MODEL NO. : TM045XYHP01-00

ISSUED DATE: 2012-1-9

VERSION : Ver 1.0

■**Preliminary Specification**
□**Final Product Specification**

Customer :

Approved by	Notes

SHANGHAI TIANMA Confirmed :

Prepared by	Checked by	Approved by
Lei_wang		

This technical specification is subjected to change without notice

Table of Contents

Record of Revision

Rev	Issued Date	Description	Editor
1.0	2012-1-9	Preliminary Specification Release	Lei_wang

1 General Specifications

Item	Specification	Uint
Substrate Thickness	0.25	mm
Panel Outline Dimension	58.5×106.34	mm
Active Screen Size(diagonal)	4.46	Inch
Active Area	55.485×98.64	mm
Resolution	540×RGB×960	pixel
Pixel Size	102.75×102.75	um
Pixel Arrangement	RGB stripe	/
Pixel Driving Element	IPS Normal black	/
Cell Gap	4.0	um
Viewing Direction	-	/
Gray Scale Inversion Direction	-	/
Weight (gram)		g
Suggested Driver IC	NT35516H-DP/3CB	/

Note 1: Viewing direction for best image quality is different from TFT definition, there is a 180 degree shift.

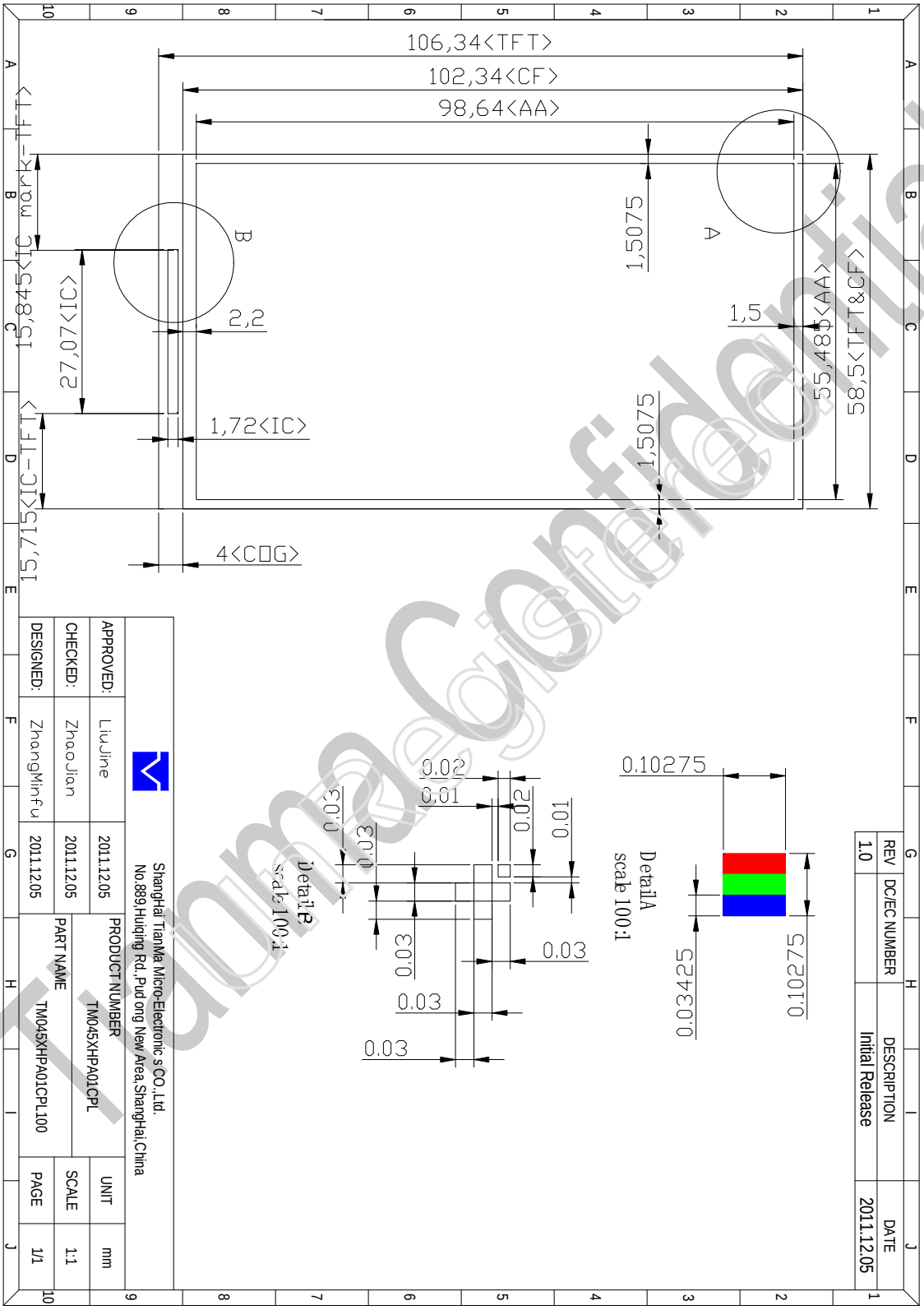
Note 2 : Requirements on Environmental Protection: Q/S0002

Note 3: Substrate represents TFT or CF side thickness.

