



## CUSTOMER APPROVAL SHEET

<b>Company Name</b>	
<b>MODEL</b>	<b>A070STN01.2</b>
<b>CUSTOMER APPROVED</b>	<b>Title :</b>  <b>Name :</b>

- ☐ APPROVAL FOR SPECIFICATIONS ONLY (Spec. Ver. 0.0)
- ☐ APPROVAL FOR SPECIFICATIONS AND ES SAMPLE (Spec. Ver.0.0 )
- ☐ APPROVAL FOR SPECIFICATIONS AND CS SAMPLE (Spec. Ver. 0.0 )
- ☐ CUSTOMER REMARK :

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# Product Specification

## 7" COLOR TFT-LCD MODULE

### **MODEL NAME: A070STN01.2**

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<b>Planned Lifetime:</b>	From 2012/Mar To 2013/June
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<b>Phase-out Control:</b>	From 2012/Jan To 2013/June
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<b>EOL Schedule:</b>	2013/June
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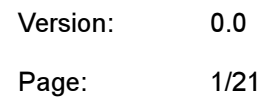
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< ☐ > Preliminary Specification

< ☐ > Final Specification

Note: The content of this specification is subject to change.

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## Contents

<b>A. General Information.....</b>	<b>3</b>
<b>B. Outline Dimension .....</b>	<b>4</b>
1. TFT-LCD Module – Front & Rear View .....	4
<b>C. Electrical Specifications .....</b>	<b>5</b>
1. TFT LCD Panel Pin Assignment .....	5
2. Backlight Pin Assignment .....	7
3. Absolute Maximum Ratings .....	7
4. Electrical DC Characteristics .....	8
5. Electrical AC Characteristics .....	9
6. Serial Interface Characteristics .....	11
7. Power On/Off Characteristics .....	11
8. Content-based Automatic Backlight Control (CABC) reference circuit .....	12
<b>D. Optical Specification .....</b>	<b>12</b>
<b>E. Reliability Test Items .....</b>	<b>14</b>
<b>F. Packing and Marking .....</b>	<b>15</b>
1. Packing Form .....	15
2. Module/Panel Label Information .....	15
3. Carton Label Information .....	15
<b>G. Reference application circuit.....</b>	<b>16</b>
1.Recomonded Gamma Voltage .....	16
2.Application Circuit.....	16
<b>H. Precautions .....</b>	<b>17</b>

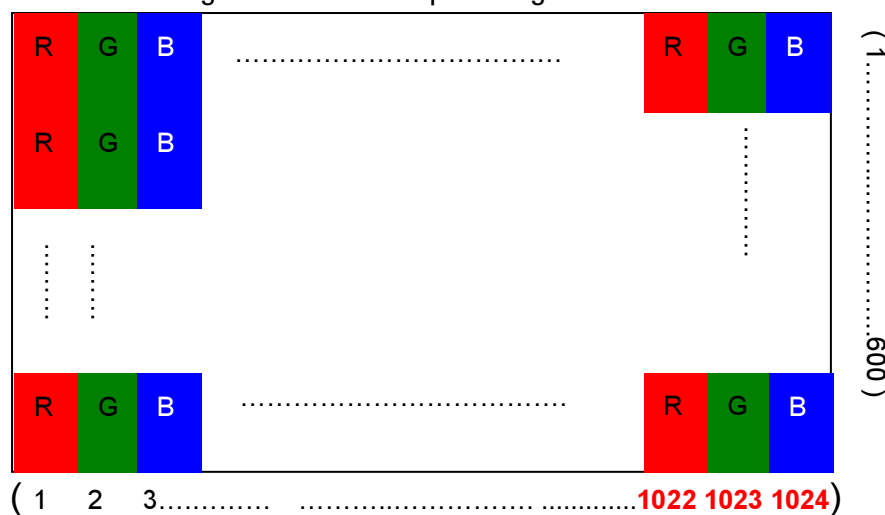
## A. General Information

This product is for car after-market. digital photo frame and other suitable application.

