



深圳市恒通视讯科技有限公司

Shenzhen Heng Tong Video Technology Co., Ltd.

MODEL: HT043DA-V.0

< ◇ > PRELIMINARY SPECIFICATION

< ◆ > APPROVAL SPECIFICATION

CUSTOMER
APPROVED BY
DATE:

DESIGNED	CHECKED	APPROVED
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REVISION RECORD

<u>REV NO</u>	<u>REV DATE</u>	<u>PAGE</u>	<u>CONTENTS</u>	<u>ISSUER</u>
1.0	2016-12-1	18	First release	Liqin
1.1	2018-04-7		Modify Timing characteristics	Liqin

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1.0 GENERAL SPECIFICATIONS

HT043DA-V.0-TFT1N18 is a color active matrix LCD module incorporating amorphous silicon **TFT** (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver IC, FPC and a back light unit. The module display area contains **480x272** pixels. This product accords with RoHS environmental criterion.

Item	Contents	Unit
Viewing direction	6:00	O' Clock
Number of Pixels	480(RGB) x272	/
TFT-LCD manufacturers	BOE	
Number of color	16.7M	/
Shape size	105.5*67.15*2.9	mm
Active area (WxH)	95.04mm(W)×53.856mm(H)	mm
Pixel Pitch	0.198mm(H) × 0.198mm(W)	mm
Backlight Type	7*1chips white LED	/
Backlight life	50000	hours
Interface	RGB	
LCM Luminance	220(typ)	cd/m2
Contrast Ratio	200(typ)	

2.0 ABSOLUTE MAXIMUM RATINGS

The following are maximum values which, if exceeded ,may cause faulty operation or damage to the unit.

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Digital Power Supply Voltage	VDD	-0.3	-	4.4	V	-
Analog Power Supply Voltage	VDDI	-0.3	-	4	V	-
TFT Gate on voltage	VGH	11.5	15	19	V	-
TFT Gate off voltage	VGL	-16	-10	-8.5	V	-
Common Power Supply Voltage	VCOM	-3.475	-0.68	-3	V	-
TFT Gate on voltage	VGH	10.5	15	18	V	
TFT Gate off voltage	VGL	-15.5	-10	-7	V	
Common Power Supply Voltage	VCOM	-4	-0.68	-0.2	V	

Note :If users use the product out off the environment operation range (temperature and humidity ,it will have visual quality concerns

3.0 ELECTRICAL CHARACTERISTICS

Recommended Operating Condition

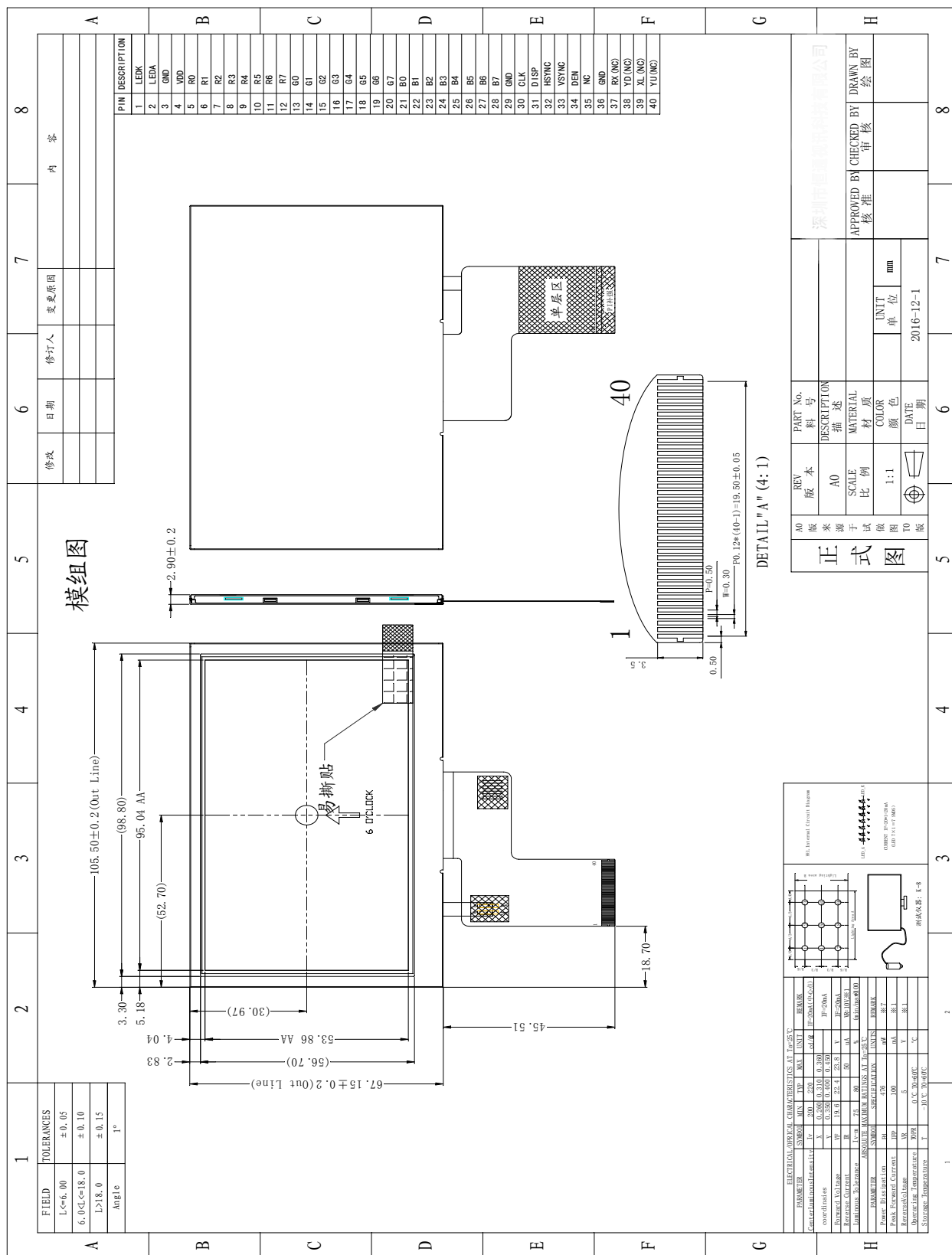
Item	Symbol	Min	TYP	Max	Unit	NOTE
Supply voltage for logic	VDD	3.1	3.3	3.5	V	

