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Custom Display

Production Custom designs Installation

Mechanical design



MODEL NO : ET030FW01-T

MODEL VERSION: 01

SPEC VERSION : 1.0

ISSUED DATE: 2020-02-14

☐ Preliminary Specification

☒ Final Product Specification

Customer : _____

Approved by	Notes

Youri Confirmation

Prepared by	Reviewed by	Approved by
John	Johnny	Wang

1. Introduction

1.1 Scope of application

LCD specification: Dots 480xRGBx854.

As to basic specification of the driver IC, refer to the IC (Sitronix:ST7701S) specification and data book.

All material & processing of the LCD module should be Lead Free.

1.2 TFT features:

Structure: TFT PANNEL+IC +FPC+BL;

IPS Type LCD

480dot-segment and 854 dot-common outputs;

16.7M Color can be selected by software;

White LED back light;

2 Lane MIPI interface

1.3 Applications:

2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	480*3RGB(H)X854(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.0255(W) × 0.07644(H)	mm
Active area	36.72(W) × 65.28(H)	mm
Viewing direction	ALL O'CLOCK	--
TFT Driver IC	ST7701S	--
TFT interface	2Lane MIPI Interface	--
Module Size(W*H*T)	43.04(W) ×74.91(H) ×2.3(D)	mm
Approx. Weight	TBD	g
Touch structure	--	--
Touch Driver IC	--	--
Touch Interface	--	--

货出开展

3. Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T _{OPR}	-20	+70	°C
LCM Storage Temperature	T _{STG}	-30	+80	°C
Humidity	RH	-	90	%

4. Electrical Characteristics

4.1.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage for I/O	VDDIO	1.65	1.8	3.3	V
Supply Voltage for(DC/DC)	VDD	2.5	2.8	3.6	V
Current Consumption	I _{DD}	--	TBD	--	mA
	I _{DD-SLEEP}	--	TBD	--	uA

4.2 Back-Light Unit Characteristics

The back-light system is an edge-lighting type with white 6 LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	17.5	--	20.5	V	--
Forward current	I _F	--	20	--	mA	--
Luminance(With LCD)	L _v	--	300	--	cd/m ²	--
LED life time	N/A	--	30,000	--	Hr	Note 1

Note:

- (1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_L=20mA/LED. The LED life time could be decreased if operating I_L is larger than 25mA/LED.

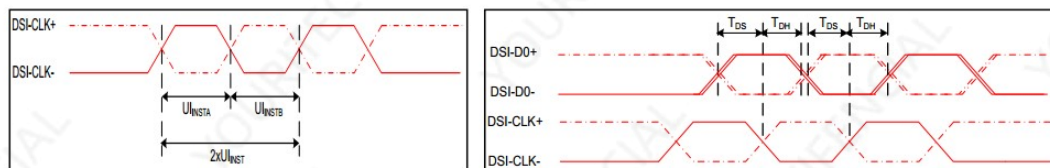


5. Module Function Description

Pin No.	Symbol	Functional	Notes
1	LEDK	Power supply for backlight cathode input terminal.	
2	LEDK	Power supply for backlight cathode input terminal.	
3	LEDA	Power supply for backlight anode input terminal.	
4	LEDA	Power supply for backlight anode input terminal.	
5	GND	Power Ground	
6	GND	Power Ground	
7	GND	Power Ground	
8	VCI	Analog Voltage (VDDA to GND): 2.5V ~ 3.6V	
9	GND	Power Ground	
10	GND	Power Ground	
11	NC	NC	
12	NC	NC	
13	GND	Power Ground	
14	NC	NC	
15	NC	NC	
16	GND	Power Ground	
17	MIPI-1P	MIPI DSI differential data pair	
18	MIPI-1N	MIPI DSI differential data pair	
19	GND	Power Ground	
20	MIPI-0P	MIPI DSI differential data pair	
21	MIPI-0N	MIPI DSI differential data pair	
22	GND	Power Ground	
23	CLK_P	MIPI DSI differential clock pair	
24	CLK_N	MIPI DSI differential clock pair	
25	GND	Power Ground	
26	NC	NC	
27	TE	Tearing effect output pin to synchronize MPU to frame writing	
28	RESET	The external reset input	
29	GND	Power Ground	
30	IOVCC	I/O Voltage (VDDI to GND): 1.65V ~ 3.3V	
31	IOVCC	I/O Voltage (VDDI to GND): 1.65V ~ 3.3V	

