

## SPECIFICATIONS

**CUSTOMER** : CNO003

**SAMPLE CODE** : SMA800480T033IHC07

**MASS PRODUCTION CODE** : HMA800480T033IHC07

**SAMPLE VERSION** : 01

**SPECIFICATIONS EDITION** : 002

**DRAWING NO. (Ver.)** : LMD- HMA800480T033IHC07(Ver.002)

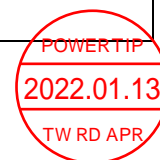
**PACKAGING NO. (Ver.)** : PKG- HMA800480T033IHC07(Ver.001)

**Customer Approved**

**Date:**

| Approved          | Checked         | Designer         |
|-------------------|-----------------|------------------|
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- ☐ Preliminary specification for design input
- ☒ Specification for sample approval



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## History of Version

[illegible]

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## 1. SPECIFICATIONS

### 1.1 Features

#### Hardware

|             |                   |   |
|-------------|-------------------|---|
| CPU         | RISC Processor    | STM32H750<br>480 MHz, ARM Cortex-M7                       |
| Memory      | RAM               | 16MB SDRAM  |
|             | Flash             | 32MB QSPI FLASH<br>8GB eMMC                               |
|             | External Storage  | 1 x Micro SD (max. 32G)                                   |
| Display     | Resolution        | 800 x 480   |
|             | Touch Panel       | Projected Capacitive Touch                                |
|             | Interface         | Parallel RGB 24 bits                                      |
|             | Viewing Direction | 6 O'clock ( Gray scale Inversion ) *1,<br>12 O'clock (*2) |
| I/O         | USB               | 1 x USB2.0 Device   |
|             | Serial            | 1 x UART, 1 x SPI, 1 x I2C, 1 x CAN                       |
|             | RMII              | 1 x Ethernet  |
| Power Input | DC                | 5V  |

#### Note:

1. Support Micro USB Power Supply.
2. Support USB Device Full Speed.
3. Support CAN Bus (Compatible with ISO11898-2).
4. Support Ethernet (10BASE-T / 100BASE-T).
5. Support RTC.

## 1.2 Mechanical Specifications

| Item              | Standard Value                 | Unit |
|-------------------|--------------------------------|------|
| Outline Dimension | 75.5(W) x 63.5(L) x 9.0(H) MAX | mm   |
| Active Area       | 108.0(W) x 64.8(L)             | mm   |

## 1.3 Absolute Maximum Ratings

Ta = 25°C

| Item                  | Symbol          | Condition | Min. | Max. | Unit |
|-----------------------|-----------------|-----------|------|------|------|
| Power Supply          | VIN             | —         | 4.5  | 6.0  | V    |
| Operating Temperature | T <sub>OP</sub> | —         | -20  | 70   | °C   |
| Storage Temperature   | T <sub>ST</sub> | —         | -30  | 80   | °C   |
| Humidity              | HD              | Ta=60 °C  | 10   | 90   | %RH  |

## 1.4 DC Electrical Characteristics

Ta = 25°C

| Item                                 | Sym<br>bol      | Condition | Min. | Typ. | Max. | Unit |
|--------------------------------------|-----------------|-----------|------|------|------|------|
| Power Supply Voltage                 | VIN             | -         | 4.5  | 5    | 5.5  | V    |
| Power Supply Voltage of RTC          | VBAT            | -         | 1.2  | -    | 3.6  | V    |
| Power Supply Current                 | IIN             | VIN = 5V  | -    | 730  | -    | mA   |
| Power Consumption of System          | PIN             | VIN = 5V  | -    | 3.65 | -    | W    |
| High-Level voltage of digital input  | V <sub>IH</sub> | -         | 2.3  | -    | -    | V    |
| Low-Level voltage of digital input   | V <sub>IL</sub> | -         | -    | -    | 0.9  | V    |
| High level voltage of digital output | V <sub>OH</sub> | -         | 2.4  | -    | -    | V    |
| Low level voltage of digital output  | V <sub>OL</sub> | -         | -    | -    | 0.4  | V    |

