

Chefree Technology Corp.

TFT COLOR LCD MODULE

MODEL: CF070HLDLWH-001

(Complied with RoHS)

WVGA

LVDS interface (1 Port)

Version: P02

Customer : _____

Approved By : _____

Date: _____

CHEFREE		
APPROVAL	CHECKER	PREPARE
Tim	Mark	Jacky

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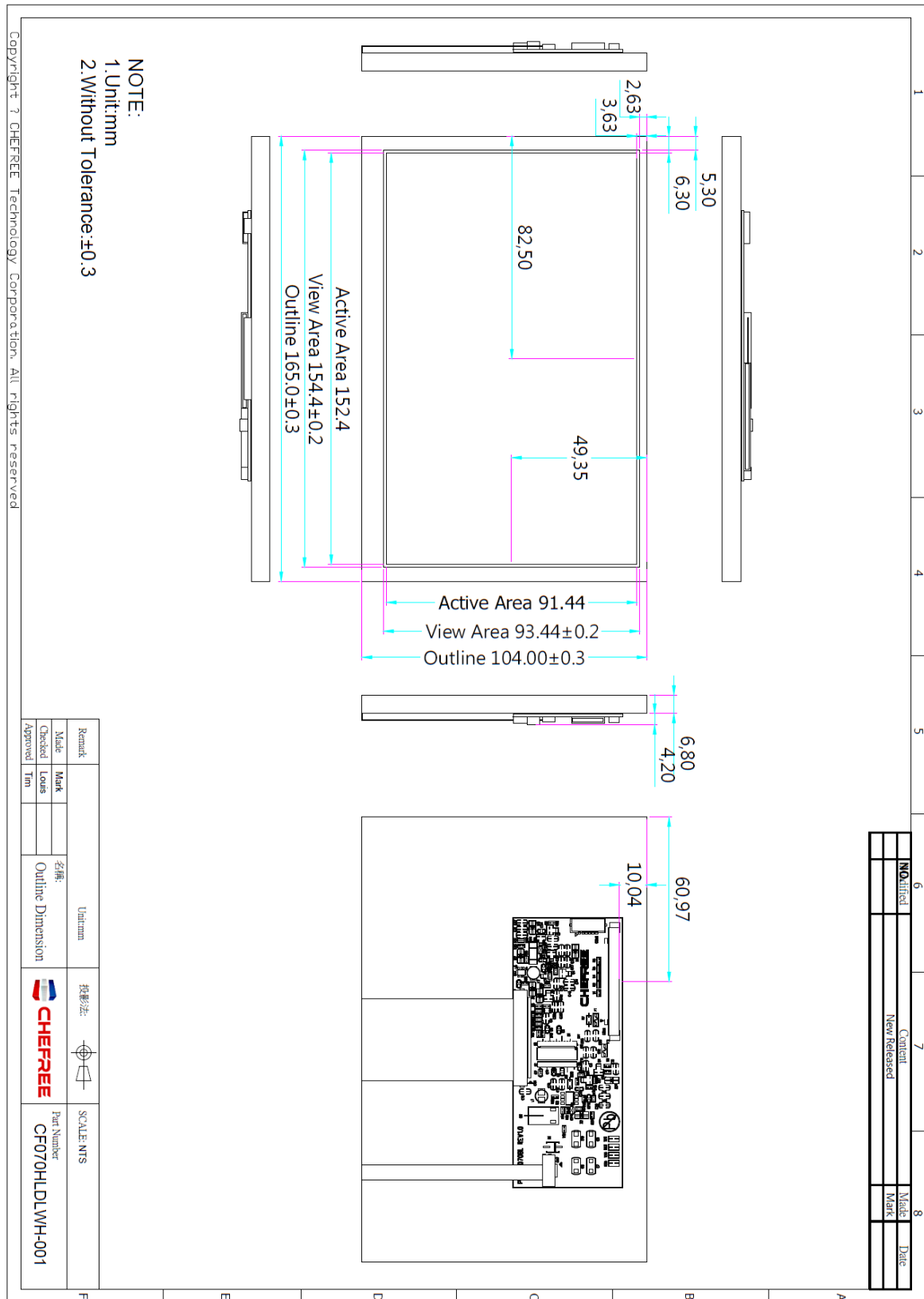
1.RECORD OF REVISION

Rev	DATE	PAGE	SUMMARY
P01	2019.06.21	ALL	Preliminary specification was first issued.
P02	2019.07.03	9	LED Driving Current 320mA revised to 150mA.

