

Chefree Technology Corp.

TFT COLOR LCD MODULE

MODEL: CF070HLDLWH-CT1-U

(Complied with RoHS)

WVGA
LVDS interface (1 Port)

Version: P01

Customer : _____
Approved By : _____
Date: _____

CHEFREE		
APPROVAL	CHECKER	PREPARE
Tim	Mark	Jacky

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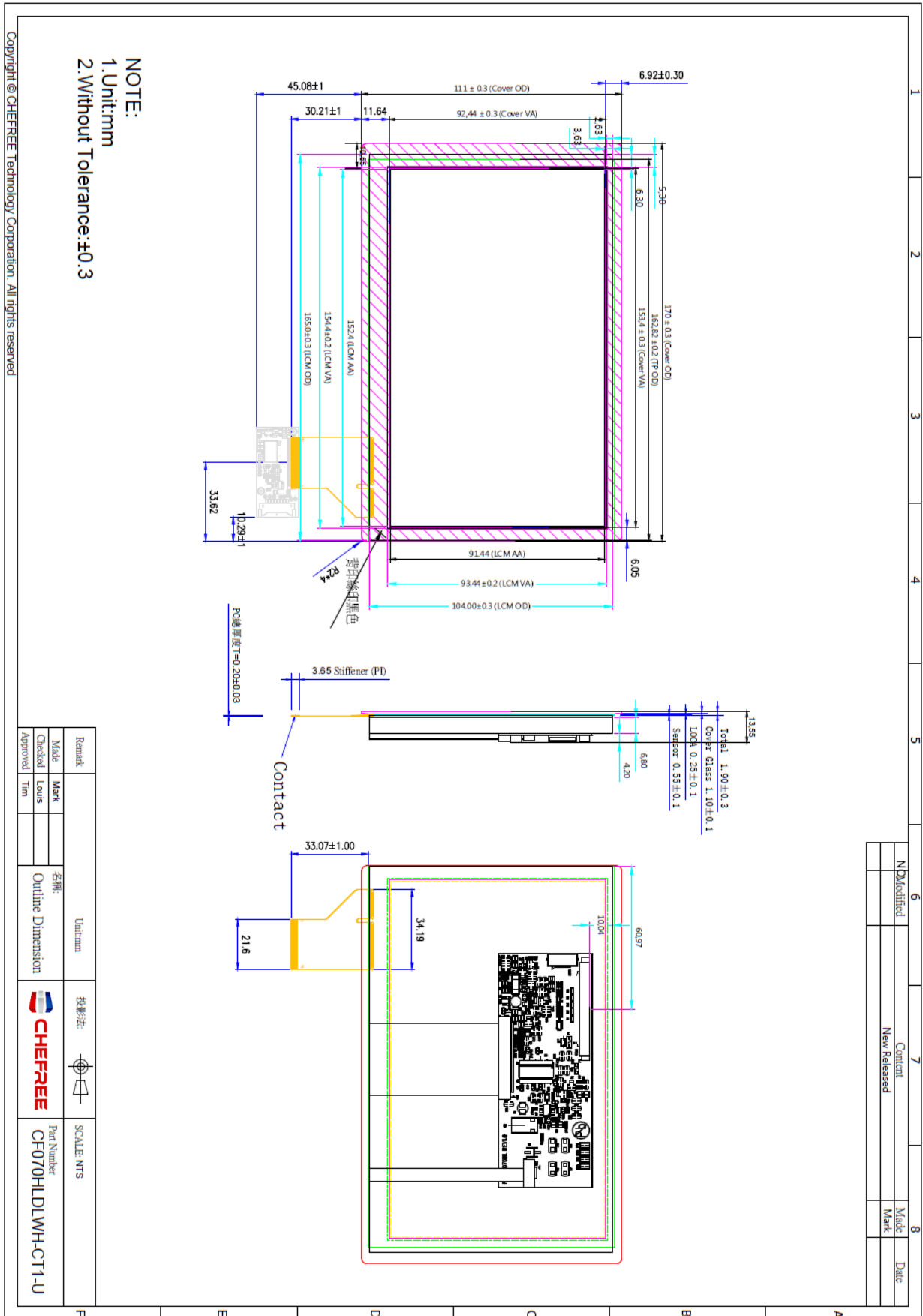
1.RECORD OF REVISION

Rev	DATE	PAGE	SUMMARY
P01	2019.07.16	ALL	Preliminary specification was first issued.

