

MDT101012	1920 X 1200	LVDS Interface	TFT Module
Specification			
Version: 1		Date: 17/10/2023	
Revision			
1	15/10/2023	First issue	

Display Features			
Display Size	10.10"		
Resolution	1920 X 1200		
Orientation	Landscape		
Appearance	RGB		
Logic Voltage	3.3V		
Interface	LVDS		
Brightness	2000 cd/m ²		
Touchscreen	---		
Module Size	230.50 x 155.00 x 6.80 mm		
Operating Temperature	-20°C ~ +70°C	Created By	Checked By
Pinout	45 way connector	CL	TSB
Pitch	0.50 mm	Box Quantity	Weight / Display
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Display Accessories	
Part Number	Description
MCIB14/16	HDMI-to-LVDS interface board, with voltage generation.
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.

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 FHD (1920(H) x 1200(V)) screen and 16.7M (8 bits) color support.

2.2 Features

- High brightness display, 2000nits by LED backlight.
- Long operation lifetime BLU design
- IPS extra wide view angle
- LVDS interface
- Wide operation temperature
- 72% NTSC
- RoHS Compliance

2.3 Application

Industrial applications.



2.4 Display specifications

Items	Unit	Specification
Screen Diagonal	inch	10.1"
Active Area	mm	216.91 (H) X 135.5 (V)
Pixels H x V	pixels	1920 x3(RGB) x 1200
Pixels Pitch	um	112.92 (per one triad) x 112.92
Pixel Arrangement		RGB Vertical stripe
Display mode		Normally black
White luminance (center)	Cd/m ²	2000 (Typ)
Contrast ratio		900:1 (Typ.)
Optical Response Time	msec	30 ms (Typ. On/off)
Normal Input Voltage	Volt	3.3V
Power Consumption (Vcc Line + LED backlight)	Watt	12.0 W (VDD line=0.6 W; LED lines= 11.4 W)
Weight	Grams	TBD
Physical size	mm	230.5 (W)× 155.0 (H)× 6.8 (D, typ)
Electrical Interface		LVDS
Support colors		16.7M colors (8 bits)
Surface Treatment		AG type, 3H hard coating
Temperature range		
Operating	°C	-20 ~ 70 (TFT surface)
Storage	°C	-20 ~ 80
RoHS Compliance		RoHS Compliance



2.5 Optical characteristics

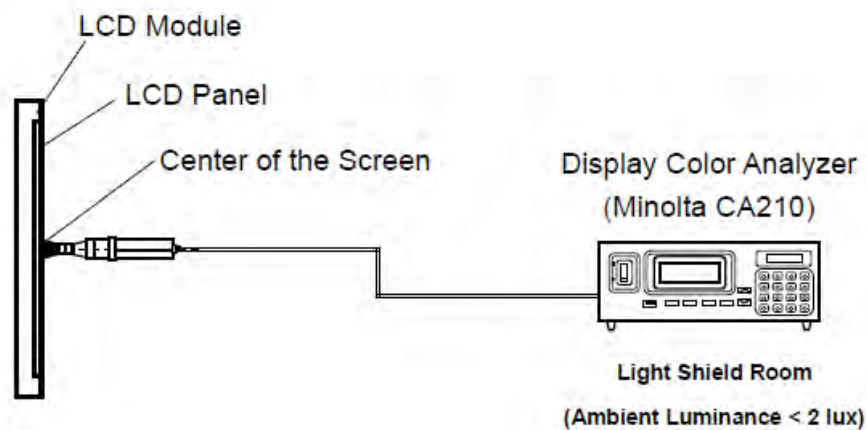
The following optical characteristics are measured under stable condition at 25 °C

Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right)	70	80		2
		CR=10 (Left)	70	80		
		Vertical (Up)	70	80		
		CR=10 (Down)	70	80		
Contrast Ratio		Normal Direction	700	900		3
Response Time	msec	Raising + Falling		30	35	4
Color coordinates (CIE) White		Red x	-0.05	0.644	+0.05	5
		Red y		0.344		
		Green x		0.315		
		Green y		0.632		
		Blue x		0.157		
		Blue y		0.054		
		White x		0.285		
		White y		0.327		
Center Luminance	Cd/m ²		1600	2000		6
Luminance Uniformity	%		70	75		7
NTSC	%			72		
Crosstalk (in 60 Hz)	%				1.5	
Flicker	dB				-20	

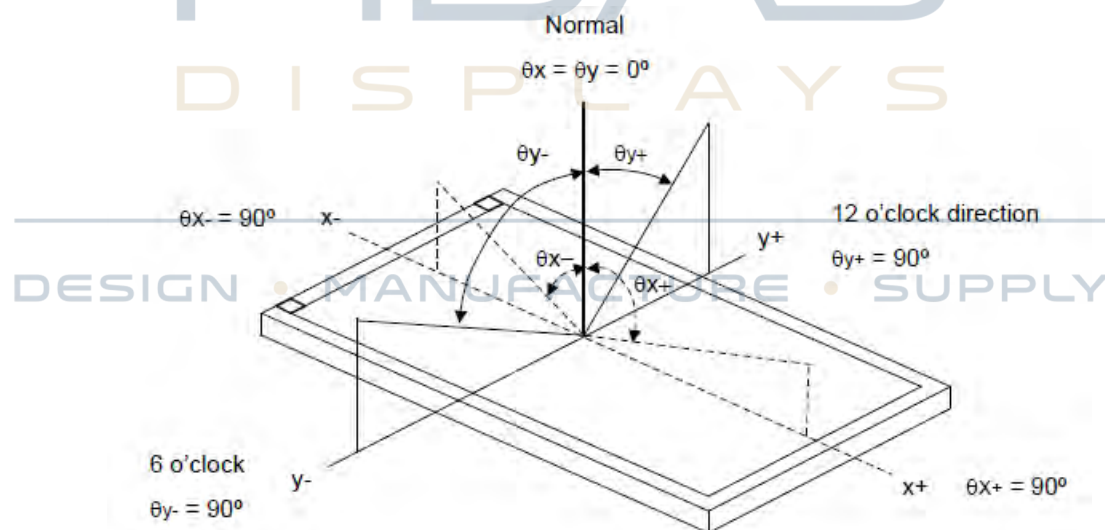


Note 1: Measurement method

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.



