



深圳市鹏基光电有限公司

Shenzhen PengJi Photoelectricity Co., Ltd.

SPECIFICATION

NO.:PJT350P15H32-400P54N

ACCEPTED BY CUSTOMER	
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Product: 3.5" TFT 320(RGB) *240 Pixels

Version: V00

Date: 2016/05/16

APPROVED	CHECKED	PREPARED

深圳市鹏基光电有限公司

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1. History Version

Sample version	Doc. version	Date	Description	Modify
V00	V00	2016-05-16	First issue	LW

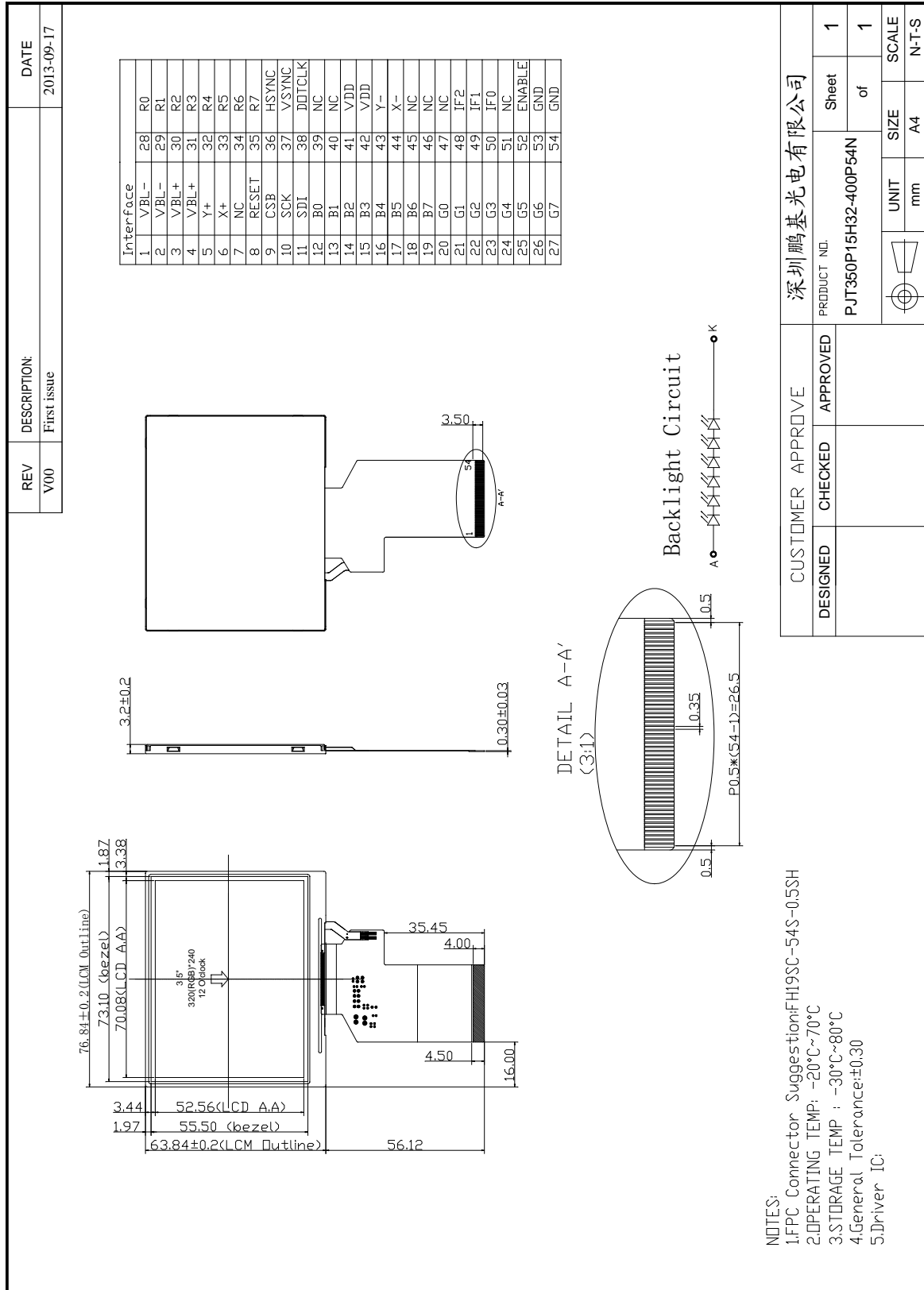
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2. Mechanical Description

