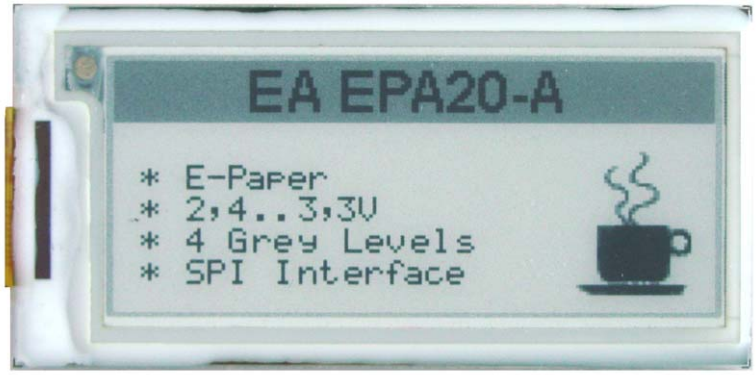
Issue 9.2015

ELECTRONIC ASSEMBLY
new display design

ePAPER 2.0“ - 172X72 DOTS

INCL. CONTROLLER SSD1606 WITH SPI

available ex stock in low quantities !



Dimensions:
59.2 x 29.2 mm

TECHNICAL DATA

* HIGH-CONTRAST E-PAPER LCD DISPLAY
* WIDE VIEWING ANGLE
* ACTIVE MATRIX ELECTROPHORETIC DISPLAY (ePAPER) 2“ WITH 172X72 DOTS
* CONTROLLER SSD1606 FOR SPI (4-WIRE) INTERFACE
* POWER: +3,3V SINGLE SUPPLY
* NO ADDITIONAL VOLTAGES REQUIRED
* OPERATING TEMPERATURE RANGE 0°...+50°C (STORAGE TEMP. -25°..+75°C)
* STANDBY-POWER 0W (CONTENT READABLE)
* POWER CONSUMPTION WHILE CONTENT CHANGE ca. 40 mW (~1 sec image update)
* ON-CHIP DISPLAY RAM
* ON-CHIP BOOSTER AND REGULATOR FOR GATE AND SOURCE VOLTAGES
* 4 GRAYSCALES - BLACK, DARK GRAY, LIGHT GRAY AND WHITE

