8.0” WSVGA

High brightness color TFT-LCD module

Model: VM08B8 V2

Version：01

Date: Aug. 9th, 2021

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 2021/08/09	All	First Edition for customer		

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 WSVGA (1024(H) x 600(V)) screen and 16.7M colors (8 bit).

2.2 Features

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

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	1024 x3(RGB) x 600
Pixels Pitch	um	172.5 (per one triad) x 165.6
Pixel Arrangement		RGB Vertical stripe
Display mode		Normally black, Transmissive
White luminance (center)	Cd/m^2	1000 (Typ)
Contrast ratio		1000:1 (Typ.)
Optical Response Time	msec	25 ms (Typ. On/off)
Normal Input Voltage VDD	Volt	3.3 / 13 / 24.0 / -5.6
Power Consumption (Vcc Line + LED backlight)	Watt	9.274 W (VDD line=0.634 W; LED lines= 8.64 W)
Weight	Grams	184
Physical size	mm	192.8 (W)× 116.9 (H)× 6.4 (D, w PCB)
Electrical Interface		LVDS
IC		ILI5120 & ILI6150M5
Support colors		16.7M colors
Surface Treatment		Anti-glare, Hardness 3H
Temperature range Operating Storage	 ^0C ^0C	 -20 ~ 70 (TFT surface) -30 ~ 80
RoHS Compliance		RoHS Compliance

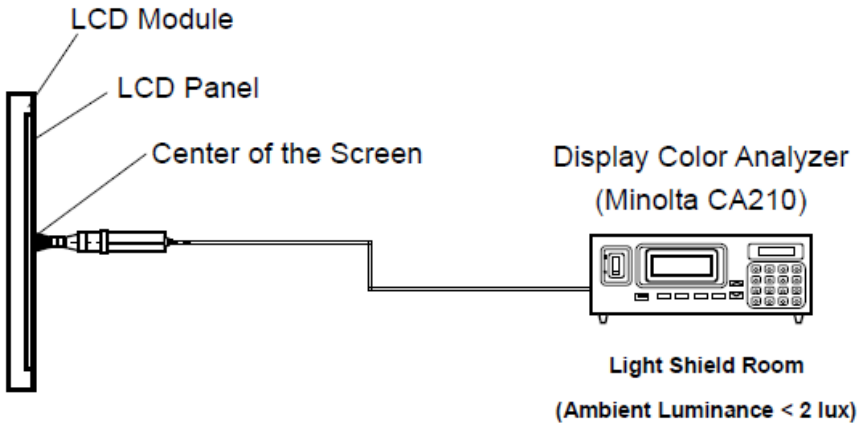
2.5 Optical characteristics

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

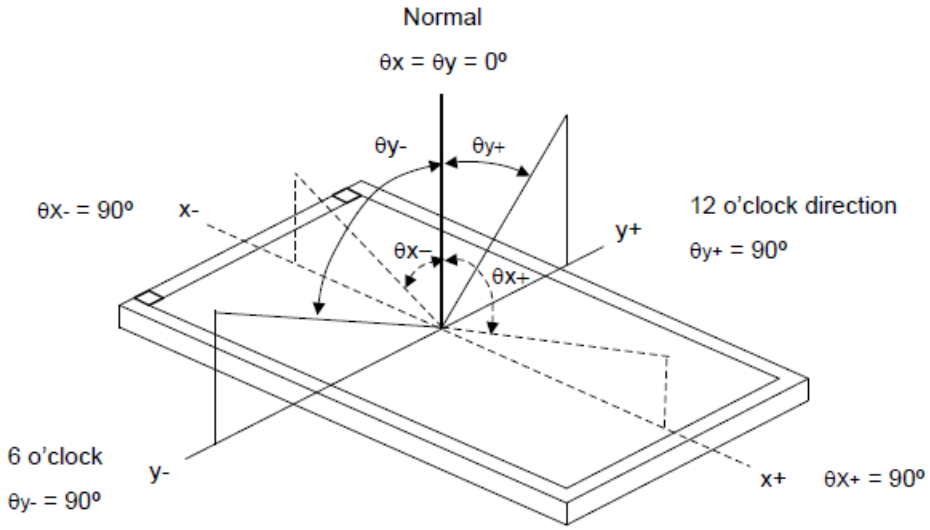
Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right)	75	85		2
		CR=10 (Left)	75	85		
		Vertical (Up)	75	85		
		CR=10 (Down)	75	85		
Contrast Ratio		Normal Direction	600	1000		3
Response Time	msec	Raising + Falling		25	50	4
Color coordinates (CIE) White		White x	-0.05	0.31	+0.05	5
		White y		0.33		
Center Luminance	Cd/m^2		800	1000		6
NTSC	%		65	70		
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.



