

Doc. Number:

- ☐ Tentative Specification
☒ Preliminary Specification
☐ Approval Specification

MODEL NO.: JE092IB
SUFFIX: 01A

Customer:	
APPROVED BY	SIGNATURE
Name / Title _____	
Note : _____	

Please return 1 copy for your confirmation with your signature and comments.	

Approved By	Checked By	Prepared By
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REVISION HISTORY

Version	Date	Page	Description
V00	2018/9/7		Preliminary Specification
V01	2018/11/29	17. 18	Update Mechanical Drawing for FPCA 長度變更
V02	2019/04/24	8	And LVDS DC Electrical Characteristics
V03	2019/08/30	5	Update Power off

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1. General Specifications

No.	Item	Specification	Remark
1	Products Type	FOG	
2	LCD size	216.896 x 114.948 mm	
3	PPI	156	
4	Resolution	1280 x 3(RGB) x 640	
5	Display mode	Normally Black, Transmissive, AAS	
6	Pixel Pitch	0.0544(W) x 0.1632(H) mm	
7	Active area	208.896(W) x 104.448(H) mm	
8	Module size	216.896(W) x 114.948(H) x 1.031(D) mm	Note 1
9	Surface treatment	Glare Clear Surface	
10	Color Depth	8Bits, 16.7M	
11	Interface	LVDS	
12	Sunglasses	Polarization angle of display between 12:00 and 01:30 allowed	
13	Lifetime	8000 h; 300 000 km, 15 years with temperature profile as mentioned in ID 81, FOG Only	
14	BP(Forecase)	2020/7/30 MP; 80-100K/M	
15	DPPM	德賽公版：400	

Note 1: Refer to Mechanical Drawing.

2. Pin Assignment

Pin No.	Symbol	I/O	Function
1	VGL	P	Charge bump voltage for gate driver
2	NC		Please keep floating
3	VGH	P	Charge bump voltage for gate driver
4	NC		Please keep floating
5	VSN	P	Power input for source driver and power circuit
6	NC		Please keep floating
7	VSP	P	Power input for source driver and power circuit
8	NC		Please keep floating
9	GND	P	Connect to Ground
10	I2C_SCL	I	Serial interface clock input for I2C interface
11	I2C_SDA	I	Serial interface address and data input/output for I2C interface.
12	GND	P	Connect to Ground
13	GND	P	Connect to Ground
14	EEP_SPI-CSB	I	Serial Interface chip enable signal for EEPROM SPI interface. SPI_CSB=0: Selected (Accessible). SPI_CSB=1: Not selected (Inaccessible).
15	EEP_SPI-SCL	I	Serial interface clock input for EEPROM SPI interface
16	EEP_SPI-SDAO	O	Serial interface address and data output for EEPROM SPI interface.
17	EEP_SPI-SDAI	I	Serial interface address and data input for EEPROM SPI interface.
18	GND	P	Connect to Ground
19	RESET	I	Global reset pin, set logic High for normal display
20	STBYB	I	Standby mode setting pin, set logic High for normal display operation
21	GND	P	Connect to Ground
22	RXIN03+	I	LVDS data 3+
23	RXIN03-	I	LVDS data 3-
24	GND	P	Connect to Ground

25	RXIN02+	I	LVDS data 2+
26	RXIN02-	I	LVDS data 2-
27	GND	P	Connect to Ground
28	RXCLKIN+	I	LVDS CLK+
29	RXCLKIN-	I	LVDS CLK-
30	GND	P	Connect to Ground
31	RXIN01+	I	LVDS data 1+
32	RXIN01-	I	LVDS data 1-
33	GND	P	Connect to Ground
34	RXIN0+	I	LVDS data 0+
35	RXIN0-	I	LVDS data 0-
36	GND	P	Connect to Ground
37	FAIL_DET	O	Fail detection signal output
38	GND	P	Connect to Ground
39	VDD	P	External main and I/O power supply; Power 3V3
40	VDD	P	External main and I/O power supply; Power 3V3
41	VDD	P	External main and I/O power supply; Power 3V3
42	VDD	P	External main and I/O power supply; Power 3V3
43	GND	P	Connect to Ground
44	GND	P	Connect to Ground
45	L/R	I	Horizontal shift direction (source output) selection. RL = 1: Left -> Right (Default) RL = 0: Right -> Left
46	GND	P	Connect to Ground
47	U/D	I	Vertical shift direction (gate output) selection. TB = 1: Top -> Bottom (Default) TB = 0: Bottom -> Top
48	GND	P	Connect to Ground
49	NC		Please keep floating
50	GND	P	Connect to Ground

