AUO

CUSTOMER APPROVAL SHEET

Company Name	
MODEL	A070STN01.1
CUSTOMER APPROVED	Title : Name :

☐ 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: A070STN01.1

Model Name：	A070STN01.1
Planned Lifetime:	From 2011/May To 2012/Dec
Phase-out Control:	From 2012/June To 2012/Dec
EOL Schedule:	2012/Dec

< ◆ >Preliminary Specification

<   >Final Specification

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

Record of Revision

| Version	Revise Date	Page	Content
0.0	2011/11/15	All	First Draft.

Contents

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	165.75(H) × 105.39(V) ×3.2 (T)	Note 1
4	Active Area	mm	153.60(H)×90.00(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	99.7	
12	Panel Power Consumption	mW	TBD	Note 3
13	Backlight Power Consumption	W	1.4	
	Viewing direction		6 o'clock (gray inversion)	

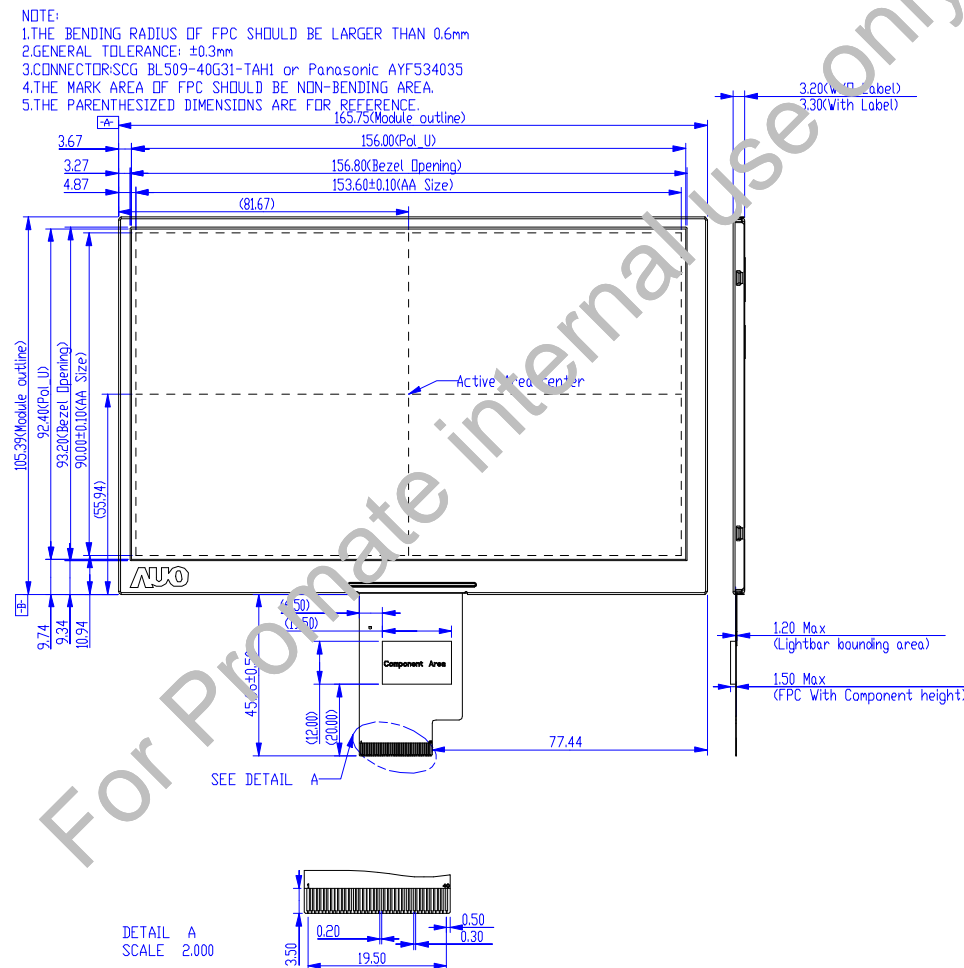Note 1: Not include FPC. Refer next page to get further information.

