



LOGIC
TECHNOLOGIES

PRODUCT SPECIFICATION

DESCRIPTION

TFT Module – 5.0” WVGA
800 x (RGB) x 480
Full viewing angle High brightness
Cap touch with Atmel driver

PART NUMBER

LT180408-050CP1

VERSION

1.1

ROHS COMPLIANT

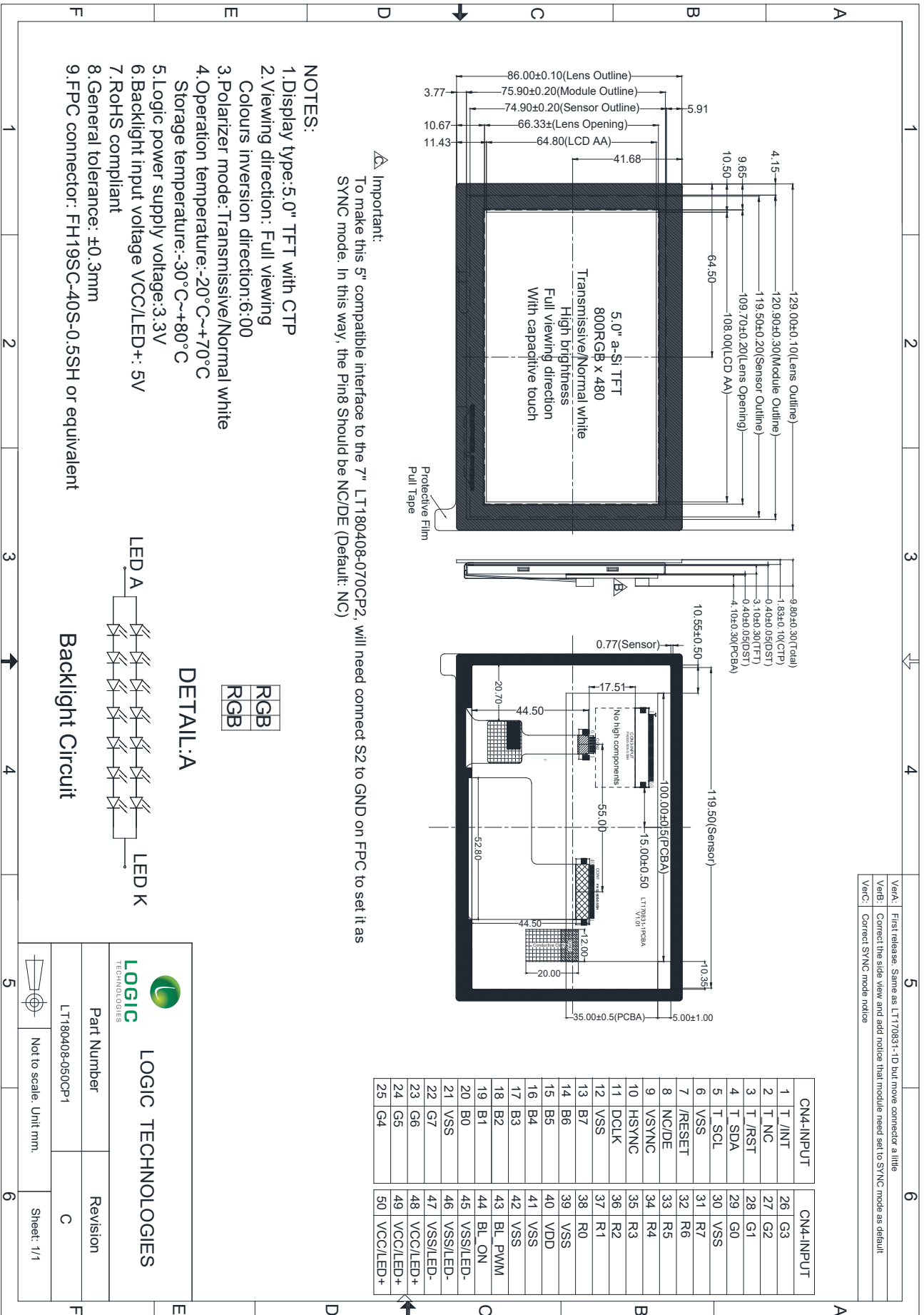
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- GENERAL INFORMATION

Item	Contents	Unit
LCD Type	TFT Transmissive, anti-glare	/
Technology	a-Si TFT	-
Viewing Direction	Full View	O'clock
Viewing Angle (Gray Scale Inversion Direction)	6:00	O'clock
Module dimensions (W x H x T)	129.0 x 86.0 x 10.1(Max)	mm
Active area (W x H)	108.0 x 64.8	mm
Number of pixels	800 x 3 (RGB) x 480	/
Pixel pitch (W x H)	0.135x 0.135	mm2
Colours	16.7M	/
Contrast ratio	500 (typical)	/
Backlight	LED (14; 7x serial, 2 x parallel)	/
Backlight Brightness	450(typical)	cd/m2
Interface	RGB 24bit + TCON	/
Touch solution	With Cap Touch	/
Touch driver	Atmel mXT640U	/
Touch Interface	I2C	/
Operating temperature	-20 to +70	°C
Storage temperature	-30 to +80	°C

