SPECIFICATION

FOR

AMOLED MODULE

CUSTOMER : _____

CUSTOMER MODULE : _____

HG MODEL : HG070FH002

☐**Preliminary Specification**

■**Final Specification**

Customer Confirmation column:

Approved by : _____ Dept. : _____ Data : _____

Please return one of the copies of the specification with your signature to us within two weeks after you receive this document. If it is not returned, we will assume that you agree to the entire contents of this specification document.

Designed by	Checked by	Approved by

Table of Contents

Record of Revision

Rev	Issue Date	Description	Editor
A0	2024-7-29	Draft	Gao Pei

1 General Specifications

Feature		Spec	Remark
Display Spec	Screen Size (inch)	7.0	
	Display Mode	AMOLED	
	Display method	Active Matrix TFT	
	Resolution(dot)	1080(W)x1920(H)	
	Active Area(mm)	87.1344 (H) x 154.9056 (V)	
	PPI	315	
	Pixel Configuration	V-style4	
	Technology Type	LTPS	
	With TP/Without TP	With TP	
	Panel Outline Dimension(W x H x D) (mm)	89.1344*160.9056*1.028	Include POL&Foam
Electronic	Driver IC(Type)	ICNA3512	
	TP IC（Type）	FT3519	
	Frame Rate	60/90/120/144Hz	

Note 1: Requirements on Environmental Protection: RoHS 2.0

2 Input/output Terminals

2.1 Main FPC Pin Assignment

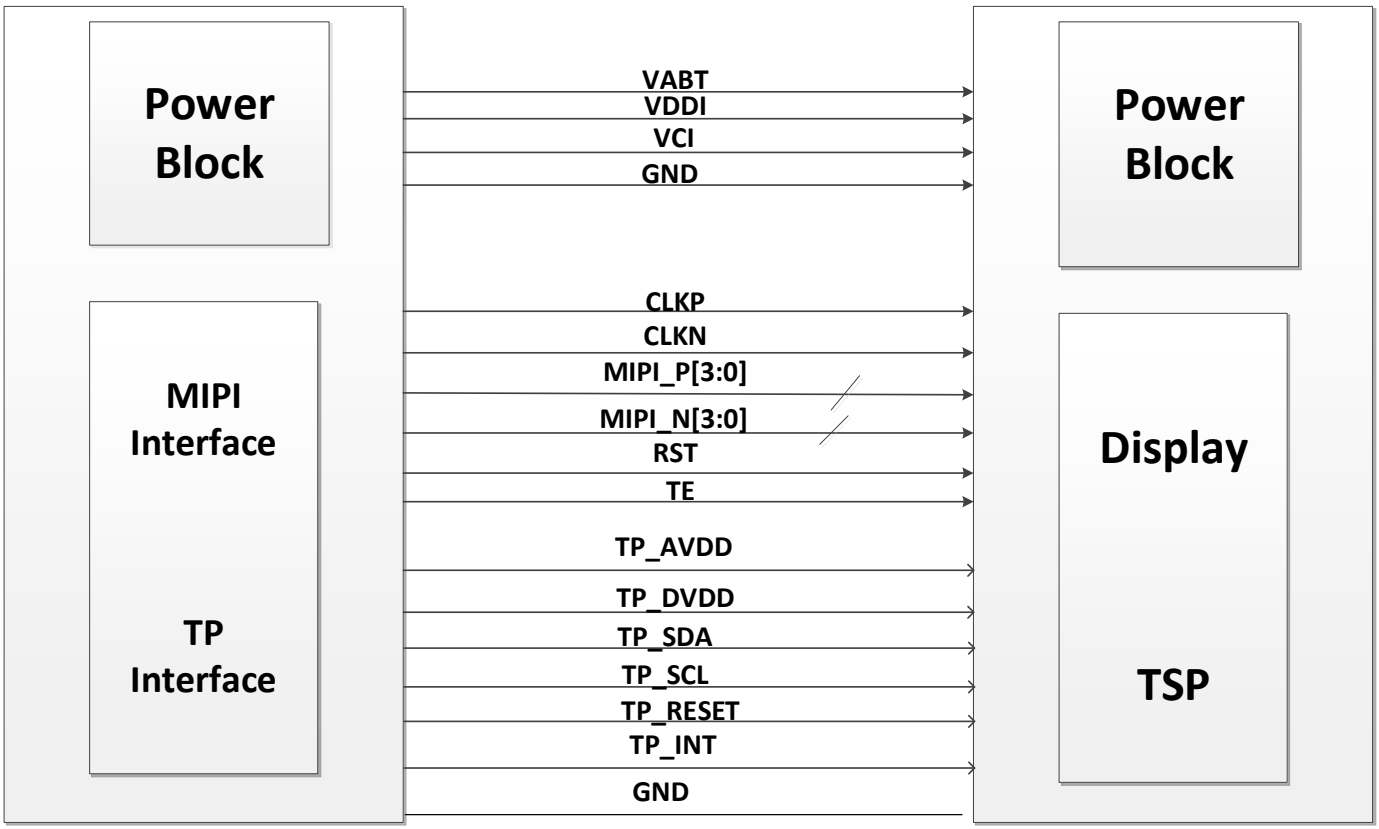
FPC connector: OK-F302-39115 (Connector).

Transfer FPC: OK-F302-39115 (Goldfinger).

No	Symbol	I/O	Description
1	GND	P	Ground
2	GND	P	Ground
3	GND	P	Ground
4	VBAT	P	Power supply for EL PMIC
5	VBAT	P	Power supply for EL PMIC
6	VBAT	P	Power supply for EL PMIC
7	VBAT	P	Power supply for EL PMIC
8	VBAT	P	Power supply for EL PMIC
9	GND	P	Ground
10	NC	/	No use
11	NC	/	No use
12	GND	P	Ground
13	D3P	I	MIPI data
14	D3N	I	MIPI data
15	GND	P	Ground
16	D0P	I/O	MIPI data
17	D0N	I/O	MIPI data
18	GND	P	Ground
19	CLKP	I	MIPI data
20	CLKN	I	MIPI data
21	GND	P	Ground
22	D1P	I	MIPI data
23	D1N	I	MIPI data
24	GND	P	Ground
25	D2P	I	MIPI data
26	D2N	I	MIPI data
27	GND	P	Ground
28	RST	I/O	Display reset
29	VDDI	P	Logic power for DDIC
30	VCI	P	Analog power for DDIC
31	TE	O	Tearing effect signal
32	GND	P	Ground
33	TP_AVDD	P	Analog power for TP IC
34	TP_DVDD	P	Logic power for TP IC
35	TP_SDA	I/O	IIC SDA for TP IC
36	TP_SCL	I	IIC SCL for TP IC
37	TP_RESET	I	RESET for TP IC
38	TP_INT	I	INT for TP IC
39	NC	/	No use

Note: I=Input; O=Output; P=Power; I/O=Input / Output

2.2 MCU and Display Module Interface Conflagration



3 Absolute Maximum Ratings

3.1 Driving AMOLED Panel

Maximum Ratings (Voltage Referenced to VSS) VSS=0V, Ta=25°C

Item		Symbol	MIN	MAX	Unit
Display Power	Logic Power supply	VCI	-	3.6	V
	Analog Power supply	VDDIO	-	3.6	V
	Power IC Power Supply	VBAT	-	7	V

Note: Functional operation should satisfy the limits in the Electrical Characteristics tables or Pin Description section. If the module exceeds the absolute maximum ratings, permanent damage may occur. Besides, if the module is operated with the absolute maximum ratings for a long time, the reliability may also drop.

4 Electrical Characteristics

4.1 Driving AMOLED Panel

Ta=25℃

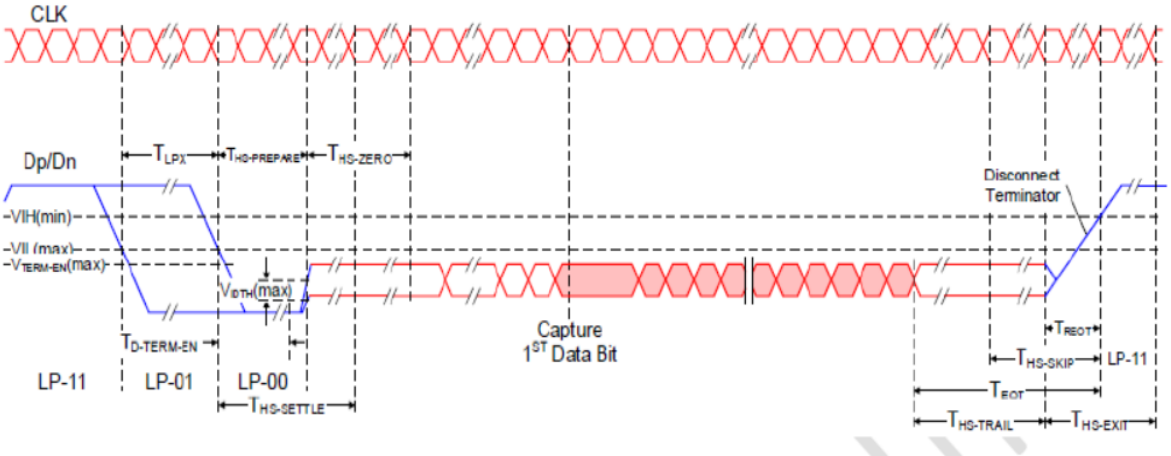
Item		Symbol	MIN	TYP	MAX	Unit
Logic Power supply		VDDI	1.65	1.8	1.95	V
Analog Power supply		VCI	2.65	3	3.60	V
Default Positive Output Voltage		VBAT	4.0	4.2	4.8	V
Input Signal Voltage	High Level	VIH	0.70*VDDI	-	VDDI	V
	Low Level	VIL	0.00	-	0.30*VDDI	V
Output Signal Voltage	High Level	VOH	0.80*VDDI	-	VDDI	V
	Low Level	VOL	0.00	-	0.20*VDDI	V

