

# SPECIFICATION

**Customer :** \_\_\_\_\_  
**Model Name:** SAT070AT50D18B1-57100T082KN2  
**ERP NO. :** 1010700010  
**Spec Vision:** V.1  
**Date:** 2019.03.22

- Preliminary Specification  
 Final Specification

Approved by	Comment

Prepared by	Reviewed by	Approved by



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# 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	165 (W) x 100 (H) x 5.7(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	NT39419D+NT52001C	
13	Weight	TBD	g

## 2. Pin Assignment

No.	Symbol	Function	Remarks
1~2	VLED+	Power for LED backlight (Cathode)	
3~4	VLED-	Power for LED backlight (anode)	
5	GND	Power ground	
6	VCOM	Common Voltage	
7	DVDD	Power for Digital Circuit	
8	MODE	DE/sync mode select	
9	DE	Data input enable	
10	VS	Vertical Sync input	
11	HS	Horizontal Sync input	
12~19	B7~B0	Blue data	
20~27	G7~G0	Green data	
28~35	R7~R0	Red data	
36	GND	Power ground	
37	DCLK	Pixel clock	
38	GND	Power ground	
39	L/R	Left/right selection	
40	U/D	Up/Down selection	
41	VGH	Gate on Voltage	
42	VGL	Gate off Voltage	
43	AVDD	Power for Analog Circuit	
44	RESET	Global reset pin	
45	NC	No connection	
46	VCOM	Common Voltage	
47	DITHB	Dithering function	
48	GND	Power ground	
49~50	NC	No connection	

## 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	-0.5	3.96	V	
	AVDD	-0.5	14.85	V	
	VGH	-0.3	40	V	
	VGL	-20.0	0.3	V	
	VGH-VGL	-	40.0	V	
Operating Temperature	T <sub>op</sub>	-20	70	°C	
Storage Temperature	T <sub>st</sub>	-30	80	°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	10.2	10.4	10.6	V
	VGH	15	16	17	V
	VGL	-7.7	-7.0	-6.3	V
Input signal voltage	VCOM	3.9	4.1	4.3	V
Input logic high voltage	V <sub>IH</sub>	0.7 V <sub>DD</sub>	-	V <sub>DD</sub>	V
Input logic low voltage	V <sub>IL</sub>	0	-	0.3 V <sub>DD</sub>	V

**3.1.2. Current Consumption**

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I <sub>GH</sub>	-	0.2	1	mA	V <sub>GH</sub> =16.0V
	I <sub>GL</sub>	-	0.2	1	mA	V <sub>GL</sub> =-7.0V
	I <sub>VDD</sub>	-	10	15	mA	V <sub>DD</sub> =3.3V
	I <sub>AVDD</sub>	-	10	20	mA	A <sub>VDD</sub> =10.4V

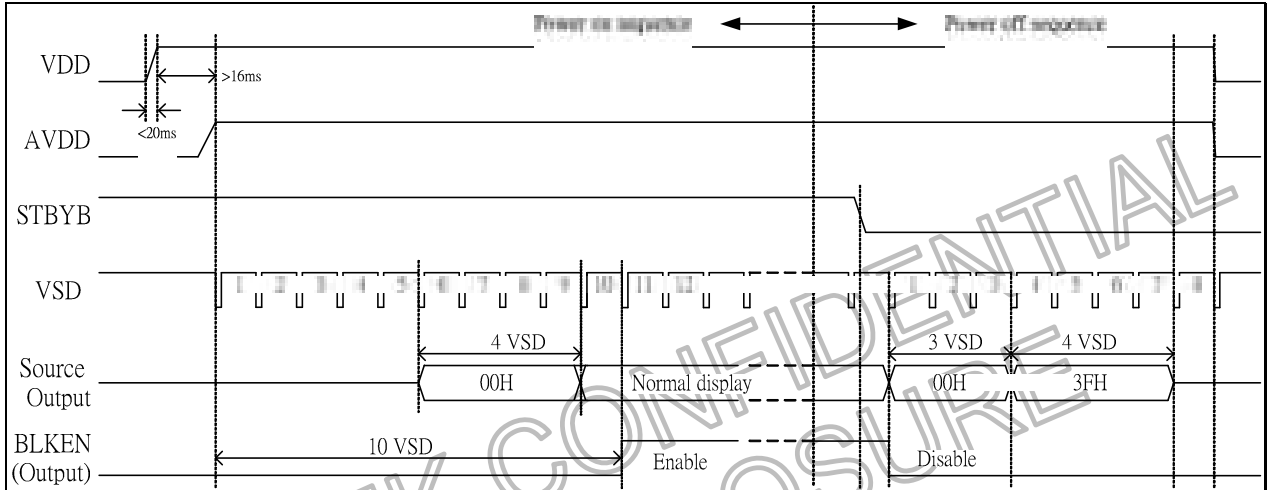
**3.1.3. Backlight Driving Conditions**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage of white LED backlight	V <sub>L</sub>	8.7	9.6	10.5	V
Current for LED backlight	I <sub>L</sub>	90	120	150	mA
Luminance (on the module surface ,BM-7)		-	250	-	cd/m <sup>2</sup>
LED life time	-	50000	-	-	Hr