NO.	Item	Unit	Specification	Remark
1	Screen Size	inch	7(Diagonal)	
2	Display Resolution	dot	1024RGB(W)x600(H)	
3	Overall Dimension	mm	161.78(H) × 101.2(V) × 1.23 (T)	Note 1
4	Active Area	mm	153.60(H)×90(V)	
5	Pixel Pitch	mm	0.150(W)x0.150(H)	
6	Color Configuration	--	R. G. B. Stripe	Note 2
7	Color Depth	--	16.2M Colors	Note 3
8	NTSC Ratio	%	50	
9	Display Mode	--	Normally White	
10	Panel surface Treatment	--	Anti-Glare, 3H	
11	Weight	g	42	
12	Panel Power Consumption	mW	TBD	Note 3
13	Backlight Power Consumption	W	-	
	Viewing direction		6 o'clock	

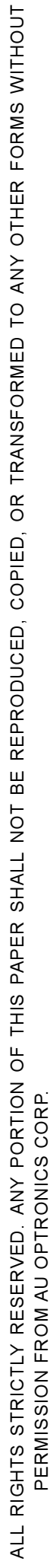
Note 1: Not include FPC. Refer next page to get further information.

Note 2: Below figure shows dot stripe arrangement.



Note 3: Please refer to Electrical Characteristics chapter.

## 1. TFT-LCD Module – Front & Rear View



## C. Electrical Specifications

### 1. TFT LCD Panel Pin Assignment

Recommended connector :

NO.	Symbol	I/O	Description	Remark
1	VCOM	P	Common Voltage	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	---	NC	
5	Reset	I	Global reset pin	
6	STBYB	I	Standby mode, Normally pulled high	
			STBYB = "1", normal operation	
			STBYB = "0", timing controller, source	
			driver will turn off, all output are High-Z	
7	GND	P	Ground	
8	RXIN0-	I	- LVDS differential data input	
9	RXIN0+	I	+ LVDS differential data input	
10	GND	P	Ground	
11	RXIN1-	I	- LVDS differential data input	
12	RXIN1+	I	+ LVDS differential data input	
13	GND	P	Ground	
14	RXIN2-	I	- LVDS differential data input	
15	RXIN2+	I	+ LVDS differential data input	
16	GND	P	Ground	
17	RXCLKIN-	I	- LVDS differential clock input	
18	RXCLKIN+	I	+ LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	- LVDS differential data input	
21	RXIN3+	I	+ LVDS differential data input	
22	GND	P	Ground	
23	NC	---	No connection	
24	NC	---	No connection	
25	GND	P	Ground	
26	NC	---	No connection	
27	DIMO	O	Backlight CABC controller signal output	
28	SELB	I	6bit/8bit mode select	Note1
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	

32	LED-	P	LED Cathode	
33	L/R	I	Horizontal inversion	Note2
34	U/D	I	Vertical inversion	Note2
35	VGL	P	Gate OFF Voltage	
36	CABCEN1	I	CABC H/W enable	Note3
37	CABCEN0	I	CABC H/W enable	Note3
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

I: input O: Output P: Power

Note1 : If LVDS input data is 6 bits ,SELB must be set to High;  
If LVDS input data is 8 bits, SELB must be set to Low.

Note2 : When L/R=" 0" , set right to left scan direction.

When L/R="1", set left to right scan direction.

When U/D="0", set top to bottom scan direction.

