Sauls Wharf House
Crittens Road
Great Yarmouth
Norfolk
NR31 0AG

Telephone +44 (0)1493 602602
Email:sales@midasdisplays.com
Email:tech@midasdisplays.com
www.midasdisplays.com

MDT121002C	1280x800	LVDS Interface	TFT Module
Specification			
Version: 1		Date: 21/10/2017	
Revision			
1	19/10/2017	First issue	

Display Features	
Display Size	12.1”
Resolution	1280x800
Orientation	Landscape
Appearance	RGB
Logic Voltage	3.3V
Interface	LVDS
Brightness	1400 cd/m^2
Touchscreen	CTP
Module Size	278.00 x 184.00 x 9.29 mm
Operating Temperature	-30°C ~ +85°C
Pinout	30 way connector
Pitch	1.00 mm

RoHS compliant

Created By	Checked By
CL	TSB
Box Quantity	Weight / Display
---	---

MiDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

Display Accessories	
Part Number	**Description**
MDIB-CC1	Interconnect board for standard pitch pinouts to fine pitch wires. Providing pinouts for 2.54 pinout. 1.27, 1, 0.845, 0.8, 0.7, 0.65, 0.62, 0.6, 0.5 & 0.3 pads.

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.

MIDAS DISPLAYS
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 WXGA (1280(H) x 800(V)) MVA mode screen and 262k / 16.2M colors.
LED driving board for backlight unit is not included.

2.2 Features

- Sunlight readable display, 1500nits by LED backlight.
- Wide viewing angle
- Low power consumption
- Wide operation temperature
- RoHS Compliance

2.3 Application

Industrial Application; especial kiosk and digital signage display.

2.4 Display Specifications

Items	Unit	Specification
Screen Diagonal	inch	12.1
Active Area	mm	261.12 (H) x 163.2 (V)
Pixels H x V	pixels	1280 x3(RGB) x 800
Pixels Pitch	um	204 (per one triad) x 204
Pixel Arrangement		RGB Vertical stripe
Display mode		MVA mode, normally black
White luminance (center)	Cd/m^2	1400 (Typ.)
Contrast ratio		1000 (Typ.)
Optical Response Time	msec	25 ms (Typ. on/off)
Normal Input Voltage Vcc	Volt	3.3
Power Consumption (Vcc Line + LED backlight)	Watt	18.93W (Vcc line=1.65W , LED line=17.28 W)
Weight	Grams	480 max.
Physical size	mm	278(H) x 184(V) x 9.29 (D)
Electrical Interface		One Chanel LVDS
Support Colors		262K / 16.2 M colors
Surface Treatment		Anti-Glare, 3H
Temperature range Operating Storage (Shipping)	 ^0C ^0C	 -30 ~ 85 (TFT surface temperature) -30 ~ 85
RoHS Compliance		RoHS Compliance

MIDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

2.5 Optical Characteristics

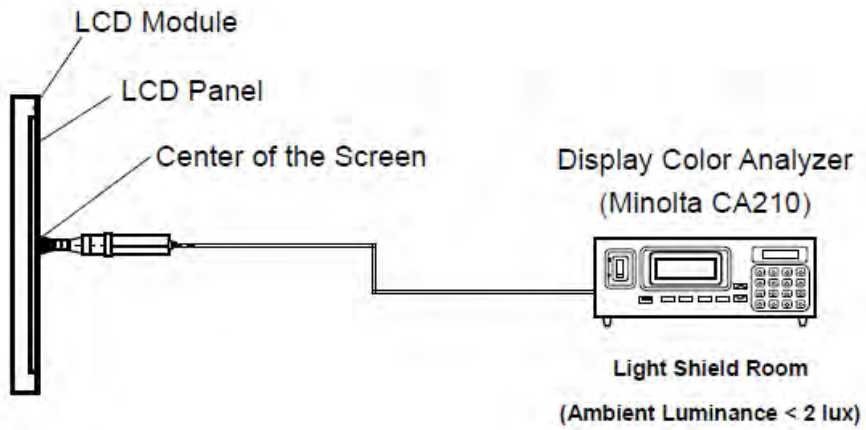
The following optical characteristics are measured under stable condition at 25 ^{0}C

Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right) CR=10 (Left)	160	178		2
		Vertical (Up) CR=10 (Down)	166	178		
Contrast Ratio		Normal Direction	800	1000		3
Response Time	msec	Raising time (T_{rR})		15		4
		Falling time (T_{rF})		10		
		Raising + Falling		25		
Color / Chromaticity Coordinates (CIE)		Red x	-0.05	0.631	+0.05	5
		Red y		0.329		
		Green x		0.299		
		Green y		0.619		
		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		1200	1500		6
Luminance Uniformity	%		70	75		7
Crosstalk (in 60 Hz)	%				1.5	
Flicker	dB				-20	

