

# AMOLED SPECIFICATION

Part Number	USMP-A014-040040MCM-A1
Size	1.4"
Resolution	400 x 400
Brightness	250 nits
Contrast	10,000:1
Viewing Angle	85/85/85/85
Operating Temp.	-20 ~ 60°C

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Reversion History			
Reversion. No	Date	Contents	Remark
01	2017-6-26	First Draft	
02	2018-1-10	Change Driver IC/ Updated the drawing	
03	2018-4-10	IIS definition update	
04	2018-5-07	Add material P/N and update the drawing	

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## 1 Scope

This specification defines AMOLED by US MICRO PRODUCTS. In the case of any unspecified item, it may require both USMP and the party designs this module into its product to work out a solution.

## 2 Features

### 2.1 Product Applications

Smart Watch

### 2.2 Product Features

- 1) Display color: 16.7M (RGB x 8bits)
- 2) Display format: 1.4”(400RGBx400)
- 3) Pixel arrangement: Real RGB arrangement
- 4) Interface: MIPI 1-lane

## 3 General Specifications

### (i) Display

Item	Specification	unit
Dimension outline	38.6 x 40.5 x 0.67	mm
LTPS Glass outline	38.6 x 40.5	mm
Encapsulation Glass outline	φ38.6	mm
Number of dots	400(W) x RGB x 400(H)	dots
Active area	φ35.4	mm
Diagonal size	1.39	inch
Pixel pitch	29.5 x 88.5	μm
Glass thickness (LTPS/encapsulation glass)	0.2 / 0.2	mm
Weight	2	g

Note: Refer to 10 Outline Dimension Drawing

## (ii). Touch

Item	CONTENTS	Unit
Outline Dimension	Ø 40.41	mm
Active Area	Ø 35.4	mm
Display Active Area	Ø35.4	mm
TP size (inch)	1.4	inch
Interface Type	I <sup>2</sup> C	-
TP thickness	1.725	mm

#### 4 Maximum Rating

Parameter	Symbol	Spec			Unit	Note
		Min.	Typ.	Max.		
Analog/boost power voltage	VCI	-0.3	-	-	V	-
I/O voltage	VDDIO	-0.3	-	-	V	-
Operating temperature	Top	-20	-	60	°C	-
Storage temperature	Tstg	-30	-	70	°C	-

## 5 Electrical Specifications

### 5.1 Electrical Characteristics

#### 5.1.1 Power Characteristic:

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
AMOLED Power positive	ELVDD	4.55	4.6	4.65	V	-
AMOLED power Negative	ELVSS	-2.45	-2.4	-2.35	V	Ref
Digital Power supply	VDDIO	1.65	1.8	1.95	V	Ref
Analog Power supply	VCI	2.7	2.8	2.9	V	Ref

#### 1) Normal Mode

**Power Supply:** IOVCC=1.8V VCI=2.8V

**Frame Frequency:**  $F_{frame}=60\text{HZ @ }25\text{degC}$ , Brightness 300 nits, Command Mode,

Display Condition	Symbol	Min.	Typ.	Max.	Unit	Remark
100% Pixel On 300nits	IELVDD /ELVSS	-	21.0	25.4	mA	Ref
	IVCI	-	6.0	7.2	mA	Ref
	IVDDIO	-	2.0	2.4	mA	Ref
50% Pixel On 150nits	IELVDD /ELVSS	-	5.2	6.2	mA	Ref
	IVCI	-	6.6	8.0	mA	Ref
	IVDDIO	-	2.0	2.4	mA	Ref
10% Pixel On 50nits	IELVDD /ELVSS	-	0.4	0.5	mA	Ref
	IVCI	-	7.2	8.6	mA	Ref
	IVDDIO	-	2.0	2.4	mA	Ref

#### 2) Idle Mode

**Power Supply:** IOVCC=1.8V VCI=2.8V

**Frame Frequency:**  $F_{frame}=15\text{HZ @ }25\text{degC}$ , Brightness 30 nits,

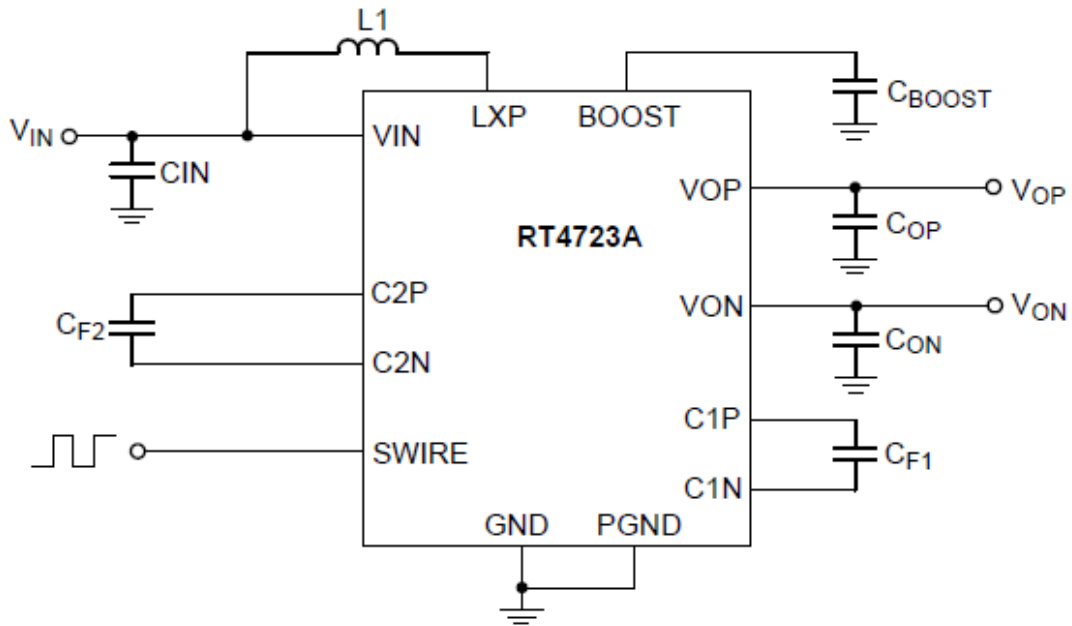
Display Condition	Symbol	Min.	Typ.	Max.	Unit	Remark
10% Pixel On 30 nits	IELVDD /ELVSS	-	-	-	mA	Supplied by Driver IC
	IVCI	-	3.0	3.6	mA	Ref
	IVDDIO	-	1.0	1.2	mA	Ref

