Chefree Technology Corp.

TFT COLOR LCD MODULE

MODEL: CH070ELDLTH-001

(Complied with RoHS)

WVGA
LVDS interface

Version: P03

Customer : _____

Approved By : _____

Date: _____

CHEFREE		
APPROVAL	**CHECKER**	**PREPARE**
Tim	Mark	Benson

CONTENTS

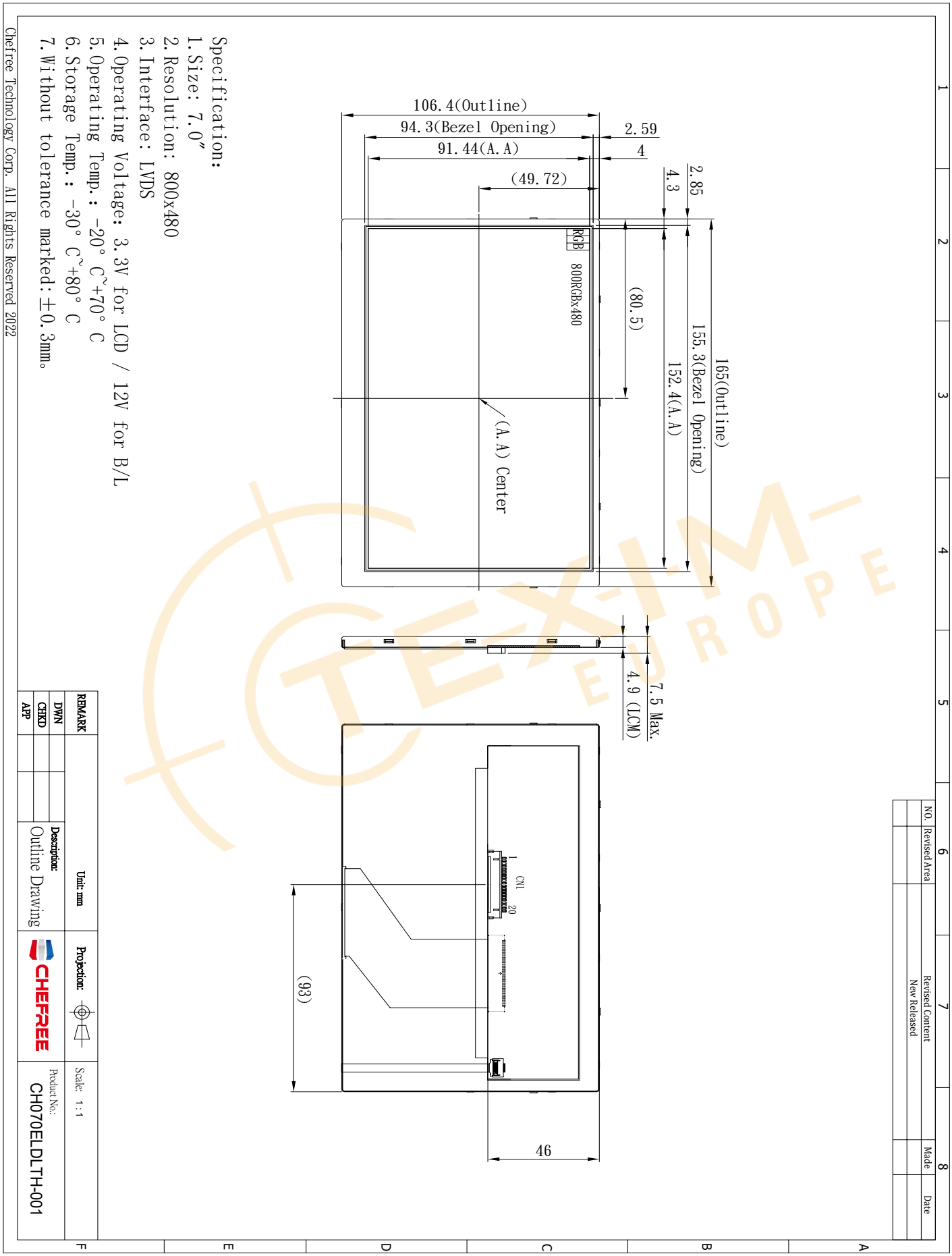
1. RECORD OF REVISION

Rev	DATE	PAGE	SUMMARY
P00	2022.03.31	ALL	Preliminary specification
P01	2022.04.07	3	Updated drawing 1. LCM Thickness: 4.9mm → 4mm 2. Total Thickness: 7.9mm → 6.3mm 3. CN1 dimension: 91.6mm → 93mm 4. AA center: 80.75mm → 80.5mm , 50mm → 49.72mm
P02	2022.04.14	3	Updated drawing 1. LCM Thickness: 4→4.9mm 2. Total Thickness: 6.3→7.5mm
P03	2023.01.18	2,8,9	Updated 1. The Weight of LCM 2. current consumption for IDD, ILED

2. MECHANICAL SPECIFICATIONS

(1)	Number of Dots	800(R.G.B) x 480
(2)	Module Size(mm)	165(H) x 106.4(V) x (7.5) (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 White
(6)	Backlight Color	White, LED
(7)	Viewing Direction	6 o'clock
(8)	Electrical Interface	LVDS Interface
(9)	Color Configuration	R.G.B Vertical Stripe