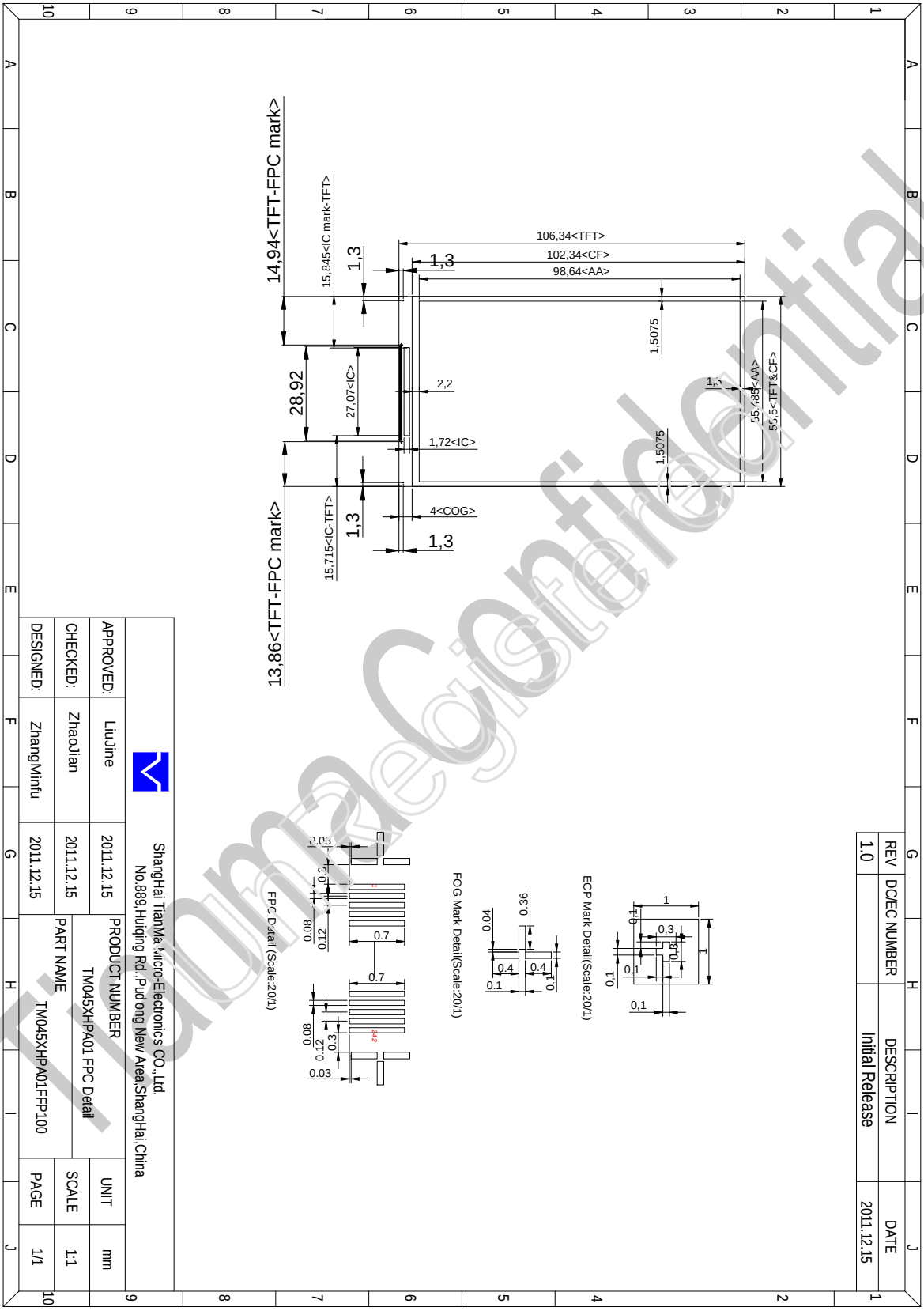
Note 4: LCD weight tolerance : ±5%

2 Dimension

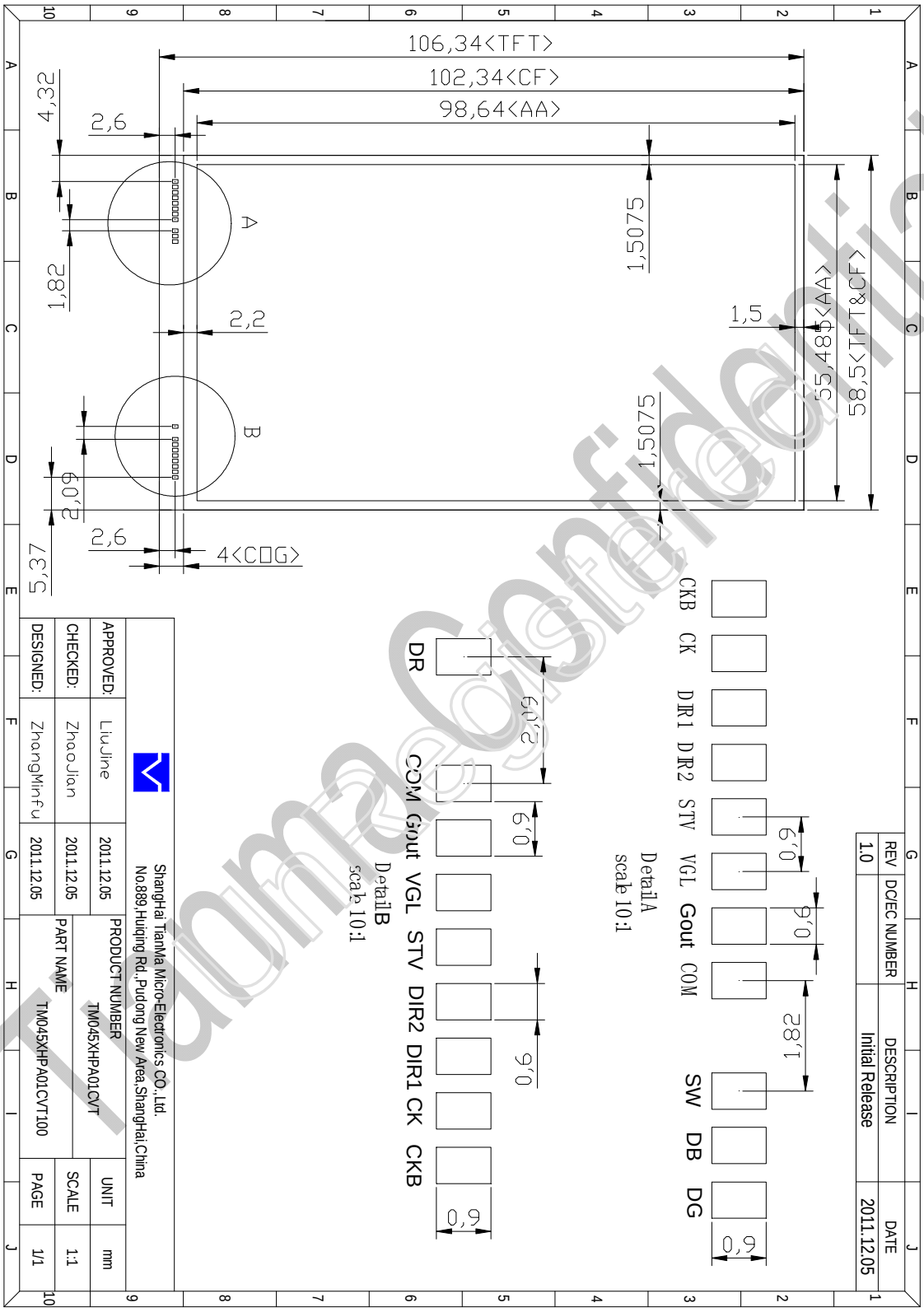
2.1 Outline Dimension



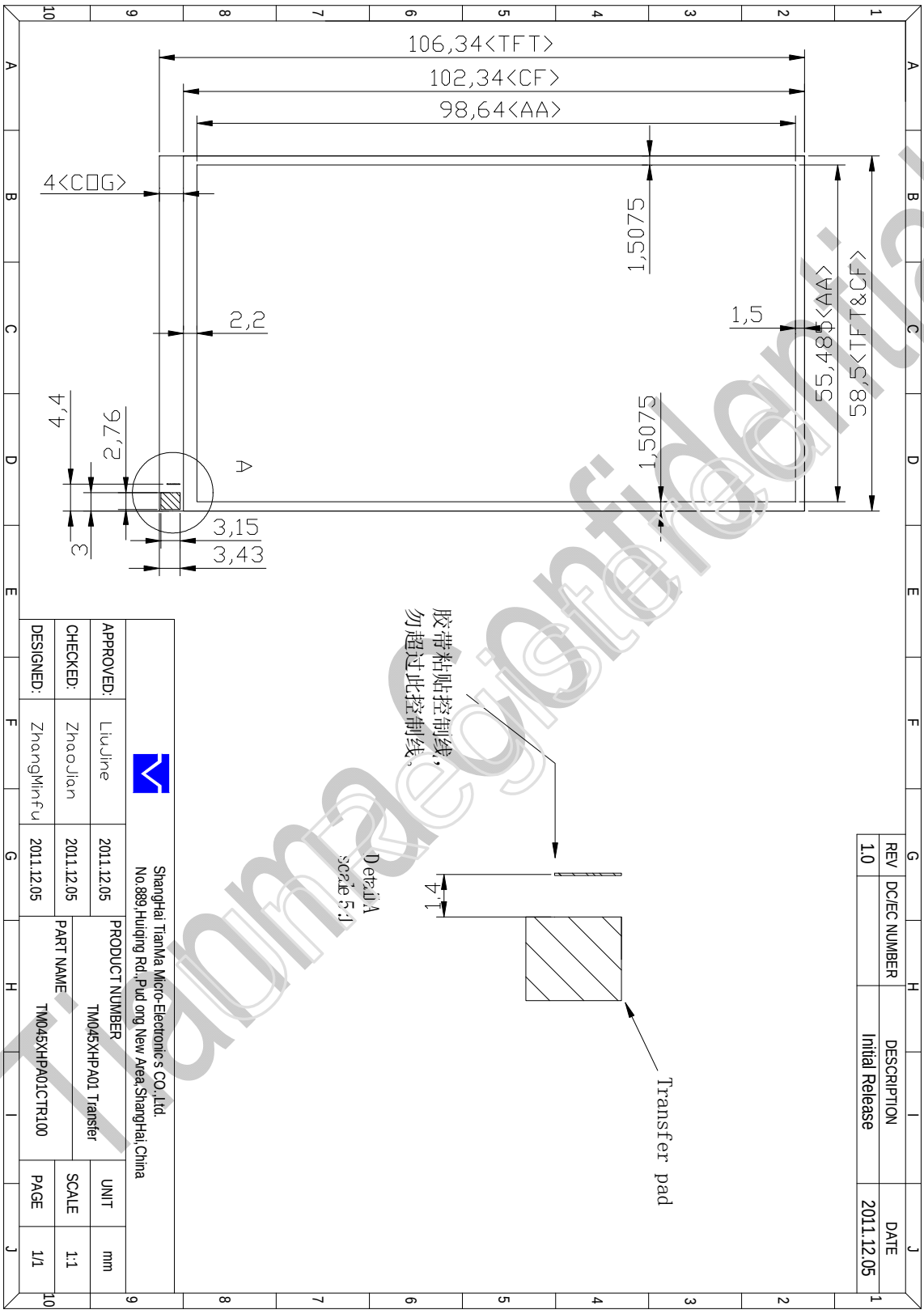
FPC Detail



Test Pad



Module Transfer pad location for CF ITO



3 FPC PIN Assignment

3.1 Pin Definition

IC	NT35516	HX8389-B	HX8389-A
1	DUMMY	DUMMY	DUMMY
2	GND	GND	GND
3	VCOM	VCOM	VCOM
4	FOG_TEST2	FOG_TEST2	FOG_TEST 2
5	FOG_TEST1	FOG_TEST1	FOG_TEST 1
6	VCOM	VCOM	VCOM
7	VCOM	VCOM	VCOM
8	DVSS	VSSD	VSSD
9	DVDD	VDDD	VDDD
10	VDDA	VDD3	VDD3
11	VDDA	VDD3	VDD3
12	AVSS	VSSA	VSSA
13	VGL	VGL	VGL
14	VGLX	VGL	VGL
15	VGHT	VGH	VGH
16	VGH	VGH	VGH
17	C51P	C51P	C51P
18	C51P	C51P	C51P
19	C51P	C51P	C51P
20	C51N	C51N	C51N
21	C51N	C51N	C51N
22	C51N	C51N	C51N
23	C41N	C41N	C41N
24	C41N	C41N	C41N
25	C41N	C41N	C41N
26	C41P	C41P	C41P
27	C41P	C41P	C41P
28	C41P	C41P	C41P
29	VSSB	VSSD_P	VSSD_P
30	VSSB	VSSD_P	VSSD_P
31	VDDB	VDD3_P	VDD3_P
