BI070CP850

7.0" 1024*600, High Brightness: 850nits LCD Panel, Integrated Projective Capacitive Touch Screen, USB Interface Module.

1. Features

7 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module. This module is composed of a 7” TFT-LCD panel, LED backlight, Projective capacitive touch panel and power circuit unit.

(1) Construction: 7” a-Si TFT active matrix, White LED Backlight and power.
(2) Resolution (pixel): 1024(R.G.B) X600
(3) Number of the Colors : 16M colors (R , G , B 8bit digital each)
(4) LCD type : Transmissive , normally White
(5) Interface: LVDS interface 6bit (default), 8bit by jumper setting.
(6) Power Supply Voltage: 3.3V for logic voltage.
(7) Viewing Direction: 6 O’clock (Gray Inversion)
(8) Projective capacitive touch panel. USB interface.

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
LCD size	7 inch (Diagonal)	
Resolution	1024 x 3(RGB) x 600	dot
Dot pitch	0.05(W) x 0.15(H)	mm
Active area	153.6(W) x 90.0(H)	mm
Module size	165. 5(W) x 104.44(H) x 10.31(D)	mm
Color arrangement	RGB-stripe	
interface	LVDS	
Brightness	850	cd/m^2

3. ABSOLUTE MAX. RATINGS

Item	Symbol	Values		UNIT	Note
		Min.	Max.		
Power voltage	VCC	-0.3	4.2	V	
Operation temperature	TOP	-20	70	℃	
Storage temperature	TST	-30	80	℃	

The following values are maximum operation conditions, if exceeded; it may cause faulty operation or damage

.

4. ELECTRICAL CHARACTERISTICS

4-1 Typical Operation Conditions

Item		Symbol	Values			Unit	Remark
			MIN	TYP	MAX		
Power Voltage		V_{CC}	3.0	3.3	3.6	V	Note 1,2
Power Consumption		I_{CC}	--	150	--	mA	Note 1,2 VCC=3.3V
Logic Input Voltage	Input Voltage	V_{IN}	0	-	V_{CC}	V	
	Logic input high voltage	V_{TH}	$0.7V_{CC}$	-	V_{CC}	V	Note 3
	Logic input low voltage	V_{TL}	GND	-	$0.3V_{CC}$	V	Note 3

Note 1: Value for Power Board combined panel.

Note 2: VCC setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 3: LVDS.

4-2 LED Driving Conditions

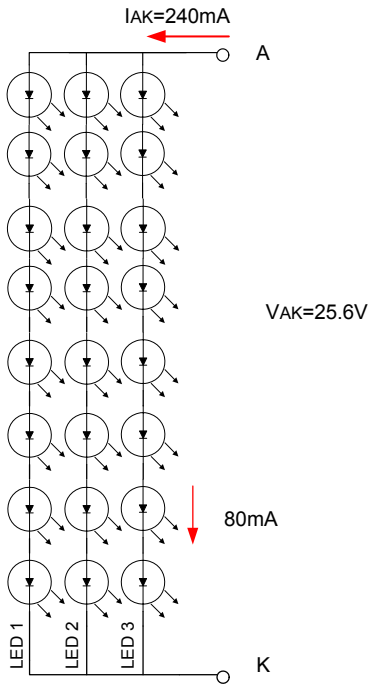
Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
LED Driver Power Voltage	V_{LED}	9	12	14	V	
LED Driver Current Consumption	I_{LED}	--	730	--	mA	VLED=12V ADJ=5V (duty 100%)
ADJ Input Voltage	V_{ADJ}	1.2	--	V_{LED}	V	duty=100% Note(3)
LED voltage	V_{AK}	24.8	25.6	26.4	V	Note(1)
LED forward Current	I_{AK}	--	240	--	mA	Ta=25℃
LED life time	--	--	50,000	--	Hr	Note(2)

Note (1) The constant current source is needed for white LED back-light driving.
When LCM is operated over 60 deg.C ambient temperature.

Note (2) Brightness to be decreased to 50% of the initial value.

Note (3) VLEDADJ is PWM signal input. It is for brightness control.

