



Microtips

TECHNOLOGY

Model No: MTD0300ECP06DF-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
2018-04-28	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of MTD0300ECP06DF-1 active matrix TFT module. It is composed of a color TFT-LCD panel, driver IC, FPC and a backlight unit. The 3.0” display area contains 360 (RGB) x 640 pixels.

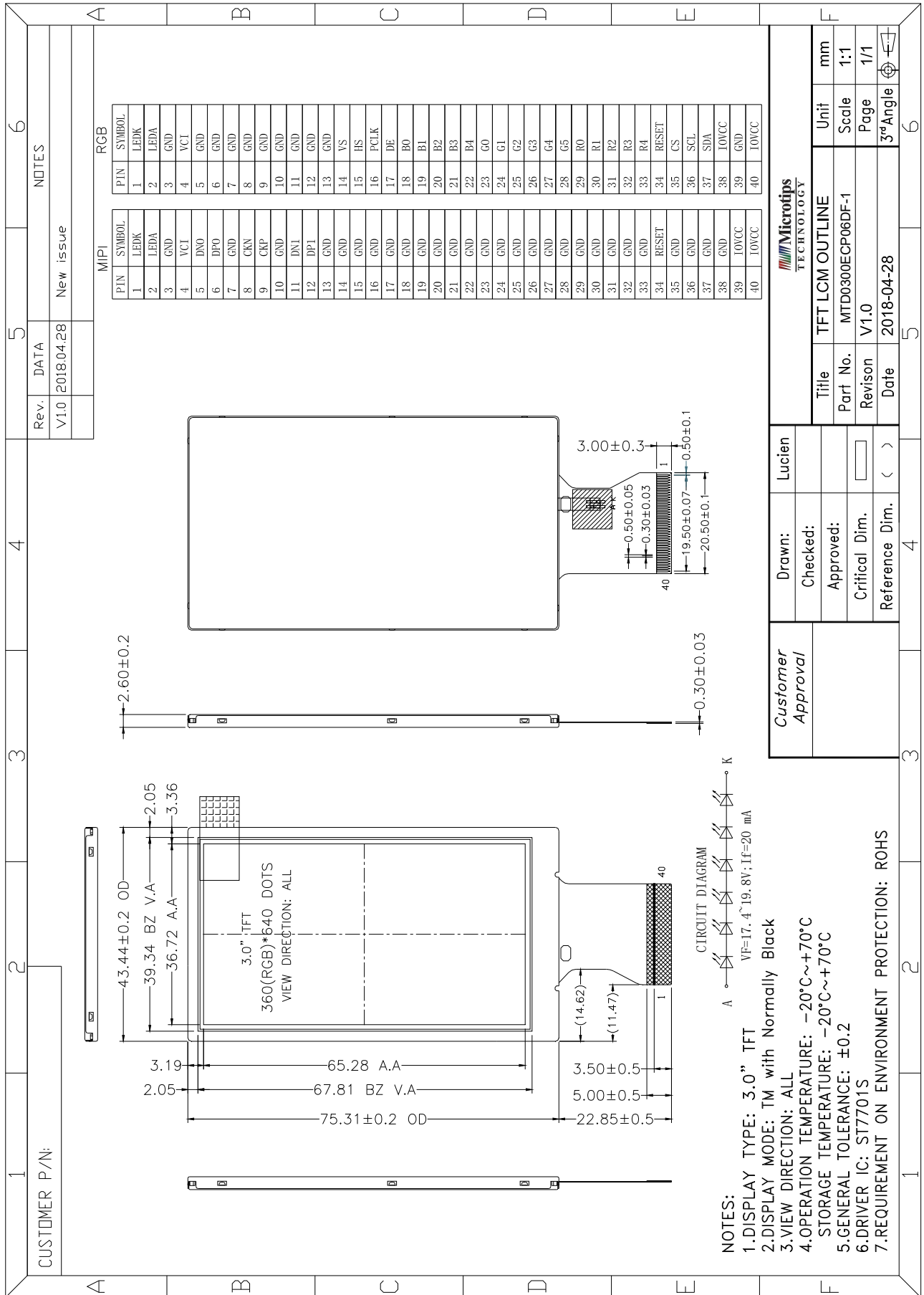
2. Application

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

3. General Information

Item	Contents	Unit
Size	3.0	inch
Resolution	360 (RGB) x 640	/
Interface	RGB-16bit or MIPI	/
Technology type	a-Si TFT	/
Pixel pitch	0.102x0.102	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	43.44 x 75.31 x 2.6	mm
Active Area	36.72 x 65.28	mm
Driver IC	ST7701S	
Display Mode	Transmissive Normally Black	/
Viewing Direction	ALL	o'clock
Backlight Type	LED	/

4. Outline Drawing



5. Interface signals

16 Bit RGB Description

No.	Symbol	Description
1	LEDK	Power for Backlight LED Cathode
2	LEDA	Power for Backlight LED Anode.
3	GND	Power ground
4	VCI	Power supply
5~13	GND	Power ground
14	VS	Vertical sync signal
15	HS	Horizontal sync signal
16	PCLK	Pixel clock
17	DE	Data enable
18~22	B0~B4	Blue data
23~28	G0~G5	Green data
29~33	R0~R4	Red data
34	RESET	Reset signal input
35	CS	Chip select signal
36	SCL	Serial clock input
37	SDA	Serial data input
38	IOVCC	Power supply
39	GND	Power ground
40	IOVCC	Power supply