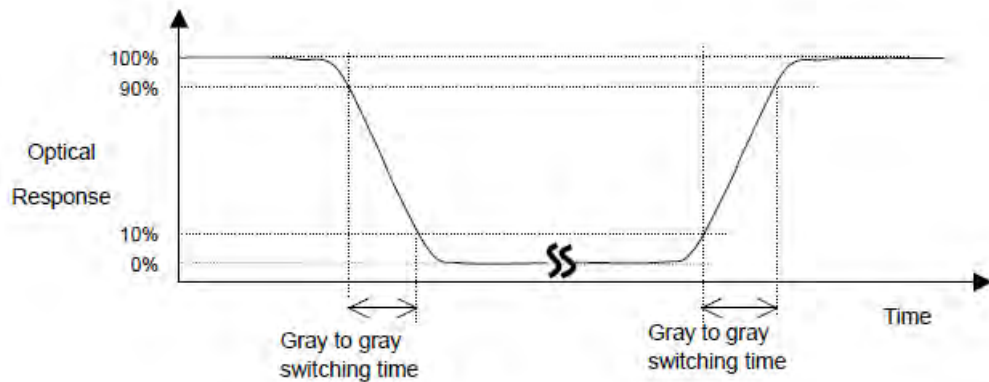
Note 2: Definition of viewing angle



Note 3: Contrast ratio is measured by Minolta CA310

Note 4: Definition of Response time

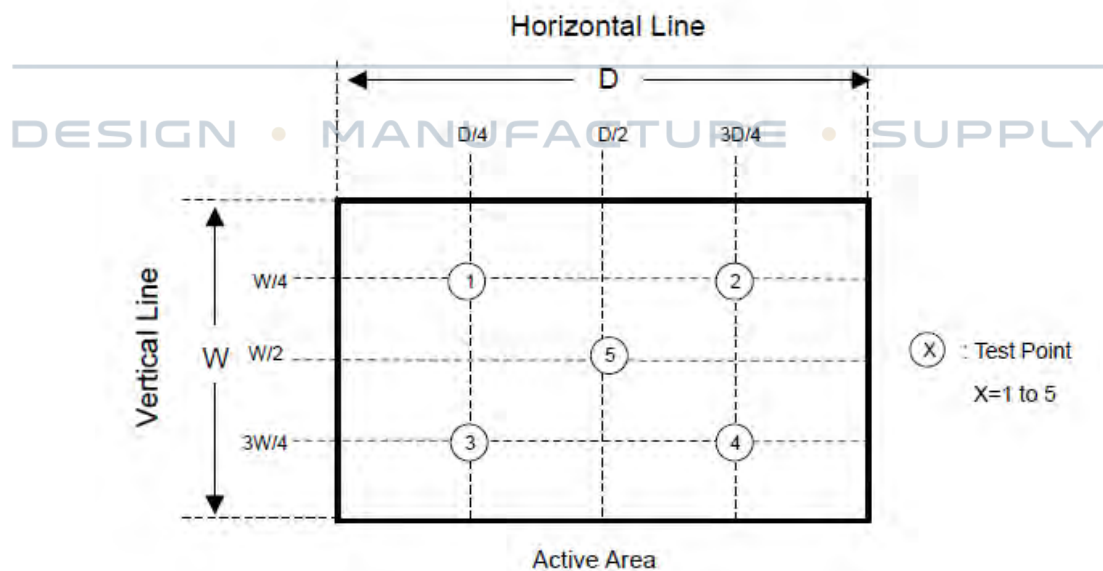
The output signals of photo detector are measured when the input signals are changed from “Full Black” to “Full White” (rising time), and from “Full White” to “Full Black” (falling time), respectively. The response time is interval between the 10% and 90% of amplitudes. Please refer to the figure as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



Note 5: Color chromaticity and coordinates (CIE) is measured by Minolta CA310

Note 6: Center luminance is measured by Minolta CA310

Note 7: Luminance uniformity of these 5 points is defined as below and measured by Minolta CA310



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



3. Absolute Maximum Ratings

Absolute maximum ratings of the module are as following:

3.1 TFT LCD module

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

3.2 Backlight unit

Items	Symbol	Min	Max	Unit	Conditions
LED bar input current			480	mA	

3.3 Environment

Items	Symbol	Values			Unit	Conditions
		Min.	Typ.	Max.		
Operation temperature	T_{OS}	-20	-	70	$^{\circ}\text{C}$	Note 3
Operation Humidity	H_{OP}	10		85	%	
Storage temperature	T_{ST}	-20		80	$^{\circ}\text{C}$	
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).

4. Electrical characteristics

4.1 LCD electronics specification

4.1.1 Power specification

Parameter		Symbol	Values			Unit	Notes
			Min.	Typ.	Max.		
Power Supply Voltage		VDD	3.0	3.3	3.6	V	
		VRP			300	mV	Ripple
Power Supply Current		IDD	-	300	360	mA	Note 1
Power Consumption		PLCD	-	1	1.2	W	
Rush current		IRUSH	-	-	3.0	A	Note 2
CMOS Interface	Input Voltage	VIH	2.7		3.3	V	
		VIL	0		0.5	V	
	Output Voltage	VOH	2.7		3.3	V	
		VOL	0		0.5	V	

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for VDD=3.3V, Frame rate $f_V=60\text{Hz}$ and Clock frequency = 80MHz. Test Pattern of power supply current

a) Typ : Mosaic 8 x 6 Pattern(L0/L255)



b) Max : skip subPixel(L255)



2. The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)

4.2 Backlight unit

Parameter	Min	Typ	Max	Unit	Note
LED voltage (VL)		30		[V]	2
LED current (IL)		190		[mA]	2
LED power (PL)		11.4		[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 190 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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4.3 Interface connector

