

MDT190000	1280x1024	LVDS Interface	TFT Module
Specification			
Version: 1		Date: 21/03/2021	
Revision			
1	19/03/2021	First issue	

Display Features			
Display Size	19"		
Resolution	1280x1024		
Orientation	Landscape		
Appearance	RGB		
Logic Voltage	5.0V		
Interface	LVDS		
Brightness	1600 cd/m ²		
Touchscreen	---		
Module Size	396.00 x 324.00 x 15.18 mm		
Operating Temperature	-30°C ~ +85°C	Created By	Checked By
Pinout	30 way connector	CL	TSB
Pitch	1.25 mm	Box Quantity	Weight / Display
		---	---

DESIGN • MANUFACTURE • SUPPLY

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 momentarily. 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.

DESIGN • MANUFACTURE • SUPPLY



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 SXGA (1280(H) x1024(V)) screen and 16.7M colors (6 bit + HiFRC data).

2.2 Features

- High brightness display, 1600nits by LED backlight.
- Long operation lifetime BLU design
- RoHS Compliance
- Wide operation temperature
- Wide view angle

2.3 Application

Industrial applications.

MIDAS
DISPLAYS

DESIGN • MANUFACTURE • SUPPLY



2.4 Display specifications

Items	Unit	Specification
Screen Diagonal	inch	19.0"
Active Area	mm	376.32 (H) X 301.06 (V)
Pixels H x V	pixels	1280 x3(RGB) x 1024
Pixels Pitch	um	294 (per one triad) x 294
Pixel Arrangement		RGB Vertical stripe
Display mode		Normally white
White luminance (center)	Cd/m ²	1600 (Typ)
Contrast ratio		1000:1 (Typ.)
Optical Response Time	msec	10 ms (Typ. On/off)
Normal Input Voltage VDD	Volt	5.0
Power Consumption (Vcc Line + LED backlight)	Watt	30.92W (VDD line=5.0 W; LED lines= 25.92 W)
Weight	Grams	1800
Physical size	mm	396 (W)×324 (H)×15.18 (D)
Electrical Interface		LVDS
Support colors		16.7M 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

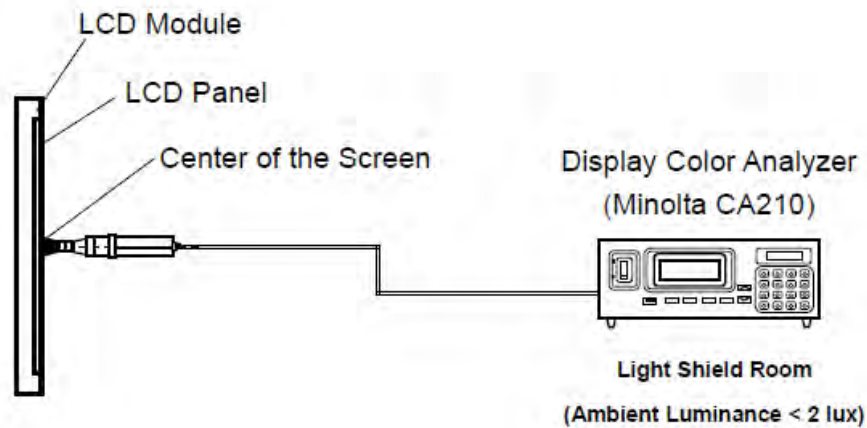
The following optical characteristics are measured under stable condition at 25 °C

Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right)	75	85		2
		CR=10 (Left)	75	85		
		Vertical (Up)	70	80		
		CR=10 (Down)	70	80		
Contrast Ratio		Normal Direction	600	1000		3
Response Time	msec	Raising + Falling		10	20	4
Color / Chromaticity Coordinates (CIE)		Red x	-0.05	0.640	+0.05	5
		Red y		0.344		
		Green x		0.327		
		Green y		0.624		
		Blue x		0.155		
		Blue y		0.054		
Color coordinates (CIE) White		White x		0.313		
		White y		0.329		
Center Luminance	Cd/m ²		1280	1600		6
Luminance Uniformity	%		70	75		7
Crosstalk (in 60 Hz)	%				1.5	
Flicker	dB				-20	

