

SPECIFICATION

Customer : _____
Model Name: SAT070AT40R04D-FG165100TK-21
ERP NO. : 1090700030
Spec Vision: V.1
Date: 2019/05/04

- Preliminary Specification
- Final Specification

Approved by	Comment

Prepared by	Reviewed by	Approved by

Record of Revision

Version	Revise Date	Page	Content	Modified by
V.1	2019.05.04	-	First Issued.	DWH

Contents

1. General Specifications.....	4
2. Pin Assignment.....	5
2.1 LCM pin define.....	5
2.2 TP pin define.....	6
3. Operation Specifications.....	7
3.1. Absolute Maximum Ratings.....	7
3.1.1. Typical Operation Range.....	7
3.1.2. Current Consumption.....	8
3.1.3. Backlight Driving Conditions.....	8
3.2. Power Sequence.....	9
3.3. Timing Characteristics.....	10
3.3.1. AC Electrical Characteristics.....	10
3.3.2. Input Clock and Date Timing Diagram.....	10
3.3.3. Timing.....	11
3.3.4. Date Input Format.....	12
4. Optical Specifications.....	13
5. Reliability Test Items.....	14
6. Mechanical Drawing.....	15
6.1 LCM+TP.....	15
6.2 LCM.....	16
6.3 TP.....	17
7. Package Drawing.....	18
8. Numbering System.....	19

1. General Specifications

NO.	Item	Specification	Remark
1	Panel Size	7.0 inch(Diagonal)	
2	Resolution	800 x 3(RGB) x 480	
3	Driver Method	A-Si TFT active matrix	
4	Active Area	154.08(W) x 85.92(H) mm	
5	Dot Pitch	0.1926(W) x 0.1790(H) mm	
6	Pixel Arrangement	RGB-stripe	
7	Module Size	164.9(W) x 100 (H) x 4.45(D) mm	
8	Display Mode	Normally White	
9	Display Color	16.7M	
10	Viewing Direction	6 o'clock	
11	Interface	TTL RGB-24Bit parallel interface	
12	Driving IC	EK9713CA+EK73002AB	
13	Weight	TBD	g

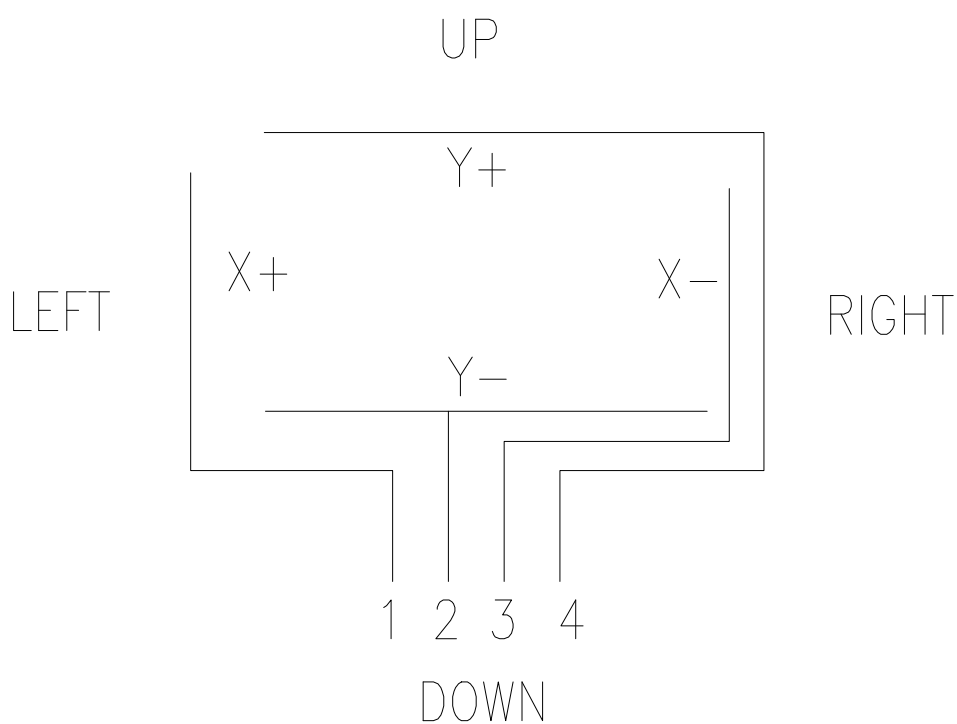
2. Pin Assignment

2.1 LCM pin define

No.	Symbol	Function	Remarks
1	VLED-	Power for LED backlight (Cathode)	
2	VLED+	Power for LED backlight (anode)	
3	GND	Power ground	
4	VDD	Power for digital circuit	
5-12	R0~R7	Red data	
13-20	G0~G7	Green data	
21~28	B0~B7	Blue data	
29	GND	Power ground	
30	PCLK	Pixel clock	
31	NC	No connection	
32	HSYNC	Horizontal Sync input	
33	VSYNC	Vertical Sync input	
34	DE	Data input enable	
35	NC	No connection	
36	GND	Power ground	
37	XR	Right electrode-differential analog	When this pin not used,please leave it open
38	YD	Bottom electrode-differential analog	
39	XL	Left electrode-differential analog	
40	YU	Top electrode-differential analog	

2.2 TP pin define

No.	Symbol	Function	Remarks
1	X+	LEFT	
2	Y-	DOWN	
3	X-	RIGHT	
4	Y+	UP	



逻辑图

3. Operation Specifications

3.1. Absolute Maximum Ratings

Voltage (AGND=GND=0V, Ta = 25°C)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power Voltage	VDD	-0.3	+3.96	V	
	AVDD	-0.5	+14.85	V	
	VGH	-0.3	40	V	
	VGL	-20.0	0.3	V	
	VGH-VGL	12	40.0	V	
Operating Temperature	T _{op}	-10	50	°C	
Storage Temperature	T _{st}	-20	60	°C	

Note: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings case ,the module may be permanently destroyed.

