1.9inch Segment e-Paper Specification

	SIGNATURE	DATE
CUSTOMER APPROVAL		
	Notes:	

Notes :

1、Please contact WS before assigning your product based on this module specification.

2、To improve the quality of product, and this product specification is subject to change without any notice.

REVISION RECORD

Rev No.	Rev date	Contents	Remarks
0.1		First release	Preliminary

CONTENTS

1. General Description

This display is a Segment Electrophoretic Display Module which can be used in thermometer.The module is integrated circuits including Segment drivers.

2 Features

- White Reflectance above 35%(0 minute)
- Contrast Ratio above 9:1(0 minute)
- Wide viewing angle
- Ultra low power consumption
- Reflective mode
- Bi-stable display
- Commercial temperature range
- I2C Interface

3 Application

Thermometer

4 Mechanical Specification

4.1 Dimension

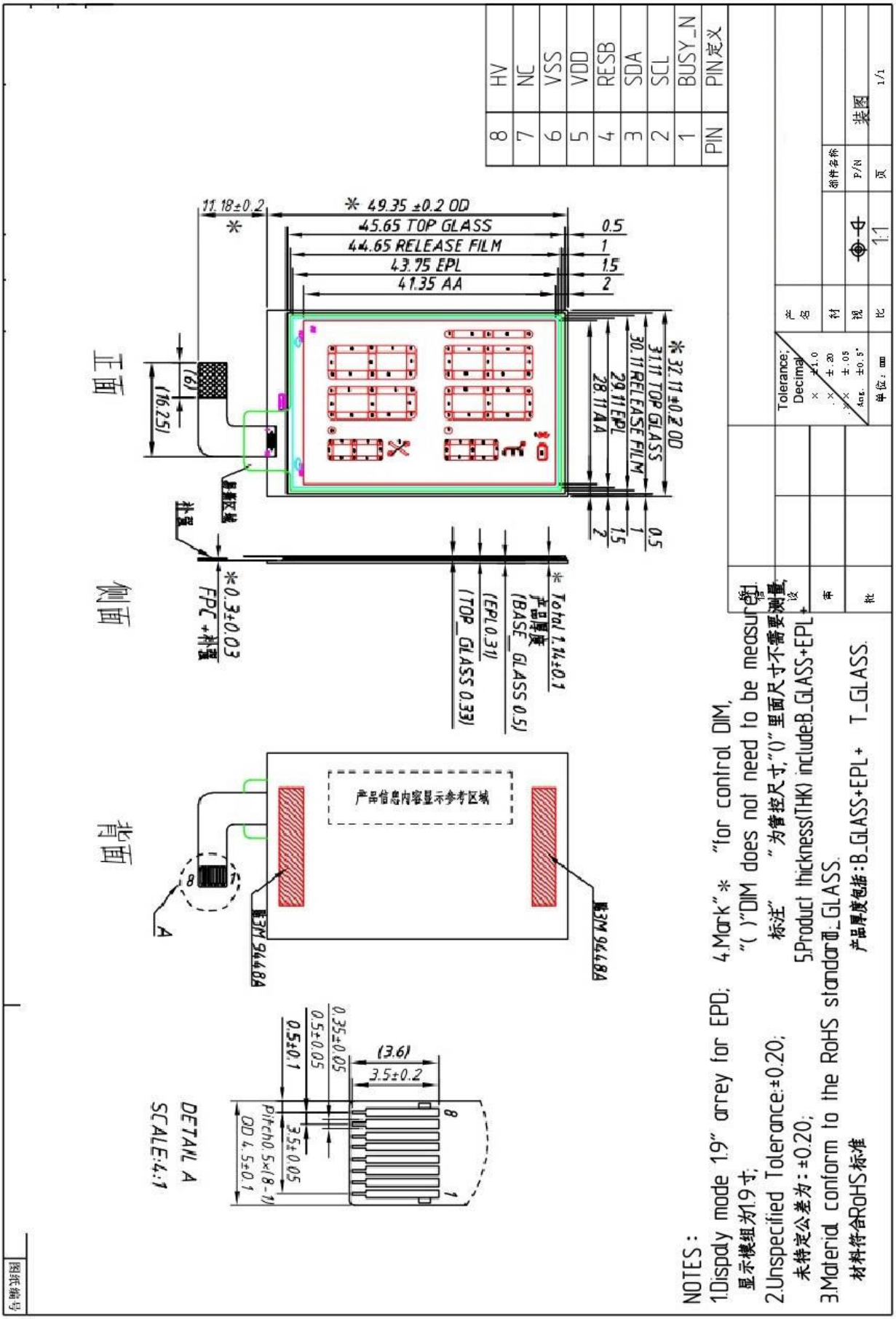
PARAMETER	VALUE	UNIT
Display Resolution	91segment+1Vcom+1BG	segment
Active Area Dimensions Diameter	41.35*28.11	mm
Overall Dimensions Width Height Thickness	 32.11 49.35 1.13±0.1	 mm mm mm
Mass of the Module	TBD	g

