

MDT150001C	1024 x 768	LVDS Interface	TFT Module
Specification			
Version: 1		Date: 11/03/2021	
Revision			
1	09/03/2021	First issue	

Display Features			
Display Size	15"		
Resolution	1024 x 768		
Orientation	Landscape		
Appearance	RGB		
Logic Voltage	3.3V		
Interface	LVDS		
Brightness	2400 cd/m ²		
Touchscreen	CTP		
Module Size	326.50 x 253.50 x 9.00 mm		
Operating Temperature	-30°C ~ +85°C	Created By	Checked By
Pinout	20 way connector	CL	TSB
Pitch	1.25 mm	Box Quantity	Weight / Display
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Display Accessories	
Part Number	Description

Optional Variants	
Appearances	Voltage



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 XGA (1024(H) x768(V)) screen and 16.2M colors.

2.2 Features

- High brightness display, 2500nits by LED backlight.
- Long operation lifetime BLU design
- RoHS Compliance
- Wide operation temperature
- Extra Wide view angle

2.3 Application

Industrial applications.



2.4 Display specifications

Items	Unit	Specification
Screen Diagonal	inch	15.0"
Active Area	mm	304.128 (H) X 228.098 (V)
Pixels H x V	pixels	1024 x3(RGB) x 768
Pixels Pitch	um	297 (per one triad) x 297
Pixel Arrangement		RGB Vertical stripe
Display mode		Normally Black, AHVA
White luminance (center)	Cd/m ²	2500 (Typ)
Contrast ratio		1000:1 (Typ.)
Optical Response Time	msec	25 ms (Typ. On/off)
Normal Input Voltage VDD	Volt	3.3
Power Consumption (Vcc Line + LED backlight)	Watt	27.3W (VDD line=1.56 W; LED lines= 25.74 W)
Weight	Grams	920
Physical size	mm	326.5 (W)×253.5 (H)×9.0 (D)
Electrical Interface		LVDS
Support colors		16.2M colors
Surface Treatment		Anti-glare and hard-coating 3H
Temperature range		
Operating	°C	-30 ~ 85 (TFT surface)
Storage	°C	-30 ~ 85
RoHS Compliance		RoHS Compliance



2.5 Optical characteristics

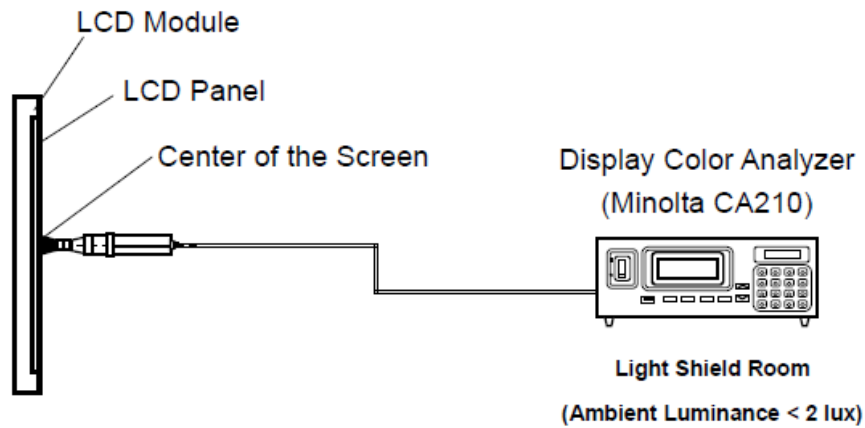
The following optical characteristics are measured under stable condition at 25 °C

Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right)	80	89		2
		CR=10 (Left)	80	89		
		Vertical (Up)	80	89		
		CR=10 (Down)	80	89		
Contrast Ratio		Normal Direction	800	1000		3
Response Time	msec	Raising + Falling		25	30	4
Color / Chromaticity Coordinates (CIE)		Red x	-0.05	0.619	+0.05	5
		Red y		0.352		
		Green x		0.329		
		Green y		0.609		
		Blue x		0.150		
		Blue y		0.118		
Color coordinates (CIE) White		White x		0.313		
		White y		0.329		
Center Luminance	Cd/m ²		2000	2500		6
Luminance Uniformity	%		70	75		7
Color gamut	%			60		
Crosstalk (in 60 Hz)	%				1.5	
Flicker	dB				-20	