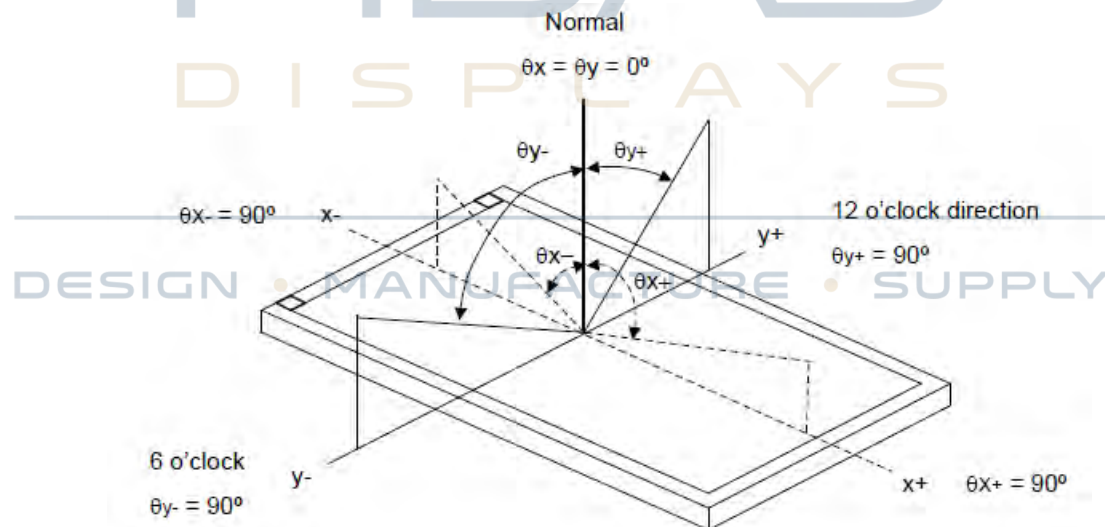


Note 1: Measurement method

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.



