



| | | | |
|----------------|--|----------|------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 1/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

TO :

Date : Nov., 24, 2008

Mobile Phone: 13428909046 (Mr.qiu)

HannStar Product Specification **(Preliminary)**

8.4" Color TFT-LCD Module

Model : HSD084ISN1-A**

Note:

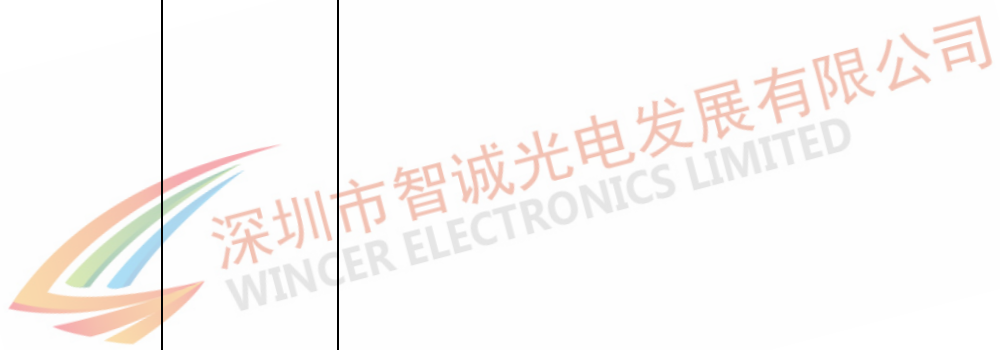
1. Please contact HannStar Display Corp. before designing your product based on this module specification.
2. The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by HannStar for any intellectual property claims or other problems that may result from application based on the module described herein.
3. The mark "***" of Model means sub-model code.



| | | | |
|----------------|--|----------|------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 2/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

Record of Revisions

| Rev. | Date | Sub-Model | Description of change |
|------|---------------|-----------|---|
| 1.0 | Nov, 12, 2008 | - | Preliminary Product Specification was first released. |
| 1.1 | Nov, 24, 2008 | - | Modify FPC location (P22). |
| | | - | |
| | | - | |
| | | - | |
| | | - | |

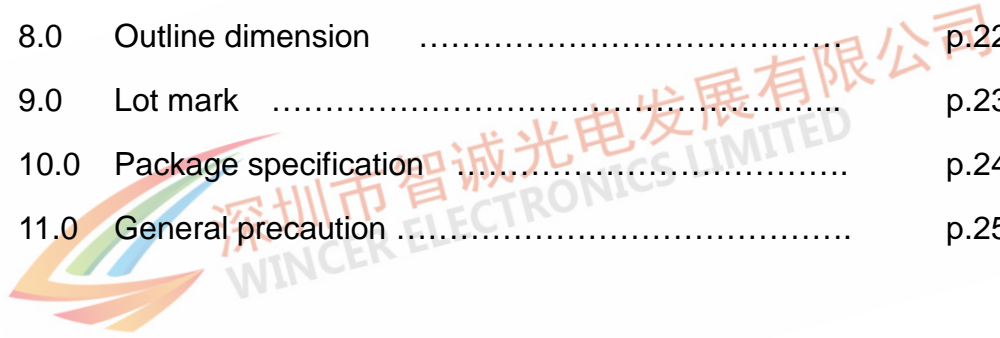




| | | | |
|----------------|--|----------|------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 3/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

Contents

| | | |
|------|----------------------------------|------|
| 1.0 | General description | p.4 |
| 2.0 | Absolute maximum ratings | p.5 |
| 3.0 | Optical characteristics | p.6 |
| 4.0 | Block diagram | p.10 |
| 5.0 | Interface pin connection | p.11 |
| 6.0 | Electrical characteristics | p.13 |
| 7.0 | Reliability test items..... | p.21 |
| 8.0 | Outline dimension | p.22 |
| 9.0 | Lot mark | p.23 |
| 10.0 | Package specification | p.24 |
| 11.0 | General precaution | p.25 |



| | | | |
|----------------|--|----------|------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 4/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

1.0 GENERAL DESCRIPTION

1.1 Introduction

HannStar Display model HSD084ISN1-A is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 8.4 (4:3) inch diagonally measured active display area with SVGA (800 horizontal by 600 vertical pixel) resolution.

1.2 Features

- 8.4 (4:3 diagonal) inch configuration
- 6 bits R/G/B + 2 bits FRC driver with 1channel TTL interface
- RoHS and Halogen-Free Compliance

1.3 Applications

- Digital Photo frame
- Multimedia applications and Others AV system

1.4 General information

| Item | Specification | Unit | |
|-------------------|-------------------------------|----------------|---|
| Outline Dimension | 189.75 x 149.40 x 5.00 (Typ.) | mm | |
| Display area | 170.40(H) x 127.80(V) | mm | |
| Number of Pixel | 800 RGB (H) x 600(V) | pixels | |
| Pixel pitch | 0.213(H) x 0.213(V) | mm | |
| Pixel arrangement | RGB Vertical stripe | | |
| Display mode | Normally white | | |
| Surface treatment | Antiglare, Hard-Coating (3H) | | |
| Weight | (230)(Typ.) | g | |
| Back-light | LED Side-light type | | |
| Power Consumption | Logic System | (0.5) W (Max) | W |
| | B/L System | (1.9) W (Max.) | W |

1.5 Mechanical Information

| Item | Min. | Typ. | Max. | Unit | |
|---------------------------|---------------|--------|--------|--------|----|
| Module Size | Horizontal(H) | 189.45 | 189.75 | 190.05 | mm |
| | Vertical(V) | 149.10 | 149.40 | 149.70 | mm |
| | Depth(D) | 4.70 | 5.00 | 5.30 | mm |
| Weight (Without inverter) | --- | (230) | --- | g | |

| | | | |
|----------------|--|----------|------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 5/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

| Item | Symbol | Min. | Max. | Unit | Note |
|--------------------------|------------------|------|----------------------|------|--------|
| Power supply voltage | V _{CC} | -0.3 | 5.0 | V | GND=0 |
| | AV _{DD} | -0.5 | 15 | V | AGND=0 |
| | V _{COM} | 0 | 6 | V | |
| Logic Signal Input Level | V _I | -0.3 | V _{CC} +0.3 | V | |

2.1.2 Back-Light Unit

| Item | Symbol | Typ. | Max. | Unit | Note |
|-------------|----------------|------|------|------|-----------|
| LED current | I _L | 180 | — | mA | (1)(2)(3) |
| LED voltage | V _L | 10.5 | — | V | (1)(2)(3) |

Note

- (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.
- (2) Ta =25±2°C
- (3) Test Condition: LED current 180 mA. The LED lifetime could be decreased if operating IL is larger than 180mA.

