TFT DISPLAY SPECIFICATION



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司

Represented by:

FIRST Components s.r.l.
www.first-components.com
technical@first-components.com
+39 0332 1888005

Product Specifications

Customer	**Standard**
Description	**4.2” E-PAPER DISPLAY**
Model Name	**WAA0420BB5#A2N4AA-FC**
Date	**2025/02/14**
Revision	**1.0**

	Design Engineering		
	Approval	**Check**	**Design**

Over View

WAA0420BB5#A2N4AA-FC is an Active Matrix Electrophoretic Display (AM EPD), with front light panel and capacitive touch panel. The display is capable to display images at 1-bit white, black full display capabilities. The 4.2inch active area contains 400×300 pixels. The module is a TFT-array driving electrophoresis display, with integrated circuits including gate driver, source driver, MCU interface, timing controller, oscillator, DC-DC, SRAM, LUT, VCOM. Module can be used in portable electronic devices, such as Electronic Shelf Label (ESL) System.

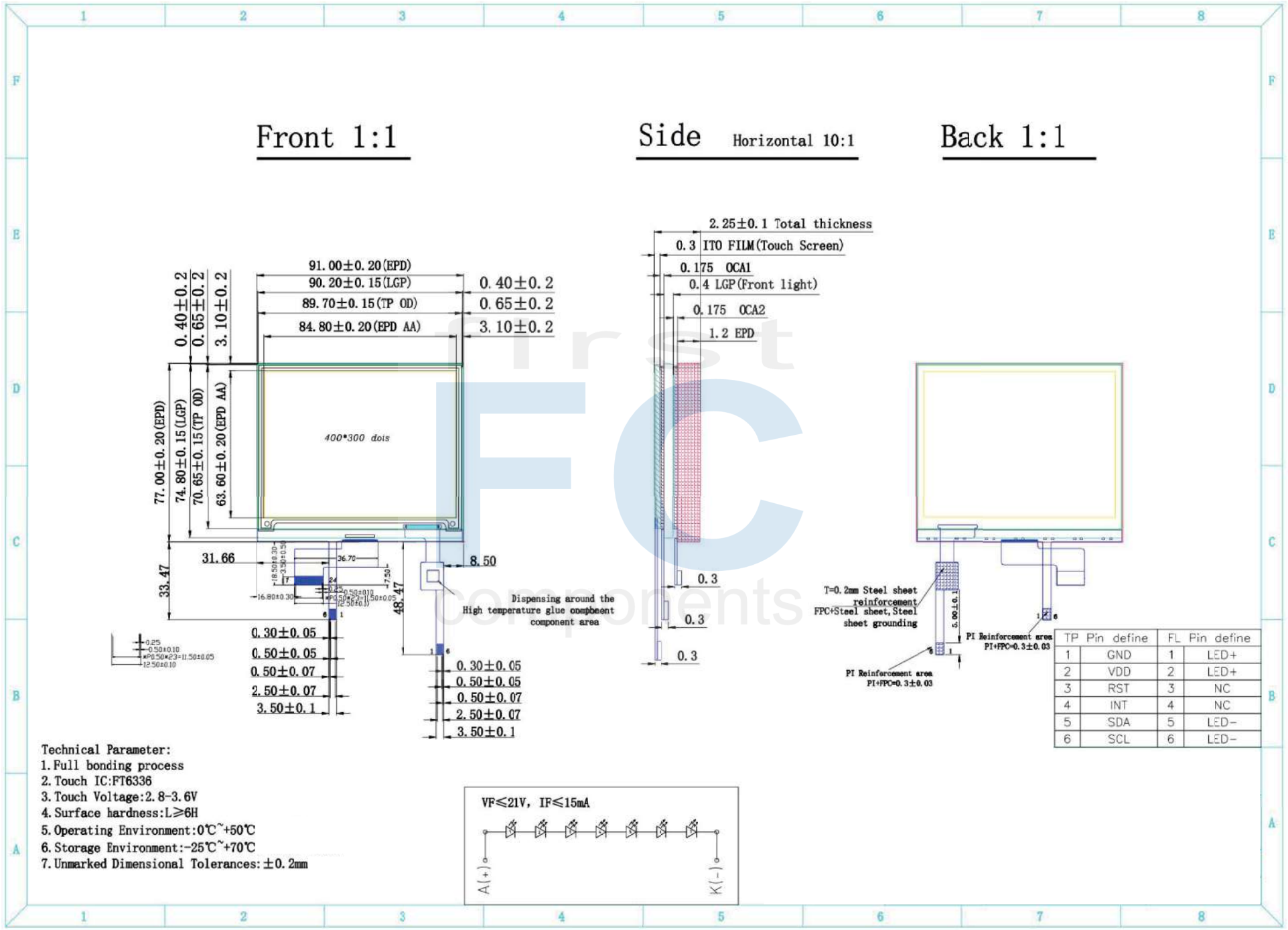
Features

- 400×300 pixels display
- High contrast High reflectance
- Ultra wide viewing angle Ultra low power consumption
- Pure reflective mode
- Bi-stable display
- Commercial temperature range
- Landscape portrait modes
- Hard-coat antiglare display surface
- Ultra Low current deep sleep mode
- On chip display RAM
- Waveform can stored in On-chip OTP or written by MCU
- Serial peripheral interface available
- On-chip oscillator
- On-chip booster and regulator control for generating VCOM, Gate and Source driving voltage
- I2C signal master interface to read external temperature sensor
- Support partial update mode
- Built-in temperature sensor

