

PRODUCT SPECIFICATION

MODEL: 043BV4001A7D1TT-C

< ◆ > PRELIMINARY SPECIFICATION

< ◇ > APPROVAL SPECIFICATION

CUSTOMER
APPROVED BY
DATE:

DESIGNED	CHECKED	APPROVED

REVISION RECORD

<u>REV NO</u>	<u>REV DATE</u>	<u>PAGE</u>	<u>CONTENTS</u>	<u>ISSUER</u>
1.0	2018-12-28	18	First release	Liqin
1.1	2019-1-23	4, 7	Modify Input Timing Table	Liqin

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1.0 GENERAL SPECIFICATIONS

043BV4001A7D1TT-C 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 **480x 272** pixels. This product accords with RoHS environmental criterion.

Item	Contents	Unit
Viewing direction	6:00	O' Clock
Number of Pixels	480(RGB) x272	/
Number of color	16.7M	/
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	/
Interface	RGB	
LCM Luminance	220(typ)	cd/m ²
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	-

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

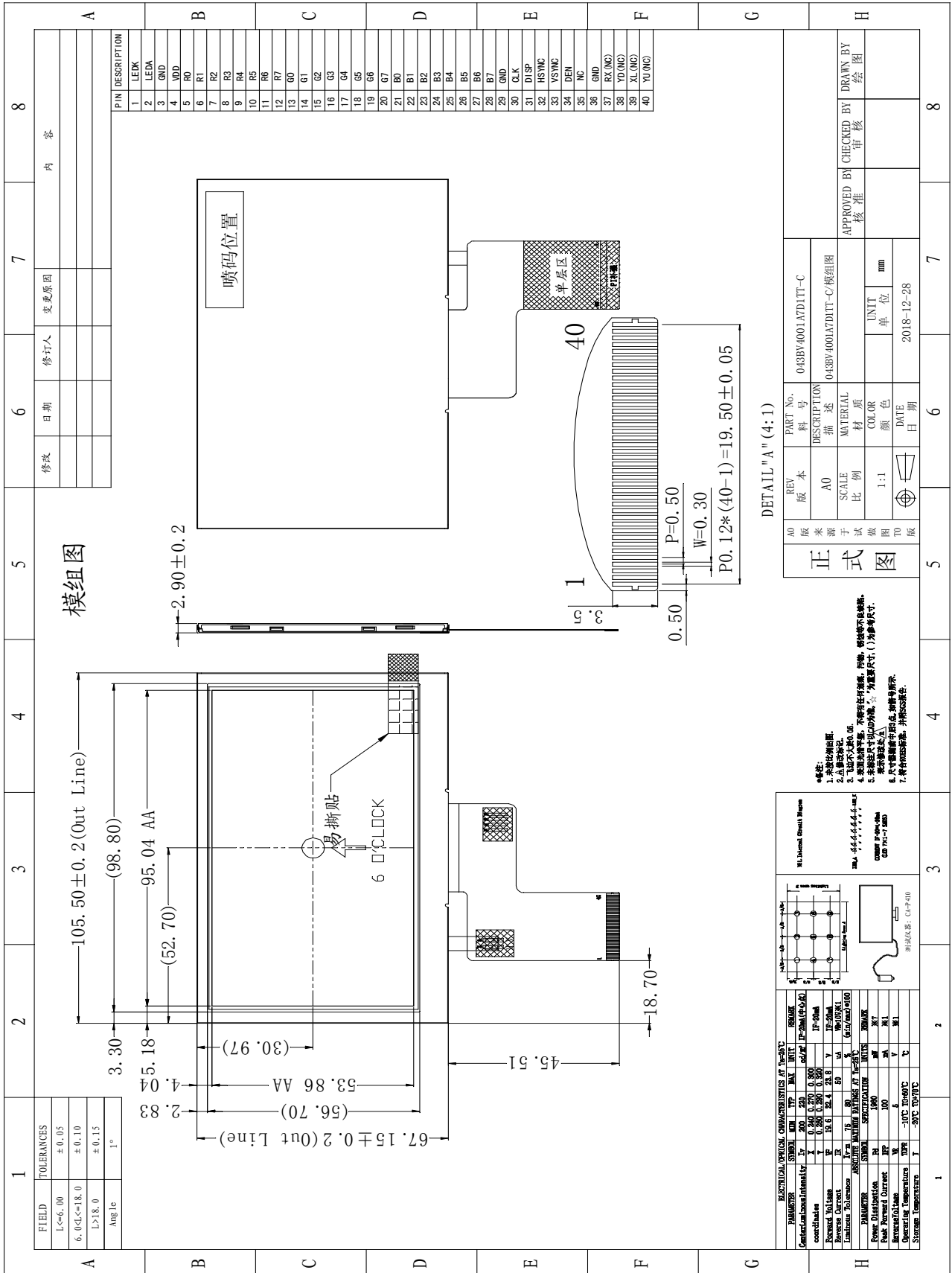
Item	Symbol	Min	TYP	Max	Unit	NOTE
Supply voltage for logic	VDD	3.1	3.3	3.5	V	