2.2 Environment Absolute Rating

| Item | Symbol | Min. | Max. | Unit | Note |
|-----------------------|------------------|------|------|------|------|
| Operating Temperature | T _{opa} | -20 | 70 | °C | |
| Storage Temperature | T _{stg} | -30 | 80 | °C | |

| | | | |
|----------------|--|----------|------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 6/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit | Note | |
|------------------------------|------------|----------------------|---------|---------|---------|-------------------|------------------------------|--------|
| Contrast | CR | Normal viewing angle | (500) | (600) | — | | (1)(2) | |
| Response time | Rising | | T_R | — | (4) | (8) | msec | (1)(3) |
| | Falling | | T_F | — | (12) | (24) | | |
| White luminance (Center) | Y_L | | (200) | (250) | — | cd/m ² | (1)(4)(7) ($I_L=180mA$) | |
| Color chromaticity (CIE1931) | White | | W_x | (0.260) | (0.310) | (0.360) | | (1)(4) |
| | | W_y | (0.280) | (0.330) | (0.380) | | | |
| Viewing angle | Hor. | θ_L | (65) | (75) | — | | | |
| | | θ_R | (65) | (75) | — | | | |
| | Ver. | θ_U | (50) | (60) | — | | | |
| | | θ_D | (60) | (70) | — | | | |
| Brightness uniformity | B_{UNI} | $\theta=0$ | 70 | — | — | % | (5)(7) | |
| Optima View Direction | 6 O' clock | | | | | | (6) | |

3.2 Measuring Condition

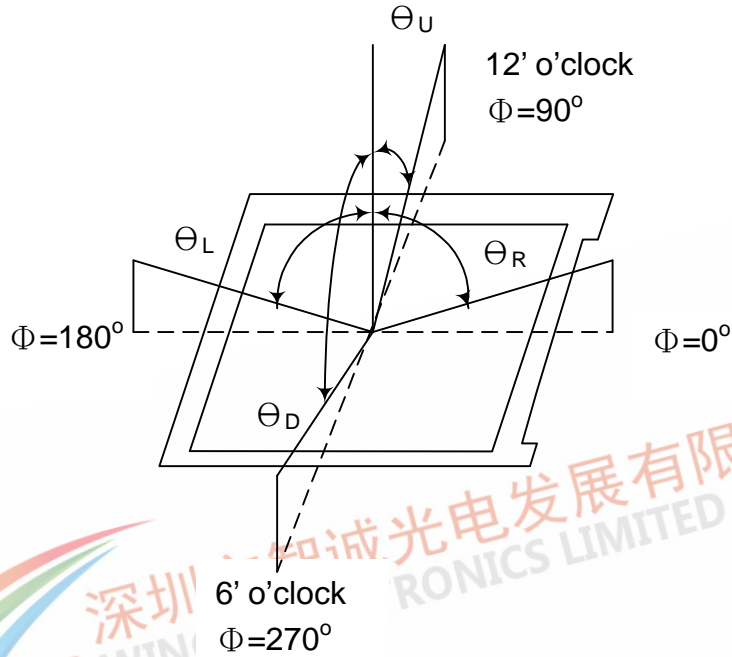
- Measuring surrounding : dark room
- LED current I_L : 180mA
- Ambient temperature : 25±2°C
- 15min. warm-up time.

3.3 Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.
- Measuring spot size : 20 ~ 21 m

| | | | |
|----------------|--|----------|------|
| Document Title | HSD0841SN1-A Preliminary Specification | Page No. | 7/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

Note (1) Definition of Viewing Angle :

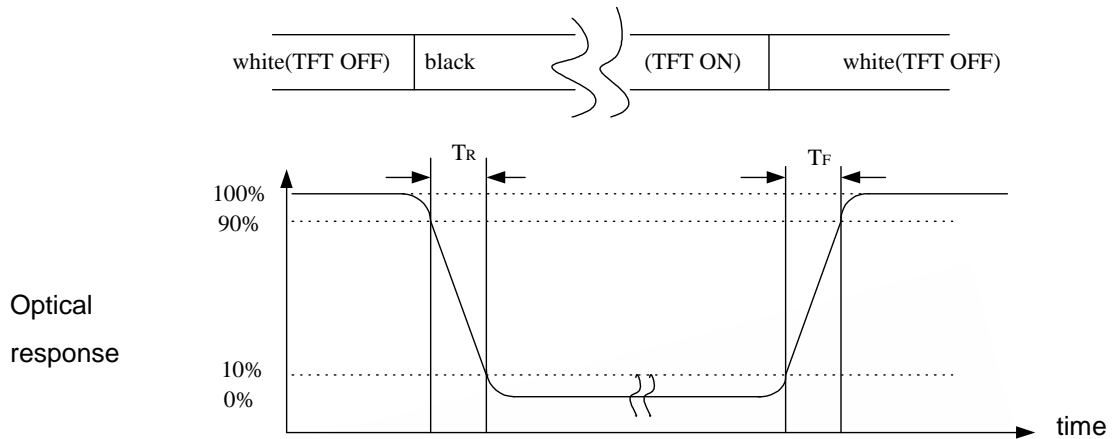


Note (2) Definition of Contrast Ratio(CR) :
measured at the center point of panel

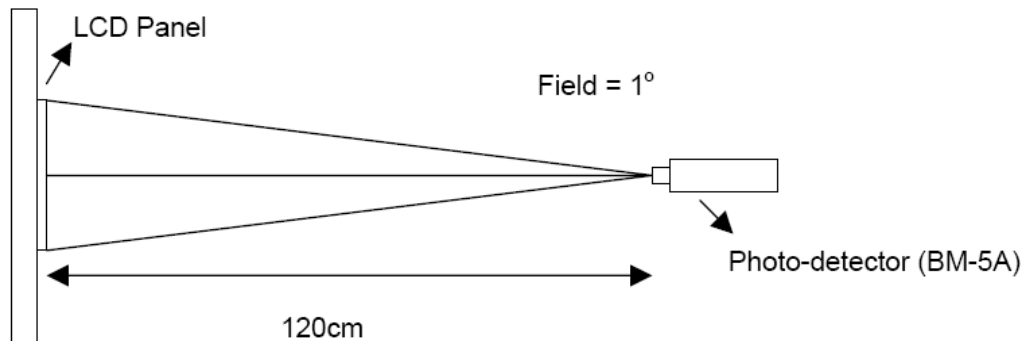
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

| | | | |
|----------------|--|----------|------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 8/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

Note (3) Definition of Response Time : Sum of T_R and T_F

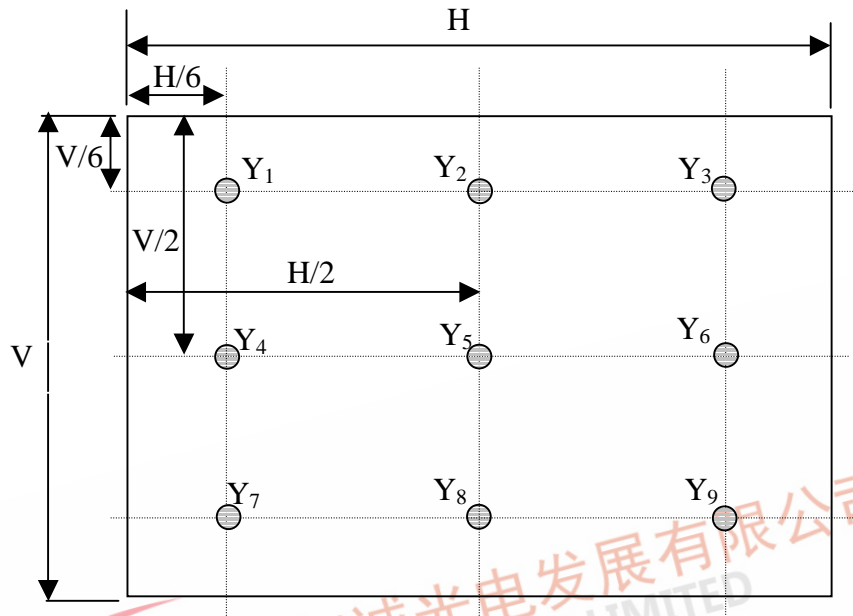


Note (4) Definition of optical measurement setup



| | | | |
|----------------|--|----------|------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 9/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

Note (5) Definition of brightness uniformity



$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 9 points})}{(\text{Max Luminance of 9 points})} \times 100\%$$