Note1 : Please adjust VCOM to make the flicker level be minimum.

3.1 BACKLIGHT CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit	Condition
Forward voltage	Vf	18.9	22.4	23.8	V	If=20mA
Luminance	Lv	200	220	-	cd/m2	If=20mA
Number of LED	--	7			Piece	--
Connection mode	P	7serial 1parallel			--	--

4.0 DIMENSIONAL DRAWING



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5.0 INTERFACE PIN CONNECTIONS

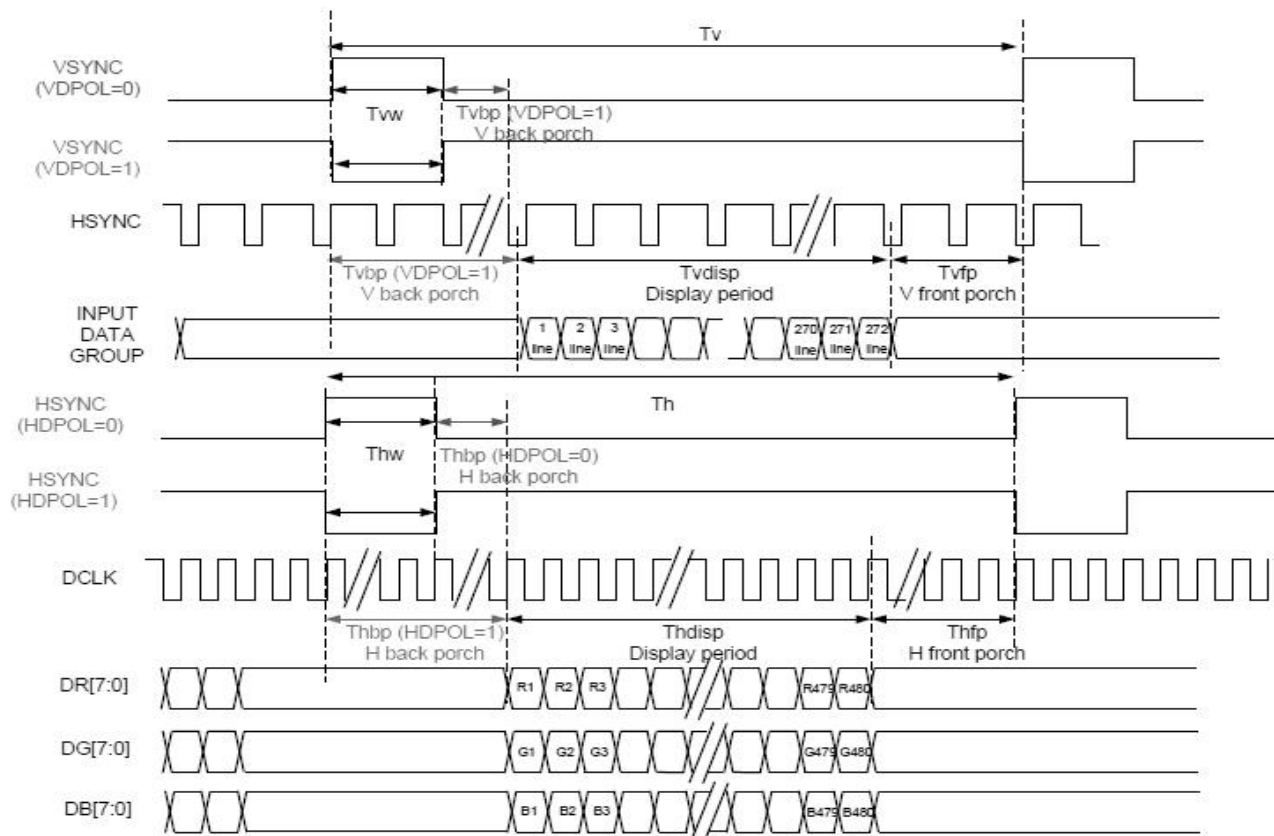
Pin.No	Symbol	Function
1	VLEDK	Power for LED backlight (Cathode)
2	VLEDA	Power for LED backlight (Anode)
3	GND	Power ground
4	VDD	Common Voltage(3.3V)
5-12	R0-R7	7 Bit RED Data Bus
13-20	G0-G7	7 Bit GREEN Data Bus
21-28	B0-B7	7 Bit BLUE Data Bus
29	GND	Power ground
30	CLK	Colock signal
31	DISP	Display on/off
32	HSYNC	Horizontal sync input in RGB mode
33	VSYNC	Vertical sync input in RGB mode
34	DEN	Data enable
35	NC	No Connection
36	GND	Power ground
37-40	NC	No Connection