2. MECHANICAL SPECIFICATIONS

(1)	Number of Dots (Dots)	800 x (R.G.B) x 480
(2)	Module Size(mm)	170(H) x 111(V) x 13.55 (D)
(3)	Active Area(mm)	152.4(H) x 91.44(V)
(4)	Pixel Pitch(mm)	0.1905(H) x 0.1905(V)
(5)	LCD Model	TFT, Transmissive, Normally Black
(6)	Backlight Color	White, LED
(7)	Viewing Direction	All
(8)	Electrical Interface	LVDS Interface
(9)	Color Configuration	R.G.B Stripe
(10)	Touch Panel Mode	USB PCAP with EETI 80H46 Controller
(11)	Module Weight(g)	(TBD)

3.OUTLINE DIMENSION



4.INTERFACE PIN CONNECTION

4.1 TFT LCM PANEL PIN DEFINE

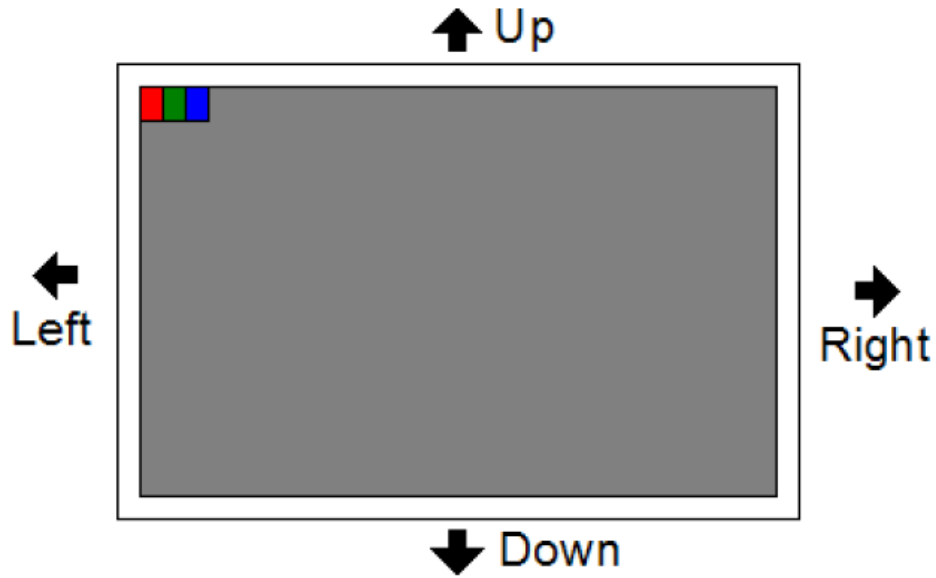
CN1 Connector : STM MSBK2407P30 RF:HB or Equivalent

PIN NO.	Definition	I/O	Description	Remark
1	GND	P	Ground	
2	GND	P	Ground	
3	EN	I	Enable Control for Backlight	
4	PWM	I	Brightness Control for Backlight	
5	VLED	P	Power Supply for LED Backlight (12V)	
6	VLED	P	Power Supply for LED Backlight (12V)	
7	VDD	P	Power Supply for Digital Circuit (3.3V)	
8	R/L	I	Horizontal Direction Signal Select (Right/Left)	Note 1
9	U/D	I	Vertical Direction Signal Select (Up/Down)	Note 1
10	GND	P	Ground	
11	RxIN0-	I	Negative LVDS Differential Data Input	
12	RxIN0+	I	Positive LVDS Differential Data Input	
13	GND	P	Ground	
14	RxIN1-	I	Negative LVDS Differential Data Input	
15	RxIN1+	I	Positive LVDS Differential Data Input	
16	GND	P	Ground	
17	RxIN2-	I	Negative LVDS Differential Data Input	
18	RxIN2+	I	Positive LVDS Differential Data Input	
19	GND	P	Ground	
20	RxCLK-	I	Negative LVDS Differential Clock Input	
21	RxCLK+	I	Positive LVDS Differential Clock Input	
22	GND	P	Ground	
23	RxIN3-	I	Negative LVDS Differential Data Input	
24	RxIN3+	I	Positive LVDS Differential Data Input	
25	VDD	P	Power Supply for Digital Circuit (3.3V)	
26	NC	-	No connection	
27	VDD	I	Power Supply for PCAP (5.0V)	
28	D-	I	Data-	
29	D+	I	Data+	
30	GND	P	Ground	

Note : 'P' stand for Power, 'I' stand for Input

Note1 :

