connector is used for the module electronics interface. The recommended model is FH12A-50S-0.5SH manufactured by Hirose.

Pin No.	Symbol	I/O	Function	Remark
1	V_{LED+}	P	Power for LED backlight (Anode)	
2	V_{LED+}	P	Power for LED backlight (Anode)	
3	V_{LED-}	P	Power for LED backlight (Cathode)	
4	V_{LED-}	P	Power for LED backlight (Cathode)	
5	GND	P	Power ground	
6	V_{COM}	I	Common voltage	
7	DV_{DD}	P	Power for Digital Circuit	
8	MODE	I	DE/SYNC mode select	Note 1
9	DE	I	Data Input Enable	
10	VS	I	Vertical Sync Input	
11	HS	I	Horizontal Sync Input	
12	B7	I	Blue data(MSB)	
13	B6	I	Blue data	
14	B5	I	Blue data	
15	B4	I	Blue data	
16	B3	I	Blue data	
17	B2	I	Blue data	
18	B1	I	Blue data	Note 2
19	B0	I	Blue data(LSB)	Note 2
20	G7	I	Green data(MSB)	
21	G6	I	Green data	
22	G5	I	Green data	
23	G4	I	Green data	
24	G3	I	Green data	
25	G2	I	Green data	

26	G1	I	Green data	Note 2
27	G0	I	Green data(LSB)	Note 2
28	R7	I	Red data(MSB)	
29	R6	I	Red data	
30	R5	I	Red data	
31	R4	I	Red data	
32	R3	I	Red data	
33	R2	I	Red data	
34	R1	I	Red data	Note 2
35	R0	I	Red data(LSB)	Note 2
36	GND	P	Power Ground	
37	DCLK	I	Sample clock	Note 3
38	GND	P	Power Ground	
39	L/R	I	Left / right selection	Note 4,5
40	U/D	I	Up/down selection	Note 4,5
41	V_{GH}	P	Gate ON Voltage	
42	V_{GL}	P	Gate OFF Voltage	
43	AV_{DD}	P	Power for Analog Circuit	
44	RESET	I	Global reset pin.	Note 6
45	NC	-	No connection	
46	V_{COM}	I	Common Voltage	
47	DITHB	I	Dithering function	Note 7
48	GND	P	Power Ground	
49	NC	-	No connection	
50	NC	-	No connection	

I: input, O: output, P: Power

Note 1: DE/SYNC mode select. Normally pull high.

When select DE mode, MODE="1", VS and HS must pull high.

When select SYNC mode, MODE= "0", DE must be grounded.

Note 2: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.

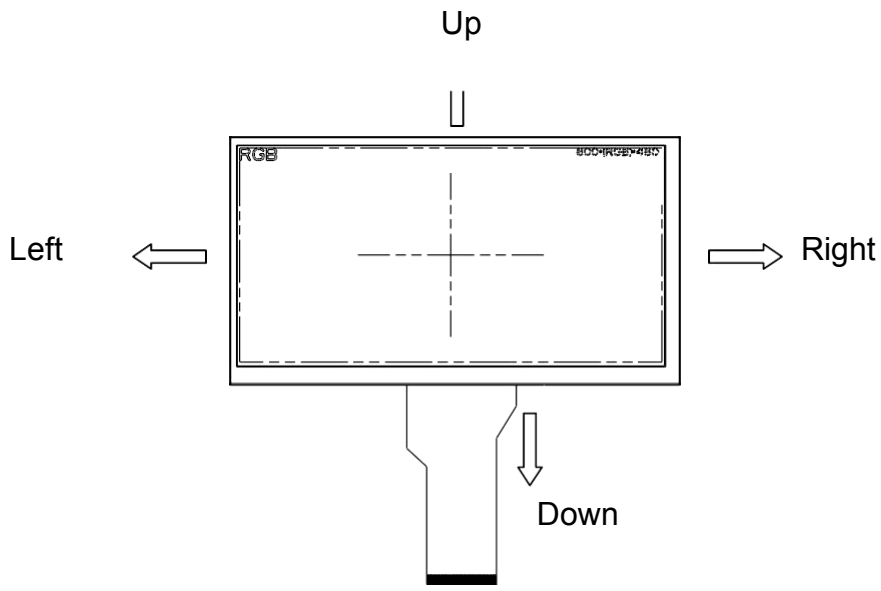
Note 3: Data shall be latched at the falling edge of DCLK.