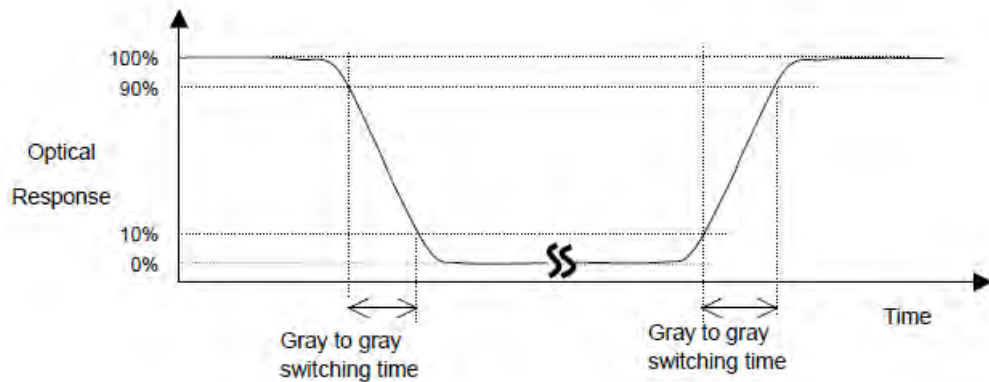
Note 2: Definition of viewing angle



Note 3: Contrast ratio is measured by Minolta CA210

Note 4: Definition of Response time

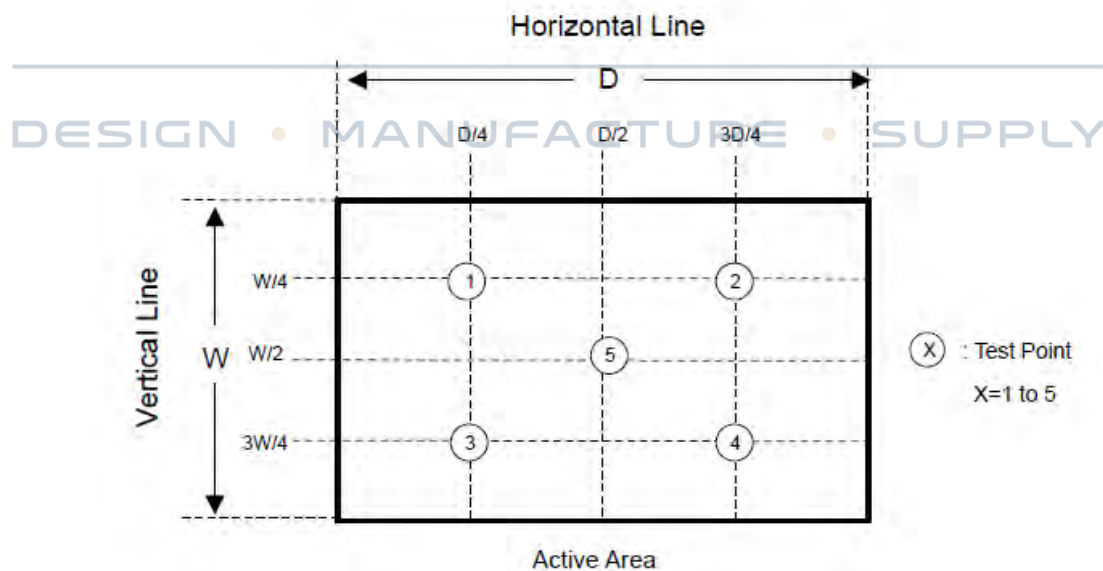
The output signals of photo detector are measured when the input signals are changed from “Full Black” to “Full White” (rising time), and from “Full White” to “Full Black” (falling time), respectively. The response time is interval between the 10% and 90% of amplitudes. Please refer to the figure as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



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

Note 6: Center luminance is measured by Minolta CA210

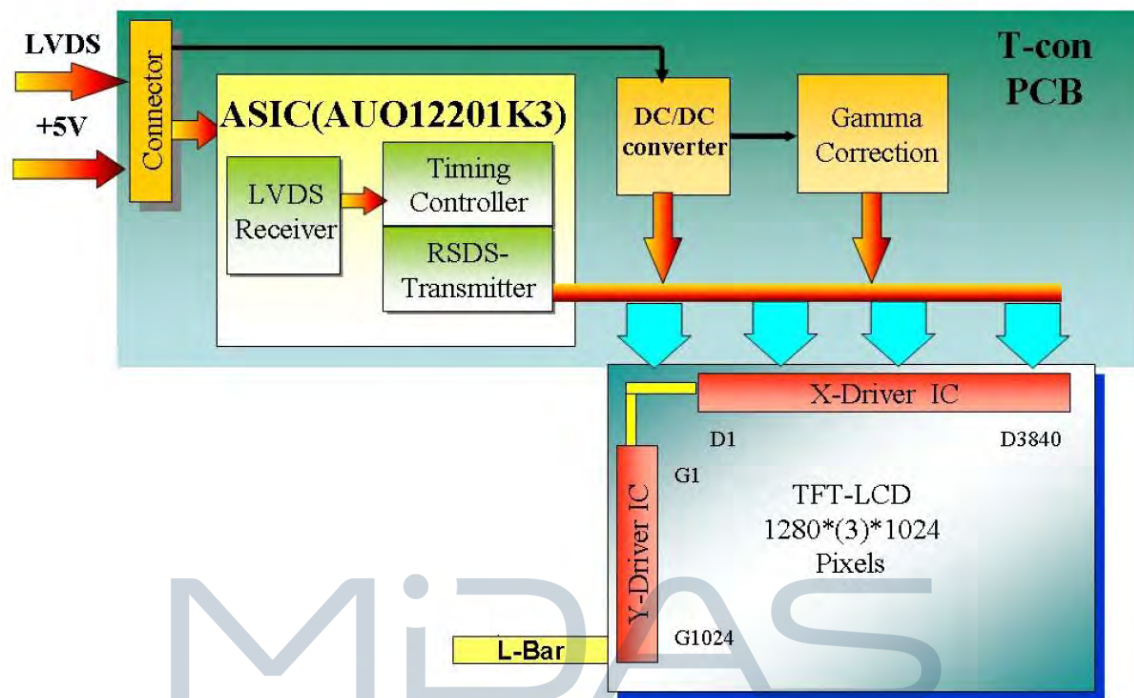
Note 7: Luminance uniformity of these 5 points is defined as below and measured by Minolta CA210



