



YEEBO LCD Limited

LCM Specialist

SPECIFICATION FOR LCD MODULE

MODULE NO: YB-TG1024768S02A-N-A0

Doc.Version:00

Customer Approval:

☐ Accept

☐ Reject

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☐ APPROVAL FOR SPECIFICATIONS ONLY

☒ APPROVAL FOR SPECIFICATIONS AND SAMPLE

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1. Revision History

[illegible]



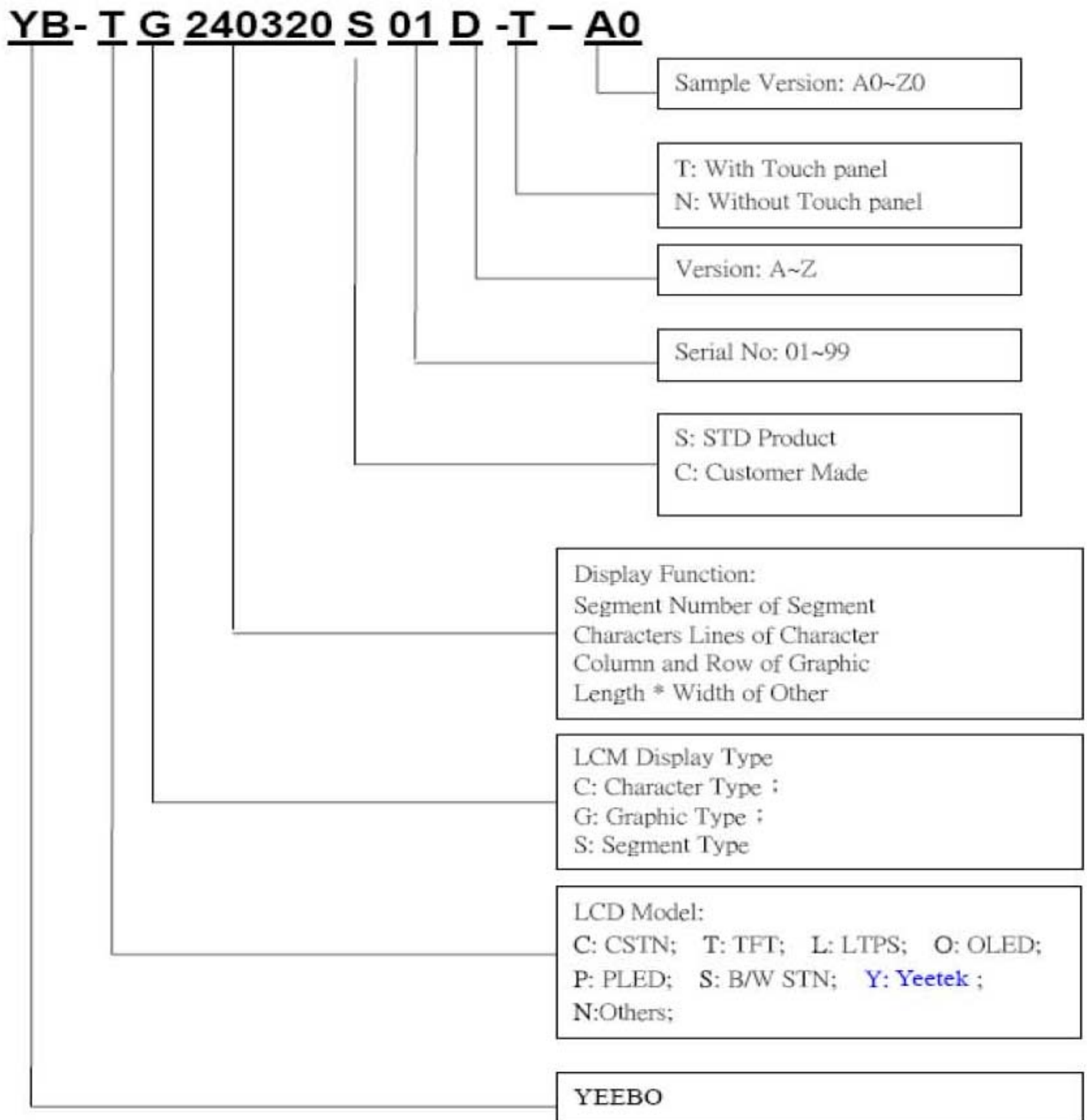
2. Table of Contents:

NO	CONTENTS	PAGE
1	Revision History	1
2	Table of Contents	2
3	Module Numbering System	3
4	General Specification	4
5	LCM drawing	5
6	Electrical Characteristics	7
7	Optical Characteristics	12
8	Interface Pin Assignment	14
9	Block Diagram	15
10	Backlight	16
11	General Precaution	17



3. Module Numbering System:

(Example)