3. Operation Specifications

3.1. Typical Operation Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	V_{DD}	3.0	3.3	3.6	V	Note 1
Power voltage for source IC	AVDD	6.4	6.6	6.8	V	
Power voltage for source IC	AVEE	-6.8	-6.6	-6.4	V	
Power Supply Input Current	I_{DD}	17.3	21.6	26	mA	Note 3
Power Supply Input Current	I_{AVDD}	14	17.5	21	mA	Note 3
Power Supply Input Current	I_{AVEE}	16	20	24	mA	Note 3
Power for Panel Gate on	VGH		18		V	
Power for Panel Gate off	VGL		-12		V	
Input logic high voltage	V_{IH}	$0.7 V_{DD}$	-	V_{DD}	V	Note 2
Input logic low voltage	V_{IL}	GND	-	$0.3 V_{DD}$	V	Note 2
Internal Pull low / high resistor	RI	150	350	550	k Ω	

Note 1: V_{DD} setting should match the signals output voltage of customer's system board .

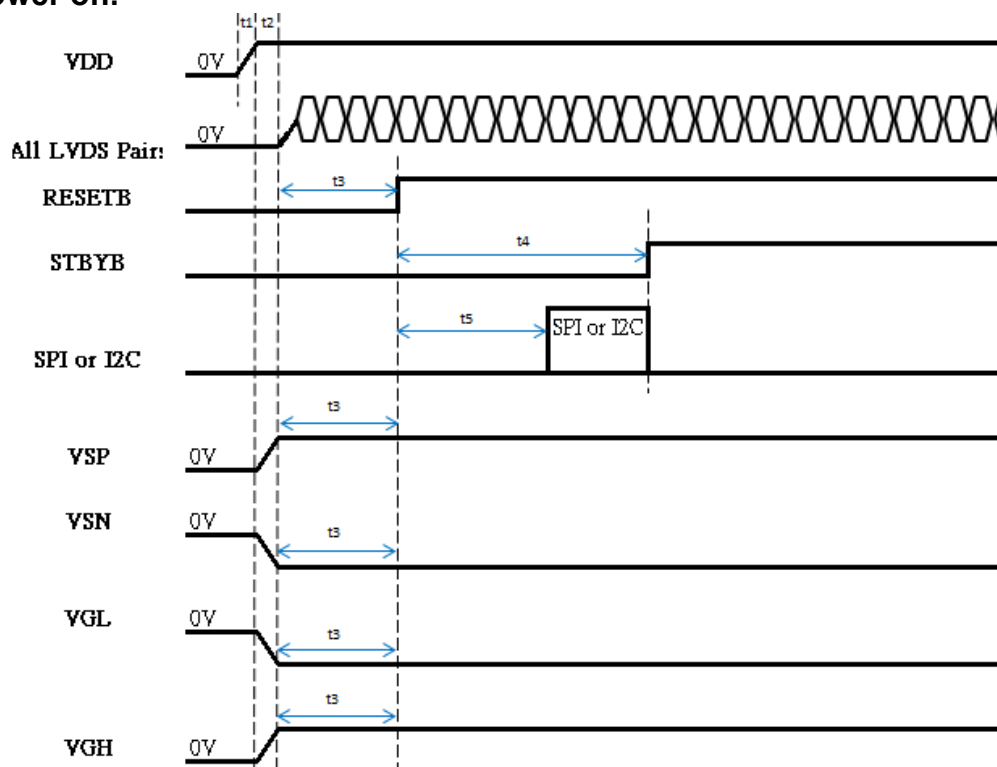
Note 2: RESET, STBYB, L/R, U/D

Note 3: Full white pattern.