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



3. Function block diagram



MIDAS
DISPLAYS

DESIGN • MANUFACTURE • SUPPLY

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	6.0	Volt	Note 1, 2

4.2 Backlight unit

Items	Symbol	Min	Max	Unit	Conditions
LED bar input current			720	mA	

4.3 Environment

Items	Symbol	Values			Unit	Conditions
		Min.	Typ.	Max.		
Operation temperature	T_{OS}	-30	-	85	$^{\circ}\text{C}$	Note 3
Operation Humidity	H_{OP}	10		85	%	
Storage temperature	T_{ST}	-30		85	$^{\circ}\text{C}$	
Storage Humidity	H_{ST}	5		90	%	

Note 1: With in $T_a = 25^{\circ}\text{C}$

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

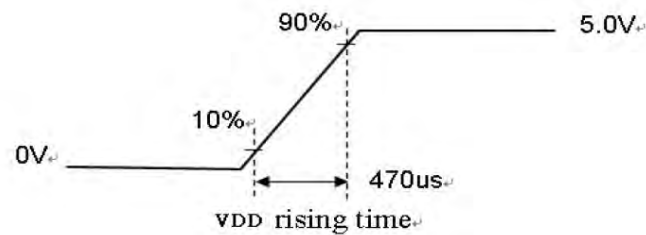
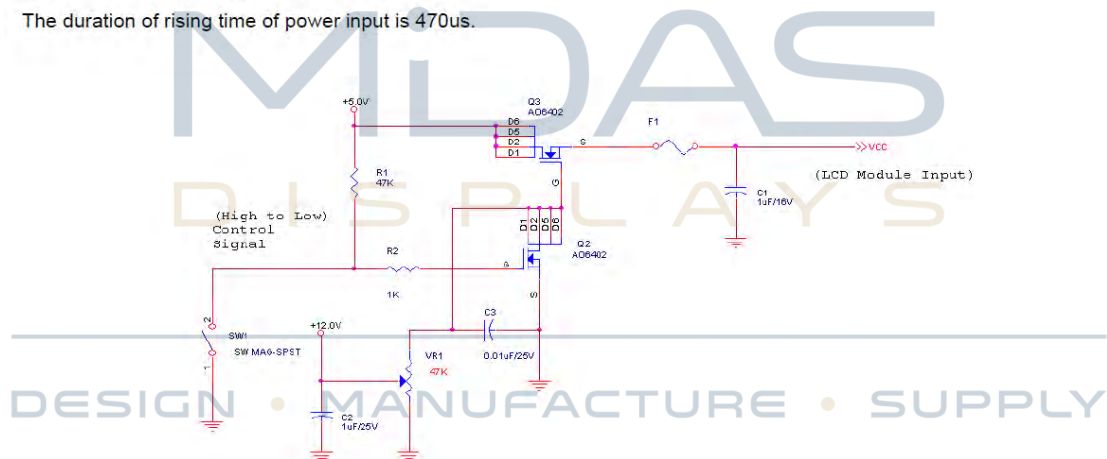
5.1.1 Power specification

Input power specifications are as follows:

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
VDD	Logic/LCD Drive Voltage	4.5	5.0	5.5	[Volt]	+/-10%
IDD	Input Current	-	1	1.2	[A]	VDD= 5.0V, All Black Pattern At 75Hz
PDD	VDD Power	-	5	6	[Watt]	VDD= 5.0V, All Black Pattern At 75Hz
IRush	Inrush Current	-	-	3.0	[A]	Note 1
VDDrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	100	[mV] p-p	VDD= 5.0V, All Black Pattern At 75Hz

Note 1: Measurement conditions:

The duration of rising time of power input is 470us.