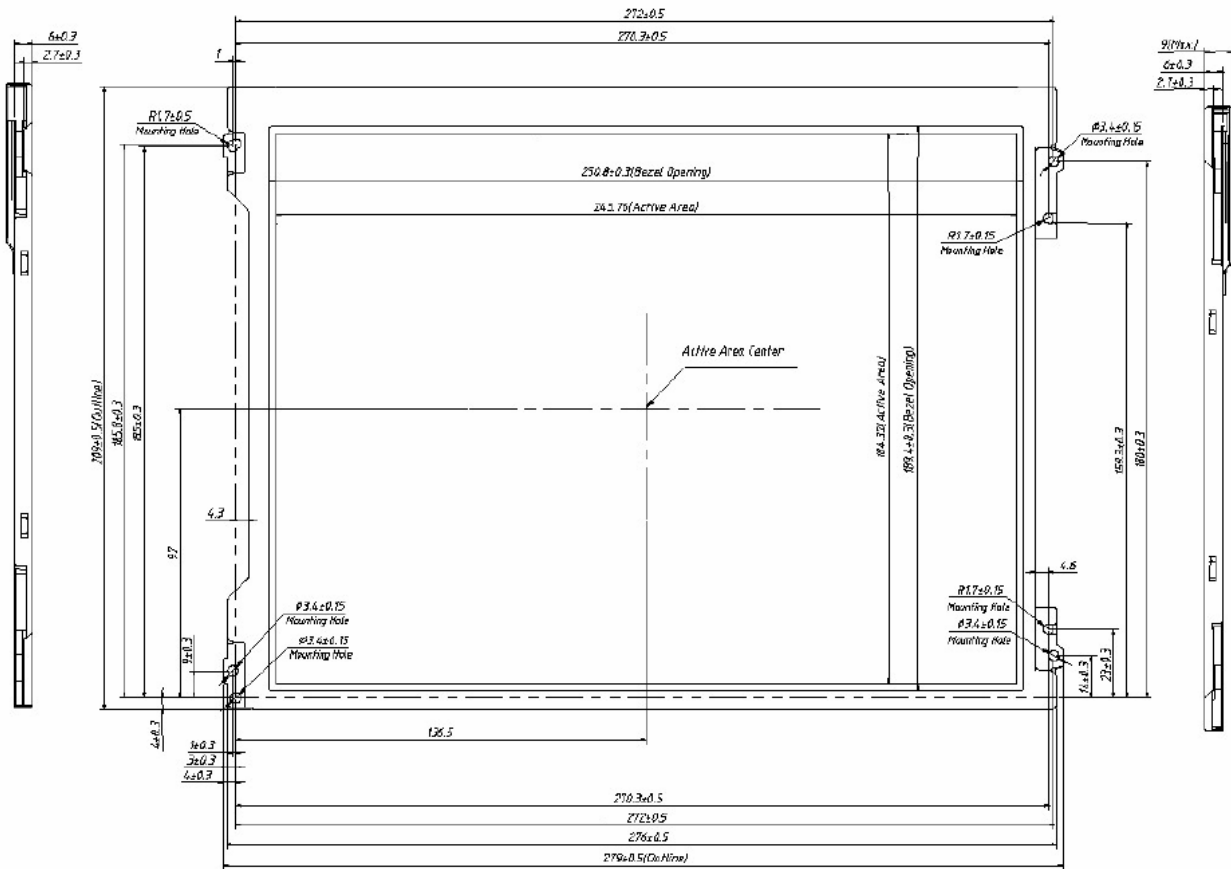


4. General Specification:

ITEM	CONTENTS
Module Size	279.0(W) * 209.0(H) * 9.0(T) mm
Display Size (Diagonal)	12.1 inch
Display Format	1024(RGB)* 768 Pixels
Active Area	245.76 (W) * 184.32 (H) mm
Dots Pitch	0.24 * 0.24 mm
LCD Type	TFT (16.7M)/ Normal White /Anti-Glare
TFT Interface	LVDS
Viewing Direction	6 O'clock
Weight	518.7g

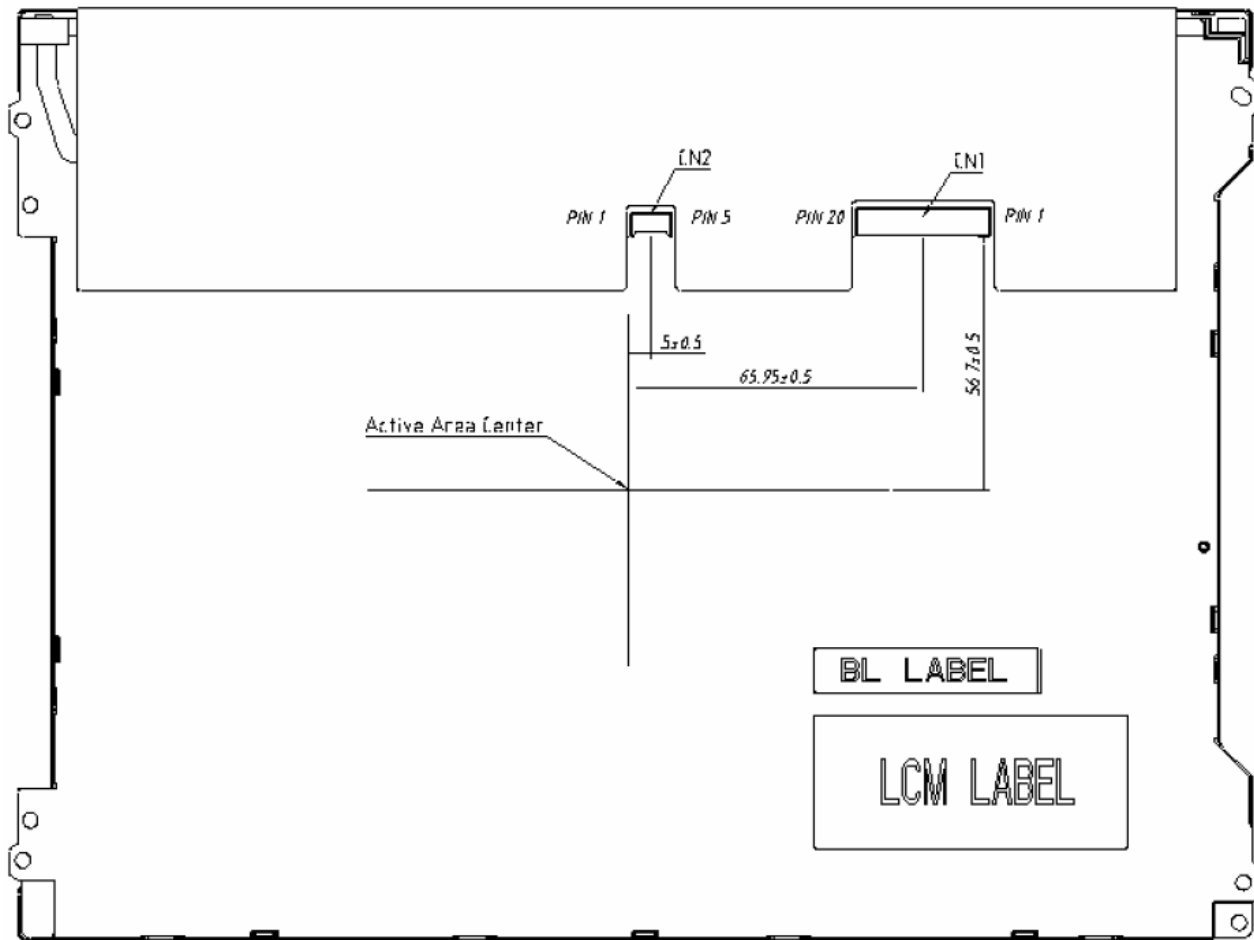
5. LCM drawing:

Front Side





Back Side



6. Electrical Characteristics

6-1 Absolute Maximum Ratings

(Ta=25°C VSS=0V)

Item	Symbol	Min.	Type	Max.	Unit	Remark
Power Supply voltage	VDD	-0.5	-	5.0	Volt	(1)
LED Backlight Drive Voltage	VCC	10.8		12.6	Volt	
Operating Temperature	Topr	-20	-	+70	°C	(1),(2),(3),(4)
Operating Humidity	Hopr	10		+85	%RH	
Storage Temperature	Tstg	-30	-	+80	°C	
Storage Humidity	Hstg	10		+95	%RH	

Note (1): Humidity: 85%RH Max. (T≤40°C) Note static electricity.

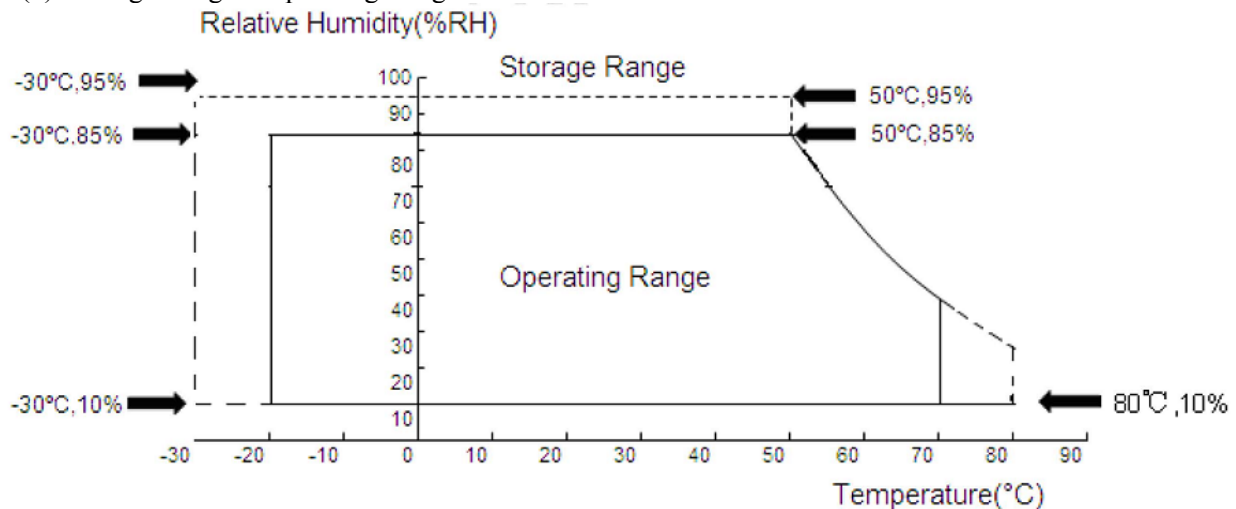
Maximum wet bulb temperature at 39°C or less. (T>40°C) No condensation.

Note (2): There is a possibility of causing deterioration in the irregularity and others of the screen and the display fineness though the liquid crystal module doesn't arrive at destruction when using it at 80~85 °C or -20 °C

Note (3): There is a possibility of causing the fineness deterioration by the prolonged use in the (high temperature) humidity environment (60% or more).

Note (4): In the operating temperature item, the low temperature side is the ambient temperature regulations. The high temperature side is the panel surface temperature regulations.

Note (5): Storage Range& Operating Range Picture:



Note(6): Absolute maximum rating is the limit value beyond which the IC maybe broken.