Note 4: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	L/R	
GND	DV_{DD}	Up to down, left to right
DV_{DD}	GND	Down to up, right to left
GND	GND	Up to down, right to left
DV_{DD}	DV_{DD}	Down to up, left to right

Note 5: Definition of scanning direction.

Refer to the figure as below:



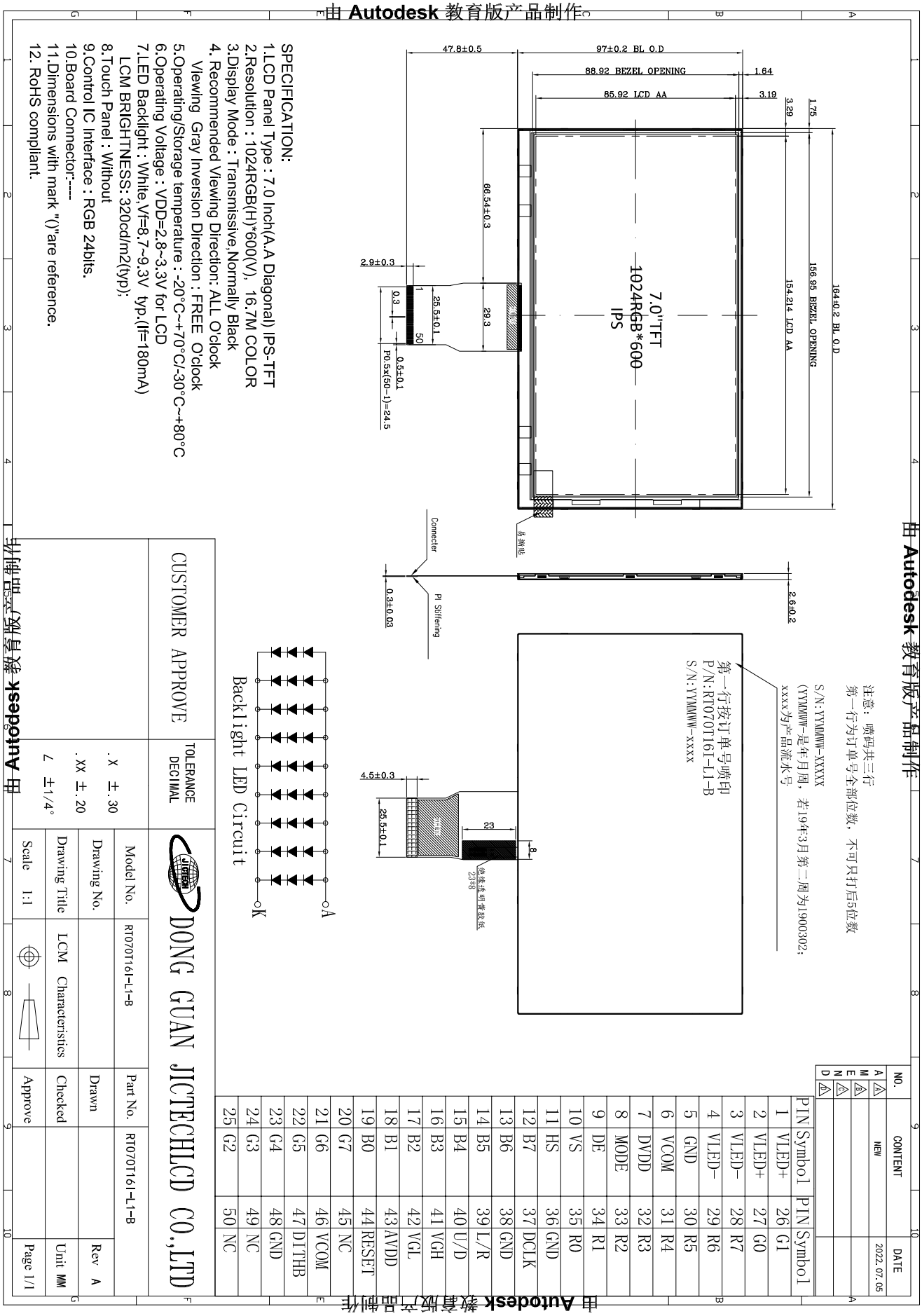
Note 6: Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

Note 7: Dithering function enable control, normally pull high.