## 1.5 Optical Characteristics

### TFT LCD Module

VDD= 3.3 V, Ta=25°C

| Item  |        | Symbol | Condition                             | Min.                                  | Typ. | Max. | unit | -      |
|---|--------|--------|---------------------------------------|---------------------------------------|------|------|------|--------|
| Response time   | Tr+Tf  | 25℃    | -                                     | -                                     | 30   | 45   | ms   | -      |
| Viewing angle   | Top    | θY+    | CR ≥ 10                               |                                       | 60   | -    | Deg. | Note 4 |
|   | Bottom | θY-    |                                       |                                       | 60   | -    |      |        |
|   | Left   | θX-    |                                       |                                       | 60   | -    |      |        |
|   | Right  | θX+    |                                       |                                       | 60   | -    |      |        |
| Contrast ratio  |        | CR     | Ta = 25℃<br>θX , θY = 0°              | 500                                   | 600  | -    | -    | Note 3 |
| Color of CIE<br>Coordinate<br>( With B/L & T/P )                  | White  | X      |                                       | 0.24                                  | 0.29 | 0.34 | -    | Note1  |
|   |        | Y      |                                       | 0.26                                  | 0.31 | 0.36 |      |        |
|   | Red    | X      |                                       | 0.51                                  | 0.56 | 0.61 |      |        |
|   |        | Y      |                                       | 0.28                                  | 0.33 | 0.38 |      |        |
|   | Green  | X      |                                       | 0.29                                  | 0.34 | 0.39 |      |        |
|   |        | Y      |                                       | 0.54                                  | 0.59 | 0.64 |      |        |
|   | Blue   | X      |                                       | 0.08                                  | 0.13 | 0.18 |      |        |
|   |        | Y      |                                       | 0.03                                  | 0.08 | 0.13 |      |        |
| Average Brightness<br>Pattern=white display<br>(With LCD & T/P)*1 |        | IV     |                                       | VCC=5.0V<br>PWM="High"<br>(Duty=100%) | 680  | 850  | -    | cd/m2  |
| Uniformity<br>(With LCD & T/P)*2                                  |        | △B     | VCC=5.0V<br>PWM="High"<br>(Duty=100%) | 70                                    | -    | -    | %    | Note1  |

Note 1:

\*1 :  $\Delta B = B(\min) / B(\max) * 100\%$

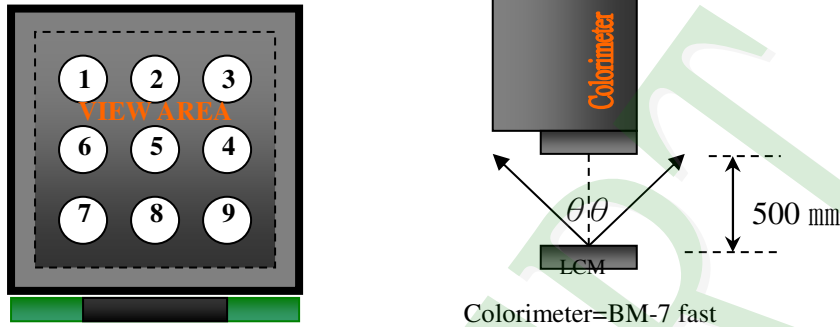
\*2 : Measurement Condition for Optical Characteristics:

a : Environment:  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  /  $60 \pm 20\%$  R.H , no wind , dark room below 10 Lux at typical lamp current and typical operating frequency.

b : Measurement Distance:  $500 \pm 50$  mm , ( $\theta = 0^{\circ}$ )

c : Equipment: TOPCON BM-7 fast , (field  $1^{\circ}$ ) , after 10 minutes operation.

d : The uncertainty of the C.I.E coordinate measurement  $\pm 0.01$  , Average Brightness  $\pm 4\%$



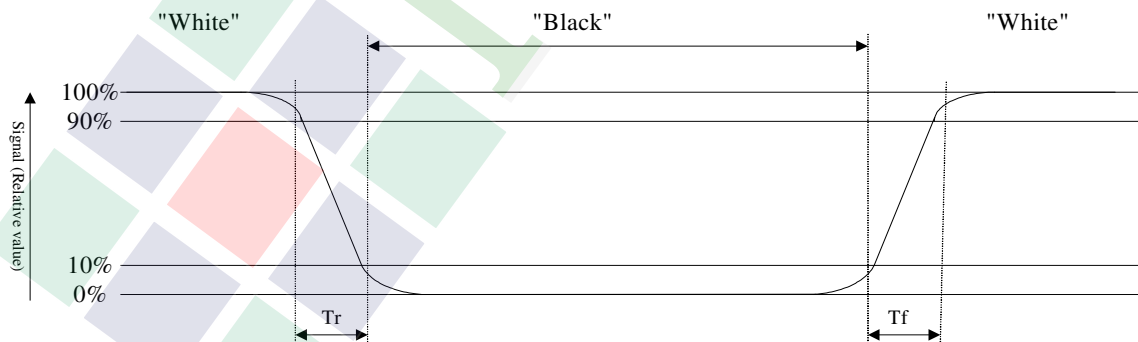
To be measured at the center area of panel with a viewing cone of  $1^{\circ}$  by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

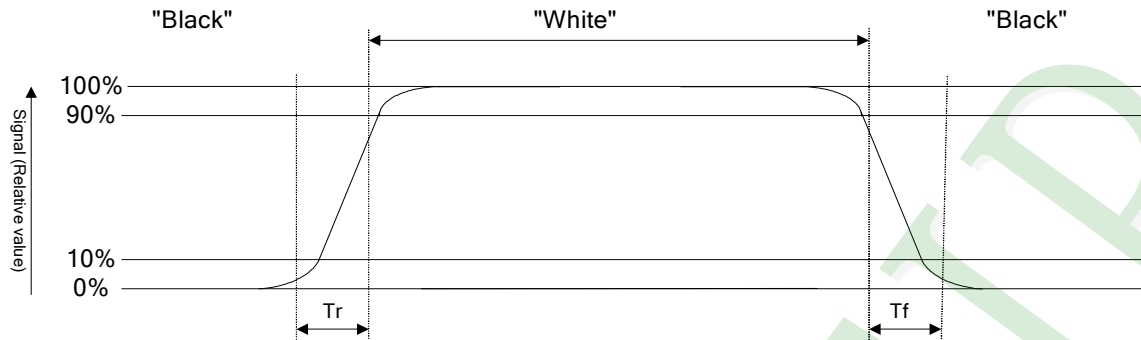
The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