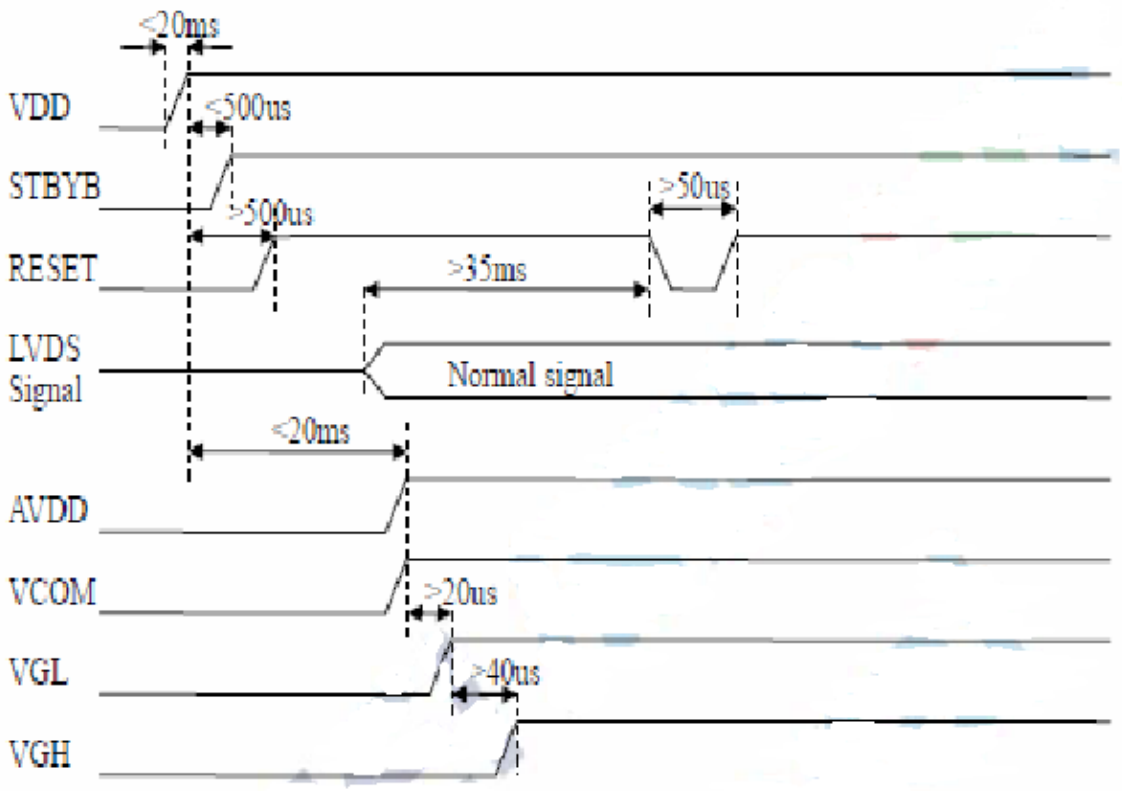
There are 5 Groups LED shown as below , V_{AK} =25.6V , I_{AK} =240mA.



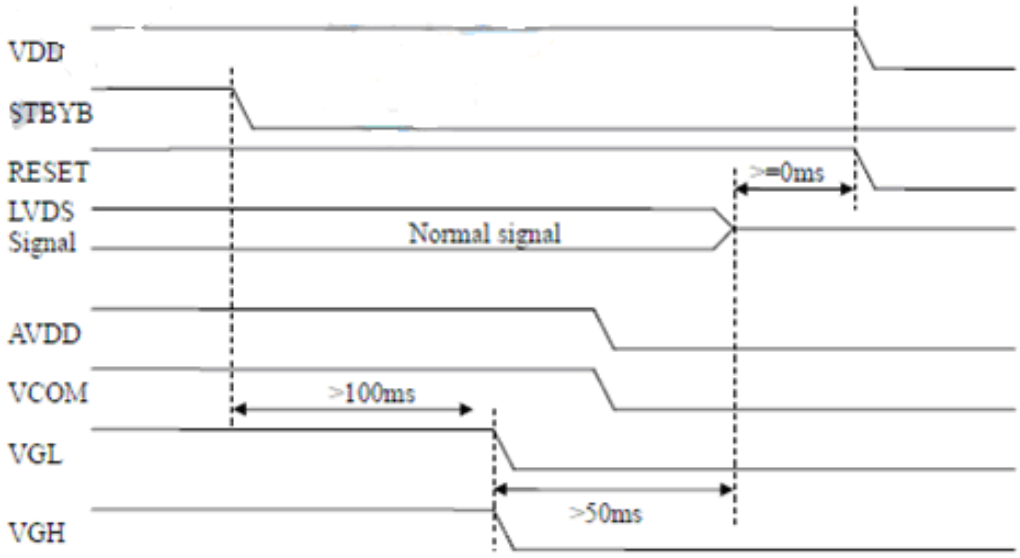
Brightess to be decreased to 50% of the initial value.

4-3 Power Sequence

a. Power on:



b. Power off:



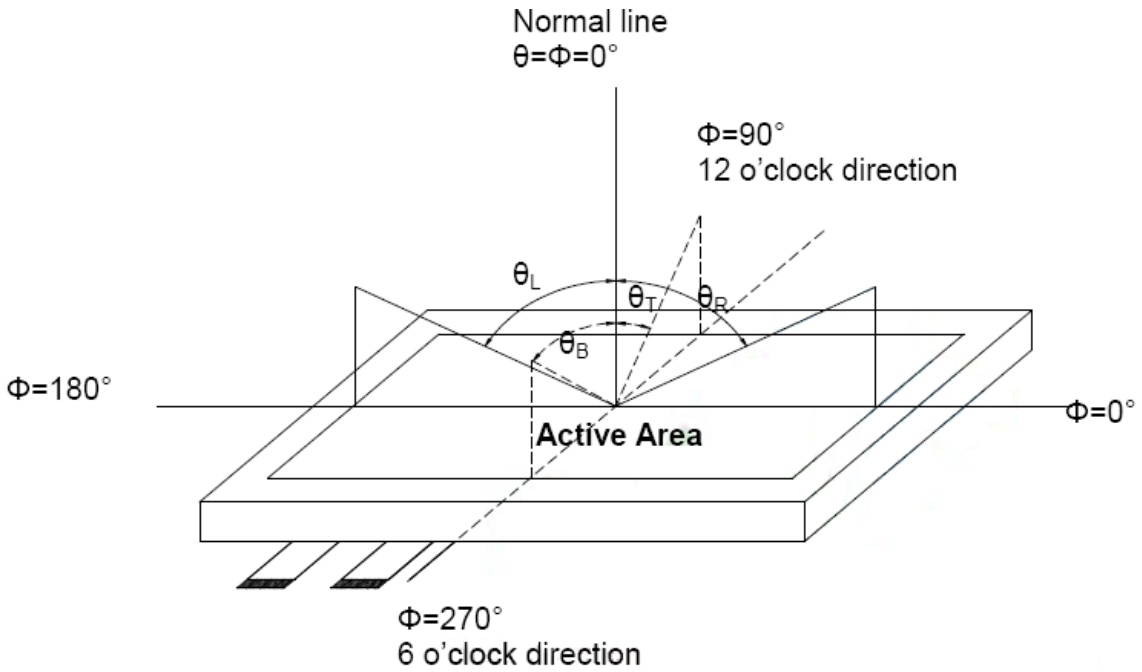
5. Optical Specifications

Item	Symbol	Condition	Values			Unit	Note
			Min.	Typ.	Max.		
Viewing angle (CR≧10) B/L ON	θL	Φ = 180° (9 o'clock)	65	75	--	degree	Note1
	θR	Φ = 0° (3 o'clock)	65	75	--		
	θT	Φ = 90° (12 o'clock)	60	70	--		
	θB	Φ = 270° (6 o'clock)	65	75	--		
Response time	TON	Normal θ =Φ=0°	--	10	20	msec	Note3
	TOFF		--	15	30	msec	
Contrast ratio	CR		500	700	--	--	Note4
Color chromaticity	WX		0.249	0.299	0.349	--	Note5 Note6
	WY		0.273	0.323	0.373	--	
Luminance	L		680	850	--	cd/m^2	Note6

Test Conditions:

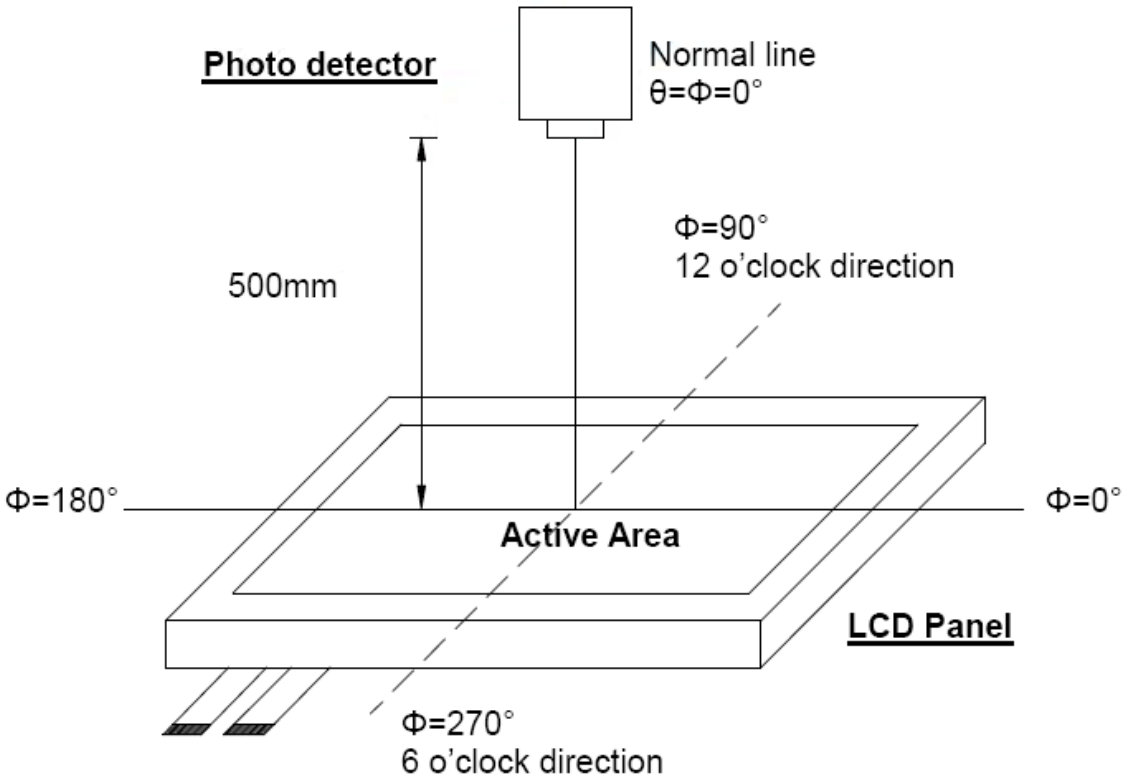
1. V_{LED}= 12V, I_L = 240mA (Backlight current), the ambient temperature is 25℃.
2. The test systems refer to Note 2.