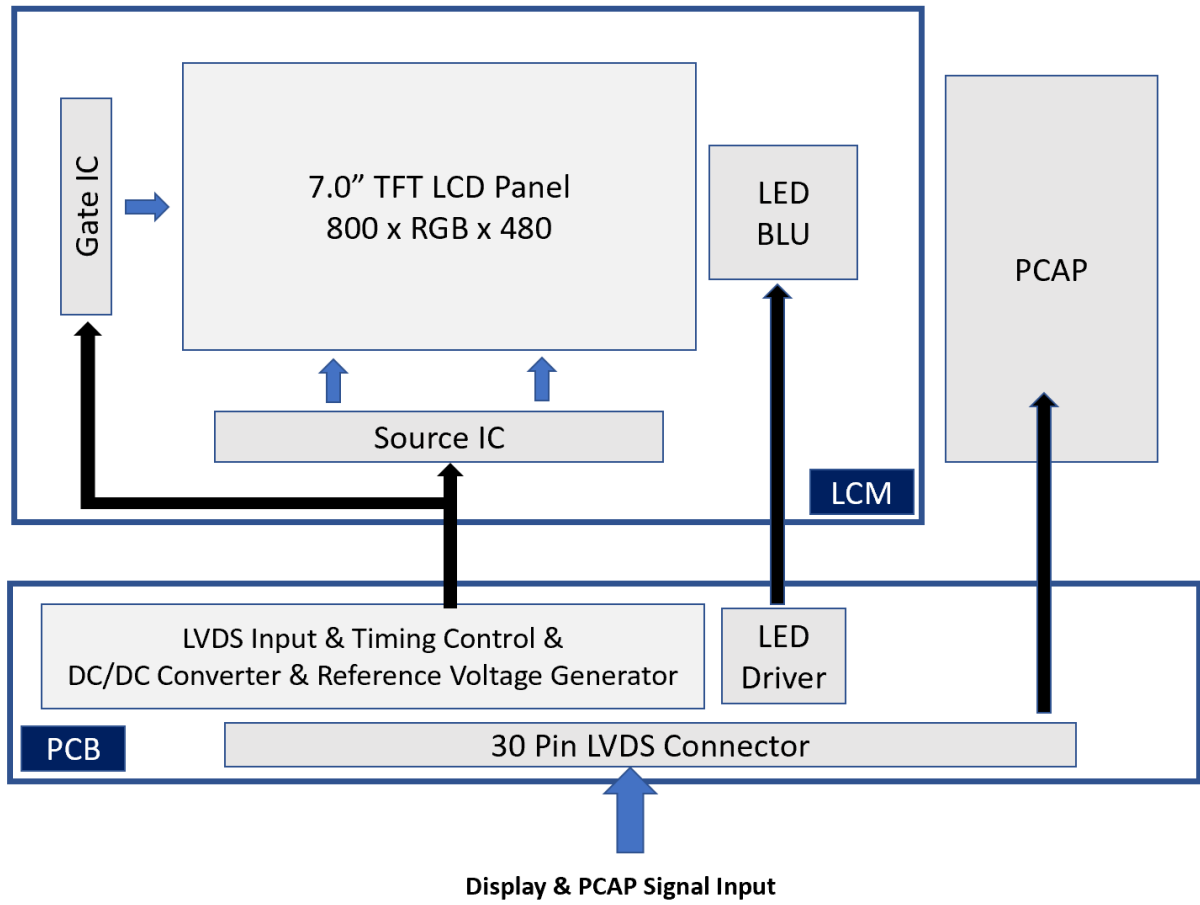
R/L	U/D	Data Shifting Direction
H	H	Left to Right, Up to Down (Normal display)
L	H	Right to Left, Up to Down (Horizontal Inverse)
L	L	Right to Left, Down to Up (Up and Down Inverse)
H	L	Left to Right, Down to UP (Vertical Inverse)



4.2 CTP Pin Definition:

Connector Pin Definition	
1	VDD_5V
2	D+
3	D-
4	GND
5	RST
6	INT
7	SDA
8	SCL

5.BLOCK DIAGRAM



6.ABSOLUTE MAXIMUM RATINGS

6.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Supply Voltage	VDD	0.2	5.0	V	
Power Supply Voltage	VLED	12.0	13.8	V	
Power Voltage For CTP	/	/	/	V	

Note : The absolute maximum rating values of this product not allowed to be Exceeded at any times. Should be module be used with any of absolute maximum ratings exceeded. The characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

6.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature(°C)	-30	85	-30	85	Note 1,2
Humidity(% RH)	10~90(Note3)		10~90(Note 3)		-

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Storage Ta=40°C & RH=90% ≤ 96Hrs

7.ELECTRICAL CHARACTERISTICS

7.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage for LCD	VDD	3.0	3.3	3.6	V	
	IDD	-	(15)	-	mA	Note1
Differential Input Threshold Voltage	VTH	-	-	+100	mV	Note2
	VTL	-100	-	-	mV	

Note 1 : Test Condition: VDD=3.3V ; Test Pattern: Black.

Note 2 : VTH and VTL is defined in RxIN0+/- 、 RxIN1+/- 、 RxIN2+/- 、 RxIN3+/- 、 RxCLK+/- signal voltage level.

