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TFT | CHARACTER | UWVD | FSC | SEGMENT | CUSTOM | REPLACEMENT

TFT Display Module

Part Number

E43GB-I-MW405-C

Overview:

- 4.3-inch TFT: 62.4(W) x 105.4(H) mm
- 480(RGB)x800 pixels
- MIPI Interface
- All View/Wide Temp
- White LED back-light

- Transmissive/ Normally Black
- Capacitive Touch Panel
- 410 NITS
- Controller: ILI9806E
- RoHS Compliant

Description

This is a color active matrix TFT (Thin Film Transistor) LCD (Liquid Crystal Display) that uses amorphous silicon TFT as a switching device. This model is composed of a transmissive type TFT-LCD Panel, driver circuit, capacitive touch panel and backlight unit. The resolution of the 4.3" TFT-LCD contains 480x800 pixels and can display up to 65K/262K/16.7M colors.

TFT Features

General Information Items	Specification Main Panel	Unit	Note
TFT Display area (AA)	56.16(H)*93.60(V) (4.3inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	480(RGB)x800	dots	-
TFT Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.117 (H) x 0.117 (V)	mm	-
Viewing angle	ALL	-	-
TFT Controller IC	ILI9806E	-	-
LCM Interface	MIPI 2 LINE	-	-
Display mode	Transmissive / Normally Black	-	-
Operating temperature	-20～+70	℃	-
Storage temperature	-30～+80	℃	-
Module Bonding	Tape bonding between LCM CTP	-	-

CTP Features

General Information Items	Specification Main Panel	Unit	Note
Structure	G+G	-	-
Controller IC	GT911	-	-
Interface	I2C	-	-

Mechanical Information

Item		Min	Typ.	Max	Unit	Note
Module size	Height (H)	62.2	62.4	62.6	mm	-
	Vertical (V)	105.2	105.4	105.6	mm	-
	Depth (D)	3.63	3.93	4.23	mm	-
Weight			TBD		g	-

1.   Block Diagram

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I2C ──────▶ [CTP FPC] ──────▶ [TOUCH CONTROLLER] ──────▶ [TOUCH PANEL]


Input Signal ──────▶                    ──────▶ [LCD CONTROLLER] ──────▶ [GATE DRIVER] ⇒ [TFT LCD PANEL]
                      [LCM FPC]                                  │                            ⇑
                                                                 └──────────▶ [SOURCE DRIVER]
LEDA ──────▶
LEDK ──────▶          [LCM FPC] ──────▶ [LED] ──────▶ [BACKLIGHT UNIT]
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2. Outline Dimensions

Rev.	Description		Date
1.0	First		3/8/22

FRONT

BACK

4.3 TFT
480*RGB*800
IPS

Dimensions (front view):
- 62,4±0,2 (BL O.D)
- 62,1 (LENS O.D)
- 56,76 (LENS A.A)
- 56,16 (LCD A.A)
- 2,38
- 2,88
- 0,15
- 2,82
- 3,12
- Handle
- Black
- 105,4±0,2 (BL O.D)
- 105,15 (LENS O.D)
- 94,6 (LENS A.A)
- 93,6 (LCD A.A)
- 57,35±0,5
- 51,54±0,5
- Yellow Tape on surface (T=0,05mm)
- Component & Driver IC (Yellow tape on surface)
- EMI
- Contact side
- PITCH0,5
- W0,3
- 3,5
- 9,5
- 31,2±0.05
- 46,67±0,5

Side view:
- 3,93±0,3 (TOTAL)
- 0,55 (LENS)
- 2,15±0,3 (LCM)
- 1.5MAX (Driver ic)
- PI stiffener
- 0.3±0.03

Diagram of fpc bending
- 31,2±0.5
- 15,73±0.5
- 49.66±0.5
- 56,05±0.5
- 1.2MAX
- steel stiffener
- 10,5
- 3,5 (WHITE SILK)
- 5 (P1)
- 3 (WHITE SILK)

B/L Circuit

A — K

FPC LOGIC

Pin	Logic
1	GND
2	NC
3	VDD
4	SCL
5	SDA
6	INT
7	RST
8	GND

Number	Pin Name
1	NC
2	LEDK
3	NC
4	LEDA
5	NC
6	VCI
7	IOVCC
8	TE
9	RESET
10	GND
11	MIPI_D1P
12	MIPI_D1N
13	GND
14	MIPI_CLP
15	MIPI_CLN
16	GND
17	MIPI_D0P
18	MIPI_D0N
19	GND
20	GND

Notes:

1. Display type 4.3" TFT TFT LCD, 16.7M Colors
2. Display Mode Normally Black
3. Viewing Direction: All
4. TFT Driver ID: ILI9806E CTP IC:GT911
5. Touch Driver IC: CTP
6. Backlight: White 8 LED 40mA 12.8v (+- 0.3v)
7. TFT Interface MIPI
8. ROHS Compliant

