8.0" WVGA

High brightness color TFT-LCD module

Model: VM08B4 V3

Version：01

Date: Sep. 13RD, 2020

Note: This specification is subject to change without notice

Customer： _____

Date： _____

Approved	Prepared
Date:	**Date:**

Contents

RECORD OF REVISION

Version and Date	Page	Old description	New description	Remark
0.1 2016/02/18	All	First Edition for customer		
0.2 2020/09/13	5		100K hrs (typical) backlight life	

1. Handling Precautions

1) Since front polarizer is easily damaged, pay attention not to scratch it.

2) Be sure to turn off power supply when inserting or disconnecting from input connector.

3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.

4) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.

5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.

6) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.

7) Do not open or modify the Module Assembly.

8) Do not press the reflector sheet at the back of the module to any directions.

9) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.

10) After installation of the TFT Module into an enclosure, do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.

2. General Description

2.1 Overview

This specification applies to the Color Active Matrix Liquid Crystal Display composed of a TFT-LCD display a LED backlight system. The screen format is intended to support WVGA (800(H) x 480(V)) screen and 16.7M color support.

2.2 Features

- High brightness display, 1000nits by LED backlight.
- 100K hrs Long operation lifetime BLU design
- Wide view angle
- Wide operation temperature
- RoHS Compliance
- LVDS interface

2.3 Application

Industrial applications.

2.4 Display specifications

| Items	Unit	Specification
Screen Diagonal	inch	8.0"
Active Area	mm	176.64 (H) X 99.36 (V)
Pixels H x V	pixels	800 x3(RGB) x 480
Pixels Pitch	um	73.6 (per one triad) x 207
Pixel Arrangement		RGB Vertical stripe
Display mode		Normally white, Transmissive
White luminance (center)	Cd/m^2	1000 (Typ)
Contrast ratio		500:1 (Typ.)
Optical Response Time	msec	25 ms (Typ. On/off)
Normal Input Voltage VDD	Volt	3.3
Power Consumption (Vcc Line + LED backlight)	Watt	2.746 W (VDD line=0.226 W; LED lines= 2.52 W)
Weight	Grams	251
Physical size	mm	192.8 (W)× 116.9 (H)× 10.4 (D)
Electrical Interface		LVDS
Support colors		16.7M
Surface Treatment		Hard coating
Temperature range Operating Storage	^0C ^0C	-30 ~ 85 (TFT surface) -30 ~ 85
RoHS Compliance		RoHS Compliance

2.5 Optical characteristics

The following optical characteristics are measured under stable condition at 25 ^{0}C

Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right)	60	70		2
		CR=10 (Left)	60	70		
		Vertical (Up)	40	50		
		CR=10 (Down)	60	70		
Contrast Ratio		Normal Direction	400	500		3
Response Time	msec	Raising + Falling		25	50	4
Color coordinates (CIE) White		White x	-0.05	0.31	+0.05	5
		White y		0.33		
Center Luminance	Cd/m^2		800	1000		6
Luminance Uniformity	%		70	75		7
Crosstalk (in 60 Hz)	%				1.5	
Flicker	dB				-20	

Note 1: Measurement method

The LCD module should be stabilized at given temperature for 0.5 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.
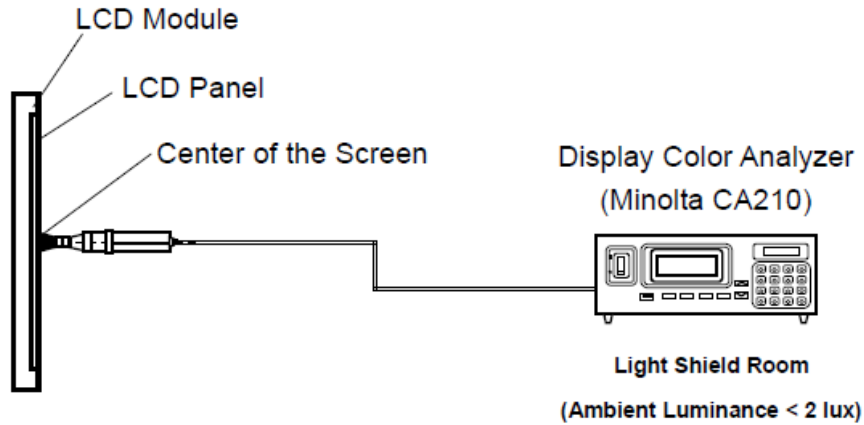