7.2 BACKLIGHT UNITS

Ta=25°C

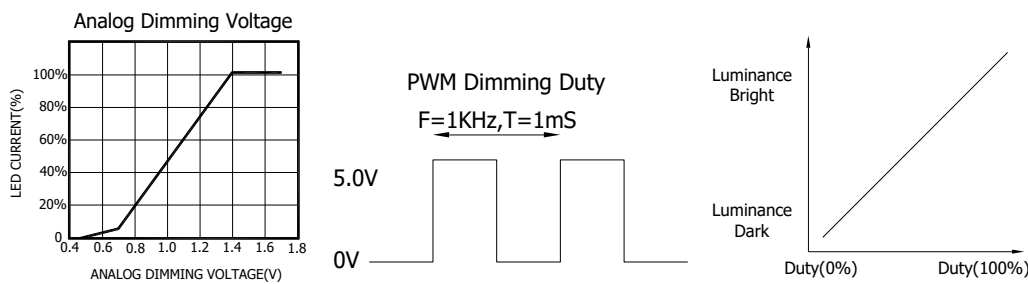
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
LED Driving Voltage	VLED	11.5	12	12.5	V	
LED Driving Current	ILED	-	150	-	mA	
LED Life Time	-	30,000	-	-	Hrs	Note1
Brightness Control	Analog Dimming	ADJ				Note4
	PWM Dimming		220	-	20K	Hz
B/L Enable	-	0.2	-	5	V	

Note 1: The LED life time define as the estimated time to 50% degradation of initial luminous.

Note 2: Operating temperature 25°C, humidity 55%RH.

Note 3: A higher LED power supply voltage will result in better power efficiency.

Keep the VLED between 12V and 12.5V is strongly recommended.



7.3 CTP ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage For PCAP	VCC	/	5.0	/	V	

8.OPTICAL CHARACTERISTICS

Ta=25°C

ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle $\Theta_x = \Theta_y = 0^\circ$	700	1000	-	-	Note 1
Response Time		TR+TF		-	30	40	ms	Note 2
Chromaticity	White	x		0.27	0.31	0.35	-	Note 4
		y	0.29	0.33	0.37	-		
Viewing Angle	Hor.	θ_{x+}	Viewing Angle $\Theta_x = \Theta_y = 0^\circ$ $CR \geq 10$	80	85	-	Deg.	Note 3
		θ_{x-}		80	85	-		
	Ver.	θ_{y+}		80	85	-		
		θ_{y-}		80	85	-		
Luminance		L	PWM=100%	750	800	-	cd/m ²	Center
Luminance Uniformity		YU		70	80	-	%	Note 5

Note 1 : Definition of Contrast Ratio (CR) :

The contrast ratio can be calculated by the following expression.