#### 3) Deep Standby Mode

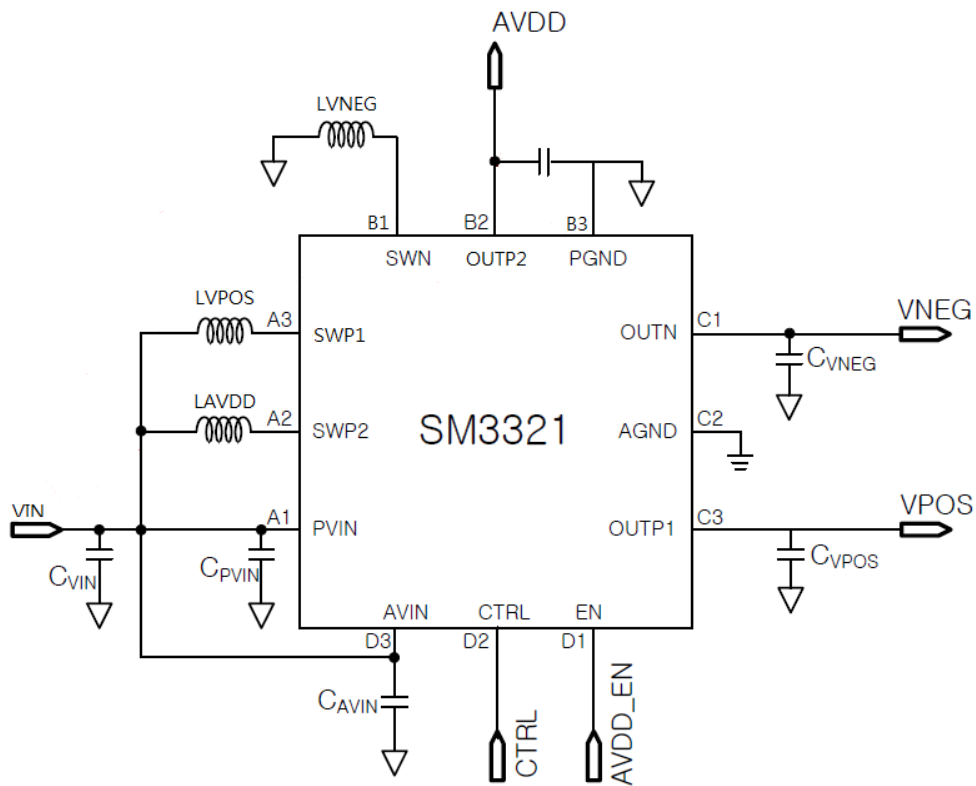
Display Condition	Symbol	Min.	Typ.	Max.	Unit	Remark
Deep Standby	IVCI	-	-	1	uA	-
	IVDDIO	-	-	0	uA	-