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	19.6	22.4	23.8	V	If=20mA
Luminance	Lv	200	220	-	cd/m ²	If=20mA
Number of LED	--	7			Piece	--
Connection mode	P	7serial 1parallel			--	--

4.0 DIMENSIONAL DRAWING



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

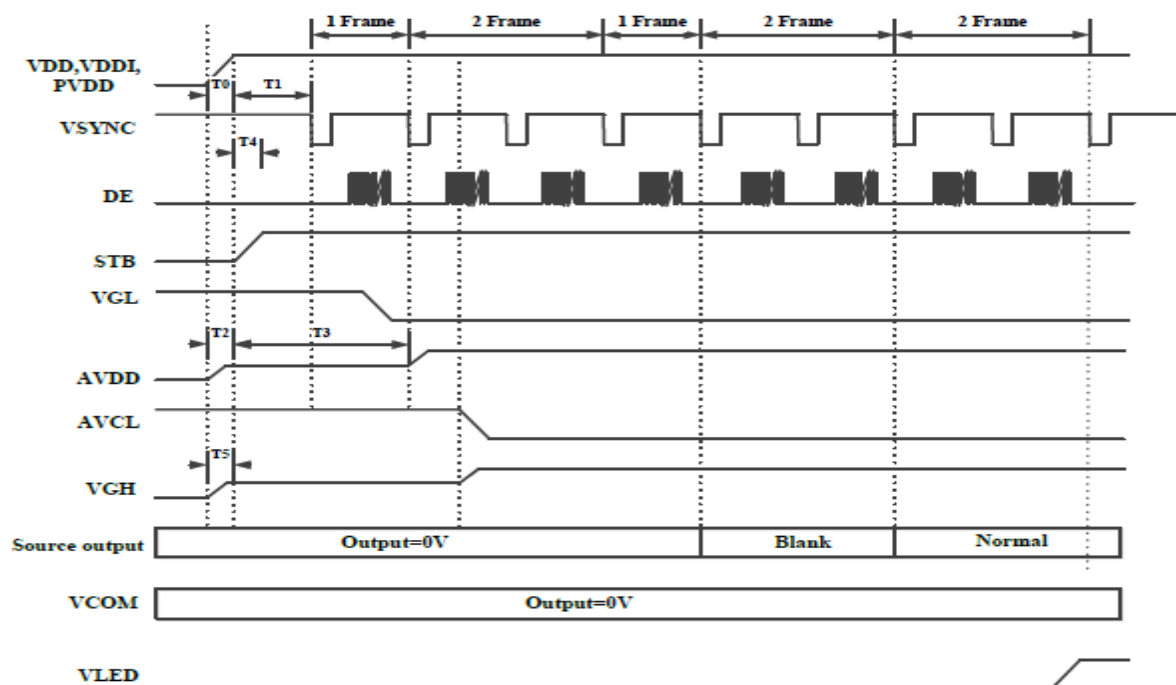
6.1 Parallel 24 bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

480RGB X 272 Resolution 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	598	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	By H_BLANKING setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	43	DCLK	
VSYNC	Period Time	Tv	276	292	321	HSYNC	
	Display Period	Tvdisp		272		HSYNC	
	Back Porch	Tvbp	2	12	12	HSYNC	By V_BLANKING setting
	Front Porch	Tvfp	2	8	37	HSYNC	
	Pulse Width	Tvw	2	4	12	HSYNC	