Note 1 : Definition of viewing angle range



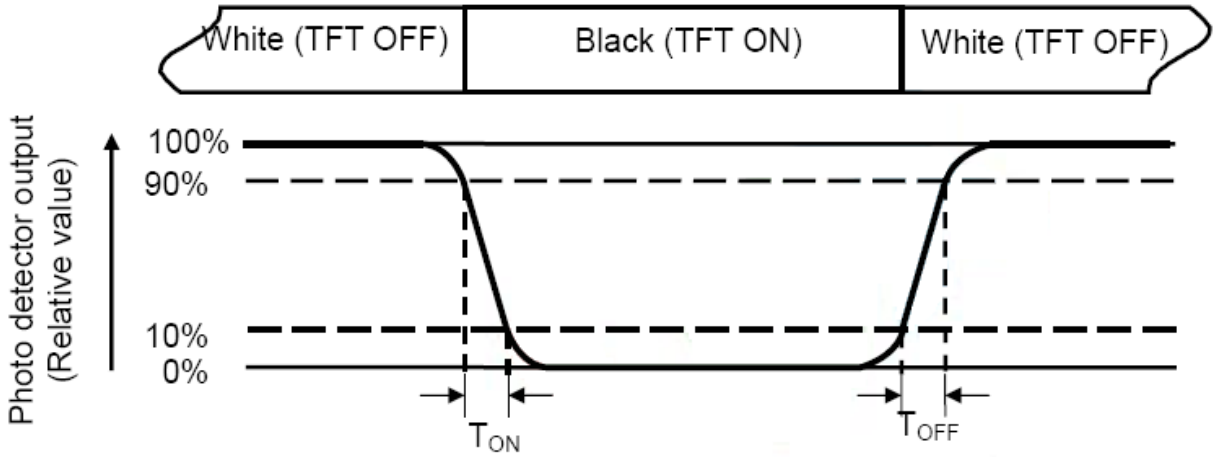
Note 2 : Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view : 1° / Height : 500mm.)



Note 3 : Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 4 : Definition of contrast ratio

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

Note 5 : Definition of color chromaticity (CIE1931)

Color coordinated measured at center point of LCD.

6. INTERFACE

TFT LCD Panel Driving Section

Pin No.	Symbol	I/O	Description	Note
1	VDD	P	Power Voltage for Logic: 3.3V	
2	VDD	P	Power Voltage for Logic: 3.3V	
3	GND	P	Ground	
4	GND	P	Ground	
5	IN0-	I	- LVDS differential data input	
6	IN0+	I	+ LVDS differential data input	
7	GND	P	Ground	
8	IN1-	I	- LVDS differential data input	
9	IN1+	I	+ LVDS differential data input	
10	GND	P	Ground	
11	IN2-	I	- LVDS differential data input	
12	IN2+	I	+ LVDS differential data input	
13	GND	P	Ground	
14	CLK-	I	- LVDS differential data input	
15	CLK+	I	+ LVDS differential data input	
16	GND	P	Ground	
17	IN3-	I	- LVDS differential data input	
18	IN3+	I	+ LVDS differential data input	
19	VLED	P	Power supply for backlight: 12V	
20	LEDADJ	I	LED PWM signal	

I : input, O : output, P : power

NOTE :

(1) Pin3: ADJ is PWM signal input. It is for brightness control.

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
ADJ signal frequency	f_{PWM}	10	--	100	KHz
ADJ signal logic level High	VIH	1.2	--	VLED	V
ADJ signal logic level Low	VIL	0	--	0.5	V

7. Projected capacitive-type Touch panel specification

For normal operation, there must be a cover lens of 0.7~4mm thickness to be put on the top of touch panel.

7-1. Basic Characteristic

ITEM	SPECIFICATION
Interface Type	Projective Capacitive Multi-Touch Panel
Activation	Two-fingers or Signal-finger

7-2. Operation Environmental Characteristic

ITEM	SPECIFICATION
Operation Temperature	-20~70℃
Storage Temperature	-30~80℃

7-3. Optical Characteristic

ITEM	SPECIFICATION
Transmittance	80% (Typ)

【Notes】

(1) UV-V is 400nm~700nm Spectrum Transmittance (Reference: Air)