Note: The current and power consumption were tested under White pattern，25℃

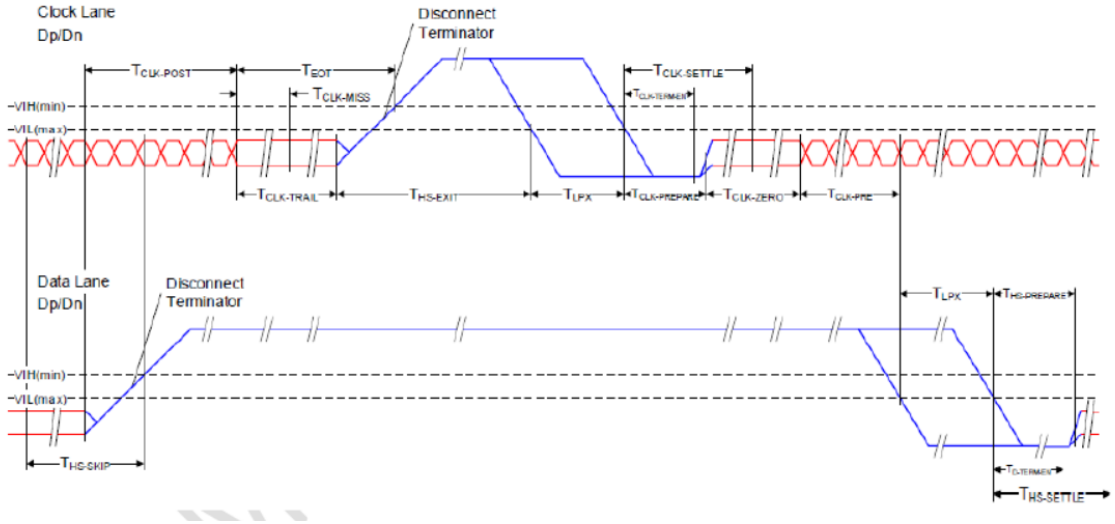
5 AC Characteristics

5.1 MIPI Interface Characteristics

HS Data Transmission Burst



HS clock transmission



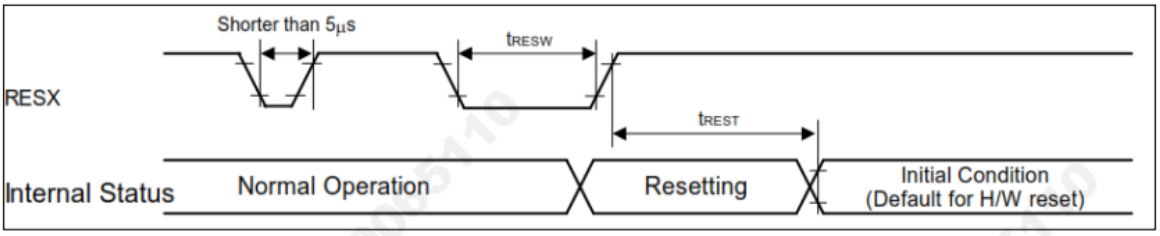
Timing Parameter:

Parameter	Description	Min	Typ	Max	Unit	Notes
$T_{CLK-MISS}$	Timeout for receiver to detect absence of Clock transitions and disable the Clock Lane HS-RX.			60	ns	1, 6
$T_{CLK-POST}$	Time that the transmitter continues to send HS clock after the last associated Data Lane has transitioned to LP Mode. Interval is defined as the period from the end of $T_{HS-TRAIL}$ to the beginning of $T_{CLK-TRAIL}$.	60 ns + 52*UI			ns	5
$T_{CLK-PRE}$	Time that the HS clock shall be driven by the transmitter prior to any associated Data Lane beginning the transition from LP to HS mode.	8			UI	5
$T_{CLK-PREPARE}$	Time that the transmitter drives the Clock Lane LP-00 Line state immediately before the HS-0 Line state starting the HS transmission.	38		95	ns	5
$T_{CLK-SETTLE}$	Time interval during which the HS receiver should ignore any Clock Lane HS transitions, starting from the beginning of $T_{CLK-PREPARE}$.	95		300	ns	6, 7
$T_{CLK-TERM-EN}$	Time for the Clock Lane receiver to enable the HS line termination, starting from the time point when Dn crosses $V_{IL,MAX}$.	Time for Dn to reach $V_{TERM-EN}$		38	ns	6
$T_{CLK-TRAIL}$	Time that the transmitter drives the HS-0 state after the last payload clock bit of a HS transmission burst.	60			ns	5
$T_{CLK-PREPARE}$ + $T_{CLK-ZERO}$	$T_{CLK-PREPARE}$ + time that the transmitter drives the HS-0 state prior to starting the Clock.	300			ns	5
$T_{D-TERM-EN}$	Time for the Data Lane receiver to enable the HS line termination, starting from the time point when Dn crosses $V_{IL,MAX}$.	Time for Dn to reach $V_{TERM-EN}$		35 ns + 4*UI		6
T_{EOT}	Transmitted time interval from the start of $T_{HS-TRAIL}$ or $T_{CLK-TRAIL}$, to the start of the LP-11 state following a HS burst.			105 ns + n*12*UI		3, 5
$T_{HS-EXIT}$	Time that the transmitter drives LP-11 following a HS burst.	100			ns	5

Parameter	Description	Min	Typ	Max	Unit	Notes
$T_{HS-PREPARE}$	Time that the transmitter drives the Data Lane LP-00 Line state immediately before the HS-0 Line state starting the HS transmission	40 ns + 4*UI		85 ns + 6*UI	ns	5
$T_{HS-PREPARE}$ + $T_{HS-ZERO}$	$T_{HS-PREPARE}$ + time that the transmitter drives the HS-0 state prior to transmitting the Sync sequence.	145 ns + 10*UI			ns	5
$T_{HS-SETTLE}$	Time interval during which the HS receiver shall ignore any Data Lane HS transitions, starting from the beginning of $T_{HS-PREPARE}$. The HS receiver shall ignore any Data Lane transitions before the minimum value, and the HS receiver shall respond to any Data Lane transitions after the maximum value.	85 ns + 6*UI		145 ns + 10*UI	ns	6
$T_{HS-SKIP}$	Time interval during which the HS-RX should ignore any transitions on the Data Lane, following a HS burst. The end point of the interval is defined as the beginning of the LP-11 state following the HS burst.	40		55 ns + 4*UI	ns	6
$T_{HS-TRAIL}$	Time that the transmitter drives the flipped differential state after last payload data bit of a HS transmission burst	max(n*8*UI, 60 ns + n*4*UI)			ns	2, 3, 5
T_{INIT}	See Section 6.11.	100			µs	5
T_{LPX}	Transmitted length of any Low-Power state period	50			ns	4, 5
Ratio T_{LPX}	Ratio of $T_{LPX(MASTER)}$/$T_{LPX(SLAVE)}$ between Master and Slave side	2/3		3/2		
T_{TA-GET}	Time that the new transmitter drives the Bridge state (LP-00) after accepting control during a Link Turnaround.	5*T_{LPX}			ns	5
T_{TA-GO}	Time that the transmitter drives the Bridge state (LP-00) before releasing control during a Link Turnaround.	4*T_{LPX}			ns	5
$T_{TA-SURE}$	Time that the new transmitter waits after the LP-10 state before transmitting the Bridge state (LP-00) during a Link Turnaround.	T_{LPX}		2*T_{LPX}	ns	5
T_{WAKEUP}	Time that a transmitter drives a Mark-1 state prior to a Stop state in order to initiate an exit from ULPS.	1			ms	5

5.2 Display RESET Timing Characteristics

Reset input timing:



VDDIO=1.65 to 1.95V, VCI=2.65 to 3.6V, AGND=DGND=0V, Ta=-40 to 85℃

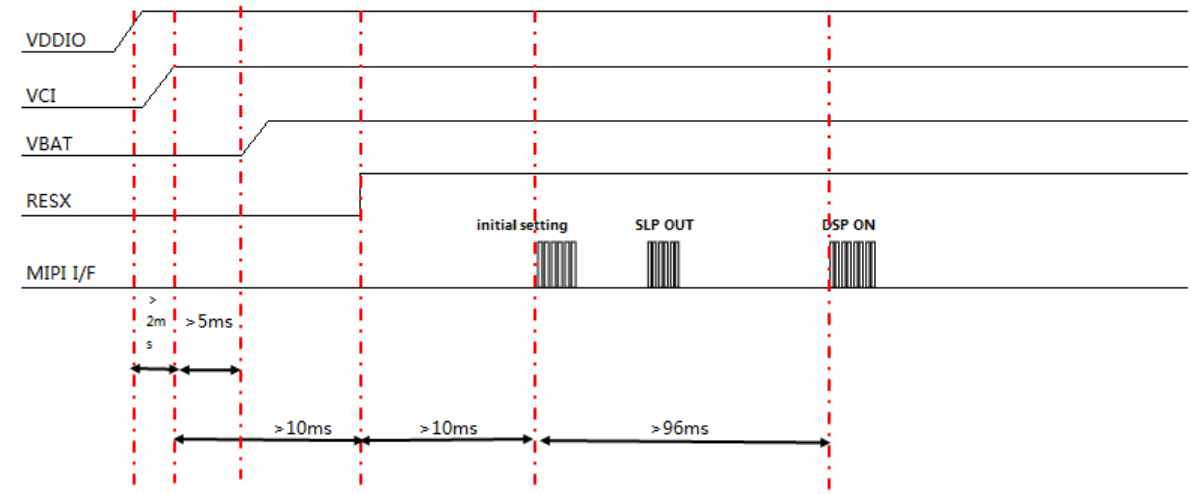
Timing Parameters

Symbol	Parameter	Related Pins	Min.	Typ.	Max.	Note	Unit
tRESW	*1) Reset low pulse width	RESX	10	-	-	-	us
tREST	*2) Reset complete time				5	When reset applied during sleep in mode	ms
					120	When reset applied during Sleep out mode	ms