Note 2: Definition of viewing angle
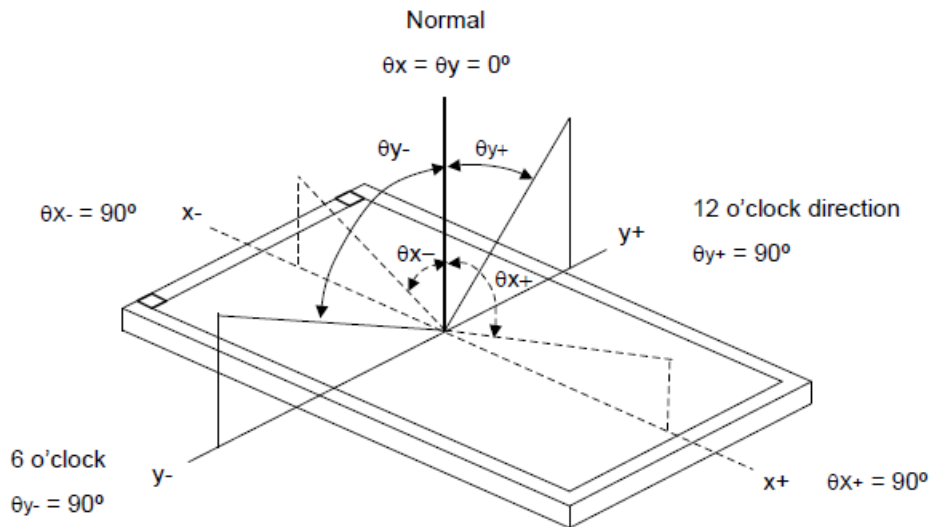
Note 3: Contrast ratio is measured by Minolta CA210

Note 4: Definition of Response time

The output signals of photo detector are measured when the input signals are changed from "Full Black" to "Full White" (rising time), and from "Full White" to "Full Black" (falling time), respectively. The response time is interval between the 10% and 90% of amplitudes. Please refer to the figure as below.
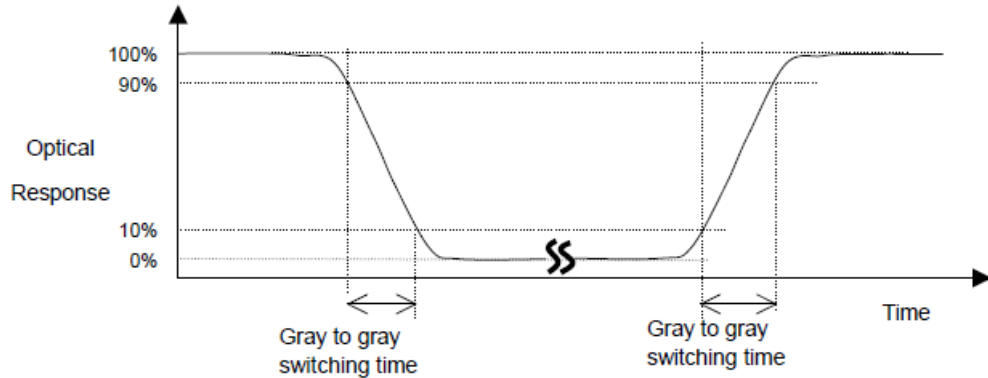
Note 5: Color chromaticity and coordinates (CIE) is measured by Minolta CA210