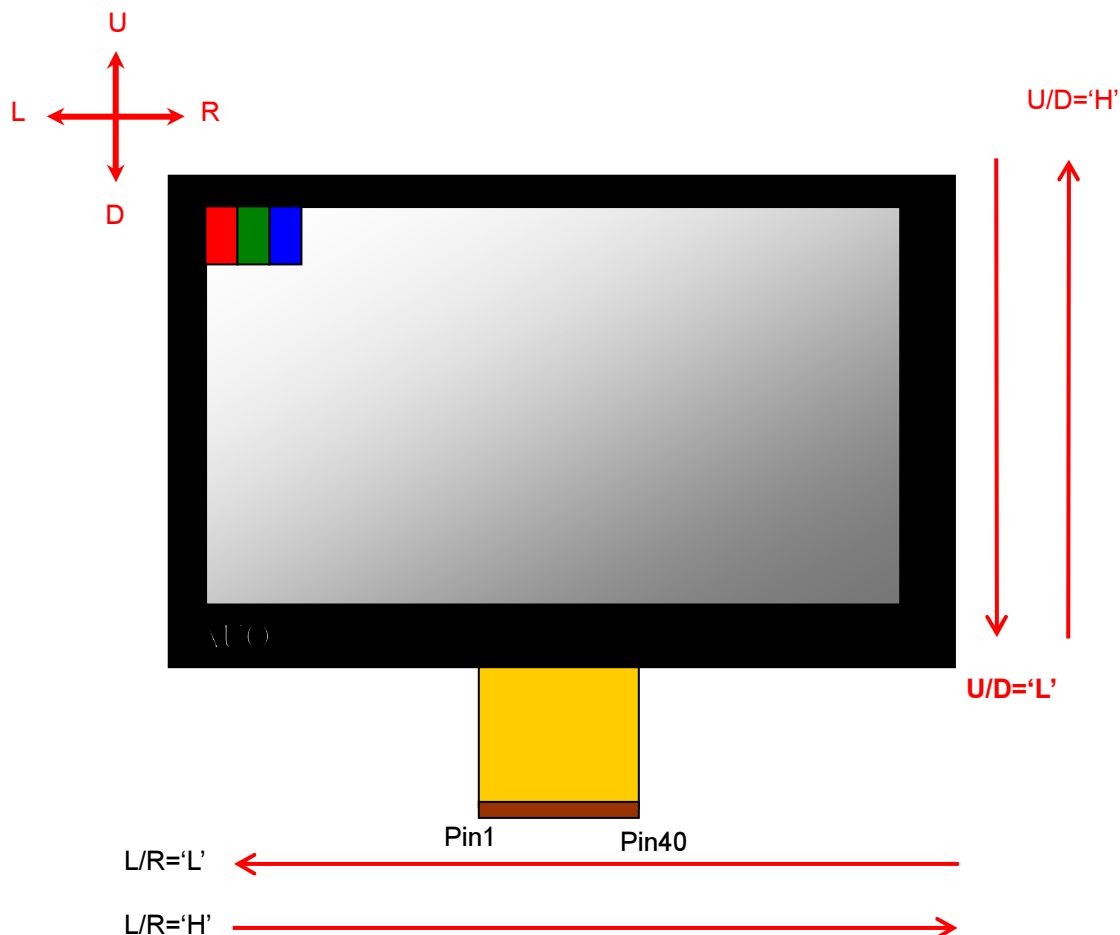
When U/D="1", set bottom to top scan direction.

Note3 : When CABC\_EN="00", CABC OFF.

When CABC\_EN="01", user interface image.

When CABC\_EN="11", moving image. When CABC\_EN="10", still picture.

When CABC off, don't connect DIMO, else connect it to backlight.





## 2. Backlight Pin Assignment

N/A

## 3. Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power voltage	VDDIO	GND=0	-0.5	5	V	
	AVDD	GND=0	-0.5	15	V	
	VGH	GND=0	-0.3	42	V	
	VGL	GND=0	-20	0.3	V	
Operating Temperature	Topa		-20	85	°C	
Storage temperature	Tstg		-55	125	°C	

Note 1:De, Digital Data

Note 2:Functional operation should be restricted under ambient temperature (25°C).

Note 3:Maximum ratings are those values beyond which damages to the device may occur. Functional operation should be restricted to the limits in the Electrical Characteristics chapter.

#### 4. Electrical DC Characteristics

a. (VCC = +3.3V, AVDD = 12V, AGND=GND=0V)

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
Power Voltage		VCC	3.0	3.3	3.6	V	Digital power
		AVDD	10	11	13.5	V	Analog Power
		VGH	17	18	19	V	Positive power supply for gate driver
		VGL	-12.5	-12	-11.5	V	Negative power supply for gate driver
Input Signal Voltage	H Level	VIH	VDDx0.7	-	VDD	V	Note 1
	L Level	VIL	GND	-	0.3xVDD	V	
VCOM voltage		VCOM				V	

Note 1: DE , Digital Data

#### b. Current Consumption (AGND=GND=0V)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Input current for VDD	$I_{VDD}$	VDD=3.3V		TBD		mA	Note 1
Input current for AVDD	$I_{AVDD}$	AVDD=11V		TBD		mA	Note 1
Input current for VGH	$I_{VGH}$	VGH=18V		TBD		mA	Note 1
Input current for VGL	$I_{VGL}$	VGL= -12V		TBD		mA	Note 1
Input current for VCOM	$I_{VCOM}$	VCOM=TBD		TBD		mA	Note 1

Note 1: The test pattern use the following pattern.