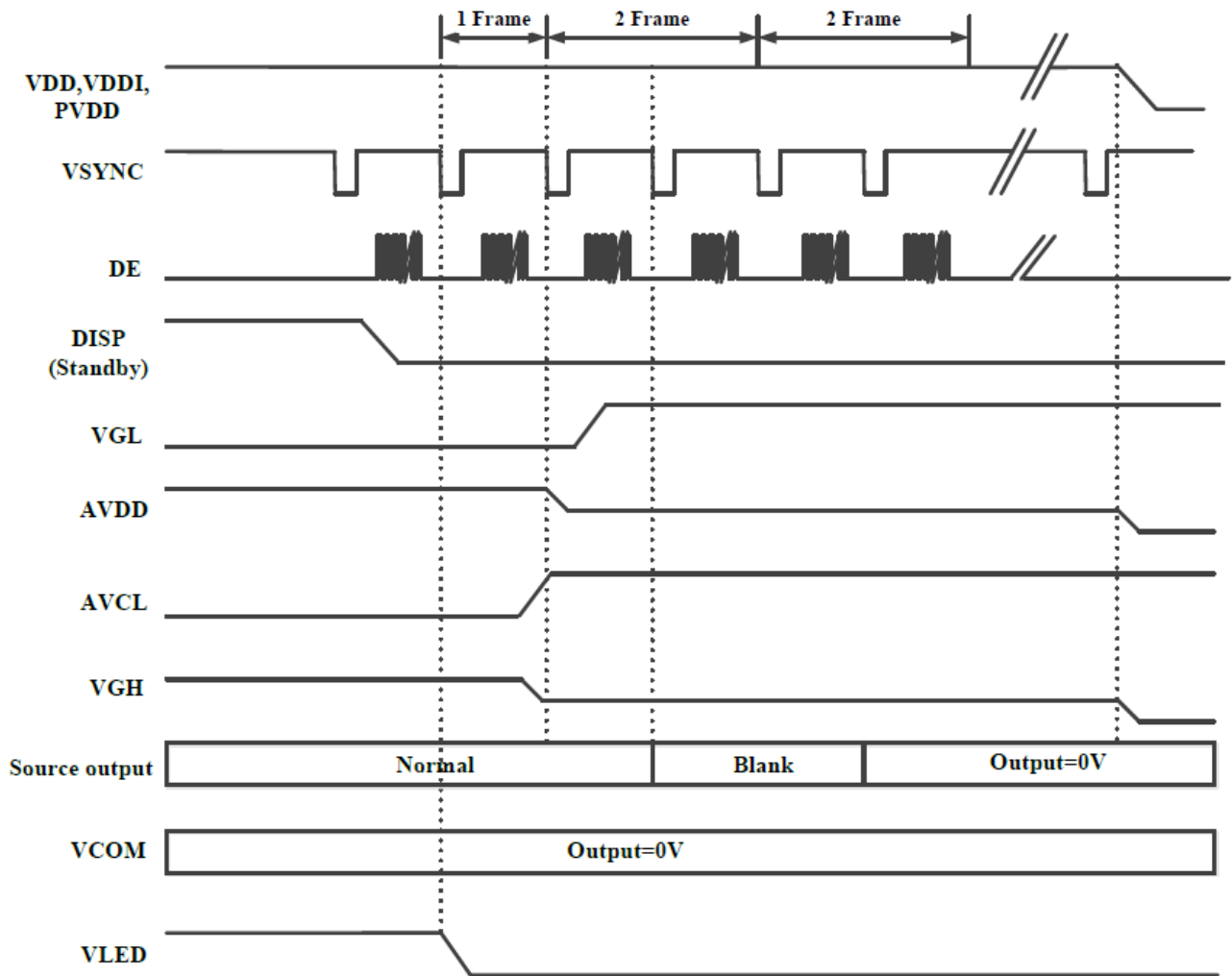
Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