3.1.1. Typical Operation Range

Item	Symbol	values			Unit
		Min.	Typ.	Max.	
Power Voltage	VDD	3.0	3.3	3.6	V
	AVDD	9.8	10.4	11	V
	VGH	15	16	17	V
	VGL	-7.6	-7	-6.4	V
Input signal voltage	VCOM	3.8	4.1	4.4	V

Note1:Be Sure to apply DVDD and VGL to the LCD first , and then apply VGH.

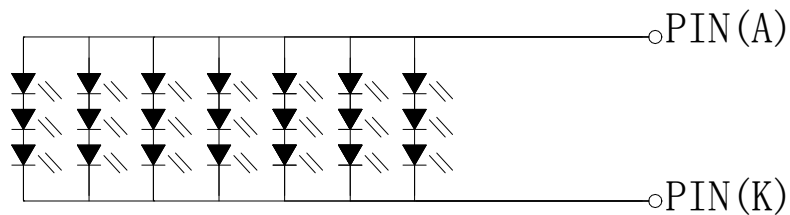
Note2:Please adjust vcom to make flicker level be minimum.

3.1.2. Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I _{GH}	-	0.2	14	V	V _{GH} =16.0V
	I _{GL}	-	0.2	50	mA	V _{GL} =-7.0V
	I _{VDD}	-	10	-	mA	V _{DD} =3.3V
	I _{AVDD}	-	15	-	mA	A _{VDD} =10.4V

3.1.3. Backlight Driving Conditions

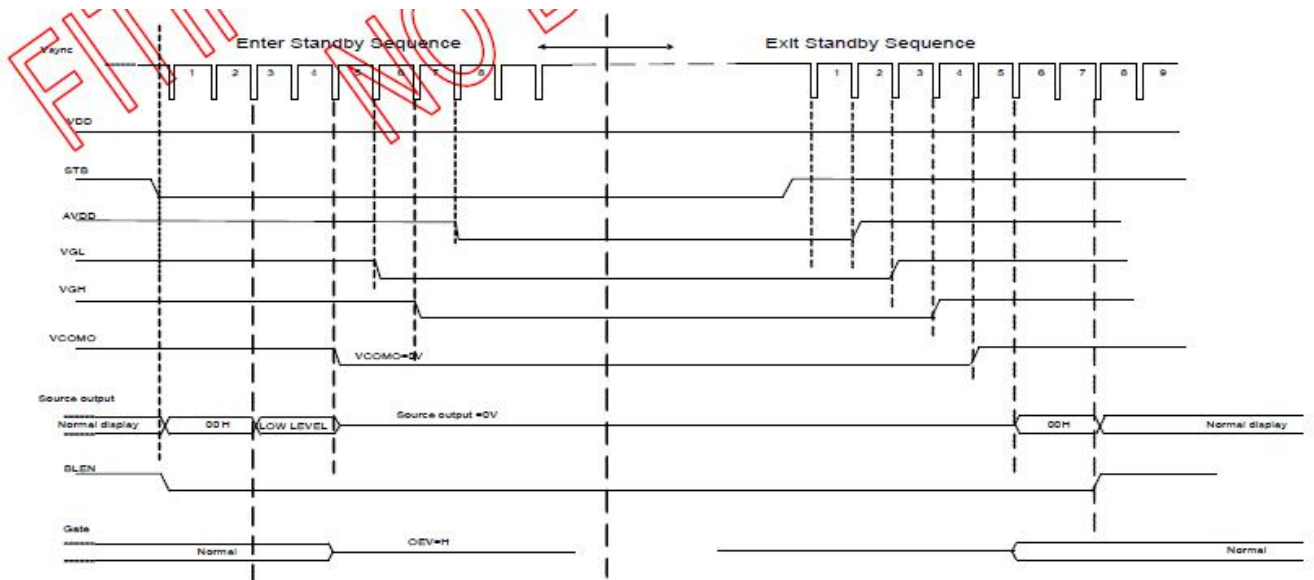
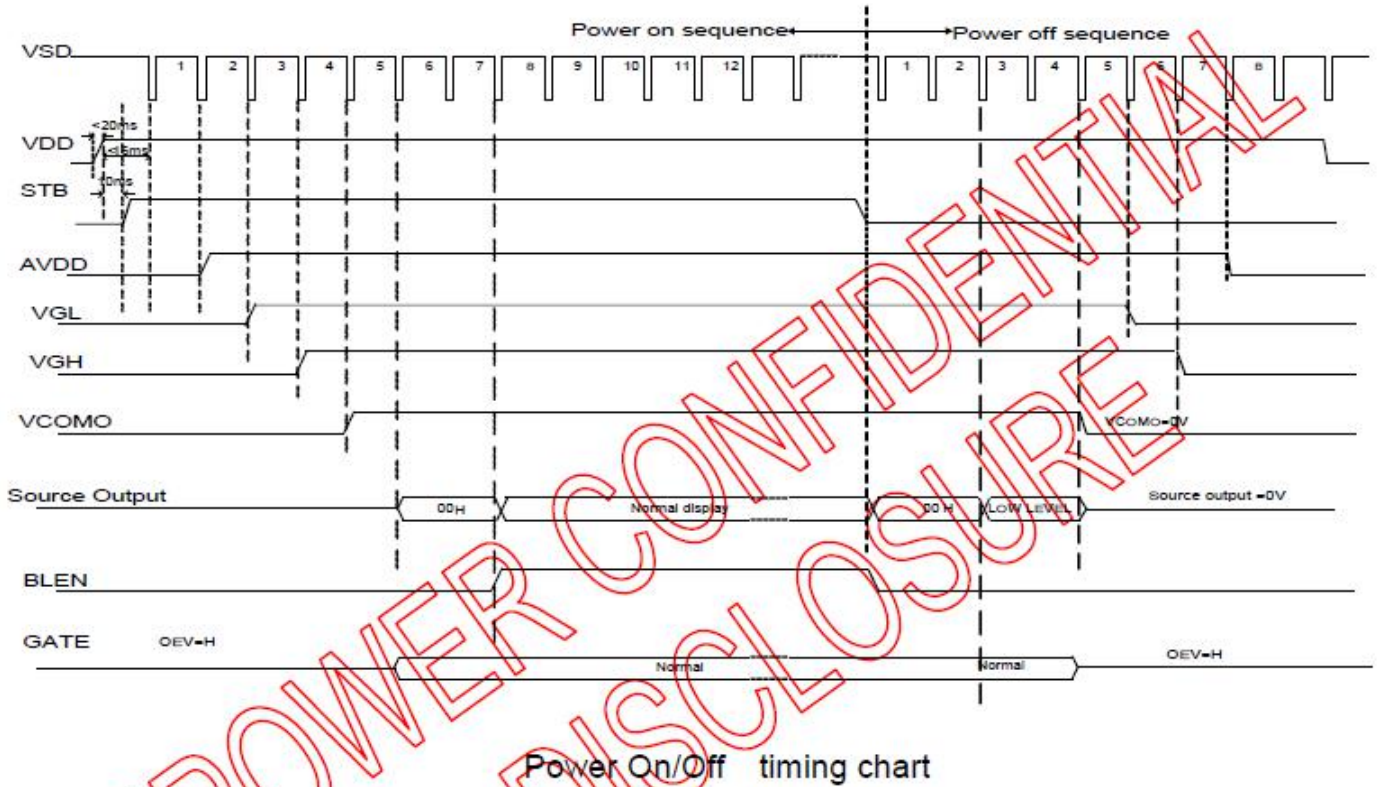
Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage of white LED backlight	V _L	9.0	9.6	10.5	V
Current for LED backlight	I _L	105	140	175	mA
Luminance TP+LCM (on the module surface ,BM-7)		210	250	-	cd/m ²
LED life time	-	30000	-	-	Hr



