

Chefree Technology Corp.

TFT COLOR LCD MODULE

MODEL: CH101CLHLWN-003

(Complied with RoHS)

WXGA
LVDS interface

Version: P00

Customer : _____

Approved By : _____

Date: _____

CHEFREE		
APPROVAL	CHECKER	PREPARE
Tim	Mark	Benson

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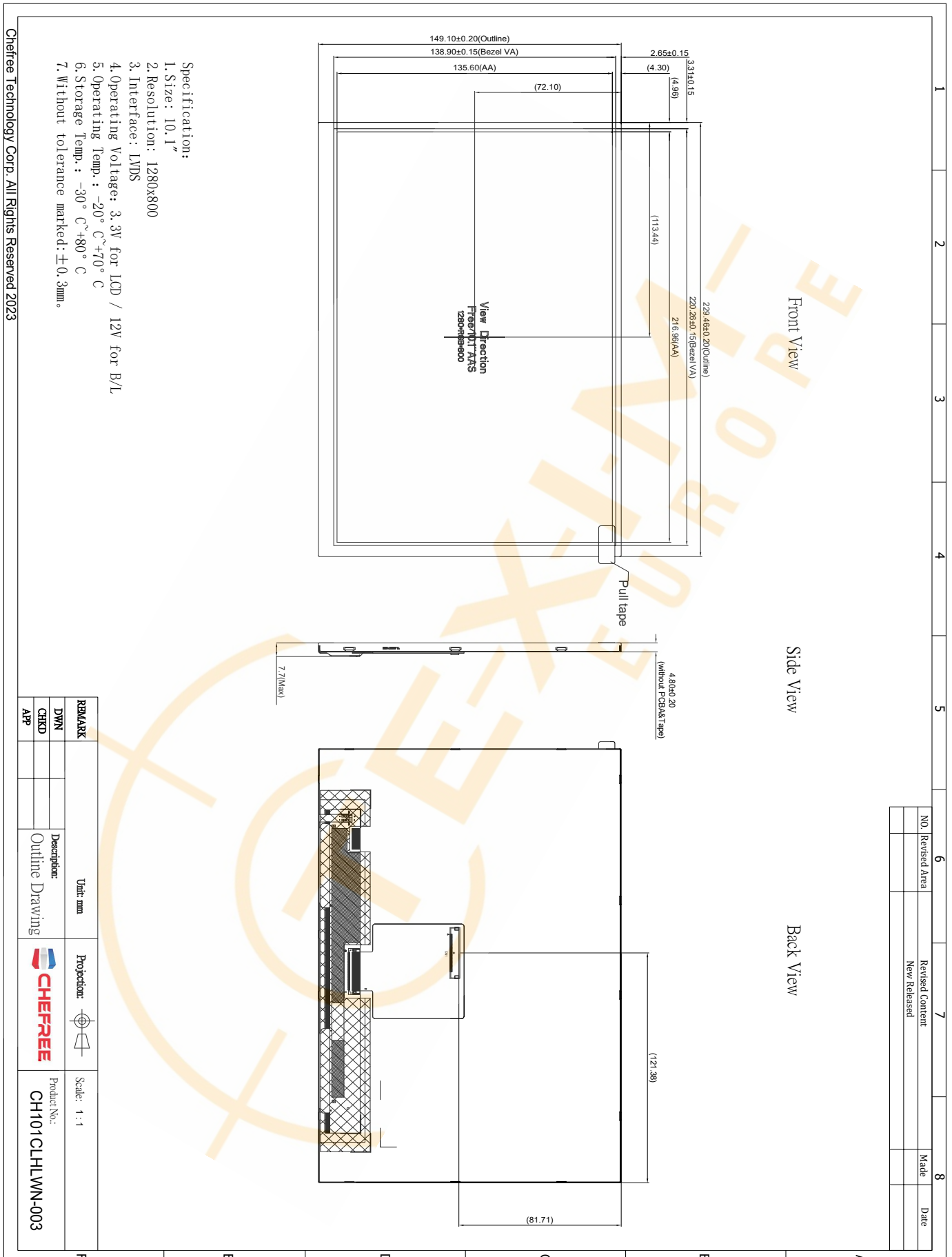
1. RECORD OF REVISION

Rev	DATE	PAGE	SUMMARY
P00	2023.06.08	ALL	Preliminary specification was first issued.

