AUO

CUSTOMER APPROVAL SHEET

Company Name	
MODEL	C103VAN01.1
CUSTOMER **APPROVED**	Title : Name :

☐ **APPROVAL FOR SPECIFICATIONS ONLY (Spec. <u>Ver. 1.1</u>)**

☐ **APPROVAL FOR SPECIFICATIONS AND ES SAMPLE (Spec. <u>Ver. 1.1</u>)**

☐ **APPROVAL FOR SPECIFICATIONS AND CS SAMPLE (Spec. <u>Ver. 1.1</u>)**

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Doc. Version	1.1
Total Page	22
Date	2017/02/24

Product Specification

10.25" COLOR TFT-LCD MODULE

MODEL NAME: C103VAN01.1

Model Name: C103VAN01.1

Planned Lifetime:	From 2016/Jan To 2019/Dec
Phase-out Control:	From 2019/Apr To 2019/Dec
EOL Schedule:	2019/Apr

<>Preliminary Specification

<◆>Final Specification

Record of Revision

Version	Revise Date	Page	Content
0.0	2015/11/27	All	First draft.
0.1	2015/12/17	6	2D drawing modified
0.2	2016/01/27	9	Modified connector type:Hirose FH28-40S-0.5SH
	2016/01/27	23	Updated Packing Form
0.3	2016/02/27	9	Modified pin assignment statement.
0.4	2016/04/29	11	Add DC Electrical Characteristics: IVDD and AVDDA
		12	Modified Power Specification
		9、17、18、19	Updated pin assignment、input timing、power on / off sequence
		20	Modified Optical specifications: Color Chromaticity
0.5	2016/07/11	5	Add LCM weight
		7,8	Modified Module Drawing: the connection of PCBA and FPC
		9	Pin 26,27,28,29 are defined as the NC pins.
1.0	2017/01/24	9	Pin5 are defined as the NC pin.
1.1	2017/02/24	7	Modified Drawing version

Contents

A. General Description

C103VAN01.1 is an a-Si & Transmissive type Thin Film Transistor Liquid crystal Display (TFT-LCD) with AHVA (Advanced Hyper View Angle) technology. This model is composed of a TFT-LCD, drivers, the FPC (flexible printed circuit), a backlight unit, and the PCBA (Printed Circuit Board Assembly)

B. Features

- 10.25-inch (8:3) display
- 1280RGB x 480 resolution in RGB stripe dot arrangement
- Interfaces: LVDS
- Advanced Hyper View Angle – Normal Black wide view technology, AHVA
- RoHs compliance

