



Model No: MTD1230AHP80LF-1

Approved By	

Tel: 1 (888) 499-8477

Fax: (407) 273-0771

E-mail: mtusainfo@microtipsusa.com

Web: www.microtipsusa.com

Record of Revision

Date	Revision No.	Summary
2019-11-19	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of MTD1230AHP80LF-1 active matrix TFT module. It is composed of a color TFT-LCD panel, driver IC, FPC and a backlight unit. The 12.3" display area contains 1920(RGB) x 720 pixels.

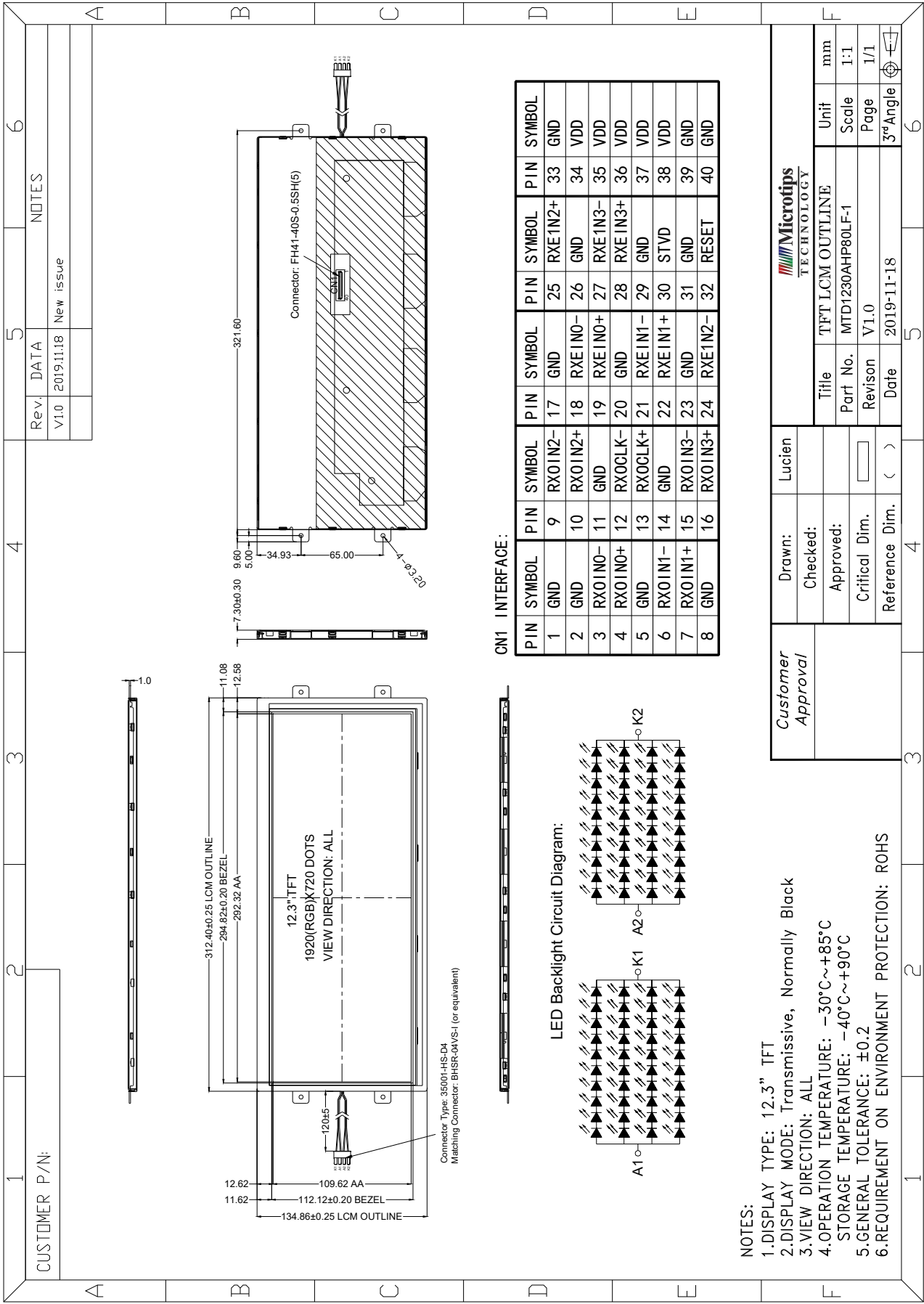
2. Application

Digital equipments which need color display, mobile navigator/video systems.

3. General Information

Item	Contents	Unit
Size	12.3	inch
Resolution	1920 (RGB) x 720	/
Interface	LVDS	/
Technology type	IPS	/
Pixel pitch	0.15225 x 0.15225	mm
Pixel Configuration	RGB stripes	
Outline Dimension (W x H x D)	312.40 x 134.86 x 7.30	mm
Active Area	292.32 x 109.62	mm
Display Mode	Transmissive, Normally Black	/
Backlight Type	LED	/
Viewing Direction	ALL	/

4. Outline Drawing



5. Interface signals

Pin No	Symbol	Function
1~2	GND	Power ground
3	RXOIN0-	- LVDS differential data input (Odd data)
4	RXOIN0+	+ LVDS differential data input (Odd data)
5	GND	Power ground
6	RXOIN1-	- LVDS differential data input (Odd data)
7	RXOIN1+	+ LVDS differential data input (Odd data)
8	GND	Power ground
9	RXOIN2-	- LVDS differential data input (Odd data)
10	RXOIN2+	+ LVDS differential data input (Odd data)
11	GND	Power ground
12	RXOCLKIN-	- LVDS differential data input (Odd clock)
13	RXOCLKIN+	+ LVDS differential data input (Odd clock)
14	GND	Power ground
15	RXOIN3-	- LVDS differential data input (Odd data)
16	RXOIN3+	+ LVDS differential data input (Odd data)
17	GND	Power ground
18	RXEIN0-	- LVDS differential data input (Even data)
19	RXEIN0+	+ LVDS differential data input (Even data)
20	GND	Power ground
21	RXEIN1-	- LVDS differential data input (Even data)
22	RXEIN1+	+ LVDS differential data input (Even data)
23	GND	Power ground
24	RXEIN2-	- LVDS differential data input (Even data)
25	RXEIN2+	+ LVDS differential data input (Even data)
26	GND	Power ground
27	RXEIN3-	- LVDS differential data input (Even data)
28	RXEIN3+	+ LVDS differential data input (Even data)
29	GND	Power ground
30	STVD	Feedback signal
31	GND	Power ground
32	RESET	Global reset pin
33	GND	Power ground
34~38	VDD	Power supply
39~40	GND	Power ground

Note: Connector: FH41-40S-0.5SH(5).