MECHANICAL DIMENSIONS



NOTES:

1. Display type: 5.0" TFT with CTP
2. Viewing direction: Full viewing
3. Polarizer mode: Transmissive/Normal white
4. Operation temperature: -20°C~+70°C
5. Logic power supply voltage: 3.3V
6. Backlight input voltage VCC/LED+: 5V
7. RoHS compliant
8. General tolerance: ±0.3mm
9. FPC connector: FH19SC-40S-0.5SH or equivalent

Important:
To make this 5" compatible interface to the 7" LT180408-070CP2, will need connect S2 to GND on FPC to set it as SYNC mode. In this way, the Pin8 Should be NC/DE (Default: NC)

VerA: First release. Same as LT170831-1D but move connector a little
 VerB: Correct the side view and add notice that module need set to SYNC mode as default
 VerC: Correct SYNC mode notice

- ABSOLUTE MAXIMUM RATING

Parameter	Symbol	Min.	Max.	Unit	Note
Power Voltage	V _{DD}	- 0.5	5.0	V	---
Backlight LED Forward Current	I _F	---	25	mA	One LED
Operating Temperature	T _{OPR}	- 20	70	°C	---
Storage temperature	T _{ST}	- 30	80	°C	---

- ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Min	Typ.	Max	Unit	Remark
Supply Voltage	V _{DD}	3.00	3.30	3.60	V	---
Input Signal Voltage	Low Level	V _{IL}	0	---	0.3xV _{DD}	
	High Level	V _{IH}	0.7xV _{DD}	---	V _{DD}	
Output Signal Voltage	Low Level	V _{OL}	0	---	V _{DD} +0.4	
	High Level	V _{OH}	V _{DD} -0.4	---	V _{DD}	
Current (TFT panel only)	Black Mode (60Hz)	---	38	56	mA	
Power Consumption	Panel and Gamma		125	185	mW	All pixels on and black
	Backlight		1.19	1.68	W	
	Total		1.32	1.87	W	

- BACKLIGHT UNIT CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Driver Input Voltage	V _{CC/LED+}	---	5	6	V	
Current of driver IC	I _{VLED}	---	238	280	mA	
Power Consumption	P _{BL}	---	1.19	1.68	W	Notes
PWM Frequency	PWM	100	150	200	Hz	
Forward Current	I _F	---	40	50	mA	Notes
Forward Current Voltage	V _F	---	22.4	23.1	V	Notes
LED Lifetime	---	30k	---	---	Hrs	Notes

NOTES:

Backlight drive conditions: constant current driving method.

- The LED driving condition is defined for each LED module (7 LED Serial, 2 LED Parallel).
- The LED driving condition is defined for total backlight consumption.
- Forward Voltage adjustment depends on the Forward Current setting.
- One LED : max IF = 25mA, VF = 3.3V
- The LED lifetime is estimated data at 25degC operating.
- I_F defined for whole backlight without driver.
- If the LEDs are driven by high current, high ambient temperature & humidity condition the lifetime of the LEDs will be reduced.
- Operating life means brightness reduces to 50% of initial brightness.
- Backlight diagram.
-



• **ELECTRO-OPTICAL CHARACTERISTICS**

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Refer	Note	
Response Time	T _{ON}	25°C	---	20	30	ms	Fig 1	1	
	T _{OFF}								
Contrast ratio	Cr	θ=0°	400	500	---	---	Fig 2	1	
Uniformity	U	---	70	80	---	%	Fig 2	3	
NTSC	---	---	---	50	---	%			
Surface Luminance (no Touch panel)	Lv		400	450	---	cd/m ²	Fig 2	2	
Viewing angle ratio	Cr=10	∅=Top	60	75	---	deg	Fig 3	6	
		∅=Bottom	60	75	---				
		∅=Left	60	75	---				
		∅=Right	60	75	---				
CIE (x,y) chromaticity	Red	x	Backlight On	0.540	0.590	0.640	---	Fig 2.	5
		y		0.300	0.350	0.400			
	Green	x		0.290	0.340	0.390			
		y		0.530	0.580	0.630			
	Blue	x		0.100	0.150	0.200			
		y		0.060	0.110	0.150			
	White	x		0.260	0.310	0.360			
		y		0.280	0.320	0.380			

Optical performance should be evaluated at Ta=25°C.