(10)	Touch Panel Mode	Without Touch
(11)	Module Weight(g)	135±5%

3. OUTLINE DIMENSIONS



4. INTERFACE PIN CONNECTION

4.1 TFT LCM PANEL PIN DEFINE

CN1 Connector：MS240420 or Equivalent

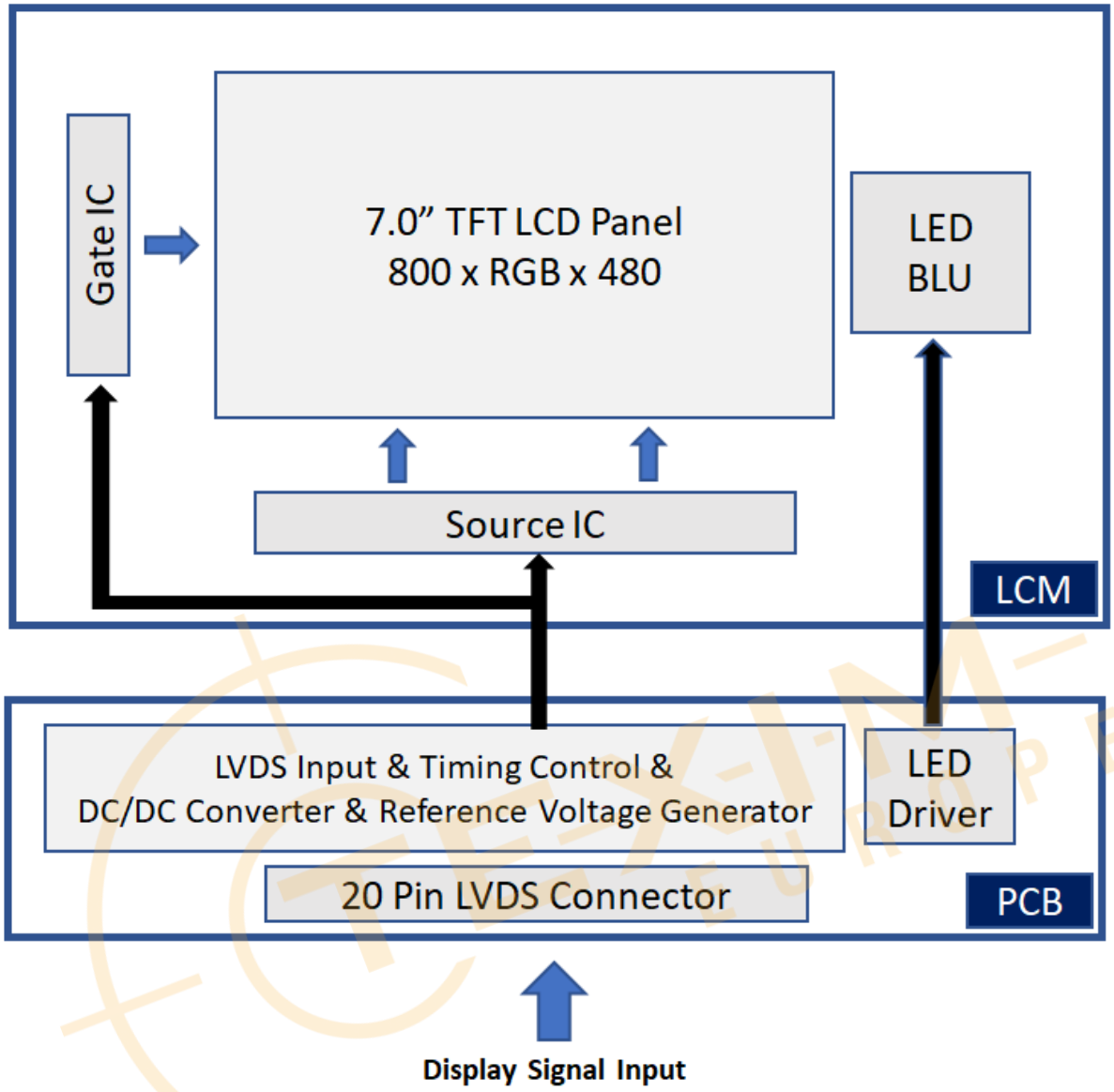
PIN NO.	Definition	I/O	Description	Remark
1	VDD	P	Power Supply for Digital Circuit	
2	VDD	P	Power Supply for Digital Circuit	
3	GND	P	Ground	
4	GND	P	Ground	
5	RxIN0-	I	Negative LVDS Differential Data Input	
6	RxIN0+	I	Positive LVDS Differential Data Input	
7	GND	P	Ground	
8	RxIN1-	I	Negative LVDS Differential Data Input	
9	RxIN1+	I	Positive LVDS Differential Data Input	
10	GND	P	Ground	
11	RxIN2-	I	Negative LVDS Differential Data Input	
12	RxIN2+	I	Positive LVDS Differential Data Input	
13	GND	P	Ground	
14	CKIN-	I	Negative LVDS Differential Clock Input	
15	CKIN+	I	Positive LVDS Differential Clock Input	
16	GND	P	Ground	
17	VLED	P	Power Supply for LED Driver Circuit	
18	VLED	P	Power Supply for LED Driver Circuit	
19	GND	P	Ground	
20	ADJ	I	Brightness Control for Backlight	