Model Name:	E43GB-I-MW405-C
General Tol:	± 0.2

Approvals	Date
DWN:	
CHK:	
APP:	

Drawing No.:

Scale:

Size:

Unit: mm

Page: 1/1

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3. Input Terminal Pin Assignment

NO.	Symbol	Description	I/O
1	NC	NOT CONNECTED	
2	LEDK	Cathode pin of backlight	P
3	NC	NOT CONNECTED	
4	LEDA	Anode pin of backlight	P
5	NC	NOT CONNECTED	
6	VCI	Supply Voltage (3.3v).	P
7	IOVCC	I/O Power supply voltage	P
8	TE	Tearing Effect Output - leave open when not used	O
9	RESET	External Reset Input - initializes chip, low input. Execute a power-on reset after supplying power	I
10	GND	GROUND	P
11	MIPI_D1P	MIPI DSI differential data pair (DSI-Dn+/-).	I/O
12	MIPI_D1N	If MIPI are not used, they should be connected to DGND.	
13	GND	GROUND	
14	MIPI_CLP	MIPI DSI differential clock pair (DSI-CLK+/-).	I
15	MIPI_CLN	If MIPI are not used, they should be connected to DGND.	
16	GND	GROUND	P
17	MIPI_D0P	MIPI DSI differential data pair (DSI-Dn+/-).	I/O
18	MIPI_D0N	If MIPI are not used, they should be connected to DGND	
19	GND	GROUND	P
20	GND	GROUND	P

I: Input, O: Output, P: Power

3.1 CTP

NO.	Symbol	Description	I/O
1	GND	Ground	P
2	NC	Not Connected	--
3	VDD	Supply voltage	P
4	SCL	I2C clock input	I
5	SDA	I2C data input and output	I
6	INT	External interrupt to host	I
7	RST	External reset. Low is active.	I
8	GND	Ground	P

I: Input, O: Output, P: Power

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4. LCD Optical Characteristics

4.1 Optical Specifications

Item		Symbol	Condition	Min	Typ.	Max	Unit	Note
Contrast Ratio		CR		1000	1500	--	%	(1)(2)
Response Time	Rising	TR+TF		--	35	40	msec	(4)
	Falling							
Color Filter Chromaticity	White	W$_X$	θ=0 Normal viewing angle	0.25	0.30	0.35		BM-7A
		W$_Y$		0.27	0.32	0.37		
	Red	R$_X$		-	-	-		
		R$_Y$		-	-	-		
	Green	G$_X$		-	-	-		
		G$_Y$		-	-	-		
	Blue	B$_X$		-	-	-		
		B$_Y$		-	-	-		
Viewing angle	Hor.	ΘL	CR≥10	70	80	--	degree	(1)(6)
		ΘR		70	80	--		
	Ver.	ΘT		70	80	--		
		ΘB		70	80	--		
View Direction			ALL					

Optical Specification Reference Notes:

(1) Definition of Viewing Angle: The viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3,9 o'clock direction and the vertical or 6,12 o'clock direction with respect to the optical axis which is normal to the LCD surface.