C. Physical Specifications

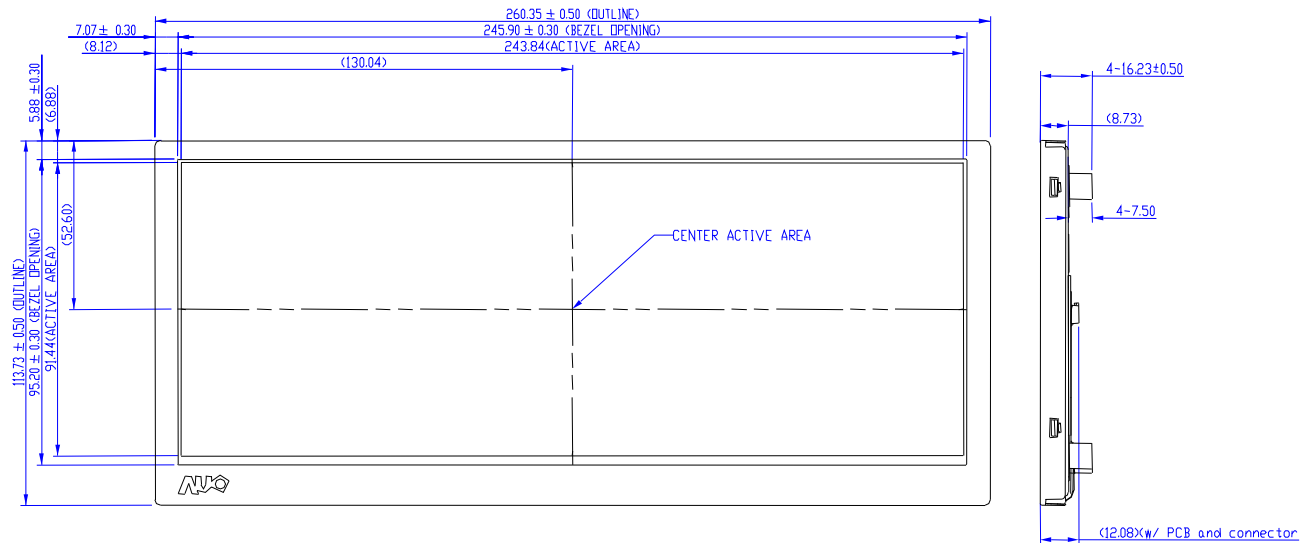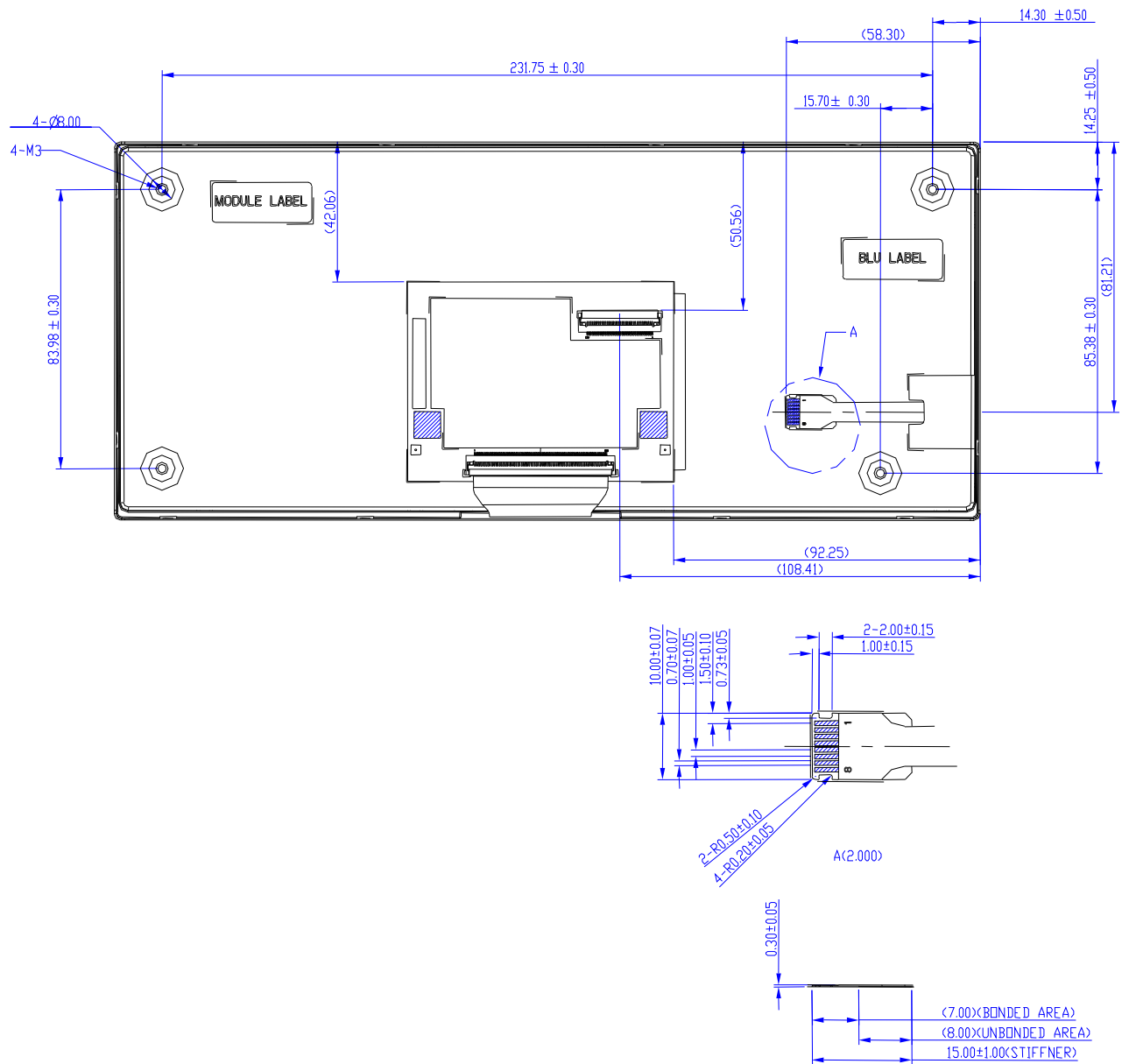| NO.	Item	Unit	Specification	Remark
1	Display Resolution	dot	1280 (H)×480(V)	
2	Active Area	mm	243.84(H)x91.44(V)	
3	Screen Size	inch	10.25(Diagonal)	
4	Dot Pitch	mm	0.0635(H)×RGBx0.190.5(V)	
5	Color Configuration	--	R. G. B. Stripe	Note 1
6	Color Depth	--	16.7M Colors	
7	Overall Dimension	mm	260.35 x 113.73 x 8.73/16.23 w/o Boss, w BOSS	Note 2
8	Weight	g	363+/-10%	
9	Display Mode	--	Normally Black	
10	Surface Treatment		AG，3H	