ORDERING CODE

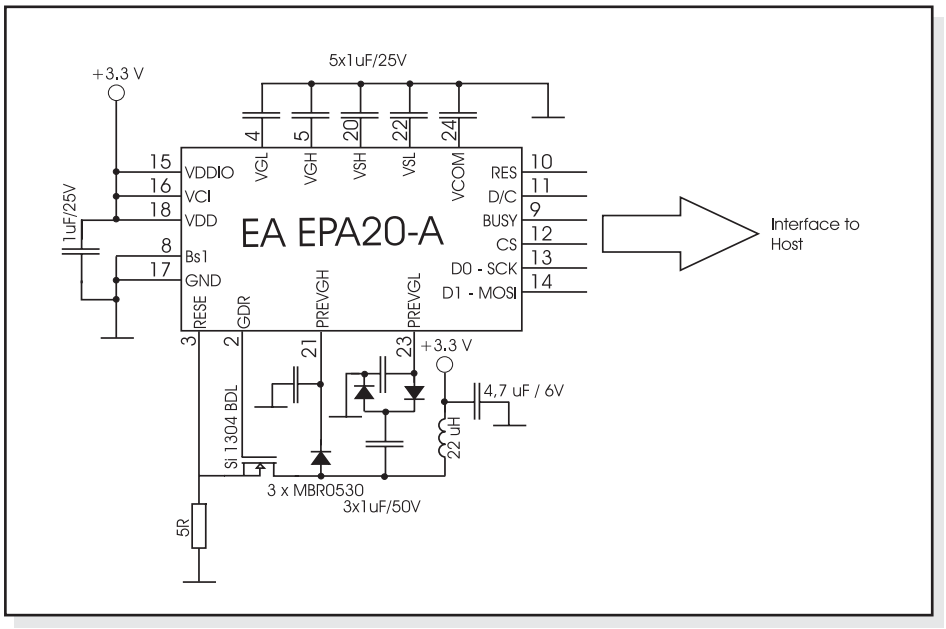
ePAPER DISPLAY 2“ 172X72	**EA EPA20-A**

ACCESSORIES

ZIFF-CONNECTOR, 24 PINS, TOP CONTACT	**EA WF050-24T**

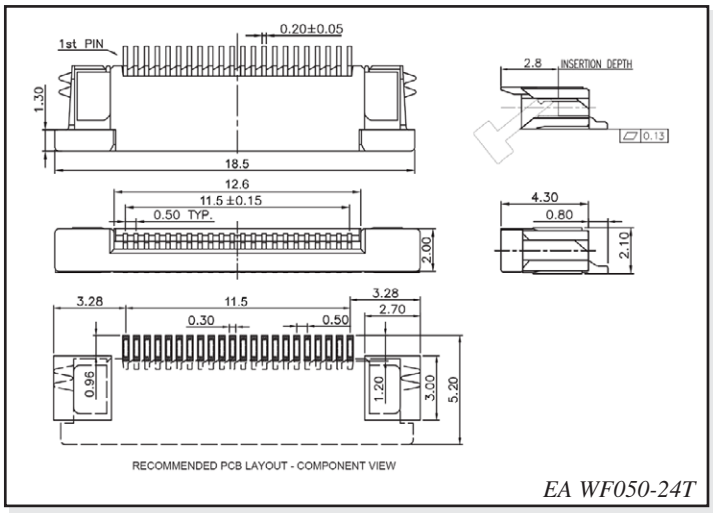
APPLICATION EXAMPLE

Please find a sample schematic below.



INITIALISATION EXAMPLE

```
const unsigned char lut_data[]=
{    0x82,0x00,0x00,0x00,0xAA,0x00,0x00,0x00,0xAA,
     0xAA,0x00,0x00,0xAA,0xAA,0xAA,0x00,0x55,0xAA,
     0xAA,0x00,0x55,0x55,0x55,0x55,0xAA,0xAA,0xAA,
     0xAA,0x55,0x55,0x55,0x55,0xAA,0xAA,0xAA,0xAA,
     0x15,0x15,0x15,0x15,0x05,0x05,0x05,0x05,0x01,
     0x01,0x01,0x01,0x00,0x00,0x00,0x00,0x00,0x00,
     0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
     0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
     0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x41,
     0x45,0xF1,0xFF,0x5F,0x55,0x01,0x00,0x00,0x00
};

void SPI_out (unsigned char data)
{
     uchar count;
     CS=0;
     for(count=0;count<8;count++)
     {
          if(data&0x80)
            SDIN=1;
          else
            SDIN=0;
          SCLK=1;
          data<<=1;
          SCLK=0;
      }
      CS=1;
}

void writecmd(char data)
{
  DC=0;
  SPI_out(data);
}

void writedata(char data)
{
  DC=1;
  SPI_out(data);
}
```