2. MECHANICAL SPECIFICATIONS

(1)	Number of Dots	1280(H) x 800(V)
(2)	Module Size(mm)	229.46(H) x 149.1(V) x 4.8 (D)
(3)	Active Area(mm)	216.96(H) x 135.60(V)
(4)	Pixel Pitch(mm)	0.1695(H) x 0.1695(V)
(5)	LCD Model	TFT, Transmissive, Normally Black, Hard coating
(6)	Backlight Color	White LED
(7)	Viewing Direction	Wide viewing angle
(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

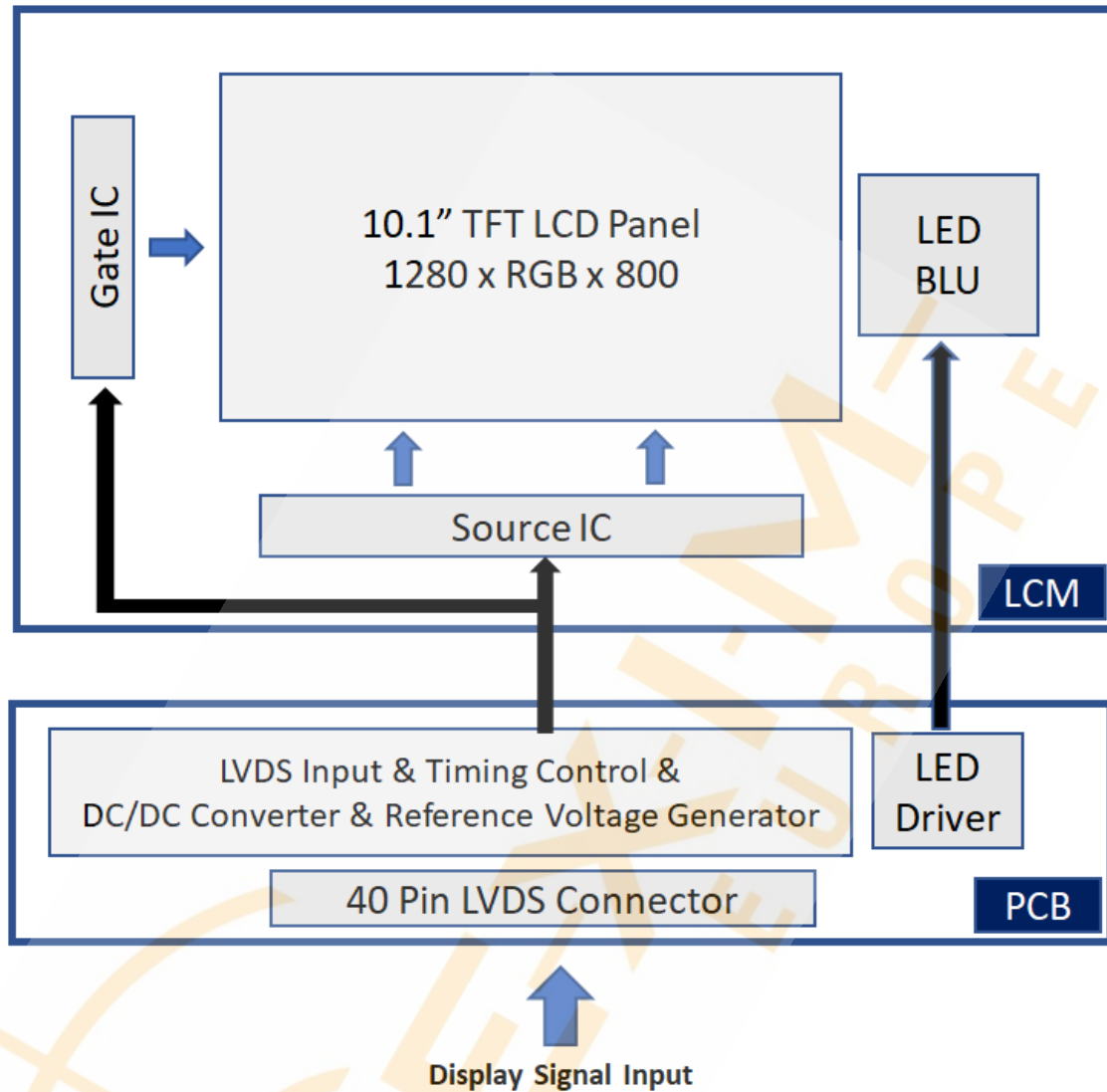
CN1 Connector : I-PEX 20455-040E-12 or Equivalent