Note

1. Contrast ratio (CR) is defined mathematically in Figure 2.

$$\text{Contrast Ratio} = \frac{\text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Average Surface Luminance with all black pixels (P1, P2, P3, P4, P5)}}$$

Note 2. Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see figure 2.

$$L_v = \text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5...)}$$

Note 3. Uniformity of surface luminance, White, is defined mathematically in figure 2.

$$\text{White} = \frac{\text{Minimum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Maximum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}$$

Note 4. Response time is the time required for the display to transition from white to black (rise time T_r) and from black to white (decay or fall time, T_f). The industry standard test equipment used is the Autronic-Melcher's Conoscope.

Note 5. CIE (x,y) chromaticity. The x,y value is determined by measuring luminance at each test position 1 through 5, then calculating the average value.

Note 6. The Viewing angle is the angle at which the contrast ratio is greater than 2. For a TFT module, the contrast ratio is greater than 10. The angles are determined for the horizontal or 'x' axis and the vertical or 'y' axis with respect to the 'z' axis, being the LCD surface reference. Also see figure 3.

Note 7. For viewing angle and response time testing, the testing data is based on Autronic-Melcher's BM-7A. For the contrast ratio, surface luminance, luminance uniformity and chromaticity (CIE), the test data is based on the industry's standard SR-3A photo detector.

Note 8. For TFT modules, grey scale reversing occurs in the direction of the panel viewing angle.

Figure 1. Definition of response time

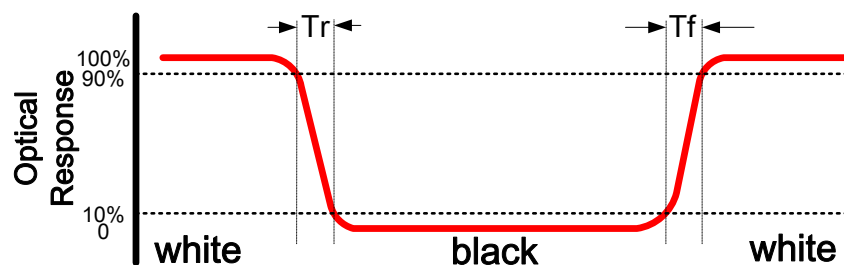


Figure 2. Measuring contrast ratio, surface luminance, luminance uniformity and CIE (chromaticity.)

A : 5mm, B : 5mm, H, V : Active area, Light spot size $q = 7\text{mm}$, 500mm distance from the LCD surface to the detector lens.

Measurement instrument is Topcon's luminance meter BM-5.

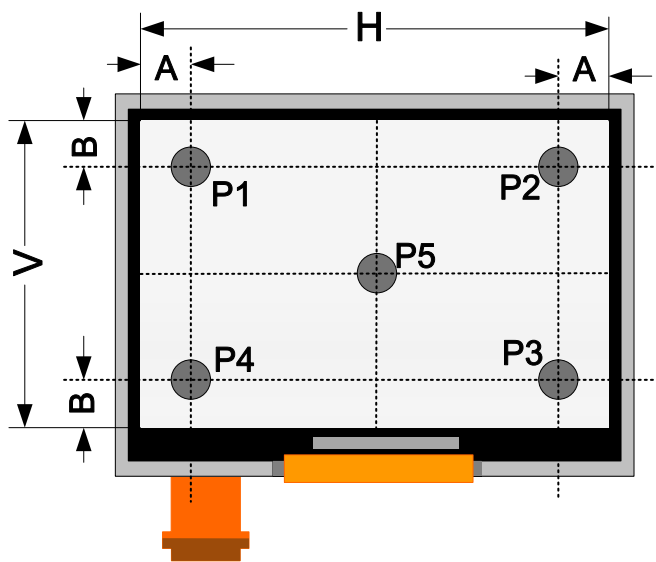
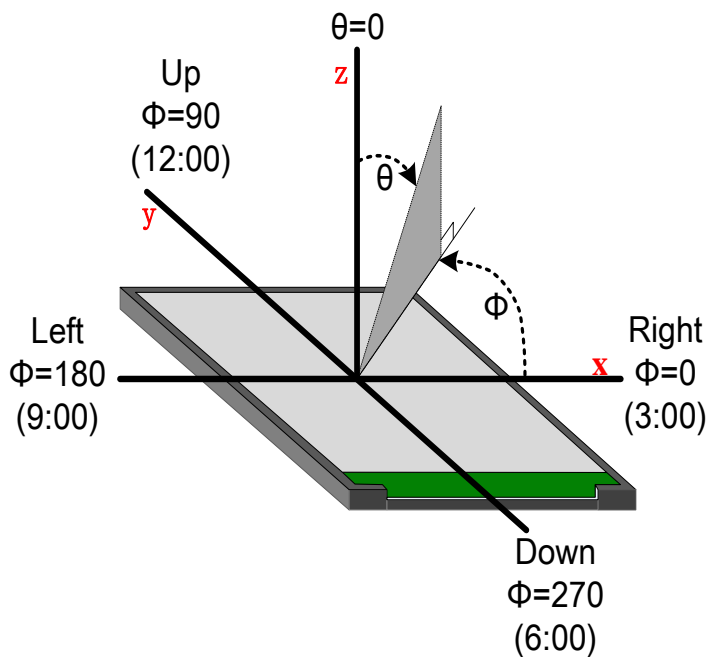


