

PRODUCT SPECIFICATION FOR LCD MODULE

(产品规格书)

Reversion (版本) : 1.0

Module No. (模组型号) : RV028Z6P-400-40-V2

Customer Name: (客户名) : _____

Project Name: (客户项目名) : _____

This module uses ROHS material

(本产品使用环保材料)

CUSTOMER APPROVED (客户确认) :

☐ Approved Product Specification only. (确认产品规格)	Approved by (核准) :
☐ Approved Product Specification and Samples. (确认产品规格及样品)	

Please sign back after confirmed. (确认后请签回)

RJOYTEK DISPLAY LTD:

QA Dept. (品质)	Tech. Dept. (工程)	Sale Dept. (业务)
	章雷	

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REVISION RECORD

REV	CHANGE DESCRIPTION	DATE
1.0	Original Version	2022-06-23

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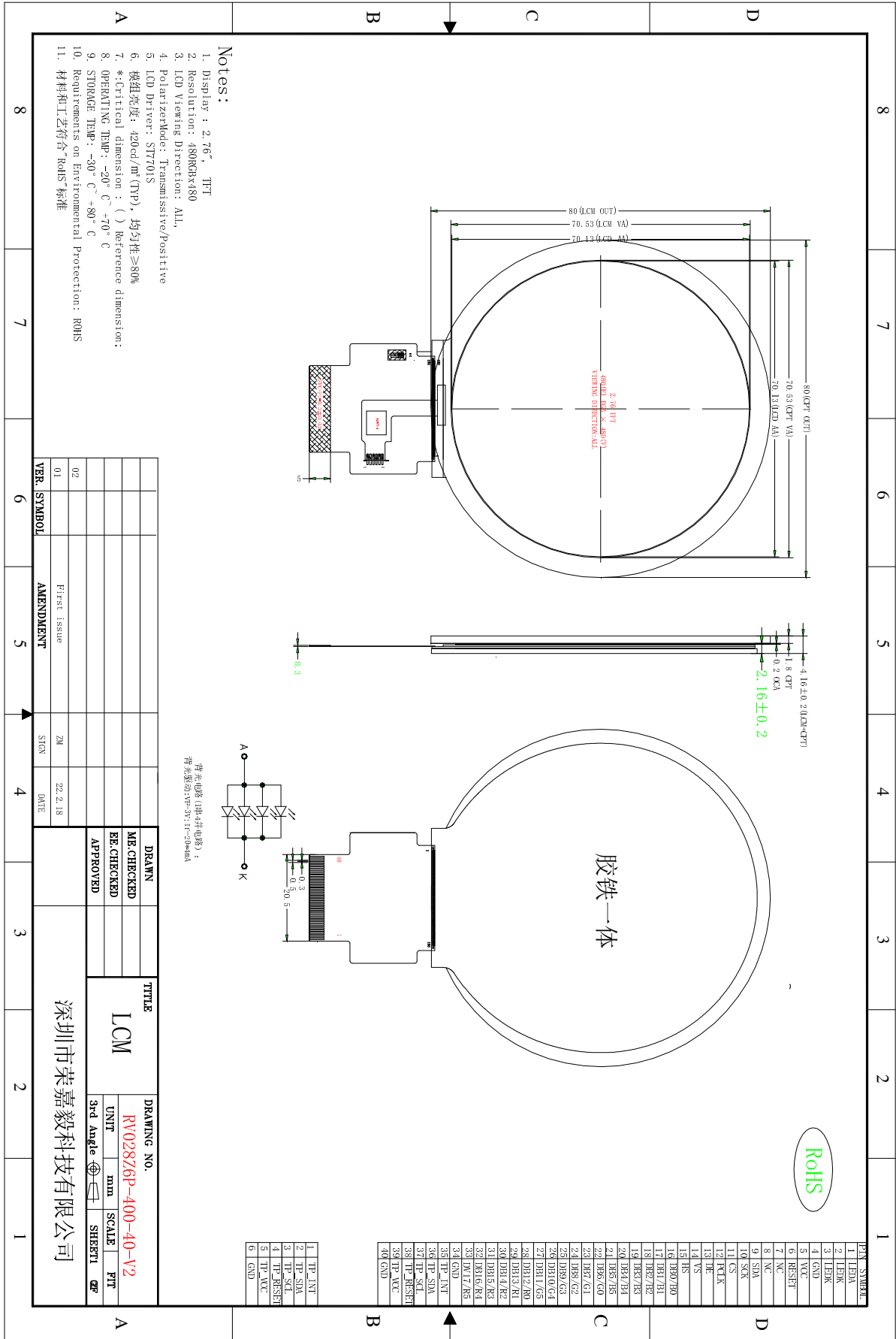
■ PRECAUTIONS IN USE OF LCM

