



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | <b>A0</b>                               | <b>Page Number</b>   | <b>1 of 39</b>        |

# Specification For HINK 2.13"EPD

**Model NO.: HINK-E0213A217**

**Product VER:A0**

## Customer Approval

|                         |  |
|-------------------------|--|
| <b>Customer</b>         |  |
| <b>Approval By</b>      |  |
| <b>Date Of Approval</b> |  |

**It will be agreed by the receiver,if not sign back the Specification within 15days.**

|                    |                    |                    |
|--------------------|--------------------|--------------------|
| <b>Prepared By</b> | <b>Checked By</b>  | <b>Approval By</b> |
| <b>Diasy Zhu</b>   | <b>Yufeng Zhou</b> | <b>Ziping Hu</b>   |



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 2 of 39               |

| <b>Version</b> | <b>Content</b> | <b>Date</b> | <b>Producer</b> |
|----------------|----------------|-------------|-----------------|
| A0             | New release    | 2021/09/02  | Daisy Zhu       |
|                |                |             |                 |
|                |                |             |                 |
|                |                |             |                 |
|                |                |             |                 |
|                |                |             |                 |
|                |                |             |                 |
|                |                |             |                 |
|                |                |             |                 |



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 3 of 39               |

## CONTENTS

|   |    |
|---|----|
| 1.GENERAL DESCRIPTION .....                             | 4  |
| 2.FEATURES .....  | 4  |
| 3.APPLICATION.....                                      | 4  |
| 4.MECHANICAL SPECIFICATIONS.....                        | 4  |
| 5. MECHANICAL DRAWING OF EPD MODULE.....                | 5  |
| 6.INPUT/OUTPUT TERMINALS .....                          | 6  |
| 7.MCU INTERFACE .....                                   | 7  |
| 7.1 MCU INTERFACE SELECTION .....                       | 7  |
| 7.2 MCU SERIAL PERIPHERAL INTERFACE (4-WIRE SPI).....   | 7  |
| 7.3MCU SERIAL PERIPHERAL INTERFACE (3-WIRE SPI).....    | 8  |
| 8. TEMPERATURE SENSOR OPERATION .....                   | 10 |
| 9.COMMAND TABLE .....                                   | 11 |
| 11. REFERENCE CIRCUIT .....                             | 25 |
| 12. ABSOLUTE MAXIMUM RATING .....                       | 27 |
| 13.DC CHARACTERISTICS .....                             | 27 |
| 14. SERIAL PERIPHERAL INTERFACE TIMING.....             | 28 |
| 15. POWER CONSUMPTION .....                             | 28 |
| 16.TYPICAL OPERATING SEQUENCE.....                      | 29 |
| 17.OPTICAL CHARACTERISTICS.....                         | 30 |
| 17.1 SPECIFICATIONS .....                               | 30 |
| 17.2 DEFINITION OF CONTRAST RATIO.....                  | 31 |
| 17.3 REFLECTION RATIO.....                              | 31 |
| 18. HANDLING, SAFETY AND ENVIROMENTAL REQUIREMENTS..... | 32 |
| 19. RELIABILITY TEST .....                              | 34 |
| 19.1 RELIABILITY TEST ITEMS.....                        | 34 |
| 19.2 PRODUCT LIFE TIME .....                            | 34 |
| 19.3 PRODUCT WARRANTY .....                             | 34 |
| 20. BLOCK DIAGRAM.....                                  | 35 |
| 21. PARTA/PARTB SPECIFICATION.....                      | 35 |
| 22. POINT AND LINE STANDARD.....                        | 36 |
| 23.BARCODE .....  | 38 |
| 24. PACKING.....  | 39 |



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 4 of 39               |

## 1.General Description

HINK-E0213A217 is an Active Matrix Electrophoretic Display (AMEPD), with interface and a reference system design. The 2.13" active area contains 104×212 pixels, and has 1-bit B/W/R full display capabilities. An integrated circuit contains gate buffer, source buffer, interface, timing control logic, oscillator, DC-DC, SRAM, LUT, VCOM and border are supplied with each panel.

## 2.Features

- 104×212 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
- Low voltage detect for supply voltage
- High voltage ready detect for driving voltage
- Internal temperature sensor
- 10-byte OTP space for module identification
- Waveform stored in On-chip OTP
- 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

## 3.Application

Electronic Shelf Label System

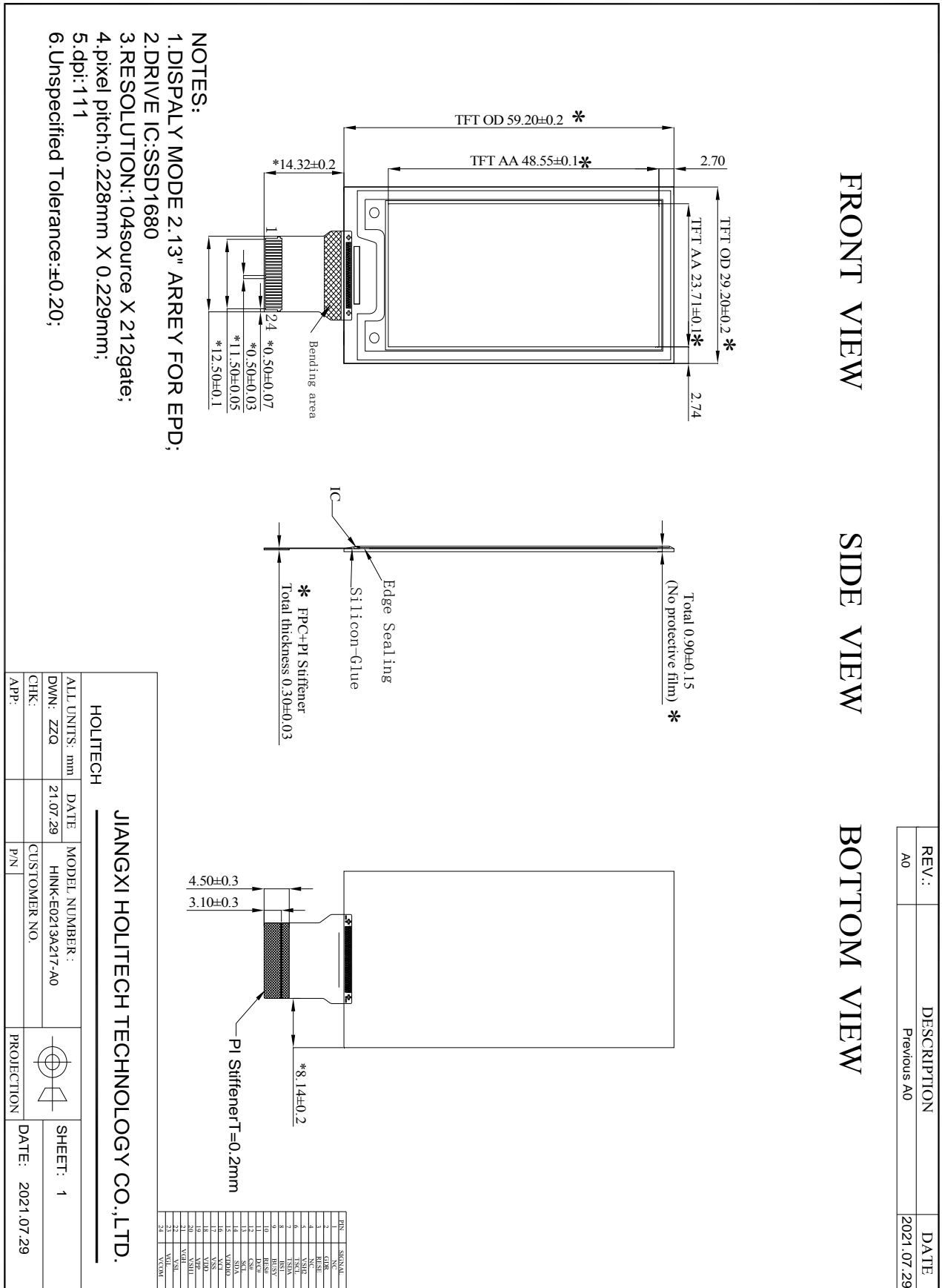
## 4.Mechanical Specifications

| <b>Parameter</b>    | <b>Specifications</b>    | <b>Unit</b> | <b>Remark</b>               |
|---------------------|--------------------------|-------------|-----------------------------|
| Screen Size         | 2.13                     | Inch        |                             |
| Display Resolution  | 104(H)×212(V)            | Pixel       | Dpi:111                     |
| Active Area         | 23.71(H)×48.55(V)        | mm          |                             |
| Pixel Pitch         | 0.228×0.229              | mm          |                             |
| Pixel Configuration | Rectangle                |             |                             |
| Outline Dimension   | 29.2(H)×59.2 (V) ×0.9(D) | mm          | <b>Without masking film</b> |
| Weight              | 3±0.5                    | g           |                             |



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 5 of 39        |

### 5. Mechanical Drawing of EPD module



| REV.: | DESCRIPTION | DATE       |
|-------|-------------|------------|
| A0    | Previous A0 | 2021.07.29 |



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 6 of 39        |

## 6.Input/Output Terminals

| Pin # | Single | Description  | Remark    |
|-------|--------|--|-----------|
| 1     | NC     | No connection and do not connect with other NC pins                | Keep Open |
| 2     | GDR    | N-Channel MOSFET Gate Drive Control                                |           |
| 3     | RESE   | Current Sense Input for the Control Loop                           |           |
| 4     | NC     | No connection and do not connect with other NC pins                | Keep Open |
| 5     | VSH2   | Positive Source driving voltage                                    |           |
| 6     | TSCL   | I <sup>2</sup> C Interface to digital temperature sensor Clock pin |           |
| 7     | TSDA   | I <sup>2</sup> C Interface to digital temperature sensor Data pin. |           |
| 8     | BS1    | Bus selection pin  | Note 6-5  |
| 9     | BUSY   | Busy state output pin  | Note 6-4  |
| 10    | RES #  | Reset signal input.  | Note 6-3  |
| 11    | D/C #  | Data /Command control pin  | Note 6-2  |
| 12    | CS #   | The chip select input connecting to the MCU.                       | Note 6-1  |
| 13    | SCL    | Serial clock pin for interface.                                    |           |
| 14    | SDA    | Serial data pin for interface.                                     |           |
| 15    | VDDIO  | Power input pin for the Interface.                                 |           |
| 16    | VCI    | Power Supply pin for the chip                                      |           |
| 17    | VSS    | Ground (Digital)   |           |
| 18    | VDD    | Core logic power pin   |           |
| 19    | VPP    | Power Supply for OTP Programming                                   |           |
| 20    | VSH1   | Positive Source driving voltage                                    |           |
| 21    | VGH    | Power Supply pin for Positive Gate driving voltage and VSH         |           |
| 22    | VSL    | Negative Source driving voltage                                    |           |
| 23    | VGL    | Power Supply pin for Negative Gate driving voltage, VCOM and VSL   |           |
| 24    | VCOM   | VCOM driving voltage   |           |

Note 6-1: 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 6-2: This pin (D/C#) is Data/Command control pin connecting to the MCU. When the pin is pulled HIGH, the data will be interpreted as data. When the pin is pulled LOW, the data will be interpreted as command.

Note 6-3: This pin (RES#) is reset signal input. The Reset is active low.

Note 6-4: This pin (BUSY) is Busy state output pin. When Busy is High, the operation of chip should not be interrupted and any commands should not be issued to the module. The driver IC will put Busy pin High when the driver IC is working such as:

- Outputting display waveform;
- Communicating with digital temperature sensor

Note 6-5: This pin (BS1) is for 3-line SPI or 4-line SPI selection. When it is “Low”, 4-line SPI is selected. When it is “High”, 3-line SPI (9 bits SPI) is selected.



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 7 of 39        |

## 7.MCU Interface

### 7.1 MCU interface selection

The HINK-E0213A217 can support 3-wire/4-wire serial peripheral interface. In the Module, the MCU interface is pin selectable by BS1 pins shown in table 7-1.

**Table 7-1: Interface pin assignment for different MCU interfaces**

| MCU Interface   | Pin name |      |     |      |     |     |
|---|----------|------|-----|------|-----|-----|
|   | BS1      | RES# | CS# | D/C# | SCL | SDA |
| 4-wire serial peripheral interface (SPI)              | L        | RES# | CS# | D/C# | SCL | SDI |
| 3-wire serial peripheral interface (SPI) - 9 bits SPI | H        | RES# | CS# | L    | SCL | SDI |

Note:

(1) L is connected to VSS H is connected to VDDIO

### 7.2 MCU Serial Peripheral Interface (4-wire SPI)

The 4-wire SPI consists of serial clock SCL, serial data SDA, D/C# and CS#. The control pins status in 4-wire SPI in writing command/data is shown in Table 7-2 and the write procedure 4-wire SPI is shown in table 7-2.

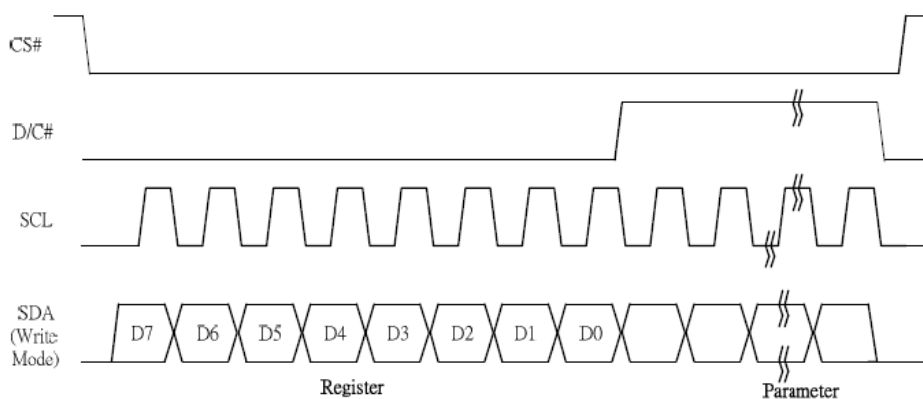
**Table 7-2 : Control pins status of 4-wire SPI**

| Function      | SCL pin | SDA pin     | D/C# pin | CS# pin |
|---------------|---------|-------------|----------|---------|
| Write command | ↑       | Command bit | L        | L       |
| Write data    | ↑       | Data bit    | H        | L       |

Note:

- (1) L is connected to VSS and H is connected to VDDIO
- (2) ↑ stands for rising edge of signal
- (3) SDA (Write Mode) is shifted into an 8-bit shift register on every rising edge of SCL in the order of D7, D6, ...D0. The level of D/C# should be kept over the whole byte. The data byte in the shift register is written to the Graphic Display Data RAM (RAM)/Data Byte register or command Byte register according to D/C# pin.

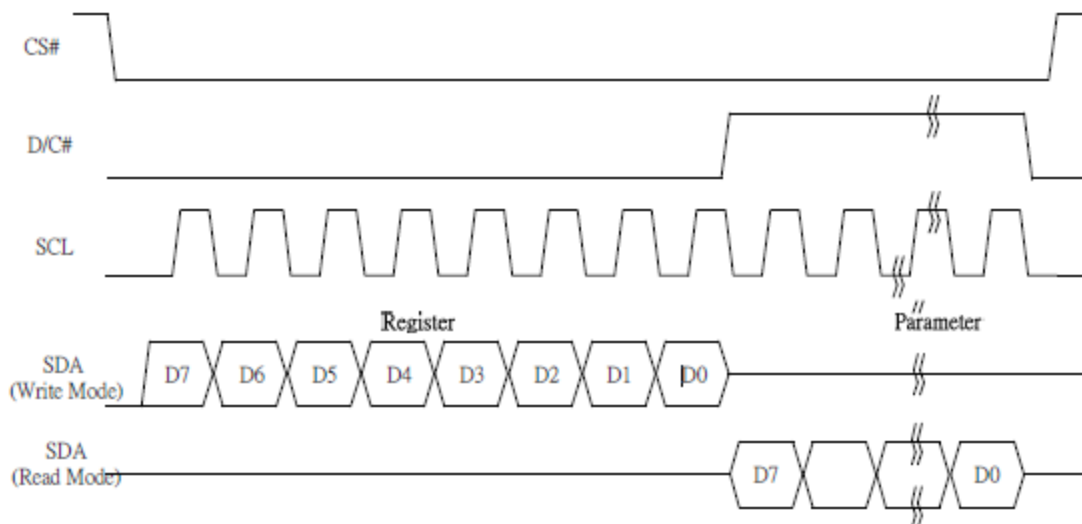
**Figure 7-1 Write procedure in 4-wire SPI mode**





|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 8 of 39               |

In the read operation (Command 0x1B, 0x27, 0x2D, 0x2E, 0x2F, 0x35). After CS# is pulled low, the first byte sent is command byte, D/C# is pulled low. After command byte sent, the following byte(s) read are data byte(s), so D/C# bit is then pulled high. An 8-bit data will be shifted out on every clock falling edge. The serial data SDA bit shifting sequence is D7, D6, to D0 bit. Figure 6-2 shows the read procedure in 4-wire SPI.



