LCD Module + Touch Panel Specifications

Customer:	
Model Name:	**MCTP101C38A-001**
Date:	**2017.10.25**
Version:	**V.0**

■Preliminary Specification

□Final Specification

Customer Signature

Approved By	Comment

Approved By	Checked By	Prepared By
Carrio	Carrio	LXL

Record of Revision

Version	Revise Date	Page	Content	Modified by
V.0	2017.10.25	ALL	First Issue	LXL

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1. GENERAL DESCRIPTION

1.1 Introduction

This specification applies to the 10.1 inch diagonal display module with touch panel .

1.2 Features

10.1 inch configuration
Compatible with NTSC & PAL system
Image Reversion: UP/DOWN and LEFT/RIGHT
Capacitive touch screen
ROHS design

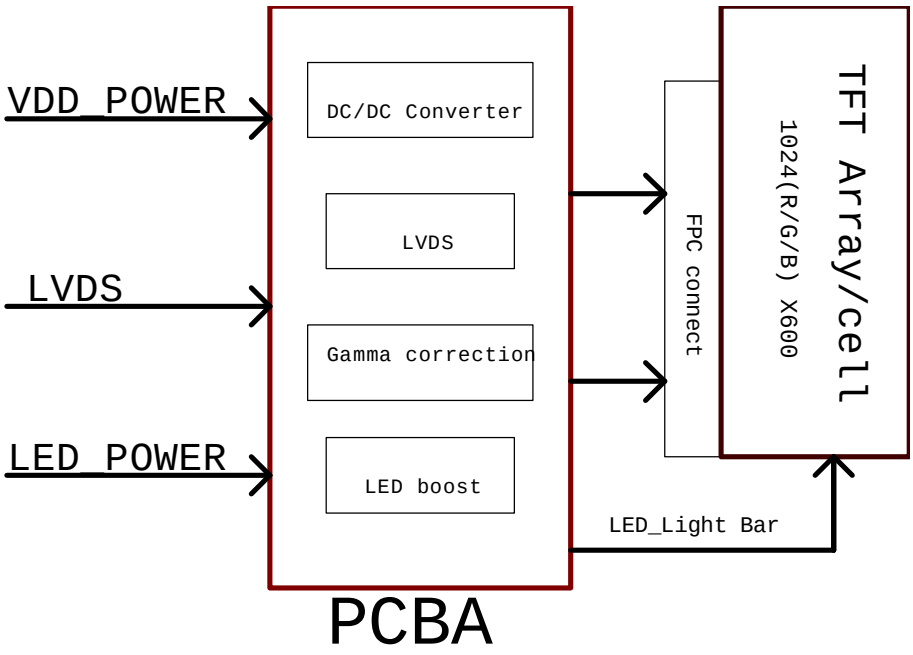
1.3 General Information

Feature		SPEC
Display Spec	Size	10.1 inch
	Resolution	1024(H) x 3RGB x 600(V)
	Technology Type	a-si TFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Pixel pitch(mm)	0.217(H) x 0.208(V)
	Display Mode	Normally white TN
	Surface Treatment	Anti-Glare， Surface hardness: 3H
	Viewing Direction	6 O'clock
	Gray Scale Inversion Direction	12 O'clock
Mechanical	OD (W*H*D)(mm)	245.64(H) x 148.2(W) x 6.9(D)
	Active Area	222.72(H) x 125.28(W)
	With/Without TP	With TP
	Matching Connection Type	TBD
	Weight(g)	340±5 (g)
Electrical Characteristics	Interface	LVDS
	Color Depth	262K
	Driver IC	HX8282-A02 / HX8696-A
CTP	Interface	IIC/USB
	Surface hardness	6H
	Structure	G+G
	Touch Method	Finger
	Active Area(mm)	223.72(H) x 126.68(V)

	Number of Simultaneous Touches	5
	Minimum Touch Area(mm)	0.5
	Finger Touch Pitch(mm)	2.5

2. Electrical Characteristics

2.1 Functional Block Diagram



2.2 Abslute Maximum Ratings

Item	Symbol	Min	Max	Unit	Remark
Supply Voltage	VDD	-0.5	5	V	
Supply V_ LED Voltage	V_VDD	4.5	6	V	
Input Signal		-0.5	2.6	V	
Operating Temperature	TOP	-20	70	℃	
Operating Humidity	HOP		80	%RH	
Storage Temperature	TST	-30	80	℃	
Storage Humidity	HST		90	%RH	

2.3 Typical Operation Conditions

Item	Symbol	Min	Typ	Max	Unit
Digital Supply Voltage	VDD	-0.5	3.2	5	V
VLED Supply Voltage	VLED	3.3	5	6	V
VEDID Voltage	VEDID	3	3.3	3.6	V

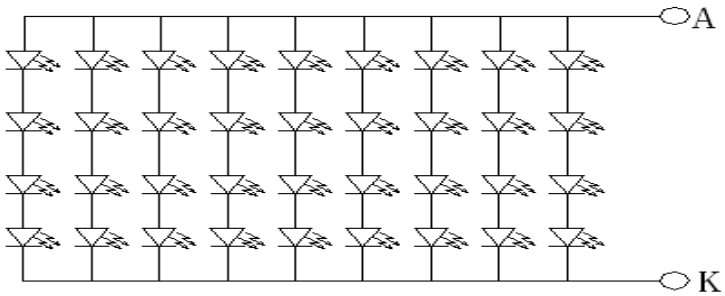
2.4 Back-light Unit

Item	Symbol	Min	Typ	Max	Unit	Condition
LED Current	IF	—	180	—	mA	Ta=25℃
LED Voltage	VF	12	13.2	14	V	Ta=25℃
Life Time		30K	50K		Hr	Ta=25℃

Note 1：LED supply voltage defined by an array of 9 branches of 4 diodes in series.