Name	Content	Unit
Outline Size	76.84 (W) * 63.84 (H) * 3.20(T)	mm
Module size	3.5 (A.A)	inch
Resolution	320(RGB)* 240 Pixels	-
Viewing size	70.08 (W) * 52.56 (H)	mm
Pixel size	0.219 * 0.219	mm
LCD Type	TFT (16.7M)/ Transmissive	-
Viewing Angle	12 0' clock	-
Driver IC	-	-
Backlight Type	6 series LEDs	-
Interface Type	24 Bit RGB	-

3. Mechanical Drawing



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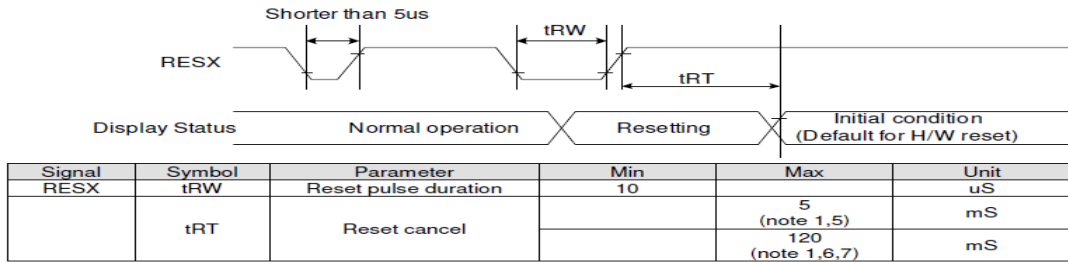
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4. Interface Definition

PIN NO.	PIN Name	Function Description
1	VBL-	Power supply for backlight cathode input terminal.
2	VBL-	Power supply for backlight cathode input terminal.
3	VBL+	Power supply for backlight anode input terminal.
4	VBL+	Power supply for backlight anode input terminal.
5	NC (Y+)	Touch panel Y+ pin
6	NC (X+)	Touch panel X+ pin
7	NC	No connection
8	RESET	Reset signal input terminal. Active at 'L' .
9	CSB	Chip select signal input terminal
10	SCK	Clock pin of serial interface.
11	SDI	Data input pin in serial mode
12~19	B0~B7	Blue Data
20~27	G0~G7	Green Data
28~35	R0~R7	Red Data
36	HSYNC	Horizontal sync input in RGB mode. (Short to GND if not sued)
37	VSYNC	Vertical sync input in RGB mode. (Short to GND if not sued)
38	DCLK	Clock signal. Latching data at the rising edge.
39、40	NC	Not Connect
41、42	VCI	Digital Power(3.3V)
43	NC (Y-)	Touch panel Y- pin
44	NC (X-)	Touch panel X- pin
45~47	NC	Not Connect
48~50	input data	Control the input data format /floating (IF2, IF1, IF0 Control GND)
51	NC	Not Connect
52	ENABLE	Display enable pin from controller
53、54	GND	Power Ground