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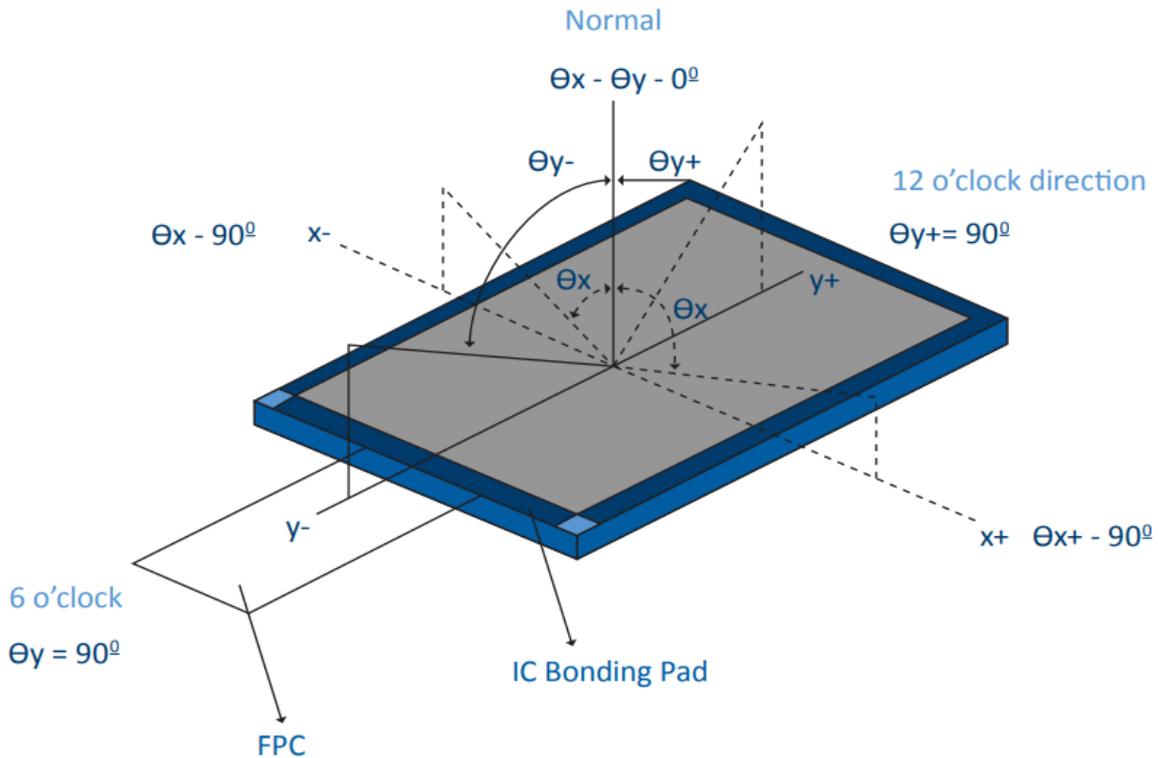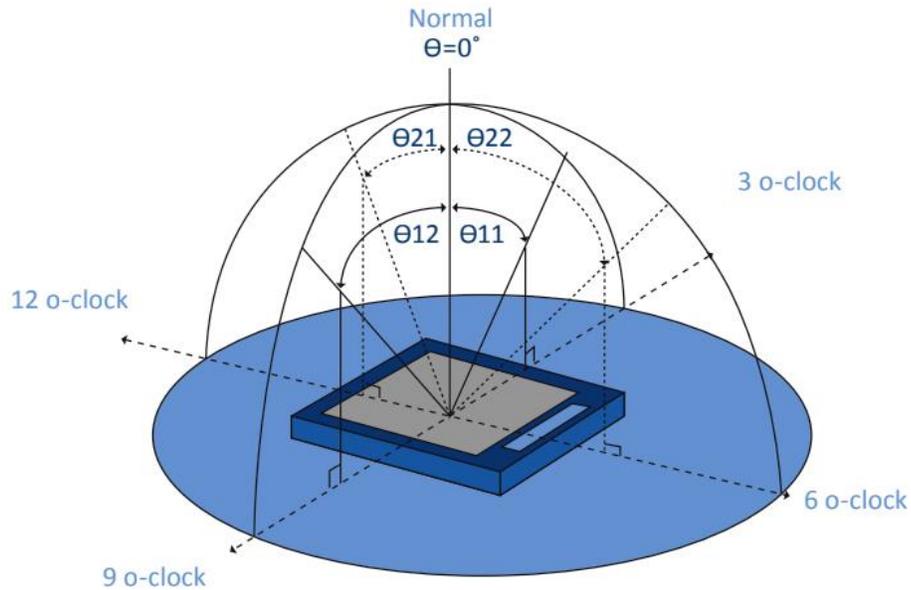
(2) Definition of Contrast Ratio (Cr): measured at the center point of panel. The contrast ratio (Cr) measured on a module, is the ratio between the luminance (Lw) in a full white area (R=G=B=1) and the luminance (Ld) in a dark area (R=G=B=0).

$$Cr = \frac{Lw}{Ld}$$

(3) Definition of transmittance (T%): The transmittance of the panel including the polarizers is measured with electrical driving.
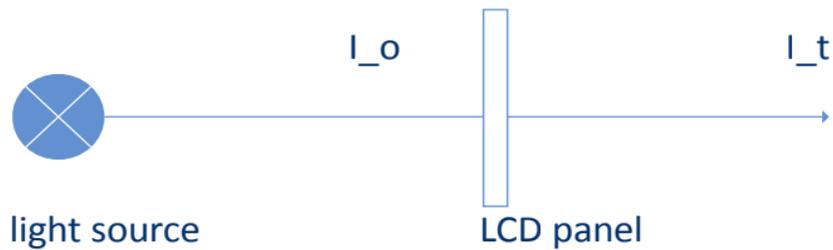
The transmittance is defined as:

$$Tr = \frac{It}{Io} \; x \; 100\%$$

Io = the brightness of the light source.
It = the brightness after panel transmission

