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	2016-2-16	NEW ISSUE	

Table of Contents

1. Scope

This specification defines general provisions as well as inspection standards for TFT module supplied by AMSON electronics.
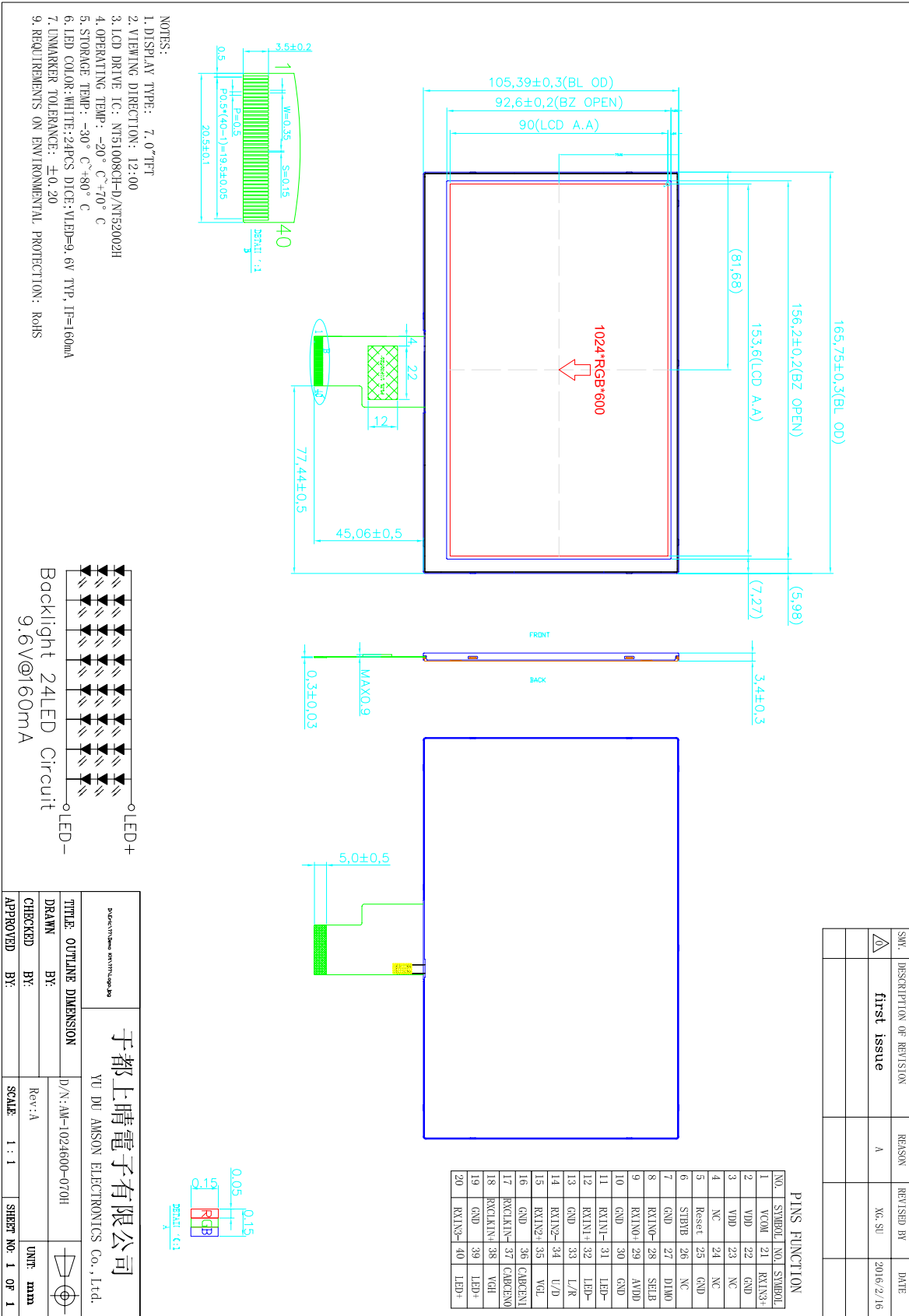
If the event of unforeseen problem or unspecified items may occur, naturally shall negotiate and agree to solution

2. General Information

LCM

ITEM	STANDARD VALUES	UNITS
LCD type	7.0"TFT	--
Dot arrangement	1024×(RGB)×600	dots
Color filter array	RGB stripe	--
Display mode	TN / Transmission / Normally White	--
Viewing Direction	12 O'clock	--
Driver IC	NT52002H-D + NT51008CH-D	--
Module size	165.75(W)×105.39(H)×3.4(T)	mm
Active area	153.6(W)×90.0(H)	mm
Dot pitch	0.15(W)×0.15(H)	mm
Interface	LVDS	--
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Back Light	24 White LED	--
Weight	TBD	g

