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TO :

Date :

HannStar Product Specification **(Preliminary)**

15.6” Color TFT-LCD Module

Model: **HSD156JUW1- A****

Note: (1) The information contained herein is tentative and may be changed without prior notices

(2) Please contact HannStar Display Corp. before designing your product based on this module specification.

(3) 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.

(4) The mark “ ** ” of Model means sub-model code.

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1.0 GENERAL DESCRIPTION

1.1 Introduction HannStar Display model HSD156JUW1-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 15.6 inch diagonally measured active display area with FHD (1920 horizontal by 1080 vertical pixel) resolution.

1.2 Features

- 15.6 (16:9 diagonal) inch configuration
- Two channel LVDS interface
- 16.7M color by 8 bit R.G.B signal input
- RoHS Compliance
- Halogen Free

1.3 Applications

- Automotive

1.4 General information

| Item | Specification | Unit | |
|-------------------|------------------------------|---|---|
| Outline Dimension | 363.8 x 215.9 x 11.5 (Typ.) | mm | |
| Display area | 344.16(H) x 193.59(V) | mm | |
| Number of Pixel | 1920 RGB (H) x 1080(V) | pixels | |
| Pixel pitch | 0.1792(H) x 0.1792(V) | mm | |
| Pixel arrangement | RGB Vertical stripe | | |
| Display mode | Normally Black | | |
| NTSC | 70(typ) 60(min) | % | |
| Surface treatment | AG | | |
| Weight | TBD (Typ.) | g | |
| Back-light | White LED | | |
| Power Consumption | Logic System (White Pattern) | 5W | W |
| | B/L System | 23.1W MAX (Include LED driver efficiency) | W |

1.5 Mechanical Information

| Item | Min. | Typ. | Max. | Unit | |
|-------------|------------------|-------|-------|-------|----|
| Module Size | Horizontal (H) | 363.3 | 363.8 | 364.3 | mm |
| | Vertical (V) | 215.4 | 215.9 | 216.4 | mm |
| | Depth (D) w/ PCB | 11.0 | 11.5 | 12.0 | mm |
| Weight | — | TBD | TBD | g | |

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2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

| Item | Symbol | Min. | Max. | Unit | Note |
|--------------------------|-----------|------|------|------|------|
| Logic Supply voltage | V_{DD} | -0.3 | 6.0 | V | |
| Backlight Supply Voltage | V_{LED} | -0.3 | 45 | V | |

2.1.2 Environment Absolute Rating

| Item | Symbol | Min. | Max. | Unit | Note |
|-----------------------|-----------|------|------|------|------|
| Operating Temperature | T_{opa} | -30 | 85 | °C | |
| Storage Temperature | T_{stg} | -40 | 90 | °C | |

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3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

| Item | | Symbol | Condition | Min. | Typ. | Max. | Unit | Note |
|------------------------------|---------|------------|------------------------------------|------|------|-------|-------------------|---------------------------|
| Contrast | | CR | $\theta=0$ Normal viewing angle | 700 | 1000 | — | | (1)(2) |
| Response time | Rising | T_R | | — | 18 | 20 | msec | (1)(3) |
| | Falling | T_F | | — | 17 | 20 | | |
| White luminance (Center) | | Y_L | | 650 | 850 | — | cd/m ² | (1)(4) ($I_L=720mA$) |
| Color chromaticity (CIE1931) | White | W_x | $\theta=0$ Normal viewing angle | 0.26 | 0.31 | 0.36 | | (1)(4) |
| | | W_y | | 0.28 | 0.33 | 0.38 | | |
| | Red | R_x | | TBD | TBD | TBD | | |
| | | R_y | | TBD | TBD | TBD | | |
| | Green | G_x | | TBD | TBD | TBD | | |
| | | G_y | | TBD | TBD | TBD | | |
| | Blue | B_x | | TBD | TBD | TBD | | |
| | | B_y | | TBD | TBD | TBD | | |
| Viewing angle | Hor. | θ_L | CR>10 | — | 85 | — | | |
| | | θ_R | | — | 85 | — | | |
| | Ver. | θ_U | | — | 85 | — | | |
| | | θ_D | | — | 85 | — | | |
| Brightness uniformity | | B_{UNI} | $\theta=0$ | — | — | 0.751 | | (5) |
| Optima View Direction | | Free | | | | | | (6) |

3.2 Measuring Condition

- Measuring surrounding : dark room
- LED current I_L : 720mA
- Ambient temperature : 25±2°C
- 15min. warm-up time.

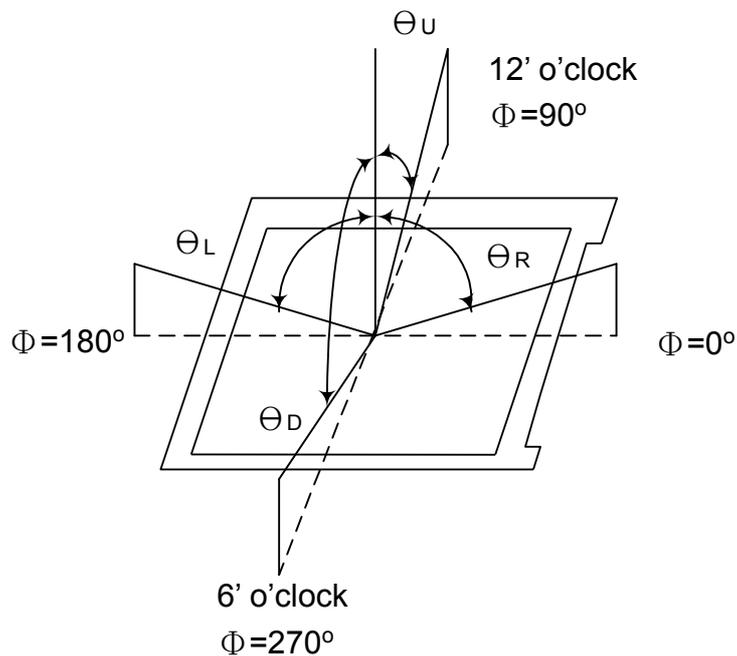
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3.3 Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

- Measuring spot size : 20 ~ 21 mm

Note (1) Definition of Viewing Angle:

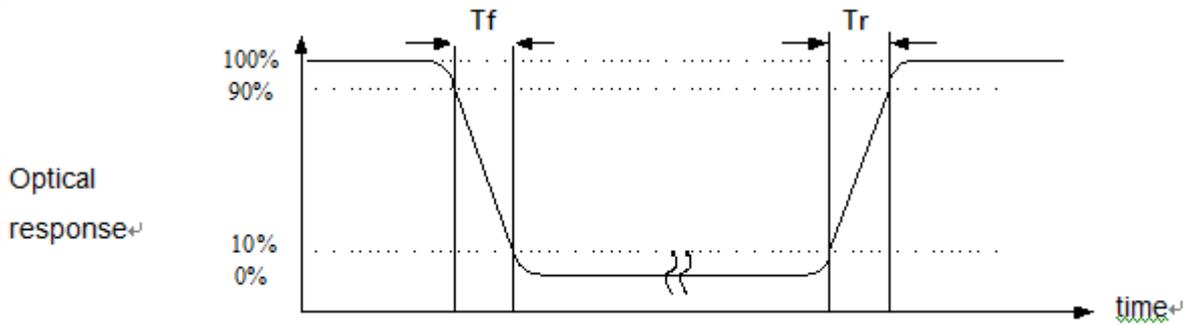


Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

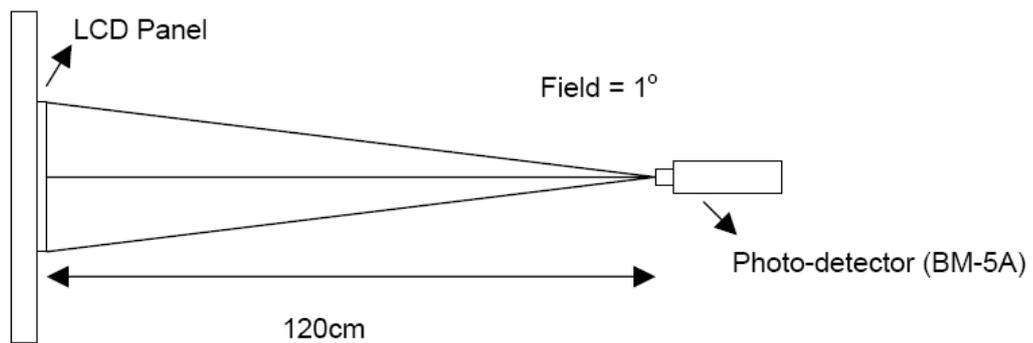
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

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

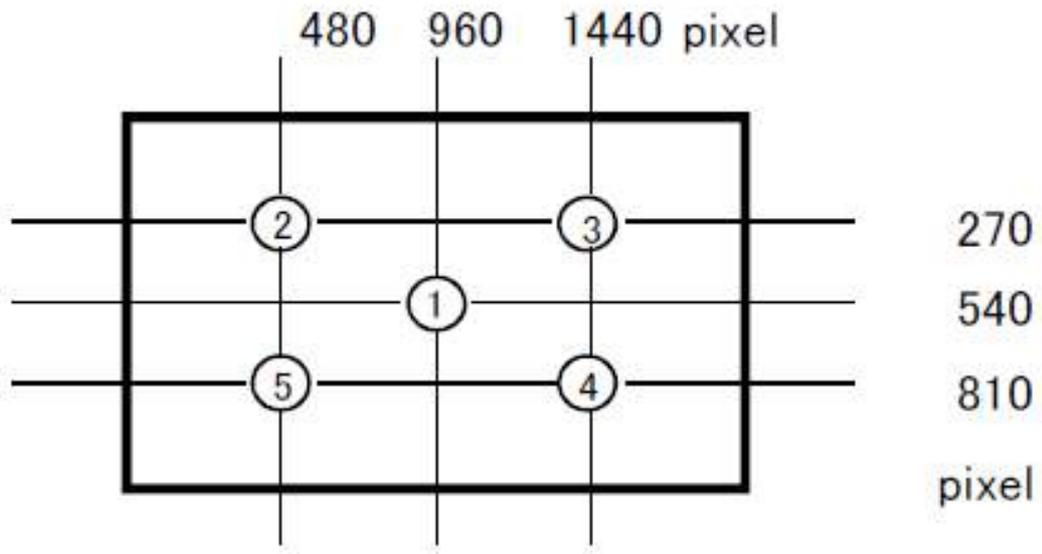


Note (4) Definition of optical measurement setup



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Note (5) Definition of brightness uniformity

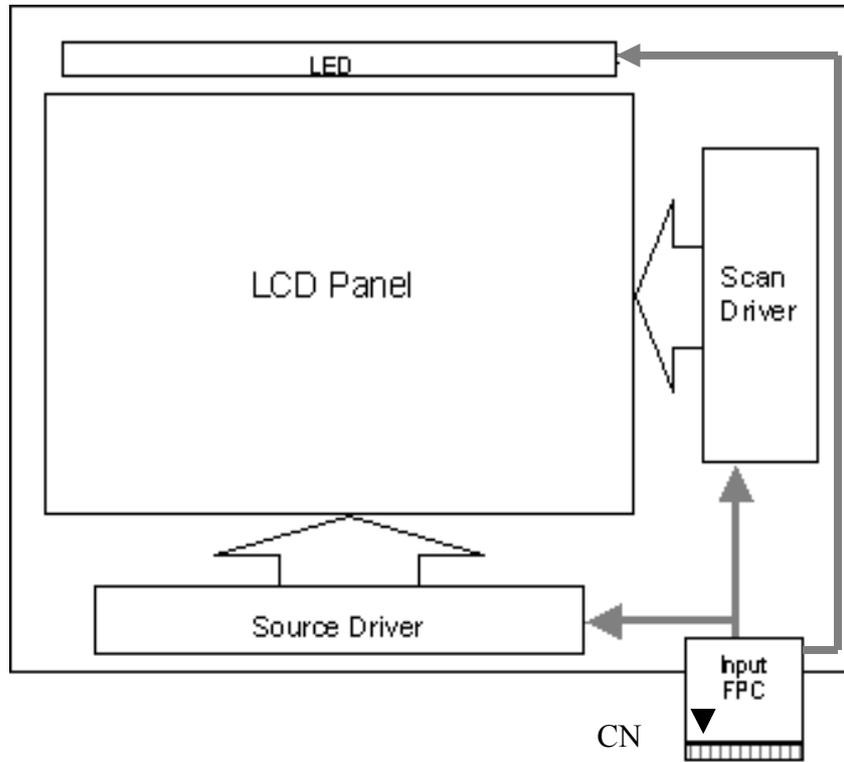


$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 5 points})}{(\text{Max Luminance of 5 points})} \times 100\%$$