32	VDDB	VDD3_P	VDD3_P
33	AVEE	VSN	VSN
34	AVEE	VSN	VSN
35	C23P	C23P	C23P
36	C23P	C23P	C23P
37	C23P	C23P	C23P

38	C23N	C23N	C23N
39	C23N	C23N	C23N
40	C23N	C23N	C23N
41	C22N	C22N	C22N
42	C22N	C22N	C22N
43	C22N	C22N	C22N
44	C22P	C22P	C22P
45	C22P	C22P	C22P
46	C22P	C22P	C22P
47	C21N	C21N	C21N
48	C21N	C21N	C21N
49	C21N	C21N	C21N
50	C21P	C21P	C21P
51	C21P	C21P	C21P
52	C21P	C21P	C21P
53	VCL	VCL	VCL
54	VCL	VCL	VCL
55	C32N	C32N	C32N
56	C32N	C32N	C32N
57	C32N	C32N	C32N
58	C32P	C32P	C32P
59	C32P	C32P	C32P
60	C32P	C32P	C32P
61	C31N	C31N	C31N
62	C31N	C31N	C31N
63	C31N	C31N	C31N
64	C31P	C31P	C31P
65	C31P	C31P	C31P
66	C31P	C31P	C31P
67	VSSB	VSSD_P	VSSD_P
68	VSSB	VSSD_P	VSSD_P
69	VDDB	VDD3_P	VDD3_P
70	VDDB	VDD3_P	VDD3_P
71	AVDD	VSP	VSP
72	AVDD	VSP	VSP
73	C13P	C13P	C13P
74	C13P	C13P	C13P
75	C13P	C13P	C13P
76	C13N	C13N	C13N
77	C13N	C13N	C13N
78	C13N	C13N	C13N
79	C12N	C12N	C12N

80	C12N	C12N	C12N
81	C12N	C12N	C12N
82	C12P	C12P	C12P