4.2 Electrical Connector

SERVICE	CONNECTOR	NUMBER OF PINS
Interface	FPC pitch=0.5mm	8

The position of the interface width FPC =（8+1）*0.5=4.5 mm

4.3 Mechanical Drawing of EPD Module



5 Input/output Pin Assignment

No.	Pin Name	I/O	Description
1	BUSY_N	O	L: interface is BUSY and not ready for write command and data.H: interface is ready for write command and data.
2	SCL	I	Serial clock for IIC interface.
3	SDA	I/O	Serial data for IIC interface.
4	RESB	I	Hardware Reset input pin. When RESB is “L”, initialization isexecuted.
5	VDD	P	Core logic power pin
6	VSS	P	Ground
7	NC	/	Do not connect
8	HV	C	HV ,connect the capacitance

I = Input Pin, O =Output Pin, I/O = Bi-directional Pin (Input/Output), P = Power Pin, C = Capacitor Pin

6 Electrical Characteristics

6.1 Module Interface Description

This module can be driven by Waveshare driver board.

6.2 Module DC Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	Note
Signal ground	VSS		-	0	-	V	
Logic Voltage supply	VDD		1.9	3.0	3.6	V	
	IVDD	update	-	1	1.2	mA	
	Istop	Stop mode	-	1	-	μA	
Gate Positive supply	VPP		14	15	30	V	
	IVPP	update	-	30	-	μA	
Storage	T_{st}	Temperature	0	-	50	℃	2.3
	RH_{st}	Relative humidity	-	-	70%		2.3
Operating	T_{st}	Temperature	0	-	50	℃	1.2.3
	RH_{st}	Relative humidity	-	-	70%		2.3

Notes:

1、The temperature of panel display surface area should be 0℃Min and 50℃Max

2、No condensation and no frost

3、In order to keep good performance of EPD, please refer to precaution for storage condition

7 Optical Characteristics

Parameter	Conditions	Values			Units	Notes
		Min.	Typ.	Max		
White Reflectivity	0 minute	35	-	-	%	
Contrast Ratio (CR)	0 minute	9:1	-	-		1

(T_{amb}=25℃. Measurements are made with Eye-One Pro Spectrophotometer.)

Notes:

1. CR=Surface Reflectance with all white pixel/Surface Reflectance with all black pixels

8 Handling, Safety and Environment Requirements

Warning

The display may break when it is dropped or bumped on a hard surface. Handle with care. Should the displaybreak, do not touch the electrophoretic material. In case of contact with electrophoretic material, wash with water and soap.

Caution

The display module should not be exposed to harmful gases, such as acid and alkali gases, which corrode electronic components.