Note 2: Below figure shows dot stripe arrangement.
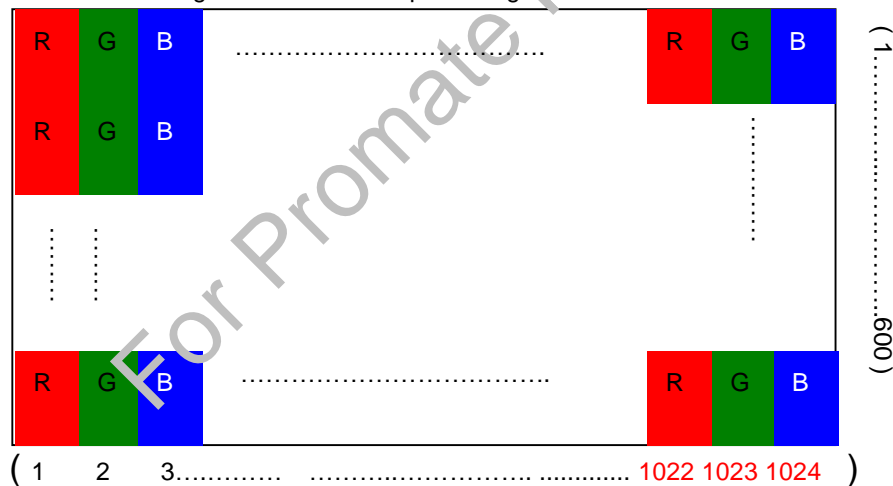
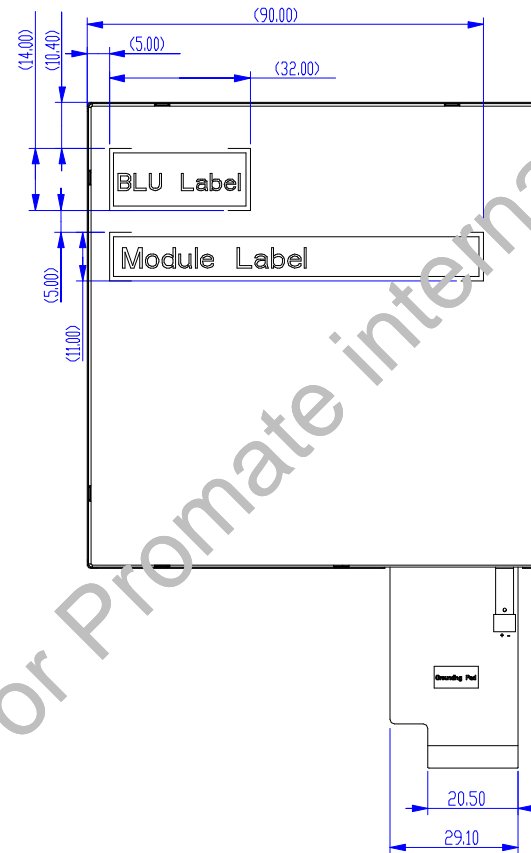Note 3: Please refer to Electrical Characteristics chapter.

A. Outline Dimension
1. TFT-LCD Module – Front View

NOTE:
1.THE BENDING RADIUS OF FPC SHOULD BE LARGER THAN 0.6mm
2.GENERAL TOLERANCE: ±0.3mm
3.CONNECTOR:SCG BL509-40G31-TAH1 or Panasonic AYF534035
4.THE MARK AREA OF FPC SHOULD BE NON-BENDING AREA.
5.THE PARENTHESIZED DIMENSIONS ARE FOR REFERENCE.