6.0 Timing characteristics

6.1 Parallel 24-bit RGB Timing Table

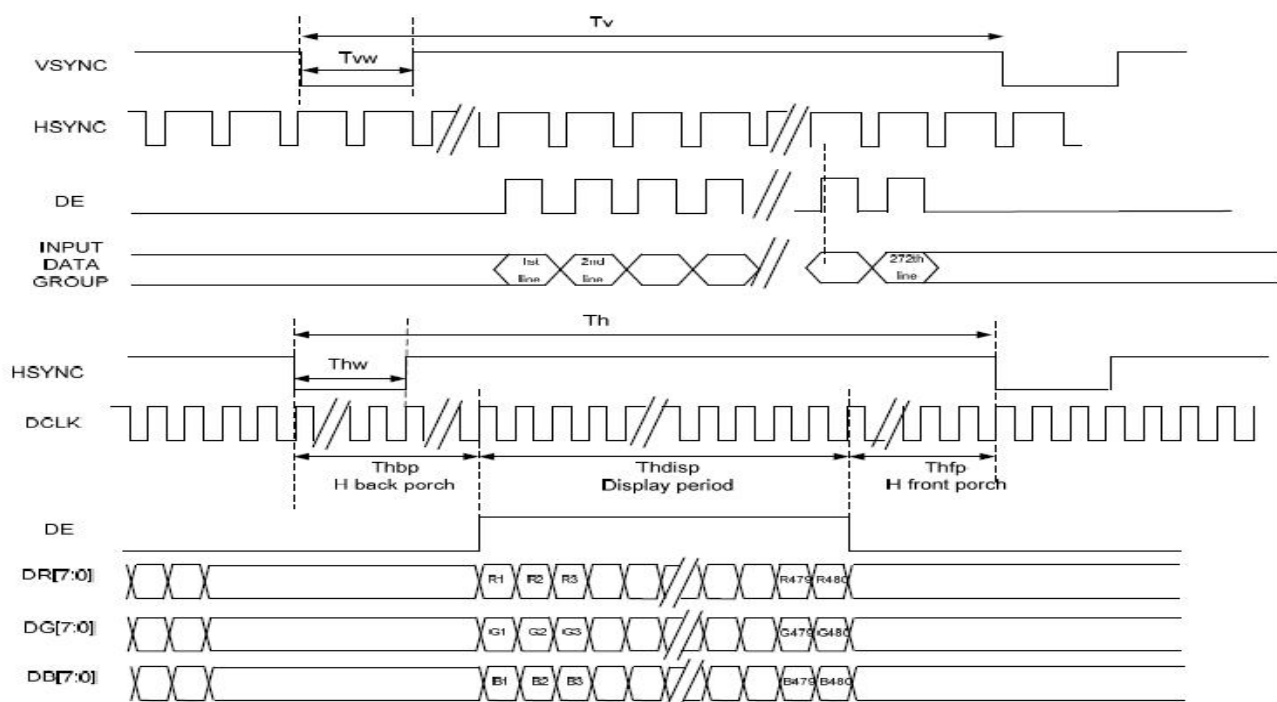
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	Ns	
HSYNC	Period Time	Th	485	531		DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43		DCLK	By H_Blanking setting
	Front Porch	Thfp	2	8		DCLK	
	Pulse Width	Thw	2	4		DCLK	
VSYNC	Period Time	Tv	276	292		H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12		H	By V_Blanking setting
	Front Porch	Tvfp	2	8		H	
	Pulse Width	Tvw	2	4		H	

