



一众显示科技有限公司

TEAM SOURCE DISPLAY TECH. CO, LTD.

AMOLED Module Specification

Module NO.: TSO055FHGK-30CO

Version: V1.0

☐ APPROVAL FOR SPECIFICATION

☐ APPROVAL FOR SAMPLE

For Customer's Acceptance:	
Approved by	Comment

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Revision history

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1 GENERAL DESCRIPTION

Feature		Spec	Remark
Display Spec	Screen Size (inch)	5.48	
	Display Mode	AMOLED	
	Resolution(dot)	1080(W)×1920(H)	
	Active Area(mm)	68.256(W)×121.344(H)	
	Pixel Pitch (um)	90 (W)×90 (H)	
	Technology Type	LTPS	
	Color Depth	16.7M	
	Interface	MIPI 4 LANE	
Mechanical Characteristics	With TP/Without TP	With TP	
	Module Outline Dimension(W x H x D) (mm)	70.356(W)x127.344(H)x0.893(D)	
	Weight (g)	TBD	
Electronic	Driver IC(Type)	CH13721	
	Touch IC(Type)	CST148	

Note 1: Requirements on Environmental Protection: RoHS.

2 INPUT/OUTPUT TERMINALS

2.1 Main FPC Pin Assignment

FPC connector: FH26-39S-0.3SHW

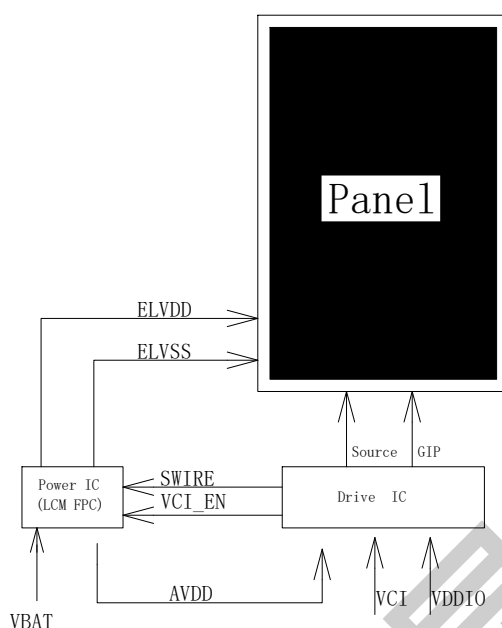
Main board recommended connector: ZIF finger.

No	Symbol	I/O	Description
1	GND	GND	GND
2	GND	GND	GND
3	GND	GND	GND
4	VBAT	P	Power supply for POWER IC
5	VBAT	P	Power supply for POWER IC
6	VBAT	P	Power supply for POWER IC
7	VBAT	P	Power supply for POWER IC
8	VBAT	P	Power supply for POWER IC
9	GND	GND	GND
10	OTPV	I/O	Provide programming voltage to the internal OTP/NVM of the screen
11	TE	I/O	Sync Signal for preventing Tearing Effect
12	GND	GND	GND
13	D3P	I/O	MIPI-DSI data Lane 3 positive-end input pin
14	D3N	I/O	MIPI-DSI data Lane 3 negative-end input pin
15	GND	GND	GND
16	D0P	I/O	MIPI-DSI data Lane 0 positive-end input pin
17	D0N	I/O	MIPI-DSI data Lane 0 negative-end input pin
18	GND	GND	GND

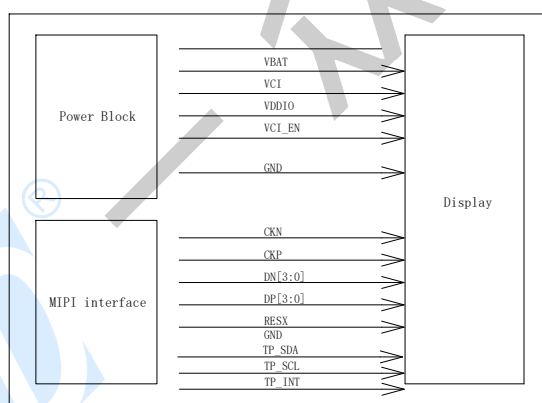
19	DKP	I/O	MIPI-DSI clock Lane positive-end input pin.
20	DKN	I/O	MIPI-DSI clock Lane negative-end input pin.
21	GND	GND	GND
22	D1P	I/O	MIPI-DSI data Lane 1 positive-end input pin
23	D1N	I/O	MIPI-DSI data Lane 1 negative-end input pin
24	GND	GND	GND
25	D2P	I/O	MIPI-DSI data Lane 2 positive-end input pin
26	D2N	I/O	MIPI-DSI data Lane 2 negative-end input pin
27	GND	GND	GND
28	RESX	I/O	Display reset. Active low
29	VDDIO	P	Power Supply for display logic circuit
30	VCI	P	Power Supply for Analog circuit
31	NC	I/O	DUMMY
32	GND	GND	GND
33	TP_AVDD_3.3V	P	Analog Power for TP
34	TP_IOVCC	P	Power Supply for Logic
35	TP_SDA	I/O	Touch panel.I2C data input and output.
36	TP_SCL	I/O	Touch panel.I2C clock input.
37	TP-RESET	I/O	Reset pin, the TP is initialized when RESX active Low.
38	TP_INT	I/O	Interrupt request to the host,or Wakeup request from the host
39	GND	GND	GND

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

2.2 Circuit block diagram (Display)



2.3 MCU and Display Module Interface Configuration



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
Analog Power supply	VCI	-0.3	+5.5	V
Logic Power supply	VDDIO	-0.3	+5.5	V
Analog Power for TP	TP_AVDD_3.3V	-0.3	+3.6	V
Analog Power for power ic	VBAT	2.9	5.5	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

Item		Symbol	MIN	TYP	MAX	Unit
Logic Power supply		VDDIO	1.65	1.80	3.3	V
Analog Power supply		VCI	2.5	3.0	3.6	V
Analog Power for power ic		VBAT	2.9	3.7	5.5	V
Analog Power for TP		TP_AVDD_3.3V	2.8	3.3	3.6	V
Input Signal Voltage	High Level	VIH	0.7*VDDIO	-	VDDIO	V
	Low Level	VIL	GND	-	0.3*VDDIO	V
Output Signal Voltage	High Level	VOH	0.8*VDDIO	-	VDDIO	V
	Low Level	VOL	GND	-	0.2*VDDIO	V
Normal		IVDDIO	-	49	-	mA
Stand-by		IVDDIO	-	3.2	-	mA
Normal		IVCI	-	3.5	-	mA
Stand-by		IVCI	-	0	-	mA
Normal		IVBAT	-	390	-	mA
Stand-by		IVBAT	-	0	-	mA