Note 2：Useful Life is defined as the time for the emitted luminance of the backlight to decline to 50% of its initial brightness.

Backlight LED Array



LED circuit diagram

Stresses above those listed under "Absolute Maximum Rating" may cause permanent damage to the device.

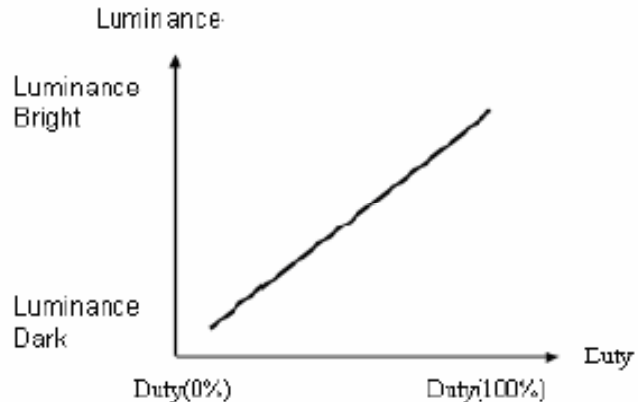
2.4 TFT LCD Panel Driving Section

Pin NO	SYMBOL	DESCRIPTION	Remark
1	GND	Ground	
2	VDD	3.3V Power	
3	VDD	3.3V Power	
4	V_EDID	3.3V Power for EDID	
5	ADJ	Adjust for LED brightness Note	Note1,Note2
6	CLK_EDID	EDID Clock Input	
7	DATA_EDID	EDID Data Input	
8	RXIN0-	LVDS Signal - channel0-	
9	RXIN0+	LVDS Signal - channel0+	
10	GND	Ground	
11	RXIN1-	Data Input channel1-	
12	RXIN1+	Data Input channel1+	
13	GND	Ground	
14	RXIN2-	Data Input channel2-	
15	RXIN2+	Data Input channel2+	
16	GND	Ground	
17	RXCLKIN-	Data Input CLK-	
18	RXCLKIN+	Data Input CLK+	
19	GND	Ground	
20	NC	NC	
21	NC	NC	
22	GND	Ground	
23	GND	Ground	

24	VLED	LED Power +5V	
25	VLED	LED Power +5V	
26	VLED	LED Power +5V	
27	NC	NC	
28	NC	NC	
29	NC	NC	
30	NC	NC	

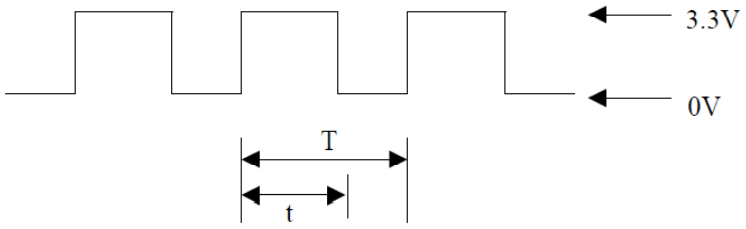
Note: The brightness of LCD panel could be changed by adjusting ADJ .

Note1: ADJ can adjust brightness to control Pin . Pulse duty the bigger the brighter .



Note2: ADJ Signal=0~3.3V , Operation Frequency :

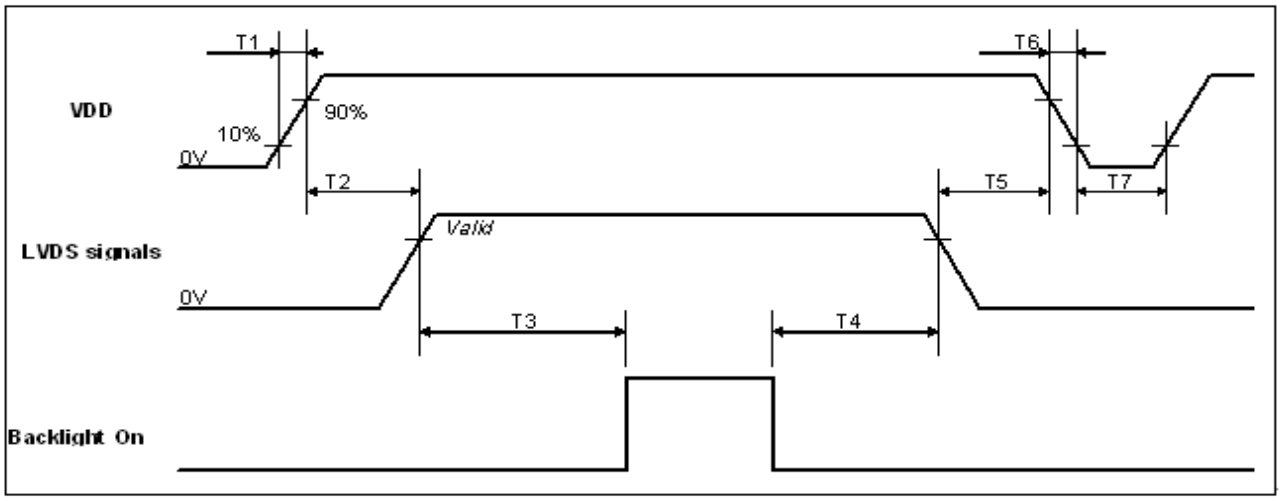
Dimming Range		
PWM Frequency (F)	Duty Cycle (min)	Duty Cycle (max)
100Hz < F < 500Hz	5%	100%
500Hz < F < 20KHz	10%	100%