RV028Z6P-400-40-V2 is a color active matrix TFT-LCD Panel using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This model is composed of a TFT-LCD Panel, a driving circuit and a back light system. It is a transmissive type display operating in the normal white. This TFT-LCD has a 2.76 inch diagonally measured active area with WVGA resolutions (480 horizontal by 480 vertical pixel array). Each pixel is divided into Red, Green, Blue dots which are arranged in vertical stripe and this panel can display 16.7M colors.

■ GENERAL SPECIFICATION

Item	Contents	Unit
LCD Type	AM TFT ,TRANSMISSIVE, NEGATIVE	
Display Format	480(R,G,B)*480	Dots
Input Data	RGB+SPI	\
View Angle	ALL O'clock	\
IC Driver	ST7701S	\
Display Colors	16.7M	\
Module Size	73.33(W)×76.82(L)×2.2(T)	mm
Active Area	70.13(W) ×70.13(L)	mm
Pixel Size	0.1461x0.1461	mm
Operating Temperature	-20 to +70	°C
Storage Temperature	-30 to +80	°C
LCM Luminance	400	cd/m ²
Weight	TBD	g

LCM MODULE DRAWING



■ INTERFACE PIN ASSIGNMENT

Pin No.	Symbol	Function description	When not in use
1	LED-A	B/L positive pin	
2-3	LED-K	B/L negative pin	
4	GND	Ground	
5	VCC	Power supply=2.8Vtyp	
6	RESET	Reset Signal ,Active Low	
7	NC	NC	
8	NC	NC	
9	SDA	SPI Data signal	
10	SCL	SPI Clock signal	
11	CS	SPI Chip select signal	
12	PCLK	RGB dot clock signal	
13	DE	RGB data enable signal	
14	VS	RGB frame synchronizing signal	
15	HS	RGB line synchronizing signal	
16-21	R0-R5	Bi-directional data bus	
22-27	G0-G5	Bi-directional data bus	
28-33	R0-R5	Bi-directional data bus	
34	GND	Ground	
35	TP_INT	TP_INT	
36	TP_SDA	TP_SDA	
37	TP_SCL	TP_SCL	
38	TP_RESET	TP_RESET	
39	TP_VCC	TP_VCC	
40	GND	Ground	