Note 6: Center luminance is measured by Minolta CA210

Note 7: Luminance uniformity of these 5 points is defined as below and measured by Minolta CA210
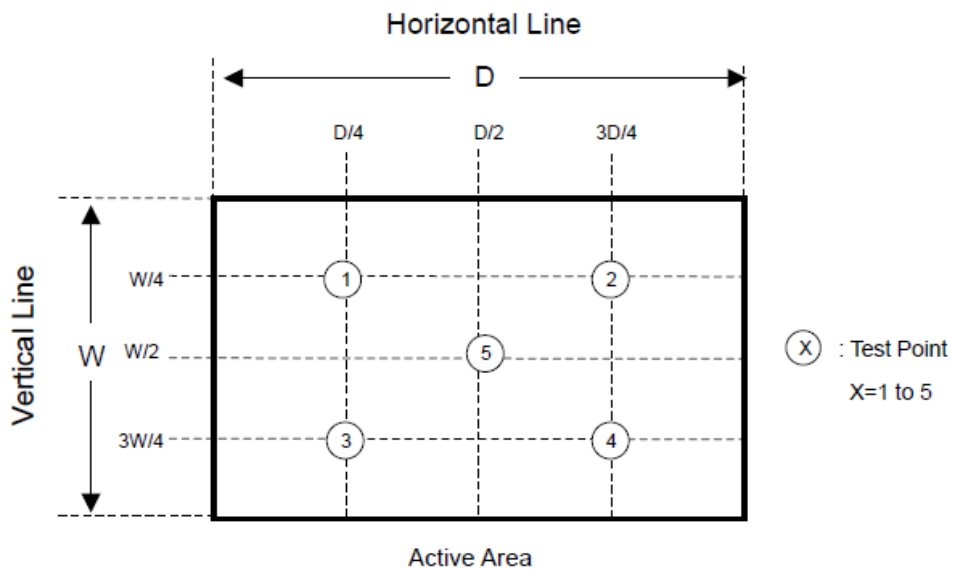
Uniformity = (Min. Luminance of 5 points) / (Max. Luminance of 5 points)

3. Absolute Maximum Ratings

Absolute maximum ratings of the module are as following:

3.1 TFT LCD module

Items	Symbol	Min	Max	Unit	Conditions
Power supply voltage	V_{DD}	-0.3	4.0	Volt	Note 1, 2

3.2 Backlight unit

Items	Symbol	Min	Max	Unit	Conditions
LED bar input current			480	mA	

3.3 Environment

Items	Symbol	Values			Unit	Conditions
		Min.	Typ.	Max.		
Operation temperature	T_{OS}	-30	-	85	^{0}C	
Operation Humidity	H_{OP}	10		85	%	Note 3
Storage temperature	T_{ST}	-30		85	^{0}C	
Storage Humidity	H_{ST}	5		90	%	

Note 1: With in Ta= 25℃

Note 2: Permanent damage to the device may occur if exceed maximum values

Note 3: For quality performance, please refer to IIS (Incoming Inspection Standard).

4. Electrical characteristics

    4.1 LCD electronics specification

        4.1.1   Power specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks (Test Condition)
Input Specification						
Input Voltage	V_{CC}	3.0	3.3	3.6	V_{DC}	
	V_{LED}	-	5	8		
Input Current	I_{vcc}		5	10	mA	
	I_{LED}		TBD	1.1	A	V_{LED} =5V, Dim=Max
On/Off control	**ON/OFF**	-	3	-	V_{DC}	ON STATE
		-	0	-		OFF STATE
Dimming Control	**DIM**	-	5	-	V_{DC}	MIN BRIGHTNESS
		-	0	-		MAX BRIGHTNESS

4.2 Interface connector

    4.2.1   TFT connector(CN1)

CN1: Hirose DF19G-20P-1.25H or equivalent

Pin No	Symbol	Description	Remark
1	VCC	Power supply +3.3V	
2	VCC	Power supply +3.3V	
3	GND	Power ground	
4	GND	Power ground	
5	IN0-	Negative LVDS differential data input	
6	IN0+	Positive LVDS differential data input	
7	GND	Power ground	
8	IN1-	Negative LVDS differential data input	
9	IN1+	Positive LVDS differential data input	
10	GND	Power ground	
11	IN2-	Negative LVDS differential data input	
12	IN2+	Positive LVDS differential data input	
13	GND	Power ground	
14	CLK-	Negative LVDS differential clock input	
15	CLK+	Positive LVDS differential clock input	
16	GND	Power ground	
17	VLED	LED Power supply +5V	
18	VLED	LED Power supply +5V	
19	Enable	Backlight Enable	
20	ADJ	Backlight Dimming (Analog)	