DETAIL A
SCALE 2.000

2. TFT-LCD Module – Rear View

B. Electrical Specifications

1. TFT LCD Panel Pin Assignment (Tentative)

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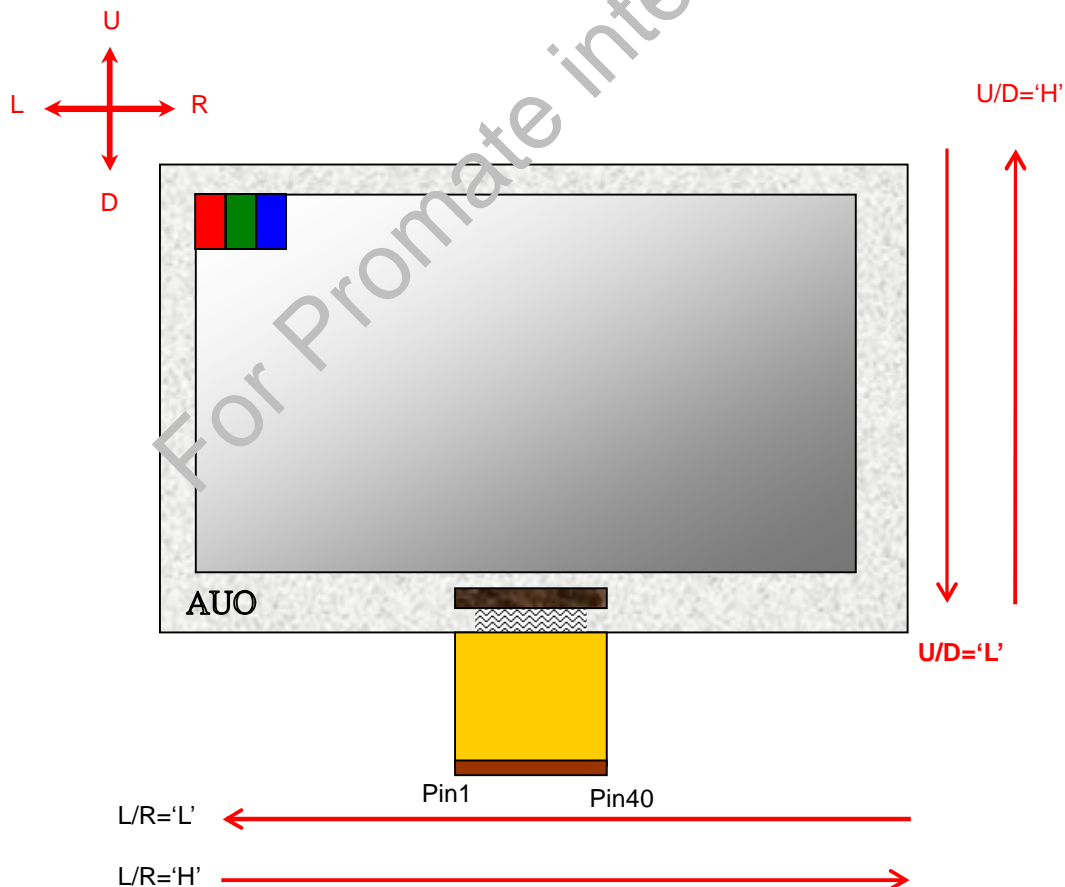
When U/D="0", set top to bottom scan direction.

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

Note3 : When CABC_EN="00", CABC OFF.

When CABC_EN="01", user interface image.

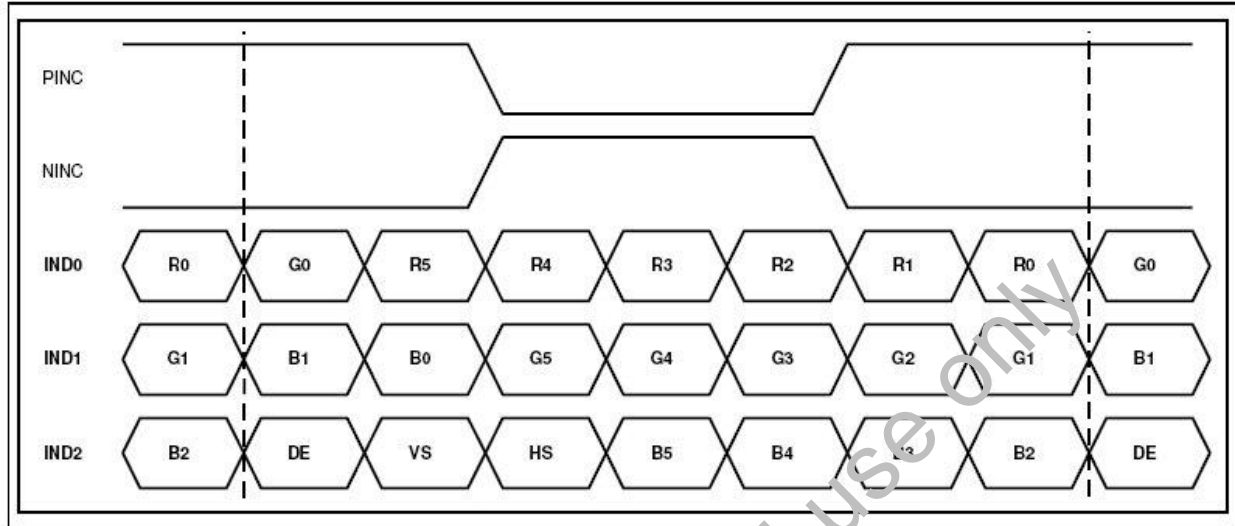When CABC_EN="11", moving image.When CABC_EN="10", still picture.

