Chefree Technology Corporation

CUSTOMER' S APPROVAL SPECIFICATIONS

MODEL: CH101ILHL-CT2
(Complied with RoHS)

CUSTOMER: _____

Version:P0.2

C O N T E N T S

ISSUE:DEC.25.2015

Spec Condition: Preliminary

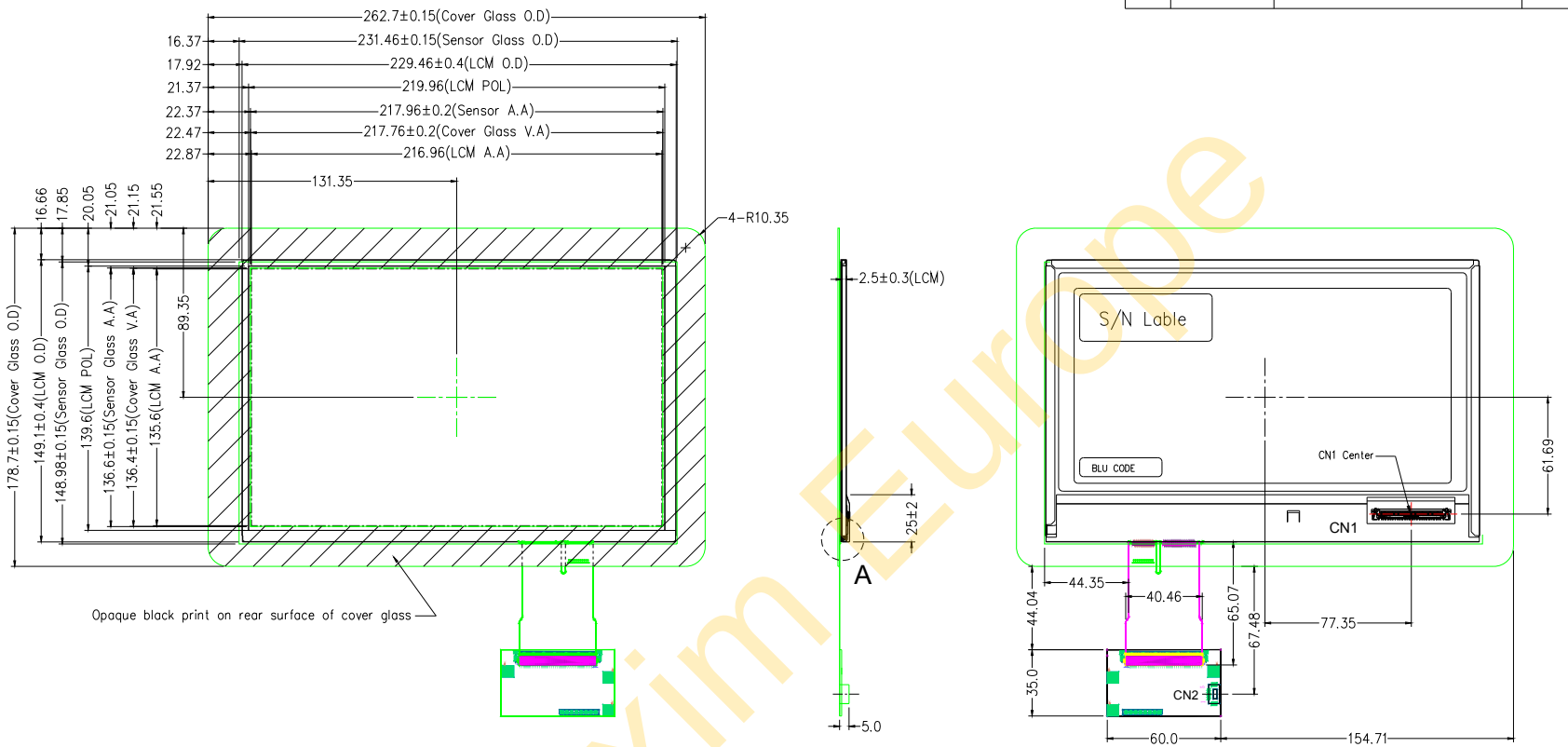
CUSTOMER	CHEFREE		
APPROVAL	APPROVAL	CHECKER	PREPARE
	ch lee	kevin	cloud

2.RECORD OF REVISION

Rev	DATE	PAGE	SUMMARY
0.1	2015.11.06	ALL	Preliminary specification was first issued.
0.2	2015.11.18	2	Modify Drawing of assembly direction.
0.3	2015.12.25	5	Modify VDD Current from 270mA to 295mA
		5	Modify Logical power consumption from 1W to 1.2W.
		4	Modify Min. LED Life Time from 15000Hr to 20000Hr.
		11	Modify T8 of Power Sequencing from 10ms to 200ms.