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Power Supply Voltage	VDD	-0.3	4.0	V	
Input Logic Voltage	Vi	-0.3	VDD+0.3	V	

6.2. Environment Conditions

Item	Symbol	MIN	MAX	Unit	Remark
Operating Temperature	TOPR	-30	85	°C	
Storage Temperature	TSTG	-40	95	°C	

7. Electrical Specifications

7.1 Electrical characteristics

Ta = 25 °C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power Supply Voltage	VDD	3.0	3.3	3.6	V	
	IVDD	-	1.1	1.4	A	

7.2 LED Backlight

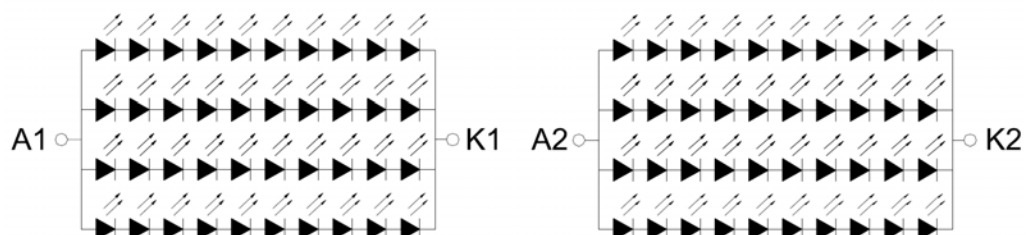
Ta=25°C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	-	480	520	mA	
Forward Voltage	VF	-	32	33	V	
Backlight Power Consumption	WBL	-	15.36	17.16	W	
LED Life time	-	-	50,000	-	Hrs	Note 2

Notes:

- Each LED: IF=60mA, VF=3.2V.
- The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IF=480mA. The LED life time could be decreased if operating IF is larger than 480mA.

LED Backlight Circuit Diagram:

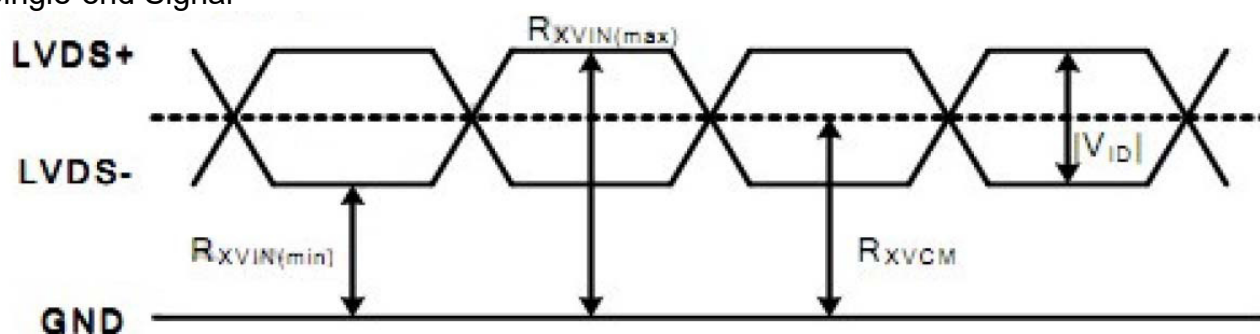


8. Command/AC Timing

8.1 DC Electrical Characteristics

Parameter	Symbol	MIN	TYP	MAX	Unit	Remark
Differential input high threshold	RxVTH	-	-	200	mV	RxVCM=1.2V
Differential input low threshold	RxVTL	-200	-	-	mV	RxVCM=1.2V
Input voltage range(singled-end)	RxVIN	0.7	-	1.6	V	
Input differential voltage	V _{ID}	200	-	600	mV	
Differential input Common Mode Voltage	RxVCM	1.0	1.2	1.3	V	