Note 1: Below figure shows dot stripe arrangement.
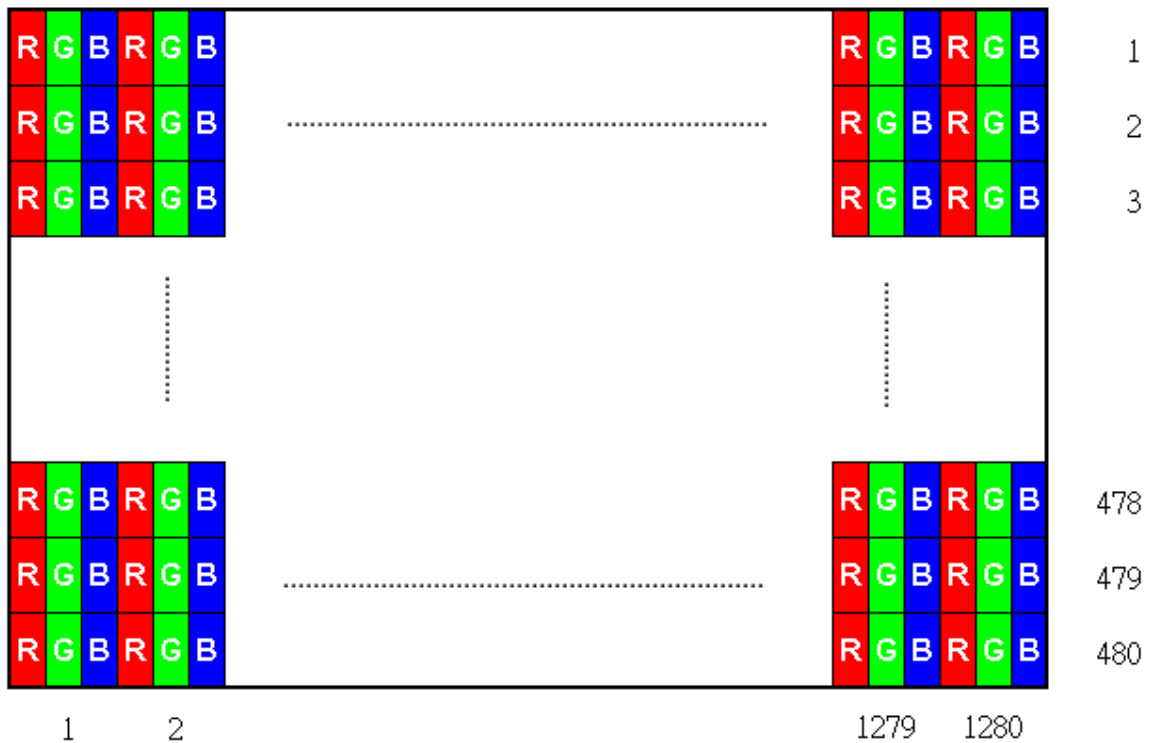
Note 2: Please refer to the drawing in page 6 for further information

D. Outline Dimension

Notes:
1. General tolerance is ±0.3MM
2. The bending radius of FPC should be large than 0.6MM
3. The parenthesized dimensions are for reference.
4. LED connector type:Lriso 9664 S, 8pins.
5. CELL FPC connector type: Kyocera 6228, 40pins.

14.30 ±0.50
(58.30)
231.75 ± 0.30
15.70± 0.30
14.25 ±0.50
4-Ø8.00
4~M3
MODULE LABEL
(42.06)
(50.56)
BLU LABEL
(81.21)
A
83.98 ± 0.30
85.38 ± 0.30
(92.25)
(108.41)

2-2.00±0.15
1.00±0.15
10.00±0.07
0.70±0.07
1.00±0.05
1.50±0.10
0.73±0.05
1
8
2-R0.50±0.10
4-R0.20±0.05
A(2.000)

0.30±0.05
(7.00)(BONDED AREA)
(8.00)(UNBONDED AREA)
15.00±1.00(STIFFNER)

E. Electrical Specifications

1. Pin Assignment

a. Main FPC

Connector= *Hirose FH28-40S-0.5SH*

| Pin No.	Symbol	I/O	Function
1	GND	G	Ground
2	DISP_ON	I	Display on/off(Black display) High : normal display Low : no display
3	GRB	I	Reset (low active normally pull high)
4	GND	G	Ground
5	NC	NA	No Use
6	GND	G	Ground
7	D3_P	I	LVDS data 3+
8	D3_N	I	LVDS data 3-
9	GND	G	Ground
10	CLK_P	I	LVDS data clock+
11	CLK_N	I	LVDS data clock-
12	GND	G	Ground
13	D2_P	I	LVDS data 2+
14	D2_N	I	LVDS data 2-
15	GND	G	Ground
16	D1_P	I	LVDS data 1+
17	D1_N	I	LVDS data 1-
18	GND	G	Ground
19	D0_P	I	LVDS data 0+
20	D0_N	I	LVDS data 0-
21	GND	G	Ground
22	GND	G	Ground
23	VDD	P	Power supply(3.3V)
24	VDD	P	Power supply(3.3V)
25	GND	G	Ground
26	NC	NA	No Use
27	NC	NA	No Use
28	NC	NA	No Use
29	NC	NA	No Use
30	GND	G	Ground
31	GND	G	Ground
32	LRR	I	Left right rotation
33	UDR	I	Up down rotation
34	GND	G	Ground
35	GND	G	Ground
36	GND	G	Ground
37	GND	G	Ground
38	GND	G	Ground
39	GND	G	Ground
40	GND	G	Ground

b. BACK LIGHT UNIT FPC
Connector=IRISO 9664S-08Y800

No.	Pin Name	I/O	Description	Remarks
1	Anode	Vin	LED power supply voltage	
2	Anode	Vin	LED power supply voltage	
3	NC	NA	No Use	
4	NC	NA	No Use	
5	NC	NA	No Use	
6	Cathode 1	G1	Ground of string 1	
7	Cathode 2	G1	Ground of string 2	
8	Cathode 3	G1	Ground of string 3	

R: Resistance, G: GND, V_{in}: Power input
Gold finger side:

PIN 1

SHLR="H"

SHLR="L"

UPDN="H"

UPDN="L"