3. External Dimensions

NOTES:
1.DISPLAY TYPE: 7.0"TFT
2.VIEWING DIRECTION: 12:00
3.LCD DRIVE IC: NT51008CH-D/NT52002H
4.OPERATING TEMP: -20°C~+70°C
5.STORAGE TEMP: -30°C~+80°C
6.LED COLOR:WHITE:24PCS DICE: VLED=9.6V TYP, IF=160mA
7.UNMARKER TOLERANCE: ±0.20
9.REQUIREMENTS ON ENVIRONMENTAL PROTECTION: RoHS

Backlight 24LED Circuit
9.6V@160mA
LED+
LED−

105,39±0,3(BL OD)
92,6±0,2(BZ OPEN)
90(LCD A.A)
(81,68)
156,2±0,2(LCD A.A)
153,6(LCD A.A)
165,75±0,3(BL OD)
1024*RGB*600
(7,27)
(5,98)
77,44±0,5
45,06±0,5
22
12
40

3.5±0.2
0.5
P0.5*(40-1)=19.5±0.05
20.5±0.1
W=0.35
P=0.5
S=0.15
DETAIL :1 B

FRONT
BACK
0,3±0.03
MAX0.9
3,4±0,3

5,0±0,5
0.15
0.05
0.15
RGB
DETAIL :1 A

PINS FUNCTION					
NO.	SYMBOL	NO.	SYMBOL		
1	VCOM	21	RX1N3+		
2	VDD	22	GND		
3	VDD	23	NC		
4	NC	24	NC		
5	Reset	25	GND		
6	STBYB	26	NC		
7	GND	27	D1MO		
8	GND	28	SELB		
9	RX1N0+	29	AVDD		
10	GND	30	GND		
11	RX1N1−	31	LED−		
12	RX1N1+	32	LED−		
13	GND	33	L/R		
14	RX1N2−	34	U/D		
15	RX1N2+	35	VGL		
16	GND	36	CABCEN0		
17	RXCLKIN−	37	CABCEN1		
18	RXCLKIN+	38	VGH		
19	GND	39	GND		
20	RX1N3−	40	LED+		

SMK.	DESCRIPTION OF REVISION	REASON	REVISED BY	DATE
	first issue	A	XG. SU	2016/2/16

TITLE: OUTLINE DIMENSION
D:\Fac\70\Demo-BK\TTV\Logo.jpg
DRAWN BY:
CHECKED BY:
APPROVED BY:

于都上睛电子有限公司
YU DU AMSON ELECTRONICS Co.,Ltd.

D/N:AM-1024600-070H
Rev:A
SCALE: 1:1
UNIT: mm
SHEET NO. 1 OF 1

4. Interface Description

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

29	AVDD	Power fo Analog Circuit
30	GND	Ground
31	LED-	LED Cathode
32	LED-	LED Cathode
33	L/R	Horizontal inversion
34	U/D	Veritical inversion
35	VGL	Gate OFF Voltage
36	CABCEN1	CABC H/W enable
37	CABCEN0	CABC H/W enable
38	VGH	Gate ON Voltage
39	LED+	LED Anode
40	LED+	LED Anode

Note1: If LVDS input data is 6bits,SELB must be set to High;
     If LVDS input data is 8bits,SELB must be set to Low.
Note2: When CABC_EN="00",CABC OFF.
     When CABC_EN="01",user interface image.
     When CABC_EN="10",still picture.
     When CABC_EN="11",moving image.
     When CABC off,don't connect DIMO,else connect it to backlight.
Note3: When L/R="0",set right to left scan direction.
     When L/R="1",set left to right scan direction.
     When C/D="0",set top to bottom scan direction.
     When C/D="1",set bottom to top scan direction.

5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Digital Power Voltage	VDD	GND-0.3	5.0	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
Power Voltage	DVDD	3	3.3	3.6	V	Note1
	AVDD	10.8	11	11.2	V	Note1
TFT Gate ON Voltage	VGH	16	20	24	V	Note1
TFT Gate OFF Voltage	VGL	-10	-7	-4	V	Note1
TFT Common Electrode Voltage	VCOM	3.56	3.76	3.96	V	Note2

Note1:

1)   Vcom value is available in the condition.

The ambient temperature is 25℃.

The operation frequency is 60Hz.

2) The gate ICis the NT52002H-D,the source IC is the NT51008CH-D.