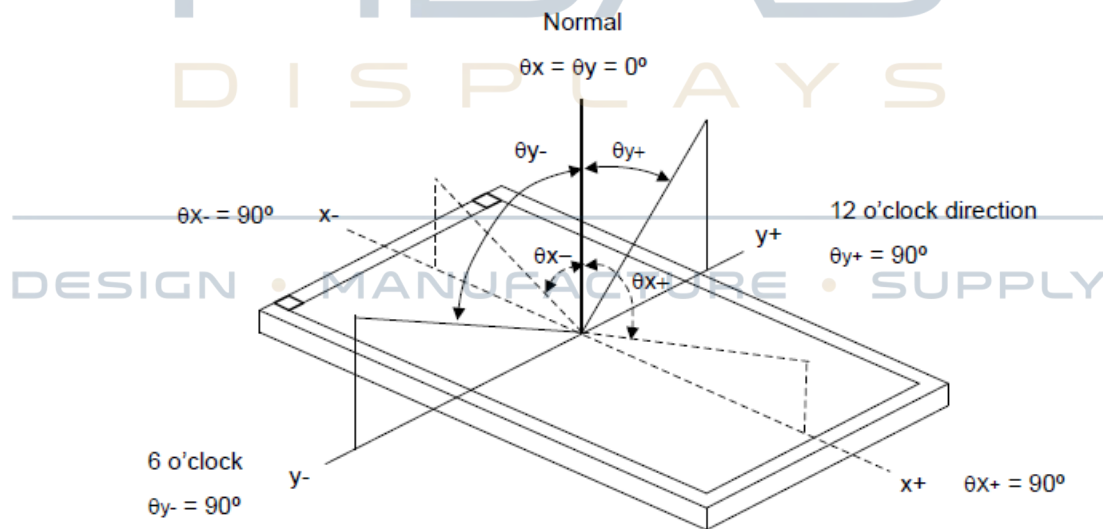


Note 1: Measurement method

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.



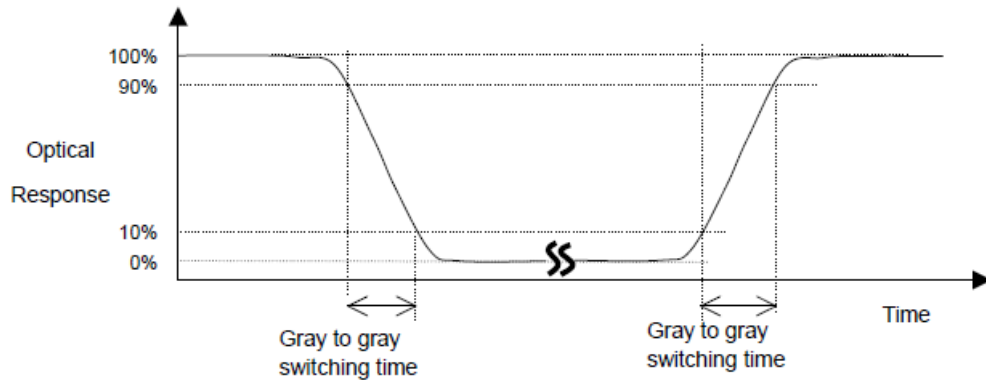
Note 2: Definition of viewing angle



Note 3: Contrast ratio is measured by Minolta CA210

Note 4: Definition of Response time

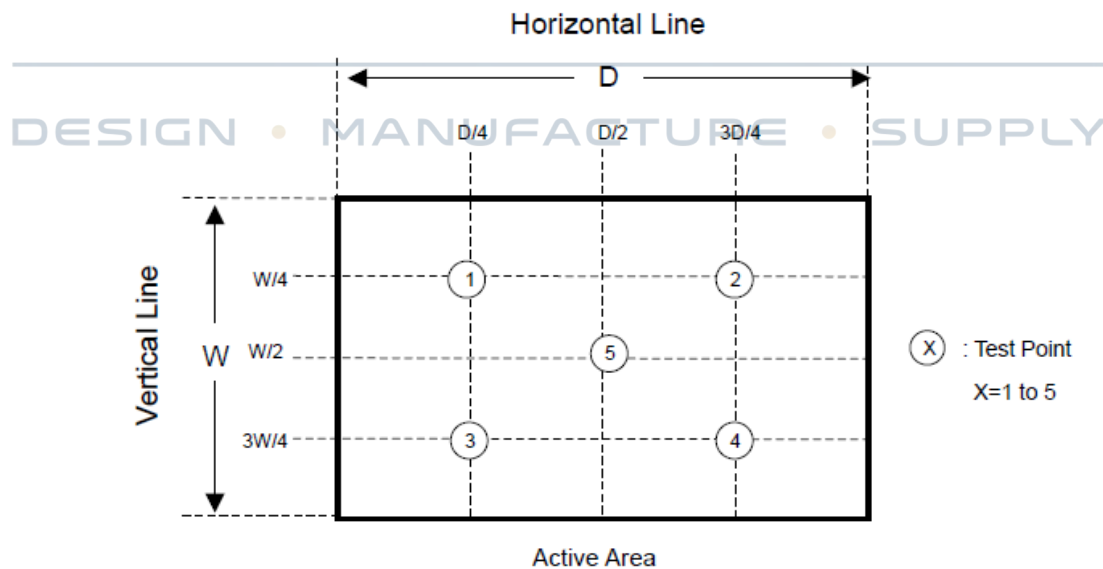
The output signals of photo detector are measured when the input signals are changed from “Full Black” to “Full White” (rising time), and from “Full White” to “Full Black” (falling time), respectively. The response time is interval between the 10% and 90% of amplitudes. Please refer to the figure as below.