MIPI Interface Description

No.	Symbol	Description
1	LEDK	Power for LED Backlight Cathode
2	LEDA	Power for LED Backlight Anode
3	GND	Power ground
4	VCI	Power supply
5	DN0	Negative MIPI differential data inputs
6	DPO	Positive MIPI differential data inputs
7	GND	Power ground

8	CKN	Negative MIPI differential clock inputs
9	CKP	Positive MIPI differential clock inputs
10	GND	Power ground
11	DN1	Negative MIPI differential data inputs
12	DP1	Positive MIPI differential data inputs
13~33	GND	Power ground
34	RESET	Global reset pin
35~38	GND	Power ground
39~40	IOVCC	Power voltage

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	VCC	-0.3	3.6	V	
	IOVCC	-0.3	3.6	V	

6.2. Environment Conditions

Item	Symbol	MIN	MAX	Unit	Remark
Operating Temperature	TOPR	-20	70	°C	
Storage Temperature	TSTG	-20	70	°C	

6.3. LED Backlight Absolute max. ratings

Item	Symbol	MIN	MAX	Unit	Remark
LED Forward Current	I _{LED}	--	25	mA	One LED

7. Electrical Specifications

7.1 Electrical characteristics

GND=0V, Ta=25°C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage	VCC	2.5	2.8	3.6	V	
	IOVCC	1.65	1.8	3.3	V	
Input Signal Voltage	L level	VIL	0	--	0.3xVCC	V
	H level	VIH	0.7xVCC	--	VCC	V

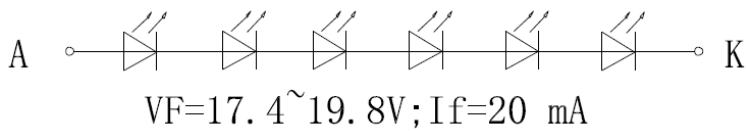
7.2 LED Backlight

Ta=25°C

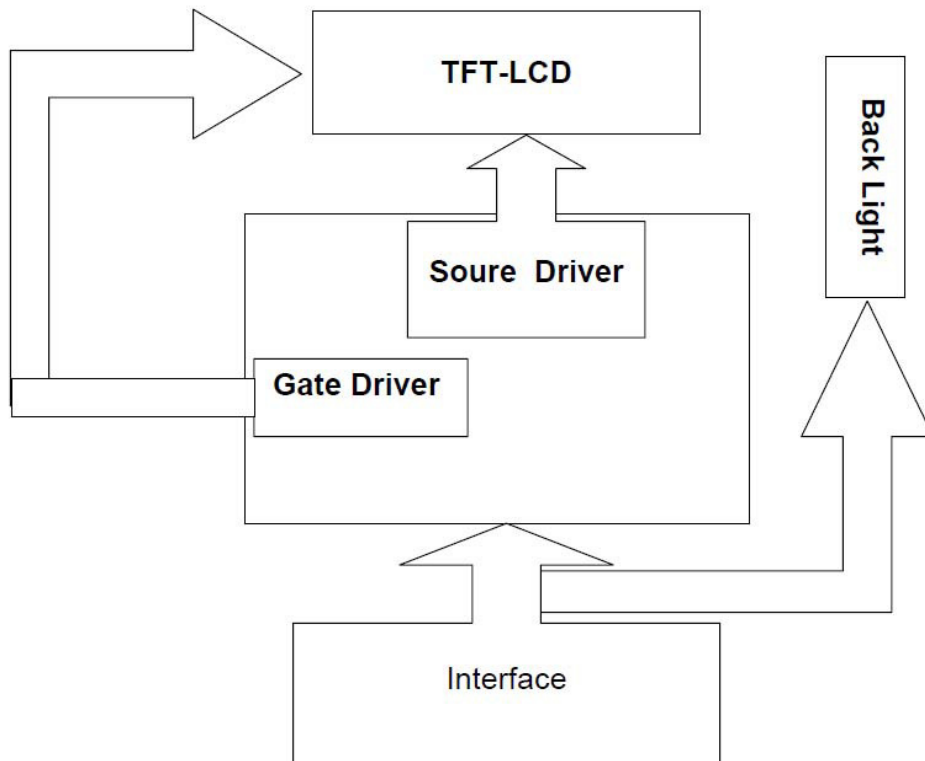
Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IBL	-	20	-	mA	Note 1
Forward Voltage	VBL	17.4	19.2	19.8	V	

Note 1: Each LED: IF =20 mA, VF = 3.2V.