Note：‘P’ stand for Power, ‘ I ‘ stand for Input

4.2 CTP Specification:

Without Touch.

5. BLOCK DIAGRAM



6. ABSOLUTE MAXIMUM RATINGS

6.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Supply Voltage	VDD	-0.3	5.0	V	
Backlight Supply Voltage	VLED	-	24	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(℃)	-20	70	-30	80	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℃ & RH=90%≦96Hrs

7. ELECTRICAL CHARACTERISTICS

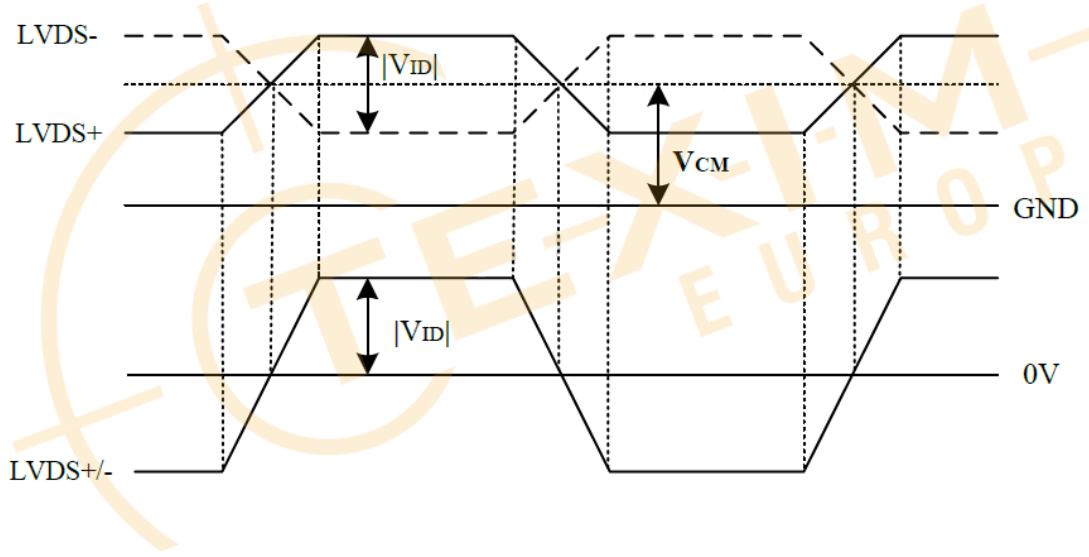
7.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage For LCD	VDD	3.0	3.3	3.6	V	
	IDD	-	150	-	mA	Note1
Differential Input Threshold	VTH	-	-	100	mV	Note2
	VTL	-100	-	-	mV	
Magnitude Differential Input	$\|V_{ID}\|$	0.2		0.6	mV	
Common Mode Voltage	V_{CM}	1.0	1.2	1.4	V	