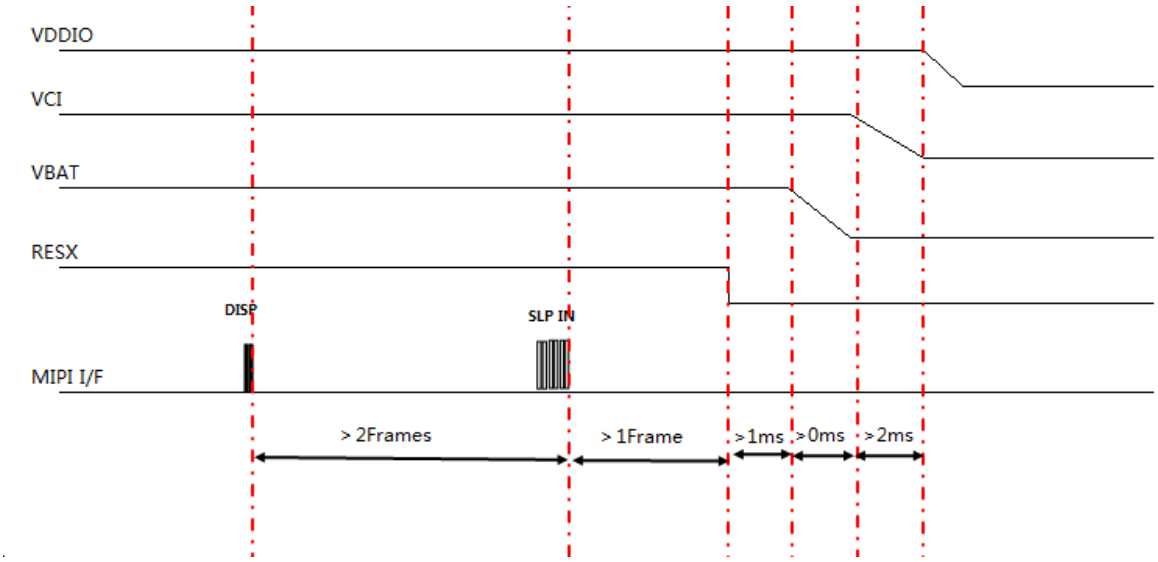
6 Recommended Operating Sequence

6.1 Display Power on / off Sequence

6.1.1 Power On Sequence



6.1.2 Power Off Sequence



7 Touch Design

7.1 Touch Panel Design

Item		Description	Notes
Touch Design	Sensor structure	On cell	
	Sensor pitch	Tx: 4.359mm, Rx:4.3042mm	
	Sensor pattern	Diamond	
	CH Number	20(Tx) / 36(Rx)	
	Trace mode	2T1R	
	TP IC	FT3519	

7.2 General Specifications

NO	ITEM	SPEC	REMARK
1	Precision @ D7mm Finger(mm)	center≤1.0mm border≤1.5mm	
2	Jitter @D7mm Finger(mm)	center≤0.4mm border≤0.5mm	
3	Sensitivity @D5mm Finger(mm)	w/o line broken	
4	Report rate	120Hz	
5	Touch Point	Max 10 Fingers	

7.3 Electrical Characteristics

7.3.1 Maximum Ratings

Item	Symbol	MIN	MAX	Unit
TP power supply Input	TSP_AVDD	2.7	3.6	V
TP power supply for logic circuits	TSP_VDDIO	1.7	3.6	V

7.3.2 Power supply DC characteristics

Item	Symbol	MIN	TYP	MAX	Unit
TP power supply Input	TSP_AVDD	2.8	2.8/3.0/3.3	3.6	V
TP power supply for logic circuits	TSP_VDDIO	1.7	1.8/TSP_AVDD	3.6	V

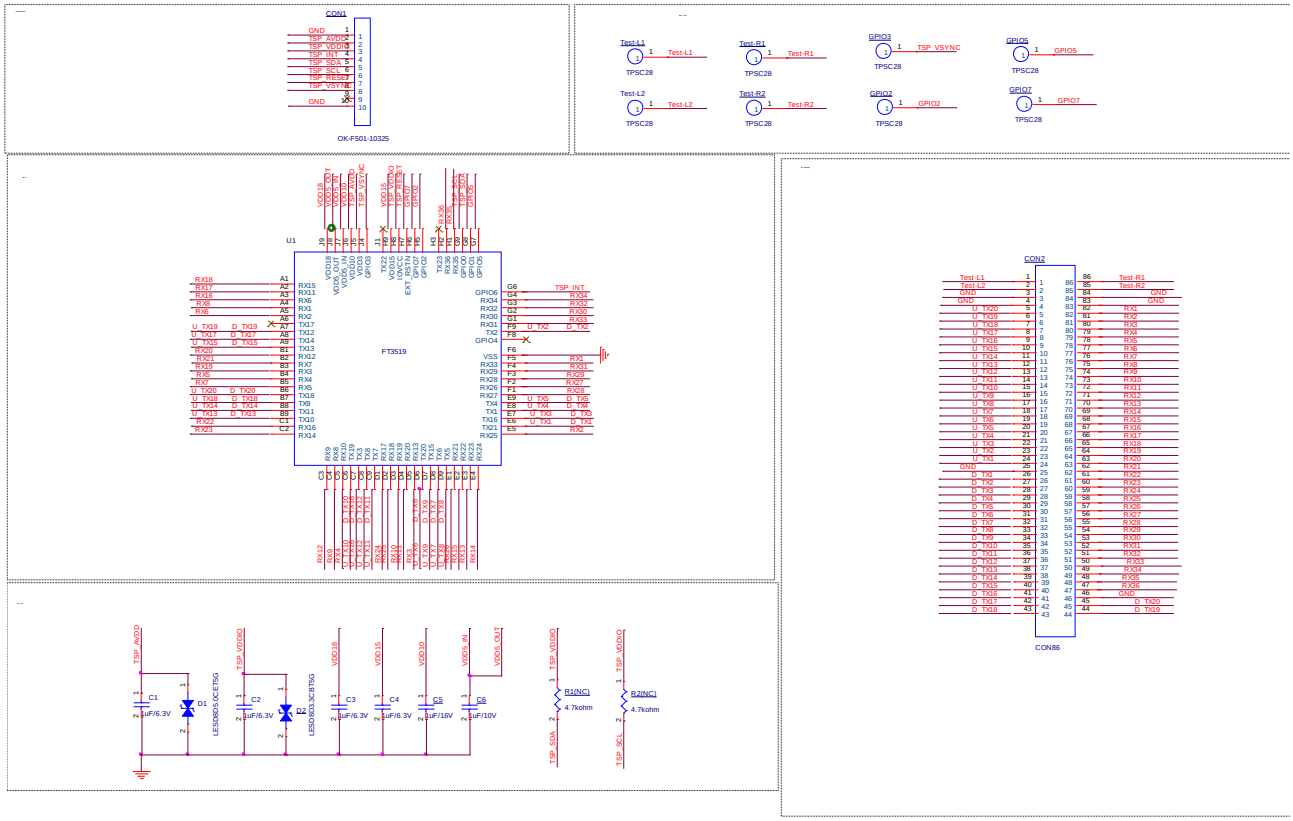
7.4 TP FPC Pin Assignment

No	Symbol	I/O	Description
1	GND	GND	Ground
2	TSP_AVDD	Power	Analog Power for Touch Panel
3	TSP_VDDIO	Power	Digital Power for Touch Panel
4	TSP_INT	O	Interrupt signal for Touch Panel
5	TSP_SDA	I/O	SDA pin for Touch Panel
6	TSP_SCL	I	SCL pin for Touch Panel
7	TSP_RESET	I	Reset Pin for Touch Panel
8	TSP_VSYNC		TE input for display VSYNC
9	NC	/	/
10	GND	GND	Ground

7.5 Touch Design

Item		Description	Notes
Touch Design	Sensor structure	Oncell	

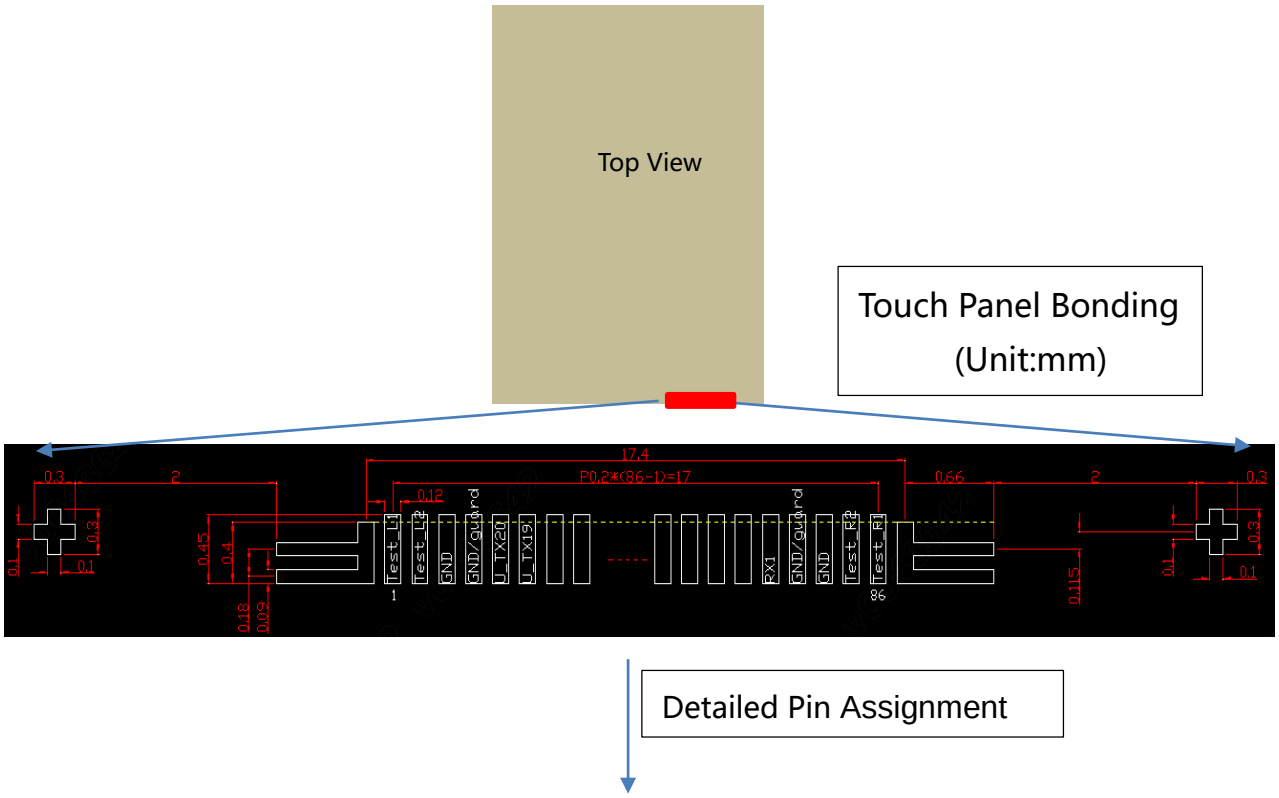
7.6 Touch FPCB Schematic



7.7 TSP FPC Electronic Part List

Item	Reference	Specification
1	C1 C2 C3 C4	1uF/6.3V/0402
2	C5	1uF/16V/0402
3	C6	1uF/10V/0402
4	D1	Bi-directional /5V/0402
5	D2	Bi-directional /3.3V/0402
6	U1	Touch IC ,FT3519