When DITHB="1",Disable internal dithering function,

When DITHB="0",Enable internal dithering function,

5.0 Outline dimension



SPECIFICATION:

1.LCD Panel Type : 7.0 Inch(A.A Diagonal) IPS-TFT
2.Resolution : 1024RGB(H)*600(V), 16.7M COLOR
3.Display Mode : Transmissive,Normally Black
4. Recommended Viewing Direction: ALL O'clock
Viewing Gray Inversion Direction : FREE O'clock
5.Operating/Storage temperature : -20°C~+70°C/-30°C~+80°C
6.Operating Voltage : VDD=2.8~3.3V for LCD
7.LED Backlight : White,Vf=8.7~9.3V typ.(If=180mA)
LCM BRIGHTNESS: 320cd/m2(typ);
8.Touch Panel : Without
9.Control IC Interface : RGB 24bits.
10.Board Connector:----
11.Dimensions with mark "()"are reference.
12. RoHS compliant.

NO.	CONTENT	DATE
A	NEW	2022.07.05
M		
E		
N		
D		

PIN	Symbol	PIN	Symbol
1	VLED+	26	G1
2	VLED+	27	G0
3	VLED-	28	R7
4	VLED-	29	R6
5	GND	30	R5
6	VCOM	31	R4
7	DVDD	32	R3
8	MODE	33	R2
9	DE	34	R1
10	VS	35	R0
11	HS	36	GND
12	B7	37	DCLK
13	B6	38	GND
14	B5	39	L/R
15	B4	40	U/D
16	B3	41	VGH
17	B2	42	VGL
18	B1	43	AVDD
19	B0	44	RESET
20	G7	45	NC
21	G6	46	VCOM
22	G5	47	DITHB
23	G4	48	GND
24	G3	49	NC
25	G2	50	NC

CUSTOMER APPROVE

TOLERANCE DECIMAL	DONG GUAN JICTECHLCD CO.,LTD		
.X ±.30	Model No.	RT070T16I-L1-B	Part No. RT070T16I-L1-B
.XX ±.20	Drawing No.		Drawn Rev A
∠ ±1/4°	Drawing Title	LCM Characteristics	Checked Unit MM
	Scale 1:1		Approve Page 1/1

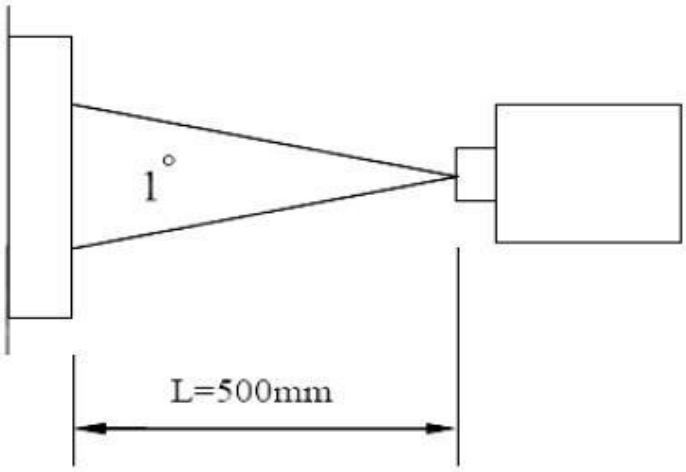
6.0 Optical Characteristics

6.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max	Unit
Panel Transmittance		-	-	4.7	5.0	—	%
LCM luminance (Center)		YL	I=180mA	280	320	—	cd/㎡
Contrast		CR		560	800	_	-
Response time	Rising	TR	Point-5	—	30	40	ms
	Falling	TF					
NTSC				45%	50%	-	
Color chromaticity (CIE1931)	White	WX		-0.05	0.265	+0.05	-
		WY		-0.05	0.243	+0.05	
Viewing angle	Left	φ	Point-5 CR≧10	—	85	—	°
	Right	φ		—	85	—	°
	Upper			—	85	—	
	Lower			—	85	—	