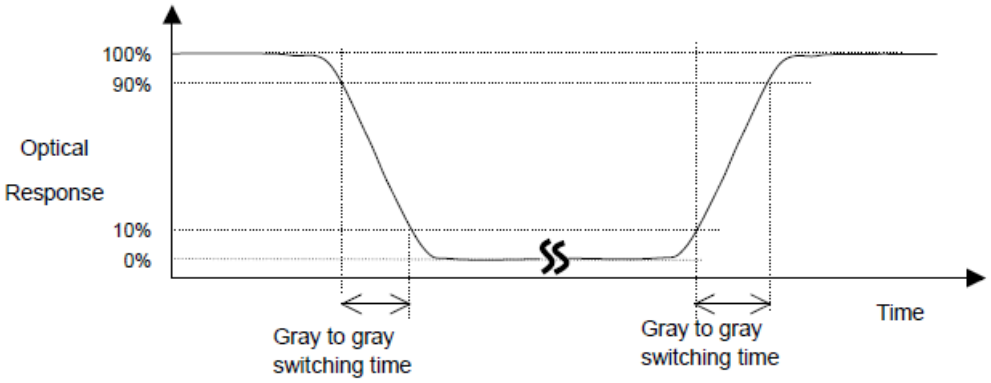
Note 2: Definition of viewing angle



Note 3: Contrast ratio is measured by Minolta CA210

Note 4: Definition of Response time

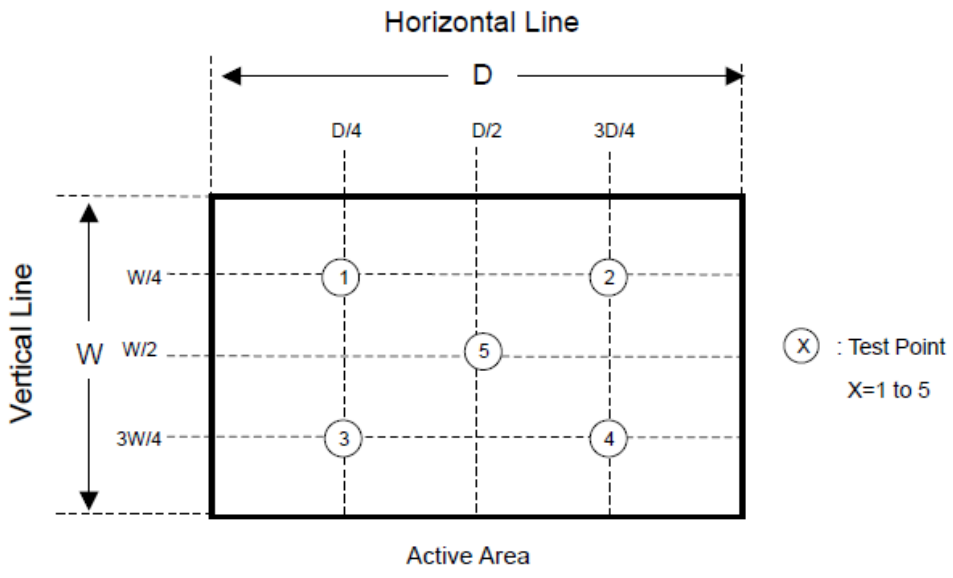
The output signals of photo detector are measured when the input signals are changed from “Full Black” to “Full White” (rising time), and from “Full White” to “Full Black” (falling time), respectively. The response time is interval between the 10% and 90% of amplitudes. Please refer to the figure as 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	DV_{DD}	-0.3	5.0	Volt	
	AV_{DD}	6.5	13.5		
	V_{GH}	-0.3	42		
	V_{GL}	-20.0	0.3		
	V_{GH} -V_{GL}	-	40		

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}	-20	-	70	^{0}C	Note 3
Operation Humidity	H_{OP}	10		85	%	
Storage temperature	T_{ST}	-30		80	^{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