Ta=25°C

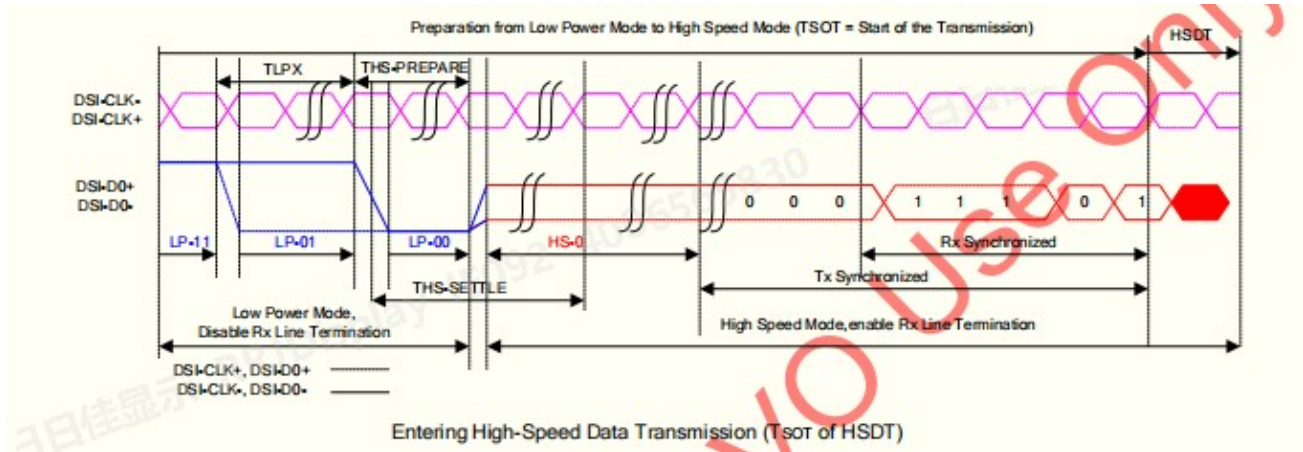
Note1: The input digital voltage is the I/O reference voltage.

Note2: VDDIO usually ranges from 1.65V to 3.3 V. If VDDIO is changed, the remaining voltage needs to be changed to the same voltage as VDDIO.

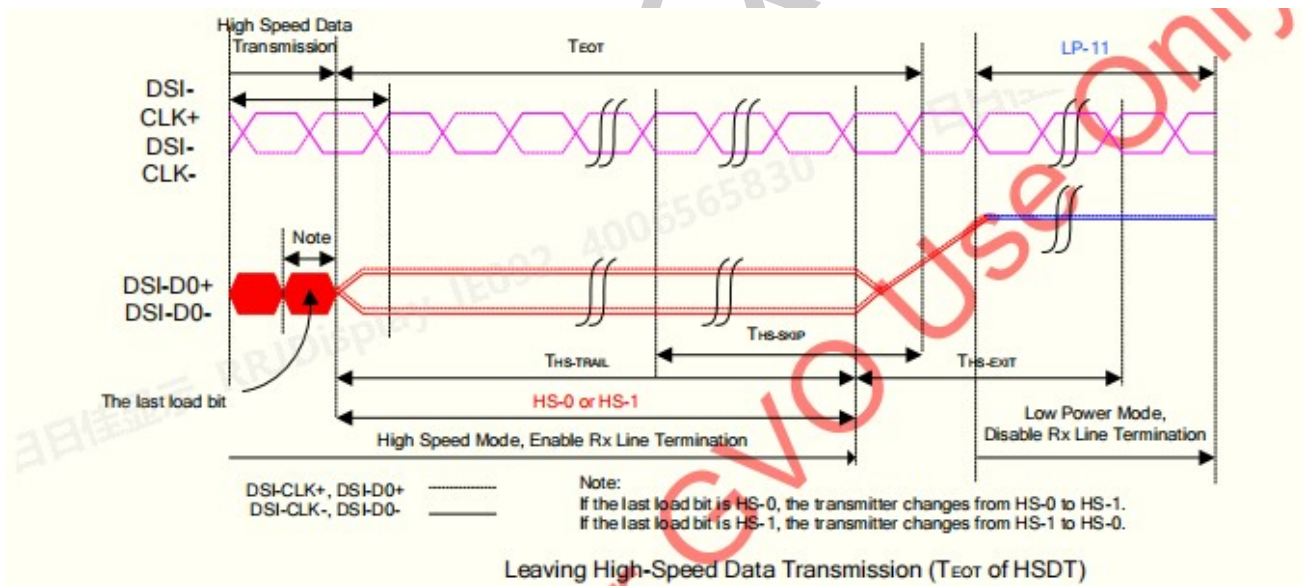
Note3: Under full white pattern, Video Mode 60.5Hz.

5 AC CHARACTERISTICS

5.1 High Speed Mode-Clock Timings



High Speed Mode-Clock /Data Timings



High Speed Mode-Rising and Falling Timings

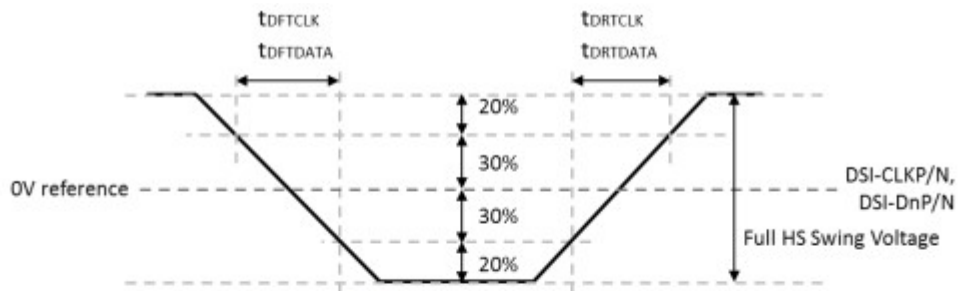


Figure 6-2 Rising and Falling Timings

High Speed Mode - Rising and Falling Timing

Parameter	Symbol	Conditions	Specification			Unit	Notes
			MIN	TYP	MAX		
Differential Rise Time for Clock	tDRTCLK	CLKP/N	150pS		0.3*UI		2,3
Differential Rise Time for Data	tDRTDATA	DnP/N	150pS		0.3*UI		1,2,3
Differential Fall Time for Clock	tDFTCLK	CLKP/N	150pS		0.3*UI		2,3
Differential Fall Time for Data	tDFTDATA	DnP/N	150pS		0.3*UI		1,2,3

Note 1: DnP/N, n=0, and 1.