7.8 Touch Panel Pin Assignment



Pin Number	Pin Name	Pin Number	Pin Name	Pin Number	Pin Name	Pin Number	Pin Name
1	Test_L1	23	U_TX2	45	D_TX20	67	RX16
2	Test_L2	24	U_TX1	46	GND/Guard	68	RX15
3	GND	25	GND/Guard	47	RX36	69	RX14
4	GND/Guard	26	D_TX1	48	RX35	70	RX13
5	U_TX20	27	D_TX2	49	RX34	71	RX12
6	U_TX19	28	D_TX3	50	RX33	72	RX11
7	U_TX18	29	D_TX4	51	RX32	73	RX10
8	U_TX17	30	D_TX5	52	RX31	74	RX9
9	U_TX16	31	D_TX6	53	RX30	75	RX8
10	U_TX15	32	D_TX7	54	RX29	76	RX7
11	U_TX14	33	D_TX8	55	RX28	77	RX6
12	U_TX13	34	D_TX9	56	RX27	78	RX5
13	U_TX12	35	D_TX10	57	RX26	79	RX4
14	U_TX11	36	D_TX11	58	RX25	80	RX3
15	U_TX10	37	D_TX12	59	RX24	81	Rx2
16	U_TX9	38	D_TX13	60	RX23	82	RX1
17	U_TX8	39	D_TX14	61	RX22	83	GND/Guard
18	U_TX7	40	D_TX15	62	RX21	84	GND
19	U_TX6	41	D_TX16	63	RX20	85	Test_R2
20	U_TX5	42	D_TX17	64	RX19	86	Test_R1
21	U_TX4	43	D_TX18	65	RX18		
22	U_TX3	44	D_TX19	66	RX17		

8 Optical Characteristics Optical Specification

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angle		θT	CR≥20000	80			Degree	Note 2 Test Equipment:CS2000A
		θB		80				
		θL		80				
		θR		80				
Contrast Ratio		CR	θ=0°	100,000				Note1 Note3 Test Equipment:CS2000A
Chromaticity	White	x		(0.290)	(0.310)	(0.330)		Note 4 Test Equipment:CS2000A
		y		(0.296)	(0.316)	(0.336)		
	Red	x		(0.652)	(0.682)	(0.712)		
		y		(0.285)	(0.315)	(0.345)		
	Green	x		(0.200)	(0.240)	(0.280)		
		y		(0.676)	(0.716)	(0.756)		
	Blue	x		(0.108)	(0.138)	(0.168)		
		y		(0.016)	(0.046)	(0.076)		
Uniformity		U		75			%	Note1 Note5 Test Equipment:CS2000A
NTSC					100		%	Note4
Normal-Luminance		L		720	800	880	Cd/m^2	Note1 Note6 Test Equipment:CS2000A
HBM-Luminance		L		900	1000	1100	Cd/m^2	Note1 Note6 Test Equipment:CS2000A
Flicker						-30	dB	Note8 Test Equipment:CA410 (Green127 60HZ)
Cross-talk						2	%	Note7 Test Equipment:CS2000A

Response Time	T_{ON} T_{OFF}	25℃	-	-	2	ms	Note9 Test Equipment： Oscilloscope and photoelectric converter
Gamma (Gray16-240)			2.0	2.2	2.4		Test Equipment：CA410

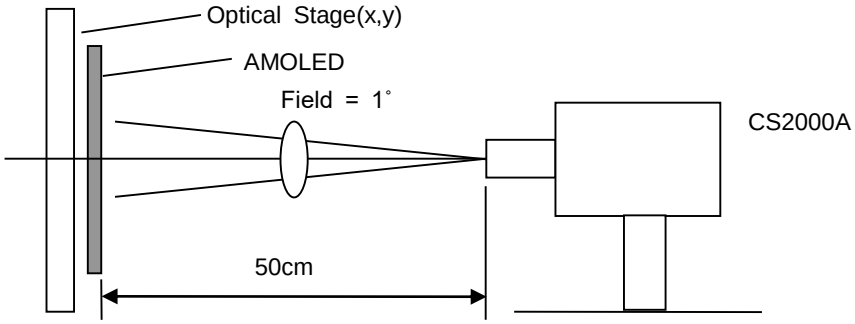
* **Reference value.**

Test Conditions:

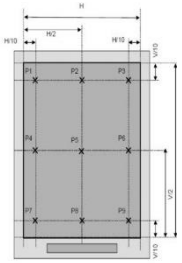
1. the ambient temperature is 25℃.
2. The test systems refer to Note1 and Note2.

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. The optical properties are measured at the center point of the AMOLED screen. All input terminals AMOLED panel must be ground when measuring the center area of the panel.

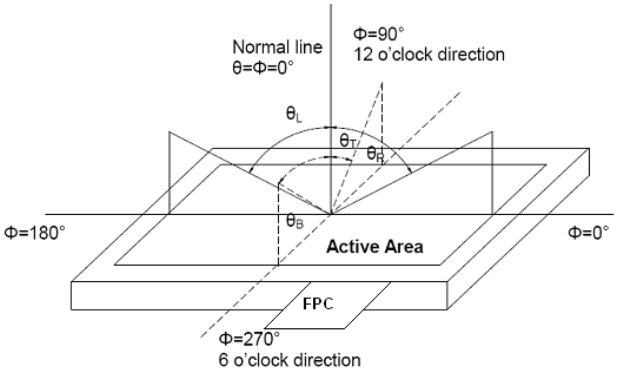


Optical Characteristic Measurement Equipment and Method



Measuring point for surface luminance

Note 2: Definition of viewing angle range and measurement system.



Definition of viewing angle

Note 3: Definition of contrast ratio

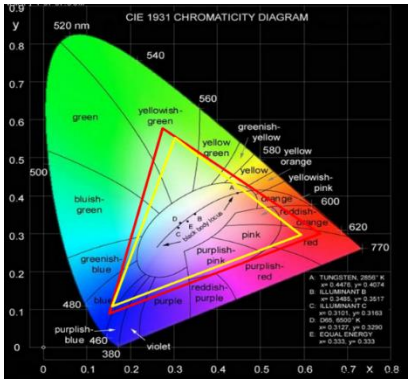
$$\text{Contrast ratio(CR)} = \frac{Luminance\ measured\ when\ AMOLED\ \text{is on the "white" state}}{Luminance\ measured\ when\ AMOLED\ \ is\ \ on\ the\ "Black"\ state}$$

"White state ": A state where the AMOLED should be driven by V_{white}.

"Black state": A state where the AMOLED should be driven by V_{black}.

Note 4 Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of AMOLED.

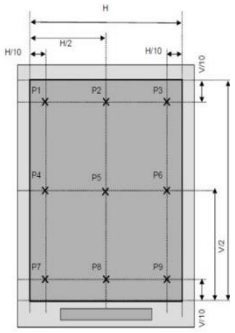


Note 5: Definition of luminance uniformity

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

Luminance Uniformity(U) = Lmin/ Lmax

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



Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 6: Definition of luminance:

Measure the luminance of white state at center point.

Note 7: Cross Talk

A. Measure luminance at the position, P0.

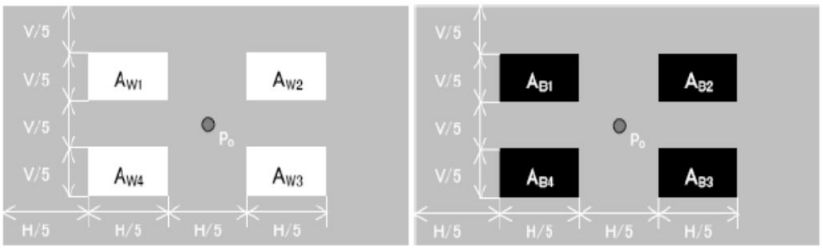
B. Calculate cross talk as below equation.

$$L_{W\_OFF} = \frac{L_{W1} + L_{W2} + L_{W3} + L_{W4}}{4}$$

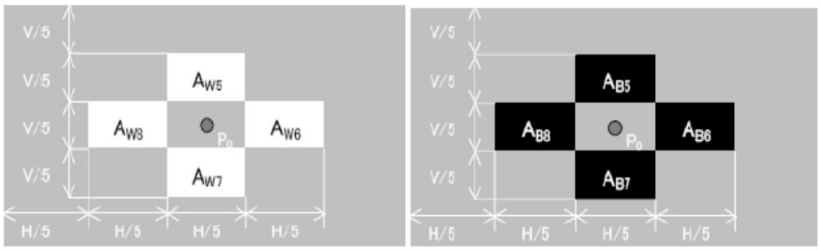
$$L_{B\_OFF} = \frac{L_{B1} + L_{B2} + L_{B3} + L_{B4}}{4}$$

$$\text{crosstalk} = \frac{|L_{Wi\_ON} - L_{W\_OFF}|}{L_{W\_OFF}} \times 100\% \qquad (i = 5 \text{ to } 8)$$

$$\text{crosstalk} = \frac{|L_{Bi\_ON} - L_{B\_OFF}|}{L_{B\_OFF}} \times 100\% \qquad (i = 5 \text{ to } 8)$$