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.

Voltage Definitions



7.2 BACKLIGHT UNITS

Ta=25℃

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
LED Driving Voltage		VLED	-	12	-	V	
LED Driving Current		ILED	-	220	-	mA	
LED Life Time		-	(20,000)	-	-	Hrs	Note1
PWM Control Level	High Level	ADJ	2.5	-	6	V	
	Low Level		0	-	0.4	V	
PWM Frequency		-	200	-	2000	Hz	

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

7.3 CTP ELECTRICAL CHARACTERISTICS

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

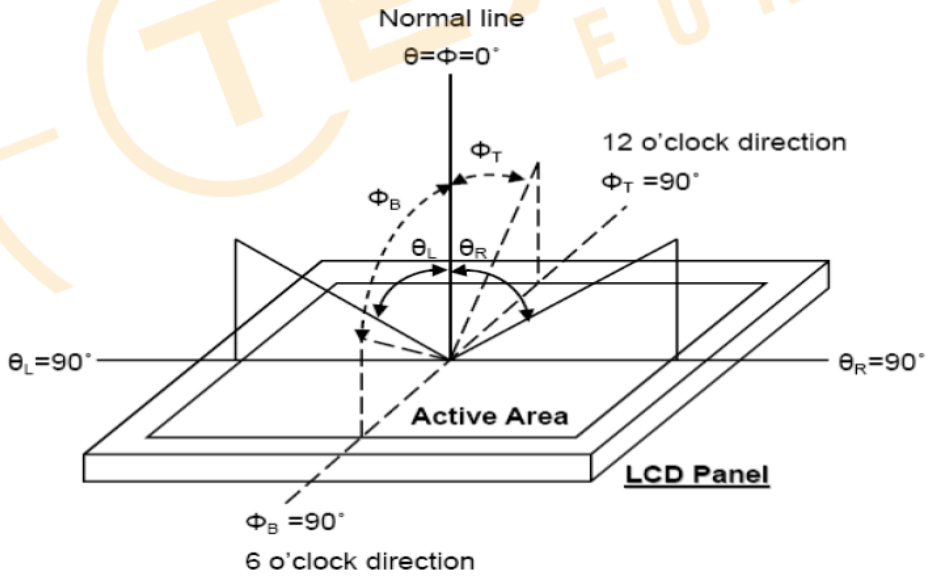
8. OPTICAL CHARACTERISTICS

8.1 Optical specification

Ta=25℃

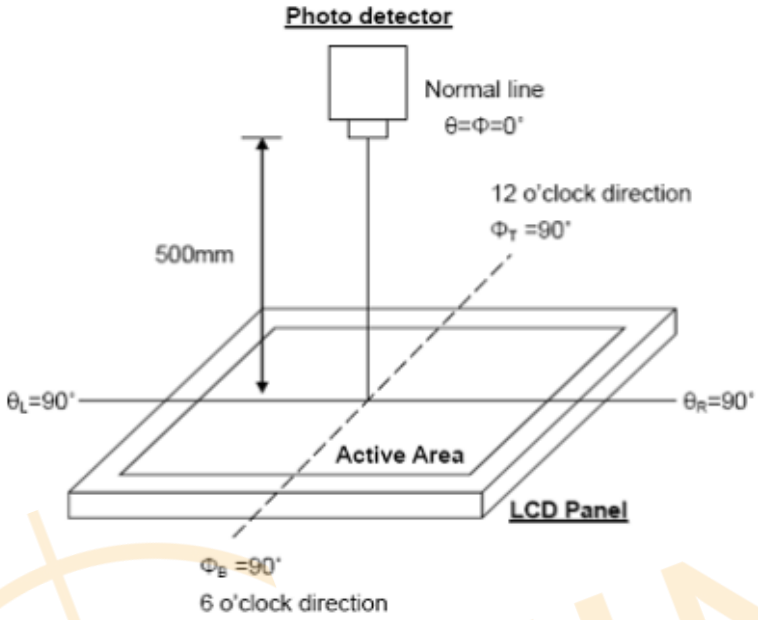
ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle Θx=Θy=0°	(600)	(800)	-	-	Note 4
Response Time		TR+TF		-	20	30	ms	Note 3
Chromaticity	White	x		(0.270)	(0.310)	(0.360)	-	Note 2
		y		(0.280)	(0.330)	(0.370)	-	
Viewing Angle	Hor.	θx+	Viewing Angle Θx=Θy=0° CR≧10	-	70	-	Deg.	Note 1
		θx -		-	70	-		
	Ver.	θy+		-	60	-		
		θy -		-	60	-		
Luminance		L	PWM=100%	-	(1000)	-	cd/m^2	Center