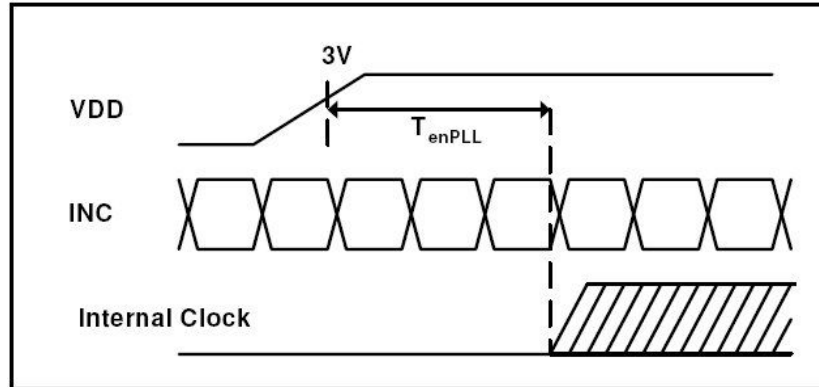
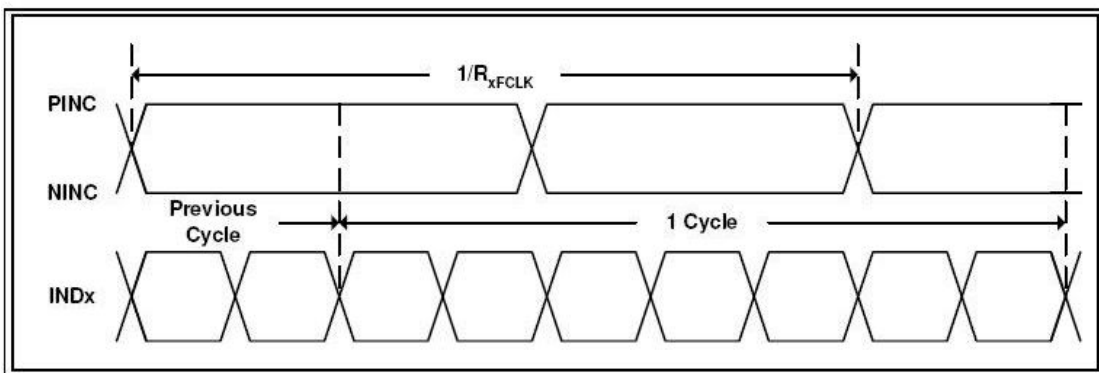
#### c. Backlight Driving Conditions

