Tailorpixels

A Professional Manufacturer of Display

Manufacturer Certificated

9001 CERT. No.: 282Q19070712006

14001 CERT. No.: 282E19070712007

Product Specification

Model: TOH497XVT-01C

4.97″AMOLED Display Module(720*1080）

This module uses RoHS material

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Version History			
Version. No	Date	Contents	Remark
V1	20250429	update touch IC	

Contents

1 Scope

This Specification defines AMOLED FOG module.

2 Features

2.1 Product Applications

Mobile phone

2.2 Product Features

1) Display color: 16.7M (RGB x 8bits)
2) Display format: 4.97' HD (720RGBx1280)
3) Pixel arrangement: Real RGB arrangement
4) Interface: MIPI 4 lanes
5) State: W/ POL

3 Mechanical Specifications

Item	Specification	unit	Note
Panel Dimension outline	64.12 × 116.72×0.643	mm	*
LTPS Glass outline	64.12 × 116.72	mm	
Encapsulation Glass outline	64.12 × 113.82	mm	
Number of dots	720(W) x RGB x 1280(H)	dots	
Active area	61.884 × 110.016	mm	
Diagonal size	4.97	inch	
Pixel pitch	28.65 × 85.95	μm	
Glass thickness (LTPS/encapsulation glass)	0.2 / 0.3	mm	
Weight	TBD	g	

*Note: Refer to 9 Outline Dimension Drawing

4 Maximum Rating

Parameter	Symbol	Spec			Unit	Note
		Min.	Typ.	Max.		
Analog/boost power voltage	VCI	-0.3	-	5.5	V	-
VCI I/O voltage	VCI_IF	-0.3	-	5.5	V	-
I/O voltage	VDDI	-0.3	-	5.5	V	-
VBAT voltage	VBAT	-0.3	-	5.0	V	-
VPP(OTP power)	VPP	-	-	8.25	V	-
Operating temperature	Top	-20		60	℃	
Storage temperature	Tstg	-40		70	℃	

5 Electrical Specifications

5.1 Electrical Characteristics

5.1.1 Power Characteristic:

Item	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**	**Remark**
AMOLED Power positive	ELVDD		4.6		V	
AMOLED power Negative	ELVSS		-2.5		V	Ref
Gamma Voltage	VBAT	3.5	3.7	4.2	V	Ref
Digital Power supply	VDDI	1.65	1.8	3.3	V	Ref
Analog Power supply	VCI	2.8	3.3	3.6	V	Ref

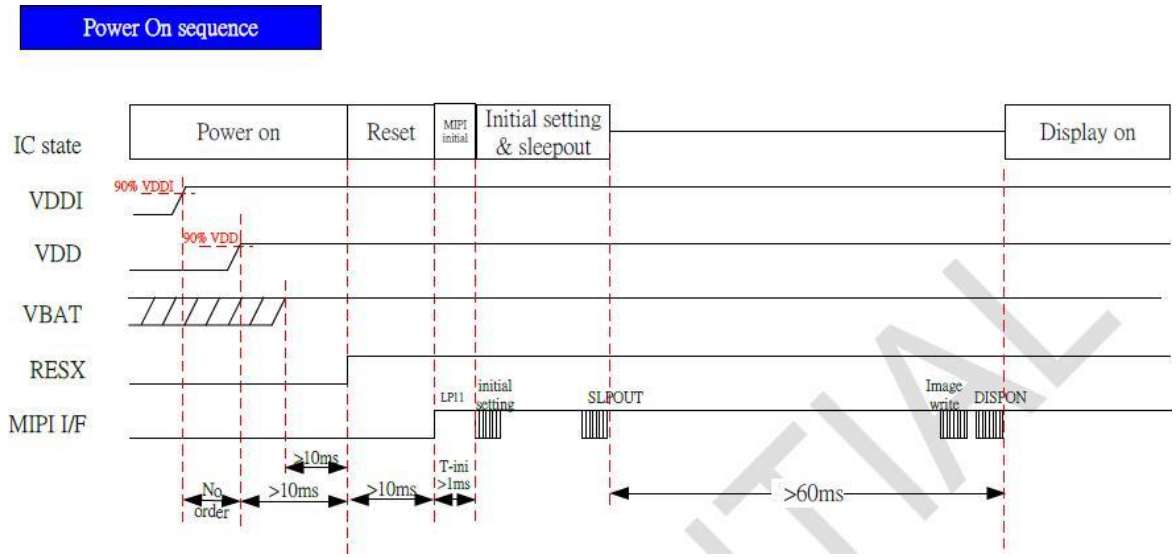
Mode	Symbol	Condition	Min.	Typ.	Max.	Unit
350 nits @Gray 255	I_{BAT}	VBAT=3.7V	-	TBD	-	mA
	I_{VCI}	VCI=3.3V	-	1.5	2	mA
	I_{VDDI}	VDDIO=1.8V	-	15	20	mA

