

# Chefree Technology Corp.

## TFT COLOR LCD MODULE

MODEL: CF070HLDLWH-002

(Complied with RoHS)

WVGA

LVDS interface (1 Port)

Version: P01

Customer : \_\_\_\_\_

Approved By : \_\_\_\_\_

Date: \_\_\_\_\_

CHEFREE		
APPROVAL	CHECKER	PREPARE
Tim	Mark	Benson

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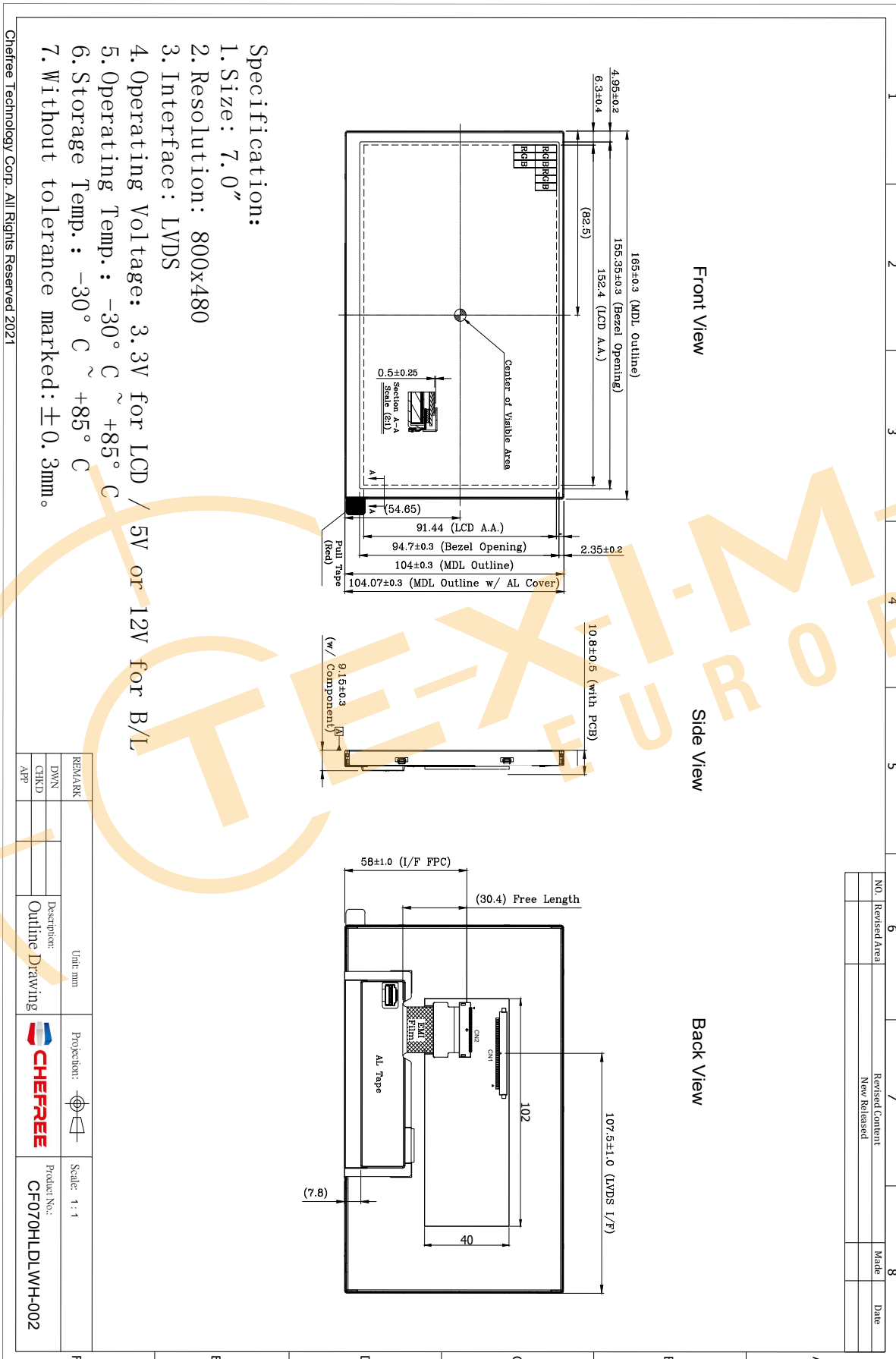
## 1. RECORD OF REVISION