2. MECHANICAL SPECIFICATIONS

(1)	Number of Dots (Dots)	800 x (R.G.B) x 480
(2)	Module Size(mm)	165(H) x 104(V) x 11 (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	Without Touch
(11)	Module Weight(g)	(TBD)

3.OUTLINE DIMENSIONS



4.INTERFACE PIN CONNECTION

4.1 TFT LCM PANEL PIN DEFINE

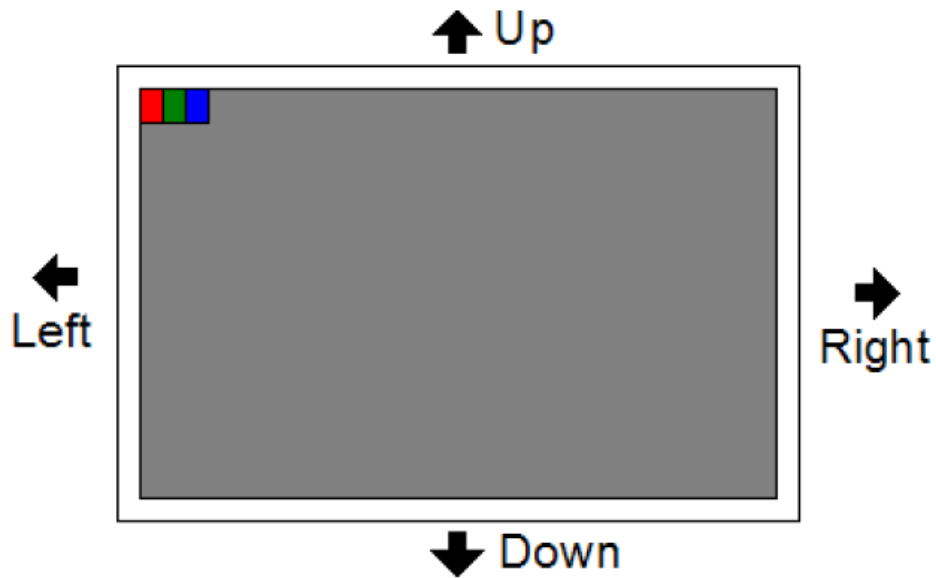
CN1 Connector : STM MSBK2407P30 RF:HB or Equivalent

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	NC	-	No connection	
28	NC	-	No connection	
29	NC	-	No connection	
30	GND	P	Ground	

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

Note1 :

