Specification for Approval

Customer:

Model Name:

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

Revision Record

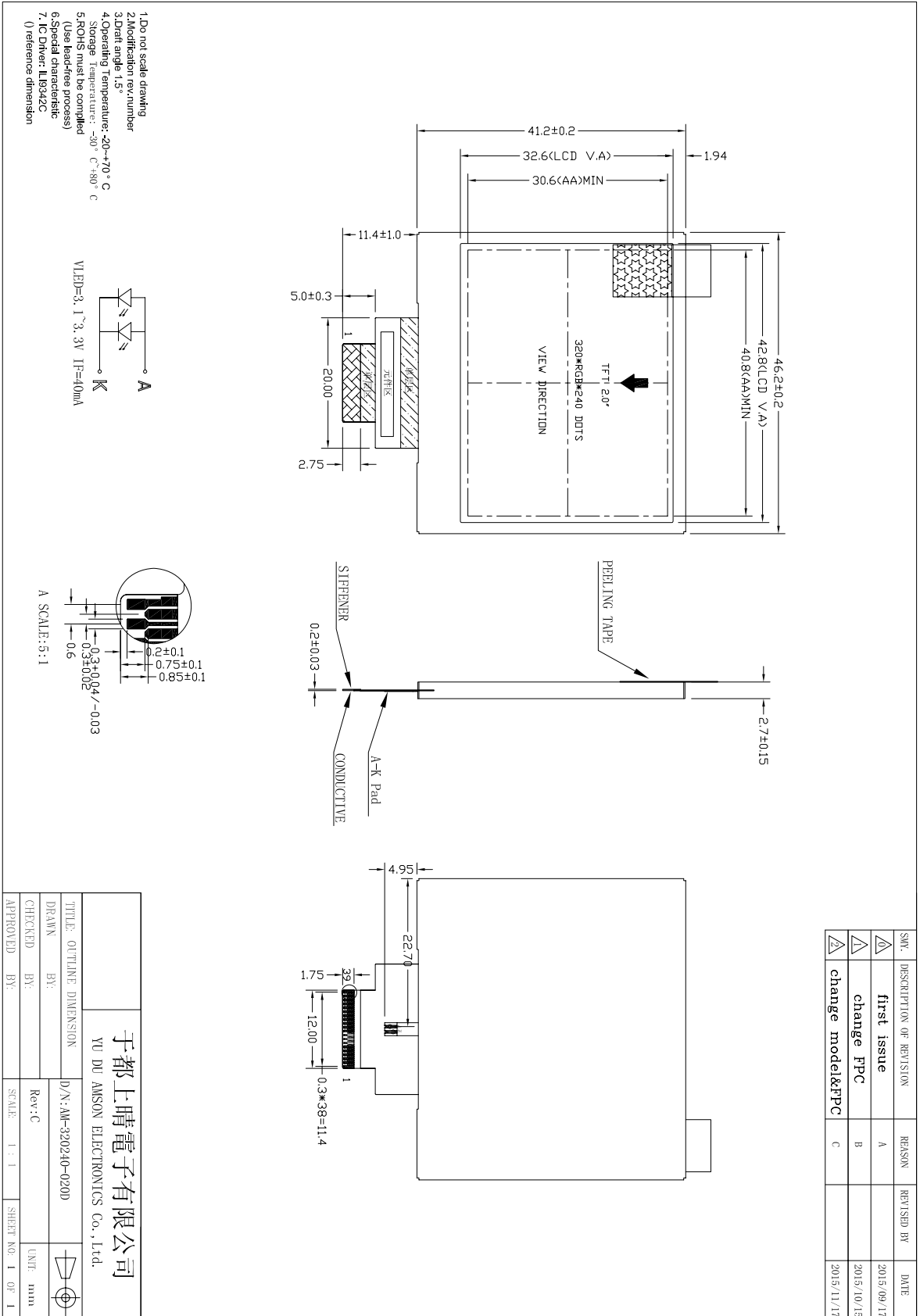| REV NO.	REV DATE	CONTENTS	Note
A	2015.11.17	NEW ISSUE	