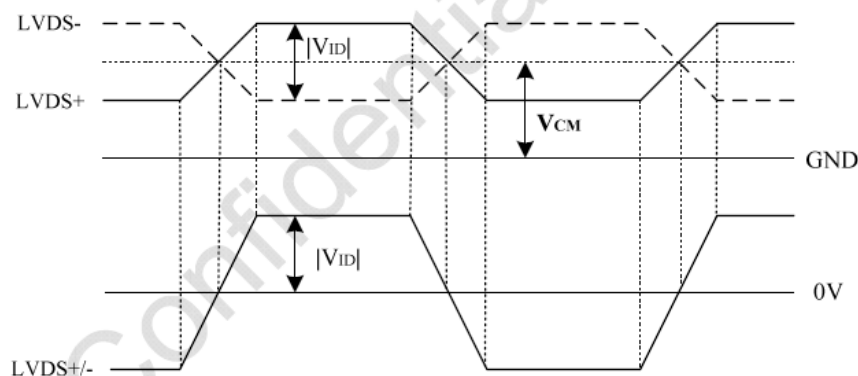
6-2 Operating Conditions**(Ta=25°C)**

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply voltage	VDD	-	3.0	3.3	3.6	V
Input Inrush Current	IRUSH	-	-	-	3.0	A
Input Power Voltage Ripple	VDDrp	-	-	-	200	mV
LVDS Signals						
Differential Input High Threshold	Vth	VCM=+1.2V	-	-	100	mV
Differential Input Low Threshold	Vtl	VCM=+1.2V	-100	-	-	mV
Magnitude Differential Input Voltage	VID	-	100	-	600	mV
Common Mode Voltage	Vcm	-	VID /2+0.6	1.2	1.8- VID /2	V
Common Mode Voltage Offset	ΔV_{cm}	VCM=+1.2V	-	-	50	mV
Power Supply Current for LCM	IDD	-	-	-	250	mA
Power Consumption (Black Pattern)	PBLACK	-	-	-	0.825	W
Back Light Control signals						
LED Input Voltage	VCC	-	10.8	12	12.6	V
LED Current	IL	-	-	240	-	mA
LED Power Consumption	PLED	-	-	-	6.1	W

Note:

A. Input signals shall be low or Hi-Z state when VDD is off.

B. All electrical characteristics for LVDS signal interface connector of LCD.

Voltage Definitions

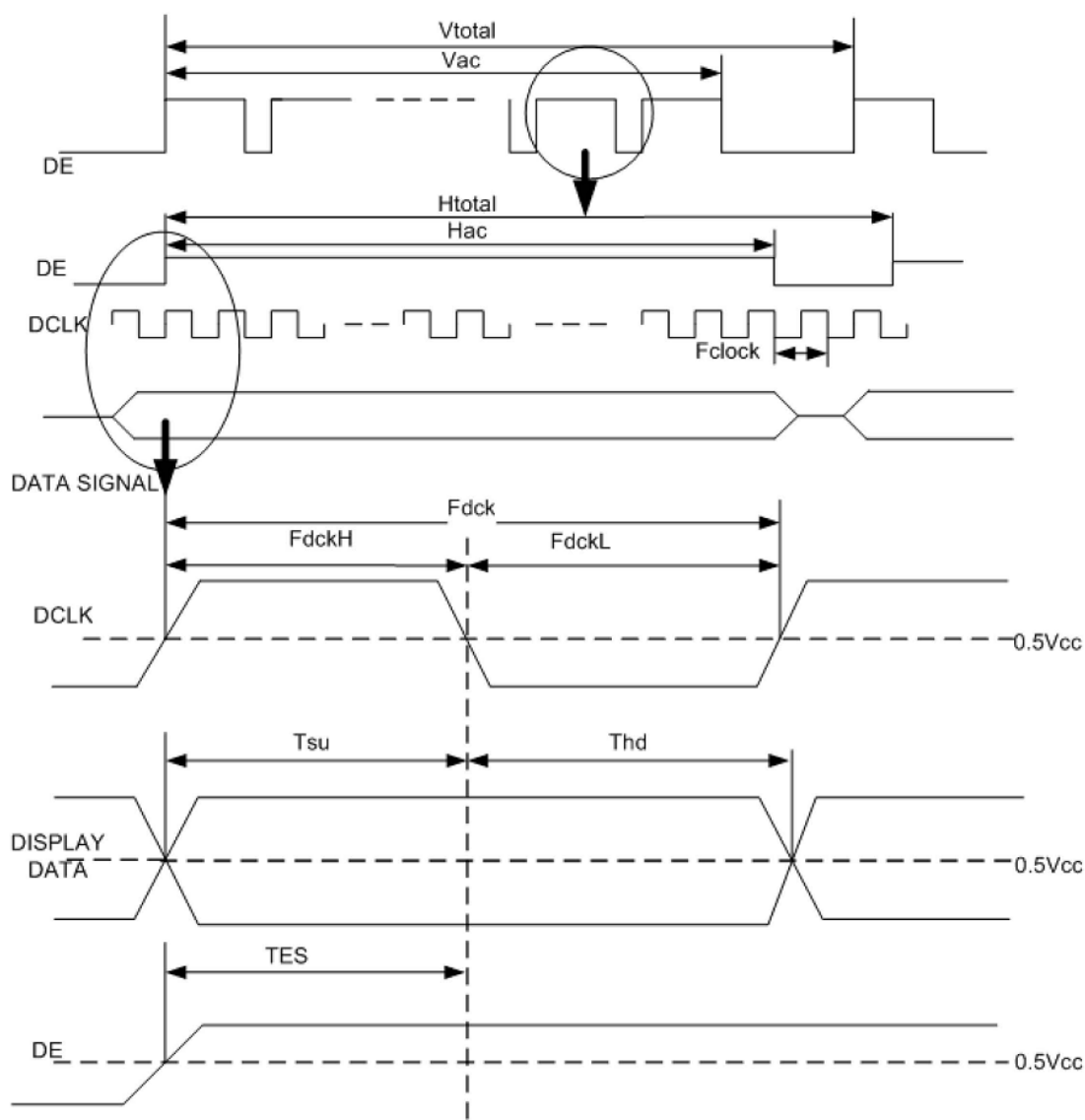
6-3 Display Data Input Timing

Interface Timings

Parameter	Symbol	Unit	Min.	Typ.	Max.
LVDS Clock Frequency	Fclk	MHz	50	65	80
H Total Time	HT	Clocks	1100	1344	2047
H Active Time	HA	Clocks	1024	1024	1024
H Blanking Time	HBL	Clocks	76	320	1023
V Total Time	VT	Lines	776	806	1023
V Active Time	VA	Lines	768	768	768
V Blanking Time	VBL	Lines	8	38	255
Frame Rate	Vsync	Hz	55	60	65

