



Approved Specification

Rev:A0

MODEL NO. : VSX392A101GG

ISSUED DA. : 2020-08-24

Proposed by			Customer's Approval
Designed	Checked	Approved	

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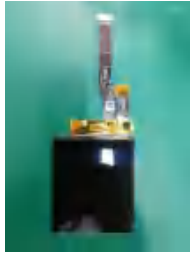
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**1 Record of Revisions**

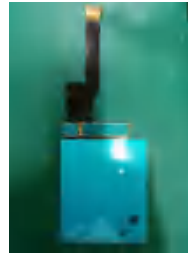
Rev	Date	Contents of Revision Change	Editor
A0	2020/08/24	Draft	Wangchun

2 General Description

2.1 General Feature



[Front]



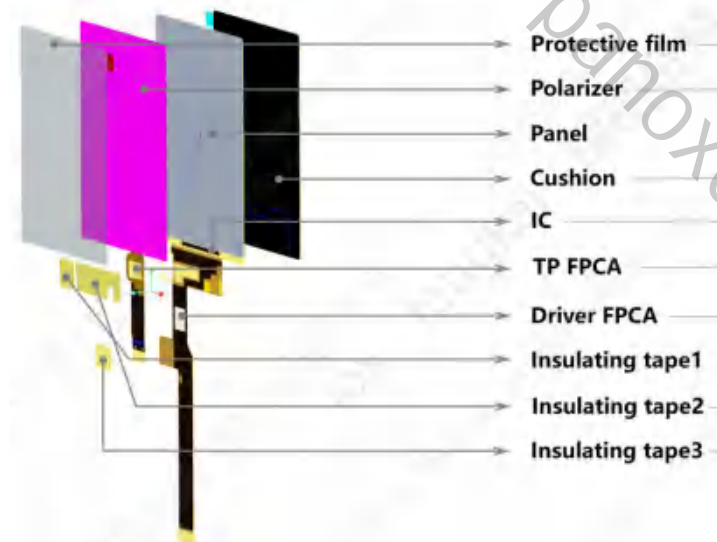
[Rear]

No	ITEM	Specification	Remark
1	Display Method	Active Matrix TFT	-
2	Display Mode	AMOLED	-
3	Display Resolution	1080(H) × 1240(V)	-
4	Active Area (mm)	65.448 (W) × 75.144 (H)	-
5	Screen Size (inch)	3.92"	-
6	Pixel Pitch (mm)	0.0606(H) × 0.0606(V)	RGB
7	PPI (Pixel Per Inch)	419PPI	-
8	Display Color	16.7M Colors	-
9	Outside Dimension (mm)	67.248 (W)×79.874 (H)×0.699(D)	Panel outside (Excluding Cover lens)
10	Viewing Angle	Wide view (85°/85°/85°/85°)	(U/D/R/L)
11	Weight (g)	13g	
12	Driver IC	RM692C9	COG Package
13	Interface	MIPI	CMD Mode, 4Lane

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2.2 Module Part List

No.	Name		Spec	Maker
1	OLED		67.248×79.874×0.465t	Visionox
2	POL		66.948×76.394×0.104t	Nitto
3	Cushion	Foam	66.648×79.274×0.1t	S&K
		Cu	66.648×79.274×0.03t	YUNQING
4	Main FPC		103.95×49.02×0.13t	KWONG
5	TP FPC		43.72×14.51×0.13t	KWONG
6	Insulation Tape1		10.96×9.92×0.05t	YINGSHUN
7	Insulation Tape2		34.42×10×0.05t	YINGSHUN
8	Insulation Tape3		11.9×8.1×0.05t	3M
9	Main FPC Fixing Tape		9.68×36.494×0.05t	JINGHUA
10	TP FPC Fixing Tape		9.622×12.723×0.05t	JINGHUA
11	Driver IC ACF		Secret-- www.panoxdiplay.com	HITACHI
12	Driver FPCA ACF			
13	TP FPCA ACF			
14	T-FOF ACF			



2.3 FPCB Part list & Structure



Top Layer



Bottom Layer

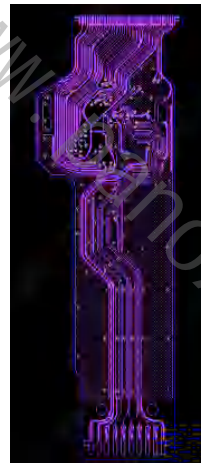
No1	Name	Spec	Maker	EA	Note
1	FPC	57.80×75.8 1×0.15t	KINWONG	1	
2	Capaci tor	1uF, 16V, ±20%, 0201	Murata/TAIYO YUDEN/TDK/ KYOCERA	6	C1,C2,C3,C4,C5,C6
3	Capaci tor	1uF, 16V, ±20%, 0402		2	C22,C23
4	Capaci tor	2.2uF, 10V, ±20%, 0201		9	C7,C8,C9,C12,C13,C 14,C15,C16,C30
5	Capaci tor	2.2uF, 16V, ±10%, 0402		8	C10,C11,C17,C18,C1 9,C20,C21,C25
6	Capaci tor	2.2uF, 10V, ±20%, 0402		4	C26,C27,C28,C29
7	Capaci tor	22nF, 6.3V, ±10%, 0201		1	C24
8	Diode	ESD, DFN1006- 2L/SOD882 , 30V	VAKOS,ADSBD2FD30V01/KE G,KS52130F2- HXC/RS,RSX5362DB	1	D1
		ESD, 0201, 3.3V	Amazing,AZ5A83- 01B/DIODES,D3V3L1B2LP3/L RC,LESD11D3.3CBT5G	7	D2,D3,D4,D5,D6,D7, D8

		ESD, 0402, 7.9/8V	semtech,uClamp0811ZV/DIODES,D8V0H1B2LP/LRC,LESD8D8.0T5G	1	D9
		ESD, 0402, 5/5.5V	Amazing,AZ5825-01F/DIODES,D5V0H1B2LP/LRC,LESD8D5.0CET5G	2	D10,D11
		ESD, 0201, 30V	Innochips (IMG0330C101MFR)	1	D12
9	IC	Flash Memory, 16M	Winbond/GigaDevice	1	CON1
10	Connector	BM23PF0.8-44DP-0.35V(43)	HIROSE	1	CON2
11	Resistance	20kohm, 0201	Yageo	1	R7

2.4 Touch FPCB Partlist & Structure



Top Layer



Bottom Layer

No1	Name	Spec	Maker	EA	Note
1	TP FPC	14.51×43.72×0.13t	KINWONG	1	
2	Capacitor	2.2uF, 10V, ±20%, 0201	Refer to (1)	3	C1, C3, C7
3	Capacitor	1uF, 10V, ±20%, 0201		1	C2
4	Capacitor	1uF, 16V, ±20%, 0201		1	C4
5	Capacitor	220nF, 16V, ±10%, 0201		2	C5, C6
6	Diode	ESD, 0201, 30V	Innochips(IMG0330C101MFR)	1	D12
7	Resistance	10KΩ, ±1%, 0201	Yageo	1	R1
8	IC	Touch IC SW42000 BGA116, 6×6×0.5mm	Silicon Works	1	U1

(1) Capacitor Maker : TAIYO YUDEN, MURATA, KYOCERA, Walsin

2.5 Optical Characteristics

Ta=25 °C

Parameter	Symbol	Values			Units	Notes
		Min.	Typ.	Max.		
Luminance of white	L _{WH}	494	520	546	cd/m ²	1, 5
Luminance(AOD mode)			50		cd/m ²	
Luminance(HBM)		570	600	630	cd/m ²	
Contrast Ratio	CR	90K	100K	-	-	1, 2
Uniformity of luminance (with L/G)	-	80	-	-	%	5

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Visionox Technology Inc.

Model No. VSX392A101GG

Color Uniformity		$\Delta u'v'$	-	-	0.012	-	10
CIE color coordinates	White	Wx	0.289	0.299	0.309	-	5
		Wy	0.3052	0.3152	0.3252		
	Red	Rx	0.650	0.680	0.710		
		Ry	0.285	0.315	0.345		
	Green	Gx	0.210	0.250	0.290		
		Gy	0.670	0.710	0.750		
	Blue	Bx	0.110	0.140	0.170		
		By	0.017	0.047	0.077		
Color Gamut (CIE1931)		Gamut	-	100	-	%	
Crosstalk		-	-	-	2	%	4
Flicker		-	-	-	-40	dB	6
Life time(T95)			260h@420nit (B10)			Hrs	9
Residual image					max. 80s (Lv.2)	Sec.	8
Instant Residual image					10	Sec.	7
Gamma			2.0	2.2	2.4		
Viewing Angle (Color)		$\Delta u'v'$			0.02		11
Viewing Angle(CR > 10) (R/L/U/D)		θ x		85	-	degree	3

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2.6 Optical Specifications (Note)

Note 1 : Optical Characteristic Measurement System

- Surface luminance is the center point across the OLED surface 50cm from the surface. Optical characteristics are determined after the unit has been 'ON' and stable for 5 minutes in a dark environment at Room temperature.

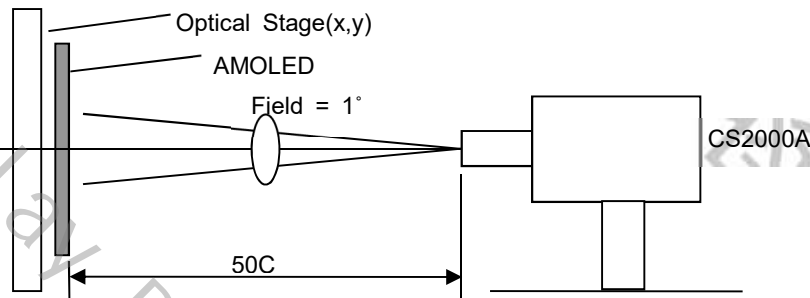


Fig. 1 Optical Characteristic Measurement Equipment and Method

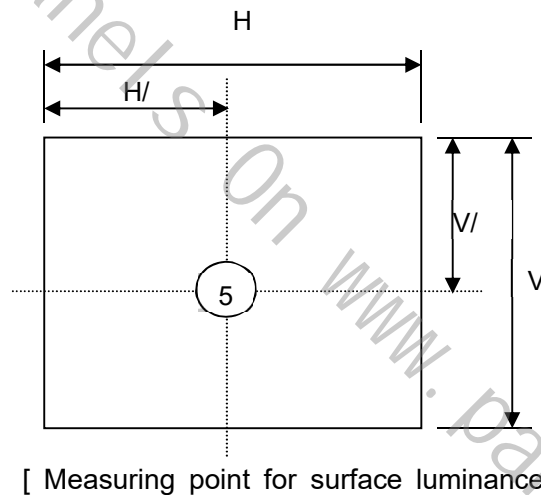


Fig. 2 Luminance

Note 2. Contrast Ratio (CR) is defined mathematically as

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

Note 3: Viewing Angle

The definition of viewing angle range is that the contrast ratio is higher than CR 10.(CR >10)

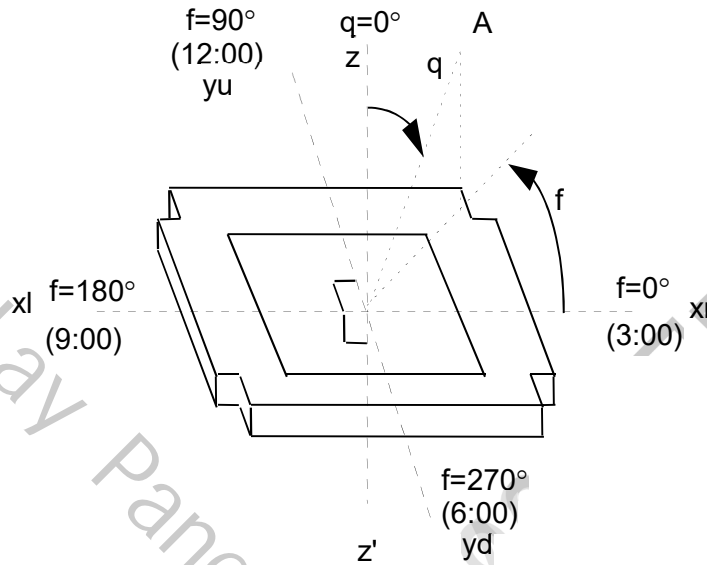
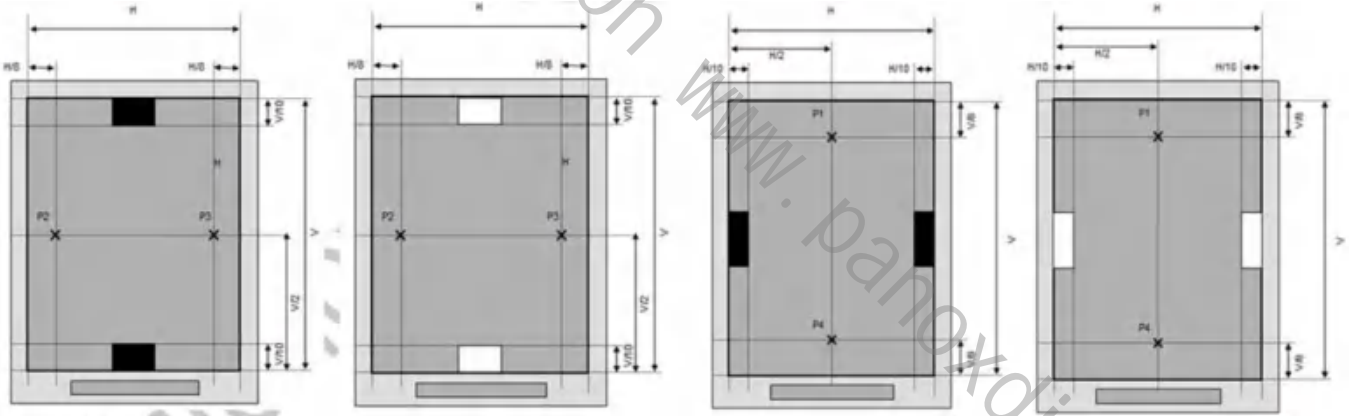