Note 5: Color chromaticity and coordinates (CIE) is measured by Minolta CA210

Note 6: Center luminance is measured by Minolta CA210

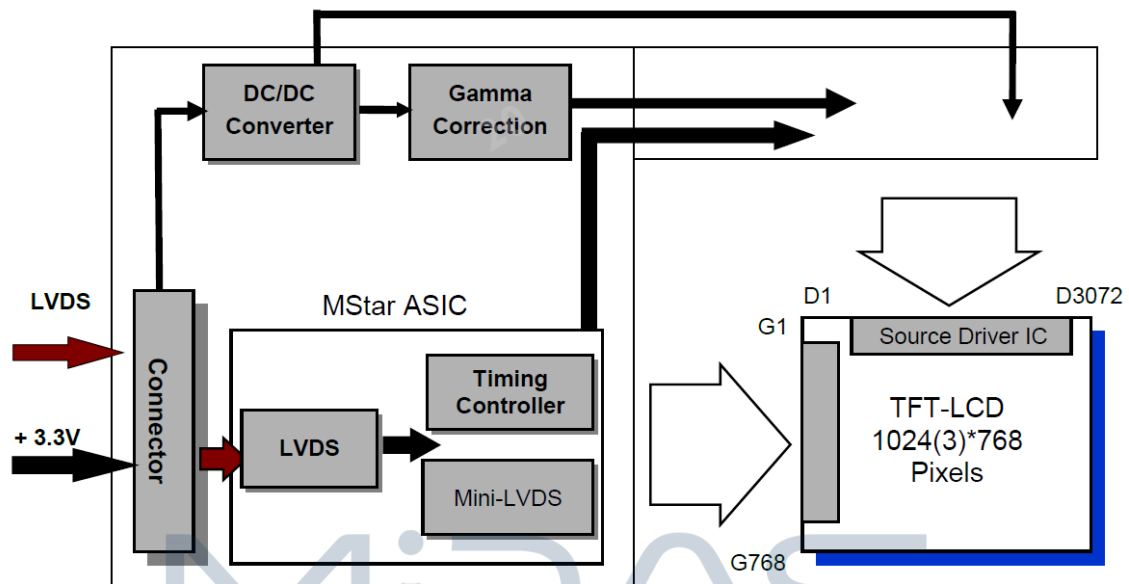
Note 7: Luminance uniformity of these 5 points is defined as below and measured by Minolta CA210



$$\text{Uniformity} = (\text{Min. Luminance of 5 points}) / (\text{Max. Luminance of 5 points})$$



3. Function block diagram



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4. Absolute Maximum Ratings

Absolute maximum ratings of the module are as following:

4.1 TFT LCD module

Items	Symbol	Min	Max	Unit	Conditions
Power supply voltage	V _{DD}	-0.3	3.6	Volt	Note 1, 2

4.2 Backlight unit

Items	Symbol	Min	Max	Unit	Conditions
LED bar input current			600	mA	

4.3 Environment

Items	Symbol	Values			Unit	Conditions
		Min.	Typ.	Max.		
Operation temperature	T _{OS}	-30	-	85	°C	Note 3
Operation Humidity	H _{OP}	10		85	%	
Storage temperature	T _{ST}	-30		85	°C	
Storage Humidity	H _{ST}	5		90	%	

Note 1: With in T_a= 25°C

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).