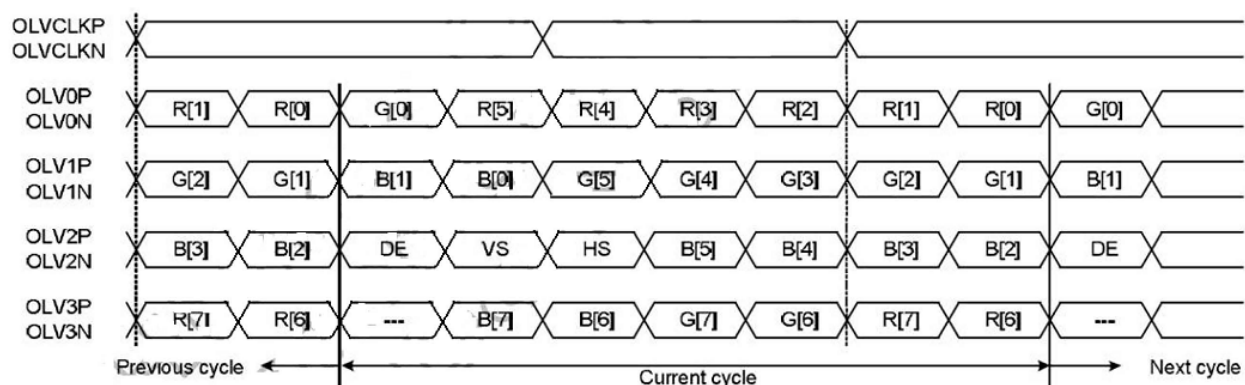
Note: H Blanking Time and V Blanking Time can not be changed at every frame.

Timing Characteristics

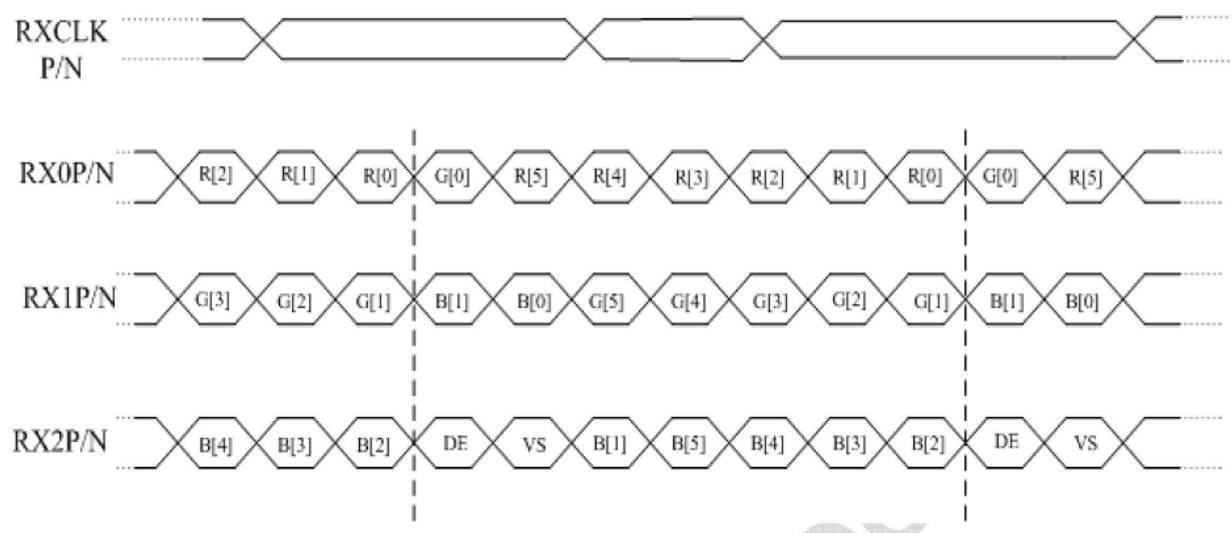




Data Mapping (8 Bit)