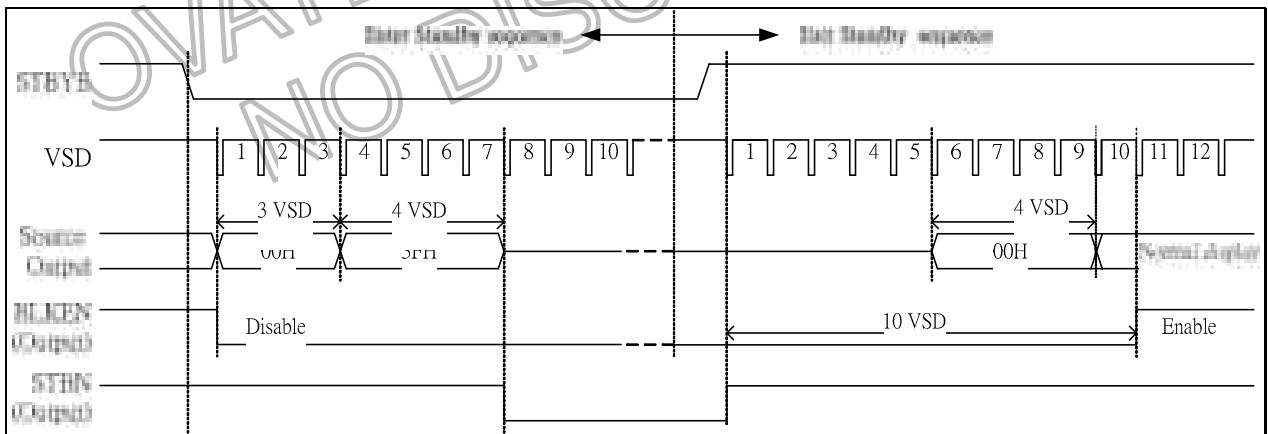
### 3.2. Power Sequence

In order to prevent IC from power on reset fail, the rising time ( $T_{POR}$ ) of the digital power supply VDD should be maintained within the given specifications. Refer to “AC Characteristics” for more detail on timing.

#### Power-On/Off Timing Sequence:



#### Enter and Exit Standby Mode Sequence:





### 3.3. Timing Characteristics

#### 3.3.1. AC Electrical Characteristics

(VDD= 3.0 to 3.6V, AVDD= 6.5 to 13.5V, GND=AGND= 0V, TA= -20 to +85°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
VDD Power On Slew rate	T <sub>POR</sub>	-	-	20	ms	From 0V to 90% VDD
RSTB pulse width	T <sub>Rst</sub>	1	-	-	ms	CLKIN = 40MHz
CLKIN cycle time	T <sub>cph</sub>	20			ns	
CLKIN pulse duty	T <sub>cwh</sub>	40	50	60	%	
VSD setup time	T <sub>vst</sub>	8	-	-	ns	
VSD hold time	T <sub>vhd</sub>	8	-	-	ns	
HSD setup time	T <sub>hst</sub>	8	-	-	ns	
HSD hold time	T <sub>hhd</sub>	8	-	-	ns	
Data set-up time	T <sub>dsu</sub>	8	-	-	ns	D0[7:0], D1[7:0], D2[7:0] to CLKIN
Data hold time	T <sub>dhd</sub>	8	-	-	ns	D0[7:0], D1[7:0], D2[7:0] to CLKIN
DEN setup time	T <sub>esu</sub>	8	-	-	ns	
DEN hold time	T <sub>ehd</sub>	8	-	-	ns	
Output stable time	T <sub>sst</sub>	-	-	6	us	10% to 90% target voltage. CL=120pF, R=10K ohm