5.2 I/O Connection and Block Diagrams

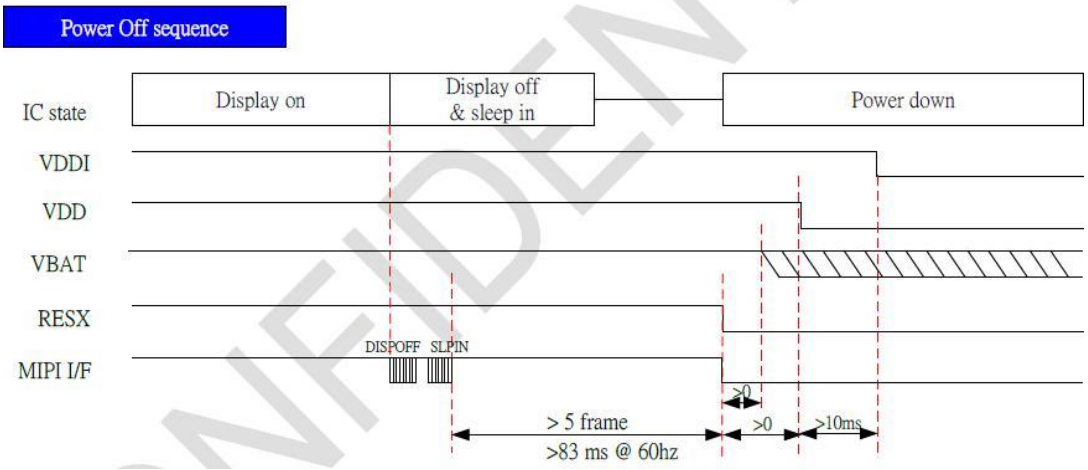
5.2.1 Main FPC Define

1	GND
2	VBAT(3.5~4.2V)
3	VBAT(3.5~4.2V)
4	VBAT(3.5~4.2V)
5	VBAT(3.5~4.2V)
6	VBAT(3.5~4.2V)
7	GND
8	GND
9	GND
10	MTP_PWR
11	TE
12	RESX
13	VDDI(1.8V)
14	GND
15	D2P
16	D2N
17	GND
18	D1P
19	D1N
20	GND
21	CKP
22	CKN
23	GND
24	D0P
25	D0N
26	GND
27	D3P
28	D3N
29	GND
30	VCI(3.3V)
31	GND
32	TP_VCC(2.8V)
33	TP_VDDI(1.8)
34	TP_INT
35	TP_SDA
36	TP_SCL
37	TP_RESX
38	NC
39	GND

5.3 power on sequence 5



.4 power off sequence



6 Electro-Optical Specification

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	Remark
Brightness			315	350	385	cd/m2	Suggest MDL Brightness
Brightness Uniformity			75	85	-	%	Note 1
Contrast Ratio	CR		10000	20000			Based on