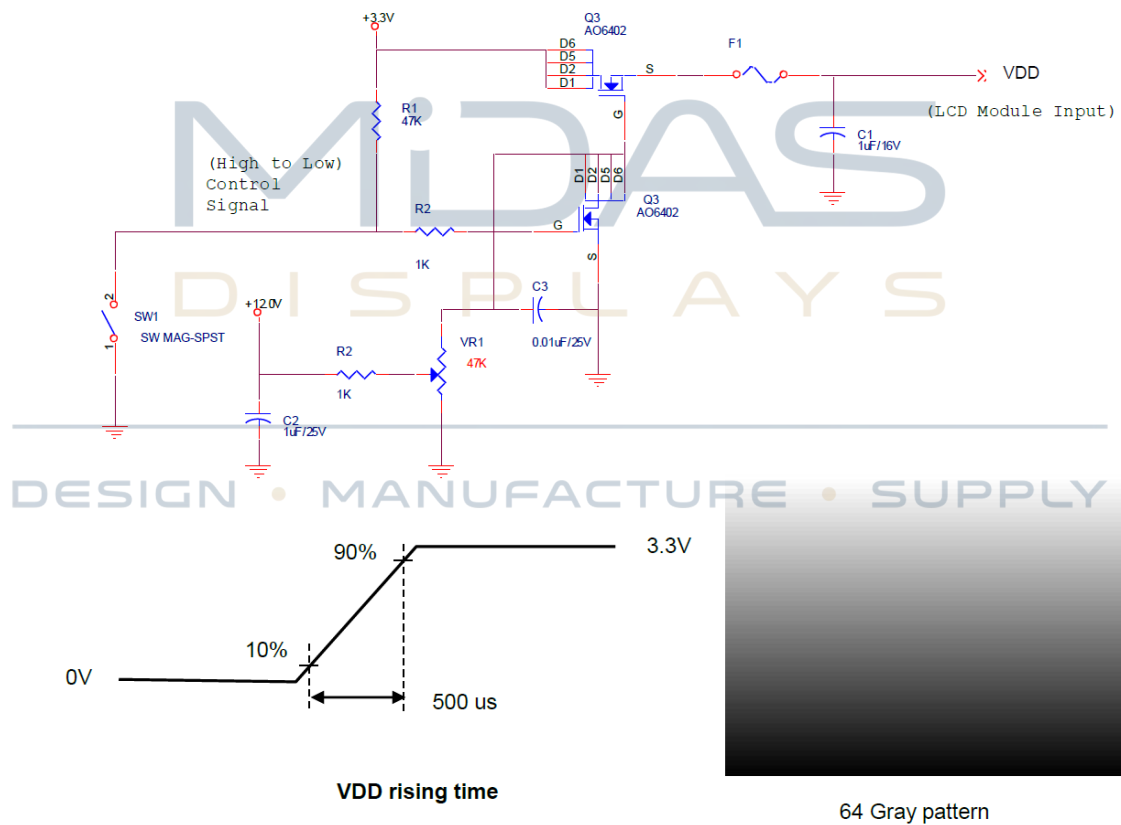
5. Electrical characteristics

5.1 LCD electronics specification

5.1.1 Power specification

Symbol	Parameter	Min	Typ	Max	Units	Remark
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	± 10%
IDD	VDD Current	-	0.46	0.55	[A]	All White Pattern (VDD=3.3V, at 60Hz)
Irush	LCD Inrush Current			3	[A]	Note 1
PDD	VDD Power	-	1.52	1.82	[Watt]	All White Pattern (VDD=3.3V, at 60Hz)

Note 1: Measurement condition:



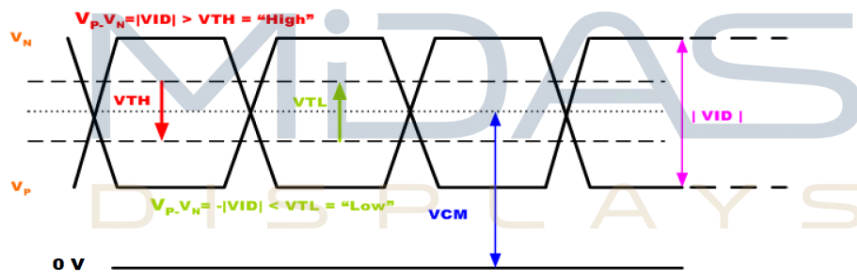
5.1.2 Signal electrical characteristics

Symbol	Item	Min.	Typ.	Max.	Unit	Remark
VTH	Differential Input High Threshold	-	-	100	[mV]	VCM=1.2V
VTL	Differential Input Low Threshold	-100	-	-	[mV]	VCM=1.2V
VID	Input Differential Voltage	100		600	[mV]	
VICM	Differential Input Common Mode Voltage	1.0	1.2	1.5	[V]	VTH/VTL=±100mV