5. Interface Timing:

5.1 Reset Timing



5.2 RGB Interface Timing

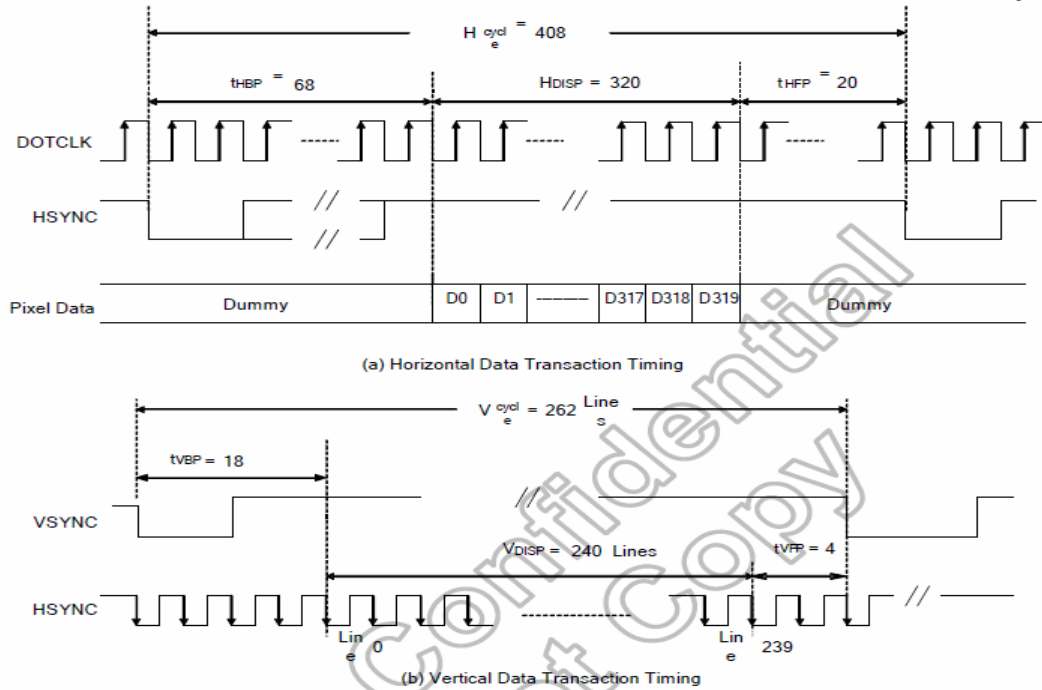


Figure 12. 2 Data Transaction Timing in Parallel RGB (24 bit) Interface (SYNC Mode)

Characteristics	Symbol	Min.		Typ.		Max.		Unit
		24 bit	8 bit	24 bit	8 bit	24 bit	8 bit	
DOTCLK Frequency	fDOTCLK	-	-	6.5	19.5	10	30	MHz
DOTCLK Period	tDOTCLK	100	33.3	154	51.3	-	-	ns
Horizontal Frequency (Line)	fH	-	-	14.9	-	22.35	-	KHz
Vertical Frequency (Refresh)	fV	-	-	60	-	90	-	Hz
Horizontal Back Porch	tHBP	-	-	68	204	-	-	tDOTCLK
Horizontal Front Porch	tHFP	-	-	20	60	-	-	tDOTCLK
Horizontal Data Start Point	tHBP	-	-	68	204	-	-	tDOTCLK
Horizontal Blanking Period	tHBP + tHFP	-	-	88	264	-	-	tDOTCLK
Horizontal Display Area	HDISP	-	-	320	960	-	-	tDOTCLK
Horizontal Cycle	Hcycle	-	-	408	1224	450	1350	tDOTCLK
Vertical Back Porch	tvBP	-	-	18	-	-	-	Lines
Vertical Front Porch	tvFP	-	-	4	-	-	-	Lines
Vertical Data Start Point	tvBP	-	-	18	-	-	-	Lines
Vertical Blanking Period	tvBP + tvFP	-	-	22	-	-	-	Lines
Vertical Display Area	NTSC	-	-	240		-	-	Lines
	PAL			280(PALM=0)				
	PAL			288(PALM=1)				
Vertical Cycle	NTSC	-	-	262		350	-	Lines
	PAL			313				