Mechanical Specifications

Parameter	Specifications	Unit	Remark
Screen Size	4.2	Inch	
Display Resolution	400(H)×300(V)	Pixel	Dpi:120
Active Area	84.8×63.6	mm	
Pixel Pitch	0.212×0.212	mm	
Pixel Configuration	Rectangle		
Outline Dimension	91 (H)×77 (V) ×2.25(D)	mm	
Weight	22.4	g	

Mechanical Drawing of EPD module



TP Pin define		FL Pin define	
1	GND	1	LED+
2	VDD	2	LED+
3	RST	3	NC
4	INT	4	NC
5	SDA	5	LED-
6	SCL	6	LED-

Technical Parameter:
1. Full bonding process
2. Touch IC:FT6336
3. Touch Voltage:2.8-3.6V
4. Surface hardness:L≥6H
5. Operating Environment:0℃~+50℃
6. Storage Environment:-25℃~+70℃
7. Unmarked Dimensional Tolerances: ±0.2mm

Input /Output Pin Assignment

No.	Name	I/O	Description	Remark
1	NC		Do not connect with other NC pins	Keep Open
2	GDR	O	N-Channel MOSFET Gate Drive Control	
3	RESE	I	Current Sense Input for the Control Loop	
4	NC	NC	Do not connect with other NC pins	Keep Open
5	VSH2	C	Positive Source driving voltage(Red)	
6	TSCL	O	I^2C Interface to digital temperature sensor Clock pin	
7	TSDA	I/O	I^2C Interface to digital temperature sensor Data pin	
8	BS1	I	Bus Interface selection pin	Note 5-5
9	BUSY	O	Busy state output pin	Note 54
10	RES#	I	Reset signal input. Active Low.	Note 5-3
11	D/C#	I	Data /Command control pin	Note 5-2
12	CS#	I	Chip select input pin	Note 5-1
13	SCL	I	Serial Clock pin (SPI)	
14	SDA	I/O	Serial Data pin (SPI)	
15	VDDIO	P	Power Supply for interface logic pins It should be connected with VCI	
16	VCI	P	Power Supply for the chip	
17	VSS	P	Ground	
18	VDD	C	Core logic power pin VDD can be regulated internally from VCI. A capacitor should be connected between VDD and VSS	
19	VPP	P	FOR TEST	
20	VSH1	C	Positive Source driving voltage	
21	VGH	C	Power Supply pin for Positive Gate driving voltage and VSH1	
22	VSL	C	Negative Source driving voltage	
23	VGL	C	Power Supply pin for Negative Gate driving voltage VCOM and VSL	
24	VCOM	C	VCOM driving voltage	

First components

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

Note 1: This pin (CS#) is the chip select input connecting to the MCU. The chip is enabled for MCU communication only when CS# is pulled LOW.

Note 2: This pin is (D/C#) Data/Command control pin connecting to the MCU in 4-wire SPI mode. When the pin is pulled HIGH, the data at SDA will be interpreted as data. When the pin is pulled LOW, the data at SDA will be interpreted as command.

Note 3: This pin (RES#) is reset signal input. The Reset is active low.

Note 4: This pin is Busy state output pin. When Busy is High, the operation of chip should not be interrupted, command should not be sent. The chip would put Busy pin High when –Outputting display waveform -Communicating with digital temperature sensor

Note 5: Bus interface selection pin

BS1 State	MCU Interface
L	4-lines serial peripheral interface(SPI) - 8 bits SPI
H	3- lines serial peripheral interface(SPI) - 9 bits SPI

Electrical Characteristics

Absolute Maximum Rating

Parameter	Symbol	Rating	Unit
Logic supply voltage	VCI	-0.5 to +6.0	V
Logic Input voltage	VIN	-0.5 to VCI +0.5	V
Logic Output voltage	VOUT	-0.5 to VCI +0.5	V
Operating Temp range	TOPR	0 to +50	°C
Storage Temp range	TSTG	-25 to+70	
Optimal Storage Temp	TSTGo	23±2	°C
Optimal Storage Humidity	HSTGo	55±10	%RH

Note: 1. Maximum ratings are those values beyond which damages to the device may occur. Functional operation should be restricted to the limits in the Panel DC Characteristics tables.

Optical Specifications

Measurements are made with that the illumination is under an angle of 45 degree, the detection is perpendicular unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ.	Max	Units	Notes
R	White Reflectivity	White	30	35	-	%	8-1
CR	Contrast Ratio	Indoor	8:1		-		8-2
GN	2Grey Level	-		DS+(WS-DS)*n(m-1)			8-3
T update	Image update time	at 25 °C		3	-	sec	
Life		Topr		1000000times or 5years			

Notes:

1. Luminance meter: Eye-One Pro Spectrophotometer.
2. CR=Surface Reflectance with all white pixel/Surface Reflectance with all black pixels.
3. WS: White state, DS: Dark state

first FC components