Duty Cycle = t / T *100%

T = 1 / F

2.5 Power Sequence



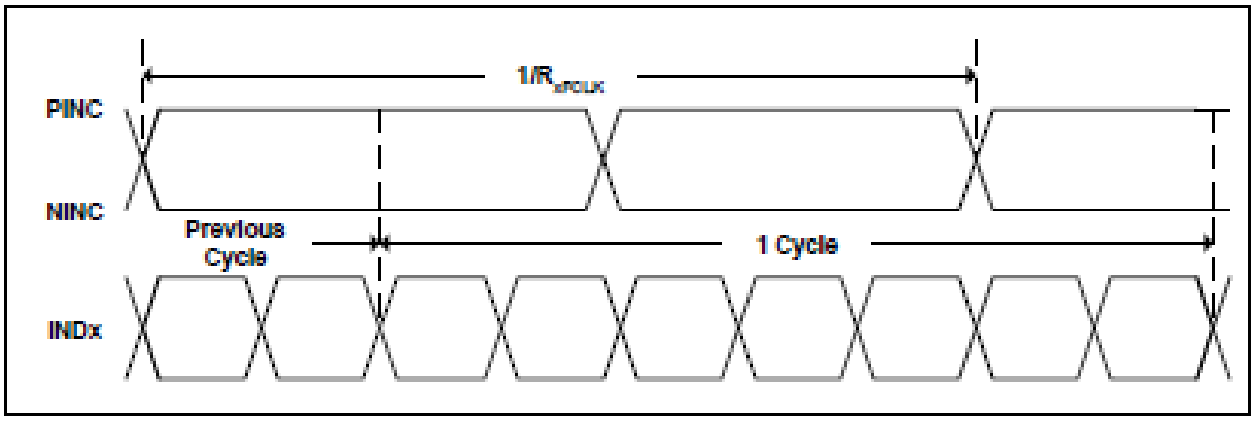
Item	Symbol	Min	Typ	Max	Unit
VDD rise time	T1	0.5		10	ms
VDD Good to Signal Valid	T2	0		50	ms
Signal Valid to Backlight ON	T3	200			ms
Backlight OFF to Signal Disable	T4	200			ms
Signal Disable to Power Dowm	T5	0		50	ms
VDD Fall Time	T6	0		10	ms
Power OFF	T7	400			ms