Rev	DATE	PAGE	SUMMARY
P00	2020.07.21	ALL	Preliminary specification
P01	2020.03.15	3	Updated Drawing
		7,8,9	Updated Power consumption for the Panel

## 2. MECHANICAL SPECIFICATIONS

(1)	Number of Dots	800(R.G.B) x 480
(2)	Module Size(mm)	165(H) x 104.07(V) x 9.15 (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 Vertical 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	NC	-	No connection	
9	NC	-	No connection	
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	NC	-	No connection	
26	NC	-	No connection	
27	NC	-	No connection	
28	NC	-	No connection	
29	NC	-	No connection	
30	NC	-	No connection	

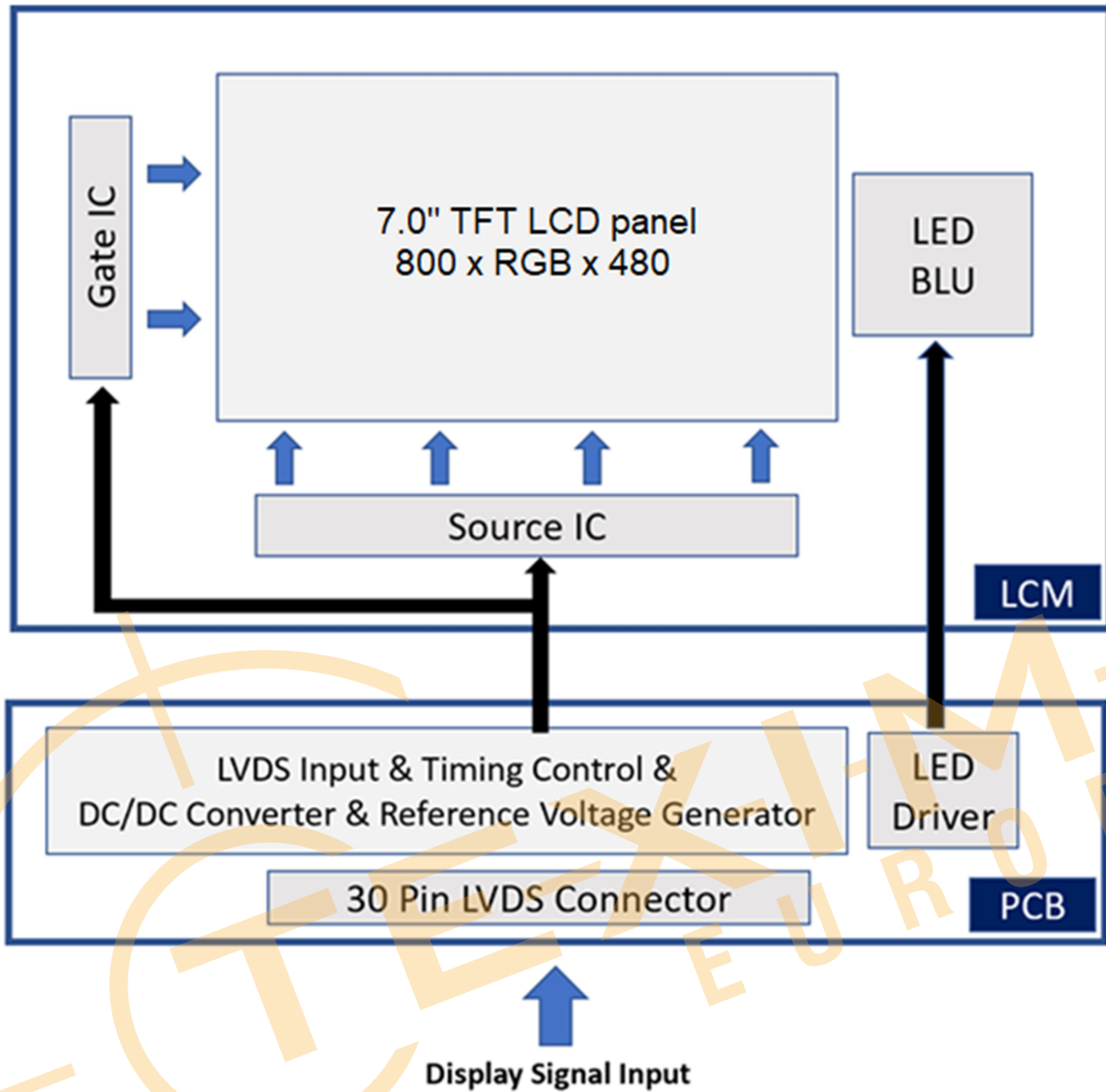
Note : 'P' stand for Power, 'I' stand for Input