Note 2: The display module has to meet timing requirements, which are defined for the transmitter (MCU) on MIPI D-PHY standard.

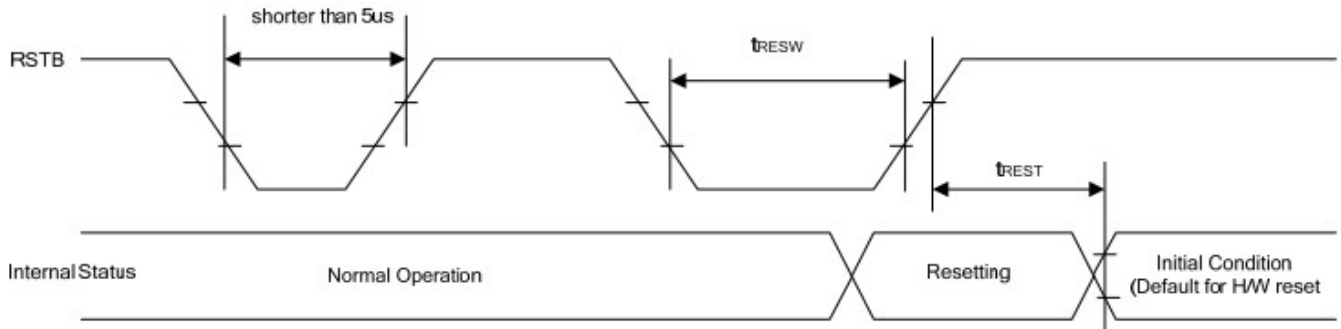
Note 3: DSI-CLK+ = CLKP.

DSI-CLK- = CLKN.

DSI-D0+ = D0P.

DSI-D0- = D0N.

5.2 Display RESET Timing Characteristics



Reset input timing

Signal	Symbol	Parameter	Min.	Typ.	Max.	Unit	Description
RSTB	tRESW	Reset "L" pulse width (Note 1)	10	-	-	μs	-
	tREST	Reset complete time (Note 2)	-	-	10	ms	When reset applied during Sleep In Mode
			-	-	120	ms	When reset applied during Sleep Out Mode

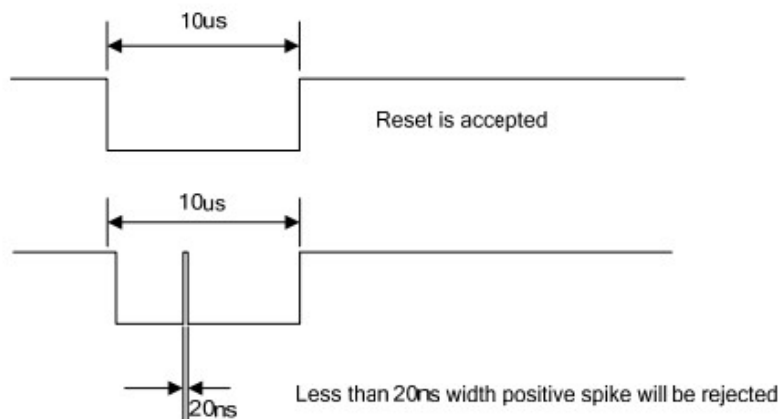
Note 1: Spike due to an electrostatic discharge on RSTB line does not cause irregular system Reset according to the table below.

RSTB Pulse	Action
Shorter than 5μs	Reset Rejected
Longer than 10μs	Reset
Between 5μs and 10μs	Reset Start

Note 2: During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In–mode) and then return to Default condition for H/W Reset.

Note 3: During Reset Complete Time, values in OTP memory will be latched to internal register during this period. This loading is done every time when there is H/W Reset complete time (tREST) within 5ms after a rising edge of RSTB.

Note 4: Spike Rejection also applies during a valid Reset pulse as shown below:



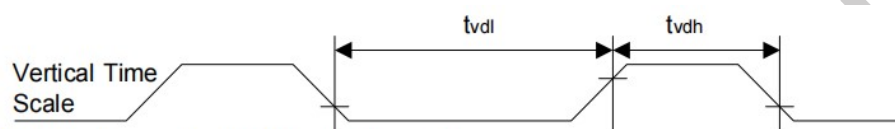
Note 5: It is necessary to wait 5msec after releasing RSTB before sending commands. Also Sleep Out command cannot be sent for 120msec.

5.3 TE Timing Characteristics

Tear Effect Output Line

The Tearing Effect output line supplies to the MPU a Panel synchronization signal. This signal can be enabled or disabled by the Tearing Effect Line Off & On commands. The mode of the Tearing Effect signal is defined by the parameter of the Tearing Effect Line On command. The signal can be used by the MPU to synchronize Frame Memory Writing when displaying video images.

Tearing Effect Line Modes VS output1: The Tearing Effect Output signal consists of V-Blanking Information only:



$tvdh$ = The LCD display is not updated from the Frame Memory

$tvdl$ = The LCD display is updated from the Frame Memory(except Invisible Line –see below)

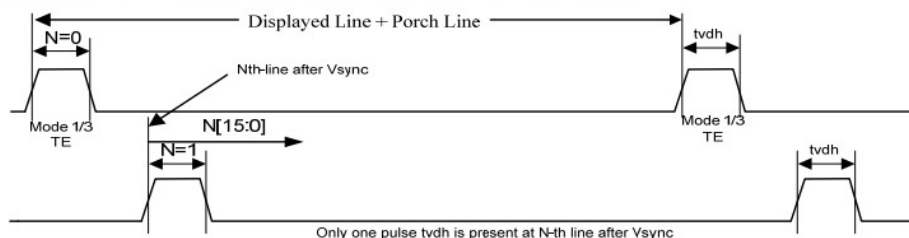
HS output: The Tearing Effect Output signal consists of V-Blanking and H-Blanking Information, there is one Vsync and H-sync pulses per field.