6. Timing Characteristics

7.5.4.1 High Speed Mode



DSI clock channel timing

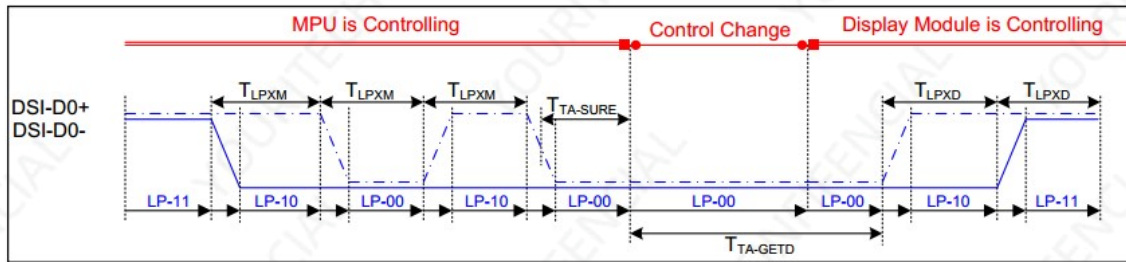
Rising and falling time on clock and data channel

$VDDI=1.8, VDD=2.8, AGND=DGND=0V, T_a=25^\circ C$

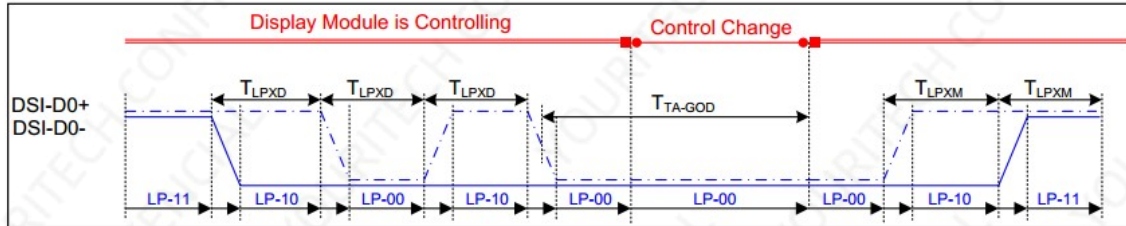
Signal	Symbol	Parameter	MIN	MAX	Unit	Description
DSI-CLK+/-	$2xUI_{INSTA}$	Double UI instantaneous	4	25	ns	
DSI-CLK+/-	UI_{INSTA} UI_{INSTB}	UI instantaneous halves	2	12.5	ns	$UI = UI_{INSTA} = UI_{INSTB}$
DSI-Dn+/-	t_{DS}	Data to clock setup time	0.15	-	UI	
DSI-Dn+/-	t_{DH}	Data to clock hold time	0.15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

Mipi Interface- High Speed Mode Timing Characteristics

Low Power Mode



Bus Turnaround (BTA) from display module to MPU Timing



Bus Turnaround (BTA) from MPU to display module Timing

VDDI=1.8, VDD=2.8, AGND=DGND=0V, Ta=25 °C

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
DSI-D0+/-	TLPXM	Length of LP-00,LP-01, LP-10 or LP-11 periods MPU→Display Module	50	75	ns	Input
DSI-D0+/-	TLPXD	Length of LP-00,LP-01, LP-10 or LP-11 periods MPU→Display Module	50	75	ns	Output
DSI-D0+/-	TTA-SURED	Time-out before the MPU start driving	T_{LPXD}	$2 \times T_{LPXD}$	ns	Output
DSI-D0+/-	TTA-GETD	Time to drive LP-00 by display module	$5 \times T_{LPXD}$		ns	Input
DSI-D0+/-	TTA-GOD	Time to drive LP-00 after turnaround request-MPU	$4 \times T_{LPXD}$		ns	Output

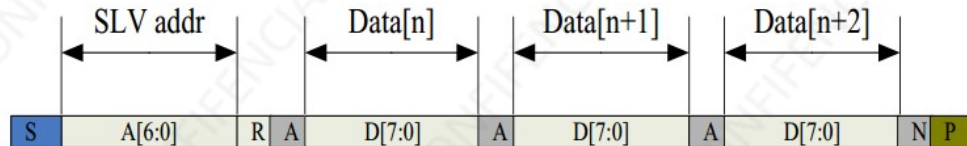
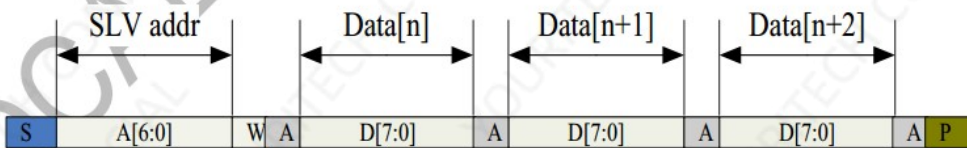
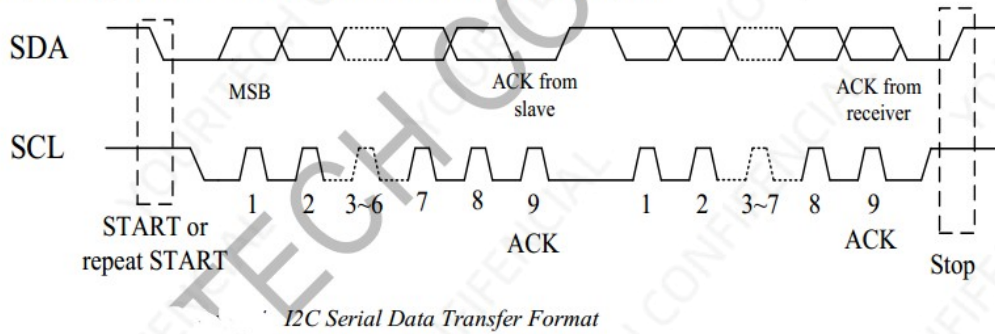
Please refer to the following table for the setting limitation of RGB interface signals.