Figure 3. Definition of viewing angle



- INTERFACE DESCRIPTION

Pin	Symbol	I/O	Description	Note
1	T_/INT(YU)	I/O	Cap touch wake up /Interrupt; Resistive touch YU terminal; NC when no touch.	
2	T_NC(XL)	I/O	Resistive touch XU terminal; NC when with cap touch or no touch.	
3	T_/RST(YD)	I/O	Cap touch /Reset pin; Resistive touch YD terminal; NC when no touch.	
4	T_SDA(XR)	I/O	Cap touch I2C data input/output pin; Resistive touch XR terminal; NC when no touch.	
5	T_SCL	I	Cap touch I2C clock input pin; NC when with resistive touch or no touch.	
6	VSS	P	TFT&CTP Ground	
7	/RESET	I	TFT display system reset	
8	NC/DE	I	NC	
9	VSYNC	I	Vertical Synch Input	
10	HSYNC	I	Horizontal Synch Signal	
11	DCLK	I	Display Pixel Clock	
12	VSS	I	TFT&CTP Ground	
13	B7	I	Blue data signal (MSB)	
14	B6	I	Blue data signal	
15	B5	I	Blue data signal	
16	B4	I	Blue data signal	
17	B3	I	Blue data signal	
18	B2	I	Blue data signal	
19	B1	I	Blue data signal	
20	B0	I	Blue data signal (LSB)	
21	VSS	P	TFT&CTP Ground	
22	G7	I	Green data signal (MSB)	
23	G6	I	Green data signal	
24	G5	I	Green data signal	
25	G4	I	Green data signal	
26	G3	I	Green data signal	
27	G2	I	Green data signal	
28	G1	I	Green data signal	
29	G0	I	Green data signal (LSB)	

30	VSS	P	TFT&CTP Ground	
31	R7	I	Red data signal (MSB)	
32	R6	I	Red data signal	
33	R5	I	Red data signal	
34	R4	I	Red data signal	
35	R3	I	Red data signal	
36	R2	I	Red data signal	
37	R1	I	Red data signal	
38	R0	I	Red data signal (LSB)	
39	VSS	P	TFT&CTP Ground	
40	VDD	P	TFT&CTP Power supply, 3.3V	
41	VSS	P	TFT&CTP Ground	
42	VSS	P	TFT&CTP Ground	
43	BL_PWM	I	PWM signal to control backlight diming. 100~200Hz	
44	BL_ON	I	Backlight on/off control pin. H: On ; L: Off	
45	VSS/LED-	P	Backlight Ground which is LED Cathode. R19=0ohm to connect it to TFT&CTP Ground	
46	VSS/LED-	P		
47	VSS/LED-	P		
48	VCC/LED+	P	Backlight supply voltage input, 5V typical	
49	VCC/LED+	P		
50	VCC/LED+	P		

I -Input only; O -Output only; I/O -Input /output; P -Power or Ground.