83	C12P	C12P	C12P
84	C12P	C12P	C12P
85	C11N	C11N	C11N
86	C11N	C11N	C11N
87	C11N	C11N	C11N
88	C11P	C11P	C11P
89	C11P	C11P	C11P
90	C11P	C11P	C11P
91	AVSS	VSSD_P	VSSD_P
92	AVSS	VSSD_P	VSSD_P
93	CSN	DUMMY10	DUMMY10
94	EXTN	VCSW1	VCSW1
95	EXTN	VCSW1	VCSW1
96	CSP	DUMMY9	DUMMY9
97	EXTP	VCSW2	VCSW2
98	EXTP	VCSW2	VCSW2
99	VREFCP	DUMMY7	DUMMY7
100	VREFCP	DUMMY6	DUMMY6
101	VSSR	VSSD	VSSD
102	VSSR	VSSD	VSSD
103	TE_R	TE_R	TE_R
104	VDDR	VDD3	VDD3
105	VDDR	VDD3	VDD3
106	VSSAM	HS_VSS	HS_VSS
107	HSSI_D21_N	HS_D21_N	HS_D21_N
108	HSSI_D21_N	HS_D21_N	HS_D21_N
109	HSSI_D21_P	HSSI_D21_P	HSSI_D21_P
110	HSSI_D21_P	HSSI_D21_P	HSSI_D21_P
111	VSSAM	HS_VSS	HS_VSS
112	HSSI_D0_N	HS_D0_N	HS_D0_N
113	HSSI_D0_N	HS_D0_N	HS_D0_N
114	HSSI_D0_P	HS_D0_P	HS_D0_P
115	HSSI_D0_P	HS_D0_P	HS_D0_P
116	VSSAM	HS_VSS	HS_VSS
117	HSSI_CLK_N	HS_CLK_N	HS_CLK_N
118	HSSI_CLK_N	HS_CLK_N	HS_CLK_N
119	HSSI_CLK_P	HS_CLK_P	HS_CLK_P
120	HSSI_CLK_P	HS_CLK_P	HS_CLK_P