**5.1.2 Power supply circuit application (This is for reference only):**

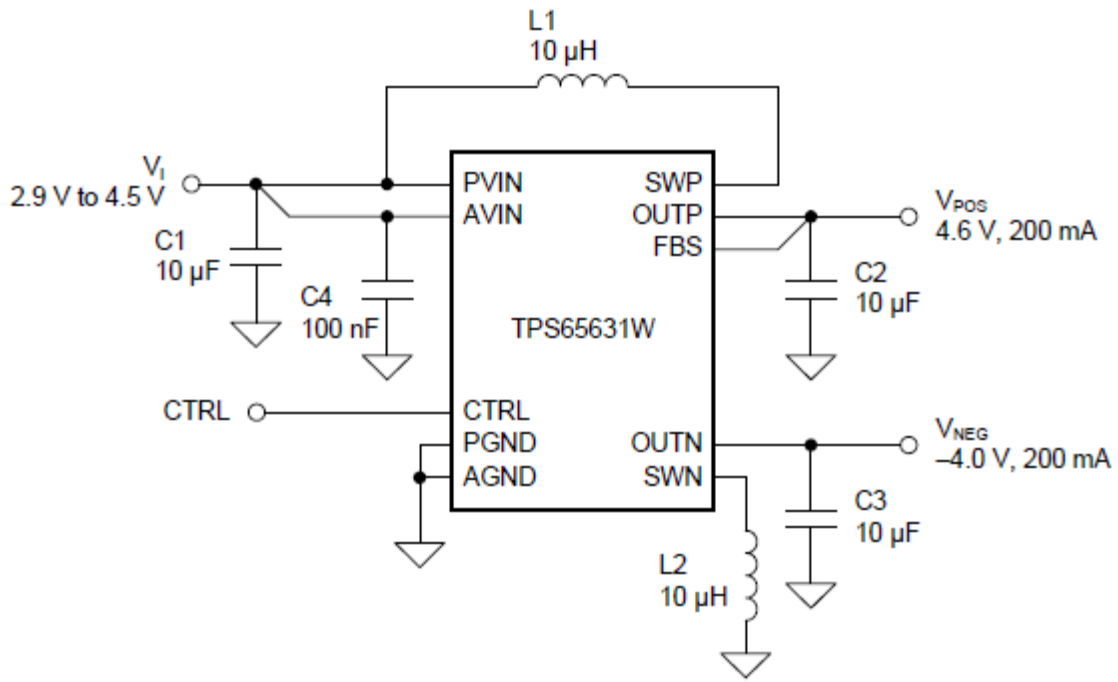
**1) RT4723A**



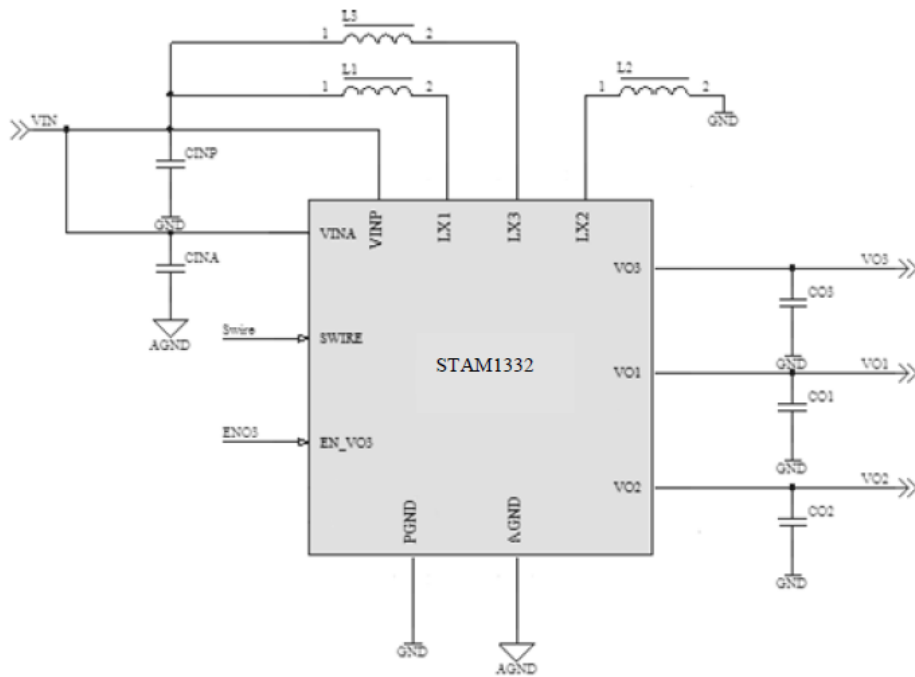
**2) SM3321**



**3) TPS65631W**



4) STAM1332





### 5.1.3 Electrical Characteristics ( Touch )

Parameter	Pins	Symbol	Condition	Rated Value			Unit
				Min.	Typ.	Max.	
Power supply voltage	Power	VDD	—	2.1	—	5.5	V
	Power	VDDIO	—	1.8	—	5.5	
Input voltage	—	V <sub>IH</sub>	—	VDDIO×0.7	—	VDDIO	V
	—	V <sub>IL</sub>	—	0	—	VDDIO×0.3	
Pull-up resistor	I/O pins	R <sub>PU</sub>	—	—	66	—	kΩ
	RESETB	R <sub>PU</sub>	—	—	50	—	
Pull-down resistor	I/O pins	R <sub>PD</sub>	—	—	20	—	
Output drive current	I/O pins	I <sub>OH</sub>	VDDIO=3.3V VOH=2.4V	8 or 3.5 *Note 1	14 or 5.5 *Note 1	—	mA
Output drive current	I/O pins	I <sub>OL</sub>	VDDIO =3.3V VOL=0.4V	5.5 or 2.5 *Note 1	11 or 4 *Note 1	—	
Output drive current	I/O pins	I <sub>OH</sub>	VDDIO=1.8V VOH=1.5V	2 or 0.8 *Note 1	3 or 1 *Note 1	—	
Output drive current	I/O pins	I <sub>OL</sub>	VDDIO =1.8V VOL=0.4V	4.5 or 2 *Note 1	7 or 2.5 *Note 1	—	
Normal mode Current consumption @ Report rate 100Hz	Power	I <sub>NORMAL</sub>	VDD=2.1V	—	2.5	3.0	mA
Idle mode Current consumption @ Scan rate 10Hz	Power	I <sub>IDLE</sub>	VDD=2.1V	—	13	20	uA
Sleep mode Current consumption	Power	I <sub>SLEEP</sub>	VDD=2.1V	—	0.6	1	

**Note 1:** There are two drive/sink currents selectable through register setting.

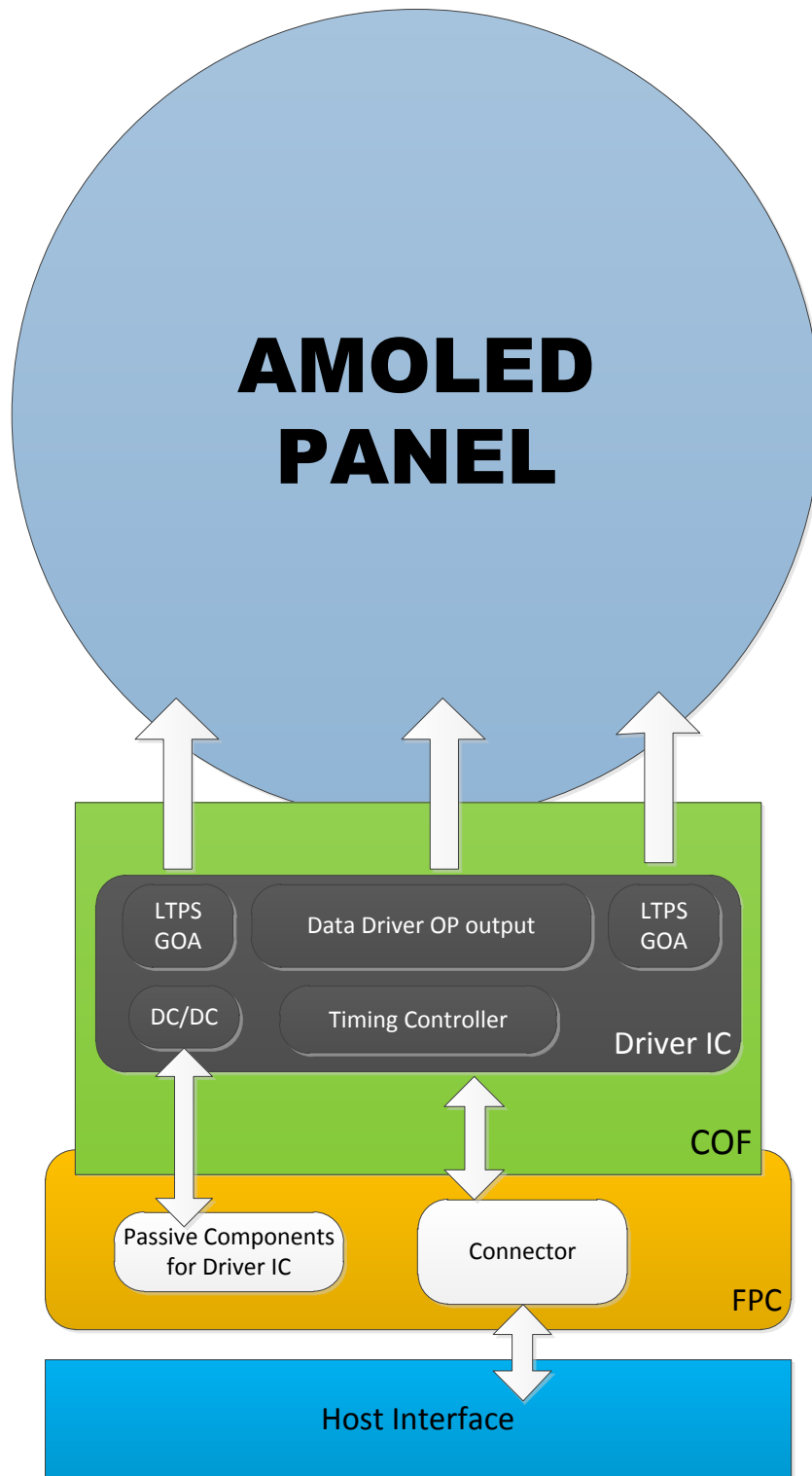
## 5.2 I/O Connection and Block Diagrams

### 5.2.1 I/O Connection

#	Pin_name	I/O	Description
1	ELVSS1	Power	AMOLED power Negative
2	ELVDD1	Power	AMOLED power Positive
3	ELVSS2	Power	AMOLED power Negative
4	ELVDD2	Power	AMOLED power Positive
5	ELVSS3	Power	AMOLED power Negative
6	ELVDD3	Power	AMOLED power Positive
7	VCI	Power	Driver IC analog supply
8	GND2	Power	The power ground
9	VDDIO	Power	Driver IC digital I/O supply
10	DSI_D0N	I/O	MIPI DSI data0-
11	GND1	Power	The power ground
12	DSI_D0P	I/O	MIPI DSI data0+
13	TE	O	Tear effect output
14	GND3	Power	The power ground
15	VPP	Power	Power supply for OTP. Leave the pin to open when not in use.
16	DSI_CLKN	I/O	MIPI DSI clock-
17	REST	I	This signal will reset the device and must be applied to properly initialize the chip. Active low.
18	DSI_CLKP	I/O	MIPI DSI clock+
19	SWIRE	O	Swire protocol setting pin of Power IC
20	GND4	Power	The power ground

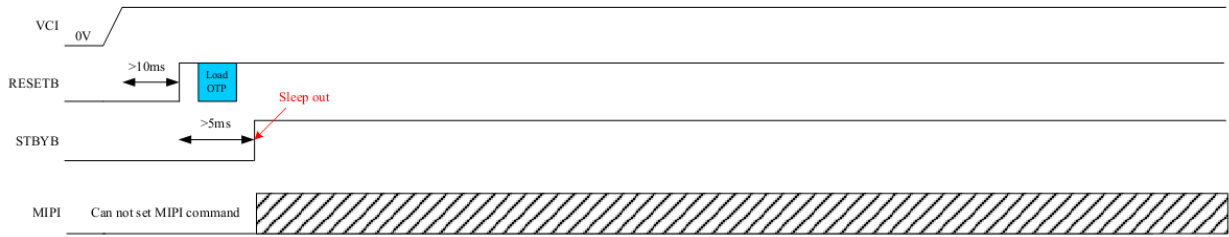
### 5.2.2 I/O Connection ( Touch )