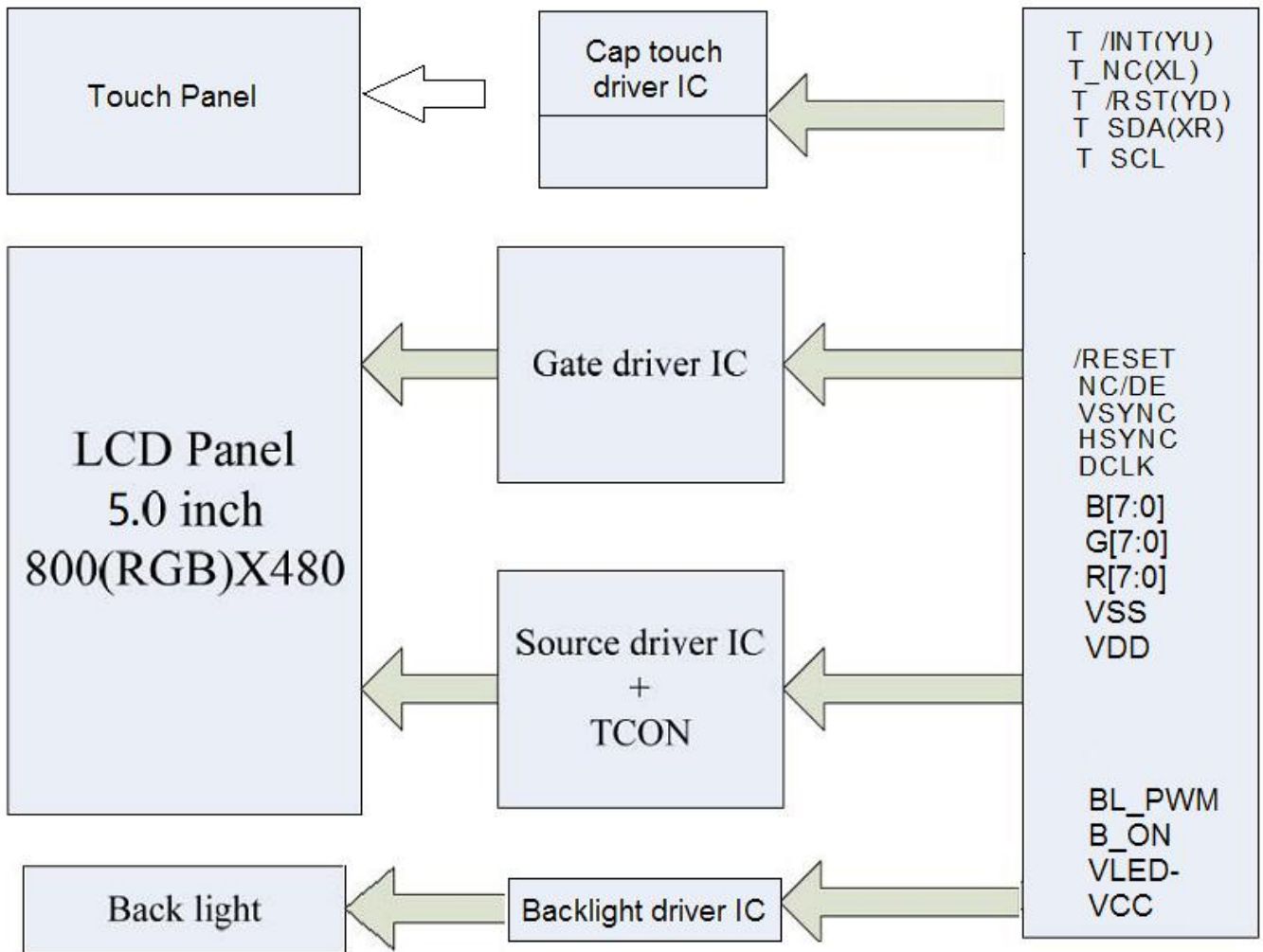
Suggested connection for this connector is 0.5pitch 50pins FFC or FPC.

Note 1: Default setting is SYNC mode. n FPC S2=H, DE mode; S2=L, SYNC mode (default).
In DE mode, HSYNC and VSYNC should connect to GND.TIMING CHART

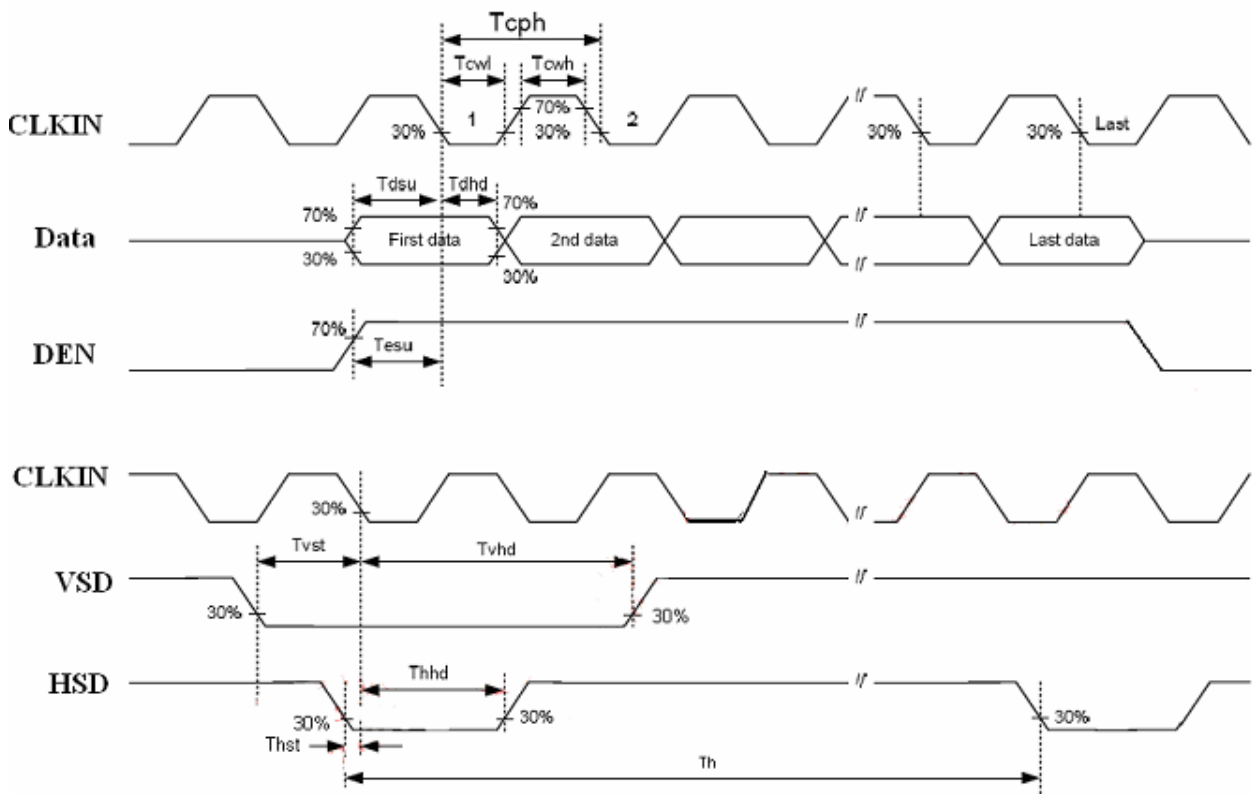
Note 2: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.