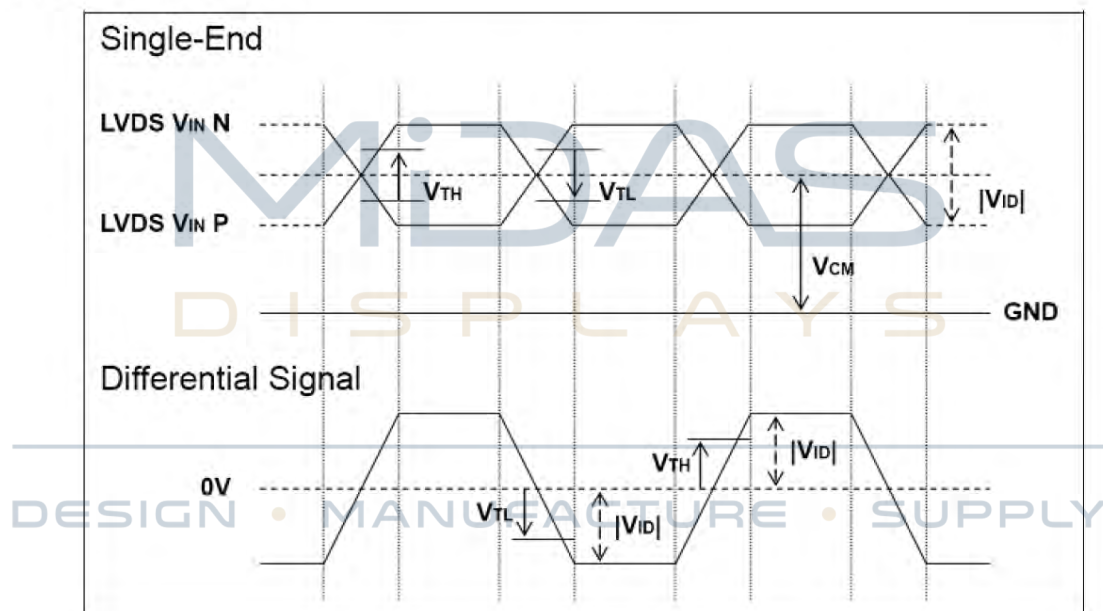
5.1.2 Signal electrical characteristics

Input signals shall be low or Hi-Z state when VDD is off. Please refer to specifications of SN75LVDS82DGG (Texas Instruments) in detail.

Each signal characteristics are as follows;

Symbol	Parameter	Min	Typ	Max	Units	Condition
V_{TH}	Differential Input High Threshold	-	-	+100	[mV]	$V_{CM} = 1.2V$ Note 1
V_{TL}	Differential Input Low Threshold	-100	-	-	[mV]	$V_{CM} = 1.2V$ Note 1
$ V_{ID} $	Input Differential Voltage	100	400	600	[mV]	Note 1
V_{CM}	Differential Input Common Mode Voltage	+1.0	+1.2	+1.5	[V]	$V_{TH}-V_{TL} = 200mV \text{ (max)}$ Note 1

Note1: LVDS Signal Waveform



5.2 Backlight unit

Parameter	Min	Typ	Max	Unit	Note
LED voltage (VL)		36		[V]	2
LED current (IL)		360		[mA]	2
LED power (PL)		25.92		[W]	
LED lite time (MTBF)		80,000		[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 360 mA

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

5.3 Interface connector

5.3.1 TFT connector(CN1)

The module using one LVDS receiver SN75LVDS82(Texas Instruments). LVDS is a differential signal technology for LCD interface and high speed data transfer device. LVDS transmitters shall be SN75LVDS83(negative edge sampling). The first LVDS port(RxOxxx) transmits odd pixels while the second LVDS port(RxExxx) transmits even pixels.