**Figure 7-2 Read procedure in 4-wire SPI mode**

### 7.3MCU Serial Peripheral Interface (3-wire SPI)

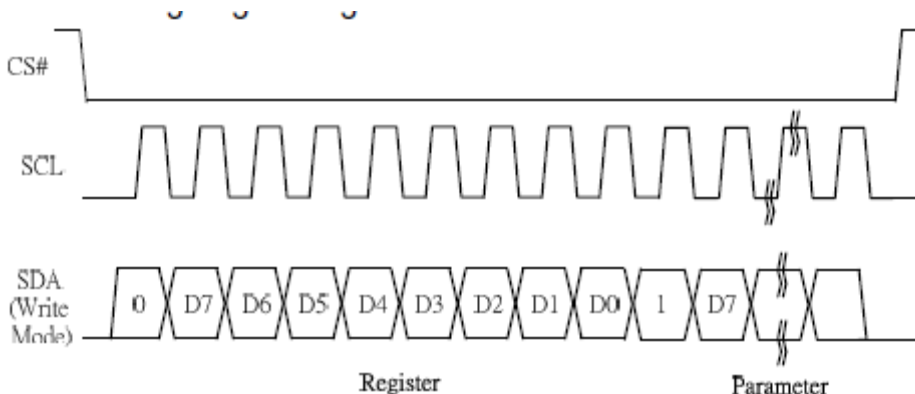
The 3-wire SPI consists of serial clock SCL, serial data SDA and CS#. The operation is similar to 4-wire SPI while D/C# pin is not used and it must be tied to LOW. The control pins status in 3-wire SPI is shown in Table 6-3. In the write operation, a 9-bit data will be shifted into the shift register on every clock rising edge. The bit shifting sequence is D/C# bit, D7 bit, D6 bit to D0 bit. The first bit is D/C# bit which determines the following byte is command or data. When D/C# bit is 0, the following byte is command. When D/C# bit is 1, the following byte is data. Table 6-3 shows the write procedure in 3-wire SPI

**Table 7-3 : Control pins status of 3-wire SPI**

| Function      | SCL pin | SDI pin     | D/C# pin | CS# pin |
|---------------|---------|-------------|----------|---------|
| Write command | ↑       | Command bit | Tie LOW  | L       |
| Write data    | ↑       | Data bit    | Tie LOW  | L       |

**Note:**

- (1) L is connected to V<sub>SS</sub> and H is connected to V<sub>DDIO</sub>
- (2) ↑ stands for rising edge of signal



**Figure 7-3 Write procedure in 3-wire SPI mode**





| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
|-----------|----------------------------------|---------------|----------------|
| Version   | A0                               | Page Number   | 9 of 39        |

In the read operation (command 0x1B, 0x27, 0x2D, 0x2E, 0x2F, 0x35). SDA data are transferred in the unit of 9 bits. After CS# pull low, the first byte is command byte, the D/C# bit is as 0 and following with the register byte. After command byte send, the following byte(s) are data byte(s), with D/C# bit is 1. After D/C# bit sending from MCU, an 8-bit data will be shifted out on every clock falling edge. The serial data SDA bit shifting sequence is D7, D6, to D0 bit. Figure 6-4 shows the read procedure in 3-wire SPI.

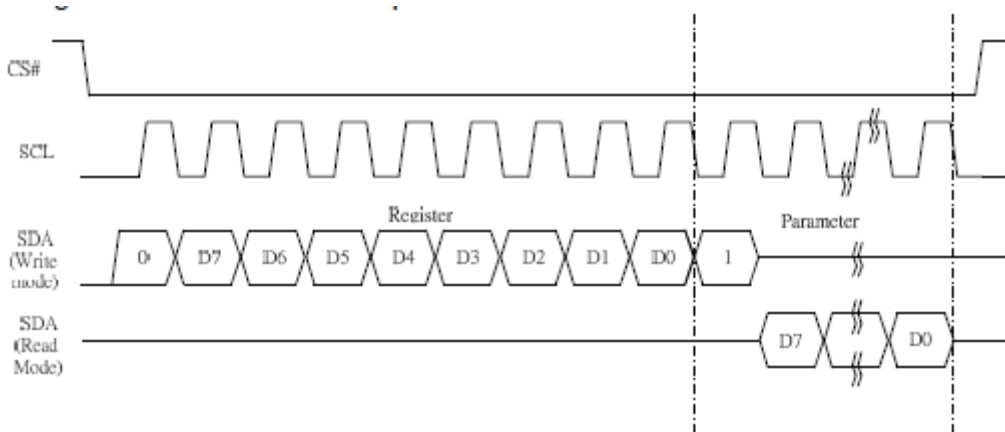


Figure 7-4 Read procedure in 3-wire SPI mode



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 10 of 39              |

## 8. Temperature sensor operation

Following is the way of how to sense the ambient temperature of the module. First, use an external temperature sensor to get the temperature value and converted it into HEX format with below mapping table, then send command 0x1A with the HEX temperature value to the module thru the SPI interface.

The temperature value to HEX conversion is as follow:

1. If the Temperature value MSByte bit D11 = 0, then

The temperature is positive and value (DegC) = + (Temperature value) / 16

2. If the Temperature value MSByte bit D11 = 1, then

The temperature is negative and value (DegC) = ~ (2's complement of Temperature value) /16

**Table 8-1 : Example of 12-bit binary temperature settings for temperature ranges**

| <b>12-bit binary<br/>(2's complement)</b> | <b>Hexadecimal<br/>Value</b> | <b>TR Value<br/>[DegC]</b> |
|---|------------------------------|----------------------------|
| 0111 1111 1111                            | 7FF                          | 128                        |
| 0111 1111 1111                            | 7FF                          | 127.9                      |
| 0110 0100 0000                            | 640                          | 100                        |
| 0101 0000 0000                            | 500                          | 80                         |
| 0100 1011 0000                            | 4B0                          | 75                         |
| 0011 0010 0000                            | 320                          | 50                         |
| 0001 1001 0000                            | 190                          | 25                         |
| 0000 0000 0100                            | 004                          | 0.25                       |
| 0000 0000 0000                            | 000                          | 0                          |
| 1111 1111 1100                            | FFC                          | -0.25                      |
| 1110 0111 0000                            | E70                          | -25                        |
| 1100 1001 0000                            | C90                          | -55                        |



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 11 of 39       |

## 9.COMMAND TABLE

| Command Table |      |        |      |    |    |    |    |    |    |    | Command                      | Description   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
|---------------|------|--------|------|----|----|----|----|----|----|----|------------------------------|---|--------|-----|--------|-----|-----|----|-----|----|-----|----|-----|------|-----|------|-----|----|-----|----|-----|------|-----|------|-----|----|-----|----|-----|------|-----|------|-----|----|-----|----|-----|------|-----|------|-----|----|-----|----|-----|------|-----|------|-----|----|-----|----|-------|----|-----|------|--|--|
| R/W#          | D/C# | Hex    | D7   | D6 | D5 | D4 | D3 | D2 | D1 | D0 |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 0             | 0    | 01     | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 1  | Driver Output control        | Gate setting  |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 0             | 1    |        | A7   | A6 | A5 | A4 | A3 | A2 | A1 | A0 |                              | A[8:0]= 127h [POR], 296 MUX   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 0             | 1    |        | 0    | 0  | 0  | 0  | 0  | 0  | 0  | A8 |                              | MUX Gate lines setting as (A[8:0] + 1).   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 0             | 1    |        | 0    | 0  | 0  | 0  | 0  | B2 | B1 | B0 |                              | B[2:0] = 000 [POR].<br>Gate scanning sequence and direction   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
|               |      |        |      |    |    |    |    |    |    |    |                              | B[2]: GD<br>Selects the 1st output Gate<br>GD=0 [POR],<br>G0 is the 1st gate output channel, gate output sequence is G0,G1, G2, G3, ...<br>GD=1,<br>G1 is the 1st gate output channel, gate output sequence is G1, G0, G3, G2, ...  |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
|               |      |        |      |    |    |    |    |    |    |    |                              | B[1]: SM<br>Change scanning order of gate driver.<br>SM=0 [POR],<br>G0, G1, G2, G3...295 (left and right gate interlaced)<br>SM=1,<br>G0, G2, G4 ...G294, G1, G3, ...G295   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
|               |      |        |      |    |    |    |    |    |    |    |                              | B[0]: TB<br>TB = 0 [POR], scan from G0 to G295<br>TB = 1, scan from G295 to G0.   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 0             | 0    | 03     | 0    | 0  | 0  | 0  | 0  | 0  | 1  | 1  | Gate Driving voltage Control | Set Gate driving voltage  |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 0             | 1    |        | 0    | 0  | 0  | A4 | A3 | A2 | A1 | A0 |                              | A[4:0] = 00h [POR]<br>VGH setting from 10V to 20V   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
|               |      |        |      |    |    |    |    |    |    |    |                              | <table border="1"> <thead> <tr> <th>A[4:0]</th> <th>VGH</th> <th>A[4:0]</th> <th>VGH</th> </tr> </thead> <tbody> <tr><td>00h</td><td>20</td><td>0Dh</td><td>15</td></tr> <tr><td>03h</td><td>10</td><td>0Eh</td><td>15.5</td></tr> <tr><td>04h</td><td>10.5</td><td>0Fh</td><td>16</td></tr> <tr><td>05h</td><td>11</td><td>10h</td><td>16.5</td></tr> <tr><td>06h</td><td>11.5</td><td>11h</td><td>17</td></tr> <tr><td>07h</td><td>12</td><td>12h</td><td>17.5</td></tr> <tr><td>08h</td><td>12.5</td><td>13h</td><td>18</td></tr> <tr><td>07h</td><td>12</td><td>14h</td><td>18.5</td></tr> <tr><td>08h</td><td>12.5</td><td>15h</td><td>19</td></tr> <tr><td>09h</td><td>13</td><td>16h</td><td>19.5</td></tr> <tr><td>0Ah</td><td>13.5</td><td>17h</td><td>20</td></tr> <tr><td>0Bh</td><td>14</td><td>Other</td><td>NA</td></tr> <tr><td>0Ch</td><td>14.5</td><td></td><td></td></tr> </tbody> </table> | A[4:0] | VGH | A[4:0] | VGH | 00h | 20 | 0Dh | 15 | 03h | 10 | 0Eh | 15.5 | 04h | 10.5 | 0Fh | 16 | 05h | 11 | 10h | 16.5 | 06h | 11.5 | 11h | 17 | 07h | 12 | 12h | 17.5 | 08h | 12.5 | 13h | 18 | 07h | 12 | 14h | 18.5 | 08h | 12.5 | 15h | 19 | 09h | 13 | 16h | 19.5 | 0Ah | 13.5 | 17h | 20 | 0Bh | 14 | Other | NA | 0Ch | 14.5 |  |  |
| A[4:0]        | VGH  | A[4:0] | VGH  |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 00h           | 20   | 0Dh    | 15   |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 03h           | 10   | 0Eh    | 15.5 |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 04h           | 10.5 | 0Fh    | 16   |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 05h           | 11   | 10h    | 16.5 |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 06h           | 11.5 | 11h    | 17   |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 07h           | 12   | 12h    | 17.5 |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 08h           | 12.5 | 13h    | 18   |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 07h           | 12   | 14h    | 18.5 |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 08h           | 12.5 | 15h    | 19   |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 09h           | 13   | 16h    | 19.5 |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 0Ah           | 13.5 | 17h    | 20   |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 0Bh           | 14   | Other  | NA   |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |
| 0Ch           | 14.5 |        |      |    |    |    |    |    |    |    |                              |   |        |     |        |     |     |    |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |     |      |     |      |     |    |     |    |       |    |     |      |  |  |



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 12 of 39              |

| R/W# | D/C# | Hex | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Command                        | Description   |
|------|------|-----|----|----|----|----|----|----|----|----|--------------------------------|---|
| 0    | 0    | 04  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | Source Driving voltage Control | Set Source driving voltage<br>A[7:0] = 41h [POR], VSH1 at 15V<br>B[7:0] = A8h [POR], VSH2 at 5V.<br>C[7:0] = 32h [POR], VSL at -15V<br>Remark: VSH1>=VSH2 |
| 0    | 1    |     | A7 | A6 | A5 | A4 | A3 | A2 | A1 | A0 |                                |   |
| 0    | 1    |     | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |                                |   |
| 0    | 1    |     | C7 | C6 | C5 | C4 | C3 | C2 | C1 | C0 |                                |   |

A[7]/B[7] = 1,  
VSH1/VSH2 voltage setting from 2.4V to 8.8V

| A/B[7:0] | VSH1/VSH2 | A/B[7:0] | VSH1/VSH2 |
|----------|-----------|----------|-----------|
| 8Eh      | 2.4       | AFh      | 5.7       |
| 8Fh      | 2.5       | B0h      | 5.8       |
| 90h      | 2.6       | B1h      | 5.9       |
| 91h      | 2.7       | B2h      | 6         |
| 92h      | 2.8       | B3h      | 6.1       |
| 93h      | 2.9       | B4h      | 6.2       |
| 94h      | 3         | B5h      | 6.3       |
| 95h      | 3.1       | B6h      | 6.4       |
| 96h      | 3.2       | B7h      | 6.5       |
| 97h      | 3.3       | B8h      | 6.6       |
| 98h      | 3.4       | B9h      | 6.7       |
| 99h      | 3.5       | BAh      | 6.8       |
| 9Ah      | 3.6       | BBh      | 6.9       |
| 9Bh      | 3.7       | BCh      | 7         |
| 9Ch      | 3.8       | BDh      | 7.1       |
| 9Dh      | 3.9       | BEh      | 7.2       |
| 9Eh      | 4         | BFh      | 7.3       |
| 9Fh      | 4.1       | C0h      | 7.4       |
| A0h      | 4.2       | C1h      | 7.5       |
| A1h      | 4.3       | C2h      | 7.6       |
| A2h      | 4.4       | C3h      | 7.7       |
| A3h      | 4.5       | C4h      | 7.8       |
| A4h      | 4.6       | C5h      | 7.9       |
| A5h      | 4.7       | C6h      | 8         |
| A6h      | 4.8       | C7h      | 8.1       |
| A7h      | 4.9       | C8h      | 8.2       |
| A8h      | 5         | C9h      | 8.3       |
| A9h      | 5.1       | CAh      | 8.4       |
| AAh      | 5.2       | CBh      | 8.5       |
| ABh      | 5.3       | CCh      | 8.6       |
| ACH      | 5.4       | CDh      | 8.7       |
| ADh      | 5.5       | CEh      | 8.8       |
| Aeh      | 5.6       | Other    | NA        |

A[7]/B[7] = 0,  
VSH1/VSH2 voltage setting from 9V to 17V

| A/B[7:0] | VSH1/VSH2 | A/B[7:0] | VSH1/VSH2 |
|----------|-----------|----------|-----------|
| 23h      | 9         | 3Ch      | 14        |
| 24h      | 9.2       | 3Dh      | 14.2      |
| 25h      | 9.4       | 3Eh      | 14.4      |
| 26h      | 9.6       | 3Fh      | 14.6      |
| 27h      | 9.8       | 40h      | 14.8      |
| 28h      | 10        | 41h      | 15        |
| 29h      | 10.2      | 42h      | 15.2      |
| 2Ah      | 10.4      | 43h      | 15.4      |
| 2Bh      | 10.6      | 44h      | 15.6      |
| 2Ch      | 10.8      | 45h      | 15.8      |
| 2Dh      | 11        | 46h      | 16        |
| 2Eh      | 11.2      | 47h      | 16.2      |
| 2Fh      | 11.4      | 48h      | 16.4      |
| 30h      | 11.6      | 49h      | 16.6      |
| 31h      | 11.8      | 4Ah      | 16.8      |
| 32h      | 12        | 4Bh      | 17        |
| 33h      | 12.2      | Other    | NA        |
| 34h      | 12.4      |          |           |
| 35h      | 12.6      |          |           |
| 36h      | 12.8      |          |           |
| 37h      | 13        |          |           |
| 38h      | 13.2      |          |           |
| 39h      | 13.4      |          |           |
| 3Ah      | 13.6      |          |           |
| 3Bh      | 13.8      |          |           |