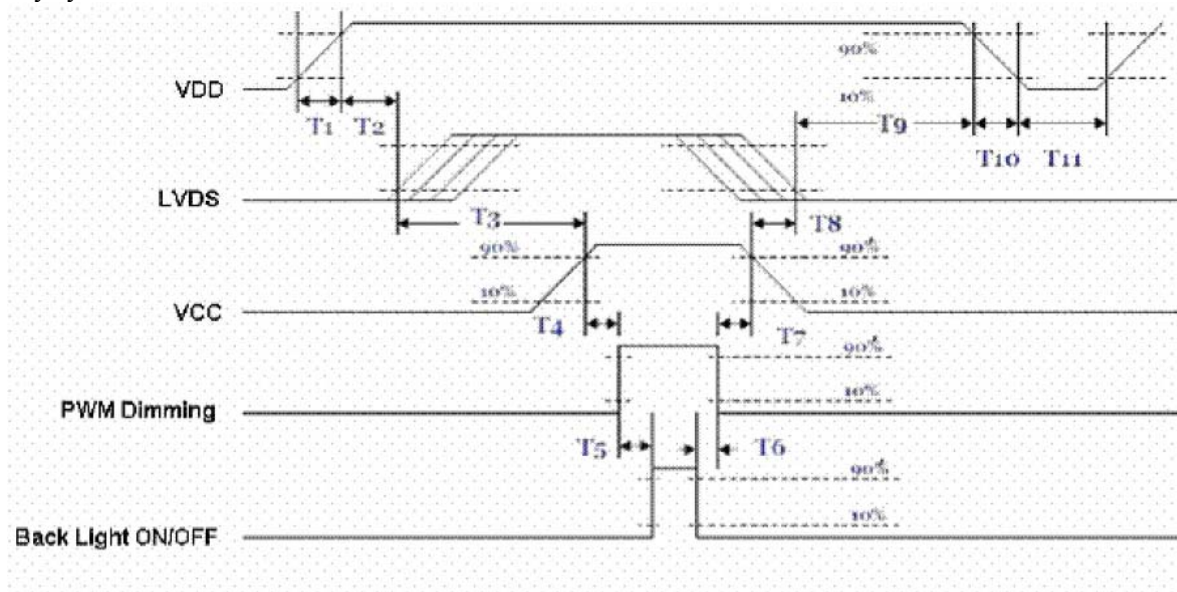


Data Mapping (6 Bit)



6-4 Power ON/OFF Sequence

Power on/off sequence is as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-resistance state or low level when VDD is off.



Power ON/OFF sequence timing

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.5	-	10	[ms]
T2	30	40	50	[ms]
T3	200	-	-	[ms]
T4	10	-	-	[ms]
T5	10	-	-	[ms]
T6	0	-	-	[ms]
T7	10	-	-	[ms]
T8	100	-	-	[ms]
T9	0	16	50	[ms]
T10	-	-	10	[ms]
T11	1000	-	-	[ms]

Note (1) Power On Sequence: VDD->(AVDD->VGL->VGH)->Data->B/L Power(VCC)

Note (2) Power Off Sequence: B/L Power(VCC)-> Data->(VGH->VGL->AVDD)->VDD



7. Optical Characteristics:

Item	Symbol	Conditions	Specifications			Unit	Note
			Min	Typ	Max		
Transmittance	T(%)	-	-	TBD	-	-	-
Contrast Ratio	CR	$\theta=0$ Normal Viewing angle	720	800	-		(1) (2)
Response time	TR+TF	-	-	16	-	ms	(1) (3)
Viewing angle	Hor.	Θ_{x+}	70	80	-	deg.	-
		Θ_{x-}	70	80	-		
	Ver.	Θ_{y+}	70	80	-		
		Θ_{y-}	70	80	-		

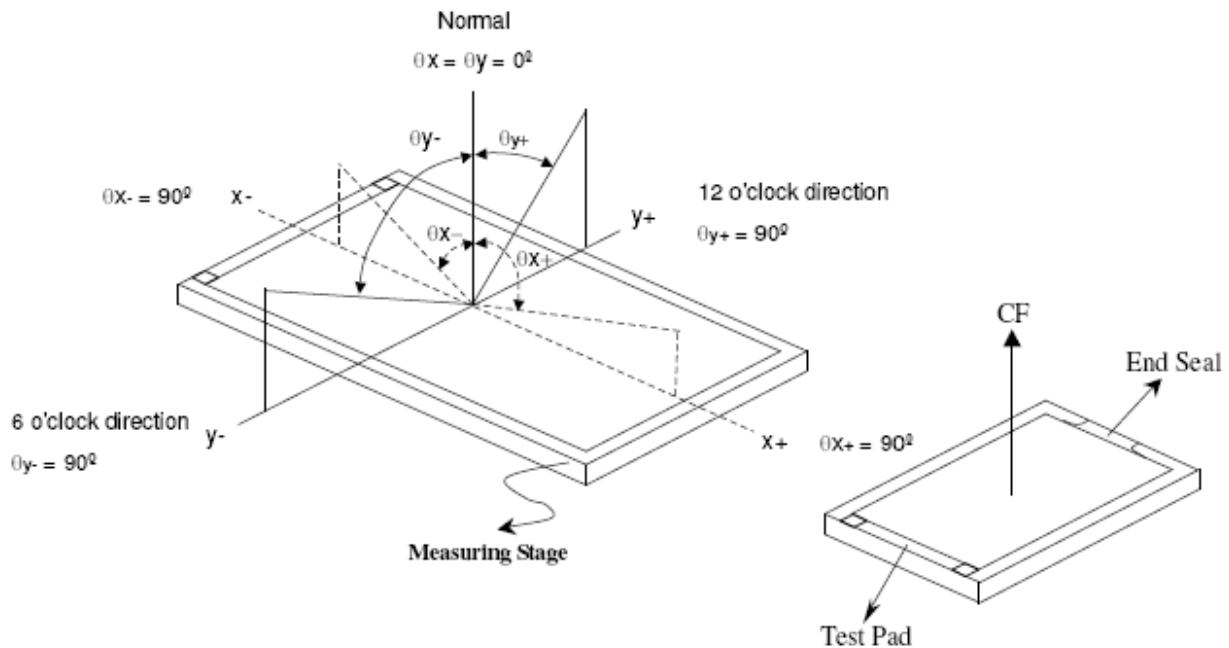
Measuring Condition

1. Measuring surrounding: dark room
2. Ambient temperature: $25 \pm 2^\circ\text{C}$
3. 30 min. Warm-up time.

Color of CIE Coordinate:

Item		Symbol	Min.	Typ.	Max.
Chromaticity Coordinates (Transmissive)	Red	x	TBD	TBD	TBD
		y	TBD	TBD	TBD
	Green	x	TBD	TBD	TBD
		y	TBD	TBD	TBD
	Blue	x	TBD	TBD	TBD
		y	TBD	TBD	TBD
	White	x	0.255	0.305	0.355
		y	0.275	0.325	0.375