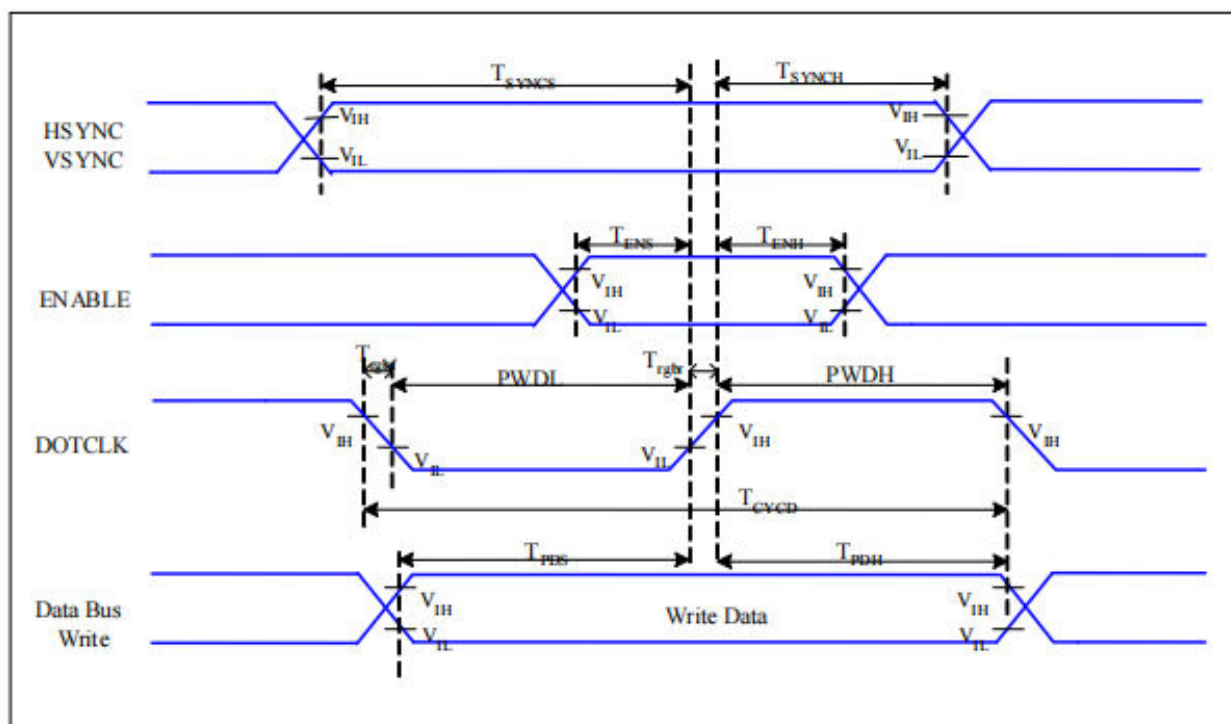
■ BACKLIGHT CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	Vf	--	3.2	--	V	If=20mA*4 T=25℃
Luminance	Avg	--	-	--	cd/m ²	
Number of LED	-	1X4			Piece	-
Connection mode	S/P	1Serial/4Parallel			-	-

■ DC ELECTRICAL CHARACTERISTICS

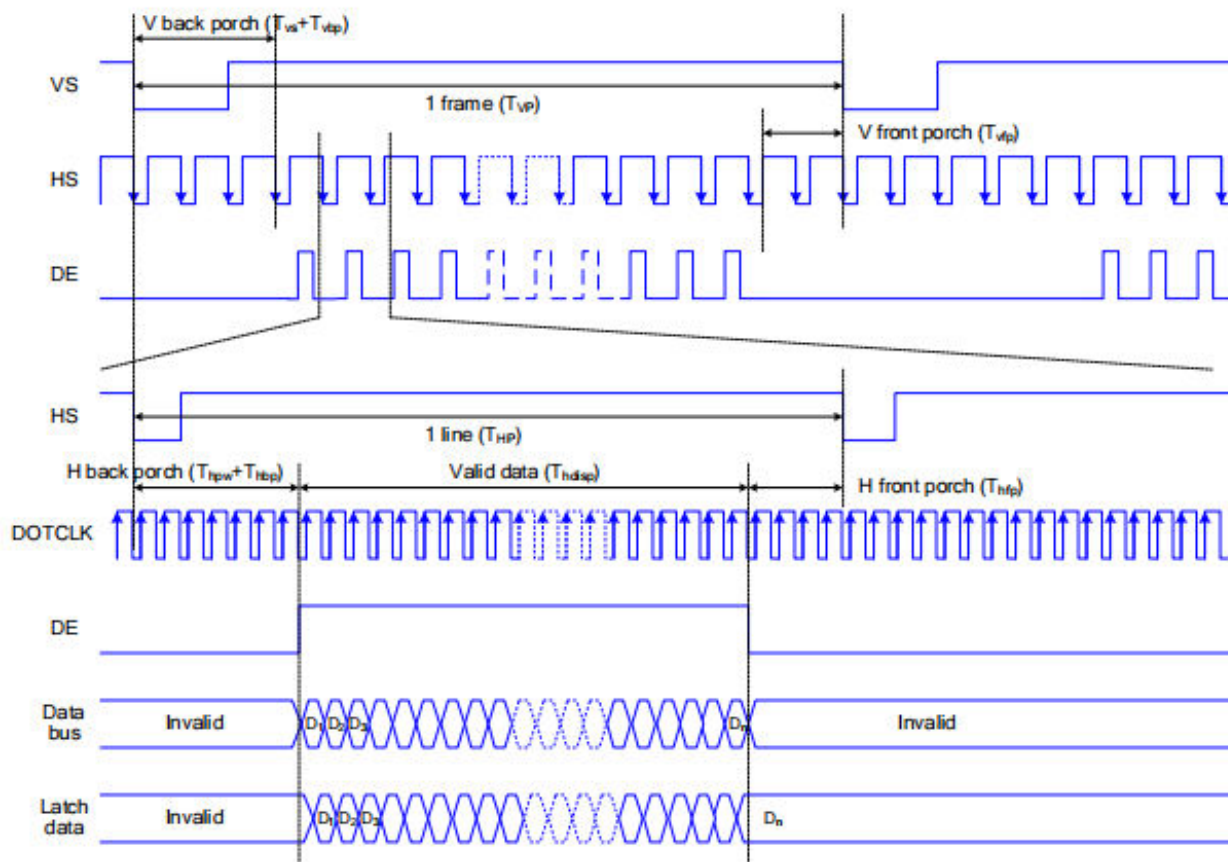
Item	Symbol	Min.	Typ.	Max.	Unit
Power supply for logic	IOVCC	1.65	1.8/2.8	3.3	V
Input power supply	VCC/VC1	2.5	2.8	3.3	V
Input current	I _{IN}	-	TBD	TBD	mA
Input high voltage	V _{IH}	0.7IOVCC	-	IOVCC	V
Input low voltage	V _{IL}	0	-	0.3IOVCC	V
Output high voltage	V _{OH}	0.8IOVCC	-	IOVCC	V
Output low voltage	V _{OL}	0	-	0.2IOVCC	V