121	VSSAM	HS_VSS	HS_VSS
122	HSSI_D1_N	HS_D1_N	HS_D1_N
123	HSSI_D1_N	HS_D1_N	HS_D1_N
124	HSSI_D1_P	HS_D1_P	HS_D1_P
125	HSSI_D1_P	HS_D1_P	HS_D1_P
126	VSSAM	HS_VSS	HS_VSS
127	HSSI_D22_N	HS_D22_N	HS_D22_N
128	HSSI_D22_N	HS_D22_N	HS_D22_N
129	HSSI_D22_P	HS_D22_P	HS_D22_P
130	HSSI_D22_P	HS_D22_P	HS_D22_P
131	VSSAM	HS_VSS	HS_VSS
132	VSSAM	HS_VSS	HS_VSS
133	MVDDL	HS_LDOL	HS_LDOL
134	VDDAM	HS_VCC	HS_VCC
135	VDDAM	HS_VCC	HS_VCC
136	VDDAM	HS_VCC	HS_VCC
137	MVDDA	HS_LDO	HS_LDO
138	MVDDA	HS_LDO	HS_LDO
139	MVDDA	HS_LDO	HS_LDO
140	DVDD	VDDD	VDDD
141	DVDD	VDDD	VDDD
142	DVSS	VSSD	VSSD
143	DVSS	VSSD	VSSD
144	AVEE	VSN	VSN
145	AVEE	VSN	VSN
146	AVDD	VSP	VSP
147	AVDD	VSP	VSP
148	VDDA	VDD3	VDD3
149	VDDA	VDD3	VDD3
150	VSSI	VSSD	VSSD
151	VSSI	VSSD	VSSD
152	VDDI	VDD1	VDD1
153	VDDI	VDD1	VDD1
154	ERR	ERR	ERR
155	LEDON	CABC_LED_EN	CABC_LED_EN
156	LEDPWM	CABC_PWM_OUT	LEDPWM
157	VS	VSYNC	VSYNC
158	HS	HSYNC	HSYNC
159	PCLK	PCLK	PCLK
160	DE	DE	DE
161	D0	DB0	DB0
162	D1	DB1	DB1

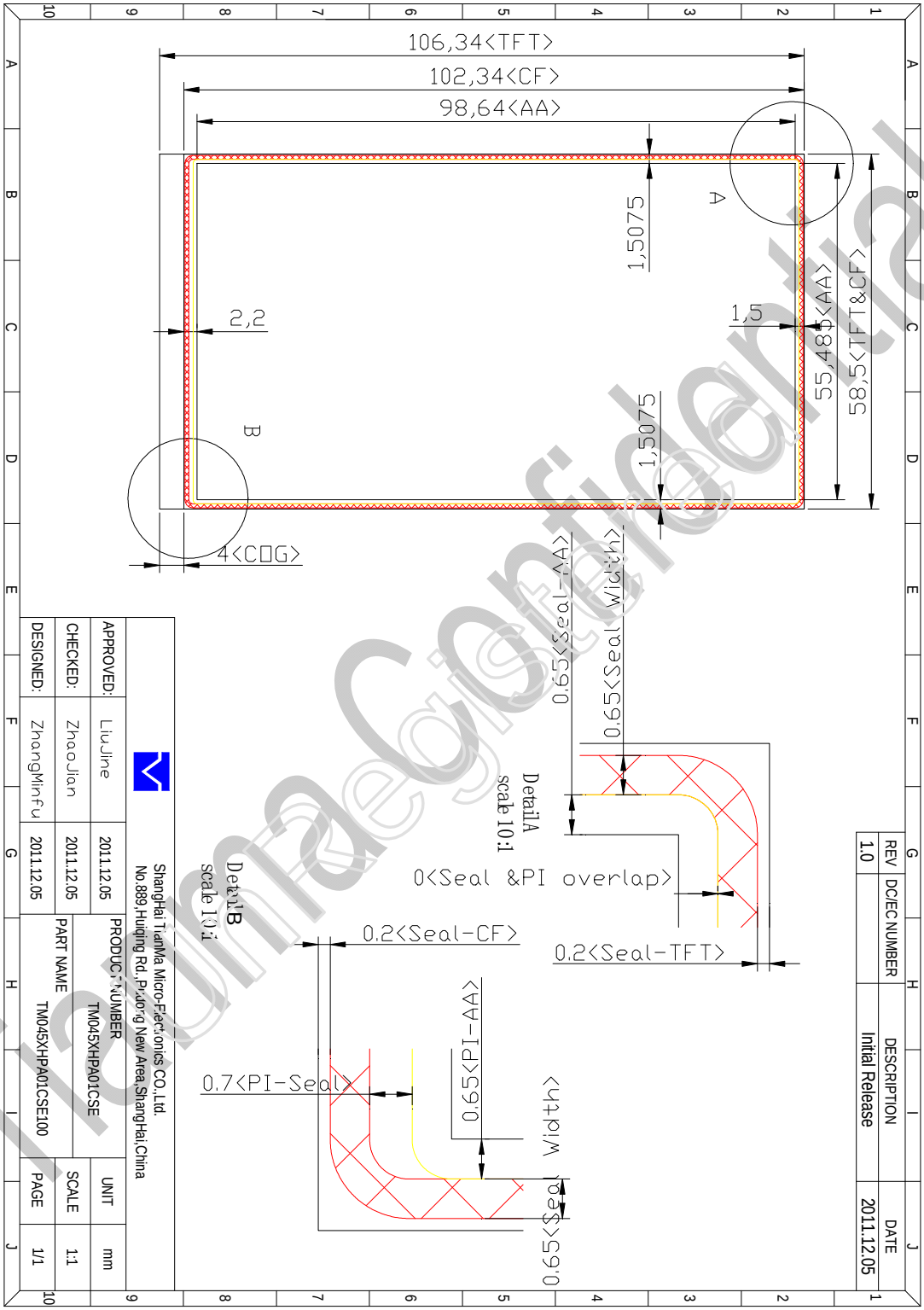
163	D2	DB2	DB2
164	D3	DB3	DB3
165	D4	DB4	DB4
166	D5	DB5	DB5
167	D6	DB6	DB6
168	D7	DB7	DB7
169	D8	DB8	DB8
170	D9	DB9	DB9
171	D10	DB10	DB10
172	D11	DB11	DB11
173	D12	DB12	DB12
174	D13	DB13	DB13
175	D14	DB14	DB14
176	D15	DB15	DB15
177	D16	DB16	DB16
178	D17	DB17	DB17
179	D18	DB18	DB18
180	D19	DB19	DB19
181	D20	DB20	DB20
182	D21	DB21	DB21
183	D22	DB22	DB22
184	D23	DB23	DB23
185	VDDI	VDD1	VDD1
186	VDDI	VDD1	VDD1
187	VSSI	VSSD	VSSD
188	VSSI	VSSD	VSSD
189	RESX	RESX	RESX
190	CSX	CSX	CSX
191	RDX	RDX	RDX
192	WRX	WRX_SCL	WRX_SCL
193	DCX	DCX	DCX
194	SDI	SDI	SDI
195	SDO	SDO	SDO
196	TE_L	TE	TE
197	EXB1T	DUMMY3	DUMMY3
198	GPO2	GPO2	GPO2
199	IM0	IM0	IM0
200	IM1	IM1	IM1
201	IM2	IM2	IM2
202	IM3	IM3	IM3
203	RGBBP	DUMMY1	DUMMY1
204	AVSS	VSSAC	VSSAC
205	AVSS	VSSAC	VSSAC
206	DVDD	VDDD	VDDD