C[7] = 0,  
VSL setting from -5V to -17V

| C[7:0] | VSL   |
|--------|-------|
| 0Ah    | -5    |
| 0Ch    | -5.5  |
| 0Eh    | -6    |
| 10h    | -6.5  |
| 12h    | -7    |
| 14h    | -7.5  |
| 16h    | -8    |
| 18h    | -8.5  |
| 1Ah    | -9    |
| 1Ch    | -9.5  |
| 1Eh    | -10   |
| 20h    | -10.5 |
| 22h    | -11   |
| 24h    | -11.5 |
| 26h    | -12   |
| 28h    | -12.5 |
| 2Ah    | -13   |
| 2Ch    | -13.5 |
| 2Eh    | -14   |
| 30h    | -14.5 |
| 32h    | -15   |
| 34h    | -15.5 |
| 36h    | -16   |
| 38h    | -16.5 |
| 3Ah    | -17   |
| Other  | NA    |

|   |   |    |   |   |   |   |   |   |   |   |   |                                  |  |
|---|---|----|---|---|---|---|---|---|---|---|---|----------------------------------|--|
| 0 | 0 | 08 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | Initial Code Setting OTP Program | Program Initial Code Setting<br><br>The command required ENABLE CLOCK SIGNAL.<br>Refer to Register 0x22 for detail.<br>BUSY pad will output high during operation. |
|---|---|----|---|---|---|---|---|---|---|---|---|----------------------------------|--|

|   |   |    |    |    |    |    |    |    |    |    |   |   |  |
|---|---|----|----|----|----|----|----|----|----|----|---|---|--|
| 0 | 0 | 09 | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 1 | Write Register for Initial Code Setting | Write Register for Initial Code Setting Selection<br>A[7:0] ~ D[7:0]: Reserved<br>Details refer to Application Notes of Initial Code Setting |
| 0 | 1 |    | A7 | A6 | A5 | A4 | A3 | A2 | A1 | A0 |   |   |  |
| 0 | 1 |    | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |   |   |  |
| 0 | 1 |    | C7 | C6 | C5 | C4 | C3 | C2 | C1 | C0 |   |   |  |

|   |   |    |   |   |   |   |   |   |   |   |   |  |  |
|---|---|----|---|---|---|---|---|---|---|---|---|--|--|
| 0 | 0 | 0A | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | Read Register for Initial Code Setting | Read Register for Initial Code Setting |
|---|---|----|---|---|---|---|---|---|---|---|---|--|--|



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 13 of 39       |

| R/W#     | D/C#                                      | Hex | D7 | D6             | D5             | D4             | D3             | D2             | D1             | D0             | Command            | Description  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
|----------|---|-----|----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|--|----------|----------------------------|-----|------------|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|--------------|----------|---|------|----|------|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|------|------|------|----------|-----------------------------------|----|------|----|------|----|------|----|------|
| 0        | 0   | 0C  | 0  | 0              | 0              | 0              | 1              | 1              | 0              | 0              | Booster Soft start | Booster Enable with Phase 1, Phase 2 and Phase 3 for soft start current and duration setting.<br><br>A[7:0] -> Soft start setting for Phase1 = 8Bh [POR]<br>B[7:0] -> Soft start setting for Phase2 = 9Ch [POR]<br>C[7:0] -> Soft start setting for Phase3 = 96h [POR]<br>D[7:0] -> Duration setting = 0Fh [POR]<br><br>Bit Description of each byte:<br>A[6:0] / B[6:0] / C[6:0]: <table border="1" data-bbox="1075 748 1533 1088"> <thead> <tr> <th>Bit[6:4]</th> <th>Driving Strength Selection</th> </tr> </thead> <tbody> <tr><td>000</td><td>1(Weakest)</td></tr> <tr><td>001</td><td>2</td></tr> <tr><td>010</td><td>3</td></tr> <tr><td>011</td><td>4</td></tr> <tr><td>100</td><td>5</td></tr> <tr><td>101</td><td>6</td></tr> <tr><td>110</td><td>7</td></tr> <tr><td>111</td><td>8(Strongest)</td></tr> </tbody> </table> <table border="1" data-bbox="1075 1113 1533 1664"> <thead> <tr> <th>Bit[3:0]</th> <th>Min Off Time Setting of GDR [ Time unit ]</th> </tr> </thead> <tbody> <tr><td>0000</td><td rowspan="2">NA</td></tr> <tr><td>0011</td></tr> <tr><td>0100</td><td>2.6</td></tr> <tr><td>0101</td><td>3.2</td></tr> <tr><td>0110</td><td>3.9</td></tr> <tr><td>0111</td><td>4.6</td></tr> <tr><td>1000</td><td>5.4</td></tr> <tr><td>1001</td><td>6.3</td></tr> <tr><td>1010</td><td>7.3</td></tr> <tr><td>1011</td><td>8.4</td></tr> <tr><td>1100</td><td>9.8</td></tr> <tr><td>1101</td><td>11.5</td></tr> <tr><td>1110</td><td>13.8</td></tr> <tr><td>1111</td><td>16.5</td></tr> </tbody> </table><br>D[5:0]: duration setting of phase<br>D[5:4]: duration setting of phase 3<br>D[3:2]: duration setting of phase 2<br>D[1:0]: duration setting of phase 1 <table border="1" data-bbox="1075 1785 1533 1982"> <thead> <tr> <th>Bit[1:0]</th> <th>Duration of Phase [Approximation]</th> </tr> </thead> <tbody> <tr><td>00</td><td>10ms</td></tr> <tr><td>01</td><td>20ms</td></tr> <tr><td>10</td><td>30ms</td></tr> <tr><td>11</td><td>40ms</td></tr> </tbody> </table> | Bit[6:4] | Driving Strength Selection | 000 | 1(Weakest) | 001 | 2 | 010 | 3 | 011 | 4 | 100 | 5 | 101 | 6 | 110 | 7 | 111 | 8(Strongest) | Bit[3:0] | Min Off Time Setting of GDR [ Time unit ] | 0000 | NA | 0011 | 0100 | 2.6 | 0101 | 3.2 | 0110 | 3.9 | 0111 | 4.6 | 1000 | 5.4 | 1001 | 6.3 | 1010 | 7.3 | 1011 | 8.4 | 1100 | 9.8 | 1101 | 11.5 | 1110 | 13.8 | 1111 | 16.5 | Bit[1:0] | Duration of Phase [Approximation] | 00 | 10ms | 01 | 20ms | 10 | 30ms | 11 | 40ms |
| Bit[6:4] | Driving Strength Selection                |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 000      | 1(Weakest)                                |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 001      | 2   |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 010      | 3   |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 011      | 4   |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 100      | 5   |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 101      | 6   |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 110      | 7   |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 111      | 8(Strongest)                              |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| Bit[3:0] | Min Off Time Setting of GDR [ Time unit ] |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 0000     | NA  |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 0011     |   |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 0100     | 2.6                                       |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 0101     | 3.2                                       |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 0110     | 3.9                                       |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 0111     | 4.6                                       |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 1000     | 5.4                                       |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 1001     | 6.3                                       |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 1010     | 7.3                                       |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 1011     | 8.4                                       |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 1100     | 9.8                                       |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 1101     | 11.5                                      |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 1110     | 13.8                                      |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 1111     | 16.5                                      |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| Bit[1:0] | Duration of Phase [Approximation]         |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 00       | 10ms                                      |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 01       | 20ms                                      |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 10       | 30ms                                      |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 11       | 40ms                                      |     |    |                |                |                |                |                |                |                |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 0        | 1   |     | 1  | A <sub>6</sub> | A <sub>5</sub> | A <sub>4</sub> | A <sub>3</sub> | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> | Control            |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 0        | 1   |     | 1  | B <sub>6</sub> | B <sub>5</sub> | B <sub>4</sub> | B <sub>3</sub> | B <sub>2</sub> | B <sub>1</sub> | B <sub>0</sub> |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 0        | 1   |     | 1  | C <sub>6</sub> | C <sub>5</sub> | C <sub>4</sub> | C <sub>3</sub> | C <sub>2</sub> | C <sub>1</sub> | C <sub>0</sub> |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |
| 0        | 1   |     | 0  | 0              | D <sub>5</sub> | D <sub>4</sub> | D <sub>3</sub> | D <sub>2</sub> | D <sub>1</sub> | D <sub>0</sub> |                    |  |          |                            |     |            |     |   |     |   |     |   |     |   |     |   |     |   |     |              |          |   |      |    |      |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |          |                                   |    |      |    |      |    |      |    |      |



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 14 of 39              |

| R/W#     | D/C#                    | Hex | D7 | D6 | D5 | D4 | D3 | D2             | D1             | D0             | Command                 | Description   |          |             |    |                   |    |                         |    |                         |
|----------|-------------------------|-----|----|----|----|----|----|----------------|----------------|----------------|-------------------------|---|----------|-------------|----|-------------------|----|-------------------------|----|-------------------------|
| 0        | 0                       | 10  | 0  | 0  | 0  | 1  | 0  | 0              | 0              | 0              | Deep Sleep mode control | Deep Sleep mode Control:<br><table border="1"> <tr> <th>A[1:0] :</th> <th>Description</th> </tr> <tr> <td>00</td> <td>Normal Mode [POR]</td> </tr> <tr> <td>01</td> <td>Enter Deep Sleep Mode 1</td> </tr> <tr> <td>11</td> <td>Enter Deep Sleep Mode 2</td> </tr> </table> After this command initiated, the chip will enter Deep Sleep Mode, BUSY pad will keep output high.<br>Remark:<br>To Exit Deep Sleep mode, User required to send HWRESET to the driver   | A[1:0] : | Description | 00 | Normal Mode [POR] | 01 | Enter Deep Sleep Mode 1 | 11 | Enter Deep Sleep Mode 2 |
| A[1:0] : | Description             |     |    |    |    |    |    |                |                |                |                         |   |          |             |    |                   |    |                         |    |                         |
| 00       | Normal Mode [POR]       |     |    |    |    |    |    |                |                |                |                         |   |          |             |    |                   |    |                         |    |                         |
| 01       | Enter Deep Sleep Mode 1 |     |    |    |    |    |    |                |                |                |                         |   |          |             |    |                   |    |                         |    |                         |
| 11       | Enter Deep Sleep Mode 2 |     |    |    |    |    |    |                |                |                |                         |   |          |             |    |                   |    |                         |    |                         |
| 0        | 1                       |     | 0  | 0  | 0  | 0  | 0  | 0              | A <sub>1</sub> | A <sub>0</sub> |                         |   |          |             |    |                   |    |                         |    |                         |
| 0        | 0                       | 11  | 0  | 0  | 0  | 1  | 0  | 0              | 0              | 1              | Data Entry mode setting | Define data entry sequence<br>A[2:0] = 011 [POR]<br><br>A [1:0] = ID[1:0]<br>Address automatic increment / decrement setting<br>The setting of incrementing or decrementing of the address counter can be made independently in each upper and lower bit of the address.<br>00 - Y decrement, X decrement,<br>01 - Y decrement, X increment,<br>10 - Y increment, X decrement,<br>11 - Y increment, X increment [POR]<br><br>A[2] = AM<br>Set the direction in which the address counter is updated automatically after data are written to the RAM.<br>AM= 0, the address counter is updated in the X direction. [POR]<br>AM = 1, the address counter is updated in the Y direction. |          |             |    |                   |    |                         |    |                         |
| 0        | 1                       |     | 0  | 0  | 0  | 0  | 0  | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |                         |   |          |             |    |                   |    |                         |    |                         |
| 0        | 0                       | 12  | 0  | 0  | 0  | 1  | 0  | 0              | 1              | 0              | SW RESET                | It resets the commands and parameters to their S/W Reset default values except R10h-Deep Sleep Mode<br><br>During operation, BUSY pad will output high.<br><br>Note: RAM are unaffected by this command.  |          |             |    |                   |    |                         |    |                         |



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 15 of 39       |

| R/W#   | D/C#      | Hex | D7              | D6              | D5             | D4             | D3             | D2             | D1             | D0             | Command  | Description  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
|--------|-----------|-----|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|--|--------|-----------|-----|------|-----|------|-----|------|-----|------|-----|------|-------|----|
| 0      | 0         | 14  | 0               | 0               | 0              | 1              | 0              | 1              | 0              | 0              | HV Ready Detection   | HV ready detection<br>A[7:0] = 00h [POR]<br>The command required CLKEN=1 and ANALOGEN=1.<br>Refer to Register 0x22 for detail.<br>After this command initiated, HV Ready detection starts.<br>BUSY pad will output high during detection.<br>The detection result can be read from the Status Bit Read (Command 0x2F).   |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 0      | 1         |     | 0               | A <sub>6</sub>  | A <sub>5</sub> | A <sub>4</sub> | 0              | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |  | A[6:4]=n for cool down duration:<br>10ms x (n+1)<br>A[2:0]=m for number of Cool Down Loop to detect.<br>The max HV ready duration is<br>10ms x (n+1) x (m)<br>HV ready detection will be trigger after each cool down time. The detection will be completed when HV is ready.<br>For 1 shot HV ready detection, A[7:0] can be set as 00h.  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 0      | 0         | 15  | 0               | 0               | 0              | 1              | 0              | 1              | 0              | 1              | VCI Detection  | VCI Detection<br>A[2:0] = 100 [POR] , Detect level at 2.3V<br>A[2:0] : VCI level Detect  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 0      | 1         |     | 0               | 0               | 0              | 0              | 0              | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |  | <table border="1"> <thead> <tr> <th>A[2:0]</th> <th>VCI level</th> </tr> </thead> <tbody> <tr> <td>011</td> <td>2.2V</td> </tr> <tr> <td>100</td> <td>2.3V</td> </tr> <tr> <td>101</td> <td>2.4V</td> </tr> <tr> <td>110</td> <td>2.5V</td> </tr> <tr> <td>111</td> <td>2.6V</td> </tr> <tr> <td>Other</td> <td>NA</td> </tr> </tbody> </table> <p>The command required CLKEN=1 and ANALOGEN=1<br/>Refer to Register 0x22 for detail.</p> <p>After this command initiated, VCI detection starts.<br/>BUSY pad will output high during detection.<br/>The detection result can be read from the Status Bit Read (Command 0x2F).</p> | A[2:0] | VCI level | 011 | 2.2V | 100 | 2.3V | 101 | 2.4V | 110 | 2.5V | 111 | 2.6V | Other | NA |
| A[2:0] | VCI level |     |                 |                 |                |                |                |                |                |                |  |  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 011    | 2.2V      |     |                 |                 |                |                |                |                |                |                |  |  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 100    | 2.3V      |     |                 |                 |                |                |                |                |                |                |  |  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 101    | 2.4V      |     |                 |                 |                |                |                |                |                |                |  |  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 110    | 2.5V      |     |                 |                 |                |                |                |                |                |                |  |  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 111    | 2.6V      |     |                 |                 |                |                |                |                |                |                |  |  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| Other  | NA        |     |                 |                 |                |                |                |                |                |                |  |  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 0      | 0         | 18  | 0               | 0               | 0              | 1              | 1              | 0              | 0              | 0              | Temperature Sensor Control                                 | Temperature Sensor Selection<br>A[7:0] = 0x48[POR], external temperature sensor<br>A[7:0] = 0x 80 Internal temperature sensor  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 0      | 1         |     | A <sub>7</sub>  | A <sub>6</sub>  | A <sub>5</sub> | A <sub>4</sub> | A <sub>3</sub> | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |  |  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 0      | 0         | 1A  | 0               | 0               | 0              | 1              | 1              | 0              | 1              | 0              | Temperature Sensor Control (Write to temperature register) | Write to temperature register.<br>A[7:0] = 0x 7F [POR]   |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 0      | 1         |     | A <sub>11</sub> | A <sub>10</sub> | A <sub>9</sub> | A <sub>8</sub> | A <sub>7</sub> | A <sub>6</sub> | A <sub>5</sub> | A <sub>4</sub> |  |  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |
| 0      | 1         |     | A <sub>3</sub>  | A <sub>2</sub>  | A <sub>1</sub> | A <sub>0</sub> | 0              | 0              | 0              | 0              |  |  |        |           |     |      |     |      |     |      |     |      |     |      |       |    |