(4) Definition of Response Time (Tr, Tf): The rise time 'Tr' is defined as the time for luminance to change from 90% to 10% as a result of a change of the electrical condition. The fall time 'Tf' is defined as the time for luminance to change from 10% to 90% as a result of a change of the electrical condition.
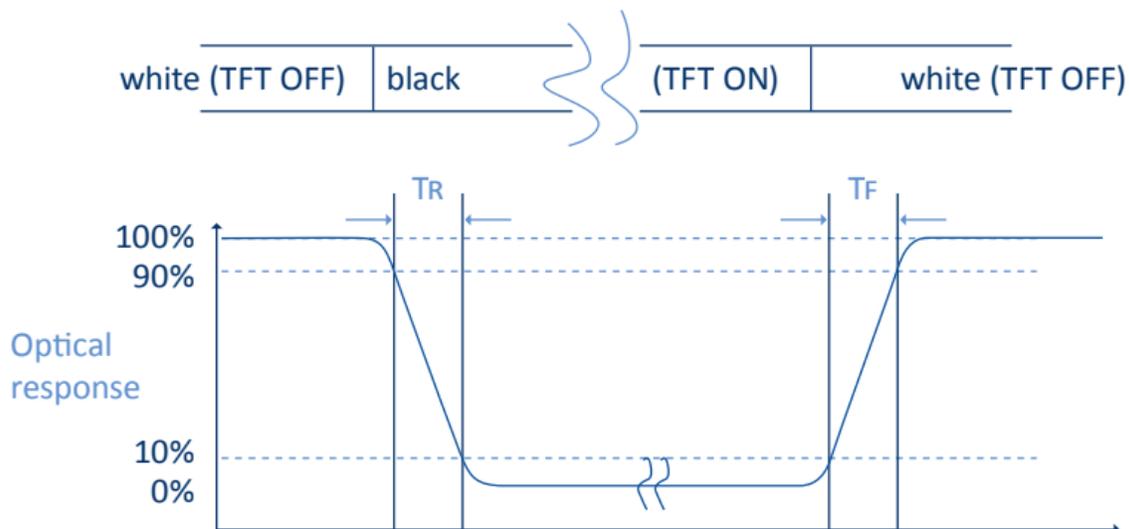
(5) Definition of Color Gamut: Measuring machine CFT-01. NTSC's Primaries: R(x,y,Y),G(x,y,Y), B(x,y,Y). FPM520 of Westar Display Technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.



1931 CIE Chromaticity Diagram
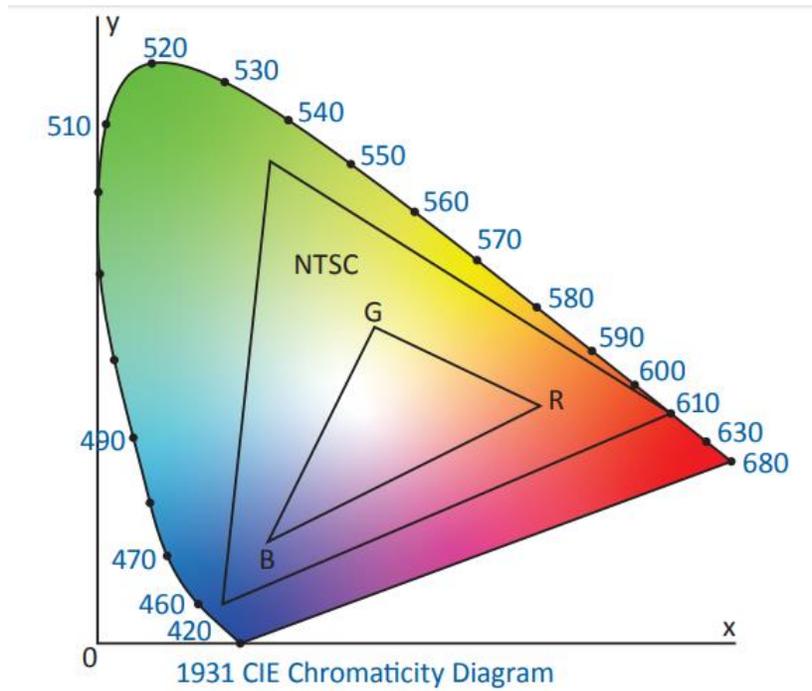
Fig. 1931 CIE chromacity diagram

Color gamut: $S = \dfrac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}} \times 100\%$