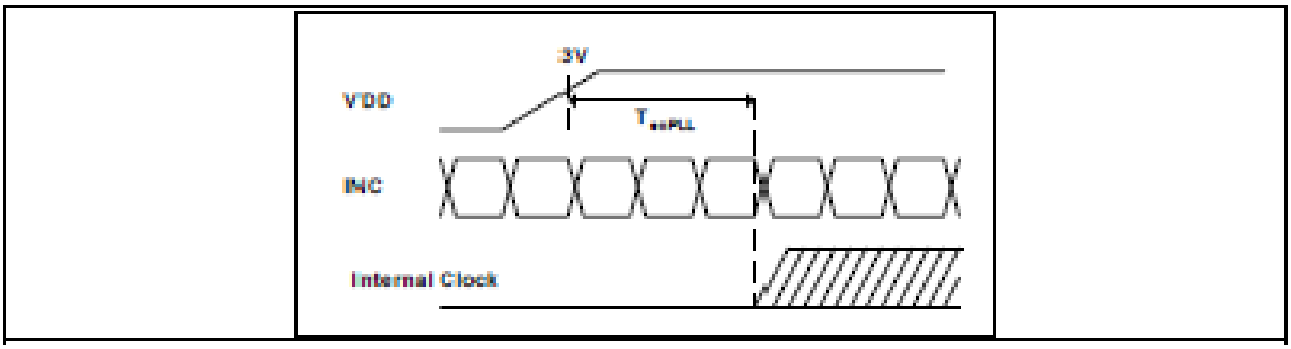
2.6 Input Signal Timing

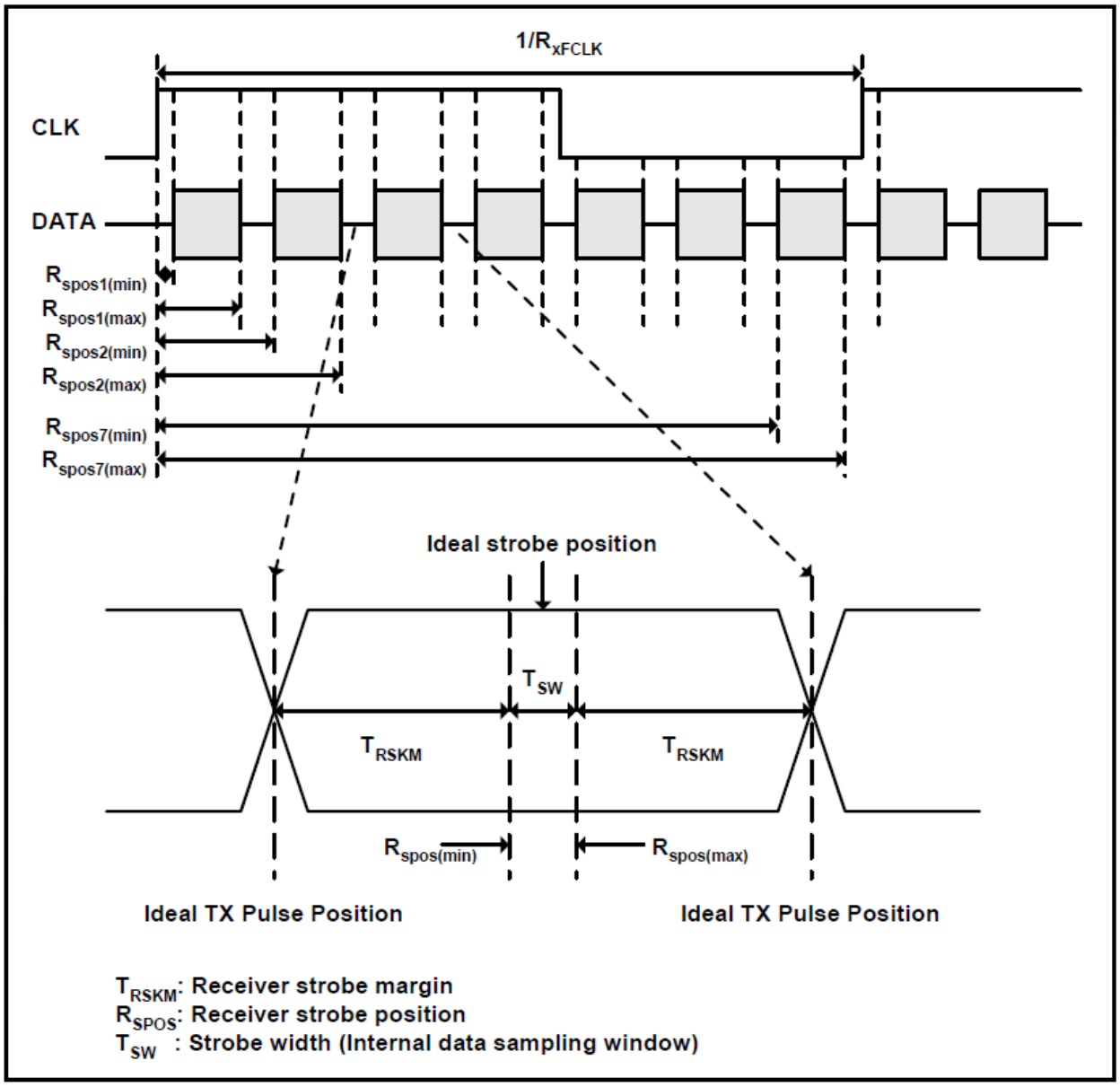
2.6.1 AC Electrical Characteristics

LVDS mode AC Electrical characteristics

Item	Symbol	Min	Typ	Max	Unit	Condition
Clock frequency	RxFCLK	20		71	MHZ	
Input data skew margin	TRSKM	500			pS	| VID | =400mV RxVCM=1.2V RxFCLK=71 MHz
Clock high time	TLVCH		4/(7*RxFCLK)		ns	
Clock low time	TLVCl		3/(7*RxFCLK)		ns	
PLL wake-up time	TenPLL			150	uS	





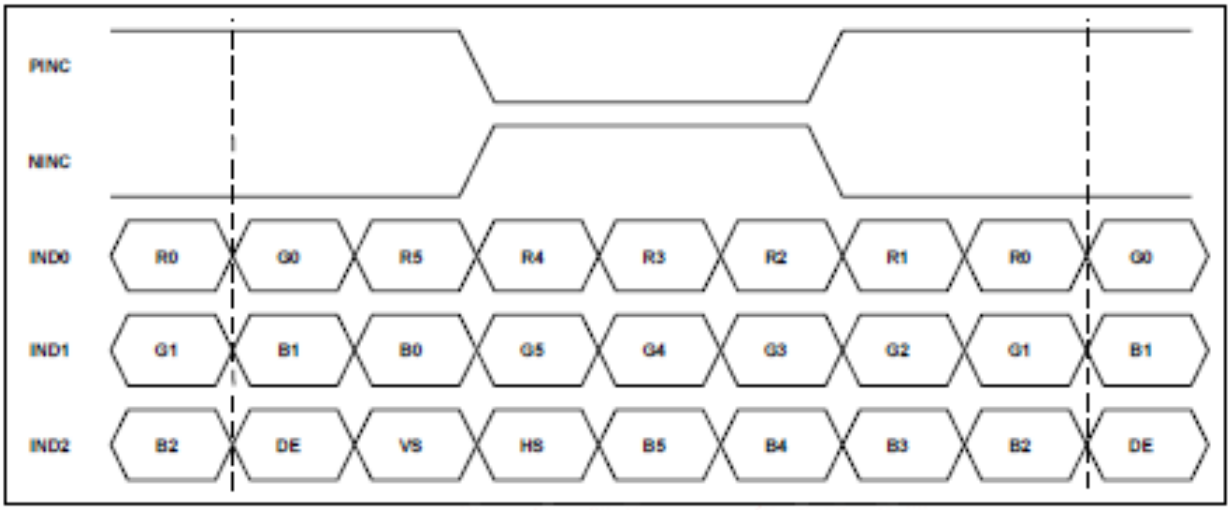


SSC to rence of LVDS receiver						
Item	**Symbol**	**Min**	**Typ**	**Max**	**Condition**	**Units**
Modulation Frequency	SSCMF	23		93		KHZ
Modulation Rate	SSCMF			+3	LVDS clock = 71 MHZ center spread	%

2.7 Data Input Format

2.7.1 Data Input Format for LVDS

6bit LVDS input (HSD=ʼHʼ)



2.8 Parallel RGB input timing table

2.8.1 DE mode

Item	Symbol	Min	Typ	Max	Unit
DCLK Frequency@ Frame rate=60Hz	fclk	40.8	51.2	67.2	MHZ
Horizontal Display Area	thd		1024		DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		600		TH
VSYNC period time	tv	610	635	800	TH
VSYNC blanking	tvbp+tvfp	10	35	200	TH