CIRCUIT DIAGRAM

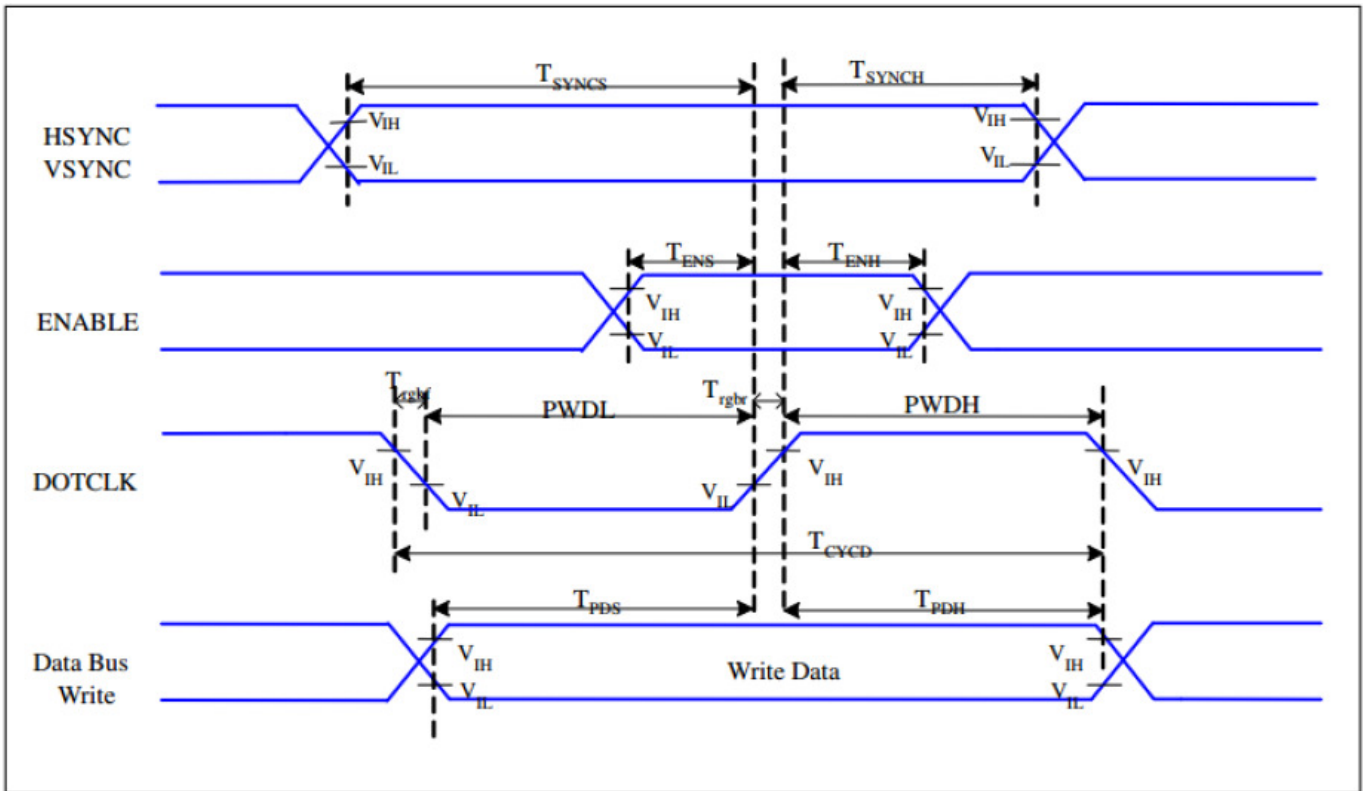


7.3 Schematic of LCD module system



8. Command/AC Timing

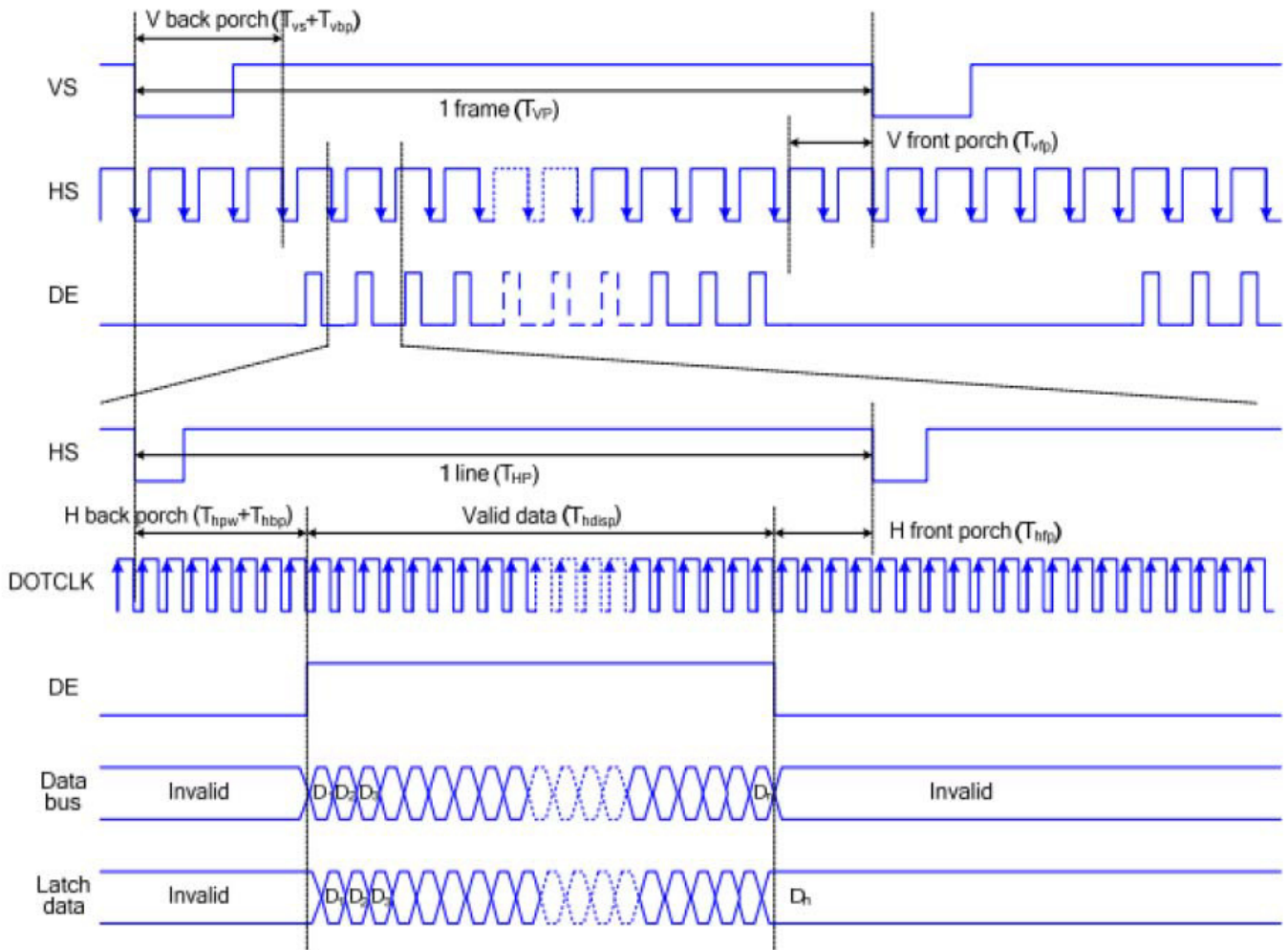
8.1 RGB Interface Characteristics



Signal	Symbol	Parameter	Min	Max	Unit	Remark
HSYNC, VSYNC	T_{SYNCS}	VSYNC, HSYNC Setup Time	5	-	ns	
ENABLE	T_{ENS}	Enable setup time	5	-	ns	
	T_{ENH}	Enable hold time	5	-	ns	