4.3.1 TFT connector(CN1)

Connector : FH34SRJ-45S-0.5SH(50) (HRS) or equivalent

Pin No.	Symbol	Description	I/O
1	VDDIN	Power supply VDDIN=3.3V (Typ.)	P
2	VDDIN		P
3	VDDIN		P
4	VDDIN		P
5	VDDIN		P
6	GND	GROUND	P
7	VDD_OTP	OTP Power supply VDD OTP=8.6V	P
8	I2C_SCL	OTP_SCL	I
9	I2C_SDA	OTP_SDA	I
10	GND	GROUND	P
11	OLV0N	Odd LVDS Negative data signal (-)	I
12	OLV0P	Odd LVDS Positive data signal (+)	I
13	GND	GROUND	P
14	OLV1N	Odd LVDS Negative data signal (-)	I
15	OLV1P	Odd LVDS Positive data signal (+)	I
16	GND	GROUND	P
17	OLVCLKN	Odd LVDS Negative CLK signal (-)	I
18	OLVCLKP	Odd LVDS Positive CLK signal (+)	I
19	GND	GROUND	P
20	OLV2N	Odd LVDS Negative data signal (-)	I

Pin No.	Symbol	Description	I/O
21	OLV2P	Odd LVDS Positive data signal (+)	I
22	GND	GROUND	P
23	OLV3N	Odd LVDS Negative data signal (-)	I
24	OLV3P	Odd LVDS Positive data signal (+)	I
25	GND	GROUND	P
26	ELV0N	EVEN LVDS Negative data signal (-)	I
27	ELV0P	EVEN LVDS Positive data signal (+)	I
28	GND	GROUND	P
29	ELV1N	EVEN LVDS Negative data signal (-)	I
30	ELV1P	EVEN LVDS Positive data signal (+)	I
31	GND	GROUND	P
32	ELVCLKN	EVEN LVDS Negative CLK signal (-)	I
33	ELVCLKP	EVEN LVDS Positive CLK signal (+)	I
34	GND	GROUND	P
35	ELV2N	EVEN LVDS Negative data signal (-)	I
36	ELV2P	EVEN LVDS Positive data signal (+)	I
37	GND	GROUND	P
38	ELV3N	EVEN LVDS Negative data signal (-)	I
39	ELV3P	EVEN LVDS Positive data signal (+)	I
40	GND	GROUND	P
41	NC	NC	-
42	NC	NC	-
43	NC	NC	-
44	NC	NC	-
45	NC	NC	-