Luminance Uniformity		YU		-	70	-	%	Note 5

Note (1)Definition of Viewing Angle：



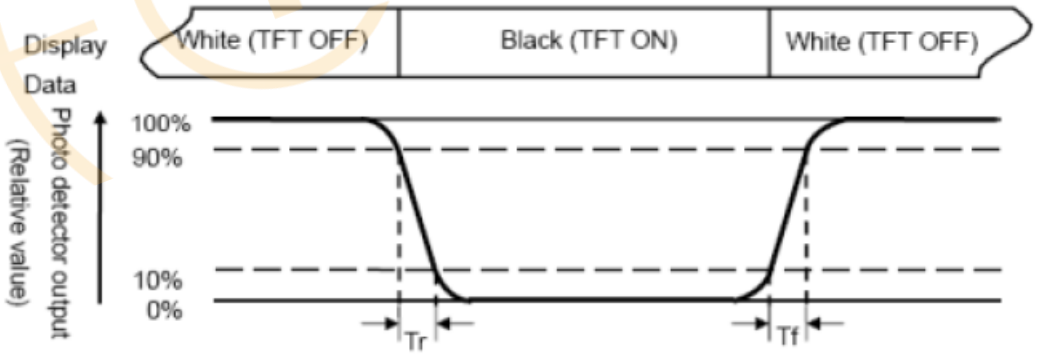
Note(2) Test equipment setup:：

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 luminance meter 1.0° field of view at a distance of 50cm and normal direction.



Note(3) Definition of Response Time ：

The response time is defined as the LCD optical switching time interval between “White state and “Black” state. Rise time, Tr, is the time between photo detector output intensity changed from 90 % to 10 % . And fall time, Tf, is the time between photo detector output Intensity changed from10 % to 90

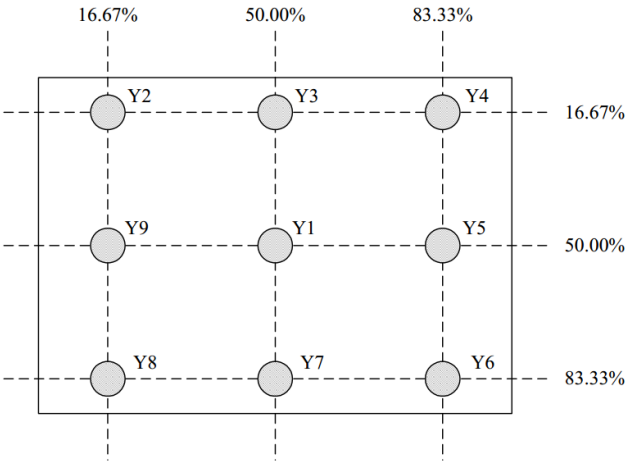


Note(4) Definition of contrast ratio：

The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the “White” state}}{\text{Luminance measured when LCD on the “Black” state}}$$

Note (5) Definition of brightness uniformity：



$$\text{Luminance uniformity} = \frac{\text{(Min Luminance of 9 points)}}{\text{(Max Luminance of 9 points)}} \times 100\%$$

