

# NHD-7.0-800480EF-ASXV#-T

## TFT (Thin-Film-Transistor) Color Liquid Crystal Display Module

|         |                                      |
|---------|--------------------------------------|
| NHD-    | Newhaven Display                     |
| 7.0-    | 7.0" Diagonal                        |
| 800480- | 800x480 Pixels                       |
| EF-     | Model                                |
| A-      | Built-in Driver / No Controller      |
| S-      | High Brightness, White LED Backlight |
| X-      | TFT                                  |
| V-      | MVA, Wide Temperature                |
| #-      | <b>RoHS Compliant</b>                |
| T-      | Resistive Touch Panel                |

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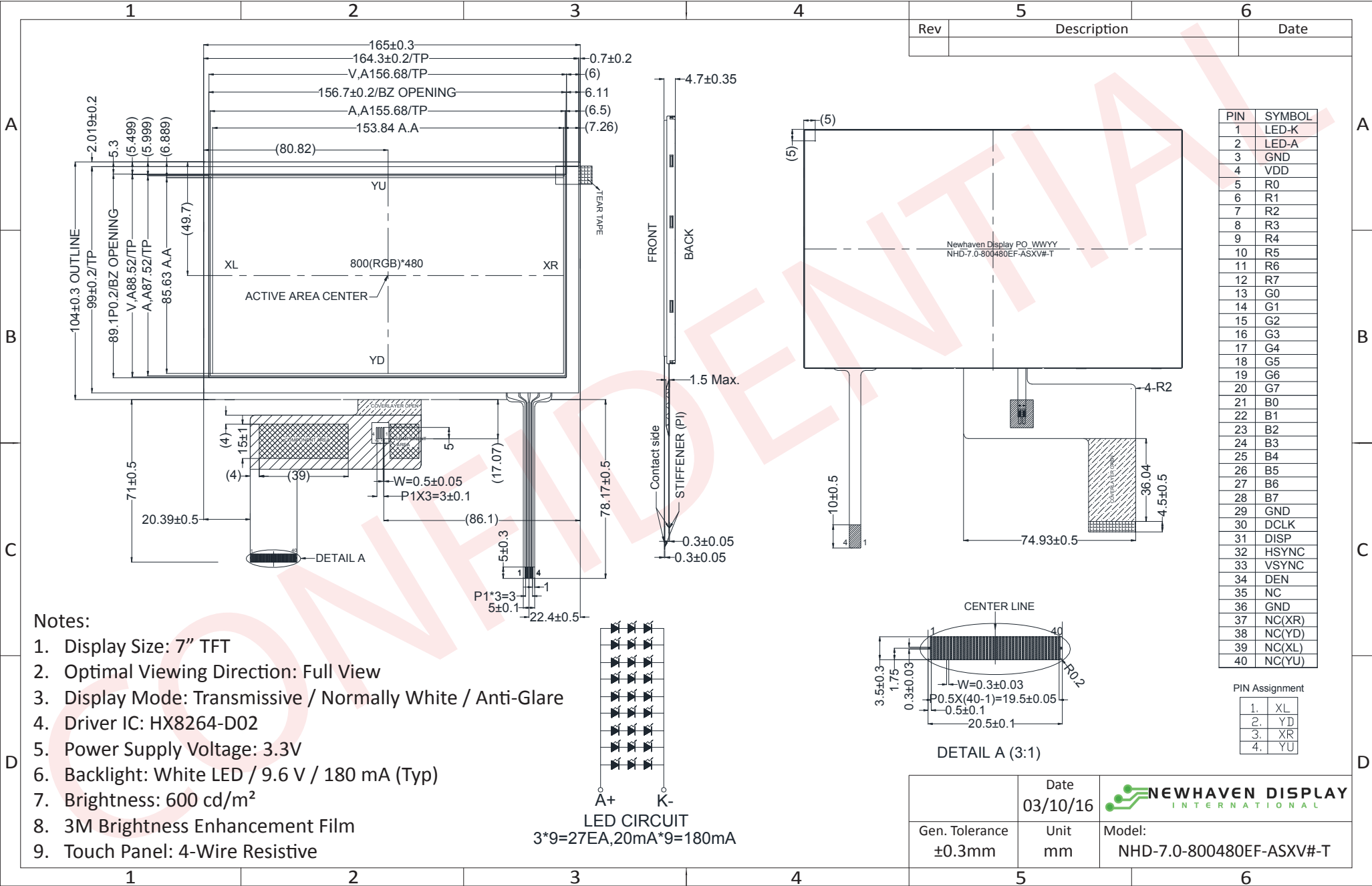
## Document Revision History

| Revision | Date    | Description     | Changed by |
|----------|---------|-----------------|------------|
| 0        | 3/10/16 | Initial Release | SB         |