Note2:

1) Be sure to apply Vcc and V_{GL} TO the LCD first, and then apply V_{GH}

2) Be sure contrast ratio is 90% at least when V_{GL} drifts 3v and VGH drifts 4v.Operation Frequency is @60Hz.

7. Timing Characteristics

Item	Symbol	Values			Unit	Remark
		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	
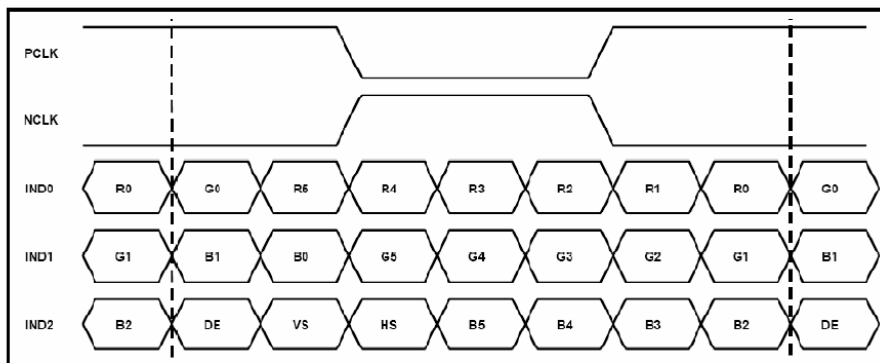
6-bit LVDS input
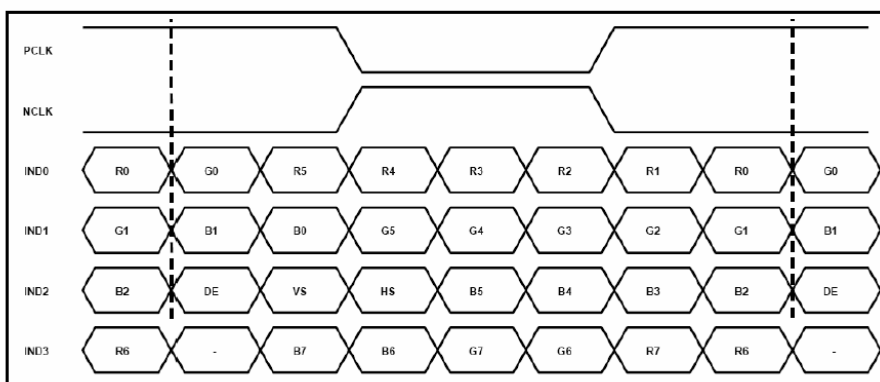
8-bit LVDS input

8. Backlight Characteristic
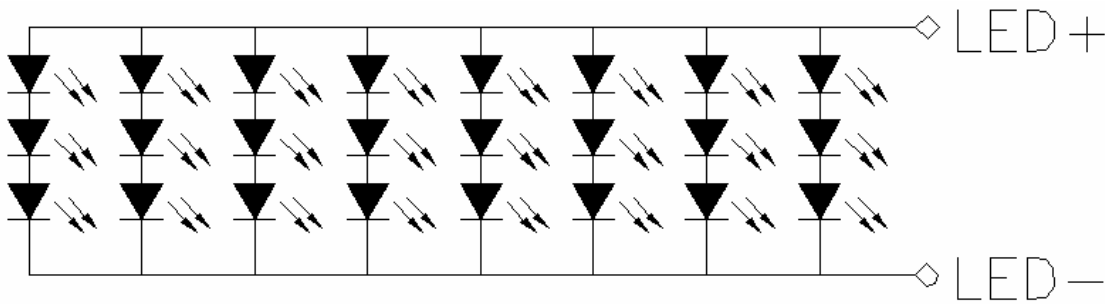
Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	Vf	9.0	(9.6)	12.9	V	If=160mA
Supply Current	If	-	(160)	-	mA	-
Luminous Intensity for LCM	-		280	-	Cd/m^2	If=160mA
Uniformity for LCM	-	70	-	-	％	If=160mA
Life Time	-			-	Hr	If=160mA
Backlight Color	White					

9. Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR>10)	Horizontal	θL	60	70	-	degree	(1),(2),(6)
		θR	60	70	-		
	Vertical	θT	40	50	-		
		θB	60	70	-		
Contrast Ratio	Center		500	700	-	-	(1),(3),(6)
Response Time	Rising+Falling		-	25	50	ms	(1),(4),(6)
CF Color Chromaticity (CIE1931)	Red x		0.634	0.649	0.664	-	(1), (6)
	Red y		0.346	0.331	0.346	-	
	Green x		0.273	0.288	0.303	-	
	Green y		0.57	0.585	0.6	-	
	Blue x		0.125	0.140	0.155	-	
	Blue y		0.074	0.089	0.104	-	
	White x		0.294	0.309	0.324	-	
	White y		0.312	0.327	0.342	-	
Transmittance			3.2	3.5	-	%	(1),(6)