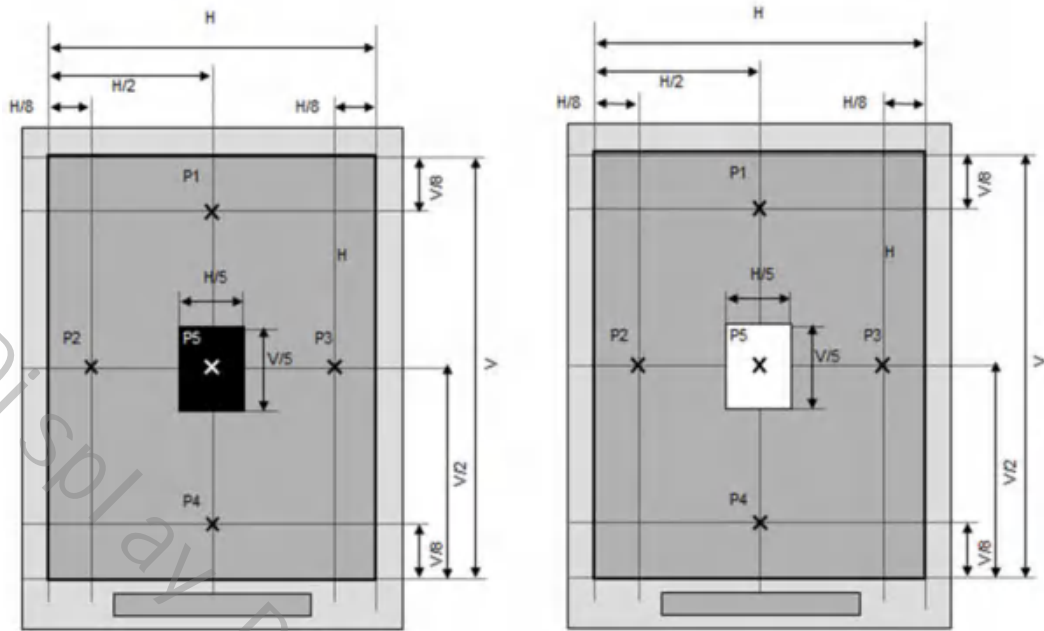
Fig. 4 Viewing Angle

Note 4. Cross talk



Horizontal C/T reference A point

Vertical C/T reference A point



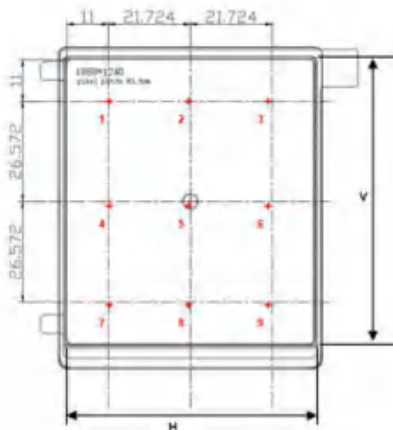
Crosstalk measurement points (B point)

A : Luminance for P1 ~ P4 with all 127 gray pixels
B : Luminance for P1 ~ P4 with 127 gray when the white box is applied

$$\text{Crosstalk [\%]} = \text{Maximum} \left[\text{Absolute} \left(\frac{A - B}{A} \right) \right]$$

Note 5: Measurement of Luminance

- * Uniformity : 9Point
- * Brightness / Chromaticity : Center Point



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Note 6: Flicker

The flicker level should be measured with G127 gray image. The flicker is essentially a ratio the powers in the frequency spectrum at 30Hz(P_x) and 0 Hz(P_0 -DC level.)



$$F=20\text{Log}(P_x/P_0)$$

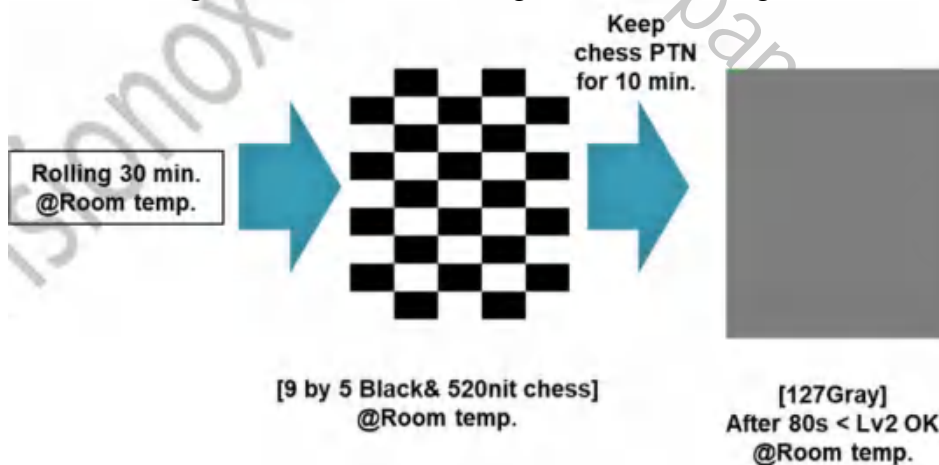
Note 7: Instant residual image

No residual image allowed after burning time of test image



Note 8: Residual image

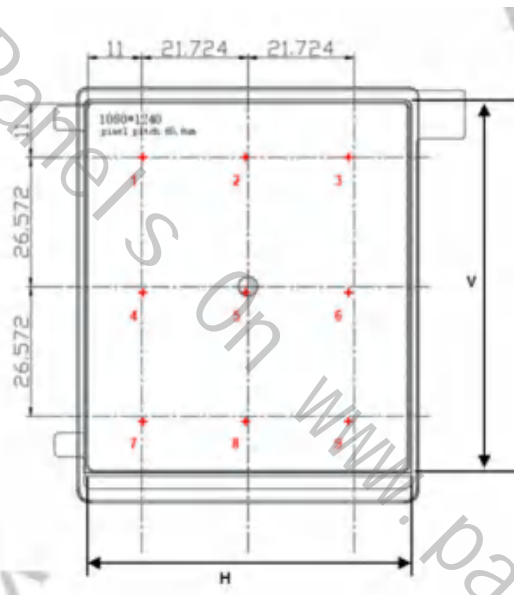
No residual image allowed after burning time of test image



Note 9: Life time(T95) @Room temp.

[Measurement Procedure]

1. After display on, carry out display aging for 30 minutes
(Check the normal operation of display)
2. Measure White Luminance at 1 center point
(1 Point = P5 in the below picture)
3. Keep the White PTN operation (420nit) for 330Hrs at Room temp.
4. After display off, keep the display off state for 24Hrs
5. After display on, carry out display aging for 30 minutes
6. Measure White Luminance at 1 center point
: Calculate the Ratio(%) of luminance according to the below formula
and judge the OK/NG



[T95 Judgment Formula]

$$\text{Ratio}(\%) = \frac{\text{Luminance}(t)}{\text{Luminance}(t_0)} \times 100 > 95\%$$

T95 measurement points

Note 10: Color Unifor

Total 64 measure points should set as shown in the following figures (255gray pattern)

The color uniformity ($\Delta u'v'$) is calculated by using following formula:

$\Delta u'v' = \text{Square Root}((u_2' - u_1')^2 + (v_2' - v_1')^2)$, (CIE1976)

$\text{Max}(\Delta u'v') \leq 0.012$ (the max $\Delta u'v'$) value between two random point of 64 points



Note 11: Viewing Angle (Color)

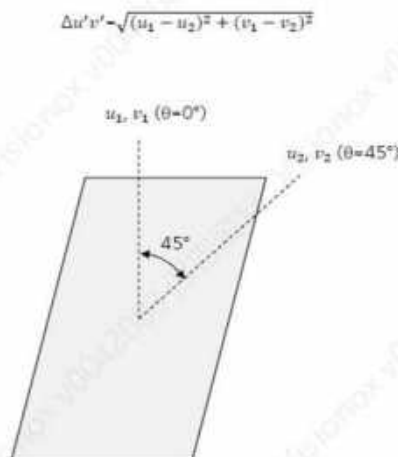
All measurements are done in 255gray pattern

Measure with Eldim equipment

Measure at $\theta=0^\circ (u_1, v_1)$, $\theta=45^\circ (u_2, v_2)$

The viewing angle ($\Delta u'v'$) is calculated by using following formula

$\Delta u'v' = \text{Square Root}((u_2' - u_1')^2 + (v_2' - v_1')^2)$, (CIE1976)



3 Electrical Characteristic

3.1 Maximum Ratings

Ambient Temperature : $T_a = 25 \pm 5^\circ\text{C}$

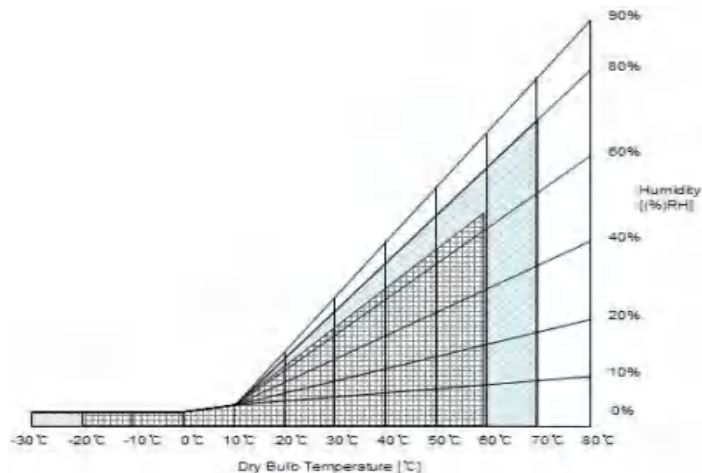
The following are maximum values which, if exceeded, may cause operation or damage to the unit

Item		Symbol	MIN	MAX	Unit
Display Power	Logic Power supply	VCI	-0.3	5.5	V
	Analog Power supply	VDDI	-0.3	5.5	V
	Analog Power supply	AVDD	-0.3	8.0	V
	Positive Power Input	ELVDD	-	5.0	V
	Negative Power Input	ELVSS	-5.4	-	V
TSP Power	Logic Power supply	TSP_DVDD	-0.3	2.22	V
	Analog Power supply	TSP_AVDD	-0.3	4.0	V

Parameter	Symbol	Values		Units	Notes
		Min	Max		
Operating Ambient Humidity	H_{OP}	10	90	%RH	*1), *2)
Operating Ambient Temperature	T_{OP}	-30	70	$^\circ\text{C}$	*1), *2)
Storage Humidity	H_{STG}	10	90	%RH	*1), *2)
Storage Temperature	T_{STG}	-40	80	$^\circ\text{C}$	*1), *2)


*1) Temp. $\leq 60^\circ\text{C}$, 90% RH MAX

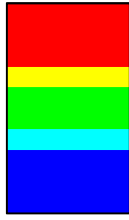


*2) Temp. $> 60^\circ\text{C}$, Absolute humidity shall be less than 90% RH at 60°C





3.2. Electrical Characteristic

Ambient Temperature : Ta = 25±5°C

Characteristics		Symbol	Min	Typ.	Max	Unit	Note
Logic Power Supply		VDDIO	1.65	1.8	1.95	V	
Analog Power Supply		VCI	2.5	3.0	3.6	V	
Analog Power Supply		AVDD	-	7.0	-	V	
Supply Voltage		ELVDD	-	4.6	-	V	
		ELVSS	-	-3.0	-	V	
TP Power supply for logic circuits		TP_DVDD	1.62	1.8	1.98	V	
TP Power supply Input		TP_AVDD	3.0	3.3	3.6	V	
Frame Frequency		Ff	57	60	63	Hz	
Current Consumption		I _{VDDIO}	-	38.6	56.1	mA	Note 1), 2), 3)
		I _{VCI}	-	2.9	4.3	mA	
		I _{AVDD}	-	9.4	15.0	mA	
		I _{ELVDD}	-	126.3	179.7	mA	
		I _{ELVSS}	-	126.3	179.7	mA	

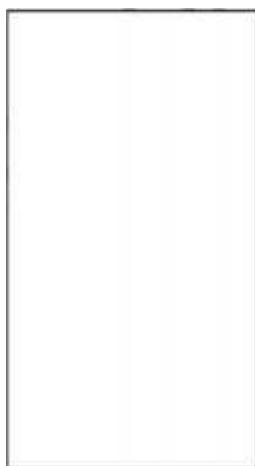
Power Consumption		I _{VDDIO}	-	43.9	-	mA	
		I _{VCI}	-	3.4	-	mA	
		I _{AVDD}	-	15.1	-	mA	
		I _{ELVDD}	-	54.9	-	mA	
		I _{ELVSS}	-	54.9	-	mA	
		P _{VDDIO}	-	69.5	101.0	mW	
		P _{VCI}	-	8.7	12.9	mW	
		P _{AVDD}	-	65.8	105.0	mW	
		P _{ELVDD}	-	581.0	820.2	mW	
		P _{ELVSS}	-	378.9	539.1	mW	
		Total		1103.9	1578.2	mW	
		P _{VDDIO}	-	79.2	-	mW	
		P _{VCI}	-	10.2	-	mW	
		P _{AVDD}	-	105.7	-	mW	
		P _{ELVDD}	-	164.7	-	mW	
		P _{ELVSS}	-	252.6	-	mW	
		Total	-	612.2	-	mW	

Characteristics		Symbol	Min	Typ.	Max	Unit	Note
Current Consumption		I _{VCI}	-	3.4	-	mA	Just for reference, no control
		I _{VDDIO}	-	37.3	-	mA	
		I _{AVDD}	-	8.8	-	mA	

Power Consumption		P_{VCI}	-	10.2	-	mW
		P_{VDDIO}	-	67.2	-	mW
		P_{AVDD}	-	61.6	-	mW
		Total	-	139.0	-	mW

Note :

- 1) The recommended operating conditions refers to a range in which operation of this product is guaranteed. Should this range is exceeded, the operation cannot be guaranteed even if the values may be without the absolute maximum ratings.
Accordingly, please make sure that the module is used within this range.
And these current values are measured under the condition that all device are stopped, each component is stable and logic signal is input.
- 2) All the unused input terminals have to be connected to GND or leave it open.
Please select appropriate one which meet the function required by unused terminal.
- 3) Power Consumption—normal mode
 - ① All kinds of specifications and functions are measured and optimized with the below test condition
 - Input VCI : 3.0V / VDDIO :1.8V / ELVDD 4.6V / ELVSS -3.0V / AVDD 7.0V
 - All image enhancement IP off
 - ② The patterns of measuring current/power consumption are "Full white image" , "40% on image" and " AOD black image".