6.2 SYNC Mode Timing Diagram

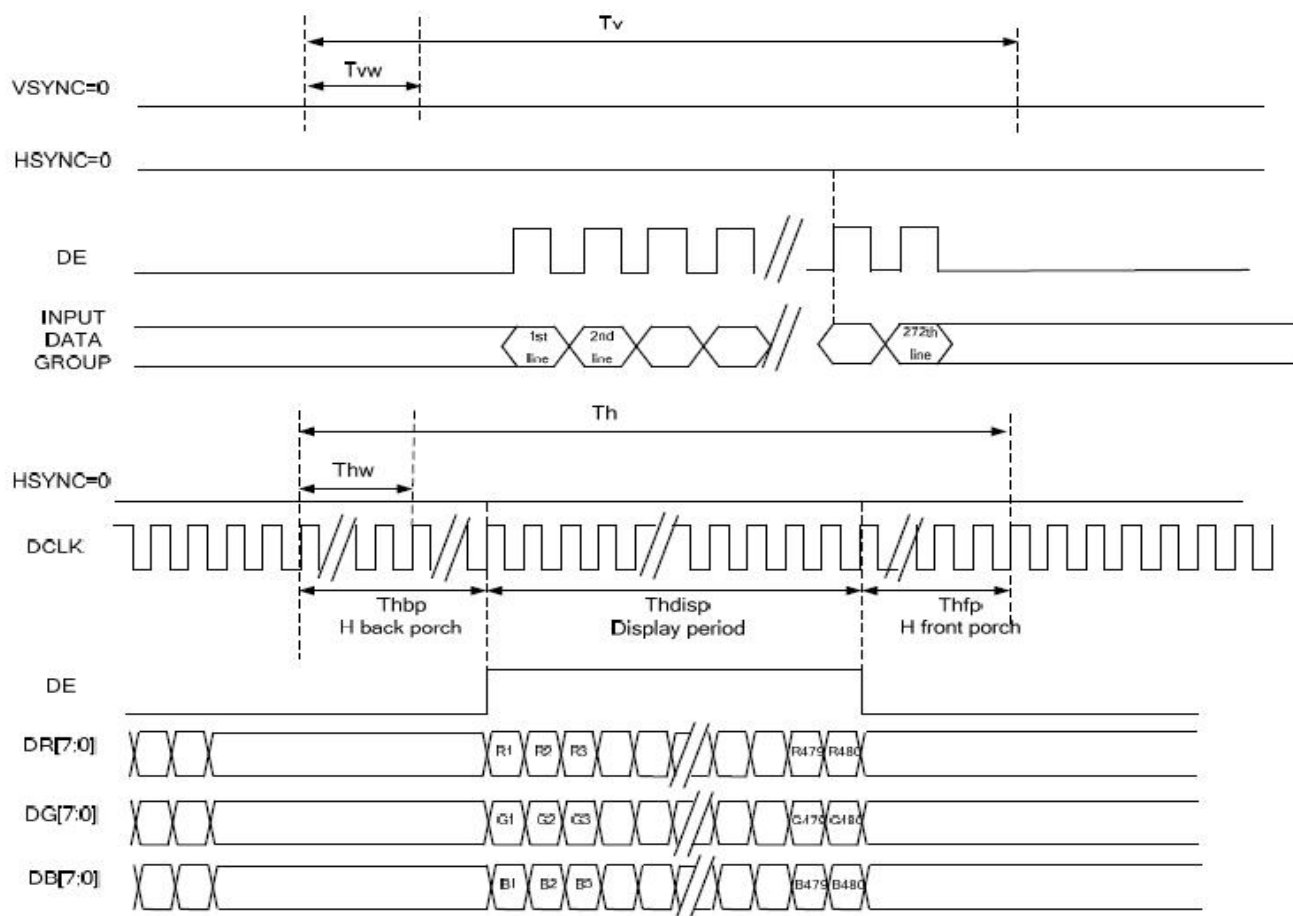


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6.3 SYNC-DE Mode Timing Diagram