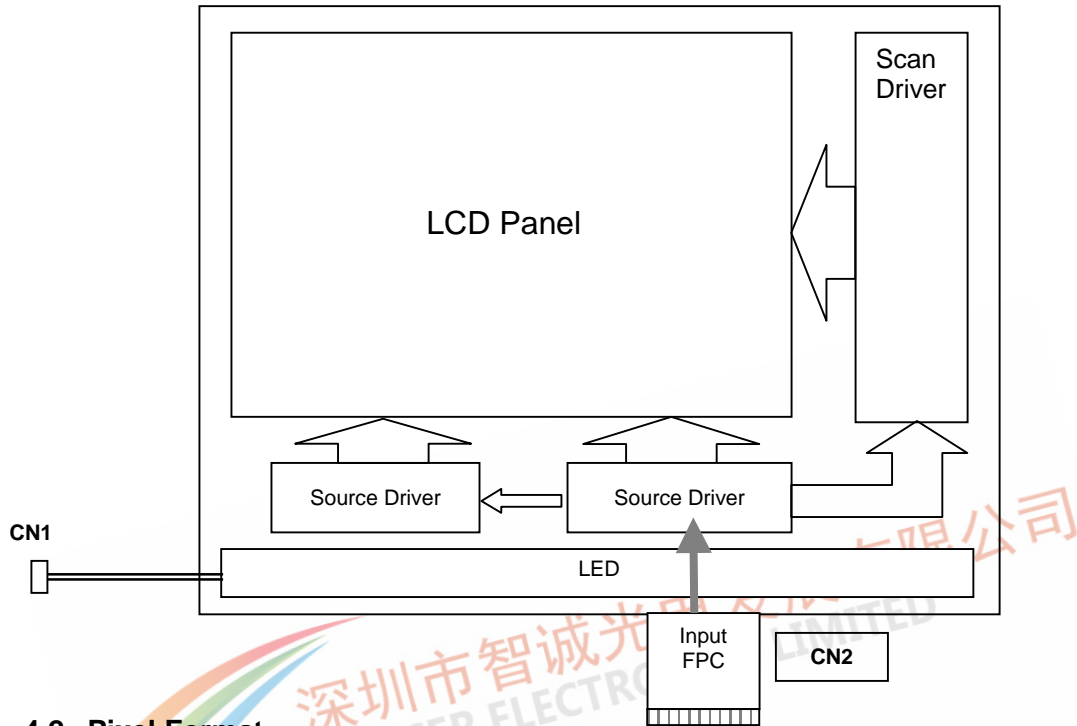
Note (6) Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.)

Note (7) Measured at the brightness of the panel when all terminals of LCD panel are electrically open.

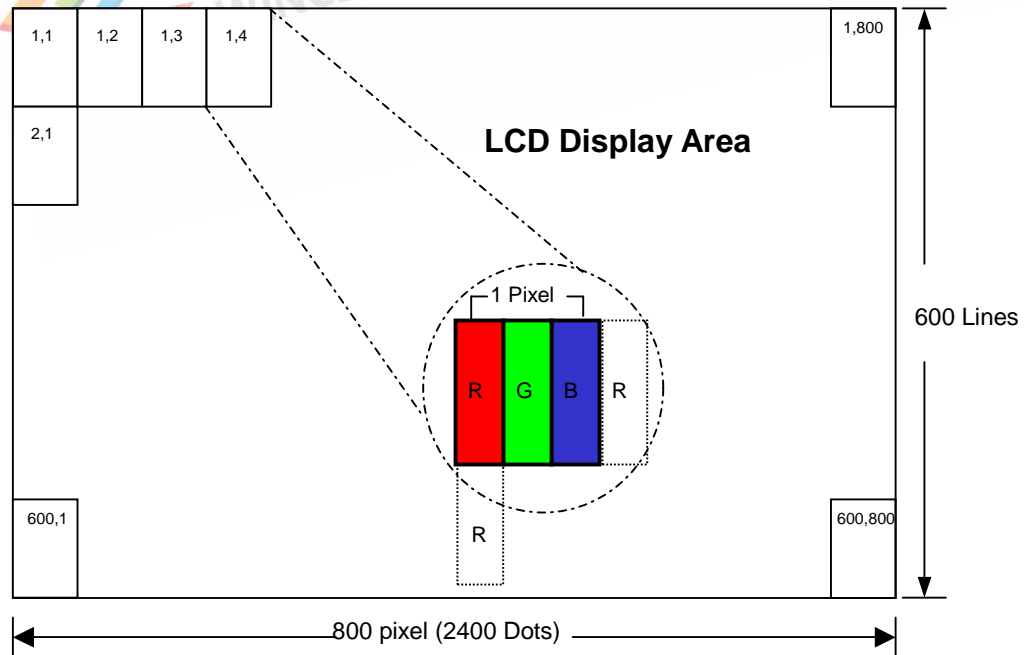
| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 10/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

4.0 BLOCK DIAGRAM

4.1 TFT LCD Module



4.2 Pixel Format



| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 11/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

5.0 INTERFACE PIN CONNECTION

5.1 TFT LCD Module

CN2 (Input signal):

FPC Down Connector, (FH28-60S-0.5SH (HIROSE or equivalent), 60pin, pitch = 0.5mm)

| Terminal no. | Symbol | I/O | Function |
|--------------|--------|-----|---|
| 1 | AGND | P | Analog Ground |
| 2 | AVDD | P | Analog Power |
| 3 | VCC | P | Digital Power |
| 4 | R0 | I | Data Input(LSB) |
| 5 | R1 | I | Data Input |
| 6 | R2 | I | Data Input |
| 7 | R3 | I | Data Input |
| 8 | R4 | I | Data Input |
| 9 | R5 | I | Data Input |
| 10 | R6 | I | Data Input |
| 11 | R7 | I | Data Input(MSB) |
| 12 | G0 | I | Data Input(LSB) |
| 13 | G1 | I | Data Input |
| 14 | G2 | I | Data Input |
| 15 | G3 | I | Data Input |
| 16 | G4 | I | Data Input |
| 17 | G5 | I | Data Input |
| 18 | G6 | I | Data Input |
| 19 | G7 | I | Data Input(MSB) |
| 20 | B0 | I | Data Input(LSB) |
| 21 | B1 | I | Data Input |
| 22 | B2 | I | Data Input |
| 23 | B3 | I | Data Input |
| 24 | B4 | I | Data Input |
| 25 | B5 | I | Data Input |
| 26 | B6 | I | Data Input |
| 27 | B7 | I | Data Input(MSB) |
| 28 | DCLK | I | Clock input |
| 29 | DE | I | Data Enable signal |
| 30 | HSD | I | Horizontal sync input. Negative polarity |
| 31 | VSD | I | Vertical sync input. Negative polarity |
| 32 | MODE3 | I | DE/SYNC mode select .normally pull high H:DE mode .L:HSD/VSD mode |
| 33 | RSTB | I | Global reset pin. Active low to enter reset state. suggest to connecting with an RC reset circuit for stability .normally pull high. |
| 34 | STBYB | I | Standby mode, normally pull high STBYB="1",normal operation STBYB="0",timming control , source driver will turn off, all output are high-Z |
| 35 | SHLR | I | Source right or left sequence control .SHLR="L", shift left: last data=S1<-S2...S1200=first data ; SHLR="H", shift right :first data=S1->S2...S1200=last data |

| | | | |
|----------------|--|----------|-------|
| Document Title | HSD0841SN1-A Preliminary Specification | Page No. | 12/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