(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DV_{DD}	3.0	3.3	3.6	V	Note 2
	AV_{DD}	12.9	13	13.1	V	
	V_{GH}	23.5	24.0	24.5	V	
	V_{GL}	-6.1	-5.6	-5.1	V	
Input logic high voltage	V_{IH}	$0.7DV_{DD}$	$0.9\ DV_{DD}$	DV_{DD}	V	Note 3
Input logic low voltage	V_{IL}	0	$0.1DV_{DD}$	$0.3DV_{DD}$	V	

Note 1: Be sure to apply DV_{DD} and V_{GL} to the LCD first, and then apply V_{GH}.
Note 2: DV_{DD} setting should match the signals output voltage (refer to Note 3) of customer's system board.
Note 3: RESET,STBYB,SELB,L/R,U/D,CABCEN0,CABCEN1.

3.1.2. Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I_{GH}	0.07	0.30	1.0	mA	-
	I_{GL}	0.08	0.31	1.0	mA	-
	IDV_{DD}	6	24	40	mA	-
	IAV_{DD}	10.5	42	70	mA	-

4.2 Backlight unit

Parameter	Min	Typ	Max	Unit	Note
LED voltage (VL)		24		[V]	2
LED current (IL)		360		[mA]	2
LED power (PL)		8.64		[W]	
LED lite time (MTBF)		60,000		[Hour]	1

Note 1: The “LED lift time” is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25℃ and typical LED Current at 360 mA

Note 2: The variance of LED Light Bar power consumption is ±10%. Calculator value for reference (IL × VL = PLED)

4.3 Interface connector

4.3.1 TFT connector(CN1)

FPC Connector is used for the module electronics interface. The recommended model is FH12A-40S-0.5SH manufactured by Hirose.

Pin No.	Symbol	I/O	Function	Remark
1	NC	---	No connection	Note4
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	---	No connection	Note4
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	Note4
24	NC	-	No connection	Note4

25	GND	P	Ground	
26	NC	---	No connection	Note4
27	DIMO	O	Backlight CABC controller signal output	Note3
28	SELB	I	6bit/8bit mode select	Note1
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	NC	---	No connection	
32	NC	---	No connection	
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	NC	---	No connection	
40	NC	---	No connection	

4.3.2 Backlight connector(CN2)

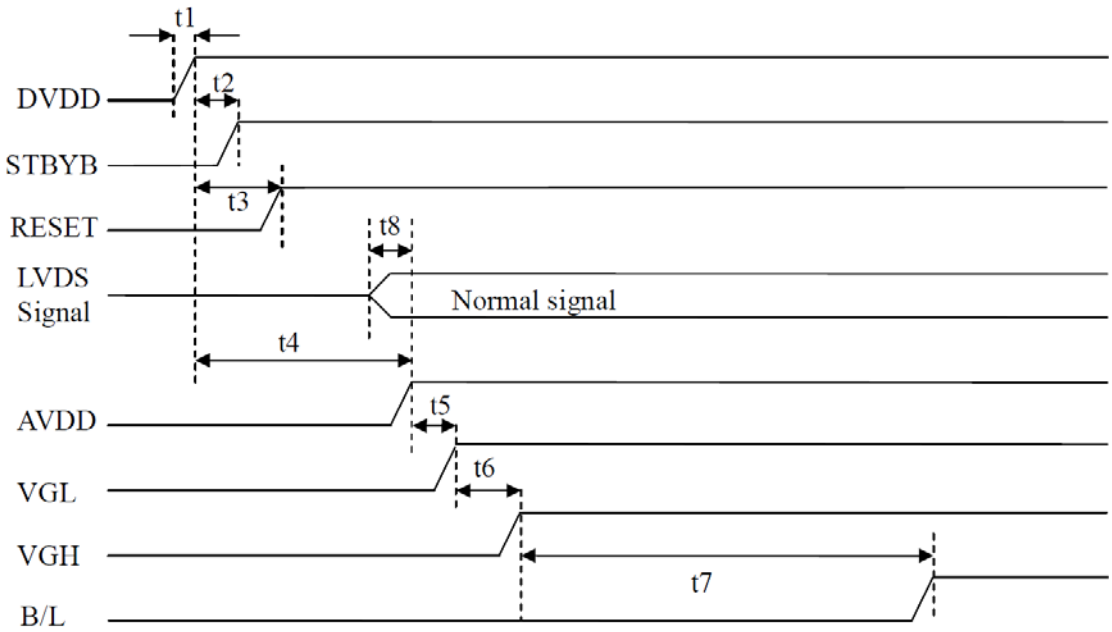
Recommended connector : BHSR-02VS-1 manufactured by JST