Single-end Signal



Differential Signal

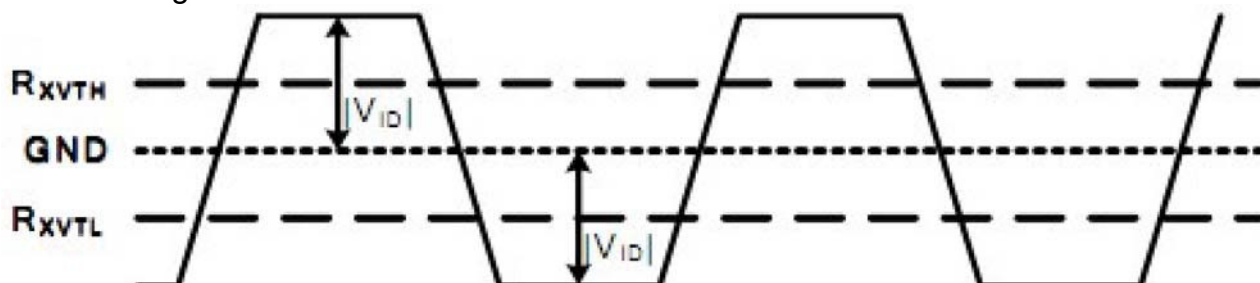
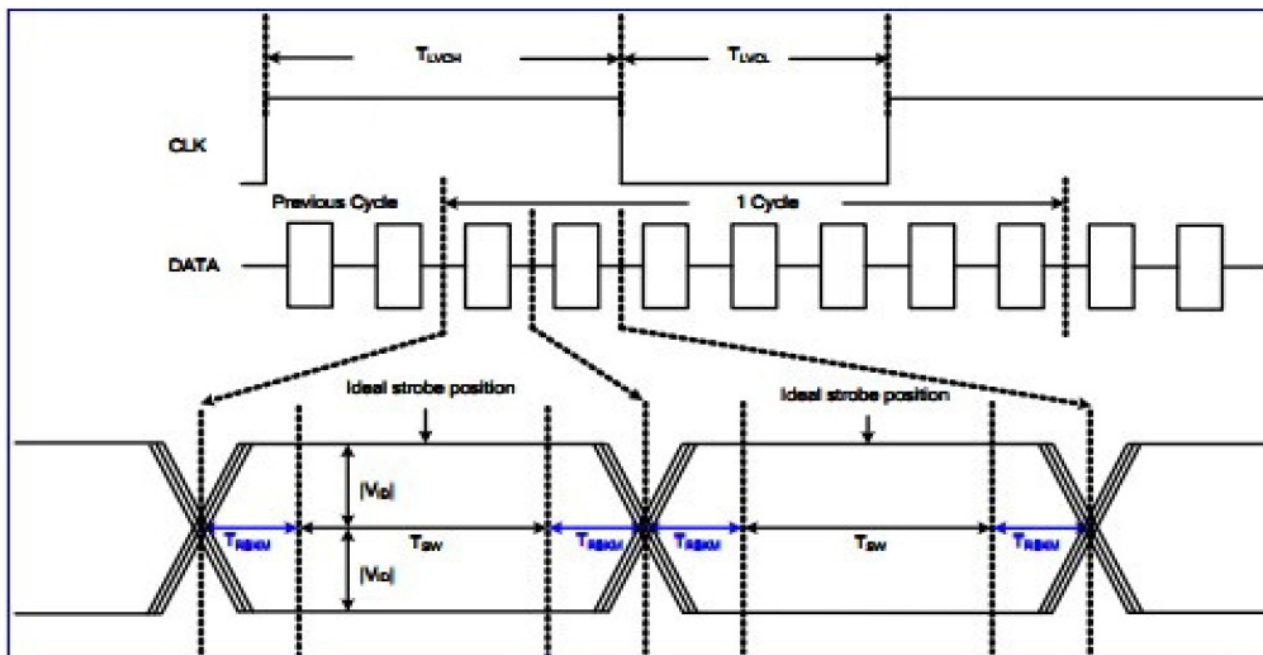
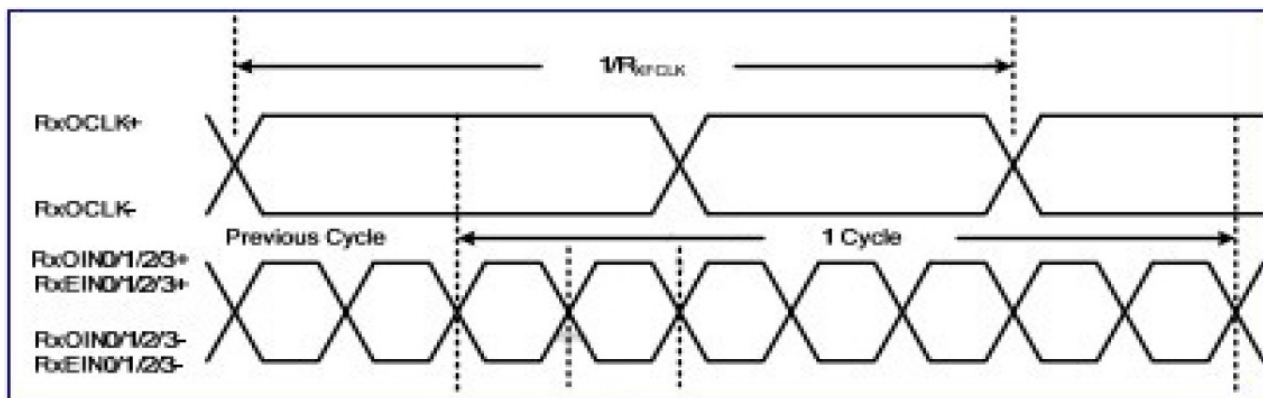


Figure: LVDS DC Characteristics diagram

8.2 AC Electrical Characteristics

Parameter	Symbol	MIN	TYP	MAX	Unit	Remark
Clock Frequency	RxFCLK	44.7	47.5	61	MHz	
Input data skew margin	TRSKM	-	-	200	ps	V _{ID} = 200mV RxVCM=1.2V Note1
Clock strobe width	Tsw	1200	-	-	ps	
Clock High Time	TLVCH	-	4/(7* RxFCLK)	-	ns	
Clock Low Time	TLVCL	-	3/(7* RxFCLK)	-	ns	

Note: For the data skew margin, “Input signal skew + Input signal jitter” must be smaller than TRSKM.