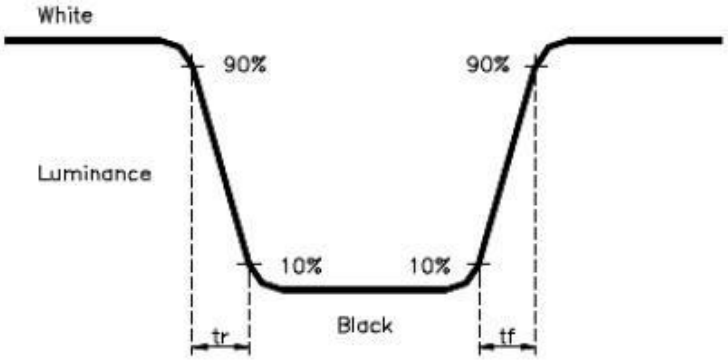
Note 1.Ambient condition：25℃±2℃，60±10%RH，under 10 Lunx in the darkroom。

Note 2.Measure device：BM-5A (TOPCON)，viewing cone= 1°，I_L=20mA。

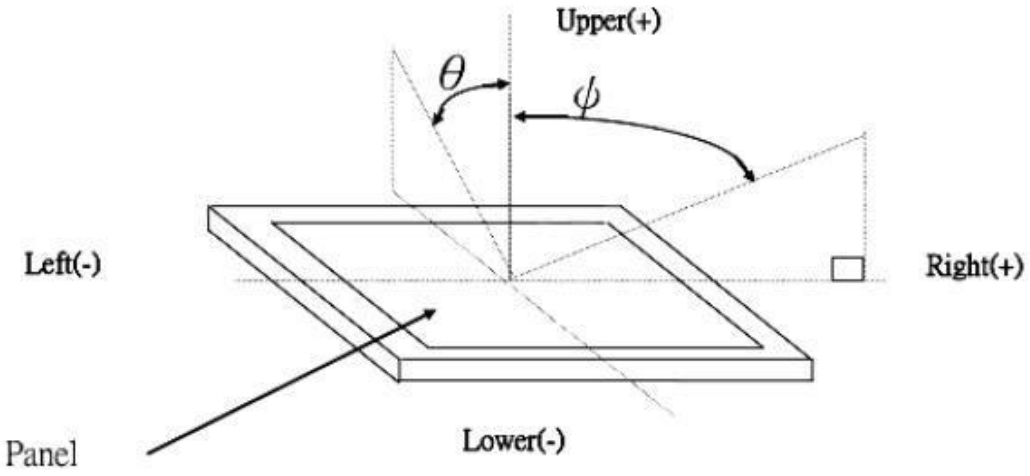


Note 3. Definition of Contrast Ratio：CR = White Luminance (ON) / Black Luminance (OFF)

Note 4. Definition of response time：The response time is defined as the time interval between the 10% and 90% amplitudes.



Note 5. Definition of view angle(θ，ψ)：



Note 6. Light source: C light.

7.0 Reliability test items

7.1 Temperature and Humidity

TEST ITEMS	CONDITIONS	NOTE
High Temperature Operation	70 ℃ 120hrs	
High Temperature Storage	80 ℃ 120hrs	
High Temperature High Humidity Operation	60℃ ;90%RH 120hrs (No condensation)	
Low Temperature Operation	-20℃ 120hrs	
Low Temperature Storage	-30℃ 120hrs	

Note :

1. All judge of display are performed after temperature of panel return to room temperature
2. Display function should be no change under normal operating condition.
3. Under no condensation of dew.

8.0 Warranty

8.1 The period is within 3 months since the date of shipping out under normal using and storage conditions.

8.2 The warranty will be avoided in case of defect induced by customer.

8.0 Packing form