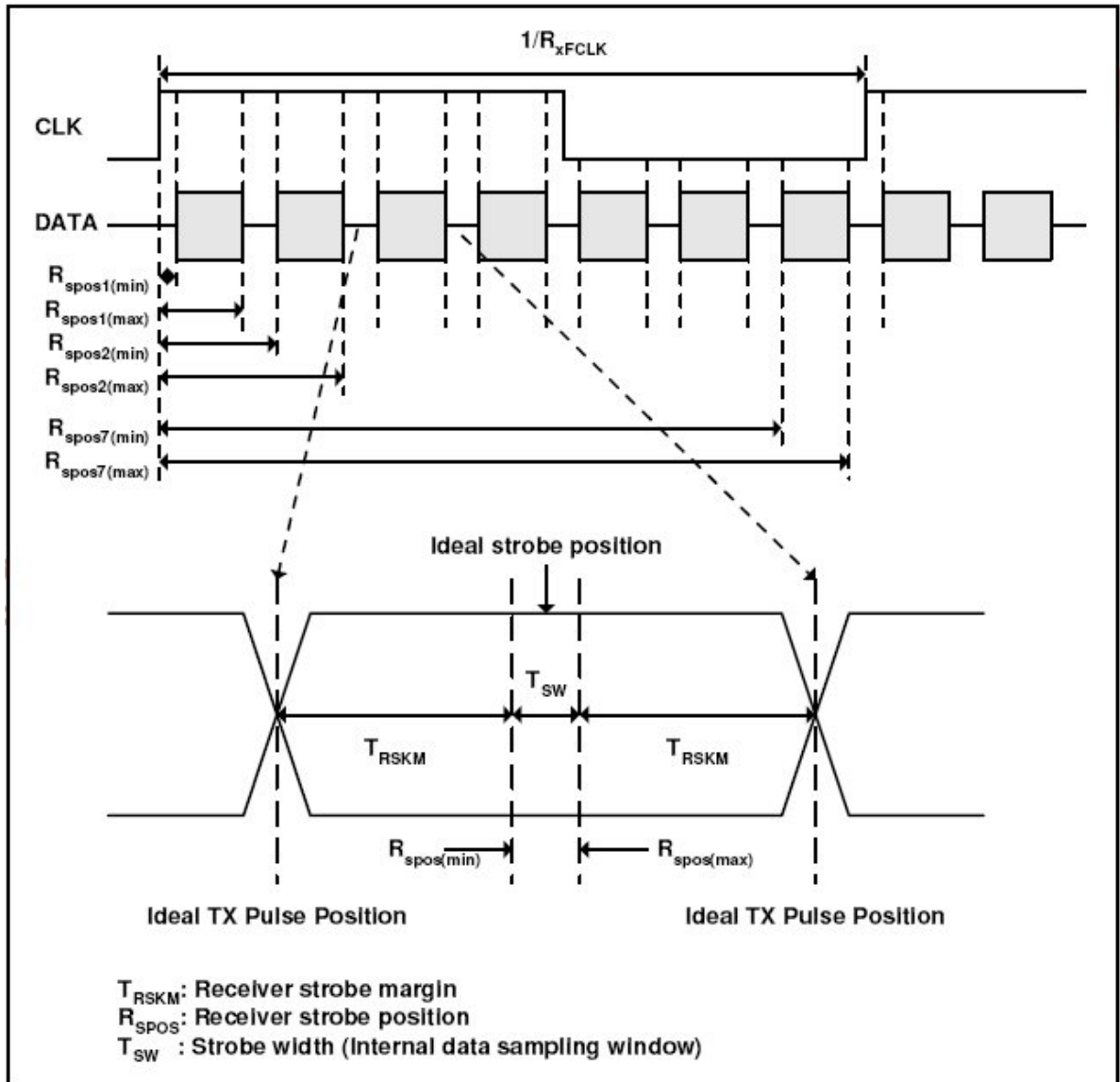
N/A

## 5. Electrical AC Characteristics

### a. Signal AC Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency	$R_{xCLK}$	20		71	MHz	
Input data skew margin	$T_{RSKM}$	500			pS	$ V_{ID}  = 400mV$ $R_{xVCM} = 1.2V$ $R_{xCLK} = 71 MHz$
Clock high time	$T_{LVCH}$		$4/(7 \cdot R_{xCLK})$		ns	
Clock low time	$T_{LVCL}$		$3/(7 \cdot R_{xCLK})$		ns	
PLL wake-up time	$T_{enPLL}$			150	uS	