Table 12. 2 Data Transaction Timing in Normal Operating Mode

5.3 AC Timing Diagram

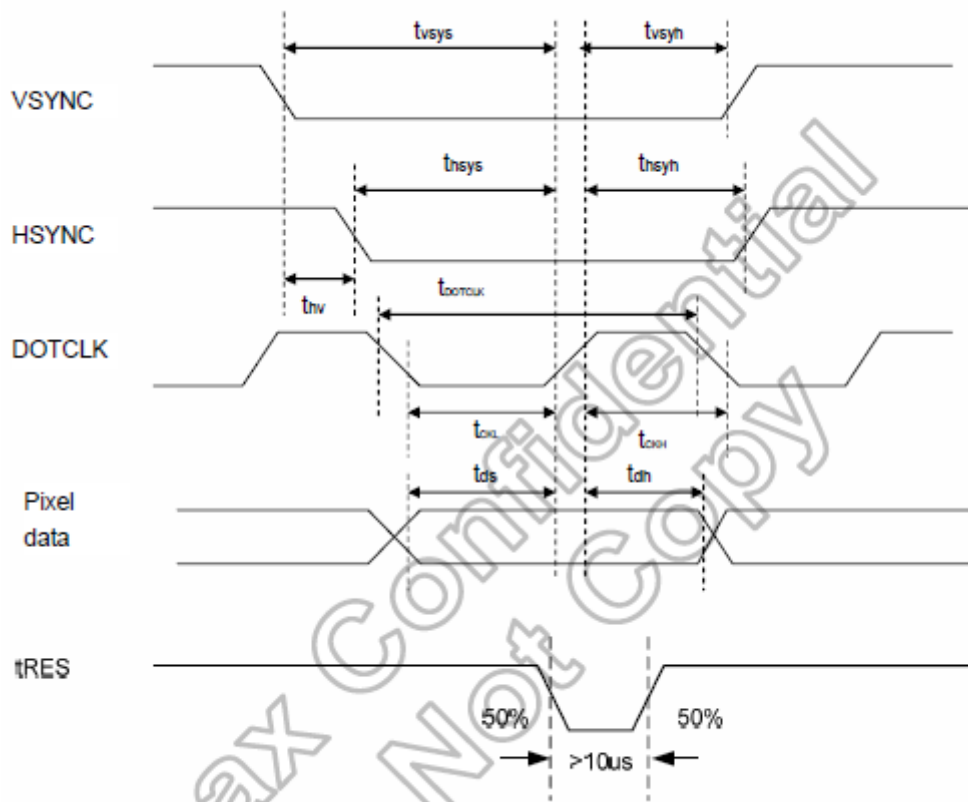


Figure 12. 1 Pixel Timing

Characteristics	Symbol	Min.		Typ.		Max.		Unit
		24 bit	8 bit	24 bit	8 bit	24 bit	8 bit	
DOTCLK Frequency	fDOTCLK	-	-	6.5	19.5	10	30	MHz
DOTCLK Period	tDOTCLK	100	33.3	154	51.3	-	-	ns
Vertical Sync Setup Time	tvsys	20	10	-	-	-	-	ns
Vertical Sync Hold Time	tvsyn	20	10	-	-	-	-	ns
Horizontal Sync Setup Time	thsys	20	10	-	-	-	-	ns
Horizontal Sync Hold Time	thsyn	20	10	-	-	-	-	ns
Phase difference of Sync Signal Falling Edge	thv	1		-		240		tDOTCLK
DOTCLK Low Period	tCKL	50	15	-	-	-	-	ns
DOTCLK High Period	tCKH	50	15	-	-	-	-	ns
Data Setup Time	tds	12	10	-	-	-	-	ns
Data hold Time	tdh	12	10	-	-	-	-	ns
Reset pulse width	tRES	10		-		-		μs

Note: External clock source must be provided to DOTCLK pin of HX8238-D. The driver will not operate if absent of the clocking signal.