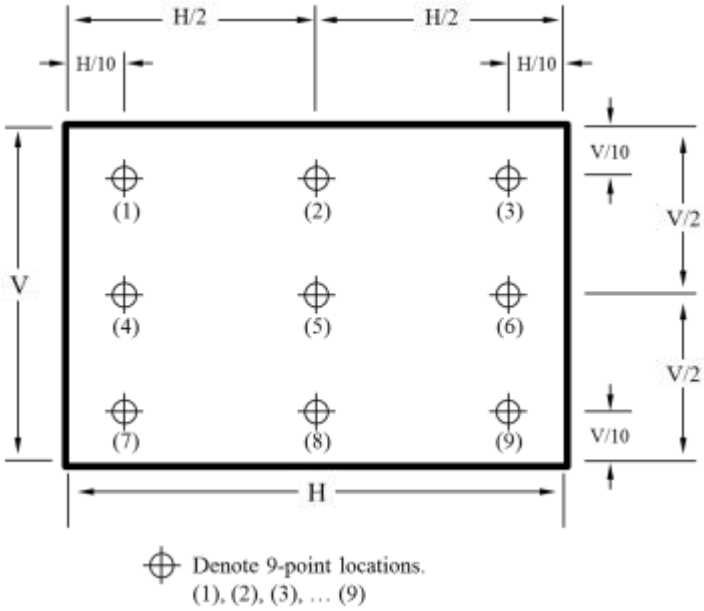
								CA-310 Note 2
CIE	Red	x		0.64	0.67	0.7	-	Ref.
		y		0.3	0.33	0.36	-	Ref.
	Green	x		0.16	0.2	0.24	-	Ref.
		y		0.69	0.73	0.77	-	Ref.
	Blue	x		0.105	0.135	0.165	-	Ref.
		y		0.025	0.055	0.085	-	Ref.
Color Gamut			vs. NTSC (CIE 1976)	95	110	-	%	
Viewing angle	Left	θL	CR≥10	75	80	-	Deg.	Note 3
	Right	θR		75	80		Deg.	Note 3
	Top	ϕT		75	80		Deg.	Note 3
	Bottom	ϕB		75	80		Deg.	Note 3
Color Shift			White @ 30 degree			6	JNCD	Note 4
Flicker						-30	dB	Note 5
Cross Talk						1.7	%	Note 6
Polarization Direction			PdF		135		Deg.	Note 7
OLED Life Time			With a Full-white image, lighting on with brightness of 350 nits for 120 hrs.	T94>=120h				
Response time						2	ms	Note 8

Note 1: Brightness Uniformity

- Environmental conditions: Temp. 25℃±3℃, 65±20%RH, Dark Room.
- Measurement equipment: CS2000 or similar equipment.
- The brightness uniformity is calculated by using following formula:
  Brightness uniformity = Bri.(Min.) / Bri.(Max.) × 100%
  Bri.(Min.) = Minimum brightness measured in 9 measuring spots.

Bri.(Max.) = Maximum brightness measured in 9 measuring spots.

- Illustration of 9 measuring spots as follows



Note 2: Contrast Ratio

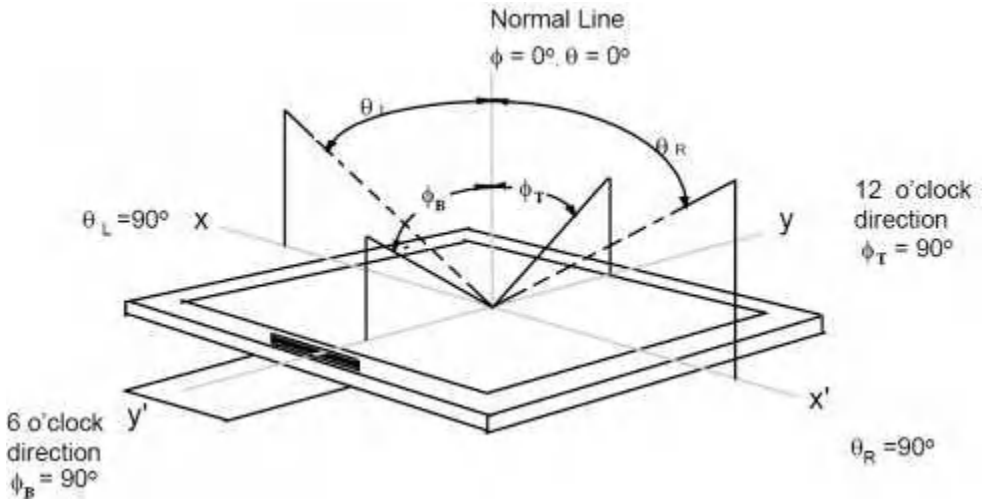
Dark Room C.R=L_W/L_B

L_W: Full white brightness of display center P0;

L_B : Full black brightness of display center P0.

Note 3: Viewing Angle

Refer to the figure below marked by θ and ϕ.



Note 4: Color Shift JNCD

- For JNCD measure, fix on white pattern, on the condition θ = 0°, ϕ= 0°, a color coordinate (u'_1, v'_1) can be obtained and another color coordinate (u'_2, v'_2) can be obtained on θ_L=30°.
- Delta u'v' = square root ((u'2-u'1)^2+(v'2-v'1)^2), and JNCD stands for "Just Noticeable Color Difference". For the (u', v') color space 1 JNCD = 0.004 Delta u'v', For example, color shift less than 2 JNCD means Delta u'v' < 0.008.

