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Chunghwa Picture Tubes, Ltd.
Technical Specification

To : **Samrterglass**

Date : 160629

TFT LCD

CLAA080FP01

ACCEPTED BY : V0.0

Tentative

APPROVED BY	CHECKED BY	PREPARED BY
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REVISION STATUS

NO	Description	Page	Rev. Date
1	First revision (Tentative)		2014.03.07
2	Add EE & ME spec in page 5,6,8,9,12,14,15		2014.05.12

Table of Content

1. OVERVIEW

CPT **CLAA080FP01** is 8" color TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel , driver ICs ,control circuit, Utilizes a panel with a 10:16 aspect ratio.

The 8” screen produces a high resolution image that is composed of 2,304,000 (1200x1920) pixel elements in a stripe arrangement.

General specifications are summarized in the following table:

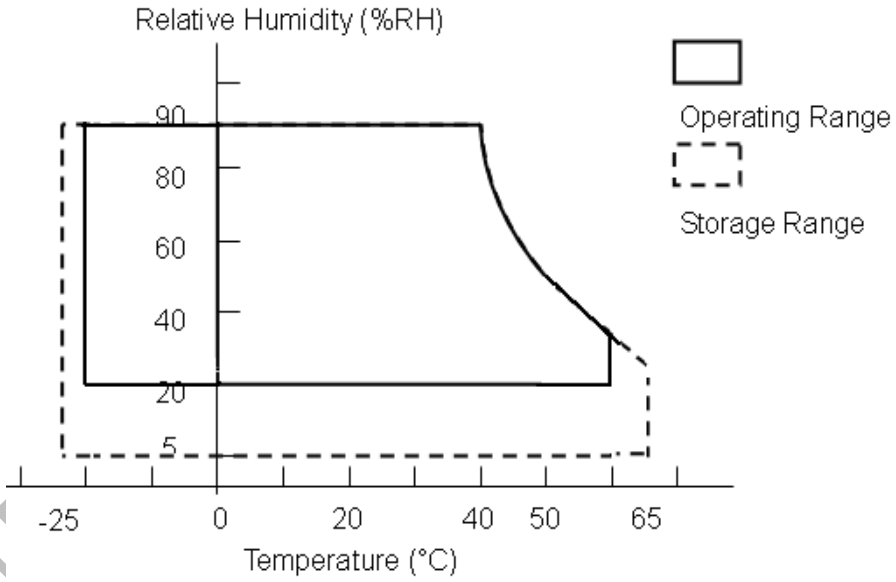
ITEM	SPECIFICATION
Panel Size	8" inch
Display Area (mm)	107.64(W) x 172.224(H)
Number of Pixels (dot)	1200(H) x 3(RGB) x 1920(V)
Pixel Pitch(mm)	0.0897(W) x 0.0897(H)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally black FFS
Number of Colors	16.7M(8bits)(MIPI)
Luminance (cd/m^2)	390nit (TYP)
Contrast Ratio	900
Optimum Viewing Angle	12 o'clock
Video Signal Interface	CPU I/F with18 bit
Weight (g)	75g (TYP.)
Outline Dimension (mm)	114.6 (H)×184.1 (V)×2.15 (D) (Typ.)(mm)
Surface Treatment	Top:HC,

The LCD Products listed on this document are not suitable for use of aerospace equipments, submarine cables, nuclear reactor control systems and life support systems. If customers intend to use these LCD products for above applications or not listed in "Standard" as follows, please contact our sales people in advance.

2. ABSOLUTE MAXIMUM RATINGS

(GND=0V) (Note 1)

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power supply for Logic	VDD	-0.3	5.5	V	
Forward current （per LED）	I_F	---	30	mA	Note 4
Pulse forward current （per LED）	I_{FP}	---	100	mA	Note 4
Reverse voltage （per LED）	V_R	---	5	V	Note 4
Operating temperature	Topa	-20	60	℃	Note 3
Storage temperature	Tstg	-25	65	℃	Note 3
Forward Current （per LED）	If		30	mA	
Reverse Voltage （per LED）	VR		5	V	
Pulse forward current （per LED）	Ifp		100	mA	*5). 6)



Note 1. If the module exceeds the absolute maximum ratings, it may be damaged permanently. Also, if the module operated with the absolute maximum ratings for a long time, its reliability may drop.

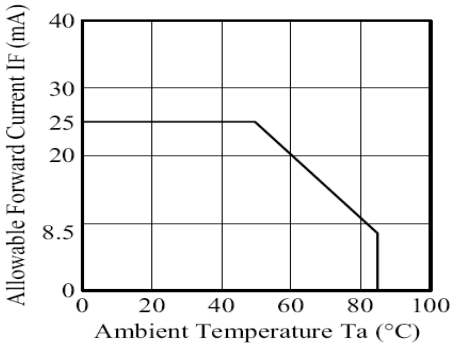
Note 2. DBN(N=0 ~17), /CS , /RS , /WR , /RD, /nRESET.

Note 3. The display function wise is no problem.

Note 4. If you operate LCD in normal temperature range, the center surface of panel should be under 50℃.