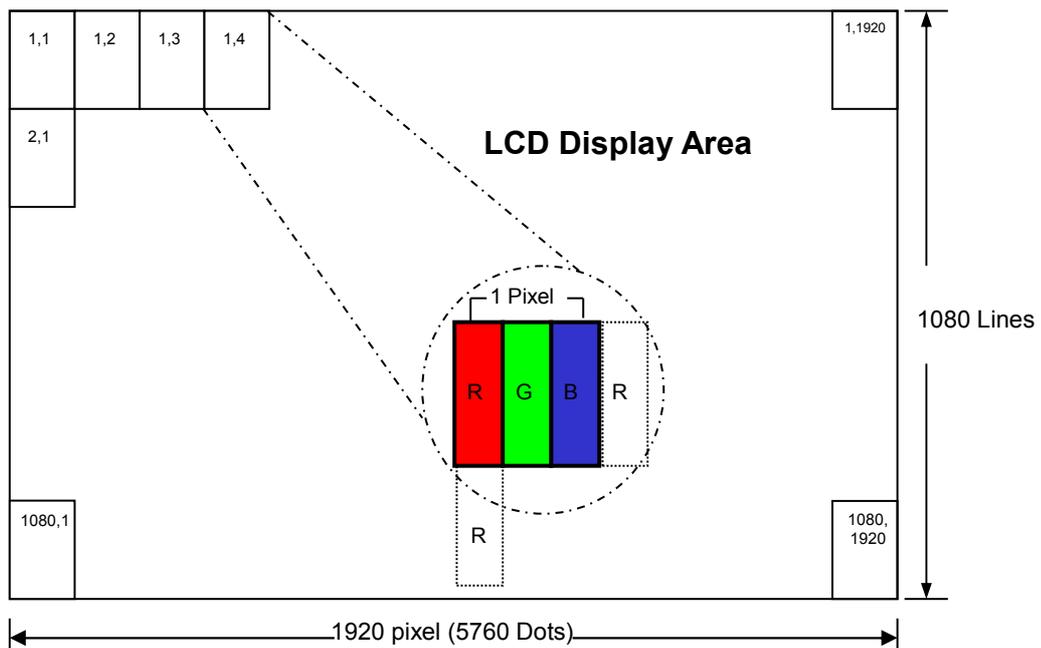
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4.0 BLOCK DIAGRAM

4.1 TFT LCD Module:



4.2 Pixel Format



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4.3 Relationship Between Displayed Color and Input

| | Display | MSB | | | | | | | | LSB | | | | | | | | Gray scale Level | | | | | | | | |
|-----------------------------|------------|-----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|------------------|----|----|----|------------|-----------|----------|-----------|-----------|
| | | R7 | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 | | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
| Basic color | Black | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | - |
| | Blue | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | H | H | H | H | H | H | H | - |
| | Green | L | L | L | L | L | L | L | L | H | H | H | H | H | H | H | H | L | L | L | L | L | L | L | L | - |
| | Light Blue | L | L | L | L | L | L | L | L | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - |
| | Red | H | H | H | H | H | H | H | H | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | - |
| | Purple | H | H | H | H | H | H | H | H | L | L | L | L | L | L | L | L | H | H | H | H | H | H | H | H | - |
| | Yellow | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | L | L | L | L | L | L | L | L | - |
| | White | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - |
| Gray scale of Red | Black | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L0 |
| | Dark | L | L | L | L | L | L | L | H | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L1 |
| | | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L2 |
| | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | L3...L251 |
| | | H | H | H | H | H | H | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L252 |
| | Light | H | H | H | H | H | L | H | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L253 | |
| | | H | H | H | H | H | H | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L254 | |
| Red | H | H | H | H | H | H | H | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | Red L255 | | |
| Gray scale of Green | Black | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L0 |
| | Dark | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | L | L | L | L | L | L | L | L | L1 | |
| | | L | L | L | L | L | L | L | L | L | L | L | L | L | H | L | L | L | L | L | L | L | L | L | L2 | |
| | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | L3...L251 | |
| | | L | L | L | L | L | L | L | L | H | H | H | H | H | L | L | L | L | L | L | L | L | L | L | L252 | |
| | Light | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L253 | | |
| | | L | L | L | L | L | L | L | H | H | H | H | H | L | L | L | L | L | L | L | L | L | L | L254 | | |
| Green | L | L | L | L | L | L | L | H | H | H | H | H | H | L | L | L | L | L | L | L | L | Green L255 | | | | |
| Gray scale of Blue | Black | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L0 |
| | Dark | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | L1 |
| | | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | L | L2 | |
| | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | L3...L251 | |
| | | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | H | H | H | H | L | L | L | L | L252 |
| | Light | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | H | H | H | H | L | H | L | L | L253 | |
| | | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | H | H | H | H | H | L | L | L | L254 | |
| Blue | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | H | H | H | H | H | H | H | Blue L255 | | | |
| Gray scale of White & Black | Black | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L0 |
| | Dark | L | L | L | L | L | L | L | H | L | L | L | L | L | L | H | L | L | L | L | L | L | L | H | L1 | |
| | | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | H | L2 | |
| | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | L3...L251 | |
| | | H | H | H | H | H | L | L | H | H | H | H | L | L | H | H | H | H | L | L | L | L | L | L | L252 | |
| | Light | H | H | H | H | L | H | H | H | H | H | L | H | H | H | H | H | L | H | L | L | L | L | L253 | | |
| | | H | H | H | H | H | H | L | H | H | H | H | H | L | H | H | H | H | H | L | L | L | L | L | L254 | |
| White | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | White L255 | | | | |

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5.0 INTERFACE PIN CONNECTION

5.1 CN1 : JAE FI-XB30SSRL-HF16 or compatible connector

| Pin No. | Signal | Description |
|---------|------------|---|
| 1 | RxOIN0- | Negative LVDS differential data input (Odd data) |
| 2 | RxOIN0+ | Positive LVDS differential data input (Odd data) |
| 3 | RxOIN1- | Negative LVDS differential data input (Odd data) |
| 4 | RxOIN1+ | Positive LVDS differential data input (Odd data) |
| 5 | RxOIN2- | Negative LVDS differential data input (Odd data) |
| 6 | RxOIN2+ | Positive LVDS differential data input (Odd data) |
| 7 | GND | Power ground |
| 8 | RxOCLKIN- | Negative LVDS differential clock input (Odd clock) |
| 9 | RxOCLKIN + | Positive LVDS differential clock input (Odd clock) |
| 10 | RxOIN 3- | Negative LVDS differential data input (Odd data) |
| 11 | RxOIN 3+ | Positive LVDS differential data input (Odd data) |
| 12 | RxEIN0- | Negative LVDS differential data input (Even data) |
| 13 | RxEIN0+ | Positive LVDS differential data input (Even data) |
| 14 | GND | Power ground |
| 15 | RxEIN1- | Positive LVDS differential data input (Even data) |
| 16 | RxEIN1+ | Negative LVDS differential data input (Even data) |
| 17 | GND | Power ground |
| 18 | RxEIN2- | Negative LVDS differential data input (Even data) |
| 19 | RxEIN2+ | Positive LVDS differential data input (Even data) |
| 20 | RxECLKIN- | Negative LVDS differential clock input (Even clock) |
| 21 | RxECLKIN + | Positive LVDS differential clock input (Even clock) |
| 22 | RxEIN3- | Negative LVDS differential data input (Even data) |
| 23 | RxEIN3+ | Positive LVDS differential data input (Even data) |
| 24 | GND | Power ground |
| 25 | GND | Please Contact to GND(Bist function for HSD test) |
| 26 | GND | Power ground |
| 27 | GND | Power ground |
| 28 | VCC | Power +5V |
| 29 | VCC | Power +5V |
| 30 | VCC | Power +5V |