5. Signal characteristics

5.1 Power sequence

Power on
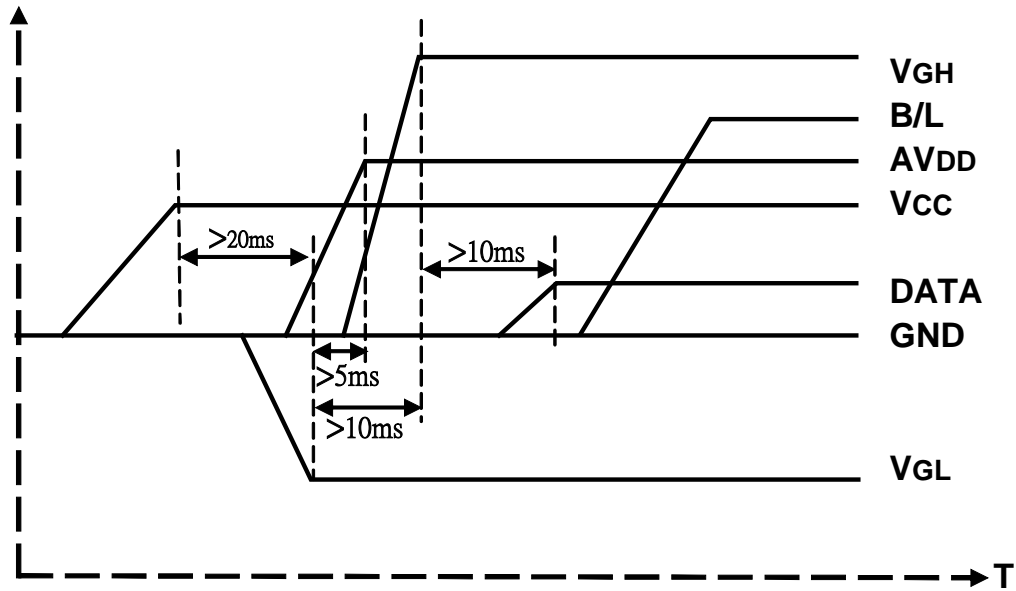
$V_{CC} \rightarrow V_{GL} \rightarrow V_{GH} \rightarrow Data \rightarrow B/L$

Power off
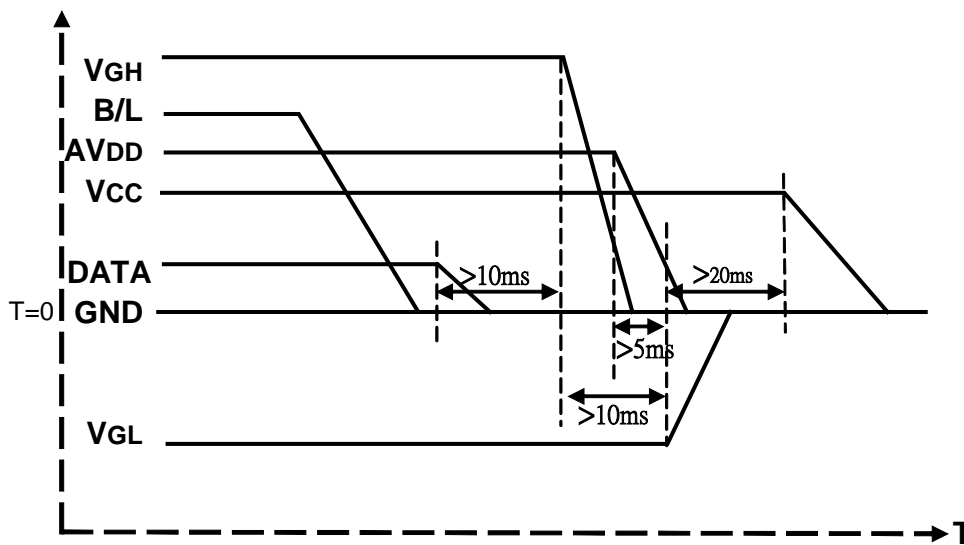
5.2 Timing characteristics
5.2.1 Timing conditions