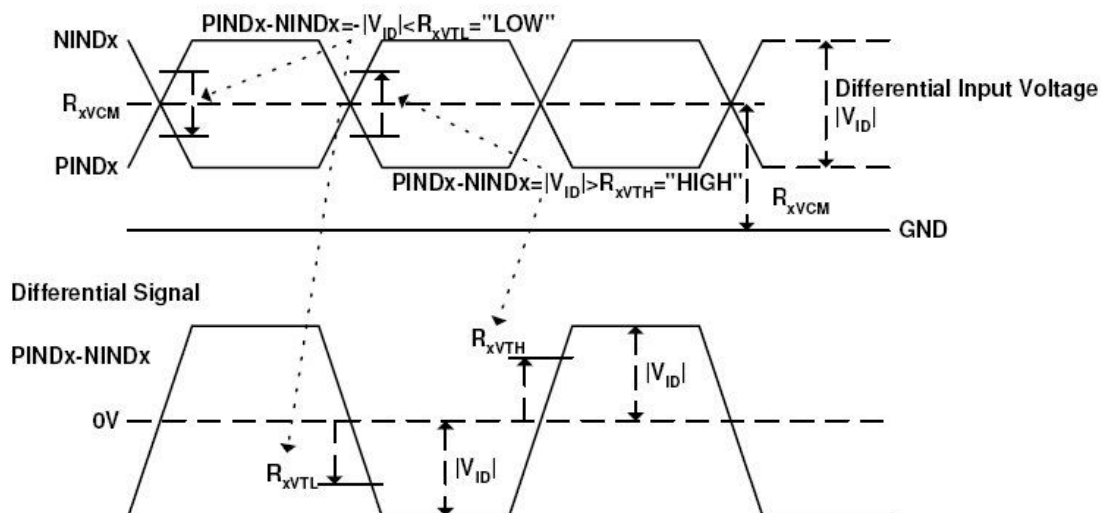




## b. Signal DC Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	$R_{xVTH}$			+0.1	V	$R_{xVCM} = 1.2V$
Differential input low threshold voltage	$R_{xVTL}$	-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 input voltage	$ V_{ID} $	0.2		0.6	V	
Differential input leakage current	$R_{V_{xIIZ}}$	-10		+10	$\mu A$	
LVDS Digital Operating Current	$I_{ddlvds}$	-	40	50	mA	Fclk=65 MHz, VDD=3.3V
LVDS Digital Stand-by Current	$I_{stlvds}$	-	10	50	$\mu A$	Clock & all Functions are stopped