< Full White >



< 40% on >



< AOD black >

3.2. FPC PAD Pin Assignment (COG)

No	NAME	No	NAME	No	NAME	No	NAME	No	NAME	No	NAME	No	NAME	No	NAME	No	NAME
1	D_R	38	DVSS	75	C51P	112	HSSI_D 0_P	149	I_SDA	186	VGMP	223	OVSS_I C	260	VGLR	297	D_G
2	D_G	39	AVSS	76	C51P	113	HSSI_D 0_P	150	I_SPW P	187	VGSP	224	OVDD_ IC	261	TE_R	298	D_R
3	D_B	40	AVSS	77	VCL	114	HSSI_D 0_N	151	I_SPHO LD	188	VREF	225	OVDD_ IC	262	DVDD		
4	D_SW3	41	AVSS	78	VCL	115	HSSI_D 0_N	152	PSWAP	189	AVSS	226	MTP_P WR_R	263	DVDD		
5	D_SW1	42	DVDD	79	VCL	116	VSSAM	153	DSWAP [2]	190	AVSS	227	VDDR	264	VDDI		
6	D_SW2	43	VGHR	80	C41N	117	VSSAM	154	DSWAP [1]	191	AVDD	228	VDDR	265	VEQ_S D		
7	SIN_R	44	VGHR	81	C41N	118	HSSI_C LK_P	155	DSWAP [0]	192	AVDD	229	VSSR	266	PASS3		
8	SCK1_ R	45	VGLR	82	C41N	119	HSSI_C LK_P	156	RSTN	193	DB_MO DE[2]	230	VSSR	267	PASS3		
9	SCK2_ R	46	VGLR	83	C41P	120	HSSI_C LK_N	157	I_DISS	194	DB_MO DE[1]	231	VSSR	268	FBD_L0		
10	ECK1_ R	47	VGL	84	C41P	121	HSSI_C LK_N	158	I_SPDI	195	DB_MO DE[0]	232	AVSS	269	FBD_L1		
11	ECK2_ R	48	VGL	85	C41P	122	VSSAM	159	I_SPDO	196	TEST[1 6]_PCD	233	AVSS	270	DUMM Y(window w)		
12	EM_12 40	49	VGL	86	VSSA	123	VSSAM	160	I_SPCK	197	TEST[1 5]_ERR _FG	234	AVSS	271	VREFN		
13	S_1240	50	VGL1	87	VSSA	124	HSSI_D 1_P	161	I_SPCS	198	TEST[1 3]	235	AVDD	272	PVGL		
14	D_MUX 2	51	C24N	88	VDDA	125	HSSI_D 1_P	162	AVDD	199	DUMM Y	236	AVDD	273	PVGH		
15	SW_AT	52	C24N	89	VDDA	126	HSSI_D 1_N	163	AVDD	200	DUMM Y	237	C21N	274	ELVDD		
16	DUMM Y	53	C24N	90	DVSS	127	HSSI_D 1_N	164	AVSS	201	DUMM Y	238	C21N	275	ELVDD		
17	ELVSS	54	C24P	91	DVSS	128	VSSAM	165	AVSS	202	TEST[1]	239	C21N	276	ELVDD		
18	ELVSS	55	C24P	92	DVSS	129	VSSAM	166	AVSS	203	VCC	240	C21P	277	ELVDD		
19	ELVSS	56	C24P	93	DVDD	130	HSSI_D	167	VSSI	204	DVSS	241	C21P	278	DUMM		

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Model No. VSX392A101GG

							2_P								Y		
20	ELVSS	57	C23N	94	DVDD	131	HSSI_D 2_P	168	VSSI	205	DVSS	242	C21P	279	ELVSS		
21	DUMM Y	58	C23N	95	DVDD	132	HSSI_D 2_N	169	VDDI	206	DVSS	243	C22N	280	ELVSS		
22	ELVDD	59	C23N	96	VCC	133	HSSI_D 2_N	170	VDDI	207	DVDD	244	C22N	281	ELVSS		
23	ELVDD	60	C23P	97	VCC	134	VSSAM	171	BIST_E N	208	DVDD	245	C22N	282	ELVSS		
24	ELVDD	61	C23P	98	VCC	135	VSSAM	172	AGING _EN	209	DVDD	246	C22P	283	DUMM Y		
25	ELVDD	62	C23P	99	VDDAM	136	DVSS	173	OLED_ EN	210	VCC	247	C22P	284	SW_AT		
26	PVGH	63	AVDD	100	VDDAM	137	AVSS	174	DVSS	211	VCC	248	C22P	285	D_MUX 1		
27	PVGL	64	AVDD	101	VDDAM	138	AVSS	175	SWIRE	212	VCC	249	VGH	286	S_1240		
28	VREFN	65	VDDB	102	MVDDA	139	AVSS	176	VSSA	213	VREFP 5	250	VGH	287	EM_12 40		
29	DUMM Y(window w)	66	VDDB	103	MVDDA	140	DVDD	177	DVDD	214	DUMM Y	251	VGHR	288	ECK2_ L		
30	FBD_R 0	67	VSSB	104	VSSAM	141	AVDD	178	VSSA	215	VREFN 5	252	VGHR	289	ECK1_ L		
31	FBD_R 1	68	VSSB	105	VSSAM	142	VDDI	179	IM1	216	VREFN 5	253	DVSS	290	SCK2_ L		
32	PASS1	69	VSSB	106	HSSI_D 3_P	143	VSSI	180	IM0	217	VCL	254	VDDB	291	SCK1_ L		
33	PASS1	70	AVEE	107	HSSI_D 3_P	144	VSSI	181	ANA_T EST[1]	218	VCL	255	VDDB	292	EIN_L		
34	MTP_P WR_L	71	AVEE	108	HSSI_D 3_N	145	DUMM Y	182	ANA_T EST[0]	219	AVEE	256	VSSB	293	D_SW2		
35	VDDI	72	AVEE	109	HSSI_D 3_N	146	VSSI	183	VDDA	220	AVEE	257	VSSB	294	D_SW1		
36	VDDI	73	C51N	110	VSSAM	147	BSTM[2]	184	VDDA	221	AVEE	258	VSSB	295	D_SW3		
37	TE_L	74	C51N	111	VSSAM	148	I_SCL	185	VDDA	222	OVSS_I C	259	VGLR	296	D_B		

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3.3. Pin Description (FPCB Connector)

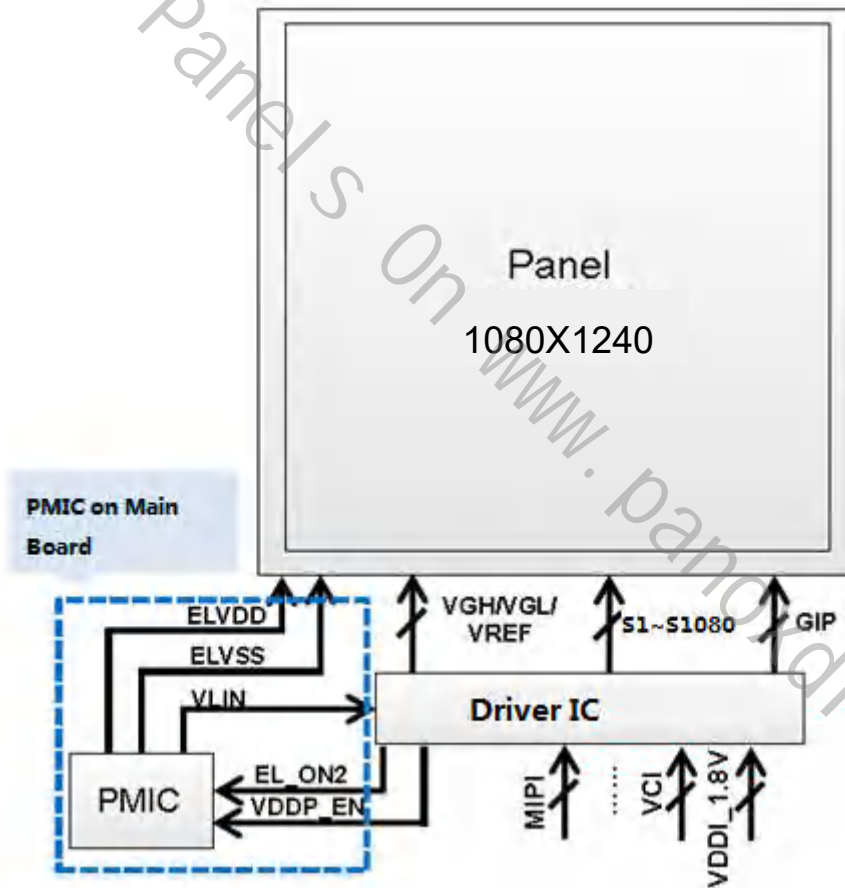
No	Symbol	I/O	Description
1	VCI	P	Power supply for display analog circuits
2	GND	GND	Ground
3	VDDIO	P	Power supply for interface system except MIPI interface
4	RSTX	I	Display reset. Active low.
5	TE	O	Sync Signal for preventing Tearing Effect
6	ERR_FG	O	Error status of MIPI's HSDT
7	NC	/	NC
8	GND	GND	Ground
9	AVDD	P	Power supply for Analog system
10	GND	GND	Ground
11	ELVDD	P	Positive power supply for EL
12	ELVDD	P	Positive power supply for EL
13	ELVDD	P	Positive power supply for EL
14	GND	GND	Ground
15	ELVSS	P	Negative power supply for EL
16	ELVSS	P	Negative power supply for EL
17	ELVSS	P	Negative power supply for EL
18	GND	GND	Ground
19	TP_INT	I	Interrupt signal for TP
20	TP_RESET	I	Reset Pin for TP, Active low
21	TP_SDA	I/O	SDA pin for TP
22	TP_SCL	I	SCL pin for TP
23	GND	GND	Ground
24	VPP	P	Power supply for MTP Programming or Erase. If it is not used, please let it open
25	TP_1P8	P	Digital Power for TP
26	TSP_AVDD	P	Analog Power for TP
27	GND	GND	Ground
28	D3N	I	MIPI data lane
29	D3P	I	MIPI data lane
30	GND	O	Control signal for power IC
31	D0N	I	MIPI data lane
32	D0P	I	MIPI data lane
33	GND	GND	Ground
34	CLKN	I	MIPI clock lane

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35	CLKP	I	MIPI clock lane
36	GND	GND	Ground
37	D1N	I	MIPI data lane
38	D1P	I	MIPI data lane
39	GND	GND	Ground
40	D2N	I	MIPI data lane
41	D2P	I	MIPI data lane
42	GND	GND	Ground
43	VDDP_EN(OLED_EN)	O	Power IC enable control pin for AVDD
44	EL_ON2(SWIRE)	O	Power IC enable control pin for ELVDD/ELVSS

3.4 Block Diagram

3.4.1 Display



3.5 Timing Characteristics

3.5.1 MIPI interface DC characteristic

Parameter	Description	Min	TYP	Max	Units
VCMRX(DC)	Common-mode voltage for HS receiver	70		330	mV
WIDTH	Differential input high threshold			70	mV
VIDTL	Differential input low threshold	-70			mV
VIHHS	Single-ended input high voltage			460	mV
VILHS	Single-ended input low voltage	-40			mV
ZID	Differential input impedance	80	100	125	Ω

Table 3-1 DC Characteristics of MIPI HS Receiver

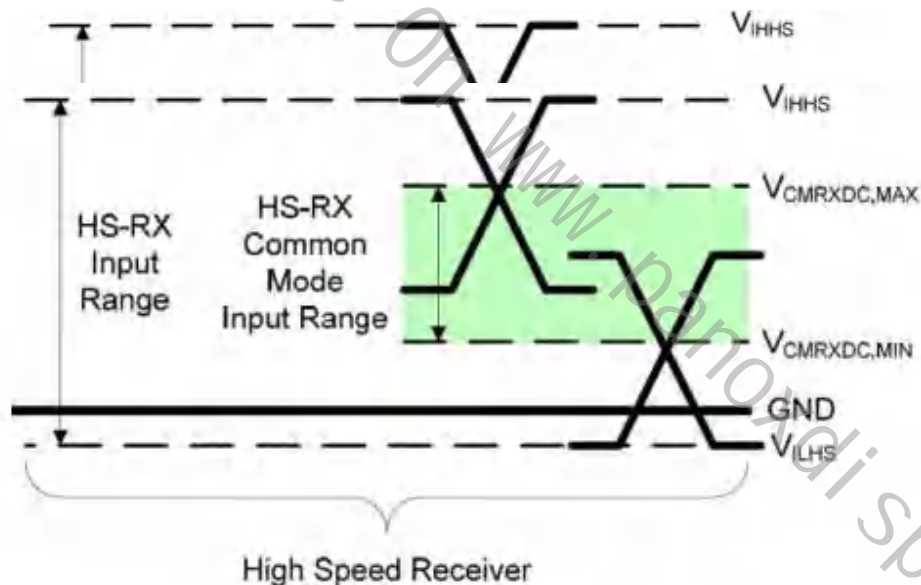


Figure 3-1. Signaling Voltage Levels

Clock Parameter	Symbol	Min	Typ	Max	Units	Notes
UI instantaneous	UI_{INST}	0.83	-	12.5	ns	1, 3

Notes:

1. This value corresponds to a maximum of 1.2Gbps and a minimum of 80 Mbps data rate for HS CMD/ Video mode.
2. The minimum UI shall not be violated for any single bit period, i.e., any DDR half cycle within a data burst.

Data-Clock Timing Specifications

Parameter	Symbol	Min	Typ	Max	Units	Notes
Data to Clock Skew [measured at transmitter]	$T_{SKEW[TX]}$	-0.2		0.2	UI_{INST}	1
Data to Clock Setup Time [receiver]	$T_{SETUP[RX]}$	0.2			UI_{INST}	2
Clock to Data Hold Time [receiver]	$T_{HOLD[RX]}$	0.2			UI_{INST}	2

Notes:

1. Total silicon and package delay budget of $0.3 \cdot UI_{INST}$
2. Total setup and hold window for receiver of $0.3 \cdot UI_{INST}$.