| Terminal no. | Symbol | I/O | Function |
|--------------|--------|-----|--|
| 36 | VCC | P | Digital Power |
| 37 | UPDN | I | gate up or down scan control. UPDN="L" , DOWN shift : G1->G2...->G480 ; UPDN="H", up shift: G1<-G2...<-G480 |
| 38 | GND | P | Digital Ground |
| 39 | AGND | P | Analog Ground |
| 40 | AVDD | P | Analog Power |
| 41 | VCOM | I | For external VCOM DC input(Optional) |
| 42 | DITH | I | Dithering setting DITH="H" 6bit resolution (last 2 bits of input data truncated) (default setting) DITH="L" 8bit resolution |
| 43 | NC | - | Not connect |
| 44 | NC | - | Not connect |
| 45 | V10 | P | Gamma correction voltage reference |
| 46 | V9 | P | Gamma correction voltage reference |
| 47 | V8 | P | Gamma correction voltage reference |
| 48 | V7 | P | Gamma correction voltage reference |
| 49 | V6 | P | Gamma correction voltage reference |
| 50 | V5 | P | Gamma correction voltage reference |
| 51 | V4 | P | Gamma correction voltage reference |
| 52 | V3 | P | Gamma correction voltage reference |
| 53 | V2 | P | Gamma correction voltage reference |
| 54 | V1 | P | Gamma correction voltage reference |
| 55 | NC | - | Not connect |
| 56 | VGH | P | Positive Power for TFT |
| 57 | VCC | P | Digital Power |
| 58 | VGL | P | Negative Power for TFT |
| 59 | GND | P | Digital Ground |
| 60 | NC | - | Not connect |

5.2 Back-Light Unit

CN1 LED Power Source (**BHSR-02VS-1**) or equivalent

Mating Connector: (**SBHT-002T-P0.5**) or equivalent

| Terminal no. | Symbol | Function |
|--------------|--------|---------------------------------|
| 1 | VL | LED power supply (high voltage) |
| 2 | GL | LED power supply (low voltage) |

| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 13/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

6.0 ELECTRICAL CHARACTERISTICS

6.1 TFT LCD Module

| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|-------------------------|--------------------|---------------------|------|-----------------------|------|--------------------------------|
| Supply Voltage | V _{CC} | 2.7 | 3.0 | 3.5 | V | |
| | V _{GH} | 14 | 15 | 16 | V | |
| | V _{GL} | -8 | -7 | -6 | V | |
| | AV _{DD} | 9.85 | 10.0 | 10.15 | V | |
| VCOM | V _{COMin} | | TBD | | V | |
| Input signal voltage | V _{iH} | 0.7 V _{CC} | - | V _{CC} | V | Note (1) |
| | V _{iL} | 0 | - | 0.3 V _{CC} | V | |
| Current of power supply | I _{CC} | - | TBD | - | mA | V _{CC} = 3.0V |
| | I _{ADD} | - | TBD | - | mA | AV _{DD} = 10 V(Black) |
| | I _{GH} | - | TBD | - | mA | V _{GH} = 15 V |
| | I _{GL} | - | TBD | - | mA | V _{GL} = -9 V |
| Input level of V1~V5 | V _X | AV _{DD} /2 | - | AV _{DD} -0.1 | | |
| Input level of V6~V10 | V _X | 0.1 | - | AV _{DD} /2 | | |

Note (1): HSYNC , VSYNC , DE , Digital Data

Note (2): Be sure to apply the power voltage as the power sequence spec.

Note (3): DGND=AGND=0V

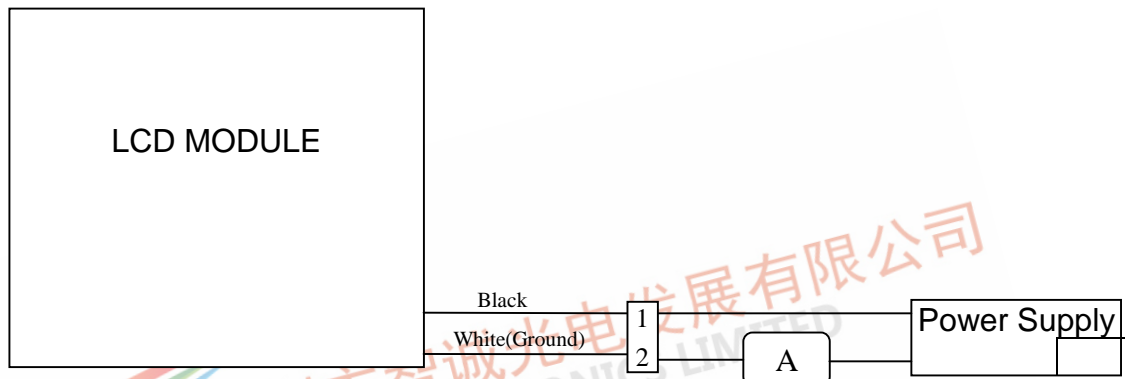
| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 14/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

6.2 Back-Light Unit

The back-light system is an edge-lighting type with 27 LED.

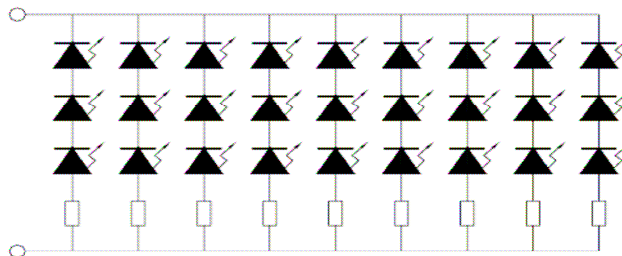
The characteristics of the LED is shown in the following tables.

| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|-------------------------|--------|-------|------|------|------|--------|
| LED current | IL | — | 180 | — | mA | (2) |
| LED voltage | VL | — | 10.5 | — | V | |
| Operating LED life time | Hr | 20000 | — | — | Hour | (1)(2) |



Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: $T_a=25\pm3\text{ }^\circ\text{C}$, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note (2) The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a=25\text{ }^\circ\text{C}$ and $I_L=180\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 180mA. The constant current driving method is suggested.



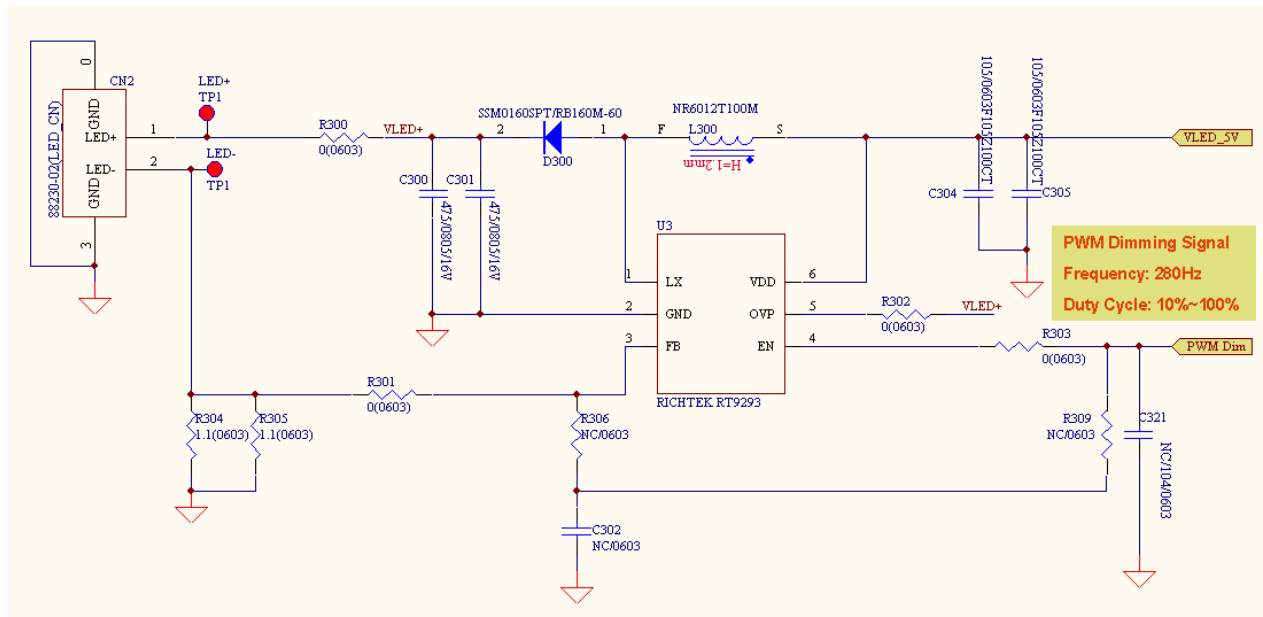
LED Light Bar Circuit

| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 15/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

