Specification for Approval

Customer:_____

Model Name:_____

Supplier Approval			Customer approval
R&D Designed	R&D Approved	QC Approved	
Peter	*Peng Jun*		

Revision Record

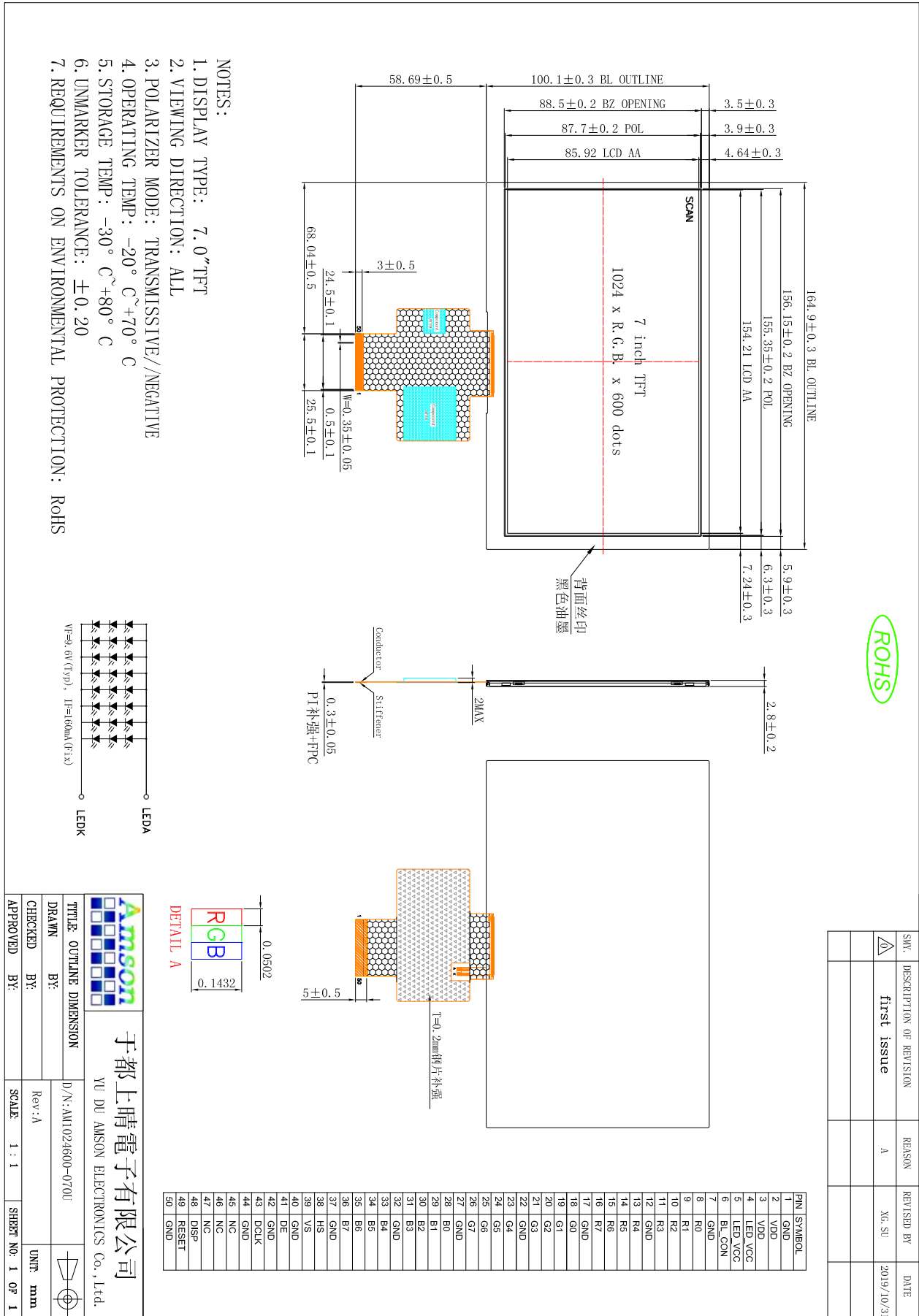| REV NO.	REV DATE	CONTENTS	Note
A	2019-10-31	NEW ISSUE	

Table of Contents

1. Scope

This specification defines general provisions as well as inspection standards for TFT module supplied by AMSON electronics.

If the event of unforeseen problem or unspecified items may occur, naturally shall negotiate and agree to solution.

2. General Information

TITEM	STANDARD VALUES	UNITS
LCD type	7.0"TFT	--
Dot arrangement	1024(RGB)×600	dots
Color filter array	RGB vertical stripe	--
Display mode	Normally Black , Transmissive	-
Gray Scale Inversion Direction	ALL	--
Eyes Viewing Direction	85/85/85/85	
Module size	164.90(W)×100.10(H)×2.8(T)	mm
Active area	154.21(W)×85.92(H)	mm
Dot pitch	0.1506(W)×0.1432(H)	mm
Interface	RGB	--
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Back Light	24White LED	--

3. External Dimensions

NOTES：

1. DISPLAY TYPE： 7.0"TFT
2. VIEWING DIRECTION: ALL
3. POLARIZER MODE: TRANSMISSIVE//NEGATIVE
4. OPERATING TEMP: -20°C~+70°C
5. STORAGE TEMP: -30°C~+80°C
6. UNMARKER TOLERANCE: ±0.20
7. REQUIREMENTS ON ENVIRONMENTAL PROTECTION: RoHS

58.69±0.5
100.1±0.3 BL OUTLINE
88.5±0.2 BZ OPENING
87.7±0.2 POL
85.92 LCD AA
3.5±0.3
3.9±0.3
4.64±0.3

68.04±0.5
24.5±0.1
3±0.5
W=0.35±0.05
0.5±0.1
25.5±0.1

156.15±0.2 BZ OPENING
155.35±0.2 POL
154.21 LCD AA
164.9±0.3 BL OUTLINE

7 inch TFT
1024 x R.G.B. x 600 dots

SCAN

背面丝印
黑色油墨

5.9±0.3
6.3±0.3
7.24±0.3

VF=9.6V(Typ.)，IF=160mA(Fix)

LEDA
LEDK

Conductor
Stiffener
PI补强+FPC
0.3±0.05
2MAX
2.8±0.2

DETAIL A
RGB
0.0502
0.1432

5±0.5
T=0.2mm倒片补强

ROHS

TITLE: OUTLINE DIMENSION
于都上晴电子有限公司
YU DU AMSON ELECTRONICS Co., Ltd.