Note 3: Global reset pin, low active. Suggest it connect with an RC reset circuit for stability.
Normally pull high.

Block Diagram



o Input AC Clock and Data Timing Diagram

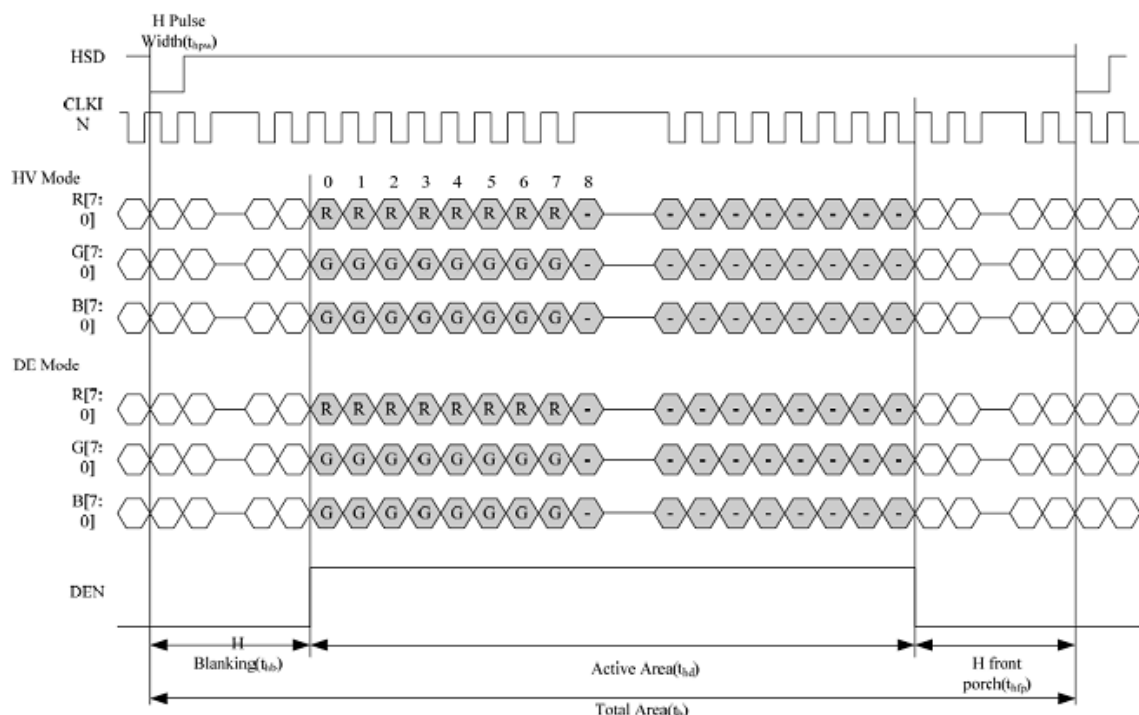


• TIMING PARAMETERS (VDD=3.3V, Ta=25degC)