## Functions and Features

- 800x480 resolution
- LED backlight
- 24-bit digital RGB interface
- 16.7M colors
- Premium high brightness display
- 4-wire resistive Touch Panel

Mechanical Drawing



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## Pin Description

### TFT:

| Pin No. | Symbol  | Connection   | Function Description                     |
|---------|---------|--------------|------------------------------------------|
| 1       | LED-K   | Power Supply | Backlight Cathode (Ground)               |
| 2       | LED-A   | Power Supply | Backlight Anode (180mA @ 9.6V)           |
| 3       | GND     | Power Supply | Ground                                   |
| 4       | VDD     | Power Supply | Supply Voltage for LCD and logic (+3.3V) |
| 5-12    | [R0-R7] | MPU          | Red Data signals                         |
| 13-20   | [G0-G7] | MPU          | Green Data signals                       |
| 21-28   | [B0-B7] | MPU          | Blue Data signals                        |
| 29      | GND     | Power Supply | Ground                                   |
| 30      | DCLK    | MPU          | Dot data Clock                           |
| 31      | DISP    | MPU          | Display on/off DISP=1:Display on         |
| 32      | HSYNC   | MPU          | Line synchronization signal              |
| 33      | VSYNC   | MPU          | Frame synchronization signal             |
| 34      | DEN     | MPU          | Data Enable signal                       |
| 35      | NC      | -            | No Connect                               |
| 36      | GND     | Power Supply | Ground                                   |
| 37      | NC(XR)  | -            | No Connect                               |
| 38      | NC(YD)  | -            | No Connect                               |
| 39      | NC(XL)  | -            | No Connect                               |
| 40      | NC(YU)  | -            | No Connect                               |

**Recommended connector:** 0.5mm pitch 40-Conductor FFC. Molex p/n: 54104-4031 (top contact)

### Resistive Touch Panel:

| Pin No. | Symbol | Connection       | Function Description |
|---------|--------|------------------|----------------------|
| 1       | XL     | Touch Controller | Touch Panel – Left   |
| 2       | YD     | Touch Controller | Touch Panel – Down   |
| 3       | XR     | Touch Controller | Touch Panel – Right  |
| 4       | YU     | Touch Controller | Touch Panel – Up     |

**Recommended connector:** 1.0mm pitch 4-Conductor FFC. Molex p/n: 52207-0485 (top contact)

## Electrical Characteristics

| Item                        | Symbol | Condition                  | Min.    | Typ.   | Max.    | Unit |
|-----------------------------|--------|----------------------------|---------|--------|---------|------|
| Operating Temperature Range | Top    | Absolute Max               | -20     | -      | +70     | °C   |
| Storage Temperature Range   | Tst    | Absolute Max               | -30     | -      | +80     | °C   |
| Supply Voltage              | VDD    | -                          | 3.0     | 3.3    | 3.6     | V    |
| Supply Current              | IDD    | VDD=3.3V 25°C              | 60      | 85     | 120     | mA   |
| "H" Level Input             | VIH    | -                          | 0.7*VDD | -      | VDD     | V    |
| "L" Level Input             | VIL    | -                          | GND     | -      | 0.3*VDD | V    |
| "H" Level Output            | VOH    | -                          | VDD-0.4 | -      | -       | V    |
| "L" Level Output            | VOL    | -                          | -       | -      | GND+0.4 | V    |
|                             |        |                            |         |        |         |      |
| Backlight Supply Voltage    | VLED   | -                          | 8.7     | 9.6    | 9.9     | V    |
| Backlight Supply Current    | ILED   | VLED=9.6V                  | -       | 180    | -       | mA   |
| Backlight Lifetime*         | -      | ILED = 180 mA<br>Top = 25° | 20,000  | 50,000 | -       | Hrs. |

\*Backlight Lifetime is rated as Hours until **half-brightness**, under normal operating conditions.

## Optical Characteristics

| Item                   | Symbol | Condition | Min. | Typ. | Max. | Unit              |
|------------------------|--------|-----------|------|------|------|-------------------|
| Optimal Viewing Angles | Top    | Cr ≥ 10   | -    | 70   | -    | °                 |
|                        | Bottom |           | -    | 70   | -    | °                 |
|                        | Left   |           | -    | 70   | -    | °                 |
|                        | Right  |           | -    | 70   | -    | °                 |
| Contrast Ratio         | Cr     | -         | -    | 400  | -    | -                 |
| Luminance              | L      | -         | 480  | 600  | -    | cd/m <sup>2</sup> |
| Response Time (rise)   | Tr+Tf  | -         | -    | 25   | 35   | ms                |