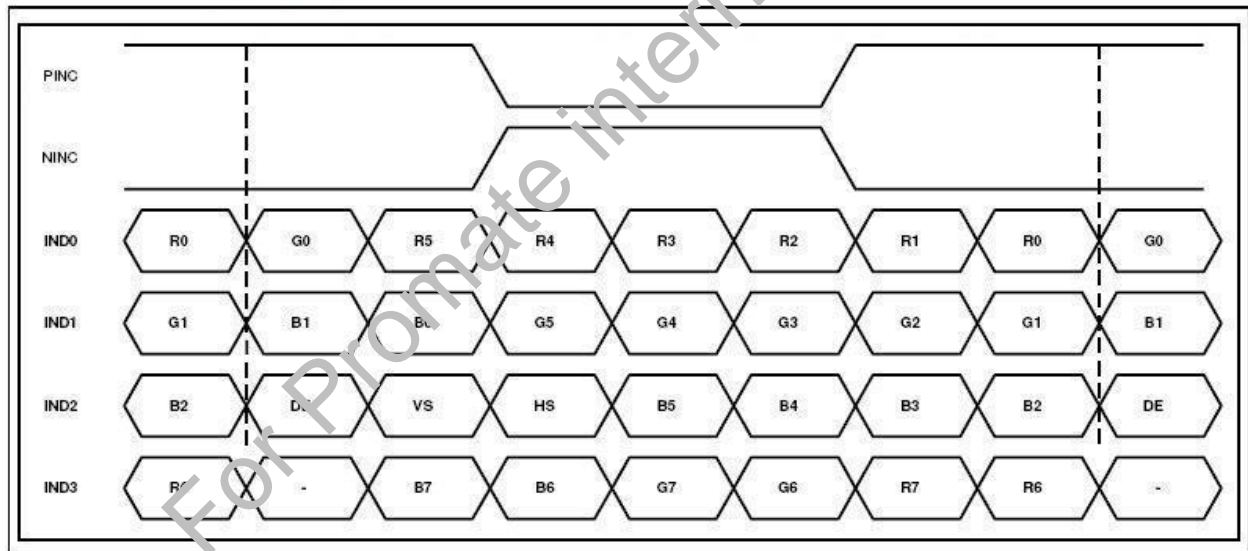When CABC off, don't connect DIMO, else connect it to backlight.

2. The Input Data Format

6bit LVDS input

8-bit LVDS input (HSD='L')

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	℃	
Storage temperature	Tstg		-55	125	℃	

4. Electrical DC Characteristics

a. DC Charateristics

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
Power Voltage		VDD	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	TBD	TBD	TBD	V	Detail Gamma voltage please

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
Inpur current for AVDD	I$_{AVDD}$	AVDD=11V	-	TBD		mA	Note 1
Inpur current for VGH	I$_{VGH}$	VGH= TBD	-	TBD		mA	Note 1
Inpur current for VGL	I$_{VGL}$	VGL= TBD		TBD		mA	Note 1
Inpur current for VCOM	I$_{VCOM}$	VCOM=TBD		TBD		mA	Note 1

Note 1: The test pattern use the following pattern.

c. Backlight Driving Conditions

The backlight (LED module, Note 1) is suggested to drive by constant current 220mA.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED light bar Voltage	V_L	8.4	9	10.2	V	I_F=140mA
Power Consumption	P_{BL}	1.18	1.26	1.43	W	Note 1
LED Life Time	L_L	10000	--	--	Hr	Note 2, 3

Note 1: The LED driving condition is defined for LED module (21LED). The voltage range will be 8.4V

to 10.2V based on suggested driving current set as 140mA.
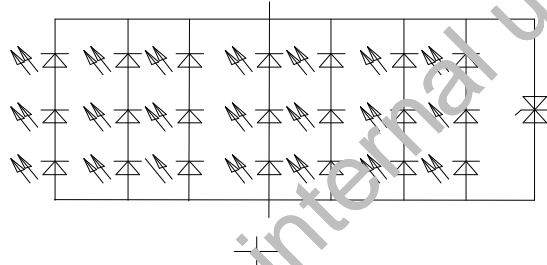
Note 2: Define "LED Lifetime": brightness is decreased to 50% of the initial value. LED Lifetime is