Table 3-2 AC Characteristics of MIPI HS Receiver

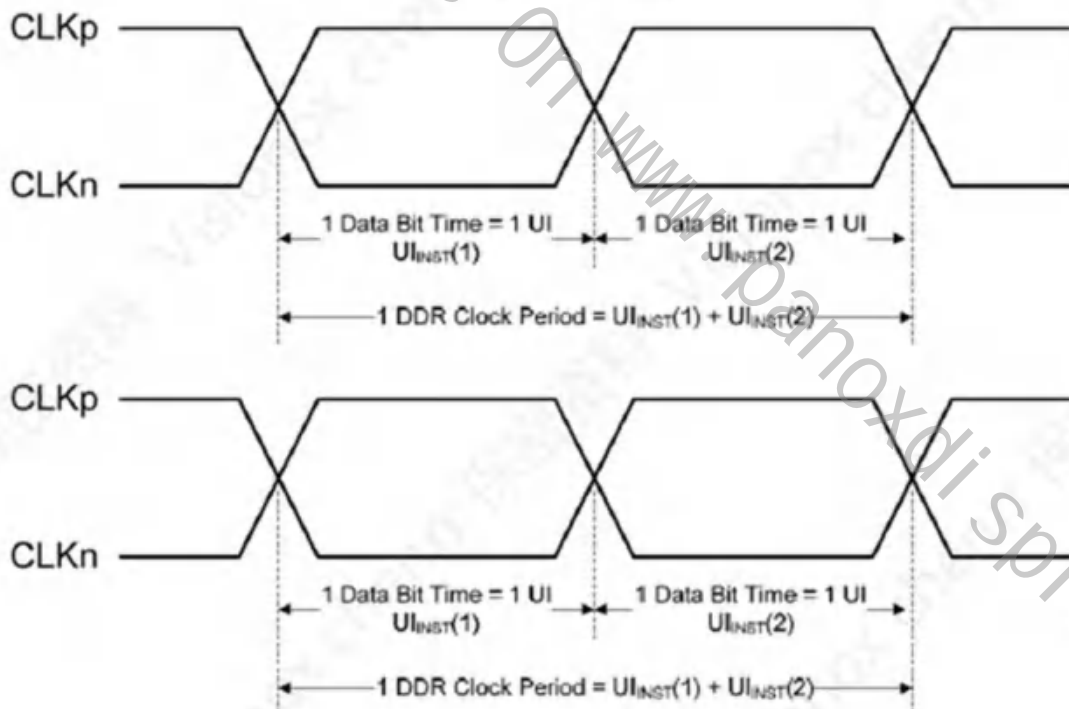


Figure 3-2. AC Timing Waveform for HS Mode MIPI Operation

3.5.2 MIPI LP Transmitter Characteristics

Low-Power Receiver Specifications

Parameter	Description	Min	Nom	Max	Units	Note
V_{IH}	Logic 1 input voltage	880		1350	mV	
V_{IL}	Logic 0 input voltage, not in ULP State			550	mV	
$V_{IL-ULPS}$	Logic 0 input voltage, ULP State			300	mV	
V_{HYS}	Input hysteresis	25			mV	
eSPIKE	Input pulse rejection			300	V*ps	1

Table 3-3. DC Characteristics of MIPI LP Transmitter

3.5.3 Reset Characteristics

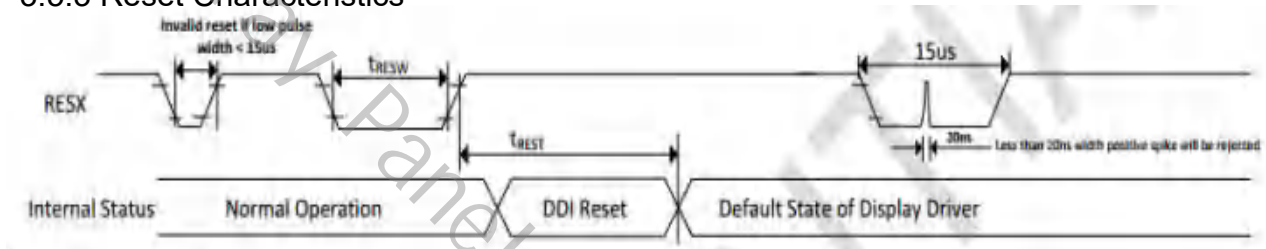


Figure 3-4 Reset Timing

Signal	Symbol	Parameter	Min.	Max	Note	Unit
nRESET	tRESW	Reset pulse duration	15	-	1. Shorter than 5us, Reset rejected 2. Longer than 15ms, IC reset 3. Between 5ms and 15ms, It depends on voltage and temperature condition.	us
	tREST	Reset cancel	-	10	When reset applied at sleep-in mode	ms
			-	120	When reset applied at sleep-out mode	ms

Table 3-5. Reset Timing

3.6 Input Timing

VCLK Active Edge	Video data is fetched at rising edge
H Total	1080

**Visionox Technology Inc.****Model No. VSX392A101GG**

HBP	36
HFP	28
HSW	4
HS polarity	Inverted (active low)
Vertical resolution	1240
VBP	8
VFP	16
VSW	4
VS polarity	Inverted (active low)
VDEN polarity	Normal (active high)

POWER DESCRIPTION

VCI	3V
VDDIO	1.8V
ELVSS	-3.0V
ELVDD	4.6V
AVDD	7.0V

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3.7 Initial Sequence

// ** Please send initial code in LP mode //

[Initial code]

mipi.write 0x39 FE 00

mipi.write 0x39 C2 08 //CMD mode

mipi.write 0x39 35 00

mipi.write 0x39 51 07 FF

mipi.write 0x05 11

delay 120

mipi.write 0x05 29

Delay 10ms or more

Note:

[CGM correlation (after CGM import)]

mipi.write 0x39 FE 12

mipi.write 0x39 83 00

//CGM OFF(10 CGM ON, default ON)

mipi.write 0x39 FE 12

mipi.write 0x39 84 00

//CGM White color coordinate adjustment ON(08 OFF, default OFF)

HBM Enter

mipi.write 0x39 FE 00

mipi.write 0x39 51 0F FF ---HBM ON

HBM Exit

mipi.write 0x39 FE 00

mipi.write 0x39 51 07 FF ---HBM OFF

#AOD Enter

mipi.write 0X39 0xFE 0x00

mipi.write 0X05 0x39

Delay 120ms

#AOD Enter

#AOD Exit

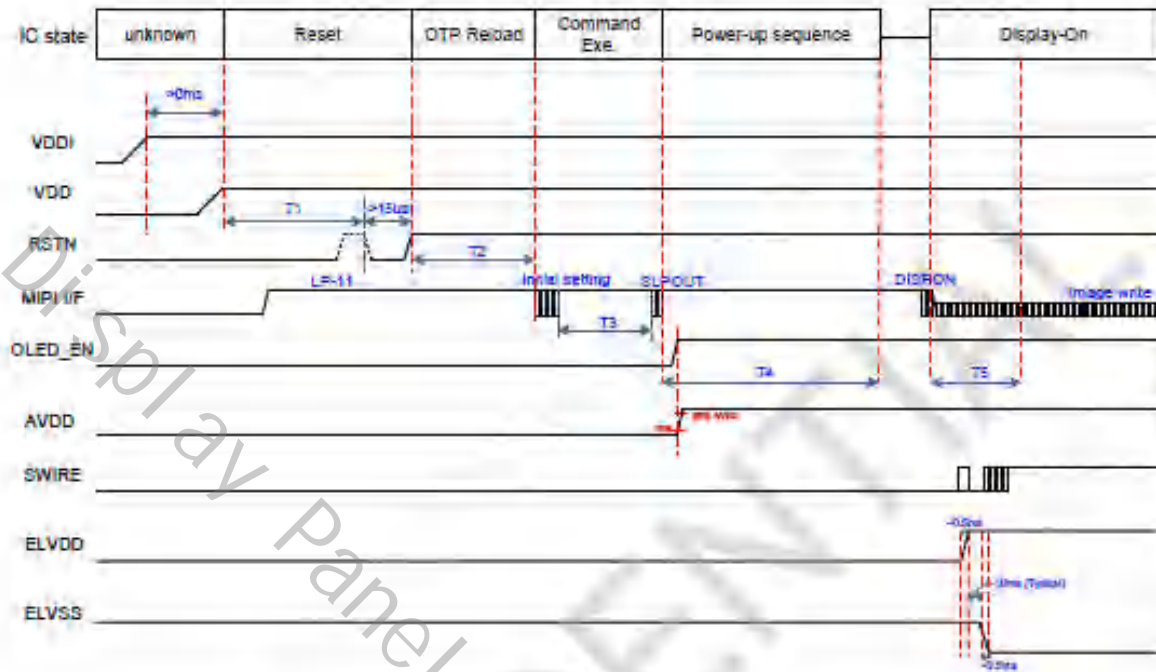
mipi.write 0X39 0xFE 0x00

mipi.write 0X05 0x38

Delay 120ms

#AOD Exit

3.8. Power on Sequence

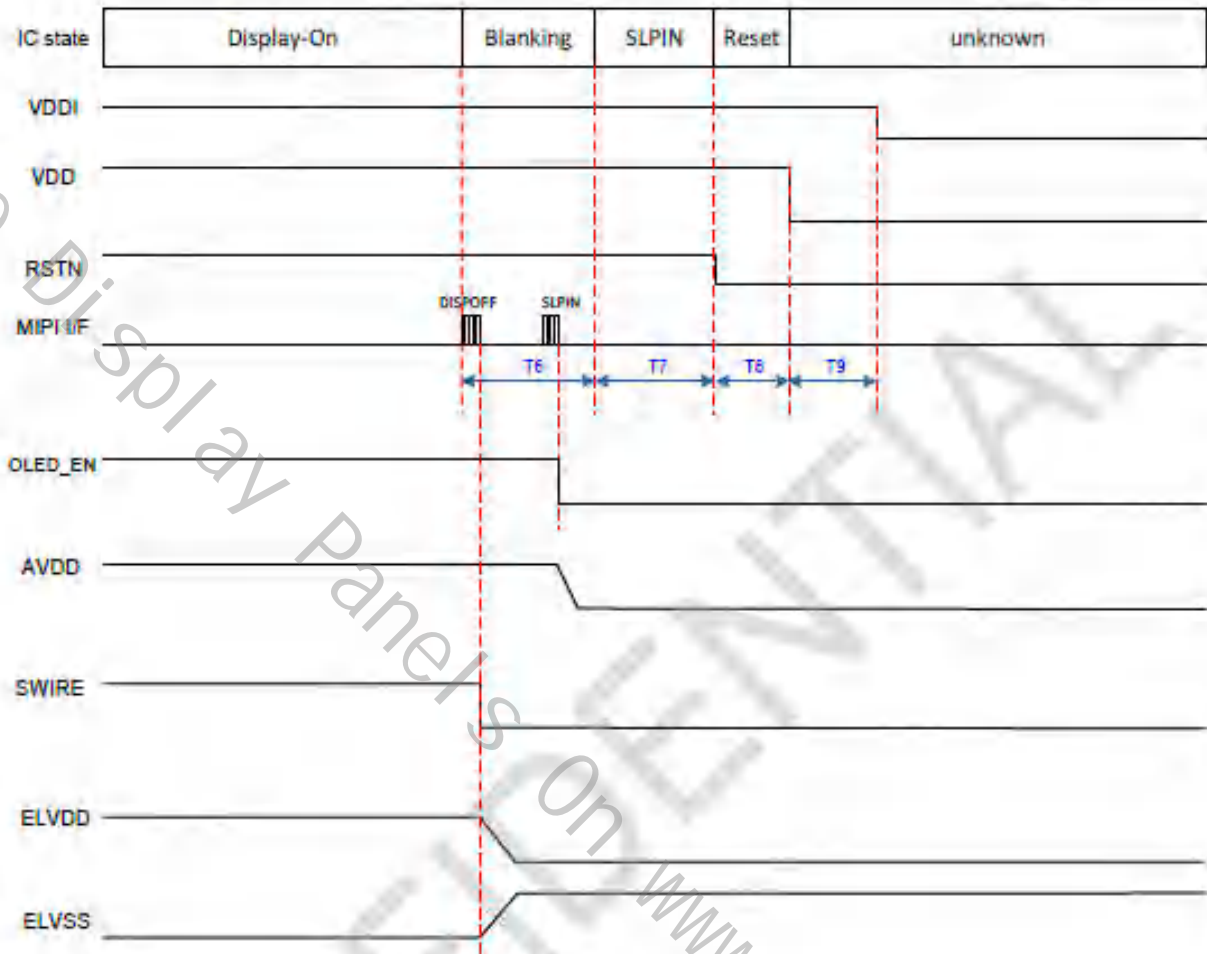


◆ Timing Specification of Power On Sequence

Symbol	Value			Unit	Remark
	Min.	Typ.	Max.		
T1	10	-	-	ms	Effective hardware reset period
T2	10	-	-	ms	OTP reload time
T3	0	-	-	ms	Initial code input finish to SLPOUT command input
T4	-	96	-	ms	Normal power-up sequence
T5	2	-	-	VS	Display-On Blanking region

Notes: VS means the time period of a complete display frame and are approximately 16ms if internal display timing is used.

3.9. Power off Sequence



Symbol	Value			Unit	Remark
	Min.	Typ.	Max.		
T6	2	-	-	VS	Display-Off blanking region
T7	1	-	-	VS	Blanking region
T8	1	-	-	ms	Effective hardware reset period
T9	2	-	-	ms	Power off period

Notes: VS means the time period of a complete display frame and are approximately 16ms if internal display timing is used.

4 Touch Specification

4.1 General Specifications

	Item	Spec.
Touch IC F/W	V1W39WING_v7.07	V1W39WING_v7.07
Test JIG F/W	/	/
General Specification	Multi touch points	10 points
	Active touch area	66.552 x 75.24 [mm]
	Resolution	1080(H)×1240(V) Pixel
	Interface	I2C

Note: This Touch IC FW is the first version of the FW, it will be updated with debugging.

4.2 Touch Design

Item	Description	Notes
Touch Design	CH Number	17(Tx) / 19(Rx)

4.3 Touch Performance

Item	Spec.	Notes
Touch Performance	Report Rate	120 Hz @ 1 finger
	Point Accuracy (Edge, Center)	≤1.0mm
	Linearity (Edge, Center)	≤1.0mm

4.4 Touch Function Inspection

No.	Item	TOVIS		Description
		Min	Max	
1	Chip ID check	7600		Check IC type
2	FW Version check	7.07		Check firmware version
3	IO Test	Pass/Fail		Function check for INT/SDA/SCL
4	U3 Open Test	Min 7500		Check TSP OPEN by measuring Cm scan date
5	U3 Short Test	Min 8000		Check TSP SHORT
6	U3M2 Raw Test	Reference Table ($\pm 20\%$)		Check Normal mutual raw capacitance of all pixels.
7	U3M2 Jitter Test	MAX 30		Check Jitter data of all pixels.
8	U3M2 Raw Self Test	3000~5500		Check self raw capacitance.
9	U3M2 Jitter Self Test	Max 40		Check self Jitter data.

Note1: U3M2 Raw test, Tavis is controlled according to $\pm 10\%$. For those in the range of 10%-20%, direct RMA is not accepted, the modules must be analyzed. If the analysis result is real quality issues, Visionox accept RMA.

Note2 :For the bad outflow of LPWG, RMA treatment shall be performed after Visionox analytical and rejudgment.