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	4.5	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(°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

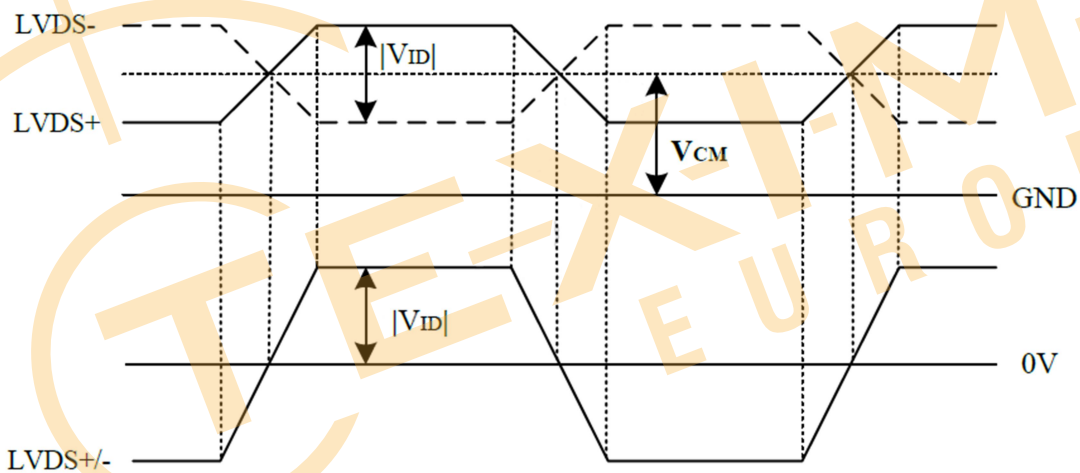
Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage For LCD	VDD	3.0	3.3	3.6	V	
	IDD	-	(200)	-	mA	Note1
Differential Input Threshold	VTH	100	-	-	mV	Note2
	VTL	-	-	-100	mV	
Magnitude Differential Input	VID	0.2		0.6	mV	
Common Mode Voltage	V <sub>CM</sub>	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°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
LED Driving Voltage	VLED	-	12	-	V	
		-	5	-	V	
LED Driving Current	ILED	-	(0.5)	-	A	VLED=12V
		-	(1.15)	-	A	VLED=5V
Power Consumption	-		(6)		W	VLED=12V
			(5.75)		W	VLED=5V
LED Life Time	-	20000	-	-	Hrs	Note1