Note (3) Suggested Schematic of LED Back-Light Driver

$$((FB = 0.3V) / R) = I$$

$$R = R304 // R305$$



Suggested Schematic of LED Back-Light Driver

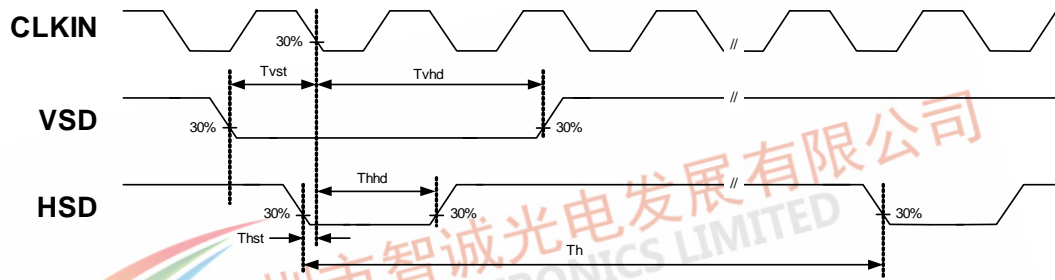
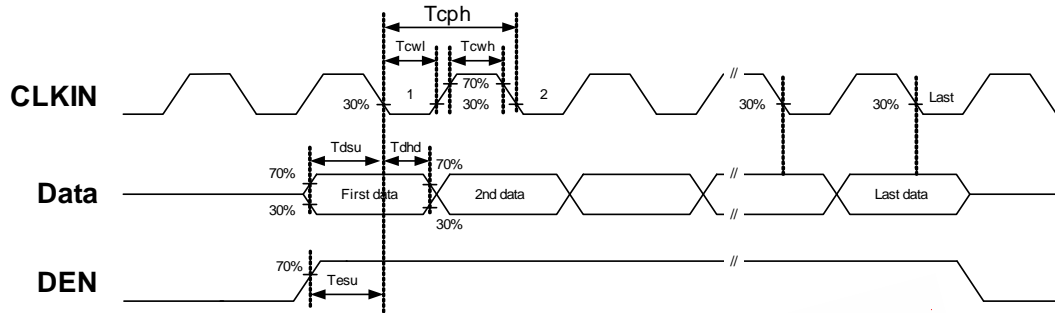
| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 16/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

6.3 AC Characteristics

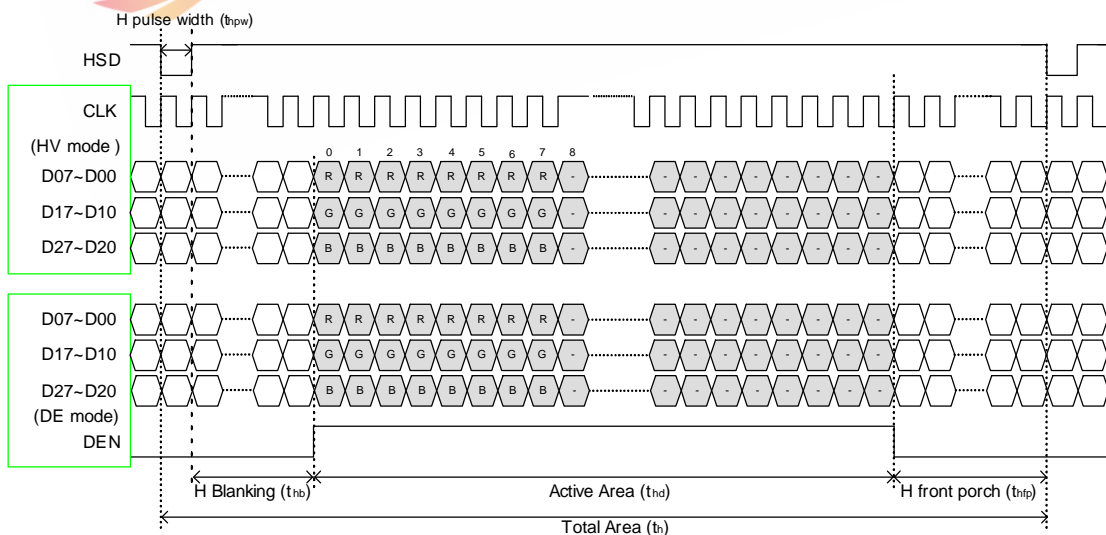
| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|-------------------------|--------|------|------|------|------|------|
| DCLK cycle time | Tcph | 20 | | | ns | |
| DCLK frequency | fclk | | 40 | 50 | MHz | |
| DCLK pulse duty | Tcwh | 40 | 50 | 60 | % | |
| VSD setup time | Tvst | 8 | | | ns | |
| VSD hold time | Tvhd | 8 | | | ns | |
| HSD setup time | Thst | 8 | | | ns | |
| HSD hold time | Thhd | 8 | | | ns | |
| Data setup time | Tdsu | 8 | | | ns | |
| Data hold time | Tdhd | 8 | | | ns | |
| DE setup time | Tesu | 8 | | | ns | |
| DE hold time | Tehd | 8 | | | ns | |
| Horizontal display area | thd | | 800 | | Tcph | |
| HSD period time | th | | 1000 | | Tcph | |
| HSD pulse width | thpw | 1 | 48 | | Tcph | |
| HSD back porch | thb | | 40 | | Tcph | |
| HSD front porch | thfp | | 112 | | Tcph | |
| Vertical display area | tvd | | 600 | | th | |
| VSD period time | tv | | 660 | | th | |
| VSD pulse width | tvpw | | 3 | | th | |
| VSD back porch | tvb | | 36 | | th | |
| VSD front porch | tvfp | | 21 | | th | |

| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 17/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

6.4 Timing Diagram of Interface Signal

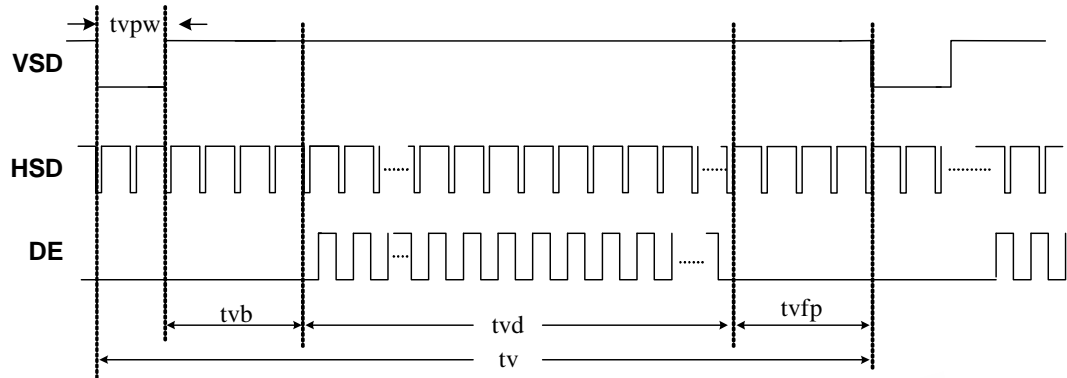


Sampling clock timing



Horizontal display timing range

| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 18/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