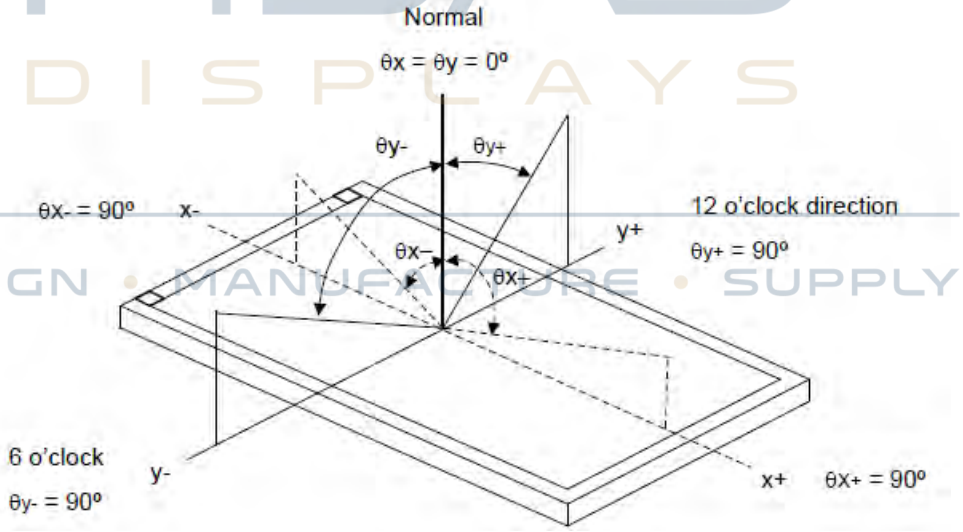
MiDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

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

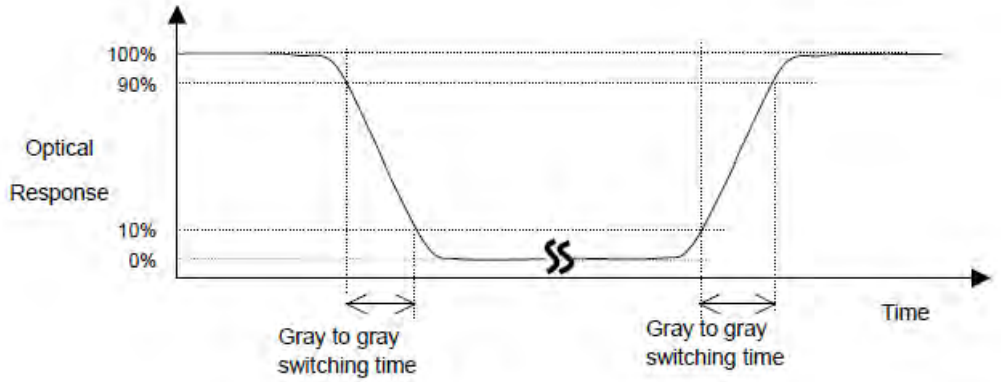


Note 3: Contrast ratio is measured by Minolta CA210

MiDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

Note 4: Definition of Response time

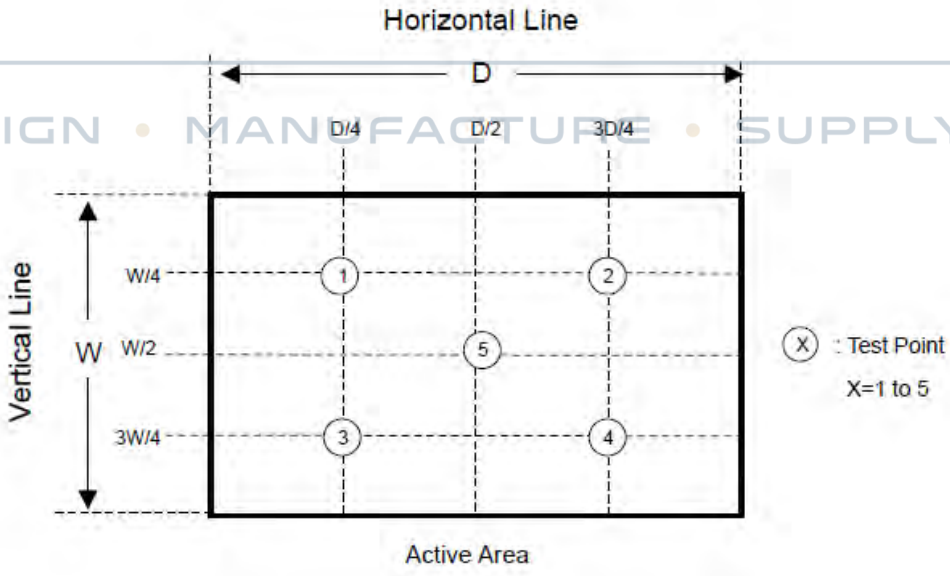
The output signals of photo detector are measured when the input signals are changed from “Full Black” to “Full White” (rising time), and from “Full White” to “Full Black” (falling time), respectively. The response time is interval between the 10% and 90% of amplitudes. Please refer to the figure as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