(a) L_{W_OFF}, L_{B_OFF} measuring pattern



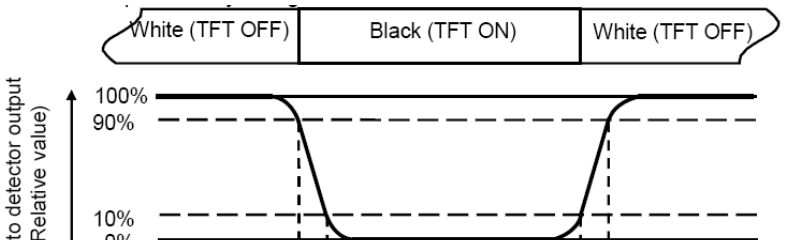
(b) L_{W_ON}, L_{B_ON} measuring pattern

Note 8: Flicker

Adjust the sample to Green127 at 60Hz @800nit,measure Flicker value by JEITA with CA410.

Note 9: Definition of response time

The response time is defined as the AMOLED optical switching time interval between “White” state and “Black” state. Rise time (T_{ON}) is the time between photo detector output intensity changing from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changing from 10% to 90%.



9 Environmental /Reliability Test

No	Test Item	Condition	Remark
1	High Temperature Operation	+70℃, 120hrs	IEC 62341-5:2009
2	Low Temperature Operation	-40℃, 120hrs	IEC 62341-5:2009
3	High Temperature Storage	+80℃, 120hrs	IEC 62341-5:2009
4	Low Temperature Storage	-50℃, 120hrs	IEC 62341-5:2009
5	Thermal Shock (Non-operation)	-40℃(30 min)~+80℃(30 min), 30Cycles	IEC 62341-5:2009
6	High Temperature and High humidity operation	60℃,90%RH,120hrs	IEC 62341-5:2009

10 Quality Level

10.1 Definition and description

10.1.1 Critical Defect: Any defect that directly or indirectly affects personal health and safety, or causes a loss of functionality in the product's function list.

10.1.2 Major Defects: Defects that directly or indirectly affect the functionality of the product, or result in partial loss of functionality, and other defects that cannot be accepted by customers (including a collection of three or more minor defects).

10.1.3 Minor Defects: Appearance defects that do not affect product functionality and are still acceptable to customers.

10.2 Execution level

10.2.1 Sampling standard:The sampling scheme of (GB/T2828.1 2012) normal inspection was adopted.

10.2.2 Check item and frequency

category	Inspection content	Standard	Sampling standard	remark
General item	telecommunication /appearance	Telecommunication inspection standard& Visual inspection criteria	Critical Defect(CR Not allowed); Major Defects(MA AQL 0.65); Minor Defects (MI AQL 1.0);	/
Special item	Optical test	Product specification	5PCS/ work order or according to customer requirements	/
	Dimensional measurement	drawing	5PCS/ work order or according to	Meet the requirements of drawings (spot

			customer requirements	check key dimensions); Meet the requirements of the sample acknowledgment.

10.2.3 Number of defects criterion decide CR=CR,MA=CR +MA,MI=CR +MA+ MI.

10.2.4 When a product has two flaws, More serious defect judgment .

10.2.5 Manufacturing department functional test and appearance inspection perform full inspection,The quality department shall execute as above 5.2.1~ 5.2.4.

10.3 Content

10.3.1 Inspector qualification:Inspectors must be trained and obtain a job certificate before they can inspect products.

10.3.2 Inspection condition:OLED does not light the light source 1000±200lux ;OLED light source is not higher than 200LUX,Surrounded by a black background.

10.3.3 Inspection distance:The standard viewing distance for all surfaces of the detected object is 30CM±5CM.

10.3.4 Inspection perspective :The angle between the product and the horizontal plane is 45°,and the eyes are perpendicular to the inspection plane. During inspection the product needs to rotate 45°up,down,left and right. The observation line of sight needs to be within the half section of the cone. The observation angle is 45° with the vertical axis of the product apex. The central axis of the cone must be standard andperpendicular to the product surface and pass through the fluorescent lamp;For non-conventional display defects (including but not limited to local bright lines or local floodlights),the observation angle is 75degrees from the normal of the product surface;Full visual angle ofappearance..

10.3.5 Inspection time:the inspection time without lighting is at least 10-12 seconds; The time of OLED lighting inspection for each picture is 1~3 seconds.

10.3.6 Test temperature:room temperatuer15-35℃,ambient humidity:20-75%RH.

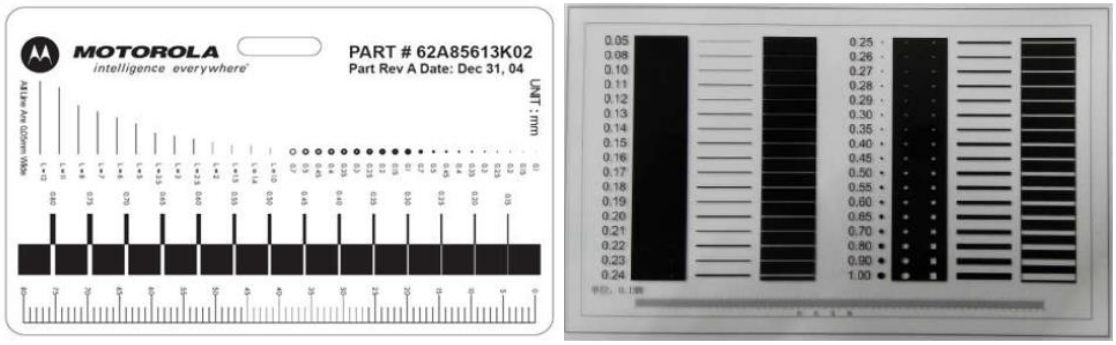
10.3.7 Inspection picture:If there are no special requirements, refer to the pass Angle inspection screen library, if each model has special requirements, it is combined with customer requirements and the needs of the factory process assessment.

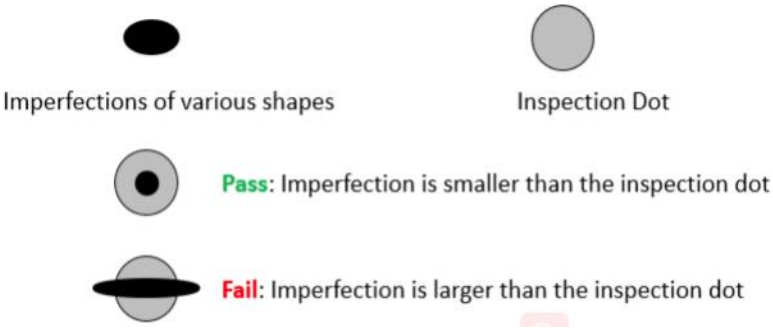
10.4 Inspection tools:

10.4.1 ND Filter:The ND filter is placed at a distance of 2-3cm above the defect for2-3S to judge whether the defect is visible. As Figure below:(ND Filter is used to test mura isochromatic and light unevenness) .

10.4.2 Point gauge(point gauge in the figure below is recommended),determination method:

as shown in the figure, the point gauge film can cover is pass, and the point gauge film can not cover is Fail.For example, a maximum of 0.2mm same-color spot defect is allowed on the Class A surface, and the pass that can be covered by 0.2mm on the film, The one that can be covered is Fail





10.4.3 Microscopic examination: use 20-50 times adjustable microscope and 10-30 times test eyepiece.

10.4.4 Digital caliper: resolution 0.01mm.

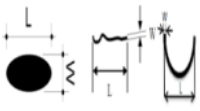
10.4.5 Projector: anime microscope,3D projector.

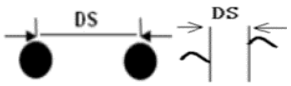
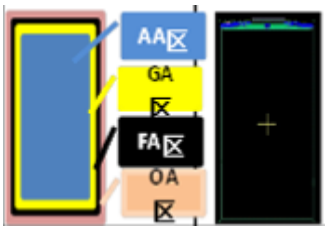
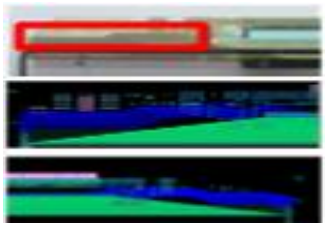
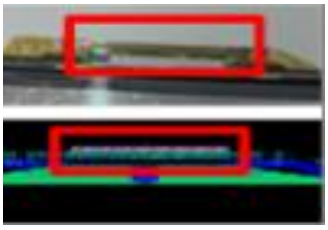
10.5 Judgment description

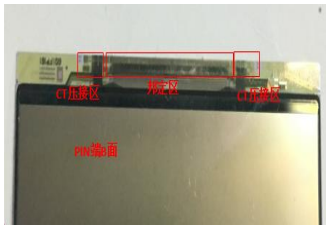
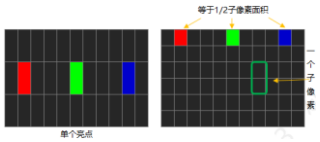
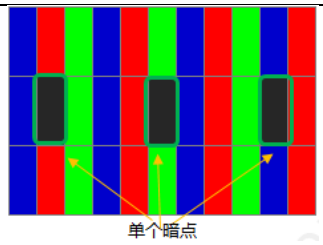
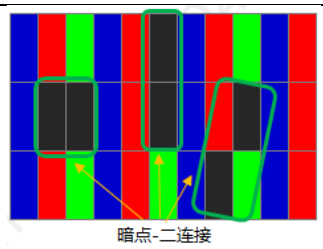
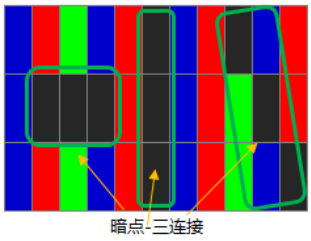
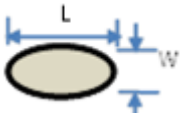
10.5.1 The measurement accuracy shall refer to the specification definition. When the measurement equipment accuracy is higher than the specification definition, the measuredvalue needs to be rounded to the size of edge collapse is 0.20mm,and the thousandth is the reference position, which is rounded to 0.200~0.204mm is ok, ≥0.205mm, it is judged al NG.