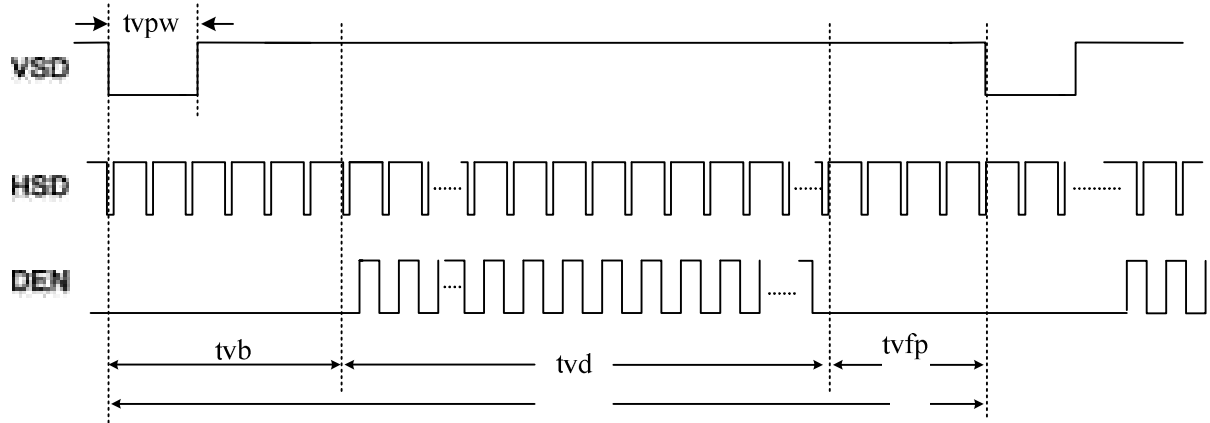
### Timing Table

#### Parallel 24-bit RGB Mode

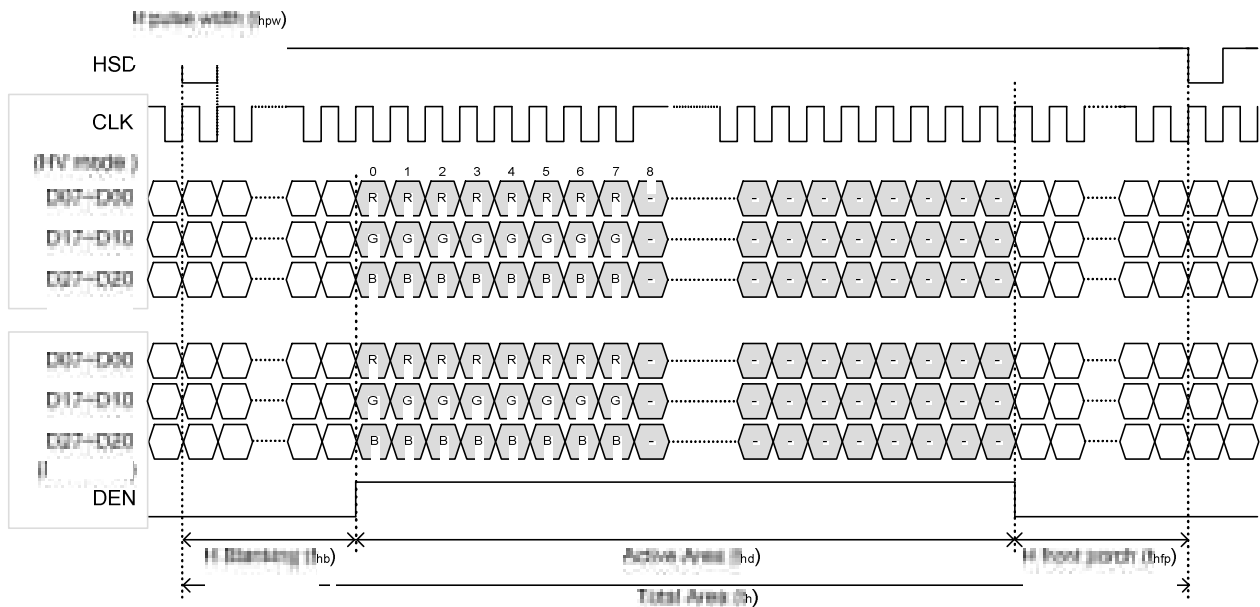
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLKIN Frequency	F <sub>clk</sub>	-	33.3	50	MHz	VDD = 3.0V ~3.6V
CLKIN Cycle Time	T <sub>clk</sub>	20	30	-	ns	
CLKIN Pulse Duty	T <sub>cwh</sub>	40	50	60	%	T <sub>clk</sub> =T <sub>cwh</sub> +cwl
	T <sub>cwl</sub>	40	50	60	%	
VSD to STV	T <sub>stv</sub>	-	24	-	H	HV mode
DEN to STV	T <sub>stv</sub>		4		CLKIN	DE mode
STV pulse width	T <sub>wstv</sub>	-	0.5	-	H	
STV to CKV	T <sub>ckv</sub>	-	18	-	CLKIN	
STV to OEV	T <sub>oev</sub>	-	2	-	CLKIN	
CKV Pulse Width	T <sub>wckv</sub>	-	66	-	CLKIN	
OEV Pulse Width	T <sub>woev</sub>	-	50	-	CLKIN	