(6) Definition of Optical Measurement Setup:
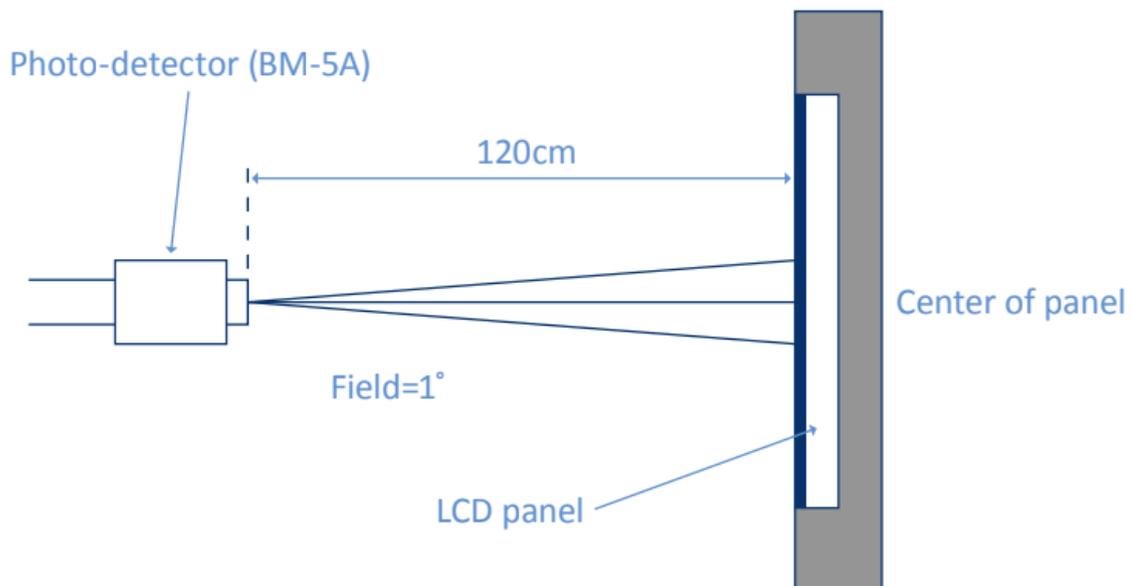
(6) Optical Measurement Setup Continued:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 20 minutes.
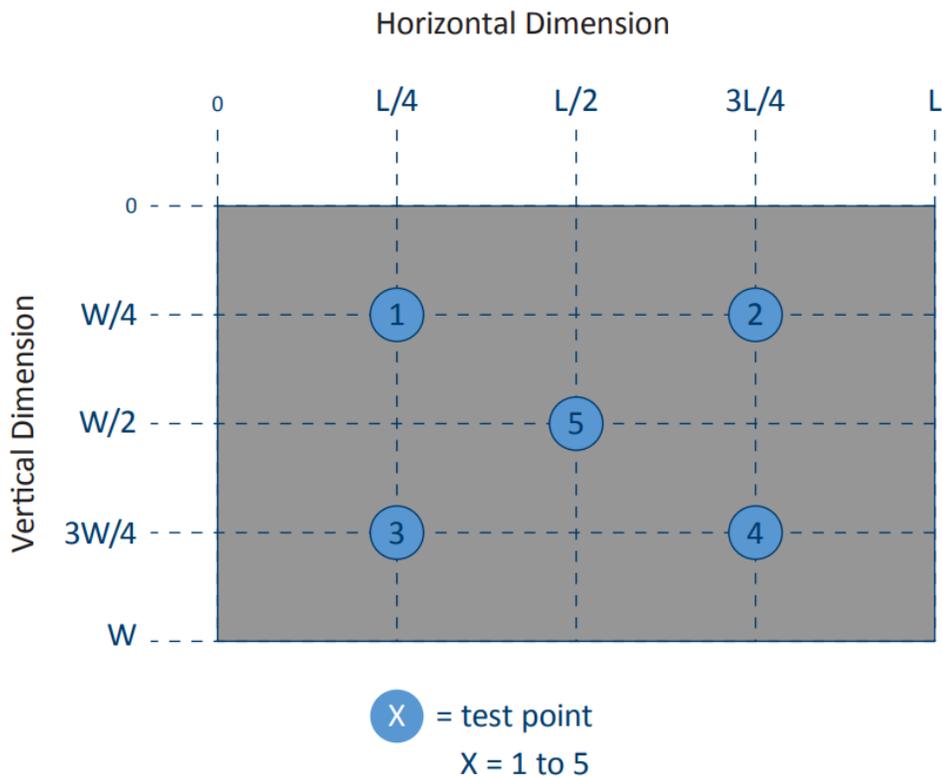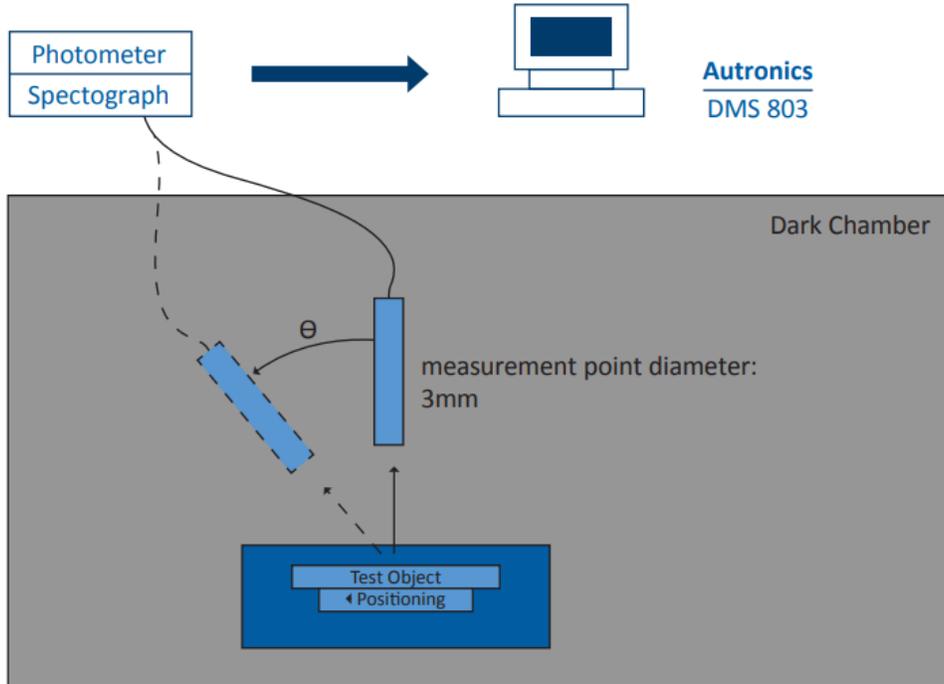
5.   TFT Electrical Characteristics