Pin no	Symbol	I/O	Description	Remark
1	VLED+	P	Backlight LED anode	Red
2	VLED-	P	Backlight LED cathode	Black

5. Signal characteristics

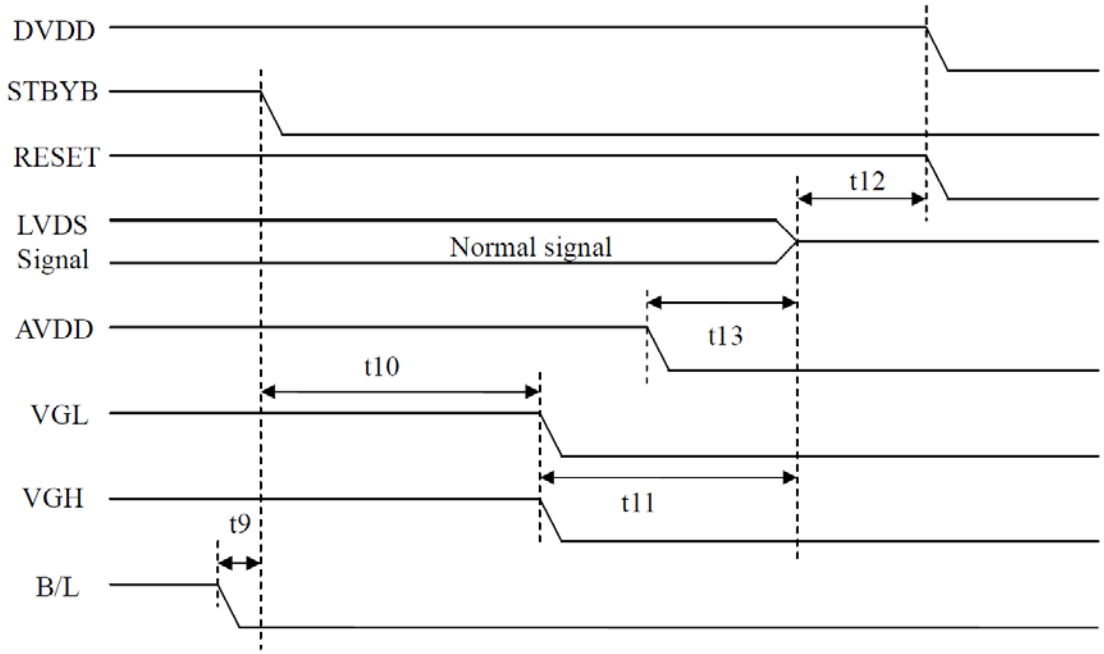
5.1 Power sequence

a. Power on:



Symbol	SPEC			Unit
	Min.	Typ.	Max.	
t1	1	10	20	ms
t2	20	35	50	us
t3	0.5	1	16	ms
t4	16	50	100	ms
t5	20	70	120	us
t6	40	90	140	ms
t7	150	170	200	ms
t8	0.1	1	16	ms

b. Power off:

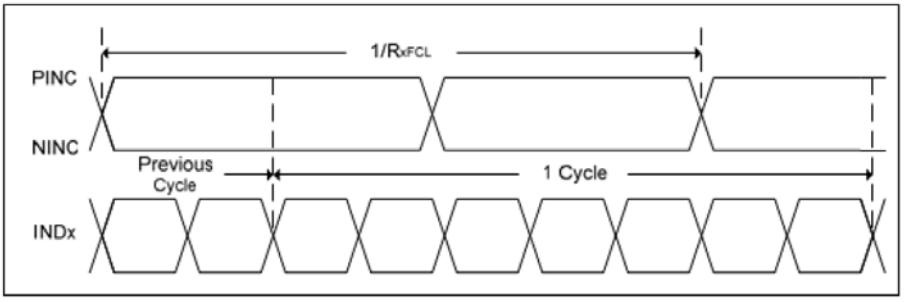


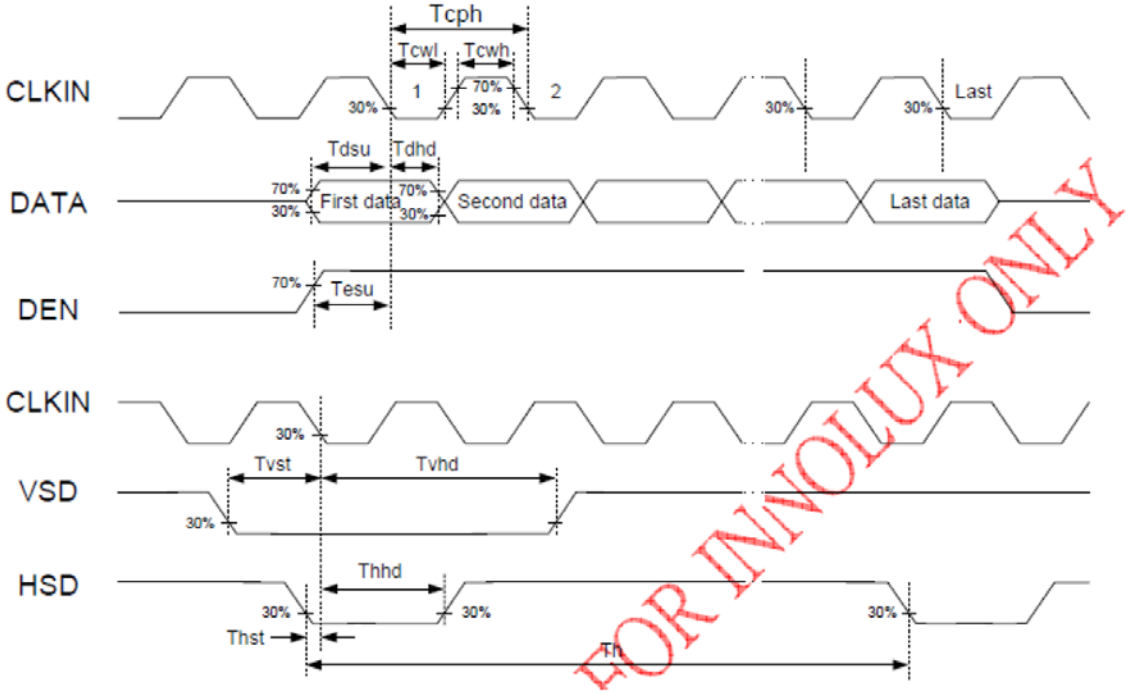
Symbol	SPEC			Unit
	Min.	Typ.	Max.	
t9	0.1	1	10	ms
t10	100	120	200	ms
t11	50	100	200	ms
t12	0.1	10	100	ms
t13	1	10	20	ms

5.2 Timing characteristics

5.2.1 AC electrical characteristics

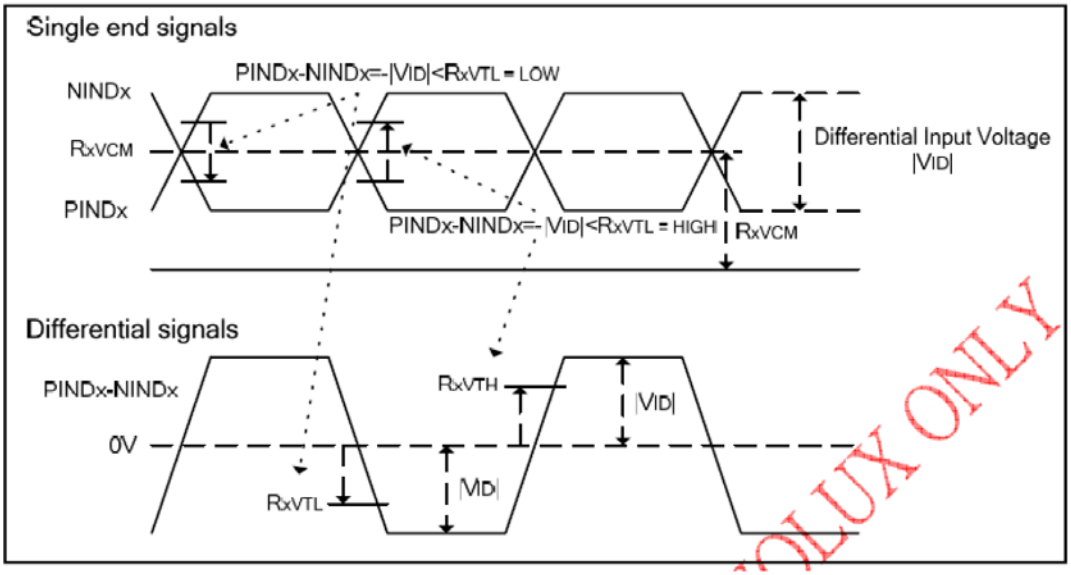
Parameter	Symbol	Min	Typ.	Max	Unit	Conditions
Clock frequency	RxFCLK	26.2	51.2	71	MHz	
Input data skew margin	TRSKM	500	500	1/(2x RxFCLK)	ps	|VID|=400mv RxVCM=1.2V RxFCLK=71MHz VDD_LVDS=3.3V
Clock high time	TLVCH	4/(7x RxFCLK)			ns	
Clock low time	TLVCL	3/(7xRxFCLK)			ns	
VSD setup time	TenPLL	0<TenPLL<150			us	