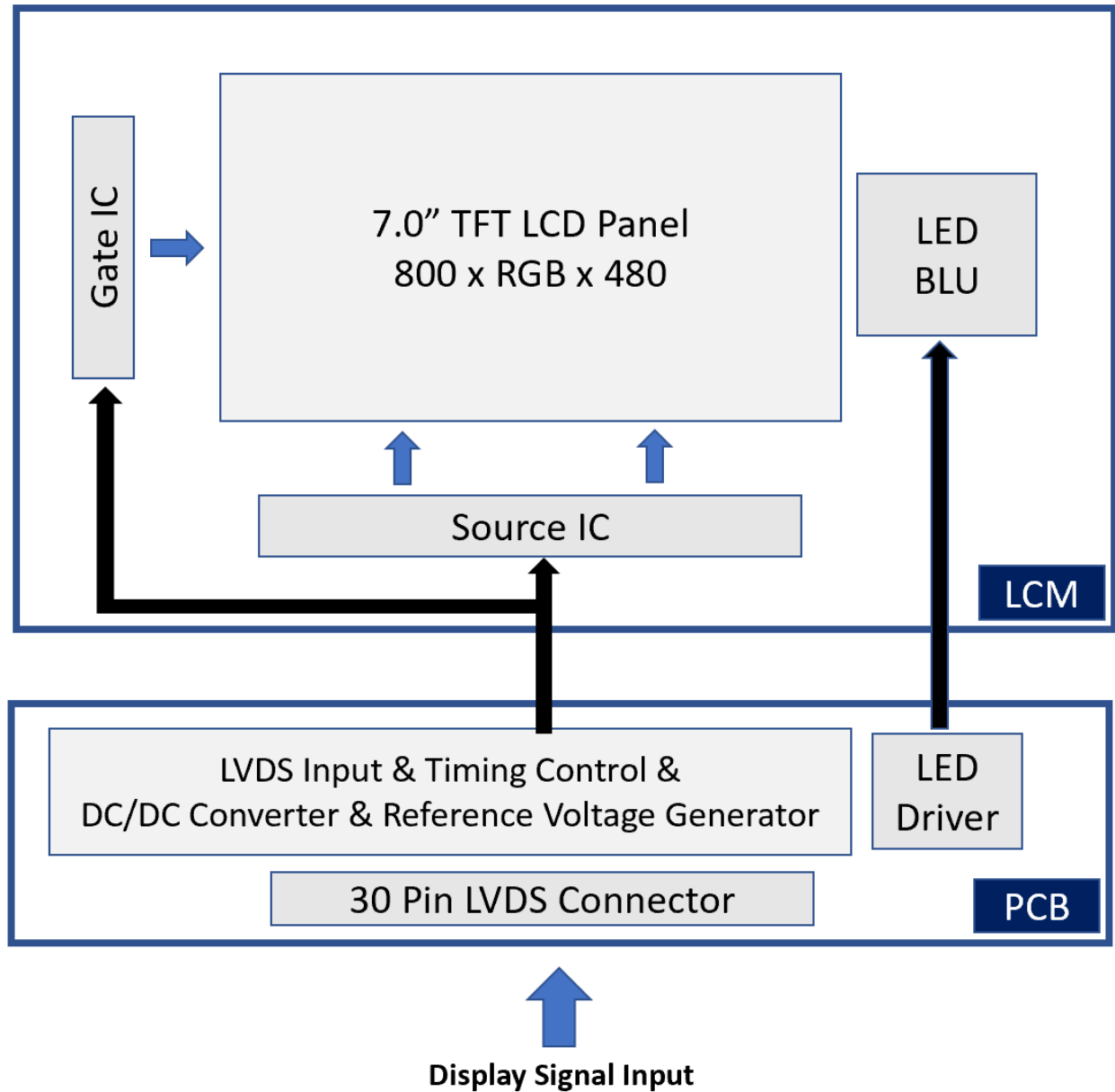
R/L	U/D	Data Shifting Direction
H	H	Left to Right, Up to Down (Normal display)
L	H	Right to Left, Up to Down (Horizontal Inverse)
L	L	Right to Left, Down to Up (Up and Down Inverse)
H	L	Left to Right, Down to UP (Vertical Inverse)



4.2 CTP Pin Definition:

None.

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	-40	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

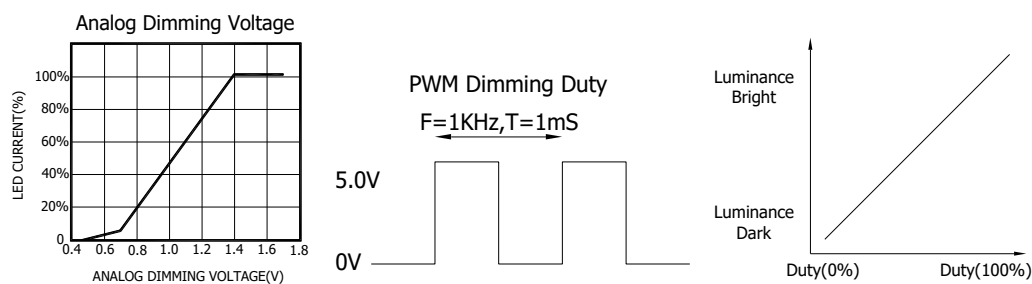
ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
LED Driving Voltage		VLED	11.5	12	12.5	V	
LED Driving Current		ILED	-	150	-	mA	
LED Life Time		-	30,000	-	-	Hrs	Note1
Brightness Control	Analog Dimming	ADJ					Note4
	PWM Dimming		220	-	20K	Hz	Note5
B/L Enable		-	0.2	-	5	V	

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	/	/	/	V	

8.OPTICAL CHARACTERISTICS

Ta=25°C

ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle Θx=Θy=0°	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.	θx+	Viewing Angle Θx=Θy=0° CR≥10	80	85	-	Deg.	Note 3
		θx -		80	85	-		
	Ver.	θy+		80	85	-		
		θy -		80	85	-		
Luminance		L	PWM=100%	800	1000	-	cd/m2	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.