RGB Interface Characteristics

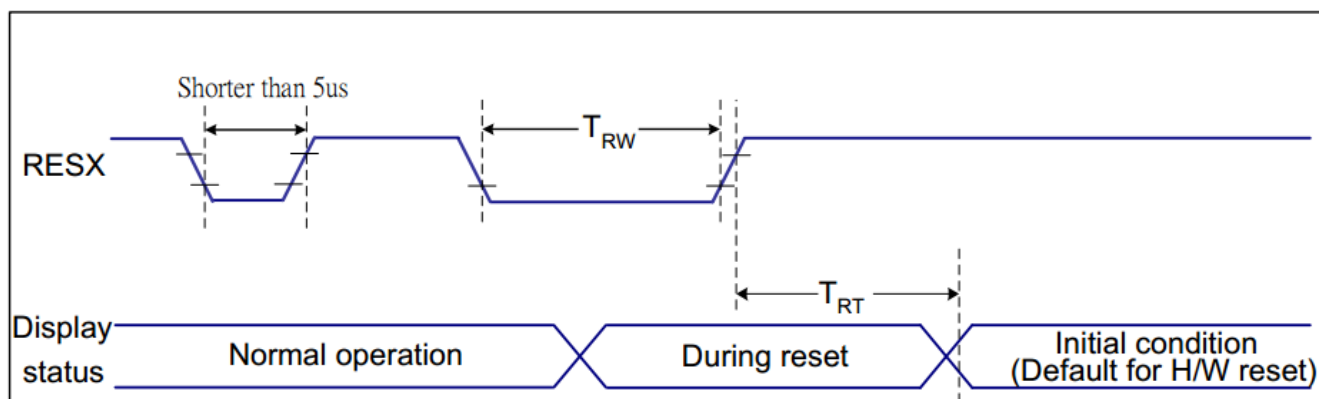


■ Timing Characteristics

The timing chart of RGB interface DE mode is shown as follows.