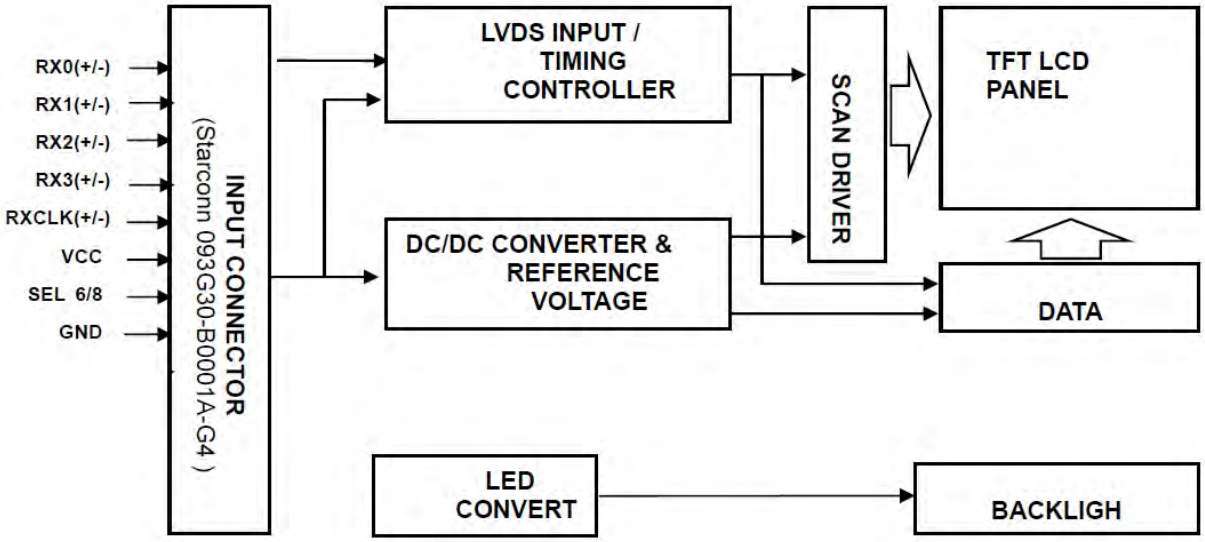


Uniformity = (Min. Luminance of 5 points) / (Max. Luminance of 5 points)

MiDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

3. **Functional Block Diagram**

The following diagram shows the functional block of the 12.1 inches Color TFT-LCD Module:



4. Absolute Maximum Ratings

Absolute maximum ratings of the module are as following:

4.1 TFT LCD Module

Items	Symbol	Min	Max	Unit	Conditions
Logic input voltage	V_{DD}	-0.3	+3.8	Volt	
Control Signals	SEL68, REVERSE	-0.3	V_{DD}	Volt	
LVDS Signals	CLKIN -/+, RIN0~3-/+	-0.3	0.6	Volt	

4.2 Backlight unit

Items	Symbol	Min	Max	Unit	Conditions
LED Current	I_{LED}	--	600	mA	Note 1, 2

4.3 Absolute Ratings of Environment

Items	Symbol	Values			Unit	Conditions
		Min.	Typ.	Max.		
Operation temperature	T_{OP}	-30	-	85	^{0}C	Note 3
Operation Humidity	H_{OP}	5		90	%	
Storage temperature	T_{ST}	-30		85	^{0}C	
Storage Humidity	H_{ST}	5		90	%	

Note 1: With in Ta= 25℃

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).

MiDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

5. Electrical characteristics

5.1 TFT LCD Module

5.1.1 Power Specification

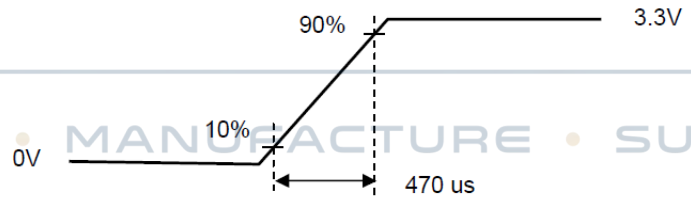
Input power specifications are as follows

Symbol	Parameter		Min	Typ	Max	Units	Remark
VDD	Logic/LCD Input Voltage		3.0	3.3	3.6	[Volt]	
I_{VDD}	LCD Input Current		-	-	458	[mA]	VDD=3.3V at 60 HZ, all Black Pattern
P_{VDD}	LCD Power comsumption		-	-	1.65	[Watt]	VDD=3.3V at 60 HZ, all Black Pattern
$I_{rush\ LCD}$	LCD Inrush Current		-	-	1.5	[A]	VDD=3.3V at 60 HZ, all Black Pattern Note 1 VDD rising time≧470us
VDD_{rp}	Allowable Logic/LCD Drive Ripple Voltage		-	-	100	[mV] p-p	VDD=3.3V at 60 HZ, all Black Pattern
VIH	Control Signals Voltage	High Level	0.7* VDD	-	VDD	[Volt]	SEL68 and REVERSE
VIL		Low Level	0	-	0.3* VDD	[Volt]	SEL68 and REVERSE

Note (1) The assembly should be always operated within above ranges.