PIN	name
1	GND
2	SDA
3	SCL
4	RST
5	INT
6	VDD 2.8V
7	NC
8	NC
9	NC
10	NC

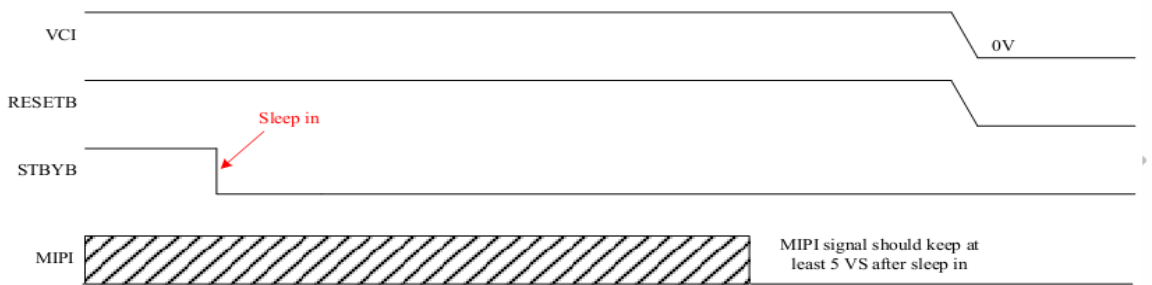


### 5.3 Recommended Operating Sequence

#### 5.3.1 Power on sequence

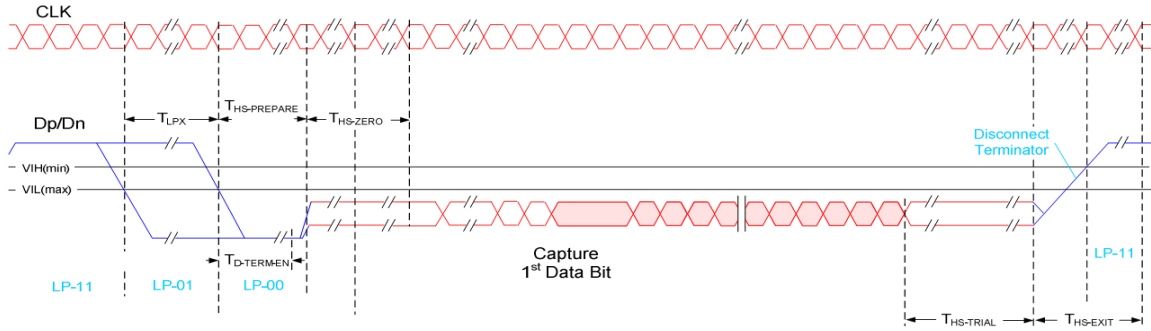


#### 5.3.2 Power off sequence

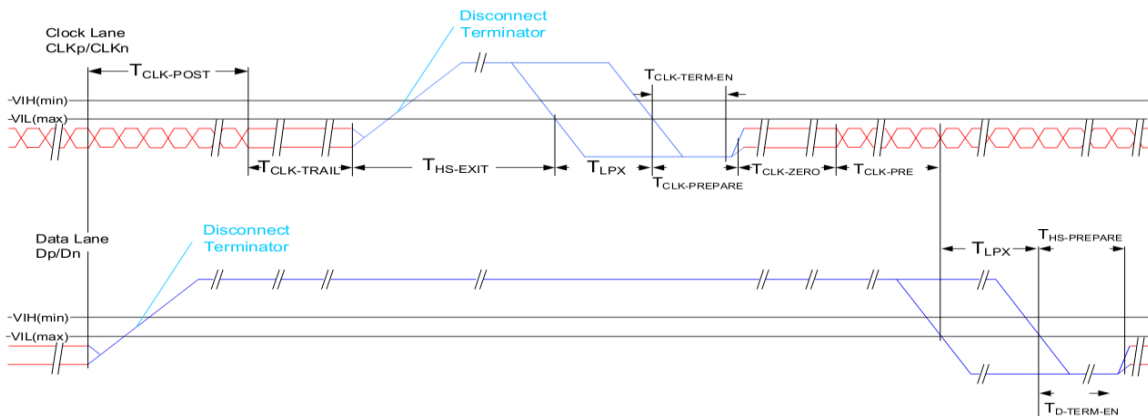


### 5.4 AC Characteristics (MIPI)

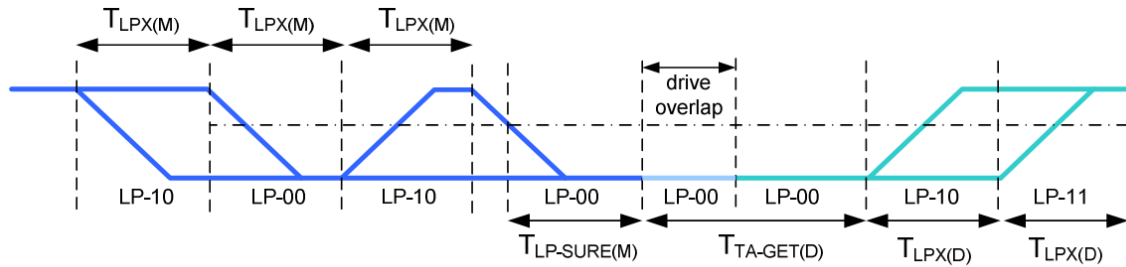
#### 5.4.1 HS Data Transmission Burst



#### 5.4.2 HS Clock Transmission



### 5.4.3 Turnaround Procedure



### 5.4.4 Timing Parameters

Symbol	Description	Min	Typ	Max	Unit
TREOT	30%-85% rise time and fall time	-	-	35	ns
TCLK-MISS	Timeout for receiver to detect absence of Clock transitions and disable the Clock Lane HS-RX.	-	-	60	ns
TCLK-POST*1	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 THS-TRAIL to the beginning of TCLK-TRAIL.	60ns + 52*UI (For DCS)	-	-	ns
TCLK-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	-	-	ns
TCLK-SETTLE	Time interval during which the HS receiver shall ignore any Clock Lane HS transitions, starting from the beginning of TCLK-PRE.	95	-	300	ns
TCLK-TERM-EN	Time for the Clock Lane receiver to enable the HS line termination, starting from the time point when Dn crosses VIL,MAX.	Time for Dn to reach VTERM-EN	-	38	ns
THS-SETTLE	Time interval during which the HS receiver shall ignore any Data Lane HS transitions, starting from	85 ns + 6*UI	-	145 ns + 10*UI	ns

	the beginning of THSPREPARE.				
TEOT	Time from start of THS-TRAIL or TCLK-TRAIL period to start of LP-11 state	-	-	105ns+48*UI	ns
THS-EXIT(1)	time to drive LP-11 after HS burst	100	-	-	ns
THS-PREPARE	Time to drive LP-00 to prepare for HS transmission	40ns + 4*UI	-	85ns+6*UI	ns
THS-PREPARE + THS-ZERO	THS-PREPARE + Time to drive HS-0 before the Sync sequence	145ns + 10*UI	-	-	ns
THS-SKIP	Time-out at RX to ignore transition period of EoT	40	-	55ns+4*UI	ns
THS-TRAIL	Time to drive flipped differential state after last payload data bit of a HS transmission burst	60 + 4*UI	-	-	ns
TLPX	Length of any Low-Power state period	50	-	-	ns
Ratio TLPX	Ratio of TLPX(MASTER)/TLPS(SLAVE) between Master and Slave side	2/3	-	3/2	ns
TTA-GET	Time to drive LP-00 by new TX	5*TLPX	5*TLPX	5*TLPX	ns
TTA-GO	Time to drive LP-00 after Turnaround Request	4*TLPX	4*TLPX	4*TLPX	ns
TTA-SURE	Time-out before new TX side starts driving	TLPX	-	2*TLPX	ns