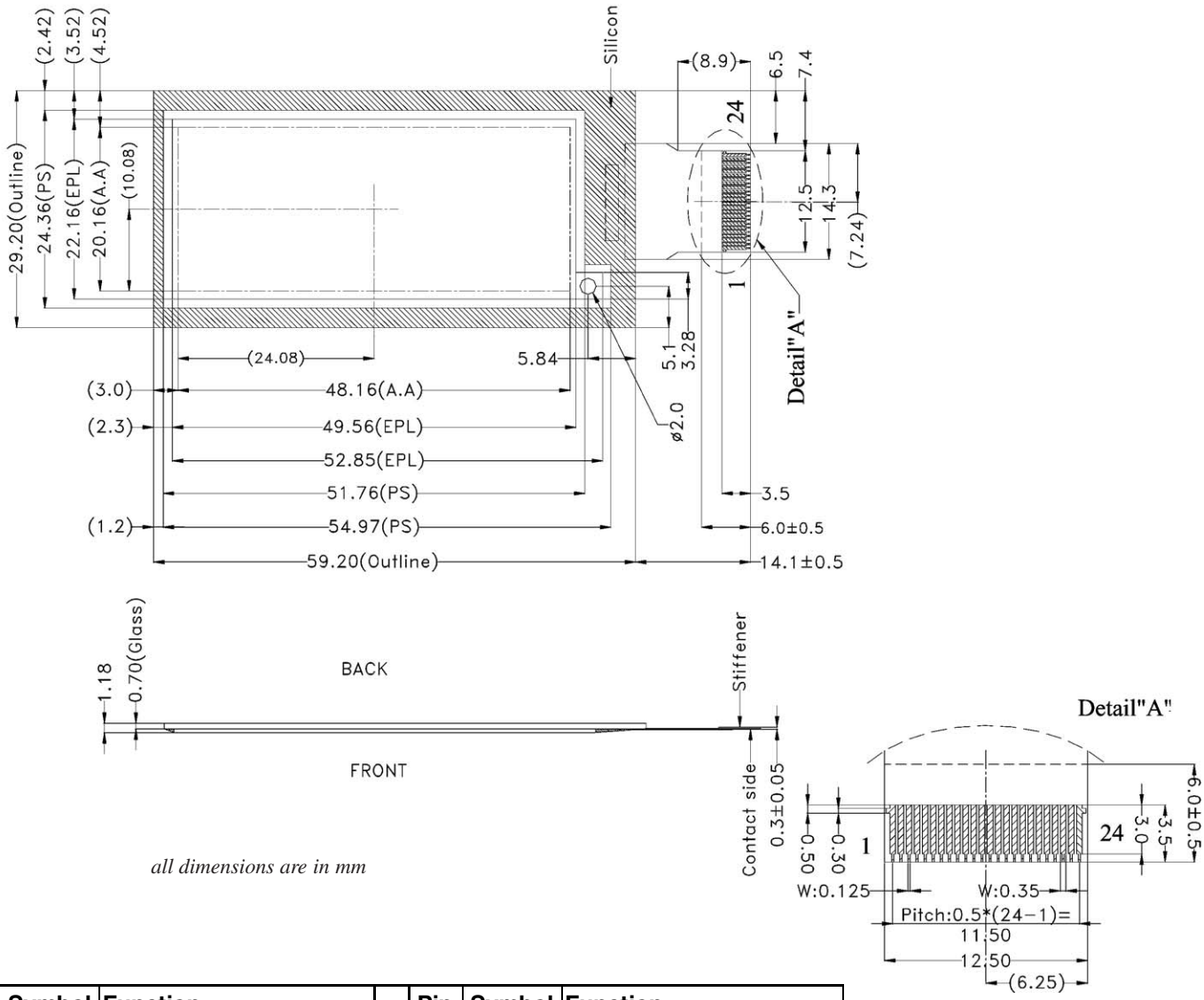


Printing and typographical errors reserved.
ELECTRONIC ASSEMBLY reserves the right to change specifications without prior notice.

```
void init(void)
{
     unsigned char i;

     CS=1;               //perform reset CS idle=1
     SCLK=0;             //SCLK idle=0
     RST=1;
     delayms(1);
     RST=0;
     delayms(2);
     RST=1;
     delayms(3);

     writecmd(0x10);    //do not enter deep sleep mode
     writedata(0x00);

     writecmd(0x11);  //data entry mode setting,0x01,Y decrement,X increment
     writedata(0x01);
     writecmd(0x44);  //set RAM X-address start/end position
     writedata(0x00); //RAM X -address start at 00H
     writedata(0x11); //RAM X-address end at 11H->(17D),that is (17+1*4=72)start/end
                        position
     writedata(0xAB); //RAM Y-address start at ABH->(171D)
     writedata(0x00); //RAM Y-address end at 00H
     writecmd(0x4E);  //set RAM x address count to 0;
     writedata(0x00);
     writecmd(0x4F);  //set RAM Y address count to 172->0;
     writedata(0xAB);

     writecmd(0xF0);  //booster feedback selection,0x1F->internal feedback is used
     writedata(0x1F); //0x83
     writecmd(0x21);  //bypass the RAM data into the display,enable pass
     writedata(0x03);
     writecmd(0x2C);  //write VCOM register
     writedata(0xA0);
     writecmd(0x3C);  //board waveform, board voltage
     writedata(0x63);
     writecmd(0x22);  //enable sequence, CLK->CP->
     writedata(0xC4);

     writecmd(0x32);  //write LUT register
     for(i=0;i<90;i++)
     writedata(lut_data[i]);
}

void fill_display(uchar dat) //0xFF=white, 0x00=black, 0x55=gray 1, 0xAA=gray 2
{
     unsigned int i;

     writecmd(0x24);//data write into RAM after this command

     for(i=0;i<3096;i++) //3096 = 172x72/8x2, (2-Bit per dot)
     {
          writedata(dat);
     }
     writecmd(0x20);

     //Booster diable
     writecmd(0x22); //display updata sequence option ,in page 33
     writedata(0x02);
     writecmd(0x20);

}
```

Further details concerning the command set and electrical specifications are mentioned in the controller's datasheet SSD1606:
http://www.lcd-module.de/eng/pdf/zubehoer/ssd1606_1_1.pdf

DIMENSIONS



all dimensions are in mm

Pin	Symbol	Function
1	NC	do not connect
2	GDR	Gate drive control
3	RESE	current sense input
4	VGL	negative gate driving voltage
5	VGH	positive gate driving voltage
6	TSCL	I²C digital temp. sensor clock
7	TSDA	I²C digital temp. sensor data
8	BS1	Bus selector pin
9	BUSY	Busy state output pin
10	!RES	Reset (active low)
11	D/!C	data (high)/command (low) control
12	!CS	Chip select (active low)

Pin	Symbol	Function
13	D0	SPI-Clock (SCK)
14	D1	SPI-Data (MOSI)
15	VDDIO	Power for I/O logic pins
16	VCI	Power for display driver chip
17	GND	Ground
18	VDD	Power supply
19	VPP	Power for OTP programming
20	VSH	positive source driving voltage
21	PREVGH	power supply for VGH and VSH
22	VSL	negative source driving voltage
23	PREVGL	Power supply for VCOM, VGL, VSL
24	VCOM	VCOM driving voltage

Note:
- The display's surface is covered with a protecting foil. Please remove.
- Handle with care. Slim glas

ELECTRONIC ASSEMBLY GmbH
Zeppelinstraße 19
D-82205 Gilching
Germany

Fon: +49 (0)8105-778090
Fax: +49 (0)8105-778099
e-Mail: info@lcd-module.de
Web: www.lcd-module.com

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