3.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	1280(R.G.B) X 800
(2)	Module Size(mm)	254.96(W) X 172.6(H) X 6.59(D) *W/ PCB
(3)	Active Area(mm)	216.96(H) X 135.6(V)
(4)	Pixel Pitch(mm)	0.1695(H) X 0.1695(V)
(5)	LCD / Polarizer Model	Transmissive, Normally/Black; 7H front glass
(6)	LED Backlight Color	White LED
(7)	Support Colors	16.7 M colors (RGB 8-bits)
(8)	Color Configuration	R.G.B Vertical Stripe
(9)	Electrical Interface	LVDS
(10)	Viewing Direction	All Viewing Angle
(12)	Integration of LCM and Touch	Air gap tapes
(13)	PCAP Touch Function	10 fingers multi-touch Max., EXC3160 IC
(14)	Module Weight(g)	TBD



CN1			
PIN	FUNCTION	PIN	FUNCTION
1	N/C	21	LV3P
2	VDD	22	GND
3	VDD	23	LED_GND
4	VDD_EDID	24	LED_GND
5	SCL_EDID	25	LED_GND
6	SDA_EDID	26	N/C
7	N/C	27	LED_PWM
8	LV0N	28	LED_EN
9	LV0P	29	N/C
10	GND	30	N/C
11	LV1N	31	LED_VCC
12	LV1P	32	LED_VCC
13	GND	33	LED_VCC
14	LV2N	34	N/C
15	LV2P	35	BIST
16	GND	36	N/C
17	LVCLKN	37	N/C
18	LVCLKN	38	N/C
19	GND	39	N/C
20	LV3N	40	N/C

CN2	
PIN	FUNCTION
1	GND_E
2	VDD
3	GND
4	D+
5	D -

NOTE :
1. CN1 : Starconn 300E40-0010RA-G3 .
2. CN2 : CNBN E1254-0501
3. Surface Hardness : 7 H .
4. Foe RoHS.

General Tolerance ±				
DIM \ Level	1	2	3	4
0~5	0.03	0.05	0.05	0.2
5~15	0.05	0.1	0.1	0.3
15~60	0.05	0.1	0.15	0.5
60~150	0.1	0.2	0.25	0.8
150~300	0.1	0.2	0.3	0.8
300~600		0.3	0.5	0.8
Level Seclect			◎	

	備考		單位:mm	投影法:	比例尺: 1 : 1
入庫	製圖		名稱:		圖號 CH101ILHL-CT2
	審查				
	承認				

5. INTERFACE PIN CONNECTION

5.1 LCM PANEL DRIVING SECTION CN1: Starconn 300E40-0010RA-G3

Pin #	Signal Name	Description	Remarks
1	NC	No Connection	-
2	VDD	Power Supply	-
3	VDD	Power Supply	-
4	VDD_EDID	VDD_EDID	-
5	SCL_EDID	SCL_EDID	-
6	SDA_EDID	SDA_EDID	-
7	NC	No Connection	-
8	LV0N	-LVDS Differential Data Input	-
9	LV0P	+LVDS Differential Data Input	
10	GND	Ground	-
11	LV1N	-LVDS Differential Data Input	-
12	LV1P	+LVDS Differential Data Input	
13	GND	Ground	-
14	LV2N	-LVDS Differential Data Input	-
15	LV2P	+LVDS Differential Data Input	
16	GND	Ground	-
17	LVCLKN	-LVDS Differential Clock Input	-
18	LVCLKN	+LVDS Differential Clock Input	
19	GND	Ground	-
20	LV3N	-LVDS Differential Data Input	-
21	LV3P	+LVDS Differential Data Input	
22	GND	Ground	-
23	LED_GND	Ground for LED Driving	-
24	LED_GND	Ground for LED Driving	-
25	LED_GND	Ground for LED Driving	-
26	NC	No Connection	-
27	LED_PWM	PWM Input Signal for LED Driver	-
28	LED_EN	LED Enable Pin	-
29	NC	Reserved For CABC	-
30	NC	No Connection	-
31	LED_VCC	Power Supply for LED Driver	-
32	LED_VCC	Power Supply for LED Driver	-
33	LED_VCC	Power Supply for LED Driver	-
34	NC	No Connection	-
35	BIST	BIST pin	-
36	NC	No Connection	-
37	NC	No Connection	-
38	NC	No Connection	-
39	NC	No Connection	-
40	NC	No Connection	-

Note: All input signals shall be low or Hi- resistance state when VDD is off.