(2) Definition of Transmittance

T(%)=White Luminance Touch on LCM/LCM White Luminance

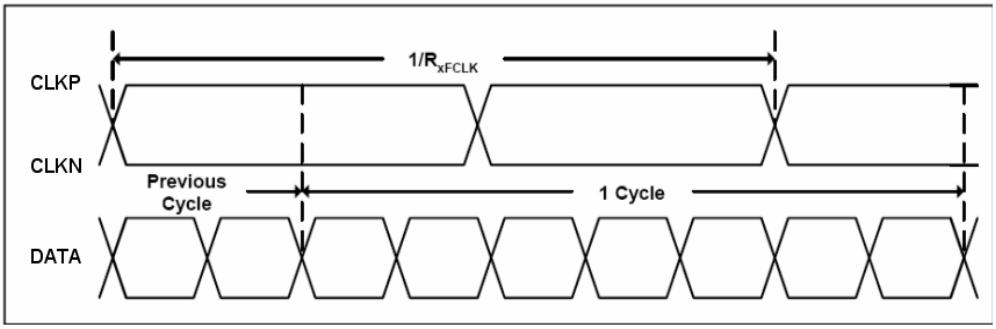
7-4Touch Panel Interface

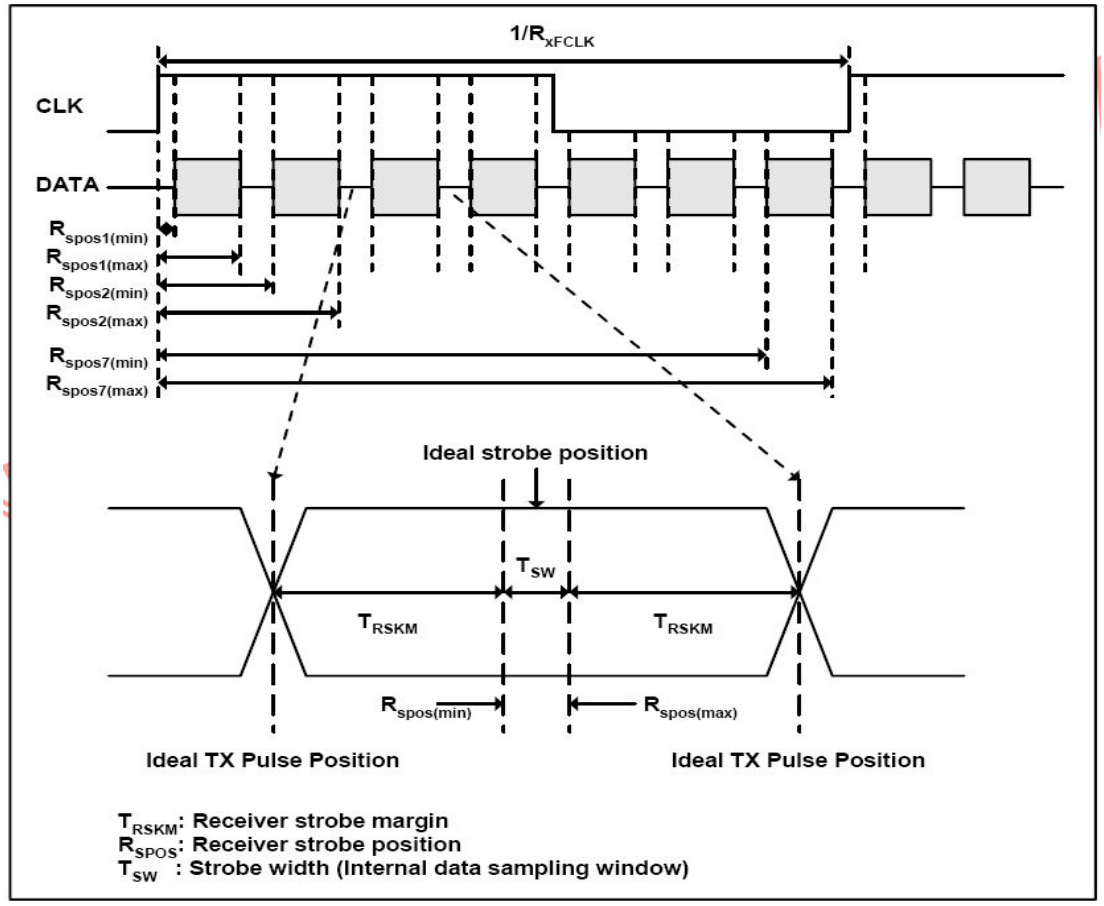
Pin No.	Symbol	Function
1	GND	USB POWER GND
2	D-	USB Data －
3	D+	USB Data ＋
4	VIN	USB POWER 5V
5	NC	No Connection
6	NC	No Connection