PIN NO.	Definition	I/O	Description	Remark
1	VDD	P	Power supply for Digital Circuit	
2	VDD	P	Power supply for Digital Circuit	
3	VDD	P	Power supply for Digital Circuit	
4	NC	-	Non Connection (open)	
5	NC	-	Non Connection (open)	
6	NC	-	Non Connection (open)	
7	NC	-	Non Connection (open)	
8	RxIN0-	I	Differential Data Input, CH0(Negative)	
9	RxIN0+	I	Differential Data Input, CH0(Positive)	
10	GND	P	Ground	
11	RxIN1-	I	Differential Data Input, CH1(Negative)	
12	RxIN1+	I	Differential Data Input, CH1(Positive)	
13	GND	P	Ground	
14	RxIN2-	I	Differential Data Input, CH2(Negative)	
15	RxIN2+	I	Differential Data Input, CH2(Positive)	
16	GND	P	Ground	
17	CLKIN-	I	Differential Clock Input(Negative)	
18	CLKIN+	I	Differential Clock Input(Positive)	
19	GND	P	Ground	
20	RxIN3-	I	Differential Data Input, CH3(Negative)	
21	RxIN3+	I	Differential Data Input, CH3(Positive)	
22	GND	P	Ground	
23	NC	-	Non Connection (open)	
24	NC	-	Non Connection (open)	
25	GND	P	Ground	
26	GND	P	Ground	
27	PWM	I	PWM Control Signal od LED Converter	
28	EN	I	EN Control Signal od LED Converter	
29	VSS	P	LED Ground	
30	VSS	P	LED Ground	
31	VSS	P	LED Ground	
32	VSS	P	LED Ground	
33	VSS	P	LED Ground	
34	NC	-	Non Connection (open)	
35	NC	-	Non Connection (open)	
36	VLED	P	LED Power Supply	

37	VLED	P	LED Power Supply	
38	VLED	P	LED Power Supply	
39	VLED	P	LED Power Supply	
40	VLED	P	LED Power Supply	

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

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	+3.9	V	
Backlight Supply Voltage	VLED	-0.3	+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)	-20	70	-30	80	Note 1,2
Humidity(% RH)	5~90(Note3)		5~90(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% ≤ 240Hrs

7. ELECTRICAL CHARACTERISTICS

7.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage For LCD	VCC	3.0	3.3	3.6	V	
	ICC	-	(240)	(300)	mA	Note1
High Level Input Voltage	VIH	0.8VDD	-	VDD	V	
Low Level Input Voltage	VIL	0	-	0.2VDD	V	

Note 1 : Test Condition: VDD=3.3V ; Test Pattern: White

7.2 BACKLIGHT UNITS

Ta=25 °C

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
LED Driving Voltage		VLED	5	12	13.2	V	
LED Driving Current		ILED (VLED=12V)	-	(460)	(600)	mA	
LED Life Time			-	50000	-	Hrs	Note1
PWM Frequency		-	100	-	2000	Hz	
PWM Control Level	PWM High level	-	3.0	3.3	3.6	V	
	PWM low level	-	0	-	1.0	V	
PWM Control Duty Ratio		-	0		100	%	

Note 1: Note 1: The LED life time define as the estimated time to 50% degradation of initial luminous. 50,000 hours is only an estimate for reference.

8. OPTICAL CHARACTERISTICS

8.1 Optical specification

Ta=25°C

ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle Θx=Θy=0°	800	1000	-	-	Note 1
Response Time		TR+TF		-	25	50	ms	Note 2
Chromaticity	White	x		0.26	0.31	0.36	-	Note 4
		y		0.27	0.32	0.37	-	
Viewing Angle	Hor.	θx+	Viewing Angle Θx=Θy=0° CR≥10	75	85	-	Deg.	Note 3
		θx -		75	85	-		
	Ver.	θy+		75	85	-		
		θy -		75	85	-		
Luminance		L	PWM=100%	400	600	-	cd/m ²	Center
Luminance Uniformity		YU		75	80	-	%	Note 5

Note 1 : Definition of Contrast Ratio (CR) :