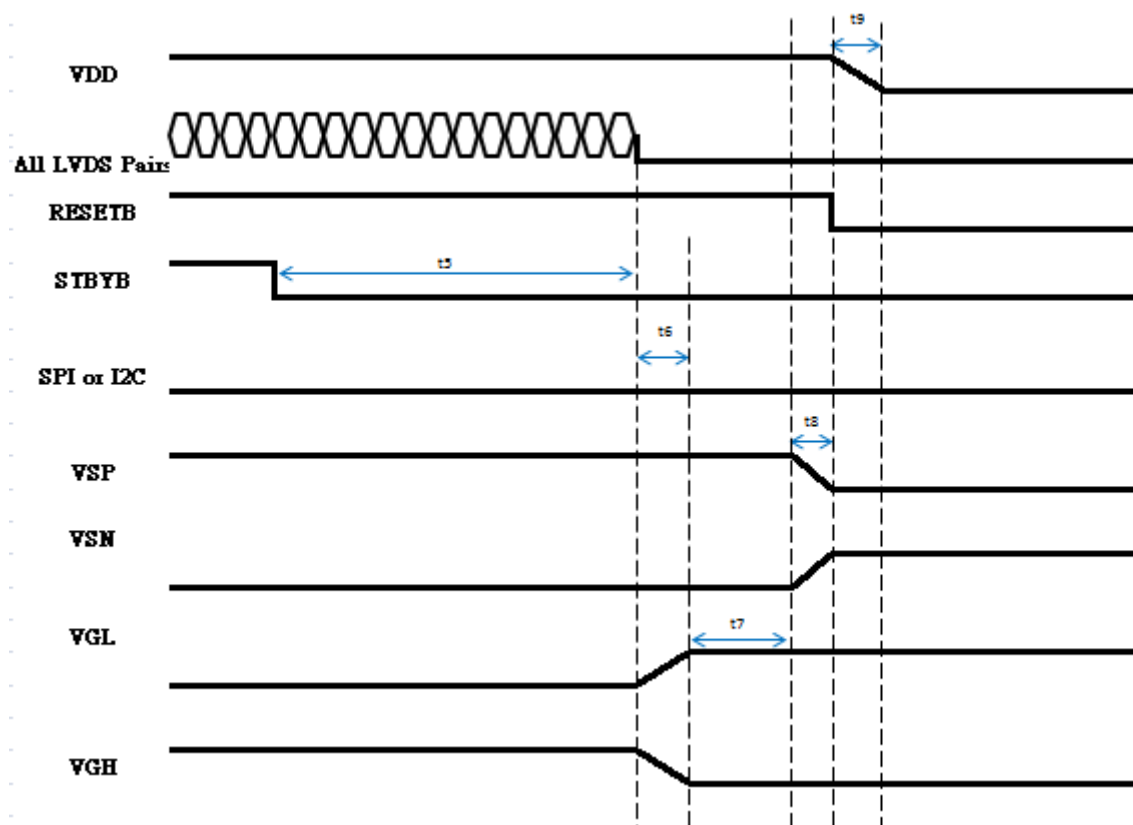
3.2. Power Sequence

VDD = 3.0~3.6V

a. Power on:



b. Power off:

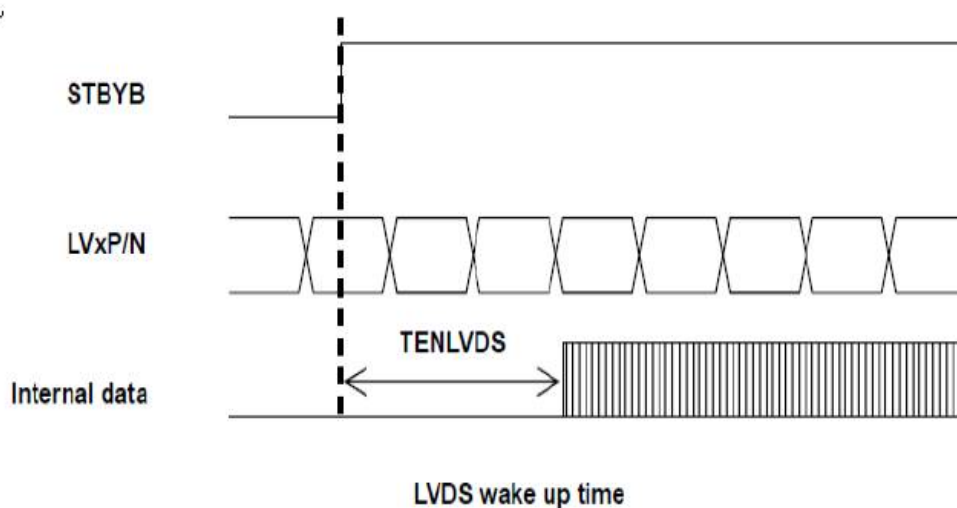


Parameter	Min	Typ	Max	Unit
t1	0.1	3	9	ms
t2	0.1	1	3	ms
t3	11	15	30	us
t4	41	100	150	ms
t5	50	100	150	ms
t6	16	17	90	ms
t7	1	2	10	ms
t8	11	15	30	us
t9	11	15	30	us