4.5 Touch Table

※.U3M2Raw_Min/Max

MAX	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16
X0	4611	4592	4586	4578	4587	4583	4573	4572	4573	4568	4570	4551	4552	4564	4547	4546	4527
X1	4642	4618	4612	4603	4613	4609	4599	4598	4600	4593	4597	4575	4577	4590	4572	4571	4558
X2	4639	4616	4609	4600	4610	4605	4596	4596	4597	4591	4593	4572	4574	4587	4569	4568	4556
X3	4638	4616	4606	4598	4608	4603	4594	4593	4595	4589	4592	4569	4571	4585	4566	4566	4554
X4	4642	4619	4608	4600	4609	4605	4596	4595	4596	4591	4593	4572	4574	4587	4568	4568	4555
X5	4654	4629	4614	4605	4614	4610	4601	4600	4603	4597	4600	4578	4579	4592	4573	4573	4560
X6	4663	4635	4614	4605	4614	4611	4601	4600	4602	4596	4599	4577	4578	4592	4573	4572	4560
X7	4674	4636	4608	4599	4609	4605	4596	4594	4598	4591	4594	4575	4576	4586	4570	4570	4554
X8	4710	4648	4608	4598	4608	4604	4595	4595	4596	4591	4594	4575	4575	4585	4570	4569	4554
X9	4838	4680	4608	4599	4608	4604	4595	4594	4596	4591	4593	4575	4574	4585	4569	4571	4556
X10	4560	4584	4586	4581	4593	4592	4584	4586	4590	4590	4593	4585	4589	4598	4595	4606	4637
X11	4558	4583	4584	4579	4592	4592	4583	4585	4589	4590	4593	4586	4591	4599	4597	4608	4641
X12	4556	4581	4582	4578	4592	4591	4582	4585	4589	4590	4595	4587	4593	4604	4602	4614	4640
X13	4560	4585	4586	4582	4596	4595	4587	4589	4594	4594	4599	4593	4600	4612	4613	4627	4659
X14	4561	4586	4587	4583	4597	4595	4588	4591	4595	4597	4602	4597	4605	4619	4624	4644	4684
X15	4567	4591	4593	4589	4604	4603	4596	4600	4606	4609	4618	4607	4617	4641	4645	4674	4735
X16	4572	4596	4598	4594	4609	4608	4600	4604	4610	4612	4620	4617	4630	4654	4671	4717	4816
X17	4568	4592	4595	4590	4605	4605	4597	4602	4608	4612	4622	4623	4640	4671	4706	4786	4981
X18	4556	4562	4574	4577	4596	4600	4598	4605	4615	4623	4637	4654	4690	4722	4818	4998	5569
MIN	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16
X0	3074	3061	3057	3052	3058	3055	3049	3048	3049	3045	3047	3034	3035	3042	3031	3031	3018
X1	3094	3079	3075	3069	3075	3072	3066	3065	3067	3062	3064	3050	3051	3060	3048	3048	3039
X2	3093	3077	3072	3067	3073	3070	3064	3064	3065	3060	3062	3048	3049	3058	3046	3045	3037
X3	3092	3077	3071	3065	3072	3069	3063	3062	3063	3059	3061	3046	3048	3057	3044	3044	3036
X4	3095	3079	3072	3066	3073	3070	3064	3063	3064	3060	3062	3048	3049	3058	3046	3045	3037
X5	3103	3086	3076	3070	3076	3074	3068	3067	3068	3064	3066	3052	3053	3062	3049	3049	3040
X6	3109	3090	3076	3070	3076	3074	3068	3067	3068	3064	3066	3051	3052	3061	3048	3048	3040
X7	3116	3091	3072	3066	3073	3070	3064	3063	3065	3061	3063	3050	3050	3058	3047	3046	3036
X8	3140	3099	3072	3066	3072	3069	3063	3063	3064	3061	3062	3050	3050	3057	3047	3046	3036
X9	3225	3120	3072	3066	3072	3069	3063	3063	3064	3061	3062	3050	3050	3056	3046	3047	3038
X10	3040	3056	3057	3054	3062	3061	3056	3057	3060	3060	3062	3057	3059	3065	3063	3071	3091

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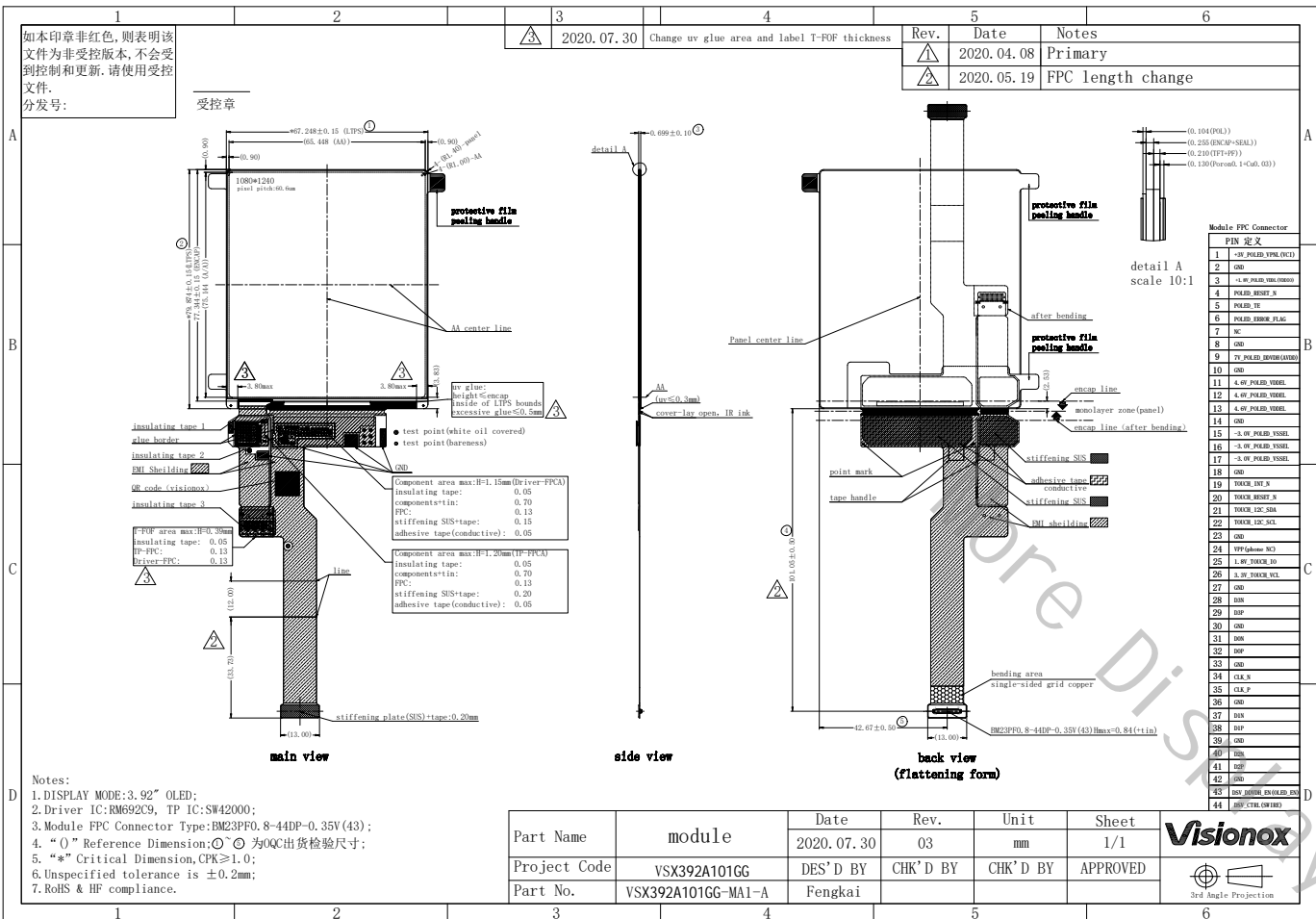
**Visionox Technology Inc.****Model No. VSX392A101GG**

X11	3038	3055	3056	3053	3062	3061	3056	3057	3059	3060	3062	3057	3061	3066	3065	3072	3094
X12	3037	3054	3055	3052	3061	3060	3055	3057	3059	3060	3063	3058	3062	3069	3068	3076	3093
X13	3040	3057	3057	3055	3064	3063	3058	3060	3062	3063	3066	3062	3066	3074	3075	3085	3106
X14	3041	3057	3058	3055	3064	3064	3059	3060	3064	3064	3068	3065	3070	3079	3083	3096	3123
X15	3044	3061	3062	3060	3069	3068	3064	3066	3070	3073	3079	3072	3078	3094	3096	3116	3156
X16	3048	3064	3066	3063	3072	3072	3067	3069	3073	3075	3080	3078	3087	3102	3114	3145	3211
X17	3045	3061	3063	3060	3070	3070	3065	3068	3072	3075	3081	3082	3094	3114	3137	3190	3321
X18	3037	3041	3049	3051	3064	3067	3065	3070	3077	3082	3091	3102	3127	3148	3212	3332	3713

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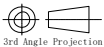
5 Mechanical Drawing

5.1 Module Drawing



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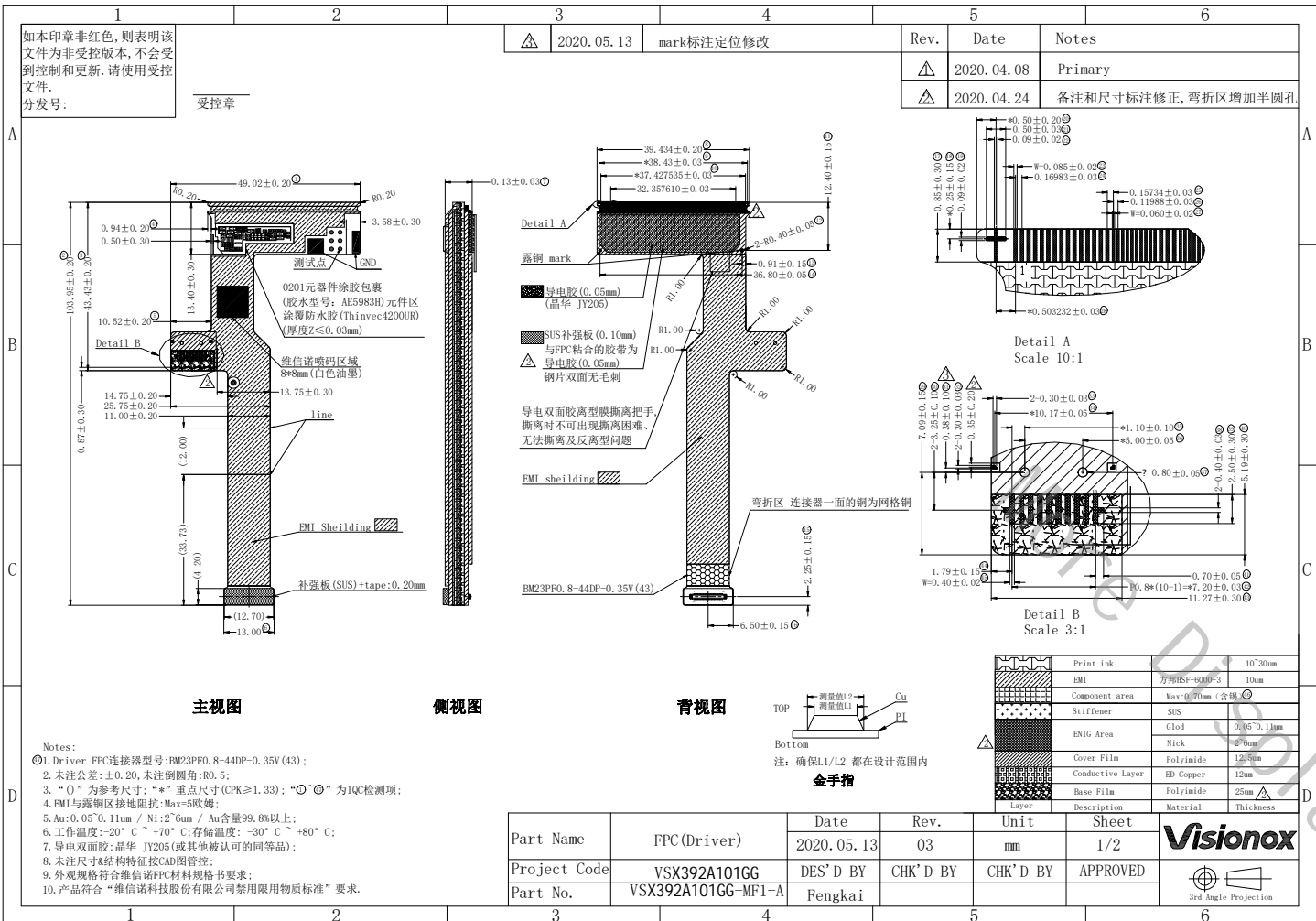
Rev.	Date	Notes
<u>1</u>	2020.02.26	Primary
<u>2</u>	2020.03.06	PAD mark 中心距调整
<u>3</u>	2020.03.12	CT PAD gap change
<u>4</u>	2020.03.16	panel mark change
<u>5</u>	2020.03.17	Add CT PAD
<u>6</u>	2020.03.24	Add CT PAD



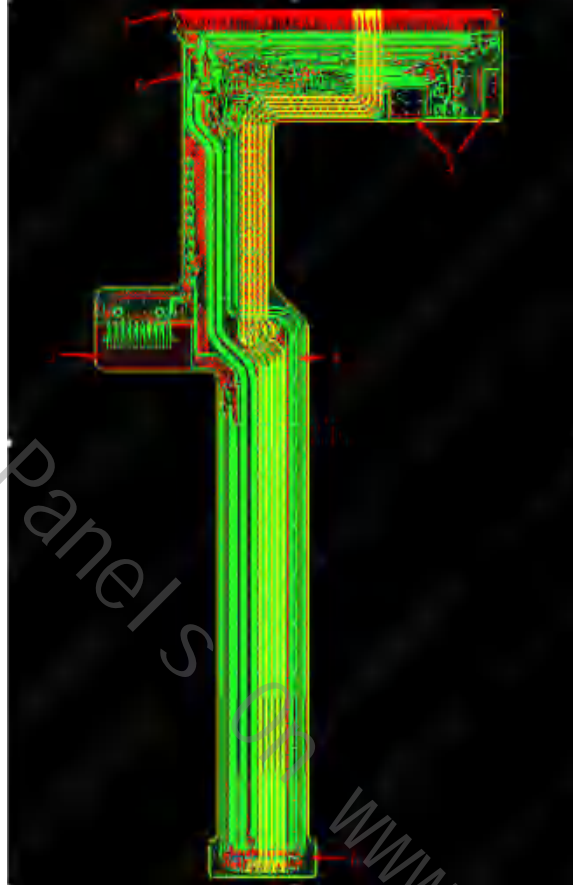
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5.3 FPCB Layout

5.3.1 Main FPC



5.3.2 Main FPCB Stack-up



ITEM	LAYER DESCRIPTIONS(ALL UNITUM)	Model	Thickness of raw material	DRIVER FPC					
			(Thickness)						
				1(Thin fingers area)	2(FPC)	3	4(EMI)	5(Dew copper)	6Position of the steel
Stiffener	SUS304								
ad	ADHESIVE								
EMI	Electromagnetic membrane Fangbang	HSF6000-3	10				10		
ENIG AREA	Immersion Au	ENIG AREA	0.05-0.11	0.05-0.11				0.05-0.11	
	Electroless Ni		2~6	2~6				2~6	
COVER	Polyimide Film	Covering film	12.5	12.5	12.5		12.5		12.5