DOTCLK	$PWDH$	DOTCLK High-level pulse width	15	-	ns	
	$PWDL$	DOTCLK Low-level pulse width	15	-	ns	
	T_{CYCD}	DOTCLK Cycle Time	33	-	ns	
	T_{rgbr}, T_{rgbf}	DOTCLK Rise/Fall time	-	15	ns	
DB	T_{PDS}	PD data setup time	5	-	ns	
	T_{PDH}	PD data hold time	5	-	ns	

8.2. RGB Interface Timing

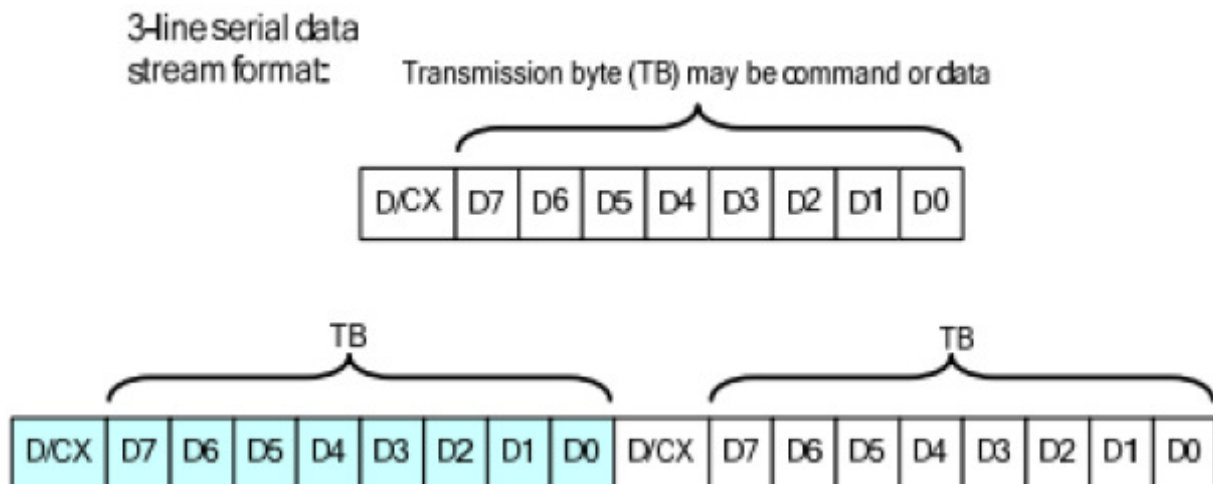
The timing chart of RGB interface DE mode is shown as follows.