电路原理图：
(I_f=140mA. V_f=9.6V)

3.2. Power Sequence

In order to prevent IC from power on reset fail, the rising time (TPOR) of the digital power supply VDD should be maintained within the given specifications. Refer to "AC Characteristics" for more detail on timing



Note: Low level=3Fh,when NBW=L(Normally white)
 Low level=00h,when NBW=H(Normally black)

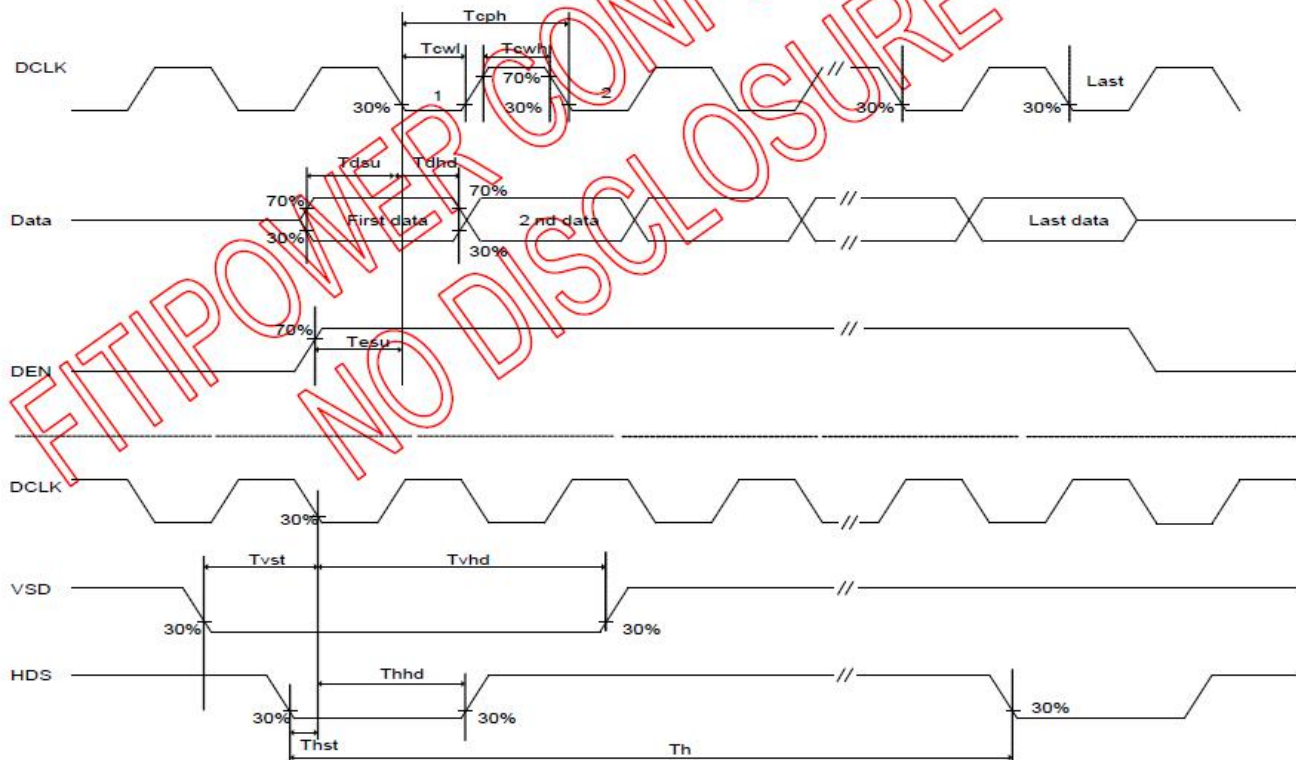
3.3. Timing Characteristics

3.3.1. AC Electrical Characteristics

TTL mode

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
VDD Power On Slew rate	TPOR	From 0V to 90% VDD	1	-	20	ms
RST pulse width	TRST	DCLK = 65MHz	50	-	-	us
DCLK cycle time	Tcph	-	14	-	-	ns
DCLK pulse duty	Tcwh	-	40	50	60	%
VSD setup time	Tvst	-	5	-	-	ns
VSD hold time	Tvhd	-	5	-	-	ns
HSD setup time	Thst	-	5	-	-	ns
HSD hold time	Thhd	-	5	-	-	ns
Data set-up time	Tdsu	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
Data hold time	Tdhd	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	- </td <td>-</td> <td>ns</td>	-	ns
DE setup time	Tesu	-	5	-	-	ns
DE hold time	Tehd	-	5	-	-	ns
Output stable time	Tsst	Dual gate	-	-	3	us

3.3.2. Input Clock and Date Timing Diagram



Parallel Input Clock and Data timing

3.3.3. Timing

DE mode

DE mode					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd	1024			DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd	600			H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

HV mode(1)

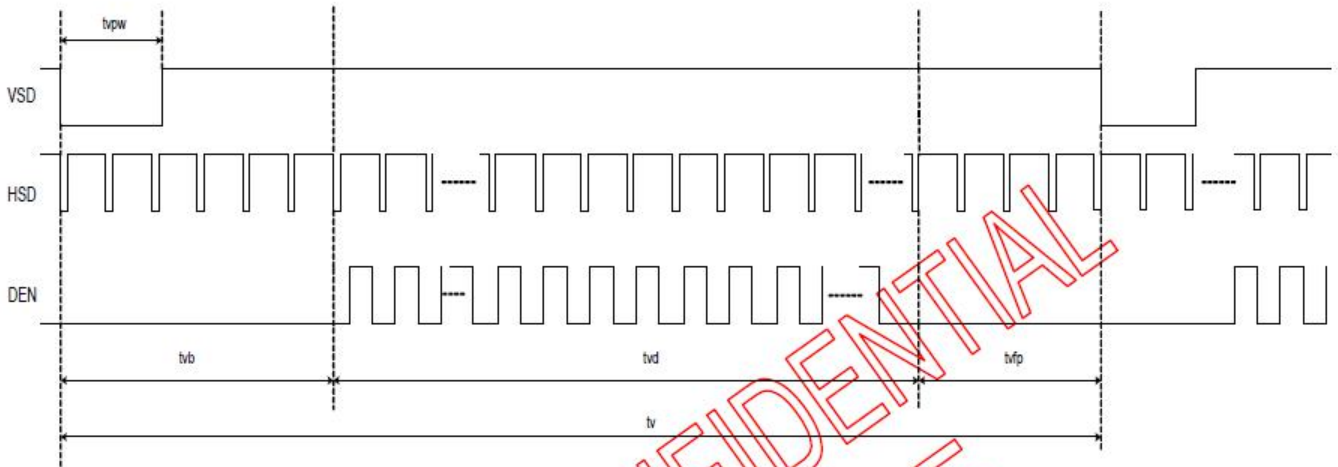
HV mode					
Horizontal input timing					
Parameter	Symbol	Value			Unit
Horizontal display area	thd	1024			DCLK
DCLK frequency@ Frame rate=60hz	fclk	Min.	Typ.	Max.	Mhz
		44.9	51.2	63	
1 Horizontal Line	th	1200	1344	1400	DCLK
HSYNC pulse width	thpw	Min.	1		
		Typ.	—		
		Max.	140		
HSYNC back porch	thbp	160	160	160	
HSYNC front porch	thfp	16	160	216	

HV mode(2)

Vertical input timing					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd	600			H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	tvpw	1	—	20	H
VSYNC back porch	tvb	23	23	23	H
VSYNC front porch	tvfp	1	12	127	H