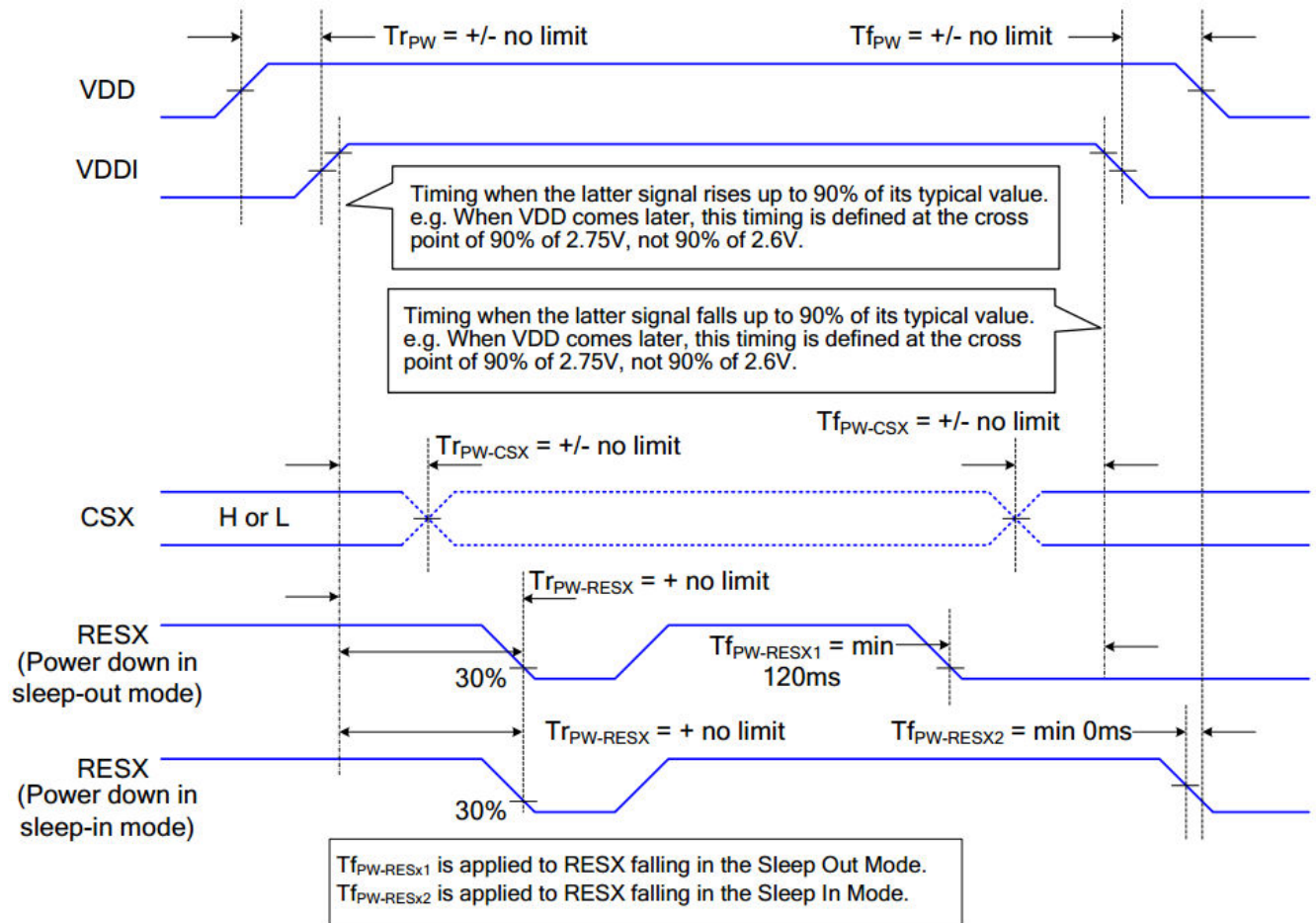


■ RESET Timing



Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1, 6, 7)	ms

Power on/off sequence



Optical Specification

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Transmittance (w/o polarizer)		T%	e=0° Ta=25°C	-	4.6	-	%	1
Contrast ratio		Cr		1000	1200	-	-	2
Response time		Ton+Toff		-	35	40	ms	3
Surface Luminance		LV		-	400	-	cd/m ²	4
Viewing angle range		Left θ_L	Center CR>10	80	85	-	deg	5
		Right θ_R		80	85	-	deg	
		Top θ_T		80	85	-	deg	
		Bottom θ_B		80	85	-	deg	
CIE(x,y) chromaticity	Red	X	Viewing normal angle 0x=0y=0° Ta=25°C	-	-	-	-	6
		y		-	-	-	-	
	Green	X		-	-	-	-	
		y		-	-	-	-	
	Blue	X		-	-	-	-	
		y		-	-	-	-	
	White	X		-	-	-	-	
		y		-	-	-	-	