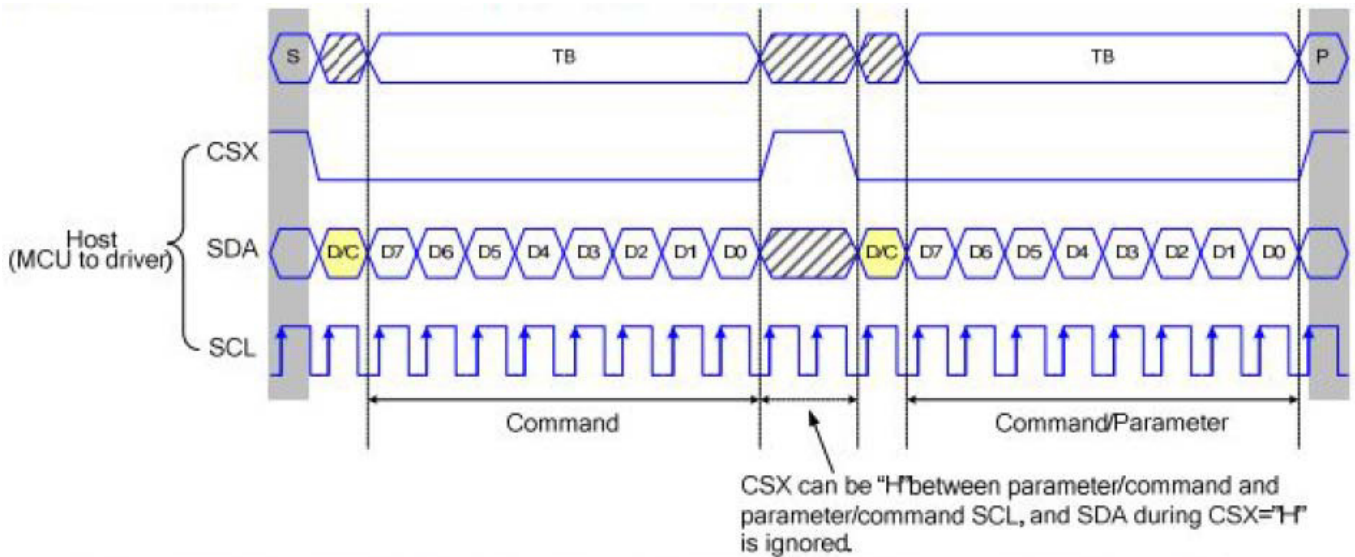


8.3. SPI Interface Timing

The write mode of the interface means the micro controller writes commands and data to the LCD driver. 3-lines serial data packet contains control bit D/CX and a transmission byte. In 4-lines serial interface, data packet contains just transmission byte and control bit D/CX is transferred by the D/CX pin. If D/CX is "low", the transmission byte is interpreted as a command byte. If D/CX is "high", the transmission byte is command register as parameter.

Any instruction can be sent in any order to the driver. The MSB is transmitted first. The serial interface is initialized when CSX is high. In this state, SCL clock pulse or SDA data have no effect. A falling edge on CSX enables the serial interface and indicates the start of data transmission.





8.4 MIPI Interface Characteristics

8.4.1 High Speed Mode

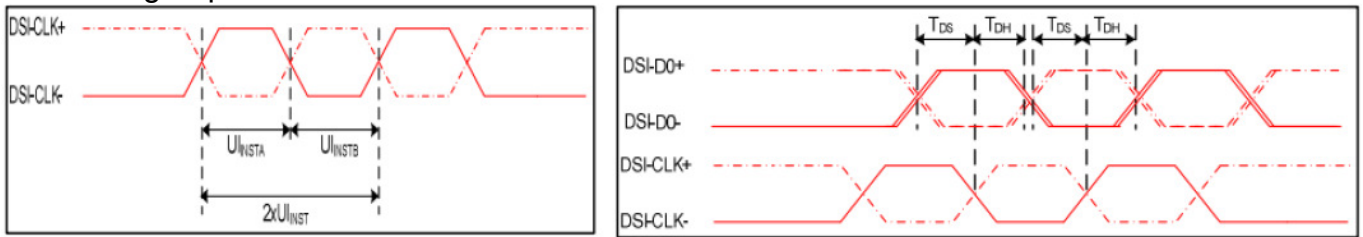


Figure: DSI clock channel timing

Parameter	Signal	Symbol	Min	Max	Unit	Description
Double UI instantaneous	DSI-CLK+/-	$2xU_{INSTA}$	4	25	ns	
UI instantaneous halves	DSI-CLK+/-	U_{INSTA}	2	12.5	ns	UI = U_{INSTA} = U_{INSTB}
		U_{INSTB}				
Data to clock setup time	DSI-Dn+/-	t_{DS}	0.15	-	UI	
Data to clock hold time	DSI-Dn+/-	t_{DH}	0.15	-	UI	