Note 5. Ifp Conditions ： Pulse Width≦10msec and Duty≦1/10。

Note 6. When LED shall be operated under following drawing (Ambient Temperature /Allowable Forward Current)



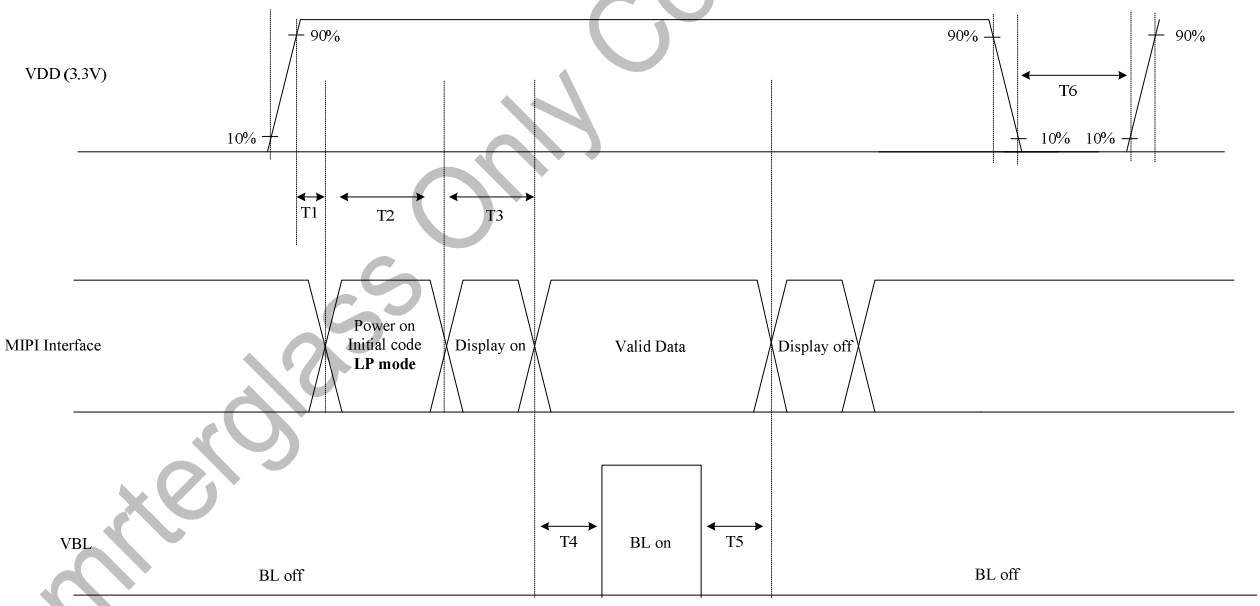
3. ELECTRICAL CHARACTERISTICS

3.1 Typical operating conditions

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
LCD Power Voltage	VDD	3	3.3	3.6	V	*1)
LCD Power Current	IVDD	-	TBD	TBD	mA	*2)

【Note】

*1) Power Sequence：

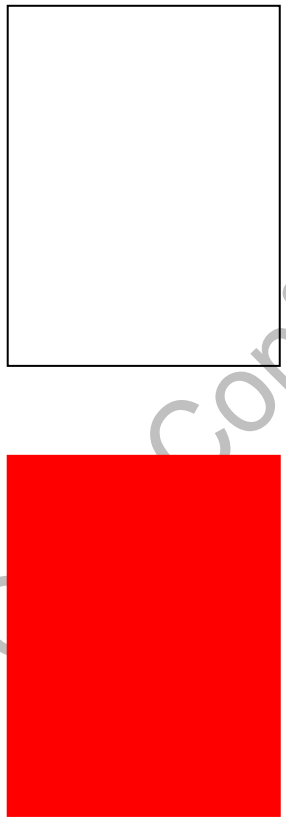


Parameter	Min.	Max.	Units
T1	5		ms
T2	180		
T3	100		
T4	200		
T5	200		
T6	500		

※Please refer to initial code

*2) Max. value is White and R/G/B Pattern：1920 line mode。

Circuit condition (Max.)：VDD=3.3 V，f_V=60 Hz，f_H=77.76 kHz，f_{CLK}=159.59 MHz



3.2 Backlight

(a) ELECTRICAL CHARACTERISTICS

Ta=25℃

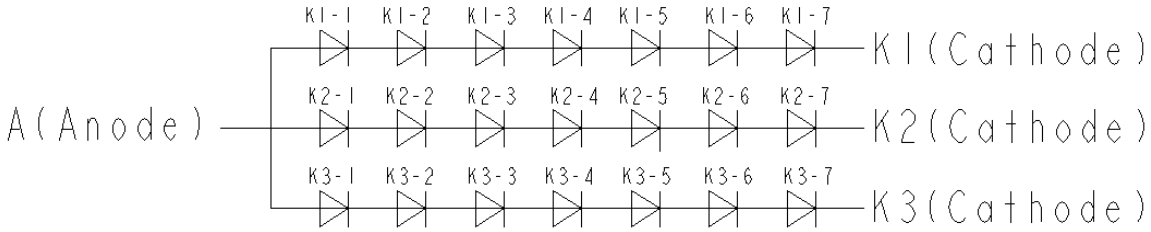
ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
LED Total Iuput Voltage	VBL+	-	19.95	21	V	
LED Total Input Current	IBL+	-	63	-	mA	*1) *2)*3)
Power consumption	PLED	-	-	1.33	W	

(b) LED LIFE – TIME

ITEM	Condition	min	typ	max	UNIT	NOTE
LIFE TIME	IF=21mA、Ta=25℃	10000	x	x	**hrs**	***4)**

【Note】

*1)LED Circuit Diagram：



*2) A：Anode(＋)，K：Cathode(－)

*3) Calculator value for reference $I_F \times V_F \times N = PLED$

*4) Life time means that estimated time to 50% degradation of initial luminous intensity.