FPC

PCBA

FPC

PCBA
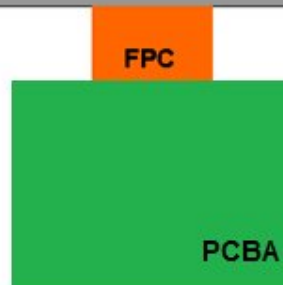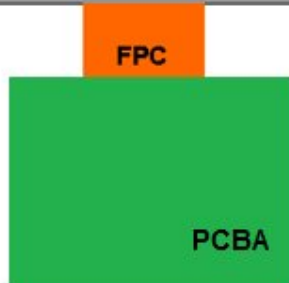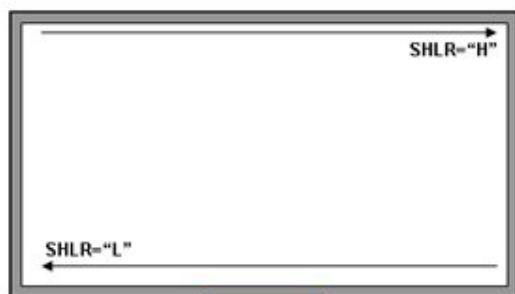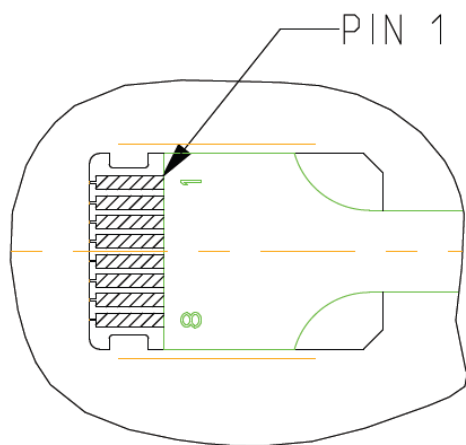
2. Absolute Maximum Ratings

Items	Symbol	Values		Unit	Condition
		Min.	Max.		
Digital Power Voltage	VDD	-0.3	5	V	Note 1
Input Signal Voltage	Vi	-0.3	VDD	V	Note 1
Operation Temperature	Topa	-30	+85	℃	
Storage Temperature	Tstg	-40	+95	℃	

Note 1: Functional operation should be restricted under normal ambient temperature.

3.   DC Electrical Characteristics
The following items are measured under stable condition and suggested application circuit.

a.   Power Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply	VDD	3	3.3	3.6	V	
	IVDD	-	-	500	mA	
	IVDD inrush current	-	-	800	mA	

Note 1: Test pattern is the following picture .
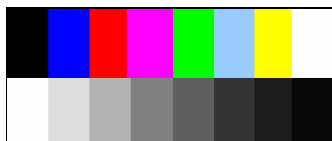
Note 2: Best VCOM can be found between Min. to Max. range. Typical value is an average value not the best VCOM. It must be optimized according to each LCD. If the value not set optimized, it will affect optical performances. Such as gamma, flicker, image sticking. Suggested to use adjustable voltage apply to VCOM.

b.   Signal DC Electrical Characteristics

※ It's the tentative list, need further modification

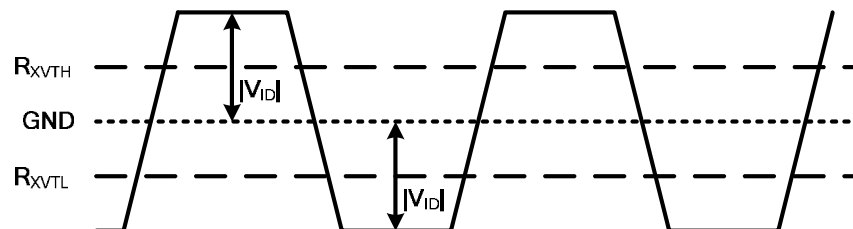| Parameter	Symbol	Min	Typ	Max	Unit	Remark
Input signal voltage	Vi	-0.3	-	VDD	V	
Input high level voltage	V_{IH}	0.7VDD	-	VDD	V	
Input low level voltage	V_{IL}	GND	-	0.3VDD	V	
Differential input high threshold	R_{XVTH}	0.1	-	-	V	
Differential input low threshold	R_{XVTL}	-	-	-0.1	V	
Input voltage range (singled-end)	R_{XVIN}	0.8	-	1.6	V	
Input differential voltage	$|V_{ID}|$	0.2	-	0.6	V	
Differential Input Common Mode Voltage	R_{XVCM}	1.1	1.2	**1.4**	V	

Single-end Signal
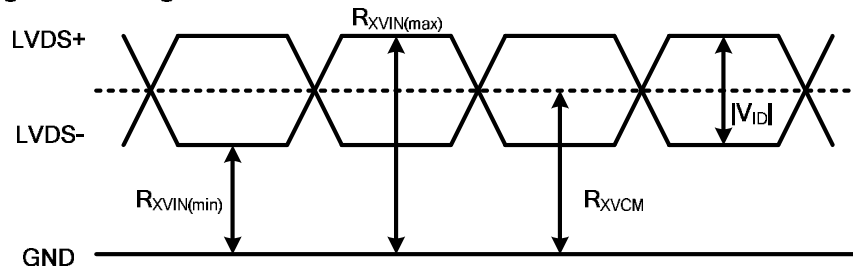
Differential Signal

Fig. 1 LVDS DC characteristics diagram

c. Backlight Driving Conditions (Note 1)

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
Forward Current	I_F	at 25℃	---	80	85	mA	Single serial (Note 2)
Forward Voltage	V_F	I_F=80(mA), at 25℃	---	(27)	30.6	V	3.4V*9pcs =30.6V (Note 3)
LED Life Time	T_{LED}	at 25℃	10,000	---	---	Hrs	Note4 (Reference)

Note 1: LED backlight has one light-bar.
Light-bar has 27 LEDs (3 strings, 9 pcs for each string).
Note 2: The LED supply power is for 3 string of LED
Note 3: Be sure your system can provide enough voltage driving capability (larger than 30.6V is recommended) to provide 80mA for each LED or the brightness is possible to be below spec.
Note 4: The LED lifetime 10,000hrs means , after normal use at 80mA, under +25°C, the brightness decreases to 50% of original level.