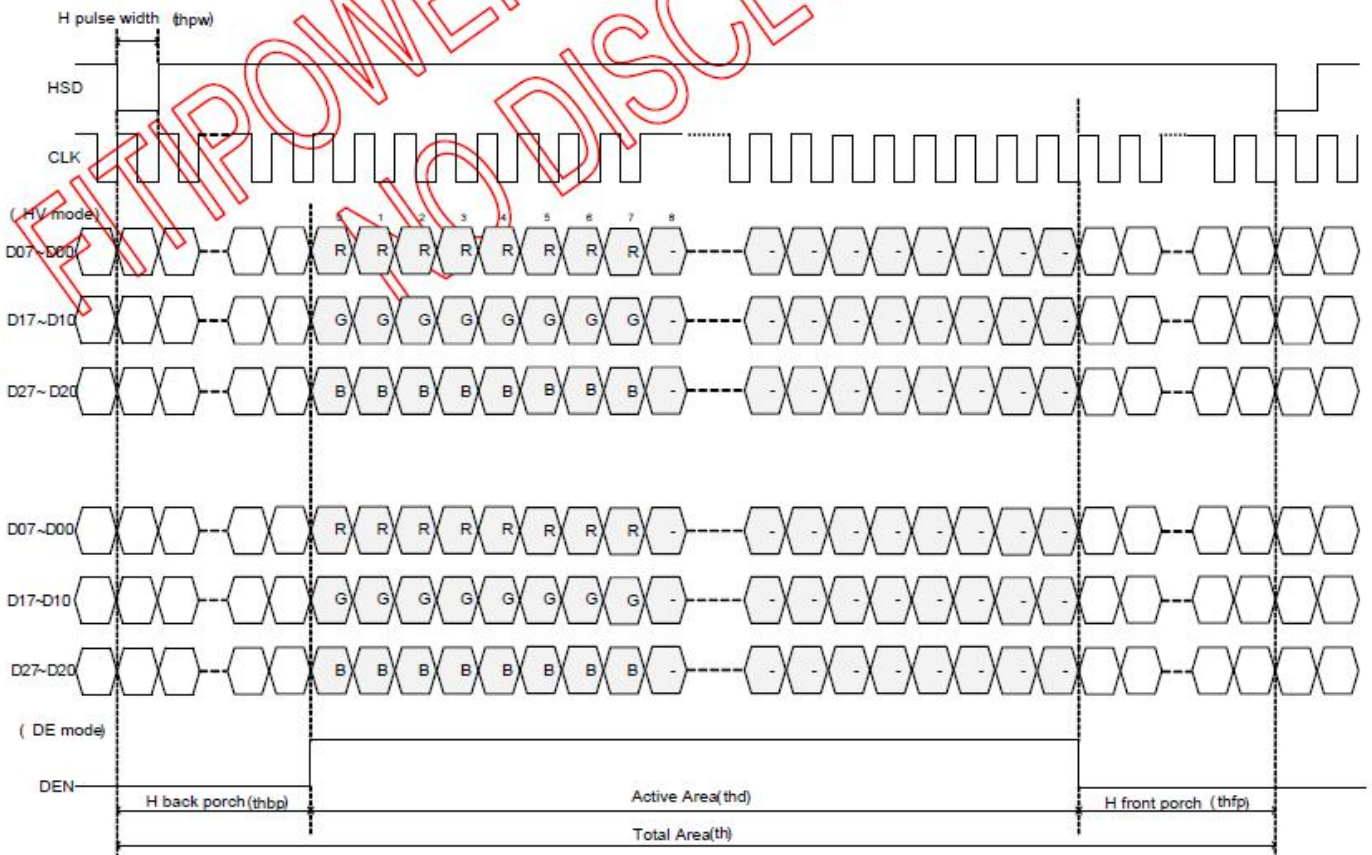
3.3.4. Date Input Format

Vertical input timing



Vertical input timing

Horizontal input timing



Horizontal input timing

4. Optical Specifications

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Viewing Angle	θT	$CR \geq 10$	40	50	-	degree	-	
	θB		60	70	-			
	θL		60	70	-			
	θR		60	70	-			
Contrast Ratio	CR	$\theta = 0^\circ$	400	500	-	-	-	
Response Time	T_{on}	25°C	-	10	20	ms	-	
	T_{off}		-	15	30	ms	-	
Chromaticity	White	X	Backlight is on	0.265	0.285	0.305	-	-
		Y		0.275	0.295	0.315		
Luminance (LCM+TP center)		L	210	250	-	cd/m ²	-	
Luminance Uniformity		ΔL	75	80	-	%	-	

Test Condition:

- VDD=3.3V, IL=140mA(Backlight current), the ambient temperature is 25°C.

5. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Storage	Ta=60°C 120h	Note1 ,Note4
Low Temperature Storage	Ta=-20°C 120h	Note1, Note4
High Temperature Operation	Ts=50°C 120h	Note2 ,Note4
Low Temperature Operation	Ts=-10°C 120h	Note4
Operation at High Temperature and Humidity	+60°C,90%RH 120h	Note4
Thermal Shock	-20°C/30min~+60°C/30min for a total 100 cycles , Start with cold temperature and end with high temperature	
Package Drop Test	Height 60cm 1corner , 3edges , 6surfaces	
Elector Static Discharge	±2KV,Human Body Mode, 150pF/330 Ω	

Note1: Ta is the ambient temperature of samples.