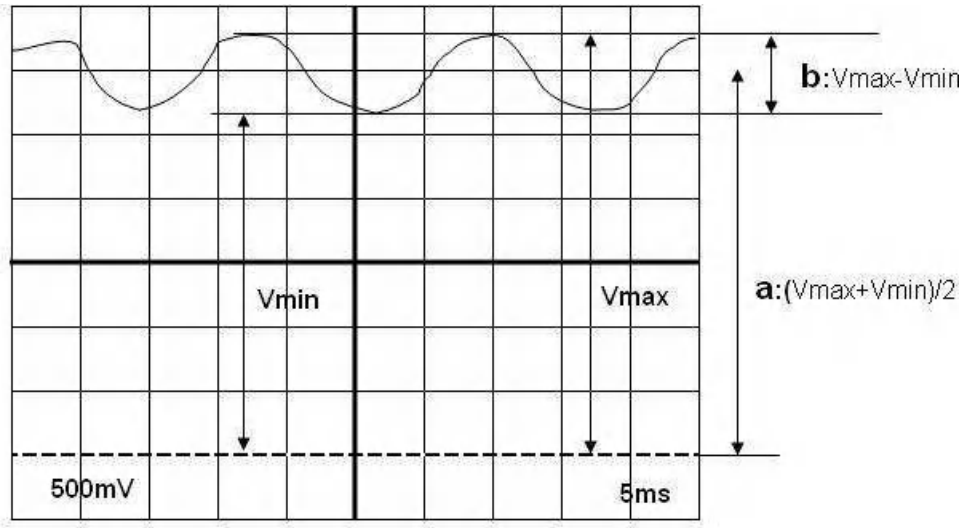
Note 5: Flicker

- Measurement equipment: CA-210 or similar equipment.
- Measuring temperature: Ta = 25 °C.
- Test method: JEITA method.

- Test pattern: Refer to below (Test pattern should be full-fill of display screen).
- The point should be marked is, the background of Flicker test pattern – "gray" is defined as middle gray scale. For example, RGB 24 bit "gray" is defined as below:

R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

- Frame frequency requirement before test: The display panel must be tuned to more than 60 Hz before measurement.
- If the intensity level of the display changes as Figure below, it is considered that AC component (b) overlaps on the DC component (a). With the contrast method, the ratio of AC component to DC component is defined as the flicker amount.
- AC component (b) is defined as V_{max} - V_{min} and DC component (a) as (V_{max} + V_{min})/2, and the flicker amount is calculated by the following formula:
  Flicker amount = AC component / DC component = b/a
  = (V_{max} - V_{min}) / [(V_{max} + V_{min})/2] × 100%



Note 6: Crosstalk

- Measurement equipment: CS2000 or similar equipment.
- The background of crosstalk test pattern 'gray' is defined as middle gray scale. For example, RGB 24 bit 'gray' is defined as below'

R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

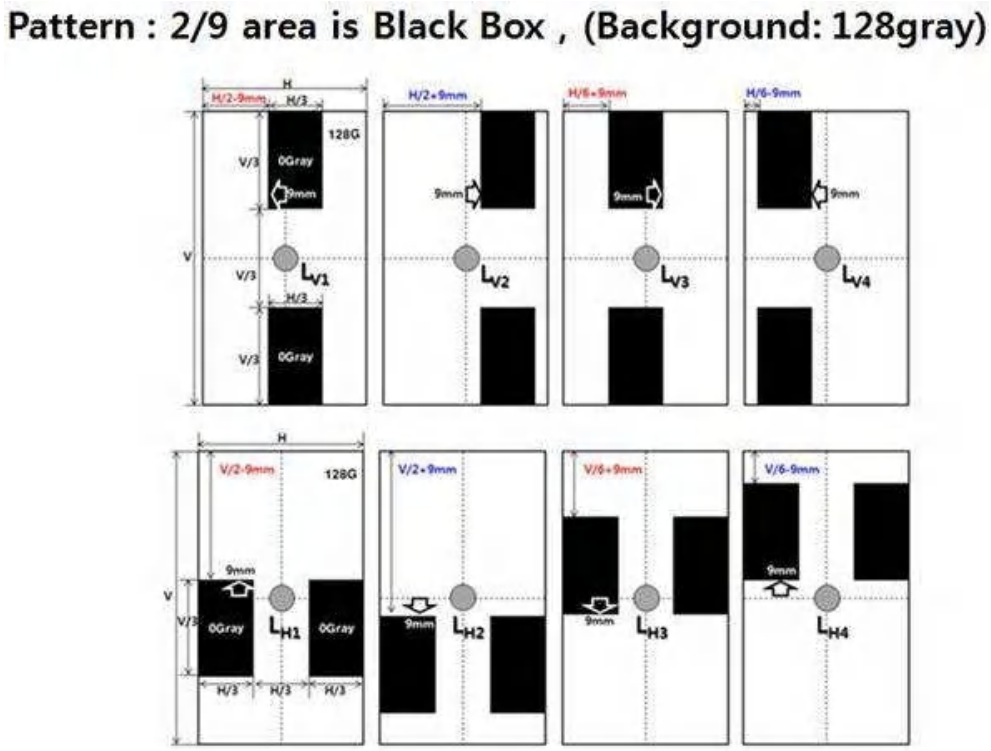
- Test pattern follows the picture below, the background is middle gray and with two black rectangle parts, each one is 1/9 of the AA size.
- Calculate the crosstalk (V) and crosstalk (H) with the formula below:

$$Crosstalk\ (V) = \max\left(\left|\frac{L_{V1} - L_{V2}}{L_{V2}}\right| \times 100, \left|\frac{L_{V3} - L_{V4}}{L_{V4}}\right| \times 100\right)$$

$$Crosstalk\ (H) = \max\left(\left|\frac{L_{H1} - L_{H2}}{L_{H2}}\right| \times 100, \left|\frac{L_{H3} - L_{H4}}{L_{H4}}\right| \times 100\right)$$

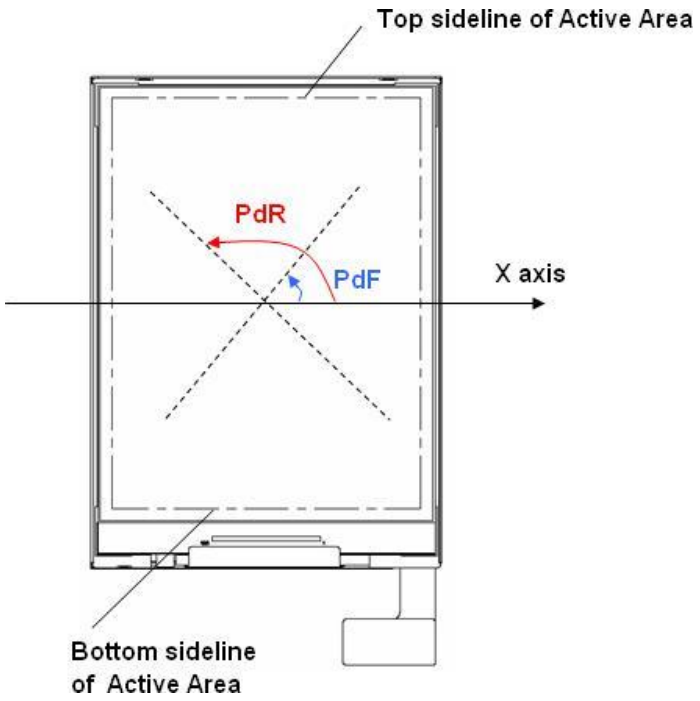
- The final crosstalk value is the maximum one between Crosstalk (V) and

Crosstalk (H).



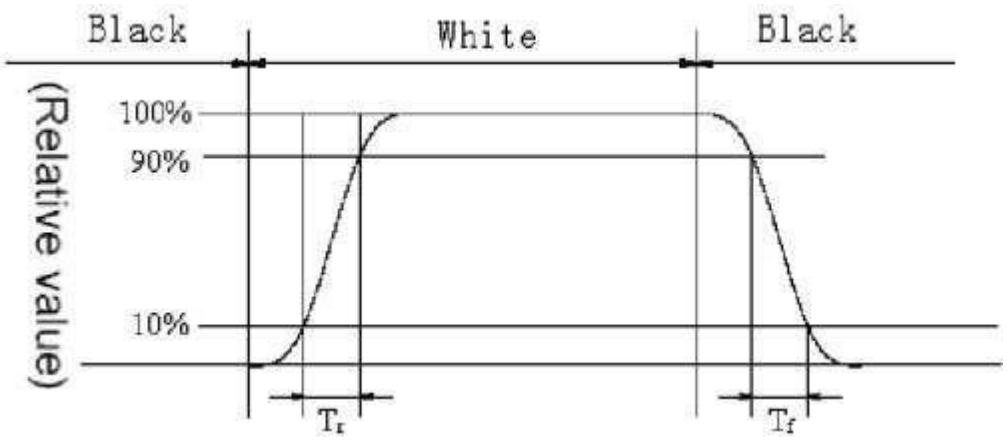
Note 7: Polarization Direction Definition