| File Name |   |     | Specification For HINK 2.13" EPD |                 |                |                |                |                |                |                | Module Number   | HINK-E0213A217   |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
|-----------|---|-----|----------------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|---|--|--------|------------------------------|------|-------------------------|------|-----------------------------------|------|---|------|-------------------------|------|---------------------|---|----------------------------------|---|----------------------------------|
| Version   |   |     | A0                               |                 |                |                |                |                |                |                | Page Number   | 16 of 39   |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| R/W#      | D/C#  | Hex | D7                               | D6              | D5             | D4             | D3             | D2             | D1             | D0             | Command   | Description  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0         | 0   | 1B  | 0                                | 0               | 0              | 1              | 1              | 0              | 1              | 1              | Temperature Sensor Control (Read from temperature register)               | Read from temperature register.  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 1         | 1   |     | A <sub>11</sub>                  | A <sub>10</sub> | A <sub>9</sub> | A <sub>8</sub> | A <sub>7</sub> | A <sub>6</sub> | A <sub>5</sub> | A <sub>4</sub> |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 1         | 1   |     | A <sub>3</sub>                   | A <sub>2</sub>  | A <sub>1</sub> | A <sub>0</sub> | 0              | 0              | 0              | 0              |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0         | 0   | 1C  | 0                                | 0               | 0              | 1              | 1              | 1              | 0              | 0              | Temperature Sensor Control (Write Command to External temperature sensor) | Write Command to External temperature sensor.<br>A[7:0] = 00h [POR],<br>B[7:0] = 00h [POR],<br>C[7:0] = 00h [POR],<br><br>A[7:6]<br><table border="1"> <tr> <td>A[7:6]</td> <td>Select no of byte to be sent</td> </tr> <tr> <td>00</td> <td>Address + pointer</td> </tr> <tr> <td>.</td> <td>Address + pointer + 1st parameter</td> </tr> <tr> <td>10</td> <td>Address + pointer + 1st parameter + 2nd pointer</td> </tr> <tr> <td>11</td> <td>Address</td> </tr> </table> A[5:0] - Pointer Setting<br>B[7:0] - 1 <sup>st</sup> parameter<br>C[7:0] - 2 <sup>nd</sup> parameter<br>The command required ENABLE CLOCK SIGNAL..<br>Refer to Register 0x22 for detail.<br><br>After this command initiated, Write Command to external temperature sensor starts. BUSY pad will output high during operation. | A[7:6] | Select no of byte to be sent | 00   | Address + pointer       | .    | Address + pointer + 1st parameter | 10   | Address + pointer + 1st parameter + 2nd pointer | 11   | Address                 |      |                     |   |                                  |   |                                  |
| A[7:6]    | Select no of byte to be sent                    |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 00        | Address + pointer                               |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| .         | Address + pointer + 1st parameter               |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 10        | Address + pointer + 1st parameter + 2nd pointer |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 11        | Address   |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0         | 1   |     | A <sub>7</sub>                   | A <sub>6</sub>  | A <sub>5</sub> | A <sub>4</sub> | A <sub>3</sub> | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0         | 1   |     | B <sub>7</sub>                   | B <sub>6</sub>  | B <sub>5</sub> | B <sub>4</sub> | B <sub>3</sub> | B <sub>2</sub> | B <sub>1</sub> | B <sub>0</sub> |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0         | 1   |     | C <sub>7</sub>                   | C <sub>6</sub>  | C <sub>5</sub> | C <sub>4</sub> | C <sub>3</sub> | C <sub>2</sub> | C <sub>1</sub> | C <sub>0</sub> |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0         | 0   | 20  | 0                                | 0               | 1              | 0              | 0              | 0              | 0              | 0              | Master Activation   | Activate Display Update Sequence<br><br>The Display Update Sequence Option is located at R22h.<br><br>BUSY pad will output high during operation. User should not interrupt this operation to avoid corruption of panel images.  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0         | 0   | 21  | 0                                | 0               | 1              | 0              | 0              | 0              | 0              | 1              | Display Update Control  | RAM content option for Display Update<br>A[7:0] = 00h [POR]<br>B[7:0] = 00h [POR]<br><br>A[7:4] RED RAM option<br><table border="1"> <tr> <td>0000</td> <td>Normal</td> </tr> <tr> <td>0100</td> <td>Bypass RAM content as 0</td> </tr> <tr> <td>1000</td> <td>Inverse RAM content</td> </tr> </table> A[3:0] BW RAM option<br><table border="1"> <tr> <td>0000</td> <td>Normal</td> </tr> <tr> <td>0100</td> <td>Bypass RAM content as 0</td> </tr> <tr> <td>1000</td> <td>Inverse RAM content</td> </tr> </table> B[7] Source Output Mode<br><table border="1"> <tr> <td>0</td> <td>Available Source from S0 to S175</td> </tr> <tr> <td>1</td> <td>Available Source from S8 to S167</td> </tr> </table>   | 0000   | Normal                       | 0100 | Bypass RAM content as 0 | 1000 | Inverse RAM content               | 0000 | Normal  | 0100 | Bypass RAM content as 0 | 1000 | Inverse RAM content | 0 | Available Source from S0 to S175 | 1 | Available Source from S8 to S167 |
| 0000      | Normal  |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0100      | Bypass RAM content as 0                         |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 1000      | Inverse RAM content                             |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0000      | Normal  |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0100      | Bypass RAM content as 0                         |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 1000      | Inverse RAM content                             |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0         | Available Source from S0 to S175                |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 1         | Available Source from S8 to S167                |     |                                  |                 |                |                |                |                |                |                |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0         | 1   |     | A <sub>7</sub>                   | A <sub>6</sub>  | A <sub>5</sub> | A <sub>4</sub> | A <sub>3</sub> | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |
| 0         | 1   |     | B <sub>7</sub>                   | 0               | 0              | 0              | 0              | 0              | 0              | 0              |   |  |        |                              |      |                         |      |                                   |      |   |      |                         |      |                     |   |                                  |   |                                  |





|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | <b>A0</b>                               | <b>Page Number</b>   | <b>17 of 39</b>       |

| R/W#                         | D/C#               | Hex | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Command                            | Description   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
|------------------------------|--------------------|-----|----|----|----|----|----|----|----|----|------------------------------------|---|--------------------|--------------------|---------------------|----|----------------------|----|---------------------|----|---------------|--|----------------|----|----------------------|--|---------------------|--|------------------------------|----|----------------------|--|---------------------|--|------------------------------|----|----------------------|--|---------------------|--|------------------------|--|------------------------------|----|----------------------|--|---------------------|--|------------------------|--|------------------------------|----|----------------------|--|---------------------|--|---------------|--|-----------------------------|----|----------------|--|-------------|--|---------------------|--|---------------|--|-----------------------------|----|----------------|--|-------------|--|---------------------|--|---------------|--|------------------------|--|-----------------------------|----|----------------|--|-------------|--|---------------------|--|---------------|--|------------------------|--|-----------------------------|----|----------------|--|-------------|--|
| 0                            | 0                  | 22  | 0  | 0  | 1  | 0  | 0  | 0  | 1  | 0  | Display Update                     | Display Update Sequence Option:   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| 0                            | 1                  |     | A7 | A6 | A5 | A4 | A3 | A2 | A1 | A0 | Control 2                          | Enable the stage for Master Activation<br>A[7:0]= FFh (POR)   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
|                              |                    |     |    |    |    |    |    |    |    |    |                                    | <table border="1"> <thead> <tr> <th>Operating sequence</th> <th>Parameter (in Hex)</th> </tr> </thead> <tbody> <tr> <td>Enable clock signal</td> <td>80</td> </tr> <tr> <td>Disable clock signal</td> <td>01</td> </tr> <tr> <td>Enable clock signal</td> <td>C0</td> </tr> <tr> <td>Enable Analog</td> <td></td> </tr> <tr> <td>Disable Analog</td> <td>03</td> </tr> <tr> <td>Disable clock signal</td> <td></td> </tr> <tr> <td>Enable clock signal</td> <td></td> </tr> <tr> <td>Load LUT with DISPLAY Mode 1</td> <td>91</td> </tr> <tr> <td>Disable clock signal</td> <td></td> </tr> <tr> <td>Enable clock signal</td> <td></td> </tr> <tr> <td>Load LUT with DISPLAY Mode 2</td> <td>99</td> </tr> <tr> <td>Disable clock signal</td> <td></td> </tr> <tr> <td>Enable clock signal</td> <td></td> </tr> <tr> <td>Load temperature value</td> <td></td> </tr> <tr> <td>Load LUT with DISPLAY Mode 1</td> <td>B1</td> </tr> <tr> <td>Disable clock signal</td> <td></td> </tr> <tr> <td>Enable clock signal</td> <td></td> </tr> <tr> <td>Load temperature value</td> <td></td> </tr> <tr> <td>Load LUT with DISPLAY Mode 2</td> <td>B9</td> </tr> <tr> <td>Disable clock signal</td> <td></td> </tr> <tr> <td>Enable clock signal</td> <td></td> </tr> <tr> <td>Enable Analog</td> <td></td> </tr> <tr> <td>Display with DISPLAY Mode 1</td> <td>C7</td> </tr> <tr> <td>Disable Analog</td> <td></td> </tr> <tr> <td>Disable OSC</td> <td></td> </tr> <tr> <td>Enable clock signal</td> <td></td> </tr> <tr> <td>Enable Analog</td> <td></td> </tr> <tr> <td>Display with DISPLAY Mode 2</td> <td>CF</td> </tr> <tr> <td>Disable Analog</td> <td></td> </tr> <tr> <td>Disable OSC</td> <td></td> </tr> <tr> <td>Enable clock signal</td> <td></td> </tr> <tr> <td>Enable Analog</td> <td></td> </tr> <tr> <td>Load temperature value</td> <td></td> </tr> <tr> <td>DISPLAY with DISPLAY Mode 1</td> <td>F7</td> </tr> <tr> <td>Disable Analog</td> <td></td> </tr> <tr> <td>Disable OSC</td> <td></td> </tr> <tr> <td>Enable clock signal</td> <td></td> </tr> <tr> <td>Enable Analog</td> <td></td> </tr> <tr> <td>Load temperature value</td> <td></td> </tr> <tr> <td>DISPLAY with DISPLAY Mode 2</td> <td>FF</td> </tr> <tr> <td>Disable Analog</td> <td></td> </tr> <tr> <td>Disable OSC</td> <td></td> </tr> </tbody> </table> | Operating sequence | Parameter (in Hex) | Enable clock signal | 80 | Disable clock signal | 01 | Enable clock signal | C0 | Enable Analog |  | Disable Analog | 03 | Disable clock signal |  | Enable clock signal |  | Load LUT with DISPLAY Mode 1 | 91 | Disable clock signal |  | Enable clock signal |  | Load LUT with DISPLAY Mode 2 | 99 | Disable clock signal |  | Enable clock signal |  | Load temperature value |  | Load LUT with DISPLAY Mode 1 | B1 | Disable clock signal |  | Enable clock signal |  | Load temperature value |  | Load LUT with DISPLAY Mode 2 | B9 | Disable clock signal |  | Enable clock signal |  | Enable Analog |  | Display with DISPLAY Mode 1 | C7 | Disable Analog |  | Disable OSC |  | Enable clock signal |  | Enable Analog |  | Display with DISPLAY Mode 2 | CF | Disable Analog |  | Disable OSC |  | Enable clock signal |  | Enable Analog |  | Load temperature value |  | DISPLAY with DISPLAY Mode 1 | F7 | Disable Analog |  | Disable OSC |  | Enable clock signal |  | Enable Analog |  | Load temperature value |  | DISPLAY with DISPLAY Mode 2 | FF | Disable Analog |  | Disable OSC |  |
| Operating sequence           | Parameter (in Hex) |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable clock signal          | 80                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable clock signal         | 01                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable clock signal          | C0                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable Analog                |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable Analog               | 03                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable clock signal         |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable clock signal          |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Load LUT with DISPLAY Mode 1 | 91                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable clock signal         |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable clock signal          |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Load LUT with DISPLAY Mode 2 | 99                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable clock signal         |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable clock signal          |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Load temperature value       |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Load LUT with DISPLAY Mode 1 | B1                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable clock signal         |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable clock signal          |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Load temperature value       |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Load LUT with DISPLAY Mode 2 | B9                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable clock signal         |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable clock signal          |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable Analog                |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Display with DISPLAY Mode 1  | C7                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable Analog               |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable OSC                  |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable clock signal          |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable Analog                |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Display with DISPLAY Mode 2  | CF                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable Analog               |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable OSC                  |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable clock signal          |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable Analog                |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Load temperature value       |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| DISPLAY with DISPLAY Mode 1  | F7                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable Analog               |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable OSC                  |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable clock signal          |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Enable Analog                |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Load temperature value       |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| DISPLAY with DISPLAY Mode 2  | FF                 |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable Analog               |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| Disable OSC                  |                    |     |    |    |    |    |    |    |    |    |                                    |   |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |
| 0                            | 0                  | 24  | 0  | 0  | 1  | 0  | 0  | 1  | 0  | 0  | Write RAM (Black White) / RAM 0x24 | <p>After this command, data entries will be written into the BW RAM until another command is written. Address pointers will advance accordingly</p> <p>For Write pixel:<br/>Content of Write RAM(BW) = 1<br/>For Black pixel:<br/>Content of Write RAM(BW) = 0</p>  |                    |                    |                     |    |                      |    |                     |    |               |  |                |    |                      |  |                     |  |                              |    |                      |  |                     |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |                        |  |                              |    |                      |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |                     |  |               |  |                        |  |                             |    |                |  |             |  |



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | <b>A0</b>                               | <b>Page Number</b>   | <b>18 of 39</b>       |

| R/W# | D/C# | Hex | D7 | D6 | D5 | D4 | D3             | D2             | D1             | D0             | Command                    | Description  |
|------|------|-----|----|----|----|----|----------------|----------------|----------------|----------------|----------------------------|--|
| 0    | 0    | 26  | 0  | 0  | 1  | 0  | 0              | 1              | 1              | 0              | Write RAM (RED) / RAM 0x26 | <p>After this command, data entries will be written into the RED RAM until another command is written. Address pointers will advance accordingly.</p> <p>For RED pixel:<br/>Content of Write RAM0x26 = 1<br/>For non- RED pixel [Black or White]:<br/>Content of Write RAM0x26 = 0</p>                               |
| 0    | 0    | 27  | 0  | 0  | 1  | 0  | 0              | 1              | 1              | 1              | Read RAM                   | <p>After this command, data read on the MCU bus will fetch data from RAM. According to parameter of Register 41h to select reading RAM0x24/ RAM0x26, until another command is written. Address pointers will advance accordingly.</p> <p>The 1<sup>st</sup> byte of data read is dummy data.</p>                     |
| 0    | 0    | 28  | 0  | 0  | 1  | 0  | 1              | 0              | 0              | 0              | VCOM Sense                 | <p>Enter VCOM sensing conditions and hold for duration defined in command 0x29 before reading VCOM value. The sensed VCOM voltage is stored in register</p> <p>The command required ENABLE CLOCK SIGNAL and ENABLE ANALOG. Refer to Register 0x22 for detail.</p> <p>BUSY pad will output high during operation.</p> |
| 0    | 0    | 29  | 0  | 0  | 1  | 0  | 1              | 0              | 0              | 1              | VCOM Sense Duration        | <p>Stabling time between entering VCOM sensing mode and reading acquired.</p> <p>A[3:0] = 0x 9, duration = 10s.<br/>VCOM sense duration = (A[3:0]+1) sec</p>   |
| 0    | 1    |     | 0  | 1  | 0  | 0  | A <sub>3</sub> | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |                            |  |
| 0    | 0    | 2A  | 0  | 0  | 1  | 0  | 1              | 0              | 1              | 0              | Program VCOM OTP           | <p>Program VCOM register into OTP</p> <p>The command required ENABLE CLOCK SIGNAL. Refer to Register 0x22 for detail.</p> <p>BUSY pad will output high during operation.</p>   |