Table 12. 1 Pixel Timing

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6. Absolute Maximum Ratings:

Name	symbol	Min	Type	Max	Unit
Operation Temperature	T _{OP}	-20	-	70	°C
Storage Temperature	T _{ST}	-30	-	80	°C

7. DC Characteristics

Name	Symbol	Min	Type	Max	Unit
Logical Voltage	V _{DD}	2.5	3.3	3.6	V
Input High Voltage	V _{IH}	0.8IOVCC	-	IOVCC	V
Input Low Voltage	V _{IL}	-0.3	-	0.2IOVCC	V
Output High Voltage	V _{OH}	0.8IOVCC	-	-	V
Output Low Voltage	V _{OL}	-	-	0.2IOVCC	V
Current Consumption	I _{DD}	-	TBD	-	mA

8. Blacklight:

Name	Min	Type	Max	Unit
Current	15.0	20.0	25.0	mA
Voltage	16.8	18.6	20.4	V
Power Consumption	--	372.0	--	mW
luminance	350	400	-	CD/M ² (Note1)
Luminance uniformity	75%	80%	-	(Note2)
X Color Coordinates	-	-	-	-
Y Color Coordinates	-	-	-	-

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Note1: This luminance is tested with assembling the LCD.

Note2: 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.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{\min}}{B_{\max}}$$

L-----Active area length W----- Active area width

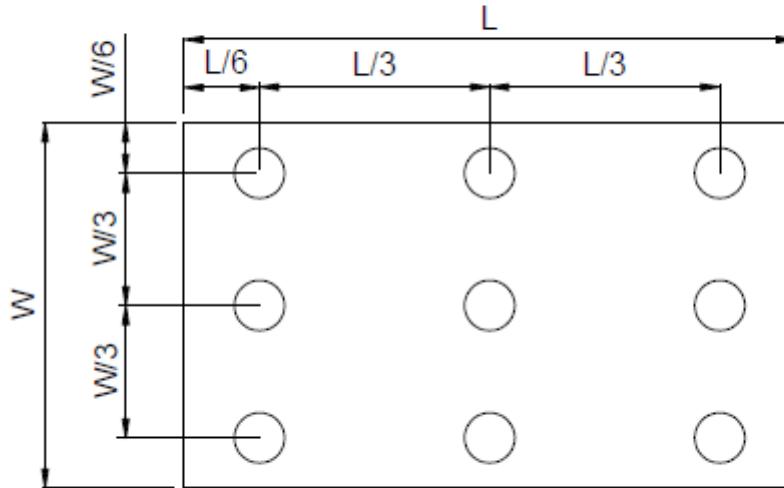


Fig. 4-4 Definition of measuring points

B_{\max} : The measured maximum luminance of all measurement position.

B_{\min} : The measured minimum luminance of all measurement position.