*5) In order to avoid quality issue. Constant current need to used in LED driving.

4. INTERFACE PIN CONNECTION

4.1 Pin Assignment

Outlet connector: FH26W-39S-0.3SHW (HRS) / MSA24052P39D(STM)

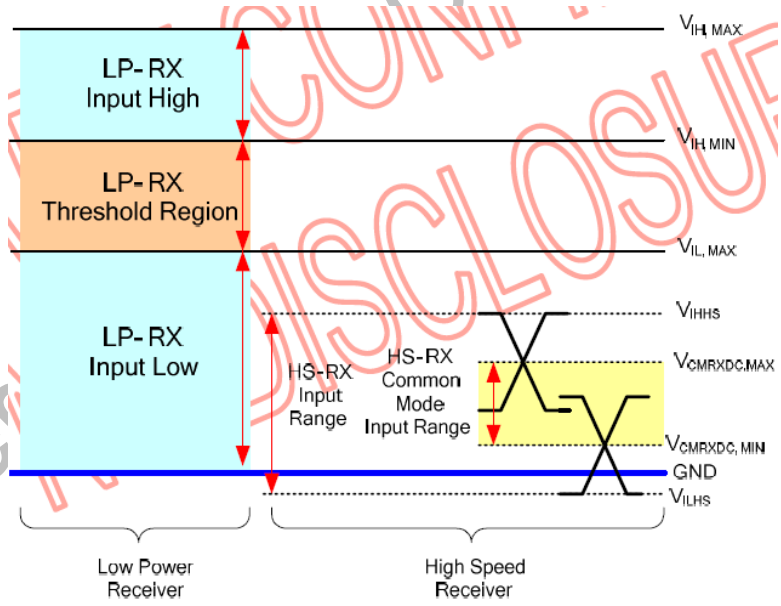
NO	SYMBOL	FUNCTION	REMARK(DEFAULT)
1	VDD	Power Supply, 3.3V(Typical)	
2	VDD	Power Supply, 3.3V(Typical)	
3	VDD	Power Supply, 3.3V(Typical)	
4	VDD	Power Supply, 3.3V(Typical)	
5	VPP (for CPT internal use)	Please float this pin for normal operation	
6	NC	Please float this pin for normal operation	
7	NC	Please float this pin for normal operation	
8	LED_PWM_OUT		
9	NC	Please float this pin for normal operation	
10	NC	Please float this pin for normal operation	
11	GND	GND	
12	D0_P	MIPI data input pin	
13	D0_N	MIPI data input pin	
14	GND	GND	
15	D1_P	MIPI data input pin	
16	D1_N	MIPI data input pin	
17	GND	GND	
18	CLK_P	MIPI clock input pin	
19	CLK_N	MIPI clock input pin	
20	GND	GND	
21	D2_2P	MIPI data input pin	
22	D2_2N	MIPI data input pin	
23	GND	GND	
24	D3_P	MIPI data input pin	
25	D3_N	MIPI data input pin	
26	GND	GND	
27	GND	GND	
28	ID		
29	STBYB	L: TCON and source driver will turn off H: Normal operation	
30	LEDFB1	LED current feedback1	
31	LEDFB2	LED current feedback 2	
32	LEDFB3	LED current feedback 3	
33	NC	Please float this pin for normal operation	
34	NC	Please float this pin for normal operation	
35	NC	Please float this pin for normal operation	
36	NC	Please float this pin for normal operation	
37	NC	Please float this pin for normal operation	
38	LED VOUT	LED output voltage	
39	LED VOUT	LED output voltage	