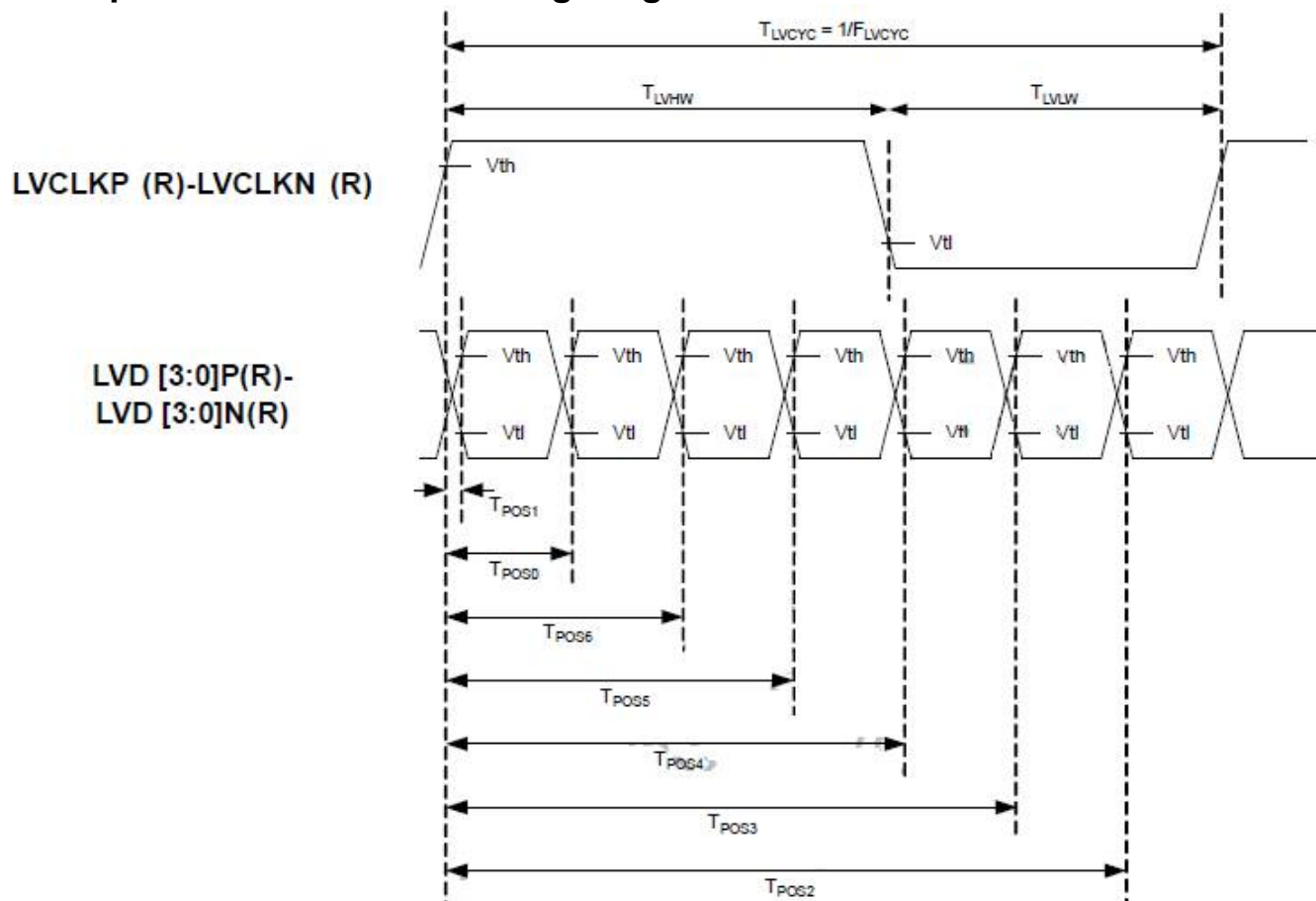
3.3. Timing Characteristics

3.3.1 AC Electrical Characteristics

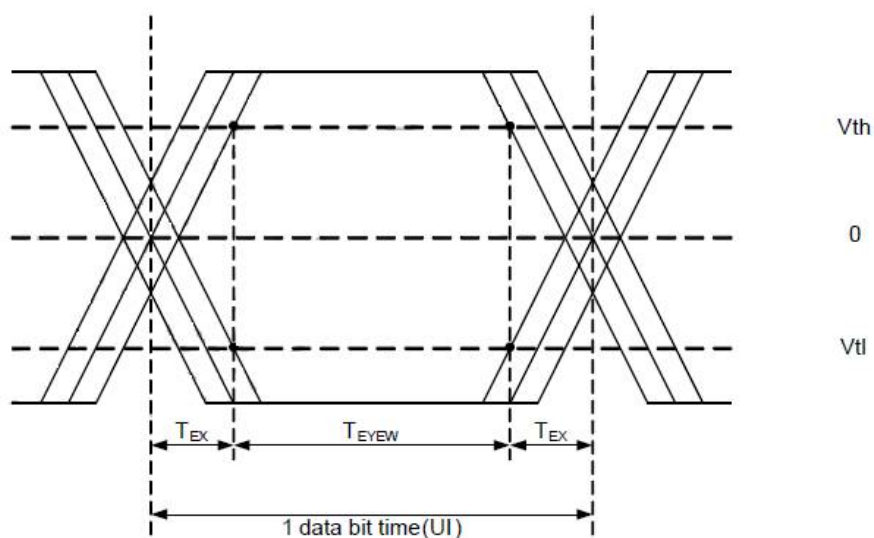
Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock frequency	$F_{LV CYC}$	20	-	85	MHz
Clock period	$T_{LV CYC}$	11.76	-	-	ns
1 data bit time	UI	-	1/7	-	$T_{LV CYC}$
Clock high time	$T_{LV HW}$	3.9	4	4.1	UI
Clock low time	$T_{LV LW}$	2.9	3	3.1	UI
Position 1	T_{POS1}	-0.2	0	0.2	UI
Position 0	T_{POS0}	0.8	1	1.2	UI
Position 6	T_{POS6}	1.8	2	2.2	UI
Position 5	T_{POS5}	2.8	3	3.2	UI
Position 4	T_{POS4}	3.8	4	4.2	UI
Position 3	T_{POS3}	4.8	5	5.2	UI
Position 2	T_{POS2}	5.8	6	6.2	UI
Input eye width	T_{EYEW}	0.6	-	-	UI
Input eye border	T_{EX}	-	-	0.2	UI
LVDS wake up time	T_{ENLVDS}	-	-	150	us