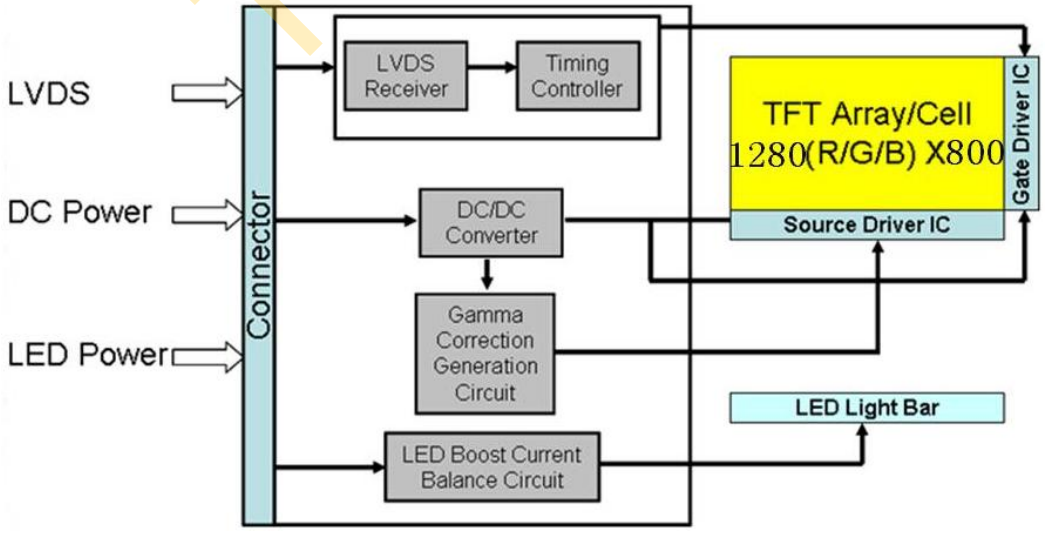
5.2 BACKLIGHT DRIVING SECTION

Item	Symbol		Min.	Typ.	Max.	Units	Note
LED Input Voltage	$V_{\_LED}$		(6)	(12)	(21)	V	(2)
LED Power Consumption	$P_{\_LED}$		-	-	(2.5)	W	(2)
LED Forward Voltage	V_F		(2.9)	-	(3.2)	V	(2)
LED Forward Current	I_F		-	(20)	-	mA	
PWM Signal Voltage	V_{PWM_EN}	High	(3.0)	-	(3.6)	V	
		Low	(0)	-	(0.4)		
LED Enable Voltage	V_{LED_EN}	High	(3.0)	-	(3.6)	V	
		Low	(0)	-	(0.4)		
Input PWM Frequency	FPWM		(1)	-	(2)	KHz	D_{DIM}≥1% (2)
			(2)	-	(5)		D_{DIM}≥2.5% (2)
			(5)	-	(10)		D_{DIM}≥5% (2)
			(10)	-	(20)		D_{DIM}≥10% (2)
LED Life Time	LT		(20,000)	-	-	Hours	(1)(2)

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

Note (2): Operating temperature 25℃, humidity 55%.

6.BLOCK DIAGRAM



7.ABSOLUTE MAXIMUM RATINGS

7.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

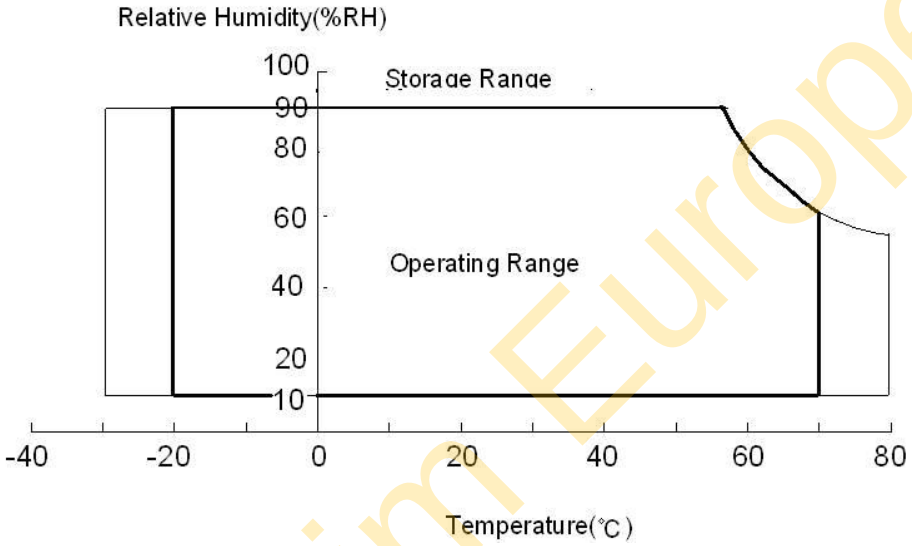
ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
Power Supply Voltage For LCD	VDD	-0.3	7	V	
Power Supply Voltage LED Driver	VCC	-0.3	24	V	

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		COMMENT
	MIN	MAX	MIN	MAX	
Ambient Temperature(℃)	-20	65	-25	75	Note 1,2
Humidity(% RH)	10	90	10	90	

Note 1 : Maximum Wet-Bulb temperature should be 39 degree C and no condensation.

Note 2 : When you apply the LCD module for OA system. Please make sure to keep the temperature of LCD module is less than 70℃.