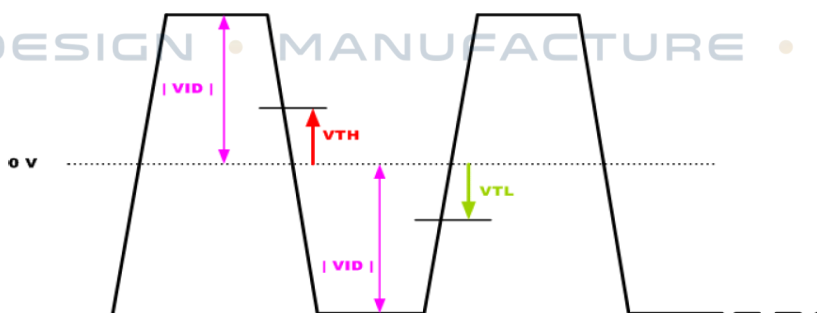
Note: LVDS Signal Waveform.

$V_P - V_N = |VID| > V_{TH} = \text{"High"}$
 $V_P - V_N = -|VID| < V_{TL} = \text{"Low"}$

Single-end Signal



Differential Signal



5.2 Backlight unit

Parameter	Min	Typ	Max	Unit	Note
LED voltage (VL)		39		[V]	2
LED current (IL)		330		[mA]	2
LED power (PL)		25.74		[W]	
LED lite time (MTBF)		100,000		[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°C and typical LED Current at 330 mA

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



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5.3 Interface connector

5.3.1 TFT connector(CN1)

Pin No.	Symbol	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	NC	No Connect
4	NC	No Connect
5	Rin1-	- LVDS differential data input (R0-R5, G0)
6	Rin1+	+ LVDS differential data input (R0-R5, G0)
7	VSS	Ground
8	Rin2-	- LVDS differential data input (G1-G5, B0-B1)
9	Rin2+	+ LVDS differential data input (G1-G5, B0-B1)
10	VSS	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	Ground
14	ClkIN-	- LVDS differential clock input
15	ClkIN+	+ LVDS differential clock input
16	GND	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	VSS	Ground
20	VSS	Ground

Note 1: Input signals shall be in low status when VDD is off.

5.3.2 Backlight connector(CN2)

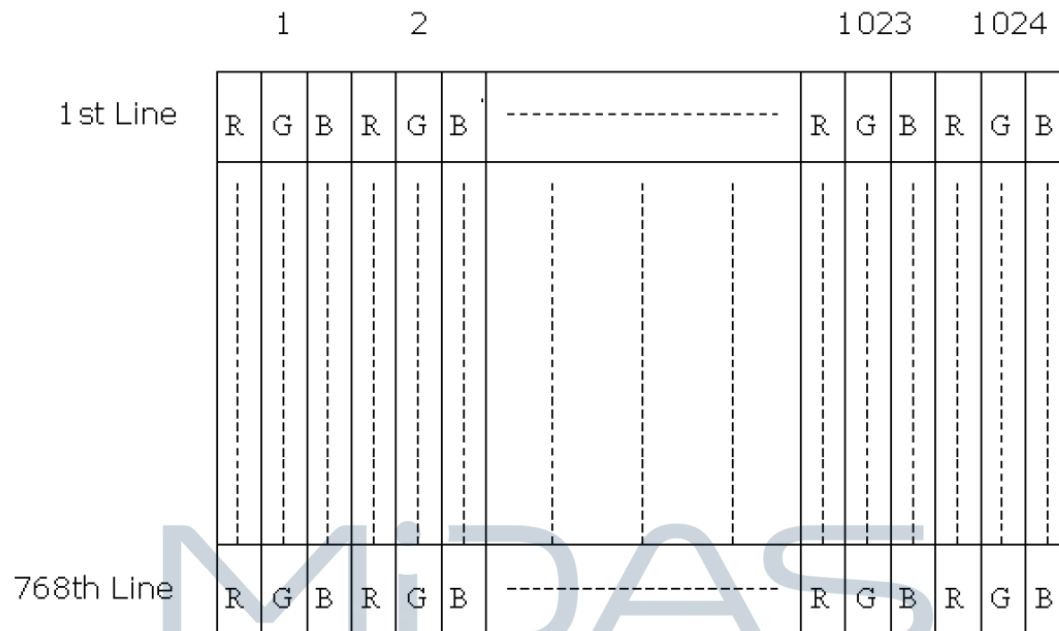
Recommended connector : JOIN TEK JT1025-1021 (BHSR-02VS-1 manufactured by JST)