3.3.2 Input Clock and Data Timing Diagram



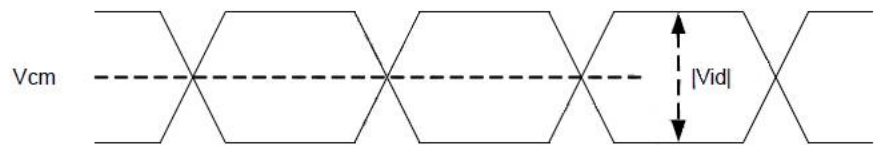
Differential:
LVD [3:0]P-LVD [3:0]N



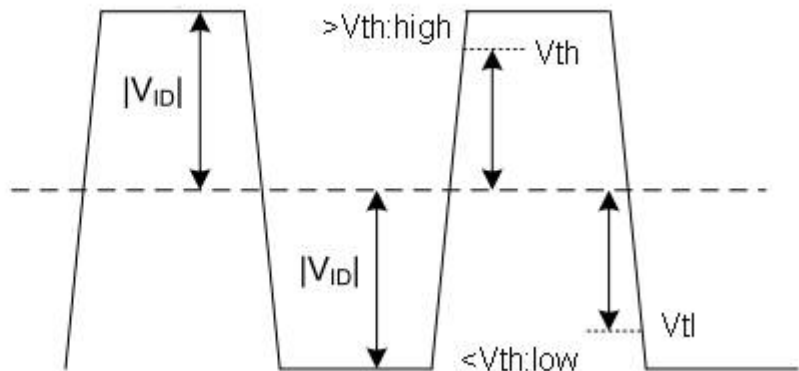
3.3.3 LVDS DC Electrical Characteristics

Parameter	Symbol	Condition	Spec.			Unit	Remark
			Min.	Typ.	Max.		
Differential input high Threshold voltage	V_{th}	$V_{cm}=1.2V$	-	-	+0.1	V	
Differential input low Threshold voltage	V_{tl}		-0.1	-	-	V	
Differential input common Mode voltage	V_{cm}		1.0	1.2	$1.7- V_{ID} /2$	V	
LVDS input Voltage	V_{INLV}		0.7		1.7		
Differential input voltage	$ V_{ID} $		0.1	-	0.6	V	
Differential input leakage Current	$ I_v _{leak}$		-10	-	+10	μA	

Single-ended:
LVCLKP(R),
LVCLKN(R),
LVD[3:0]P(R),
LVD[3:0]N(R)



Differential:
LVCLKP(R)-LVCLKN(R),
LVD[3:0]P(R)-
LVD[3:0]N(R)