Note : The brightness of LCD panel could be changed by adjusting PWM

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5.2 CN2 : STM MSB24038P8B or compatible connector

| Pin No. | Signal | Description |
|---------|--------|-------------------|
| 1 | VLED | Power Supply +12V |
| 2 | VLED | Power Supply +12V |
| 3 | VLED | Power Supply +12V |
| 4 | GND | Ground |
| 5 | GND | Ground |
| 6 | GND | Ground |
| 7 | BL_EN | BL On Off Control |
| 8 | PWM | PWM Signal |

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6.0 ELECTRICAL CHARACTERISTICS

6.1 TFT LCD Module

| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|-------------------------|-------------------|------|------|------|------|--|
| Supply Voltage | VCC | 4.7 | 5.0 | 5.5 | V | |
| Current of power supply | IDD | -- | 300 | -- | mA | V _{CC} = 5.0V 、 L255 pattern |
| VDD Power | PDD | | 1.5 | 5 | W | V _{CC} = 5.0V 、 L255 pattern |
| Inrush current | I _{RUSH} | - | - | 3.0 | A | Note |

Note : Inrush current test circuit and rising time setting (power on)

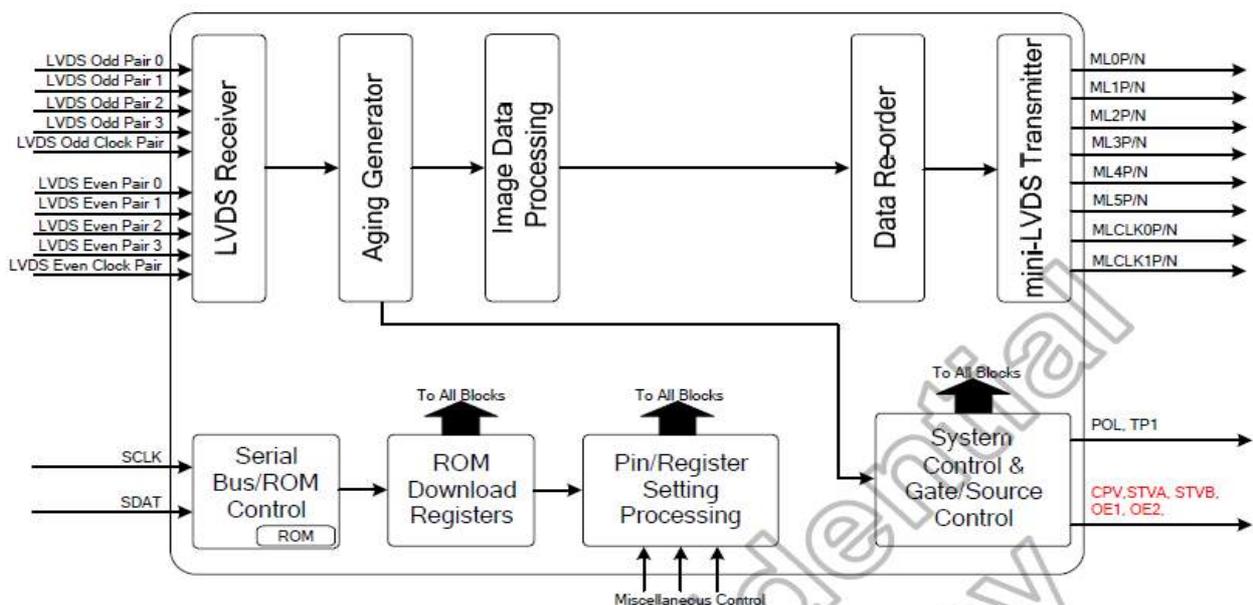
6.2 Switching Characteristics for LVDS Receiver

| Item | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|-----------------------------------|-----------------|------------------------|------|-----------------------------|------|-----------------------|
| Differential Input High Threshold | V _{th} | — | — | 100 | mV | V _{CM} =1.2V |
| Differential Input Low Threshold | V _{tl} | -100 | — | — | mV | |
| Input Current | I _{IN} | -10 | — | +10 | uA | |
| Differential input Voltage | V _{ID} | 0.2 | — | 0.6 | V | |
| Common Mode Voltage Offset | V _{CM} | (V _{ID} /2) | 1.2 | 2.25-(V _{ID} /2) | V | |

6.3 Bit LVDS input

6.3.1 LVDS Block Diagram

Block Diagram



| | | | |
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6.3.2 8Bit LVDS input