Note (2) Measurement Conditions:

V_{DD} rising time



Note (3) The specified power supply current is under the conditions at Vcc = 3.3V , Ta = 25 ± 2 ºC, fv = 60 Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern



Active Area

b. Black Pattern



Active Area

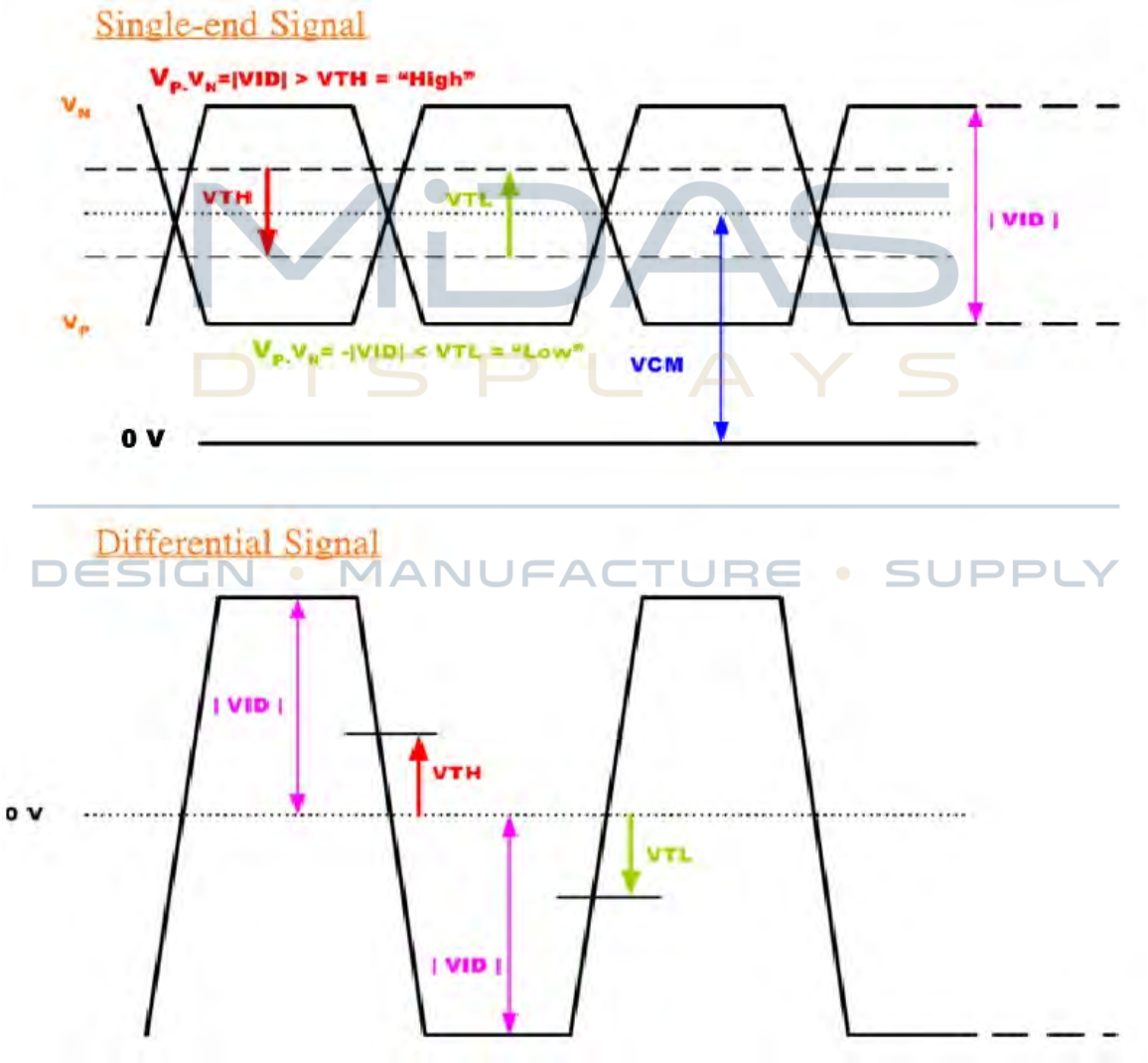
MiDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

5.1.2 LVDS Electrical Characteristics

Symbol	Parameter	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	400	600	[mV]	
VICM	Differential Input Common Mode Voltage	1.1	-	1.45	[V]	VTH/VTL=+-100mV

Input signals shall be low or Hi-Z state when V_{DD} is off

Note: LVDS Signal Waveform.



MIDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

5.1.3 Interface connection

Pin assignment

Pin No	Signal Name	Description
1	NC	No connection
2	NC	No connection
3	NC	No connection
4	NC	No connection
5	NC	No connection
6	NC	No connection
7	GND	Ground
8	GND	Ground
9	VDD	Power supply: +3.3V
10	VDD	Power supply: +3.3V
11	GND	Ground
12	GND	Ground
13	RXin0N	- LVDS differential data (0N)
14	RXin0P	+ LVDS differential data (0P)
15	GND	Ground
16	RXin1N	- LVDS differential data (1N)
17	RXin1P	+ LVDS differential data (1P)
18	GND	Ground
19	RXin2N	- LVDS differential data (2N)
20	RXin2P	+ LVDS differential data (2P)
21	GND	Ground
22	LVDS_RX_N	- LVDS differential clock input
23	LVDS_RX_P	+ LVDS differential clock input
24	GND	Ground
25	RXin3N	- LVDS differential data (3N)
26	RXin3P	+ LVDS differential data (3P)
27	GND	Ground
28	SEL 6/8	Low or NC → 6 bit input mode High → 8 bit input mode
29	GND	Ground
30	GND	Ground

Note (1) Connector Part No.: Starconn 093G30-B0001A-1

Note (2) “Low” stands for 0V. “High” stands for 3.3V

MIDAS DISPLAYS DESIGN • MANUFACTURE • SUPPLY

5.2 Backlight Unit

Parameter guideline is under stable conditions at 25℃ (Room Temperature):

Parameter	Min	Typ	Max	Unit	Note
LED voltage (VL)		36		[V]	2
LED current (IL)		480		[mA]	2,
LED Power (PL)		17.28		[W]	
LED Life Time(LTLED)		50,000		[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℃ and typical LED Current at 480 mA (Long lifetime mode).

LED Light bar connector

Recommended connector : JOIN TEK JT1025-1021

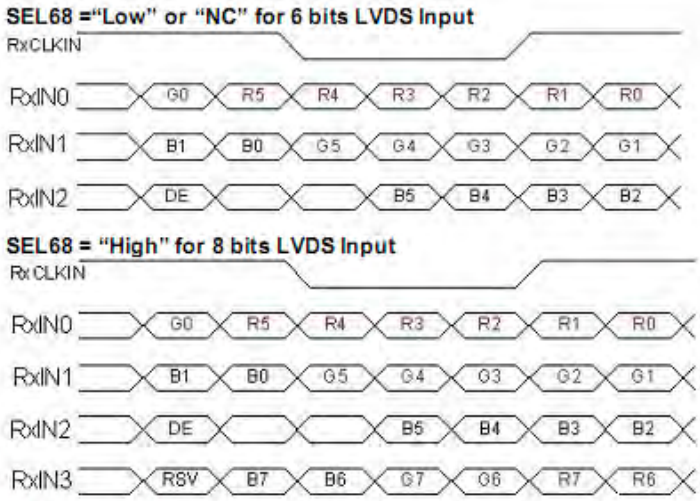
(BHSR-02VS-1 manufactured by JST)

Pin no	Symbol	I/O	Description	Remark
1	VLED+	P	Backlight LED anode	
2	VLED-	P	Backlight LED cathode	

MIDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

5.3 Color Data Input Assignment

5.3.1 (SEL68)



Note 1: Please follow PSWG.
Note 2: R/G/B data 7:MSB, R/G/B data 0:LSB
Note 3: RSV stands for "Reserved".

Signal Name	Description	Remark
R7	Red Data 7	Red-pixel Data
R6	Red Data 6	
R5	Red Data 5	For 8Bits LVDS input
R4	Red Data 4	MSB: R7 ; LSB: R0
R3	Red Data 3	
R2	Red Data 2	For 6Bits LVDS input
R1	Red Data 1	MSB: R5 ; LSB: R0
R0	Red Data 0	
G7	Green Data 7	Green-pixel Data
G6	Green Data 6	
G5	Green Data 5	For 8Bits LVDS input
G4	Green Data 4	MSB: G7 ; LSB: G0
G3	Green Data 3	
G2	Green Data 2	For 6Bits LVDS input
G1	Green Data 1	MSB: G5 ; LSB: G0
G0	Green Data 0	
B7	Blue Data 7	Blue-pixel Data
B6	Blue Data 6	
B5	Blue Data 5	For 8Bits LVDS input
B4	Blue Data 4	MSB: B7 ; LSB: B0
B3	Blue Data 3	
B2	Blue Data 2	For 6Bits LVDS input
B1	Blue Data 1	MSB: B5 ; LSB: B0
B0	Blue Data 0	
RxCLKIN	LVDS Data Clock	The typical frequency is 40MHz.
DE	Data Enable Signal	When the signal is high, the pixel data shall be valid to be displayed.
RSV	Reserved Signal	"High" or "Low" is acceptable