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | <b>A0</b>                               | <b>Page Number</b>   | <b>19 of 39</b>       |

| R/W# | D/C# | Hex | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Command             | Description  |        |      |        |      |
|------|------|-----|----|----|----|----|----|----|----|----|---------------------|--|--------|------|--------|------|
| 0    | 0    | 2C  | 0  | 0  | 1  | 0  | 1  | 1  | 0  | 0  | Write VCOM register | Write VCOM register from MCU interface<br>A[7:0] = 00h [POR] |        |      |        |      |
| 0    | 1    |     | A7 | A6 | A5 | A4 | A3 | A2 | A1 | A0 |                     |  |        |      |        |      |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | A[7:0] | VCOM | A[7:0] | VCOM |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 08h    | -0.2 | 44h    | -1.7 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 0Ch    | -0.3 | 48h    | -1.8 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 10h    | -0.4 | 4Ch    | -1.9 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 14h    | -0.5 | 50h    | -2   |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 18h    | -0.6 | 54h    | -2.1 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 1Ch    | -0.7 | 58h    | -2.2 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 20h    | -0.8 | 5Ch    | -2.3 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 24h    | -0.9 | 60h    | -2.4 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 28h    | -1   | 64h    | -2.5 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 2Ch    | -1.1 | 68h    | -2.6 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 30h    | -1.2 | 6Ch    | -2.7 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 34h    | -1.3 | 70h    | -2.8 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 38h    | -1.4 | 74h    | -2.9 |
|      |      |     |    |    |    |    |    |    |    |    |                     |  | 3Ch    | -1.5 | 78h    | -3   |
|      |      |     |    |    |    |    |    |    |    |    | 40h                 | -1.6   | Other  | NA   |        |      |

|   |   |    |    |    |    |    |    |    |    |    |                                      |  |  |
|---|---|----|----|----|----|----|----|----|----|----|--------------------------------------|--|--|
| 0 | 0 | 2D | 0  | 0  | 1  | 0  | 1  | 1  | 0  | 1  | OTP Register Read for Display Option | Read Register for Display Option:<br><br>A[7:0]: VCOM OTP Selection<br>(Command 0x37, Byte A)<br><br>B[7:0]: VCOM Register<br>(Command 0x2C)<br><br>C[7:0]~G[7:0]: Display Mode<br>(Command 0x37, Byte B to Byte F)<br>[5 bytes]<br><br>H[7:0]~K[7:0]: Waveform Version<br>(Command 0x37, Byte G to Byte J)<br>[4 bytes] |  |
| 1 | 1 |    | A7 | A6 | A5 | A4 | A3 | A2 | A1 | A0 |                                      |  |  |
| 1 | 1 |    | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |                                      |  |  |
| 1 | 1 |    | C7 | C6 | C5 | C4 | C3 | C2 | C1 | C0 |                                      |  |  |
| 1 | 1 |    | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |                                      |  |  |
| 1 | 1 |    | E7 | E6 | E5 | E4 | E3 | E2 | E1 | E0 |                                      |  |  |
| 1 | 1 |    | F7 | F6 | F5 | F4 | F3 | F2 | F1 | F0 |                                      |  |  |
| 1 | 1 |    | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 |                                      |  |  |
| 1 | 1 |    | H7 | H6 | H5 | H4 | H3 | H2 | H1 | H0 |                                      |  |  |
| 1 | 1 |    | I7 | I6 | I5 | I4 | I3 | I2 | I1 | I0 |                                      |  |  |
| 1 | 1 |    | J7 | J6 | J5 | J4 | J3 | J2 | J1 | J0 |                                      |  |  |
| 1 | 1 |    | K7 | K6 | K5 | K4 | K3 | K2 | K1 | K0 |                                      |  |  |

|   |   |    |    |    |    |    |    |    |    |    |              |  |  |
|---|---|----|----|----|----|----|----|----|----|----|--------------|--|--|
| 0 | 0 | 2E | 0  | 0  | 1  | 0  | 1  | 1  | 1  | 0  | User ID Read | Read 10 Byte User ID stored in OTP:<br>A[7:0]~J[7:0]: UserID (R38, Byte A and Byte J) [10 bytes] |  |
| 1 | 1 |    | A7 | A6 | A5 | A4 | A3 | A2 | A1 | A0 |              |  |  |
| 1 | 1 |    | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |              |  |  |
| 1 | 1 |    | C7 | C6 | C5 | C4 | C3 | C2 | C1 | C0 |              |  |  |
| 1 | 1 |    | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |              |  |  |
| 1 | 1 |    | E7 | E6 | E5 | E4 | E3 | E2 | E1 | E0 |              |  |  |
| 1 | 1 |    | F7 | F6 | F5 | F4 | F3 | F2 | F1 | F0 |              |  |  |
| 1 | 1 |    | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 |              |  |  |
| 1 | 1 |    | H7 | H6 | H5 | H4 | H3 | H2 | H1 | H0 |              |  |  |
| 1 | 1 |    | I7 | I6 | I5 | I4 | I3 | I2 | I1 | I0 |              |  |  |
| 1 | 1 |    | J7 | J6 | J5 | J4 | J3 | J2 | J1 | J0 |              |  |  |



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 20 of 39       |

| R/W#  | D/C# | Hex | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Command         | Description  |
|---|------|-----|----|----|----|----|----|----|----|----|-----------------|--|
| 0   | 0    | 2F  | 0  | 0  | 1  | 0  | 1  | 1  | 1  | 1  | Status Bit Read | Read IC status Bit [POR 0x01]  |
| 1   | 1    |     | 0  | 0  | A5 | A4 | 0  | 0  | A1 | A0 |                 | A[5]: HV Ready Detection flag [POR=0]<br>0: Ready<br>1: Not Ready<br>A[4]: VCI Detection flag [POR=0]<br>0: Normal<br>1: VCI lower than the Detect level<br>A[3]: [POR=0]<br>A[2]: Busy flag [POR=0]<br>0: Normal<br>1: BUSY<br>A[1:0]: Chip ID [POR=01] |
| Remark:<br>A[5] and A[4] status are not valid after RESET, they need to be initiated by command 0x14 and command 0x15 respectively. |      |     |    |    |    |    |    |    |    |    |                 |  |

|  |   |    |    |    |    |    |    |    |    |    |                                   |                                   |                                   |
|--|---|----|----|----|----|----|----|----|----|----|-----------------------------------|-----------------------------------|-----------------------------------|
| 0  | 0 | 37 | 0  | 0  | 1  | 1  | 0  | 1  | 1  | 1  | Write Register for Display Option | Write Register for Display Option |                                   |
| 0  | 1 |    | A7 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |                                   |                                   | A[7] Spare VCOM OTP selection     |
| 0  | 1 |    | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |                                   |                                   | 0: Default [POR]                  |
| 0  | 1 |    | C7 | C6 | C5 | C4 | C3 | C2 | C1 | C0 |                                   |                                   | 1: Spare                          |
| 0  | 1 |    | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |                                   |                                   | B[7:0] Display Mode for WS[7:0]   |
| 0  | 1 |    | E7 | E6 | E5 | E4 | E3 | E2 | E1 | E0 |                                   |                                   | C[7:0] Display Mode for WS[15:8]  |
| 0  | 1 |    | 0  | F6 | 0  | 0  | F3 | F2 | F1 | F0 |                                   |                                   | D[7:0] Display Mode for WS[23:16] |
| 0  | 1 |    | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 |                                   |                                   | E[7:0] Display Mode for WS[31:24] |
| 0  | 1 |    | H7 | H6 | H5 | H4 | H3 | H2 | H1 | H0 |                                   |                                   | F[3:0] Display Mode for WS[35:32] |
| 0  | 1 |    | I7 | I6 | I5 | I4 | I3 | I2 | I1 | I0 |                                   |                                   | 0: Display Mode 1                 |
| 0  | 1 |    | J7 | J6 | J5 | J4 | J3 | J2 | J1 | J0 |                                   |                                   | 1: Display Mode 2                 |
| F[6]: PingPong for Display Mode 2<br>0: RAM Ping-Pong disable [POR]<br>1: RAM Ping-Pong enable<br><br>G[7:0]~J[7:0] module ID /waveform version.<br><br>Remarks:<br>1) A[7:0]~J[7:0] can be stored in OTP<br>2) RAM Ping-Pong function is not support for Display Mode 1 |   |    |    |    |    |    |    |    |    |    |                                   |                                   |                                   |

|   |   |    |    |    |    |    |    |    |    |    |                            |                            |                                  |
|---|---|----|----|----|----|----|----|----|----|----|----------------------------|----------------------------|----------------------------------|
| 0   | 0 | 38 | 0  | 0  | 1  | 1  | 1  | 0  | 0  | 0  | Write Register for User ID | Write Register for User ID |                                  |
| 0   | 1 |    | A7 | A6 | A5 | A4 | A3 | A2 | A1 | A0 |                            |                            | A[7:0]~J[7:0]: UserID [10 bytes] |
| 0   | 1 |    | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |                            |                            |                                  |
| 0   | 1 |    | C7 | C6 | C5 | C4 | C3 | C2 | C1 | C0 |                            |                            |                                  |
| 0   | 1 |    | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |                            |                            |                                  |
| 0   | 1 |    | E7 | E6 | E5 | E4 | E3 | E2 | E1 | E0 |                            |                            |                                  |
| 0   | 1 |    | F7 | F6 | F5 | F4 | F3 | F2 | F1 | F0 |                            |                            |                                  |
| 0   | 1 |    | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 |                            |                            |                                  |
| Remarks: A[7:0]~J[7:0] can be stored in OTP by command 0x36 |   |    |    |    |    |    |    |    |    |    |                            |                            |                                  |



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | <b>A0</b>                               | <b>Page Number</b>   | <b>21 of 39</b>       |

| R/W#                                  | D/C#                                      | Hex | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Command                 | Description   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
|---------------------------------------|---|-----|----|----|----|----|----|----|----|----|-------------------------|---|--------|---------------|----|---|----|------------------------------|----|------|---------|-----|-----------------------------------|--|--------|-----------|----|-----|----|------|----|-----|----|------|----------------------------|--|------|-----------------------|---|--------------------------------|---|------------|---------------------------------------|--|--------|----------------|----|------|----|------|----|------|----|------|
| 0                                     | 1   |     | H7 | H6 | H5 | H4 | H3 | H2 | H1 | H0 |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 1   |     | I7 | I6 | I5 | I4 | I3 | I2 | I1 | I0 |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 1   |     | J7 | J6 | J5 | J4 | J3 | J2 | J1 | J0 |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 0   | 3C  | 0  | 0  | 1  | 1  | 1  | 1  | 0  | 0  | Border Waveform Control | Select border waveform for VBD<br>A[7:0] = C0h [POR], set VBD as HiZ.<br>A [7:6] :Select VBD option   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 1   |     | A7 | A6 | A5 | A4 | 0  | A2 | A1 | A0 |                         | <table border="1"> <tr> <td>A[7:6]</td> <td>Select VBD as</td> </tr> <tr> <td>00</td> <td>GS Transition, Defined in A[2] and A[1:0]</td> </tr> <tr> <td>01</td> <td>Fix Level, Defined in A[5:4]</td> </tr> <tr> <td>10</td> <td>VCOM</td> </tr> <tr> <td>11[POR]</td> <td>HiZ</td> </tr> </table><br><table border="1"> <tr> <td colspan="2">A [5:4] Fix Level Setting for VBD</td> </tr> <tr> <td>A[5:4]</td> <td>VBD level</td> </tr> <tr> <td>00</td> <td>VSS</td> </tr> <tr> <td>01</td> <td>VSH1</td> </tr> <tr> <td>10</td> <td>VSL</td> </tr> <tr> <td>11</td> <td>VSH2</td> </tr> </table><br><table border="1"> <tr> <td colspan="2">A[2] GS Transition control</td> </tr> <tr> <td>A[2]</td> <td>GS Transition control</td> </tr> <tr> <td>0</td> <td>Follow LUT (Output VCOM @ RED)</td> </tr> <tr> <td>1</td> <td>Follow LUT</td> </tr> </table><br><table border="1"> <tr> <td colspan="2">A [1:0] GS Transition setting for VBD</td> </tr> <tr> <td>A[1:0]</td> <td>VBD Transition</td> </tr> <tr> <td>00</td> <td>LUT0</td> </tr> <tr> <td>01</td> <td>LUT1</td> </tr> <tr> <td>10</td> <td>LUT2</td> </tr> <tr> <td>11</td> <td>LUT3</td> </tr> </table> | A[7:6] | Select VBD as | 00 | GS Transition, Defined in A[2] and A[1:0] | 01 | Fix Level, Defined in A[5:4] | 10 | VCOM | 11[POR] | HiZ | A [5:4] Fix Level Setting for VBD |  | A[5:4] | VBD level | 00 | VSS | 01 | VSH1 | 10 | VSL | 11 | VSH2 | A[2] GS Transition control |  | A[2] | GS Transition control | 0 | Follow LUT (Output VCOM @ RED) | 1 | Follow LUT | A [1:0] GS Transition setting for VBD |  | A[1:0] | VBD Transition | 00 | LUT0 | 01 | LUT1 | 10 | LUT2 | 11 | LUT3 |
| A[7:6]                                | Select VBD as                             |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 00                                    | GS Transition, Defined in A[2] and A[1:0] |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 01                                    | Fix Level, Defined in A[5:4]              |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 10                                    | VCOM                                      |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 11[POR]                               | HiZ                                       |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| A [5:4] Fix Level Setting for VBD     |   |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| A[5:4]                                | VBD level                                 |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 00                                    | VSS                                       |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 01                                    | VSH1                                      |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 10                                    | VSL                                       |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 11                                    | VSH2                                      |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| A[2] GS Transition control            |   |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| A[2]                                  | GS Transition control                     |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | Follow LUT (Output VCOM @ RED)            |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 1                                     | Follow LUT                                |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| A [1:0] GS Transition setting for VBD |   |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| A[1:0]                                | VBD Transition                            |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 00                                    | LUT0                                      |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 01                                    | LUT1                                      |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 10                                    | LUT2                                      |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 11                                    | LUT3                                      |     |    |    |    |    |    |    |    |    |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 0   | 41  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 1  | Read RAM Option         | Read RAM Option<br>A[0]= 0 [POR]<br>0 : Read RAM corresponding to RAM0x24<br>1 : Read RAM corresponding to RAM0x26  |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 1   |     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | A0 |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 0   | 44  | 0  | 1  | 0  | 0  | 0  | 1  | 0  | 0  | Set RAM X - address     | Specify the start/end positions of the window address in the X direction by an address unit for RAM<br><br>A[5:0]: XSA[5:0], XStart, POR = 00h<br>B[5:0]: XEA[5:0], XEnd, POR = 15h   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 1   |     | 0  | 0  | A5 | A4 | A3 | A2 | A1 | A0 | Start / End position    |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 1   |     | 0  | 0  | B5 | B4 | B3 | B2 | B1 | B0 |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 0   | 45  | 0  | 1  | 0  | 0  | 0  | 1  | 0  | 1  | Set Ram Y- address      | Specify the start/end positions of the window address in the Y direction by an address unit for RAM<br><br>A[8:0]: YSA[8:0], YStart, POR = 000h<br>B[8:0]: YEA[8:0], YEnd, POR = 127h   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 1   |     | A7 | A6 | A5 | A4 | A3 | A2 | A1 | A0 | Start / End position    |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 1   |     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | A8 |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 1   |     | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |
| 0                                     | 1   |     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | B8 |                         |   |        |               |    |   |    |                              |    |      |         |     |                                   |  |        |           |    |     |    |      |    |     |    |      |                            |  |      |                       |   |                                |   |            |                                       |  |        |                |    |      |    |      |    |      |    |      |