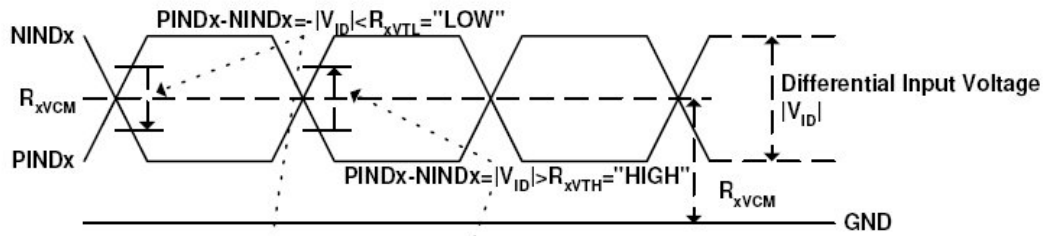restricted under normal condition, ambient temperature = 25℃ and LED lightbar current = 140mA.

Note 3: If it uses larger LED lightbar voltage/ current more than 10.2V/140mA, it maybe decreases the
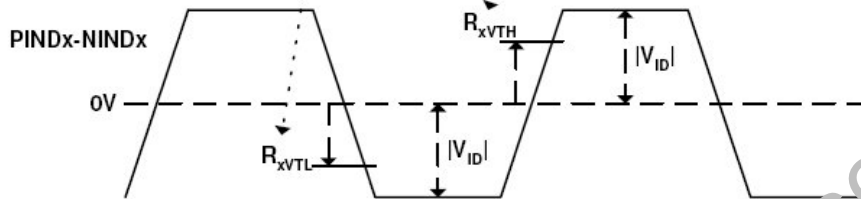
LED lifetime.

5. LVDS 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	RV_{xliz}	-10		+10	μA	
LVDS Digital Operating Current	Iddlvds	-	40	50	mA	Fclk=65 MHz, VDD=3.3V
LVDS Digital Stand-by Current	Istlvds	-	10	50	μA	Clock & all Functions are stopped

Single-end Signals

PINDx-NINDx=-|V$_{ID}$|<R$_{xVTL}$="LOW"

NINDx

R$_{xVCM}$

PINDx

PINDx-NINDx=|V$_{ID}$|>R$_{xVTH}$="HIGH"