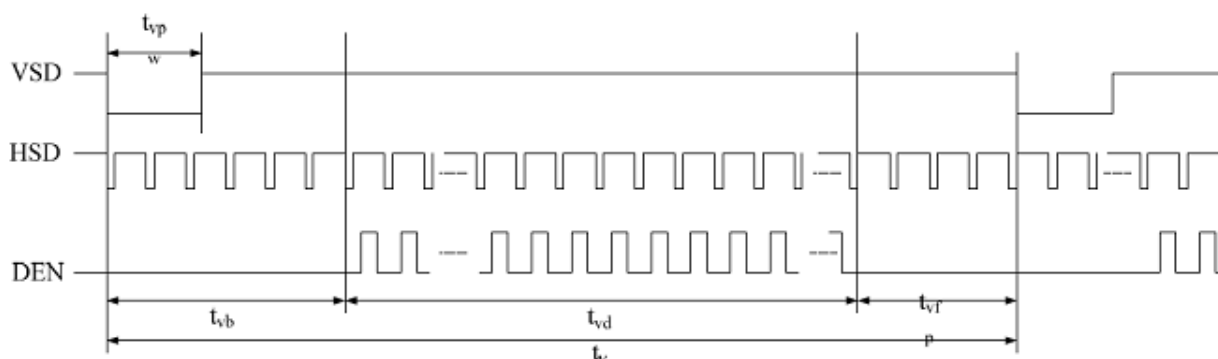
Parameter	Symbol	Min	Typ	Max	Unit	Remark
HSD Setup Time	Thst	8	---	---	ns	
HSD Hold Time	Thhd	8	---	---	ns	
VSD Setup Time	Tvst	8	---	---	ns	
VSD Hold Time	Tvhd	8	---	---	ns	
Data Setup Time	Tdsu	8	---	---	ns	
Data Hold Time	Tdhd	8	---	---	ns	
DE Setup Time	Tesu	8	---	---	ns	
DE Hold Time	Tehd	8	---	---	ns	
CLKIN Cycle Time	Tcph	20	---	---	ns	
CLKIN Pulse Width	Tcwh	40	50	60	%	
Output Stable Time	Tsst	--	---	6	us	
VDD Power On Slew Rate	Tpor	---	---	20	ms	
RSTB Pulse Width	TRst	10			us	