4. AC Electrical Characteristics

a. Input AC characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
VDD power on slew time	T_{POR}			15	ms	**From 0V to 90% VD Note 1**
GRB active pulse width	T_{GRB}	1		20	ms	**VDD=3.3V**

Note 1:the inrush current spec should follow VDD power on slew time min value is 1ms and max value is 15ms. Inrush current maybe out of spec.(max:500mA)
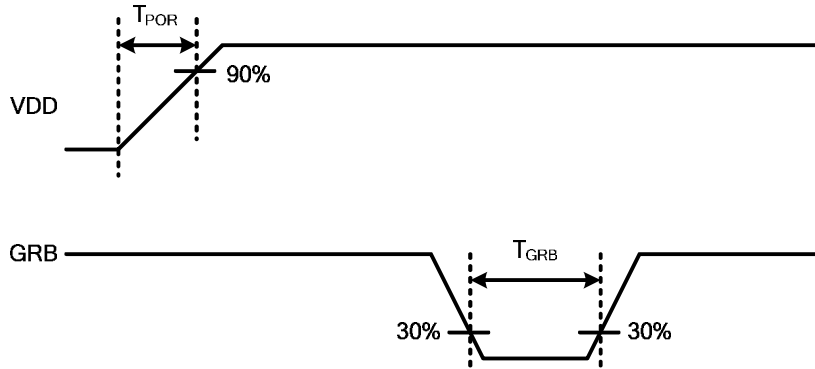

Fig. 6. VDD and GRB timing diagram

b. Differential signal AC characteristics

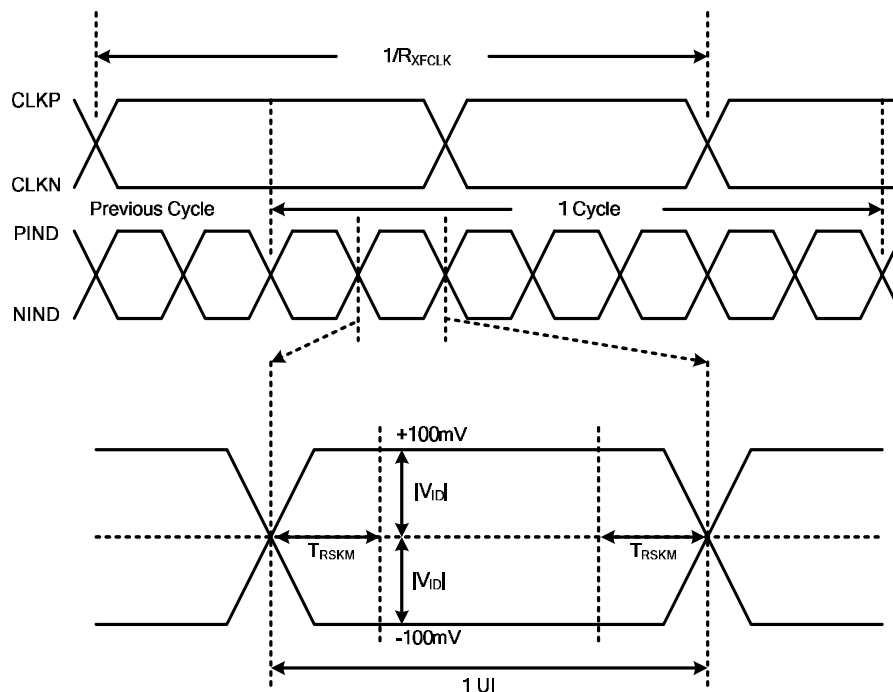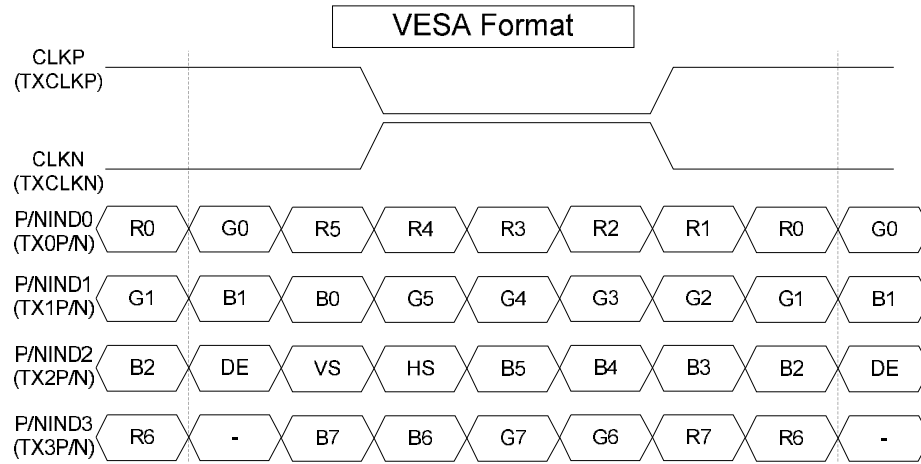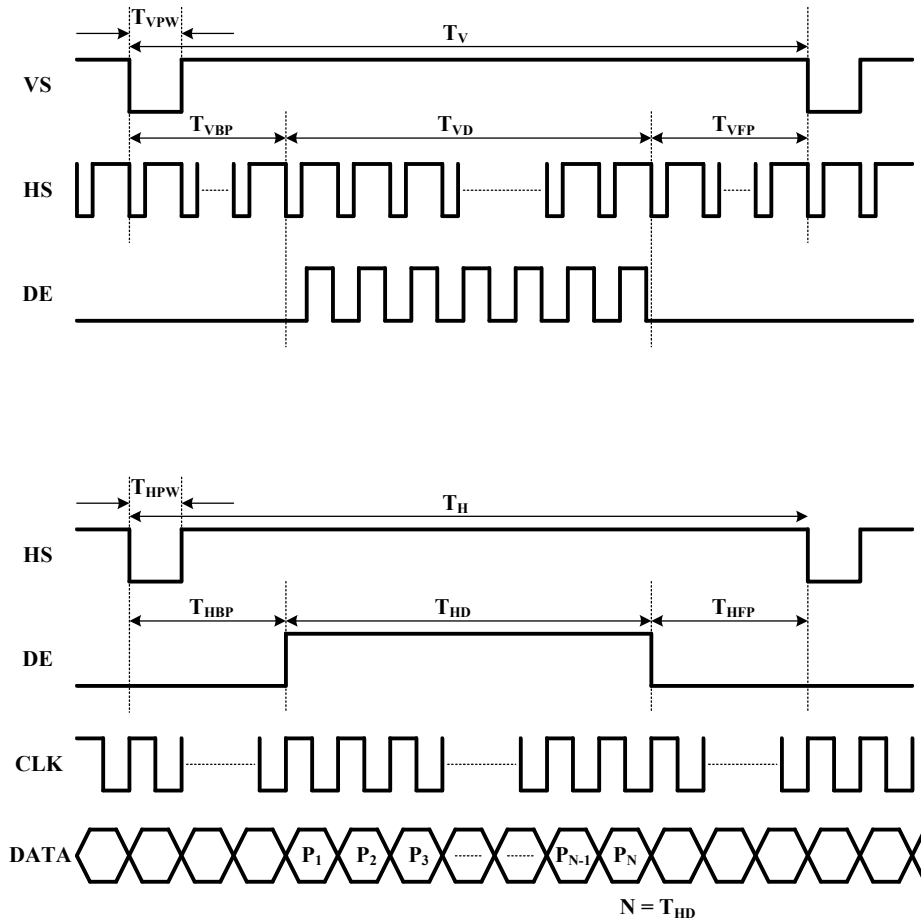| Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Clock frequency	R_{XFCLK}	45	-	60	MHz	
Input data skew margin	T_{RSKM}	400			ps	