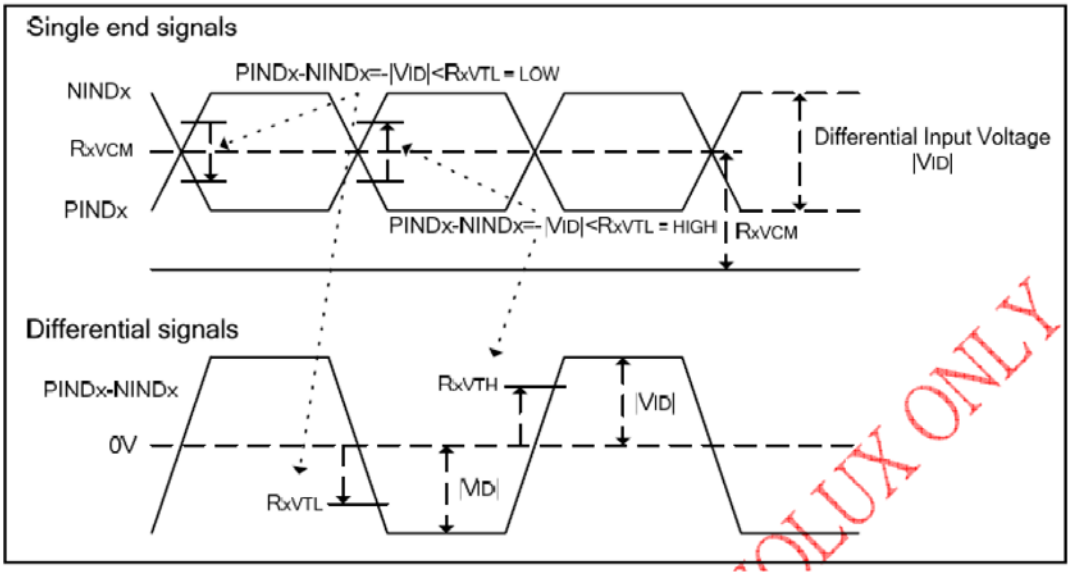
5.2.2 Input clock data timing diagram

Parameter	Symbol	Min	Typ.	Max	Unit	Conditions
Differential input high threshold voltage	RxVTH	0.1	0.2	|VID|	V	RxVCM=1.2V
Differential input low threshold voltage	RxVTL	-|VID|	-0.2	-0.1	V	
Input voltage range (singled-end)	RxVIN	0	1.2±0.4	2.4	V	
Differential input common mode voltage	RxVCM	|VID|/2	1.2	2.1-|VID|/2	V	
Differential input voltage	|VID|	0.2	0.4	0.6	V	
Differential input leakage current	RVxliz	-10	0	+10	uA	
LVDS Digital Operating Current	Iddlvds	8	22	30	mA	Fclk=65MHz,VDD=3.3V
LVDS Digital Standby Current	Istlvds	0	200	300	uA	Clock & all Functions are stopped



5.2.3 DE electrical characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Conditions
Differential input high threshold voltage	RxVTH	0.1	0.2	|VID|	V	RxVCM=1.2V
Differential input low threshold voltage	RxVTL	-|VID|	-0.2	-0.1	V	
Input voltage range (singled-end)	RxVIN	0	1.2±0.4	2.4	V	
Differential input common mode voltage	RxVCM	|VID|/2	1.2	2.1-|VID|/2	V	
Differential input voltage	|VID|	0.2	0.4	0.6	V	
Differential input leakage current	RVxliz	-10	0	+10	uA	
LVDS Digital Operating Current	Iddlvds	8	22	30	mA	Fclk=65MHz,VDD=3.3V
LVDS Digital Standby Current	Istlvds	0	200	300	uA	Clock & all Functions are stopped