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

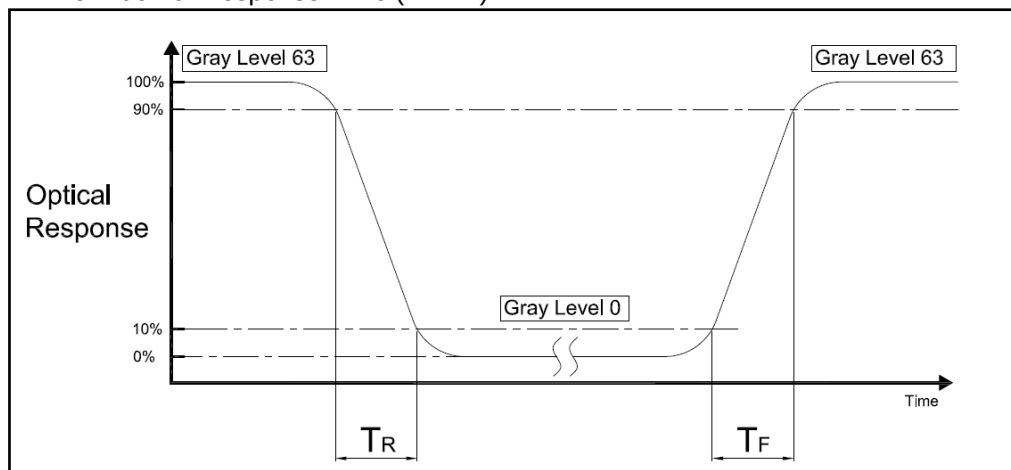
L63 : Luminance of gray level 63

L0 : Luminance of gray level 0

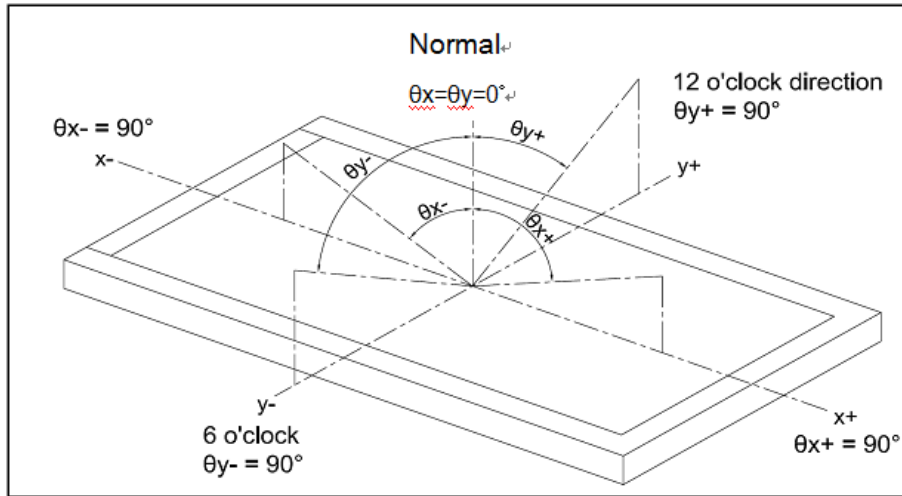
CR = CR(5)

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)