Parameter	Symbol	Min.	Typ.	Max.	Unit
Horizontal Sync. Width	hpw	1	-	255	Clock
Horizontal Sync. Back Porch	hbp	1	--	255	Clock
Horizontal Sync. Front Porch	hfp	1	--	-	Clock
Vertical Sync. Width	vs	1	--	254	Line
Vertical Sync. Back Porch	vbp	1	--	254	Line
Vertical Sync. Front Porch	vfp	2	--	--	Line

Note:

1. Typical value are related to the setting frame rate is 60Hz..

The I2C is always configured in the Slave mode. The data transfer format is shown



lists the meanings of the mnemonics used in the above figures.

Mnemonics Description

Mnemonics	Description
S	I2C Start or I2C Restart
A[6:0]	Slave address
R/W	READ/WRITE bit, '1' for read, '0' for write
A(N)	ACK(NACK)
P	STOP: the indication of the end of a packet (if this bit is missing, S will indicate the end of the current packet and the beginning of the next packet)

I2C Interface Timing Characteristics is shown

I2C Timing Characteristics

Parameter	Min	Max	Unit
SCL frequency	10	400	KHz
Bus free time between a STOP and START condition	4.7	\	us
Hold time (repeated) START condition	4.0	\	us
Data setup time	250	\	ns
Setup time for a repeated START condition	4.7	\	us
Setup Time for STOP condition	4.0	\	us

7.Optical Characteristics

Items		Symbol	Condition	Specifications			Unit
				Min.	Typ.	Max.	
Contrast Ratio		CR		-	1500	-	-
Response Time		T _R + T _F		-	25	-	ms
				-	-	-	ms
Chromaticity	Red	X _R			/		-
		Y _R			/		-
	Green	X _G			/		-
		Y _G			/		-
	Blue	X _B			/		-
		Y _B		/		-	
	White	X _W	0.28	0.31	0.34	-	
		Y _W	0.29	0.32	0.35	-	
Viewing angle	Hor.	φ1(3 o'clock)	Center CR≥10	-	85	-	deg.
		φ2(9 o'clock)		-	85	-	
	Ver.	θ2(12 o'clock)		-	85	-	
		θ1(6 o'clock)		-	85	-	
Uniformity					--		%

All left side data are based on TIAN XIAN WEI product reference only

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Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