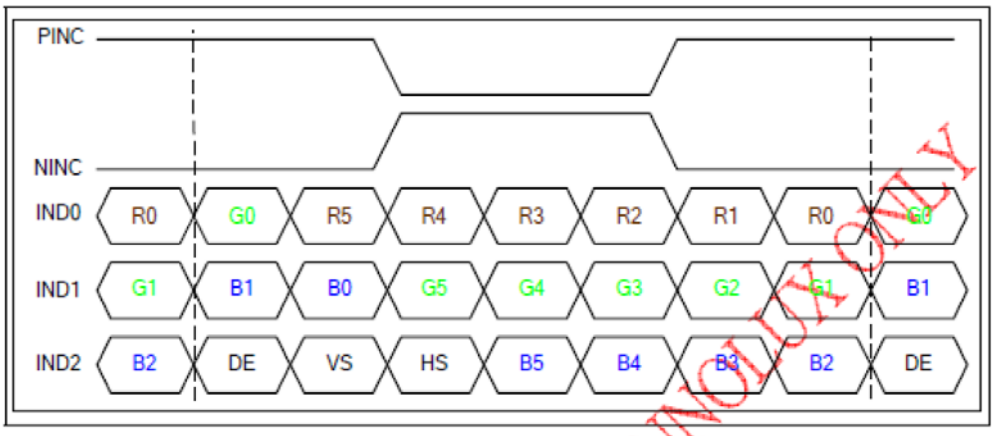
5.2.4 Timing

Parameter	Symbol	Value			Unit
		Min	Typ.	Max	
DCLK frequency Frame rate = 60Hz	fclk	42.6	51.2	67.2	MHz
Horizontal display area	thd		1024		DCLK
HSYNC period time	th	1164	1344	1400	DCLK
HSYNC blanking	thb+thfp	140	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

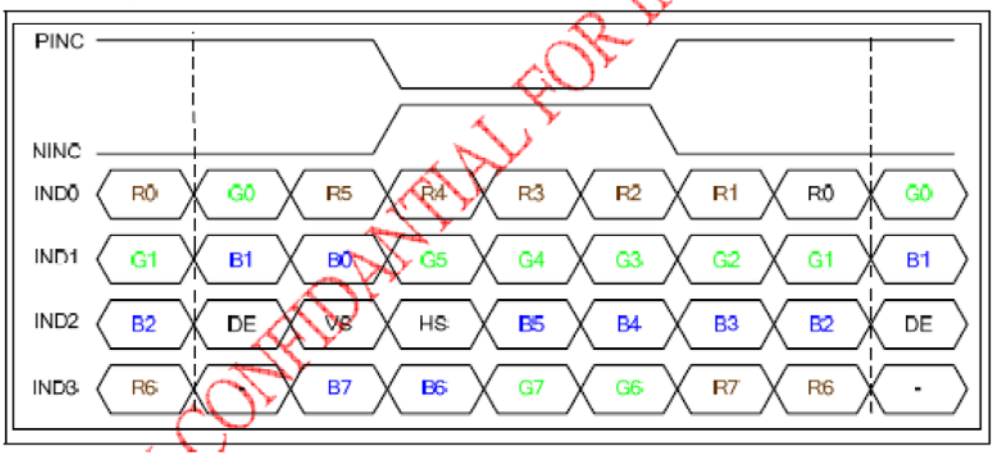
Note：Frame rate is 60Hz.

5.2.5 Data input format

6bit LVDS input



8bit LVDS input



Note: Support DE mode only, SYNC mode not support.