DRAWN BY:
CHECKED BY:
APPROVED BY:

D/N:AM1024600-070U
Rev:A
SCALE: 1:1
SHEET NO: 1 OF 1
UNIT: mm

SMX.
first issue
DESCRIPTION OF REVISION
REASON A
REVISED BY XG. SU
DATE 2019/10/31

PIN	SYMBOL
1	GND
2	VDD
3	VDD
4	LED_VCC
5	LED_VCC
6	BL_CON
7	GND
8	R0
9	R1
10	R2
11	R3
12	R4
13	GND
14	R5
15	R6
16	R7
17	GND
18	G0
19	G1
20	G2
21	G3
22	GND
23	G4
24	G5
25	G6
26	G7
27	GND
28	B0
29	B1
30	B2
31	B3
32	GND
33	B4
34	B5
35	B6
36	B7
37	GND
38	HS
39	VS
40	DE
41	DCLK
42	GND
43	DCLK
44	GND
45	NC
46	NC
47	NC
48	DISP
49	RESET
50	GND

4. Interface Description

PIN	PIN NAME	DESCRIPTION
1	GND	Power ground.
2，3	VDD	Supply Voltage
4，5	LED_VCC	BL VIN Voltage
6	BL_CON	Common Voltage.
7	GND	Power ground.
8~11	R0~R3	Red Data Input
12	GND	Power ground.
13~16	R4~R7	Red Data Input.
17	GND	Power ground.
18~21	G0	Green Data Input
22	GND	Power ground.
23~26	G4	Green Data Input.
27	GND	Power ground.
28~31	B0	Blue Data Input
32	GND	Power ground.
33~36	B4	Blue Data Input.
37	GND	Power ground.
38	HS	Horizontal sync input. Negative polarity.
39	VS	Vertical sync input. Negative polarity.
40	GND	Power ground.
41	DE	Data Enable signal.
42	GND	Power ground.
43	DCLK	Clock input.
44	GND	Power ground.
45~47	NC.	Not connect.
48	DISP	STANDBY MODE. NORMALLY PULLED HIGH. DISP=H,NORMAL OPERATION.(DEFAULT) DISP=L, TIMING ,CONTORLLER , SOURCE DRIVER WILL TURN OFF,ALL OUTPUT ARE HIGH-Z
49	RESET	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high.(R=10KΩ, C=1µF)
50	GND	Power ground.

5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	VDD	-0.5	5.0	V
Input Voltage	Vin	-0.3	VDD +0.3	V
Operating Temperature	T_{OP}	-20	70	°C
Storage Temperature	T_{ST}	-30	80	°C
Storage Humidity	HD	20	90	%RH

6. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Logic Supply Voltage	VDD	3.0	3.3	3.6	V	-
Input High Voltage	V_{IH}	0.7VDD	-	VDD	V	-
Input Low Voltage	V_{IL}	GND	-	0.3 VDD	V	-
Output High Voltage	V_{OH}	VDD-0.4	-	VDD	V	-
Output Low Voltage	V_{OL}	GND	-	GND+0.4	V	-
I/O Leak Current	I_{LI}	-1	-	1	uA	-
Supply Current	IDD	-	7.0	10	mA	-

7. Timing Characteristics
7.1 Power Sequence

a. Power on:
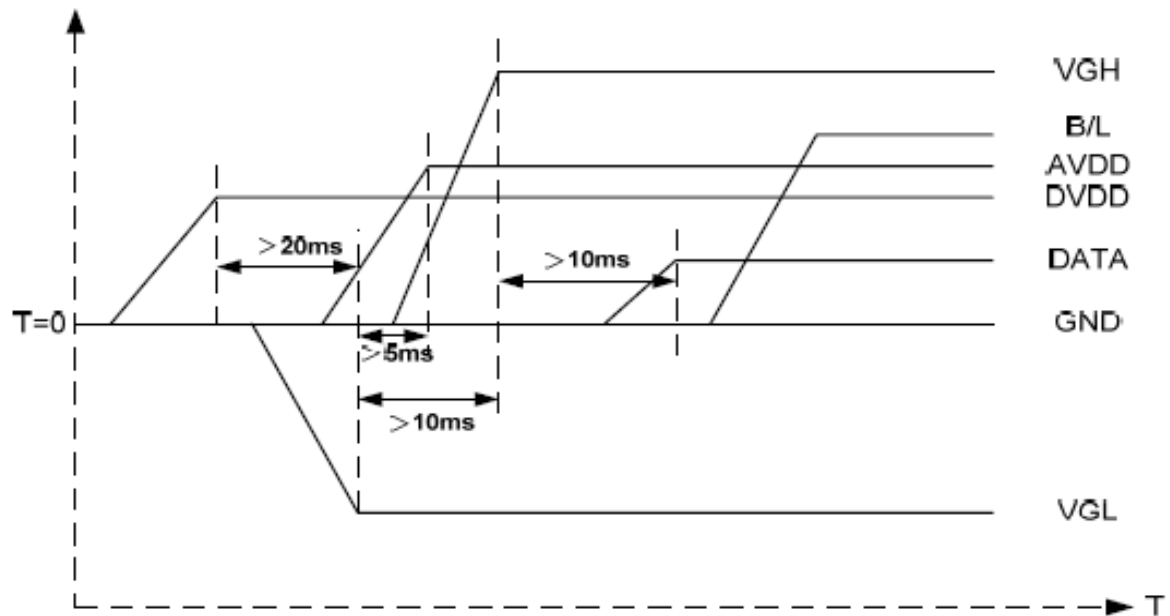
$$DV_{DD} \rightarrow VGL \rightarrow VGH \rightarrow Data \rightarrow B/L$$