#### 5.4.5 Timing requirements for RESETB

When RESETB of the reset pin equals to Low, it will be in the condition of reset.

When it is in the condition of reset, it will make the device recover the initial set.

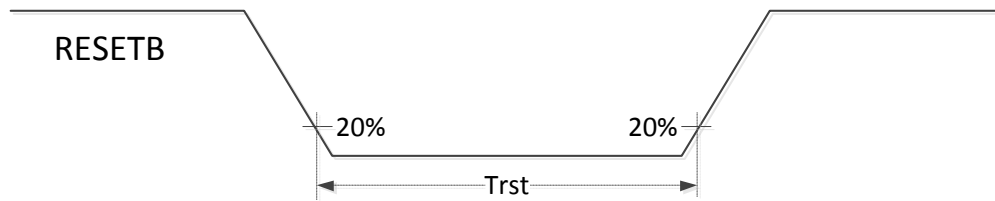
However, in order to avoid the reset noise cause reset, there is a mechanism to judge about whether the reset is needed or not.

The closed interval of Low can be shown as the following.

**(Test condition: VDDIO=1.65V~3.6V, VSS=0V, TA=-20℃~+70℃)**

Parameter	Symbol	Conditions	Spec			Unit
			Min.	Typ.	Max.	
Reset low pulse width	Trst	-	20	-	-	μs

**Table: Reset timing**



**Figure: Reset timing**

## 6 Electro-Optical Specification

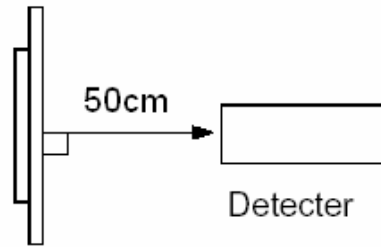
Test condition: IOVCC=1.8V , VCI=2.8V , Ta=25 °C

Item	Symbol	Condition	Value			Unit	Note	
			Min	Typ	Max			
Luminance		$\theta=0^\circ$	210	250	-	cd/m <sup>2</sup>	Note 1	
Uniformity		$\Phi=0^\circ$	80		-	%	Note 2	
Viewing Angle	Left	$\theta_L$	$Cr \geq 200$	80	85	-	Deg.	Note 3
	Right	$\theta_R$		80	85	-		
	Top	$\psi_T$		80	85	-		
	Bottom	$\psi_B$		80	85	-		
Contrast Ratio	CR	$\theta=0^\circ$	5000	10000	-	-	Note 4	
Response Time	Tr+Tf	$\Phi=0^\circ$	-	2	4	ms	Note 5	
Color Coordinate of CIE1931	Red	X	$\theta=0^\circ$ $\Phi=0^\circ$	-	0.66	-	-	-
		Y		-	0.34	-		
	Green	X		-	0.21	-		
		Y		-	0.74	-		
	Blue	X		-	0.13	-		
		Y		-	0.06	-		
	White	X		0.27	0.30	0.33		
		Y		0.28	0.31	0.34		
NTSC Ratio	NTSC	CIE1931	85	100	-	%	-	
Flicker	-	-	-	-30	-	dB	-	
Gamma	-	-	1.9	2.2	2.5		Note 6	
Crosstalk	$\Delta CT$	-	-	-	1.1		Note 7	

### Note 1: Luminance measurement

The test condition is measured on the surface of AMOLED module at 25 °C.

- Measurement equipment CS2000 or similar equipment (Field of view:1deg,Distance:50cm)
- Measuring surroundings: Dark room.
- Measuring temperature: Ta=25 °C.
- Adjust operating voltage to get optimum contrast at the center of the display.



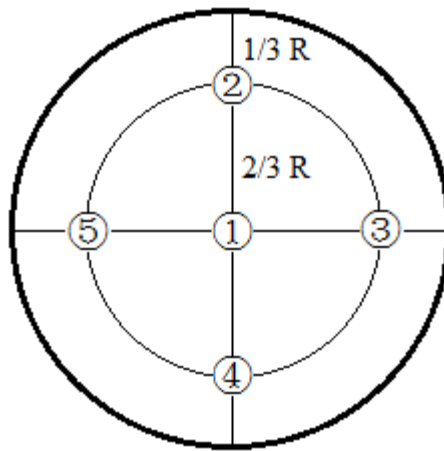
**Note 2: Uniformity**

The luminance uniformity is calculated by using following formula:

$$\Delta Bp = Bp (\text{Min.}) / Bp (\text{Max.}) \times 100 (\%)$$

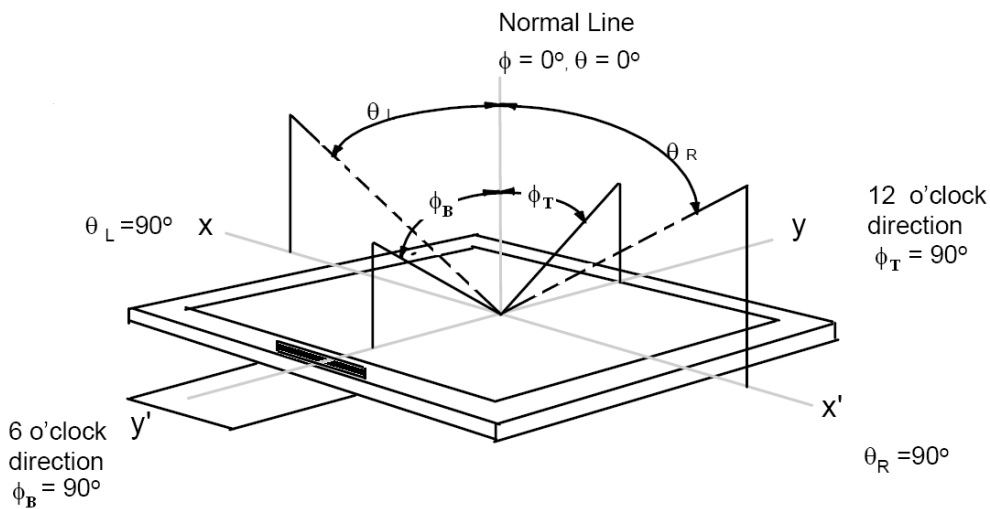
Bp (Max.) = Maximum brightness in 5 measured spots

Bp (Min.) = Minimum brightness in 5 measured spots.