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63/L0

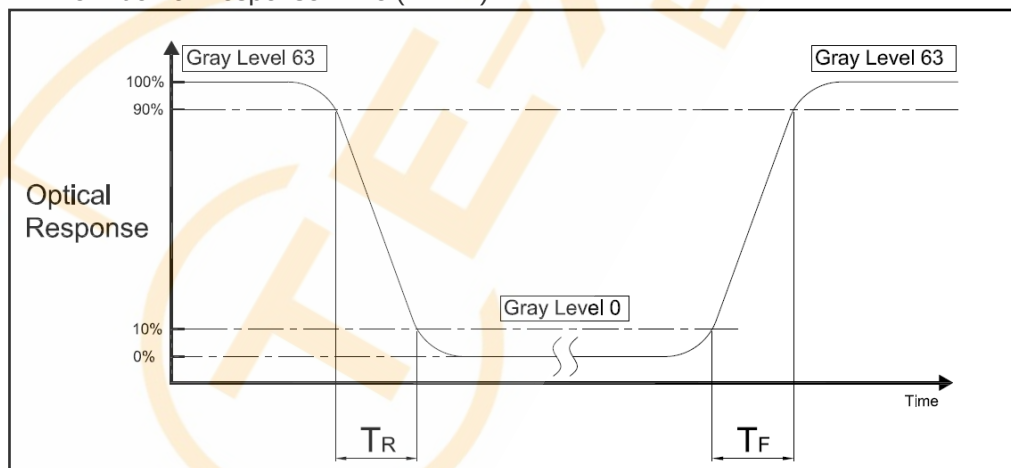
L63 : Luminance of gray level 63

L0 : Luminance of gray level 0

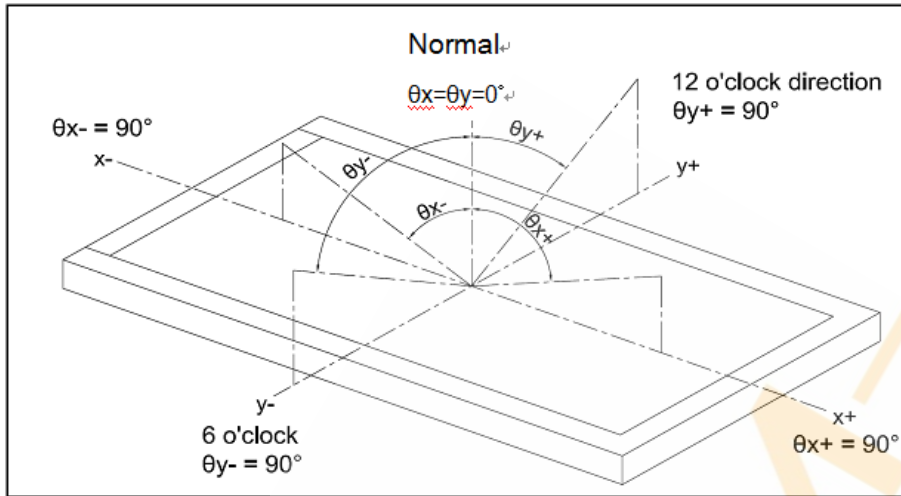
CR = CR(5)

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)