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

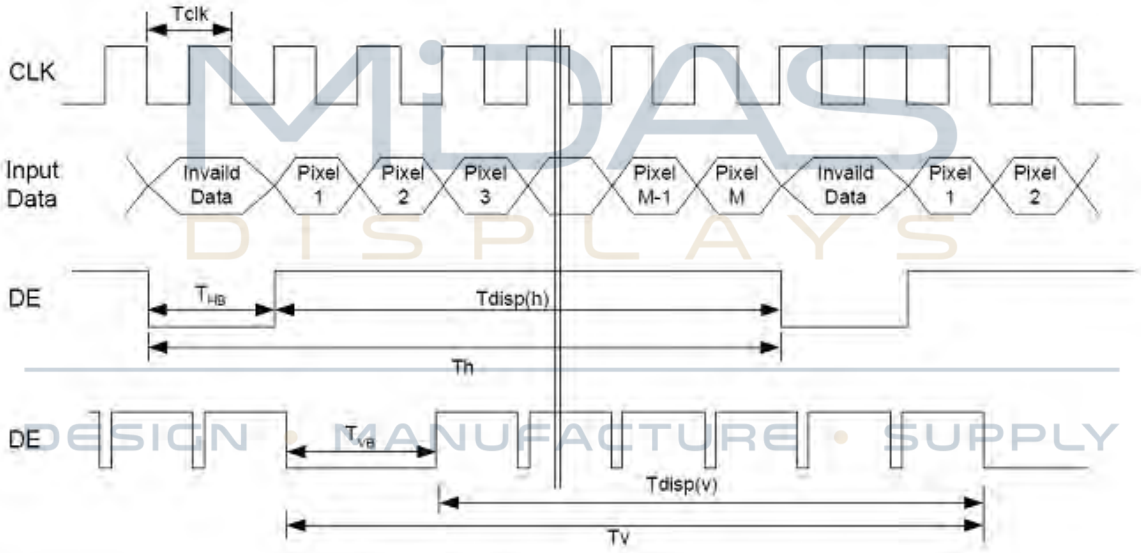
MIDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

5.4 TFT-LCD Interface Timing

5.4.1 INPUT SIGNAL TIMING SPECIFICATIONS

Signal	Parameter		Symbol	Min.	Typ.	Max.	Unit
Clock Timing	Clock frequency		$1/T_{Clock}$	60	74.4	90	MHz
Vsync Timing	Vertical Section	Period	T_V	808	838	900	Vsync Timing
		Active	T_{VD}	-	800	-	
		Blanking	T_{VB}	8	38	100	
Hsync Timing	Horizontal Section	Period	T_H	1350	1480	1680	Hsync Timing
		Active	T_{HD}	-	1280	-	
		Blanking	T_{HB}	70	200	400	
Frame Rate			F	50	60	75	Hz