6.2 Power On Sequence



	Description	Min. Time
T0	Determined by the external power	
T1	Time from stable VDD, VDDI, PVDD set-up to the first VSYNC	T1=0
T2	Time from AVDD=0V to AVDD=3.3V	T2=T0
T3	Time from AVDD=3.3V to AVDD=6.0V	T3=T1+ (1*Frame)
T4	Time from stable VDD, VDDI, PVDD set-up to DISP asserted	T4=0
T5	Time from VGH=0V to VGH=3.3V	T5=T0

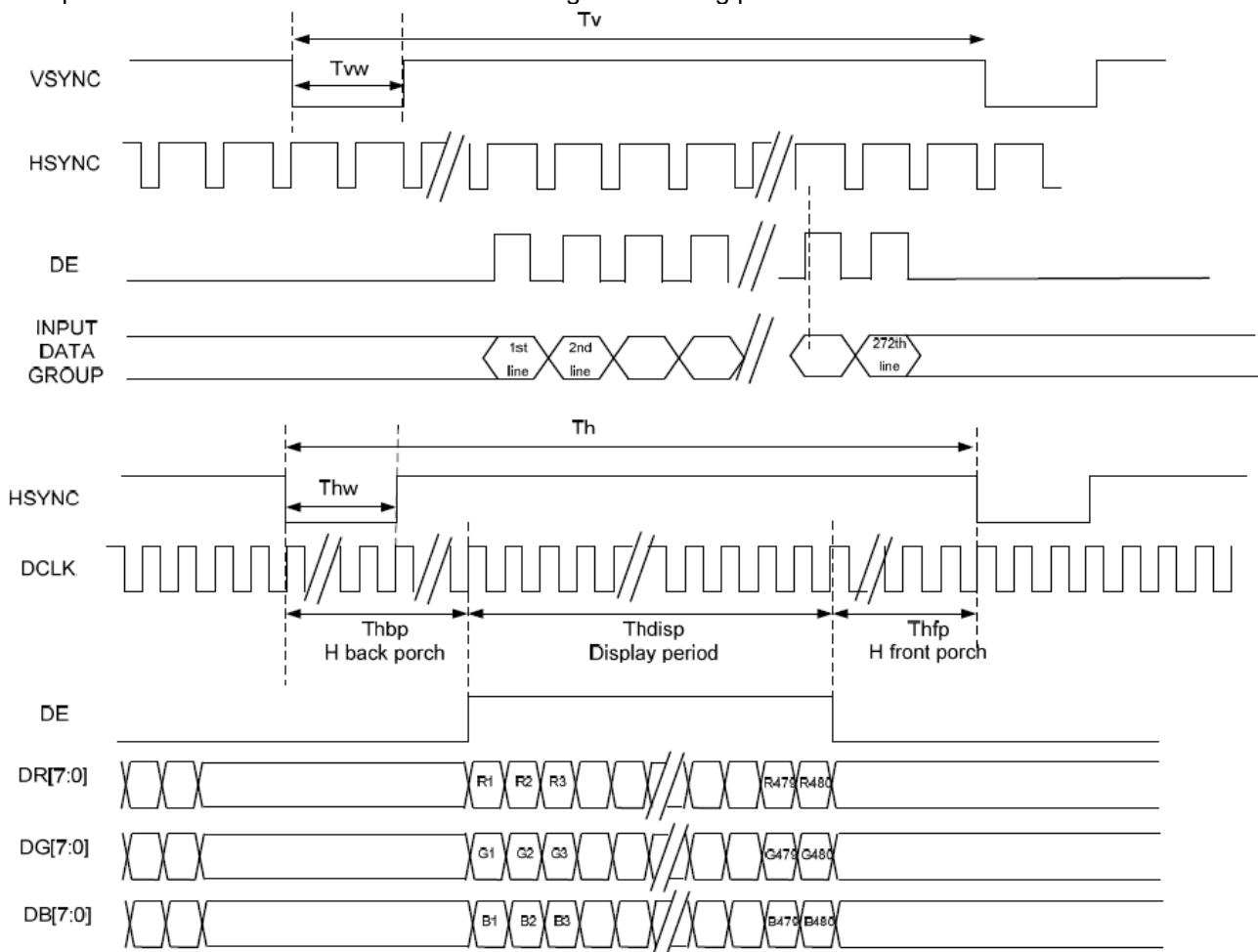
6.3 Power Off Sequence



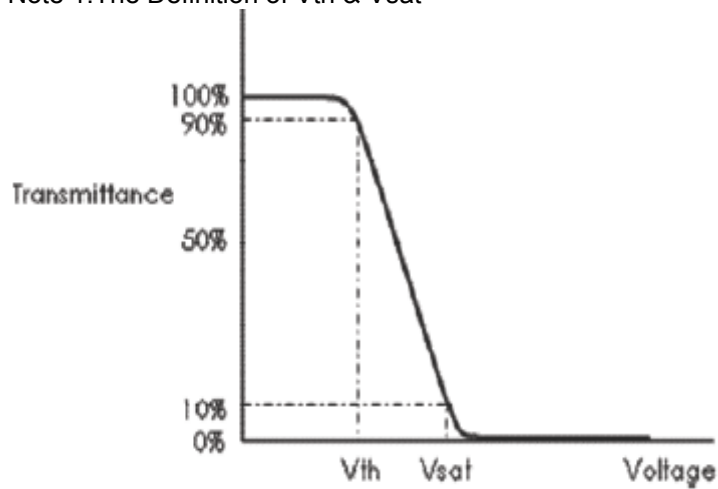
7.0 ELECTRO-OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Panel Transmittance		T	$\theta = 0^\circ$	12.5	15.3	--	%	
Luminance		L	$\theta = 0^\circ$	200	220	--	cd/m ²	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	\ominus L	Point-5	--	45			Note2