Table: MIPI Interface-High Speed Mode Timing Characteristics

8.4.2 Power ON/OFF Sequence

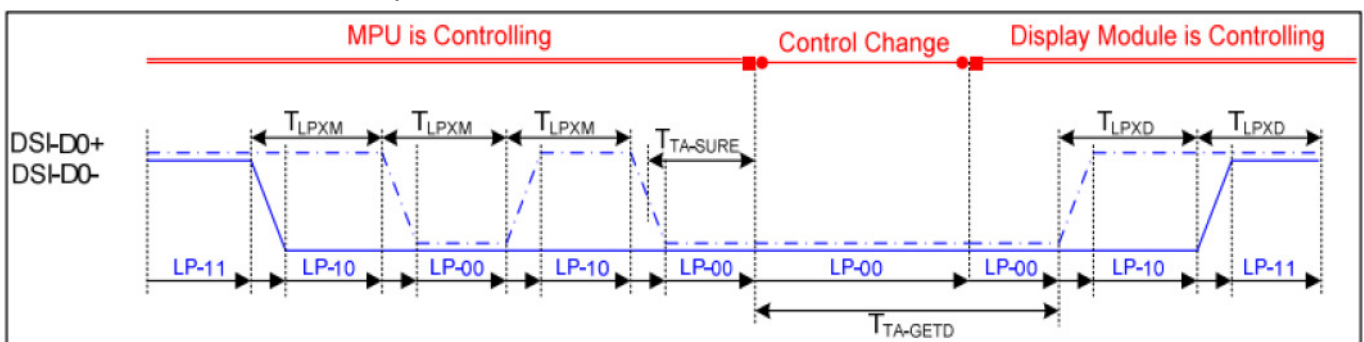


Figure: Bus Turnaround (BTA) from display module to MPU timing

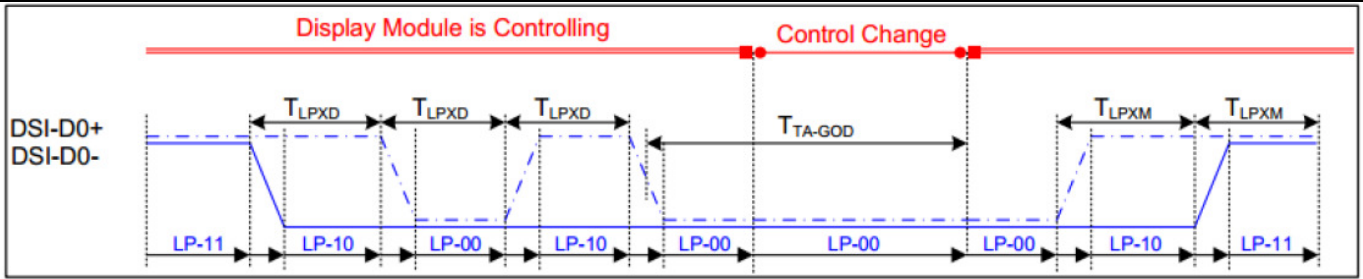


Figure: Bus Turnaround (BTA) from MPU to display module timing

Parameter	Symbol	Symbol	Min	Max	Unit	Description
Length of LP-00, LP-01, LP-10 or LP-11 periods MCU→Display Module	DSI-D0+/-	TLPXM	50	75	ns	Input
Length of LP-00, LP-01, LP-10 or LP-11 periods MCU→Display Module	DSI-D0+/-	TLPXD	50	75	ns	Output
Time-out before the MPU Start driving	DSI-D0+/-	TTA-SURED	TLPXD	2xTLPXD	ns	Output
Time to drive LP-00 by Display module	DSI-D0+/-	TTA-GETD	5xTLPXD		ns	Input
Time to drive LP-00 after Turnaround request-MPU	DSI-D0+/-	TTA-GOD	4xTLPXD		ns	Output

Table: MIPI Interface Low Power Mode Timing Characteristics

8.5 Reset Timing

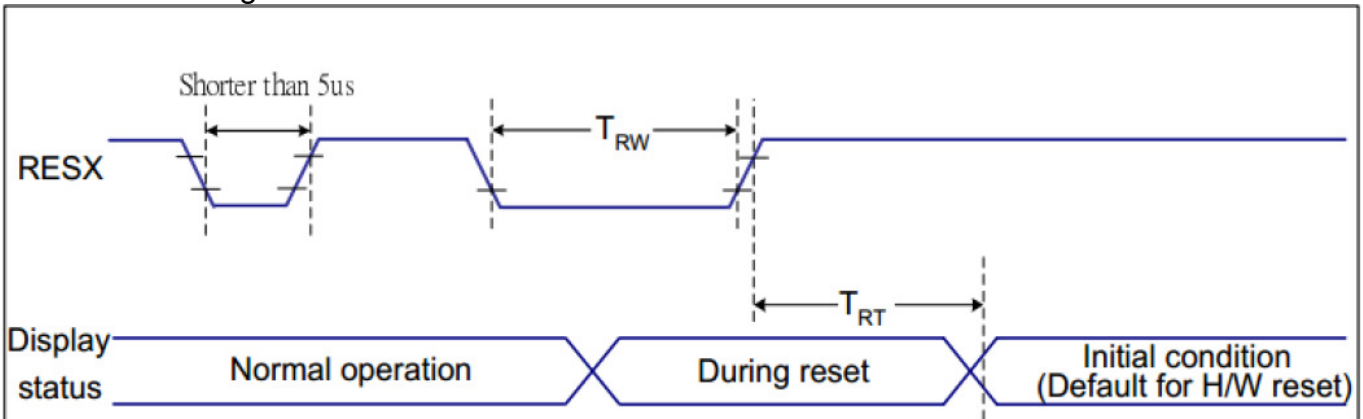


Figure: Reset Timing

Parameter	Related Pins	Symbol	Min	Max	Unit
Reset pulse duration	RESX	TRW	10	-	us
Reset cancel		TRT	-	5	ms
			-	120	ms

9. Optical Specification

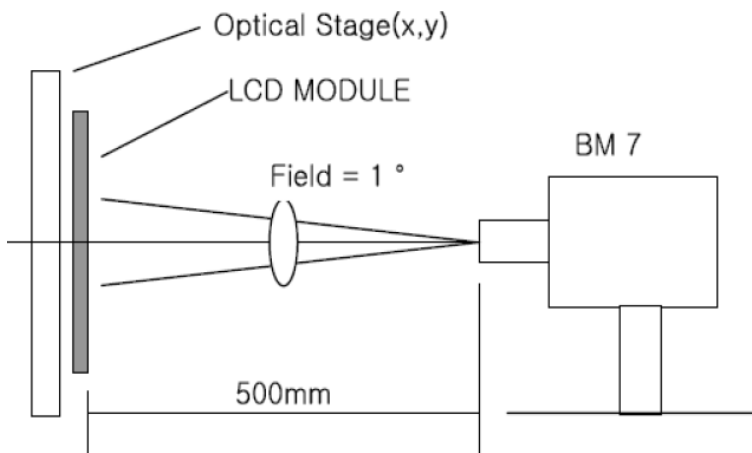
Ta=25°C

Item	Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio	CR	$\theta=0^\circ$	-	800	-		Note1 Note2
Response Time	Ton/ Toff	25°C	-	30	-	ms	Note1 Note3
View Angles	ΘT	$CR \geq 10$	-	80	-	Degree	Note 4
	ΘB		-	80	-		
	ΘL		-	80	-		
	ΘR		-	80	-		
Chromaticity	White	Brightness is on	x	TBD			Note5, Note1
			y	TBD	-		
	Red		x	TBD	-		
			y	TBD	-		
	Green		x	TBD	-		
			y	TBD	-		
	Blue		x	TBD	-		
			y	TBD	-		
Luminance	L		-	540	-	cd/m ²	Note1 Note6
Uniformity	U		-	TBD	-	%	Note1 Note7

Note 1: Definition of optical measurement system.