2.8.2 HV mode

Horizontal input timing

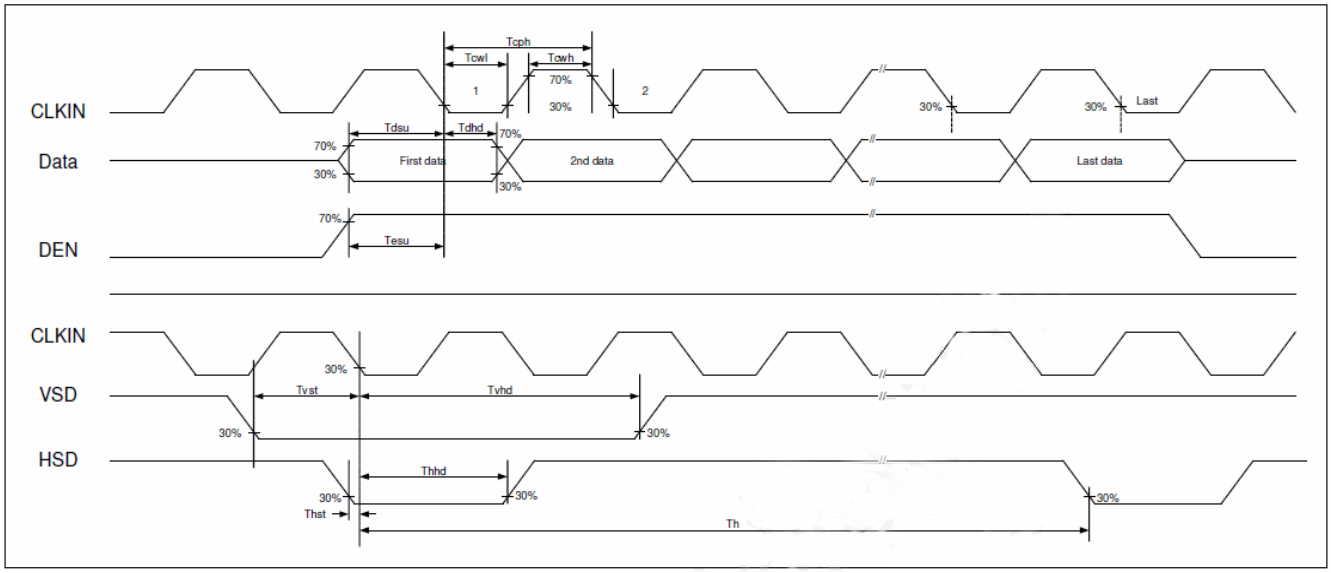
Item		Symbol	Min	Typ	Max	Unit
DCLK Frequency@ Frame rate=60Hz		fclk	44.9	51.2	63	MHZ
Horizontal Display Area		thd		1024		DCLK
1 Horizontal Line		th	1114	1344	1400	DCLK
HSYNC pulse width	Min	thpw		1		DCLK
	Typ			-		
	Max			140		
HSYNC blanking		thb	160	160	160	
HSYNC front porch		thfp	16	160	216	

Vertical input timing

Item	Symbol	Min	Typ	Max	Unit
Vertical display area	tvd		600		TH
VSYNC period time	tv	624	635	750	TH
VSYNC pulse width	tvpw	1	-	20	TH
VSYNC Blanking (tvb)	tvb	23	23	23	TH
VSYNC Front porch (tvfp)	tvfp	1	12	127	TH

2.9 Timing Diagram

2.9.1 Input Clock and Data Timing Diagram



3. Touch panel specifications

3.1 General Specification

Item	Contents	Unit
Outline Dimension	245.64*148.20*1.45	mm
Active Area(W*L)	231.22*136.96	mm
View Area	223.22*125.78	mm
TP size (inch)	10.1	inch
Interface Type	IIC /USB	-
Drive IC	SSD2533QN10	-
Number of touch point	5	-
Sensor thickness	0.55	mm
Cover lens thickness	2.0	mm
Resolution	>100 dpi	-
Input force	<10g	-
Surface hardness	> 6H	-

3.2 Electrical Characteristic

Item	Specification			
Insulation	20M _ or over(Dc 25V)			
Supply voltage for logic	min	type	max	unit
	2.8		5.0	V
Supply current for logic		13	20	mA
Current consumption(Green mode)		10	60	uA
Current consumption(Sleep mode)		1	10	uA
Supplu noise		<90		mV

Remark: The actual power consumption according to using environmental decision.

3.3 Optical Characteristics

Item	Specification	Remarks
Light Transmittance	≥85%	550nm

3.4 Touch panel pin assignment

IIC Int erface

PIN NO.	Symbol	Function Description
1	VCC-3V	Power supply voltage
2	INT	External interrupt INT to the host, It is active low when finger touching on the screen.
3	SCL	I2C Serial Clock
4	SDA-3V	I2C Serial Data
5	GND-3V	Ground
6	RESET	IExternal reset

USB Int erface

PIN NO.	Symbol	Function Description
1	VCC	Power supply voltage
2	D-	USB data-
3	D+	USB data+
4	NC	Empty
5	GND	Ground

4. Optical Characteristics

Item		Symbol	condition	Min	Typ	Max	Unit	Note
Luminous intensity		LV		320	380	-	cd/㎡	6
Contrast		CR		400	500	-		5
NTSC				-	48	-	%	
Color chromaticity (CIE1931)	White	Wx	θ=0 Normal viewing angle	0.26	0.31	0.36		
		Wy		0.28	0.33	0.38		
	Red	Rx		0.526	0.576	0.626		
		Ry		0.307	0.357	0.407		
	Green	Gx		0.261	0.311	0.361		
		Gy		0.515	0.565	0.615		
	Blue	Bx		0.099	0149	0.199		
		By		0.065	0.115	0.165		
Viewing angle	Hor	ΘL	CR>10	60	70	-		
		ΘR		60	70	-		
	Ver	ΘU		40	50	-		
		ΘD		60	70	-		
Luminance Uniformity		YU	θ=0	70	75	-	%	

4.1 Measuring Condition

- Measuring surrounding : dark room
- Ambient temperature : 25±2℃
- 30min. warm-up time.