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 22 of 39              |

| R/W#   | D/C#   | Hex    | D7             | D6             | D5             | D4             | D3 | D2             | D1             | D0             | Command                                | Description  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
|--------|--------|--------|----------------|----------------|----------------|----------------|----|----------------|----------------|----------------|--|--|--------|--------|--------|--------|-----|---|-----|-----|-----|----|-----|-----|-----|----|-----|-----|-----|----|-----|----|--------|-------|--------|-------|-----|---|-----|-----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|
| 0      | 0      | 46     | 0              | 1              | 0              | 0              | 0  | 1              | 1              | 0              | Auto Write RAM0x26 for Regular Pattern | Auto Write RAM0x26 for Regular Pattern<br>A[7:0] = 00h [POR]   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 0      | 1      |        | A <sub>7</sub> | A <sub>6</sub> | A <sub>5</sub> | A <sub>4</sub> | 0  | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |  | <p>A[7]: The 1st step value, POR = 0<br/>A[6:4]: Step Height, POR= 000<br/>Step of alter RAM in Y-direction according to Gate</p> <table border="1"> <thead> <tr> <th>A[6:4]</th> <th>Height</th> <th>A[6:4]</th> <th>Height</th> </tr> </thead> <tbody> <tr> <td>000</td> <td>8</td> <td>100</td> <td>128</td> </tr> <tr> <td>001</td> <td>16</td> <td>101</td> <td>256</td> </tr> <tr> <td>010</td> <td>32</td> <td>110</td> <td>296</td> </tr> <tr> <td>011</td> <td>64</td> <td>111</td> <td>NA</td> </tr> </tbody> </table> <p>A[2:0]: Step Width, POR= 000<br/>Step of alter RAM in X-direction according to Source</p> <table border="1"> <thead> <tr> <th>A[2:0]</th> <th>Width</th> <th>A[2:0]</th> <th>Width</th> </tr> </thead> <tbody> <tr> <td>000</td> <td>8</td> <td>100</td> <td>128</td> </tr> <tr> <td>001</td> <td>16</td> <td>101</td> <td>176</td> </tr> <tr> <td>010</td> <td>32</td> <td>110</td> <td>NA</td> </tr> <tr> <td>011</td> <td>64</td> <td>111</td> <td>NA</td> </tr> </tbody> </table> <p>BUSY pad will output high during operation.</p> | A[6:4] | Height | A[6:4] | Height | 000 | 8 | 100 | 128 | 001 | 16 | 101 | 256 | 010 | 32 | 110 | 296 | 011 | 64 | 111 | NA | A[2:0] | Width | A[2:0] | Width | 000 | 8 | 100 | 128 | 001 | 16 | 101 | 176 | 010 | 32 | 110 | NA | 011 | 64 | 111 | NA |
| A[6:4] | Height | A[6:4] | Height         |                |                |                |    |                |                |                |  |  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 000    | 8      | 100    | 128            |                |                |                |    |                |                |                |  |  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 001    | 16     | 101    | 256            |                |                |                |    |                |                |                |  |  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 010    | 32     | 110    | 296            |                |                |                |    |                |                |                |  |  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 011    | 64     | 111    | NA             |                |                |                |    |                |                |                |  |  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| A[2:0] | Width  | A[2:0] | Width          |                |                |                |    |                |                |                |  |  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 000    | 8      | 100    | 128            |                |                |                |    |                |                |                |  |  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 001    | 16     | 101    | 176            |                |                |                |    |                |                |                |  |  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 010    | 32     | 110    | NA             |                |                |                |    |                |                |                |  |  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 011    | 64     | 111    | NA             |                |                |                |    |                |                |                |  |  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |

| 0      | 0      | 47     | 0              | 1              | 0              | 0              | 0 | 1              | 1              | 1              | Auto Write RAM0x24 for Regular Pattern | Auto Write RAM0x24 for Regular Pattern<br>A[7:0] = 00h [POR]  |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
|--------|--------|--------|----------------|----------------|----------------|----------------|---|----------------|----------------|----------------|--|---|--------|--------|--------|--------|-----|---|-----|-----|-----|----|-----|-----|-----|----|-----|-----|-----|----|-----|----|--------|-------|--------|-------|-----|---|-----|-----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|
| 0      | 1      |        | A <sub>7</sub> | A <sub>6</sub> | A <sub>5</sub> | A <sub>4</sub> | 0 | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |  | <p>A[7]: The 1st step value, POR = 0<br/>A[6:4]: Step Height, POR= 000<br/>Step of alter RAM in Y-direction according to Gate</p> <table border="1"> <thead> <tr> <th>A[6:4]</th> <th>Height</th> <th>A[6:4]</th> <th>Height</th> </tr> </thead> <tbody> <tr> <td>000</td> <td>8</td> <td>100</td> <td>128</td> </tr> <tr> <td>001</td> <td>16</td> <td>101</td> <td>256</td> </tr> <tr> <td>010</td> <td>32</td> <td>110</td> <td>296</td> </tr> <tr> <td>011</td> <td>64</td> <td>111</td> <td>NA</td> </tr> </tbody> </table> <p>A[2:0]: Step Width, POR= 000<br/>Step of alter RAM in X-direction according to Source</p> <table border="1"> <thead> <tr> <th>A[2:0]</th> <th>Width</th> <th>A[2:0]</th> <th>Width</th> </tr> </thead> <tbody> <tr> <td>000</td> <td>8</td> <td>100</td> <td>128</td> </tr> <tr> <td>001</td> <td>16</td> <td>101</td> <td>176</td> </tr> <tr> <td>010</td> <td>32</td> <td>110</td> <td>NA</td> </tr> <tr> <td>011</td> <td>64</td> <td>111</td> <td>NA</td> </tr> </tbody> </table> <p>During operation, BUSY pad will output high.</p> | A[6:4] | Height | A[6:4] | Height | 000 | 8 | 100 | 128 | 001 | 16 | 101 | 256 | 010 | 32 | 110 | 296 | 011 | 64 | 111 | NA | A[2:0] | Width | A[2:0] | Width | 000 | 8 | 100 | 128 | 001 | 16 | 101 | 176 | 010 | 32 | 110 | NA | 011 | 64 | 111 | NA |
| A[6:4] | Height | A[6:4] | Height         |                |                |                |   |                |                |                |  |   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 000    | 8      | 100    | 128            |                |                |                |   |                |                |                |  |   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 001    | 16     | 101    | 256            |                |                |                |   |                |                |                |  |   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 010    | 32     | 110    | 296            |                |                |                |   |                |                |                |  |   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 011    | 64     | 111    | NA             |                |                |                |   |                |                |                |  |   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| A[2:0] | Width  | A[2:0] | Width          |                |                |                |   |                |                |                |  |   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 000    | 8      | 100    | 128            |                |                |                |   |                |                |                |  |   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 001    | 16     | 101    | 176            |                |                |                |   |                |                |                |  |   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 010    | 32     | 110    | NA             |                |                |                |   |                |                |                |  |   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |
| 011    | 64     | 111    | NA             |                |                |                |   |                |                |                |  |   |        |        |        |        |     |   |     |     |     |    |     |     |     |    |     |     |     |    |     |    |        |       |        |       |     |   |     |     |     |    |     |     |     |    |     |    |     |    |     |    |



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 23 of 39              |

| R/W# | D/C# | Hex | D7             | D6             | D5             | D4             | D3             | D2             | D1             | D0             | Command                   | Description  |
|------|------|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------------------|--|
| 0    | 0    | 4E  | 0              | 1              | 0              | 0              | 1              | 1              | 1              | 0              | Set RAM X address counter | Make initial settings for the RAM X address in the address counter (AC) A[5:0]: 00h [POR].   |
| 0    | 1    |     | 0              | 0              | A <sub>5</sub> | A <sub>4</sub> | A <sub>3</sub> | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |                           |  |
| 0    | 0    | 4F  | 0              | 1              | 0              | 0              | 1              | 1              | 1              | 1              | Set RAM Y address counter | Make initial settings for the RAM Y address in the address counter (AC) A[8:0]: 000h [POR].  |
| 0    | 1    |     | A <sub>7</sub> | A <sub>6</sub> | A <sub>5</sub> | A <sub>4</sub> | A <sub>3</sub> | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> |                           |  |
| 0    | 1    |     | 0              | 0              | 0              | 0              | 0              | 0              | 0              | A <sub>8</sub> |                           |  |
| 0    | 0    | 7F  | 0              | 1              | 1              | 1              | 1              | 1              | 1              | 1              | NOP                       | This command is an empty command; it does not have any effect on the display module.<br>However it can be used to terminate Frame Memory Write or Read Commands. |



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 24 of 39       |

### 10.Data Entry Mode Setting (11h)

This command has multiple configurations and each bit setting is described as follows:

|     |    |     |     |     |     |     |     |     |     |
|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| R/W | DC | IB7 | IB6 | IB5 | IB4 | IB3 | IB2 | IB1 | IB0 |
| W   | 1  |     |     |     |     |     | AM  | ID1 | IDO |
| POR |    | 0   | 0   | 0   | 0   | 0   | 0   | 1   | 1   |

ID[1:0]: The address counter is automatically incremented by 1, after data is written to the RAM when ID[1:0] = "01". The address counter is automatically decremented by 1, after data is written to the RAM when ID[1:0] = "00". The setting of incrementing or decrementing of the address counter can be made independently in each upper and lower bit of the address. The direction of the address when data is written to the RAM is set by AM bits.

AM: Set the direction in which the address counter is updated automatically after data are written to the RAM. When AM = "0", the address counter is updated in the X direction. When AM = "1", the address counter is updated in the Y direction. When window addresses are selected, data are written to the RAM area specified by the window addresses in the manner specified with ID[1:0] and AM bits.

|                  |   |   |   |   |
|------------------|---|---|---|---|
|                  | ID [1:0]="00"<br>X: decrement<br>Y: decrement | ID [1:0]="01"<br>X: increment<br>Y: decrement | ID [1:0]="10"<br>X: decrement<br>Y: increment | ID [1:0]="11"<br>X: increment<br>Y: increment |
| AM="0"<br>X-mode |   |   |   |   |
| AM="1"<br>Y-mode |   |   |   |   |

The pixel sequence is defined by the ID [0],

|                  |   |  |
|------------------|---|--|
|                  | ID [1:0]="00"<br>X: decrement<br>Y: decrement | D [1:0]="01"<br>X: increment<br>Y: decrement |
| AM="0"<br>X-mode |   |  |





|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 25 of 39       |

### 11. Reference Circuit

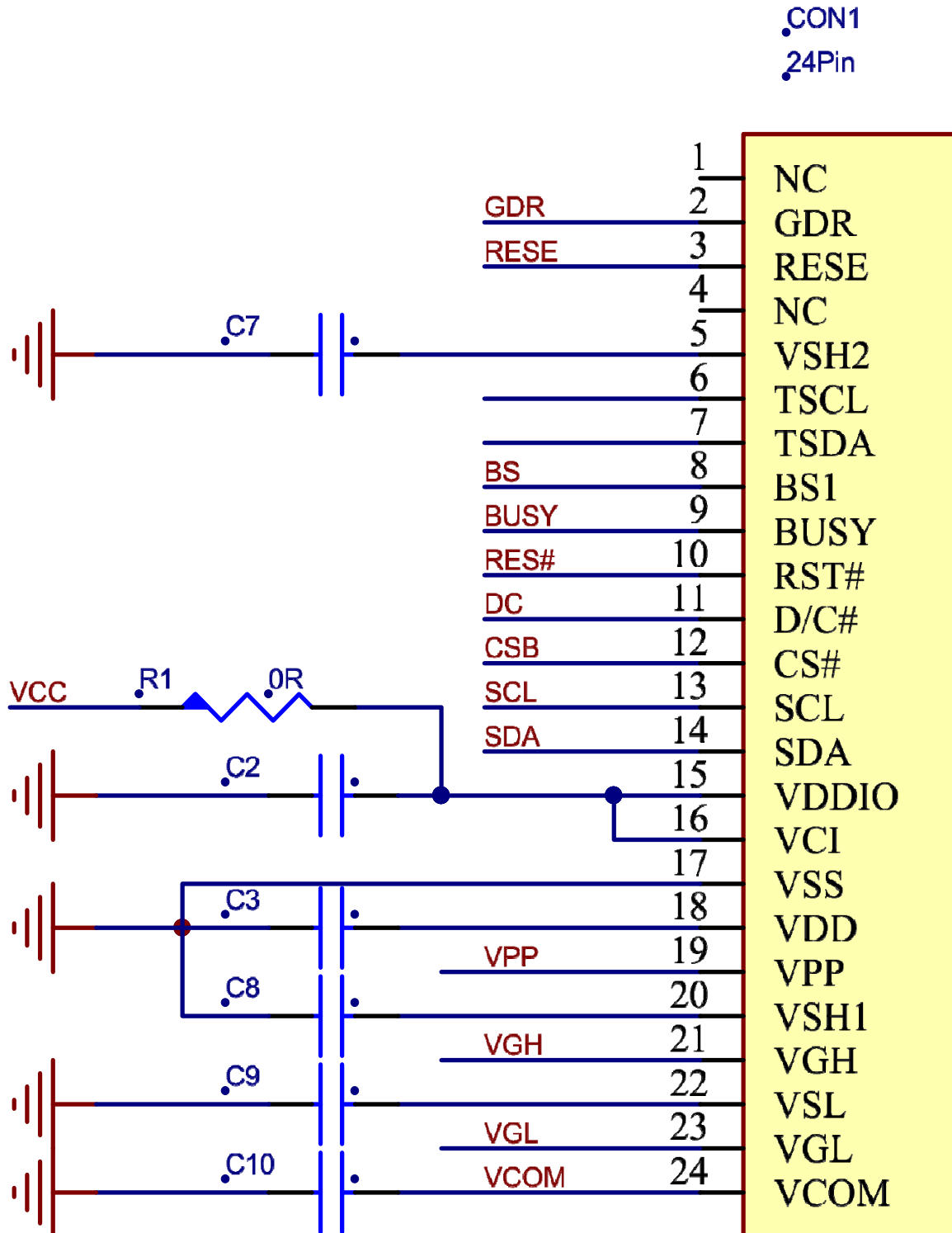


Figure. 11-1



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 26 of 39       |

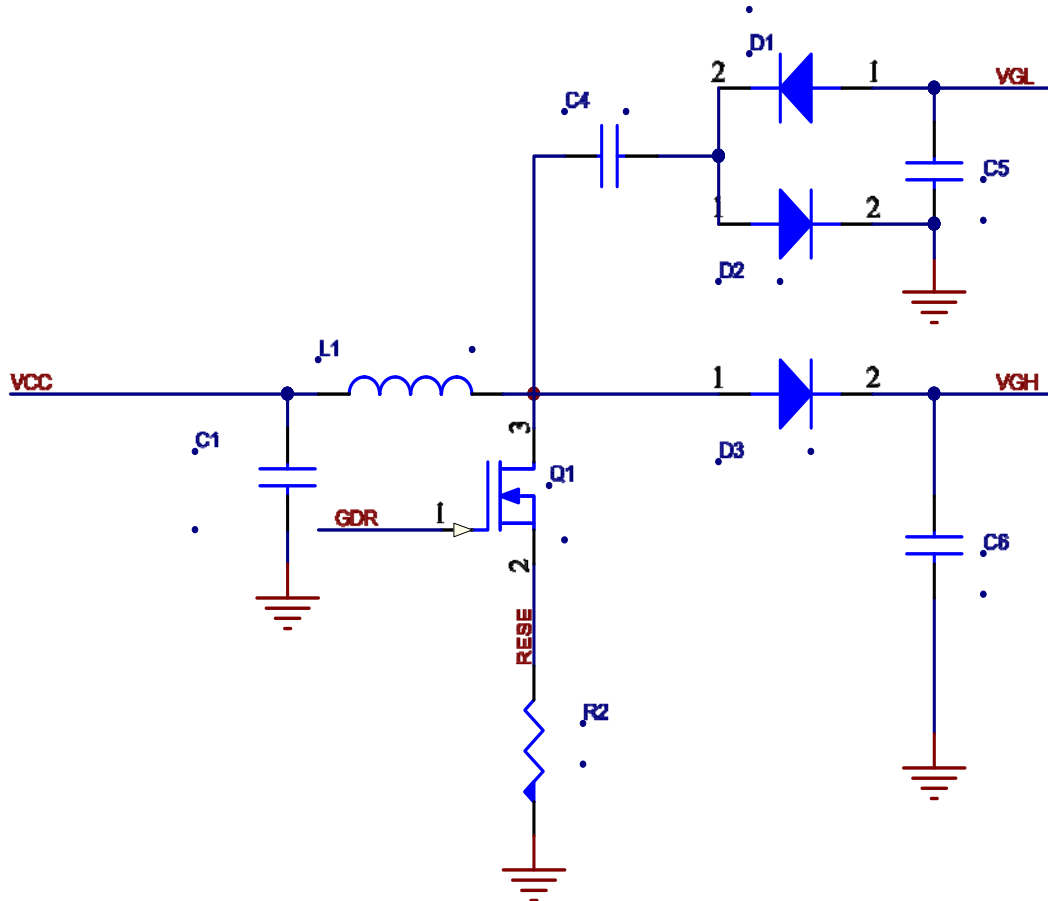


Figure. 11-2

| Part Name | Value /requirement/Reference Part   |
|-----------|---|
| C1—C9     | 1uF/0603;X5R;Voltage Rating: 25V  |
| C10       | 1uF/0603;X7R;Voltage Rating: 25V  |
| D1—D3     | MBR0530<br>1) Reverse DC voltage $\geq 30V$<br>2) Forward current $\geq 500mA$<br>3) Forward voltage $\leq 430mV$   |
| R2        | 2.2 $\Omega$ /0603: 1% variation  |
| Q1        | NMOS:Si1304BDL/NX3008NBK<br>1) Drain-Source breakdown voltage $\geq 30V$<br>2) $V_{gs} (th) = 0.9 (Typ) , 1.3V (Max)$<br>3) $R_{ds on} \leq 2.1 \Omega @ V_{gs}=2.5V$ |
| L1        | 47uH/NRH3010T470MN<br>Maximum DC current~420mA<br>Maximum DC resistance~650m $\Omega$   |
| CON24Pin  | 0.5mm ZIF Socket 24Pins,0.5mm pitch   |



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 27 of 39       |

## 12. ABSOLUTE MAXIMUM RATING

**Table 12-1: Maximum Ratings**

| Symbol           | Parameter                        | Rating       | Unit | Humidity | Unit | Note                          |
|------------------|----------------------------------|--------------|------|----------|------|-------------------------------|
| V <sub>CI</sub>  | Logic supply voltage             | -0.5 to +6.0 | V    | -        | -    |                               |
| T <sub>OPR</sub> | Operation temperature range      | 0 to 40      | °C   | 45 to70  | %    | Note 12-1                     |
| T <sub>ttg</sub> | Transportation temperature range | -25 to 60    | °C   | 45 to70  | %    | Note12-2                      |
| T <sub>stg</sub> | Storage condition                | 0 to 40      | °C   | 45 to70  | %    | Maximum storage time: 5 years |
| -                | After opening the package        | 0 to 40      | °C   | 45 to70  | %    |                               |

Note 12-1: We guarantee the single pixel display quality for 0-35°C, but we only guarantee the barcode readable for 35-40°C. Normal use is recommended to refresh every 24 hours.