## Normally Black



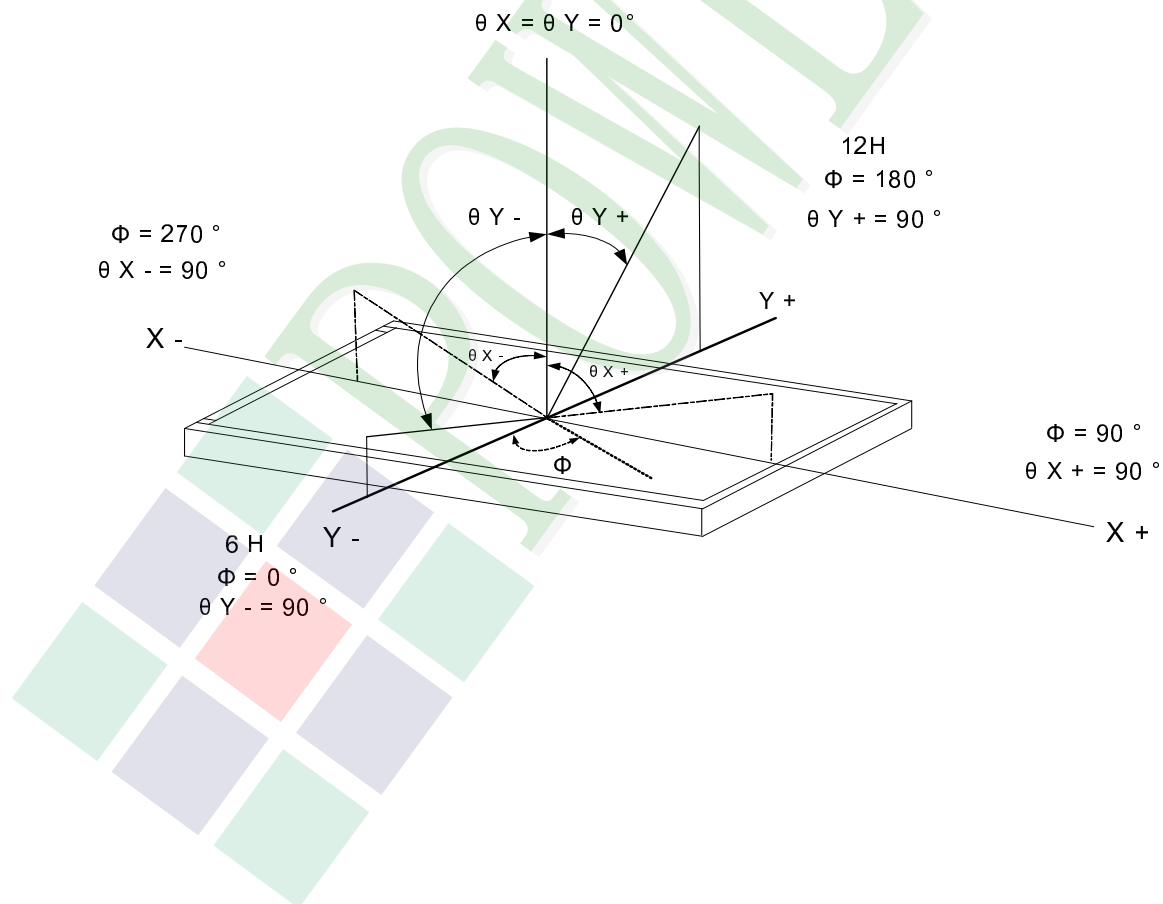
Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

Note4: Definition of viewing angle:

Refer to figure as below:





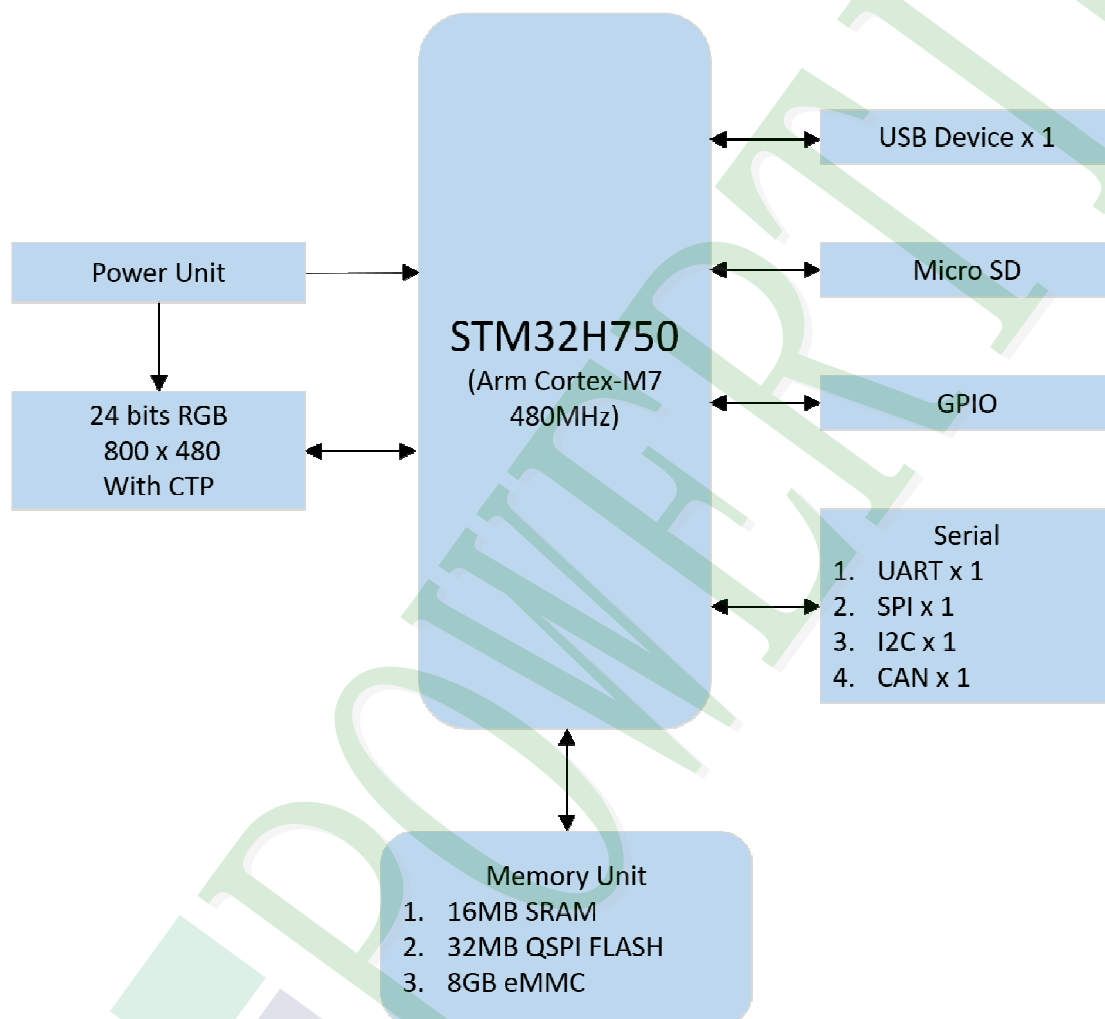
## 2. MODULE STRUCTURE

### 2.1 Counter Drawing

#### 2.1.1 Mechanical Diagram

\* See Appendix

#### 2.1.2 Block Diagram



## 2.2 Interface Pin Description

### JT1 --- JTAG (Wafer Pitch1.25mm 6pin)

| Pin No. | Symbol     | Type | DESCRIPTION                                      |
|---------|------------|------|--|
| 1       | PA15       | IO   | General Purpose I/O, Port A [15].                |
| 2       | PA8        | IO   | General Purpose I/O, Port A [8].                 |
| 3       | RESETINn   | I    | JTAG test reset.                                 |
| 4       | JTMS/SWDIO | I/O  | JTAG test mode select / Serial wire data in/out. |
| 5       | JTCK/SWCLK | I    | JTAG test clock / Serial wire clock.             |
| 6       | GND        | P    | Ground.  |

### J3 --- CAN Bus (Wafer Pitch1.25mm 2pin)

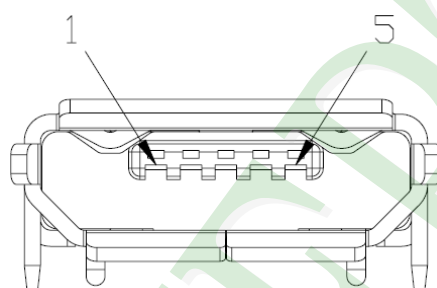
| Pin No. | Symbol | Type | DESCRIPTION              |
|---------|--------|------|--------------------------|
| 1       | CAN H  | DS   | High Level CAN Bus Line. |
| 2       | CAN L  | DS   | Low Level CAN Bus Line.  |

### J8 --- RTC (Wafer Pitch1.25mm 2pin)

| Pin No. | Symbol | Type | DESCRIPTION           |
|---------|--------|------|-----------------------|
| 1       | VBAT   | P    | Power Supply for RTC. |
| 2       | GND    | P    | Ground.               |

#### J4 --- USB 2.0 Device MICRO USB

| Pin No. | Symbol | Type | DESCRIPTION     |
|---------|--------|------|-----------------|
| 1       | VBUS5V | P    | +5.0V           |
| 2       | D-     | DS   | Data – (Data M) |
| 3       | D+     | DS   | Data + (Data P) |
| 4       | ID     | -    | Not Used.       |
| 5       | GND    | P    | Ground          |