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

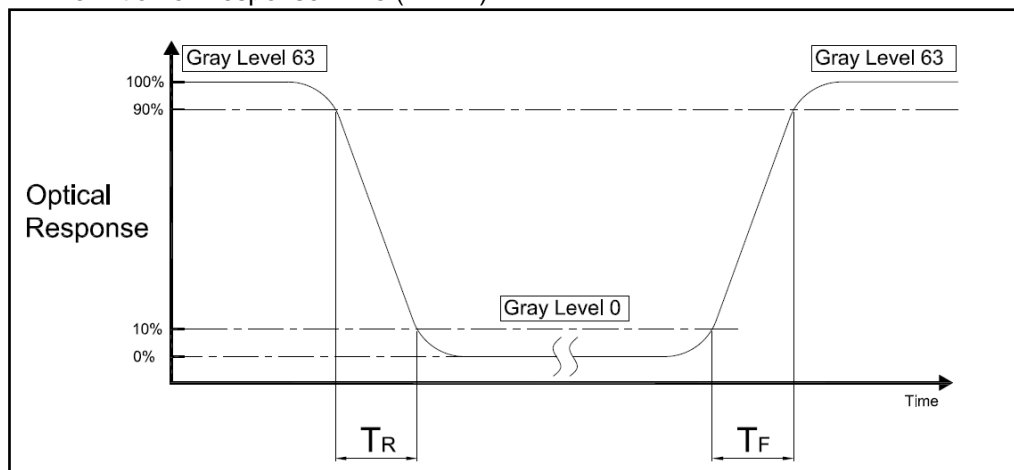
L63 : Luminance of gray level 63

L0 : Luminance of gray level 0

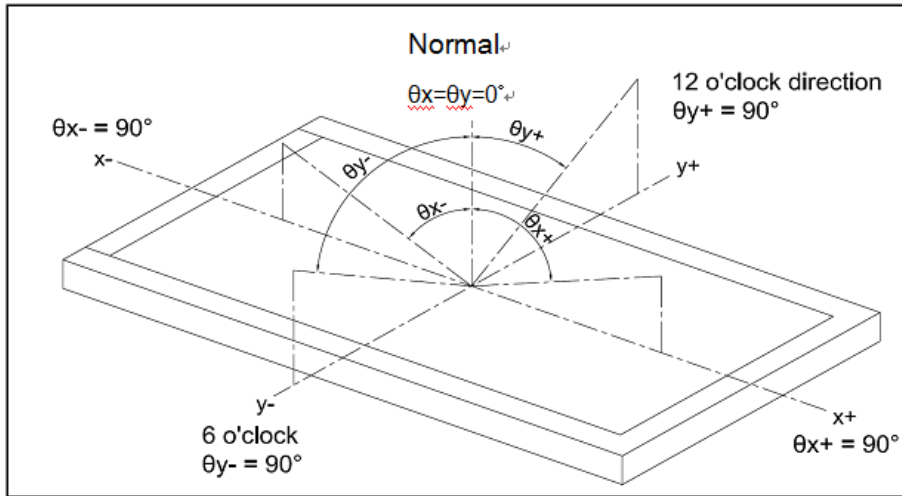
$$CR = CR(5)$$

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

Note 2 : Definition of Response Time (TR.TF)

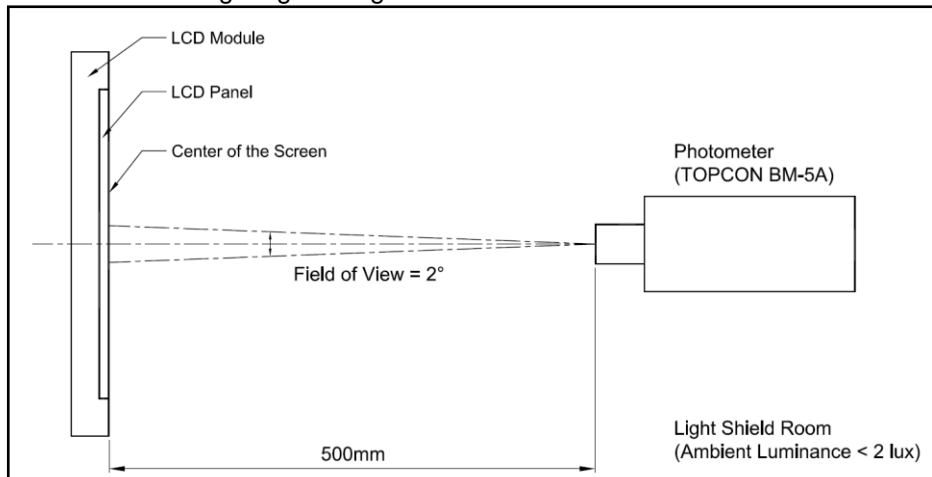


Note 3 : Definition of Viewing Angle

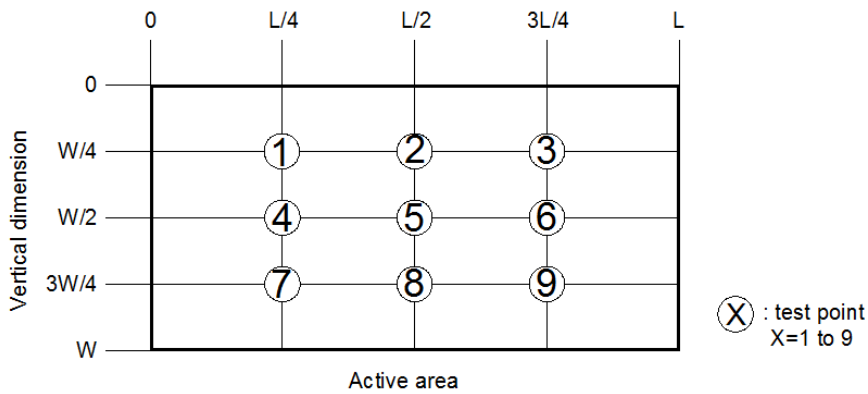


Note 4 : Measurement Set-Up :

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



Note 5 :



$$\left[1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right] \times 100\% = \text{YU}$$

9. TOUCH PANEL SPECIFICATIONS

9.1 Type:

9.1.1: USB I/F PCAP with EETI Touch Control Board

9.2 STRUCTURE:

9.2.1: Glass/Glass

9.2.2: Thickness 1.90 mm \pm 0.3 (Cover 1.1t / Sensor 0.55t / OCA 0.25)

9.2.3: Control Board Dimension: 38.6 x 18.0 x 2.8(Max)