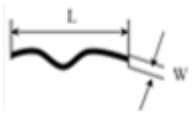
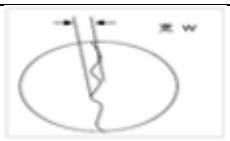
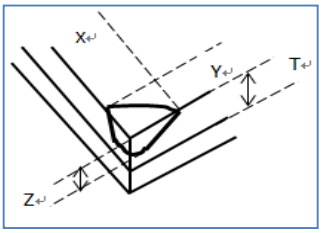
10.5.2 In addition to the tools used above, if additional inspection tools are needed to assist thejudgment, they can only be carried out after the coordination of both parties.

10.5.3 Bad code and definition

Code and name		legend	Instructions
N	Number	-	Visually calculate the number; The statistics of the total unmber of defects does not include the completely “omitted”part. For the column defined as “omitted” and “omitted”.it is not counted as the number of defects if it meets the requirements, otherwise it is calculated as an independent defect.
L	Length(mm)		Dot line distinguishing rule: L is the long side, W is the short side. A. When L>3W,handle as per line, otherwise handle as per point. When it is judged as line defect, S-shaped or C-shaped line appears, and the enclosed amount is less than 3/4 circle, it shall be treated as line defect; otherwise. It shall be treated as point defect, and the inner tangent circle shall simulate the size of point.
W	Width(mm)		

S	Area(mm^2)	-	Surface gauge
D	Diameter(mm)D=(L+W)/2	-	Point diameter calculation: calculated by half of the sum of the long side and the short side, that is, D=(L+W)/2, where D represents the diameter of the point, L is the long side, and W is the short side.
H	Depth(mm)	-	Digital micrometer
DS	Distance(mm)		Distance between two points or between two lines
Schematic diagram of screen area			AA area:display area; GA area:GIP circuit area; FA area:Frit area; OA area:outside FA area
Leader area			Screen GIP circuit area, screen data circuit area
PAD Bonding District			COG/FOG Bonding alignment mark and Bonding Pad on LTPS substrate
PAD Non-state area			Screen test pad, cutting area and lead-free area on LTPS substrate.

CT crimp area		PIN side screen body test PAD
Bright		A single sub-pixel of 1 pixel (either red, green, or blue) is called a dot; The definition of highlight is that in the environment of 200±50Lux, the pixels or points seen by employees with the naked eye are usually high, and the highlight is checked under the black screen.
Scotoma		A single sub-pixel of 1 pixel (either red, green, or blue) is called a dot; Dark spot is defined as a single sub-pixel that is not bright seen by the naked eye under a 100% white screen at an environment of 200±50Lux.
Dark spot-two connection		Two adjacent sub-pixels under the magnifying glass are not bright at the same time (horizontal, vertical and oblique
Dark spot –three Links		The adjacent R,G and B sub-pixels under the magnifying glass are not bright at the same time (horizontal, vertical and oblique)
Foreign matter highlights	-	Due to the foreign matter in the polarizer, the phenomenon that appears as a bright spot is called a foreign matter bright spot.
Point defect		There are bright spots and black spots in local positions, including but not limited to the internal dirt of the screen itself, pinholes, serrations, concave-convex spots, color spots, tiny bubbles,

		white spots, stains on the fitting of the polarizer, poor polarizer itself and other spot-like defects. Point defects are judged by diameter.
Linear defect		Linear impurities in the screen, including filaments, fibers, polarizer fitting impurities in the screen, and scratches on the surface of polarizer, etc. Linear defects are judged by length and width.
Serrated defect		W: Distance from sawtooth crest to trough
Glass chipping		In the process of screen production, especially in the process of molding and cutting, the small glass missing at the glass edge is caused. X direction: parallel to FOG Pad or glass edge; Y direction: perpendicular to FOG Pad or glass edge; Z direction: screen thickness direction;T:Thickness of single glass;
Pockmark	-	In the unit area of 10mm * 10mm, the defect point with D ≤ 0.1mm, DS ≥ 2mm, and the number N ≥ 5. If the customer has other requirements, follow the customer's requirements.
Dirty	-	Including handprints, oil stains, fingerprints, stains, white fog and other undesirable phenomena. It is divided into erasable dirt and non-erasable dirt. Use a dust-free cloth dipped in alcohol, which can not be erased as non-erasable dirt. Wipable dirt is determined as follows: A. Dry dust-free cloth can be directly erased; B. Wipe with clean cloth dipped with anhydrous alcohol Press the alcohol-stained dust-free cloth on the dry dust-free cloth twice to absorb excess alcohol;

		Wipe back and forth with a dust-free cloth twice, and the dirt can be removed.

10.6 Inspection standard

10.6.1 Telecommunications Inspection Item:

category	NO	Item	Area	Standard specification	Inspection mode	Defect type
Insufficient function	1	Abnormal display	AA	Not allowed	Visual	CR
	2	No display	AA	Not allowed	Visual	CR
	3	Display garbled characters, splashes, flickers,double image, distortion	AA	Not allowed	Visual	CR
	4	The picture is blurred, light or thick, diagonal stripes, inconsistent background color, etc	AA	Not allowed	Visual	CR

TP function	5	TP Test NG	AA	Not allowed	Visual	MA
Dot defect	6	Bright spot	AA	Not allowed	Visual	MA
	7	Dark dot	AA	1.D≤0.15mm,ignore(pockmark not allowed); 2.D>0.15mm,Not allowed;	Visual/ eyepiece/ Flinka	MI
line	8	Bright line	AA	Not allowed	Visual	CR
	9	Dark line	AA	Not allowed	Visual	MA
	10	Micro Bright line	AA	Not allowed	Visual	MA
Poor optics	11	Optical Test NG	AA	Failure to meet white balance/specification/acknowledgment/etc. optical test requirements is not allowed.	Optical measuring instrument	MA
	12	The display color effect is different from the template or color card	AA	According to the optical CIE test	Optical tester	MA
	13	Warm and cold color mix	AA	The same batch is not allowed	Optical tester	MA
Mura	14	G&H-direction mura	AA	1、Reference ND6% after Demura; 2、Reference limit sample determination （Collect edge specification samples	Visual/limit sample	MI

	15	White spot	AA	during production and agree with customers on 2pcs of standard samples and 2-4pcs of out-of-specification samples);		
	16	Black spot	AA			
	17	Color Mura	AA			
	18	Newton ring	AA			
	19	Transition grayscale color band	AA			
	20	Other Mura	AA			
	note: 1. The Mura class specifies the screen decision; 2. Limit samples are preferred.					
Foreign body points and lines	21	Spot defects (different colors, black and white spots, scratches, bubbles, etc.)	AA	1.D≤0.15mm,nonaggregation(DS≥30mm) ignore; 2.0.15mm<D≤0.20mm,N≤2,DS>50mm; 3.D>0.2mm,Not allowed;	Visual/ Flinka	MI
	22	Line defects (different	AA	1.W≤0.03mm,L≤5mm,DS≥10mm,ignore; 2.0.03mm≤W≤0.05mm,L≤2mm,DS≥10mm N≤ignore ;	Visual/ Flinka	MI

		colors, black and White spots, scratches , bubbles, etc.)		3.0.03mm≤W≤0.05mm,2<L≤5mm,DS≥10 mm N≤4; 4.L＞5mm N=0,W＞0.5mm,N=0;		

10.6.2 Appearance Inspection Item

category	NO	Item	Area	Standard specification	Inspection mode	Defect type
Panel	1	Screen soiled/handwriting	All	1.The front side (B side) can wipe dirt wipe, not wipe dirt is not allowed; 2.Back (side A):not controlled;	Visual	MI
	2	Chipping	PAD non bonding area	1.Y≤0.1mm,X&N ignore; 2.0.1mm≤Y≤0.5mm,X≤2mm,N ignore; 3.B-side Not hurt Bonding Mark, decide ok;	Visual/ Flinka	MI
			Pad bonding area	1.The cutting does not damage the PAD and the circuit; 2.Y does not damage pad1/4(Y≤0.25),X&N ignore; 3.When the glass back of the module bonding is broken, the function and performance reliability are not affected.,Y≤0.4mm,X&N ignore;		
			OA area	1.Y≤0.15mm,X&N ignore;		

				2.0.15<Y≤0.4mm,X≤2mm,N ignore; 3.Y>0.4mm,Not allowed; 4.Z≤t.(Frit above glass Chipping specification card control X/Y);		
	3	Salient point	AA	Touch is not allowed	Visual	MI
	4	Flange	OA	1.Y≤0.2mm,X No control; 2.Y>0.2mm,Not allowed;	Visual/ Flinka	MI
	5	Mark coloboma	PIN	Mark defects that affect machine alignment are not allowed.	Visual	MI
	6	Glass fragment	All	Not allowed	Visual	MI
	7	Glass crack	All	Not allowed	Visual	MI
	8	Screen body warping	All	Side A and side B of the product are laid flat respectively, and one end is raised to a height(Pluggauge)≤0.6mm.	Visual/ Plug gauge	MI
Foreign body points and lines	9	Spot defects (different colors, black and white spots, scratches, bubbles, etc.)	All	1.D≤0.15mm,non-aggregation(DS≥30mm) ignore; 2.0.15mm<D≤0.20mm,N≤2,DS >50mm; 3.D>0.2mm,Not allowed;	Visual/ Flinka	MI
	10	Line defects (different colors, black and white spots, scratches, bubbles, etc.)	All	Linear foreign body/filamentous: 1. W≤0.03mm,L≤5mm,DS≥ 10mm,ignore;	Visual/ Flinka	MI