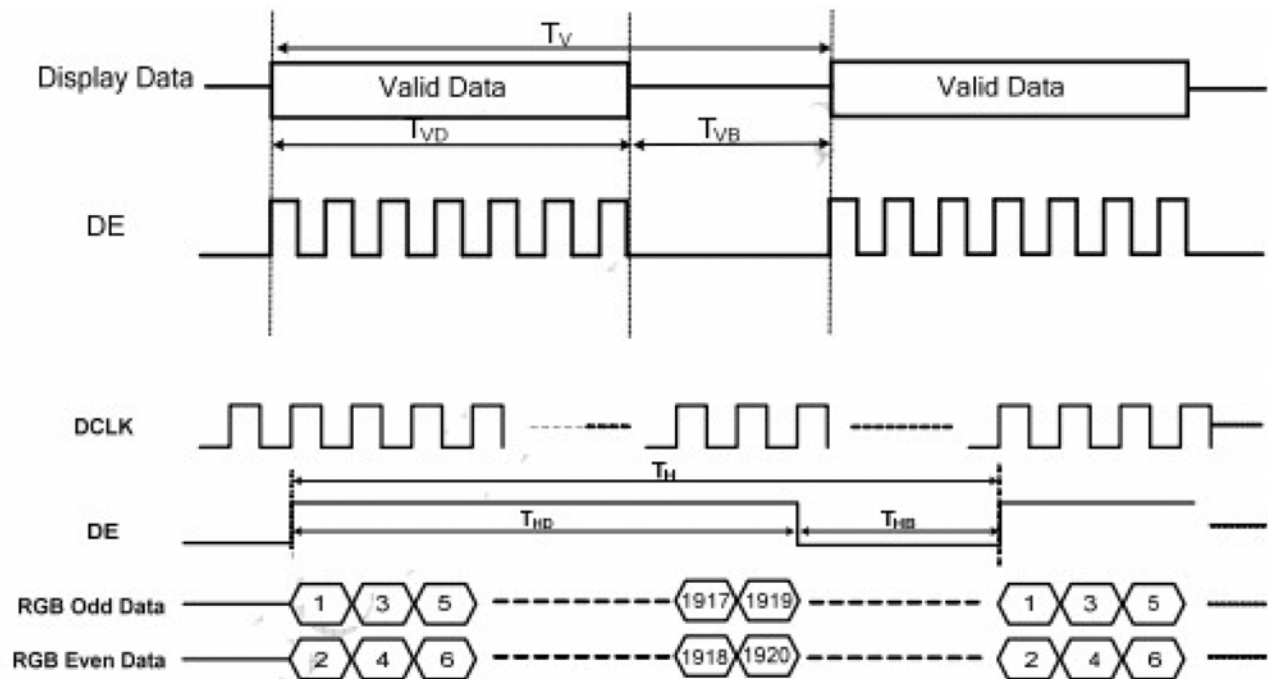


8.3 Timing Condition

8.3.1 DE Mode

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Clock Frequency	F _{DCLK}	44.7	47.5	61	MHz	
Horizontal period area	T _H	1020	1040	1200	DCLK	
Horizontal display area	T _{HD}	960	960	960	DCLK	
Horizontal blanking area	T _{HB}	60	80	240	DCLK	
Vertical period area	T _V	730	760	840	T _H	
Vertical display area	T _{VD}	720	720	720	T _H	
Vertical blanking area	T _{VB}	10	40	120	T _H	
Frame rate	FR	55	60	65	Hz	

8.3.2 Timing Diagram



8.4 Data Skew Margin Differential Input Data Format

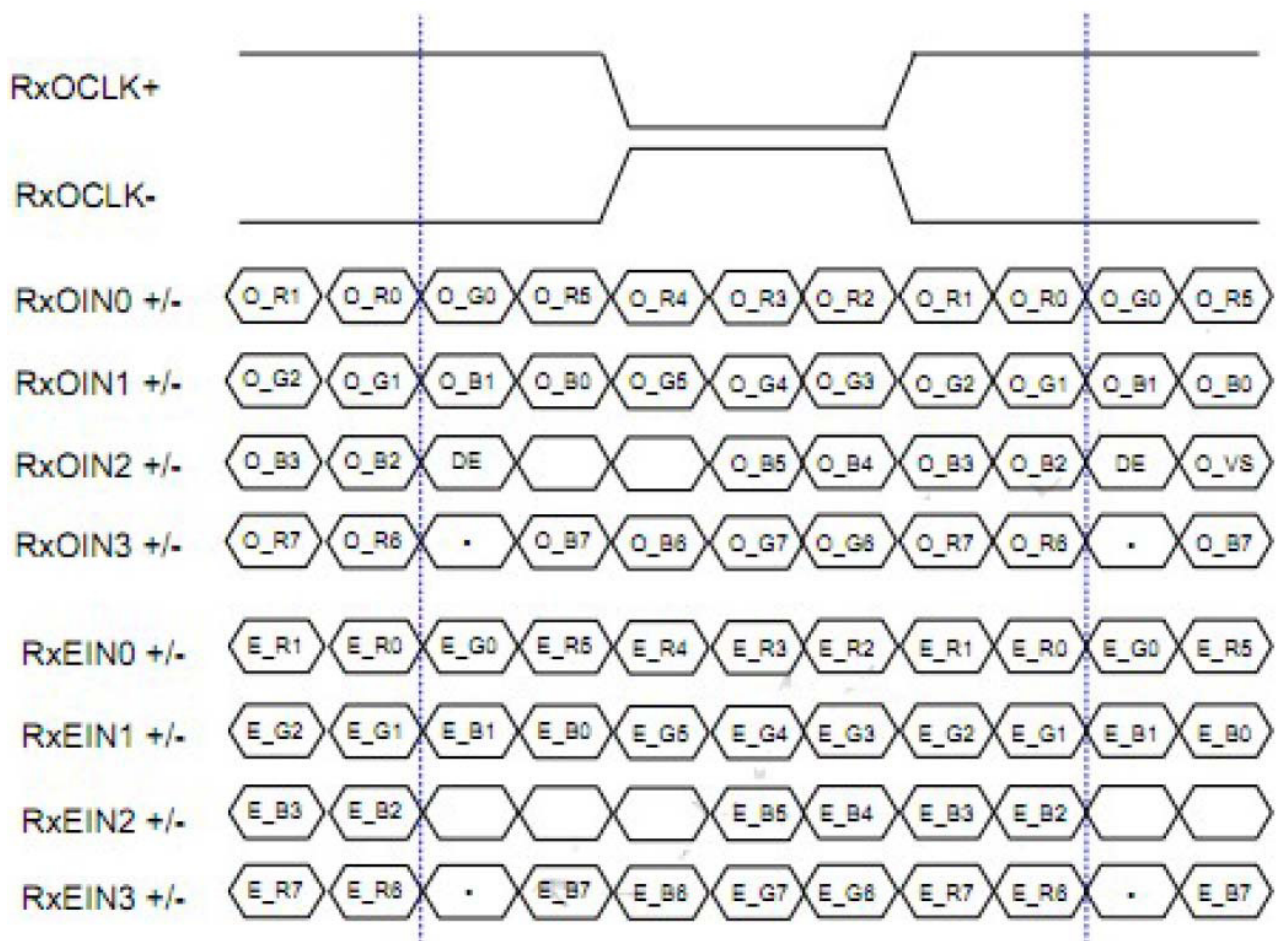
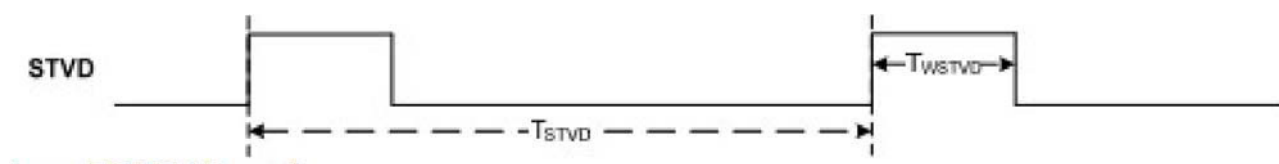