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

ITEM	STANDARD VALUES	UNITS
LCD type	2.0"TFT	
Dot arrangement	320(H)*(RGB)∗240(V)	dots
Color filter array	RGB vertical stripe	
Display mode	TN / Transmission / Normally White	
Viewing Direction	12 o'clock	
Driver IC	ILI9342C	
Module size	46.2(W)×41.2(H)×2.7(T)	mm
Active area	40.8 (W)×30.6(H)	mm
Dot pitch	0.1275 (W)×0.1275 (H)	mm
Interface	8bit serial(RGB) data input	
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Back Light	2 White LED	
Weight	TBD	g

3.External Dimensions

1.Do not scale drawing
2.Modification rev.number
3.Draft angle 1.5°
4.Operating Temperature:-20~+70°C
Storage Temperature: -30°C~+80°C
5.ROHS must be compiled
(Use lead-free process)
6.Special characteristic
7.IC Driver:ILI9342C
( ) reference dimension

VLED=3.1~3.3V IF=40mA

A SCALE:5:1

41.2±0.2
32.6(LCD V.A)
30.6(AA)MIN
1.94
11.4±1.0
5.0±0.3
20.00
2.75
46.2±0.2
42.8(LCD V.A)
40.8(AA)MIN
VIEW DIRECTION
320*RGB*240 DOTS
TFT1 2.0"

0.2±0.1
0.75±0.1
0.85±0.1
0.3+0.04/-0.03
0.3±0.02
0.6

STIFFENER
0.2±0.03
CONDUCTIVE
A-K Pad
PEELING TAPE
2.7±0.15

4.95
22.70
1.75
.39
12.00
0.3*38=11.4

SMT.
DESCRIPTION OF REVISION | REASON | REVISED BY | DATE
first issue | A | | 2015/09/17
change FPC | B | | 2015/10/15
change model&FPC | C | | 2015/11/17

TITLE: OUTLINE DIMENSION
DRAWN BY:
CHECKED BY:
APPROVED BY:

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

D/N:AM-320240-020D
Rev:C

SCALE: 1:1
SHEET NO: 1 OF 1
UNIT: mm

4. Interface Description

Pin	Symbol	Description.
1	VGL	Power supply for the gate driver. Adjust the VGL level with the BT[3:0] bits. Connect this pad with a stabilizing capacitor.
2	VGH	Power supply for the gate driver. Adjust the VGH level with the BT[3:0] bits. Connect this pad with a stabilizing capacitor.
3	C1N	Connect the charge-pumping Capacitor on C1N/C1P for
4	C2N	Connect the charge-pumping Capacitor on C2N/C2P for
5	C1P	Connect the charge-pumping Capacitor on C1P/C1N for
6	C2P	Connect the charge-pumping Capacitor on C2P/C2N for
7	GND	Ground
8	VDD3	Charge-pump circuit reference voltage. Please connect the capacitor between VDD3 and VSS.
9	VDD_25V	Intermediate voltage for charge Pump. Please connect the capacitor between VDD_25V and VSS.
10	VCAC	Define the amplitude of the VCOM swing
11	C3N	Connect the charge-pumping
12	C3P	capacitor on C3N/C3P for
13	NC	Dummy
14	LEDK	LED backlight (Cathode).
15	NC	Dummy
16	LEDA	LED backlight (Anode).
17	NC	Dummy
18	GND	Ground
19	NC	Dummy
20	VDD	Power voltage input
21	NC	Dummy
22	GND	Ground
23	VSYNC	Vertical sync input
24	HSYNC	Horizontal sync input
25	GND	Ground
26	DCLK	Data clock input
27	DB0	Data input
28	DB1	Data input

29	DB2	Data input
30	DB3	Data input
31	DB4	Data input
32	DB5	Data input
33	NC	Dummy
34	NC	Dummy
35	SDA	Serial communication data input
36	SCL	Serial communication clock input
37	GND	Ground
38	CS	Serial communication chip select
39	RESET	This signal will reset the device and must be applied to properlyinitialize the chip.