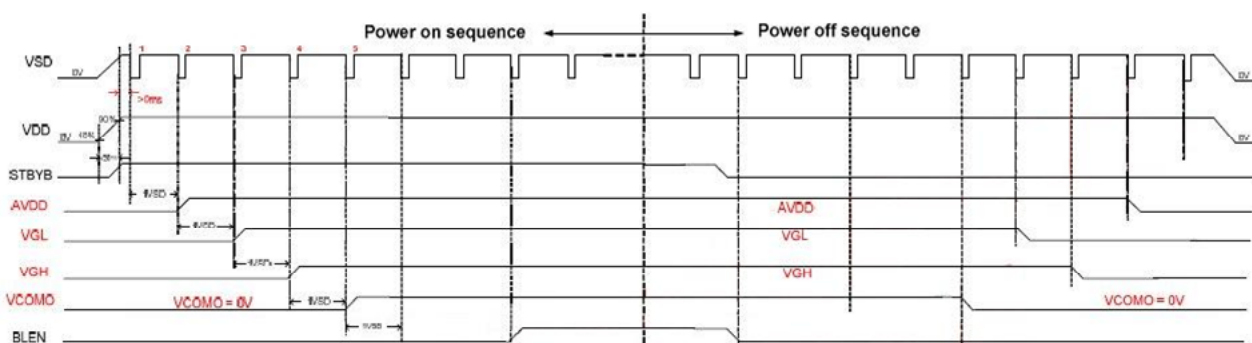
### Single-end Signals



## 6. Serial Interface Characteristics

N/A

## 7. Power On/Off Characteristics



## 8. Content-based Automatic Backlight Control (CABC) reference circuit

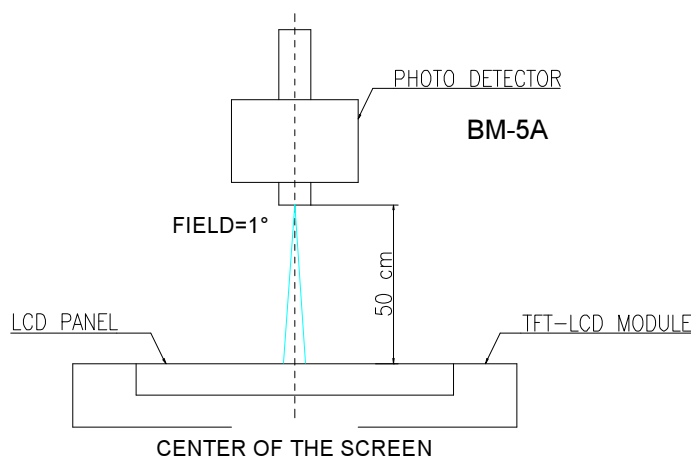
N/A

### D. Optical Specification

All optical specification is measured under typical condition (Note 1, 2)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response Time							
Rise	$T_r$	$\theta=0^\circ$	--	3	6	ms	Note 2
Fall	$T_f$		--	6	12	ms	
Contrast ratio	CR	At optimized viewing angle	600	800	--		Note 3
Viewing Angle		$CR \geq 10$	55	70		deg.	Note 4
Top			60	75			
Bottom			60	75			
Left			60	75			
Right			60	75			
Brightness	$Y_L$	$\theta=0^\circ$			--	$cd/m^2$	Note 5

Note 1: To be measured on the center area of panel with a viewing cone of  $1^\circ$  by Topcon luminance meter BM-5A, after 15 minutes operation.

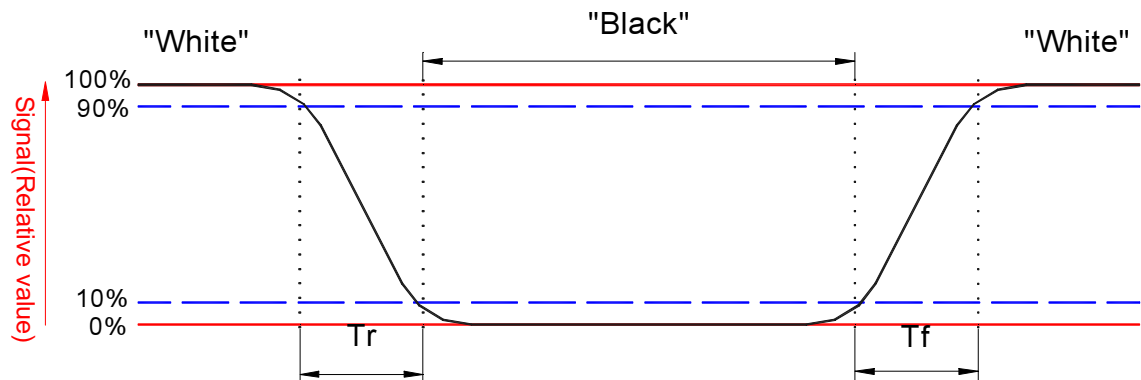


Note 2: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively.

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

Refer to figure as below.

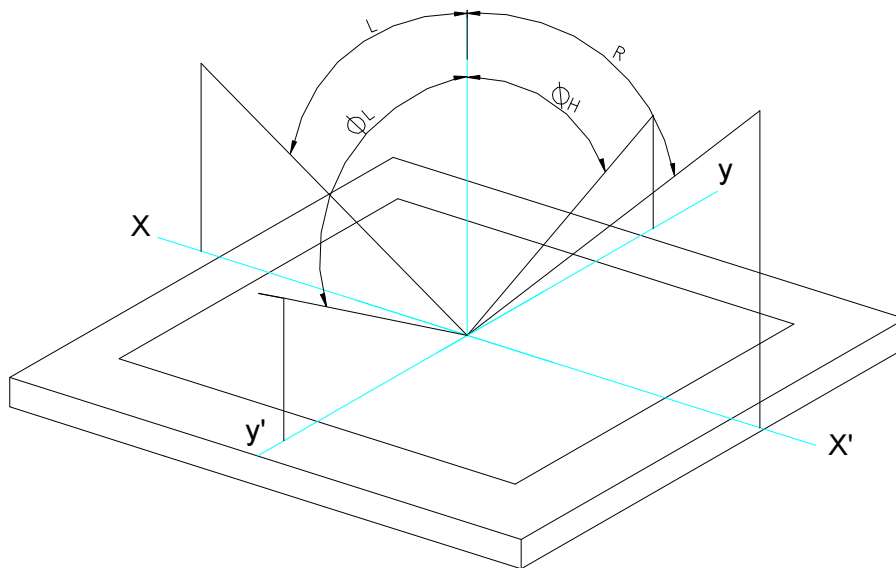


Note 3. Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" status}}{\text{Photo detector output when LCD is at "Black" status}}$$

Note 4. Definition of viewing angle,  $\theta$ , Refer to figure as below.