4.2 Measuring Equipment

- TOPCON BM-5A
- Measuring spot size : field 1°

Note 1: Definition of viewing angle range

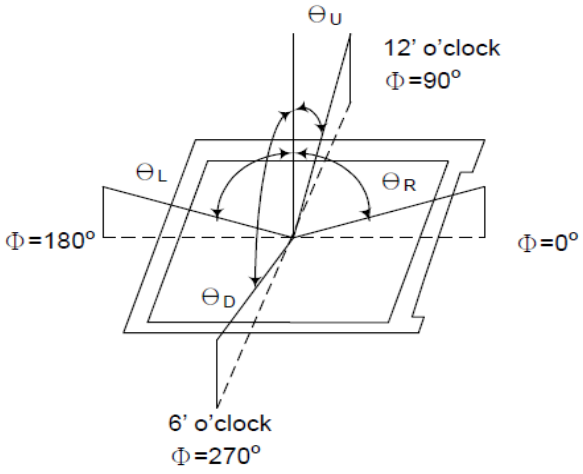


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system. The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-5A, other items are measured by BM-5A/Field of view: 1° /Height: 50cm.)

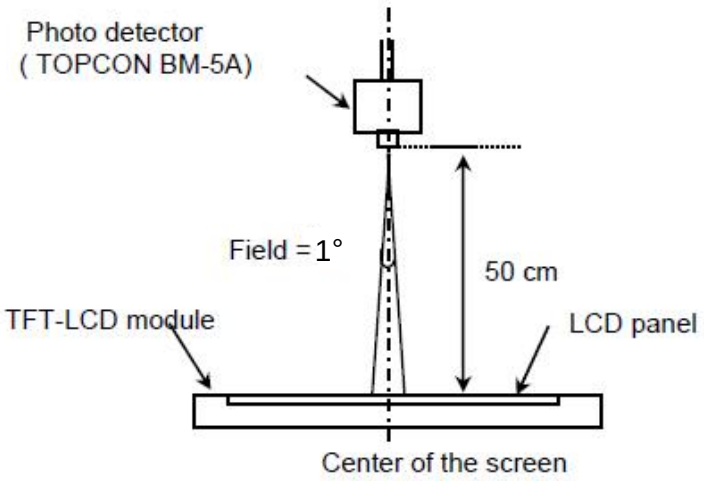


Fig. 4-2 Optical measurement system setup

Note 3: Definition of Response time The output signals of photo detector are measured when the input signals are changed from “black” to “white” (rising time) and from “white” to “black” (falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below

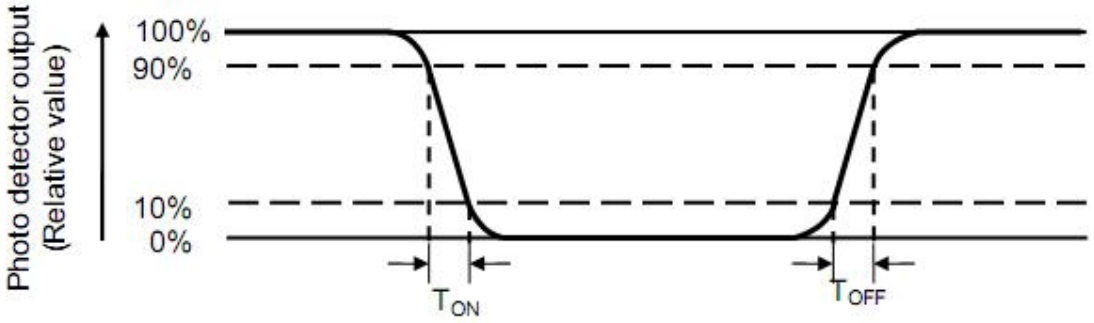


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio：

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

Note 5: Definition of color chromaticity (CIE1931) Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL=180 mA

Note 7: Definition of Luminance Uniformity Active area is divided into 9 measuring areas【Refer to Fig.4-4 】. Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{\text{Bmin}}{\text{Bmax}}$$

Bmin: The measured minimum luminance of all measurement position.
Bmax: The measured maximum luminance of all measurement position.
L-------Active area length W----- Active area width

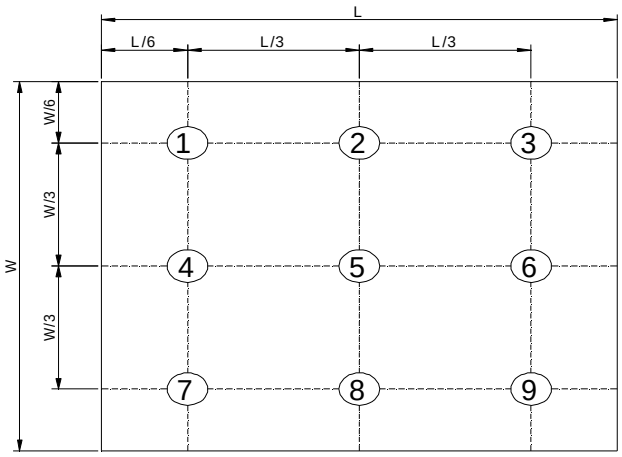
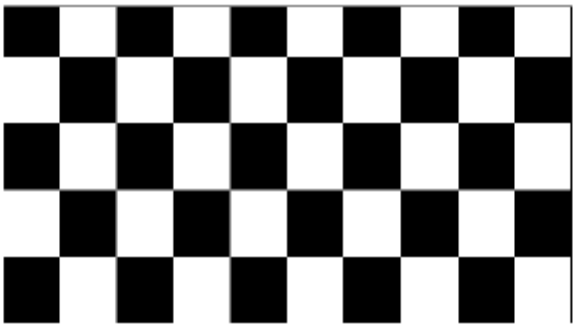