### 3.3.2. Display Timing characteristics

#### Vertical input timing



#### Horizontal input timing



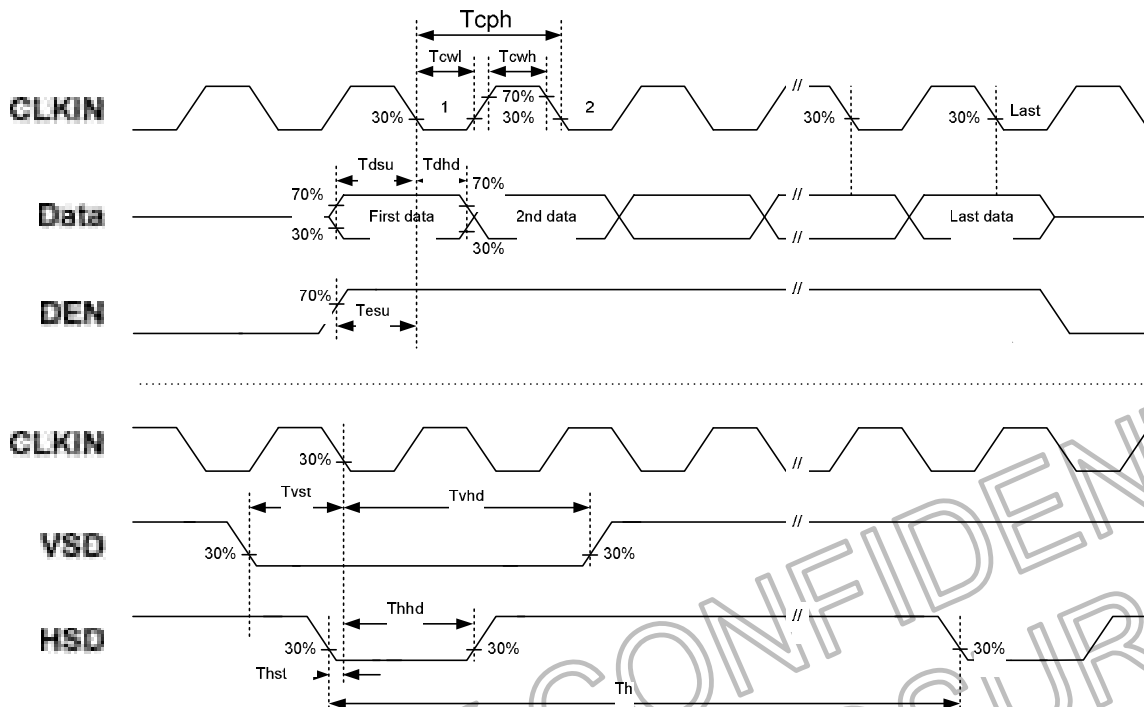
#### Horizontal input timing

Parameter	Symbol	Value			Unit
Horizontal display area	thd	800			DCLK
DCLK frequency	fclk	Min.	Typ.	Max.	MHz
		-	33.3	50	
1 Horizontal Line	th	862	1056	1200	DCLK
HSD pulse width	thpw	Min.	1		
		Typ.	-		
		Max.	40		
HSD Back Porch (Blanking)	thb	46	46	46	DCLK
HSD Front Porch	thfp	16	210	354	

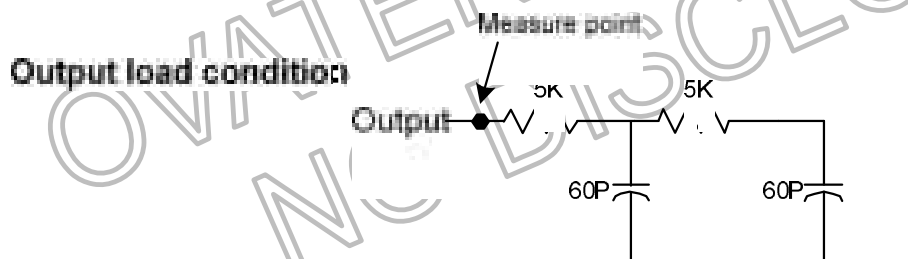
### Vertical input timing

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd	480			H
VSD period time	tv	510	525	650	H
VSD pulse width	tvpw	1	-	20	H
VSD Back Porch (Blanking)	tvb	23	23	23	H
VSD Front Porch	tvfp	7	22	147	H

### 3.3.3. Input Clock and Date Timing Diagram



### Source Output



## 4. Optical Specifications

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Viewing Angle	$\theta T$	$CR \geq 10$	40	50	-	degree	-	
	$\theta B$		60	70	-			
	$\theta L$		60	70	-			
	$\theta R$		60	70	-			
Contrast Ratio	CR	$\theta = 0^\circ$	320	400	-	-	-	
Response Time	$T_{on}$	25°C	-	10	15	ms	-	
	$T_{off}$		-	15	20	ms	-	
Chromaticity	White	X	Backlight is on	0.293	0.313	0.333	-	-
		Y		0.309	0.329	0.349		
Luminance (center)	L		200	250	-	cd/m <sup>2</sup>	-	
Luminance Uniformity	$\Delta L$		75	80	-	%	-	

### Test Condition:

- 1、VDD=3.3V, IL=120mA(Backlight current), the ambient temperature is 25°C.

## 5. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Storage	Ta=80℃ 120h	Note1 ,Note4
Low Temperature Storage	Ta=-30℃ 120h	Note1, Note4
High Temperature Operation	Ts=70℃ 120h	Note2 ,Note4
Low Temperature Operation	Ts=-20℃ 120h	Note4
Operation at High Temperature and Humidity	+80,℃ 90%RH 120h	Note4
Thermal Shock	-20℃/30min~+60℃/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	