8. TIMING CHARACTERISTICS

8-1 AC Electrical Characteristics

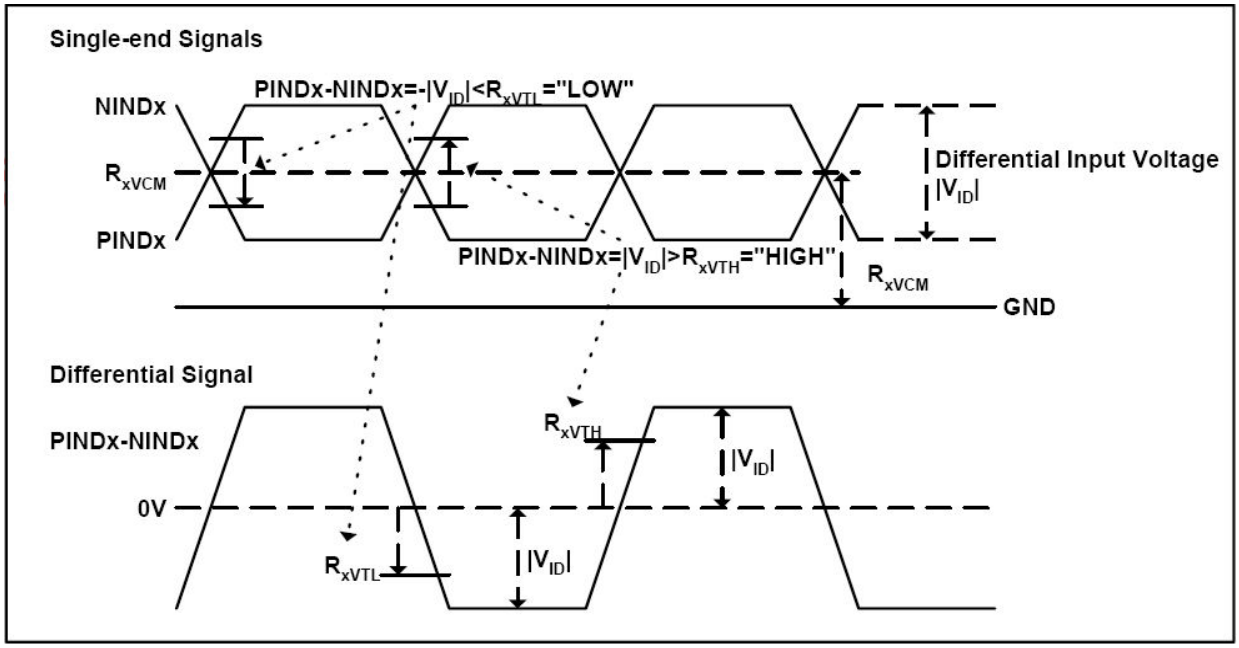
Parameter	Symbol	Values			Unit	Remark
		MIN	TYP	MAX		
Clock frequency	R_{xFCLK}	40.8	51.2	71		
Input data skew margin	T_{RSKM}	500	--	--		
Clock high time	T_{LVCH}	--	4/(7* R_{xFCLK})	--		
Clock low time	T_{LVCL}	--	3/(7* R_{xFCLK})	--		





8-2 DC Electrical Characteristics

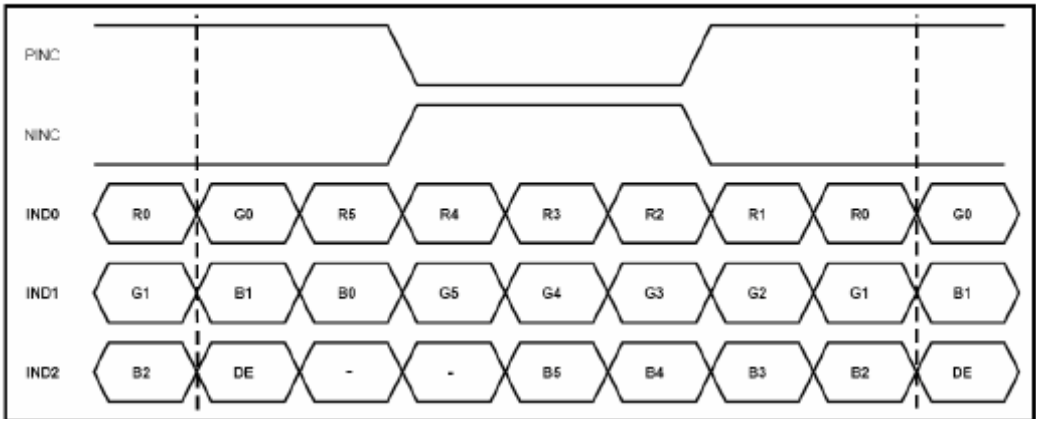
Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Differential input high Threshold voltage	R_{xVTH}	-	-	+0.1	V	R_{XVCM}=1.2V
Differential input low Threshold voltage	R_{xVTH}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{xVIN}	0	-	2.4	V	
Differential input common mode voltage	R_{xVCM}	$\|V_{ID}\|/2$	-	$2.4-\|V_{ID}\|/2$	V	
Differential voltage	$\|V_{ID}\|$	0.2	-	0.6	V	
Differential input leakage current	RV_{xliz}	-10	-	+10	uA	