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：

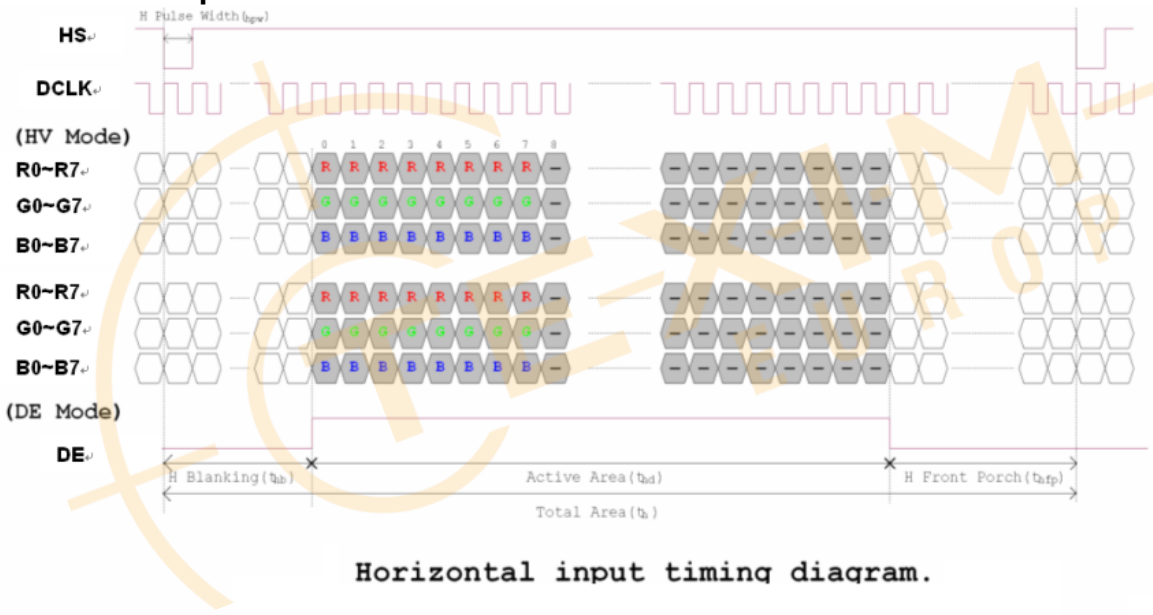
9.6.1 Transparency：
9.6.2 Haze:

10. TIMING SPECIFICATIONS

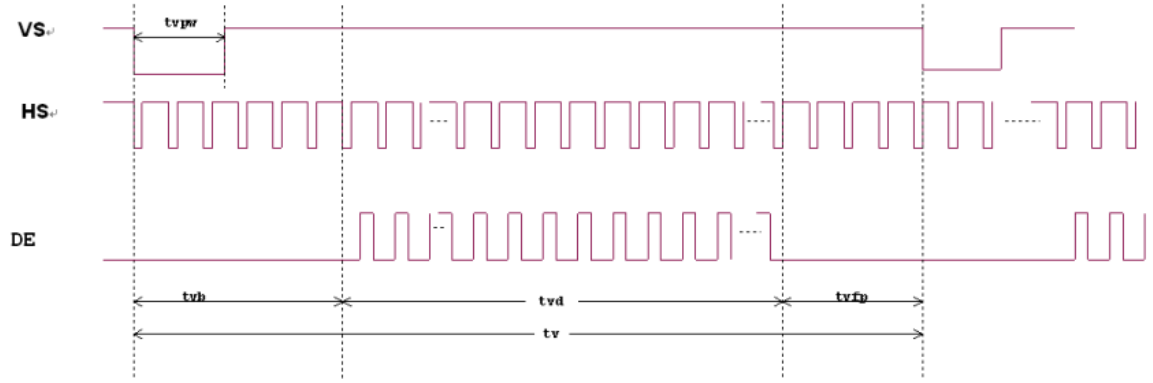
10.1 Interface Timing

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
DCLK frequency	fDCK	26.4	33.3	46.8	MHz	
Horizontal Display Time	tHA		800		Clock	
Horizontal Total Time	tH	862	1056	1200	Clock	
Horizontal Blanking Time	tHB	46	46	46	Clock	THB=THBP+THFP
Vertical Display Time	tVA		480		Line	
Vertical Total Time	tV	510	525	650	Line	
Vertical Blanking Time	tVB	23	23	23	Line	TVB=TVBP+TVFP
Frame rate	--	-	60	-	Hz	

10.2 Data Input Format



Horizontal input timing diagram.