#### J6 --- Ethernet (Wafer Pitch1.25mm 10pin)

| Pin No. | Symbol   | Type | DESCRIPTION                                |
|---------|----------|------|--|
| 1       | GND      | P    | Ground.                                    |
| 2       | GND      | P    | Ground.                                    |
| 3       | LED_ACK  | O    | Link Speed LED Indication. (See Note 1)    |
| 4       | RXD-     | DS   | Receive Negative.                          |
| 5       | RXD+     | DS   | Receive Positive.                          |
| 6       | TXD-     | DS   | Transmit Negative.                         |
| 7       | TXD+     | DS   | Transmit Positive.                         |
| 8       | LED_LINK | O    | Link Activity LED Indication. (See Note 2) |
| 9       | GND      | P    | Ground.                                    |
| 10      | VDD3V3   | P    | Power Supply (+3.3V).                      |

Note 1: This pin is driven active when the operating speed is 100Mbps. It is inactive when the operating speed is 10Mbps or during line isolation.

Note 2: This pin is driven active when a valid link is detected and blinks when activity is detected.

**J10 --- P05D00071-01 Interface Reserved (Pitch 0.5mm 30pin Double contact)**

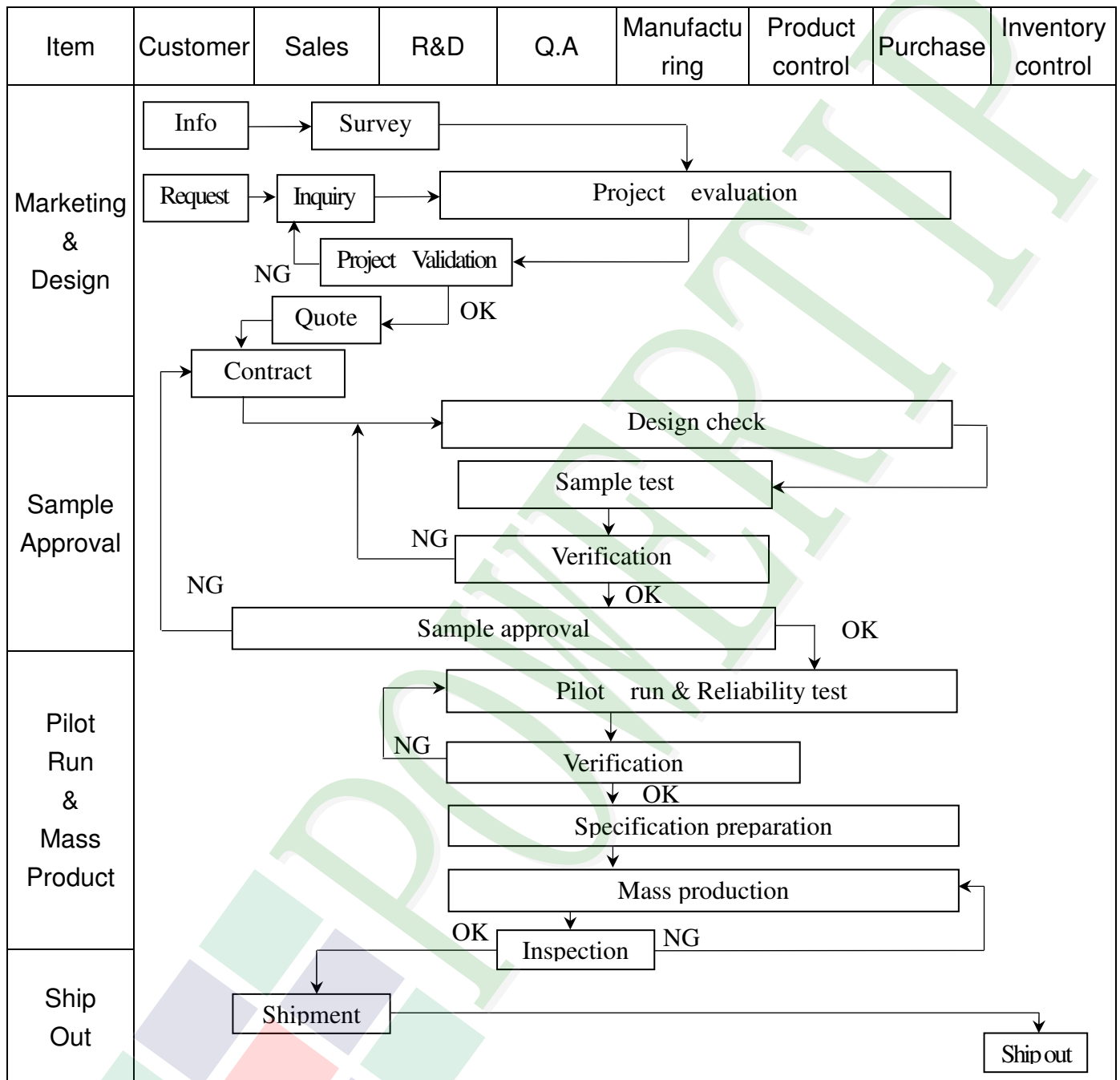
| Pin No. | Symbol   | Type | DESCRIPTION                      |
|---------|----------|------|----------------------------------|
| 1       | GND      | P    | Ground.                          |
| 2       | PG3      | IO   | General Purpose I/O, Port G [3]. |
| 3       | PB2      | IO   | General Purpose I/O, Port B [2]. |
| 4       | NC       | -    | Not Used.                        |
| 5       | GND      | P    | Ground.                          |
| 6       | I2C_CLK  | IO   | I2C2 CLK.                        |
| 7       | GND      | P    | Ground.                          |
| 8       | I2C_DAT  | IO   | I2C2 DAT.                        |
| 9       | GND      | P    | Ground.                          |
| 10      | SPI_CLK  | IO   | SPI1 CLK.                        |
| 11      | GND      | P    | Ground.                          |
| 12      | SPI_MISO | IO   | SPI1 MISO.                       |
| 13      | SPI_MOSI | IO   | SPI1 MOSI.                       |
| 14      | GND      | P    | Ground.                          |
| 15      | SPI_CS0  | IO   | SPI1 CS0.                        |
| 16      | GND      | P    | Ground.                          |
| 17      | PH6      | IO   | General Purpose I/O, Port H [6]. |
| 18      | PH7      | IO   | General Purpose I/O, Port H [7]. |
| 19      | PH4      | IO   | General Purpose I/O, Port H [4]. |
| 20      | PB1      | IO   | General Purpose I/O, Port B [1]. |
| 21      | GND      | P    | Ground.                          |
| 22      | RESETINn | I    | System Reset, Active Low.        |
| 23      | UART_RXD | IO   | USART2 RX.                       |
| 24      | UART_TXD | IO   | USART2 TX.                       |
| 25      | GND      | P    | Ground.                          |
| 26      | VIN      | P    | Power Supply (+5.0V).            |
| 27      | VIN      | P    | Power Supply (+5.0V).            |
| 28      | UART_CTS | IO   | USART2 CTS.                      |
| 29      | UART_RTS | IO   | USART2 RTS.                      |
| 30      | GND      | P    | Ground.                          |