207	DVDD	VDDD	VDDD
208	DVSS	VSSD	VSSD
209	DVSS	VSSD	VSSD
210	VGMP	VSPR	VSPR
211	VGMN	VSNR	VGSP
212	VDD_DET	VDD2	VDD2
213	VSSR	VSSD	VSSD
214	VDDR	VDD2	VDD2
215	VDDA	VDD3	VDD3
216	VDDA	VDD3	VDD3
217	VDDA	VDD3	VDD3
218	VDDA	VDD3	VDD3
219	VSSA	VSSA	VSSA
220	VSSA	VSSA	VSSA
221	VSSA	VSSA	VSSA
222	VREF	VREF	VREF
223	VREF	VREF	VREF
224	VCL	VCL	VCL
225	VCL	VCL	VCL
226	VCL	VCL	VCL
227	VCL	VCL	VCL
228	VGLX	VGL	VGL
229	VGLX	VGL	VGL
230	MTP_PWR	OTP_PWR	OTP_PWR
231	MTP_PWR	OTP_PWR	OTP_PWR
232	VCOM	VCOM	VCOM
233	VCOM	VCOM	VCOM
234	COG_TEST1	DUMMYR_1B_L	DUMMYR_1B_L
235	COG_TEST2	DUMMYR_1A_L	DUMMYR_1A_L
236	LANSEL	LANSEL	LANSEL
237	DSWAP0	DSWAP0	DSWAP0
238	DSWAP1	DSWAP1	DSWAP1
239	PSWAP	PSWAP	PSWAP
240	VCOM	VCOM	VCOM
241	GND	GND	GND
242	DUMMY	DUMMY	DUMMY

Note 1：Must be used according to related IC spec；

4 Cell Process Rule

4.1 Seal Pattern



5 Electrical Specification

Item	Symbol	Specification			Unit
		Min	Typ	Max	
TFT Gate On Voltage	VGH	--	+15	--	V
TFT Gate Off Voltage	VGL	--	-10	--	V

Note:

(1) Vcom must be adjusted to optimize display quality: cross talk, contrast ratio and etc.

(2) VGH is TFT gate on voltage

(3) VGL is TFT gate off voltage

The storage capacitance structure of this product is Cst(Storage on Common).

The low voltage level of VGL signal must be fluctuated with same phase as Vcom, in case of Storage on Gate structure.

(4) Environmental condition: 25℃

6 Optical Specification

6.1 Optical Specification

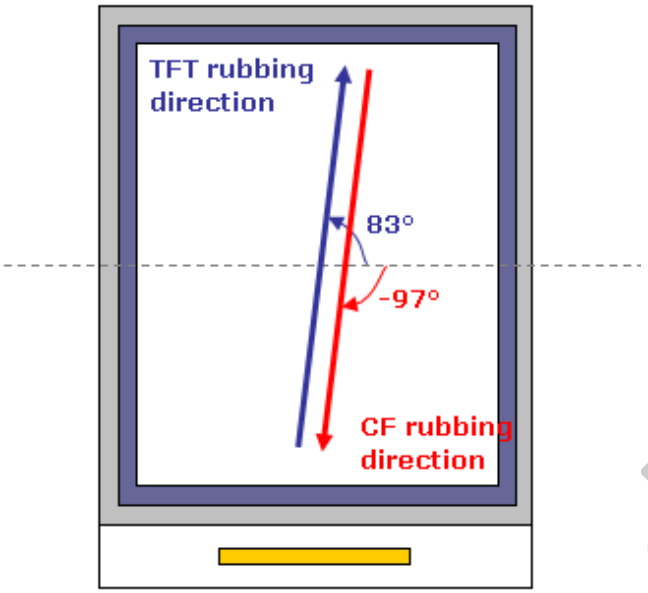
Light Source :C-light Ta=25℃

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10		80	--	Degree	Note 2
		θB			80	--		
		θL			80	--		
		θR			80	--		
Contrast Ratio		CR	θ=0°	600	800	--		Note1 Note3
Response Time		T_{ON}	25℃	-	10	15	ms	Note1 Note4
		T_{OFF}		-	15	20		
		GTG		-	35	45		
Chromaticity	White	x	C-light	0.299	0.319	0.339		Note5 Note1
		y		0.336	0.356	0.376		
	Red	x		0.640	0.660	0.680		
		y		0.315	0.335	0.355		
	Green	x		0.248	0.268	0.288		
		y		0.560	0.580	0.600		
	Blue	x		0.120	0.140	0.160		
		y		0.078	0.098	0.118		
Flicker						-30	dB	
NTSC				65	70	--	%	Note 5
Transmittance		L		3.2	3.7	--	%	Note1 (without APF)