9.3 IC MODEL:

9.3.1 IC manufacture: EETI

9.3.2 IC part number: EE80H462938-CABS-A001

9.3.3 Interface: USB

9.4 ELECTRICAL CHARACTERISTICS:

9.4.1 Operating Voltage: 5V

9.5 MECHANICAL CHARACTERISTICS:

9.5.1 Surface hardness: > 7H

9.6 OPTICAL CHARACTERISTICS:

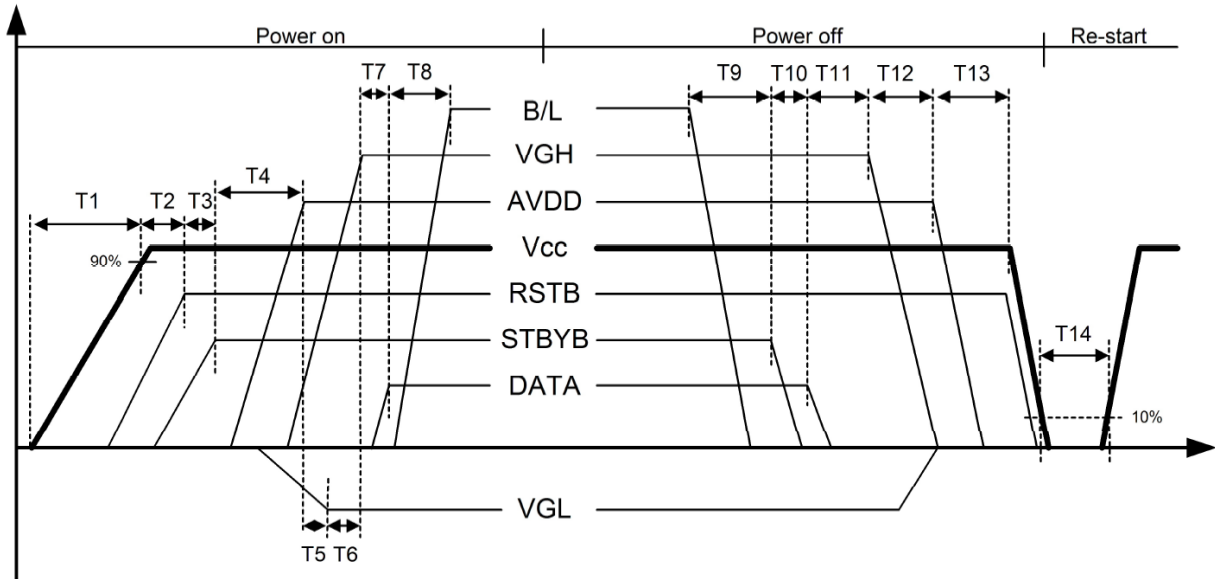
9.6.1 Transparency: Over 90%

9.6.2 Haze: TBD

10.TIMING SPECIFICATIONS

10.1 LCM POWER ON/OFF SUPPLY VOLTAGE SEQUENCE

Item	Min	Typ.	Max.	Unit
------	-----	------	------	------



T1	--	--	20	ms
T2	1	--	--	ms
T3	1	--	--	ms
T4	50	--	--	ms
T5	32	--	--	ms
T6	16	--	--	ms
T7	16	--	--	ms
T8	32	--	--	ms
T9	32	--	--	ms
T10	32	--	--	ms
T11	50	--	--	ms
T12	16	--	--	ms
T13	32	--	--	ms
T14	1000	--	--	ms

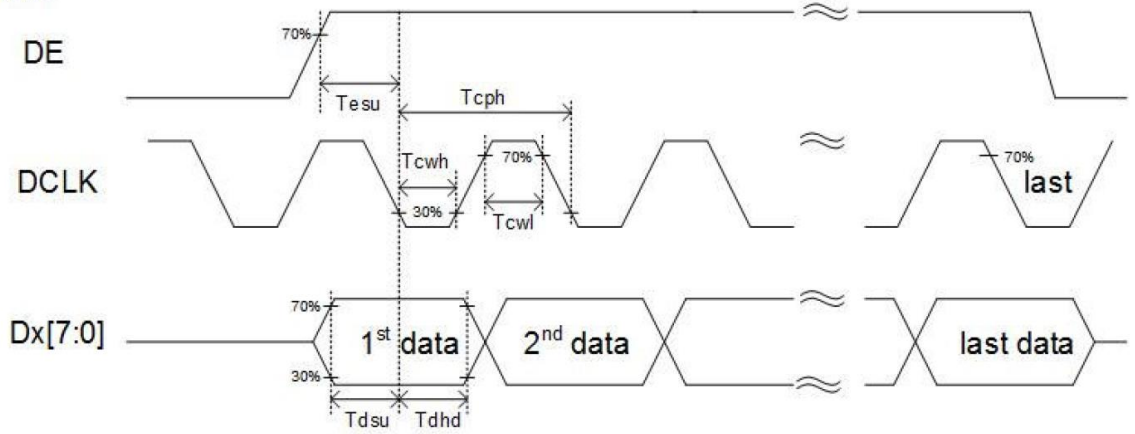
The Data are included in the R0~R7, G0~G7, B0~B7, HSD, VSD, DCLK, DE, MODE, SHLR, and UPDN.