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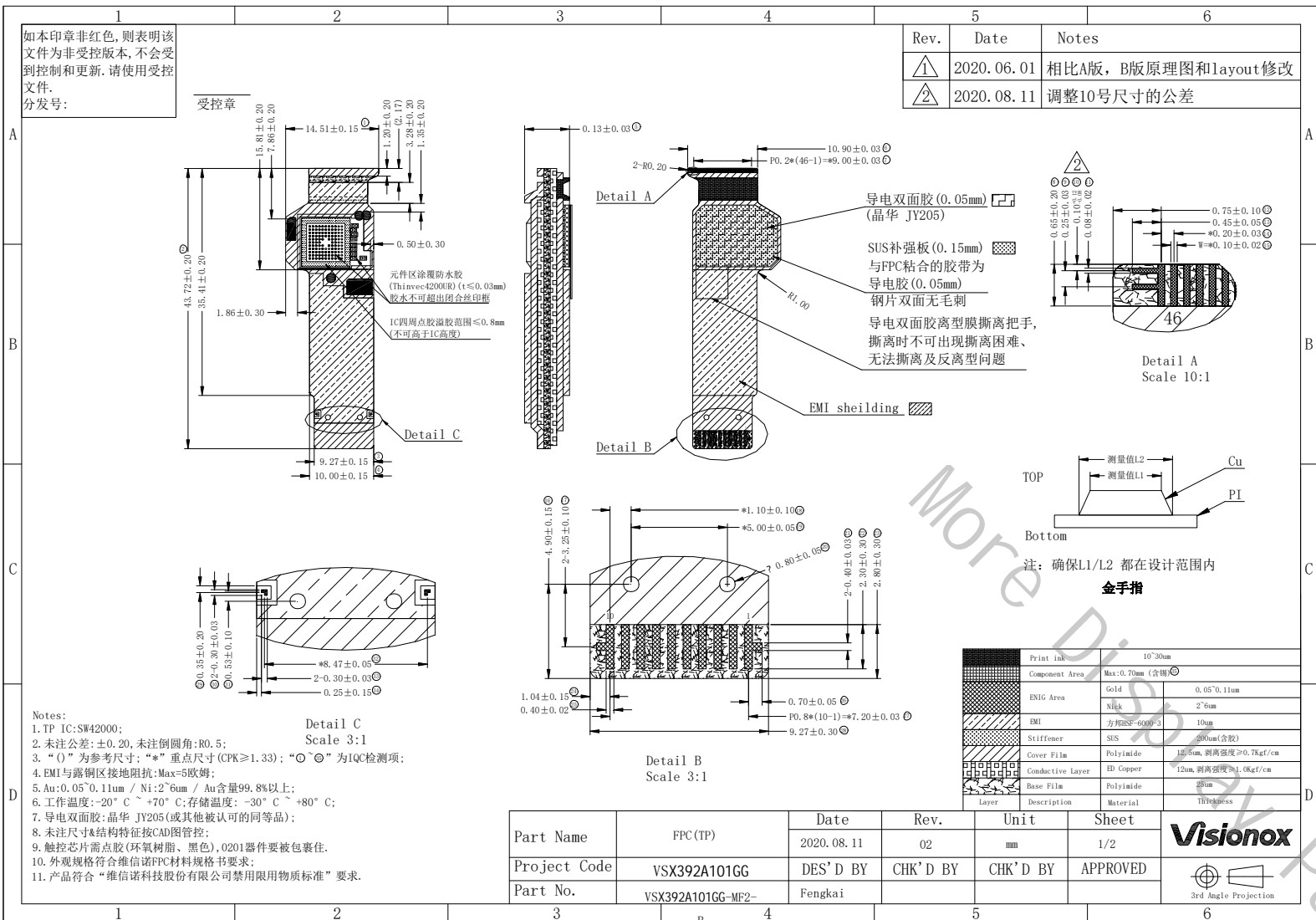
Visionox Technology Inc.

Model No. VSX392A101GG

Film		TaiFlex Taimide							
	Adhesive(Adhesive deducts the amount of spillage)	yellow PI:0.5mil AD:15um FHT0515 250mm(FHT0515)	15	13	13		13		13
Cu plating	Copper Plating	Control hole copper 9-18	9~18		9		9	9	9
FCCL	L1 Conductor (HTE)	FCCL changjieshi	12		12		12	12	12
	PI base Film	double-sided ED	25	25	25	25	25	25	25
	L2 Conductor (HTE)	PI:1mil 1/3oz AD:0um (31RLT1TZ)	12	12	12	12	12	12	12
Cu plating	Copper Plating	Control hole copper 9-18	9~18	9	9	9	9	9	9
COVER Film	Adhesive(Adhesive deducts the amount of spillage)	Covering film TaiFlex Taimide yellow PI:0.5mil	15		13	13	13		
	Polyimide Film	AD:15um FHT0515 250mm(FHT0515) X1MMN	12.5		12.5	12.5	12.5		
ENIG AREA	Immersion Au	ENIG AREA	0.05-0.11	0.05-0.11				0.05-0.11	
	Electroless Ni		2~6	2~6				2~6	
Others	PSR_[Solder resist ink]	Yellow bright oil_PSR-9000 FLX5010R							20
EMI	Electromagnetic membrane Fangbang	HSF6000-3	10				10		
ad	ADHESIVE	Tatsuta CBF- 800-D60	60						47
Stiffener	SUS304	SUS304 0.15T	150						150
The total thickness				71.5	118	71.5	140	67	310
Customer specification(mm)					130±0.03				
KINWONG suggestion(mm)									

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5.3.3 Touch FPC



5.3.4 Touch FPCB Stack-up



ITEM	LAYER DESCRIPTIONS(ALL UNITUM)	Model	Thickness of raw material	TP FPC					
			(Thickness)	1(Thin fingers area)	2(Single layer zone)	3(EMI)	4(Large solder pad position)	5(Position of the steel)	6 (FPC)
Stiffener	SUS304								
ad	ADHESIVE								
Others	PSR_[Solder resist ink]	Yellow bright oil_PSR-9000 FLX5010R					20		
	Chip IC_device						500		
	Solder paste						50		
EMI	fangbang HSF-KDT-02	fangbang HSF6000-3	10			10			
ENIG AREA	Immersion Au	ENIG AREA	0.05-0.11				0.05-0.11	0.05-0.1	

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Visionox Technology Inc.

Model No. VSX392A101GG

	Electroless Ni		2~6				2~6	2~6	
COVER Film	Polyimide Film	Covering film TaiFlex	12.5	12.5		12.5		12.5	12.5
	Adhesive(Adhesive deducts the amount of spillage)	Taimide yellow PI:0.5mil AD:15um FHT0515 250mm(FHT0515)	15	13		13		13	13
Cu plating	Copper Plating	Control hole copper 9-18	9~18			9	9	9	9
FCCL	L1 Conductor (HTE)	FCCL changjieshi	12			12	12	12	12
	PI base Film	double-sided	25	25	25	25	25	25	25
	L2 Conductor (HTE)	PI:1mil 1/3oz AD:0um (31RLT1TZ)	12	12	12	12	12	12	12
Cu plating	Copper Plating	Control hole copper 9-18	9~18	9	9	9	9	9	9
COVER Film	Adhesive(Adhesive deducts the amount of spillage)	Covering film TaiFlex Taimide yellow PI:0.5mil AD:15um FHT0515 250mm(FHT0515)	15			13	13		13
	Polyimide Film		12.5			12.5	12.5		12.5
	PSR_[Solder resist ink]	Yellow bright oil_PSR-9000 FLX5010R						20	
Others	PSR_[Thermosetting ink] green	Green bright oil_L45 LG20/H43a			20				
ENIG AREA	Immersion Au	ENIG AREA	0.05-0.11	0.05-0.11					
	Electroless Ni		2~6	2~6					
EMI	Fangbang HSF-KDT-12	Fangbang HSF6000-3	10			10			

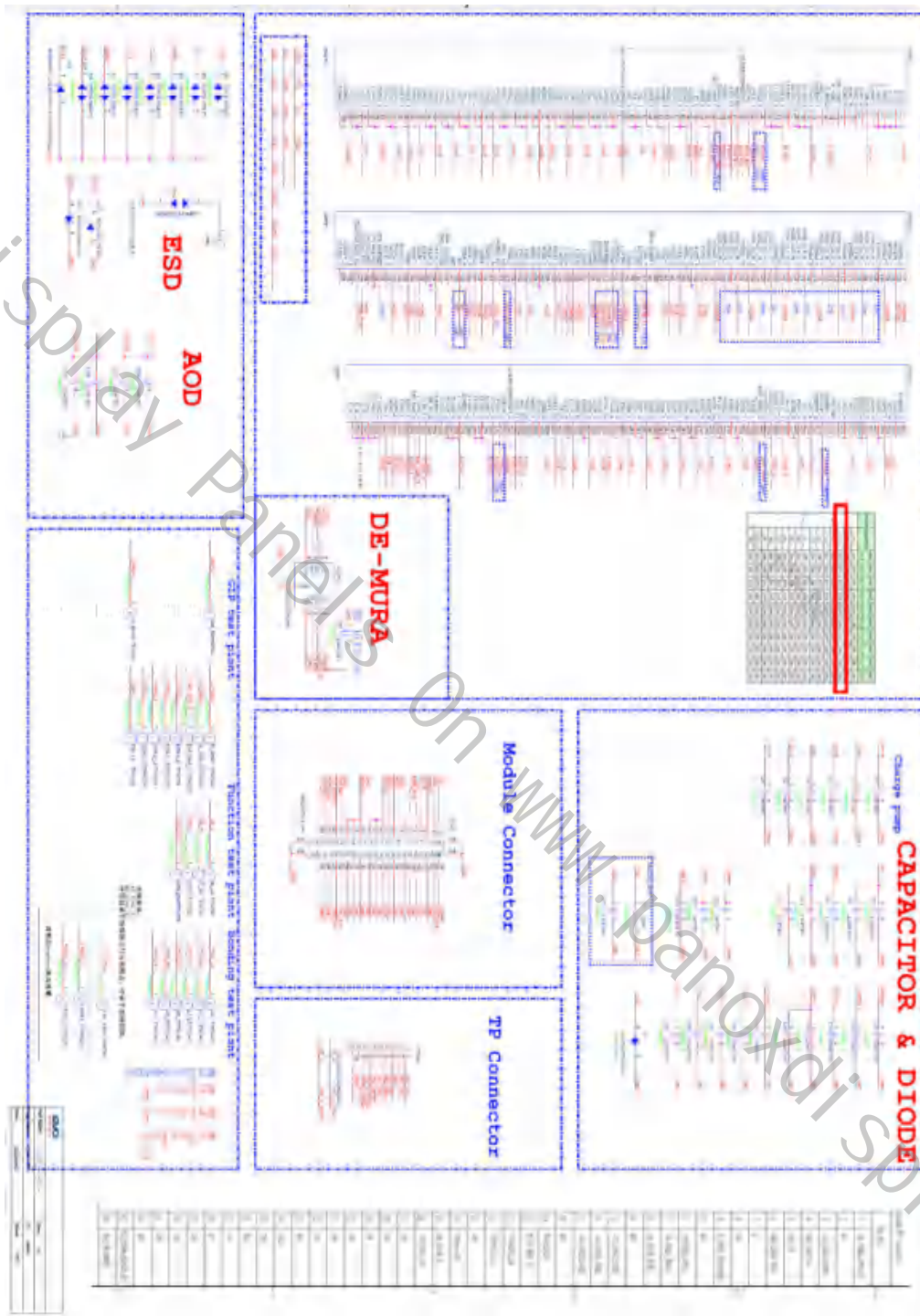
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**Visionox Technology Inc.****Model No. VSX392A101GG**

ADHESIVE		JY205					50		
ad	ADHESIVE	Tatsuta CBF-800-D60;	60				47	47	
Stiffener	SUS304	SUS304 0.15T	150				150	150	
The total thickness				71.5	66	140	910	310	118
Customer specification(mm)									

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5.4 FPCB Schematic



5.5 FPCB Gerber Data



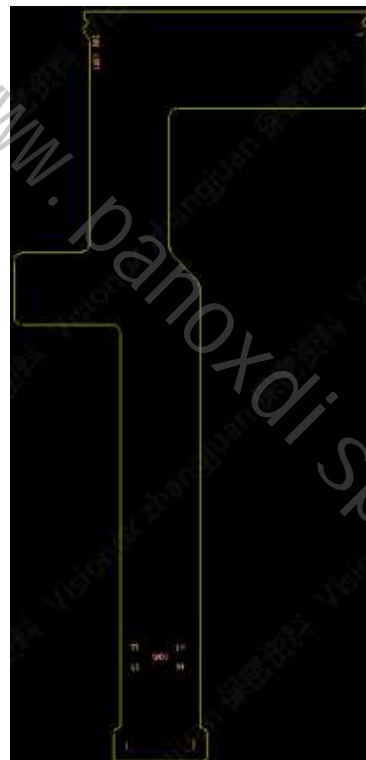
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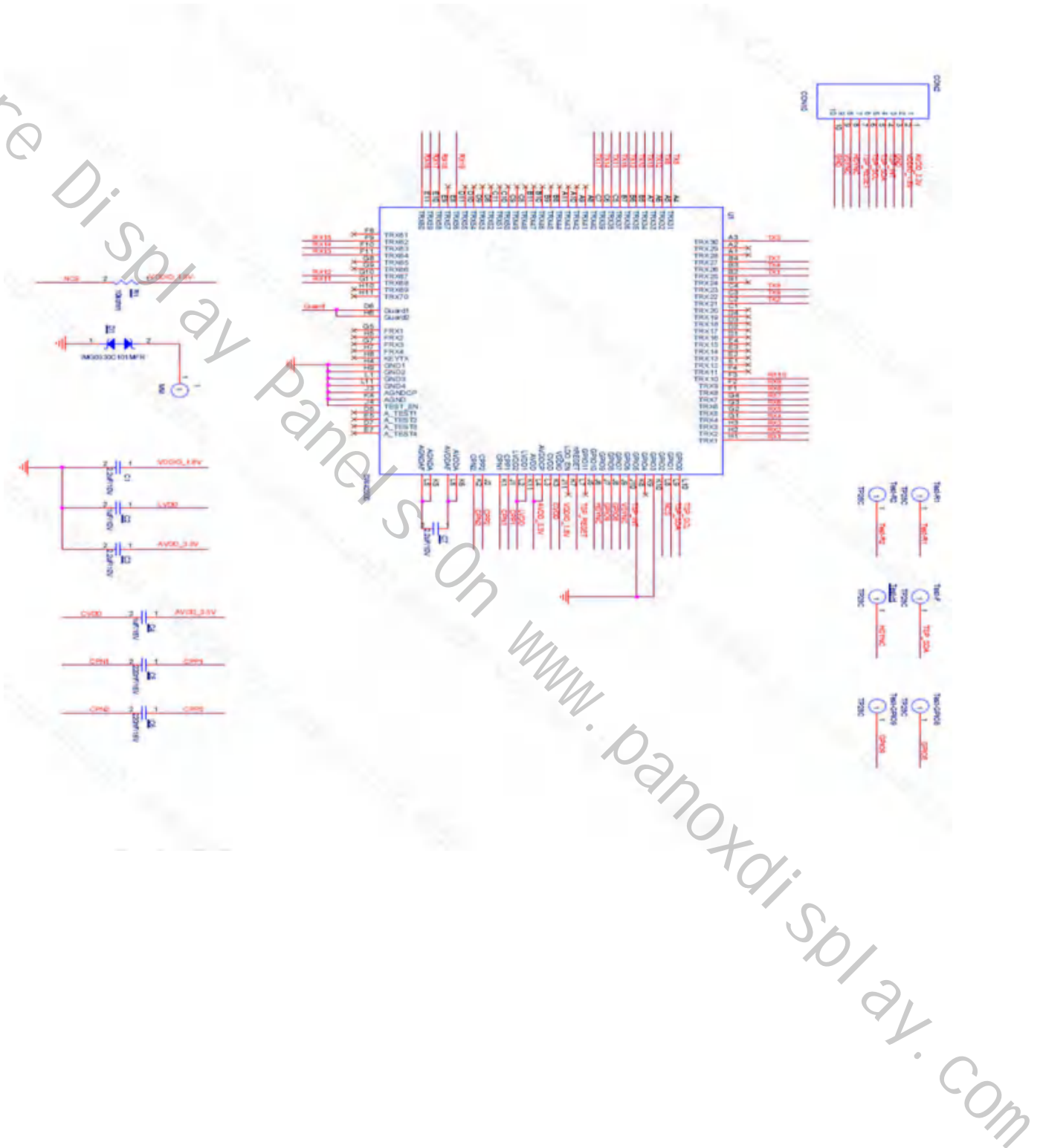