Note 12-2: T<sub>ttg</sub> is the transportation condition, the transport time is within 10 days for -25°C~0°C or 40°C~60°C.

Note 12-3: When the three-color product is stored. The display screen should be kept white and face up. In addition, please be sure to refresh the e-paper every three months. We suggest that the full black and full white picture could be added to clear the screen after the module is refreshed for a long time, the display effect would be better.

## 13.DC CHARACTERISTICS

The following specifications apply for: V<sub>SS</sub>=0V, V<sub>CI</sub>=3 V, T<sub>OPR</sub>=25°C.

**Table 13-1: DC Characteristics**

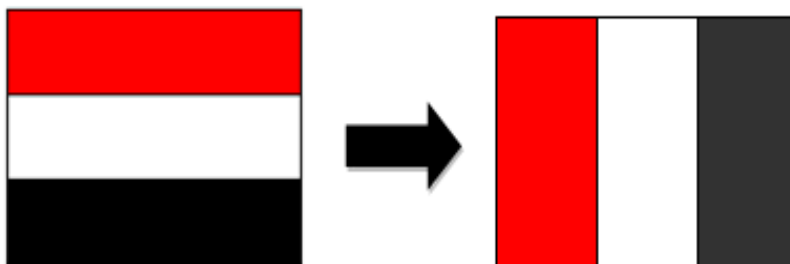
| Symbol              | Parameter                         | Test Condition           | Applicable pin                 | Min.                 | Typ. | Max.                 | Unit |
|---------------------|-----------------------------------|--------------------------|--------------------------------|----------------------|------|----------------------|------|
| V <sub>CI</sub>     | V <sub>CI</sub> operation voltage |                          | V <sub>CI</sub>                | 2.5                  | 3    | 3.7                  | V    |
| V <sub>IH</sub>     | High level input voltage          |                          | SDA, SCL, CS#, D/C#, RES#, BS1 | 0.8V <sub>DDIO</sub> |      |                      | V    |
| V <sub>IL</sub>     | Low level input voltage           |                          |                                |                      |      | 0.2V <sub>DDIO</sub> | V    |
| V <sub>OH</sub>     | High level output voltage         | I <sub>OH</sub> = -100uA | BUSY                           | 0.9V <sub>DDIO</sub> |      |                      | V    |
| V <sub>OL</sub>     | Low level output voltage          | I <sub>OL</sub> = 100uA  |                                |                      |      | 0.1V <sub>DDIO</sub> | V    |
| I <sub>update</sub> | Module operating current          |                          |                                | -                    | 3    | -                    | mA   |
| I <sub>sleep</sub>  | Deep sleep mode                   | V <sub>CI</sub> =3.0V    |                                | -                    | -    | 3                    | uA   |

The Typical power consumption is measured using associated 25°C waveform with following pattern transition: from horizontal scan pattern to vertical scan pattern. (Note 13-1)

- The listed electrical/optical characteristics are only guaranteed under the controller & waveform provided by XingTai.
- V<sub>com</sub> value will be OTP before in factory or present on the label sticker.

Note 13-1

The Typical power consumption





|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 28 of 39       |

## 14. Serial Peripheral Interface Timing

The following specifications apply for: VSS=0V, VCI=2.5V to 3.7V, T<sub>OPR</sub>=25°C, CL=20pF

### Write mode

| Symbol   | Parameter  | Min | Typ | Max | Unit |
|----------|--|-----|-----|-----|------|
| fSCL     | SCL frequency (Write Mode)   |     |     | 20  | MHz  |
| tCSSU    | Time CS# has to be low before the first rising edge of SCLK                  | 60  |     |     | ns   |
| tCSHLD   | Time CS# has to remain low after the last falling edge of SCLK               | 65  |     |     | ns   |
| tCSHIGH  | Time CS# has to remain high between two transfers                            | 100 |     |     | ns   |
| tSCLHIGH | Part of the clock period where SCL has to remain high                        | 25  |     |     | ns   |
| tSCLLOW  | Part of the clock period where SCL has to remain low                         | 25  |     |     | ns   |
| tSISU    | Time SI (SDA Write Mode) has to be stable before the next rising edge of SCL | 10  |     |     | ns   |
| tSIHLD   | Time SI (SDA Write Mode) has to remain stable after the rising edge of SCL   | 40  |     |     | ns   |

### Read mode

| Symbol   | Parameter  | Min | Typ | Max | Unit |
|----------|--|-----|-----|-----|------|
| fSCL     | SCL frequency (Read Mode)  |     |     | 2.5 | MHz  |
| tCSSU    | Time CS# has to be low before the first rising edge of SCLK              | 100 |     |     | ns   |
| tCSHLD   | Time CS# has to remain low after the last falling edge of SCLK           | 50  |     |     | ns   |
| tCSHIGH  | Time CS# has to remain high between two transfers                        | 250 |     |     | ns   |
| tSCLHIGH | Part of the clock period where SCL has to remain high                    | 180 |     |     | ns   |
| tSCLLOW  | Part of the clock period where SCL has to remain low                     | 180 |     |     | ns   |
| tSOSU    | Time SO(SDA Read Mode) will be stable before the next rising edge of SCL |     | 50  |     | ns   |
| tSOHLD   | Time SO (SDA Read Mode) will remain stable after the falling edge of SCL |     | 0   |     | ns   |

Note: All timings are based on 20% to 80% of VDDIO-VSS

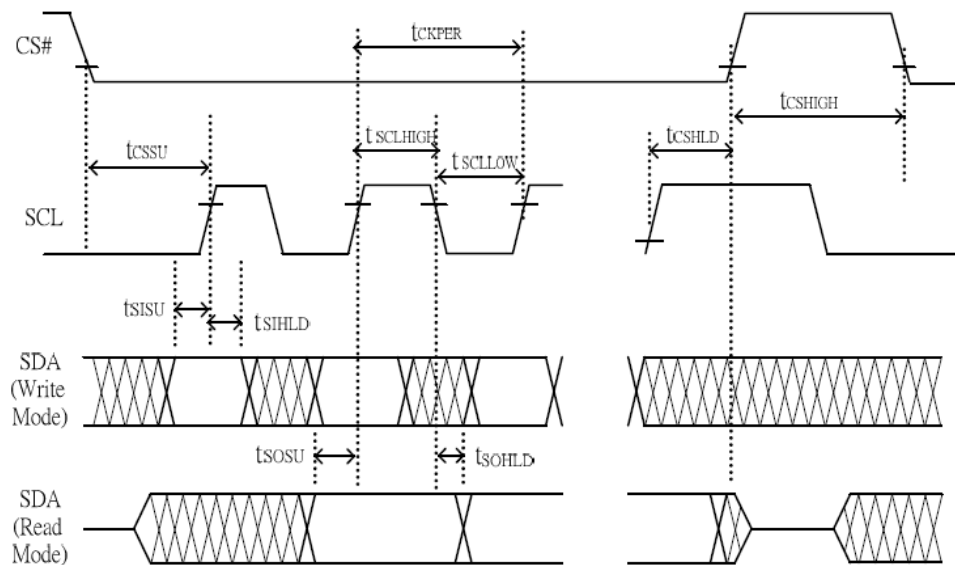


Figure 14-1: SPI timing diagram

## 15. Power Consumption

| Parameter                             | Symbol | Conditions | TYP | Max | Unit | Remark |
|---------------------------------------|--------|------------|-----|-----|------|--------|
| Panel power consumption during update | -      | 25°C       | -   | 90  | mAs  | -      |
| Deep sleep mode                       | -      | 25°C       | -   | 3   | uA   | -      |

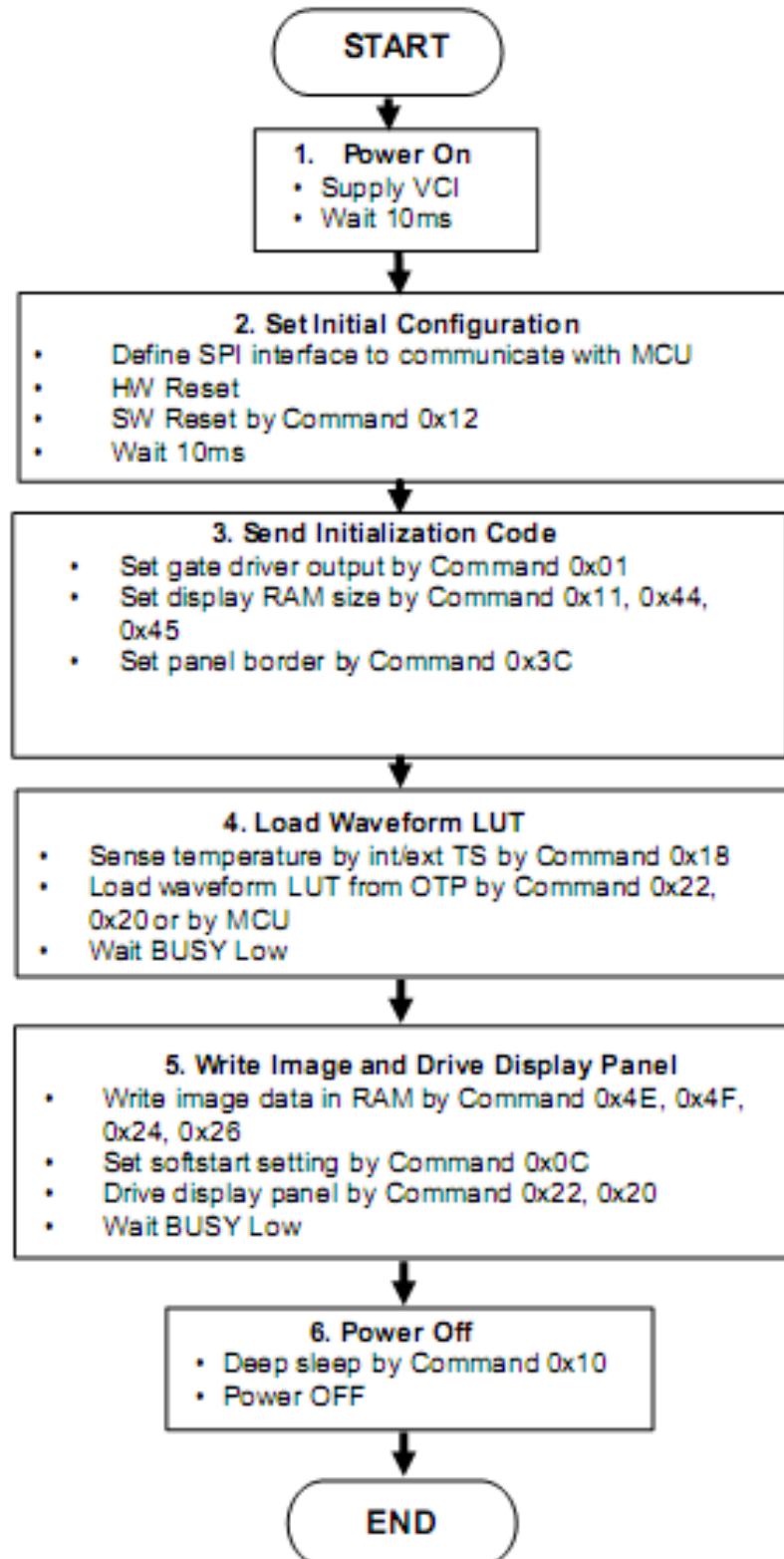
MAS=update average current × update time



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 29 of 39       |

## 16. Typical Operating Sequence

### 16.1 Normal Operation Flow





|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 30 of 39       |

## 17.Optical characteristics

### 17.1 Specifications

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

T=25±3℃, VCI=3.0V

| SYMBOL | PARAMETER            | CONDITIONS                 | MIN | TYP.                       | MAX | UNIT | Note      |
|--------|----------------------|----------------------------|-----|----------------------------|-----|------|-----------|
| R      | Reflectance          | White                      | 30  | 35                         | -   | %    | Note 17-1 |
| Gn     | 2Grey Level          | -                          | -   | $KS+(WS-KS) \times n(m-1)$ | -   | L*   | -         |
| CR     | Contrast Ratio       | -                          | 10  | 15                         | -   |      | -         |
| KS     | Black State L* value |                            | -   | 13                         | 14  |      | Note 17-1 |
|        | Black State a* value |                            | -   | 3                          | 4   |      | Note 17-1 |
| WS     | White State L* value |                            | 63  | 65                         | -   |      | Note 17-1 |
| RS     | Red State L* value   | Red                        | 25  | 28                         | -   |      | Note 17-1 |
|        | Red State a* value   | Red                        | 36  | 40                         | -   |      | Note 17-1 |
| Panel  | Image Update         | Storage and transportation | -   | Update the white screen    | -   | -    | -         |
|        | Update Time          | Operation                  | -   | Suggest Updated once a day | -   | -    | -         |

WS : White state, KS : Black State, RS: Red State

Note 17-1 : Luminance meter : i - One Pro Spectrophotometer

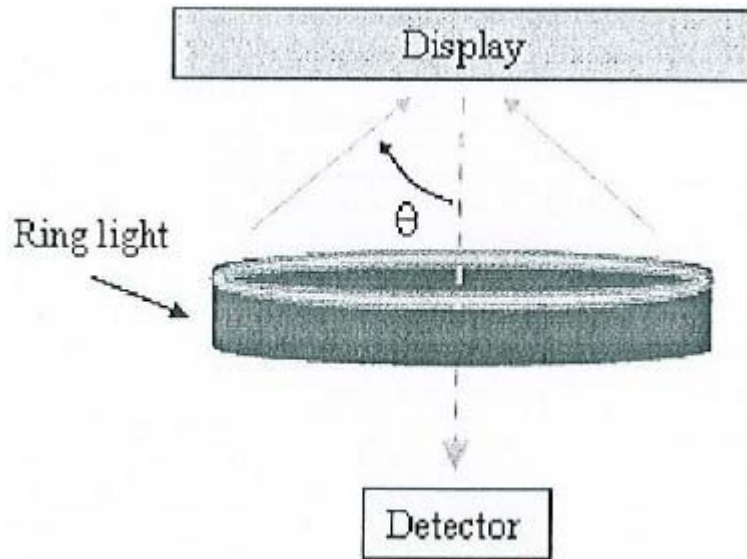


|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 31 of 39       |

### 17.2 Definition of contrast ratio

The contrast ratio (CR) is the ratio between the reflectance in a full white area (R1) and the reflectance in a dark area (Rd):

R1: white reflectance      Rd: dark reflectance  
CR = R1/Rd

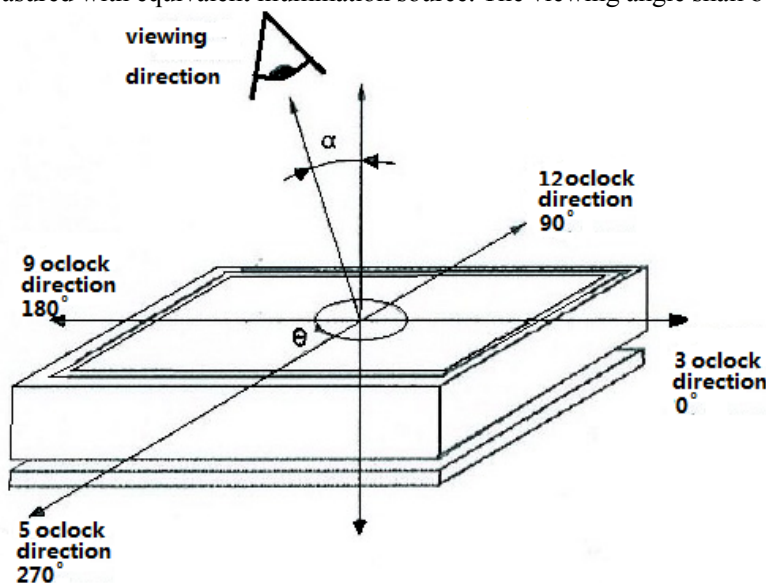


### 17.3 Reflection Ratio

The reflection ratio is expressed as:

$$R = \text{Reflectance Factor}_{\text{white board}} \times (L_{\text{center}} / L_{\text{white board}})$$

$L_{\text{center}}$  is the luminance measured at center in a white area (R=G=B=1).  $L_{\text{white board}}$  is the luminance of a standard white board. Both are measured with equivalent illumination source. The viewing angle shall be no more than 2 degrees.





|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 32 of 39              |

## 18. HANDLING, SAFETY AND ENVIROMENTAL REQUIREMENTS

|   |
|---|
| <b>WARNING</b>  |
| The display module should be kept flat or fixed to a rigid, curved support with limited bending along the long axis. It should not be used for continual flexing and bending. Handle with care. Should the display break do not touch any material that leaks out. In case of contact with the leaked material then wash with water and soap. |

|  |
|--|
| <b>CAUTION</b>   |
| 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 invalidate the warranty agreements.  |
| IPA solvent can only be applied on active area and the back of a glass. For the rest part, it is not allowed.  |
| Observe general precautions that are common to handling delicate electronic components. The glass can break and front surfaces can easily be damaged . Moreover the display is sensitive to static electricity and other rough environmental conditions. |

|  |
|--|
| <b>Mounting Precautions</b>  |
| (1) It`s recommended that you consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module.  |
| (2) It`s recommended that you attach a transparent protective plate to the surface in order to protect the EPD. Transparent protective plate should have sufficient strength in order to resist external force.  |
| (3) You should adopt radiation structure to satisfy the temperature specification.   |
| (4) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the PS at high temperature and the latter causes circuit break by electro-chemical reaction.   |
| (5) Do not touch, push or rub the exposed PS with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of PS for bare hand or greasy cloth. (Some cosmetics deteriorate the PS)   |
| (6) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach the PS. Do not use acetone, toluene and alcohol because they cause chemical damage to the PS. |
| (7) Wipe off saliva or water drops as soon as possible. Their long time contact with PS causes deformations and color fading.  |

|                          |   |
|--------------------------|---|
| <b>Data sheet status</b> |   |
| Product specification    | The data sheet contains final product specifications. |





|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | A0                                      | <b>Page Number</b>   | 33 of 39              |

**Limiting values**

Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

**Application information**

Where application information is given, it is advisory and dose not form part of the specification.