4.3.2 Backlight connector(CN2、CN3)

Recommended connector : BHSR-02VS-1 manufactured by JST

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

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DISPLAYS

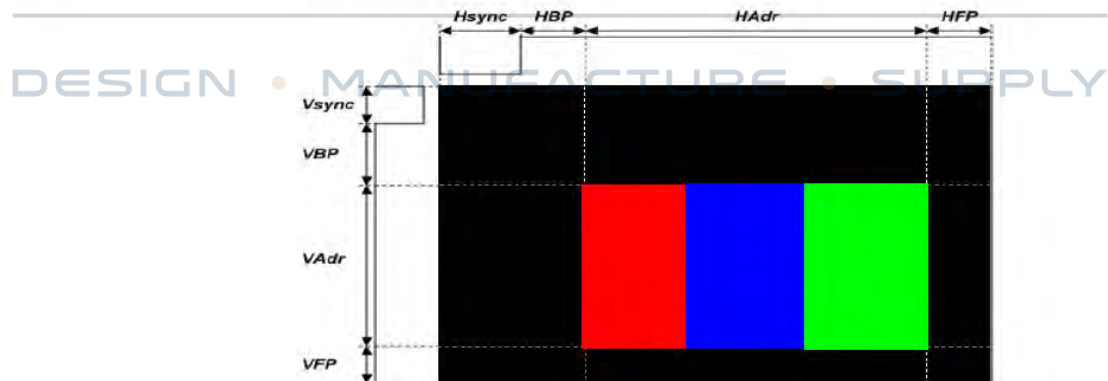
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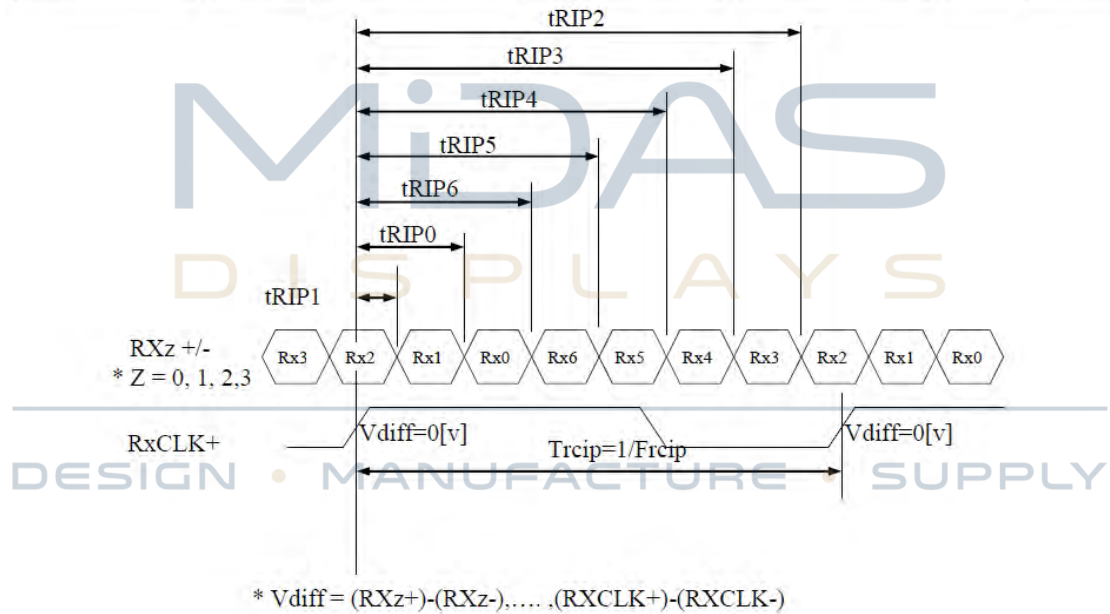
5. Signal characteristics

5.1 Interface timing parameter and AC / DC parameter

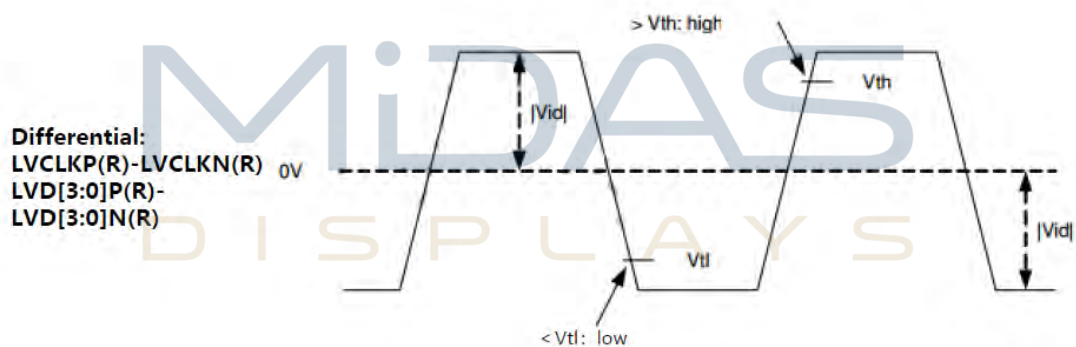
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK Frequency	Fdclk	74.5	77.56	85	MHz
Horizontal display area	Thd	960			DCLK
HSYNC period time	Th	989	1040	1248	DCLK
Horizontal Blank	THB	29	80	288	DCLK
HSYNC pulse width	Thp	2	10	255	DCLK
HSYNC back porch	thbp	3	6	255	DCLK
HSYNC Front porch	thfp	24	64	260	DCLK
Vertical display area	Tvd	1200			H
VSYNC period time	Tv	1243	1243	1560	H
Vertical Blank	TVB	43	43	360	H
VSYNC Pluse width	Tvp	4	4	20	H
VSYNC back porch	Tvbp	20	20	255	H
VSYNC front porch	Tvfp	19	19	260	H
Frequency	fV	-	60	-	Hz