< Top silk Layer >



< Bottom silk Layer >

5.6 TOUCH FPCB Schematic



5.7 TOUCH FPCB Gerber Data



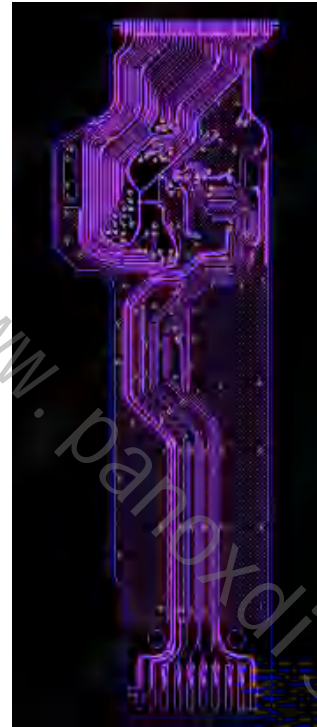
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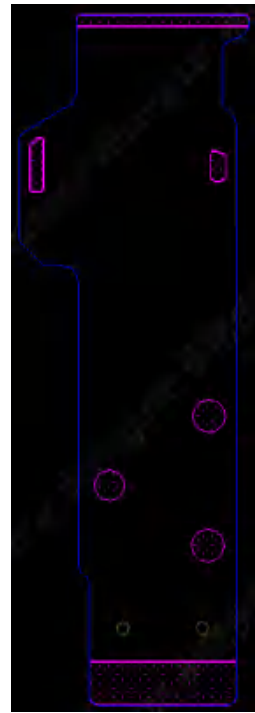
< Top silk Layer >



< Bottom silk Layer >



< Top cover-lay open Layer >



< Bottom cover-lay open Layer >



< Drill >

6 Incoming Inspection Specification

6.1 Characteristic Inspection of AMOLED Module

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

- (1) Ambient temperature: 15-35°C
- (2) Humidity: 20-75%RH
- (3) Ambient light intensity of visual inspection: 800 ~ 1200 lux
- (4) Ambient light intensity of function inspection: ≤200lux
- (5) Viewing Distance: 30 ± 5 cm
- (6) Viewing angle (tolerance): the front side 90° (Z) ±45°
- (7) Appearance inspection time: 10±5s

6.2 Sampling Procedures for each item acceptance table

Defect type	Sampling Procedures	AQL
Major defect	GB/T2828.1-2003 Inspection level II normal inspection single sample inspection	Before 10/31: 0.4 After 11/1: 0.25
Minor defect	GB/T2828.1-2003 Inspection level II normal inspection single sample inspection	Before 10/31: 0.65 After 11/1: 0.40

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.

6.3 Inspection standard

No.	Item	Area	Criterion of Defect			Defect type
1	Dot Defect	AA	Type	DS	Acceptable number	Minor
			Bright Dot	-	0	

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			Dark Dot (≤2 connections)	-	Ignore	
			Dark Dot (3 connections)	≥5mm	3	
			Dark Dot (4 connections)	≥5mm	1	
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	/		Not allowed	Major
6	Mura	AA	1、First sample 14.7K regardless of control; 2、DVT2 refer to the limit sample of G3&641; 3、Visionox will sign G10&392 limit sample with LG;			Minor
7	TP function	AA	TP function NG or TP parameters are not in conformity with the sample , not allowed.			Fatal defect

8	Edge/Side Chipping	Non AA region					Minor
			a	b	c	Acceptable number	
			≤ T	≤0.15mm	≤0.15mm	Not control	
			≤ T	≤0.2mm	≤2mm	<5	
			Frit is not allowed to be injured (normal card control X / y due to glass breakage above frit)				

9	Glass crack	AA、OA	/			No allowed	Major
10	Line defect (filaments, linear foreign	All over the region	W(mm)	L(mm)	DS(mm)	Acceptable number	Minor
			$W \leq 0.03$	-	-	Ignore	

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	bodies)		0.03<W≤0.05	L≤1.0	-	Total number	
			0.05<W≤0.1	L≤0.5	-	N≤2	
11	Polarizer scratch	All over the region	W(mm)	L(mm)	DS(mm)	Acceptable number	Minor
			W≤0.03	L≤10	-	Total number	
			0.03<W≤0.05	L≤6	-	N≤2	
12	Point defect (black and white dots, foreign dots)	All over the region	D(mm)	DS(mm)		Acceptable number	Minor
			D≤0.10	-		Ignore	
			0.10<D≤0.2	-		2	
			0.2<D	-		0	
13	Polarizer fold / indentation	AA	D≤0.1mm, Ignore; 0.1mm<D≤0.25mm, N≤3, DS≥10mm; 0.25mm<D≤0.3mm, N≤1;				Minor
14	Polarizer bump / dent / bubble	AA	D ≤ 0.1mm, ignored; 0.1<D≤0.25mm, N≤3, DS≥10mm; D ≥ 0.25mm, not allowed;				Minor
15	Back scribing	Terminal area	Width: 0.3 ± 0.1mm and height shall not be higher than TFT surface				Minor
16	Foreign matter bubble in polarizer protective film	AA	No control of protective film bubble; Foreign matter: D≤0.1mm, Ignore; 0.1<D≤0.2mm ,N<5, DS no control				Minor
17	Stain in polarizer protective film	AA	Stain can be wiped: No control (including stain on the film and under the film) Stain cannot be wiped: Not Allowed				Minor
18	UV glue height	Bonding area	The UV glue height should not exceed the encapsulation				Minor
19	Tape position offset	FPC	The tape film should not beyond the edge of main FPC and TP FPC				Minor

20	Pol edge overflow / lack of glue	Non AA area	W:0.2±0.15mm, Regardless of control	
21	ACF	Bonding Area	The attachment length of ACF is 0.2-1.5mm longer than the two ends of FPC, not beyond the edge of the screen. The effective lap width of ACF in the lead area is greater than 2 / 3 of the width of FPC gold finger, without bubbles and wrinkles.	Minor
22	FPCA	FPC	<p>It is not allowed to reverse polarity welding of capacitance and inductance, wrong package size and wrong component direction</p> <p>Incorrect use, crack, damage, falling off, warping and deviation of components are not allowed</p> <p>Component welding deviation does not affect function and assembly regardless of control</p> <p>There is no dead fold, puncturing or spot damage. The scratch is based on no copper exposure</p> <p>Parts on FPC shall be consistent with BOM, with wrong parts, multiple parts and few parts, not allowed</p> <p>There shall be no tin stained or residual solder beads on the connector, and there shall be no tin connection on the connector welding feet</p> <p>Dirty FPC surface not allowed</p> <p>No visible impurities and foreign matters in bonding lead area</p> <p>FPC burr and burr are not controlled</p> <p>Poor FPC screen printing: Content error not allowed</p> <p>FPC shape damaged: not allow</p> <p>FPC Poor punching and cutting: Missing punch locating hole or locating hole is not allowed to be punched and offset is not allowed</p> <p>FPC indentation: The line indentation shall not cause the back of the covering film to turn white; the non line area indentation shall not cause FPC damage</p> <p>FPC Bubble area of reinforcement plate<10%</p> <p>FPC Green oil / mulch: No bubbles / exposing or bridging of metal conductors</p> <p>FPC tin solder: It is not allowed to connect tin, fail to weld or leak tin, and there are cracks in the solder</p>	Minor

			FPC Residue of tin slag and bead: The area without solder, such as gold finger, is not allowed to have solder slag and solder bead residues (FPC with connector needs to flip over to check whether the above solder defects exist)	
			FPC Poor reinforcement plate: be damaged($W \leq 0.3\text{mm}$, $L \leq 1\text{mm}$)	
			Missing and reverse sticking and deformation of reinforcing plate are not allowed, separation of FPC layer nor allowed.	

			Convex point of reinforcement plate: $D \leq 0.25\text{mm}$, And shall not affect the overall thickness	Minor
			FPC Paint falling: $D < 2\text{mm}$, $N < 5$; Copper leakage is not allowed.	
			FPC Body foreign matter is not controlled (FPC bubble is not allowed)	
			FPC bending is not controlled, but dead bending is not allowed; i.e. no matter U-type is controlled, V-type is not allowed	
			The small blue membrane deviation on the back of tp-fpc shall not exceed the reinforcing plate	
			Color difference in green oil area is not controlled (thickness is within specification range)	
		FPC Gold finger defect	The gold finger coating is arc-shaped, the surface is uneven, obviously visible, not allowed	Minor
			Crack of golden finger: crack at the top $\leq 0.3\text{mm}$, cracks at other parts are not allowed	
			Shape damage, bump: not allowed	
			Deviation of gold finger: deviation of front and back gold finger and mark $w \leq 0.1\text{mm}$	
			Copper leakage of gold fingers: $W \leq 1/3$ line width, $L \leq 1/3$ line width, copper leakage of three or more gold fingers is not allowed	
			Golden finger gap: the gap is consistent with the line gap $\leq 1/3$ of the line width	
			Golden finger crush: obvious crush is not allowed	
			Gold finger fold and dead fold: no sharp angle fold and dead fold	
			Broken and dirty golden fingers: not allowed	
			Gold fingers shall not be oxidized, scratched, creased, indented, broken, dirty or deviated	
			The gold fingers shall not be blackened, scalded or brown, and the electroplated layer shall not be oxidized or discolored	

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23	FPC bound bubble	Bond District	No visible bubbles, no overlapping of 2 pads	Major
24	FPC tilted after bonding	Bond District	The overlap length between two pairs of FPC gold finger and screen lead shall not be less than 1 / 2 of the length of the pair mark	Major
25	Compound adhesive tape	LTPS surface	No damage or fold is allowed	Minor
			Do not leak light	
			No impact on assembly	
			Thickness not affected	
			Do not leak stickers. Do not look beyond the screen edge from the Encap surface.	
			Bubble of composite tape: D≤5mm N not counted	
			Concave convex point of composite tape: D≤0.3mm, N≤3	
			Compound tape foreign body (foreign body between copper foil and blue film): D≤0.3mm, N≤3	
			Compound tape edge saw tooth: 0.5×3mm, N≤3	
			No control of Color difference protective film in composite tape	
			Reference sample limit of copper foil indentation in composite tape	

26	FPC bonding bubble	Bonding Area	Visible bubble is not allowed	Major
27	IC chipping	COF	edge: D≤0.04mm, corner: D≤0.05mm, Non-intrusive sealing line	Major
28	Sealing and dispensing	Terminal area	It is not allowed to break or lack glue in the line area, or expose the line or bubble diameter<1mm	Minor
			The sealant shall be even, and shall not overflow the TFT edge, and the height shall not be higher than the encap glass.	
29	Warpage caused by overflow and lack of glue on the edge of polarizer	AA	Do not extend to AA area	Minor
30	ACF residual sealant	Binding area	No influence on function or reference limit sample.	Minor

31	Package	other	The product is completely placed in the anti-static tray without overlapping, and the direction of each layer of tray is alternate	Minor
			Products with different models cannot be mixed in one inner packing bag	
			There is no obvious deformation or damage in the packing case, the printing and label contents, and the model and quantity are correct	
			Seal QC, and paste RoHS label for RoHS control	

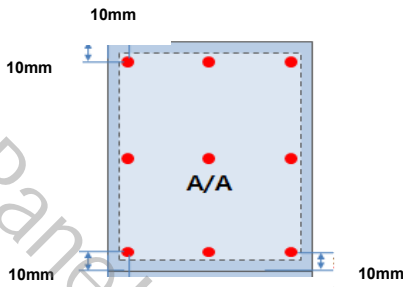
7 Reliability

7.1 Environmental Reliability Tests

* RT means Room Temperature.