Note 5. Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

## E. Reliability Test Items

No.	Test items	Conditions	Remark
1	High Temperature Storage	Ta= 70℃ 240Hrs	
2	Low Temperature Storage	Ta= -30℃ 240Hrs	
3	High Temperature Operation	Tp= 60℃ 240Hrs	
4	Low Temperature Operation	Ta= -20℃ 240Hrs	
5	High Temperature & High Humidity	Tp= 40℃, 90% RH 240Hrs	Operation
6	Heat Shock	-30℃~70℃, 100 cycle, 1Hrs/cycle	Non-operation

Note 1: Ta: Ambient Temperature. Tp: Panel Surface Temperature

Note 2: In the standard conditions, there is not display function NG issue occurred. All the cosmetic specification is judged before the reliability stress.



## F. Packing and Marking

### 1. Packing Form

TBD

### 2. Module/Panel Label Information

The module/panel (collectively called as the "Product") will be attached with a label of Shipping Number which represents the identification of the Product at a specific location. Refer to the Product outline drawing for detailed location and size of the label. The label is composed of a 22-digit serial number and printed with code 39/128 with the following definition:

ABCDEFGHIJKLMNOPQRSTUV

- For internal system usage and production serial numbers.
- AUO Module or Panel factory code, represents the final production factory to complete the Product
- Product version code, ranging from 0~9 or A~Z (for Version after 9)
- Week Code, the production week when the product is finished at its production process

### 3. Carton Label Information

The packing carton will be attached with a carton label where packing Q'ty, AUO Model Name, AUO Part Number, Customer Part Number (Optional) and a series of Carton Number in 13 or 14 digits are printed. The Carton Number is appearing in the following format:

ABC-DEFG-HIJK-LMN

- DEFG appear after first "-" represents the packing date of the carton
  - Date from 01 to 31
  - Month, ranging from 1~9, A~C. A for Oct, B for Nov and C for Dec.
  - A.D. year, ranging from 1~9 and 0. The single digit code represents the last number of the year

Refer to the drawing of packing format for the location and size of the carton label.



## **G. Reference application circuit**

### **1.Recomonded Gamma Voltage**

**TBD**

### **2.Application Circuit**

#### **a.Cell pin**

**TBD**

#### **b.Power**

**TBD**

#### **c.LVDS signal bus**

**TBD**

## H. Precautions

1. Do not twist or bend the module and prevent the unsuitable external force for display module during assembly.
2. Adopt measures for good heat radiation. Be sure to use the module within the specified temperature.
3. Avoid dust or oil mist during assembly.
4. Follow the correct power sequence while operating. Do not apply the invalid signal, otherwise, it will cause improper shut down and damage the module.
5. Less EMI: it will be more safety and less noise.
6. Please operate module in suitable temperature. The response time & brightness will drift by different temperature.
7. Avoid to display the fixed pattern (exclude the white pattern) in a long period, otherwise, it will cause image sticking.
8. Be sure to turn off the power when connecting or disconnecting the circuit.
9. Polarizer scratches easily, please handle it carefully.
10. Display surface never likes dirt or stains.
11. A dewdrop may lead to destruction. Please wipe off any moisture before using module.
12. Sudden temperature changes cause condensation, and it will cause polarizer damaged.
13. High temperature and humidity may degrade performance. Please do not expose the module to the direct sunlight and so on.
14. Acetic acid or chlorine compounds are not friends with TFT display module.
15. Static electricity will damage the module, please do not touch the module without any grounded device.
16. Do not disassemble and reassemble the module by self.
17. Be careful do not touch the rear side directly.
18. No strong vibration or shock. It will cause module broken.
19. Storage the modules in suitable environment with regular packing.
20. Be careful of injury from a broken display module.
21. Please avoid the pressure adding to the surface (front or rear side) of modules, because it will cause the display non-uniformity or other function issue.