8. ELECTRICAL CHARACTERISTICS

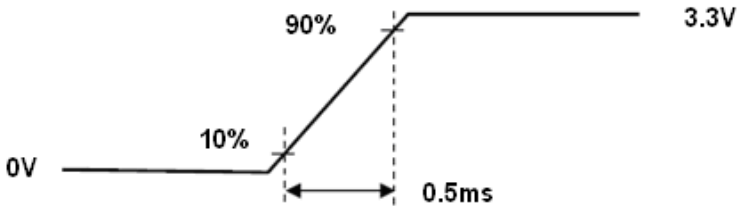
8.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage for LCD	VDD	3.0	3.3	3.6	V	(2, 4)
Rush Current	Irush	-	-	1.5	A	(1, 4, 5)
VDD Power	PDD	-	-	1.2	W	(3, 4)
IDD Current	IDD	-	295	-	mA	(3, 4)
Allowable Logic/LCD drive ripple voltage	VDDrp			300	mVp-p	(4)
LED Power Consumption	PLed	-	-	2.5	W	(3, 4)

Note (1) Measure Condition

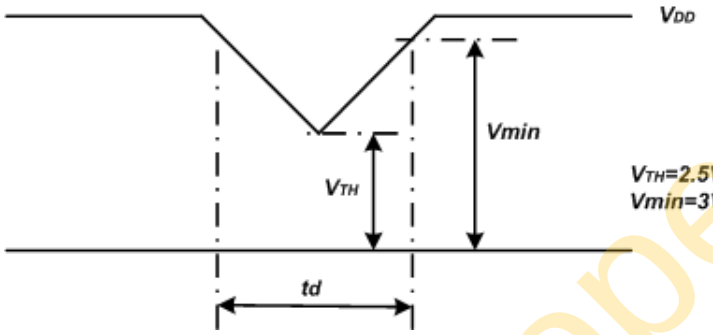
VDD Rising Time



Note (2) VDD Power Dip Condition

If VTH<VDD≤Vmin，then td≤10ms；when the voltage return to normal our panel must revive automatically.

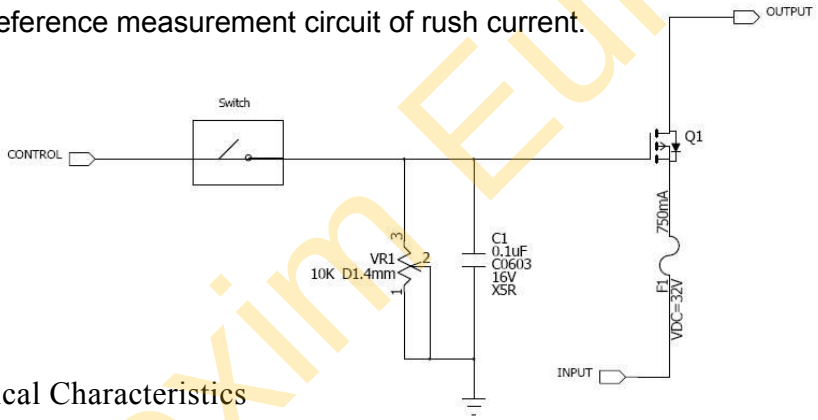
VDD Power Dip



Note (3) Frame Rate=60Hz, VDD=3.3V,DC Current.

Note (4) Operating temperature 25℃, humidity 55%RH.

Note (5) The reference measurement circuit of rush current.



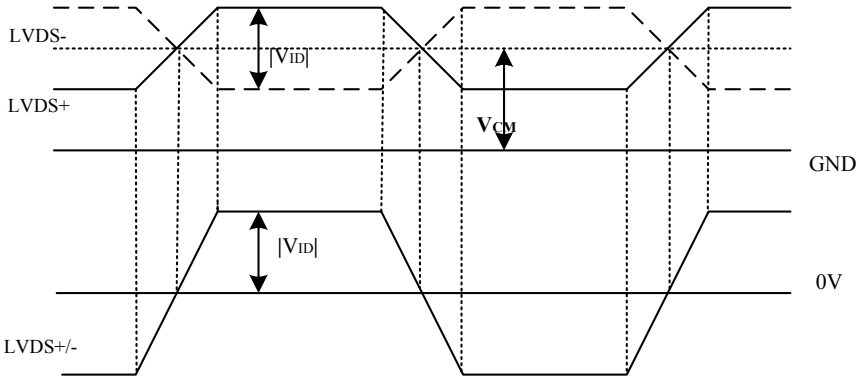
8.2 Signal Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High	Vth	-	-	+100	mV	V_{CM}=+1.2V
Differential Input Low	Vtl	-100	-	-	mV	V_{CM}=+1.2V
Magnitude Differential Input	$\|V_{ID}\|$	200	-	400	mV	-
Common Mode Voltage	V_{CM}	0.3+（VID/2）	-	VDD-1.2-（VID/2）	V	-
Common Mode Voltage	ΔV_{CM}	-	-	50	mV	V_{CM}=+1.2V