No	Test Item	Condition	Specifications	Quantity
1	High Temperature Operation	70°C±2°C, 96Hrs Operation and display off. After 24Hrs at RT, display on and check OK/NG	Must be no Visual/Function NG	10
2	Low Temperature Operation	-20°C, 96Hrs Operation and display off. After 24Hrs at RT, display on and check OK/NG		10
3	High Temperature and High Humidity Operation	60°C, 90% RH, 96 Hrs Operation and display off. After 24Hrs at RT, display on and check OK/NG		10
4	High Temperature Storage	80°C±2°C, 96 Hrs Storage without display on. After 24Hrs at RT, display on and check OK/NG		10
5	Low Temperature Storage	-30°C, 96 Hrs Storage without display on. After 24Hrs at RT, display on and check OK/NG		10
6	High Temperature and High Humidity	60°C, 90% RH, 96Hrs Storage without display on. After 24Hrs at RT, display on and check OK/NG		10

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	Storage			
7	Thermal Shock	-30°C (30min) ~ 80°C (30min), 35 Cycle After 24Hrs at RT, display on and check OK/NG		10
8	ESD Electrostatic Withstanding Voltage (with coverlens)	<p><Test Condition> Air : 330ohm 150pF, ±6KV, 10 times at the display off state</p> <p><Test Point> 9 red dotting positions in the below picture</p> 	After Reset, must be no Visual/Function NG	5
9	CDM (Charged Device Mode)	<p>1. Low temperature storage (-30°C, 24Hrs)</p> <p>2. ESD Test - Bending Area 3Points, 5times ±500V, ±700V, 1KV(Regularity), ±1.5KV(Limit)</p> <p>3. High temperature storage (70°C, 2Hrs)</p>	Must be no Line Defect	10
10	Packing Shock Test	<p>Radom Vibration 1.146Grms, 1~200Hz, Random 30mins/(X,Y,Z)axis</p> <p>Packing Drop: 1 corner ,3edges,6surfaces Drop height :760mm</p>	Must be no Crack	1 box

7.2 Mechanical Reliability Tests

1) Panel 4PB Test

- Test Condition

Test Method : 4 Point Bending Test

1. Supporting Jig : 3mm, Loading Jig : 3mm

2. Jig Speed : 1mm/min

3. Test Point : X axis, Y axis

4. Jig length (L) : L1 – 10mm, L2 – 20mm

5. Jig Material : Steel (or Al)

- Criteria (SPEC)

Item	4-Point Bending Test
Criteria	B10 (Weibull 10%)
Spec	B10(Weibull 10%) Stress Higher than 70 Mpa(X) B10(Weibull 10%) Stress Higher than 60 Mpa(Y) (Improvement sample for 4PB testing match customer (LGE, TOVIS) standard B10 (weibull 10%) stress higher than X 90Mpa/Y 90Mpa)
No. of Panel	24ea for each condition (48ea)

Formula for Stress :

$$\sigma = \frac{3 \cdot 9.8 \cdot P \cdot (L_2 - L_1)}{2 \cdot b \cdot h^2} \text{ (Mpa)}$$

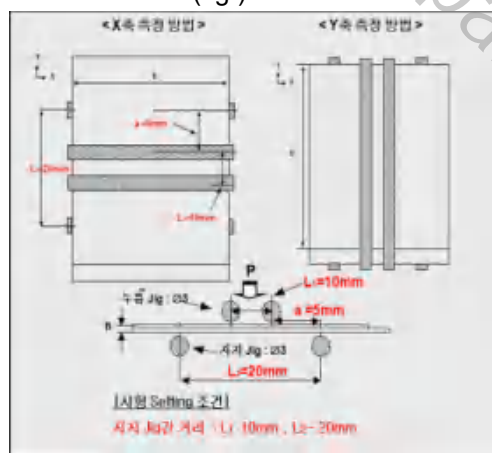
(σ : Flexural Stress)

b : item width (mm)

h : item thickness (mm)

L : Length between supports (mm)

P : Load (kgf)



2) Driver IC 3PB Test

- Test Condition

Test Method : 3 Point Bending Test

1. Supporting Jig : 3mm, Loading Jig : 3mm
2. Jig Speed : 1mm/min
3. Jig length (L) : 10mm
4. Jig Material : Steel (or Al)

- Criteria (SPEC)

Item	3-Point Bending Test
Criteria	B10 (Weibull 10%)
Spec	B10 : Higher than 350Mpa
No. of IC	24ea

Formula for Stress :

$$\sigma = \frac{3 \cdot 9.8 \cdot P \cdot (L_2 - L_1)}{2 \cdot b \cdot h^2} \quad (\text{Mpa})$$

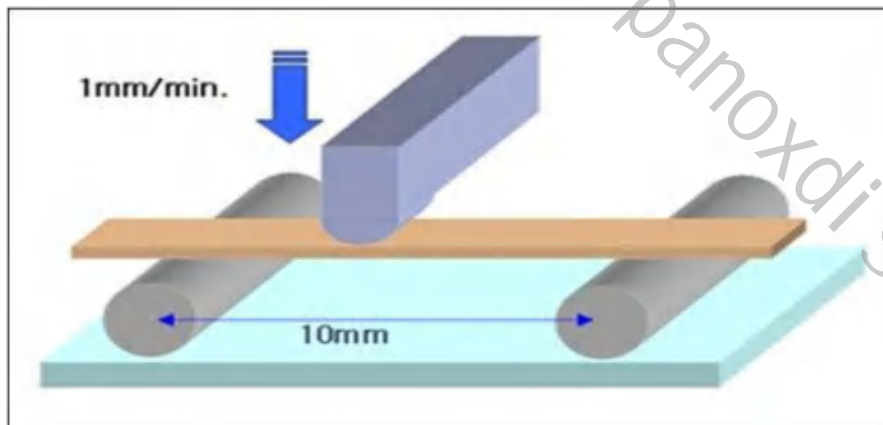
(σ : Flexural Stress)

b : item width (mm)

h : item thickness (mm)

L : Length between supports (mm)

P : Load (kgf)



8 Precautions for use

8.1 Handling Precautions

- 8.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from height.
- 8.1.2 Do not press down the screen on the adjoining areas too hard because the color tone may be shifted.
- 8.1.3 The polarizer covering the display surface of the AMOLED module is soft and easily scratched. Handle this polarizer carefully.
- 8.1.4 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.
- 8.1.5 Solvents may damage the polarizer. Do not use water, ketone or aromatic solvents except ethyl alcohol.
- 8.1.6 Do not attempt to disassemble the AMOLED Module.
- 8.1.7 If the logic circuit power is off, do not apply the input signals.
- 8.1.8 To prevent destruction from static electricity, be careful to maintain an optimum working environment.
- 8.1.9 Be sure to make yourself in contact with the ground when handling with the AMOLED Modules.
- 8.1.9 Tools required for assembly, such as soldering irons, must be properly grounded.
- 8.1.10 To reduce the generation of static electricity, do not conduct assembly or other work under dry conditions.
- 8.1.11 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.

8.2 Storage Precautions

- 8.2.1 When storing the AMOLED modules, be sure that they are not directly exposed to the sunlight or the light of fluorescent lamps.
- 8.2.2 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:
- 8.2.3 Temperature: 0°C~40°C Relatively humidity: ≤80%
- 8.2.4 The AMOLED modules should be stored in the room without acid, alkali or harmful gas.

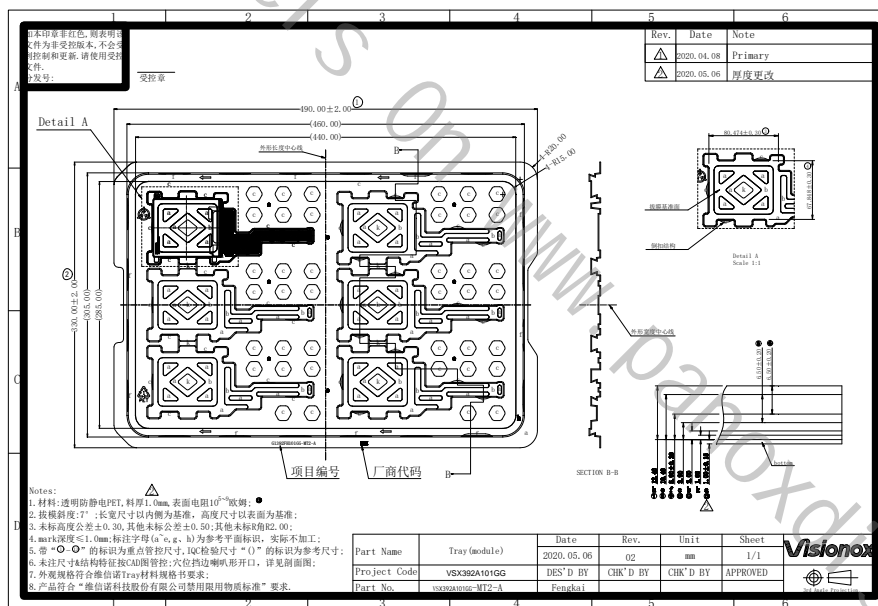
8.3 Transportation Precautions

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

9 Package

9.1 Packing Description

Packing Condition	Contents
Packing Type	TRAY + Carton packing type
Tray material model	tray ($10^5 \sim 10^9 \Omega$)
Tray packing type	See the picture 1
Number of panels per Tray	6pieces
Number of Tray per carton	22units ((20units +2empty)PET tray)
Number of panel per carton	120 pieces



9.2 Description of ABS Material composed

No.	1
Description	Polyethylene terephthalate
Composed Rate	>99%

9.3. Description of packing procedure

a) Packing

Rev.	Date	Notes
△	2020.04.08	Primary

包装顺序(1)~(8)

(1) 将1层PE膜放入Tray中，再放入产品，然后在产品表面再放入1层PE膜。(放置过程中屏体台阶方向与Mark(箭头)方向相反)；

备注：屏体显示面朝上，每Tray有2层PE膜，屏体正面1层PE膜。

(5) 在包装袋外面套上气泡袋，然后放入内箱中

(2) ②不旋转同一个方向推叠

①正面

(3) 按同一个方向依次顺序叠放Tray，然后用胶布固定Tray量。产品60pcs/内箱；
1个TRAY装产品6pcs；
10个实装产品Tray, 1个空Tray。

(4) 将存在空Tray的放入2个包中捆紧，对角放置，其次用Inlon袋包装Tray盘并由真空密封包装。

(6) 完成内箱包装

厂内通用标签

产品名称	
规格型号	
数量	
日期	
操作人	
审核人	
备注	

(7) 两内箱装入一外箱

箱子封口

(8) 完成外箱包装

包装数量：产品 120 pcs/外箱；
1个TRAY 装产品 6 pcs；
20个实装产品TRAY, 2个空TRAY；
在外箱短边侧面的中间贴内贴厂内通用标签。

Notes:

- A.标签为厂内通用标签(外形大小: 120*100mm);
- B.标签为厂内通用标签(外形大小: 150*100mm);
- C.若屏体数量不足致纸箱未装满, 内箱实装产品Tray(即空Tray)至用真空袋封紧不变形后, 再套上缓冲气泡袋。

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No.	1	2	3	4	5
Description	OLED Module	Tray	PE Foam	Inner Box	Carton Box
Quantity	120	22	2	2	1

b) Box Label

- Label Information

1. Maker P/N : Supplier project name
2. P/O : LGE PO
3. P/N : LGE P/N
4. Q'ty : Quantity of 1 box
5. Desc : GOLED Module
6. Spec : 3.92" FHD
7. Date : shipment date
8. Vendor : TOVIS Co., Ltd
9. Origin : Manufacture Nationality
10. 생산일 : Product date
11. Color : BLACK
12. Supplier OQC: OQC date

- Information Example

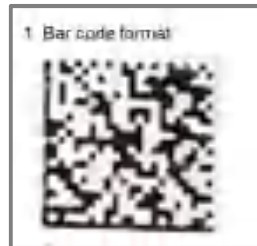
Visionox Technology Inc.				
产品标识卡				
物料号 (Product Spc)				
物料描述 (Product Spec Desc)				
批次 (Work Order)			QC检验(QC Test)	
数量 (QTY)				
净重 (NetWeight)	Kg	毛重 (GrossWeight)		Kg
PPBoxID				
备注				

9.4 Designation of Barcode Print

a) Barcode Print

1. QR Code Data Matrix Information

Part Number



L1E9202A4133AG

14 code

Total 14 code:

Ex.) L1E9202A4133AG

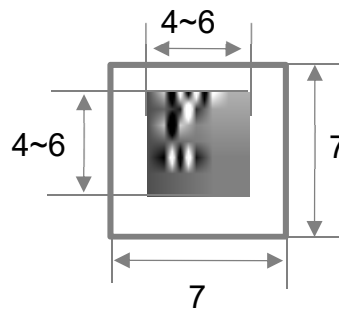
Part Number	*L1E9202A4133AG
-------------	-----------------

b) Barcode Print Position



c) Barcode Print Size

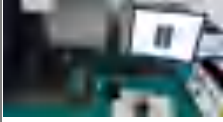


Size: 4×4mm ~ 6×6mm (Print area: 7mm x 7mm)



10 Qc Flow Char

No	Process	Photo	Sub-process
1	MATERIAL INSPECTION		01-1、MANUAL VISUAL INSPECTION 01-2、CELL TEST 01-3、CELL TP TEST
2	POL. ATTACH		02-1、CLEAN 02-2、POL ATTACH 02-3、 ATTACHMENT EFFECT CHECK Instructions: Lower border control standardPOL-Encap 0.6±0.1mm
3	COG BONDING		03-1、SOLVENT&PLASMA CLEAN 03-2、ACF ATTACH 03-3、PRE-BONDING 03-4、MAIN-BONDING 03-5、BONDING INSPECTION
4	FOG BONDING		04-1、ACF ATTACH 04-2、PRE-BONDING 04-3、MAIN-BONDING 04-4、BONDING INSPECTION
5	BONDING INSPECTION		05-1、BONDING INSPECTION
6	DISPENSER		06-1、2D CODING 06-2、GAP SEALING 06-3、BACK ON LINE SEALING 06-4、SURFACE SEALING
7	WATERPROOF GLUE ATTACH		07-1、FOF WATERPROOF GLUE ATTACH 07-2、FOF INSULATING TAPE ATTACH

8	Module Test		08-1、MANUAL VISUAL INSPECTION 08-2、MODULE TEST
9	TFOG		09-1、ACF ATTACH 09-2、PRE-BONDING 09-3、MAIN-BONDING 09-4、BONDING INSPECTION
10	TFOF		10-1、ACF ATTACH 10-2、MAIN-BONDING 10-3、BONDING INSPECTION
11	TP TEST		TP TEST
12	CUSHION TAPE		12-1、PANNEL CLEANING 12-2、CUSHION ATTACH 12-3、ATTACHMENT EFFECT CHECK
13	OTP		13-1、OTP
14	DE-MURA		14-1、DE-MURA
15	PROTECTIVE FILM		15-1、PANNEL CLEANING 15-2、POL. FILM ATTACH 15-3、ATTACHMENT EFFECT CHECK
16	ASSEMBLY		16-1、CUSHION BLOCK ATTACH 16-2、DOUBLE-SIDED TAPE ATTACH 16-3、WATERPROOF GLUE ATTACH 16-4、INSULATING TAPE ATTACH

No	Process	Photo	Sub-process
17	FINAL INSPECTION		17-1、DISPLAY FUNCTION INSPECTION 17-2、TP TEST 17-3、FINAL VISIONAL INSPECTION
18	FQC		18-1、DISPLAY FUNCTION INSPECTION 18-2、TP TEST 18-3、FINAL VISIONAL INSPECTION
19	PACKAGE		PACKAGE