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	

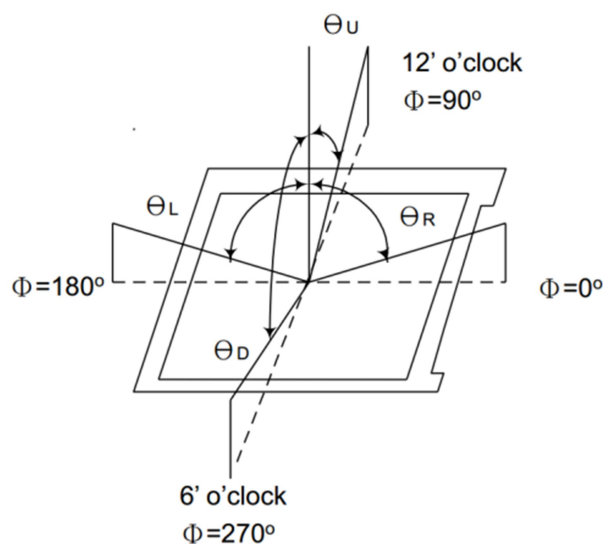
## 8. OPTICAL CHARACTERISTICS

### 8.1 Optical specification

Ta=25°C

ITEM	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio	CR		-	1000	-	-	Note 1,2
Response Time (TR+TF)	@25°C		-	30	40	ms	Note 1,3
	@-30°C			800		ms	
Color Chromaticity (CIE1931)	White	Wx	Viewing Normal Angle $\Theta=0$	-0.04	+0.04		Note 1,4
		Wy					
	Red	Rx					
		Ry					
	Green	Gx					
		Gy					
	Blue	Bx					
		By					
Viewing Angle	Hor.	$\theta_L$	80	85	-	Deg.	
		$\theta_R$	80	85	-		
	Ver.	$\theta_U$	80	85	-		
		$\theta_D$	80	85	-		
	Hor.	$\theta_L$	65				
		$\theta_R$	65				
	Ver.	$\theta_U$	65				
		$\theta_D$	65				
Luminance(Center)	YL		-	1000	-	cd/m <sup>2</sup>	Note 1,4
Luminance Uniformity	BUNI		75	80	-	%	Note 5

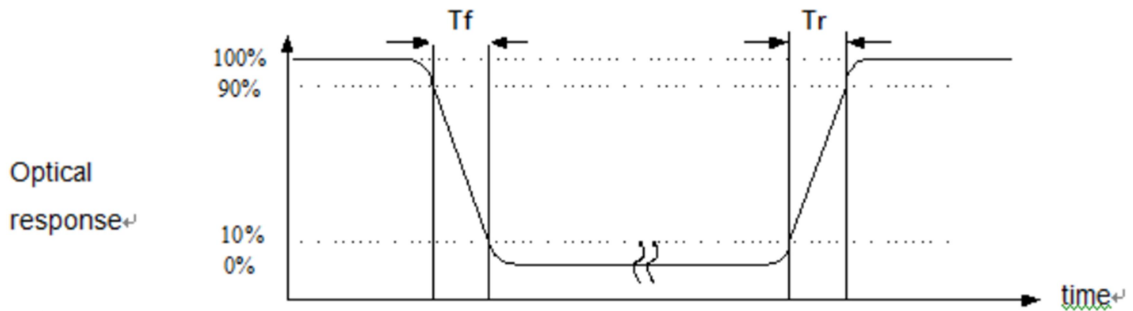
Note (1) Definition of Viewing Angle :