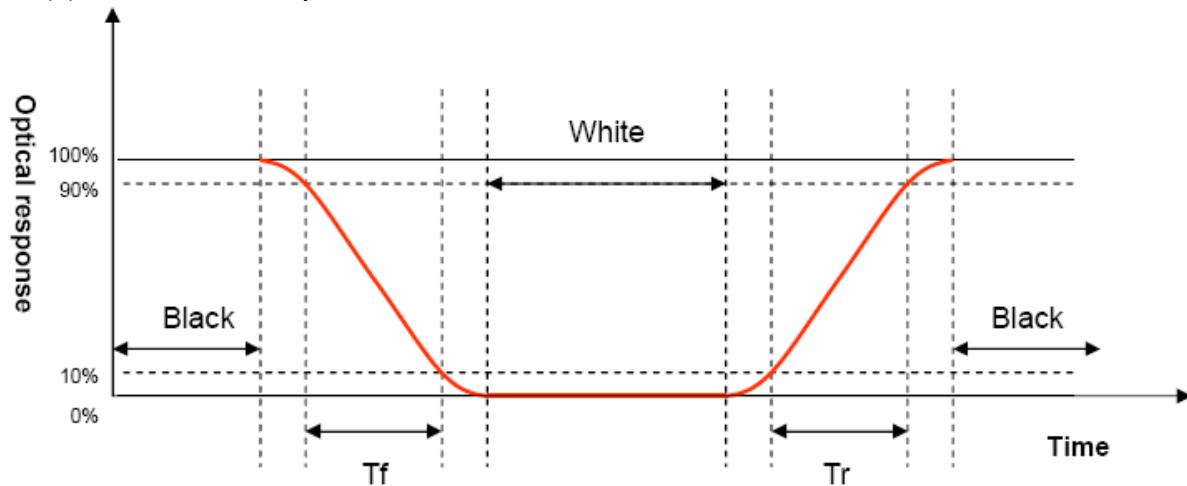
Note (1) Definition of Viewing Angle :



Note (2) Definition of Contrast Ratio(CR) :
measured at the center point of panel

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

Note (3) Definition of Response Time : Sum of TR and TF





8. Interface Pin Assignment:

8-1 TFT Interface

No.	Symbol	Function
1	VDD	Power Voltage for digital circuit
2	VDD	Power Voltage for digital circuit
3	VSS	Power Ground
4	REV	Reverse Scan selection, "H": 3.3V, or "L": 0V
5	Rin1-	-LVDS differential data input (R0-R5, G0)
6	Rin1+	+LVDS differential data input (R0-R5, G0)
7	VSS	Power Ground
8	Rin2-	-LVDS differential data input (G1-G5, B0-B1)
9	Rin2+	+LVDS differential data input (G1-G5, B0-B1)
10	VSS	Power Ground
11	Rin3-	-LVDS differential data input (B2-B5, HS, VS, DE)
12	Rin3+	+LVDS differential data input (B2-B5, HS, VS, DE)
13	VSS	Power Ground
14	CLKIN-	-LVDS differential clock input
15	CLKIN+	+LVDS differential clock input
16	VSS	Power Ground
17	Rin4-	-LVDS differential data input (R6, R7, G6, G7, B6, B7)
18	Rin4+	+LVDS differential data input (R6, R7, G6, G7, B6, B7)
19	SEL68	6/8 bits LVDS data input selection (H: 8bit L/NC: 6bit)
20	Bist	Internal use. Normally pull low.

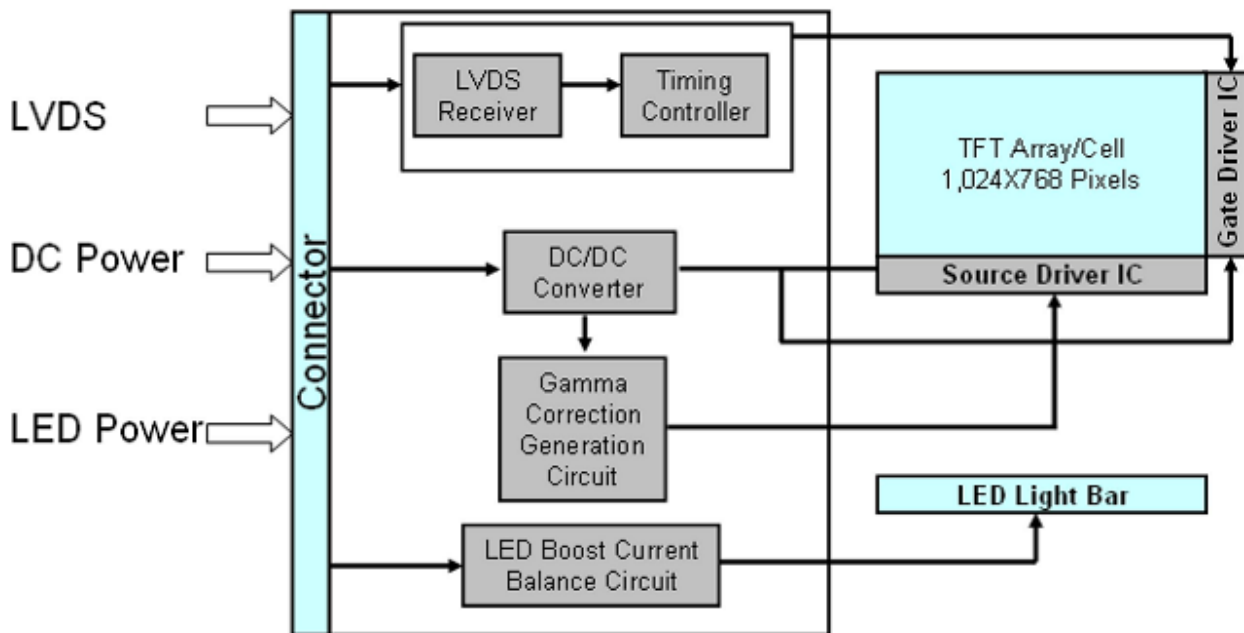
8-2 Black Light Interface

No.	Symbol	Function
1	VCC	Power Supply For LED Circuit, 12V (Typ.)
2	GND	Ground
3	EN	On/Off (5V-ON, 0V-OFF)
4	PWM	Dimming (PWM)
5	NC	Not Connection