LVDS input data mapping

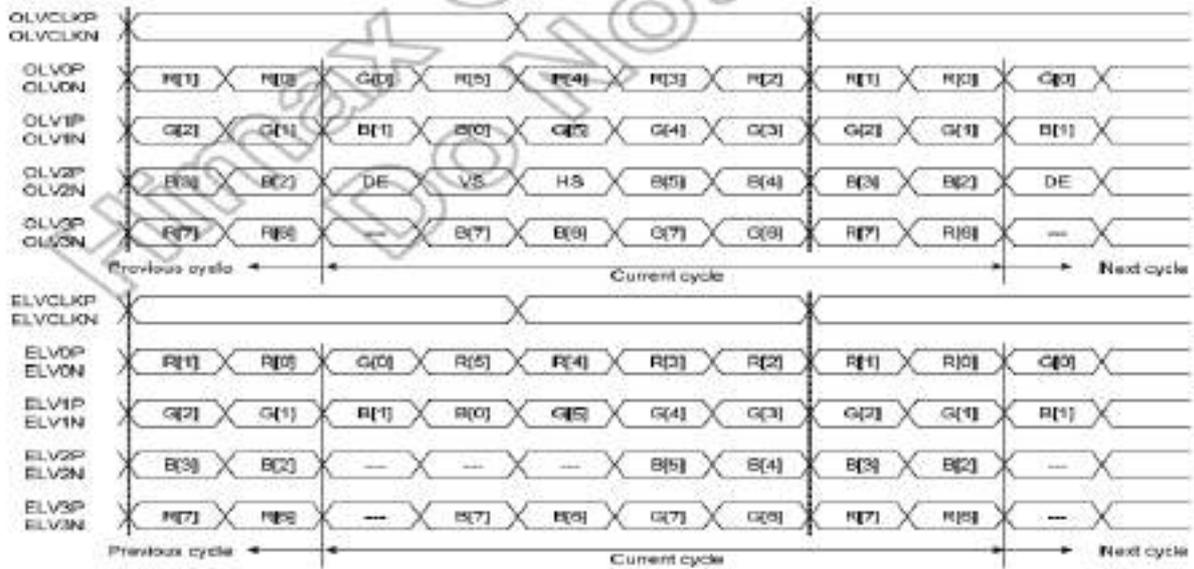


Figure 6.2: LVDS input data mapping (VESA format)

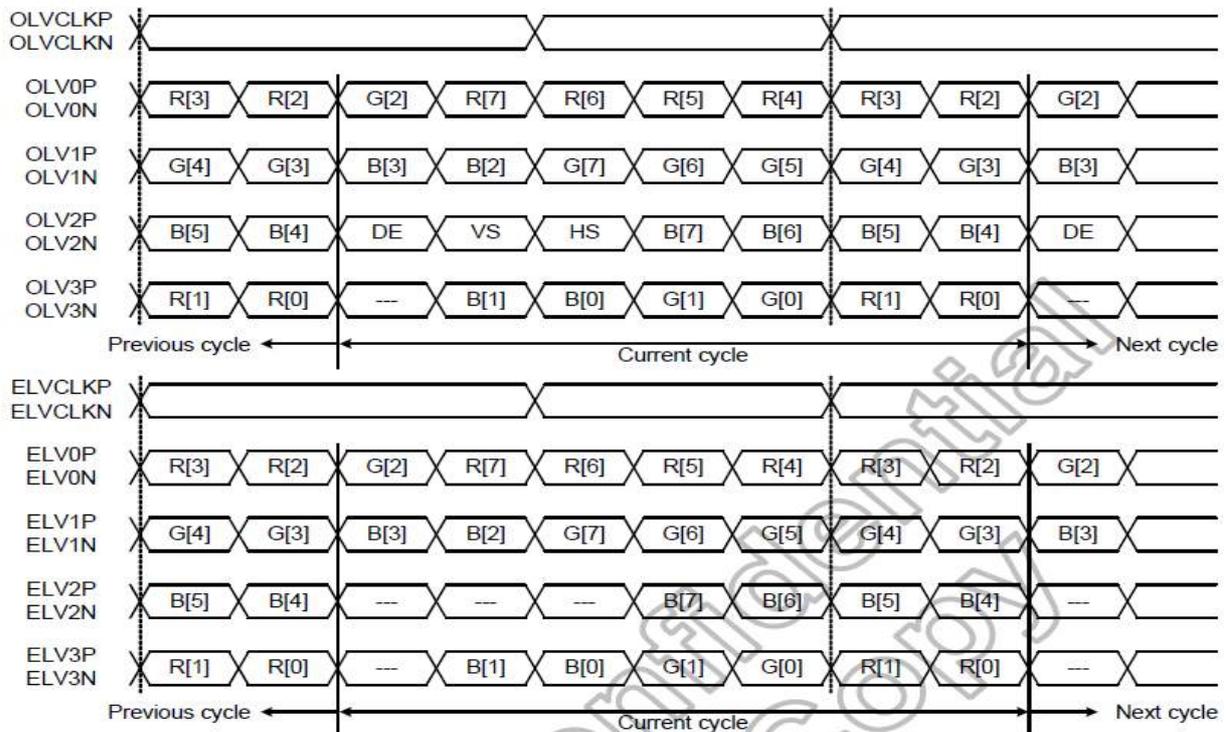


Figure 6.3: LVDS input data mapping (JEIDA format)

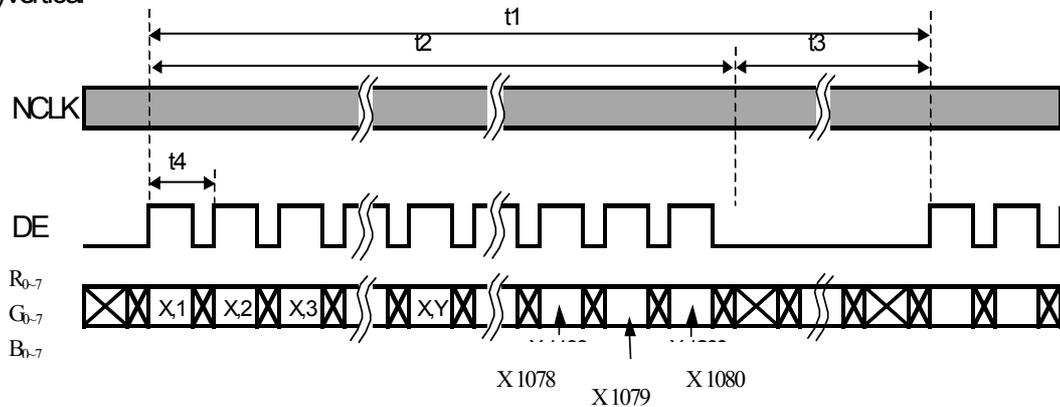
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6.4 Interface Timing (DE mode)

