TFT DISPLAY SPECIFICATION



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司

Represented by:

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

Product Specifications

Customer	**Standard**
Description	**2.9” E-PAPER DISPLAY**
Model Name	**WAA0290BA8#A2N1AA-FC**
Date	2024/09/30
Revision	**1.0**

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

Over View

WAA0290BA8#A2N1AA-FC is an Active Matrix Electrophoretic Display (AM EPD), with front light panel. The display is capable to display images at 1-bit white black full display capabilities. The 2.9 inch active area contains 296×128 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

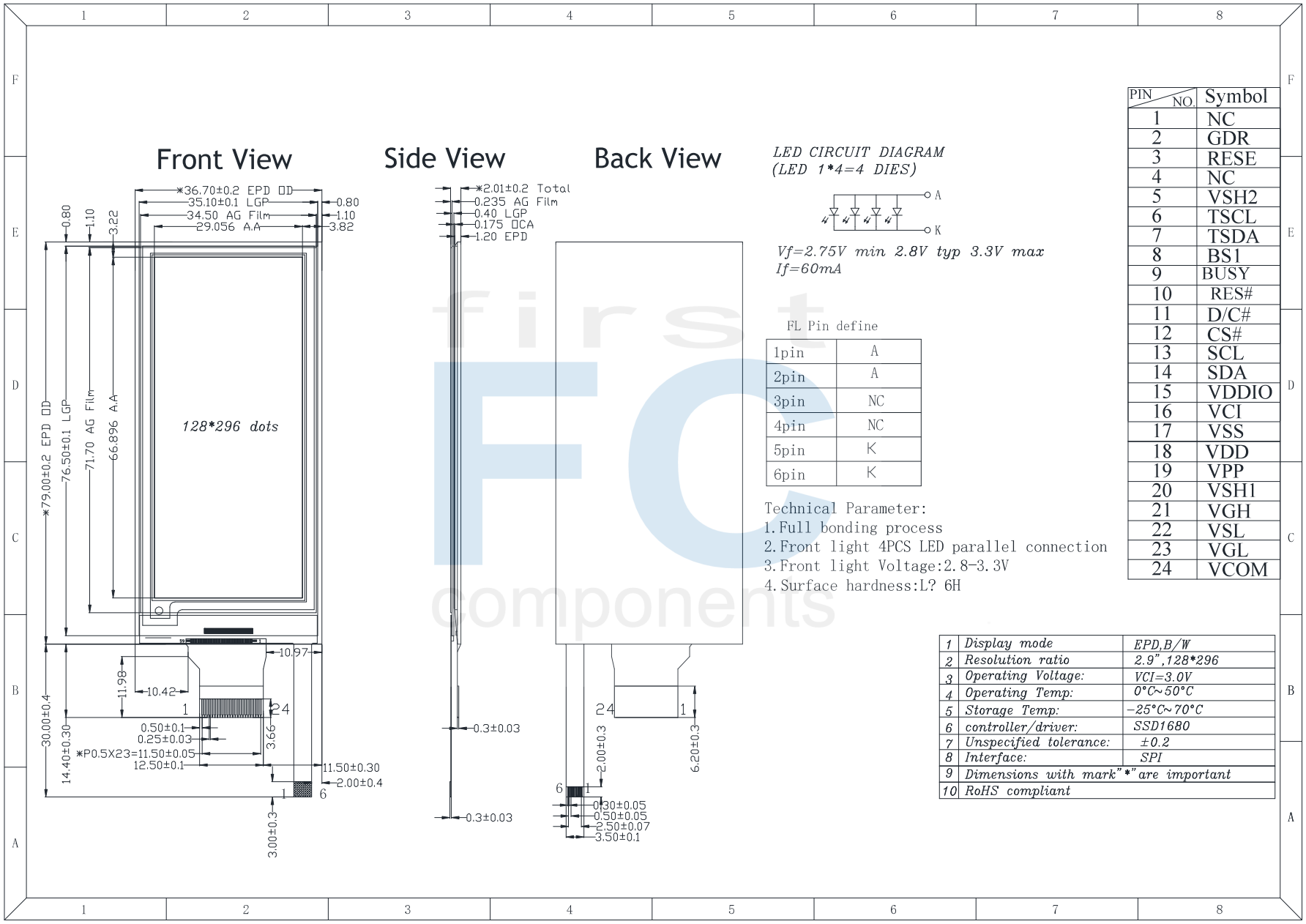
296×128 pixels display
High cntrast High reflectance
Ultra wide viewing angle Ultra low power consumption Pure reflective mode
Bi-stable display
Commercial temperature range
Landscape portrait modes
Hard-coat antiglare display surface
Ultra Low current deep sleep mode
On chip display RAM
Waveform can 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
Built-in temperature sensor
With front light panel, 4 LEDs in parallel, operating voltage 3v

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Mechanical Specifications

Parameter	Specifications	Unit	Remark
Screen Size	2.9	Inch	
Display Resolution	296 (H)×128(V)	Pixel	Dpi:125
Active Area	29.056(H)×66.896(V)	mm	
Pixel Pitch	0.227×0.226	mm	
Pixel Configuration	Rectangle		
Outline Dimension	36.7(H)×79.0(V) ×1.2(D)	mm	
Weight	8.3±0.5	g	

Mechanical Drawing of EPD module



LED CIRCUIT DIAGRAM
*(LED 1*4=4 DIES)*

Vf=2.75V min 2.8V typ 3.3V max
If=60mA

FL Pin define

1pin	A
2pin	A
3pin	NC
4pin	NC
5pin	K
6pin	K

Technical Parameter:
1. Full bonding process
2. Front light 4PCS LED parallel connection
3. Front light Voltage:2.8-3.3V
4. Surface hardness:L? 6H

PIN NO.	Symbol
1	NC
2	GDR
3	RESE
4	NC
5	VSH2
6	TSCL
7	TSDA
8	BS1
9	BUSY
10	RES#
11	D/C#
12	CS#
13	SCL
14	SDA
15	VDDIO
16	VCI
17	VSS
18	VDD
19	VPP
20	VSH1
21	VGH
22	VSL
23	VGL
24	VCOM

1	*Display mode*	*EPD,B/W*
2	*Resolution ratio*	*2.9",128*296*
3	*Operating Voltage:*	*VCI=3.0V*
4	*Operating Temp:*	*0°C~50°C*
5	*Storage Temp:*	*-25°C~70°C*
6	*controller/driver:*	*SSD1680*
7	*Unspecified tolerance:*	*±0.2*
8	*Interface:*	*SPI*
9	*Dimensions with mark"*" are important*	
10	*RoHS compliant*	

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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 5-4
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	

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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 +4.0	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	°C
Optimal Storage Temp	TSTGo	23±2	°C
Optimal Storage Humidity	HSTGo	55±10	%RH

Note:

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

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