Pin no	Symbol	Description	Note
1	V _{LED+}	Backlight LED anode	Red
2	V _{LED-}	Backlight LED cathode	Black



6. Signal characteristics

6.1 Pixel format image



the

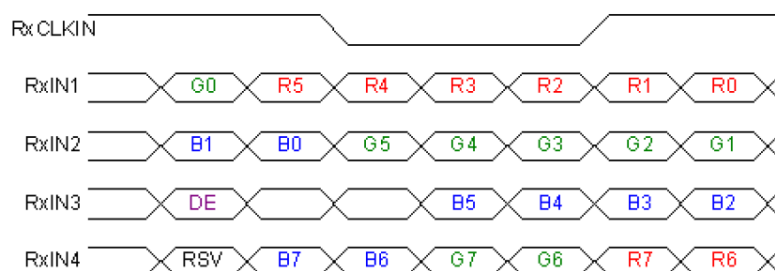
R	G	B	R	G	B	-----	R	G	B
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DISPLAYS

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6.2 The input data format



Note1: Please follow PSWG.

Note2: R/G/B data 7:MSB, R/G/B data 0:LSB

Signal Name	Description	Remark
R7 R6 R5 R4 R3 R2 R1 R0	Red Data 7 Red Data 6 Red Data 5 Red Data 4 Red Data 3 Red Data 2 Red Data 1 Red Data 0	Red-pixel Data For 8Bits LVDS input MSB: R7 ; LSB: R0
G7 G6 G5 G4 G3 G2 G1 G0	Green Data 7 Green Data 6 Green Data 5 Green Data 4 Green Data 3 Green Data 2 Green Data 1 Green Data 0	Green-pixel Data For 8Bits LVDS input MSB: G7 ; LSB: G0
B7 B6 B5 B4 B3 B2 B1 B0	Blue Data 7 Blue Data 6 Blue Data 5 Blue Data 4 Blue Data 3 Blue Data 2 Blue Data 1 Blue Data 0	Blue-pixel Data For 8Bits LVDS input MSB: B7 ; LSB: B0
RxCLKIN	LVDS Data Clock	
DE	Data Enable Signal	When the signal is high, the pixel data shall be valid to be displayed.

Note: Output signals from any system shall be low or Hi-Z state when VDD is off.

6.3 Interface timing

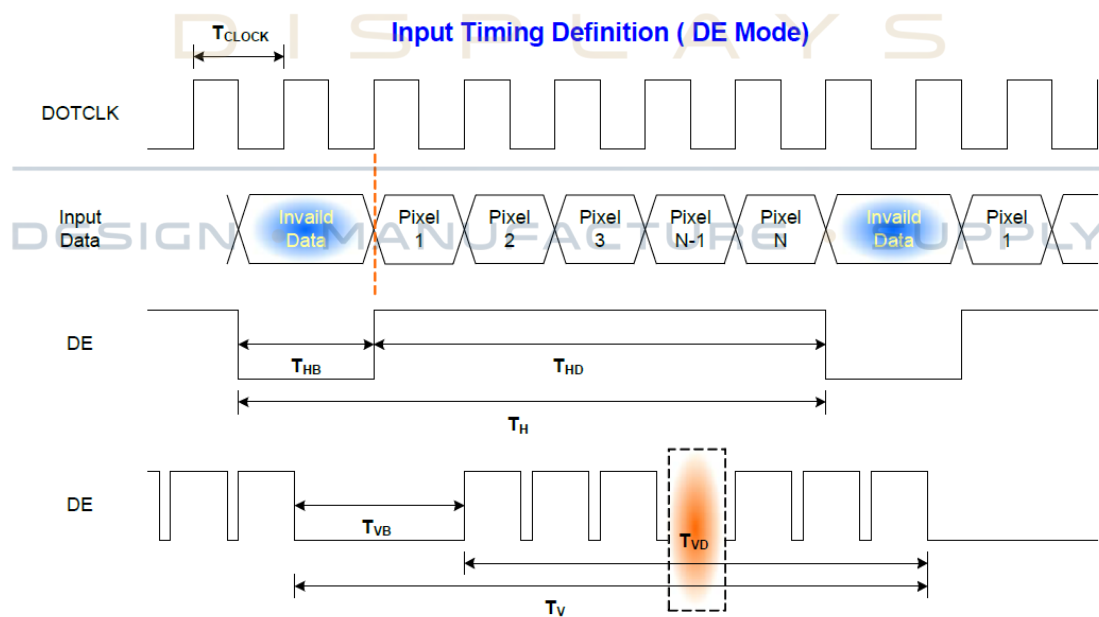
6.3.1 Timing characteristics

Signal	Parameter		Symbol	Min.	Typ.	Max.	Unit
Clock Timing	Clock frequency		1/ T _{Clock}	63	65	67	MHz
Vsync Timing	Vertical Section	Period	T _V	804	806	808	T _{Line}
		Active	T _{VD}	768	768	768	
		Blanking	T _{VB}	36	38	40	
Hsync Timing	Horizontal Section	Period	T _H	1328	1344	1360	T _{Clock}
		Active	T _{HD}	1024	1024	1024	
		Blanking	T _{HB}	304	320	336	
Frame Rate			F	59	60	61	Hz

Note: Support DE mode only.