		\ominus R		--	45	--		
	Vertical	\ominus U	$\theta = 0^\circ$	--	20	--		
		\ominus D		--	45	--		
Color Filter Chromaticity	White	X	$\theta = 0^\circ$	0.240	0.270	0.300		Note1
		Y		0.260	0.290	0.320		
	Red	X	$\theta = 0^\circ$	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Green	X	$\theta = 0^\circ$	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Blue	X	$\theta = 0^\circ$	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
Color gamut (NTSC ratio)			$\theta = 0^\circ$	45	50	--	%	
colour temperature				10200	12000	13800		

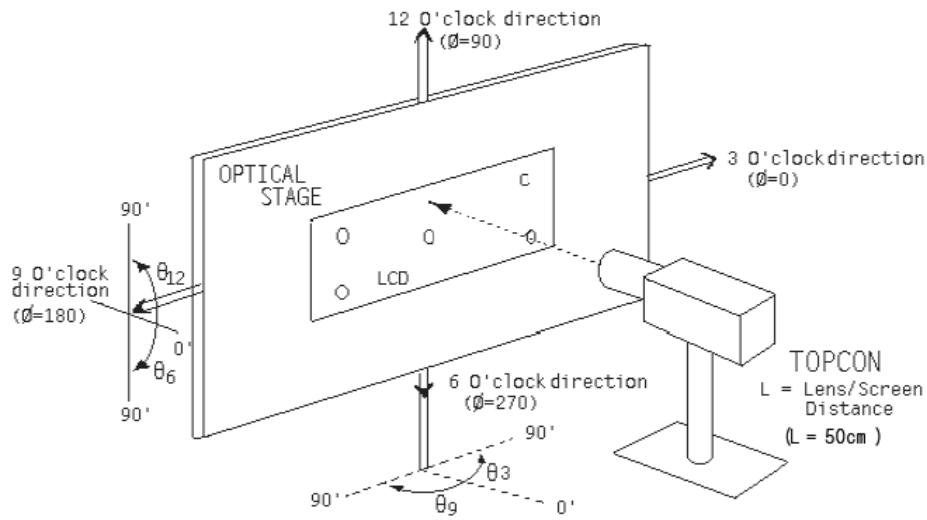
The specification of the Parallel 24-bit RGB Timing Table timing parameter is shown in Table