Item	Symbol	Min	Typ	Max	Unit	Remark
CLKfrequency	Frcip	20	-	85	MHZ	
CLKIN Period	tRCIP	11.76	-	-	nsec	
Input Data 0	tRIP1	$tRCIP/7 \times (-0.2)$	0.0	$tRCIP/7 \times 0.2$	nsec	
Input Data 1	tRIP0	$tRCIP/7 \times 0.8$	$tRCIP/7$	$tRCIP/7 \times 1.2$	nsec	
Input Data 2	tRIP6	$tRCIP/7 \times 1.8$	$tRCIP/7 \times 2$	$tRCIP/7 \times 2.2$	nsec	
Input Data 3	tRIP5	$tRCIP/7 \times 2.8$	$tRCIP/7 \times 3$	$tRCIP/7 \times 3.2$	nsec	
Input Data 4	tRIP4	$tRCIP/7 \times 3.8$	$tRCIP/7 \times 4$	$tRCIP/7 \times 4.2$	nsec	
Input Data 5	tRIP3	$tRCIP/7 \times 4.8$	$tRCIP/7 \times 5$	$tRCIP/7 \times 5.2$	nsec	
Input Data 6	tRIP2	$tRCIP/7 \times 5.8$	$tRCIP/7 \times 6$	$tRCIP/7 \times 6.2$	nsec	

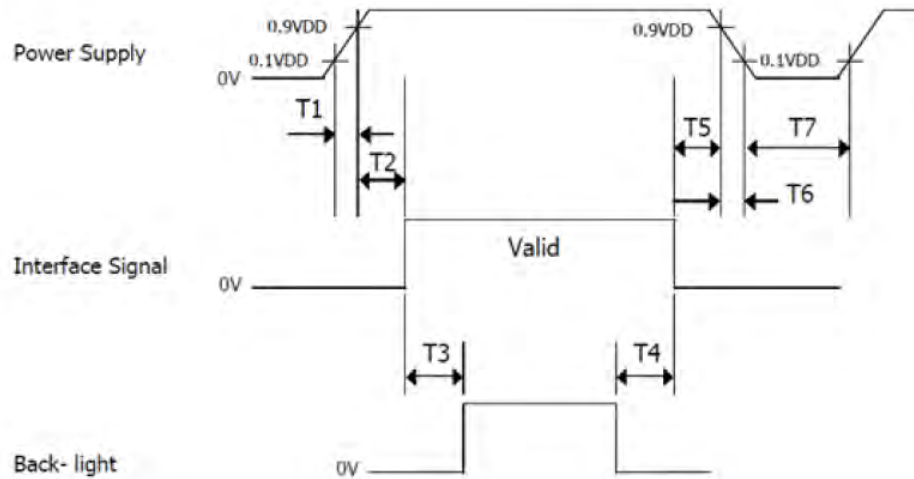


Item	Symbol	Condition	MIN	TYP	MAX	Unit
Differential input high Threshold voltage	Vth	Vcm=1.2V	-	-	+0.1	V
Differential input low Threshold voltage	Vtl	-	-0.1	-	-	V
Differential input common Threshold voltage	Vcm	-	1	1.2	1.7- Vid /2	V
LVDS input voltage	Vinlv	-	0.7	-	1.7	V
Differential input voltage	Vid	-	0.35	-	0.6	V
Differential input leakage voltage	Ilvleak	-	-10	-	+10	uA