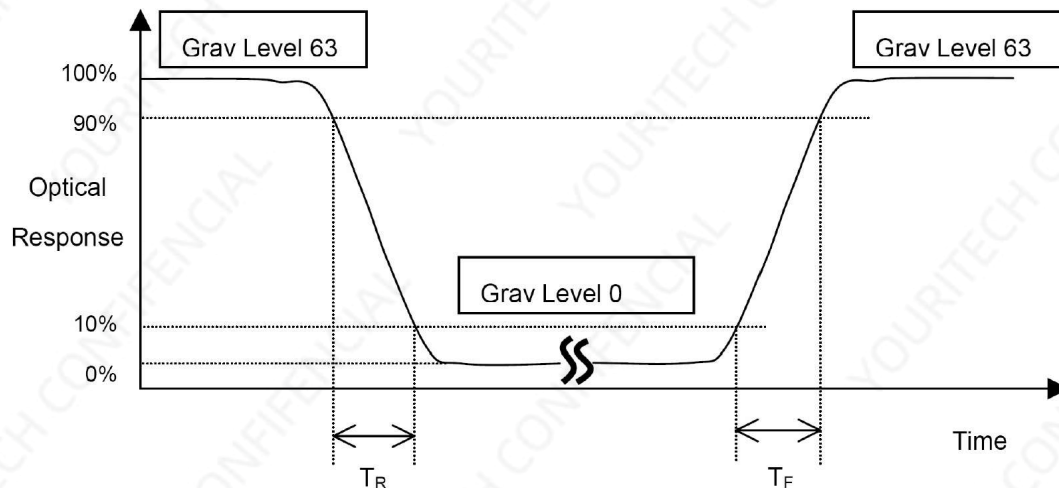
L63: Luminance of gray level 63

L0: Luminance of gray level 0

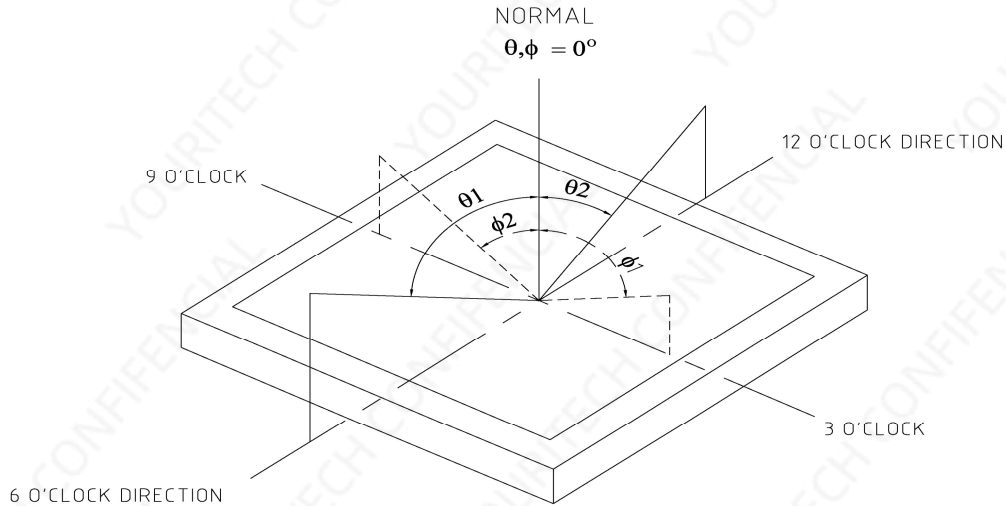
$$CR = CR(10)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (T_R , T_F):



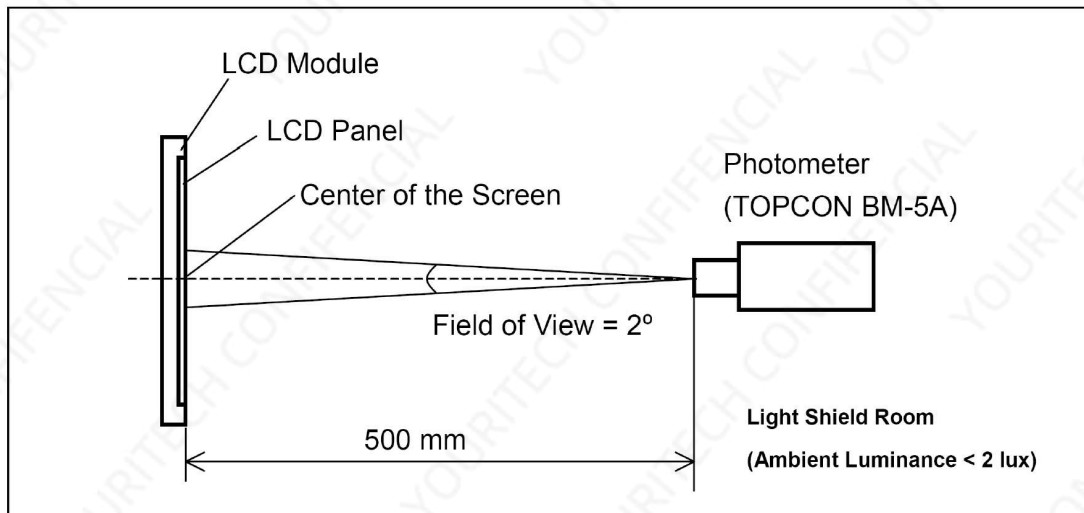
Note 3: Viewing Angle



The above “Viewing Angle” is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 6 O’clock. Module maker can increase the “Viewing Angle” by applying Wide View Film.

Note 4: Measurement Set-Up:

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 in a windless room.



8. Reliability Test Item

No	Test Items	Conditions
1	High temperature storage test	Ta = 80 °C, 240 hrs
2	Low temperature storage test	Ta = -30 °C, 240 hrs
3	High temperature & high humidity (operation test)	Ta = 60 °C, 90%RH, 240hrs
4	Low temperature operation test	Ta = -20 °C, 240hrs
5	High temperature operation test	Ta = 70 °C, 240hrs
6	Thermal Shock Test	Ta = -40 °C ~ 80°C, 1h/Cycle, 100Cycles

9. Packing Method----TBD

- END -