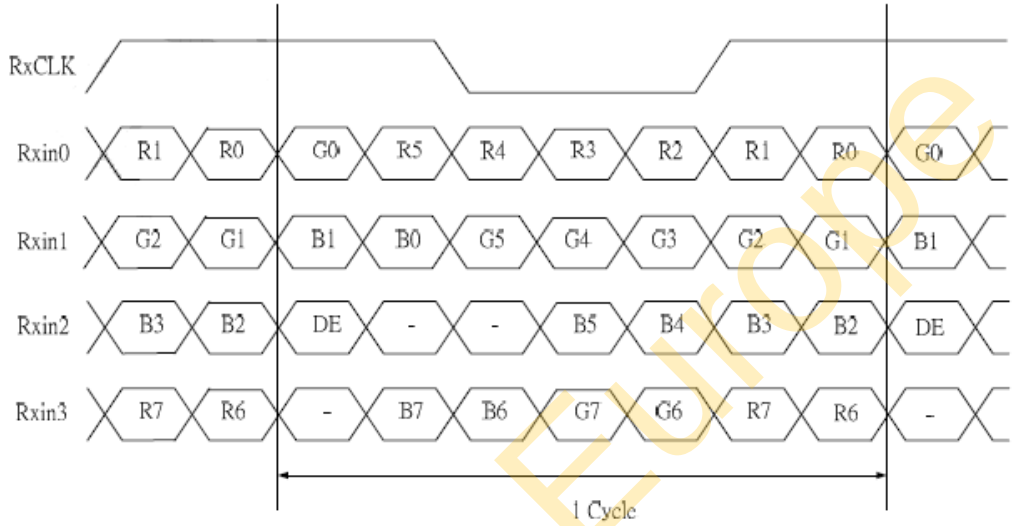
Note (1) Input signals shall be low or Hi-Z state when VDD is off.

(2) All electrical characteristics for LVDS signal are defined and shall be measured at the interface connector of LCD.

Voltage Definitions



LVDS Data Mapping



9.OPTICAL CHARACTERISTICS

Ta=25℃

ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle Θx=Θy =0°	(600)	(800)	-	-	Note (1)
Response Time		TR + TF		-	25	50	ms	Note (2)
Chromaticity	White	x		-	(0.31)	-	-	Note (4)
		y		-	(0.33)	-	-	
Viewing Angle	Hor.	Θx+	Viewing Angle Θx=Θy =0° CR≧10	-	(85)	-	Deg.	Note (3)
		Θx-		-	(85)	-		
	Ver.	ΘY+		-	(85)	-		
		ΘY-		-	(85)	-		
Luminance		L	PWM:100% Duty	(230)	(300)	-	cd/m2	Center Point
Luminance Uniformity		YU			(75)	-	%	Note (5)

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

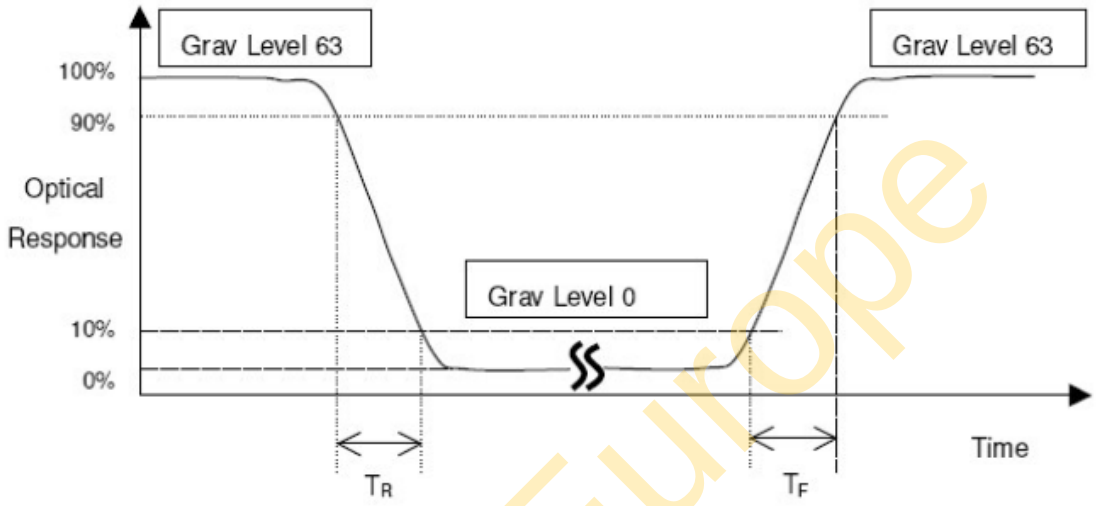
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

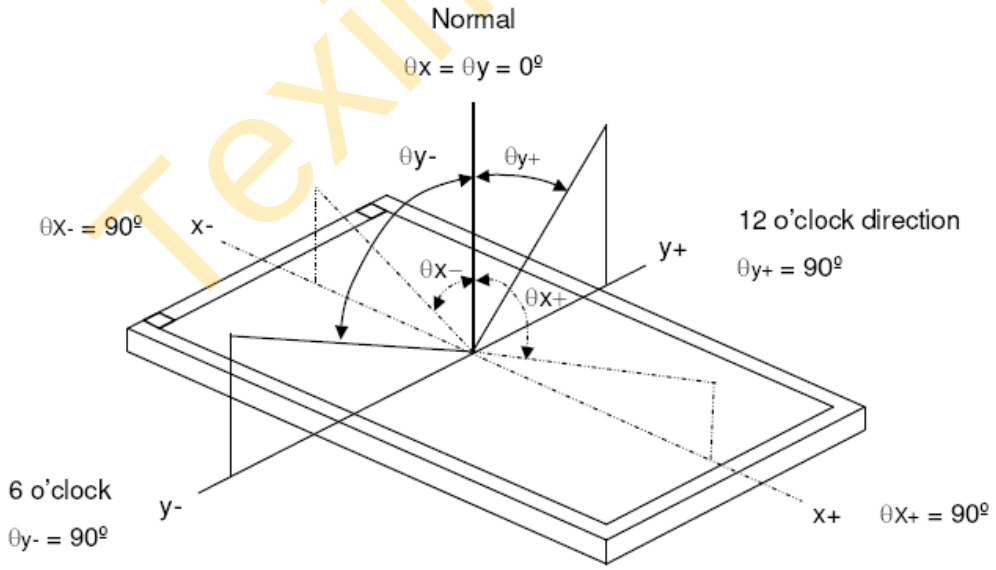
CR = CR (5)