Fig. 7 LVDS AC characteristics diagram

c.Differential Input Data Format

VESA Format

CLKP (TXCLKP)									
CLKN (TXCLKN)									
P/NIND0 (TX0P/N)	R0	G0	R5	R4	R3	R2	R1	R0	G0
P/NIND1 (TX1P/N)	G1	B1	B0	G5	G4	G3	G2	G1	B1
P/NIND2 (TX2P/N)	B2	DE	VS	HS	B5	B4	B3	B2	DE
P/NIND3 (TX3P/N)	R6	-	B7	B6	G7	G6	R7	R6	-

Input Timing Diagram

Fig. 2. Input Timing Diagram

T_{VPW} T_V

VS

T_{VBP} T_{VD} T_{VFP}

HS

DE

T_{HPW} T_H

HS

T_{HBP} T_{HD} T_{HFP}

DE

CLK

DATA P_1 P_2 P_3 P_{N-1} P_N

$N = T_{HD}$

Parameter		Symbol	Min.	Typ.	Max.	Unit.	Remark
CLK Frequency		F_{CLK}	43	46	49	MHz	
HSYNC	**Period**	T_H	1393	1440	1488	CLK	
	Horizontal display area	T_{HD}		1280		CLK	
	Blanking	$T_{HBP} + T_{HFP}$	113	160	208	CLK	
VSYNC	**Period**	T_V	517	533	549	HS	
	Vertical display area	T_{VD}		480		HS	
	Blanking	$T_{VBP} + T_{VFP}$	37	53	69	HS	