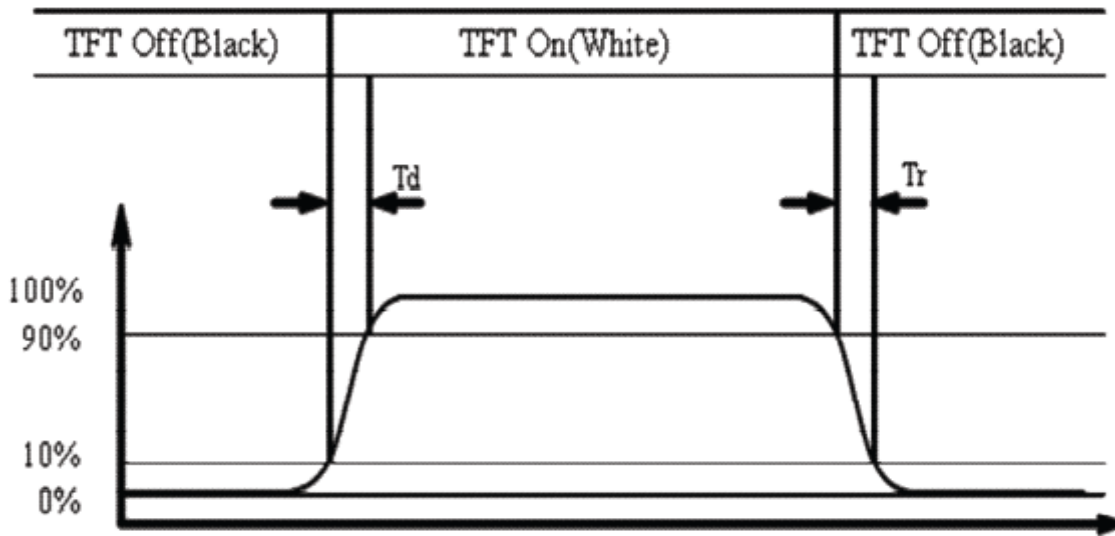
Note 1. The Definition of V_{th} & V_{sat}



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	70°C±2°C 96H Restore 2H at 25°C Power off	
2	Low Temperature Storage	-20°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	-10°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←→70°C 30min 30min after 10cycle, Restore 2H at 25°C Power off	After testing, cosmetic and electrical defects should not happen.
7	Vibration Test	10Hz~150Hz, 100m/s ² , 120min	
8	Shock Test	Half-sinewave, 300m/s ² , 11ms	
9	Drop Test(package state)	800mm, concrete floor, 1corner, 3edges, 6 sides each time	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.
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

9.1 Purpose

(用途)

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

(本进货检验标准适用于中深光电股份有限公司提供给客户的 TFT-LCD)

9.2 Scope

This inspection standard contains Cosmetic Specifications and Electrical Specifications.

9.3 Classification of defects

9.3.1 Major defect.

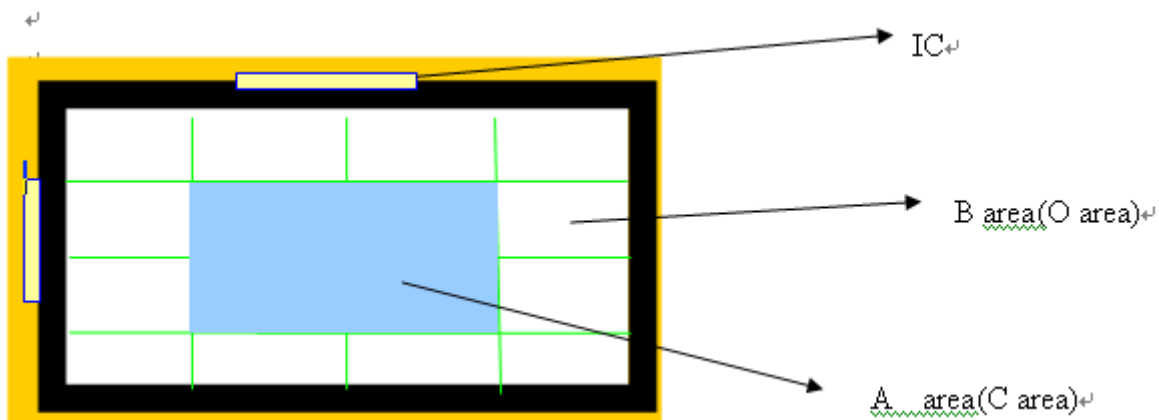
The major defect is a defect that is likely to result in product failure or reduction in Product's intended usage.