b. Power off:
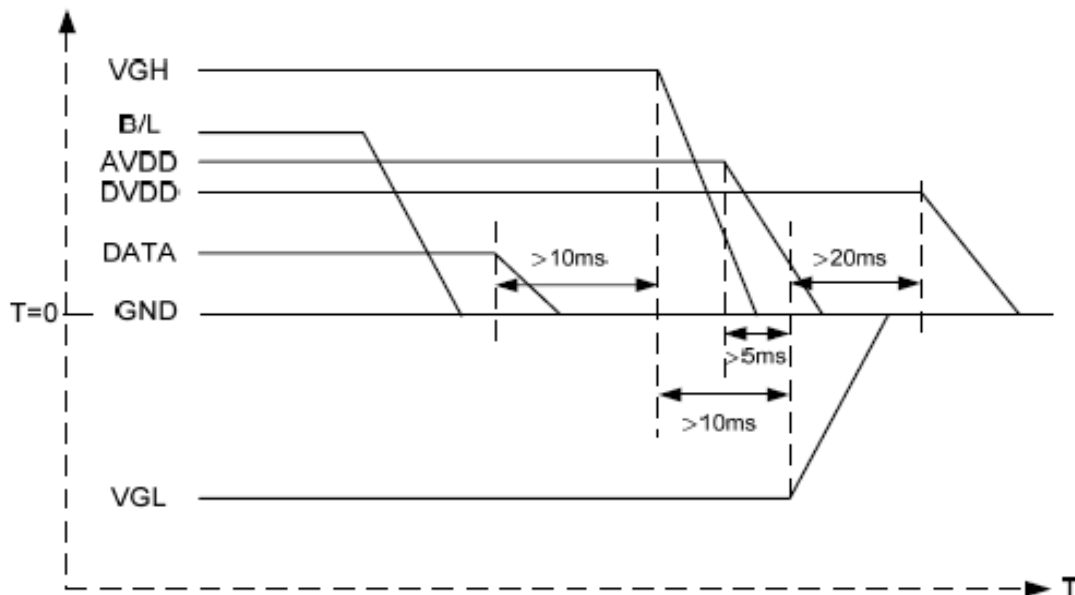
$$B/L \rightarrow Data \rightarrow VGH \rightarrow VGL \rightarrow DV_{DD}$$

Note: Data include R0~R7, B0~B7, G0~G7, U/D, L/R, DCLK, HS, VS, DE.

7.2 AC Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	ns	
HS hold time	T_{hhd}	8	-	-	ns	
VS setup time	T_{vst}	8	-	-	ns	
VS hold time	T_{vhd}	8	⊢	-	ns	
Data setup time	T_{dsu}	8	-	-	ns	
Data hole time	T_{dhd}	8	-	-	ns	
DE setup time	T_{esu}	8	-	-	ns	
DE hole time	T_{ehd}	8	-	-	ns	
DV_{DD} Power On Slew rate	T_{POR}	-	-	20	ms	From 0 to 90% DV_{DD}
RESET pulse width	T_{Rst}	1	-	-	ms	
DCLK cycle time	T_{coh}	20	-	-	ns	
DCLK pulse duty	T_{cwh}	40	50	60	%	
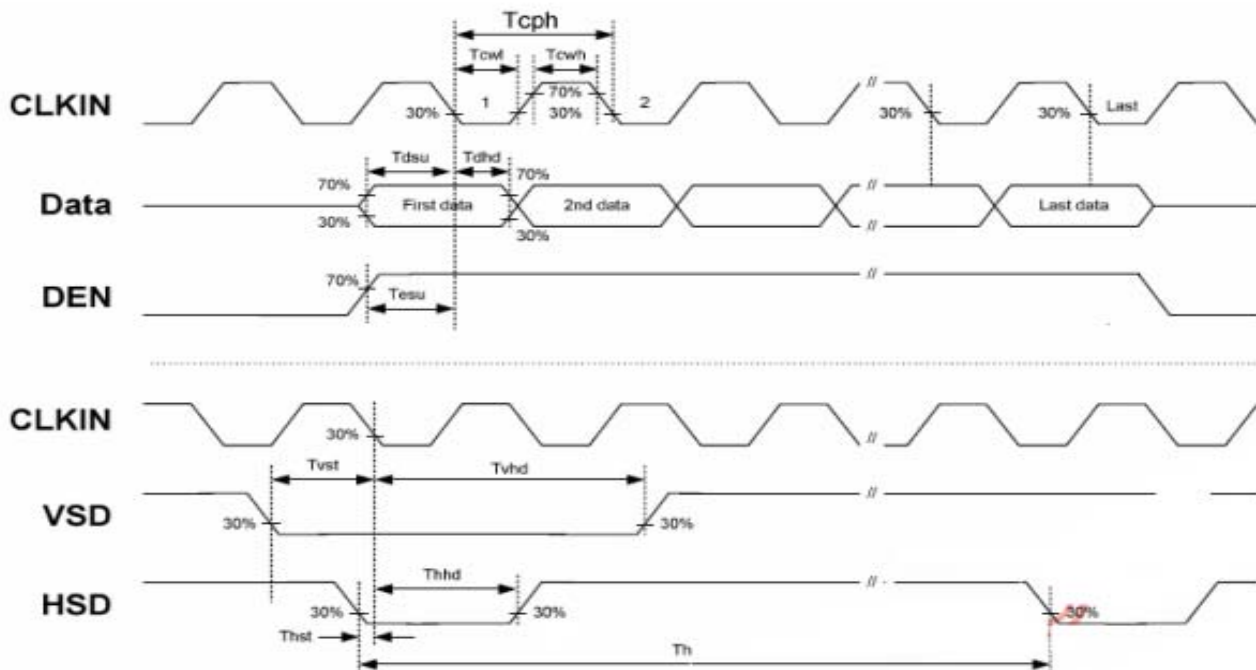
7.3 Data Input Format