■ RELIABILITY

Item	Conditions	Criteria
High temperature operation	70℃ for 48 hours	● No defect in cosmetic and Operational functions. ● Total current consumption Below double of initial value.
Low temperature operation	-20℃ for 48 hours	
High humidity storage	60℃.90% RH for 48 hours	
High Temperature storage	80℃ for 48 hours	
Low temperature storage	-30℃ for 48 hours	
Temperature cycling	-20℃ (30min) ↓ ↑ -25℃ (5min) ↓ ↑ 70℃ (30min)	

Inspection requirements

Acceptance Quality Limit (AQL) GB/T 2828.1-2012 Level II

Serious defect: C=0 Major defect: 0.4 Minor defect: 1.0

The following defects are the major defects of the product:

- 1: Functional and appearance defects affect normal use
- 2: Performance parameters exceed specification standards
- 3: Missing components, accessories and main identification
- 4: More irrelevant signs and other items that may affect the performance of the product

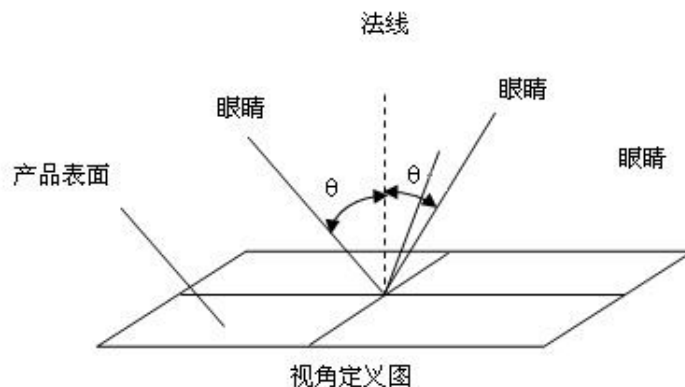
Minor defect: Outside of the major defect is minor defect

Inspection Conditions:

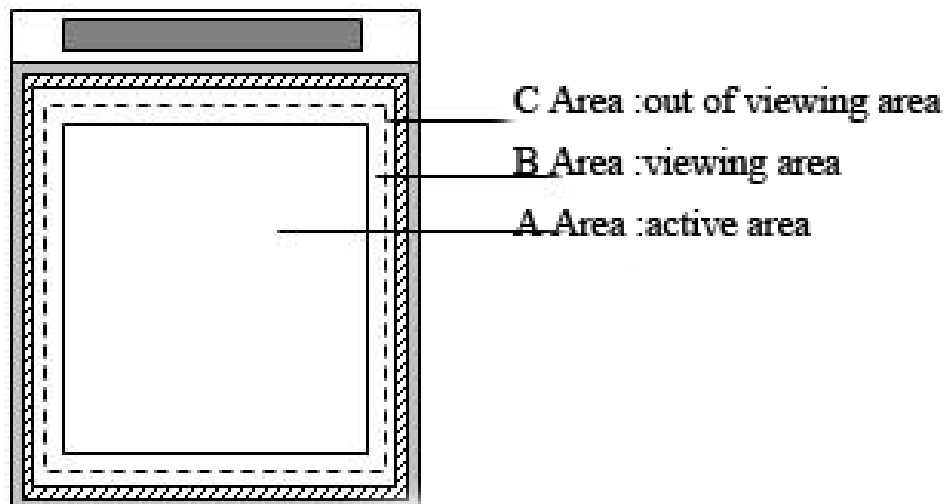
6.21 The lighting of appearance inspection and function inspection shall meet the requirements specified in the light intensity test (Function: 200 ± 20 lux, Appearance: 1000 ± 200 lux)

6.22 Finished products and semi-finished products shall be tested by the customer mainboard or the test fixture that can meet the customer's requirements. Standard backlight shall be used for the single-screen test.

6.23 Inspection method: eye distance: 30 ± 5 cm; Take the product normal line as the center to check the upper and lower 45° range.



Definition of the Area



View area definition diagram

When testing, please wear a rope static ring and anti-static finger sleeve (or gloves)

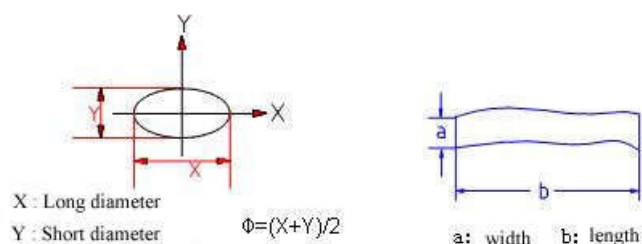
Need to determine the specification of defects (such as dots and lines) with a film card, magnifying eyepiece for coverage inspection (products with special requirements of customers shall be implemented according to customer requirements), Or use test equipment to test the exact value; Other defects are determined according to the limit sample.