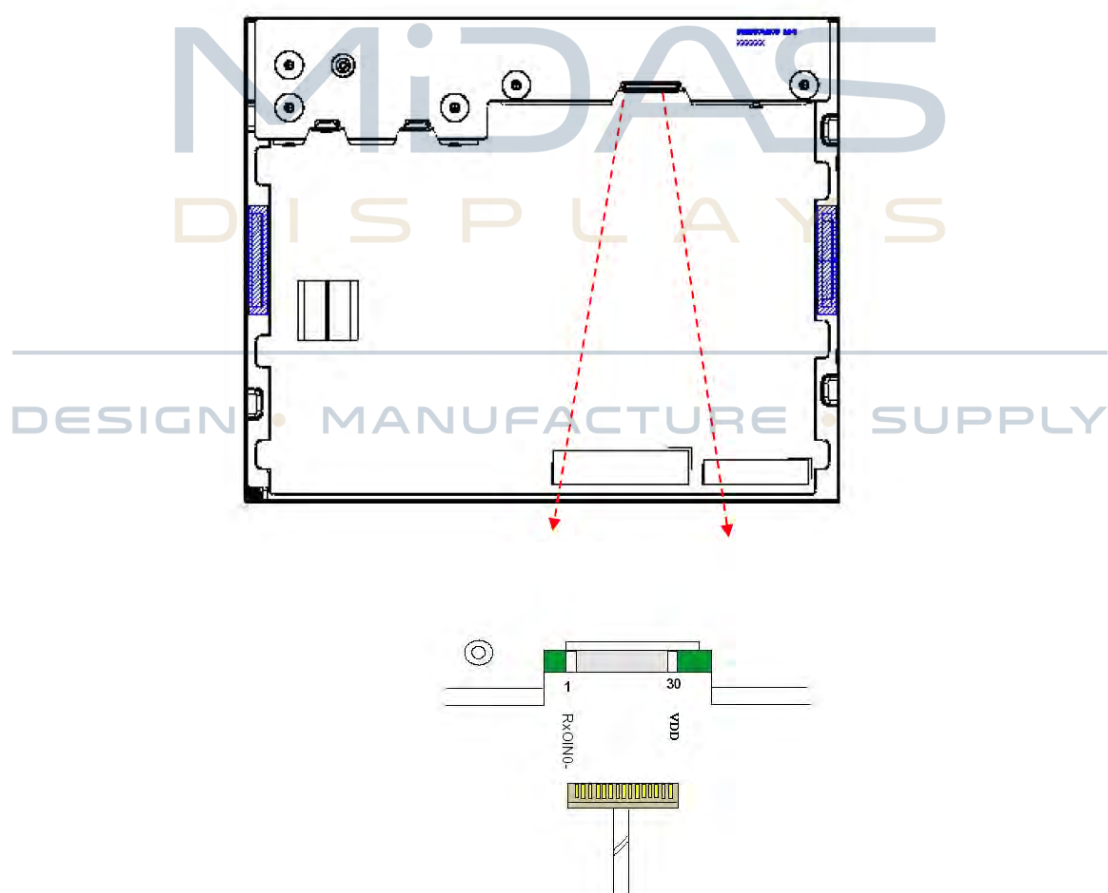
PIN #	SIGNAL NAME	DESCRIPTION
1	RxOIN0-	Negative LVDS differential data input (Odd data)
2	RxOIN0+	Positive LVDS differential data input (Odd data)
3	RxOIN1-	Negative LVDS differential data input (Odd data)
4	RxOIN1+	Positive LVDS differential data input (Odd data)
5	RxOIN2-	Negative LVDS differential data input (Odd data, DSPTMG)
6	RxOIN2+	Positive LVDS differential data input (Odd data, DSPTMG)
7	GND	Power Ground
8	RxOCLKIN-	Negative LVDS differential clock input (Odd clock)
9	RxOCLKIN+	Positive LVDS differential clock input (Odd clock)
10	RxOIN3-	Negative LVDS differential data input (Odd data)
11	RxOIN3+	Positive LVDS differential data input (Odd data)
12	RxEIN0-	Negative LVDS differential data input (Even data)
13	RxEIN0+	Positive LVDS differential data input (Even data)
14	GND	Power Ground
15	RxEIN1-	Negative LVDS differential data input (Even data)
16	RxEIN1+	Positive LVDS differential data input (Even data)
17	GND	Power Ground
18	RxEIN2-	Negative LVDS differential data input (Even data)
19	RxEIN2+	Positive LVDS differential data input (Even data)
20	RxECLKIN-	Negative LVDS differential clock input (Even clock)
21	RxECLKIN+	Positive LVDS differential clock input (Even clock)
22	RxEIN3-	Negative LVDS differential data input (Even data)
23	RxEIN3+	Positive LVDS differential data input (Even data)
24	GND	Power Ground
25	GND	Power Ground
26	GND	Power Ground
27	GND	Power Ground
28	POWER	Power +5V
29	POWER	Power +5V
30	POWER	Power +5V

Note: "Power Ground" stands for 0V.