$thdh$ = The LCD display is not updated from the Frame Memory

$thdl$ = The LCD display is updated from the Frame Memory(except Invisible Line-see above)

VS output2: This mode turn on the Tearing Effect output signal at line N after Vsync.



N = The N-th line, which set by register N[15:0] of command STESE(44h) after Vsync.

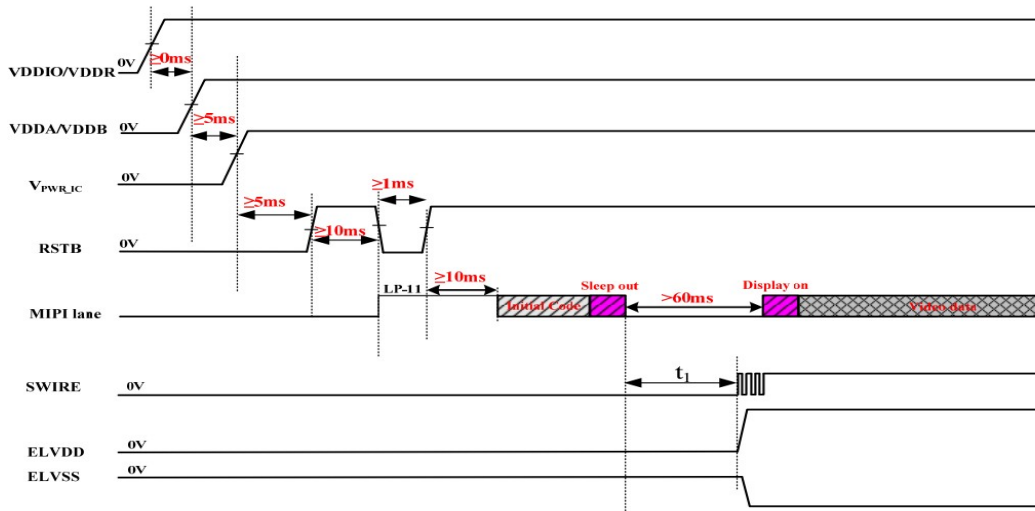
The TE mode selection is described as below table

TEOFF(34h) TEON(35h)	STESL(44h)	TE Output
TELOM	N[15:0]	
34h	X	TE off(output low)
35h with TELOM=0	N[15:0]=0	TE high in V-porch region (VS output1)
35h with TELOM=0	N[15:0]≠0	TE high at N-th line after Vsync (VS output2)
35h with TELOM=1	X	TE high in all V-porch and H-porch region (HS output)

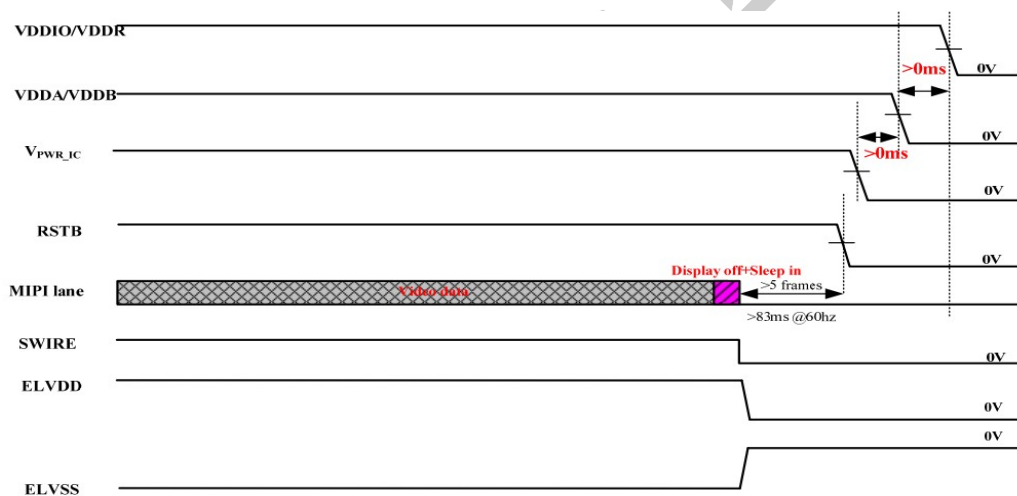
6 Recommended Operating Sequence

6.1 Display Power on / off Sequence

6.1.1 MIPI Power On Sequence



6.1.2 MIPI Power Off Sequence



6.2 Brightness control

Use “command 5100h, data xxh” to adjust the Manual Brightness value of the display:

In principle relationship is that 00h value means the lowest brightness and FFh value means the highest brightness.

Inst/Para	R/W	Address		Data Type	Description
		MIPI	Other		
BRTCTRL	W	51h	5100h	Hex	Value form 0~255(FF)

7 Optical Characteristics & Optical Specification

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angle	θT	CR≥10	80	-		Degree	Note 2 Test Equipment: CS2000A
	θB		80	-			
	θL		80	-			
	θR		80	-			
Contrast Ratio	CR	θ=0°	100000				Note1 Note3 Test Equipment: CS2000A
Response Time	TON	25℃			2	ms	Note1 Note4 Test Equipment: Admesy MSE
	TOF						
Chromaticity	White	x	0.280	0.305	0.320		Test Equipment: CS2000A Note: Chromaticity can be modified according to customer demand
		y	0.295	0.315	0.335		
	Red	x	0.625	0.655	0.685		
		y	0.315	0.345	0.375		
	Green	x	0.210	0.240	0.290		
		y	0.670	0.710	0.750		
	Blue	x	0.105	0.135	0.165		
		y	0.030	0.060	0.090		
Uniformity	U		75			%	Note1 Note6 Test Equipment: CS2000A
NTSC			90			%	Note5
Luminance	L	Normal	280	350	420	Cd/m ²	Note1 Note7 Test Equipment: CS2000A
Cross-talk					5	%	Note8 Test Equipment: CS2000A
Gamma			2.0	2.2	2.4		Gamma=2.2±0.2 Test Equipment: CS2000A