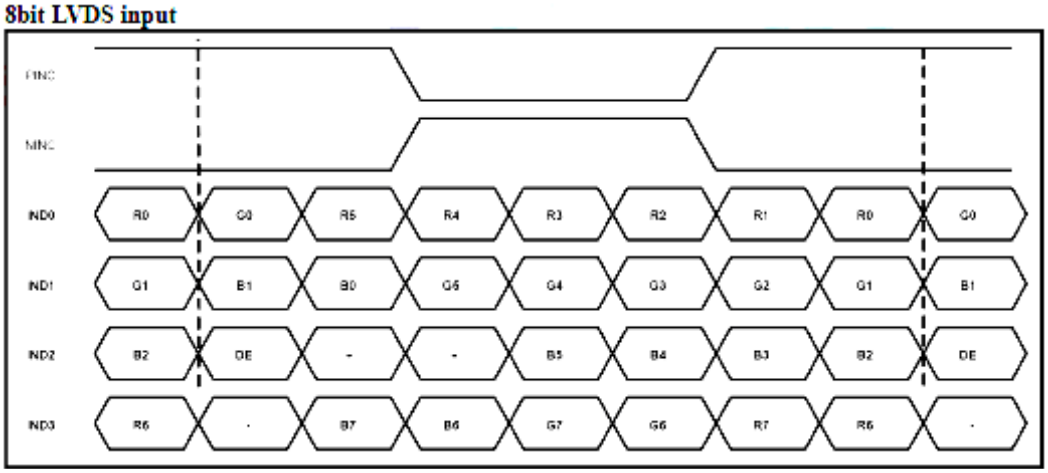
8-3 Timing

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Clock Frequency	fclk	40.8	51.2	67.2	MHz	Frame rate =60Hz
Horizontal display area	thd	1024			DCLK	
HS period time	th	1114	1344	1400	DCLK	
HS Blanking	thb	90	320	376	DCLK	
Vertical display area	tvd	600			H	
VS period time	tv	610	635	800	H	
VS Blanking	thb	10	35	200	H	

6bit LVDS input



8bit LVDS input



9. RELIABILITY TEST CONDITIONS

Test Item	Test Conditions	Note
High Temperature Operation	70±3°C , t=240 hrs	
Low Temperature Operation	-20±3°C , t=240 hrs	
High Temperature Storage	80±3°C , t=240 hrs	1,2
Low Temperature Storage	-30±3°C , t=240 hrs	1,2
Storage at High Temperature and Humidity	60°C, 90% RH , 240 hrs	1,2
Thermal Shock Test	-20°C (30min) ~ 70°C (30min) 100 cycles	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis	2

Note 1 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions (15-35°C , 45-65%RH).

10. General Precautions

10-1 Safety

Liquid crystal is poisonous. Do not put it your month. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

10-2 Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

11-3 Static Electricity

1. Be sure to ground module before turning on power or operation module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

12-4 Storage

1. Store the module in a dark room where must keep at +25±10℃ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

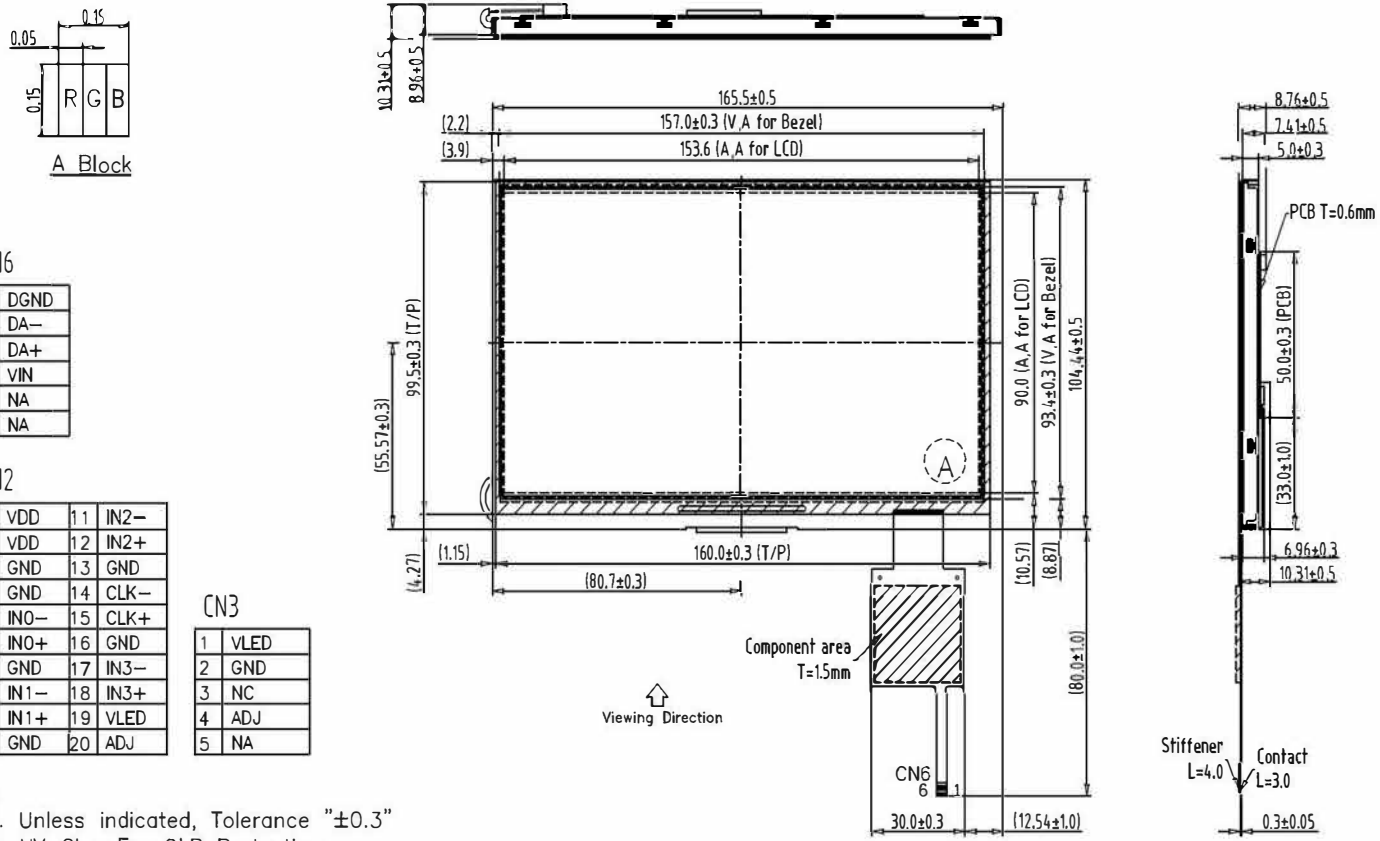
13-5 Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