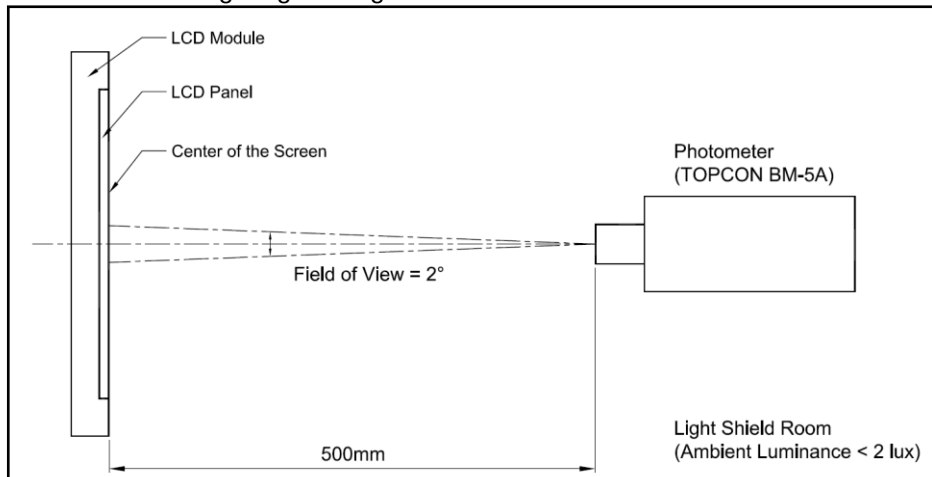


Note 3 : Definition of Viewing Angle

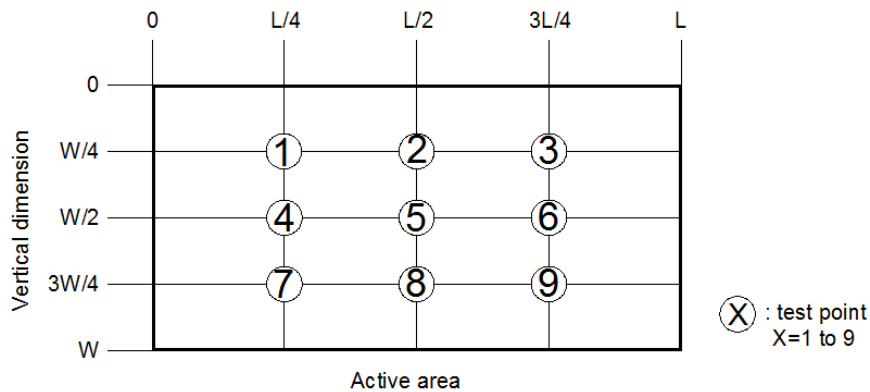


Note 4 : Measurement Set-Up :

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 :



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

9.TOUCH PANEL SPECIFICATIONS

9.1 Type :

9.2 STRUCTURE :

9.2.1 Thickness :

9.3 IC MODEL :

9.3.1 IC manufacture :

9.3.2 IC part number :

9.3.3 Interface :

9.4 ELECTRICAL CHARACTERISTICS :

9.4.1 Operating Voltage :

9.5 MECHANICAL CHARACTERISTICS :

9.5.1 Surface hardness :

9.6 OPTICAL CHARACTERISTICS :

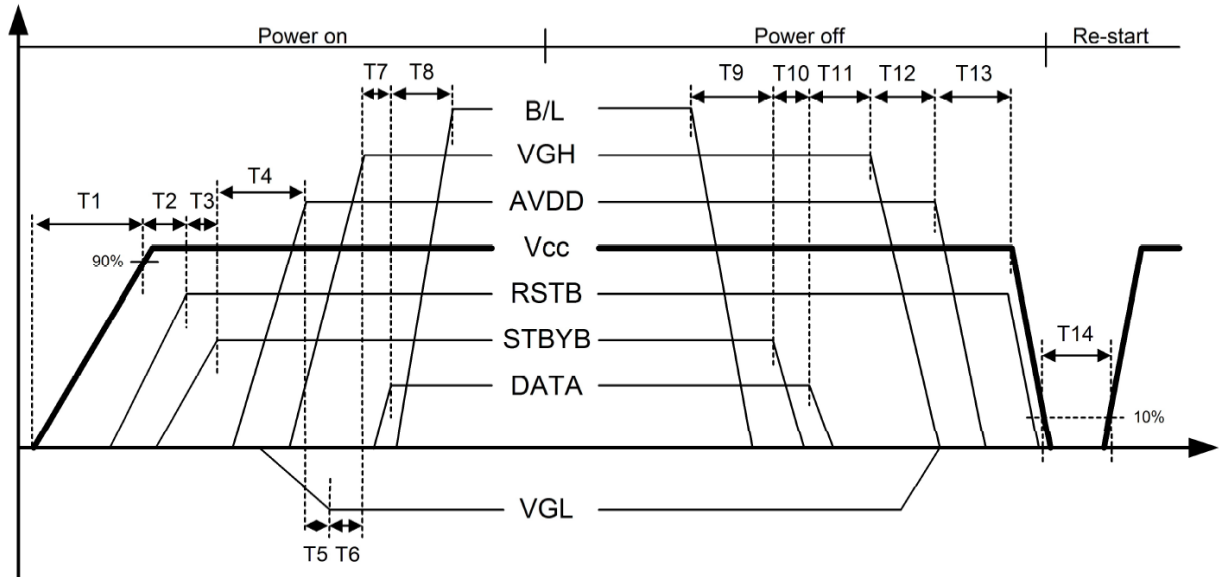
9.6.1 Transparency :