Figure: LVDS input data VESA format

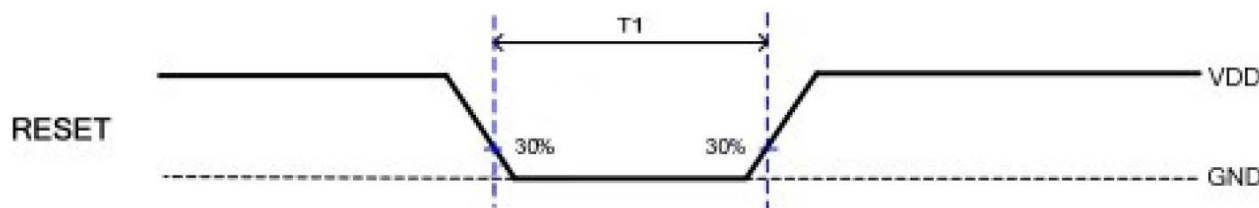
8.5 Feedback Signal Timing for Detected Function

Item	Symbol	MIN	TYP	MAX	Unit	Remark
STVD	VSTVD-H	VDD-0.3	-	VDD	V	I _{STVD-H} =200μA
	VSTVD-L	GND	-	GND+0.3	V	I _{STVD-L} =200μA
STVD Frequency	F _{STVD}	55	60	65	Hz	
STVD Period	T _{STVD}	15.4	16.6	18.2	ms	
STVD Pulse Width	T _{WSTVD}	19	21	23	μs	



8.6 RESET Function

Item	Symbol	MIN	TYP	MAX	Unit	Remark
RESET	T ₁	1	-	20	ms	

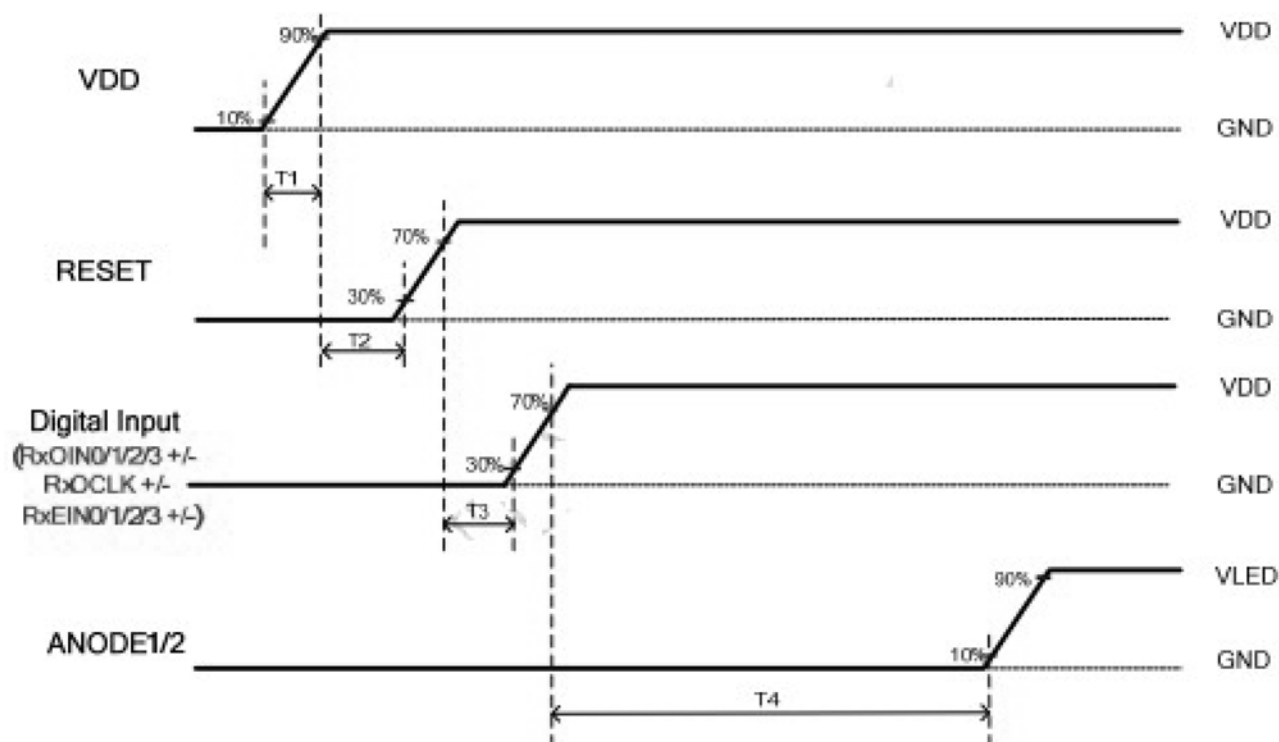


8.7 Power ON/OFF Timing

The LCD adopts high voltage driver IC, so it could be permanently damaged under a wrong power on/off sequence. The suggested LCD power sequence is below:

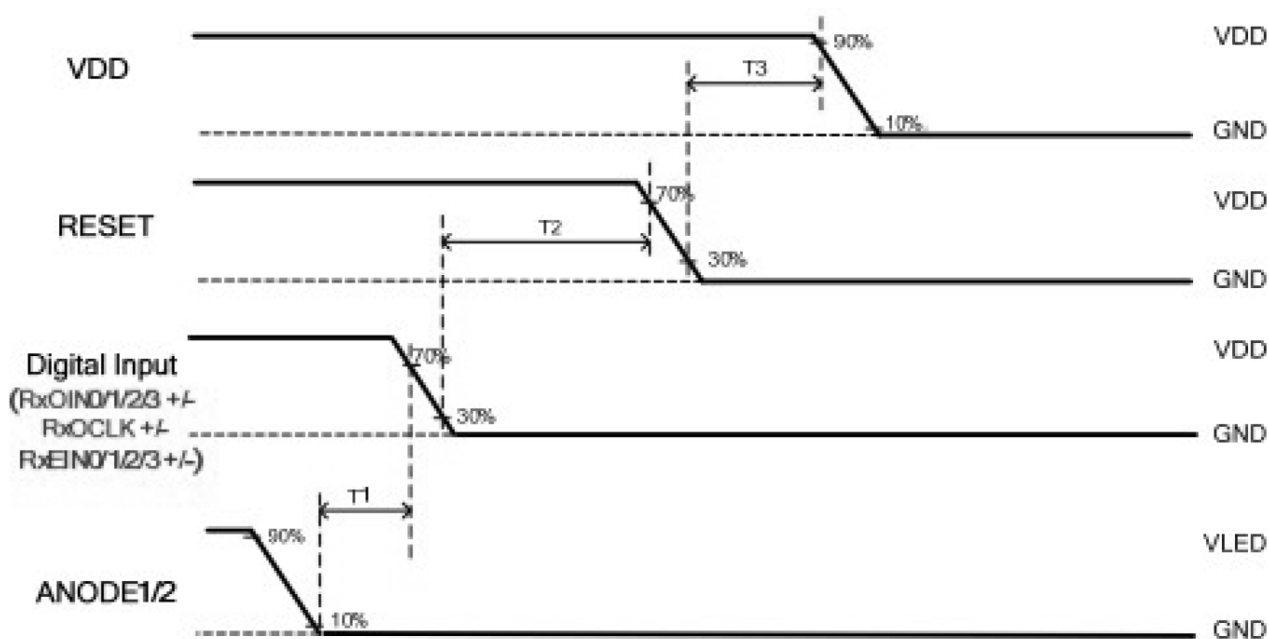
8.7.1 Power ON Sequence

Parameter	Value			Unit
	MIN	TYP	MAX	
T1	0.5	-	15	ms
T2	1	-	20	ms
T3	0	-	20	ms
T4	500	-	-	ms



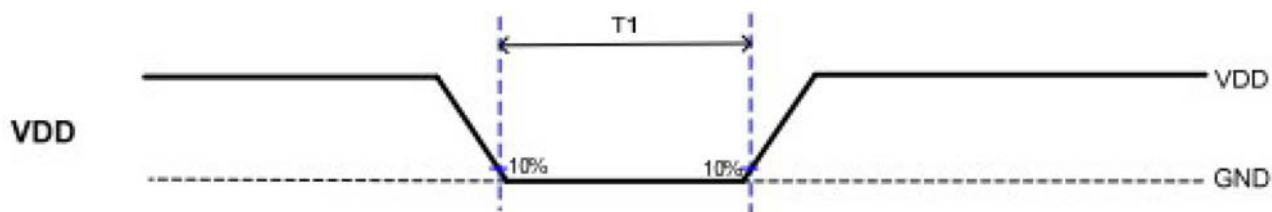
8.7.2 Power OFF Sequence

Parameter	Value			Unit
	MIN	TYP	MAX	
T1	200	-	-	ms
T2	0	-	20	ms
T3	1	-	20	ms



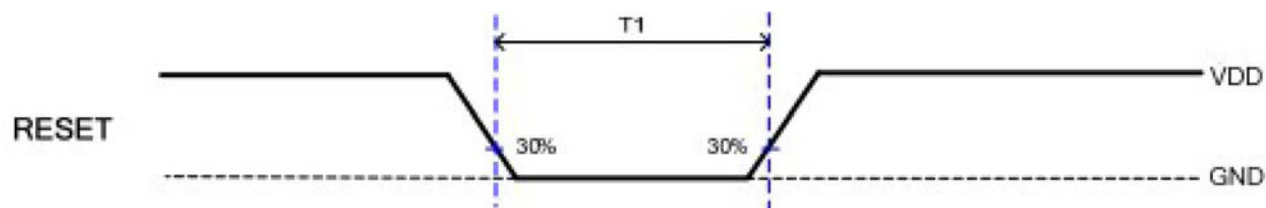
8.7.3 VDD ON/OFF

Parameter	Value			Unit
	MIN	TYP	MAX	
T1	1000	-	-	ms



8.7.4 RESET ON/OFF

Parameter	Value			Unit
	MIN	TYP	MAX	
T1	1000	-	-	ms



9. Optical Specification

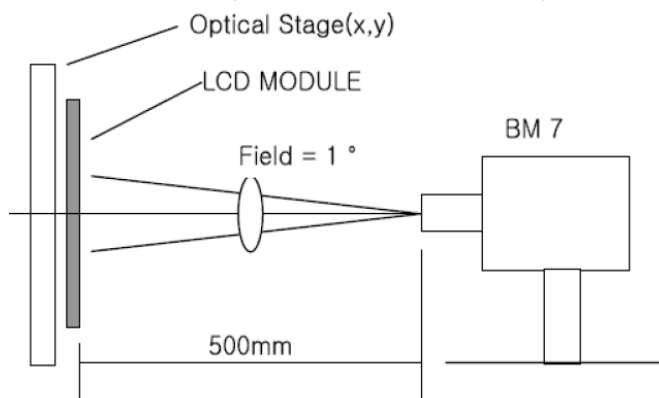
Ta=25°C

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio		CR	$\theta=0^{\circ}$	800	1000	-		Note1 Note2
Response Time		T _{ON}	25℃	-	12	-	ms	Note1 Note3
		T _{OFF}		-	13	-		
View Angles		Θ _T	CR≧10	70	80	-	Degree	Note 4
		Θ _B		70	80	-		
		Θ _L		70	80	-		
		Θ _R		70	80	-		
Chromaticity	White	x	Brightness is on	Typ-0.05	0.288	Typ+0.05		Note5, Note1
		y			0.327			
	Red	x			0.621			
		y			0.338			
	Green	x			0.299			
		y			0.621			
	Blue	x			0.148			
		y			0.069			
Luminance		L		900	1000	-	cd/m ²	Note1 Note6
Uniformity		U		80	-	-	%	Note1 Note7

Note 1: Definition of optical measurement system.