LCD/LCM judgement standard

(the unit of the following design size standard is mm without special specification)

Point/line definition

Dot size (①): when the long diameter of more than 2.5 times short diameter, dot defect into a line defect judgement)



Appearance acceptance standard and defect judgement

The judgement standard for judging the defect dot and line of full fit module (display and touch screen)

Spot defect (white spot, foreign body, impurity, color point, bump point, etc.)					
DOT		Inspection Criteria		Defect distinguish	remake
G<0.1mm		Not counted		Major	10mm* 10mm range allow 5
0.1<C) <0.2mm		2			The distance between the two defects is greater than 10
0.2<C) <0.3mm		1			
0.3mm<®		0			
Additional: pitting/poor gathering points apply to limited samples or by ND5%					
Pixel dot (bright color dott, dark dot)					
Bright > color dot		dot	N<2	Major	Total NW3
Dark dot		dot	N< 2 _z DS		
		2s	> 10mm		
		3s	N< 1		
Additional: Partial Bright Dot are judged by ND5%.					
Linear defects (scratch and other physical damage;White thread, fiber, dander, etc.)					
Details		Inspection	Defect	remake	
length (L)	width (W)	Criteria	distinguish		
L<1.5mm	W<0.03mm	Not counted		Not allowed gathered	
L<3.0mm	0.03<W<0.08mm	2		The distance between the two defects is greater than 10mm	
L>3.0mm	W>0.08mm	0			

CG defect appearance and judgement criteria

Spot defects for Ink Zone or visible area (white spot, foreign body, impurity, bump point, etc.)

DOT	Inspection Criteria	Defect distinguish	remake
	Not counted	minor	
$0.1 < C) < 0.2\text{mm}$	2		The distance between the two defects is greater than
$0.2\text{mm} < \textcircled{R}$	0		

Linear defects for Ink Zone or visible area (scratch and other physical damage; White thread, fiber, dander, etc.)

Details		Inspection Criteria	Defect distinguish	remake
length (L)	width (W)			
Ignore	$W < 0.03\text{mm}$	Ignore	minor	Not allowed gathered
$L < 3.0\text{mm}$	$0.03 < W < 0.05\text{mm}$	2		The distance between the two defects is greater than 10mm
$L > 3.0\text{mm}$	$W > 0.05\text{mm}$	0		

Ink defects for Ink Zone

Inspection item	Judge criterion	Defect distinguish
Ink area light transmission leakage	According to the spot defect.	minor
Ink sawtooth in VA area	The sawtooth size: W W 0.20mm no count	minor
Ink color difference	No difference from the front sight or upper and lower limit	minor
Silk screen graphic	Misprints, mixed printing reprints, and defects are not	minor
ink burr in VA area	LW0.05mm, WW 0.05mm. Number [^] 10	minor
Comer broken	the surface: not allowed; the back: $tW1/2, 0.1 \vee \textcircled{1} W 0.2\text{mm}$, NW3.	minor

Functional defect criteria

Num.	Inspection content	Inspection Criteria	Inspection tools/equipment	Defect distinguish
1	No display	Not allowed	Visual, test jig, power supply	major
2	Display abnormal	Not allowed	Visual, test jig, power supply	major
3	missing segment	Not allowed	Visual, test jig, power supply	major
4	Different chroma or brightness	Not allowed, reference limit template for special cases	Visual, test jig, power supply	major
5	The display image is different from the sample	Not allowed	Visual, test jig, power supply	major
6	Backlight LED don't work	Not allowed	Visual, test jig, power supply	major
7	Backlight flashing	Not allowed	Visual, test jig, power supply	major
8	Leakage liquid crystal	Not allowed	Visual	major

Note: 1. Other parts not involved shall be subject to the customer's requirements or limits.

2. The allowable proportion of defective materials in each batch shall not exceed 5%.

After the product is launched on the client, the appearance problems are all the responsibility of the client, and the functional problems are the responsibility of RJOYTEK DISPLAY LTD