9.6.2 Haze:

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

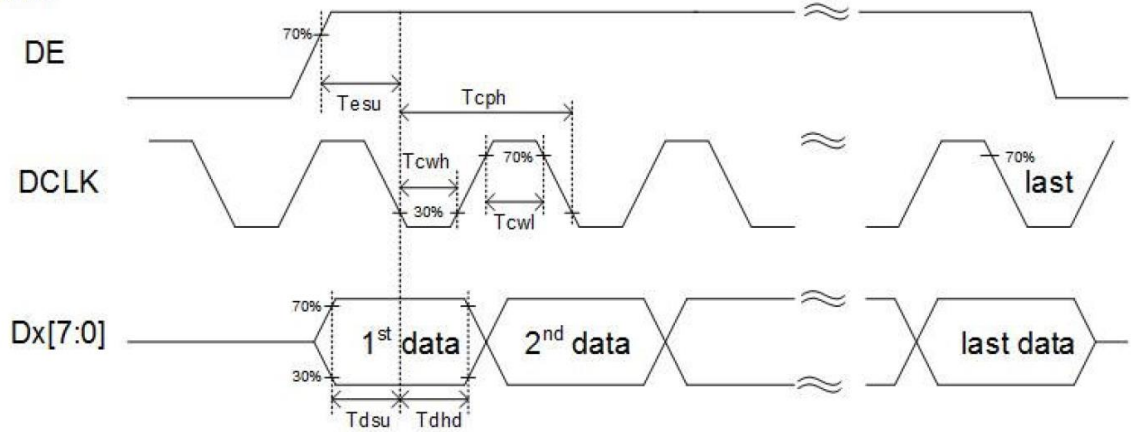
The Data are included in the R0~R7, G0~G7, B0~B7, HSD, VSD, DCLK, DE, MODE, SHLR, and UPDN.

10.2 LCM Timing Characteristics

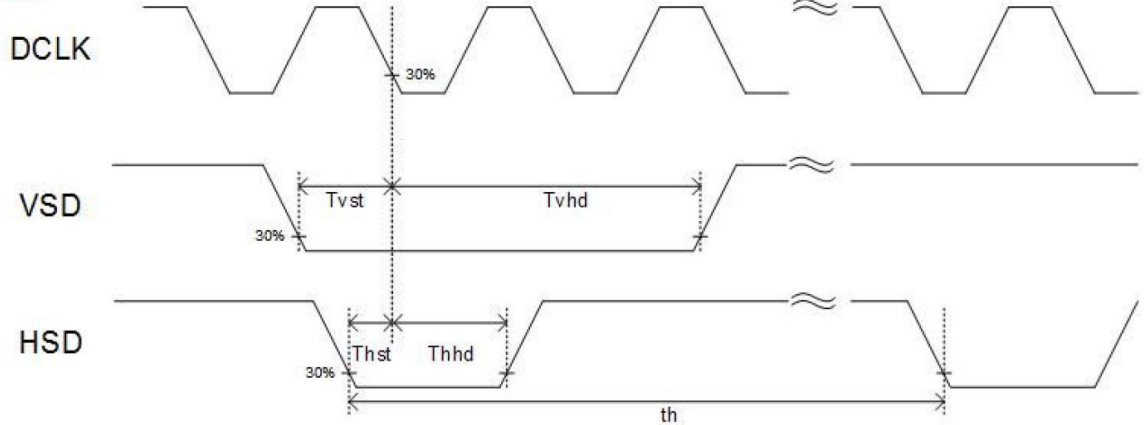
Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tcph	20		220	ns	
DCLK pulse duty	Tcwh	35	50	65	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hold time	Tdhhd	8			ns	
DE setup time	Tesu	8			ns	
DE hold time	Tehd	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