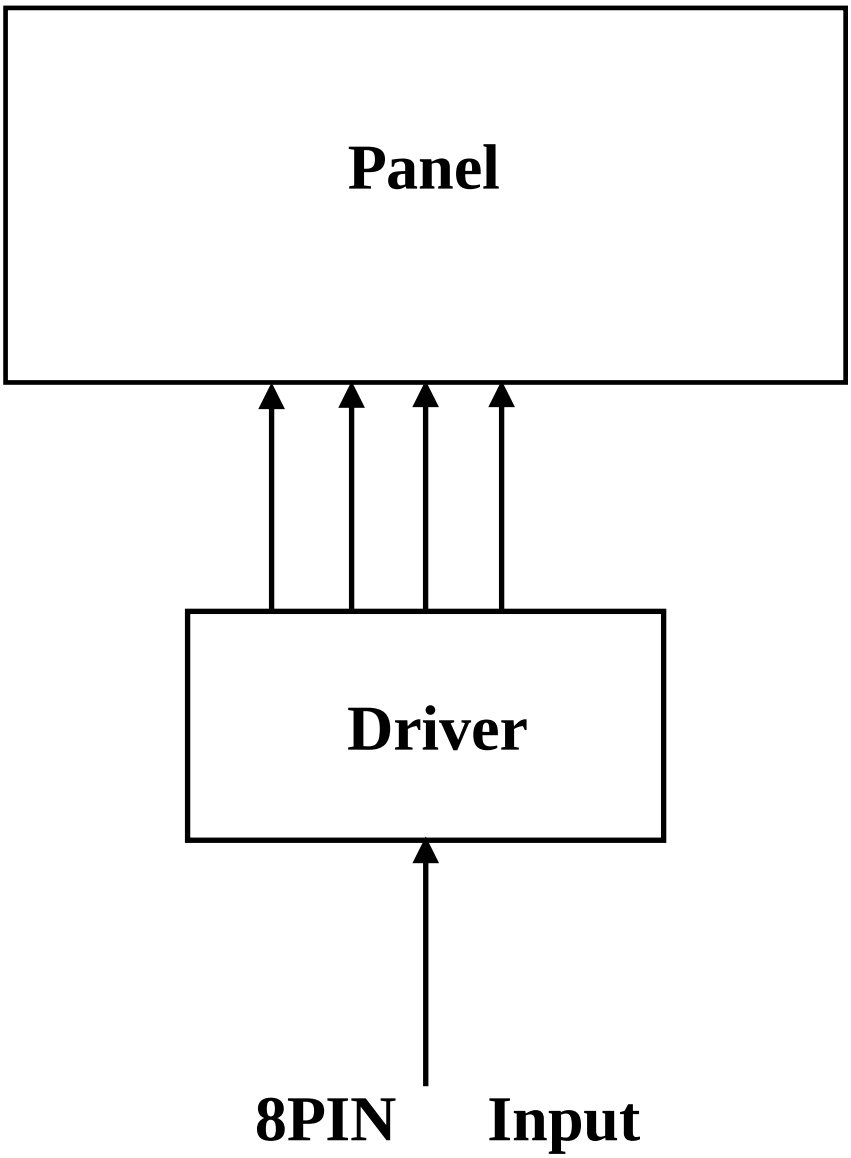
Disassembling the display module can cause permanent damage and invalidates the warranty agreements.

Observe general precautions that are common to handling delicate electronic components. The front surfaces can easily be damaged. Moreover the display is sensitive to static electricity and other rough environmental conditions.

9 Reliability Test

No.	TEST	CONDITION	METHOD	REMARK
1	High-Temperature Operation	T = +50°C, RH = 30% for 168 hrs	IEC 60 068-2-2Bp	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
2	Low-Temperature Operation	T = 0°C for 168 hrs	IEC 60 068-2-2Ab	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
3	High-Temperature Storage	T = +70°C, RH=23% for 168 hrs	IEC 60 068-2-2Bp	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
4	Low-Temperature Storage	T = -25°C for 168 hrs	IEC 60 068-2-1Ab	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
5	High-Temperature, High-Humidity Operation	T = +40°C, RH = 70% for 168 hrs	IEC 60 068-2-3CA	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
6	High Temperature, High- Humidity Storage	T = +60℃, RH=80% for 168 hrs	IEC 60 068-2-3CA	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
7	Thermal Shock	1 cycle:[-25℃30min]→[+70 ℃30 min] : 50cycles	IEC 60 068-2-14	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.
8	Electrostatic Effect (non-operating)	Machine model +/- 250V, 0Ω, 200pF	IEC 62179, IEC 62180	At the end of the test, electrical, mechanical, and optical specifications shall be satisfied.

10 Block Diagram



11 Packaging

TBD

12 Mark and Bar Code definition

TBD