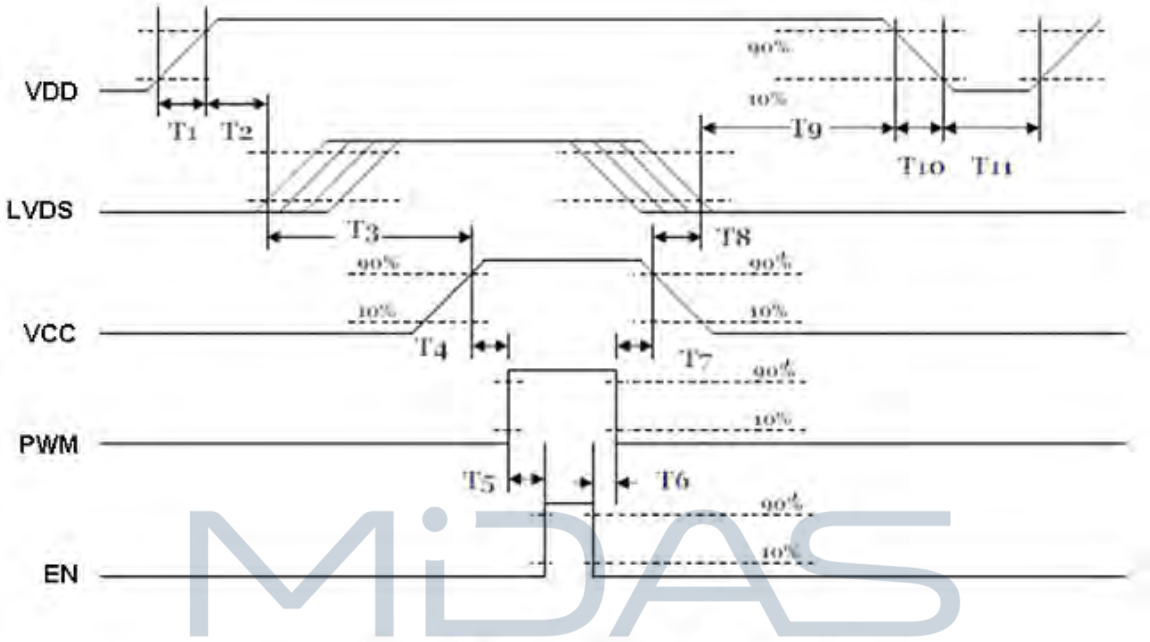
Input Timing Diagram



MIDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

5.5 Power ON/OFF Sequence

V_{DD} power and lamp on/off sequence is as below. Interface signals are also shown in the chart. Signals from an system shall be Hi-Z state or low level when V_{DD} is off.



Power ON/OFF sequence timing

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.5	-	10	[ms]
T2	30	40	50	[ms]
T3	175	-	-	[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]

MiDAS DISPLAYS
DESIGN · MANUFACTURE · SUPPLY

6. Reliability Test

Environment test conditions are listed as following table.

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 50℃, 90%RH, 240hours	
High Temperature Operation (HTO)	Ta= 85℃, 240hours	3
Low Temperature Operation (LTO)	Ta= -30℃, 240hours	
High Temperature Storage (HTS)	Ta= 85℃, 240hours	
Low Temperature Storage (LTS)	Ta= -30℃, 240hours	
Drop Test	Height: 60 cm, package test	
Thermal Shock Test (TST)	-20℃/30min, 60℃/30min, 100 cycles	
On/Off Test	On/10sec, Off/10sec, 30,000 cycles	
ESD (ElectroStatic Discharge)	Contact Discharge: ± 8KV, 150pF(330Ω) 1sec, 9 points, 25 times/ point.	
	Air Discharge: ± 15KV, 150pF(330Ω) 1sec 9 points, 25 times/ point.	

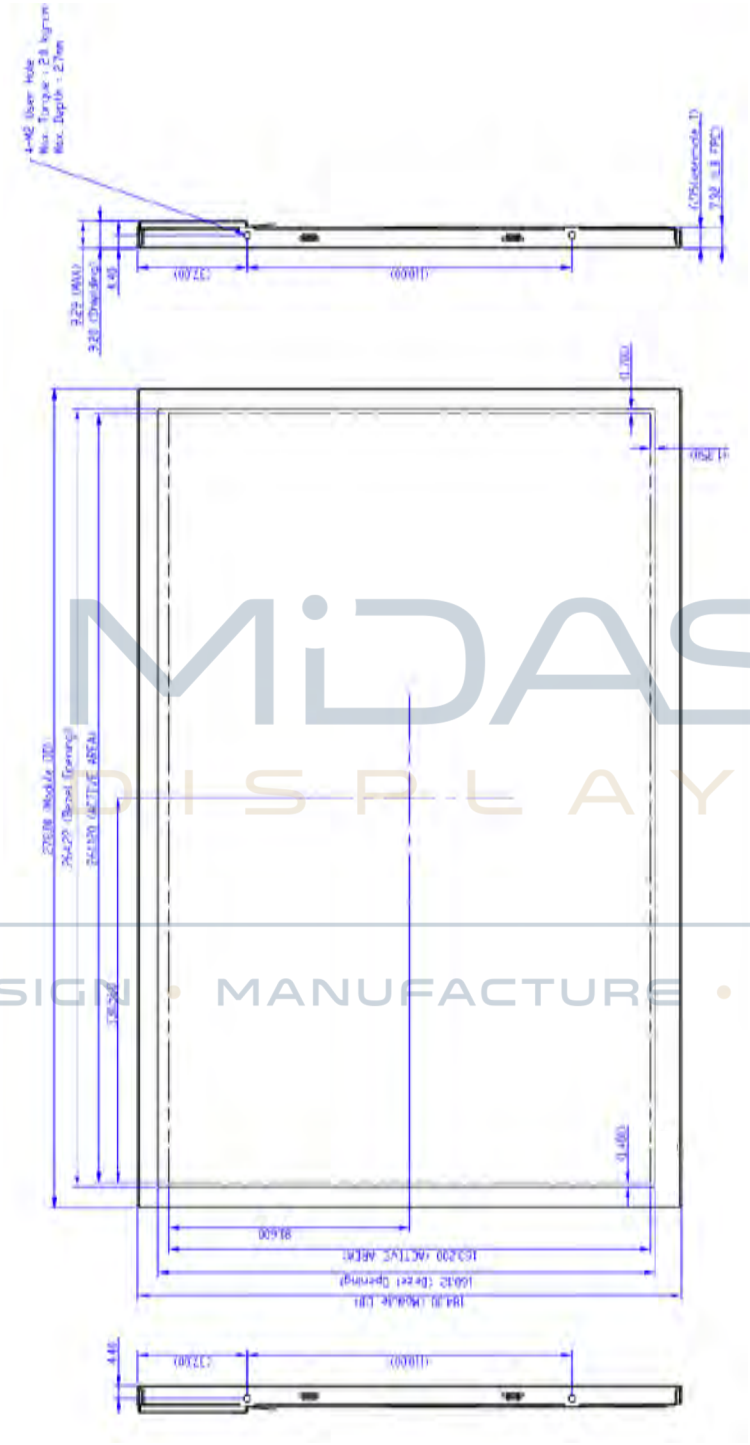
Note 1: The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -20℃ to 60℃, and back again. Power is not applied during the test. After temperature cycling, the unit is placed 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.