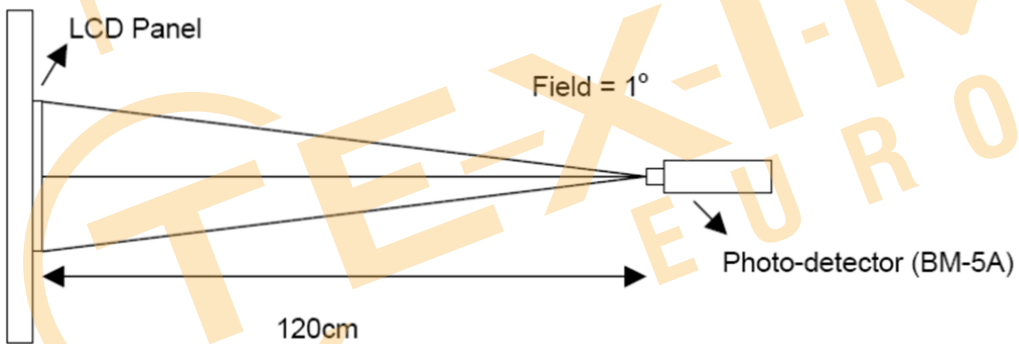
Note(2) Definition of Contrast Ratio (CR) :  
 Measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

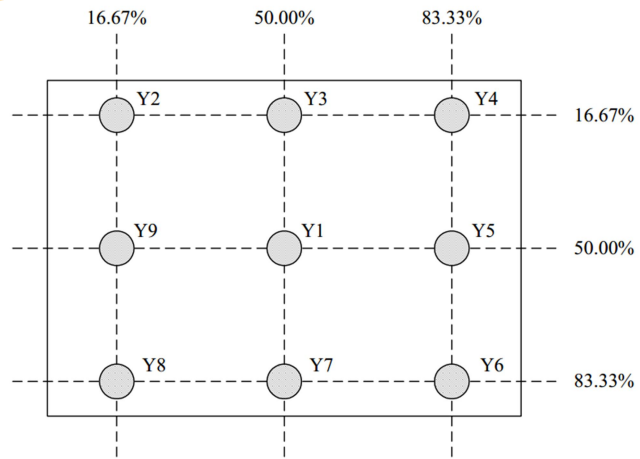
Note(3) Definition of Response Time : Sum of  $T_R$  and  $T_F$



Note(4) Definition of optical measurement setup :



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:

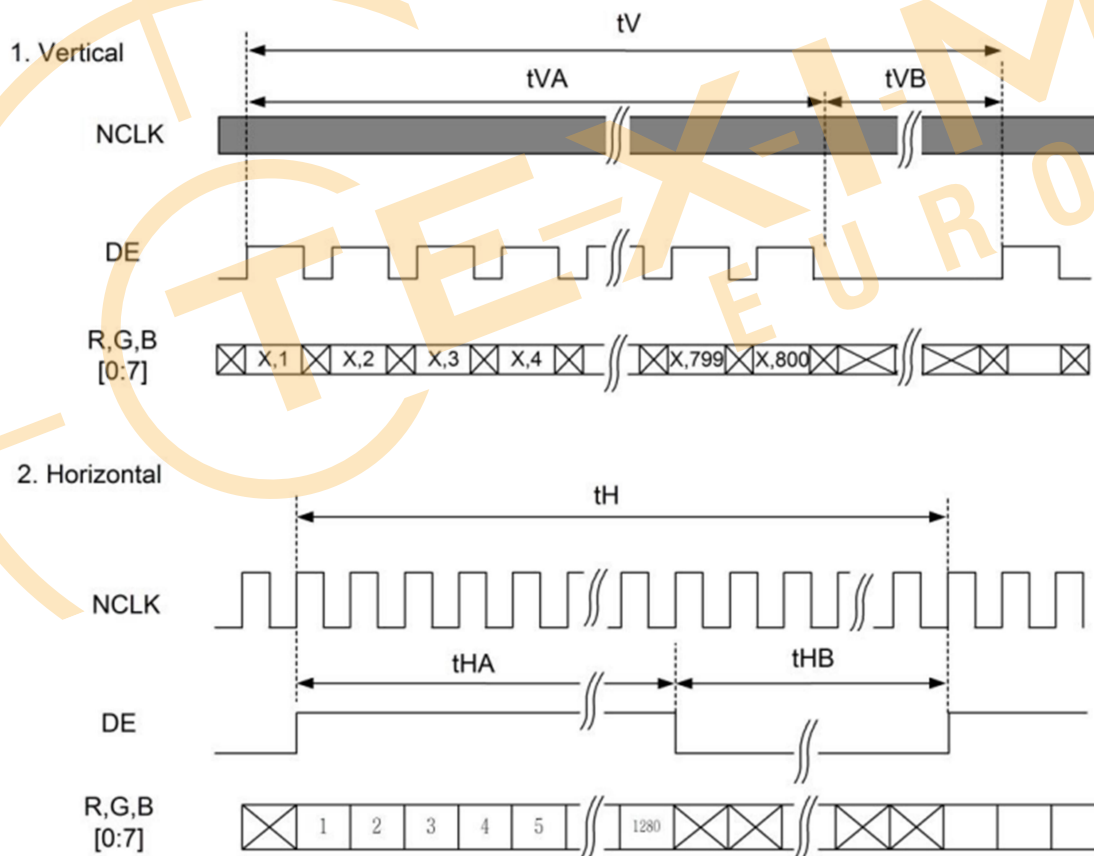


## 10. TIMING SPECIFICATIONS

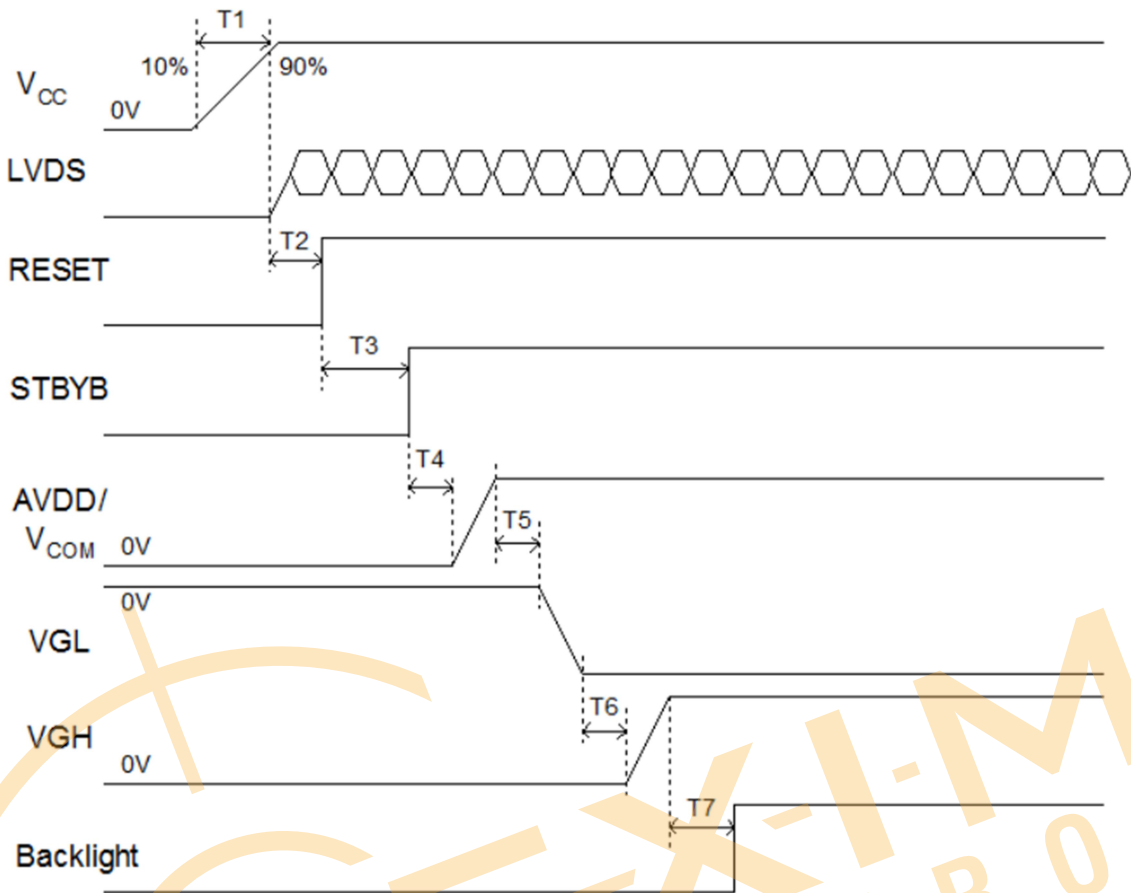
### 10.1 Interface Timing

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
DCLK frequency	fDCK	28	30	32	MHz	
Horizontal Display Time	tHA	800			Clock	
Horizontal Total Time	tH	890	902	915	Clock	
Horizontal Blanking Time	tHB	90	102	115	Clock	T <sub>HB</sub> =T <sub>HB</sub> P+T <sub>H</sub> FP
Vertical Display Time	tVA	480			Line	
Vertical Total Time	tV	546	555	564	Line	
Vertical Blanking Time	tVB	66	75	84	Line	T <sub>VB</sub> =T <sub>VB</sub> P+T <sub>V</sub> FP
Frame rate	--	54	60	66	Hz	