9.3.2 Minor defect.

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

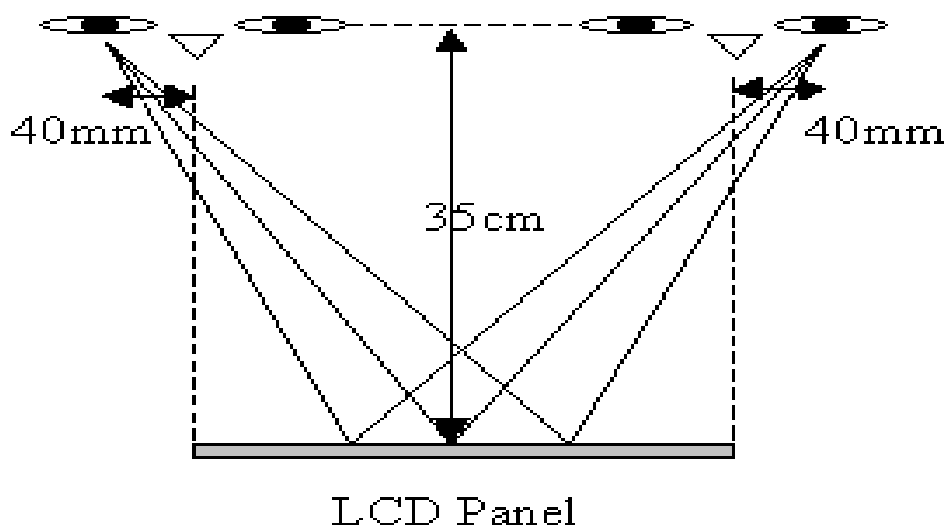
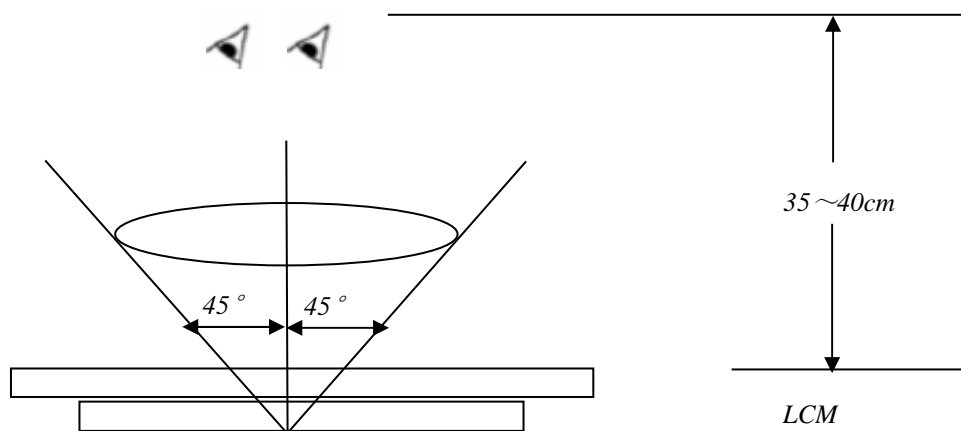
9.4 Definition

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

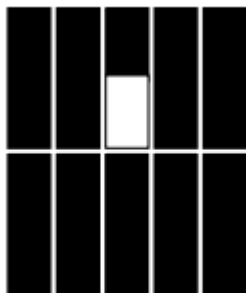
9.7 Inspection Criteria

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

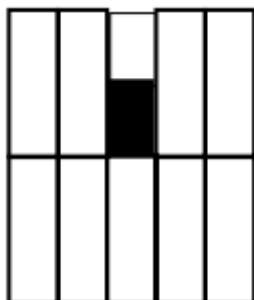
Note1: Minimum distance between dot defects and spot is 5mm;