Temperature = 25°C(±3°C)

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

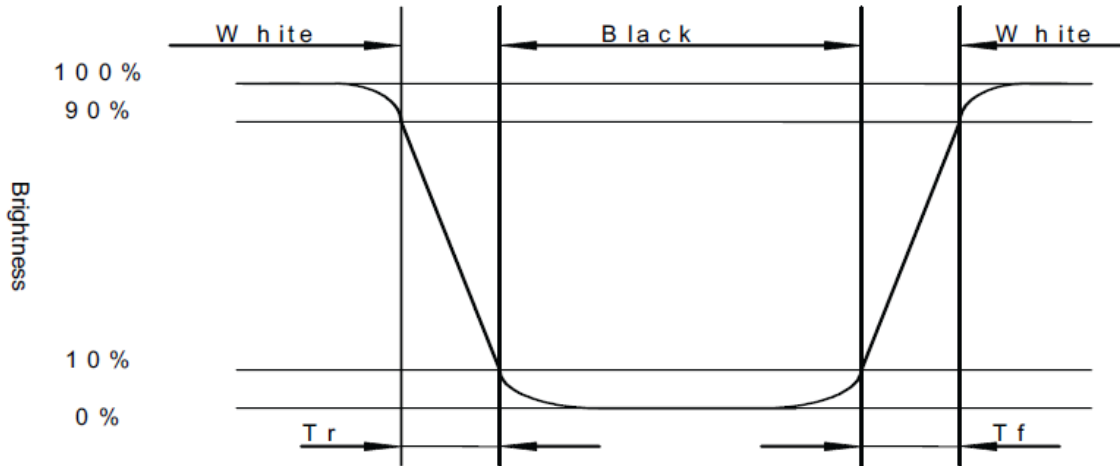


Note 2: Contrast ratio is defined as follow:

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

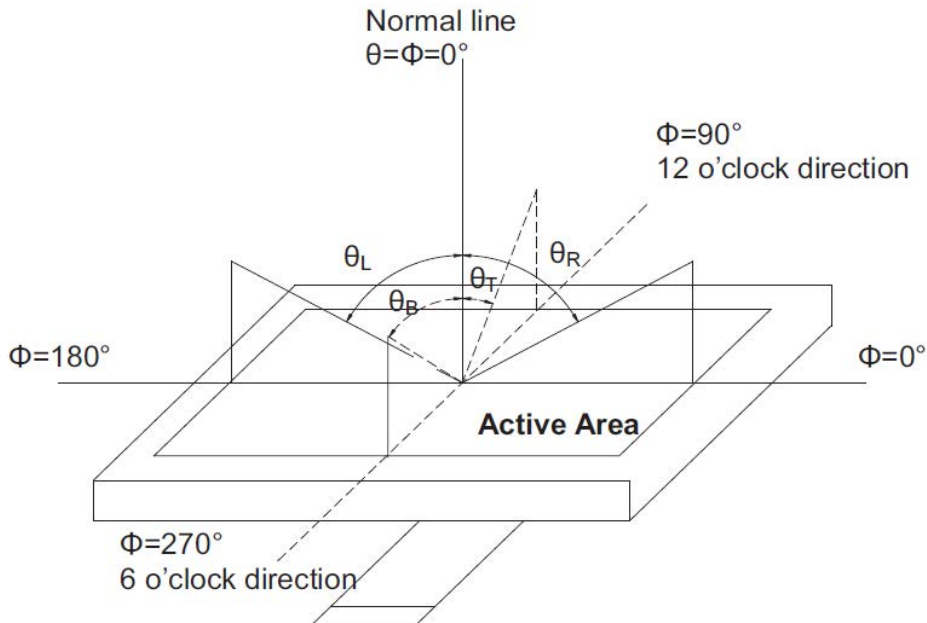
Note 3: Response time is defined as follow:

Response time is the time required for the display to transition from black to white (Rise Time, T_r) and from white to black (Decay Time, T_f).



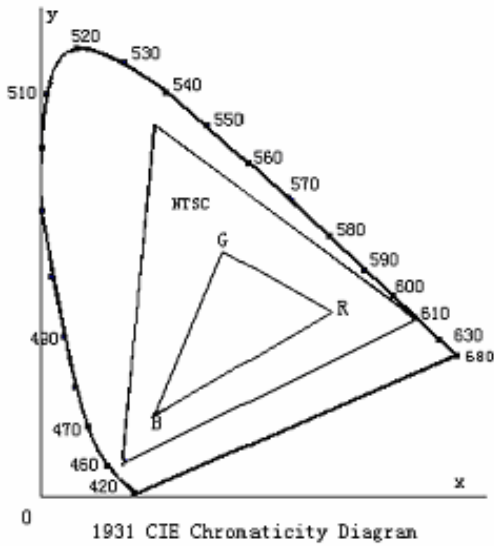
Note 4: Viewing angle range is defined as follow:

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.