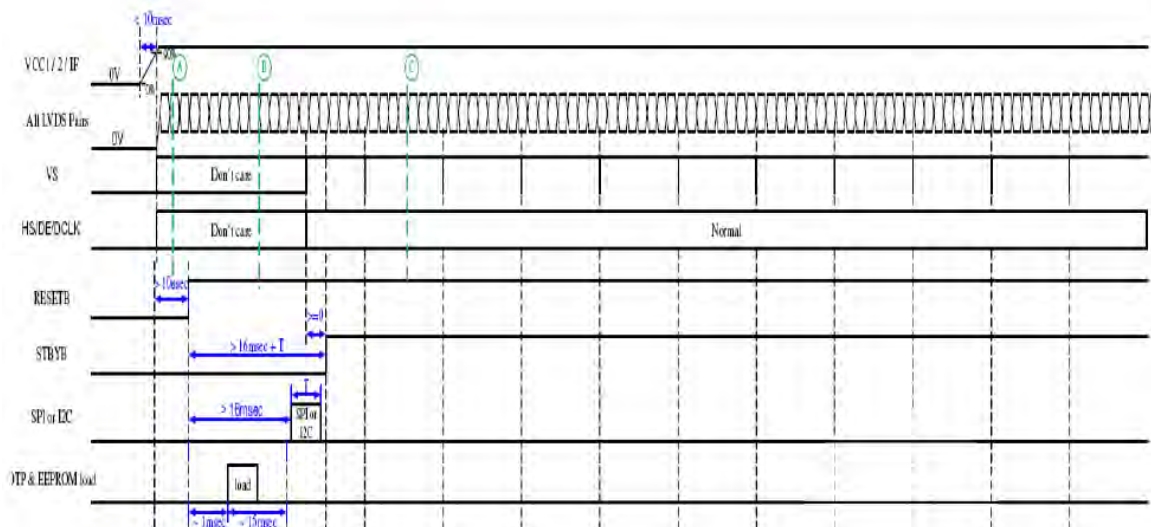


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5.2 Power sequence



Parameter	Values			Units
	Min	Typ	Max	
T1	0	-	10	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	500	-	-	ms
T5	0	-	50	ms
T6	0	-	10	ms
T7	500	-	-	ms



6. 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= 70°C, 120hours	3
Low Temperature Operation (LTO)	Ta= -20°C, 120hours	
High Temperature Storage (HTS)	Ta= 80°C, 120hours	
Low Temperature Storage (LTS)	Ta= -20°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/cycle	
	Air Discharge: $\pm$ 15KV, 150pF(330 Ω) 1sec/cycle	

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

Note 4: There should be no condensation on the surface of panel during test.

Note 5: In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before reliability test.

Note 6: Before cosmetic and function test, the product must have enough recovery time, at least 4 hours at room temperature.

Technical drawing of the MIDAS DISPLAYS M22.5H monitor, showing front, side, and rear views with dimensions.

Front View Dimensions:

- Overall Width: 155.00 ± 0.5
- Bezel Opening Width: 137.00
- Mounting Hole Spacing (A-A): 135.50
- Overall Height: 230.50 ± 0.5
- Bezel Opening Height: 218.41
- Mounting Hole Spacing (V-V): 216.91

Side View Dimensions:

- Thickness: 7.80 ± 0.5
- Mounting Hole Spacing (Horizontal): 40
- Mounting Hole Spacing (Vertical): 40
- Mounting Hole Diameter: $\phi 3.75$
- Mounting Hole Depth: 5.30
- Mounting Hole Position (from edge): 6.80

Rear View Dimensions:

- Mounting Hole Spacing (Horizontal): 41.9 ± 1
- Mounting Hole Spacing (Vertical): 21.0 (TBD)
- Back Light Cable: 200mm
- Mounting Hole Diameter: $\phi 3.75$
- Mounting Hole Depth: 5.30
- Mounting Hole Position (from edge): 6.80

Other Labels:

- MIDAS DISPLAYS
- DESIGN • MANUFACTURE • SUPPLY
- Back Light Cable-200mm
- Mounting Hole
- CN 1