Fig. 4-4 Definition of measuring points

5. Reliability Test Items

NO.	Test Item	Test Conditions	Remark
1	High Temperature Storage	Ta = 80℃ 240hrs	Note 1，Note 4
2	Low Temperature Storage	Ta = -30℃ 240hrs	Note 1，Note 4
3	High Temperature Operation	Ts = 70℃ 240hrs	Note 2，Note 4
4	Low Temperature Operation	Ta = -20℃ 240hrs	Note 1，Note 4
5	Operate at High Temperature and Humidity	+60℃, 90%RH 240hrs	Note 4
6	Thermal Shock	-20℃/30 min ~ +60℃/30 min for a total 200 cycles, Start with cold temperature and end with high temperature.	NON- Operation
7	Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	NON- Operation
8	Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (8 hours for total)	NON- Operation

Note1:Condition of image Sticking test:25℃±2℃
Operation with test pattem sustained for 4 hrs,then change to gray pattern immediately. After 5 mins, the mura be disappeared completely.



(a)Test Pattern(chess board Pattern)

(b)Gray Pattern

Note 2: Ta is the ambient temperature of samples.
Note 3: Ts is the temperature of panel's surface.
Note 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 5: Before cosmetic and function test, the product must have enough recovery time,at least 2 hours at room temperature.

Electrostatic Discharge

TEST ITEM	CONFITIONS	NOTE
ESD	150Pf,330Ω 8kV&±15kV air& contact test	1
	200Pf,0Ω， ±200V contact test	2

Note: Measure point:

1. LCD glass and metal bezel
2. IF connector pins

6. General Precautions

6.1 Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

6.2 Handling

(1). The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
(2). The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
(3). To avoid contamination on the display surface, do not touch the module surface with bare hands.
(4). Keep a space so that the LCD panels do not touch other components.
(5). Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
(6). Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
(7). Do not leave module in direct sunlight to avoid malfunction of the ICs.

6.3 Static Electricity

(1). Be sure to ground module before turning on power or operating module.
(2). Do not apply voltage which exceeds the absolute maximum rating value.

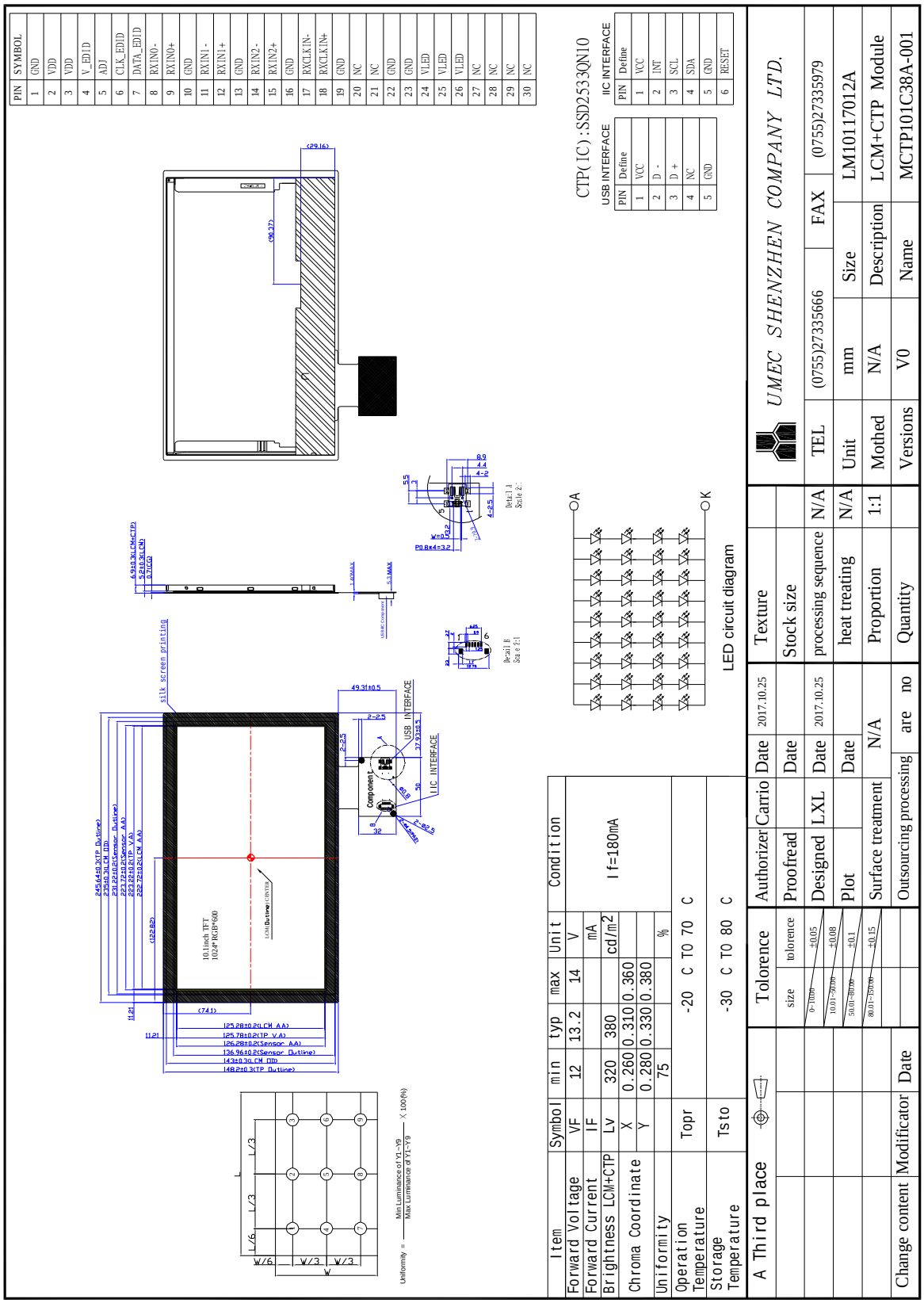
6.4 Storage

(1). Store the module in a dark room where must keep at 25±10℃ and 65%RH or less.
(2). Do not store the module in surroundings containing organic solvent or corrosive gas.
(3). Store the module in an anti-electrostatic container or bag.