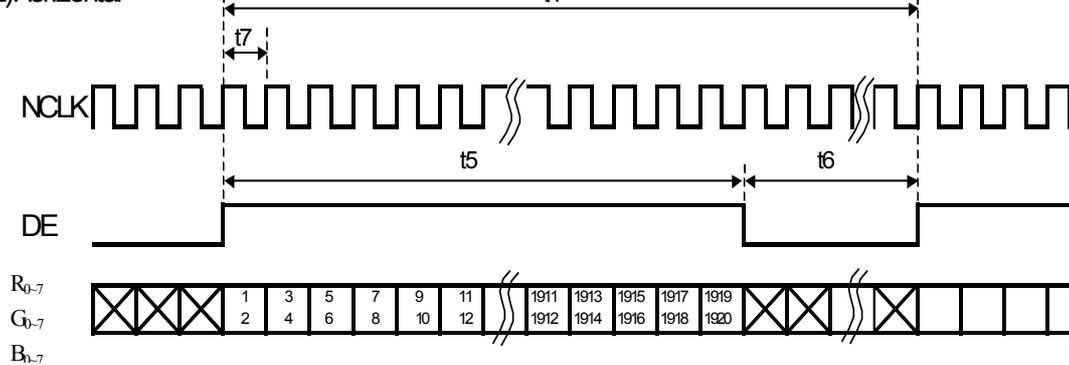
| Item | Symbol | Min. | Typ. | Max. | Unit |
|--------------------------|--------|------|------|------|-------|
| Frame Rate | -- | 58 | 60 | 62 | Hz |
| Frame Period | t1 | 1085 | 1124 | 1168 | line |
| Vertical Display Time | t2 | 1080 | 1080 | 1080 | line |
| Vertical Blanking Time | t3 | 5 | 44 | 88 | line |
| 1 Line Scanning Time | t4 | 1050 | 1080 | 1110 | clock |
| Horizontal Display Time | t5 | 960 | 960 | 960 | clock |
| Horizontal Blanking Time | t6 | 90 | 120 | 150 | clock |
| Clock Rate | t7 | 66 | 72.8 | 80.5 | MHz |

Timing Diagram of Interface Signal (DE mode)

(1) Vertical



(2) Horizontal



| | | | |
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6.5 Power On / Off Sequence

Power On/off sequence

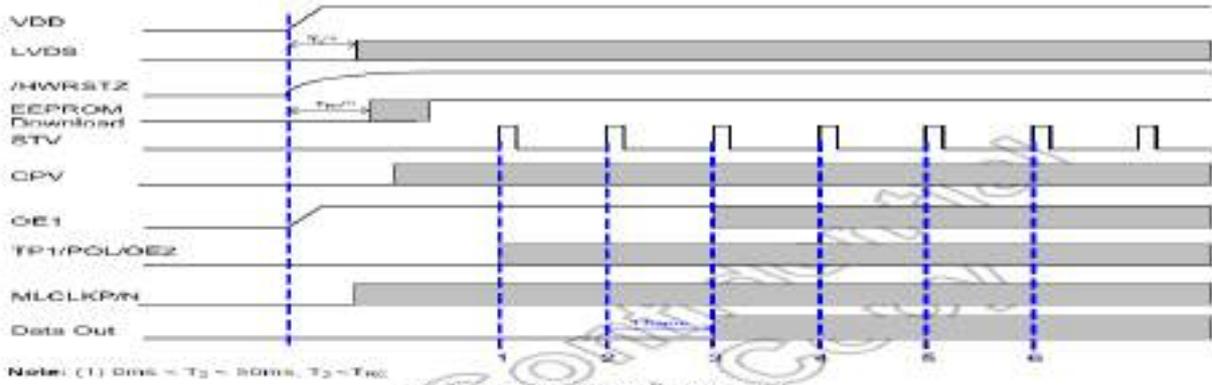
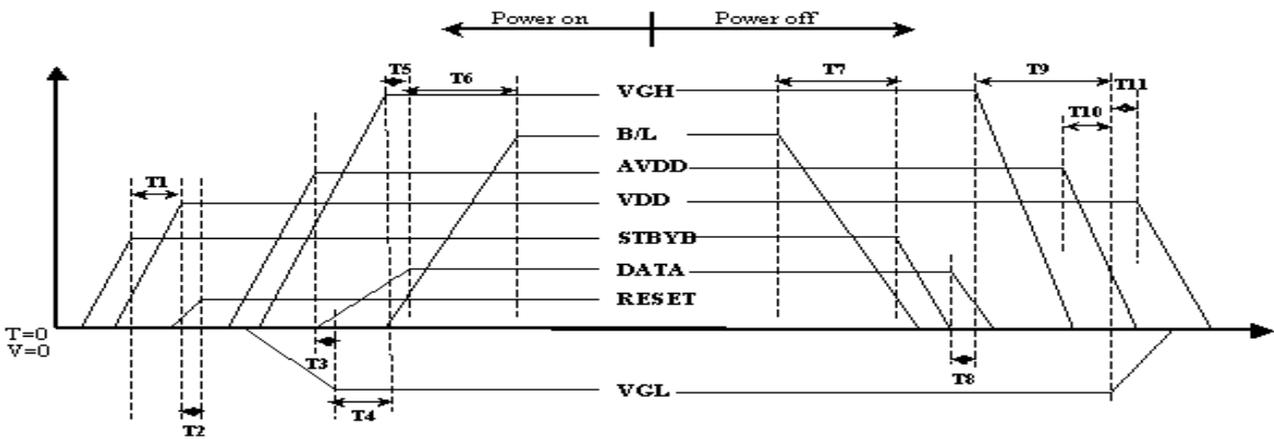


Figure 6.5: Power up sequence



| Item | Min. | Typ. | Max. | Unit |
|------|------|------|------|------|
| TP1 | 0.5 | -- | 10 | msec |
| TP2 | 0 | -- | 50 | msec |
| TP3 | 200 | -- | -- | msec |
| TP4 | 0.5 | -- | 10 | msec |
| TP5 | 10 | -- | -- | msec |
| TP6 | 10 | -- | -- | msec |
| TP7 | 0 | -- | 10 | msec |
| TP8 | 200 | -- | -- | msec |
| TP9 | 0 | -- | 50 | msec |
| TP10 | 1 | -- | 10 | msec |
| TP11 | 1000 | -- | -- | msec |

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6.6 Backlight Unit

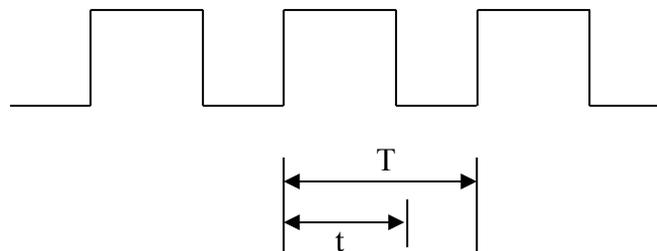
DC Electrical Characteristics

| Parameter | Symbol | Min | Typ | Max | Units | Remark |
|--------------------------|------------|-----|------|-----|-------|---------|
| LED Power Supply Voltage | V_{LED} | 9 | 12 | 16 | Volt | |
| Current dissipation | I_{LED} | -- | 0.72 | -- | A | |
| PWM High Threshold | V_{PWMH} | 2.0 | -- | 5.5 | Volt | |
| PWM Low Threshold | V_{PWML} | -- | -- | 0.4 | Volt | |
| EN High Threshold | V_{ENH} | 2.0 | -- | 5.5 | Volt | |
| EN Low Threshold | V_{ENL} | -- | -- | 0.4 | Volt | |
| PWM Frequency | f_{PWM} | 100 | -- | 10K | Hz | Note(1) |
| PWM Duty Cycle | T_D | 3 | -- | 100 | % | Note(2) |