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.
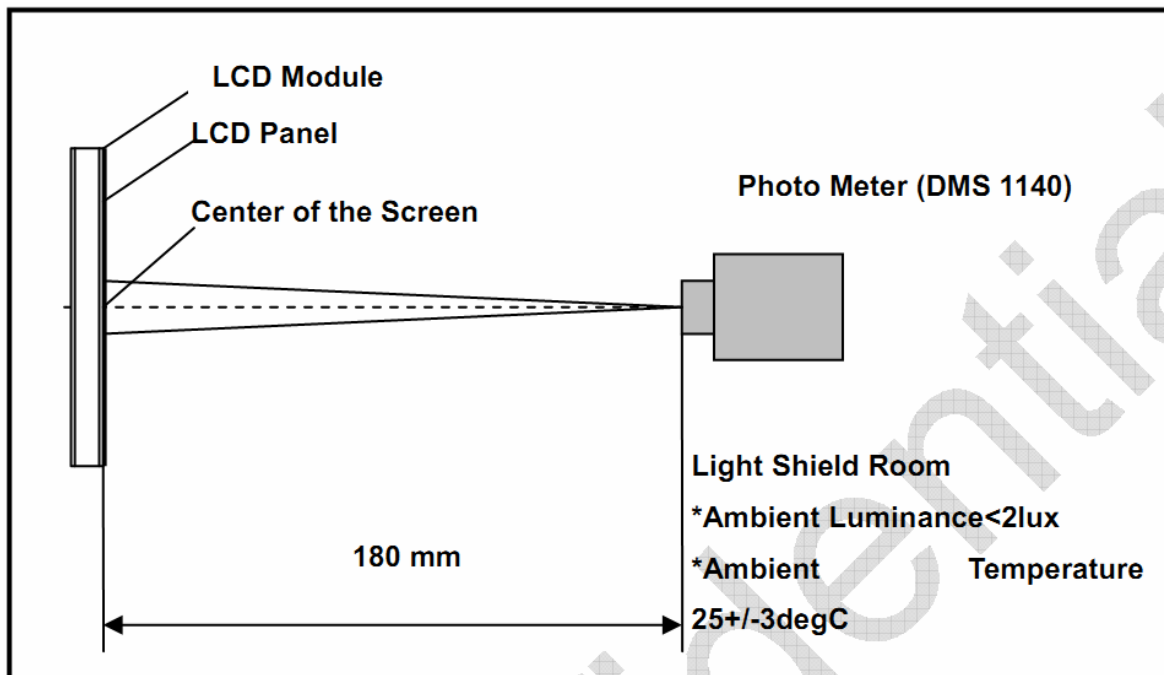
Note (2) Definition of Viewing Angle
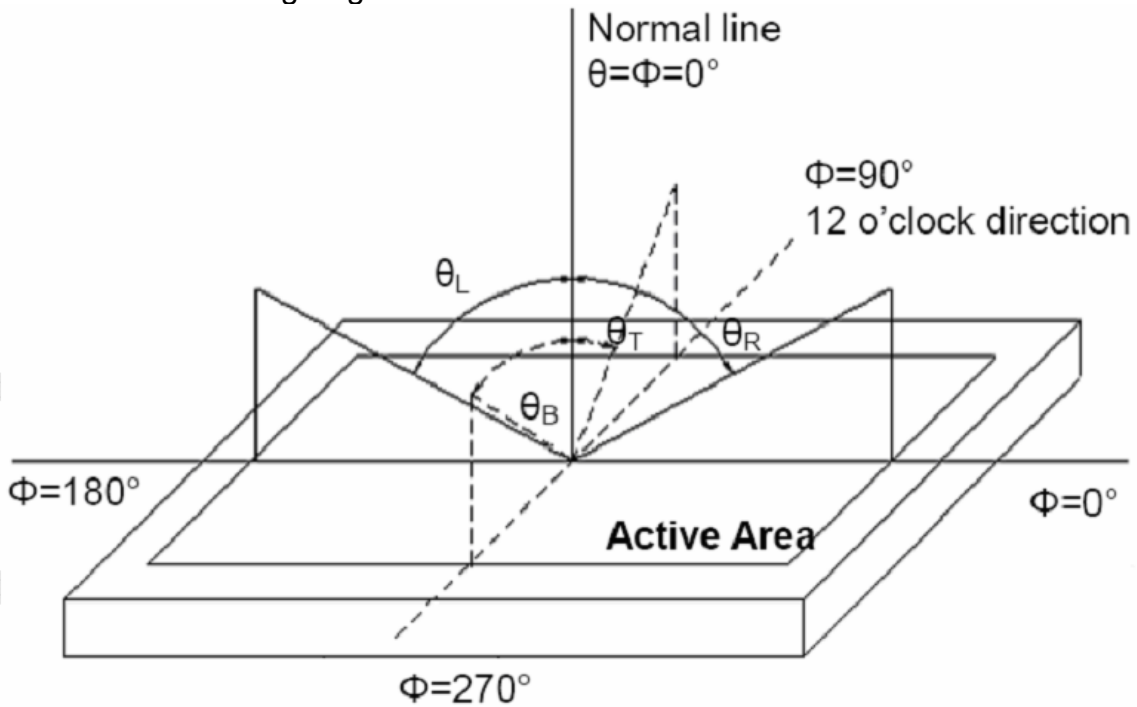
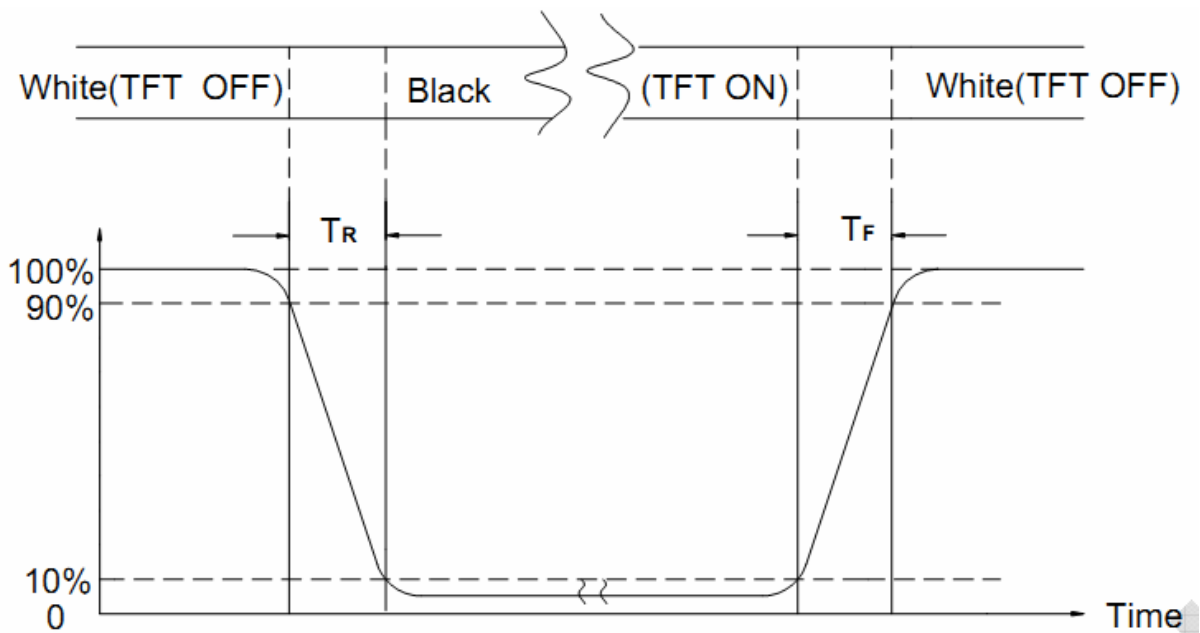Note (3) Definition Of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression

Contrast Ratio (CR) =A / B

A: Luminance when displaying a white raster

B: Luminance when displaying a black raster

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	INSPECTION AFTER TEST
①	High Temperature Storage	80°C±2°C×240Hours	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.
②	Low Temperature Storage	-30°C±2°C×240Hours	
③	High Temperature Operating	70°C±2°C×240Hours	
④	Low Temperature Operating	-20°C±2°C×240Hours	
⑤	Temperature Cycle(Storage)	-20°C ⟷ 25°C ⟷ 70°C (30min) (5min) (30min) 1cycle Total 10cycle	
⑥	Damp Proof Test (Storage)	60°C±5°C×90%RH×240Hours	
⑦	Vibration Test	Frequency:10Hz~55Hz~10Hz Amplitude:1.5M X,Y,Z direction for total 3hours (Packing Condition)	
⑧	Drooping Test	Drop to the ground from 1M height one time every side of carton. (Packing Condition)	
⑨	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 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.

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 which is not specified in this specifications
- 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