Item	Symbol	Value			Unit	Note
		Min	Typ.	Max		
RxCLKIN Period	tRCP	11.76	T	50	ns	T= RxCLKIN Period
RxCLKIN High Time	tRCH	-	T/2	-	ns	
RxCLKIN Low Time	tRCL	-	T/2	-	ns	
PAD0/1 to RxCLKIN Delay	tRCD	-	3T/7	-		
Data Setup to RxCLKIN	tRS	1.9	-	-	ns	
Data Hold from RxCLKIN	tRH	3.0	-	-	ns	
Input Data Position 0(T=11.76ns)	TRIP1	-0.4	0	0.4	ns	
Input Data Position 1(T=11.76ns)	TRIP0	T/7-0.4	T/7	T/7+0.4	ns	
Input Data Position 2(T=11.76ns)	TRIP6	2T/7-0.4	2T/7	2T/7+0.4	ns	
Input Data Position 3(T=11.76ns)	TRIP5	3T/7-0.4	3T/7	3T/7+0.4	ns	
Input Data Position 4(T=11.76ns)	TRIP4	4T/7-0.4	4T/7	4T/7+0.4	ns	
Input Data Position 5(T=11.76ns)	TRIP3	5T/7-0.4	5T/7	5T/7+0.4	ns	
Input Data Position 6(T=11.76ns)	TRIP2	6T/7-0.4	6T/7	6T/7+0.4	ns	

Item		Value			Unit	Note
		Min	Typ.	Max		
SYNC	Clock Frequency	-	40	50	MHZ	Note1
	H-sync Total	862	1056	1200	CLK	
	H-sync Pluse Width	1		40	CLK	
	H-sync Back Porch	46	46	46	CLK	
	H-sync Front Porch	16	210	354	CLK	
	H-Active		800		CLK	
	V-sync Total	624	635	700	LINE	
	V-sync Pluse Width	1		20	LINE	
	V-sync Back Porch	23	23	23	LINE	
	V-sync Front Porch	1	12	77	LINE	
	V-Active		600		LINE	