Horizontal input timing diagram
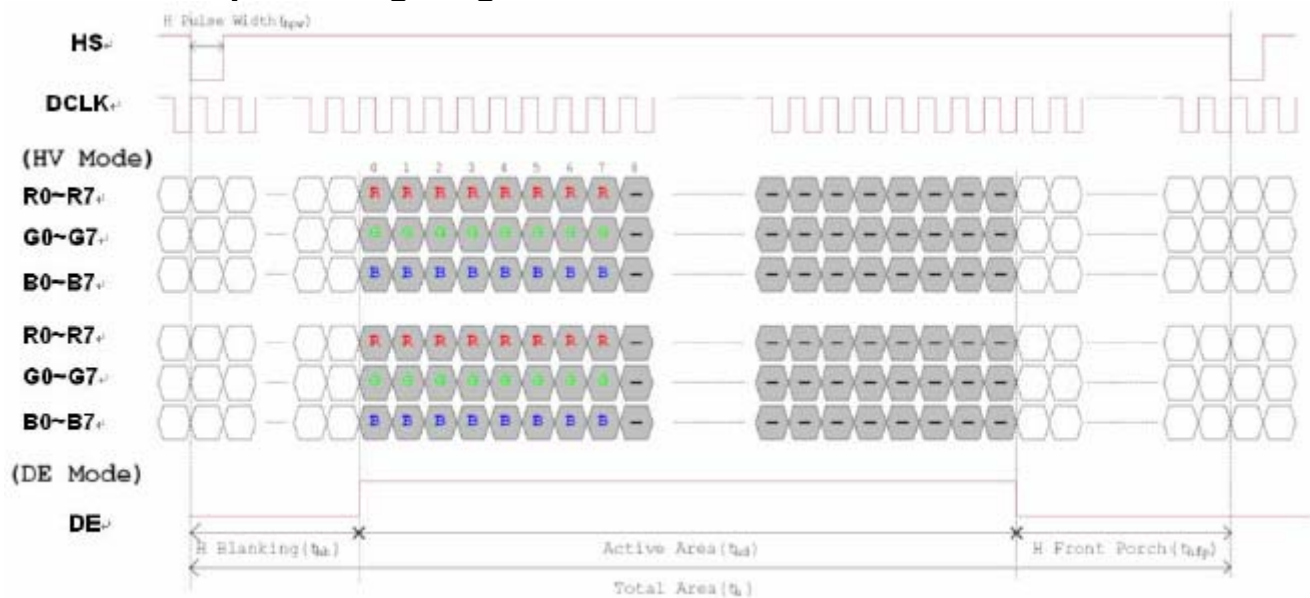
Vertial input timing diaqram
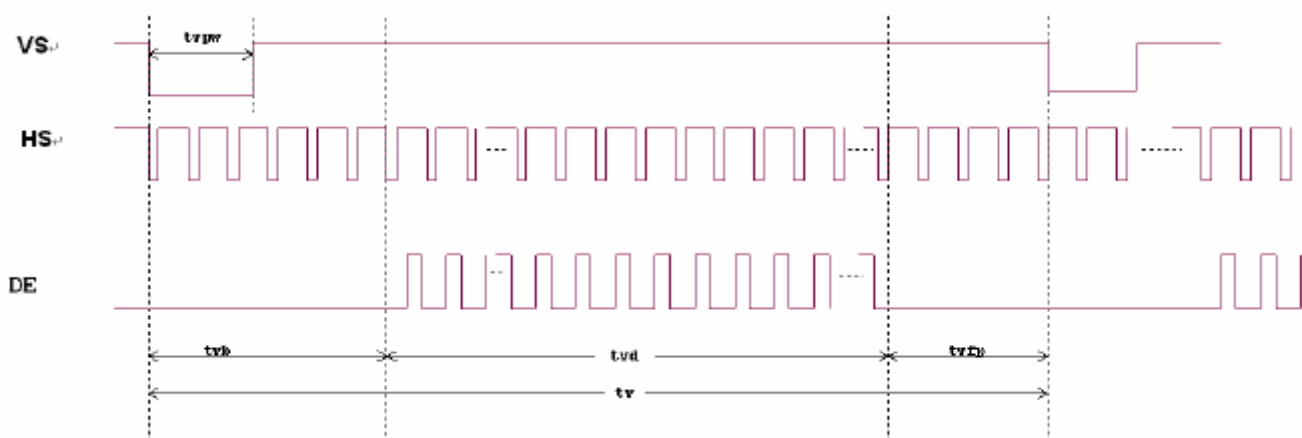
7.4 Timing

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.	Mhz
		44.9	51.2	63	
1 Horizontal Line	th	1200	1344	1400	DCLK
HSYNC pulse width	thpw	Min.	1		DCLK
		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

8. Backlight Characteristic

LED DRIVER CIRCUIT

VLED

VLSS

3~7.5V

LED_PW
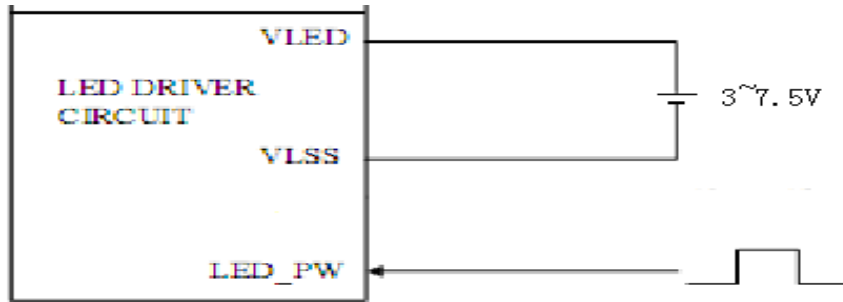
NOTE (1): ADJUST THE PWM SIGNAL IN ORDER TO CONTROL LED BACKLIGHTS BRIGHTNESS. THE HIGHER THE DUTY CYCLE, THE HIGHER THE BRIGHTNESS

LUMINANCE

LUMINANCE BRIGHT

LUMINANCE DARK

DUTY(0%)   DUTY(100%)   DUTY
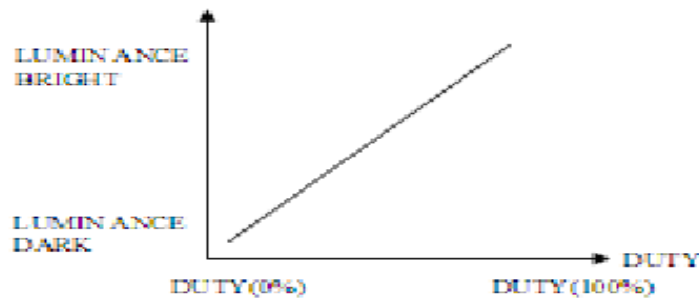
NOTE (2): PWM SIGNAL=0~3.3V · OPERATION FREQUENCY: 100+/−5 KHz