5. AC CHARACTERISTICS

5.1 MIPI Interface Timing Sequence

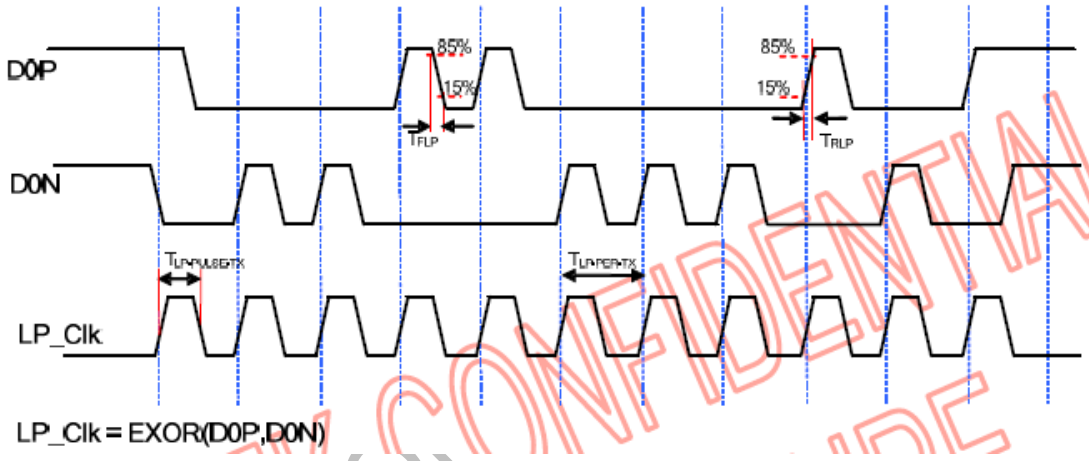
(a) MIPI interface DC characteristic：

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
MIPI Characteristics for High Speed Receiver						
Single-endedl input low voltage	V_{ILHS}	-40	-	-	mV	
Single-endedl input high voltage	V_{IHHS}	-	-	460	mV	
Common-mode voltage	V_{CMRXDC}	155	-	330	mV	
Differential input impedance	Z_{ID}	80	100	125	ohm	
Differential input high threshold	V_{IDTH}	-	-	70	mV	
Differential input low threshold	V_{IDTL}	70	-	-	mV	
MIPI Characteristics for Low Power Mode						
Pad signal voltage range	V_I	-50	-	1350	mV	
Ground shift	V_{GNDSH}	-50	-	50	mV	
Output low level	V_{OL}	-150	-	150	mV	
Output high level	V_{OH}	1.1	1.2	1.3	V	



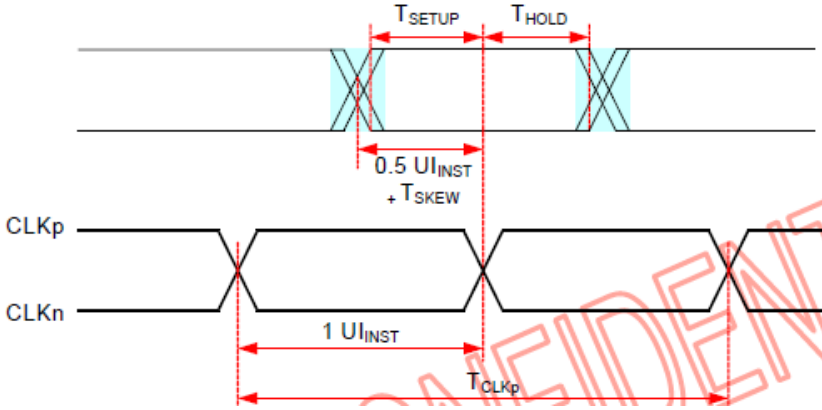
(b) MIPI LP AC characteristic：

Parameter	Symbol	Min	Typ	Max	Units
15%-85% rise time and fall time	T_{RLP} / T_{FLP}	-	-	25	ns
Pulse width of the LP exclusive-OR clock	$T_{LP\text{-}PULSE\text{-}TX}$	50	-	-	ns
Period of the LP exclusive-OR clock	$T_{LP\text{-}PER\text{-}TX}$	100	-	-	ns



(b) MIPI High speed AC characteristic：

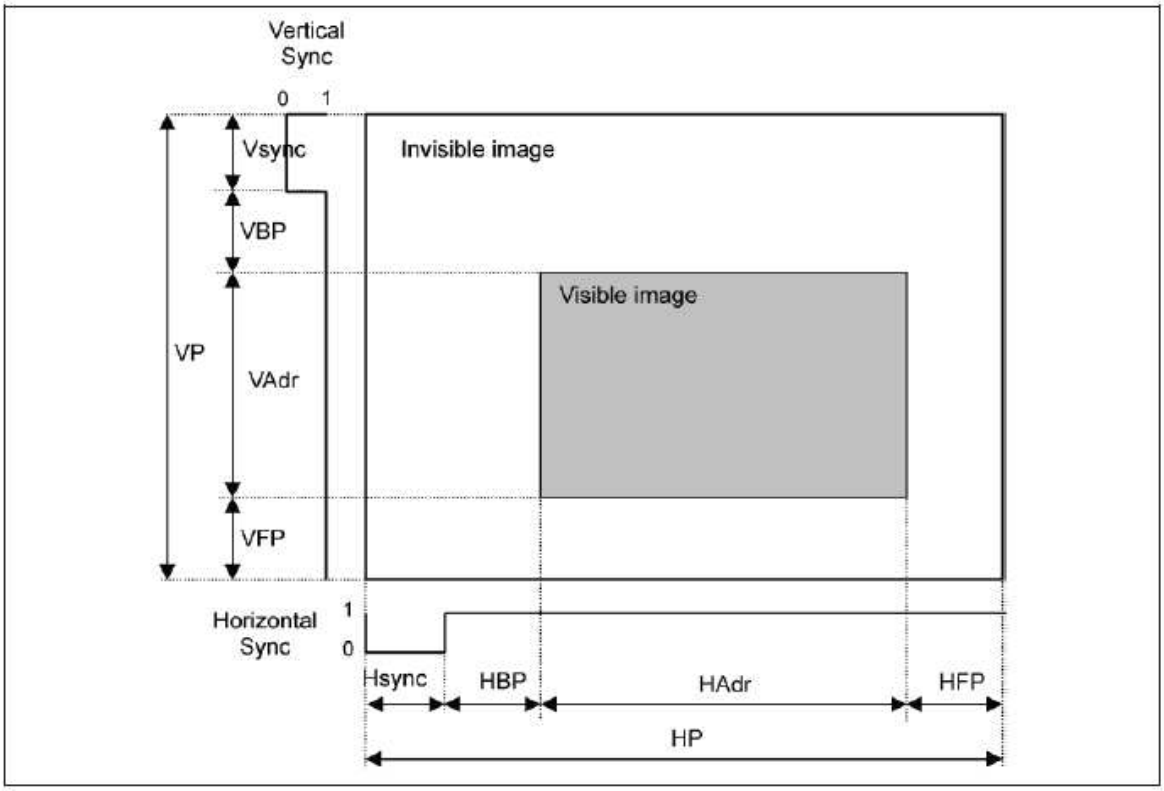
Parameter	Symbol	Min	Typ	Max	Units
UI instantaneous	UI_{INST}	1.0	-	12.5	ns
Data to Clock Setup Time	T_{SETUP}	0.3	-	-	UI_{INST}
Data to Clock Hold Time	T_{HOLD}	0.3	-	-	UI_{INST}