Note2: The definition of Bright dot and Dark dot

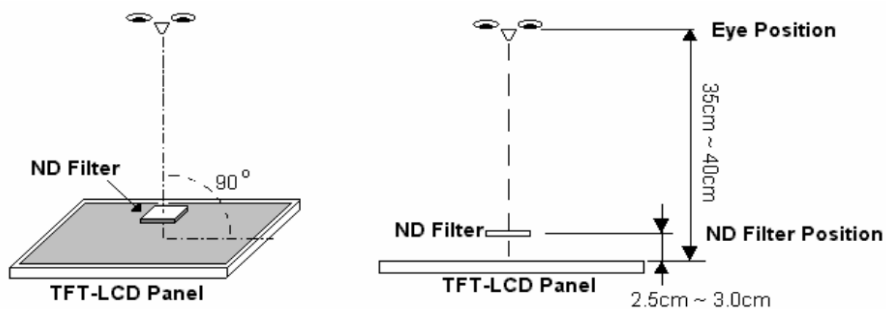
-bright area is more than 50% of one dot



-dark area is more than 50% of one dot



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

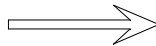
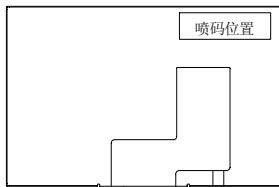


NOTE3:

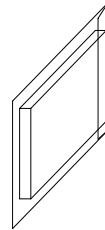
- A bit rate(bright dot model) $\leq 10\%$;
- Class Chipping but not affect the function of quality OK;
- Polarizing film appearance does not affect the function OK;

10.0 PACKINGDRAWING

包装图:

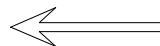
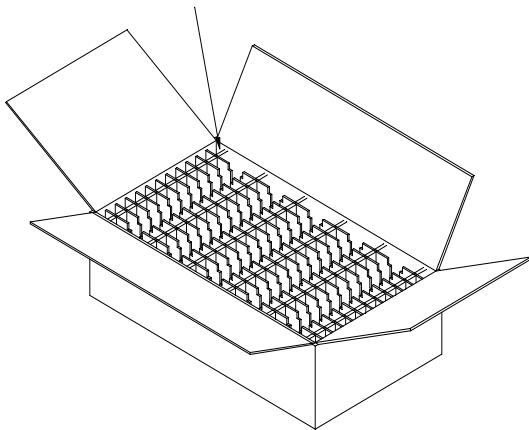


将1PCS模组产品
装在PE袋包裹。

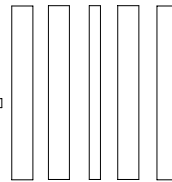


备注：2PCS产品模组的
LCD面对面，中间用
1pcs泡棉隔开，

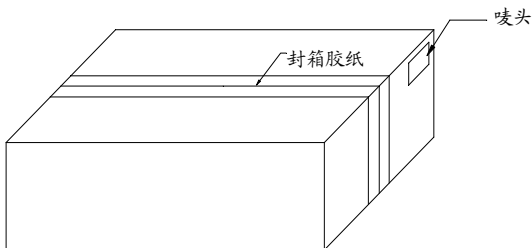
在纸箱里的卡板下面
用1PCS珍珠棉



将4PCS产品
放入纸箱里，
共计200pcs



使用封口胶封口
并贴附唛头



REVISION 版本	A0	<input checked="" type="checkbox"/> 正式规格 <input type="checkbox"/> 临时规格	REVISER 修订人	MODEL NO 产品料号	APPROVED BY 批准	CHECKED BY 审核	DRAWN BY 绘图
日期	2018-11-30		谢学虎	043BV4001A7D1TT-C			
页码	5/6			客户:			

11.0 HANDLING PRECAUTION

- (1) Don't disassemble and reassemble the module by self.
(禁止自行拆解)
- (2) Acid, alkali, alcohol or touched directly by hand will damage the display.
(酸性、碱性、酒精或手的直接接触将会损伤显示面)
- (3) Static electricity will damage the module. Please configure grounding device.
(静电会损伤模组，请装配接地设备)
- (4) The strong vibration, shock, twist or bend will cause material damage, even module broken.
(强烈的撞击、震动、扭转或弯曲将会造成原材损伤，甚至面板破裂)
- (5) It is easy to cause image sticking while displaying the same pattern for very long time.
(长期显示同一画面会造成影像残留)
- (6) The response time, brightness and performance will vary from different temperature.
(响应时间、亮度与均匀性会因温度而有所改变)
- (7) 12 months of the product term, the zhongshen shipment date began to count.
(从之日开始产品保质期为 12 个月)