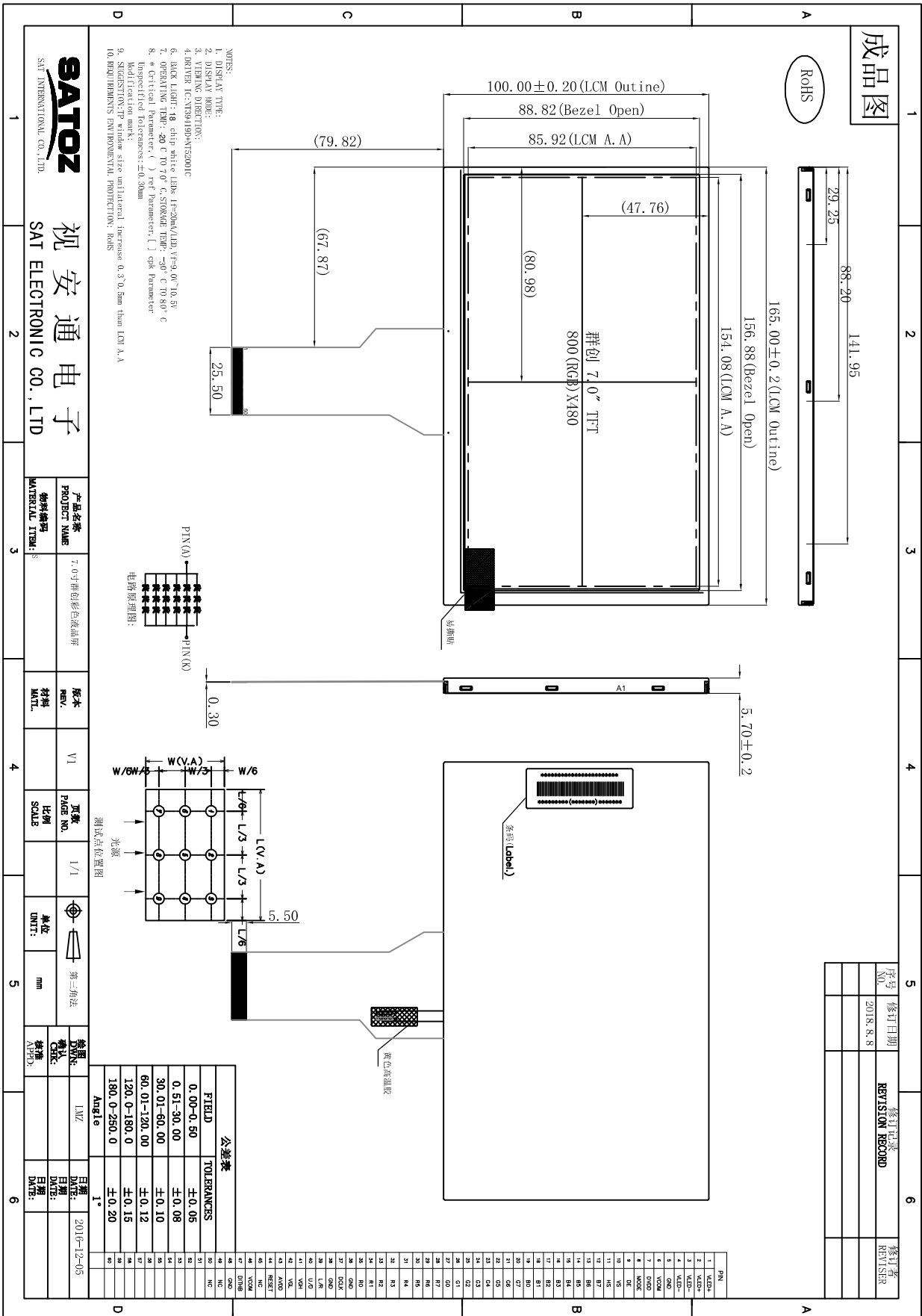
Note1: Ta is the ambient temperature of samples.