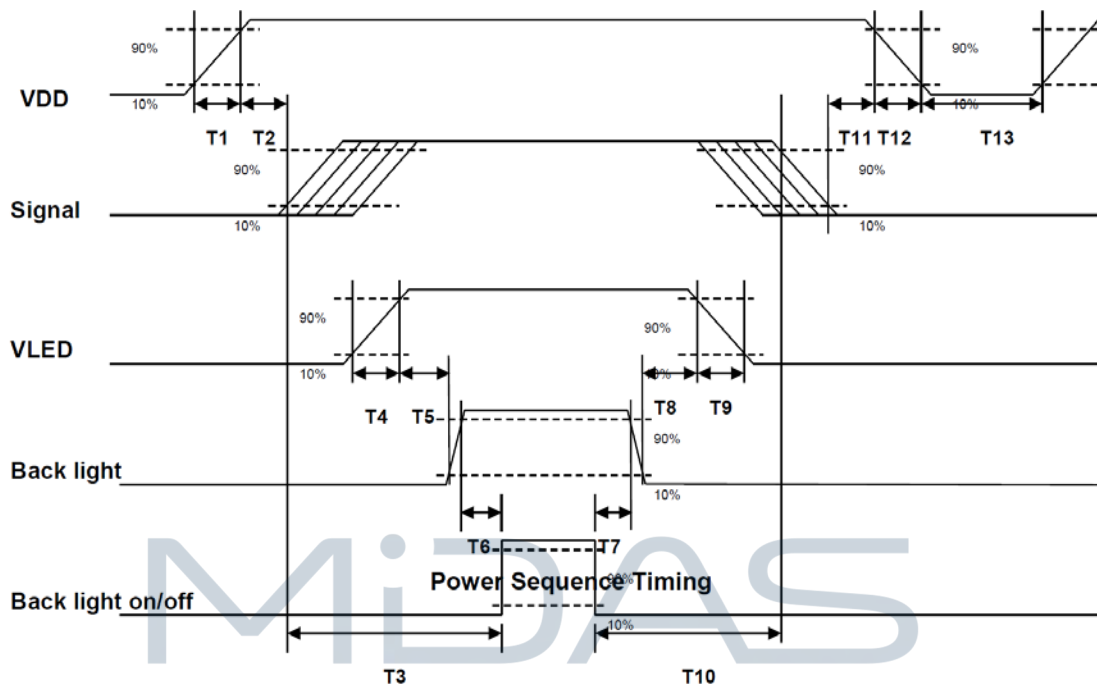
Note : Typical value refer to VESA STANDARD

6.3.2 Input timing diagram



6.4 Power ON/OFF sequence

VDD power and backlight on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	0.5	-	10	[ms]
T2	30	40	50	[ms]
T3	200	-	-	[ms]
T4	0.5	-	10	[ms]
T5	10	-	-	[ms]
T6	10	-	-	[ms]
T7	0	-	-	[ms]
T8	10	-	-	[ms]
T9	-	-	200	[ms]
T10	110	-	-	[ms]
T11	0	16	50	[ms]
T12	-	-	200	[ms]
T13	1000	-	-	[ms]

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

7. Reliability Test

Environment test conditions are listed as following table.

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta=40°C, 80%RH, 120hours	
High Temperature Operation (HTO)	Ts= 85°C, 120hours	3
Low Temperature Operation (LTO)	Ta= -30°C, 120hours	
High Temperature Storage (HTS)	Ta= 85°C, 120hours	
Low Temperature Storage (LTS)	Ta= -30°C, 120hours	
Thermal Shock Test (TST)	-20°C/30min, 60°C/30min, 100 cycles	
On/Off Test	On/10sec, Off/10sec, 3,000 cycles	
ESD (ElectroStatic Discharge)	Contact Discharge: $\pm 8KV$, 150pF(330 Ω) 1sec, 9 points, 25 times/ point.	
	Air Discharge: $\pm 15KV$, 150pF(330 Ω) 1sec 9 points, 25 times/ point.	