## Touch Panel Characteristics

| Item                         | Min.      | Typ. | Max. | Unit       |
|------------------------------|-----------|------|------|------------|
| Linearity                    | -3        | -    | 3    | %          |
| Terminal Resistance – X-Axis | 50        | -    | 400  | Ω          |
| Terminal Resistance – Y-Axis | 350       | -    | 1100 | Ω          |
| Insulation Resistance        | 20        | -    | -    | MΩ         |
| Operating Voltage            | -         | -    | 10   | V          |
| Chattering                   | -         | -    | 10   | ms         |
| Activation Force             | 10        | -    | 100  | g          |
| Pen Writing Durability       | 100,000   | -    | -    | Characters |
| Pitting Durability           | 1,000,000 | -    | -    | Touches    |
| Surface Hardness             | 3         | -    | -    | H          |

## Driver Information

Built-in HX8264-D02 Source Driver: [http://www.newhavendisplay.com/app\\_notes/HX8264-D02.pdf](http://www.newhavendisplay.com/app_notes/HX8264-D02.pdf)

Built-in HX8664-B Gate Driver: [http://www.newhavendisplay.com/app\\_notes/HX8664-B.pdf](http://www.newhavendisplay.com/app_notes/HX8664-B.pdf)

## Timing Characteristics

| Parameter              | Symbol    | Spec. |      |      | Unit |
|------------------------|-----------|-------|------|------|------|
|                        |           | Min.  | Typ. | Max. |      |
| HS setup time          | $T_{hst}$ | 8     | -    | -    | ns   |
| HS hold time           | $T_{hhd}$ | 8     | -    | -    | ns   |
| VS setup time          | $T_{vst}$ | 8     | -    | -    | ns   |
| VS hold time           | $T_{vhd}$ | 8     | -    | -    | ns   |
| Data setup time        | $T_{dsu}$ | 8     | -    | -    | ns   |
| Data hold time         | $T_{dhd}$ | 8     | -    | -    | ns   |
| DE setup time          | $T_{esu}$ | 8     | -    | -    | ns   |
| DE hold time           | $T_{ehd}$ | 8     | -    | -    | ns   |
| VDD Power On Slew rate | $T_{POR}$ | -     | -    | 20   | ms   |
| RSTB pulse width       | $T_{Rst}$ | 10    | -    | -    | us   |
| CLKIN cycle time       | $T_{cph}$ | 20    | -    | -    | ns   |
| CLKIN pulse duty       | $T_{cwh}$ | 40    | 50   | 60   | %    |
| Output stable time     | $T_{sst}$ | -     | -    | 6    | us   |