Temperature = 25°C(±3°C)

LED back-light: ON, Environment brightness < 150 lx



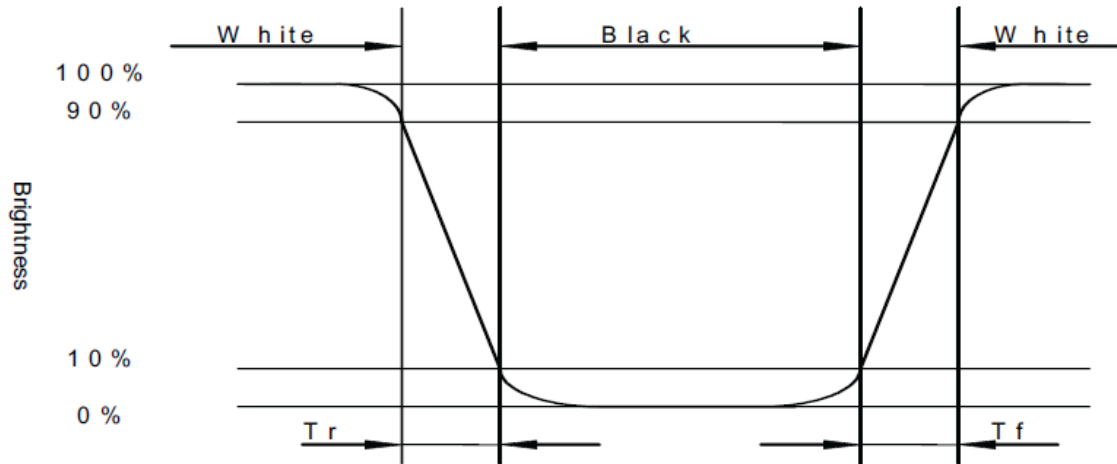
Note 2: Contrast ratio is defined as follow:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

Note 3: Response time is defined as follow:

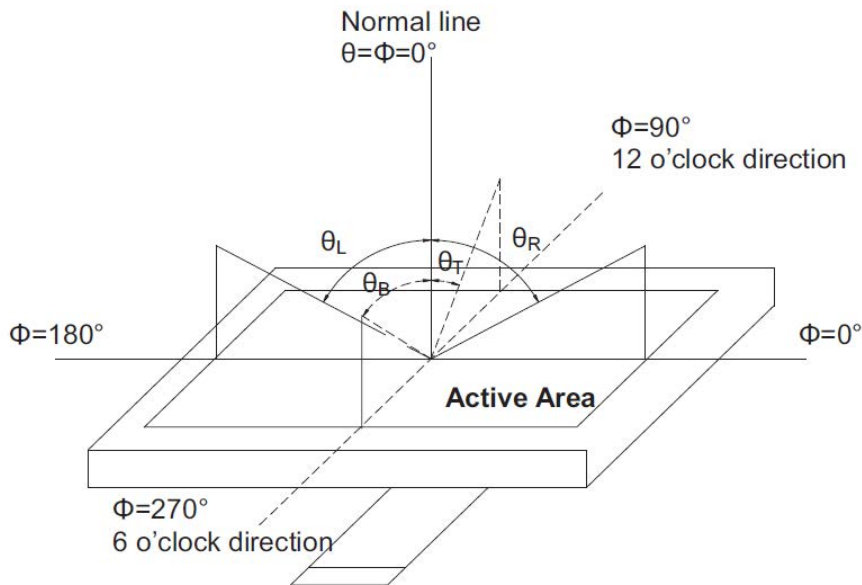
Response time is the time required for the display to transition from black to white (Rise Time, Tr) and from

white to black(Decay Time, Tf).



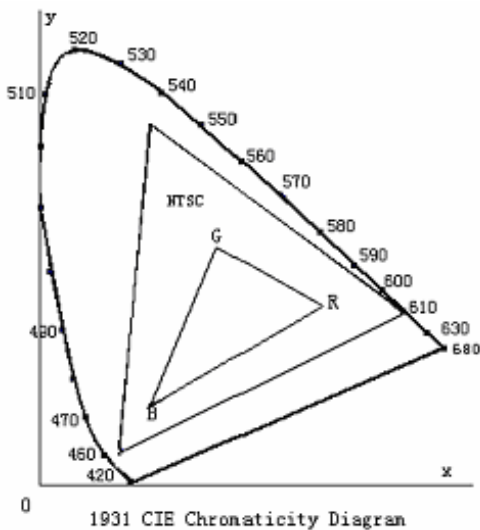
Note 4: Viewing angle range is defined as follow:

Viewing angle is measured at the center point of the LCD.



Note 5: Color chromaticity is defined as follow: (CIE1931)

Color coordinates measured at center point of LCD.



$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

Note 6: Luminance is defined as follow:

Luminance is defined as the brightness of all pixels “White” at the center of display area on optimum contrast.

Note 7: Luminance Uniformity is defined as follow:

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Uniformity (U)} = \frac{\text{Minimum Luminance(brightness) in 9 points}}{\text{Maximum Luminance(brightness) in 9 points}}$$