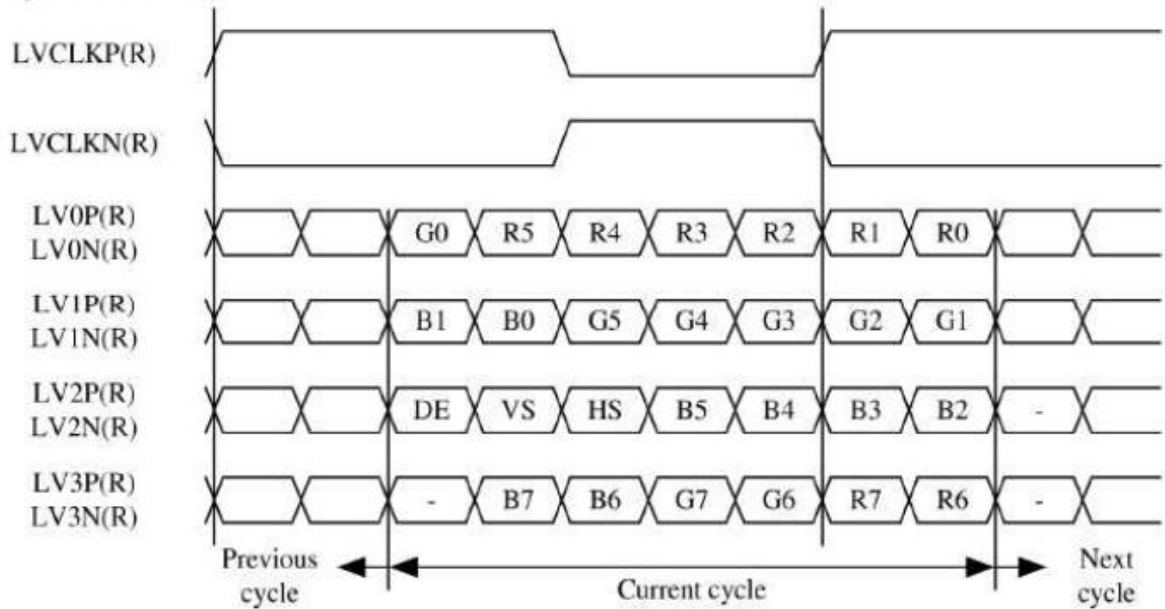
3.3.4 Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
DCLK frequency	FDCLK	50.8	51.8	77.9	MHz	
Horizontal valid data	thd	1280			DCLK	
1 horizontal line	th	1309	1322	1664	DCLK	
Vertical valid data	tvd	640			H	
1 vertical field	tv	647	653	780	H	
Hsync pulse width	thpw	10	12	255	DCLK	Note 1
Hsync back porch	thbp	5	6	255	DCLK	Note 1
Hsync front porch	thfp	24	24	260	DCLK	Note 1
Vsync pulse width	tvpw	1	3	20	H	Note 1
Vsync back porch	tvbp	2	2	255	H	Note 1
Vsync front porch	tvfp	5	8	260	H	Note 1

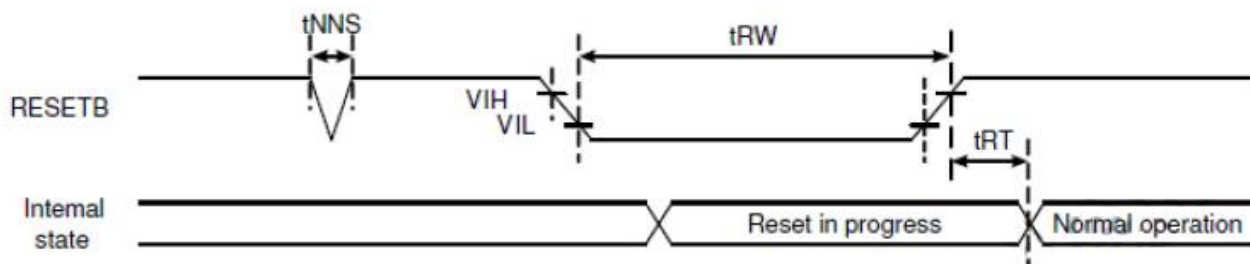
Note 1: Timing spec for Sync mode.

3.3.5 Data Input Format

LVDS, 8-bit, VESA format:



3.3.6 Reset timing



Signal	Parameter	Symbol	Spec			Unit
			Min.	Typ.	Max.	
RESETB	Reset pulse width	t_{RW}	10	-	-	μs
	Reset complete time	t_{RT}	-	-	5	μs
	Negative spike noise width	t_{NNS}	-	-	100	ns

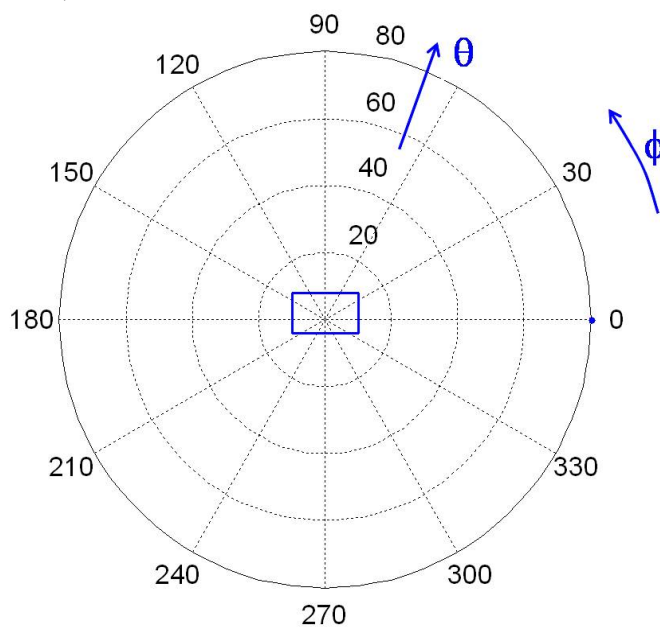
4. Optical Specifications

Remark: All exception items are marked by () and INX reserves the right to update after amount of measured data.