5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	VDD	-0.5	4.6	V
Input Voltage	VIN	0	VDD	V
Operating Temperature	TOP	-20	70	°C
Storage Temperature	TST	-30	80	°C
Storage Humidity	HD		90	%RH

6. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply Voltage	VDD	-	2.8	3.3	V	-
Input High Voltage	V_{IH}	0.7VDD		VDD	V	Digital input pins
Input Low Voltage	V_{IL}	GND		0.3VDD	V	Digital input pins
Output High Voltage	V_{OH}	0.8VDD		VDD	V	Digital output pins
Output Low Voltage	V_{OL}	GND		0.2VDD	V	Digital output pins
I/O Leak Current	I_{LI}	-0.1		0.1	uA	-

7.Timing Characteristics

Display Serial Interface Timing Characteristics (4-line SPI system)
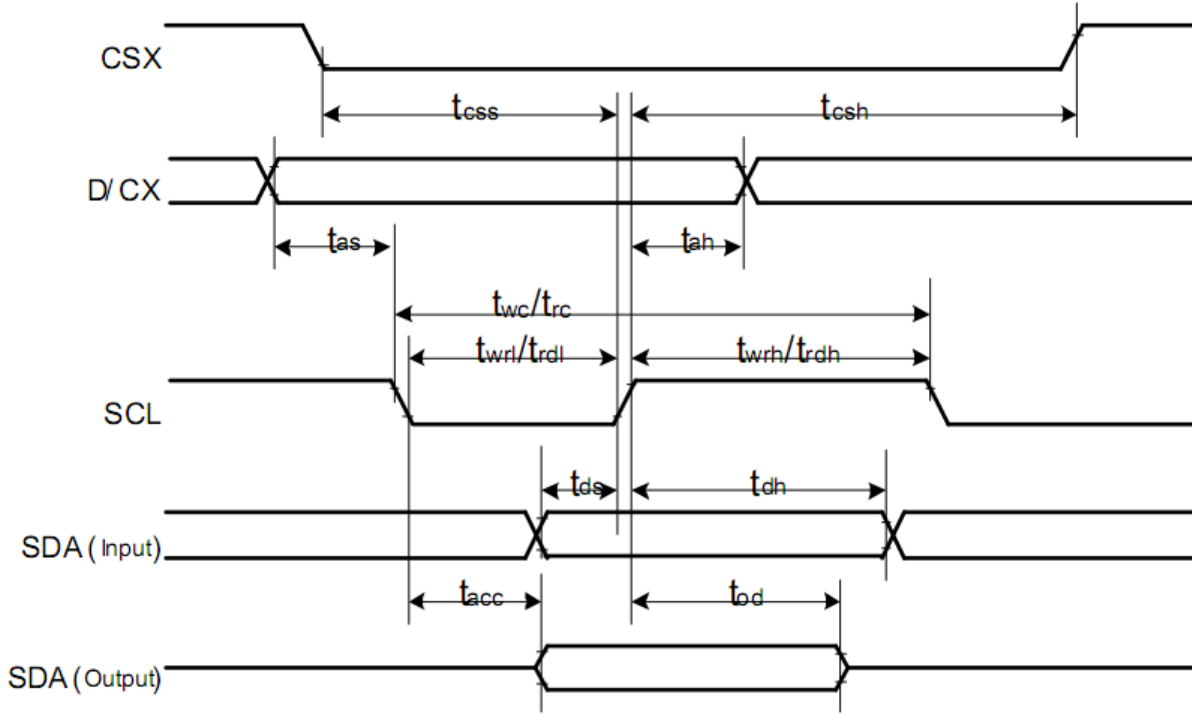
Signal	Symbol	Parameter	min	max	Unit	Description
CSX	tcss	Chip select time (Write)	30	-	ns	
	tcsh	Chip select hold time (write)	30	-	ns	
SCL	twc	Serial clock cycle (Write)	100	-	ns	
	twrh	SCL "H" pulse width (Write)	35	-	ns	
	twrl	SCL "L" pulse width (Write)	35	-	ns	
	trc	Serial clock cycle (Read)	150	-	ns	
	trdh	SCL "H" pulse width (Read)	60	-	ns	
	trdl	SCL "L" pulse width (Read)	60	-	ns	
D/CX	tas	D/CX setup time	10	-		
	tah	D/CX hold time (Write / Read)	10	-		
SDA (Input)	tds	Data setup time (Write)	30	-	ns	
	tdh	Data hold time (Write)	30	-	ns	
SDA (Output)	tacc	Access time (Read)	-	50	ns	For maximum CL=30pF
	tod	Output disable time (Read)	15	50	ns	For minimum CL=8pF