Test Conditions:

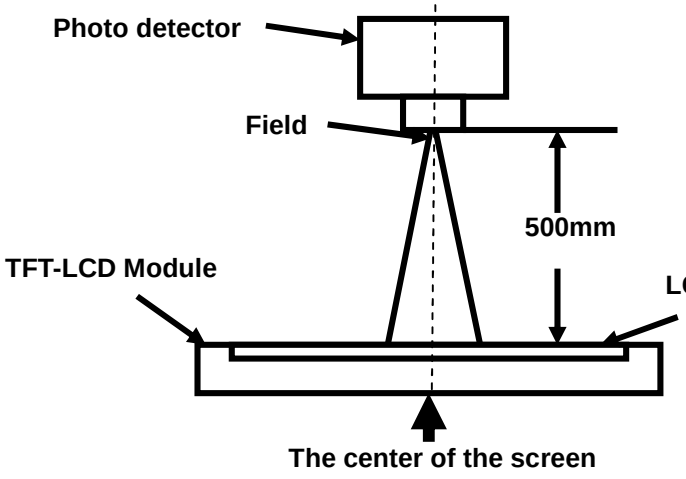
1. The ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2

6.2 Rubbing Direction



Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Chromaticity		
Response Time	BM-7A	2°

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

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).

Viewing angle is measured With Normal Polarizer.

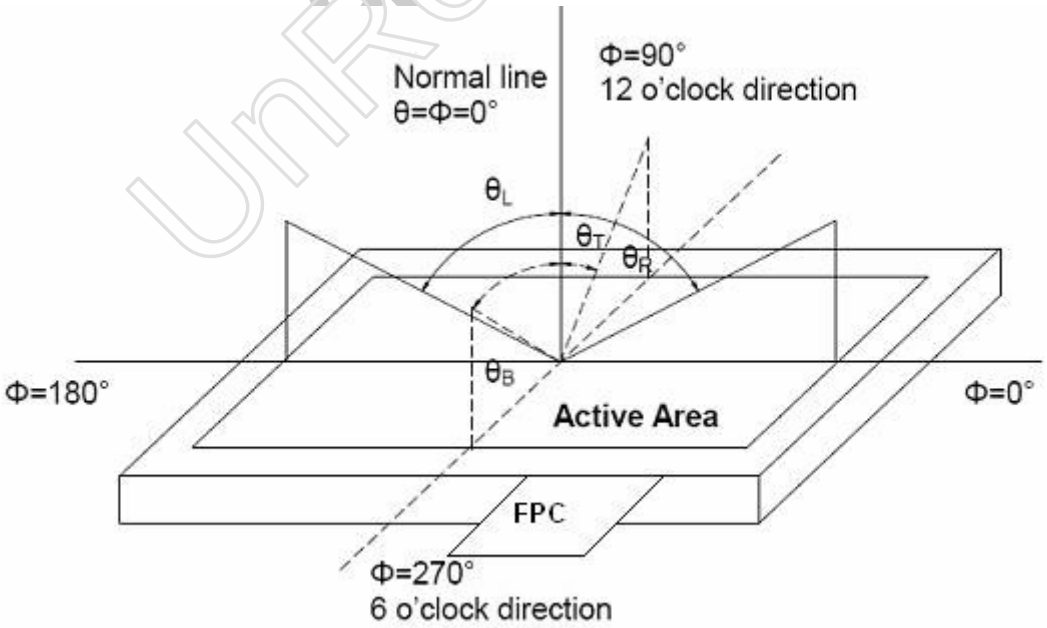


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

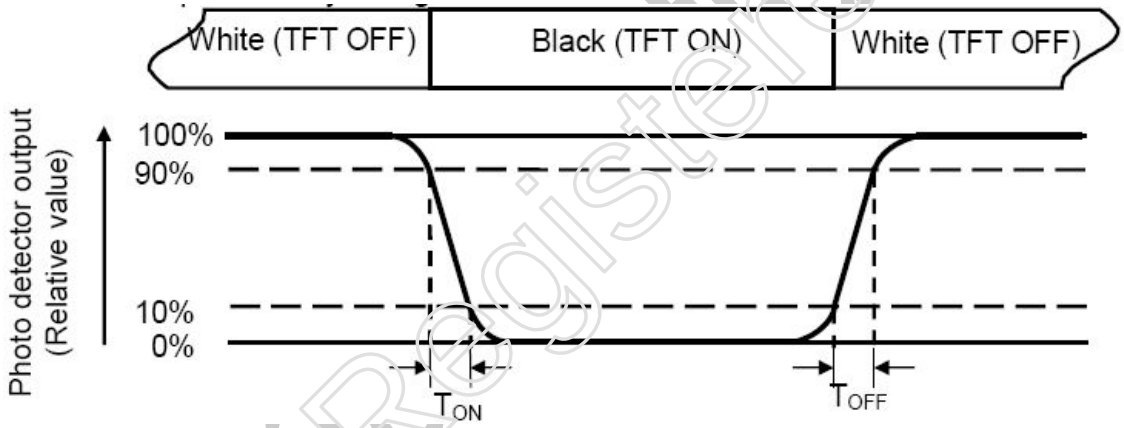
“White state “:The state is that the LCD should driven by Vwhite.