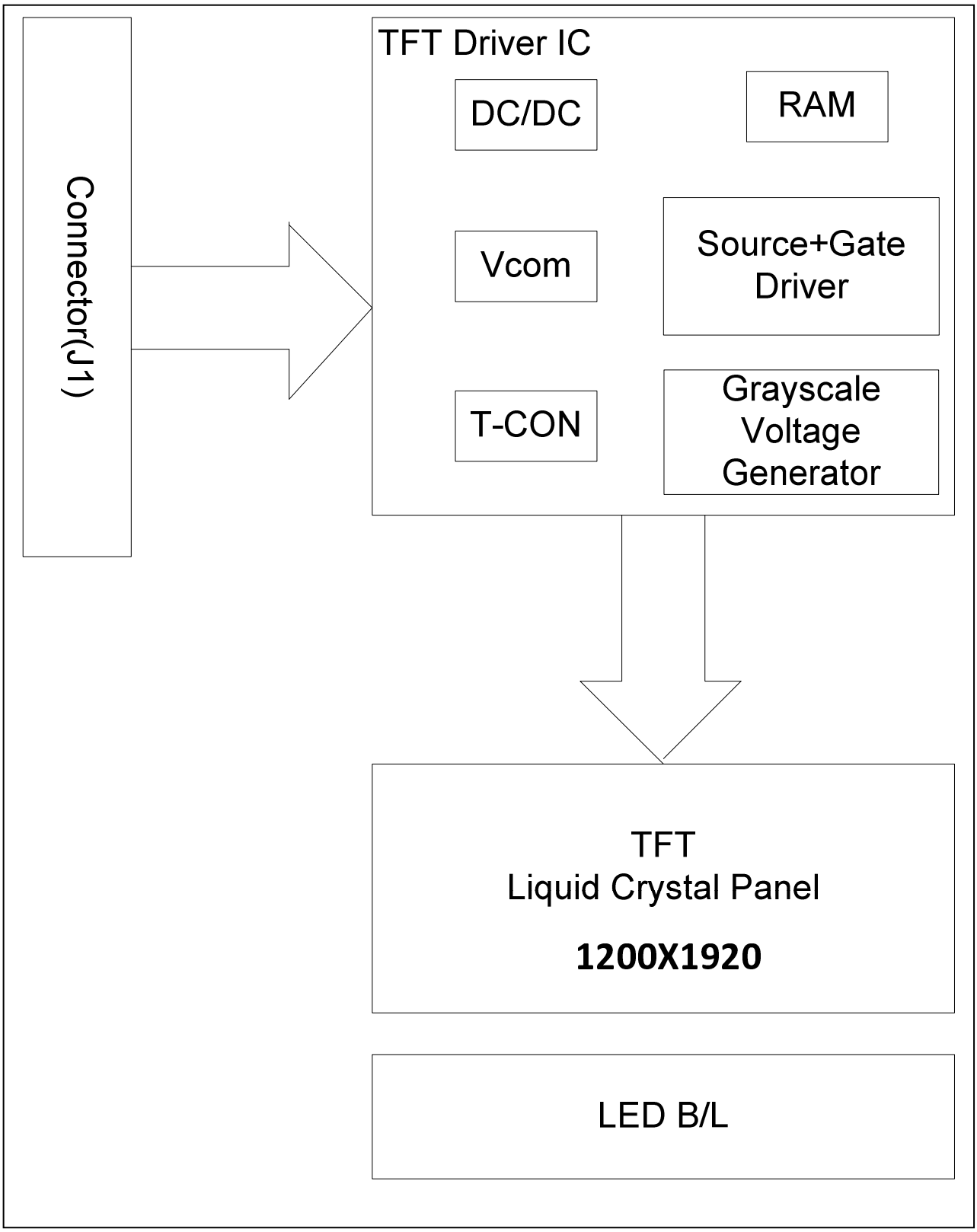
5.2 Timing Chart

ITEM			SYNBOL	Timing	UNIT
LCD	Frame Rate		-	60	Hz
Timing	DCLK	Frequency	fCLK	151.55	MHz
		Period	Tclk	6.6	ns
	Horizontal	Horizontal total time	tHP	1275	t_{CLK}
		Horizontal Active time	tHadr	1200	t_{CLK}
		Horizontal Pulse Width	tHsync	1	t_{CLK}
		Horizontal Back Porch	tHBP	32	t_{CLK}
		Horizontal Front Porch	tHFP	42	t_{CLK}
	Vertical	Vertical total time	tvp	1981	t_H