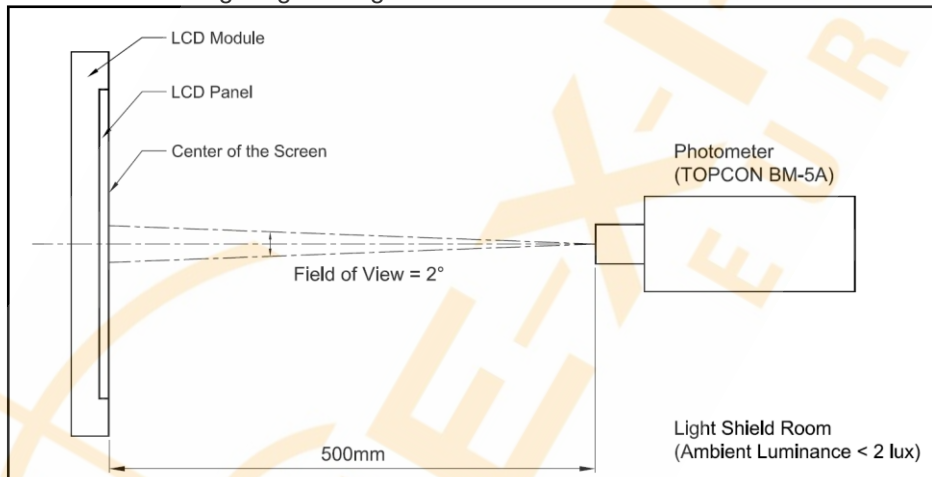


Note 3 : Definition of Viewing Angle

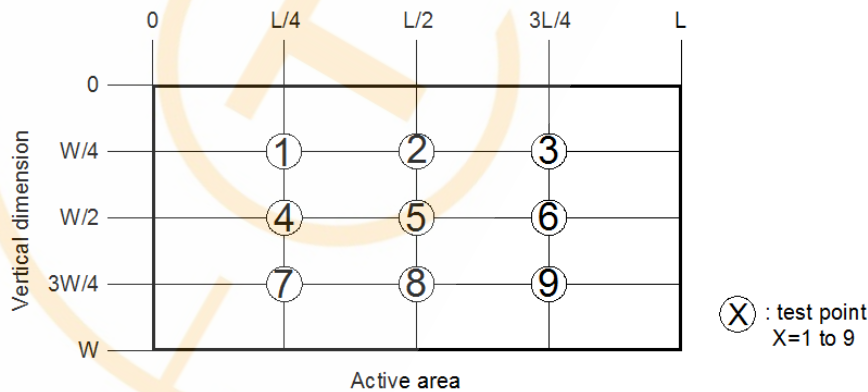


Note 4 : Measurement Set-Up :

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 :

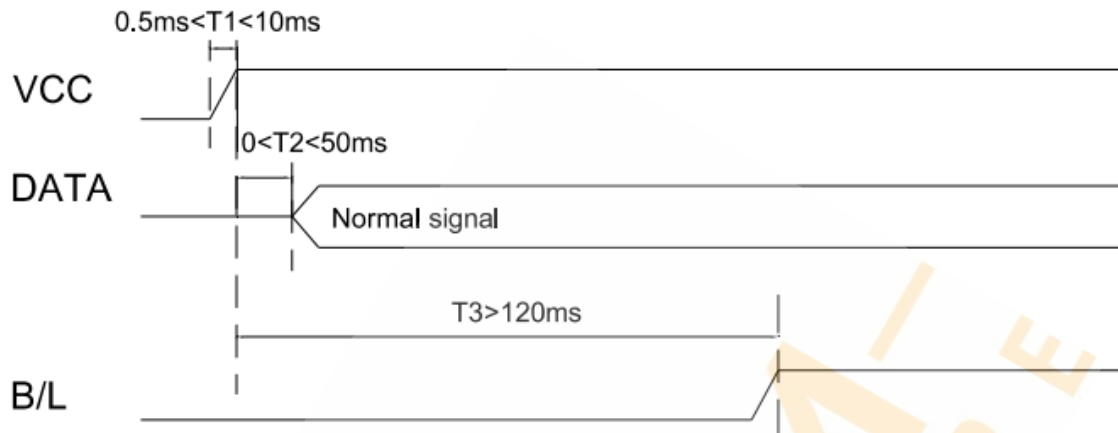
9.6 OPTICAL CHARACTERISTICS :

9.6.1 Transparency :

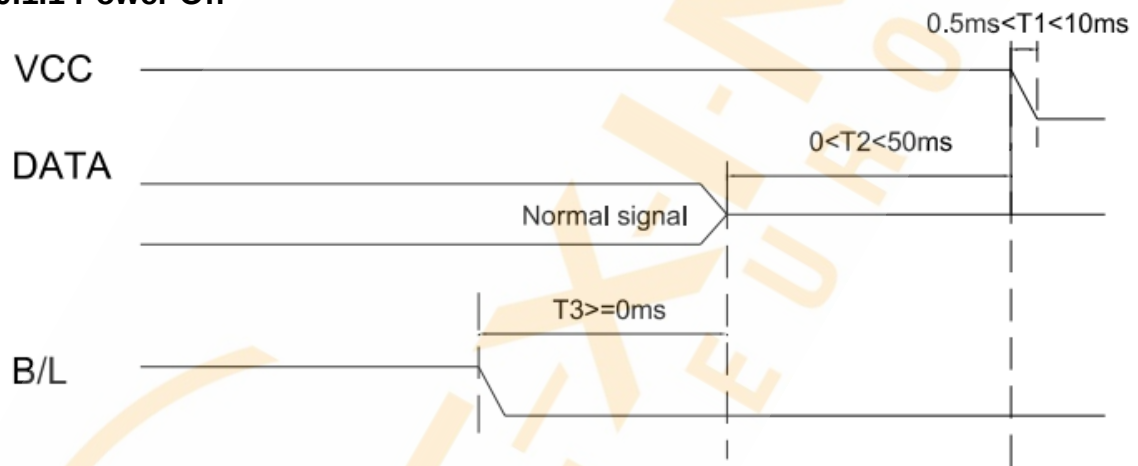
9.6.2 Haze:

10. TIMING SPECIFICATIONS

10.1.1 Power On



10.1.1 Power Off

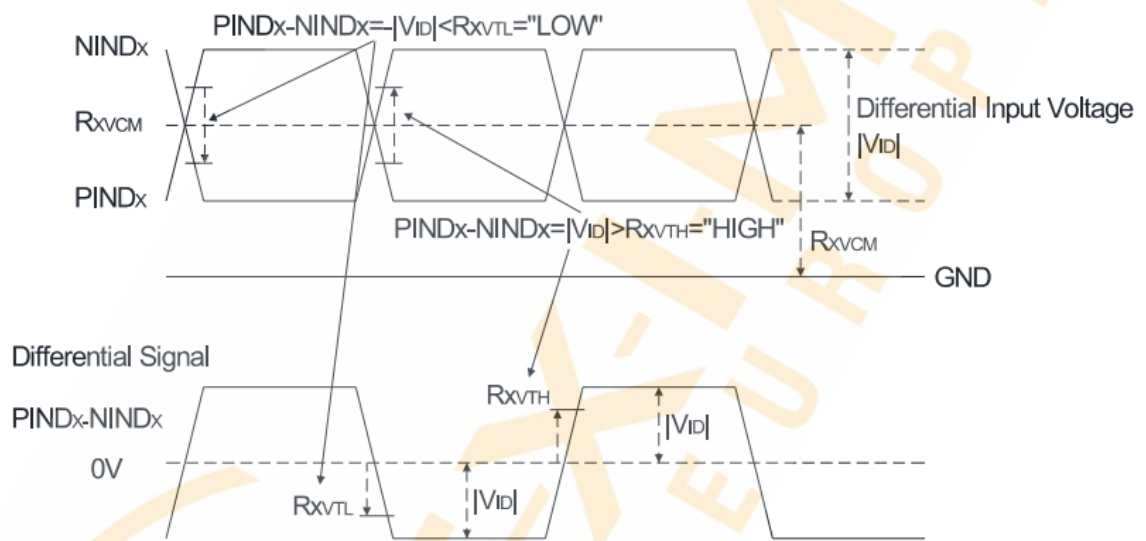


10.2 Reset Timing Characteristics

AC Electrical Characteristics

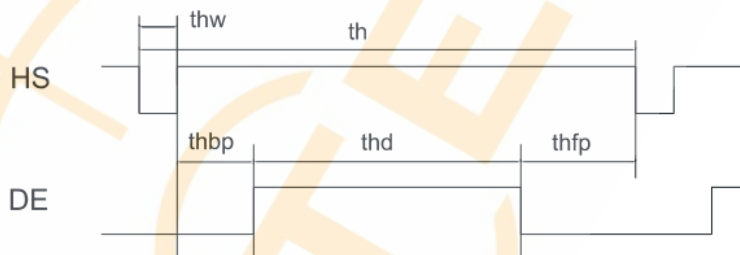
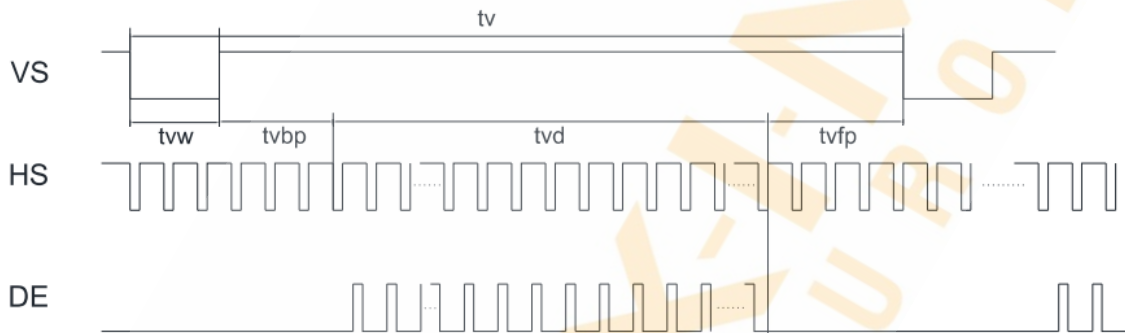
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
LVDS Differential input High Threshold voltage	R_{xVTH}	-	-	+100	mV	$R_{xVCM}=1.2V$
LVDS Differential input Low Threshold voltage	R_{xVTL}	-100	-	-	mV	
LVDS Differential input Common mode voltage	R_{xVCM}	1	1.2	$1.7- VID /2$	V	
LVDS Differential input	$ VID $	200		600	mV	