6.4 DE Mode Timing Diagram

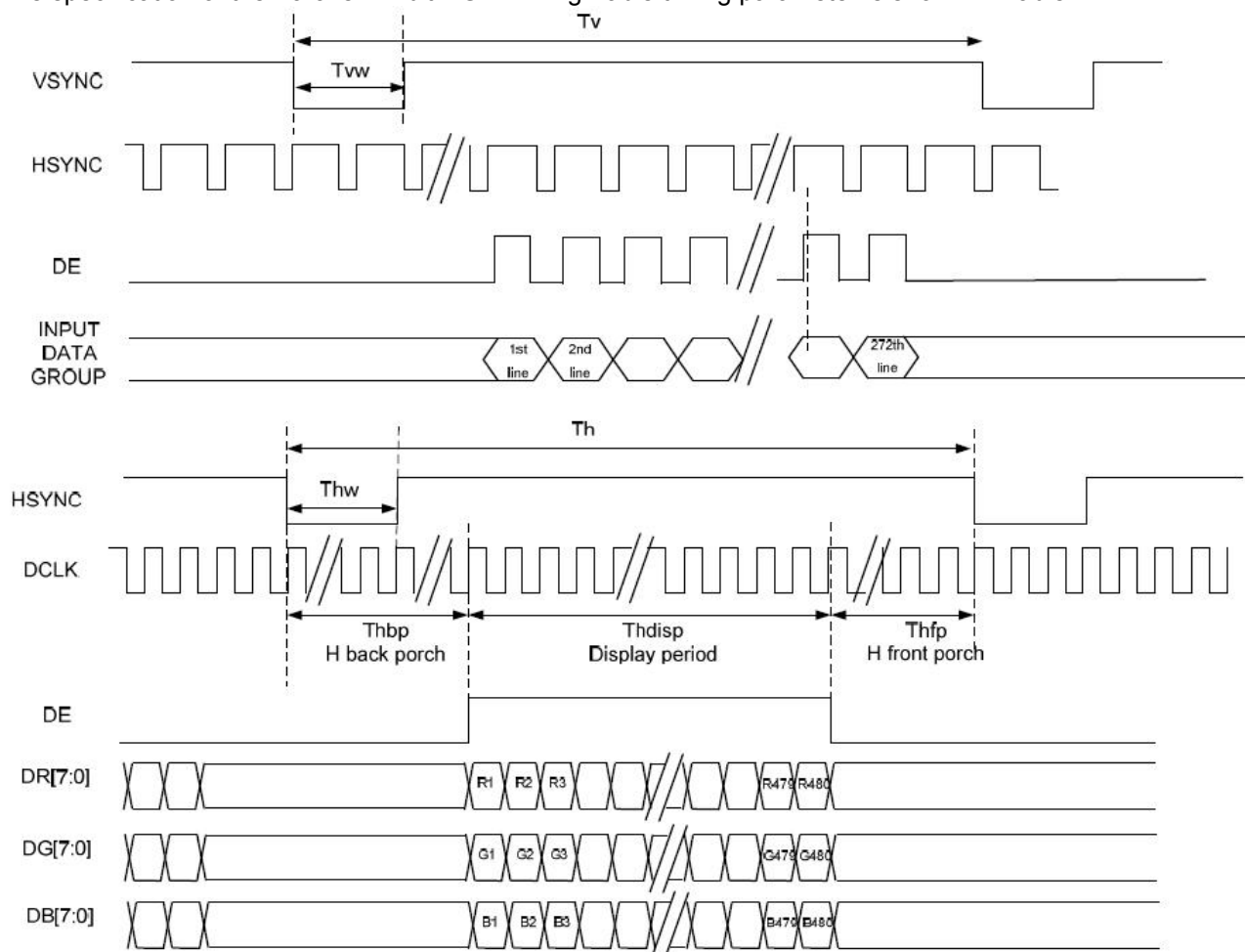


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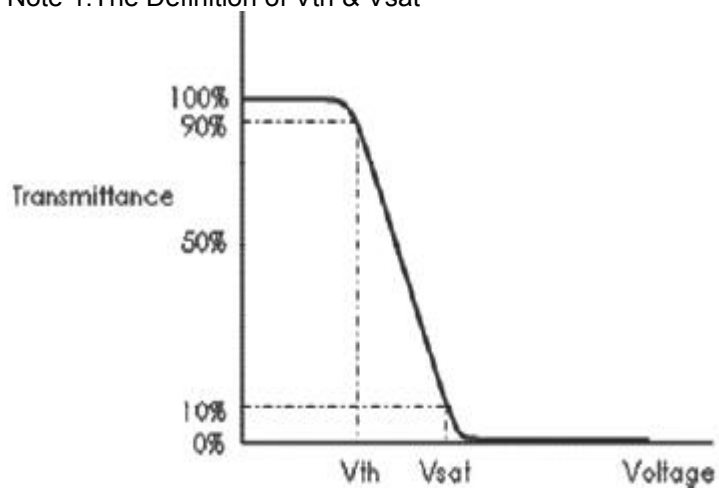
7.0 ELECTRO-OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Panel Transmittance		T	θ= 0°	12.5	15.3	--	%	
Luminance		L	θ= 0°	200	220	--	cd/m²	Note1 Note5
Luminance Uniformity		YU	9 points	75	80	--	%	Note1 Note5
* Contrast Ratio		CR	Point-9	--	200	--	-	Note3
Response Time		Rr+Tf	Point-5	--	25	35	ms	Note4
Viewing Angle K=Contrast Ratio>10	Horizontal	θL	Point-5 θ= 0°	--	45			Note2
		θR		--	45	--		
	Vertical	θU		--	20	--		
		θD		--	45	--		
Color Filter Chromaticity	White	X	θ= 0°	0.260	0.310	0.360		Note1
		Y		0.350	0.400	0.450		
	Red	X	θ= 0°	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Green	X	θ= 0°	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Blue	X	θ= 0°	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
Color gamut (NTSC ratio)			θ= 0°	--	TBD	--	%	

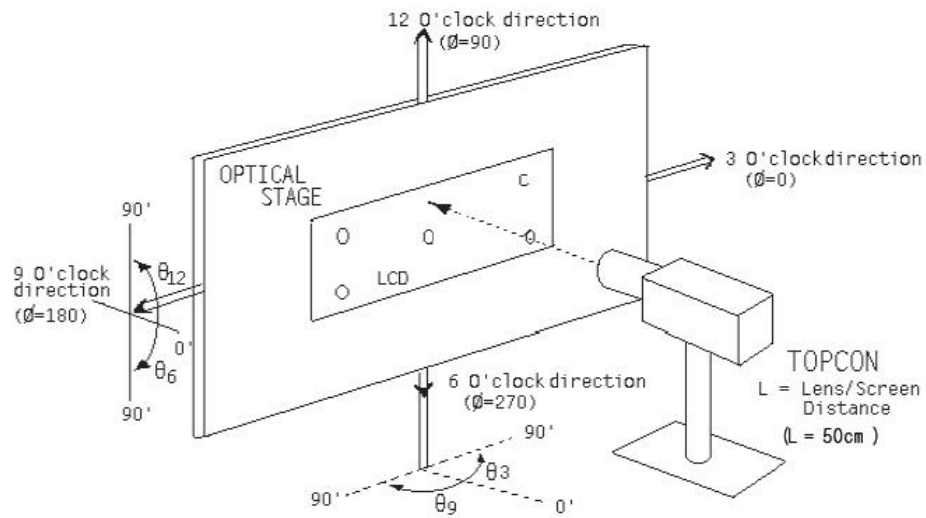
The specification of the Parallel 24-bit RGB Timing Table timing parameter is shown in Table



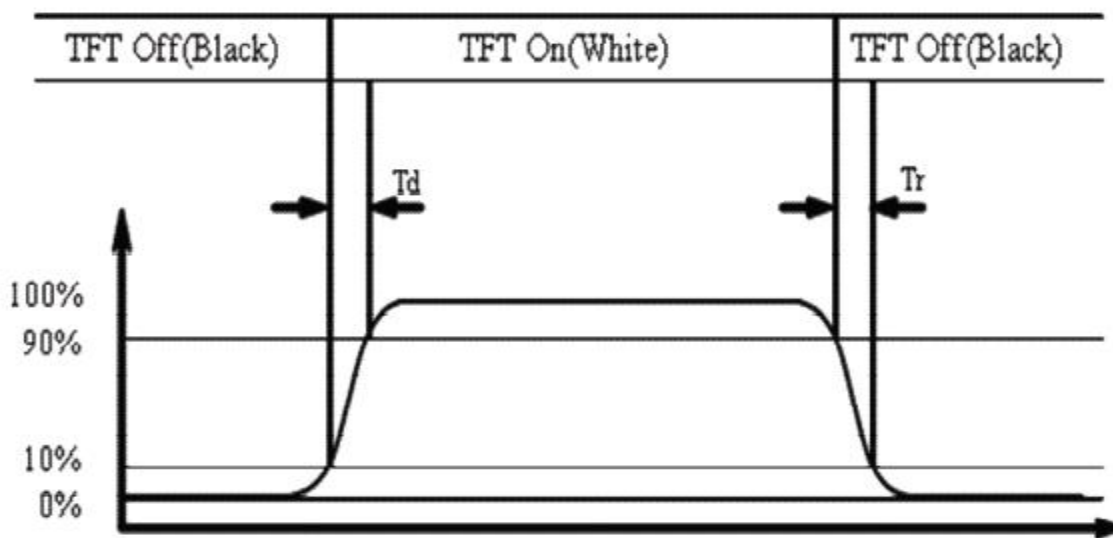
Note 1.The Definition of V_{th} & V_{sat}