Note: Ta = 25 ℃, IOVCC=1.65V to 2.8V, VCI=2.6V to 3.3V, AGND=GND=0V
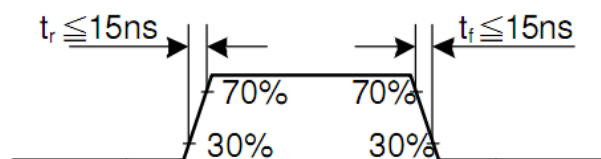
8. Backlight Characteristics

Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	Vf	2.9	3.1	3.3	V	If=40mA
Supply Current	If		40		mA	
Luminous Intensity for LCM		180	200		Cd/m$_2$	If=40mA
Uniformity for LCM		80			％	If=40mA
Life Time		50000			Hr	If=40mA
Backlight Color	White					

9. Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Transmittance		T			6.5		%	
Contrast Ratio		CR			690			Note3
Response Time		Tr+Tf	25°C		21	42	ms	Note4
Viewing Angle	3H	θ 3H(R)	CR≥10	45	60			Note5
	9H	θ 9H(L)		45	55			
	6H	φ6H(D)		10	60			
	12H	φ12(U)		30	60			
Color Filter Chromaticity	White	x	θ =φ=0°		0.31			Note6
		y			0.34			
		λ			TBD			
	Red	x	θ =φ=0°		TBD			
		y			TBD			
		λ			TBD			
	Green	x	θ =φ=0°		TBD			
		y			TBD			
		λ			TBD			
	Blue	x	θ =φ=0°		TBD			
		y			TBD			
		λ			TBD			

Note1.Ambient condition: 25°C±2°C, 60±10%RH, under 10 Lux in the darkroom.

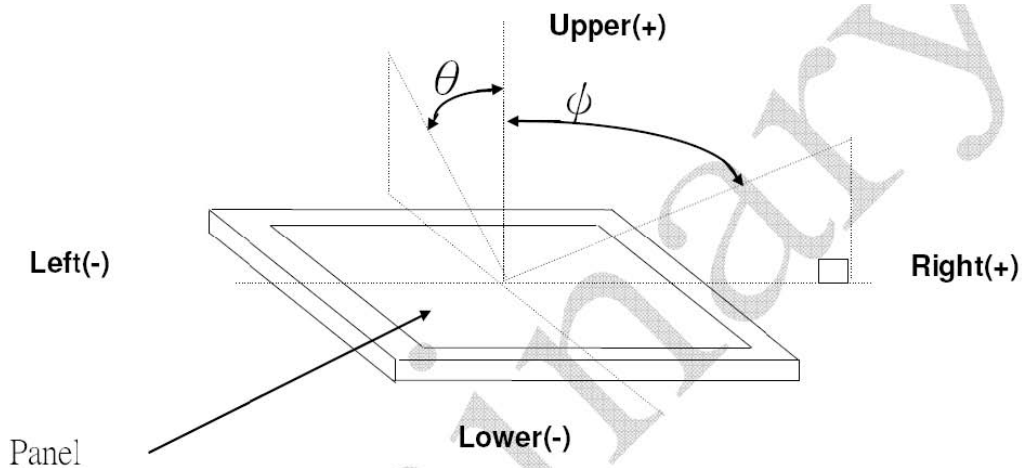Note2.Measure device:BM-5A(TOPCON),viewing cone=1°, IL=40Ma.
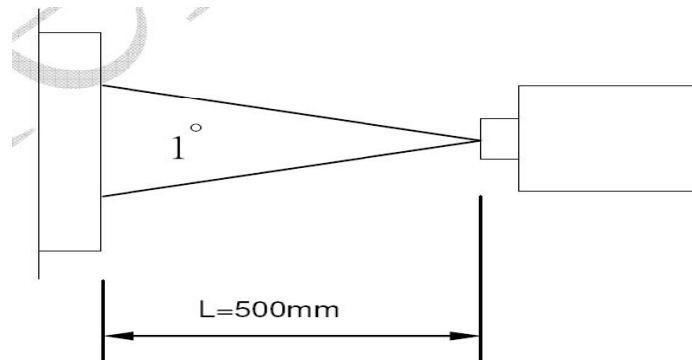
Note3. Definition of Contrast Ratio：