Single-end signals

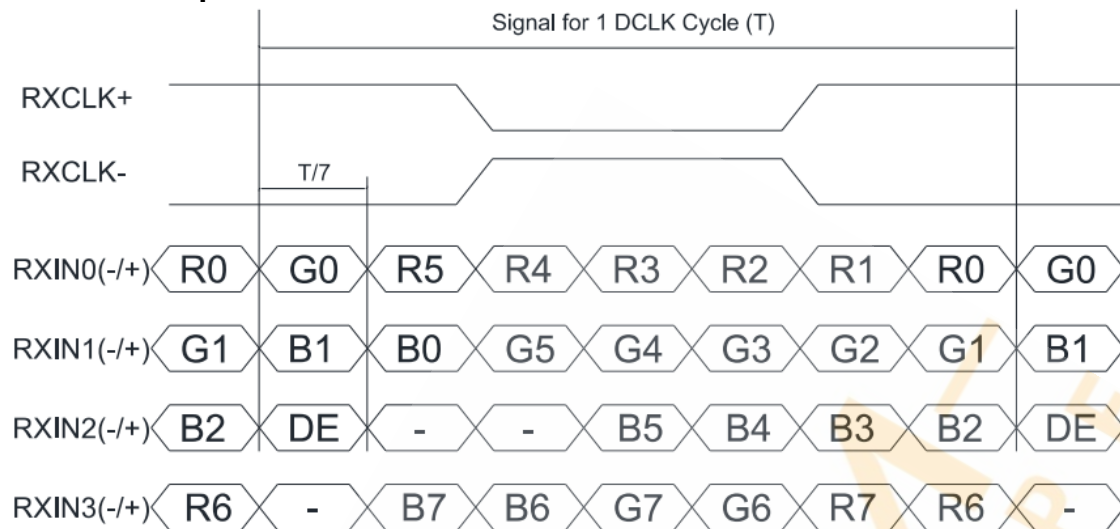


10.3 Timing

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Clock Frequency	1/Tc	63.4	64.5	85	MHz	Frame rate=60Hz
Horizontal display area	thd	1280			Tc	
HS period time	Th	1309	1322	1664	Tc	
HS Width+Back Porch+Front Porch	thw+thbb+thfp	39	54	255	Tc	
Vertical display area	tvd	800			tH	
VS period time	tv	807	813	1040	tH	
VS Width+Back Porch+Front Porch	twv+tvbp+tvfp	8	16	260	tH	



10.4 Data Input Format



11. RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	Ta= 80°C	240HRS	Note 1,3
2	Low Temperature Storage	Ta= -30°C	240HRS	Note 1,3
3	High Temperature Humidity Storage	40°C,90%RH	240HRS	Note 1,3
4	High Temperature Operation	Ts= 70°C	240HRS	Note 2,3
5	Low Temperature Operation	Ta= -20°C	240HRS	Note 1,3
6	Temperature Cycle	-30°C~80°C (30min) (30min)	100 CYCLE	Note 2,4

In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 1 : Ta is the ambient temperature of samples.

Note 2 : Ts is the temperature of panel's surface.

Note 3 : Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note 4 : Star with cold temperature and end with high temperature.

12. PRECAUTIONS FOR USE

12.1 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.

12.2 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.

12.3 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.

12.4 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.