6.5 Cleaning

(1). Do not wipe the polarizer with dry cloth. It might cause scratch.
(2). Only use a soft cloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

7.Mechanical Drawing



PIN	SYMBOL
1	GND
2	VDD
3	VDD
4	V_EDID
5	ADJ
6	CLK_EDID
7	DATA_EDID
8	RXIN0-
9	RXIN0+
10	GND
11	RXIN1-
12	RXIN1+
13	GND
14	RXIN2-
15	RXIN2+
16	GND
17	RXCLKIN-
18	RXCLKIN+
19	GND
20	NC
21	NC
22	GND
23	GND
24	VLED
25	VLED
26	VLED
27	NC
28	NC
29	NC
30	NC

USB INTERFACE

PIN	Define
1	VCC
2	D -
3	D +
4	NC
5	GND

IIC INTERFACE

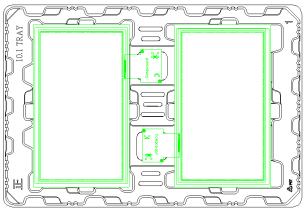
PIN	Define
1	VCC
2	INT
3	SCL
4	SDA
5	GND
6	RESET

Item	Symbol	min	typ	max	Unit	Condition
Forward Voltage	VF	12	13.2	14	V	If=180mA
Forward Current	IF				mA	
Brightness LCM+CTP	Lv	320	380		cd/m2	
Chroma Coordinate	X	0.260	0.310	0.360		
	Y	0.280	0.330	0.380		
Uniformity		75			%	
Operation Temperature	Topr	-20 C TO 70 C				
Storage Temperature	Tsto	-30 C TO 80 C				

A Third place	Tolorence		Authorizer	Carrio	Date	2017.10.25	Texture		UMEC SHENZHEN COMPANY LTD.			
	size	tolorence	Proofread		Date		Stock size		TEL	(0755)27335666	FAX	(0755)27335979
	0~10mm	±0.05	Designed	LXL	Date	2017.10.25	processing sequence	N/A	Unit	mm	Size	LM10117012A
	10.01~50mm	±0.08	Plot		Date		heat treating	N/A	Mothed	N/A	Description	LCM+CTP Module
	50.01~80mm	±0.1	Surface treatment		N/A		Proportion	1:1	Versions	V0	Name	MCTP101C38A-001
	80.01~150mm	±0.15	Outsourcing processing		are	no	Quantity					
Change content	Modificator	Date										

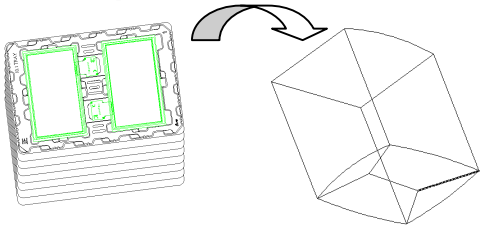
8. Packing Standard

Step1



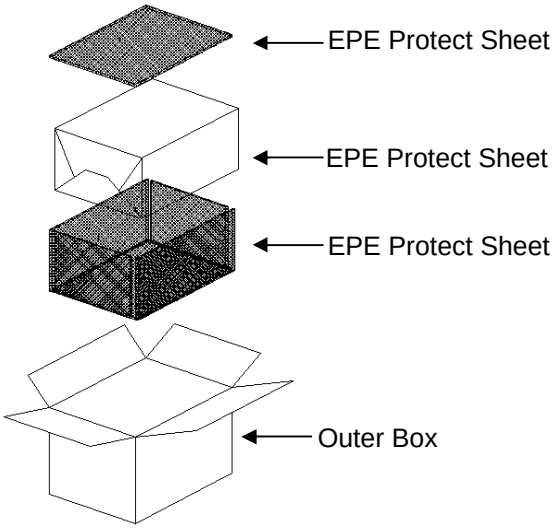
2PCS Product 1Tray

Step2



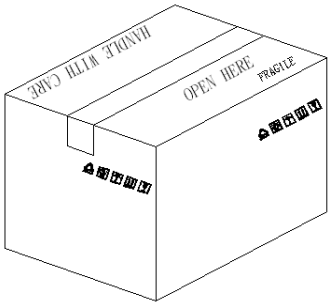
14PCS Product 1PE bag

Step3



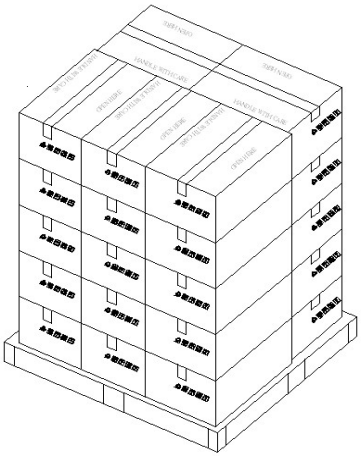
Outer Box

Step4



14PCS Product 1 Outer Box

Step5



The carton size is L495*W342*H195mm, and the pallet is L1200*W1000*H150mm. Each pallet packs 30 cartons (6layers) and each layer is including 5 cartons. The size of packed pallet is L1200*W1000*H1125mm, There are 14pcs in a carton