**Note 3: The definition of Viewing Angle**

Refer to the graph below marked by  $\vartheta$  and  $\phi$



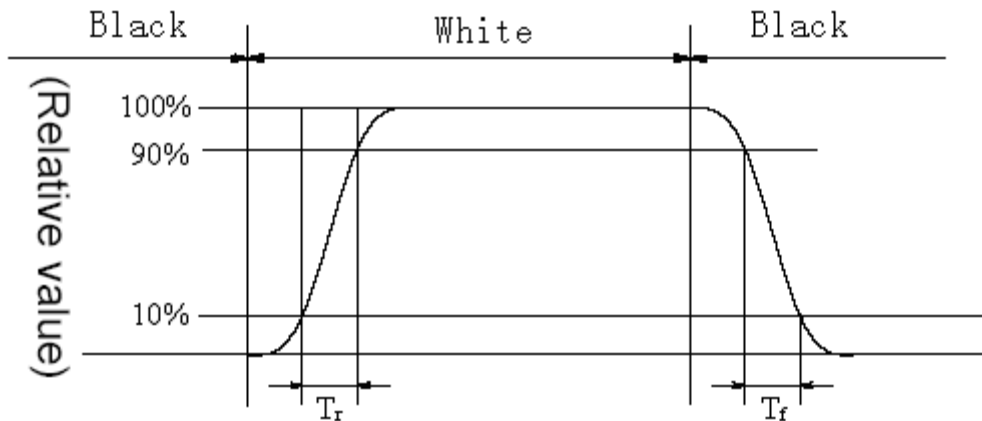
**Note 4: The definition of Contrast Ratio:**

$$\text{Contrast Ratio (CR)} = \frac{\text{Luminance When AMOLED is at "White" state}}{\text{Luminance When AMOLED is at "Black" state}}$$



**Note 5: 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 the 10% and 90% of amplitudes. Refer to figure as below.



**Note 6: Gamma curve**

The whole curve’s tolerance must control within +/-0.3, test the gray scale below:  
8, 16, 25, 33, 41, 49, 58, 66, 74, 82, 90, 99, 107, 115, 123, 132, 140, 148, 156, 165, 173, 181, 189, 197, 206, 214, 222, 230, 239, 247

**Note 7: Crosstalk**

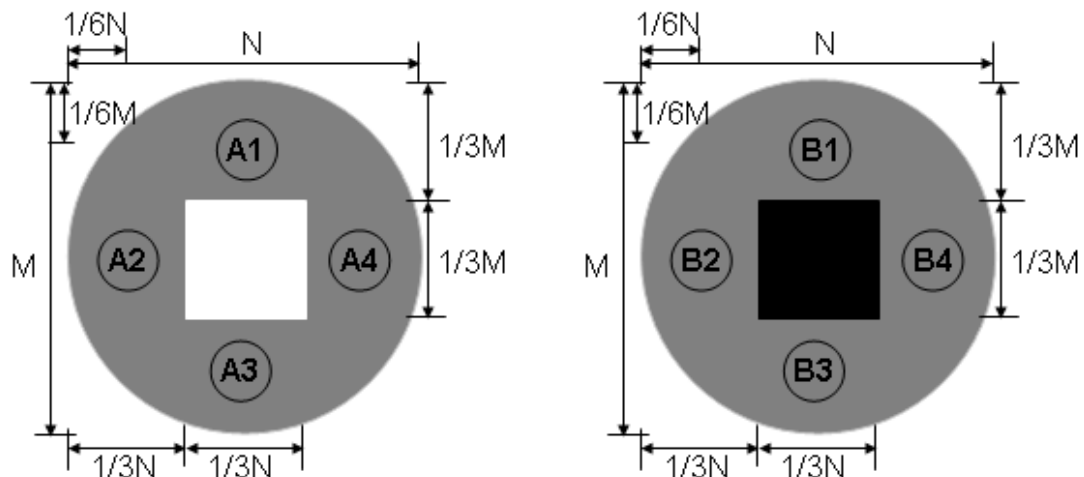
There should be no visible cross-talk in normal direction of the display when the two “Cross-talk Test Patterns” below are loaded.

$\Delta Bp$  (Max.) = Maximum value in  $\Delta Bp1 \sim \Delta Bp4$ .

$\Delta Bp$  (Min.) = Minimum value in  $\Delta Bp1 \sim \Delta Bp4$ .

$\Delta CT = \Delta Bp$  (Max.) /  $\Delta Bp$  (Min.).

$\Delta CT$  must be less than 1.10



**Cross-talk Test Pattern**

## 7 Reliability

### 7.1 Environmental Test

Item	Main spec	No. of failures / No. of examinations	Note
High Temperature Operation	70 °C / 128hours	0/5	
Low Temperature Operation	-20 °C / 128hours	0/5	
High Temperature Storage	80 °C / 128hours	0/5	
Low Temperature Storage	-30 °C / 128hours	0/5	
High Temperature Humidity Operation	60 °C /90%RH 128hours	0/5	
Thermal Shock	-40 °C ~80 °C 0.5hr, 30 cycles	0/5	

### 7.2 Electrical Test

Item	Main spec	Note
Air Discharge	±4kV , 150pF/330Ω (Module level)	5Points, Each 2times. No degradation of OLED performance after this test.
Contact Discharge	±4kV, 150pF/330Ω (Module level)	

### 7.3 Mechanical Test

Item	Main spec	Note
Drop Test	Drop the packing from 75cm height, 3 times for 6-faces, 3-edges and 1-corner	Package
Vibration-proof test	2g, f=10->55->10Hz apply in each of X, Y, and Z direction for 30 min	Package

## 8 Handling Precautions

- 8.1 When cleaning ITO pad, avoid using hard and abrasive material or corrosive solution
- 8.2 Keep module away from direct sunlight or fluorescent light, and keep it at room temperature and humidity
- 8.3 Strong impact & pressure on module and packing is prohibited

- 8.4 Following normal power on/off sequence is necessary for preventing abnormal display or permanent damage to display
- 8.5 Optimal contrast ratio under ideal voltage is AMOLED module's characteristic, hence it is recommended a voltage control function available
- 8.6 Image sticking may occur if an image displays for an extended period of time
- 8.7 When interfered by system's overall mechanical design, an abnormal display may occur
- 8.8 After considering emitting energy, you should plan your design to satisfy EMI standards.
- 8.9 Host side should place a surge-prevent circuit at power trace (ie: VCI, Vddi) to protect AMOLED module.