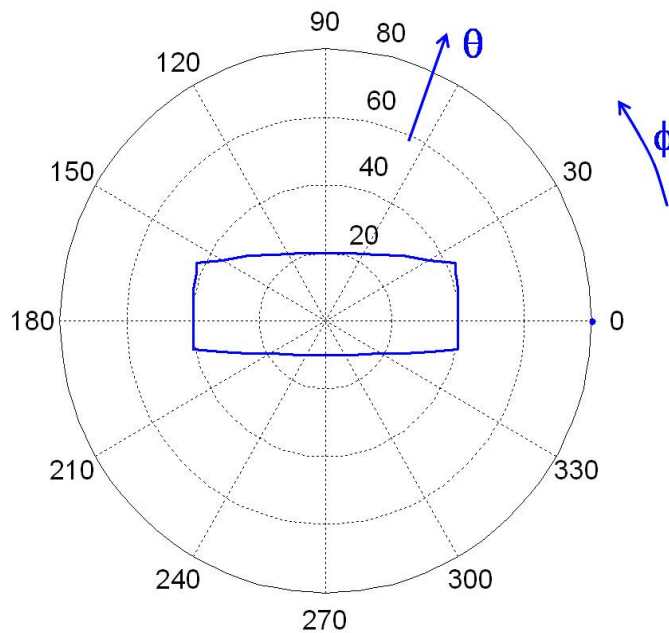
Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Contrast ratio	CR	A+-Area	(1200)	-	-	-	Note 1 Note 2
		A-Area	(650)	-	-		
		B-Area	(350)	-	-		
Switching time	TG2G	25°C	-	-	22	msec	Note 2 Note 3
		-20°C	-	-	180		
		-30°C	-	-	400		
Transmittance	T	Normal $\theta = \phi = 0^\circ$	4.05	4.42	-	%	Note 2
Chromaticity	W_x		-	0.325	-	-	Note 2 Note 4
	W_y		-	0.371	-		
	R_x		-	0.643	-		
	R_y		-	0.320	-		
	G_x		-	0.310	-		
	G_y		-	0.592	-		
	B_x		-	0.134	-		
	B_y		-	0.107	-		
Gamma	γ		1.9	2.2	2.5	-	Note 2
Flicker	F		-	-	-25	dB	Note 5
Reflection	R%		-	-	(5.2)	%	Note 6
Sunglasses	S		-	12:00	-	-	Note 7

Note 1: Definition of area

A+-Area: H $\pm 10^\circ$, V $+8/-4^\circ$



A-Area: H $\pm 40^\circ$, V $+20/-10^\circ$



B-Area: H $\pm 50^\circ$, V $+20/-10^\circ$

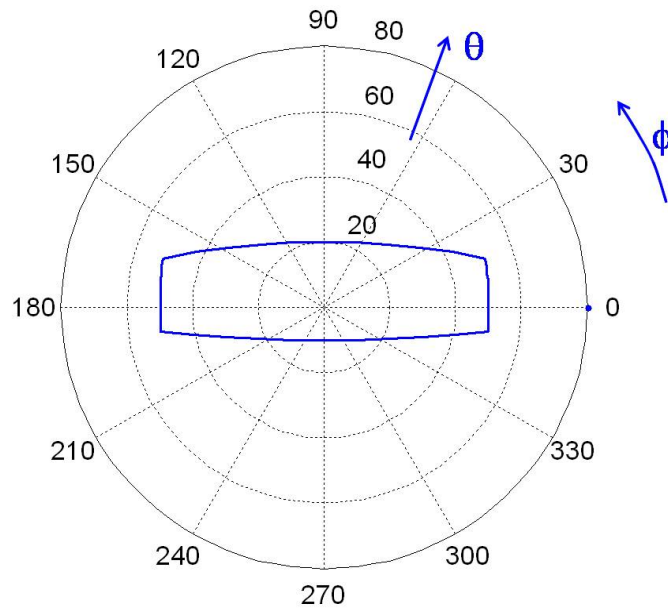


Fig. 4-1 Definition of area

Note 2: Definition of optical measurement system.