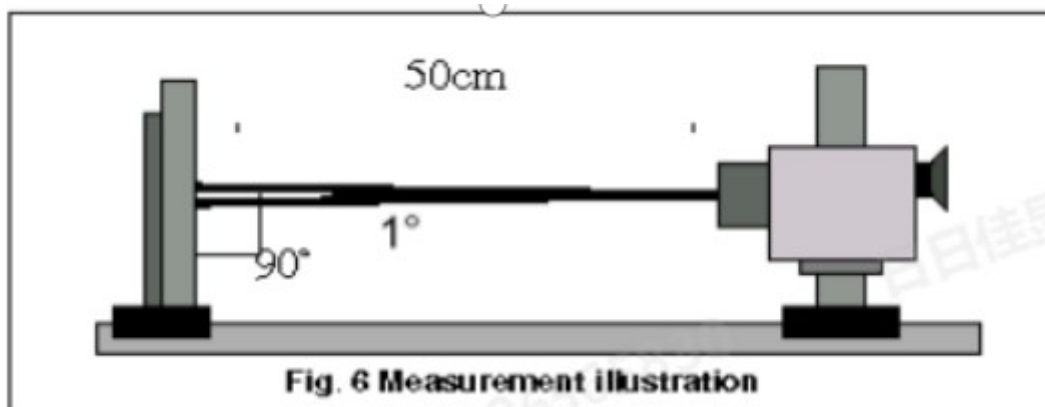
Test Conditions:

the ambient temperature is 25°C.

1. 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.



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

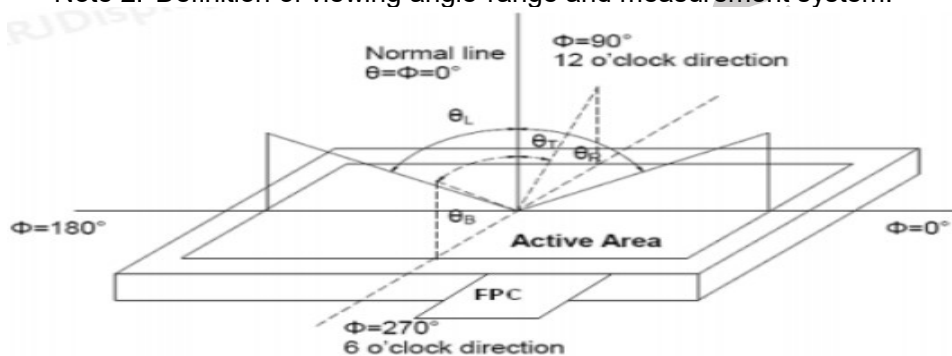


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

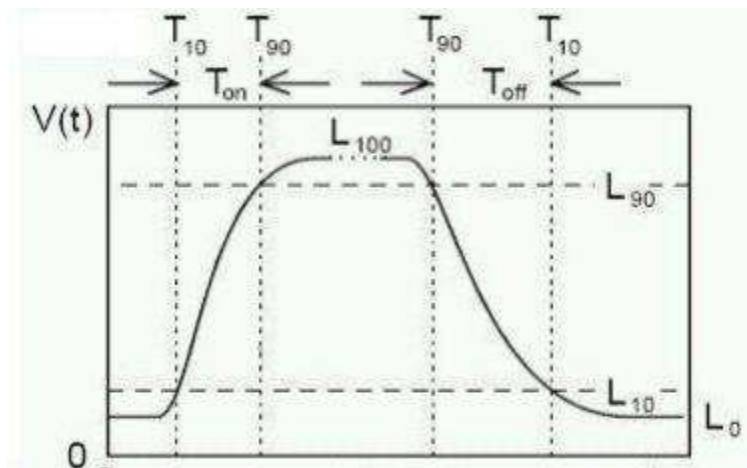
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "white" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

“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 response time

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



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates are measured at the center point of AMOLED.

Note 6: Definition of luminance uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity}(U) = L_{\min} / L_{\max}$$

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

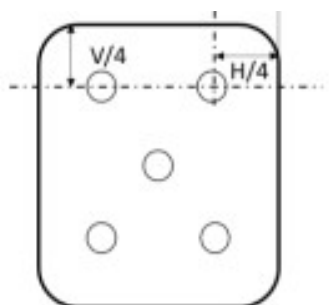


Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of luminance:

Measure the luminance of white state at the center point.

Note 8: Cross Talk

A. Measure luminance at the position, P0.

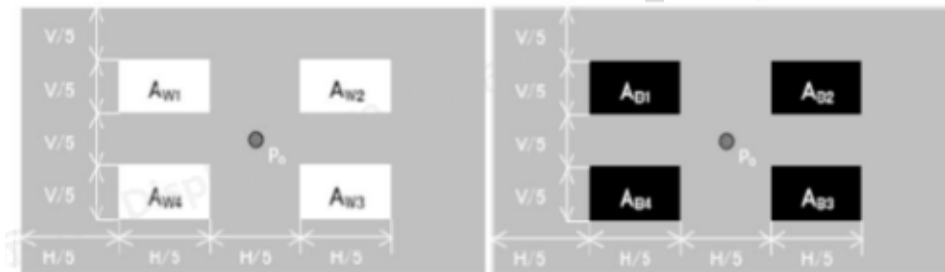
B. Calculate cross talk as below equation.

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

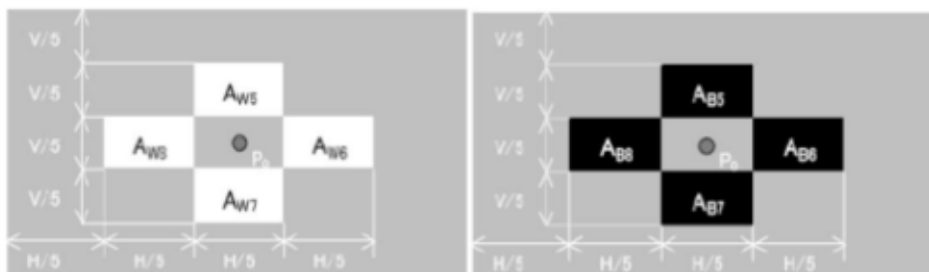
$$L_{B_OFF} = \frac{L_{B1} + L_{B2} + L_{B3} + L_{B4}}{4}$$

$$\text{crosstalk} = \frac{|L_{W_ON} - L_{W_OFF}|}{L_{W_OFF}} \times 100\% \quad (i = 5 \text{ to } 8)$$

$$\text{crosstalk} = \frac{|L_{B_ON} - L_{B_OFF}|}{L_{B_OFF}} \times 100\% \quad (i = 5 \text{ to } 8)$$