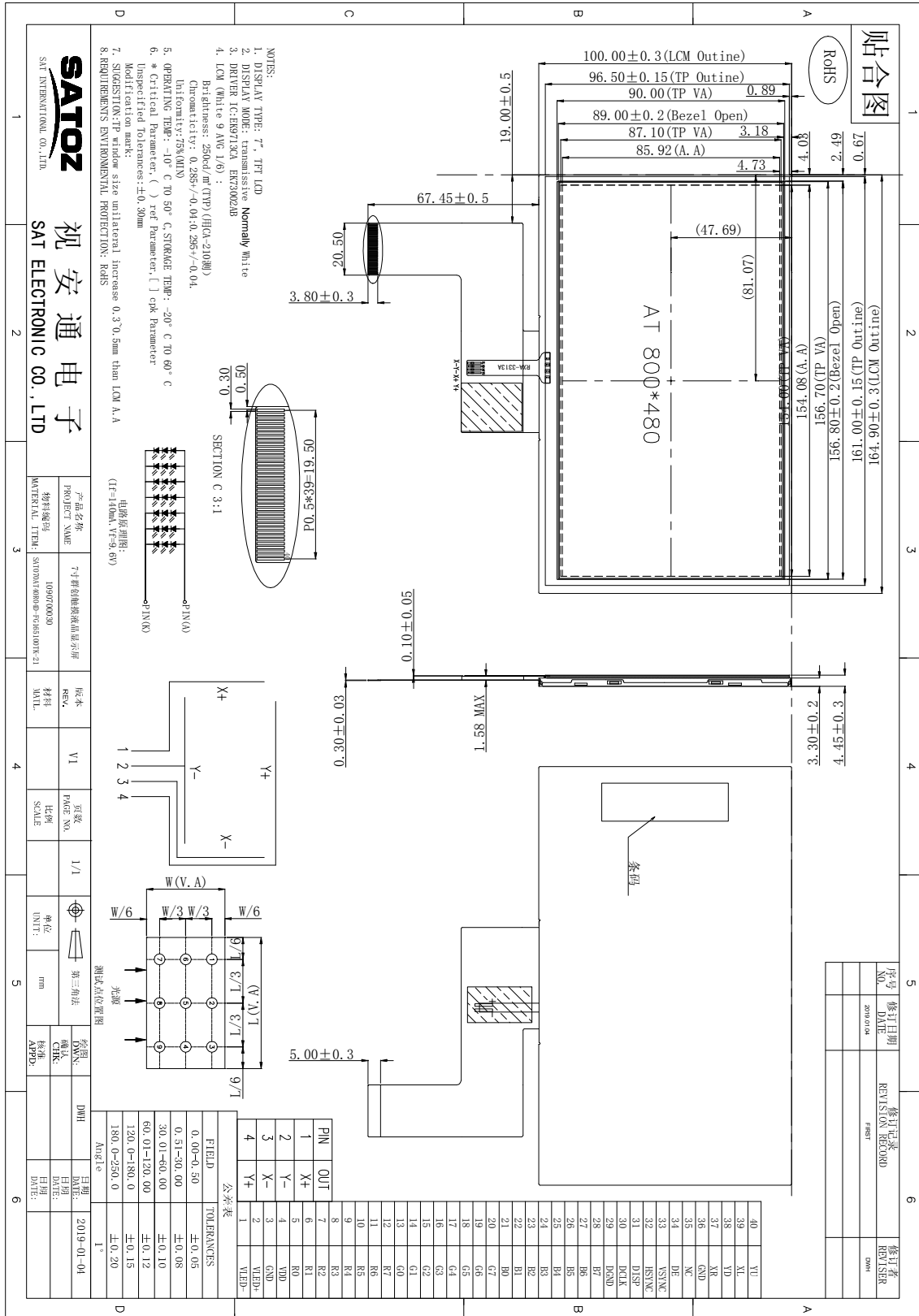
Note2: Ts is the temperature of panel's surfaces.

Note3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but doesn't