“Black state”: The state is that the LCD should driven by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: Definition of Response time

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



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

7 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts=+70℃, 240hrs,10pcs	Note1 IEC60068-2-2,GB2423.2—89
2	Low Temperature Operation	Ta=-20℃, 240hrs,10pcs	IEC60068-2-1 GB2423.1—89
3	High Temperature Storage	Ta=+80℃, 240hrs,5pcs	IEC60068-2-2, GB2423.2—89
4	Low Temperature Storage	Ta=-30℃, 240hrs,5pcs	IEC60068-2-1 GB2423.1—89
5	High Temperature & High Humidity Operation	Ta=+60℃, 90% RH 240hours,5pcs	Note2 IEC60068-2-3, GB/T2423.3—2006
6	Thermal Shock (Non-operation)	-30℃ 30 min~+70℃ 30 min, Change time:3min, 100 Cycles, 5pcs	Start with cold temperature, End with high temperature, IEC60068-2-14,GB2423.22—87
7	Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total)(Package condition)	IEC60068-2-6 GB/T2423.10—1995
8	Package Drop Test	Height: 80 cm，1 corner. 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8—1995

Note1: Ts is the temperature of panel's surface.

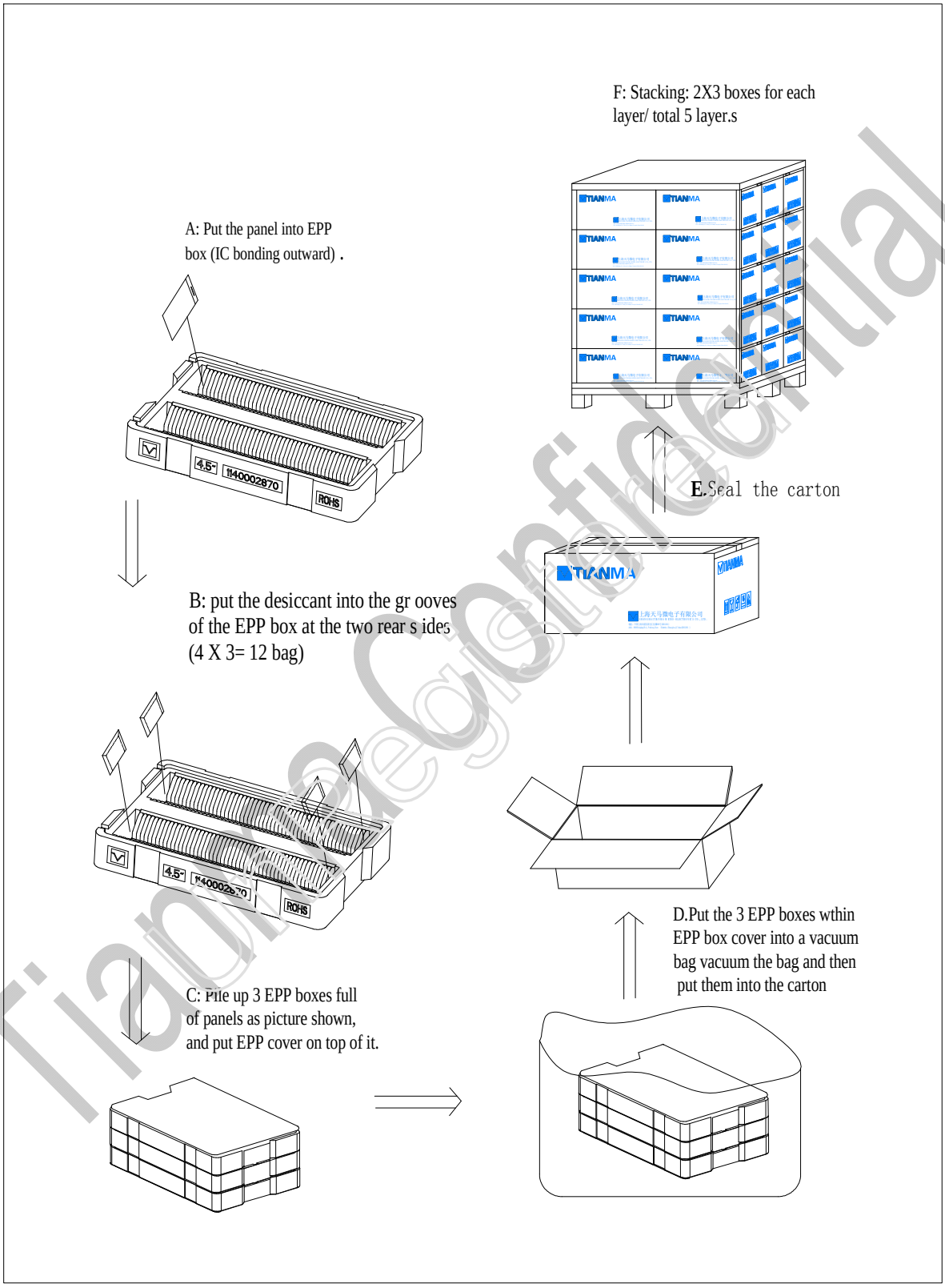
Note2: Ta is the ambient temperature of samples.

8 Packing Form

1.Packaging Material

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCD	TM045XYHP01-00	58.50×106.34×0.5	TBD	300	
2	Carton	Corrugated paper	530×350×288	1.10	1	
3	Vacuum bag	NY/AL/CPE	900×630	0.075	1	
4	EPP Box	Expanded polypropylene	513×333×83	0.318	3	
5	EPP Cover	Expanded polypropylene	513×333×22	0.125	1	
6	DESSICANT		45×35 (2 克)	0.002	12	
7	Total weight	TBD ± 10%				

2.Packaging Specification and Quantity



9 Precautions for Use of LCD

9.1 Handling Precautions

9.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

9.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.4 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

9.1.5 Do not attempt to disassemble the LCD.

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

9.1.7 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

9.1.7.1 Be sure to ground the body when handling the LCD.

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

9.1.7.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

9.2 Storage precautions

9.2.1 When storing the LCD, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.2.2 The LCD should be stored under the storage temperature range. If the LCD will be stored for a long time, the recommend condition is:

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

9.2.3 The LCD should be stored in the room without acid, alkali and harmful gas.

9.3 Transportation Precautions:

The LCD should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.