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



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

8 Environmental / Reliability Test

No	Test Item	Condition	Remark
1	High Temperature Operation	+70℃, 240 hrs	According to the customer request
2	Low Temperature Operation	-20℃, 240 hrs	According to the customer request
3	High Temperature Storage	+80℃, 240 hrs	According to the customer request
4	Low Temperature Storage	-30℃, 240 hrs	According to the customer request
5	High Temperature & High Humidity Operation	60℃, 90% RH,240 hrs	According to the customer request
6	High Temperature & High Humidity Storage	60℃, 90% RH,240 hrs	According to the customer request
7	Thermal Shock (Non-operation)	-30℃(30 min)~+70℃(30 min), Change time:10min, 30Cycles	According to the customer request

9 Quality Level

9.1 AMOLED Module of Characteristic Inspection

The environmental condition and visual inspection shall be conducted as below:

- (1) Ambient temperature: $23 \pm 3^{\circ}\text{C}$
- (2) Humidity: $55 \pm 10\% \text{RH}$
- (3) Ambient light intensity of visual inspection: 800 ~ 1200 lux
- (4) Ambient light intensity of function inspection: $\leq 100 \text{lux}$
- (5) Viewing Distance: $30 \pm 5 \text{cm}$
- (6) Viewing angle (tolerance): the front side $45^{\circ}(\text{Z}) \pm 15^{\circ}$
- (7) nspection time: $5 \pm 2 \text{ sec}$

9.2 Sampling Procedures for each item acceptance table

Defect type	Sampling Procedures	AQL
Major defect	GB/T2828.1 Inspection level II normal inspection single sample inspection	0.65
Minor defect	GB/T2828.1 Inspection level II normal inspection single sample inspection	1.0

Major defect :

Any defect may result in functional failure, or reduce the usability of product for its purpose. For example, electrical failure, deformation and etc.

Minor defect

A defect does not reduce the usability of product for its intended purpose and un-uniformity, such as dot defect and etc.

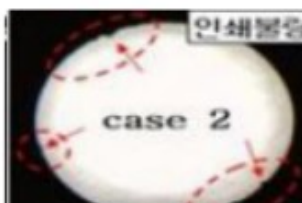
The criteria on major and/or minor judgment will be according with the classification of defects.

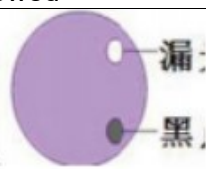
9.3 Inspection Item

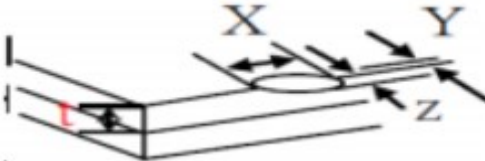
No.	Item	Area	Criterion of Defect				Defect type
1	Dot Defect	AA	Type	DS		Acceptable number	Minor
			Bright Dot	/		0	
			Dark Dot	≥10mm		4	
			Dark Dot (≥two connections)	≥10mm		2	
2	No Display	AA	/			Not allowed	Major
3	Abnormal Display	AA	/			Not allowed	Major
4	Normally white	AA	/			Not allowed	Major
5	Line Defect	AA	single line	Bright line		Not allowed	Major
				Dark line		Not allowed	
			Multiple lines	Bright line		Not allowed	
				Dark line		Not allowed	
			Half-Line	Bright line		Not allowed	
				Dark line		Not allowed	
6	Image sticking	AA	screen and display the image of the previous picture				Major
7	Color& Edge Mura	AA	See limit sample(under full white screen)				Major
8	Color crast	AA	See limit sample(under full white screen)				Major
9	Water Ripple	AA	Not allowed				Major
10	Other mura (Low gray-scale white spot 、 S-Line Mura)	AA	Not allowed(under full white screen) or See limit sample(under low gray-scale white screen)				Major
11	TP	AA	TP function NG			Not allowed	Major
12	Glass crack	AA、 OA	/			Not allowed	Major
13	Screen bump	AA、 OA	Encap surface is not allowed and LTPS does not affect assembly				Major
14	Line sefects (light visible)	AA	W (mm)	L (mm)	DS (mm)	Acceptable number	Minor
			W≤0.03	-	-	Ignore	
			0.03<W≤0.05	L≤5.0	≥10	2	
			0.05<W	-	-	0	
			-	L>5.0	-	0	
15	Point sefects (light visible)	AA	D (mm)	DS (mm)		Acceptable number	Minor
			D≤0.1	/		Ignore	
			0.1<D≤0.25	≥10		3	
			0.25<D			0	

16	Glass scratch	AA	W (mm)	L (mm)	DS (mm)	Acceptable number	Minor
			$W \leq 0.03$	$L < 5.0$	≥ 10	Ignore	
16	Glass scratch	AA	$0.03 < W \leq 0.05$	$L \leq 2.0$	≥ 10	Ignore	Minor
				$2.0 < L \leq 5.0$	≥ 10	2	
			$0.05 < W$	-	0	0	
				$L > 5.0$	0	0	
17	Frit Encapsulation	FA	Frit width uniformity. It should not have bubble or breakage.				Major
18	Polarizer crease / indentation	AA	See limit sample				Minor
19	Protective film starved/overflow glue/burr	Except AA	No control under $W \leq 0.3\text{mm}$				Minor
20	Polarizer bump point	Whole area	Bump: $D \leq 0.25\text{mm}$, dent $\leq 1\text{mm}$ or See limit sample			Allow 3	Minor
21	Polarizer bubble line	Out of AA, $\leq 0.25\text{m m}$	Encap surface			Not allowed	Minor
22	Scratches on the surface of polarizer	Whole area	No harm subject regardless of control				Minor
23	Concave dot 、Black and white dot 、Polarizer Dent/Bubble	AA	Front (Encap surface)	D (mm)	DS (mm)	Acceptable number	Minor
				$D \leq 0.1$	≥ 10	Ignore	
				$0.1 < D \leq 0.25$	≥ 10	3	
				$0.25 < D$	≥ 10	0	
			Metal material foreign material	/	≥ 10	Not allowed	
24	Polarizer Scratch/Fiber(Linear)	AA	W (mm)	L (mm)	DS (mm)	Acceptable number	Minor
			$W \leq 0.03$	$L \leq 5.0$	≥ 10	Ignore	
			$0.03 < W \leq 0.05$	$L \leq 2.0$	≥ 10	Ignore	
				$2.0 < L$	≥ 10	3	
			$0.05 < W$	-	≥ 10	0	
				$L > 5.0$	≥ 10	0	
25	Edge/Side breakage	OA	The following Criterion is applicable to any side (unit: mm)				Minor
			Z	X	Y	Acceptable number	