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

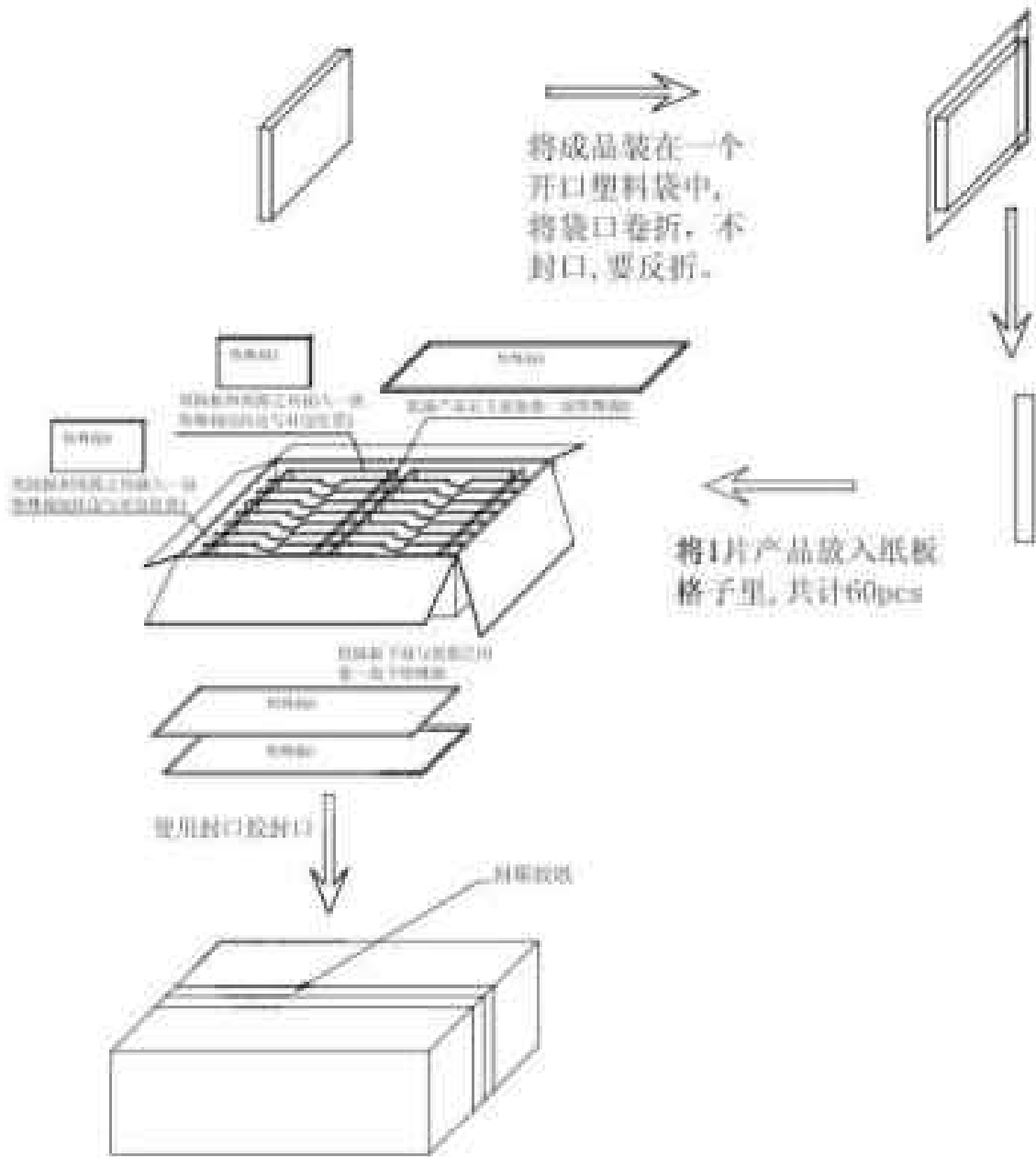
Note3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but doesn't guarantee all of the cosmetic specification.

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

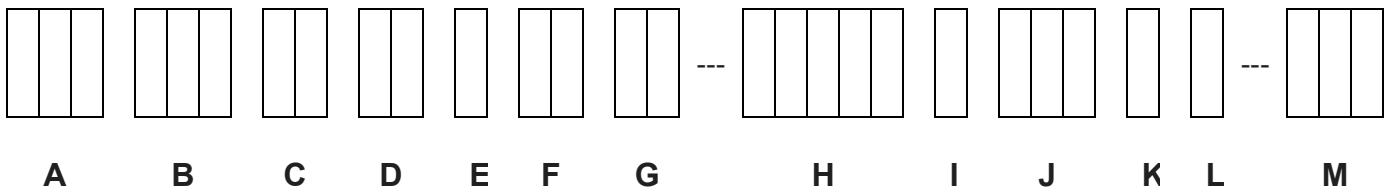
## 6. Mechanical Drawing



## 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