5.2.2 Timing diagram

R/G/B[7]s are MSBs and R/G/B[0]s are LSBs
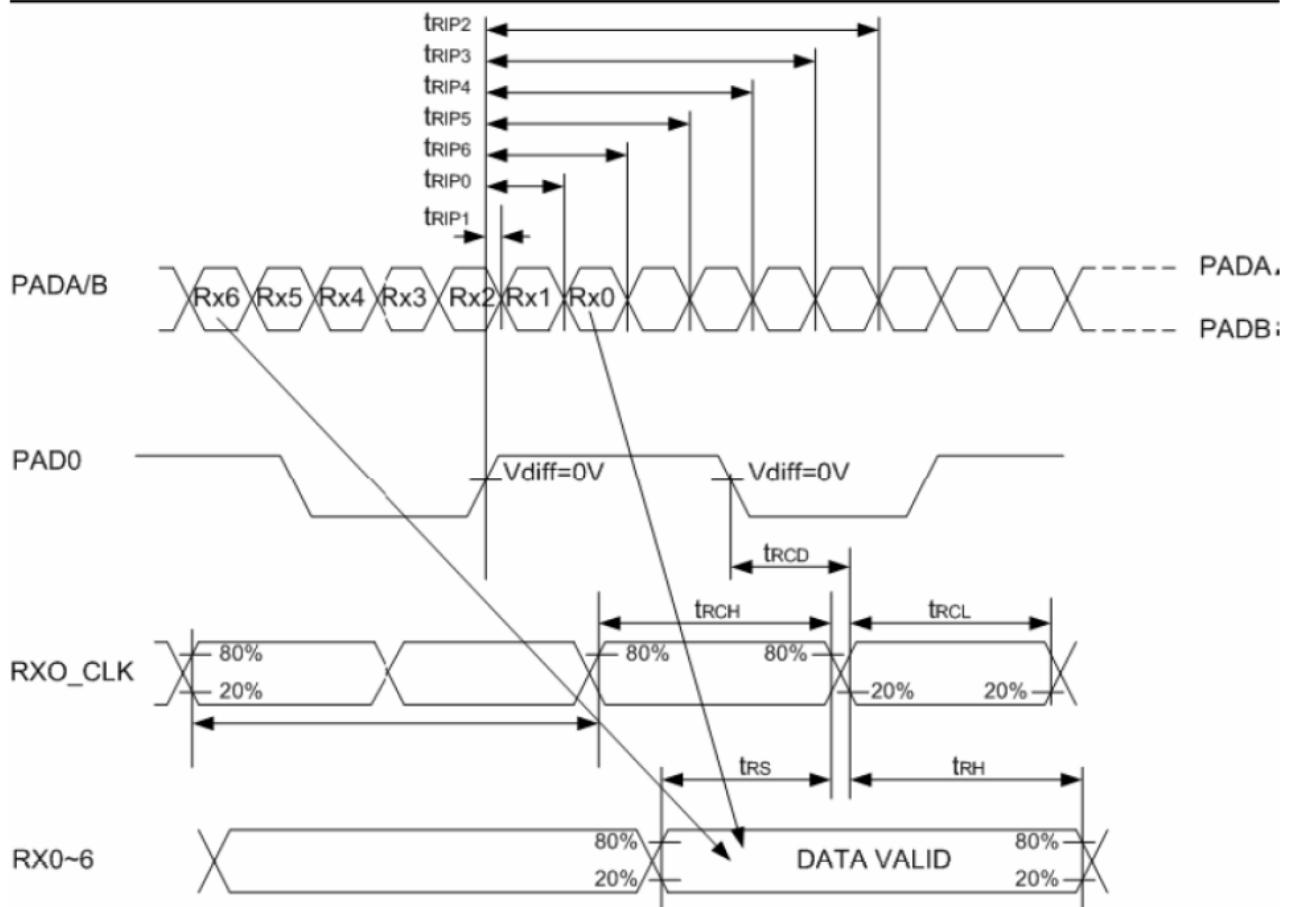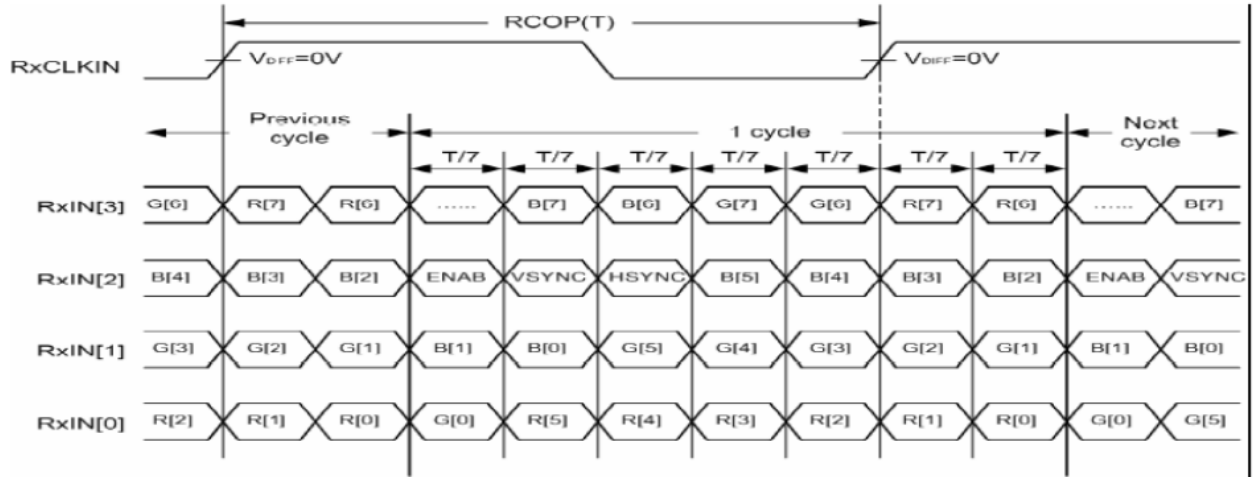
LVDS AC Timing Diagrams

6. Reliability Test

Environment test conditions are listed as following table.

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta=40℃, 80%RH, 120hours	
High Temperature Operation (HTO)	Ts= 85℃, 120hours	3
Low Temperature Operation (LTO)	Ta= -30℃, 120hours	
High Temperature Storage (HTS)	Ta= 85℃, 120hours	
Low Temperature Storage (LTS)	Ta= -30℃, 120hours	
Thermal Shock Test (TST)	-20℃/30min, 60℃/30min, 100 cycles	
On/Off Test	On/10sec, Off/10sec, 30,000 cycles	
ESD (ElectroStatic Discharge)	Contact Discharge: ± 2KV, 150pF(330Ω) 1sec/cycle	
	Air Discharge: ± 2KV, 150pF(330Ω) 1sec/cycle	

Note 1: The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -10℃ to 50℃, and back again. Power is not applied during the test. After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

Note 2: According to EN61000-4-2 , ESD class B: Some performance degradation allowed. No data lost. Self-recoverable. No hardware failures.

Note 3: TFT surface.