CR = White Luminance (ON) / Black Luminance (OFF)

Note4. Definition of response time：The response time is defined as the time interval between the 10% and 90% amplitudes
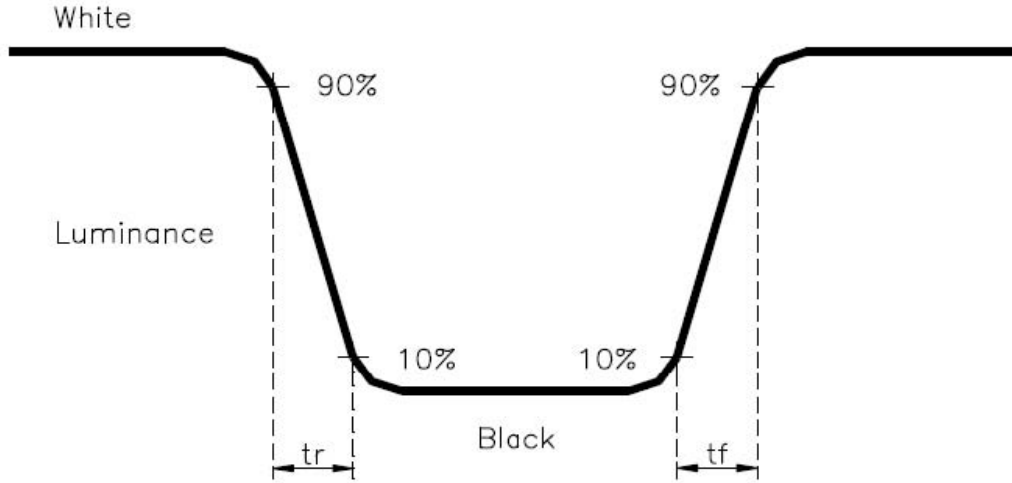
Note5. Definition of view angle(θ, φ)：

Note6. Light source: C light

10. Reliability Test Conditions and Methods

NO.	TEST ITEMS	TEST CONDITION	INSPECTION AFTER TEST
	High Temperature Storage	80°C±2°C×200Hours	Inspection after 2~4hours storage at room temperature, the samples should be free from defects: 1, Air bubble in the LCD. 2, Seal leak. 3, Non-display. 4, Missing segments. 5, Glass crack. 6, Current IDD is twice higher than initial value. 7, The surface shall be free from damage. 8, The electric characteristic requirements shall be satisfied.
	Low Temperature Storage	-30°C±2°C×200Hours	
	High Temperature Operating	70°C±2°C×120Hours	
	Low Temperature Operating	-20°C±2°C×120Hours	
	Temperature Cycle(Storage)	-20°C　　　25°C　　　70°C (30min) (5min) (30min) 1cycle Total 10cycle	
	Damp Proof Test (Storage)	50°C±5°C×90%RH×120Hours	
	Vibration Test	Frequency:10Hz~55Hz~10Hz Amplitude:1.5M X,Y,Z direction for total 3hours (Packing Condition)	
	Drooping Test	Drop to the ground from 1M height one time every side of carton. (Packing Condition)	
	ESD Test	Voltage:±8KV,R:330Ω,C:150PF,Air Mode,10times	

REMARK: 1, The Test samples should be applied to only one test item. 2, Sample side for each test item is 5~10pcs. 3,For Damp Proof Test, Pure water(Resistance > 10MΩ)should be used. 4,In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part. 5, EL evaluation should be accepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has. 6, Failure Judgment Criterion: Basic Specification Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

11. Handling Precautions

11.1 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.

11.2 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 (Cl) , Sulfur (S)

If goods were sent without being sili8con 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 (Cl), Sulfur (S) from customer, Responsibility is on customer.

11.3 Caution against static charge

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

Connect any unused input terminal to VDD or GND, 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.

11.4 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

11.5 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.

11.6 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.

11.7 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.

12.Precaution for Use

12.1

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.

12.2

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.

13.Packing Method

TBD