guarantee all of the cosmetic specification.

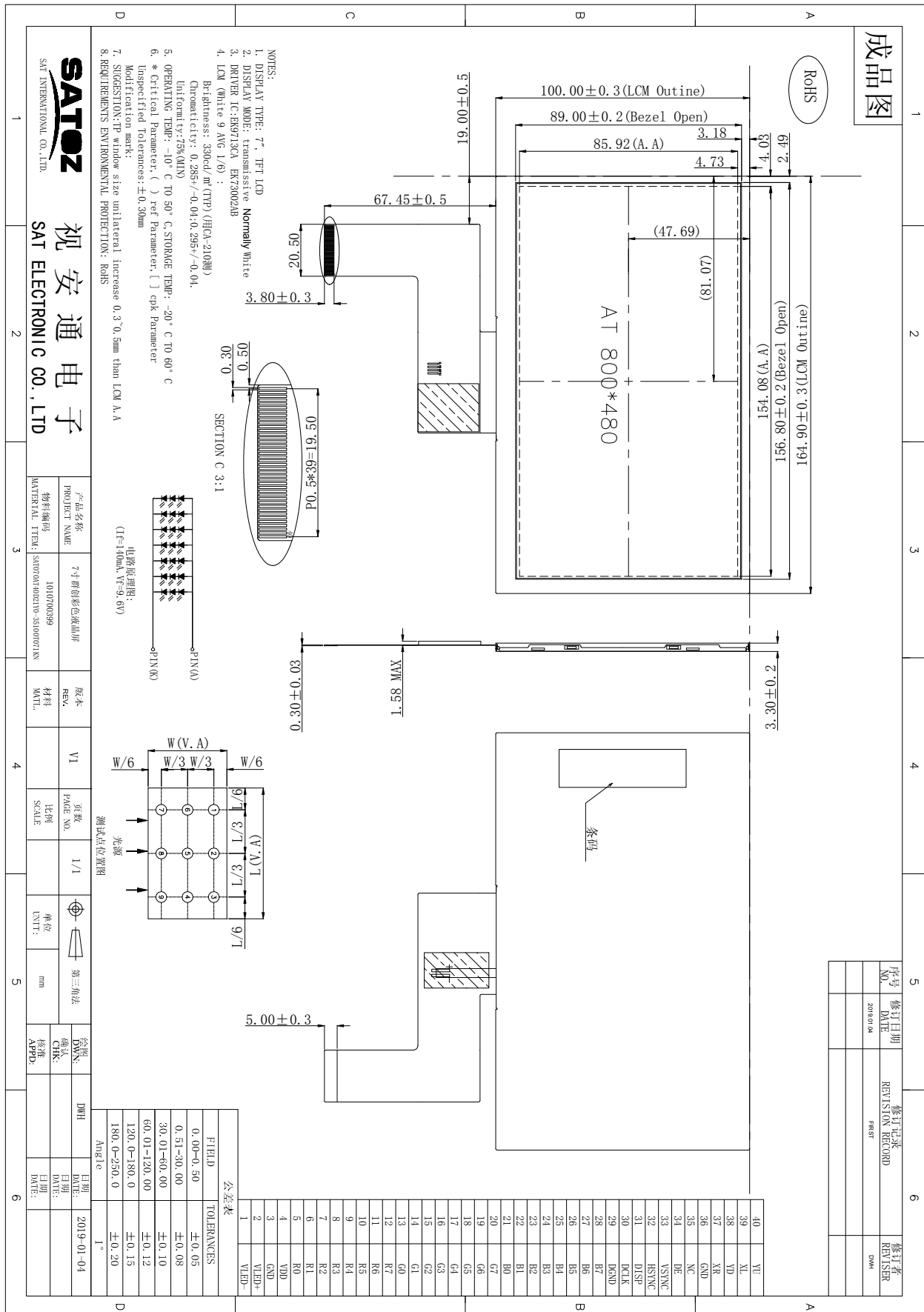
Note4: before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