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

*Note (2) Definition of Response Time (T_R, T_F):

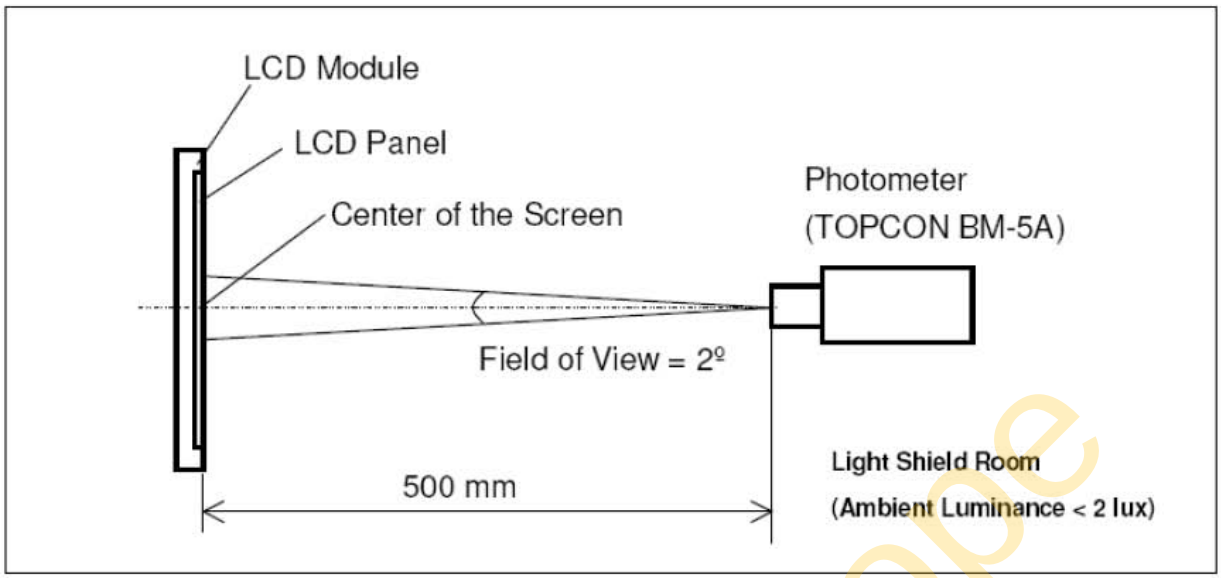


*Note(3) Definition of Viewing Angle



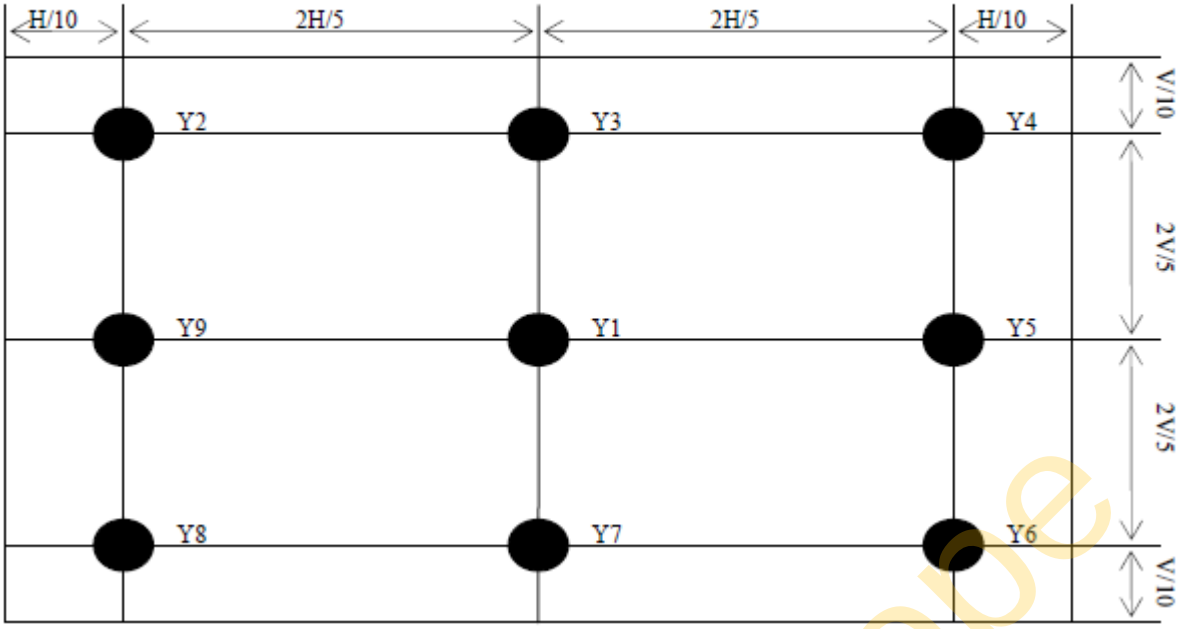
*Note (4) Measurement Set-Up:

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



*Note (5)

Figure 6 Measurement Locations

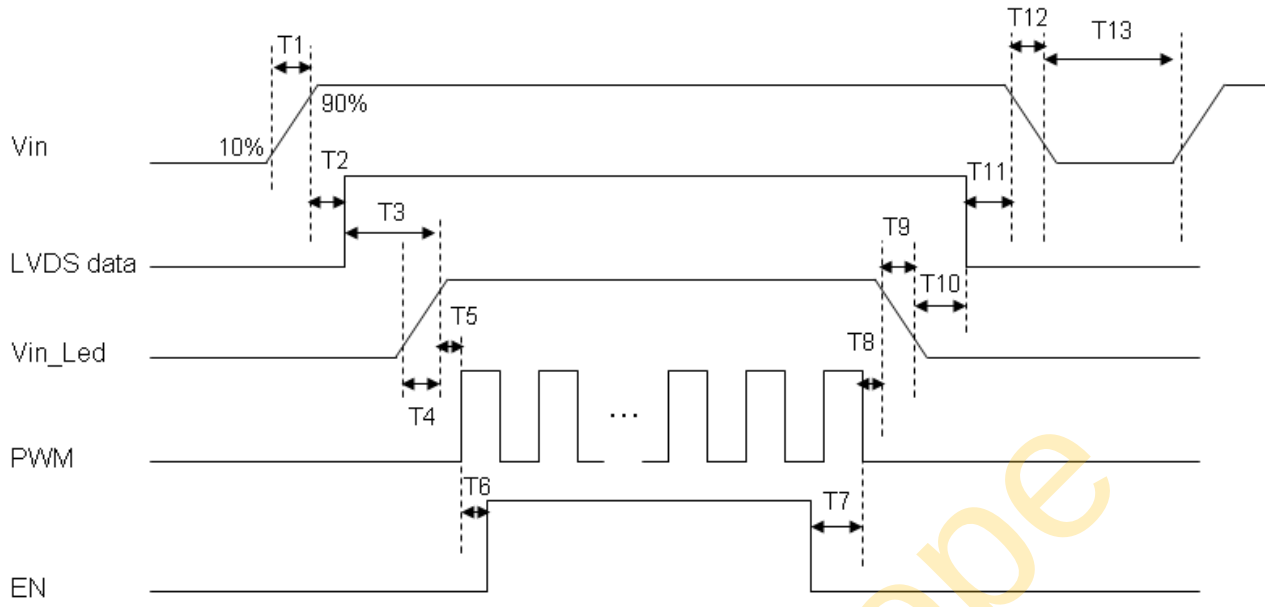


$$\left(1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}}\right) \times 100\% > 75\%$$