Power ON / OFF timing
　　　The LCD adopts high voltage driver IC, so it could be permanently damaged under a wrong power on/off sequence. The suggested LCD power sequence is below:
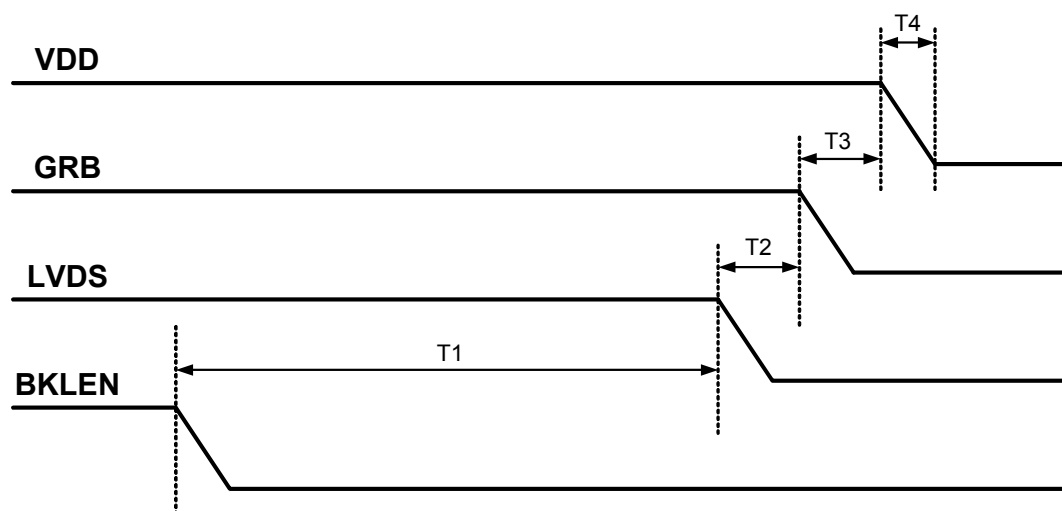
c. Power ON sequence
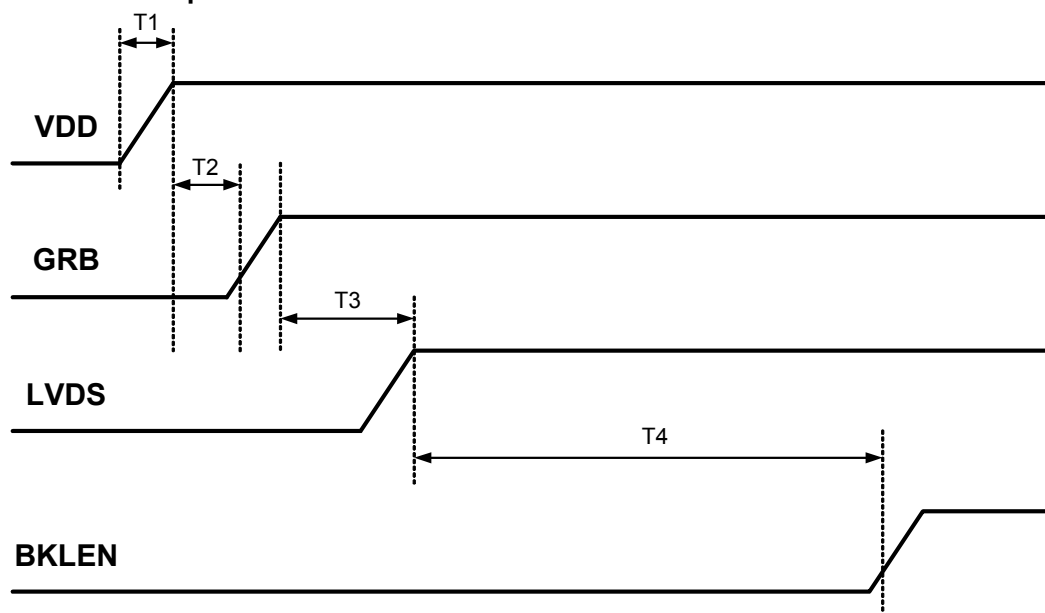
Power on timing:

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	-	-	15	ms
T2	1	-	-	ms
T3	1	-	300	ms
T4	300	350	-	ms

d. Power Off sequence

VDD

GRB

LVDS

BKLEN

T4

T3

T2

T1

Parameter	Value			Units
	Min.	**Typ.**	**Max.**	
T1	90	100	-	ms
T2	1	30	300-	ms
T3	1	30	40	ms
T4	50	-	-	ms

All signals must be discharge to zero voltage when power off.

F. Optical specifications (Note 1, 2)

| Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response	Tr+Tf	θ=0°, 25°C	-		40	ms	Note 3
		θ=0°, 0°C	-		80		
		θ=0°, -20°C	-		200		
		θ=0°, -30°C	-		400		
Contrast ratio	CR	θ=0°	800		-		Note 4, 5, 6
Viewing Angle Top Bottom Left Right		CR≧10	70 70 70 70	80 80 80 80	- - - -	deg.	Note 7, 8
Brightness	Y_L	θ=0°	600		-	cd/m^2	Note 1,2,9
White Chromaticity	X	θ=0°	0.279	0.319	0.359		Note 8
	Y	θ=0°	0.279	0.319	0.359		
Red Chromaticity	X	θ=0°	0.605	0.645	0.685		
	Y	θ=0°	0.269	0.309	0.349		
Green Chromaticity	X	θ=0°	0.259	0.299	0.339		
	Y	θ=0°	0.613	0.653	0.693		
Blue Chromaticity	X	θ=0°	0.108	0.148	0.188		
	Y	θ=0°	0.041	0.081	0.121		
Uniformity of white pattern	Uw	θ=0°	80%				Note 10

PS. Regarding Color Chromaticity, will be updated after real sample out.

Note 1: Measurement should be performed in the dark room, optical ambient temperature =25°C, and backlight current I_L=80 mA

Note 2: To be measured on the center area of panel with a field angle of 1°by Topcon luminance meter SR-3, after 10 minutes operation.

Note 3: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively.

"White"　"Black"　"White"
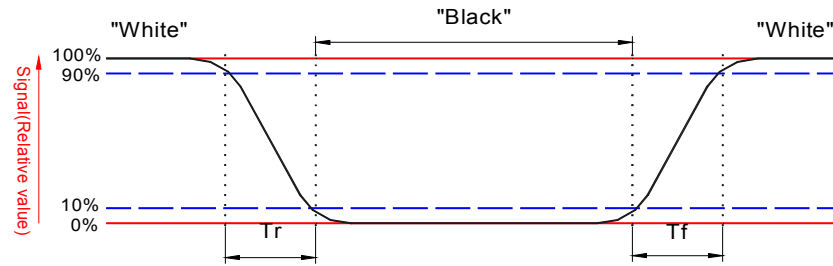
Note 4. From liquid crystal characteristics, response time will become slower and the color of panel will become darker when ambient temperature is below 25℃.
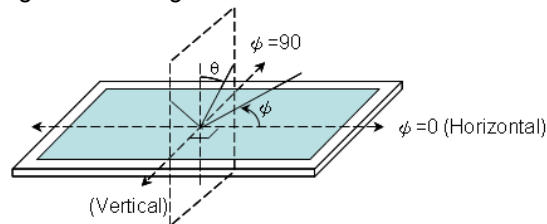
Note 5. Contrast ratio is calculated with the following formula.