		Vertical Active time	tVadr	1920	t_H
		Vertical Pulse Width	tVsync	1	t_H
		Vertical Back Porch	tVBP	25	t_H
		Vertical Front Porch	tVFP	35	t_H
Bit Rate			TX SPD(MBPS)	955	Mbps
Pixel Fomat				888	Data bit/pixel
Lane				4	Lane

※Please refer to initial code



6. BLOCK DIAGRAM



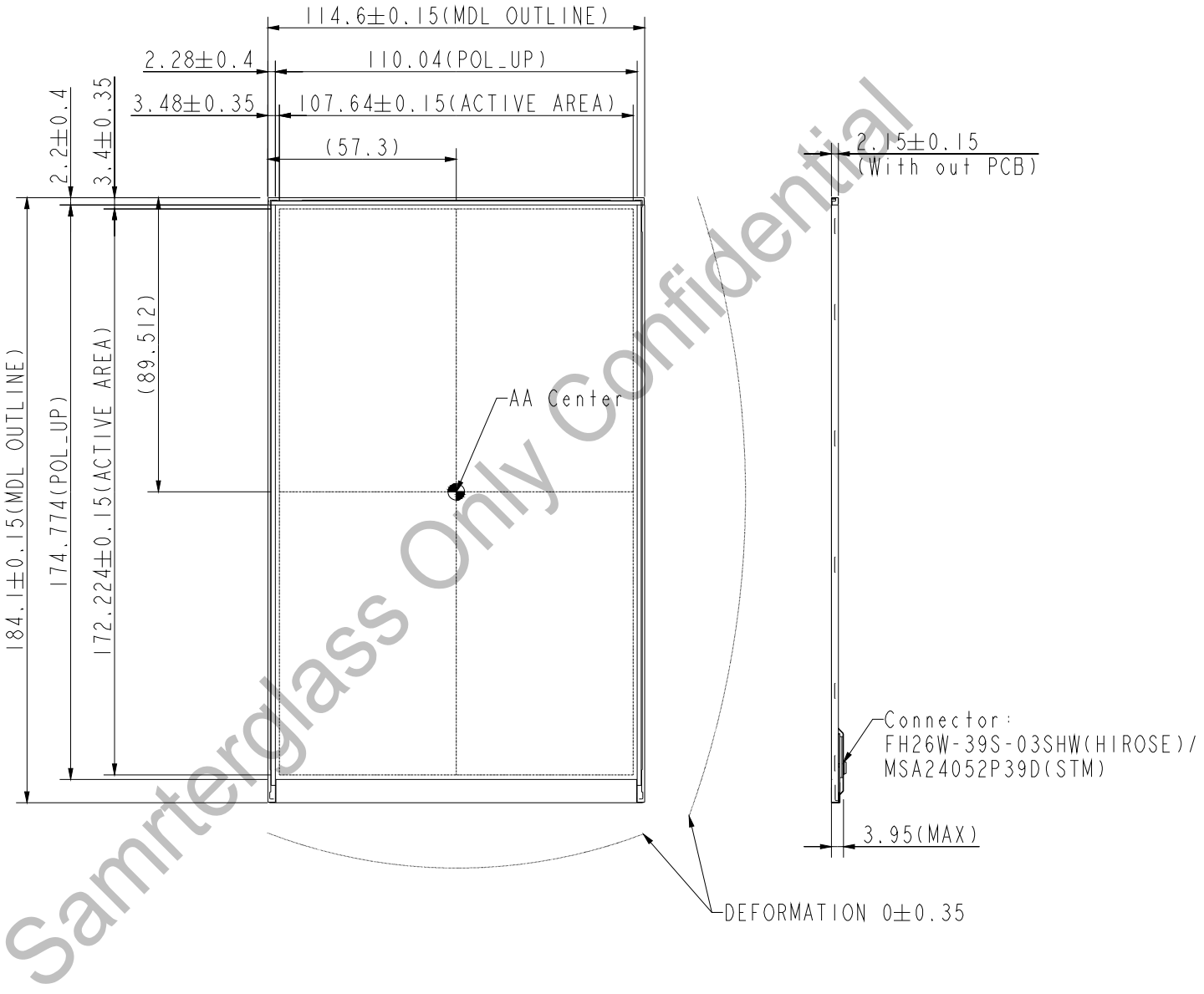
7.MECHANICAL SPECIFICATION

(1) Front side The tolerance, not show in the figure, is ±0.2 mm. [Unit：mm]