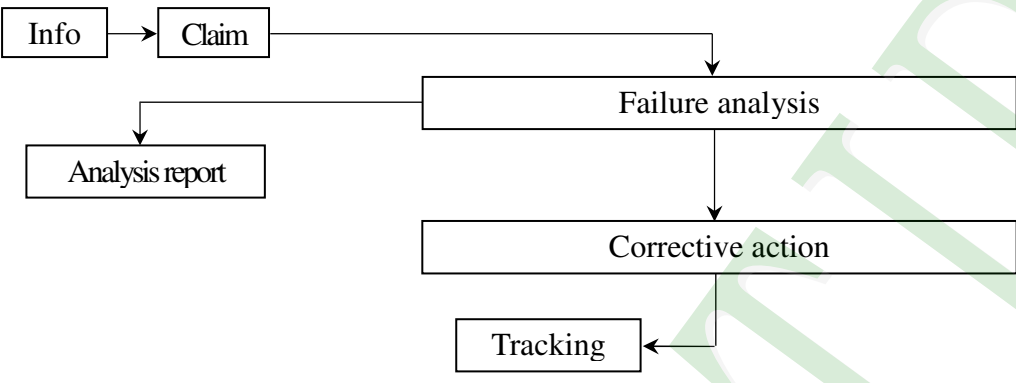
**J13 --- Power Input (Wafer Pitch1.25mm 4pin)**

| Pin No. | Symbol | Type | DESCRIPTION |
|---------|--------|------|-------------|
| 1       | VBUS5V | P    | +5.0V       |
| 2       | VBUS5V | P    | +5.0V       |
| 3       | GND    | P    | Ground      |
| 4       | GND    | P    | Ground      |

### 3. QUALITY ASSURANCE SYSTEM

#### 3.1 Quality Assurance Flow Chart



| Item          | Customer  | Sales | R&D | Q.A | Manufacturing   | Product control | Purchase | Inventory control |
|---------------|---|-------|-----|-----|---|-----------------|----------|-------------------|
| Sales Service |  <pre> graph TD     Info[Info] --&gt; Claim[Claim]     Claim --&gt; Failure[Failure analysis]     Failure --&gt; Report[Analysis report]     Failure --&gt; Action[Corrective action]     Action --&gt; Tracking[Tracking]           </pre> |       |     |     |   |                 |          |                   |
| Q.A Activity  | 1. ISO 9001 Maintenance Activities<br>3. Equipment calibration<br>5. Standardization Management   |       |     |     | 2. Process improvement proposal<br>4. Education And Training Activities |                 |          |                   |