<b>Storage</b>	Store panel under the temperature and humidity range pre-specified. Direct sunlight exposure or piling should be avoided.
<b>Unpack</b>	Unpack the box with the printed red arrow pointing up.
<b>Handling</b>	<ul style="list-style-type: none"> <li>(1) Use clean sacks or glove to prevent fingerprints and/or stains left on the panel. Extra attention and carefulness should be taken while handling the glass edge.</li> <li>(2) Avoid high voltage and/or static charge</li> <li>(3) Holding the panel instead of the tail at all time.</li> </ul>
<b>Cleaning</b>	<ul style="list-style-type: none"> <li>(1) Use neutral detergent or isopropyl alcohol on a clean soft cloth to clean the panel surface</li> <li>(2) Prevent using any kind of chemical solvent, acidic or alkali solution.</li> </ul>
<b>Installing</b>	<ul style="list-style-type: none"> <li>(1) Excessive force or strain to the panel or tail is prohibited.</li> <li>(2) Retain at least 0.3 mm clearance between panel and display module.</li> <li>(3) Gasket or cushion pads around the edge of the panel may segregate water and/or dust contamination.</li> </ul>
<b>Operating</b>	<ul style="list-style-type: none"> <li>(1) Touch the panel with your finger or stylus only to assure normal operation. Any sharp edged or hard objects are prohibited.</li> <li>(2) Operate the panel in a steady environment. Abrupt variation on temperature and humidity may cause malfunction of the panel.</li> </ul>
<b>Others</b>	<ul style="list-style-type: none"> <li>(1) Keep the panel surface clean. Prevent any kind of adhesive applied on the surface.</li> <li>(2) Avoid high voltage and/or static charge.</li> </ul>

## 9. Appearance Inspection

### 9.1 The environmental condition of inspection

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

- (1) Ambient temperature :  $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$
- (2) Humidity :  $25 \sim 75 \% \text{RH}$
- (3) The visual inspection distance: The visual inspection distance of panel between OLED module and the inspector's sight should be at 30cm distance or more.
- (4) The viewing angle:
  - a) 15 degree to the front surface of display panel in vertical direction.
  - b) 30 degree to the front surface of display panel in horizontal direction.
- (5) Ambient Illumination :
  - a) External appearance inspector : 400 ~ 600 Lux
  - b) Light on inspection : 100 ~ 200 Lux
- (6) ND filter shall be conducted at the distance 2cm to front surface of display panel and shall be conducted at the distance 30cm between the OLED module and eyes of inspectors.
- (7) Picture to check on the basis of EDO provide testing fixture to determine

### 9.2 Classification of defects

The defects are classified as major, minor and critical defects. The definitions of defects are described as below.

#### (1) Major defect

The defect may cause the functional failure, or reduce the usability of the product for its purpose. For example: electrical failure, deformation etc.

#### (2) Minor defect

The defect doesn't reduce the usability of product for its purpose.  
For example: spot defect, mura etc.

The judgment of the major and minor defects shall be according to Item 4.  
 (Classification table of defects)

**(3) Critical defect**

The defect may do harm to personal safety or threaten the customer's property.

9.3 Display inspection screen

Full screen red/Full screen blue/full screen black/full screen white/ 64 grey pattern

9.4 Sampling procedures of each item acceptance table

Defect type	Sampling Procedures	AQL
Major defect	GB/T2828.1-2012 Level II	0.65
Minor defect	GB/T2828.1-2012 Level II	1.5

① Major defect :

The major defect refers to defect which may substantially degrade usability for product applications.

② Minor defect :

The minor defect refers to defect which is not considered to substantially degrade product application, or a defect which deviates from existing standards almost unrelated to the effective use of the product or its operation.

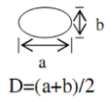
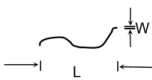
③ Bright dot : One pixel Judged by 2%ND Filter in Black pattern。

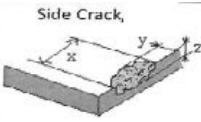
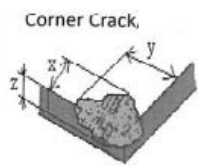
Bright Dot judge base on after second A<sub>0</sub>ing

④ View Area (VA) ±0.3mm, Spot Panel Stain/ Bubble

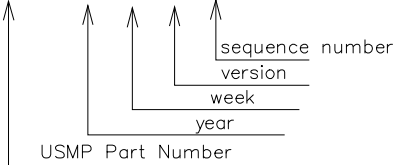
9.5 Cosmetic inspection criteria:

Item	Content	Conditions	Level		
			CR	MA	MI
Dimension	Follow drawing	Dimension out of spec is not allowed	○		