Note (1)

| Dimming Frequency (Hz) | Duty (Min.) | Duty (Max.) |
|--------------------------|-------------|-------------|
| $100 < f_{PWM} \leq 500$ | 0.2% | 100% |
| $500 < f_{PWM} \leq 1k$ | 0.4% | 100% |
| $1k < f_{PWM} \leq 2k$ | 0.8% | 100% |
| $2k < f_{PWM} \leq 5k$ | 1.5% | 100% |
| $5k < f_{PWM} \leq 10k$ | 3% | 100% |

Note (2) PWM Duty Cycle



$$\text{Duty Cycle} = (t / T) * 100\%$$

| | | | |
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| Parameter | Symbol | Min | Typ | Max | Units | Condition |
|---------------|--------|-----|-------|------|-------|--|
| LED Current | I_L | -- | 720 | -- | mA | Ta=25°C |
| LED Voltage | V_L | -- | 24 | 25.6 | Volt | Ta=25°C |
| LED Life-Time | N/A | -- | 50000 | -- | Hour | Ta=25°C I _F =120mA Note (2) |

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 °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 Ta=25°C and IL=720mA. The LED lifetime could be decreased if operating IL is larger than 720mA. The constant current driving method is suggested.

Note (3) LED Light Bar Circuit (8S6P)

| | | | |
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7.0 Reliability test items

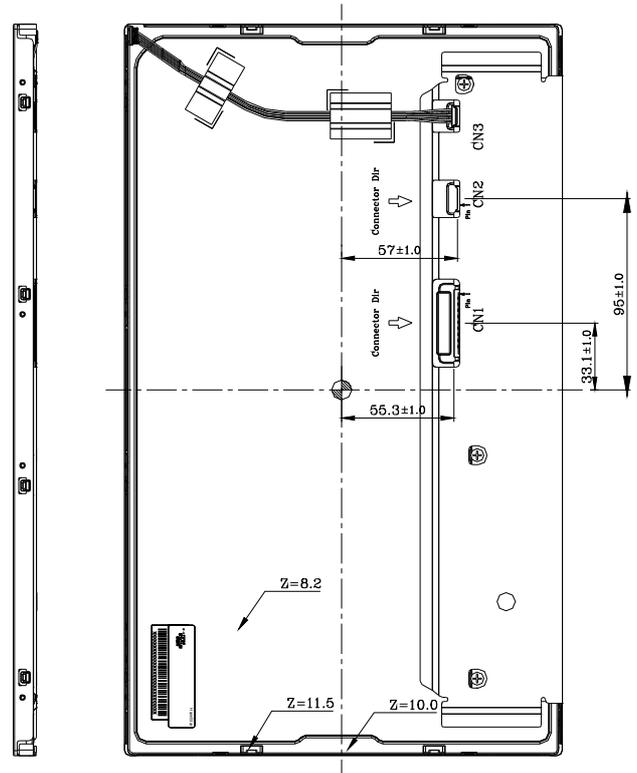
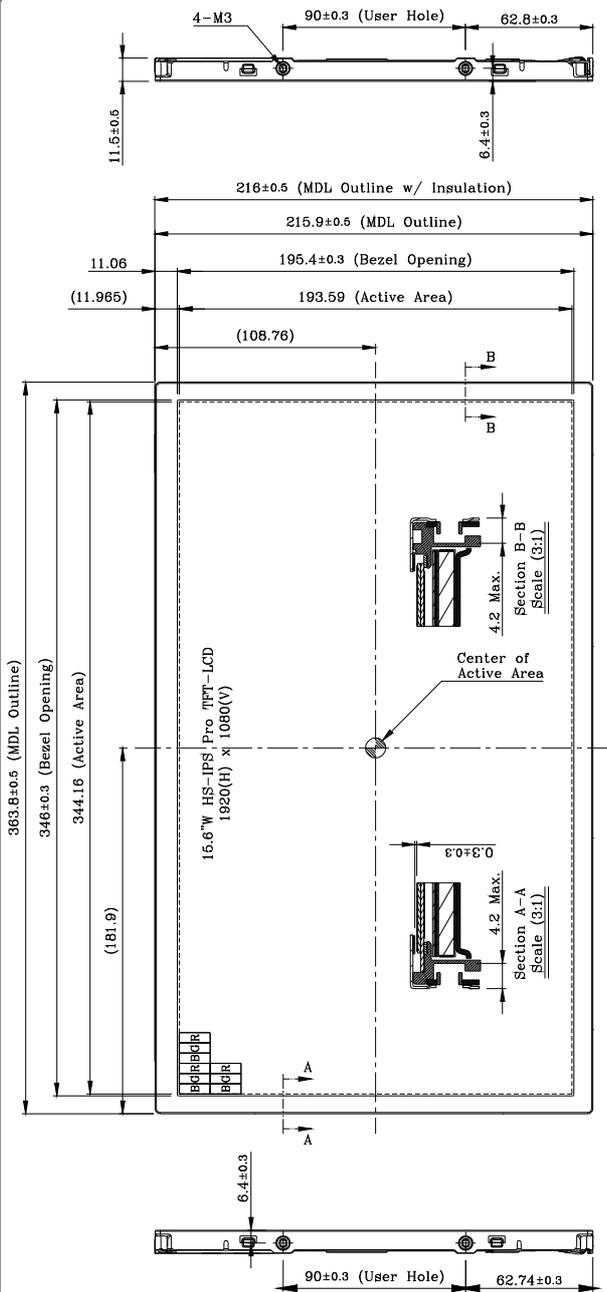
| No. | Item | Conditions | Remark |
|-----|--|---|--------|
| 1 | High Temperature Storage | Ta=+90°C, 540hrs | |
| 2 | Low Temperature Storage | Ta=-40°C, 540hrs | |
| 3 | High Temperature Operation | Ta=+85°C, 540hrs | |
| 4 | Low Temperature Operation | Ta=-30°C, 540hrs | |
| 5 | High Temperature and High Humidity (operation) | Ta=+65°C, 90%RH, 540hrs | |
| 6 | Thermal Cycling Test (non operation) | -30°C(30min) → +85°C(30min), 300 cycles | |
| 7 | Electrostatic Discharge | ±200V,200pF(0Ω) 1 time/connector | |
| 8 | Vibration | 1.Random: 1.04G, 10~500Hz, XYZ, 30min/each direction 2.Sine: Freq. Range: 8~33.3Hz, Stoke: 1.3mmhz Sweep: 2.9G, 33.3~400 X/Z: 2hrs, Y:4hrs | |
| 9 | Shock | Half-Sine, 100G, 6ms, ±XYZ, 1time | |
| 10 | Vibration (with carton) | Random: 0.015G ² /Hz, 5~200Hz -6dB/Octave, 200~400Hz XYZ 各方向 2hrs | |
| 11 | Drop (with carton) | Drop height condition, basis on the product weight and follow QB100-0027 1 corner, 3 edges, 6 surfaces | |
| 12 | ESD(Air & Contact) | AA區(打Panel 四周) 1. Air : 4kv/ 8kv / 12/ 15kv 2.Contact : 2kv 4kv / 6kv / 8kv 3. 電阻電容 : 150 pf / 330 歐姆 Connector : 1.Contact : 200v 2. 電阻電容 : 200 pf / 0 歐姆 判定標準 : 符合 Class C (含)以上 Class A : 測試時畫面無任何變化 ; 依據各執行電壓Spec作判定 Class B : 測試時畫面有閃動或雜訊產生 ; 依據各執行電壓Spec作判定 Class C : 測試時畫面當機 , 但重新Reset後恢復正常 ; 依據各執行電壓Spec作判定 NG : 畫面經重新開機仍無法恢復出畫 | |