5.1   Absolute Maximum Rating (Ta=25 ˚C, VSS=0V)

Characteristics	Symbol	Min	Max	Unit
Digital Supply Voltage	VDD	VSS-0.3	5.0	V
Backlight current (ILED)	IF	-	30	mA
Backlight Voltage	Vr	-	5.0	V

NOTE: If the absolute maximum rating of the above parameters is exceeded, even momentarily, the quality of the product may be degraded. Absolute maximum ratings specify the values which the product may be physically damaged if exceeded. Be sure to use the product within the range of the absolute maximum ratings.

5.2   LED Backlight Characteristics

Item	Symbol	Min	Typ.	Max	Unit	Note
Forward Current	IF	-	40	--	mA	
Forward Voltage	VF	11.2	12.8	13.6	V	
LCM Luminance	LV	-	410	--	cd/m2	Note 3
LED lifetime	Hr	50000	--	--	hour	Note1 & 2
Uniformity	AVg	80	--	--	%	Note 3

The back-light system is edge-lighting type with 8 chips White LED.

Note 1: LED lifetime (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25 ±3 ℃, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note 2: The "LED lifetime" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL=40mA. The LED lifetime could be decreased if operating IL is larger than 40mA. The constant current driving method is suggested.

B/L Circuit
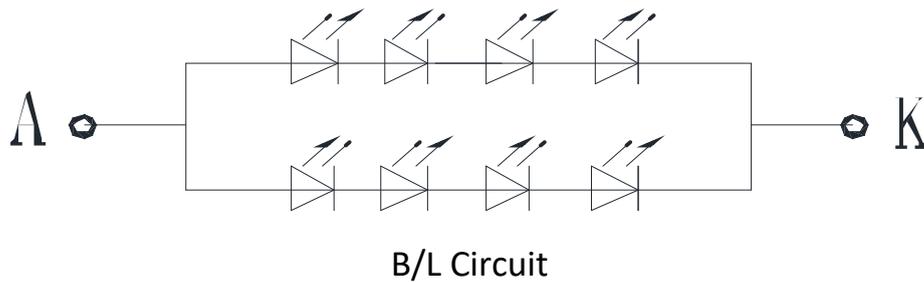
Note 3: Luminance Uniformity of these 9 points is defined as below:
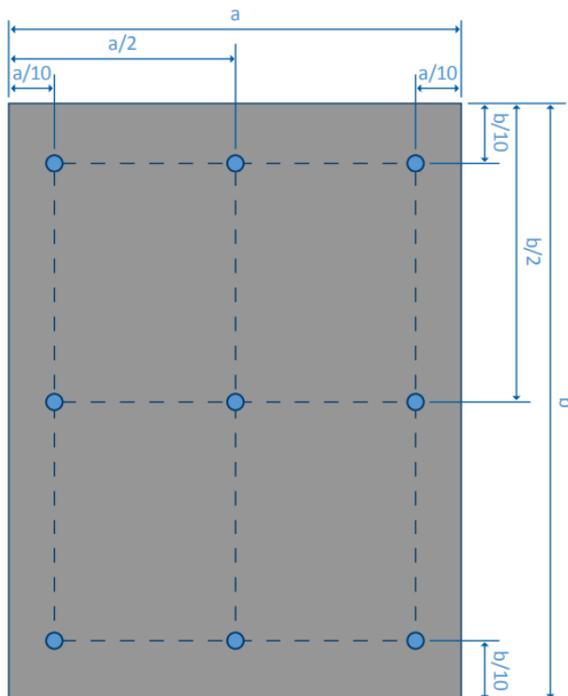
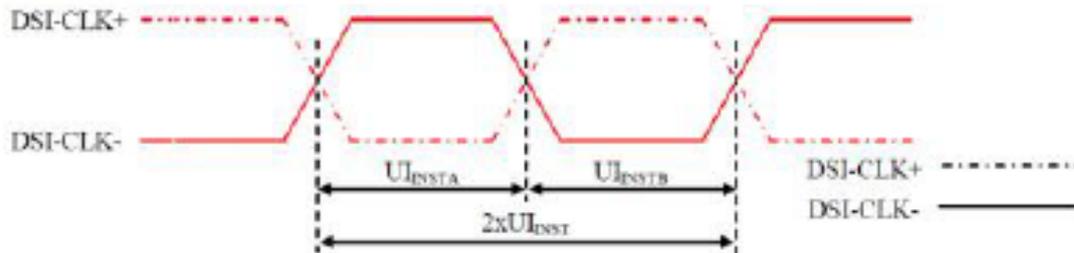$$Luminance = \frac{(Total\ Luminance\ of\ 9\ points)}{9}$$