7. MECHANICAL SPECIFICATION

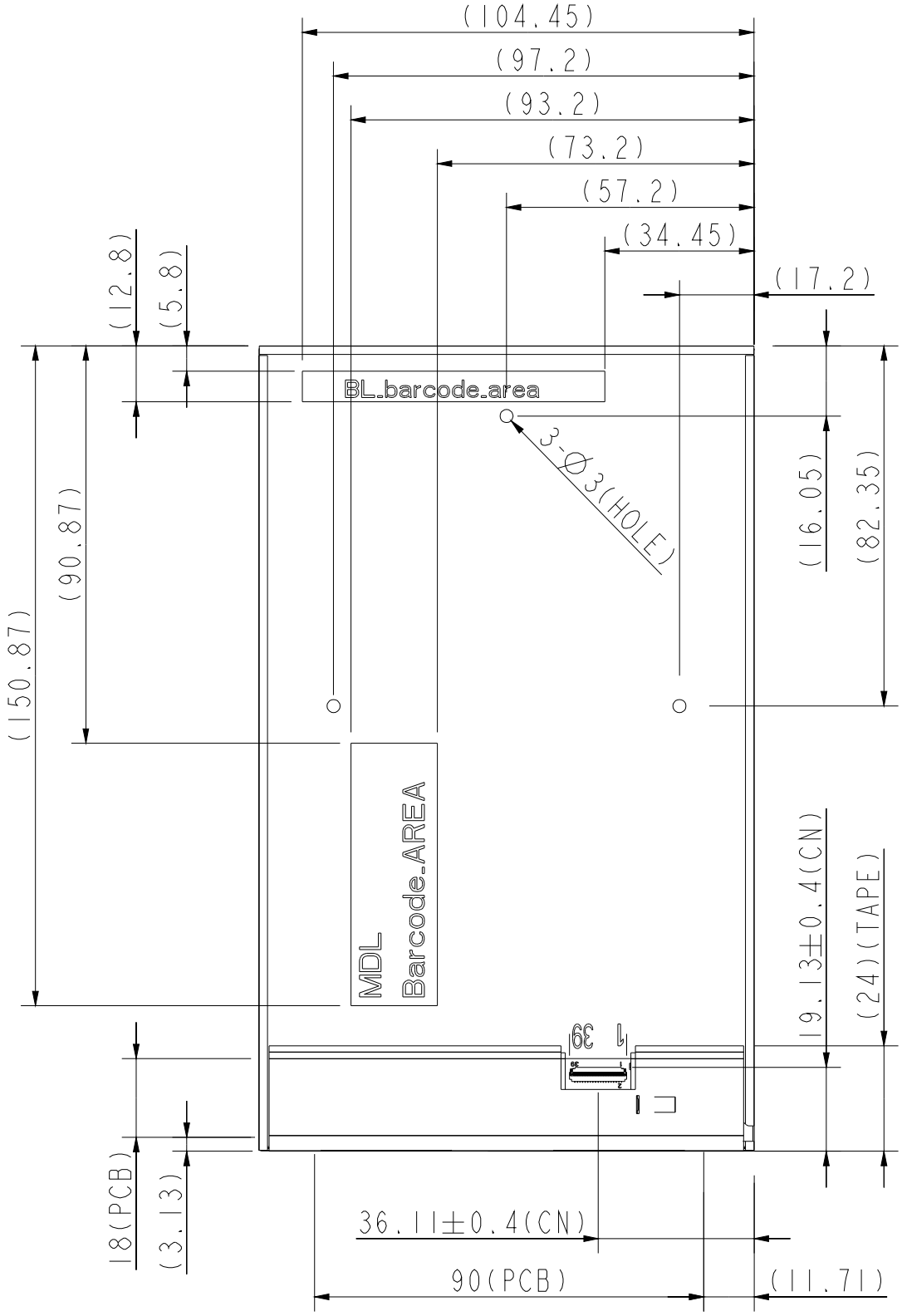
(1) Front side

The tolerance, not show in the figure, is ±0.2mm



2) Rear side

The tolerance, not show in the figure, is ±0.2mm. **[Unit ： mm]**

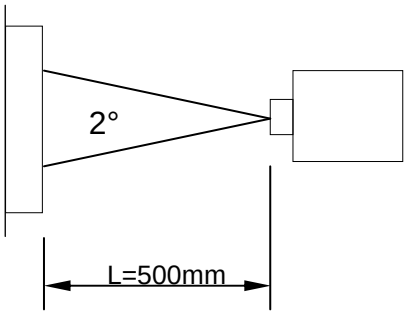


8. OPTICAL SPECIFICATION (Note1，Note2)

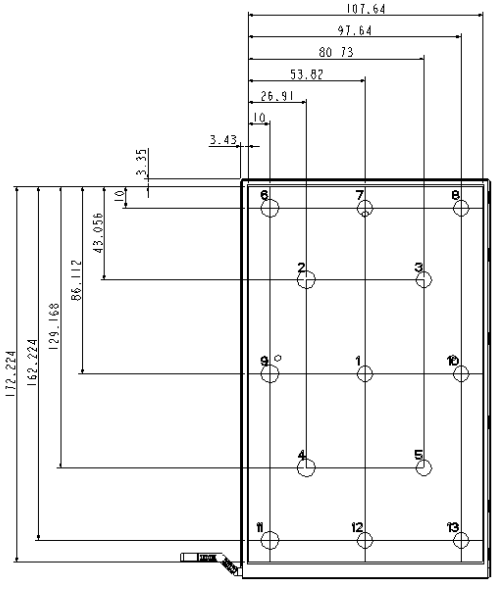
ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
Luminance		L		330	390	—	cd/m^2	
Luminance Uniformity(5P)		ΔL		80	85	—	%	Note 3
Contrast Ratio		CR		—	900	—		Note 4
NTSC Ratio		---			60%	—		
Response Time		Tr+Tf	ϑ =ψ= 0°	—	30	—	ms	Note 5
View angle	Upper	ϕ	CR≧10		170	—	°	Note 6
	Lower					—	°	
	Left	θ			170	—	°	
	Right					—	°	
Color Coordinate	W	x	ϑ =ψ= 0°	0.27	0.30	0.33		
		y		0.29	0.32	0.35		