Following figure shows the relationship of the input signals and LCD pixel format.

	1			2									1279			1280		
1st Line	R	G	B	R	G	B							R	G	B	R	G	B
	.	.	.	.	.	.	.						.	.	.	.	.	.
	.	.	.	.	.	.	.						.	.	.	.	.	.
	.	.	.	.	.	.	.						.	.	.	.	.	.
	.	.	.	.	.	.	.						.	.	.	.	.	.
	.	.	.	.	.	.	.						.	.	.	.	.	.
	.	.	.	.	.	.	.						.	.	.	.	.	.
	.	.	.	.	.	.	.						.	.	.	.	.	.
	.	.	.	.	.	.	.						.	.	.	.	.	.
	.	.	.	.	.	.	.						.	.	.	.	.	.
1024th Line	R	G	B	R	G	B							R	G	B	R	G	B

Note1: Start from left side



Note2: Input signals of odd and even clock shall be the same timing.



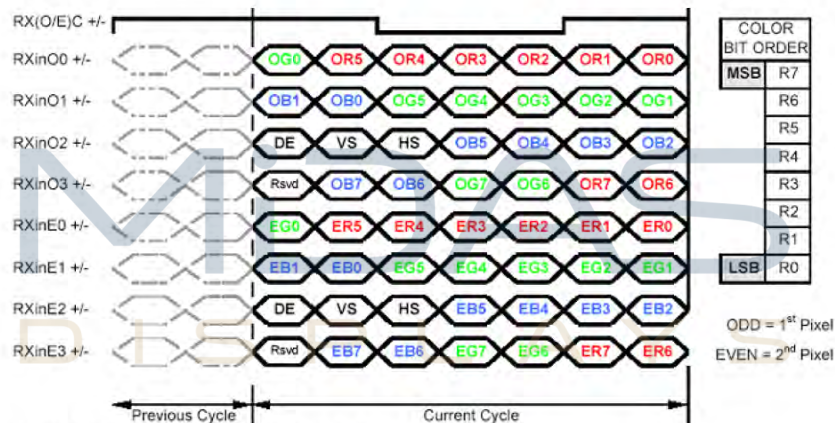
5.3.2 Backlight connector(CN2、CN3)

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 The input data format



Note1: DE only, VS, HS on EVEN channel are not used.

Note2: Please follow PSWG.