$$Uniformity = \frac{minimum\ luminance\ in\ 9\ points(1\text{-}9)}{maximum\ luminance\ in\ 9\ points(1\text{-}9)}$$

6. AC Timing Characteristics

6.1 Timing for DSI Video Mode

DSI Timing Characteristics
High Speed Mode – Clock Channel Timing
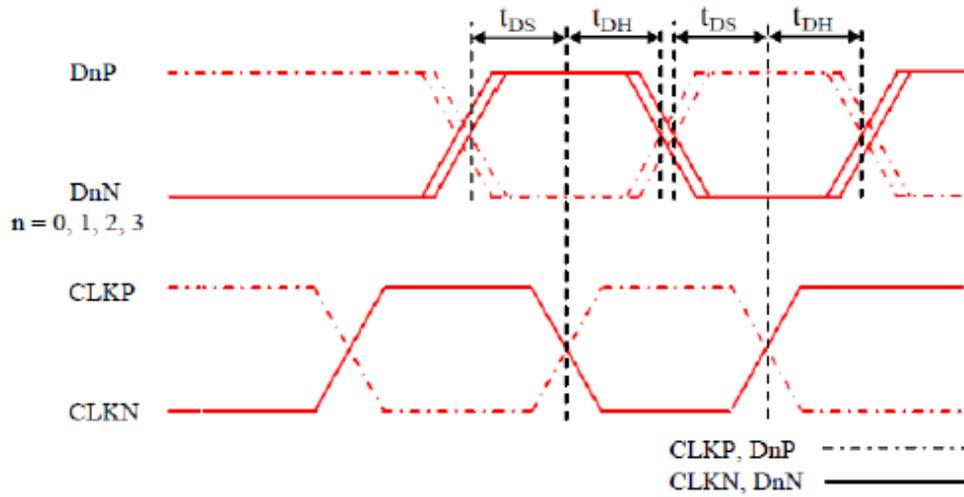

Figure 115 DSI Clock Channel Timing

Table 44 DSI Clock Channel Timing

Signal	Symbol	Parameter	Min	Max	Unit
DSI-CLK+/-	$2 \times UI_{INST}$	Double UI instantaneous	4	25	ns
DSI-CLK+/-	UI_{INSTA}, UI_{INSTB}	UI instantaneous Half	2	12.5	ns