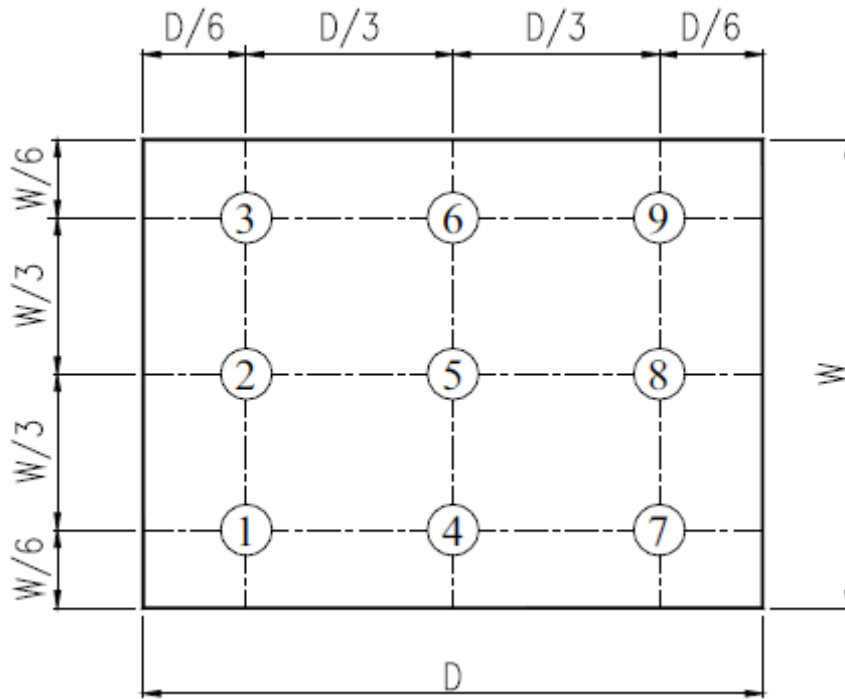


Fig. 2 Definition of uniformity

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ta= +85℃, 240hrs	Per table in below
2	Low Temp Operation	Ta= -30℃, 240hrs	Per table in below
3	High Temp Storage	Ta= +95℃, 240hrs	Per table in below
4	Low Temp Storage	Ta= -40℃, 240hrs	Per table in below
5	High Temp & High Humidity Storage	Ta= +60℃, 90% RH, 240hours	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non-operation)	-40℃ 30 min~+95℃ 30 min, Change time:5min, 10 Cycles	Per table in below
7	ESD (Operation)	C=150pF, R=330Ω , 5points/panel Air:±8KV, 5times; Contact:±4KV, 5 times;	Per table in below
8	Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z.	Per table in below
9	Shock (Non-operation)	60G 6ms, ±X,±Y,±Z 3times, for each direction	Per table in below
10	Package Drop Test	Height:80 cm, 1 corner, 3 edges, 6 surfaces	Per table in below

INSPECTION	CRITERION(after test)
Appearance	No Crack on the FPC, on the LCD Panel
Alignment of LCD Panel	No Bubbles in the LCD Panel No other Defects of Alignment in Active area
Electrical current	Within device specifications
Function / Display	No Broken Circuit, No Short Circuit or No Black line No Other Defects of Display

11. Precautions for Use of LCD Modules

11.1 Safety

The liquid crystal in the LCD is poisonous. Do not put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

11.2 Handling

- A. The LCD and touch panel is made of plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
- B. Do not handle the product by holding the flexible pattern portion in order to assure the reliability
- C. Transparency is an important factor for the touch panel. Please wear clear finger sacks, gloves and mask to protect the touch panel from finger print or stain and also hold the portion outside the view area when handling the touch panel.
- D. Provide a space so that the panel does not come into contact with other components.
- E. To protect the product from external force, put a covering lens (acrylic board or similar board) and keep an appropriate gap between them.
- F. Transparent electrodes may be disconnected if the panel is used under environmental conditions where dew condensation occurs.
- G. Property of semiconductor devices may be affected when they are exposed to light, possibly resulting in IC malfunctions.
- H. To prevent such IC malfunctions, your design and mounting layout shall be done in the way that the IC is not exposed to light in actual use.

11.3 Static Electricity

- A. Ground soldering iron tips, tools and testers when they are in operation.
- B. Ground your body when handling the products.
- C. Power on the LCD module before applying the voltage to the input terminals.
- D. Do not apply voltage which exceeds the absolute maximum rating.
- E. Store the products in an anti-electrostatic bag or container.
- F. Peel off the LCM protective film slowly since static electricity may be generated.

11.4 Storage

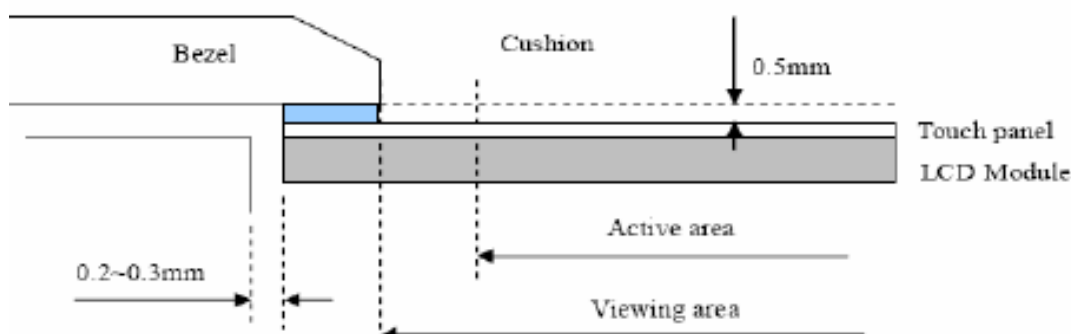
- A. Store the products in a dark place at $+25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ with low humidity (40% RH to 60% RH). Don't expose to sunlight or fluorescent light.
- B. Storage in a clean environment, free from dust, active gas, and solvent.

11.5 Cleaning

- A. Do not wipe the touch panel with dry cloth, as it may cause scratch.
- B. Wipe off the stain on the product by using soft cloth moistened with ethanol. Do not allow ethanol to get in between the upper film and the bottom glass. It may cause peeling issue or defective operation. Do not use any organic solvent or detergent other than ethanol.

11.6 Cautions for installing and assembling

- A. Bezel edge must be positioned in the area between the Active area and View area. The bezel may press the touch screen and cause activation if the edge touches the active area. A gap of approximately 0.5mm is needed between the bezel and the top electrode. It may cause unexpected activation if the gap is too narrow. There is a tolerance of 0.2 to 0.3mm for the outside dimensions of the touch panel and tail. A gap must be made to absorb the tolerance in the case and connector.
- B. In order to make the display assembly stable and firm, MT recommends to design some supporting at the display backside, especially for the display with tape-attached touch panel, such supporting is important and essential, or else, the display may drop-off from front after some period of time.
- C. Do not display the fixed pattern for a long time because it may develop image sticking due to the LCD structure. If the screen is displayed with fixed pattern, use a screen saver.



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Microtips Technology:](#)

[MTD1230AHP80LF-1](#)