## 4. RELIABILITY TEST

### 4.1 Reliability Test Condition

| NO.                 | TEST ITEM                                     | TEST CONDITION   |                     |                  |          |     |             |    |            |    |          |    |
|---------------------|---|--|---------------------|------------------|----------|-----|-------------|----|------------|----|----------|----|
| 1                   | High Temperature Storage Test                 | Keep in +80 ±2℃ 96 hrs<br>Surrounding temperature, then storage at normal condition 4hrs.  |                     |                  |          |     |             |    |            |    |          |    |
| 2                   | Low Temperature Storage Test                  | Keep in -30 ±2℃ 96 hrs<br>Surrounding temperature, then storage at normal condition 4hrs.  |                     |                  |          |     |             |    |            |    |          |    |
| 3                   | High Temperature / High Humidity Storage Test | Keep in +60℃ / 90% R.H duration for 96 hrs<br>Surrounding temperature, then storage at normal condition 4hrs.<br>(Excluding the polarizer)   |                     |                  |          |     |             |    |            |    |          |    |
| 4                   | Temperature Cycling Storage Test              | <div><div><div>-30℃ → +25℃ → +80℃ → +25℃</div><div>(30mins) (5mins) (30mins) (5mins)</div><div>← 10 Cycle →</div></div><div>Surrounding temperature, then storage at normal condition 4hrs.</div></div>  |                     |                  |          |     |             |    |            |    |          |    |
| 5                   | Vibration Test (Packaged)                     | 1. Sine wave 10~55 Hz frequency (1 min)<br>2. The amplitude of vibration :1. 5 mm<br>3. Each direction (X 、 Y 、 Z) duration for 2 Hrs  |                     |                  |          |     |             |    |            |    |          |    |
| 6                   | Drop Test (Packaged)                          | <table><tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table> <div>Drop direction :※1 corner / 3 edges / 6 sides each 1times</div> | Packing Weight (Kg) | Drop Height (cm) | 0 ~ 45.4 | 122 | 45.4 ~ 90.8 | 76 | 90.8 ~ 454 | 61 | Over 454 | 46 |
| Packing Weight (Kg) | Drop Height (cm)                              |  |                     |                  |          |     |             |    |            |    |          |    |
| 0 ~ 45.4            | 122   |  |                     |                  |          |     |             |    |            |    |          |    |
| 45.4 ~ 90.8         | 76  |  |                     |                  |          |     |             |    |            |    |          |    |
| 90.8 ~ 454          | 61  |  |                     |                  |          |     |             |    |            |    |          |    |
| Over 454            | 46  |  |                     |                  |          |     |             |    |            |    |          |    |



## 5. PRECAUTION RELATING PRODUCT HANDLING

### 5.1 SAFETY

- 5.1.1 If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.
- 5.1.2 If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

### 5.2 HANDLING

- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI – When working with the module, be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4 The polarizing plate of the display is very fragile. So, please handle it very carefully, do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass, tweezers, etc.)
- 5.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- 5.2.6 Do not touch the display area with bare hands, this will stain the display area.
- 5.2.7 Do not use ketonic solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.
- 5.2.8 To control temperature and time of soldering is  $320 \pm 10^{\circ}\text{C}$  and 3 ~ 5 sec.
- 5.2.9 To avoid liquid (include organic solvent) stained on LCM.
- 5.2.10 Caution! (LCM products with Capacitive Touch Panel)  
Strong EMI-sources such as switch-mode power supplies (SPS) can lead to touch malfunction (e.g., ghost-touches). Therefore, the touch needs to be thoroughly tested inside the target application.
- 5.2.11 CAUTION: Continuously displaying same static image will result in high possibility of image sticking/image burn-in effect due to TFT panel characteristic.
- 5.2.12 Double-sided tape designed to be attached with the customer's mechanical device, please follow up the rules and regulations published by the original manufacturer of double-side tape for the attachment operation.

### 5.3 STORAGE

- 5.3.1 Store the panel or module in a dark place where the temperature is  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and the humidity is below 65% RH.
- 5.3.2 Do not place the module near organics solvents or corrosive gases.
- 5.3.3 Do not crush, shake, or jolt the module.

### 5.4 TERMS OF WARRANTY

- 5.4.1 Applicable warrant period  
The period is within thirteen months since the date of shipping out under normal using and storage conditions.
- 5.4.2 Unaccepted responsibility  
This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in nuclear power control equipment, aerospace equipment, fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.



|               |                        |   |         |        |         |
|---------------|------------------------|---|---------|--------|---------|
| Ver.001       |                        | <div>LCM包裝規格書</div> <div>LCM Packaging Specifications</div> | Approve | Check  | Contact |
| Documents NO. | PKG-HMA800480T033IHC07 |   | Marcus  | Bright | Nini    |