6.Mechanical Drawing

6.1 LCM+TP



6.2 LCM



成品图

RoHS

SATOZ
SAT INTERNATIONAL CO., LTD.

视安通电子
SAT ELECTRONIC CO., LTD

产品名称	物料名称
1010700399	尺寸群00彩色液晶屏

版本	规格
REV.	V1

页码	比例	单位
PAGE NO.	SCALE	UNIT:

版图	日期
DWG. DATE:	2019-01-04

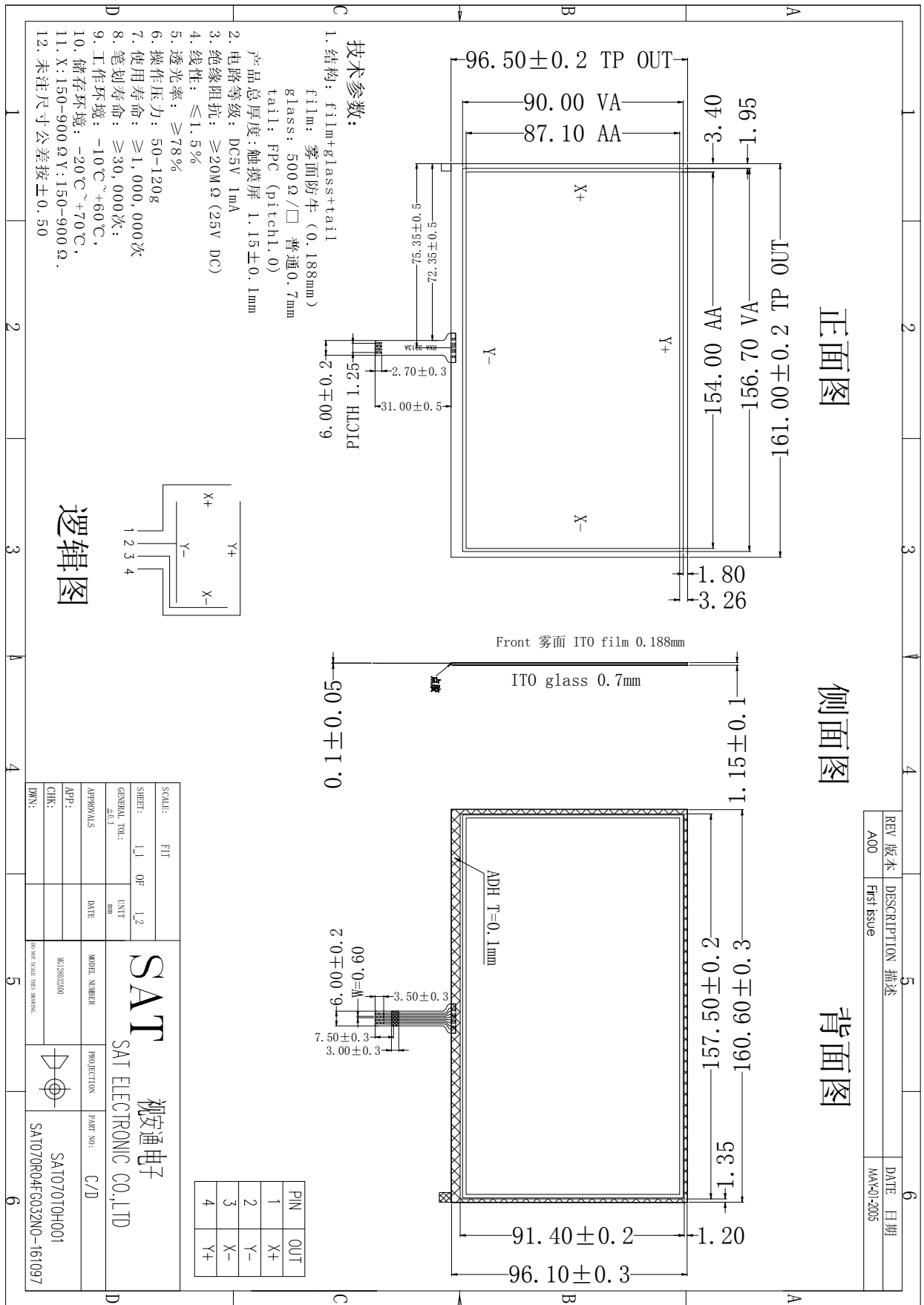
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2019.01.04