Note 2.Measurement Set Up



Note 3. Response Time Testing



8. RELIABILITY

8.1 MTBF

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal. (25°C in the room without sunlight)

8.2 TESTS

NO.	Test Item	Test condition	Criterion
1	High Temperature Storage	60°C±2°C 96H Restore 2H at 25°C Power off	After testing, cosmetic and electrical defects should not happen.
2	Low Temperature Storage	-10°C±2°C 96H Restore 2H at 25°C Power off	
3	High Temperature Operation	60°C±2°C 96H Restore 2H at 25°C Power on	
4	Low Temperature Operation	0°C±2°C 96H Restore 2H at 25°C Power on	
5	High Temperature & Humidity Operation	50°C±2°C 90%RH 96H Power on	
6	Temperature Cycle	-20°C ↔ 25°C ↔ 70°C 30min 5min 30min after 10 cycle, Restore 2H at 25°C Power off	
7	Vibration Test	10Hz~150Hz, 100m/s ² , 120min	
8	Shock Test	Half-sine wave, 300m/s ² , 11ms	1. After testing, cosmetic and electrical defects should not happen. 2. the product should remain at initial place 3. Product uncovered or package broken is not permitted.
9	Drop Test(package state)	800mm, concrete floor, 1 corner, 3 edges, 6 sides each time	
10	Electro Static Discharge Test (non-operation)	150pF, 330Ω, Contact: ±4KV, Air: ±8KV Measure point : LCD glass and metal bezel 200pF, 0Ω, ±200V contact test Measure point : IF connector pins	IEC61000-4-2: 2001 GB/T17626.2-2006

9.0 Inspection Standards

9.0 INSPECTION STANDARDS

9.1 Purpose

This incoming inspection standard shall be applied to TFT-LCD supplied by ZHONGSHEN to its customer.

9.2 Scope

This inspection standard contains Cosmetic Specifications and Electrical Specifications.

9.3 Classification of defects

9.3.1 Major defect.

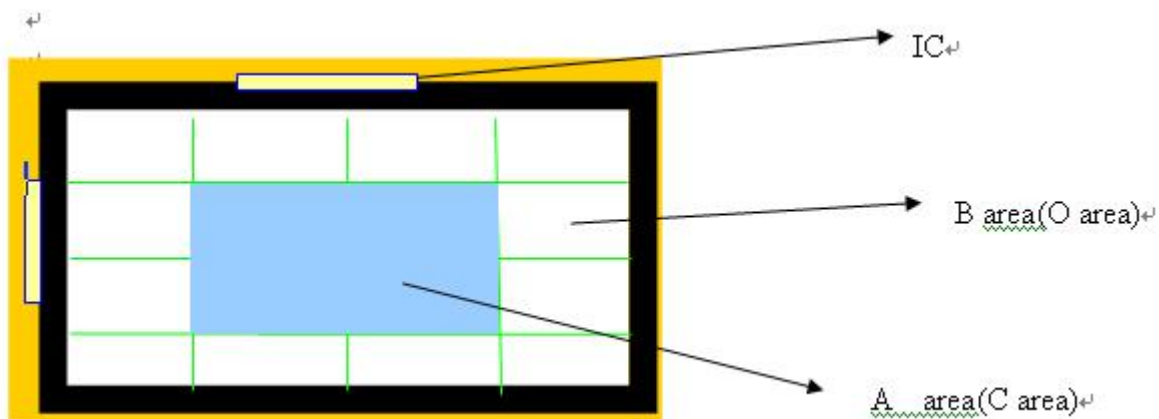
The major defect is a defect that is likely to result in product failure or reduction in Product's intended usage.

9.3.2 Minor defect.

The minor defect is a defect that has little bearing on the effective use or Operation of the product.