			$\leq T$	≤ 2.0	not extended to circuit Area or Frit	< 5	
26	UV glue	Not IC side	Over coating			Not allowed	Minor
		IC side	The coating of IC side is not higher than POL.			Not allowed	
		IC side	The coating of IC side is not higher than POL.			Not allowed	
27	Tuffy glue	IC and FPC bonding area	The coating should not have breakage or Bubble.				Minor
			The coating is not higher than POL.				
		Other area	Tuffy glue is not allowed to interrupt and the diameter of Bubble is not more than 0.5mm.				
			The coating is not higher than POL.				
		IC	Not allowed				
FPC	Ribbon glue: the width is not more than 1mm. Dot glue: the diameter is not more than 2mm.						
28	Rear reinforcement glue of FPC	FPC	The width is not more than 1mm . The height is lower than LTPS.				Minor
29	ACF	Bonding Area	The length of attachment is more than both ends of FPC, which should be range from 0.8 to 2mm. Don't go beyond the edge of panel. Effective lap width of wiring ACF is more than 2/3, which is compared with the width of the goldfinger of FPC. Don't have bubble or wrinkle.				Minor
30	FPCA	FPC	The component can not reverse polarity				Minor
			No wrong insertion				
			FPC should not have serious crease which destroy the line, prick and spots damage. Scratch is not allowed if Cu layer is exposed.				
			The goldfingers should not be oxidized, scraped, folded, impressed, broken, spotted or dissymmetry.				
			Make sure FPC is not scalded, with its location holes not having deficiency or obviously shift.				
			The component of FPC should be the same as BOM list.				
			No remaining soldering Sn				
31	FPC bonding	Bonding area	Bubble: Visible bubble is not allowed				Minor
	FPC Skew		Overhang : The size above 1/2 of soldering electrode of the parts overhang to the LAND is prohibited. The tilt height less than 0.5mm between FPC and foam.				
	Not allowed						
32	Package	Other	Products should put into the anti-static trays, with non-overlapping, and the trays should be staggered placed.				

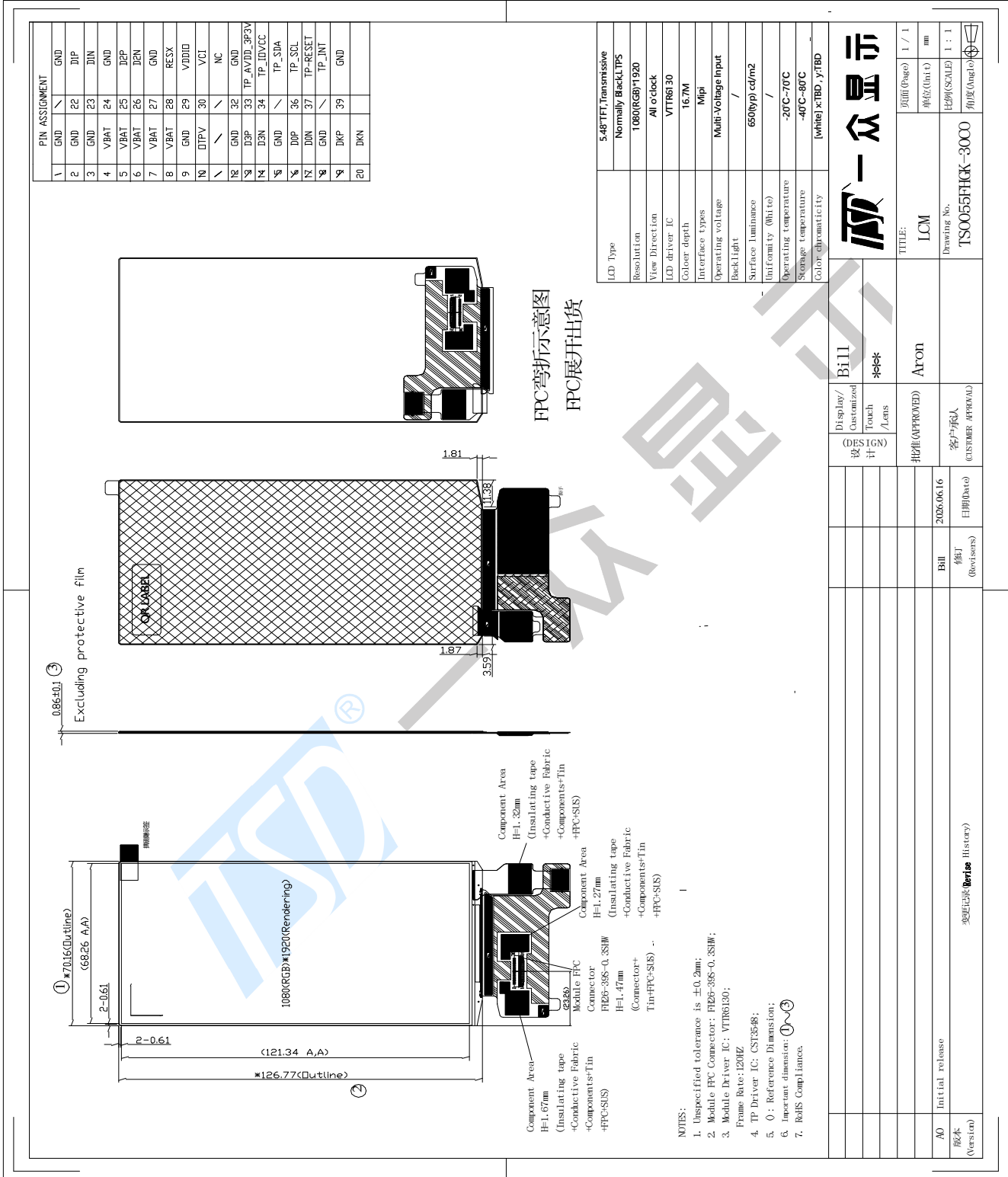
			Different products cannot be mixed into the same inner package.			Minor	
			The package should not have obvious deformation or breakage .The printing labels type and quantity are correct.				
			The package should have QC signature. ROHS label is needed if the product is under ROHS control.				
33	Cover dot 、 Black and white dot、 Polarizer Dent/Bubble	Whole area	D (mm)	DS (mm)	Acceptable number	Minor	
			D≤0.15mm	/	Ignore (specks is not allowed)		
			0.15mm < D < 0.25mm	DS≥10mm	3		
			D > 0.25mm	/	Not allowed		
			Specks: D<0.15mm, N>5 in 10mm*10mm area				
34	Cover Scratch/ Fiber(Linear)	AA	W (mm)	L (mm)	DS (mm)	Acceptable number	Minor
			W≤0.03mm	L≤10mm	≥10	Ignore	
			0.03mm < W ≤0.05mm	L≤5.0mm	≥10	2	
			W > 0.05	/	/	Not allowed	
			/	L > 5.0mm	/	Not allowed	
			Not allowed to scratch				
35	Edge pinhole	Edge of cover	D (mm)	DS (mm)	Acceptable number		Minor
36	Uneven edge of the ink	Edge of cover	W (B or D)	L(Aor C)	Acceptable number	Minor	
			W≤0.15mm	L≤3mm	≤2		
							