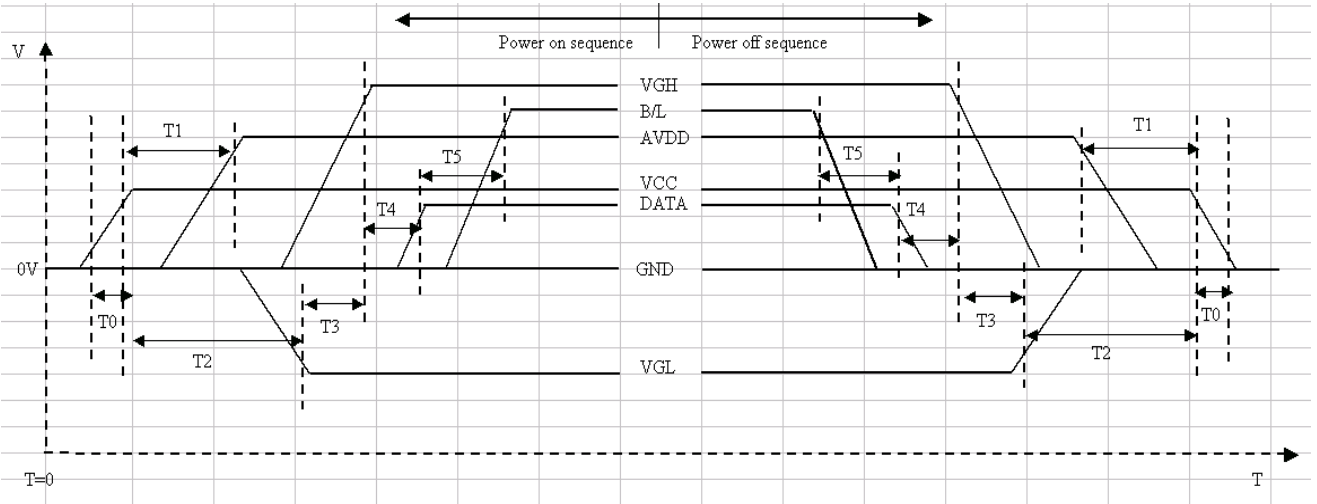


Vertical timing

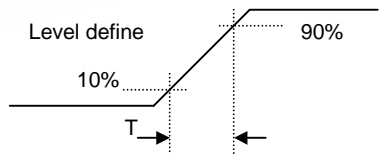


| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 19/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

6.5 Power Sequence



| Item | Min. | Typ. | Max. | Unit |
|------|------|------|------|------|
| T0 | 0.5 | -- | 20 | msec |
| T1 | 16 | | | msec |
| T2 | 20 | | | msec |
| T3 | 10 | | | msec |
| T4 | 10 | | 50 | msec |
| T5 | 50 | | | msec |

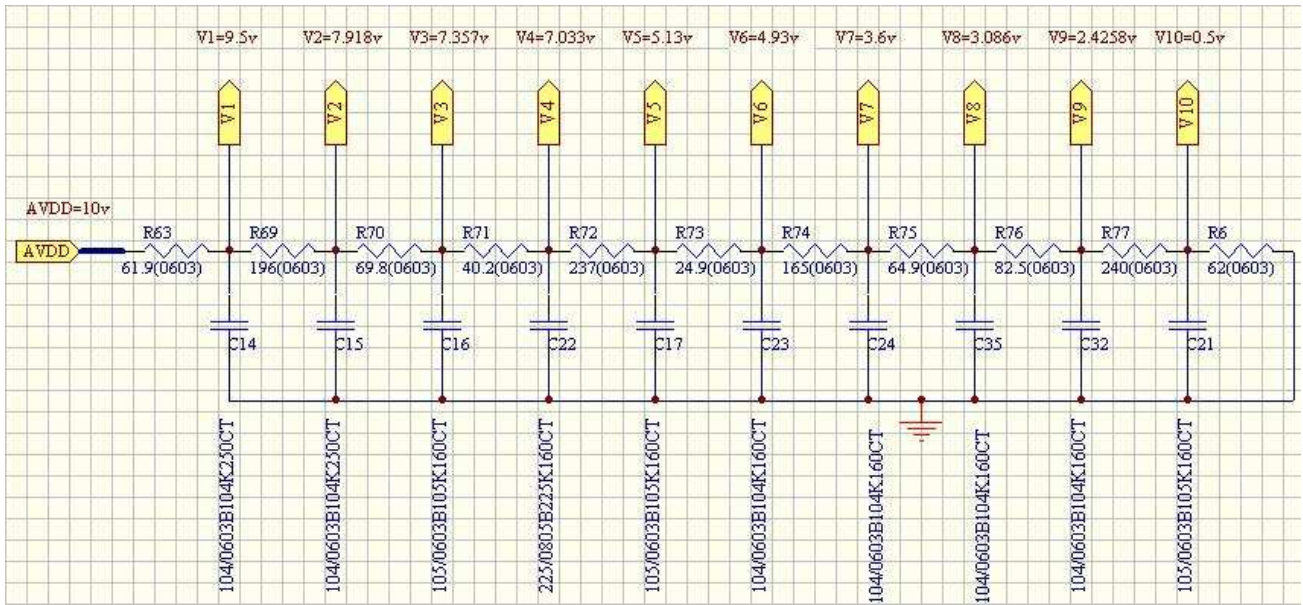


Power On Sequence: VCC-> AVDD -> VGL -> VGH -> Data -> B/L
 Power Off Sequence: B/L-> Data -> VGH -> VGL -> AVDD -> VCC

Notes: Data include R0~R7, G0~G7, B0~B7, HSD, VSD, DCLK, SHLR, UPDN, DE MODE, RSTB, STBYB, SHLR, UPDN, DITH

| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 20/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

6.6 Gamma circuit (TBD)



*Suggested Gamma Circuit.



| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 21/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

7.0 Reliability test items

| No. | Item | Conditions | Remark |
|-----|--|--|----------------------------------|
| 1 | High Temperature Storage | Ta=+80°C, 240hrs | |
| 2 | Low Temperature Storage | Ta=-30°C, 240hrs | |
| 3 | High Temperature Operation | Ta=+70°C, 240hrs | |
| 4 | Low Temperature Operation | Ta=-20°C, 240hrs | |
| 5 | High Temperature and High Humidity (operation) | Ta=+60°C, 90%RH, 240hrs | |
| 6 | Thermal Cycling Test (non operation) | -30°C(30min) → +80°C(30min), 200cycles | |
| 7 | Electrostatic Discharge | ± 200V,200pF(0Ω) 1 time/each terminal | |
| 8 | Vibration | 1.Random: 1.04Grms, 5~500Hz, X/Y/Z, 30min/each direction 2. Sine: Freq. Range: 8~33.3Hz Stoke: 1.3mm Sweep: 2.9G, 33.3~400Hz X/Z: 2hr, Y: 4hr, cyc: 15min | |
| 9 | Shock | 100G, 6ms, ±X, ±Y, ±Z 3 time for each direction | JIS C7021, A-10 (Condition A) |
| 10 | Vibration (with carton) | Random: 0.015G ² /Hz, 5~200Hz -6dB/Octave, 200~400Hz XYZ each direction: 2hr | |
| 11 | Drop (with carton) | Height: 60cm 1 corner, 3 edges, 6 surfaces | JIS Z0202 |