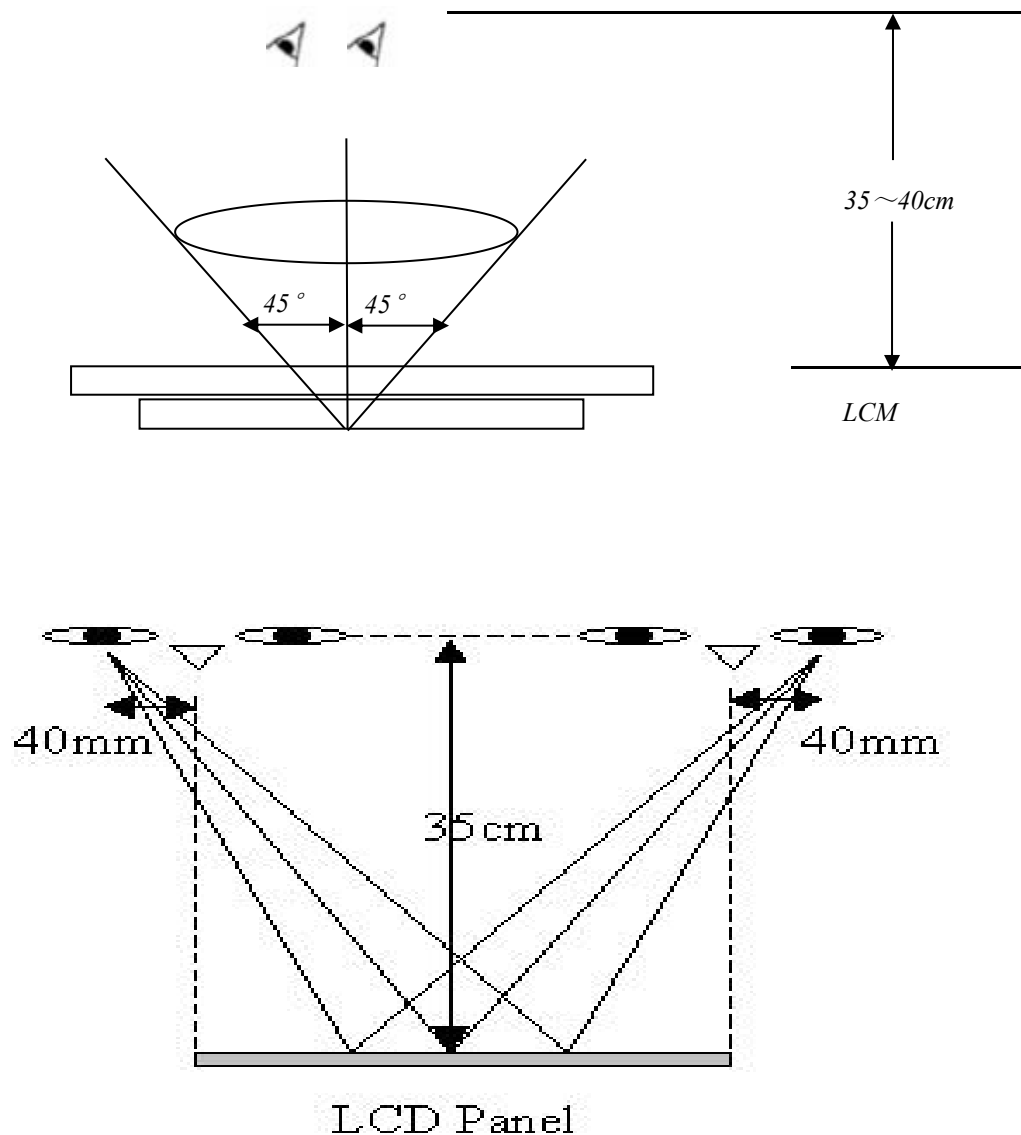
9.4 Definition

9.4.1 Display area definition



9.5 Inspection conditions is as follows

- 9.5.1 Viewing distance is approximately 35-40 cm
- 9.5.2 Viewing angle is normal to the LCD panel as 45°
- 9.5.3 Ambient temperature is approximately $25\pm 5^\circ\text{C}$
- 9.5.4 Ambient humidity is $60\pm 5\%$ RH
- 9.5.5 Ambient luminance is from 300-500 Lux.
- 9.5.6 Input signal timing should be typical value(3s-5s).
- 9.5.7 Mura & Light leakage inspection at ND-Filter 6%.



9.6 Sampling method

9.6.1 According to the MIL-STD-105E general inspection level , II Sampling plan.

9.6.2 AQL: MA 0.65 MI 1.0

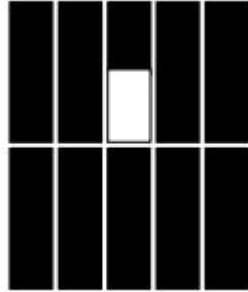
9.7 Inspection Criteria

DEFECT TYPE			LIMIT			Defect	Note
VISUAL DEFECT	SCRATCH		W≤0.05mm and L≤5mm		Ignore	Maj	NOTE1
			0.05mm<W≤0.2mm L≤10mm		N≤4		
			10mm<L, 0.1mm<W		N=0		
	INTERNAL	SPOT	Φ≤0.2mm		Ignore		
			0.2mm<Φ≤0.5mm		N≤4		
			Φ>0.5mm		N=0		
		FIBER	0.1mm≤W≤0.2mm L≤2.5mm		N≤4		
			0.2mm<W, 2.5mm<L		N=0		
		POLARIZER BUBBLE	Φ≤0.25mm		Ignore		
			0.25mm<Φ≤0.5mm		N≤4		
			Φ>0.5mm		N=0		
		DENT	Φ<0.25mm		Ignore		
			0.25mm≤Φ≤0.5mm		N≤4		
			Φ>0.5mm		N=0		
ELECTRICAL DEFECT	BRIGHT DOT		C Area	O Area	Total	Maj	NOTE2 NOTE3
			N≤4 (contain C area and O area)		N≤4		
	DARK DOT		N≤5 (contain C area and O area)		N≤5		
	TWO ADJACENT DOT		N≤1	N≤2	N≤3		
	THREE OR MORE ADJACENT DOT		NOT ALLOWLED				
	LINE DEFECT		NOT ALLOWLED				

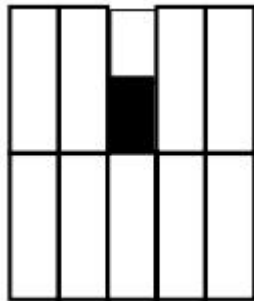
Note1: Minimum distance between dot defects and spot is 5mm;