37	ink silk screen serrated	OA area	D (mm)	DS (mm)	Acceptable number	Minor	
			D≤0.3	DS≥10mm	2		
38	Camera Hole	OA area	breakage or crack: D≤ 0.15mm				
			Hole is not round: Refer to the limit sample				
			Dot Defect: D≤0.15mm, and N≤1, heterochrosis				

			and line defect are not allowed; Camera hole smudge: not allowed		Minor	
39	Printing defect	OA area	Wrongly、Missing、Ghosting and incomplete printing : not allowed		Minor	
			Fonts consistent with the standard characters, no significant difference in visualization			
			Penetrating scratch is not allowed			
40	IR Hole/ Black spots/ Line scratch foreign matter/ Residue	OA area	DS(mm)	Acceptable number		Minor
			DS < 0.1	Ignore		
			0.1 ≤ DS ≤ 0.2	1		
			Note: Not visible on black background, don't affect the transmission rate			
			Foreign body, dirty in IR hole: not allowed			
			Scratched\Line defects in IR hole: W ≤ 0.03mm, L ≤ 1mm, N ≤ 1, Not visible on black background, don't affect the transmission rate.			
			Residual glue in IR hole: not allowed			
41	Cover lens deformation	OA area	Raised height < 0.15mm, and the area is less than 25% of the entire non-display area in the cover lens		Minor	
		AA area	Deformation is not allowed in AA area			
42	Poor penetration of icons	OA area	DS ≤ 0.15 and N ≤ 1		Minor	
43	Cover dirt	Whole area	 Not allowed		Minor	
44	Cover crack				Minor	
45	Cover paint chips					
46	Burr	Edge of cover	L ≤ 0.05mm, W < 0.2mm accept (The premise does not affect the assembly and function and user operation)		Minor	
47	colour difference	OA area	No significant difference in visualization (refer to the limit sample if necessary)			
48	Overfill	Whole area	Not allowed in AA area		Minor	
			The visible part of the periphery can not be seen after assembly, and can not affect the assembly			
49	Protective film	Whole area	Film position deviation ≤ 0.15mm		Minor	
			Scratch: no control when don't damage the body			
			Overfill/ lack of plastic/ Burr: no control			
			Not control the bubble inside the cover protection film			
50	Easy to tear	Cover surface	Function failure\ damaged\ Missing label: not allowed		Minor	
			Wrinkle\ Convex-concave point\ dirty\ punching\ burr\ squeeze out: not control			

51	Composite tape	LTPS	Don't go beyond the edge of panel.					Minor
			Folds\ Light leakage\ Impact assembly or thickness: not allowed					
			Damaged: not allowed					
			Bump does not affect the assembly: not control					
			Punching the bad size meet the drawings requirements: not control					
			Non-wipe dirty\foreign body: not allowed Foreign objects in accordance with the standard line/point					
			Burr does not exceed the screen edge: not control					
			Do not have obvious bubbles					
			Gumflower\Overfill: no control					
52	Film warpage	Whole area	Warpage $\leq 0.2\text{mm}$					Minor
53	ICON hole	OA area	chromatic aberration、double image、dot defect 、line defect: not allowed (or refer to limited sample)					Minor
54	Earpiece hole	OA area	left-right asymmetry , Hole Rather large/small or off normal(Out of specification)No chamfer, Uneven polishing: not allowed					
55	Ink bumps	OA area	Positive side reference point defects; The back side does not affect the assembly; Ink overflow or accumulation: not allowed					Minor
56	Cover concave convex point	Whole area	Front : Height & depth $\leq 0.15\text{mm}$, size $\leq 0.4\text{mm}$, if necessary reference limit sample Back: Don't affect the fit process is not controlled					
57	Insulation Tape	Bonding area	Obvious wrinkles and bubbles: not allowed					Minor
		Component area	② Scratch/ Gumflower: not control					
			Non-wipe dirty: not allowed					
			Offset can not exceed the edge of the product, Others are required to the drawings					
			Burr\ Overfill: not control					
Damaged/incomplete/missing paste: not allowed								
58	Cover edge/side breakage	Edge of cover	X	Y	Z	DS	Acceptable number	Minor
			$X < 0.2\text{mm}$	$Y < 0.2\text{mm}$	$Z \leq 1/2t$	$DS > 5\text{mm}$	Unilateral ≤ 2	
			$X > 0.2\text{mm}$	/	/	not allowed		
			/	$Y > 0.2\text{mm}$	/	not allowed		
			/	/	$Z > 1/2T$	not allowed		
			Cracks are not allowed					
59	Blunt	Whole area	Not allowed					Minor
60	Fit bubble	AA	According to the punctate specifications					Minor

61	Vision area edge defect	OA	$D \leq 0.2\text{mm}$, $DS > 10$, $N \leq 2$ (hole saw tusk less than 2), if necessary reference limit sample.	Minor
62	Cover heterochrosis	OA	Heterochrosis side execute according to point defect size, bulk/stick refer to Limited sample	Minor

10 Mechanical Drawing



11 Precautions for Use of AMOLED Modules

11.1 Handling Precautions:

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

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

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

11.1.4 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.

11.1.5 Solvents may damage the polarizer. Do not use water, ketone or aromatic solvents except ethyl alcohol. Do not attempt to disassemble the AMOLED Module.

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

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

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

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

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

11.1.11 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.

11.2 Storage Precautions:

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

11.2.2 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: Temperature: 0°C~40°C Relatively humidity: ≤80%

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

11.3 Transportation Precautions:

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