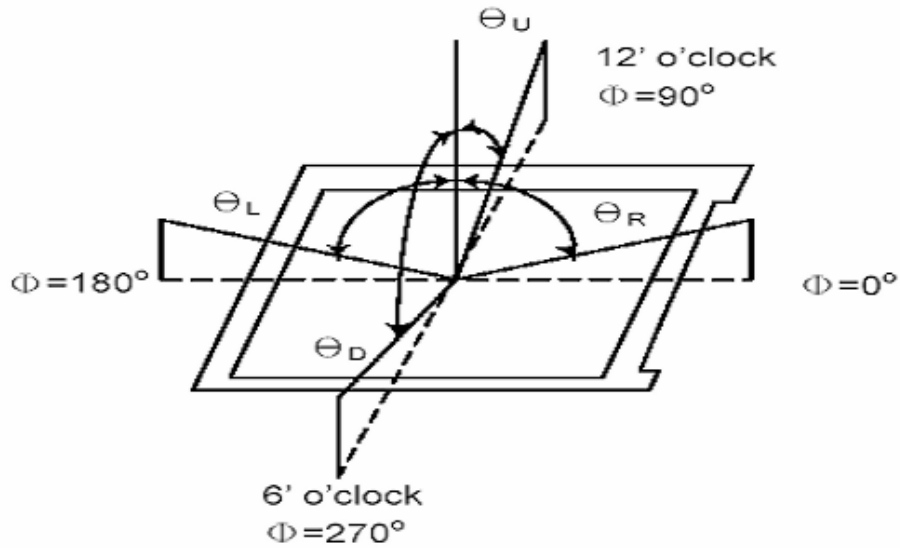
9. Optical Specification

Name	Symbol	Min	Type	Max	Unit
Transmittance rate	T (%)	-	4.6	-	%
Contrast ratio	C/R	-	400	-	-
Response time	Tr+Tf	-	35	-	ms
Viewing Angle	θU	40	50	-	degree (C/R>10)
	θD	20	30	-	
	θL	40	50	-	
	θR	40	50	-	

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*Viewing angle description:

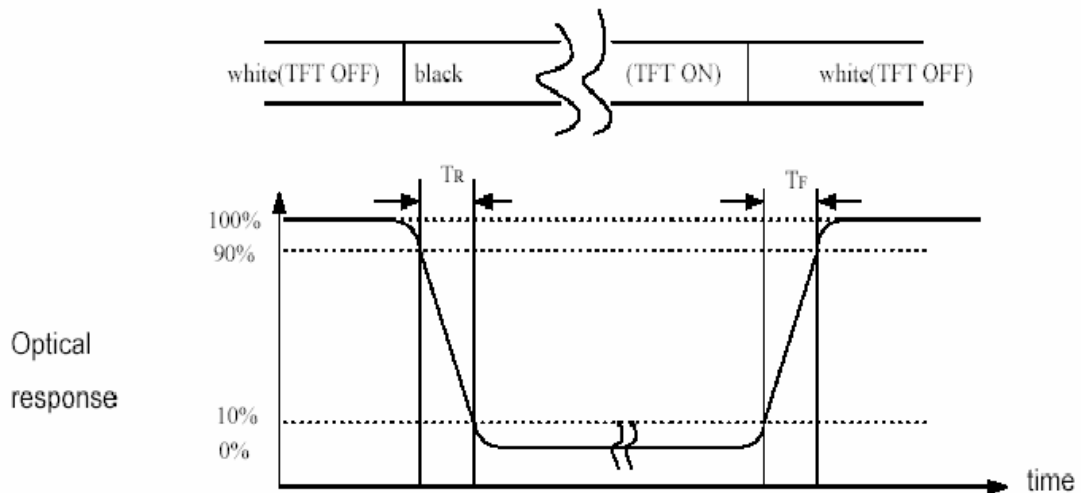


*Contrast rate description(CR) :

Tested in the center of the LCM panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

*Response time description : Sum of TR and TF



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10. Reliability testing:

Item No	Name	Condition	Remark
1	High temperature Operating	70° C , 168Hours	Finish product (With polarizer)
2	Low temperature Operating	-20° C , 168 Hours	Finish product (With polarizer)
3	High temperature Storage	80° C , 168 Hours	Finish product (With polarizer)
4	Low temperature Storage	-30° C , 168 Hours	Finish product (With polarizer)
5	High temperature & humidity Storage	60° C , 90%RH, 168 Hours	Finish product (With polarizer)
6	Thermal Shock Storage (No operation)	-20° C , 30min.<=> 70° C , 30min. 10 Cycles	Finish product (With polarizer)
7	ESD test	Voltage:+8KV R:330 ohm,C:150pF Air discharge,10 times	Finish product (With polarizer)
8	Vibration test	10 => 55 =>10 => 55 => 10 Hz, within 1 minute;Amplitude:1.5mm. 15 minutes for each Direction (X, Y, Z)	Finish product (With polarizer)
9	Drop test	Packed, 100CM free fall 6 sides, 1 corner, 3edges	Finish product (With polarizer)

*One single product test for only one item.

* Judgment after test: keep in room temperature for more than 2 hours.