**Product Environmental certification**

ROHS

**REMARK**

All The specifications listed in this document are guaranteed for module only. Post-assembled operation or component(s) may impact module performance or cause unexpected effect or damage and therefore listed specifications is not warranted after any Post-assembled operation.



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 34 of 39       |

## 19. Reliability test

### 19.1 Reliability test items

|    | TEST                                      | CONDITION  | REMARK                   |
|----|---|--|--------------------------|
| 1  | High-Temperature Operation                | T=40°C, RH=35%RH, For 240Hr  |                          |
| 2  | Low-Temperature Operation                 | T = 0°C for 240 hrs  |                          |
| 3  | High-Temperature Storage                  | T=50°C RH=35%RH For 240Hr  | Test in white pattern    |
| 4  | Low-Temperature Storage                   | T = -25°C for 240 hrs<br>Test in white pattern   | Test in white pattern    |
| 5  | High Temperature, High-Humidity Operation | T=40°C, RH=90%RH, For 168Hr  |                          |
| 6  | High Temperature, High-Humidity Storage   | T=50°C, RH=80%RH, For 240Hr  | Test in white pattern    |
| 7  | Temperature Cycle                         | -25°C(30min)~60°C(30min),50 Cycle  | Test in white pattern    |
| 8  | Package Vibration                         | 1.04G, Frequency : 20~200Hz<br>Direction : X,Y,Z<br>Duration: 30 minutes in each direction                     | Full packed for shipment |
| 9  | Package Drop Impact                       | Drop from height of 100 cm on Concrete surface<br>Drop sequence: 1 corner, 3edges, 6face<br>One drop for each. | Full packed for shipment |
| 10 | UV exposure Resistance                    | 765 W/m <sup>2</sup> for 168hrs, 40°C  |                          |
| 11 | Electrostatic discharge                   | Machine model:<br>+/-250V, 0 Ω, 200pF  |                          |

Actual EMC level to be measured on customer application.

Note1: Stay white pattern for storage and non-operation test.

Note2: Operation is black/white/red pattern , hold time is 150S.

Note3: The function ,appearance, opticals should meet the requirements of the test before and after the test.

Note4: Keep testing after 2 hours placing at 20°C-25°C.

### 19.2 Product life time

The EPD Module is designed for a 5-year life-time with 25 °C/60%RH operation assumption. Reliability estimation testing with accelerated life-time theory would be demonstrated to provide confidence of EPD lifetime.

### 19.3 Product warranty

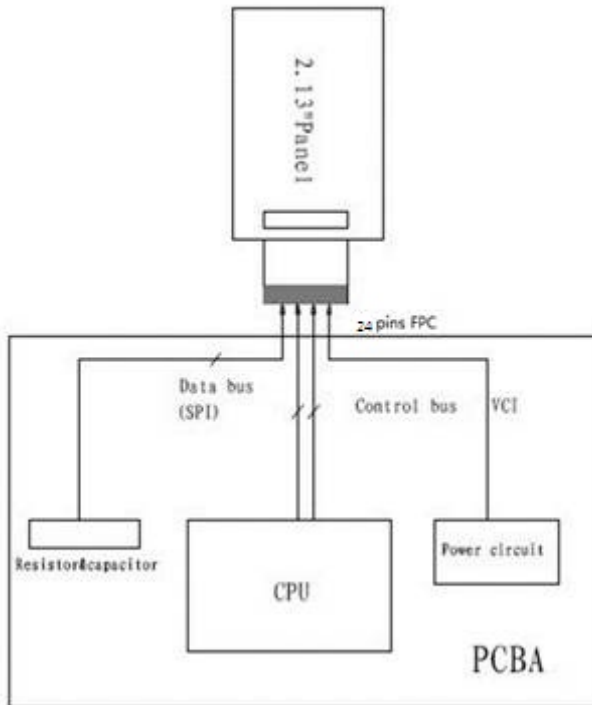
Warranty conditions have to be negotiated between Xingtai and individual customers.

Xingtai provides 12+1(one month delivery time) months warranty for all products which are purchased from Xingtai.

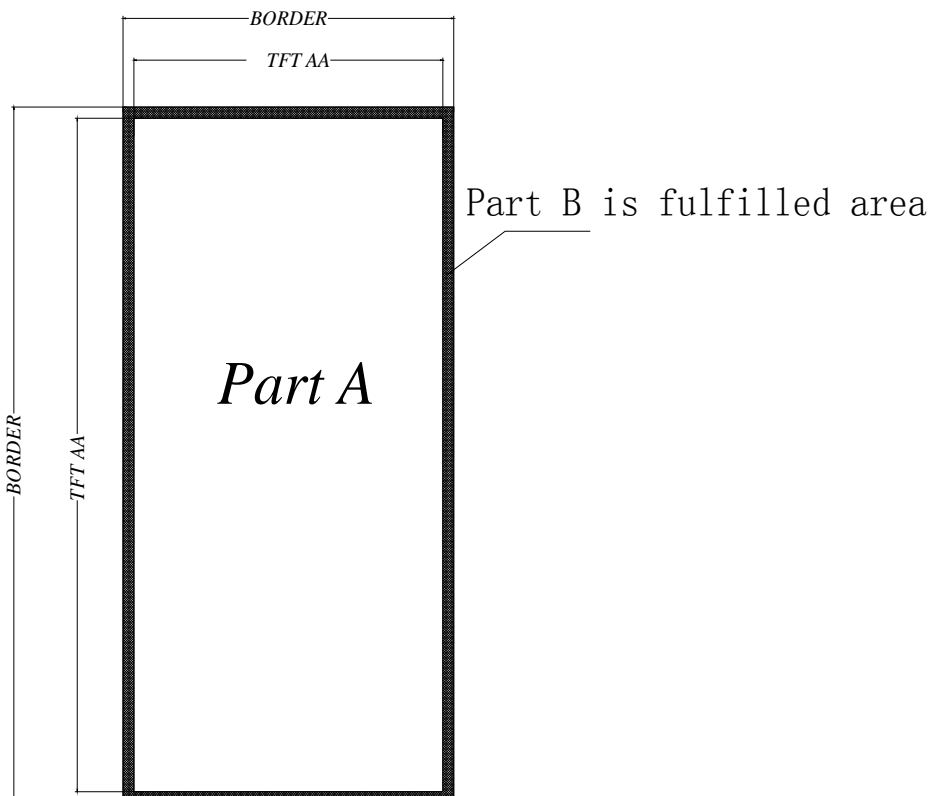


|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 35 of 39       |

## 20. Block Diagram



## 21. PartA/PartB specification





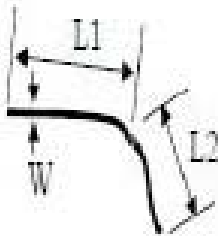
|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 36 of 39       |

## 22. Point and line standard

| Shipment Inspection Standard                    |  |   |             |             |        |             |
|---|--|---|-------------|-------------|--------|-------------|
| Equipment: Electrical test fixture, Point gauge |  |   |             |             |        |             |
| Outline dimension                               | 29.2(H)×59.2(V)×0.9(D)   | Unit: mm  | Part-A      | Active area | Part-B | Border area |
| Environment                                     | Temperature  | Humidity  | Illuminance | Distance    | Time   | Angle       |
|   | 19℃~25℃  | 55%±5%RH  | 800~1300Lux | 300 mm      | 35Sec  |             |
| Defect type                                     | Inspection method  | Standard  |             | Part-A      | Part-B |             |
| Spot  | Electric Display   | $D \leq 0.25 \text{ mm}$  |             | Ignore      | Ignore |             |
|   |  | $0.25 \text{ mm} < D \leq 0.4 \text{ mm}$   |             | $N \leq 4$  | Ignore |             |
|   |  | $D > 0.4 \text{ mm}$  |             | Not Allow   | Ignore |             |
| Display unwork                                  | Electric Display   | Not Allow   |             | Not Allow   | Ignore |             |
| Display error                                   | Electric Display   | Not Allow   |             | Not Allow   | Ignore |             |
| Scratch or line defect(include dirt)            | Visual/Film card   | $L \leq 2 \text{ mm}, W \leq 0.2 \text{ mm}$  |             | Ignore      | Ignore |             |
|   |  | $2.0 \text{ mm} < L \leq 5.0 \text{ mm}, 0.2 < W \leq 0.3 \text{ mm}$   |             | $N \leq 2$  | Ignore |             |
|   |  | $L > 5 \text{ mm}, W > 0.3 \text{ mm}$  |             | Not Allow   | Ignore |             |
| PS Bubble                                       | Visual/Film card   | $D \leq 0.2 \text{ mm}$   |             | Ignore      | Ignore |             |
|   |  | $0.2 \text{ mm} \leq D \leq 0.35 \text{ mm}$  |             | $N \leq 4$  | Ignore |             |
|   |  | $D > 0.35 \text{ mm}$   |             | Not Allow   | Ignore |             |
| Side Fragment                                   | Visual/Film card   | $X \leq 6 \text{ mm}, Y \leq 0.4 \text{ mm}$ , Do not affect the electrode circuit (Edge chipping)<br>$X \leq 1 \text{ mm}, Y \leq 1 \text{ mm}$ , Do not affect the electrode circuit( (Corner chipping)<br>Ignore |             |             |        |             |
|   |  |   |             |             |        |             |
| Remark  | 1. Appearance defect should not cause electrical defects;            |   |             |             |        |             |
|   | 2. Appearance defects should not cause dimensional accuracy problems |   |             |             |        |             |
|   | L=long W=wide D=point size N=Defects NO                              |   |             |             |        |             |

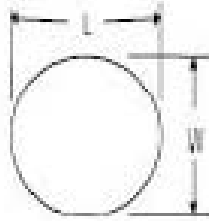


|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 37 of 39       |



$$L = L1 + L2$$

Line Defect



$$D = (L + W) / 2$$

Spot Defect

L=long W=wide D=point size



|           |                                  |               |                |
|-----------|----------------------------------|---------------|----------------|
| File Name | Specification For HINK 2.13" EPD | Module Number | HINK-E0213A217 |
| Version   | A0                               | Page Number   | 38 of 39       |

## 23.Barcode

### 23.1 Babel appearance



ABBBBBBBCC  
DDDEEEFGGG

### 23.2 QR scanned information (Total 28 code number+ 2 blank spaces)

A BBBBBBBB CC  DDD EEE F GGG  H III JJ KK  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

- ① A——The factory code
- ② BBBBBBBB——Module name of EPD
- ③ CC——Production workshop and line
- ④ DDD——Date of production
- ⑤ EEE——Production lot
- ⑥ F——Separator
- ⑦ GGG——FPL Lot
- ⑧ H——Product status
- ⑨ III——TFT、PS、EC.
- ⑩ JJ——IC
- ⑪ KK——Serial NO.
- blank spaces



|                  |   |                      |                       |
|------------------|---|----------------------|-----------------------|
| <b>File Name</b> | <b>Specification For HINK 2.13" EPD</b> | <b>Module Number</b> | <b>HINK-E0213A217</b> |
| <b>Version</b>   | <b>A0</b>                               | <b>Page Number</b>   | <b>39 of 39</b>       |

## 24. Packing

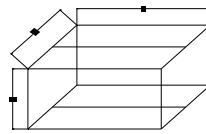
# Packing Spec

Sheet No :

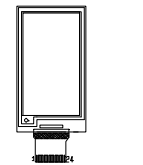
|  |         |               |      |             |     |    |      |     |
|--|---------|---------------|------|-------------|-----|----|------|-----|
|  | Part No | HINK-E0213A** | DATE | 2021. 3. 23 | VER | A0 | Page | 1-1 |
|--|---------|---------------|------|-------------|-----|----|------|-----|

一, Package Type: Box

|             |                       |
|-------------|-----------------------|
| Box No      | Holitech shipment box |
| Box size    | 515*322*170           |
| Containment | 450 PCS               |

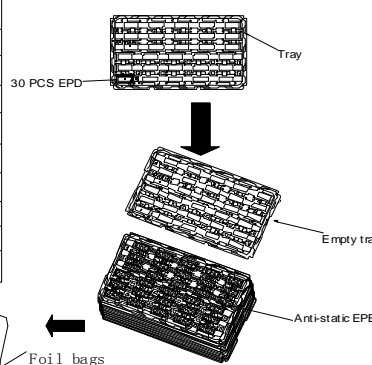


PRODUCT DRAWING



二, Inside package type: Plastic Tray  
Unit: mm

|                       |               |        |
|-----------------------|---------------|--------|
| Plastic Tray          | 465*280*15    | 13 pcs |
| Anti-static foil bags | 700*530*0.1   | 1 pcs  |
| EPE (inside)          | 405.5*250.4*2 | 12 pcs |
| EPE (Up-Down)         | 485*145*10    | 2 pcs  |
| EPE (Left-Right)      | 285*480*10    | 2 pcs  |
| EPE (Front-back)      | 310*145*10    | 2 pcs  |
| Chip board            | 500*306*5     | 2 pcs  |
| Quantity/tray         | 15 pcs        |        |
| Tray number/sheet     | 15+1 Sheets   |        |
| Box                   | 1             |        |



Step 1:

Material: Tray, EPE  
Put the product in to the tray and keep the display side up. Then put anti-static EPE in to each holes.

Step 2,

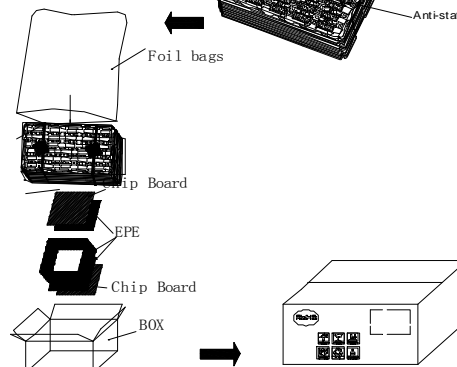
1), Must keep the angle 180 degree placed between the neighboring Plastic trays.  
2), There are 15 layers product, total 30\*15=450 pcs.  
3), An empty Plastic tray intersects put on the top of the plastic trays.

Step 5,

1), Seal the box with adhesive tapes .  
2), Paste the lable onto the exterior box, and the lable can't cover the safety , transfer and RoSH sign.

Step 3,

1), In each case, put 2 bags of desiccant, then seal the trays with adhesive tapes.  
2), Put the trays into foil bags.  
3), heat seal the foil bags.



Step 4,

1), First put a chip board on the bottom of the box, then placed the down EPE, the left - right and front -back EPE.  
2), Placed the sealed products into the box.  
3), The last placed the up EPE on the top of the trays, and place a chip board on it.

|        |             |         |             |         |             |
|--------|-------------|---------|-------------|---------|-------------|
| Design | X. Z. P     | Approve | Daisy       | Confirm | H.Z.P       |
| Date   | 2021. 3. 23 | Date    | 2021. 3. 23 | Date    | 2021. 3. 23 |