Differential Input Voltage |V$_{ID}$|

R$_{xVCM}$

GND

Differential Signal

PINDx-NINDx

0V

R$_{xVTH}$

|V$_{ID}$|

R$_{xVTL}$

|V$_{ID}$|

6. Power On/Off Characteristics

Power on sequence   Power off sequence

VSD
VDD
STBYB
AVDD
VGL
VGH
VCOMO
BLEN

VCOMO = 0V

AVDD
VGL
VGH

VCOMO = 0V
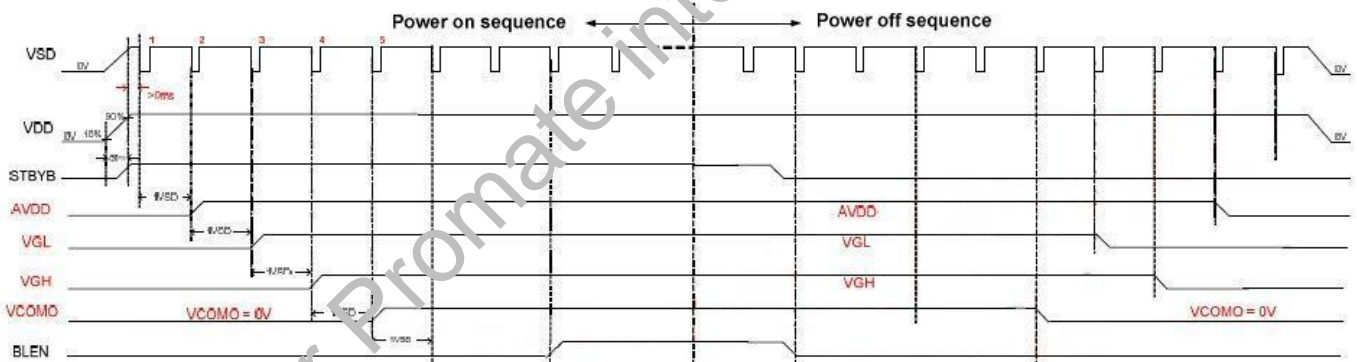
C. Optical Specification

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

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response Time Rise Fall		Tr Tf	θ=0°	-- --	3 6	6 12	ms ms	Note 2
Contrast ratio		CR	At optimized viewing angle	600	800	--		Note 3
Viewing Angle	Top Bottom Left Right		CR≧10	55 60 60 60	70 75 75 75		deg.	Viewing Angle
Brightness		Y_L	θ=0°			--	cd/m²	Note 5
Chromaticity	White	X	θ=0°	--	0.31	--		
		Y	θ=0°	--	0.33	--		
	Red	X	θ=0°	TBD	TBD	TBD		
		Y	θ=0°	TBD	TBD	TBD		
	Green	X	θ=0°	TBD	TBD	TBD		
		Y	θ=0°	TBD	TBD	TBD		
	Blue	X	θ=0°	TBD	TBD	TBD		
		Y	θ=0°	TBD	TBD	TBD		
Uniformity		△Y_L	%	70	75	--	%	Note 7

Note 1: Ambient temperature =25℃, and LED lightbar current::220mA. To be measured in the dark room.

Note 2: To be measured on the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-5A, after 15 minutes operation.
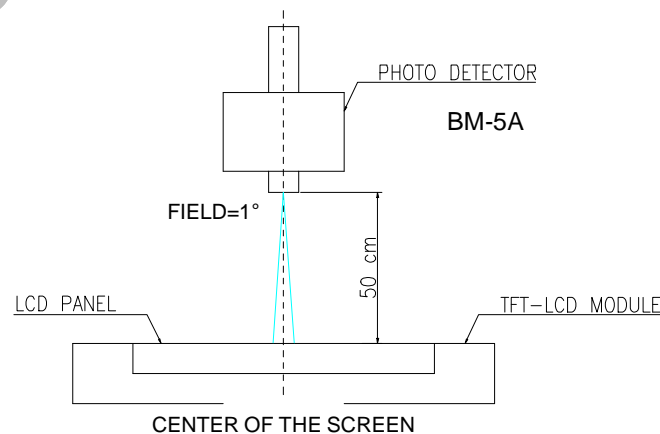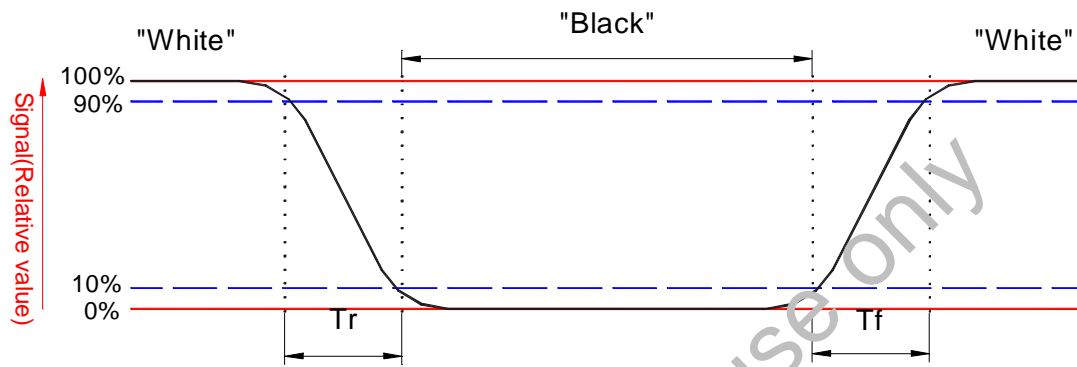

Note 3: Definition of response time:

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 4.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 5. Definition of viewing angle, θ, Refer to figure as below.
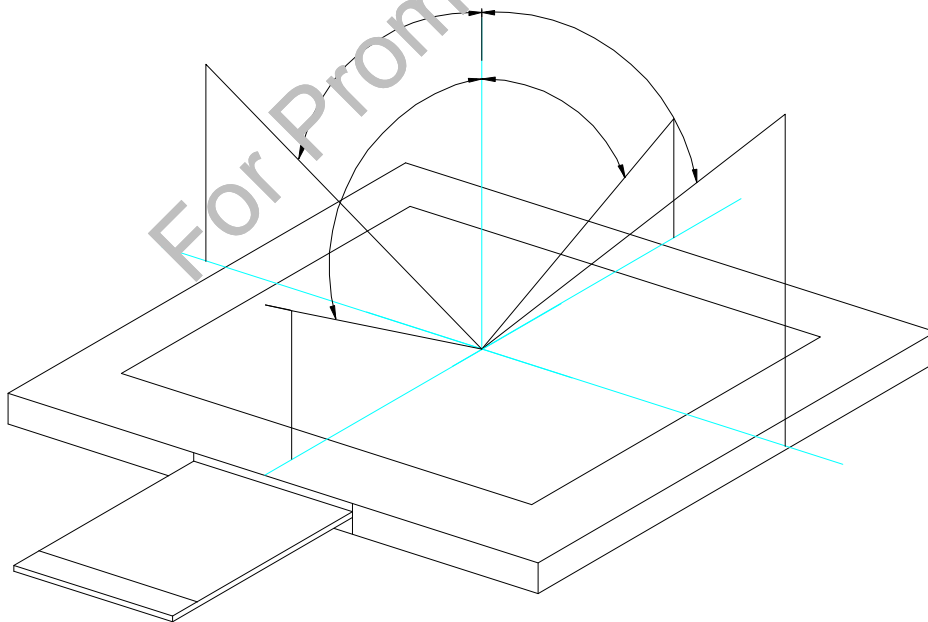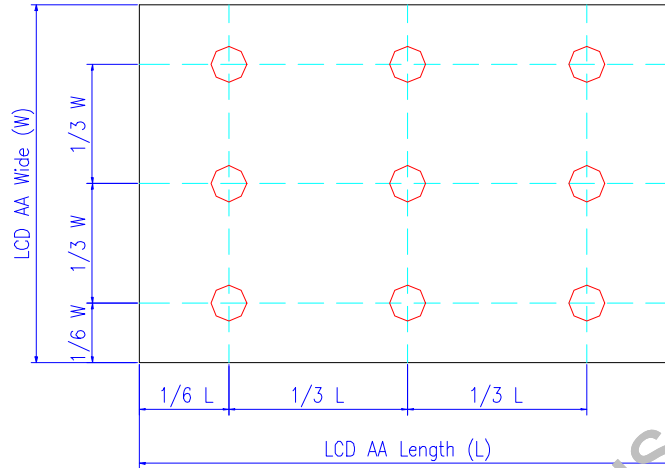

Note 6. Measured at the center area of the panel when all the input terminals of LCD panel are electrically

opened.

Note 7: Luminance Uniformity of these 9 points is defined as below:

$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$
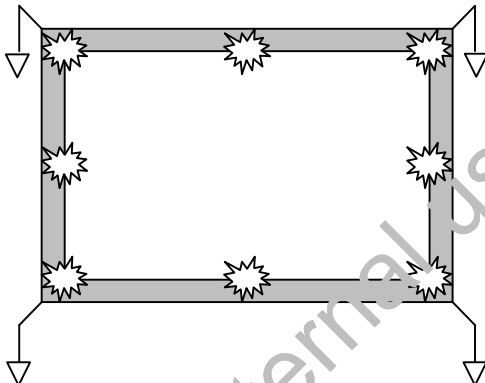
D. Reliability Test Items

No.	Test items	Conditions	Remark
1	High Temperature Storage	Ta= 70℃ 240Hrs	
2	Low Temperature Storage	Ta= -30℃ 240Hrs	
3	High Ttemperature 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
7	Image Sticking	25℃ , 4hrs	Note 5
7	Electrostatic Discharge	Contact = ± TBD kV, class B Air = ± TBD kV, class B Air = ± TBD kV,	Note 6
9	Vibration	Frequency range : 10Hz~55Hz Stoke : 1.5mm Sweep : 10Hz~55Hz~10Hz 2 hours for each direction of X,Y,Z. Total 6 hours.	Non-operation JIS C7021, A-10 condition A
10	Mechanical Shock	100G . 6ms, ±X,±Y,±Z 3 times for each direction	Non-operation JIS C7021, A-7 condition C
11	Vibration (With Carton)	Random vibration: 0.015G^2/Hz from 5~200Hz –6dB/Octave from 200~500Hz	IEC 68-34
12	Drop (With Carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces	
13	Pressure	5kg, 5sec	Note 7

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.

Note 3: All the cosmetic specification is judged before the reliability stress.