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°C to 50°C, and back again. Power is not applied during the test.

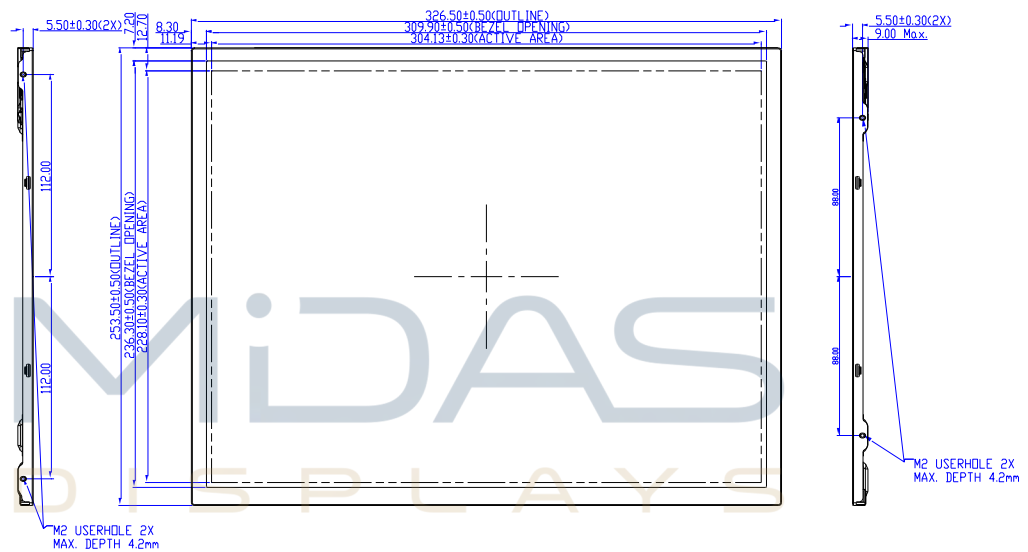
After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

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

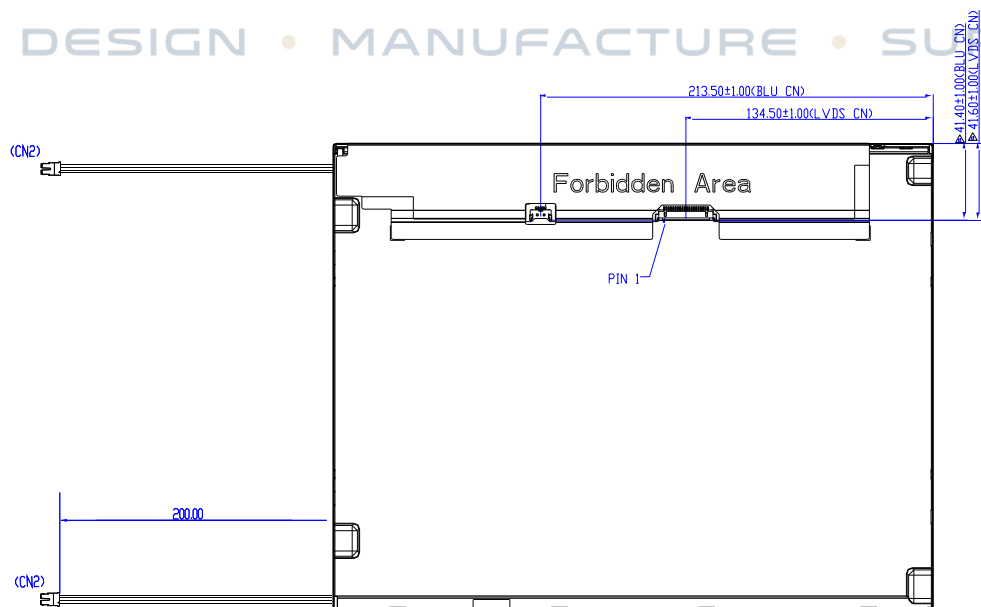
Note 3: TFT surface.

8. Mechanical Characteristics

NOTES:
1.TORQUE OF M2 USER HOLE SHOULD BE WITHIN 4 kgf-cm AND RE-SCREW 10 TIMES.
2.UNSPECIFIED TOLDRANCE TO BE $\pm 0.5\text{mm}$.
3.BLU CN TYPE:3808K-F05N-02
LVDS CN TYPE:SIN SHENG MSB240420_HD



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**Touch Panel Drawing available on
request, please contact
sales@midasdisplays.com**

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