Note 4: There should be no condensation on the surface of panel during test.

Note 5: In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before reliability test.

Note 6: Before cosmetic and function test, the product must have enough recovery time, at least 4 hours at room temperature.

**7. Shipping package
(TBD)**
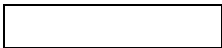
8. Mechanical Characteristics
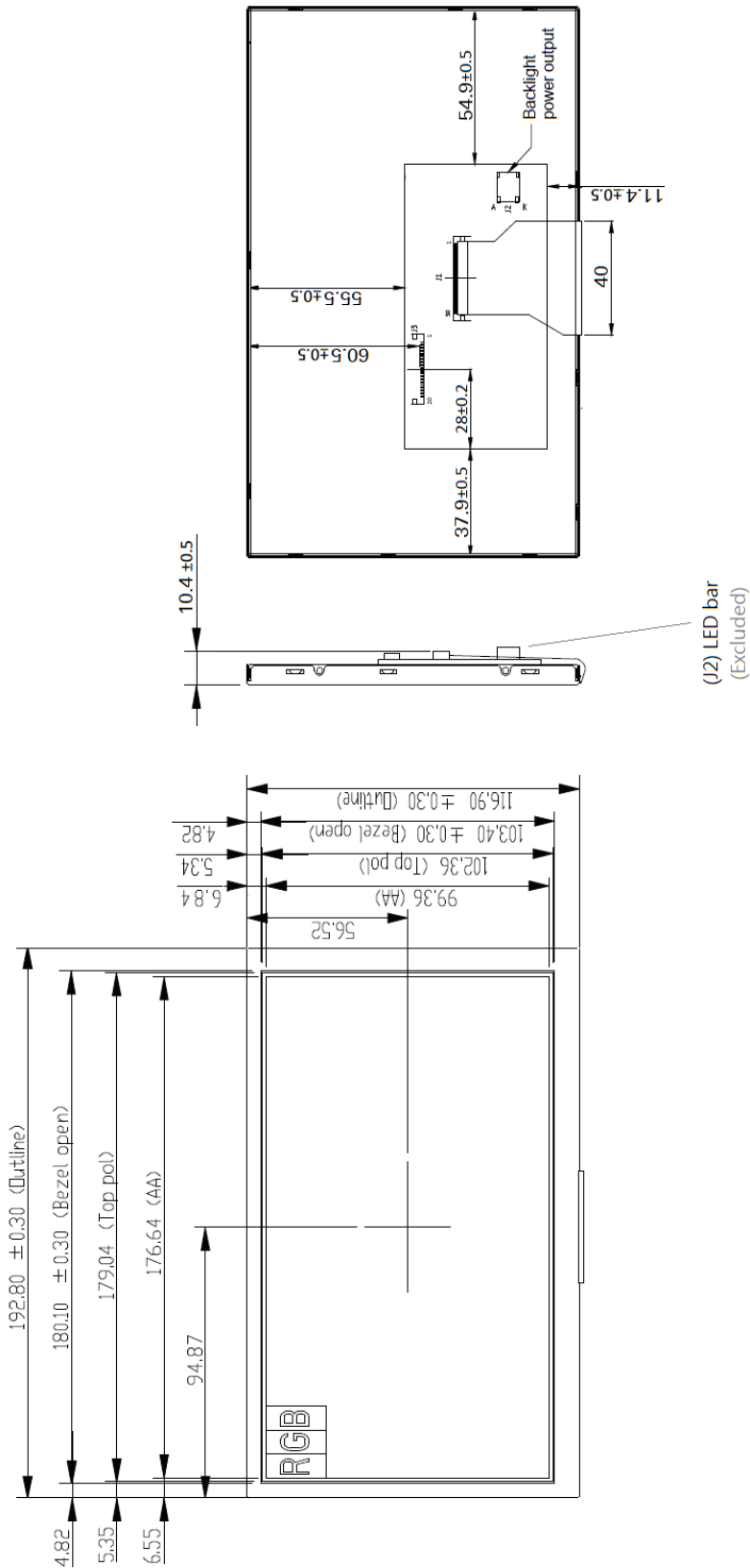
Note:
1. User connector(J2): JST-BHSR-02VS-1
2. User connector(J3):Hirose DF19G-20P-1.25H
3. Unless indicated, general tolerance is ±0.3