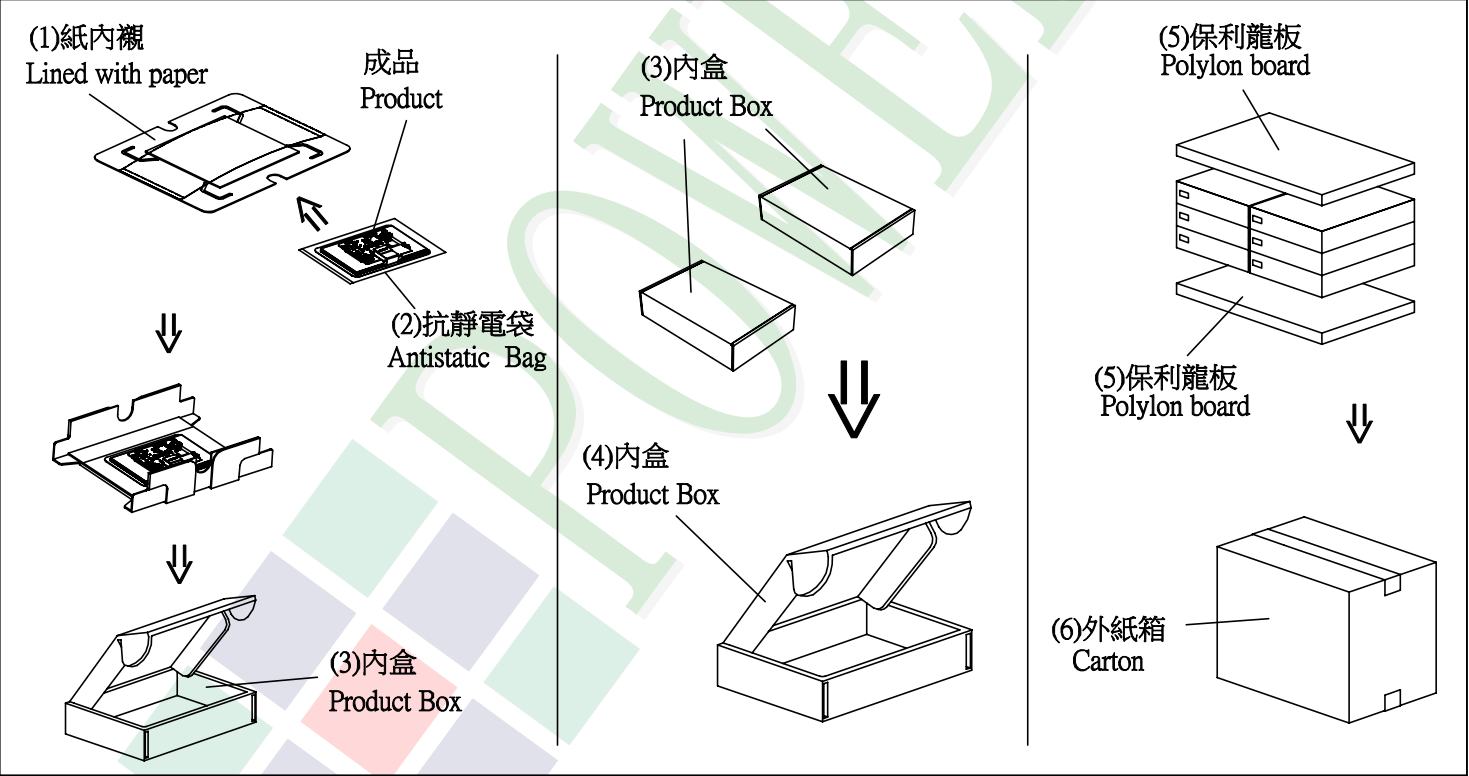
1.包裝材料規格表 (Packaging Material) : (per carton)

| No. | Item                    | Model              | Dimensions (mm) | 1Pcs Weight | Quantity | Total Weight |
|-----|-------------------------|--------------------|-----------------|-------------|----------|--------------|
| 1   | 成品 (Product)            | HMA800480T033IHC07 | 131 X 90.5      | 0.112       | 12       | 1.35         |
| 2   | 紙內襯 (1)Lined with paper | BX00000000132      | 347 X 262       | 0.07        | 12       | 0.84         |
| 3   | 抗靜電袋(2)Antistatic Bag   | BAG240170ARABA     | 170 X 240       | 0.005       | 12       | 0.06         |
| 4   | 內盒(3)Product Box        | BX00000000131      | 258 X 175 X 58  | 0.11        | 12       | 1.32         |
| 5   | 內盒(4)Product Box        | BX36627063ABBA     | 383 X 270 X 66  | 0.2         | 6        | 1.2          |
| 6   | 保利龍板(5)Polylon board    | OTPLB00PL08ABA     | 550 X 393 X 20  | 0.0284      | 2        | 0.0568       |
| 7   | 外紙箱(6)Carton            | BX57041027CCBA     | 570 X 410 X 265 | 1.4208      | 1        | 1.4208       |
| 8   |                         |                    |                 |             |          |              |
| 9   |                         |                    |                 |             |          |              |
| 10  |                         |                    |                 |             |          |              |
| 11  |                         |                    |                 |             |          |              |
| 12  |                         |                    |                 |             |          |              |

2.一整箱總重量 (Total LCD Weight in carton ) : 6.25 Kg±10%

3.單箱數量規格表 (Packaging Specifications and Quantity) :

|   |   |                   |   |   |    |
|---|---|-------------------|---|---|----|
| (1)LCM quantity per small box : no per lined with paper   | 1 | x no of small box | 1 | = | 1  |
| (2)Total LCM quantity in big box : quantity per small box | 1 | x no of big boxes | 2 | = | 2  |
| (3)Total LCM quantity in carton : quantity per big box    | 2 | x no of cartons   | 6 | = | 12 |



特 記 事 項 (REMARK)

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|