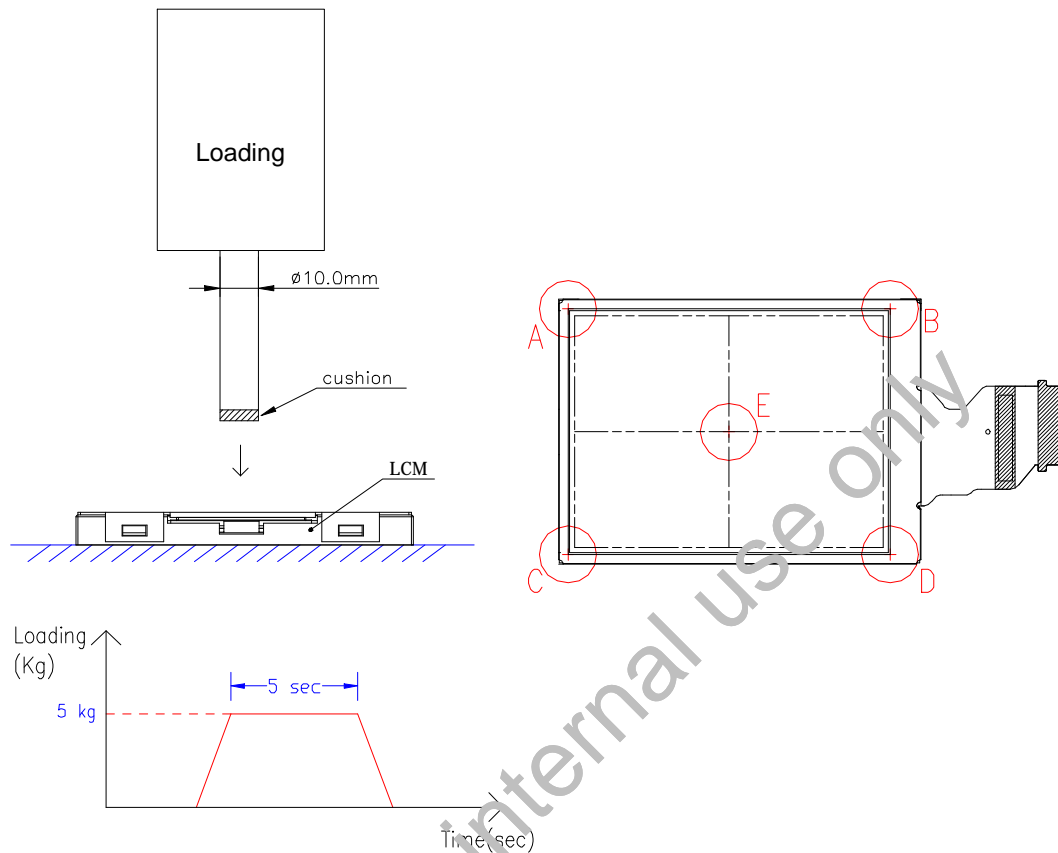Note4 : All test techniques follow IEC6100-4-2 standard.

Test Condition		Note
Pattern		
Procedure And Set-up	Contact Discharge：330Ω, 150pF, 1sec, 8 point, 25times/point Air Discharge：330Ω, 150pF, 1sec, 8 point, 25times/point 	
Criteria	B – Some performance degradation allowed. No data lost. Self-recoverable hardware failure.	
Others	1. Gun to Panel Distance 2. No SPI command, keep default register settings.	

Note 5: Operate with chess board pattern as figure and lasting time and temperature as the conditions.

Then judge with 50% gray level, the mura is less than JND 2.5
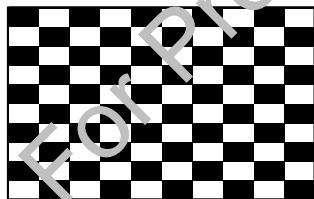
Note 6: The panel is tested as figure. The jig is ϕ 10 mm made by Cu with rubber and the loading speed is 3mm/min on position A~E. After the condition, no glass crack will be found and panel function check is OK.(no guarantee LC mura、LC bubble)

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Loading

ø10.0mm

cushion

LCM

A   B

E

C   D

Loading
(Kg)

5 sec

5 kg

Time(sec)

E. 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 apparing 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 reprents the last number or the year

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

F.   Reference application circuit
1.Recomonded Gamma Voltage
TBD

2.Application Circuit

a.Power
TBD
b.LVDS signal bus
TBD

G.   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 with in 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.

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