10.2 LCM Timing Characteristics

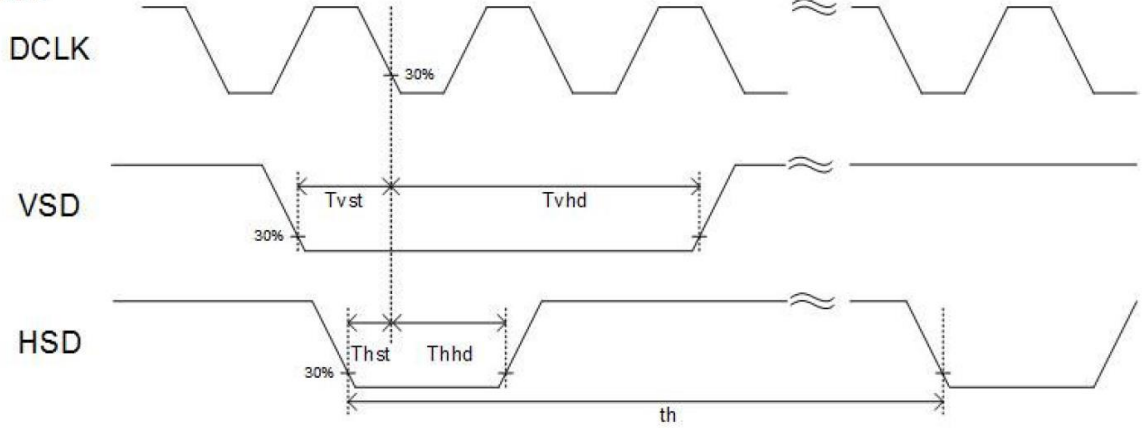
Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tcph	20		220	ns	
DCLK pulse duty	Tcwh	35	50	65	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hold time	Tdhhd	8			ns	
DE setup time	Tesu	8			ns	
DE hold time	Tehhd	8			ns	
DCLK frequency	fclk	28	30	32	MHz	
Horizontal display area	thd	800			Tcph	
HSD period time	th	899	902	915	Tcph	
HSD pulse width	thpw	5	10	15	Tcph	
HSD back porch	thb	32			Tcph	
HSD front porch	thfp	52	60	68	Tcph	
Vertical display area	tvhd	480			th	
VSD period time	tv	546	555	564	th	
VSD pulse width	tvpw	6	10	14	Th	
VSD back porch	tvb	5			th	
VSD front porch	tvfp	55	60	65	th	