- Current consumption < 2 times of initial value
- Contrast > 1/2 initial value
- Function: work normally

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11. Inspection Standard

11.1 Defect Definition

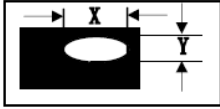
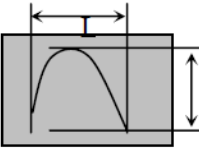
No.	Defect Class	Defination	Content
1	重缺陷 (MA)	影响显示的功能缺陷	短路、断路、缺划、大电流、视角错、漏液、显示不清等
		严重外观缺陷	产品尺寸不符、漏部品等
2	轻缺陷 (MI)	不影响产品功能, 但对产品外观有影响	反黑 / 反白点、偏光片缺陷、针孔、污点

11.2 Standard

No.	Item	Inspection Standard	Classification of defects
1	显示状态	不显、显示乱码、多划、少划、少画面、视角错、闪烁等均不允许	重缺陷
		无法用文字描述的现象, 必要时制定限度样板进行参考。如: 显示不均、显示浓淡、斜纹等	
		显示的颜色效果参照开发、工程样品或按限度样板判定	
		画面切换过程中可见(但非画异)之不良现象(暂停画面时不良现象不可见)不作管控, 客户有特殊要求时依客户要求;	轻缺陷
	仅点背光不显示画面下可见不良现象(但显示画面时不良现象不可见)不作管控, 客户有特殊要求时依客户要求;	轻缺陷	
2	背光	LED 灯不亮或闪烁不稳定不允许	重缺陷
		背光电流: 超出规格范围不允许	
		亮眼、漏光: 进入 LCD 的 A、B 区不允许, 必要时按限度样板做判定	轻缺陷
		背光颜色: 根据样品、规格书判定	轻缺陷
		亮度与发光均匀度参照开发、工程或限度样板判定	轻缺陷

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No.	Item	Inspection Standard		Classification of defects
3	显示黑点 白点 针孔	直径 ($\Phi = (X+Y) / 2$)	允收数	图示
		$\Phi \leq 0.1$ (密集不可)	不计	
		$0.1 < \Phi \leq 0.15$ [注2]	2	
		$0.15 < \Phi \leq 0.2$	1	
		$\Phi > 0.2$	0	
		注1. 包括: 黑点、白点、针孔、异物。 注2. 整个产品不允许超过2个点, 且间距必须在10mm以上。		
4	显示黑线 白线	尺寸 (L: 线长; W: 线宽)	允收数	图示
		L 不计 W < 0.03 (密集不可)	不计	
		$L \leq 2$ $0.03 \leq W \leq 0.05$ [注2]	2	
		L 不计 W > 0.05	以点判断	
		注1. 包括: 显示黑线、白线、线状异物。 注2. 单个产品不允许超过2个线状缺陷, 且缺陷距离必须大于10mm以上。		
5	触摸屏	点击触摸屏测试点画面无转换不允许		重缺陷

12. Precaution

12.1 Handling

- (1) Protect the panel from static, it may cause damage to the CMOS Gate Array IC.
- (2) Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (3) 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.
- (4) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Don't use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
- (5) Pins of I/F connector shall not be touched directly with bare hands.

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(6) Refrain from strong mechanical shock and / or any force to the panel. In addition to damage, this may cause improper operation or damage to the panel.

(7) Note that polarizers are very fragile and could be easily damaged. Do not press or scratch the surface harder than a B pencil lead.

(8) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.

(9) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

12.2 Storage

(1) Do not leave the panel in high temperature, and high humidity for a long time. It is highly recommended to store the panel with temperature from 0 to 35°C and relative humidity of less than 70%.

(2) The panel shall be stored in a dark place. It is prohibited to apply sunlight or fluorescent light during the store.

12.3 Operation

(1) The LCD shall be operated within the limits specified. Operation at values outside of these limits may shorten life, and/or harm display images.

(2) Do not exceed the absolute maximum rating value. (the supply voltage variation, Input voltage variation in part contents and environmental temperature and so on). Otherwise the panel may be damaged.

(3) If the panel displays the same pattern continuously for a long period of time, it can be the situation when the image "Sticks" to the screen.