### 10.2 Timing Diagram of Interface Signal

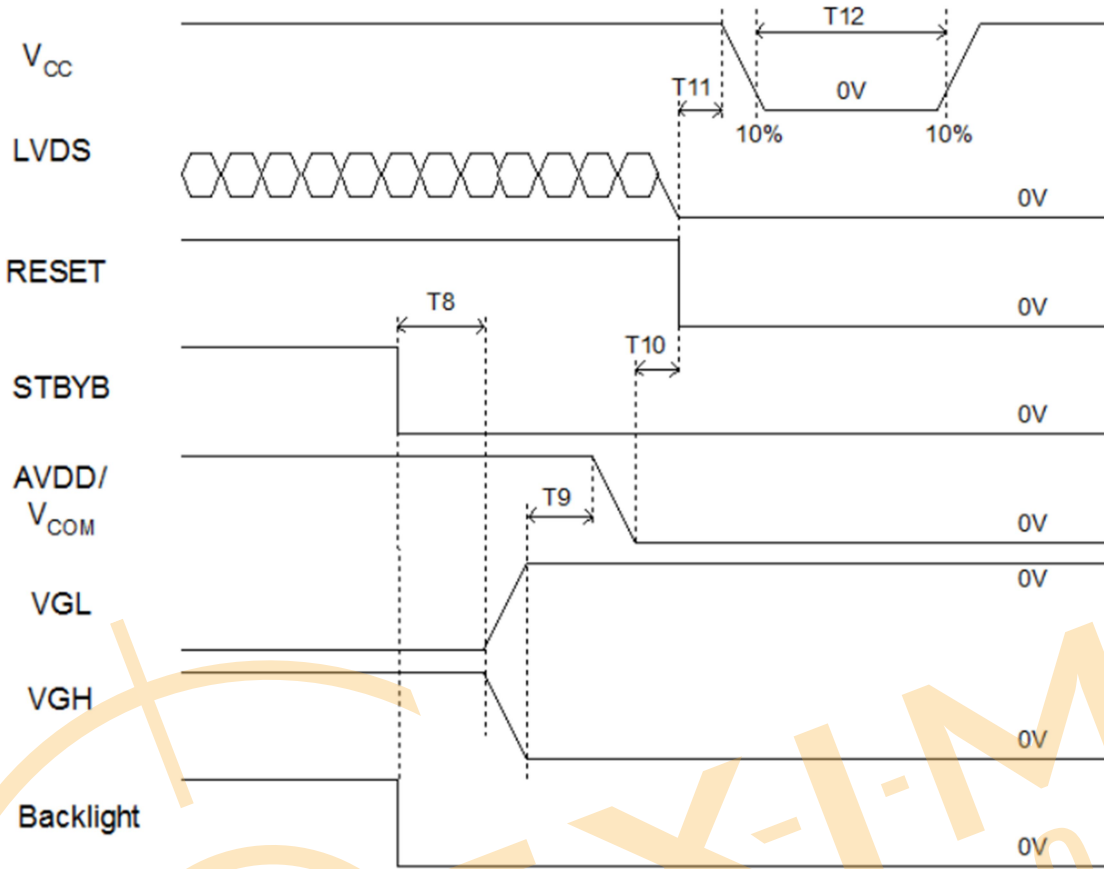


10.3 Power Sequence



ITEM	MIN.	MAX.	NOTE
T1	0.5	20	
T2	1	-	
T3	20	-	
T4	16	-	
T5	16	-	
T6	16	-	
T7	100	-	

UNIT: mm



ITEM	MIN.	MAX.	NOTE
T8	100	20	
T9	16	-	
T10	16	-	
T11	16	-	
T12	(1000)	-	

UNIT: mm

**11. RELIABILITY TEST**

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	Ta= 85°C	240Hours	1,2,3,4
2	Low Temperature Storage	Ta= -30°C	240Hours	1,2,3,4
3	High Temperature Humidity Storage	65°C,90%RH	240Hours	1,2,3,4
4	High Temperature Operation	Ts= 85°C	240Hours	1,2,3,4
5	Low Temperature Operation	Ta= -30°C	240Hours	1,2,3,4,5
6	Temperature Cycle	-30°C~85°C	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°C 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  $23\pm 5^{\circ}\text{C}$  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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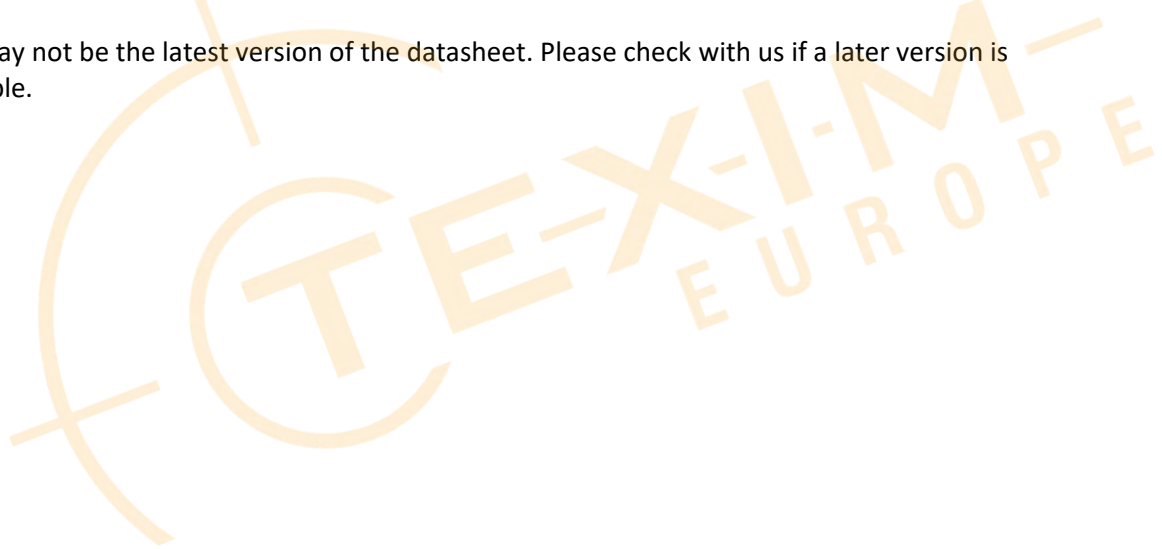
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Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time.

All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts.

Please contact us if you have any questions about the contents of the datasheet.

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