$$Contrast\,ratio = \frac{Photo\,detector\,output\,when\,LCD\,is\,at\,"White"\,state}{Photo\,detector\,output\,when\,LCD\,is\,at\,"Black"\,state}$$

Note 6. When "White" state, R[7:0]=G[7:0]=B[7:0]=11111111
When "Black" state, R[7:0]=G[7:0]=B[7:0]=0000000

Note 7. Definition of viewing angle: refer to figure as below.

Note 8. The viewing angles are measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note 9. Brightness is measured at the center of the display with white pattern in 80mA

Note 10. Luminance Uniformity is defined as following within the 9 measurements (L1~L9),
Luminance Uniformity(%) =Minimum luminance(brightness)/Maximum luminance(brightness)
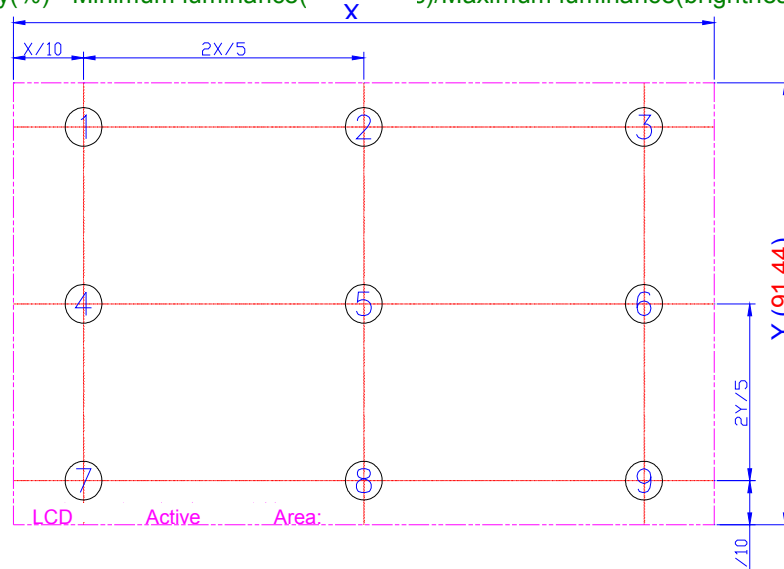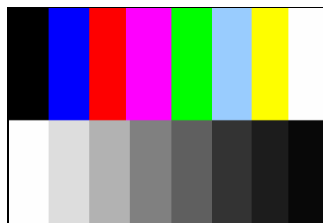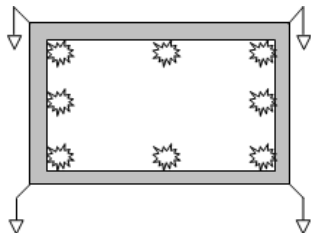
G. Reliability Test Items (Note 2)

No.	Test items	Conditions		Remark
1	High temperature storage	Ta= 95℃	240Hrs	Note1
2	Low temperature storage	Ta= -40℃	240Hrs	
3	High temperature operation	Ta= 85℃	240Hrs	
4	Low temperature operation	Ta= --30℃	240Hrs	Note1, 3
5	High temperature and high humidity	Ta= 60℃, 90% RH	240Hrs	Operation
6	Heat shock	-30℃~85℃/100 cycles 1Hrs/cycle		Non-operation
7	Electrostatic discharge	Contact = ± 8 kV, class B (R=330Ω,C=150pF) Air = ± 15 kV, class B (R=330Ω,C=150pF) 1 times for each point.		Operation (Note 4)
8	Vibration	Frequency range	8~33.3Hz	JIS D1601,A10 Condition A
		Stoke	1.3mm	
		Sweep	2.9G, 33.3~400Hz	
		Cycle	15min.	
		2 hours for each direction of X, Z 4 hours for Y direction		
9	Mechanical shock	100G, 6ms, ±X,±Y,±Z 3 times for each direction		
10	Vibration (with carton)	Random vibration: 0.015G^2/Hz from 5~200Hz –6dB/Octave from 200~500Hz		IEC 68-34
11	Drop (with carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces		

Note 1: Ta: Ambient temperature.
Note 2: In the standard condition, there is not display function NG issue occurred. All the cosmetic specification is judged before the reliability stress.
Note 3: Short time operation between -40℃~-30℃ doesn't provide full performance but a correct image on the LCD. The LCD is guaranteed to suffer no permanent damage.
Note 4: Test techniques follow IEC61000-4-2 standard. Test points and pattern as below.

H. Packing Form

Anti-static PET Tray

C103VAN01.1 Module

PET Tray Turn On 180°

Put

Put

Anti-static PET Tray

One Stratum of 3pcs Module

CF Side up

Total 6 Layers
6 Layers to put 15pcs Panel

Plastic Bags

Tape(60mm) Transparent

Tape(60mm)

OPEN

Cushion EPE

Cushion EPE

Cushion EPE

PP Board

Put

MAX CAPACITY: 15PCS
MAX WEIGHT: 12KG
CARTON DIM: 600mm*353mm*210mm

CARTON LABEL

CARTON