14-6 Others

1. Factory will provide one year warranty for all products and three months warranty for all repairing products.
2. The residual image may exist if the same display pattern is shown for hours. This residual image, however, disappears when another display pattern is shown or the drive is interrupted and left for a while. But this is not a problem on reliability.

11. OUTLINE DIMENSION



CN6

1	DGND
2	DA−
3	DA+
4	VIN
5	NA
6	NA

CN2

1	VDD	11	IN2−
2	VDD	12	IN2+
3	GND	13	GND
4	GND	14	CLK−
5	IN0−	15	CLK+
6	IN0+	16	GND
7	GND	17	IN3−
8	IN1−	18	IN3+
9	IN1+	19	VLED
10	GND	20	ADJ

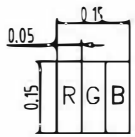
CN3

1	VLED
2	GND
3	NC
4	ADJ
5	NA

Note:

1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.
3. CN2:P1.0 20Pin/CP100−S20G−H16 or Equivalent
4. CN1:P0.5 40Pin/CS050−40ZST−H12−U or Equivalent
5. CN3: ENTERY 3808K−F05N−03L or Equivalent, Mating Connector: ENTERY H208K−P05N−02B or Equivalent
6. LCD 1024X3(R.G.B)x600=> 7.0" Digital TFT LCD

1		7		TOLERANCE GRADE(±)	A	B	DIM. MM	DWN. Tim	DATE	TITLE	
2		8									BI070CP850
3		9					IE NO.	CHK.	DATE		
4		10									
5		11					PARTS NO. LCM	APPD.	DATE	DWG. NO.	SHEET 1 OF 1
6		12									



A Block

CN6

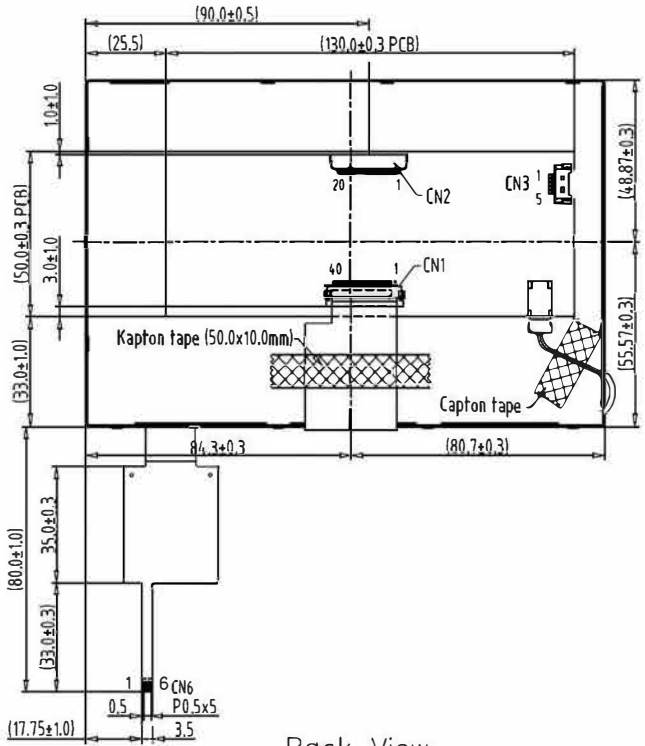
1	DGND
2	DA−
3	DA+
4	VIN
5	NA
6	NA

CN2

1	VDD	11	IN2−
2	VDD	12	IN2+
3	GND	13	GND
4	GND	14	CLK−
5	IN0−	15	CLK+
6	IN0+	16	GND
7	GND	17	IN3−
8	IN1−	18	IN3+
9	IN1+	19	VLED
10	GND	20	ADJ

CN3

1	VLED
2	GND
3	NC
4	ADJ
5	NA



Back View

Note:

1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.
3. CN2:P1.0 20Pin/CP100−S20G−H16 or Equivalent
4. CN1:P0.5 40Pin/CS050−40ZST−H12−U or Equivalent
5. CN3: ENTERY 3808K−F05N−03L or Equivalent, Mating Connector: ENTERY H208K−P05N−02B or Equivalent
6. LCD 1024X3(R.G.B)x600=> 7.0" Digital TFT LCD

1		7		TOLERANCE GRADE(±)	A	B	DIM. MM	DWN Tim	DATE	TITLE	
2		8									BI070CP850
3		9					IE NO.	CHK.	DATE		
4		10									
5		11					PARTS NO.	APPD.	DATE	DWG. NO.	SHEET 1 OF 1
6		12									