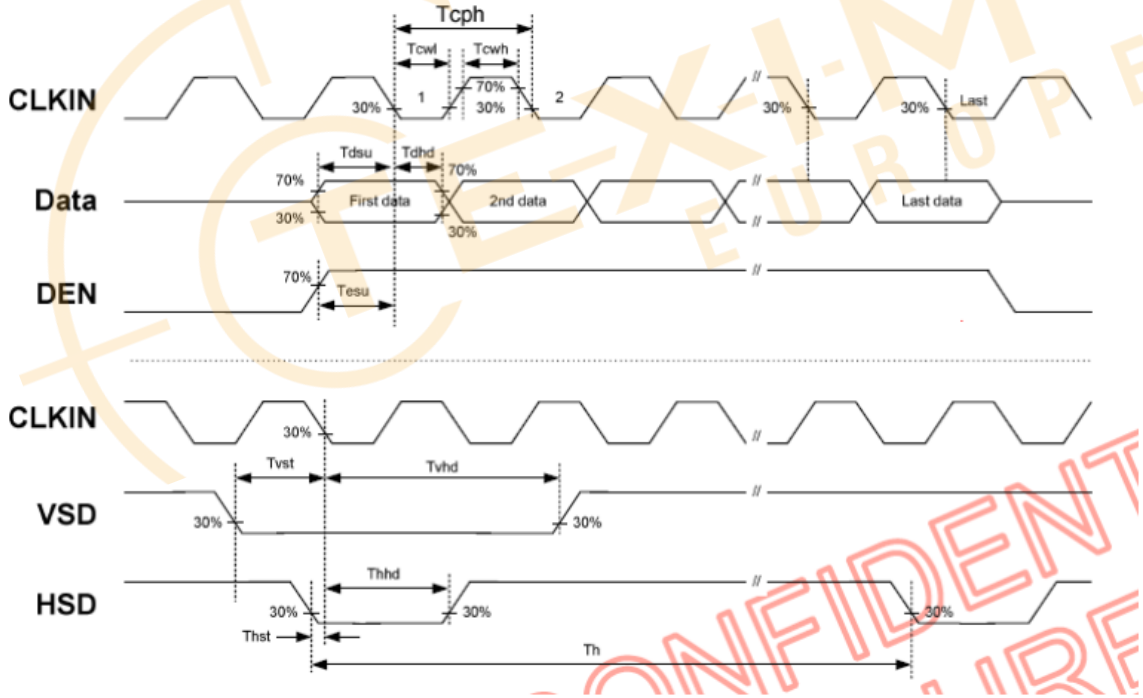


Vertical input timing diagram.

10.3 AC Electrical Characters

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
HS setup time	Thst	8			ns	
HS hold time	Thhd	8			ns	
VS setup time	Tvst	8			ns	
VS 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	
DVDD power on slew rate	TPOR			20	ms	From 0 to 90%VDD
Reset pulse width	TRst	1			ms	
DCLK cycle time	Tcph	20			ns	
DLCK pulse duty	Tcwh	40	50	60	%	

10.4 Clock and Data input waveforms



11. RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	Ta= 80℃	240Hours	1,2,3,4
2	Low Temperature Storage	Ta= -30℃	240Hours	1,2,3,4
3	High Temperature Humidity Storage	60℃,90%RH	240Hours	1,2,3,4
4	High Temperature Operation	Ts= 70℃	240Hours	1,2,3,4
5	Low Temperature Operation	Ta= -20℃	240Hours	1,2,3,4,5
6	Temperature Cycle	-30℃~80℃	100 CYCLES	1,2,3

Note 1：There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.
Note 2：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.)
Note 3：The test condition definition panel's surface temperature.
Note 4：After 1000 hours test has been done, the specimen should function normally without any fatal defect. (no picture, line defect, out of synchronization)
Note 5：Short time operation between -40~30℃ doesn't provide full performance but a correct image on the LCD. The LCD is guaranteed to suffer no permanent damage.

12. 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±5°C and the humidity is below 50±20%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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