10. TIMING SPECIFICATIONS

10.1 POWER SINGAL SEQUENCE

Power ON/OFF Sequence



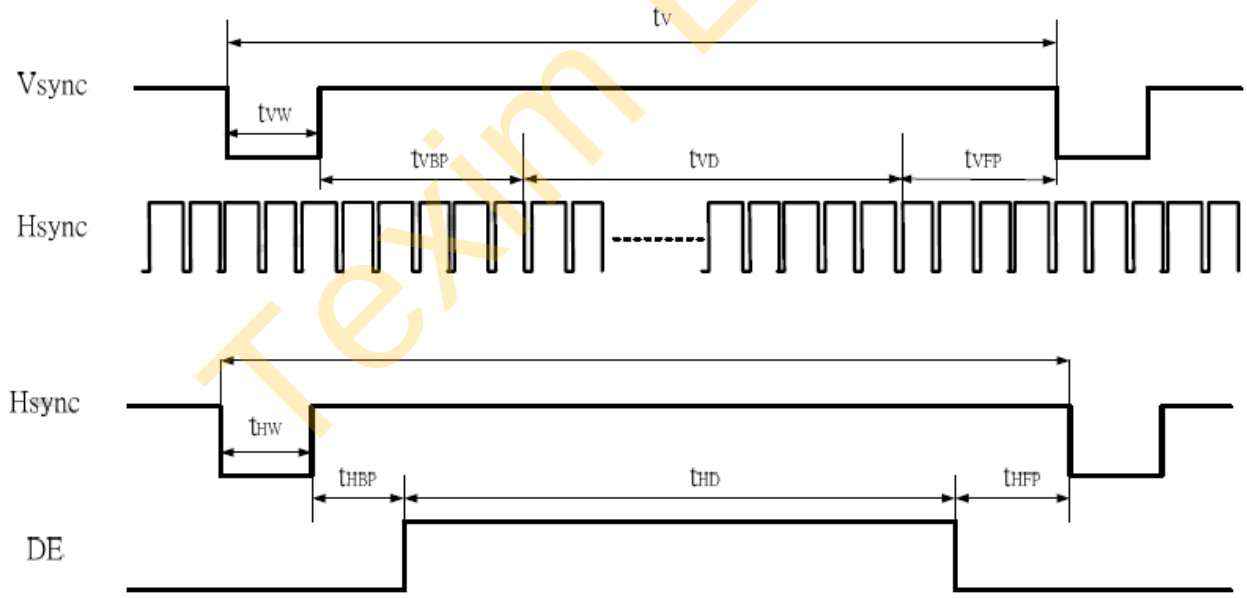
Power Sequencing Requirements

Parameter	Symbol	Unit	Min	Typ.	Max
VIN Rise Time	T1	ms	0.5	--	10
VIN Good to Signal Valid	T2	ms	30	--	90
Signal Valid to Backlight On	T3	ms	200	--	--
Backlight Power On Time	T4	ms	0.5	--	--
Backlight VDD Good to System PWM On	T5	ms	10	--	--
System PWM ON to Backlight Enable ON	T6	ms	10	--	--
Backlight Enable Off to System PWM Off	T7	ms	0	--	--
System PWM Off to B/L Power Disable	T8	ms	200	--	--
Backlight Power Off Time	T9	ms	0.5	10	30
Backlight Off to Signal Disable	T10	ms	200	--	--
Signal Disable to Power Down	T11	ms	0	--	50
VIN Fall Time	T12	ms	0.5	10	30
Power Off	T13	ms	500	--	--

10.2 TIMING CHARCTERISTICS OF INPUT SIGNALS

Parameter	Symbol	Unit	Min.	Typ.	Max.
Frame Rate	--	Hz	-	60	-
Frame Period	t_V	line	(815)	(823)	(1023)
Vertical Display Time	t_{VD}	line		800	
Vertical Blanking Time	$t_{VW}+t_{VBP}+t_{VFP}$	line	(15)	(23)	(33)
1 Line Scanning Time	t_H	clock	(1410)	(1440)	(1470)
Horizontal Display Time	t_{HD}	clock		1280	
Horizontal Blanking Time	$t_{HW}+t_{HBP}+t_{HFP}$	clock	(60)	(160)	(190)
Clock Rate	1/Tc	MHz	(68.9)	(71.1)	(73.4)

10.3 Timing diagram



11. RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	75℃	120HRS	
2	Low Temperature Storage	-25℃	120HRS	
3	High Temperature Humidity Storage	50℃ 80%RH	120HRS	
4	High Temperature Operation	65℃	120HRS	
5	Low Temperature Operation	-20℃	120HRS	
6	Temperature Cycle	-25℃←25℃→75℃ (30min) (5min) (30min)	100CYCLE	

Note 1: a. Tthe module should work properly.

b. Before and after function test, the difference of consumptive current.should be within 10%

Note 2 : a. The module should work properly.

b. The modlue won't be deformative, color changeable or broken.

c. The modules can't be apart.

12. HANDLING PRECAUTIONS

12.1 ASSEMBLY PRECAUTIONS

(1)You must mount a module using holes arranged in four corners or four sides.

(2)You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.

(3)Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.

(4)Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

(5)Do not open the case because inside circuits do not have sufficient strength.

(6)Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

(7)Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.

(8)Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

12.2 OPERATING PRECAUTIONS

(1)Please be sure to turn off the power supply before connecting and disconnecting signal input cable.

(2)Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification

(3)Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.

(4)When fixed patterns are displayed for a long time, remnant image is likely to occur.

(5)Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

(6)Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

12.3 ELECTROSTATIC DISCHARGE CONTROL

(1)The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such the copper leads on the PCB and the interface terminals with any parts of the human body.

(2)The modules should be kept in antistatic bags or other containers resistant to static for storage.

(3)Only properly grounded soldering irons should be used.

(4)If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.

(5)The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended.

(6)Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

12.4 STORAGE PRECAUTIONS

(1)When you store LCDs for a long time, it is recommended to keep the temperature between 0°C-40°C without the exposure of sunlight and to keep the humidity less than 90%RH.

(2)Please do not leave the LCDs in the environment of high humidity and high temperature such as 60°C 90%RH.

(3)Please do not leave the LCDs in the environment of low temperature; below -20°C.

12.5 OTHERS.

(1)A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight Land strong UV rays

(2)Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.

(3)For the packaging box, please pay attention to the followings:

a. Please do not pile them up more than 5 boxes.
(They are not designed so.) And please do not turn over.

b. Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.

c. Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

12.6 LIMITED WARRANTY

Unless otherwise agreed between Chefree and customer, Chefree will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with Chefree acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of Chefree is limited to repair and/or replacement on the terms set forth above. Chefree will not responsible for any subsequent or consequential events.