F=100+/−5 KHz

3.3V

0V
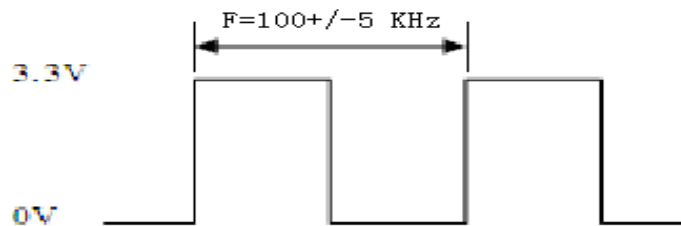
Item		Symbol	MIN	TYP	MAX	UNIT	NOTE
Backlight Power		LED_VCC	3.3	5	7.5	V	Ta = 25°C
Backlight Power		ILED_VCC	-	(0.5)	(0.7)	A	LED_VCC=5V
EN Signal Voltage	VIH	BL_CON	1.2			V	
	VIL		GND		0.4	V	
Lifetime			50000	-	-	Hr	
Color		White					
Average Brightness			-	350	450	-	Cd/cm2	
Luminance uniformity			-	--	80	-	%	

9. Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR>10)	Horizontal	θL	80	85	-	degree	(1),(2),(6)
		θR	80	85	-		
	Vertical	θT	80	85	-		
		θB	80	85	-		
Contrast Ratio	Center		600	800	-	-	(1),(3),(6)
Response Time	Rising + Falling		-	25	-	ms	(1),(4),(6)
CF Color Chromaticity (CIE1931)	Red x		Typ. -0.05	TBD	Typ. +0.05	-	(1), (6)
	Red y			TBD		-	
	Green x			TBD		-	
	Green y			TBD		-	
	Blue x			TBD		-	
	Blue y			TBD		-	
	White x			TBD		-	
	White y			TBD		-	

Note (1) Measurement Setup: The LCD module should be stabilized at given temp. 25°C for 15 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 15 minutes in a windless room.
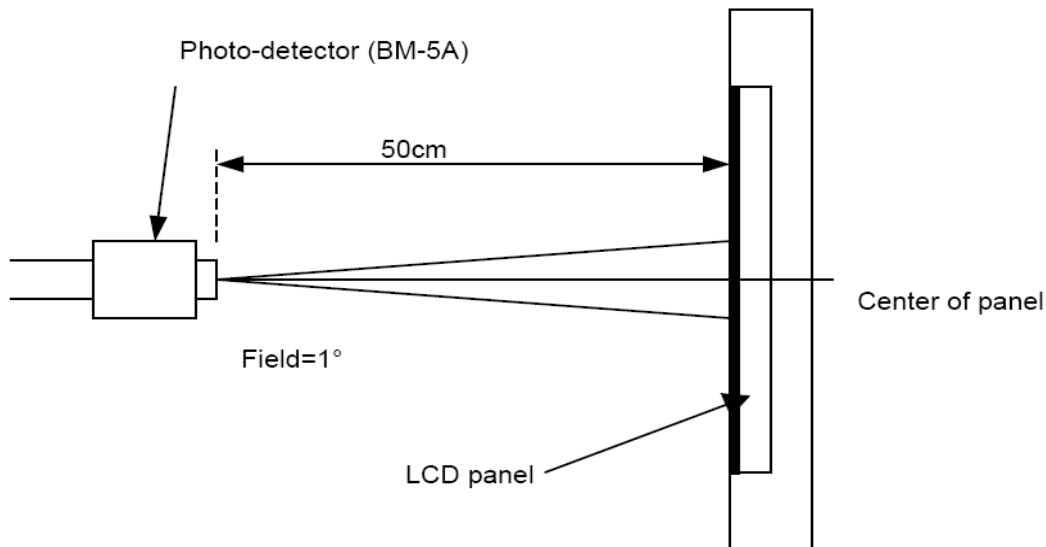
Note (2) Definition of Viewing Angle
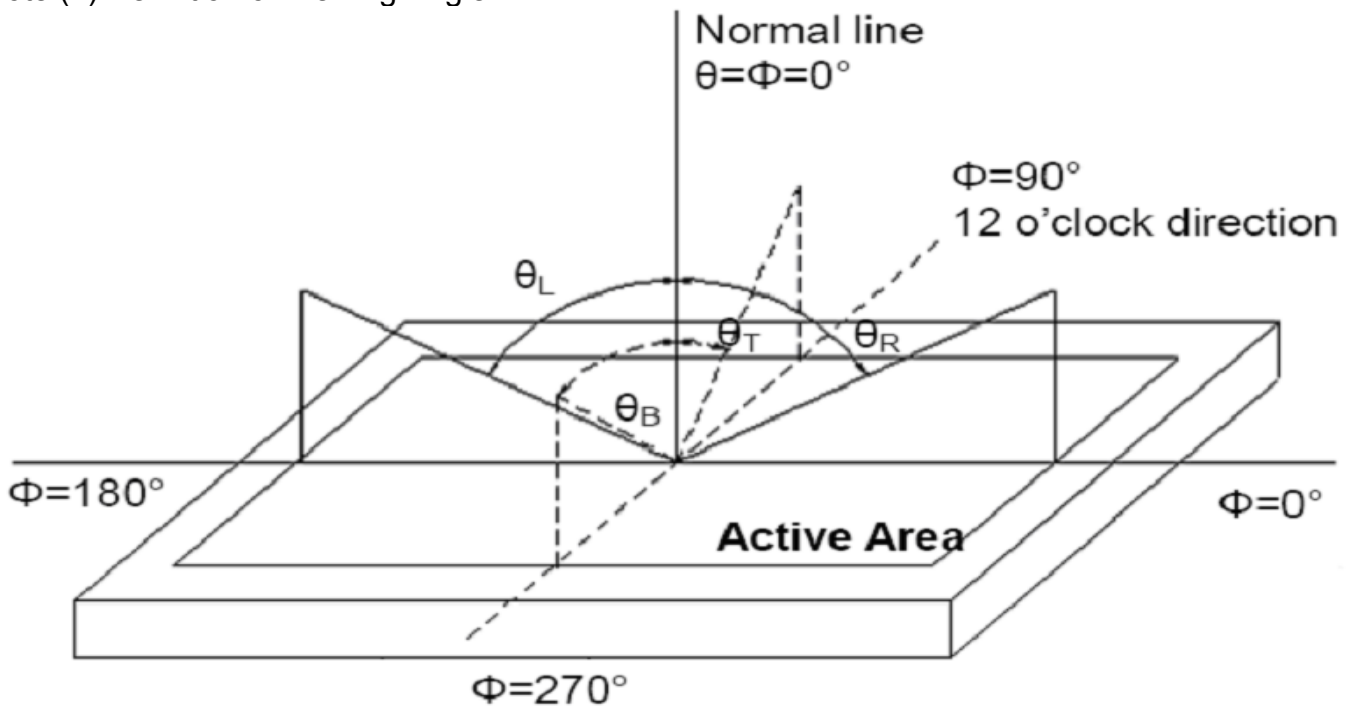
Note (3) Definition of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression

Contrast Ratio (CR) = L63 / L0

L63: Luminance of gray level 63, L0: Luminance of gray level 0

Note (4) Definition of response time
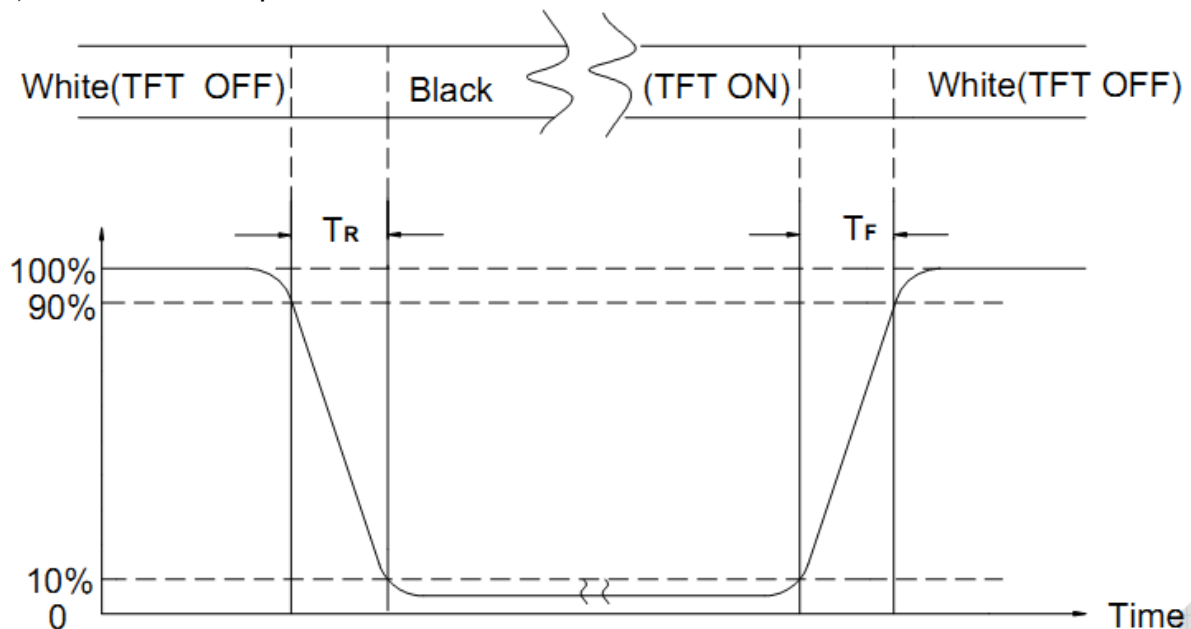
Note (5) Definition of Transmittance (Module is without signal input)

Transmittance = Center Luminance of LCD / Center Luminance of Back Light x 100%

Note (6) Definition of color chromaticity (CIE1931)

Color coordinates measured at the center point of LCD

10. Reliability Test Conditions and Methods

NO.	TEST ITEMS	TEST CONDITION
①	High Temperature Storage	Keep in 80°C ±5℃ 240 hrs Surrounding temperature, then storage at normal condition 4hrs.
②	Low Temperature Storage	Keep in -30°C ±5℃ 240 hrs Surrounding temperature, then storage at normal condition 4hrs.
③	High Temperature / High Humidity Storage Test	Keep in 60 ℃ / 90% R.H duration for 240 hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)
④	Temperature Cycling Storage Test	-30°C → +25℃ → 80°C → +25℃ (30mins) (5mins) (30mins) (5mins) 30 Cycle Surrounding temperature, then storage at normal condition 4hrs.
⑤	ESD Test	Air Discharge: Apply 2 KV with 5 times Discharge for each polarity +/- Contact Discharge: Apply 250 V with 5 times discharge for each polarity +/- 1. Temperature ambiance : 15℃～35℃ 2. Humidity relative : 30%～60% 3. Energy Storage Capacitance(Cs + Cd) : 150pF±10% 4. Discharge Resistance(Rd) : 330Ω±10% 5. Discharge, mode of operation : Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : ±5%)
⑥	Vibration Test (Packaged)	1. Sine wave 10～55 Hz frequency (1 min/sweep) 2. The amplitude of vibration :1.5 mm 3. Each direction (X、Y、Z) duration for 2 Hrs
⑦	Drop Test (Packaged)	<table><tr><td>Packing Weight (Kg)</td><td>Drop Height (cm)</td></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table>Drop Direction :※1 corner / 3 edges / 6 sides each 1time

11. Inspection Standard
11.1. QUALITY :

THE QUALITY OF GOODS SUPPLIED TO PURCHASER SHALL COME UP TO THE FOLLOWING STANDARD.

11.1.1. INSPECTIONTOOLS AND INSTRUMENTS

Vernier calipers, film scales, multimeter, magnifying eyepiece, ND5%, luminance meter and so on.