6. Reliability Test

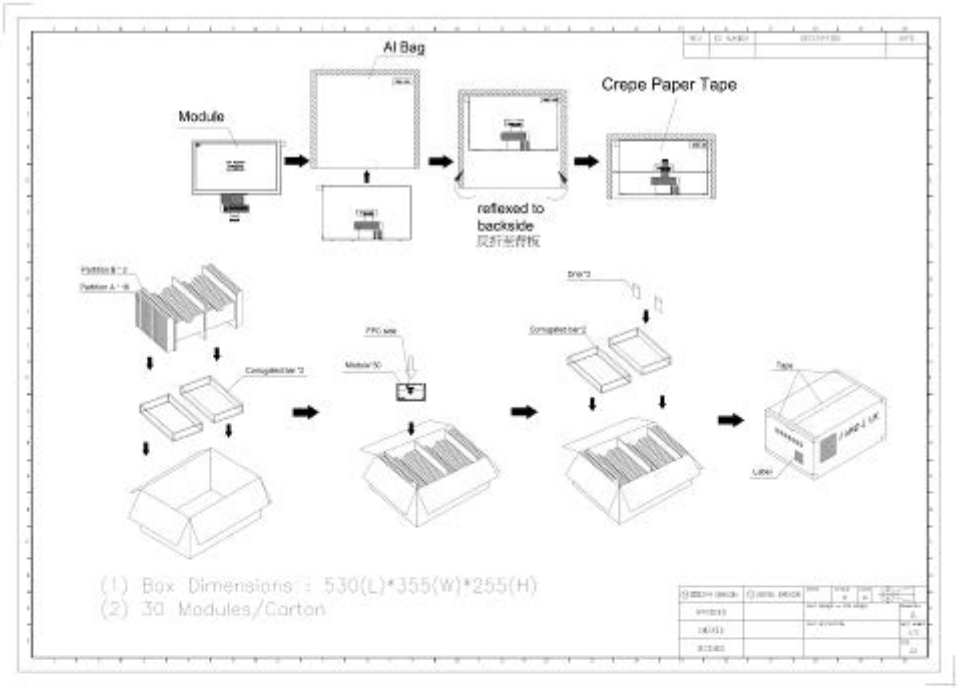
Environment test conditions are listed as following table.

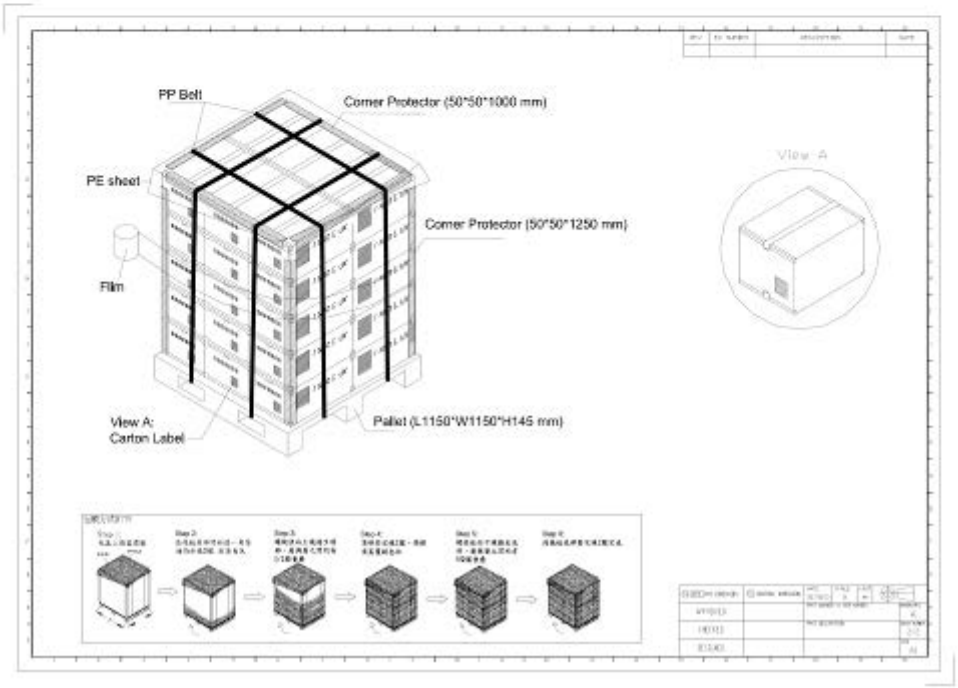
Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta=40℃, 80%RH, 240hours	
High Temperature Operation (HTO)	Ts= 70℃, 240hours	2
Low Temperature Operation (LTO)	Ta= -20℃, 240hours	
High Temperature Storage (HTS)	Ta= 80℃, 240hours	
Low Temperature Storage (LTS)	Ta= -30℃, 240hours	
Thermal Shock Test (TST)	-20℃/30min, 60℃/30min, 100 cycles	
On/Off Test	On/10sec, Off/10sec, 30,000 cycles	
ESD (ElectroStatic Discharge)	± 2KV, Human Body Mode, 100pF/1500Ω	

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: TFT surface.

7. Shipping package
(TBD)





8. Mechanical Characteristics