The backlight has been light on for 30 minutes then measured the optical properties at the center point of the LCD screen in dark room by DMS.

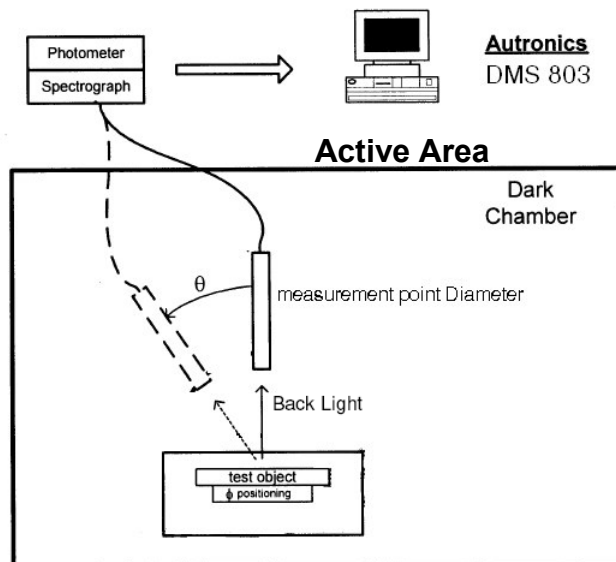


Fig. 4-2 Optical measurement system setup

Note 3: Definition of switching time

The maximum of grey-to-grey switching times is measured by photo detector of oscilloscope. The temperature is measured on the panel surface.

Note 4: Definition of chromaticity (CIE1931)

Chromaticity is panel under C light.

5. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Storage Test	$T_a=90^{\circ}\text{C}$, 500 hours	Note 1 Note 2 Note 3 Note 4
Low Temperature Storage Test	$T_a=-40^{\circ}\text{C}$, 500 hours	
High Temperature Operation Test	$T_p=85^{\circ}\text{C}$, 500 hours	
Low Temperature Operation Test	$T_a=-30^{\circ}\text{C}$, 500 hours	
High Temperature & High Humidity Operation Test	60°C , RH 90%, 500hours	
Thermal Shock	$[(-30^{\circ}\text{C } 30\text{min}) \rightarrow (85^{\circ}\text{C } 30\text{min})]/\text{cycle}$, 100cycles	
ESD Test	[Human Body Model] $C=100\text{pF}$, $R=1.5\text{K}\Omega$; Discharge: $\pm 2\text{KV}$	Note 2
Packaging Vibration Test	1.14Grms X, Y, Z three axes (30min /axis) [Frequency : 5Hz(0.015G ² /Hz) , 100Hz(0.015G ² /Hz) , 200Hz(0.0037G ² /Hz)]	
Packaging Drop Test	Height : 72cm(weight $\leq 10\text{kg}$), 60cm(weight > 10kg); 1times for 6-faces, 3-edges and 1-corner	

Note 1: T_a = Ambient Temperature, T_p = Panel Surface Temperature.

Note 2: Criteria: Normal display image with no obvious non-uniformity and no line defect.

Note 3: Evaluation should be tested after storage at room temperature for more than two hour

Note 4: A certain level of Mura (non-uniformity) of dark / black image will happen several days after high temperature testing (H.T.T.). There is a slowly part recovery over a long time (several months). Such a long exposure time like in H.T.T. will normally not happen in a real application. Therefore the test H.T.T. was introduced to simulate cycles with normal conditions in-between but with the same total exposure time what show a significant reduced Mura.

6. General Precautions

6.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or cloths, wash it off immediately by using soap and water.

6.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

6.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

6.4. Storage

1. Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

6.5. Cleaning

- 1. Do not wipe the polarizer with dry cloth. It might cause scratch.**
- 2. Only use a soft cloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.**

7.Mechanical Drawing





8. Package Drawing

8.1. Packaging Material Table & Quantity

Serial NO.	Item	Part NO.	Material Description	Qty/Box
1	Module	JE092IB-01A	Product	18
2	TRAY	8901B001YN000	360*270*16.6mm	1.055556
3	Spacer	8301B003GB000	213*111*2.2mm	2
4	BAG	8401B000JQ000	PE_Bag,LDPE,630mm, 385mm, 0.07mm	0.055556
5	Pallet	8101B0006L000	Pallet,1200*800*140mm	0.002315
6	Cushion	8301B002PV000	EPE,363*181*50mm	0.111111
7	Carton	8201B000QM000	Carton,385*390*225mm	0.055556
8	card-board	8A04B0007A002	Card_Board,360,270,7,N/A	0.111111
9	Dryer	8A02B0000B000	Exsiccator,bentonite clay,purple,85mm,4	0.111111

8.2. Packaging Drawing

NA

8.3. Shipping Drawing