Note: $UI = UI_{INSTA} = UI_{INSTB}$

6.2   AC Timing Diagrams

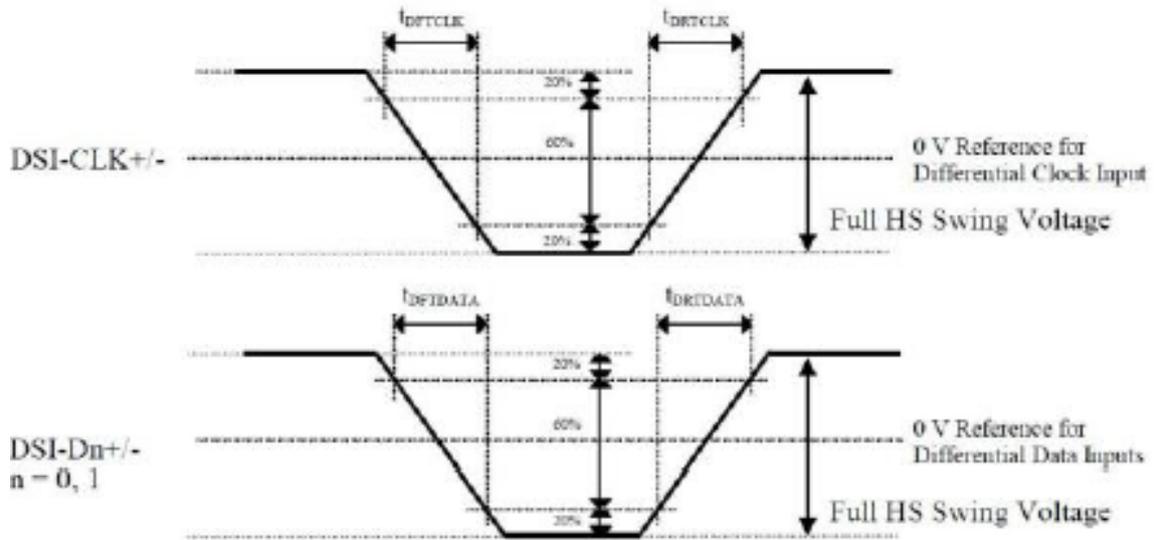### 6.2.1   High Speed Mode - Data Clock Channel Timing

Figure 119: DSI Data to Clock Channel Timings

Table 40: DSI Data to Clock Channel Timings

Signal	Symbol	Parameter	Min	Max
DnP/N , n=0 and 1	t_{DS}	Data to Clock Setup time	0.15xUI	-
	t_{DH}	Clock to Data Hold Time	0.15xUI	-

6.2.2 High Speed Mode - Rise and Fall Timing


Figure 117 Rise and Fall Timings on Clock and Data Channels

Table 46 Rise and Fall Timings on Clock and Data Channels

Parameter	Symbol	Condition	Specification			Unit
			Min	Typ	Max	
Differential Rise Time for Clock	t_{DRTCLK}	DSI-CLK+/-	-	-	150 (Note)	ps
Differential Rise Time for Data	$t_{DRTDATA}$	DSI-Dn+/- n=0 and 1	-	-	150 (Note)	ps
Differential Fall Time for Clock	t_{DFTCLK}	DSI-CLK+/-	-	-	150 (Note)	ps
Differential Fall Time for Data	$t_{DFTDATA}$	DSI-Dn+/- n=0 and 1	-	-	150 (Note)	ps

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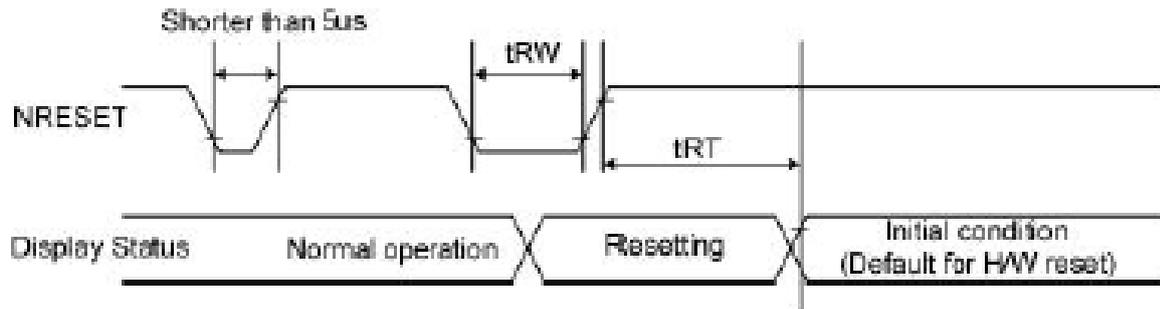
6.3   Reset Timing

Figure 103 Reset Timing

Table 40 Reset Timing

Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		us
	tRT	Reset cancel		5(note 1,6)	ms
				120 (note 1,6,7)	ms

7. Cautions and Handling Precautions

7.1 Handling and Operating the Module

1. When the module is assembled, it should be attached to the system firmly. Do not warp or twist the module during assembly work.

2. Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.

3. Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.

4. Do not allow drops of water or chemicals to remain on the display surface. If you have the droplets for a long time, staining and discoloration may occur.

5. If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

6. The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

7. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.

8. Protect the module from static; it may cause damage to the CMOS ICs.

9. Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

10. Do not disassemble the module.

11. Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

12. Pins of I/F connector shall not be touched directly with bare hands.

13. Do not connect, disconnect the module in the "Power ON" condition.

14. Power supply should always be turned on/off by the item Power On Sequence & Power Off Sequence.

7.2 Storage and Transportation.

1. Do not leave the panel in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%

2. Do not store the TFT-LCD module in direct sunlight.

3. The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.

4. It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module. In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.

5. This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.