• Data Input Format

○ Horizontal Input Timing Diagram



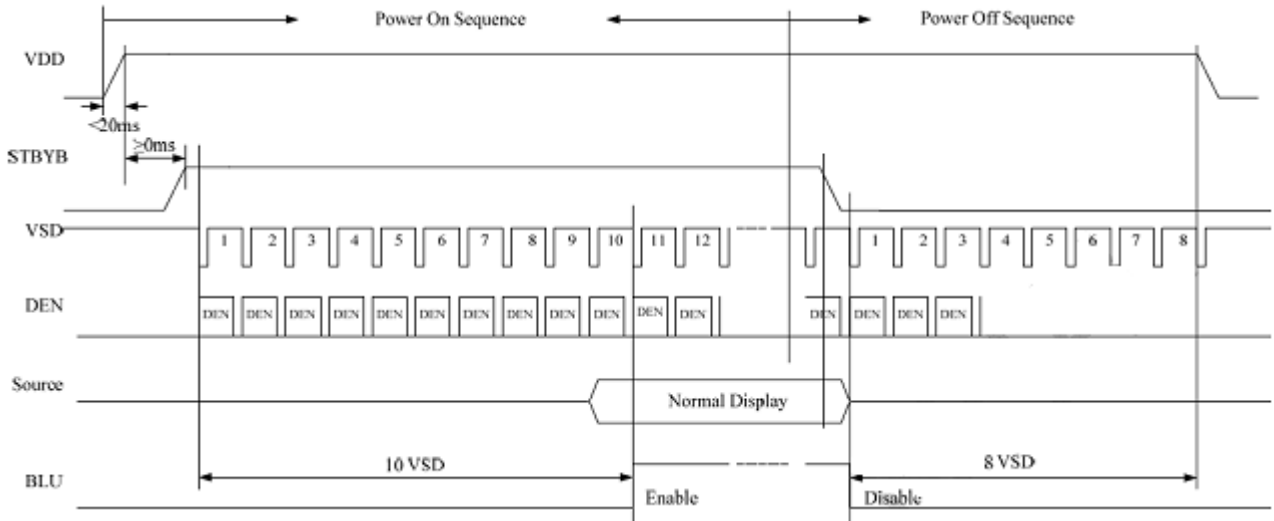
○ Vertical Input Timing Diagram



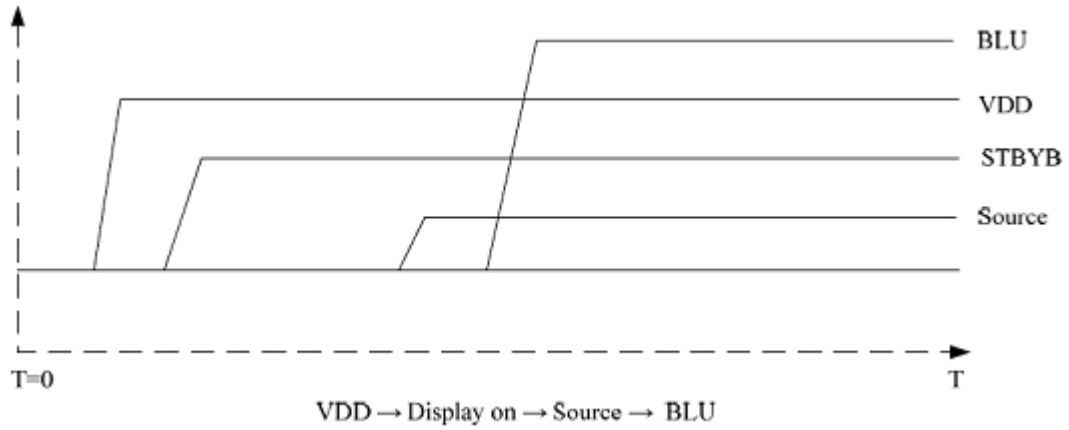
○ Parameters for Timing

Parameter	Symbol	Specification			Unit
		Min	Typ	Max	
Horizontal display area	thd	800			CLKIN
CLKIN frequency (60Hz)	fclk		30	50	MHZ
One Horizontal Line	Th	889	928	1143	CLKIN
HSD pulse width	thpw	1	48	255	CLKIN
HSD blanking	thb	88			CLKIN
HSD front porch	thfp	1	40	255	CLKIN
Vertical display area	tvd	480			TH
VSD period time	tv	513	525	767	TH
VSD pulse width	tvpw	3	3	255	TH
VSD blanking	tvb	32			TH
VSD front porch	tvfp	1	13	255	TH

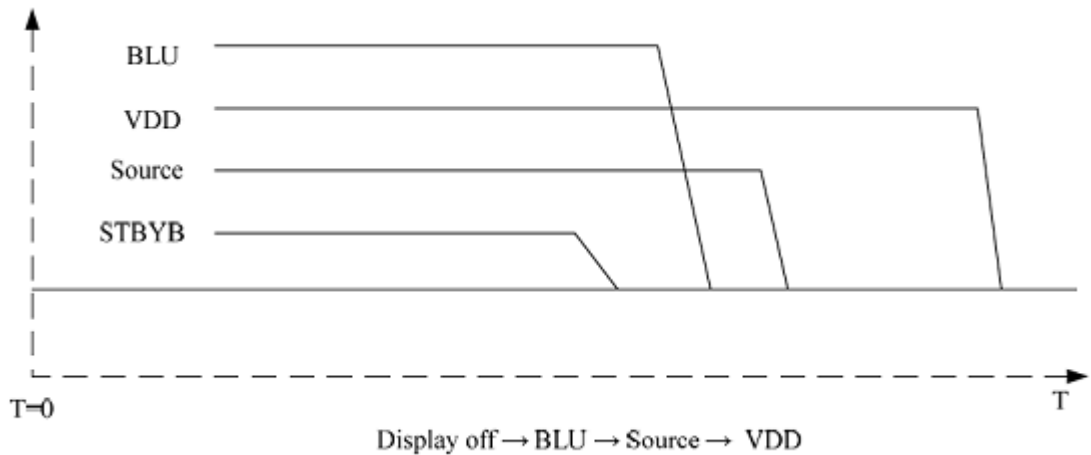
- Power On/Off Sequence



- Power On Sequence



- Power Off Sequence



• TOUCH PANEL CHARACTERISTICS

- CONSTRUCTION – Lens + OCA + ITO + OCA + ITO + FPC (See Note 1)

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Overall dimensions	---	129.0 x 86.0 x 1.9			mm	
Viewing Area	---	109.9 x 66.7			mm	
Total Thickness	---	---	1.9	---	mm	+/- 0.15mm
Lens thickness	---	---	1.1	---	mm	+/- 0.15mm
Lens surface hardness	---	6	---	---	H	JIS K 5600

Note 1

- (i) Lens = 6H surface hardness + black mask area
- (ii) OCA = Optically Clear Adhesive
- (iii) ITO = Indium Tin Oxide (touch sensor layer)
- (iv) FPC = Flexible Printed Circuit (includes Atmel MXT640U controller IC)
- (v) The minimum test force is 80g.

• TOUCH PANEL INTERFACING (Connector CN2)

Touch Panel Pin	Symbol	Description	Note
1	GND	Ground	
2	/CHG_INT	Wake up/Interrupt	
3	/RESET	Reset Signal	
4	VDD	Input voltage	
5	SCL	Serial Clock	
6	SDA	Serial Data	

Note: Suggested connector for CN2 is FH12-6S-1SH (HIROSE) or equivalent. (FPC need bend to under the module)

• TOUCH PANEL BLOCK DIAGRAM