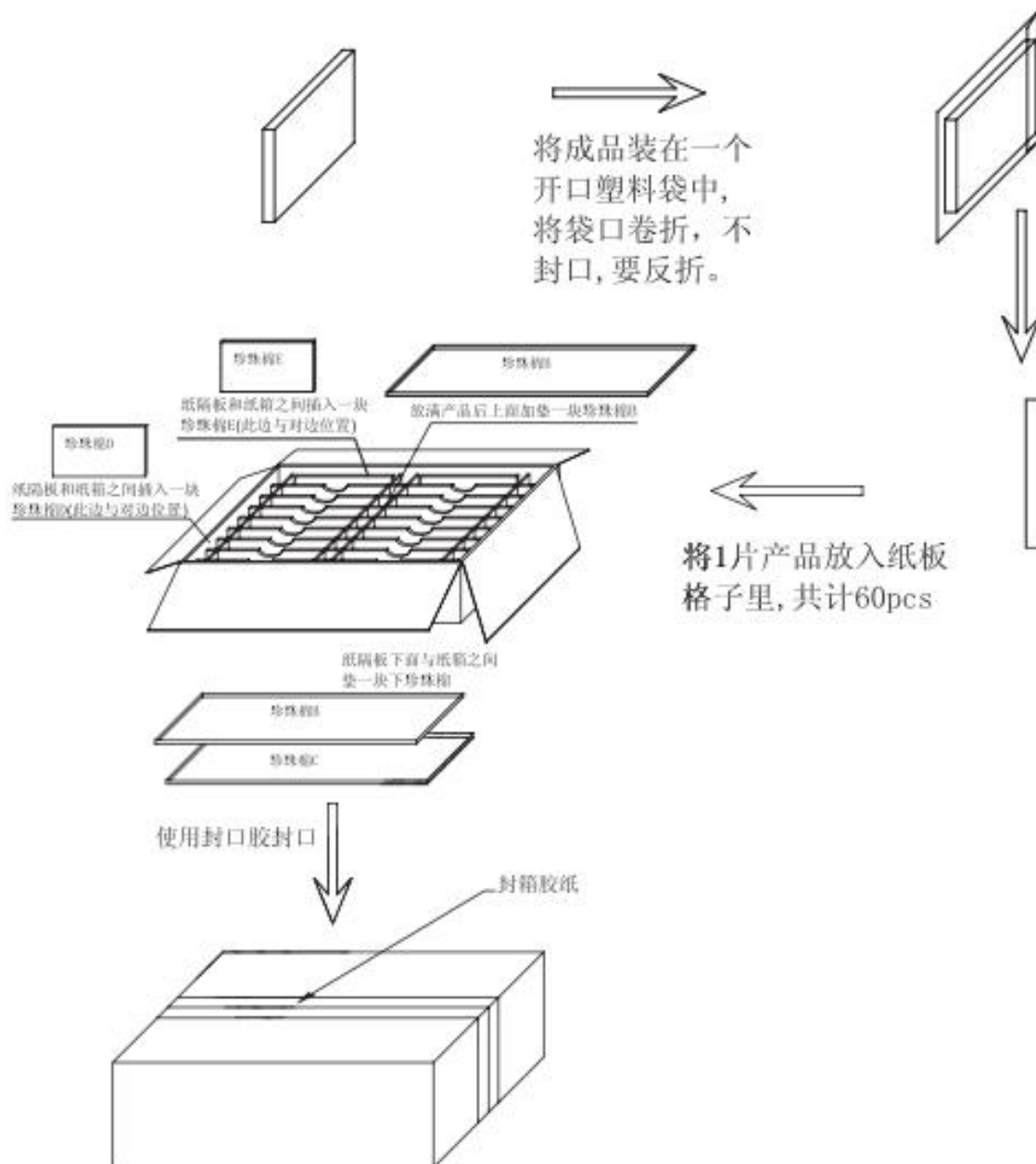
FWST

DMH

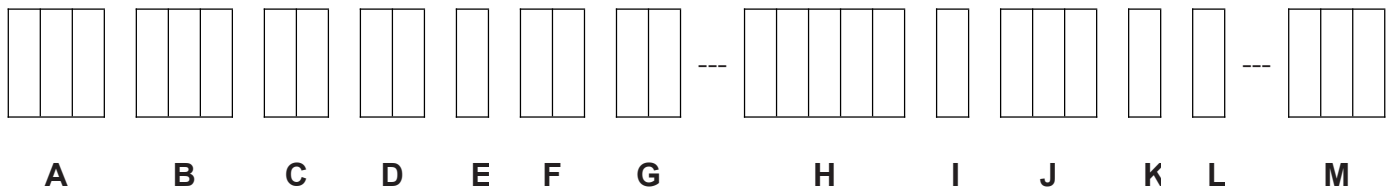
6.3 TP



7. Package Drawing



8. Numbering System



NO.	Definition	Specifications
A	Company code	SAT INTERNATIONAL CO.LTD.
B	Display monitor opposite angle line size	Unit : inch (size<10inch:take two integers;size>=10inch:takes three integers)
C	LCD Brands	AU-AUO; CP-CPT; IV-IVO; TM-TIANMA; HS-HSD; CM-CMO; BO-BOE; AT--INNOLUX;
D	Interface PIN Number	Arabic numerals from 01 to 99
E	LCD Type	A--Alternated Video Signal; D--Data Video Signal; H--High Definition ; I--IPS
F	Backlight LED Number	Arabic numerals from 01 to 99
G	Backlight Color Are	Include R1、R2、Y0、Y1、B1、B2;
H	Structure Size	Include module length and width size
I	Interface Mode	T:TTL L:LVDS M:MIPI
J	FPC Length	It represents the length of FPC with three figures, divided into long rows ,middle rows and short rows
K	View Angles	Z : represent narrow viewing angle K : represent wide viewing angle I : represent all viewing angle
L	Operating Mode	D: DE mode V: VSD mode F: Inverting mode N: No mode requirements
M	Suffix	1. NULL ; 2. TP/CTP-- Touch panel; 3. other--Insignificance