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

| | | | |
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8.0 OUTLINE DIMENSION

Unit : mm



General Tolerance : +/- 0.3mm

User Mounting Torque Spec: 3kgf-cm Max.

| | | | |
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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: Code 8 is defined by the last number of the year, for example

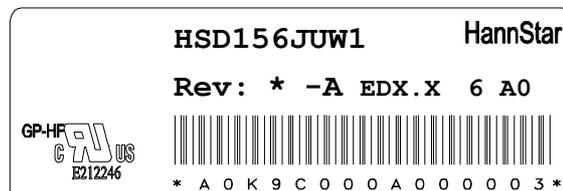
| | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|
| Year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
| Mark | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 |

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 Detail of Lot Mark

- (1) Below label is attached on the backside of the LCD module. See Section 8.0: Outline Dimension.
- (2) The detail of Lot Mark is attached as below.
- (3) This is subject to change without prior notice.



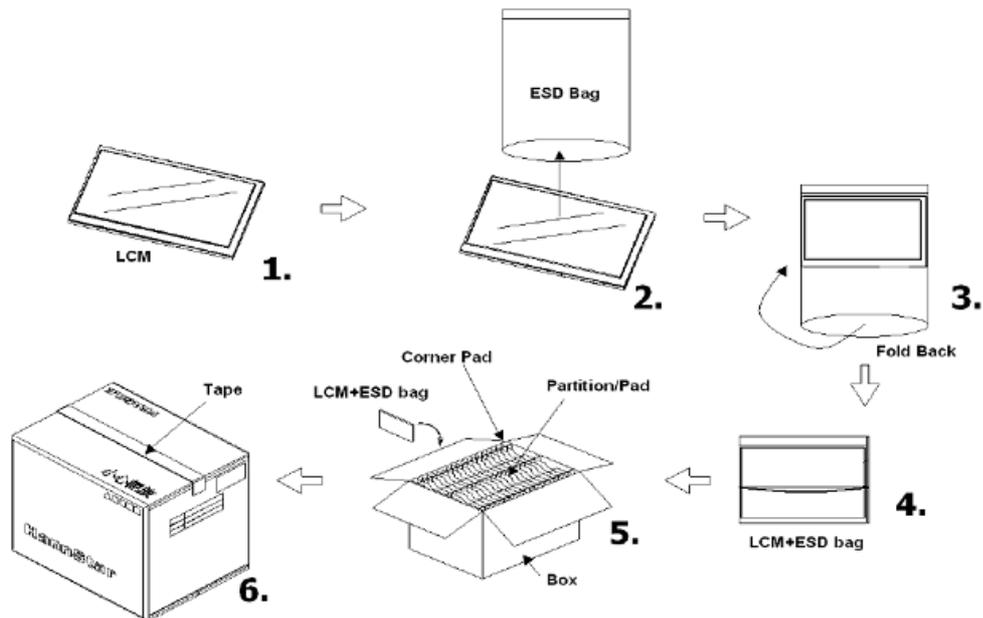
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10.0 PACKAGE SPECIFICATION

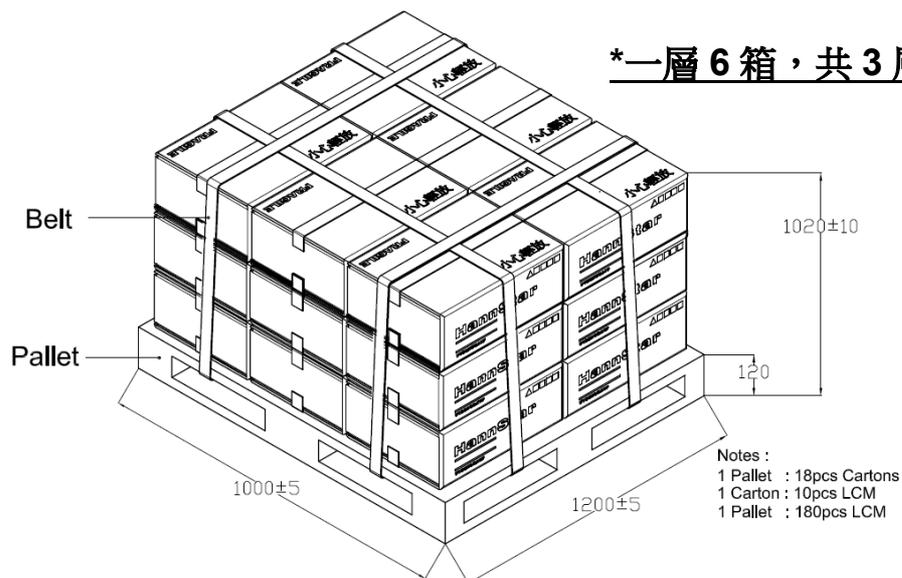
10.1 Packing form

| LCM Model | Qty. in the Box | Inner Box Size(mm) | Notice |
|--------------|-----------------|--------------------|--------|
| HSD156JUW1-A | 10pcs/Box | 465mmx270mmx300 | -- |

10.2 Packing assembly drawings



***一層 6 箱，共 3 層，共 18 箱**



Notes :
 1 Pallet : 18pcs Cartons
 1 Carton : 10pcs LCM
 1 Pallet : 180pcs LCM

| | | | |
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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.

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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.