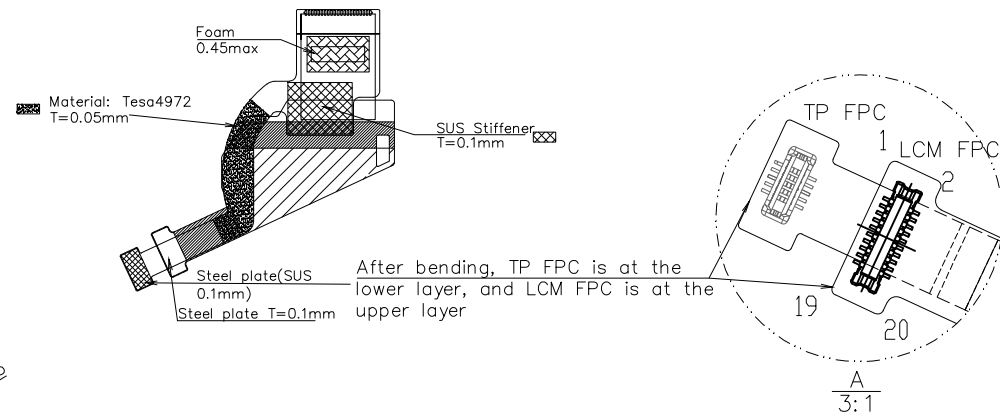
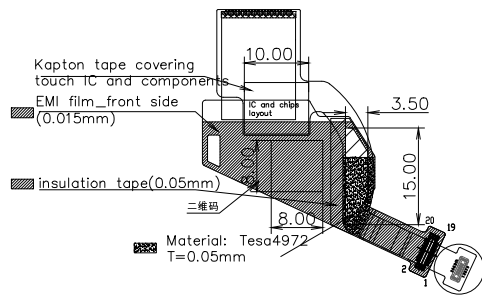
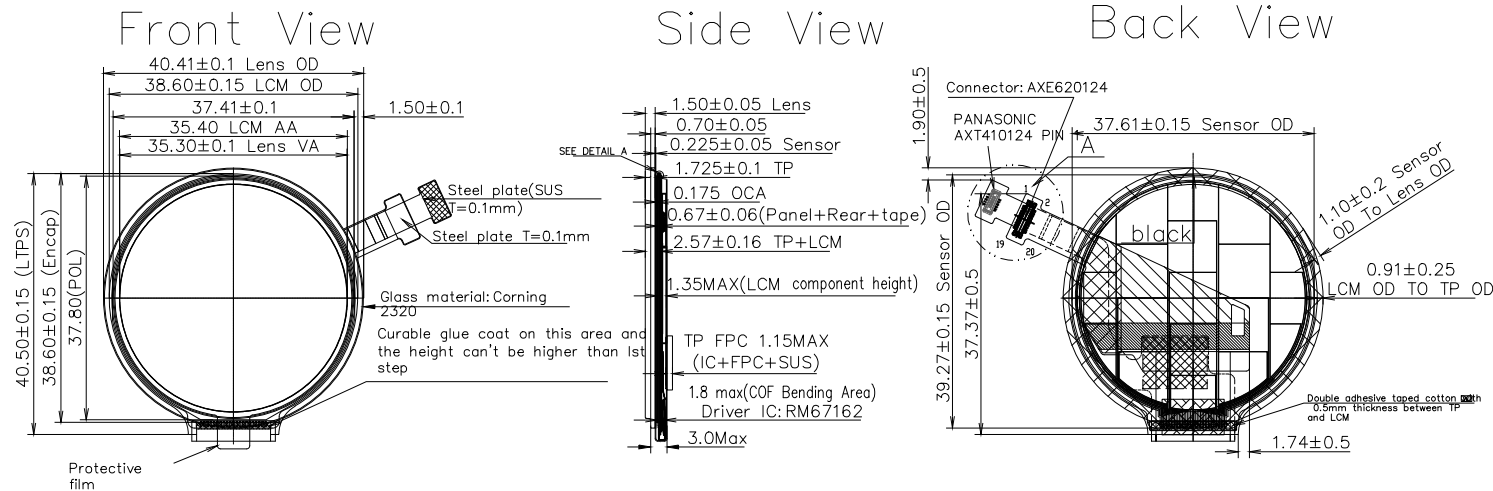
TP function	Function test	TP function testing NG is not allowed	○											
TDM	No display	Not allowance		○										
	Irregular operatio	Not allowance		○										
	Display Dot Defect	<table border="1"> <thead> <tr> <th>Defect</th> <th>Acceptable number</th> </tr> </thead> <tbody> <tr> <td>Bright Dot</td> <td>0</td> </tr> <tr> <td>Dark Dot/ each pattern</td> <td><math>\leq 7</math></td> </tr> </tbody> </table>	Defect	Acceptable number	Bright Dot	0	Dark Dot/ each pattern	$\leq 7$			○			
	Defect	Acceptable number												
	Bright Dot	0												
	Dark Dot/ each pattern	$\leq 7$												
	Spot Defect & Bubble	 <table border="1"> <thead> <tr> <th>Size D(mm)</th> <th>Acceptable number</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.05</math></td> <td>Number Ignore Distance Ignore</td> </tr> <tr> <td><math>0.05 &lt; D \leq 0.1</math></td> <td>Number Ignore Distance over 10mm</td> </tr> <tr> <td><math>0.1 &lt; D \leq 0.2</math></td> <td><math>N \leq 2</math> Distance over 10mm</td> </tr> <tr> <td><math>D &gt; 0.2</math></td> <td>0</td> </tr> </tbody> </table>	Size D(mm)	Acceptable number	$D \leq 0.05$	Number Ignore Distance Ignore	$0.05 < D \leq 0.1$	Number Ignore Distance over 10mm	$0.1 < D \leq 0.2$	$N \leq 2$ Distance over 10mm	$D > 0.2$	0		
Size D(mm)	Acceptable number													
$D \leq 0.05$	Number Ignore Distance Ignore													
$0.05 < D \leq 0.1$	Number Ignore Distance over 10mm													
$0.1 < D \leq 0.2$	$N \leq 2$ Distance over 10mm													
$D > 0.2$	0													
Scratches & materials (line shape)	 <table border="1"> <thead> <tr> <th>Width(mm),Length(mm)</th> <th>Acceptable number</th> </tr> </thead> <tbody> <tr> <td><math>W \leq 0.02</math></td> <td>Ignore</td> </tr> <tr> <td><math>0.02 &lt; W \leq 0.03, L \leq 2.0</math></td> <td>1</td> </tr> <tr> <td><math>0.03 &lt; W \leq 0.05, L \leq 1.0</math></td> <td>1</td> </tr> <tr> <td><math>W &gt; 0.05</math></td> <td>0</td> </tr> </tbody> </table>	Width(mm),Length(mm)	Acceptable number	$W \leq 0.02$	Ignore	$0.02 < W \leq 0.03, L \leq 2.0$	1	$0.03 < W \leq 0.05, L \leq 1.0$	1	$W > 0.05$	0			○
Width(mm),Length(mm)	Acceptable number													
$W \leq 0.02$	Ignore													
$0.02 < W \leq 0.03, L \leq 2.0$	1													
$0.03 < W \leq 0.05, L \leq 1.0$	1													
$W > 0.05$	0													
Discoloration /panel stain	Judged by 2% ND filter in 255 grey pattern (R/G/B/W). If its limit sample is needed , it can be fixed mutually with a customer.			○										
Mura	Judged by 2% ND filter in 64 grey pattern (R/G/B/W). If its limit sample is needed , it can be fixed mutually with a customer.			○										

	FPC	The appearance of the FPC phenomenon does not affect the function and no reliability ignored.		○	
	Crack	Not allowance		○	
	 <p>Side Crack,</p>	1、 $Z \leq T, Y \leq 0.4, X \leq 2\text{mm}$			○
	 <p>Corner Crack,</p>	1、 $Z \leq T, Y \leq 0.4, X \leq 2\text{mm}$ 2、 $Z \leq T, Y \leq 2, X \leq 0.4\text{mm}$			○

Two-dimensional code number: USMP-A014-040040MCM-A1 YY WW OO XXXX

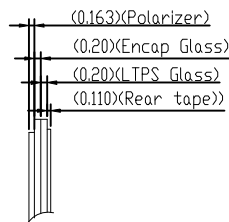


No	Date	Design update content	Version	Owner
10	2017-09-01	Update the LCM connector	LINYM	
11	2017-09-13	Modify the TP FPC element area thickness	LINYM	Wangjuan
12	2017-12-09	Increase the double-sided adhesive tap	LINYM	Wangjuan
13	2018-01-03	Driver IC model change	LINYM	Wangjuan
14	2018-04-27	Add Annotations to Drawings	LINYM	Wangjuan
15	2018-05-07	modification cover glass strength	LINYM	
06	2017-07-05	Modify CG chamfering size	LINYM	
07	2017-08-15	Increase component area thickness control and the stacking sequence of FPC after bending	LINYM	
08	2017-08-16	Modify the SUS thickness to 0.1mm Add two-dimensional code	LINYM	
09	2017-08-28	Remove the FPC steel sheet, reinforce the double-sided adhesive and increase the LCM connector type	LINYM	

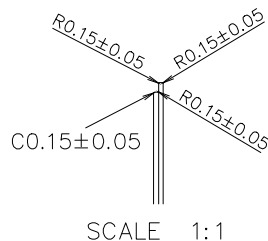


NO.	Symbol
1	ELVSS1
2	ELVDD1
3	ELVSS2
4	ELVDD2
5	ELVSS3
6	ELVDD3
7	VCI
8	GND2
9	VDDIO
10	DSI_D0N
11	GND1
12	DSI_D0P
13	TE
14	GND3
15	VFP
16	DSI_CLKN
17	REST
18	DSI_CLKP
19	SMRE
20	GND4

PIN	DEFINITION
1	GND
2	SDA
3	SCL
4	RST
5	INT
6	VDD 2.8V
7	NC
8	NC
9	NC
10	NC



DETAIL A  
SCALE 5:1



TP Stackup

CG	1.5mm
OCA	0.1mm
ITO Film	0.125mm



Name	Date	Scale	1:1	unit	mm
Design	LYM	2018.05.07	Model No.:	USMP-A014-040040MCM-A1	
Checked			Customer No.:		
Approved			PAGE 1	version	V15.0