11.1.2. THE METHOD OF PRESERVING GOODS

AFTER DELIVERY OF GOODS FROM AMSON TO PURCHASER. PURCHASER SHALL CONTROL THE LCM   AT -10 TO 40 ,AND IT MIGHT BE DESIRABLE TO KEEP AT THE NORMAL ROOM TEMPERATURE AND HUMIDITY UNTIL INCOMING INSPECTION OR THROWING INTO PROCESS LINE.

11.1.3. INCOMING INSPECTION

(A) THE METHOD OF INSPECTION

IF PURCHASER MAKE AN INCOMING INSPECTION , A SAMPLING PLAN SHALL BE APPLIED ON THE CONDITION THAT QUALITY OF ONE DELIVERY SHALL BE REGARDED AS ONE LOT.

(B) THE STANDARD OF QUALITY

ISO-2859-1 (SAME AS MIL-STD-105E) ,LEVEL:II

CLASS	AQL(%)
CRITICAL	0.4 %
MAJOR	0.65 %
MINOR	1.5 %

EVERY ITEM SHALL BE INSPECTED ACCORDING TO THE CLASS.

(C) MEASURE

IF AS THE RESULT OF ABOVE RECEIVING INSPECTION , A LOT OUT IS DISCOVERED. PURCHASER SHALL BE INFORM SELLER OF IT WITHIN SEVEN DAYS. BUT FIRST SHIPMENT WITHIN FOURTEEN DAYS.

11.1.4. WARRANTY POLICY

AMSON WILL PROVIDE ONE-YEAR WARRANTY FOR THE PRODUCTS ONLY IF UNDER SPECIFICATION OPERATING CONDITIONS. AMSON WILL REPLACE NEW PRODUCTS FOR THESE DEFECT PRODUCTS WHICH UNDER WARRANTY PERIOD AND BELONG TO THE RESPONSIBILITY OF AMSON.

11.2. CHECKING CONDITION

11.2.1. CHECKING DIRECTION SHALL BE IN THE 45 DEGREE AREA TO FACE THE SAMPLE.

11.2.2. CHECKER SHALL SEE OVER 300±25 mm. WITH BARE EYES FAR FROM SAMPLE

11.2.3. Ambient Illumination:

0 ~30 Lux for functional inspection

500 ~ 1200 Lux for external appearance inspection.

11.2.4. TEST AREA：
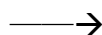
11.2.5. Inspection should be carried out with rope electrostatic ring and static finger cover (both hands except small fingers must be worn)
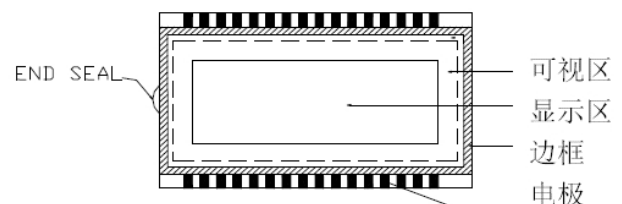
11.2.6. The inspector may make a visual inspection or a comparative examination with a film ruler and a magnifying eyepiece. Individual defects shall be determined according to the limited samples.

11.2.7. Functional testing uses electrical testing fixtures or test fixtures required by customers.

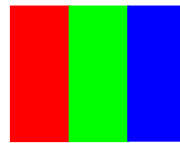**11.2.8.** the ion fan should be used when testing.

11.2.9. the principle of judgment

11.3.1   If the defect outside the visual area does
not affect the assembly and display,
it will be judged as a good product.

11.3.2   Poor definition
Pixel:
A combination of three sub-pixels
(Red + Green + Blue).

Dot:
Any of the sub-pixels
(Red or Green or Blue).
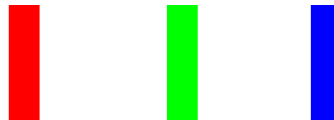
Bright and dark dots:
A point pixel (sub-pixel: R, G, B pixels) is lit or turned off during the display function test.
Highlights:
Usually considered to be shown on a black screen.
Dark spots:
They are generally considered to be shown on R, G, B solid colors or white images.
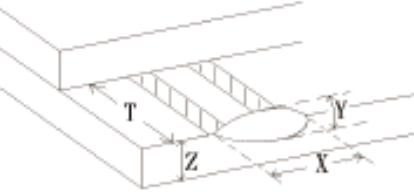**Neighborhood**:
Two or three adjacent point pixels (dot: sub-pixel) connected together (R, G or G, B or B, R or RGB).
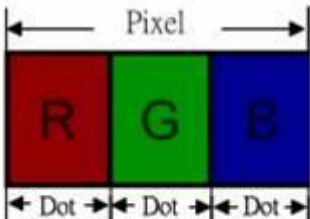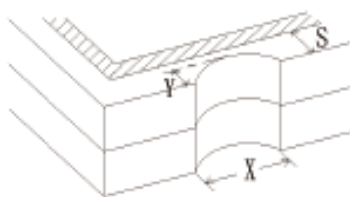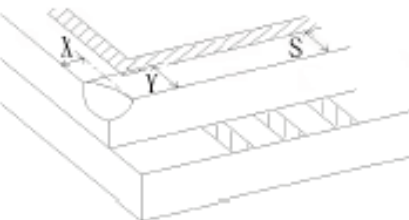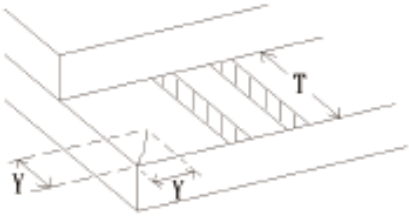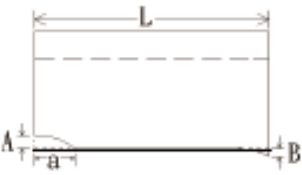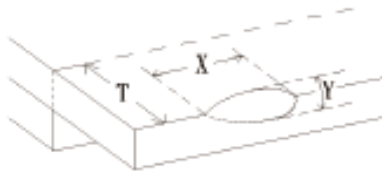
11.3. INSPECTION PLAN :