Note: There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

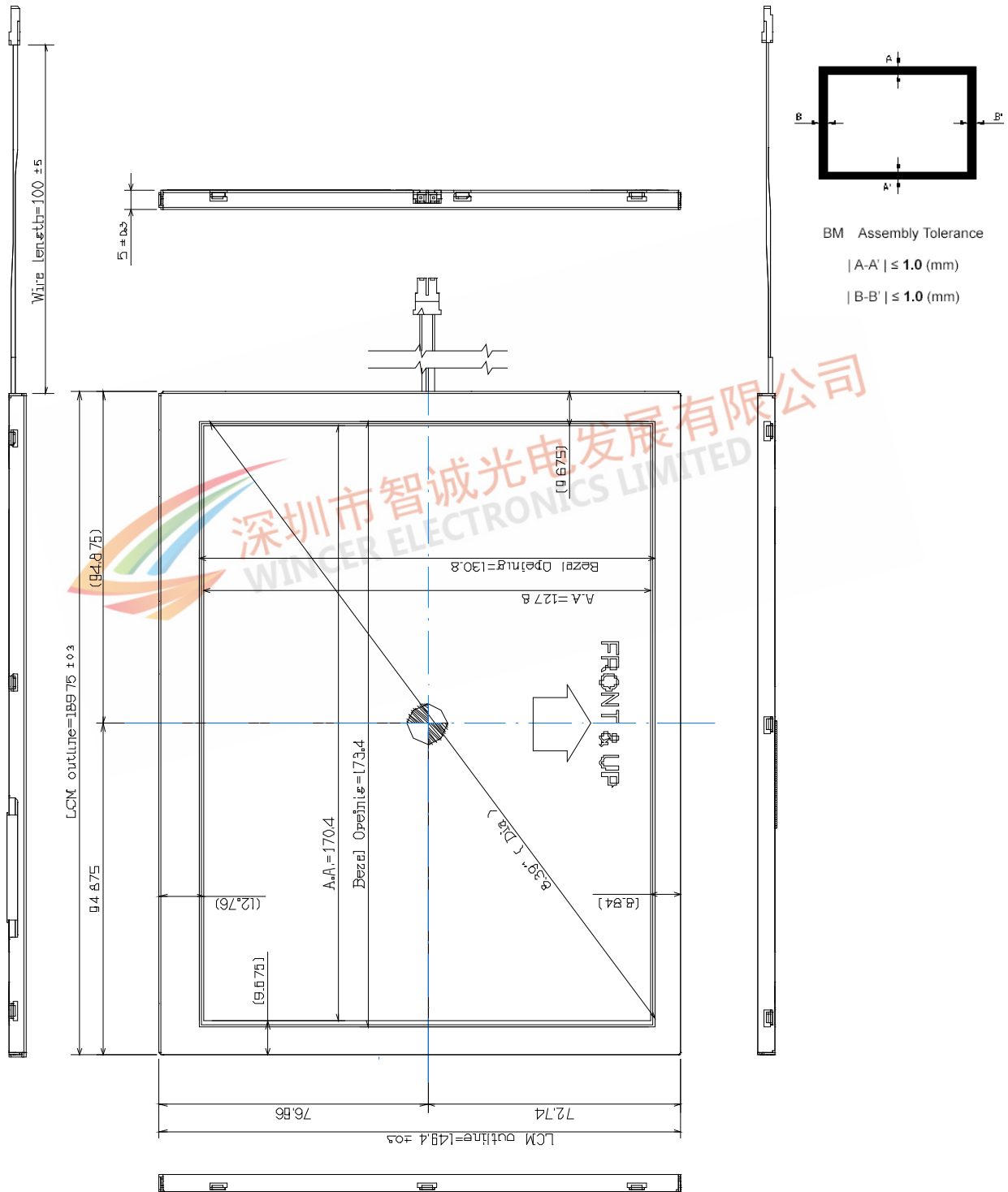
| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 22/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

8.0 OUTLINE DIMENSION

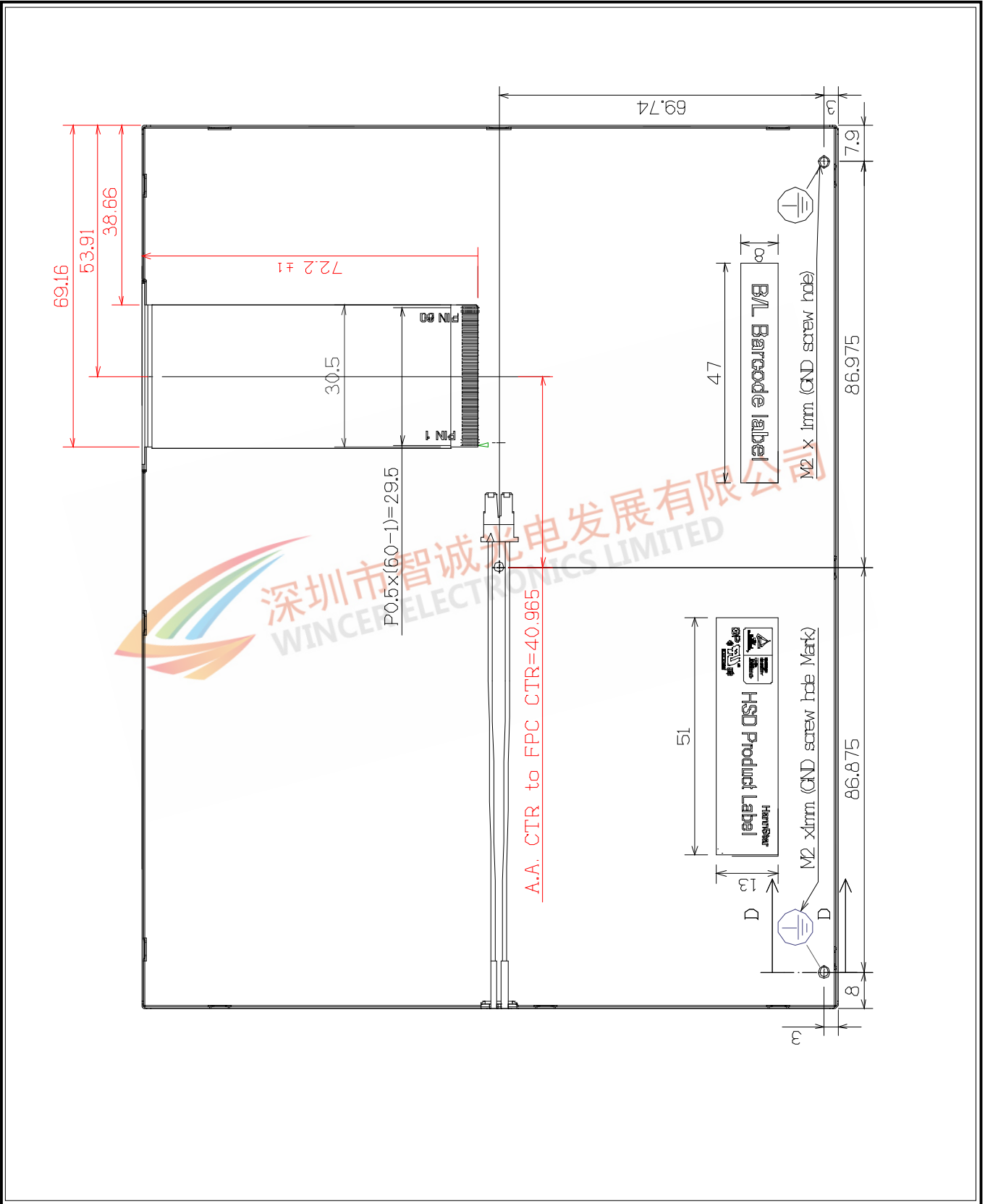
8.1 Outline Dimension

Note: General Tolerance: +/- 0.3mm

Unit : mm



| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 23/26 |
| Document No. | DC110-000555 | Revision | 1.1 |



| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 24/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

9.0 LOT MARK

9.1 Lot Mark

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|

code 1,2,3,4,5,6: HannStar internal flow control code.

code 7: production location.

code 8: production year.

code 9: production month.

code 10,11,12,13,14,15: serial number.