Note2: The definition of Bright dot and Dark dot

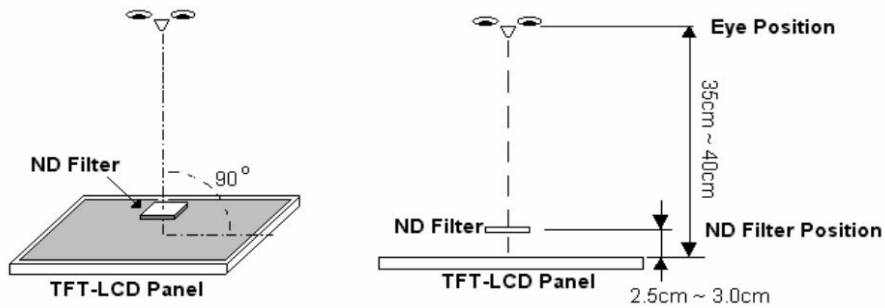
-bright area is more than 50% of one dot



-dark area is more than 50% of one dot



-The bright dot shall be visible under ND-Filter 5% as following:

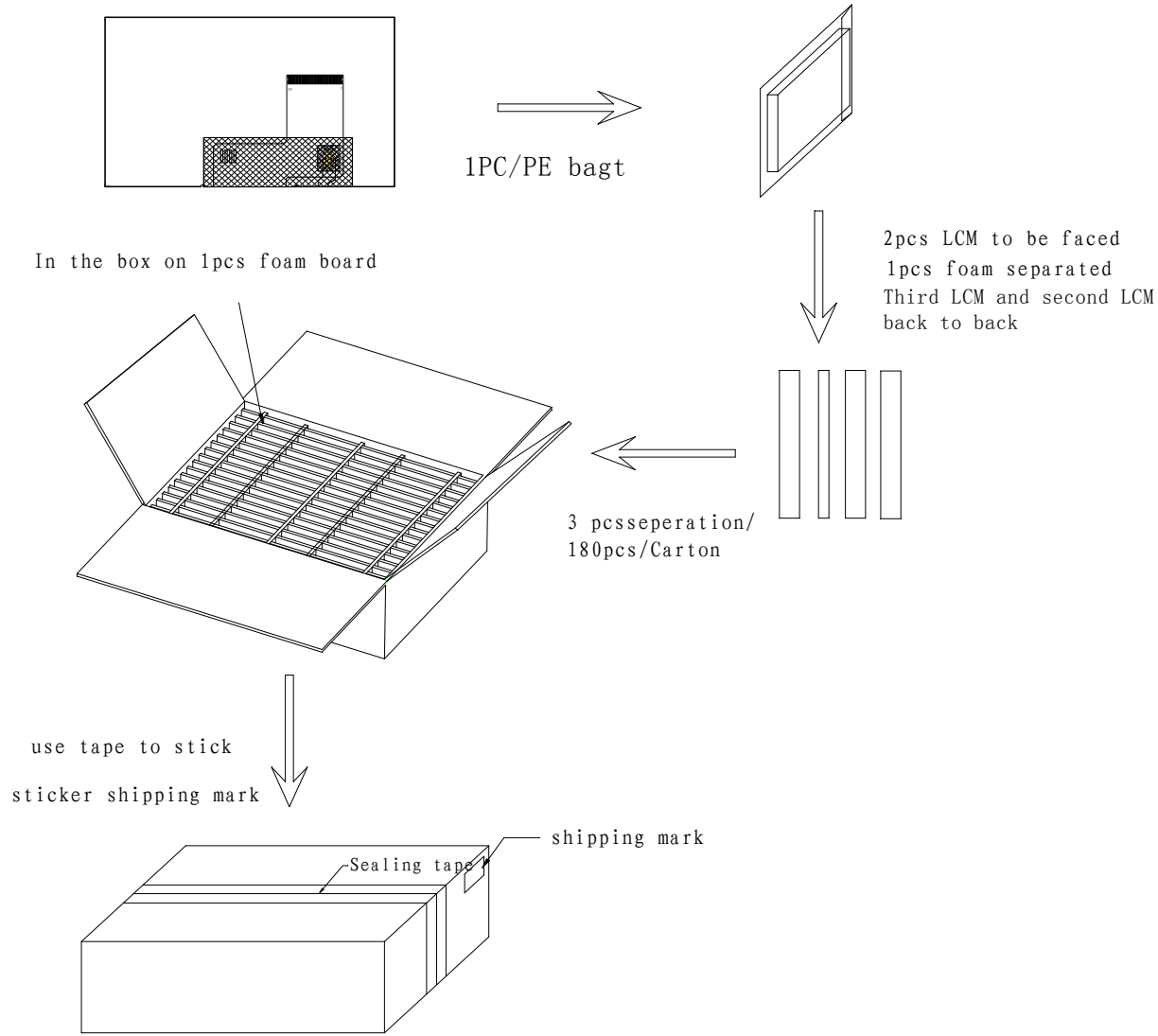


NOTE3:

- A bit rate(bright dot model) $\leq 10\%$;
- Class Chipping but not affect the function of quality OK;
- Polarizing film appearance does not affect the function OK;

10.0 PACKINGDRAWING

Packing pictures:



REVISION 版本	A1	☒ 正式 日期	☐ 临时 规格	REVISER 修订人 孙胜兴	MODEL NO 产品料号 中深: ZS043BS4001A7D1-BTT 客户:	审核			会签		
DATE 日期	2016.10.14					核 准	审 核	绘 图	工 艺 部	品 质 部	标 准 化 检 查
PAGE 页 码	5/6										

11.0 HANDLING PRECAUTION

- (1) Don't disassemble and reassemble the module by self.
- (2) Acid, alkali, alcohol or touched directly by hand will damage the display.
- (3) Static electricity will damage the module. Please configure grounding device.
- (4) The strong vibration, shock, twist or bend will cause material damage, even module broken.
- (5) It is easy to cause image sticking while displaying the same pattern for very long time.
- (6) The response time, brightness and performance will vary from different temperature.