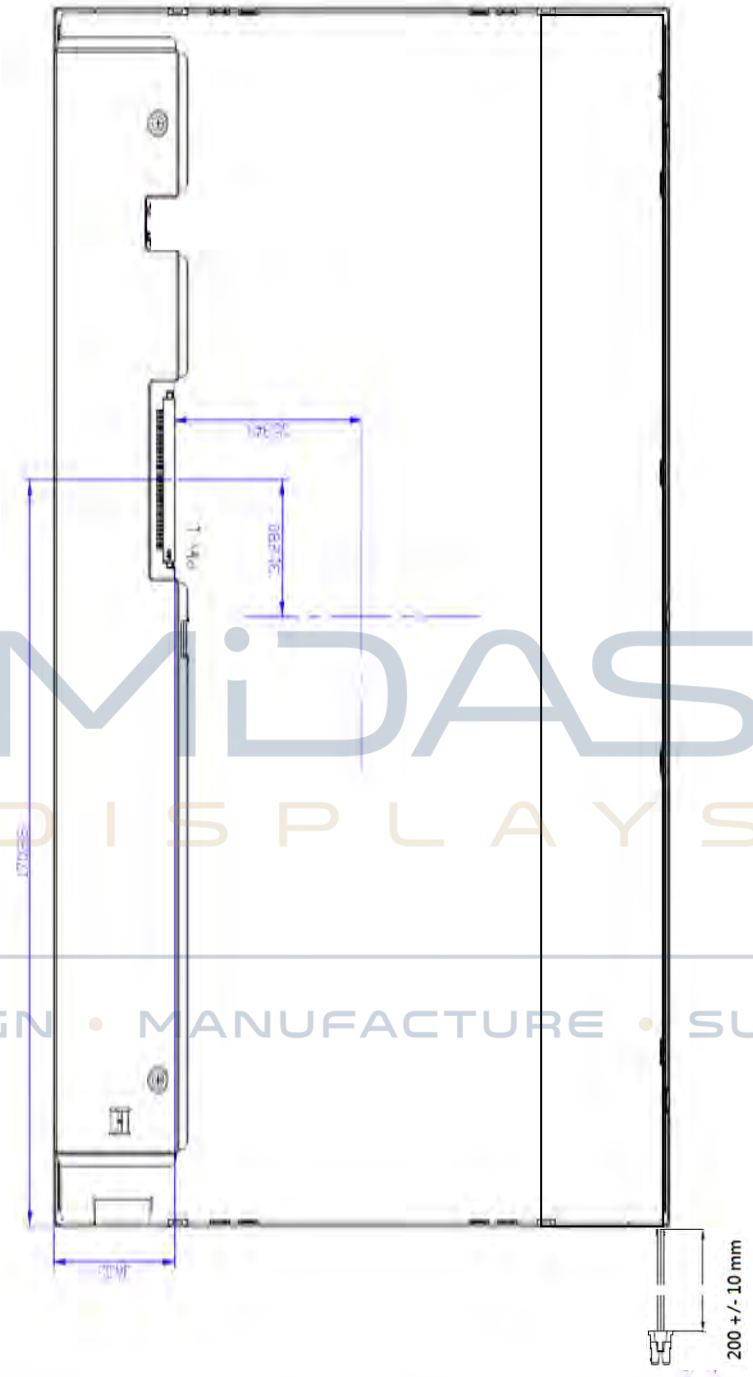
Note 3: The test items are tested by open frame type chassis.

MiDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

8. Mechanical Characteristic (mm)



MiDAS DISPLAYS
DESIGN • MANUFACTURE • SUPPLY



MIDAS
DISPLAYS
DESIGN • MANUFACTURE • SUPPLY

Sauls Wharf House
Crittens Road
Great Yarmouth
Norfolk
NR31 0AG

Telephone +44 (0)1493 602602
Email:sales@midasdisplays.com
Email:tech@midasdisplays.com
www.midasdisplays.com

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

DESIGN • MANUFACTURE • SUPPLY