Note (1) Production Year

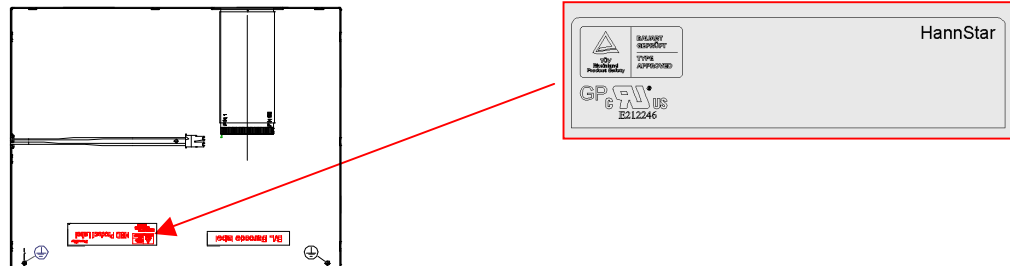
| | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|
| Year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Mark | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A |

Note (2) Production Month

| | | | | | | | | | | | | |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Month | Jan. | Feb. | Mar. | Apr. | May. | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
| Mark | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C |

9.2 Location of Lot Mark

- (1) The label is attached to the backside of the LCD module.
- (2) This is subject to change without prior notice.



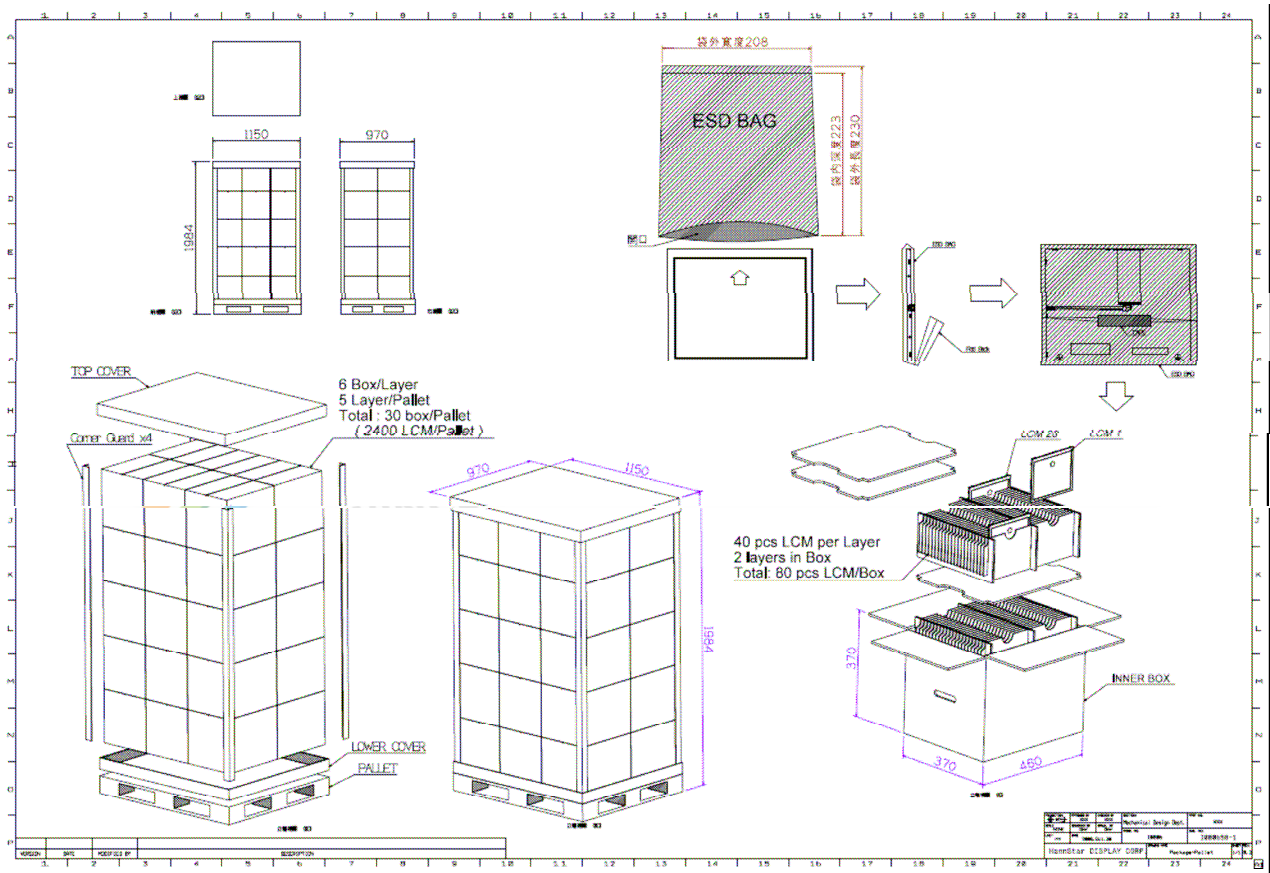
| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 25/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

10.0 PACKAGE SPECIFICATION

10.1 Packing form

- (1) Package quantity in one carton: (80) pieces. (TBD)
- (2) Carton size: (460 x370 x370) mm. (TBD)

10.2 Packing assembly drawings



| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 26/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

11.0 GENERAL PRECAUTION

11.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

11.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. HannStar does not warrant the module, if customers disassemble or modify the module.

11.3 Breakage of LCD Panel

11.3.1. If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

11.3.2. If liquid crystal contacts mouth or eyes, rinse out with water immediately.

11.3.3. If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

11.3.4. Handle carefully with chips of glass that may cause injury, when the glass is broken.

11.4 Electric Shock

11.4.1. Disconnect power supply before handling LCD module.

11.4.2. Do not pull or fold the LED cable.

11.4.3. Do not touch the parts inside LCD modules and the fluorescent LED's connector or cables in order to prevent electric shock.

11.5 Absolute Maximum Ratings and Power Protection Circuit

11.5.1. Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.

11.5.2. Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

11.5.3. It's recommended to employ protection circuit for power supply.

11.6 Operation

11.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.

11.6.2 Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

11.6.3 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

| | | | |
|----------------|--|----------|-------|
| Document Title | HSD084ISN1-A Preliminary Specification | Page No. | 27/26 |
| Document No. | DC110-000555 | Revision | 1.1 |

11.6.4 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.

11.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

11.7 Mechanism

Please mount LCD module by using mounting holes arranged in four corners tightly.

11.8 Static Electricity

11.8.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

11.8.2. Because LCD module use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

11.9 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

11.10 Disposal

When disposing LCD module, obey the local environmental regulations.