8-3 Connector Name / Designation

Item	Jack Connector	PIN IDE Connector	Remark
LVDS Connector	MSB240420HE	P240420H	Manufactured by STM
BL Connector	MSB24038P5A	P24038P5	

9. Block Diagram:

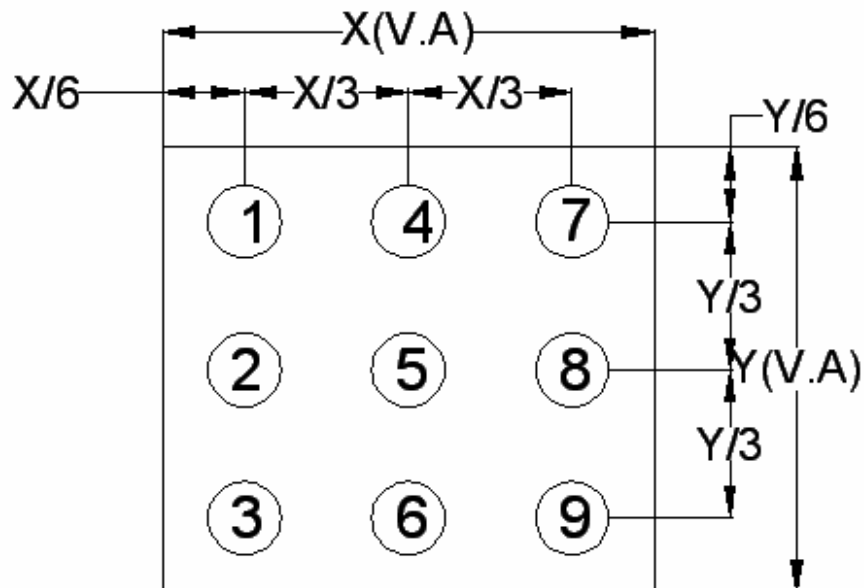


10. Backlight:**Data About LED Backlight:**

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Note
Supply Current	If	-	60	-	mA	4.
Supply Voltage	Vf	2.8	3.3	3.6	V	4.
Luminous Intensity for LCM	LV	TBD	350	-	Cd/m ²	1.4.
Uniformity for LCM	-	75	-	-	%	2.4.
Life Time	-	30000	-	-	Hr.	3.4.

NOTE:

1. Average Luminous Intensity of P1-P9
2. Uniformity = Min/Max * 100%
3. The LED life time define as the estimated time to 50% degradation of initial luminous.
4. Operating temperature 25°C, humidity 55%

Measured Method: (X*Y: Light Area)**TEST POINT**



11. General Precaution:

11.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

11.2 Handling Precaution

- (1) Please mount LCD module by using mounting holes arranged in four corners tightly.
- (2) Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. IVO does not warrant the module, if customers disassemble or modify the module.
- (3) If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid Crystal, and do not contact liquid crystal with skin. If liquid crystal contacts mouth or eyes, rinse out with water immediately. If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and Rinse thoroughly with water.
- (4) Disconnect power supply before handling LCD module
- (5) Refrain from strong mechanical shock and /or any force to the module.
- (6) Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature; etc otherwise LCD module may be damaged. It's recommended employing protection circuit for power supply.
- (7) Do not touch, push or rub the polarizer with anything harder than HB pencil lead. Use fingerstalls of soft gloves in order to keep clean display quality, when Persons handle the LCD module for incoming inspection or assembly.
- (8) When the surface is dusty, please wipe gently with absorbent cotton or other soft Material. When cleaning the adhesives, please use absorbent cotton wetted with a little Petroleum benzene or other adequate solvent.
- (9) Wipe off saliva or water drops as soon as possible. If saliva or water drops Contact with polarizer for a long time, they may cause deformation or color Fading.
- (10) Protection film must remove very slowly from the surface of LCD module to Prevent from electrostatic occurrence.
- (11) Because LCD module uses CMOS-IC on circuit board and TFT-LCD panel, it is Very weak to electrostatic discharge, Please be careful with electrostatic Discharge .Persons who handle the module should be grounded through adequate methods.
- (12) Do not adjust the variable resistor located on the module.

11.3 Storage Precaution

- (1) Please do not leave LCD module in the environment of high humidity and high temperature for a long time.
- (2) The module shall not be exposed under strong light such as direct sunlight. Otherwise, Display characteristics may be changed.
- (3) The module should be stored in a dark place. It is prohibited to apply sunlight or fluorescent light in storage.

11.4 Operation Precaution

- (1) Do not connect or disconnect the module in the "Power On" condition.
- (2) Power supply should always be turned on/off by 9.0 "Power on/off sequence"
- (3) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference should be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- (4) 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.



11.5 Others

- (1) Ultra-violet ray filter is necessary for outdoor operation.
- (2) Avoid condensation of water which may result in improper operation or disconnection of electrode.
- (3) If the module keeps displaying the same pattern for a long period of time, the image may be "sticked" to the screen.
- (4) This module has its circuitry PCB's on the rear side and should be handled carefully in order not to be stressed.

11.6 Disposal

When disposing LCD module, obey the local environmental regulations.