Note 1. Ambient condition：25℃±2℃，60±10%RH，under 10 Lunx in the darkroom。

Note 2. Measure device：BM-5A (TOPCON)，viewing cone=2°，I_L=21mA。



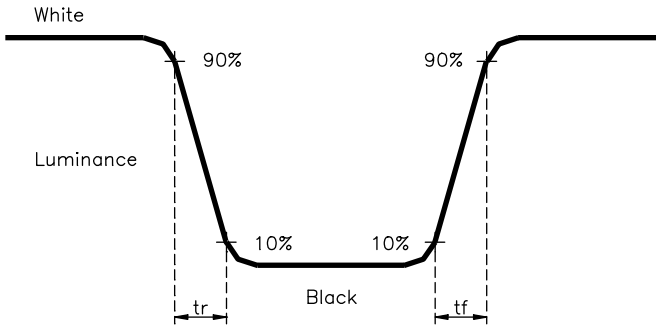
Note 3.Definition of Luminance Uniformity(P1~P5)：△L = L(MIN) / L (MAX) × 100%



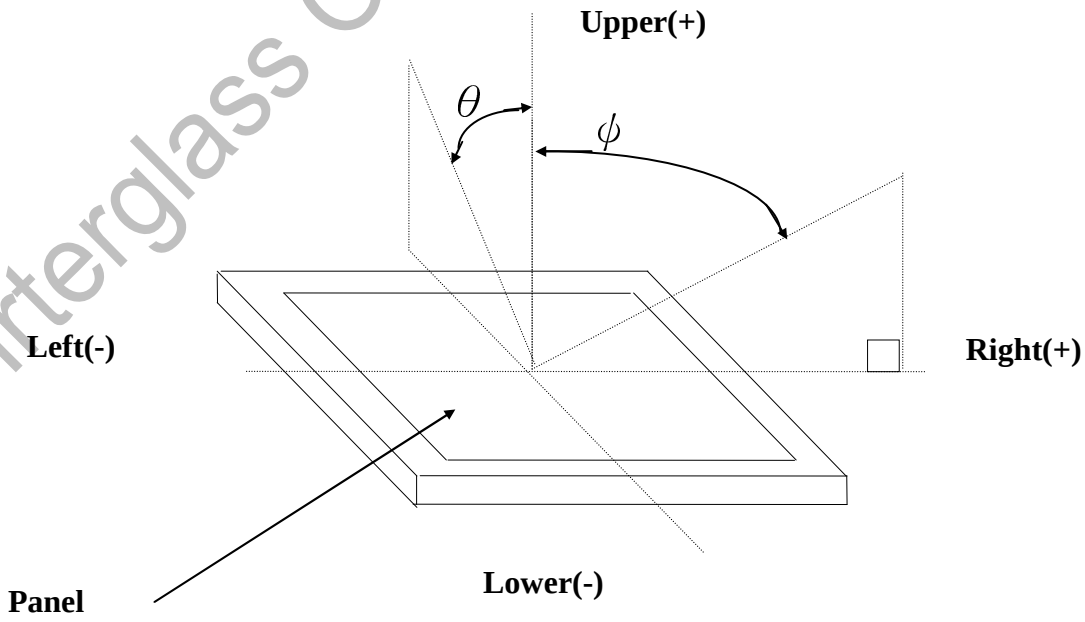
Note 4. Definition of Contrast Ratio：

CR = White Luminance (ON) / Black Luminance (OFF)

Note 5. Definition of response time：The response time is defined as the time interval between the 10% and 90% amplitudes.



Note 6.Definition of view angle(θ，ψ)：



9. RELIABILITY TEST

Test Items	Conditions
High Temp. Operating Test	50℃, 240 Hrs
High Temp. Storage Test	65℃, 240 Hrs
High Temp/ High Humidity Operating Test	40℃, 90% RH, 240Hrs
High Temp./High Humidity Storage Test	60℃, 90% RH, 48Hrs
Low Temp. Operating Test	0℃, 240 Hrs
Low Temp. Storage Test	-20℃, 240 Hrs
Shock Test	980m/s2,Action time: 6ms, Time: 3 times for each direction, Direction:+/–X, +/–Y, +/–Z
ESD	Air +/–15KV ,contact +/–8KV , No damage

【Note】

The judgment of the above test should be made as follow:

Pass：Normal display image with no obvious non-uniformity and no line defect.

Partial transformation of the module parts should be ignored.

Fail：No display image, obvious non-uniformity, or line defects.