CLASS	ITEM	JUDGEMENT	CLASS
PACKING & INDICATE	1. OUTSIDE AND INSIDE PACKAGE	"MODEL NO." , "LOT NO." AND "QUANTITY" SHOULD INDICATE ON THE PACKAGE.	Minor
	2. MODEL MIXED AND QUANTITY	OTHER MODEL MIXED...............REJECTED QUANTITY SHORT OR OVER......REJECTED	Critical
	3. PRODUCT INDICATION	"MODEL NO." SHOULD INDICATE ON THE PRODUCT	Major
ASSEMBLY	4. DIMENSION, LCD GLASS SCRATCH AND SCRIBE DEFECT.	ACCORDING TO SPECIFICATION OR DRAWING.	Major
APPEARANCE	5. VIEWING AREA	POLARIZER EDGE OR LCD'S SEALING LINE IS VISABLE IN THE VIEWING AREA ....REJECTED	Minor
	6. BLEMISH、BLACK SPOT、 WHITE SPOT IN THE LCD AND LCD GLASS CRACKS	ACCORDING TO STANDARD OF VISUAL INSPECTION(INSIDE VIEWING AREA)	Minor
	7. BLEMISH、BLACK SPOT WHITE SPOT AND SCRATCH ON THE POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION(INSIDE VIEWING AREA)	Minor
	8. BUBBLE IN POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION(INSIDE VIEWING AREA)	Minor
	9. LCD'S RAINBOW COLOR	STRONG DEVIATION COLOR (OR NEWTON RING) OF LCD......REJECTED. OR ACCORDING TO LIMITED SAMPLE (IF NEEDED, AND INSIDE VIEWING AREA)	Minor
ELECTRICAL	10. ELECTRICAL AND OPTICAL CHARACTERISTICS (CONTRAST、VOP、 CHROMATICITY ... ETC)	ACCORDING TO SPECIFICATION OR DRAWING . (INSIDE VIEWING AREA)	Critical
	11.MISSING LINE	MISSING DOT、LINE、CHARACTER ....REJECTED	Critical
	12.SHORT CIRCUIT、 WRONG PATTERN DISPLAY	NO DISPLAY、WRONG PATTERN DISPLAY、CURRENT CONSUMPTION OUT OF SPECIFICATION...... REJECTED	Critical
	13. DOT DEFECT (FOR COLOR AND TFT)	ACCORDING TO STANDARD OF VISUAL INSPECTION	Minor

NO.	CLASS	ITEM	JUDGEMENT
11.4.1	MINOR	BLACK AND WHITE SPOT FOREIGN MATERIEL DUST IN THE CELL BLEMISH SCRATCH	(A) ROUND TYPE: (see below) (B) LINEAR TYPE: (see below)
11.4.2	MINOR	BUBBLE IN POLARIZER DENT ON POLARIZER	(see below)
11.4.3	MINOR	Dot Defect	(see below)
11.4.4	MINOR	Mura	Not visible thriugh 5% ND filter in 50% gray or judge by limit sample if necessary

11.4.1

(A) ROUND TYPE:　　　　　　　　　　unit : mm.

DIAMETER (mm.)		ACCEPTABLE Q'TY
Φ ≦ 0.15		Distance≥1mm
0.15 < Φ ≦ 0.4		3 (Distance>15mm)
0.4 < Φ		0

NOTE: Φ=(LENGTH+WIDTH)/2

(B) LINEAR TYPE:　　　　　　　　　　unit : mm.

LENGTH	WIDTH		ACCEPTABLE Q'TY
------	W ≦0.03		Distance≥1mm
L ≦ 4.0	0.03 < W ≦0.05		3 (Distance>15mm)
------	0.05 < W		FOLLOW ROUND TYPE

11.4.2

　　　　　　　　　　unit : mm.

DIAMETER		ACCEPTABLE Q'TY
Φ ≦ 0.2		Distance≥1mm
0.2 < Φ ≦ 0.5		3 (Distance>15mm)
0.5 < Φ		0

11.4.3

Items	ACC. Q'TY
Bright dot	N≦2 (Distance≥15mm)
Dark dot	N≦3 (Distance>15mm)

Pixel Define :

Note 1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot.
Definittion:<1/2dot and visible by 5% ND filter N≦5

Note 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

Note 3: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green ,blue pattern.

NO.	CLASS	ITEM	JUDGEMENT	
11.4.5	MINOR	LCD GLASS CHIPPING		$X \geq 3mm$ $Y > S$ Reject
11.4.6	MINOR	LCD GLASS CHIPPING		X or $Y > S$ Reject
11.4.7	MAJOR	LCD GLASS GLASS CRACK		Continuous burst NG Reject
11.4.8	MAJOR	LCD GLASS SCRIBE DEFECT		ACCORDING TO DIMENSION
11.4.9	MINOR	LCD GLASS CHIPPING (ON THE TERMINAL AREA)		$Y < 1/2Z$ $Y \geq 0.5mm$ Reject $X \geq 3mm$
11.4.10	MINOR	LCD GLASS CHIPPING (ON THE TERMINAL SURFACE)		$Y < 1/2Z$ $Y \geq 0.5mm$ Reject $X \geq 3mm$
11.4.11	MINOR	LCD GLASS CHIPPING		$X \geq 3mm$ $Y \geq T$ Reject If touch the electrode lines, the need to retain the two-thirds electrode lines

12. Handling Precautions
12.1 Mounting method

The LCD panel of AMSON TFT module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

12.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent

[Recommended below] and wipe lightly

- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:

- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (CI) , Sulfur (S)

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (CI), Sulfur (S) from customer, Responsibility is on customer.

12.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:

Connect any unused input terminal to power or ground, do not input any signals before power is turned on, and ground your body, work/assembly areas, and assembly equipment to protect against static electricity.

12.4 packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

12.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- Slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

12.6 storing

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it. And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.
  [It is recommended to store them as they have been contained in the inner container at the time of delivery from us.

12.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water.

13. Precaution for Use

13.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

13.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification.
- When a new problem is arisen this is not specified in this specification.
- When an inspection specifications change or operating condition change in customer is reported to AMSON TFT and some problem is arisen in this specification due to the change.
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

14. Packing Method
TBD