				2. 0.03mm≤W≤0.05mm,L≤2mm,DS≥10mm N≤ignore ; 3. 0.03mm≤W≤0.05mm,2<L≤5mm,DS≥10mm N≤4; 4. L ＞ 5mm N=0,W ＞ 0.5mm,N=0; Non-inductive scratch (on display/polarizer)： 1. W≤0.03mm,L≤5mm,DS≥10mm,ignore; 2. 0.03mm≤W≤0.05mm,L≤2mm,DS≥10mm N≤ignore ; 3. 0.03mm≤W≤0.05mm,2<L≤5mm,DS≥10mm N≤4; 4. L＞5mm N=0, W＞0.5mm,N=0;		
Protective film	11	The protective film body is faulty	All	Invalid function,damage, missing paste is not allowed Bubbles, folds, bumps, dirt, raw edges, rubber overflow, etc. do not harm the body and do not control.	Visual	MI
	12	skewing	All	Meet specifications such as design drawings, and the visual inspection cannot exceed the edge of the cover plate.	Visual	MI

POL	13	POL Edge overflow	AA	1、W≤0.2mm，not control; 2、W＞0.2mm，not allowed;	Visual/ Flinka	MI
	14	POL scratch	AA	No damage body is not controlled, damage body according to the point, line specifications;	Visual	MI
	15	POL Salient point /Dent	AA	Reference point/line class specifications;	Visual/ Flinka	MI
	16	POL bubble line	All	Not allowed outside AA zone within 0.25mm;	Visual/ Flinka	MI
	17	POL crease/indentation	AA	Does not affect CG fit OK or reference limit sample;	Visual	MI
	18	The edge of the polarizer overflows and warps	AA	Cannot be extended to AA area;	Visual	MI

IC	19	IC damage	All	Visually not allowed	Visual	MA
FPC	20	FPC	All	1. Welding, tinning, breakage, shedding, warping, cracking, PIN skew, missing, etc. are not allowed; 2. Check the piano lid closed and opened once 3. connector is shipped in closed state; 4. Polarity welding, such as capacitance and; inductance, package size, component direction error is not allowed; 5.Components missing, damaged and virtual welding must not exist; 6.The parts on the FPC must beconsistent with the product BOM table, and there are incorrect, multiple, or missing parts, which are not allowed; 7.FPC scratches/scratches are based onthe absence of exposed copper; 8.The connector should not be stained with tin or residual tin beads, and the connector welding foot should not be connected to tin;	Visual/ Flinka	MI

				9.There should be no visible dirt on the surface, and the one that can be removed by wiping is judged to be acceptable, but the ratio between the number of defects and the total number of sampling is more than 2%; 10.FPC raw edges and burrs are not controlled; 11.FPC screen printing poor: content error is not allowed, can not be recognized is not allowed; 12.FPC shape damage: the damage exceeds 1/2 of the distance S between the edge of the plate and the nearest conductor, and is not allowed; Broken>2.5mm not allowed; 13.FPC punching poor: missing punching positioning hole or positioning hole damage is not allowed; 14.Creases/Indentations: Indentations in the circuit area should not cause the back of the covering film to turn white; Non line area indentation should not cause FPC damage; 15.FPC ink resist welding does not allow bubbles, covering film bubbles do not allow exposure or bridging of metal conductors;		

				16.FPC reinforcement board: Reinforcing plate cracking, falling off is not allowed; 17.The separation of the reinforced plate from the FPC starting layer is not allowed; 18.Reinforcing plate convex point: D≤0.25mm, and does not affect the overall thickness; 19.FPC Foreign body (except gold finger)： a. punctiform：D≤0.5mm，N≤3; b. threadiness：Length and width≤0.3*5mm;		
	21	FPC Goldfinger NG	Goldfinger area	1.Goldfinger cracked: The length and width of the cracked/broken tip of the goldfinger ≤ line width ; 2.Gold finger copper leakage: W≤1/3 line width, L≤ line width，N ignore; 3.Goldfinger notch W1≤1/3 line width W, length L1≤1/2 line width W, unlimited quantity, all the above conditions are allowed. 4.Gold finger crush/scratch can not expose copper, can not have concave and convex, no visual depth, does not affect the assembly acceptable.	Visual/ Flinka	MI

				5.Golden fingers should not have sharp Angle folds and dead folds 6.FPC gold finger should not be oxidized black, scald, brown, electroplating should not be oxidized discoloration phenomenon		
	22	connector	connect or	There should be no tin or residual tin bead phenomenon on the connector, and there should be no chain phenomenon on the connector welding foot; PIN deformation should not exceed 0.05mm control; Does not affect the point function: visually watch pin folding, pin falling off, extrusion deformation of the outer frame is not allowed;	Visual/ Flinka	MI
	23	FPC Bonding bendsup after bonding	FPC	The length of the overlap between the FPC goldfinger two-point mark and the screen lead is not less than 1/2 point mark length;	Visual/ Flinka	MI
TAPE	24	TAPE warping, wrinkled, foreign	ALL	1.Warping is not allowed; 2.Folds and foreign bodies should not be higher than POL	Visual	MI
	25	TAPE damaged	ALL	2mm*2mm, Maximum two on each side	Visual/ Flinka	MI
	26	TAPE attached status	ALL	1. Tape is attached near the Pol edge and does not cover the Pol on the CF side.	Visual	MI

				2.Tape opening position should not touch the Connector;		
Other	27	Insulating tape	Bonding area	No obvious folds and bubbles	Visual	MI
			Component area	1. Scratches and glue flowers are not controlled; 2. Do not wipe dirt is not allowed; 3. The deviation of insulation tape shall not exceed the edge of the product, and the rest shall be determined according to the requirements of the drawing; 4. Raw edge, overflow is not controlled; 5. Broken, incomplete, missing stickers not allowed;	Visual	MI
	28	Composite tape	All	1. The composite tape is not allowed to leak out of the screen edge; 2. It is not allowed to cause light leakage or affect the assembly and thickness of the composite tape due to fold and tissue; 3. Damage of composite tape is not allowed; 4.The size of the poor punching of the composite tape meets	Visual/ Flinka	MI

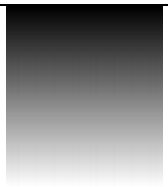
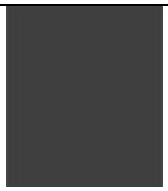
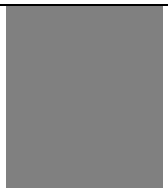
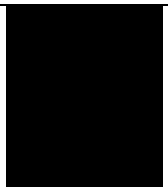
				the requirements of the drawing； 5.The dirt and foreign matters of the composite tape shall not be wiped, and the foreign matters shall be carried out according to the Dot Line standard； 6.The burr of the composite tape shall not exceed the edge of the screen； 7.No control of glue flower and overflow of composite tape； 8.No control of glue flower and overflow of composite tape； 9.Composite tape bubble: D <5mm, N ignore； 10.Composite tape bump point: sharp Angle bump point D<0.3mm, N≤3; Smooth bump D<0.8mm, N<3; 11.Composite tape foreign body (foreign body between copper foil and blue film) : D≤0.3mm,N≤3; 12.Compound tape edge serrated: 0.5*3mm，N≤3； 13.The color difference of the protective film in the composite tape is not controlled; 14.Copper foil indentation dead folding in composite tape is not		

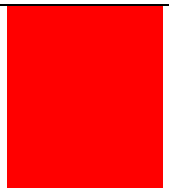
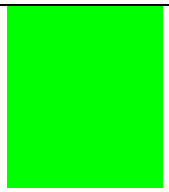
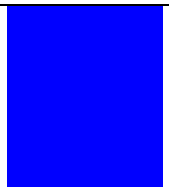
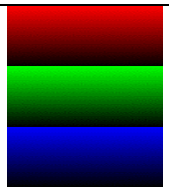
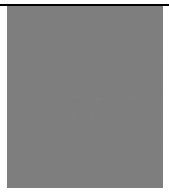
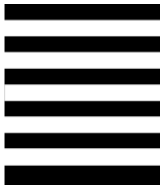
				allowed, does not affect assembly and thickness is not controlled; Or reference limit sample; 15.The foreign body concave points of copper foil in composite tape are not controlled；		
	29	sealant	Gummed area	1.Bonding area: The bonding area should not be broken, the bubbles on IC and FPC are not controlled, and the thickness of the gel should not exceed the POL level. 2.Other areas: line area is not allowed to break glue, do not expose the line, bubble diameter < 1mm, the colloidal thickness shall not be higher than the POL plane. 3.IC ontology: need to be fully covered (customer requirements to meet customer requirements); 4.FPC body: No banded colloid with a width greater than 1mm or point-like colloid with a diameter greater than 2mm.	Visual/ Flinka	MI
	30	Silicone glue/high temperature glue	All	1.Silicone rubber overflow should not exceed 0.2mm 2.High temperature glue can exceed FPC, but not on the release film	Visual/ Flinka	MI

	31	ACF attached	All	ACF adhesive length exceeds both ends of the FPC by 0.2mm ~ 1mm, Do not go beyond the edge of the screen, Lead area ACF effective lap width greater than 2/3 FPC goldfinger width,, No bubbles, folds, etc	Visual/ Flinka	MI
Two-dimensional code	32	Two-dimensional code	ALL	It is not allowed to be unable to scan or not easy to scan (more than three consecutive scans can be identified), the appearance is clear, no blur, printing loss and other bad	Barcode scanner/Visual	MI
Defects in outer packing	33	Mixed product	/	not allowed	-	-
	34	Dirt, handwriting	All	Handwriting residue and handwriting impressions are not allowed; Water/oil residue is not allowed	-	-
	35	Package	All	Refer to the specification of packing pattern book and process SOP	-	-
Overall dimension	36	Overall dimension NG	/	Not allowed to exceed the dimensions and tolerances required by the specification drawings	--	-