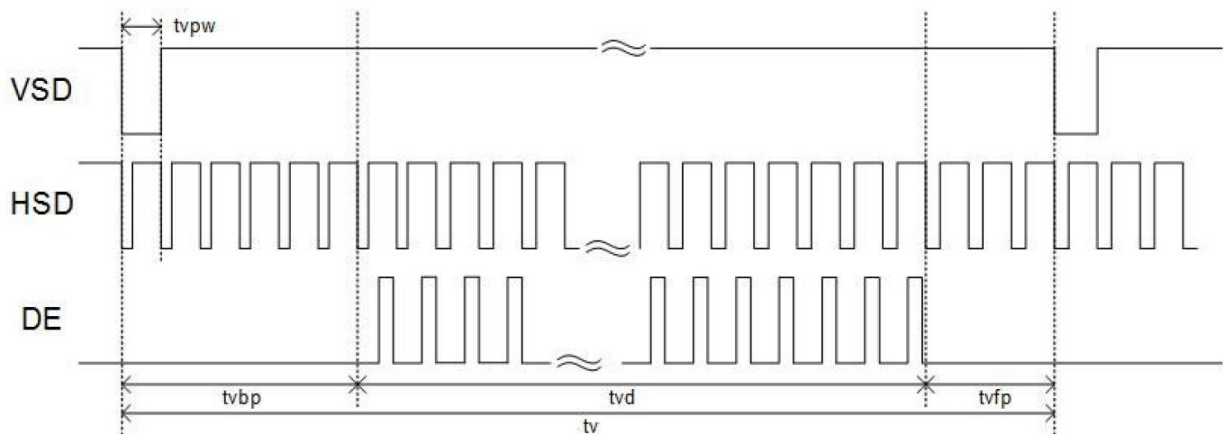
DE mode

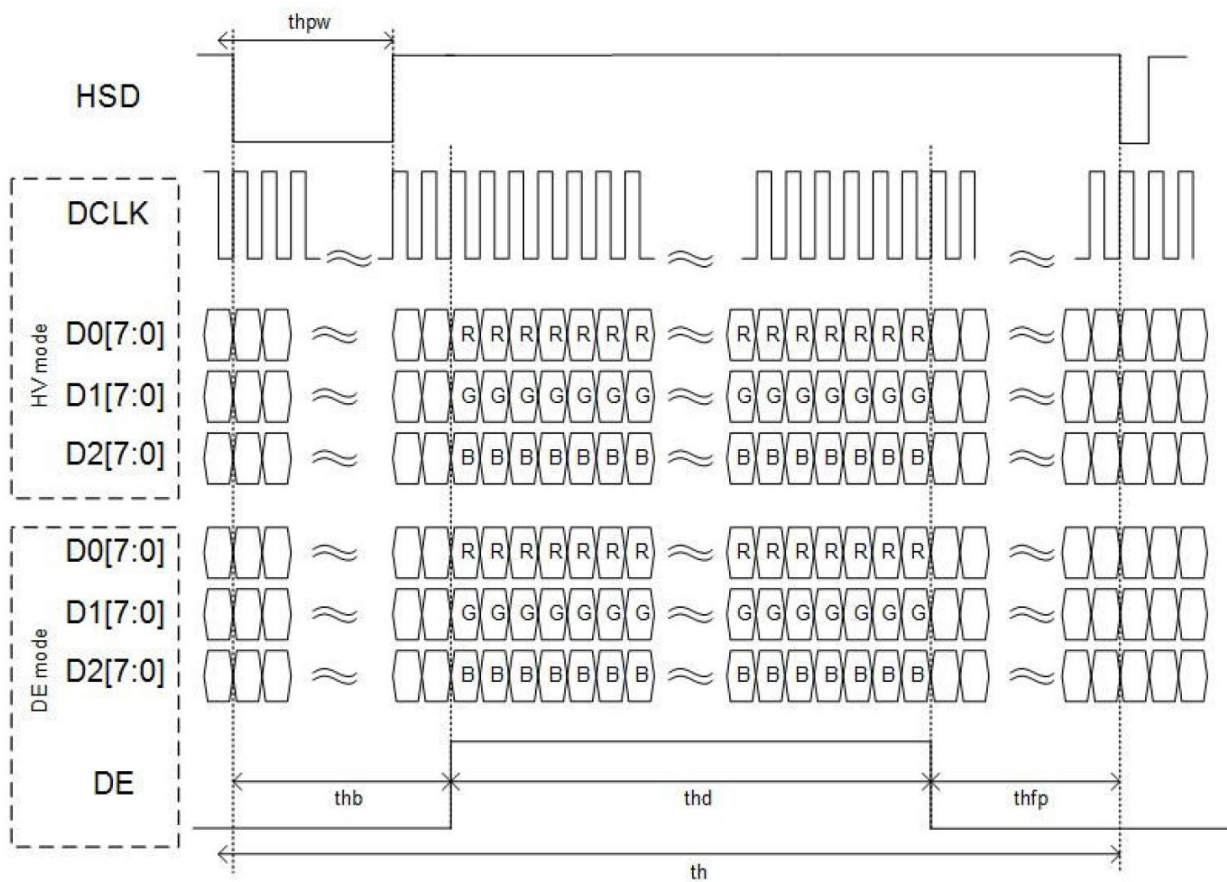


HV mode



Input clock and data timing diagram.





Data Input Format

11. RELIABILITY TEST

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+95°C , 504hrs (1000hrs reference)	1,2,3,4
2	Low Temperature Storage	Ta=-40°C , 504hrs (1000hrs reference)	1,2,3,4
3	High Temperature Operation	Ta=+85°C , 504hrs (1000hrs reference)	1,2,3,4
4	Low Temperature Operation	Ta=-40°C , 504hrs (1000hrs reference)	1,2,3,4,5
5	High Temperature and High Humidity (operation)	Ta=+65°C , 90%RH, 504hrs (1000hrs reference)	1,2,3,4
6	Thermal Cycling Test (non operation)	-40°C(30min) → +85°C(30min), 100 cycles	1,2,3
7	Electrostatic Discharge	±200V,200pF(0Ω) 1 time/each connector	
8	Vibration	1.Random: 1.04G, 5~500Hz, XYZ, 30min/each direction 2.Sine: Freq. Range: 8~33.3Hz, Stoke: 1.3mm Sweep: 2.9G, 33.3~400Hz X/Z: 2hrs, Y:4hrs	
9	Shock	Half-Sine, 100G, 6ms, ±XYZ, 1time	
10	Vibration (with carton)	Random: 0.015G ² /Hz, 5~200Hz -6dB/Octave, 200~400Hz XYZ 2hrs/ each direction	
11	Drop (with carton)	Drop height condition, basis on the product weight and follow QB100-0027 1 corner, 3 edges, 6 surfaces	

Note1 : There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

Note2 : All of the function & cosmetic Judgment basis base on IIS Spec. at room temperature. (The tested module must have enough recovery time at least 2 hours at room temperature.)

Note3 : The test condition definition panel's surface temperature.

Note4 : After 1000 hours test has been done, the specimen should function normally without any