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

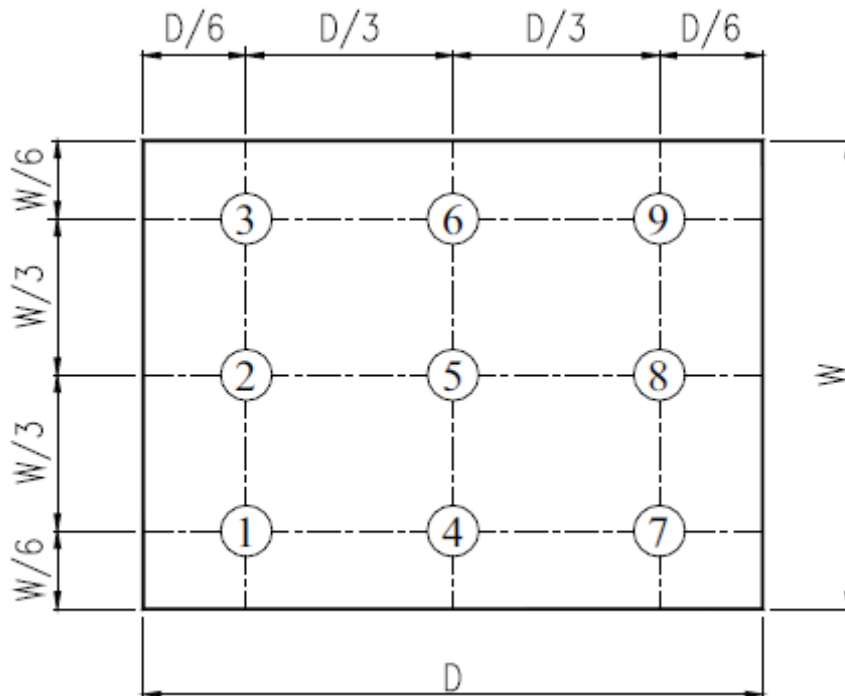


Fig. 2 Definition of uniformity

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ts=+70°C, 120hrs	Per table in below
2	Low Temp Operation	Ta=-20°C, 120hrs	Per table in below
3	High Temp Storage	Ta=+70°C, 120hrs	Per table in below
4	Low Temp Storage	Ta=-20°C, 120hrs	Per table in below
5	High Temp & High Humidity Storage	Ta=+60°C, 90% RH 120 hours	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non-operation)	-20°C 30 min~+70°C 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

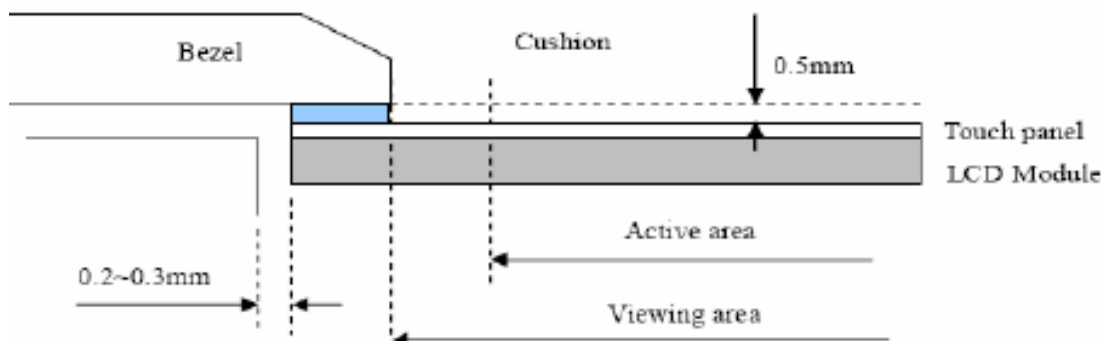
- A. Store the products in a dark place at $+25^{\circ}\text{C}\pm 10^{\circ}\text{C}$ with low humidity (40% RH to 60% RH). Don't expose to sunlight or fluorescent light.
- B. Storage in a clean environment, free from dust, active gas, and solvent.

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, MTU 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.



X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [TFT Displays & Accessories category](#):

Click to view products by [Microtips manufacturer](#):

Other Similar products are found below :

[F3ET2-005-150](#) [HDA430T-3G1H](#) [NL6448BC20-21D](#) [NB7W-KBA04](#) [NB-ATT01](#) [NB5Q-ATT01](#) [NB5Q-KBA04](#) [NB-CN001](#) [OAI-80038AA-2008-A](#) [315-U004B15300](#) [UMSH-8596MD-34T \(REV D\)](#) [TCG121WXLRXVNNANX35](#) [EIC-LCD-1080P](#) [T-55619GD065J-LW-ABN](#) [TCG104SVLPEANN-AN30](#) [NL6448BC33-70](#) [NL6448BC20-30D](#) [NL10276BC16-06](#) [NL192108AC10-01D](#) [NL12880BC20-05BD](#) [NL8060BC26-35BA](#) [NL8060BC31-50F](#) [TM070DDHG03-40](#) [NL10276AC30-42C](#) [PTPW16-070WV1S02](#) [PTPW17-070WV1S02](#) [PTPW16-084SV1S02](#) [MTD0300ECP06DF-1](#) [DEM 320240T VMX-PW-N \(A-TOUCH\)](#) [DEM 480128B TMH-PW-N \(A-TOUCH\)](#) [DEM 480272P VMX-PW-N \(C-TOUCH\)](#) [DEM 480272Q VMX-PW-N \(A-TOUCH\)](#) [DEM 480272Q VMX-PW-N \(C-TOUCH\)](#) [DEM 640480E TMH-PW-N \(A-TOUCH\)](#) [DEM 800480K1 TMH-PW-N \(A-TOUCH\)](#) [DEM 800480K1 TMH-PW-N \(C-TOUCH\)](#) [DEM 800480K2 TMH-PW-N \(A-TOUCH\)](#) [DEM 800480K3 TMH-PW-N \(C-TOUCH\)](#) [DEM 800480K4 TMH-PW-N \(A-TOUCH\)](#) [DEM 800480K4 TMH-PW-N \(C-TOUCH\)](#) [4DLCD-35480320-CTP-IPS](#) [4DLCD-35480320-IPS](#) [4DLCD-35480320-RTP-IPS](#) [4DLCD-50800480-CTP-IPS](#) [RFA6400E-AWH-DNG](#) [RFA6400E-AWH-MNN](#) [RFE430V-AZW-DNS](#) [RFF70VA2-1IW-DHS](#) [RFH700A8-AYH-MNN](#) [RFK101VF-1YH-LHG](#)