10.3 Timing Diagram of Interface Signal

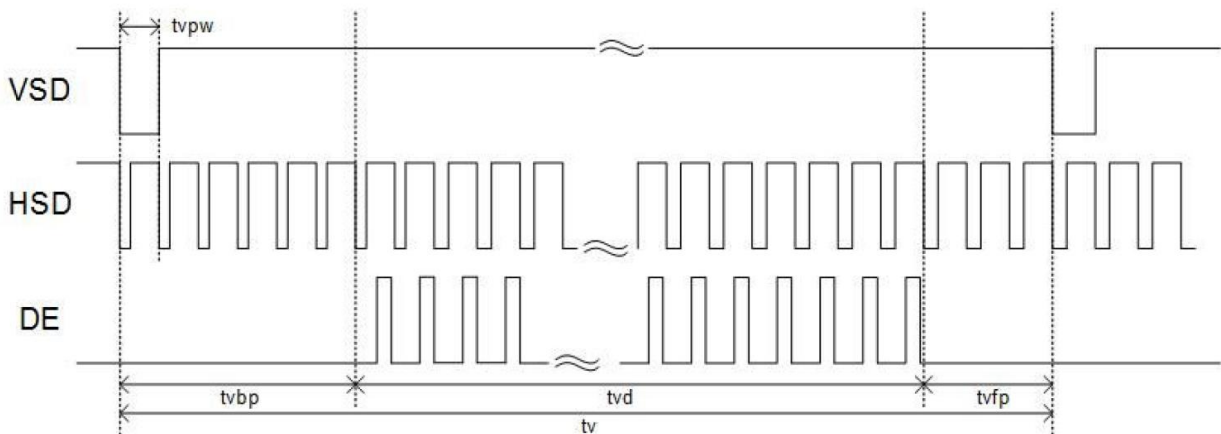
DE mode

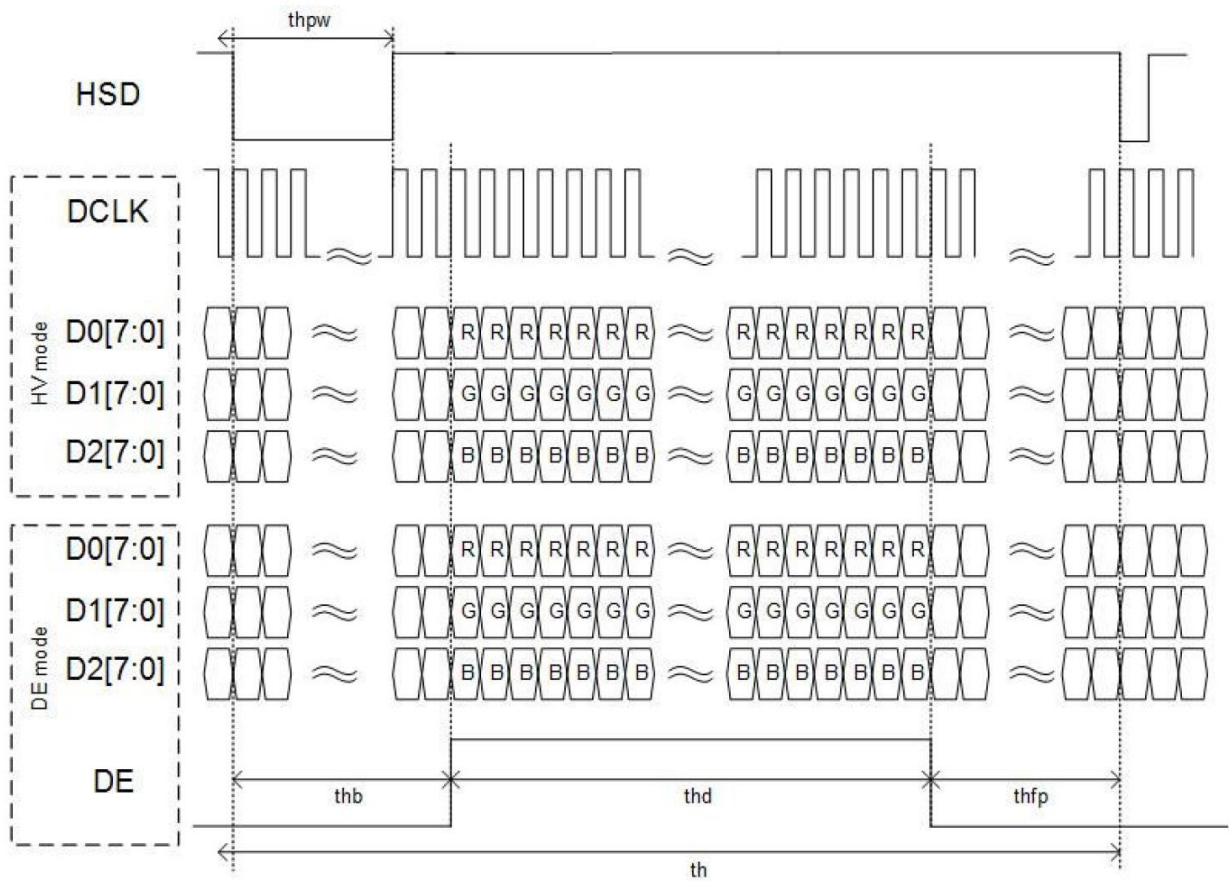


HV mode



Input clock and data timing diagram.





Data Input Format

11. RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	Ta= 85°C	240Hours	Note 1,3
2	Low Temperature Storage	Ta= -30°C	240Hours	Note 1,3
3	High Temperature Humidity Storage	40°C,90%RH	240Hours	Note 1,3
4	High Temperature Operation	Ts= 85°C	240Hours	Note 2,3
5	Low Temperature Operation	Ta= -30°C	240Hours	Note 1,3
6	Temperature Cycle	-30°C~85°C	1H/cycle 50CYCLE	Note 2,4

12.LCM INSPECTION STANDARD

Inspection specifications refer Document Number : QT3-QC-A-I004

13.PACKAGE INFORMATION

LCM Model	LCM Qty. in the box	Outer box Size (mm)	Weight(Kg)
CF070HLDLWH-CT1-U	TBD	TBD	TBD

14. PRECAUTIONS FOR USE

14.1 SAFETY

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

14.2 STORAGE CONDITIONS

- (1) Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and the humidity is below $50\pm 20\%\text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

14.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.
- (6) Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) When the module is assembled, it should be attached to the system firmly, Be careful not to twist and bend the module.
- (10) Wipe off water droplets or oil immediately . If you leave the droplets for a long time, staining and discoloration may occur.
- (11) 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.

14.4 WARRANTY

- (1) Acceptance inspection period. The period is within one month after the arrival of contracted commodity at the buyer's factory site.
- (2) Applicable warrant period. The period is within 12 months since the date of shipping out under normal using and storage conditions.

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