fatal defect. (no picture, line defect, out of synchronization)

Note5 : Short time operation between -40~30 °C doesn't provide full performance but a correct image on the LCD. The LCD is guaranteed to suffer no permanent damage.

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)
CF101VLHLWH-001	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 $23\pm5^{\circ}\text{C}$ and the humidity is below $50\pm20\%\text{RH}$.
- (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.

The Netherlands



Elektrostraat 17
NL-7483 PG Haaksbergen

T: +31 (0)53 573 33 33
F: +31 (0)53 573 33 30
E: nl@texim-europe.com

Belgium



Zuiderlaan 14 bus 10
B-1731 Zellik

T: +32 (0)2 462 01 00
F: +32 (0)2 462 01 25
E: belgium@texim-europe.com

UK & Ireland



St. Mary's House, Church Lane
Carlton Le Moorland
Lincoln LN5 9HS

T: +44 (0)1522 789 555
F: +44 (0)845 299 22 26
E: uk@texim-europe.com

Germany North



Bahnhofstrasse 92
D-25451 Quickborn

T: +49 (0)4106 627 07-0
F: +49 (0)4106 627 07-20
E: germany@texim-europe.com

Germany South



Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
F: +49 (0)89 436 086-19
E: germany@texim-europe.com

Austria



Warwitzstrasse 9
A-5020 Salzburg

T: +43 (0)662 216 026
F: +43 (0)662 216 026-66
E: austria@texim-europe.com

Nordic region



Sdr. Jagtvej 12
DK-2970 Hørsholm

T: +45 88 20 26 30
F: +45 88 20 26 39
E: nordic@texim-europe.com

Italy



Via Matteotti 43
IT-20864 Agrate Brianza (MB)

T: +39 (0)39 971 3293
F: +39 (0)39 971 3293
E: italy@texim-europe.com

General information



info@texim-europe.com
www.texim-europe.com