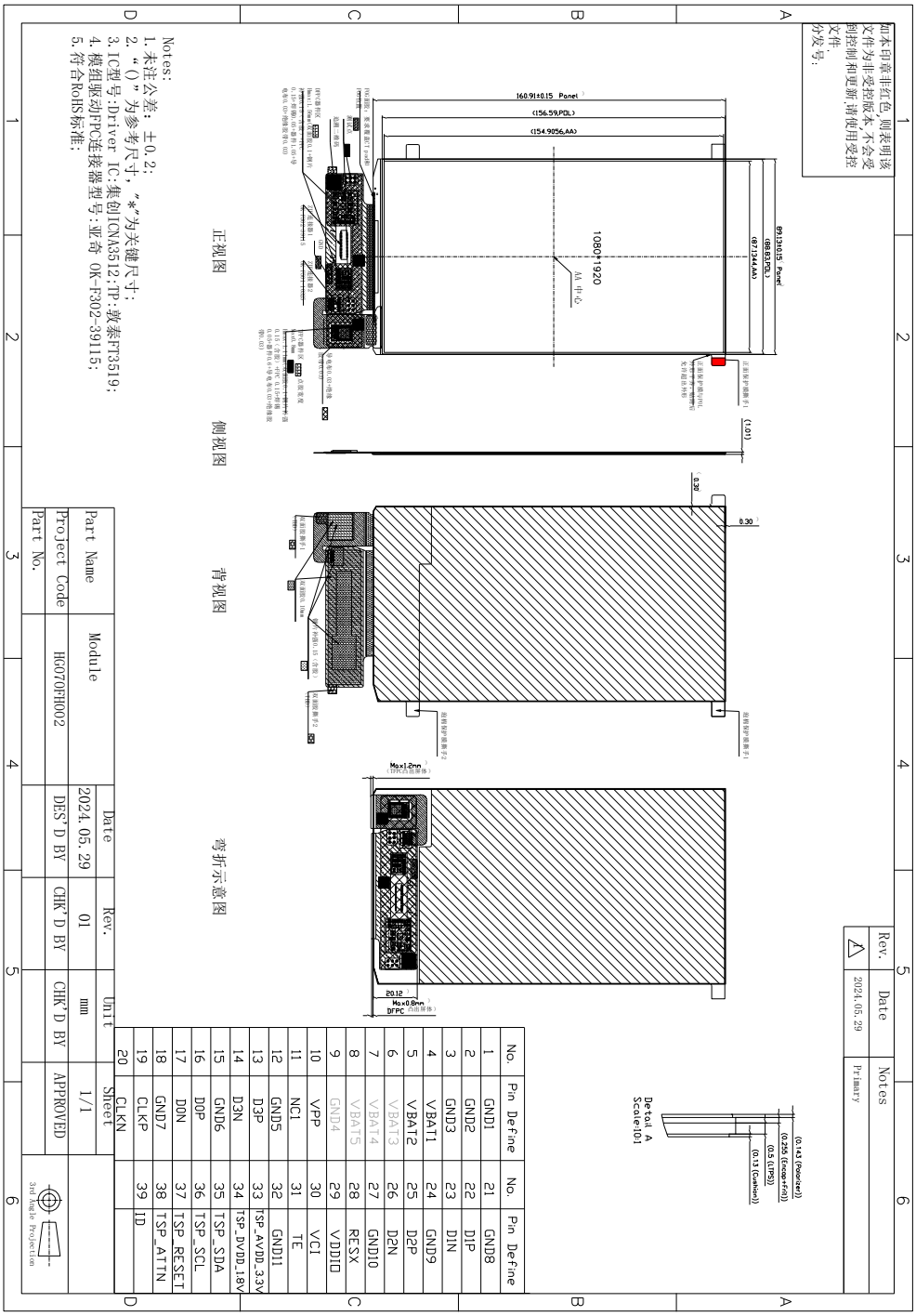
10.7 Inspection screen

Serial number	picture	Picture name	Check item	remark
1		Image	Picture exception	/

2		HSCALE	OTP NG、Abnormal function	/
3		VSCALE	OTP NG、Abnormal function	/
4		W_GRAD(32)	mura poor auxiliary decision screen	/
5		W_GRAD(64)	Point, line, foreign body/line, mura	/
6		W_GRAD(128)	Point, line, foreign body/line, mura	/
7		WHITE	Point, line, foreign body/line, mura	/
8		Black	Bright spot class, bright line class, dark state mura class	/
9		HBM WHITE	Points, lines, foreign body points/lines	/

10		RED	Points, lines, foreign body points/lines	/
11		GREEN	Points, lines, foreign body points/lines	/
12		BLUE	Points, lines, foreign body points/lines	/
13		RGB3H	OTP NG、Abnormal function	/
14		1080_Word	Display exception (word distortion, blurring, failure to display, etc.)	/
15		Complex	Microbright line	/
16		Black and white bar screen + low 51 values Note: The low 51 value is assigned to the 51 register, 51, 00, 02, which is the state when the brightness bar of the analog client is pulled to the lowest.	Splash screen	/

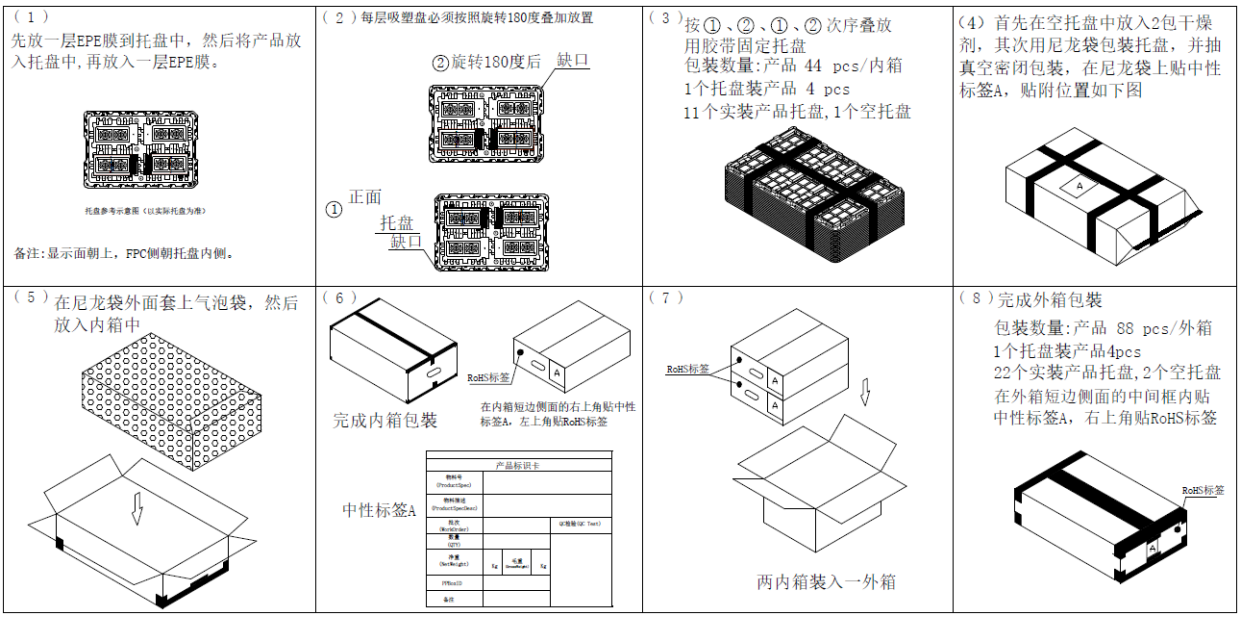
11 Mechanical Drawing



Picture 1

Packing Drawing

Packing Condition	Contents
Packing Type	TRAY + Carton packing type
TRAY material model	tray (10^4~$10^9\Omega$)
Tray packing type	See the picture 2
Number of panels per tray	4pieces
Number of Tray per carton	24units ((22units +2empty)PET tray)
Number of panels per carton	88pieces



12 Precautions for Use of AMOLED Modules

12.1 Handling Precautions:

12.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from height.

12.1.2 Do not press down the screen or the adjoining areas too hard because the color tone may be shifted.

12.1.3 The polarizer covering the display surface of the AMOLED module is soft and easily scratched. Handle this polarizer carefully.

12.1.4 If the display surface is contaminated, blow on the surface and gently wipe it with a soft dry cloth. If it is still not completely clear, moisten the cloth with ethyl alcohol.

12.1.5 Solvents may damage the polarizer. Do not use water, ketone or aromatic solvents except ethyl alcohol.

12.1.6 Do not attempt to disassemble the AMOLED Module.

12.1.7 If the logic circuit power is off, do not apply the input signals.

12.1.8 To prevent destruction from static electricity, be careful to maintain an optimum working environment.

12.1.9 Be sure to make yourself in contact with the ground when handling with the AMOLED Modules.

12.1.10 Tools required for assembly, such as soldering irons, must be properly ground.

12.1.11 To reduce the generation of static electricity, do not conduct assembly or other work under dry conditions.

12.1.12 To protect the display surface, the AMOLED Module is coated with a film. Be careful when peeling off this protective film, because static electricity may generate.

12.2 Storage Precautions:

12.2.1 When storing the AMOLED modules, be sure that they are not directly exposed to the sunlight or the light of fluorescent lamps.

12.2.2 The AMOLED modules should be stored under the storage temperature range. If the AMOLED modules will be stored for a long time, the recommended condition is:

12.2.3 Temperature: 0℃~40℃ Relatively humidity: ≤80%

12.2.4 The AMOLED modules should be stored in the room without acid, alkali or harmful gas.

12.2.5 Transportation Precautions:

12.2.6 The AMOLED modules should not be suffered from falling and violent shocking during transportation. Besides, excessive press, water, damp and sunshine, should be avoided.