Note3: 8-bit in

DESIGN • MANUFACTURE • SUPPLY

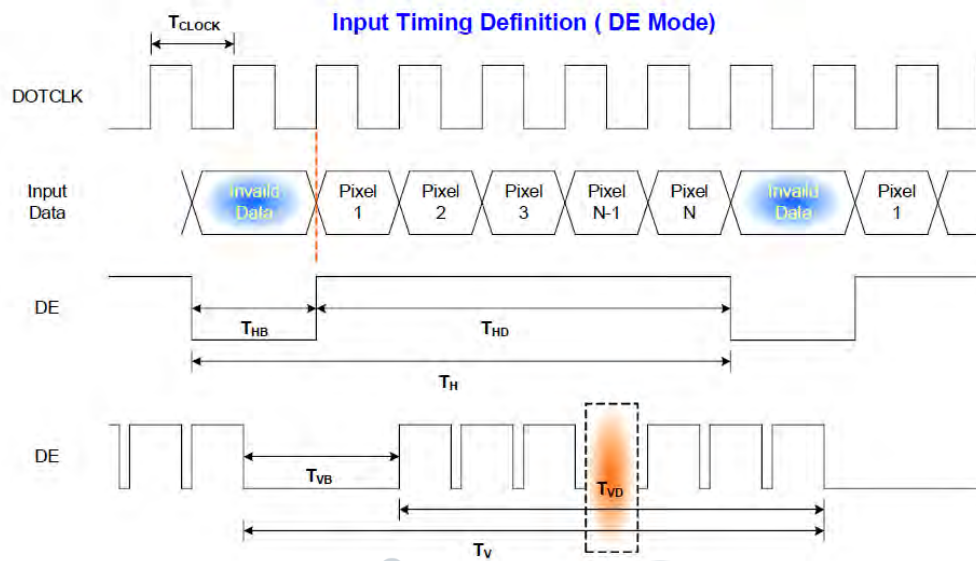
6.2 Interface timing

6.2.1 Timing characteristics

Signal	Item	Symbol	Min	Typ	Max	Unit
Vertical Section	Period	Tv	1032	1066	1150	Th
	Active	Tdisp(v)	1024	1024	1024	Th
	Blanking	Tbp(v)+Tfp(v)+PWvs	8	42	126	Th
Horizontal Section	Period	Th	780	844	2047	Tclk
	Active	Tdisp(h)	640	640	640	Tclk
	Blanking	Tbp(h)+Tfp(h)+PWhs	140	204	-	Tclk
Clock	Period	Tclk	22.2	18.52	14.81	ns
	Frequency	Freq.	44	54	67.5	MHz
Frame Rate	Frequency	1/Tv	49	60	75	Hz

Note: DE mode only

6.2.2 Timing diagram

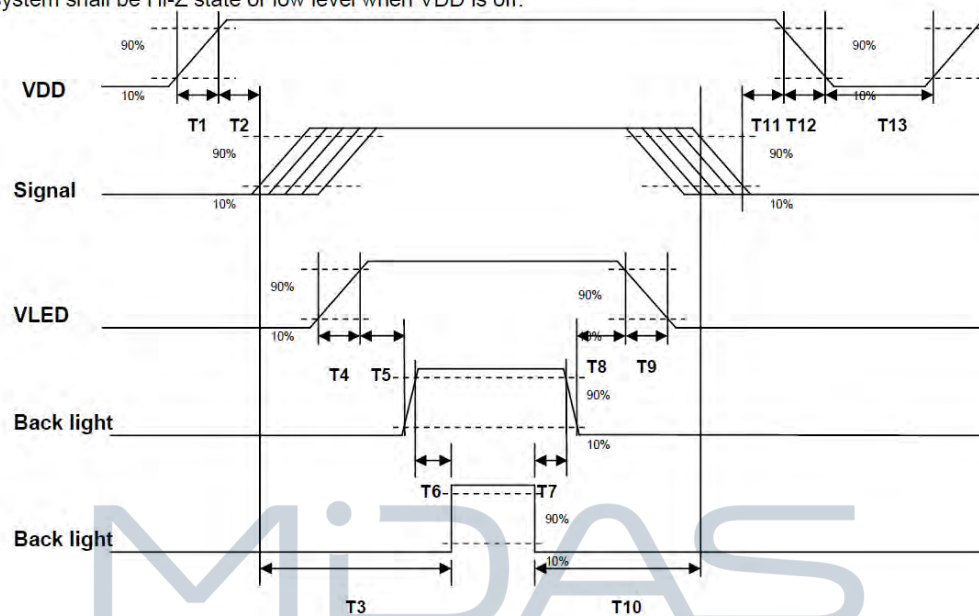


MIDAS
DISPLAYS

DESIGN • MANUFACTURE • SUPPLY

6.3 Power ON/OFF sequence

VDD power and lamp on/off sequence are as follows. 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	-	-	10	[ms]
T10	110	-	-	[ms]
T11	0	16	50	[ms]
T12	-	-	10	[ms]
T13	1000	-	-	[ms]

7. Reliability Test

Environment test conditions are listed as following table.

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta=40°C , 80%RH, 240hours	
High Temperature Operation (HTO)	Ts= 85°C , 240hours	3
Low Temperature Operation (LTO)	Ta= -30°C , 240hours	
High Temperature Storage (HTS)	Ta= 85°C , 240hours	
Low Temperature Storage (LTS)	Ta= -30°C , 240hours	
Thermal Shock Test (TST)	-20°C/30min, 60°C/30min, 100 cycles	
On/Off Test	On/10sec, Off/10sec, 30,000 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.

9. Mechanical Characteristics