- Viewing direction is normal user viewing direction which is vertical to the display surface.
- The X axis is defined as parallel to Top and Bottom sidelines of the Active Area.
- PdF which is marked in blue arrow in the figure below is polarization degree.
- The polarization degree parameter is indicated in range of 0 deg. to 180 deg. according to above definition.



Note 8: Definition of Response Time

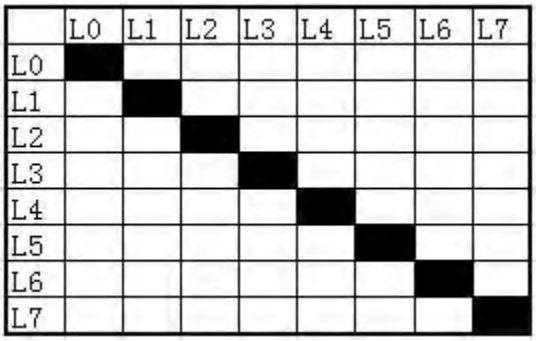
The output signals of photo detector are measured when the input signals are changed from 'black' to 'white' (voltage falling time) and from 'white' to 'black' (voltage rising time), respectively. The response time is defined as the time interval between 10% and 90% of the amplitudes, as shown in the figure below:



- Response time of gray to gray

  Measurement equipment: CS2000 or similar equipment.

  Test method: 8 grays L0 to L7 are defined, the gray level of which are 0, 36, 73, 109, 146, 182, 219, and 255. The output signals of photo detector are measured when the input signals are changed from 'Lx' to 'Ly', [x, y] = [0, 7]. The response time is defined as the time interval between 10% and 90% of the amplitudes. The result of the test can be noted as below:



7 Reliability

7.1 Environmental Test

No	Item	Conditions	Note
1	High Temperature Storage 5pcs	70℃ / 128 hours	Base on FOG or Full-MDL
2	Low Temperature Storage 5pcs	-40℃/128hours	Base on FOG or Full-MDL
3	High Temperature Operation 5pcs	60℃ / 128 hours	Base on FOG or Full-MDL
4	High Temperature and Humidity Operation 5pcs	60℃ / 90% RH 128 hours	Base on FOG or Full-MDL

5	Low Temperature Operation 5pcs	-20℃ / 128 hours	Base on FOG or Full-MDL
6	Thermal Shock Storage 5pcs	-40℃ ~ 7 0 ℃ 30min, change time < 5min, 30 cycles	Base on FOG or Full-MDL
7	Air discharge 5pcs	±8 KV,150PF/330Ω 5 Points (1 Center / 4 Corners), Each 2 times	Base on Full-MDL Note 10
8	Contact discharge 5pcs	±4 KV, 150PF/330Ω 5 Points (1 Center / 4 Corners) Each 2 times	Base on Full-MDL Note 10

Note 10:Class C will be executed unless otherwise specified :

	Class	Performance
ESD Criterion	A	All functions perform as designed during and after exposure to interference
	B	Temporary degradation or less of performance which is self-recoverable
	C	Degradation or less of performance which requires operator intervention or system reset to recover
	D	Degradation or less of function which is not recoverable

8 Handling Precautions

1) When cleaning ITO pad, avoid using hard and abrasive material or corrosive solution
2) Keep module away from direct sunlight or fluorescent light, and keep it at room temperature and humidity
3) Strong impact & pressure on module and packing is prohibited
4) Following normal power on/off sequence is necessary for preventing abnormal display or permanent damage to display
5) Optimal contrast ratio under ideal voltage is AMOLED module' s characteristic, hence it is recommended a voltage control function available.
6) Image sticking may occur if an image displays for an extended period of time
7) When interfered by system's overall mechanical design, an abnormal display may occur
8) After considering emitting energy, you should plan your design to satisfy EMI standards.
9) Host side should place a surge-prevent circuit at power trace (ie: VCI, Vddi) to protect AMOLED module.

9.Mechanical Drawing