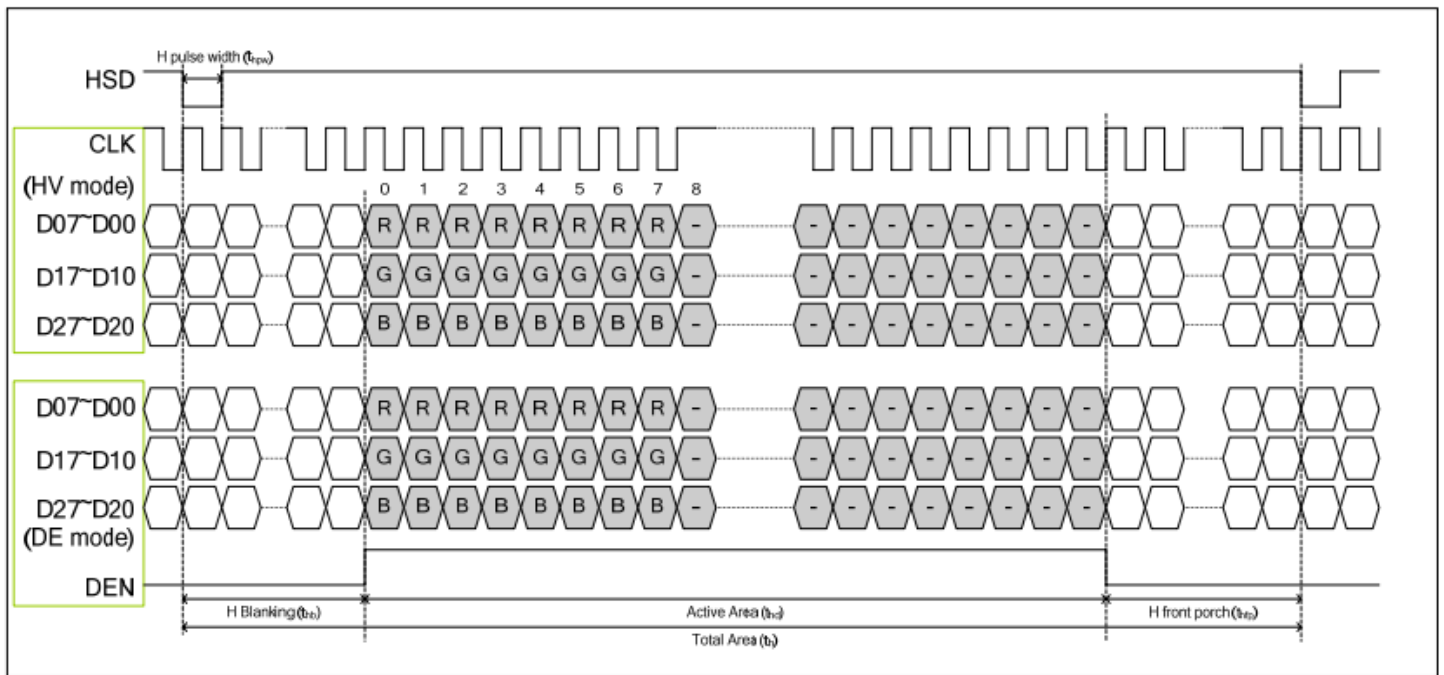
## Horizontal Timing

| Parameter                | Symbol | Spec. |      |      | Unit |
|--------------------------|--------|-------|------|------|------|
|                          |        | Min.  | Typ. | Max. |      |
| Horizontal Display Area  | thd    | 800   |      |      | DCLK |
| DCLK frequency           | fclk   | -     | 30   | 50   | MHz  |
| One Horizontal Line      | th     | 889   | 928  | 1143 | DCLK |
| HS pulse width           | thpw   | 1     | 48   | 255  | DCLK |
| HS Back Porch (Blanking) | thb    | 88    |      |      | DCLK |
| HS Front Porch           | thfp   | 1     | 40   | 255  | DCLK |
| DE mode Blanking         | th-thd | 85    | 128  | 512  | DCLK |

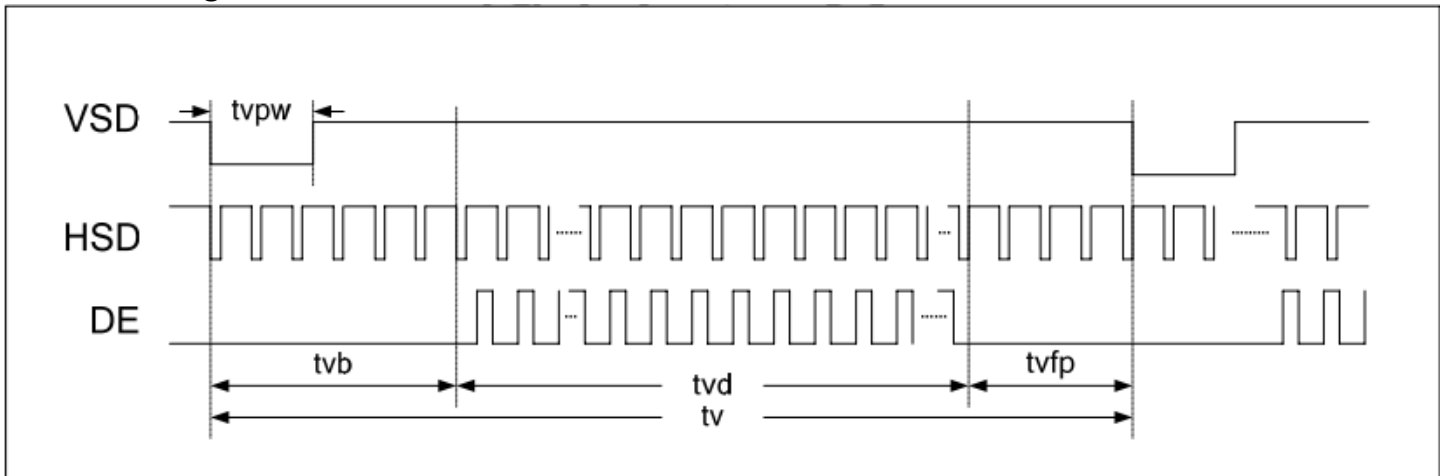
## Vertical Timing

| Parameter                | Symbol | Spec. |      |      | Unit  |
|--------------------------|--------|-------|------|------|-------|
|                          |        | Min.  | Typ. | Max. |       |
| Vertical Display Area    | tv     | 480   |      |      | $T_H$ |
| VS period time           | tv     | 513   | 525  | 767  | $T_H$ |
| VS pulse width           | tvpw   | 3     | 3    | 255  | $T_H$ |
| VS Back Porch (Blanking) | tvb    | 32    |      |      | $T_H$ |
| VS Front Porch           | tvfp   | 1     | 13   | 255  | $T_H$ |
| DE mode Blanking         | tv-tvd | 4     | 45   | 255  | $T_H$ |

## Horizontal Timing



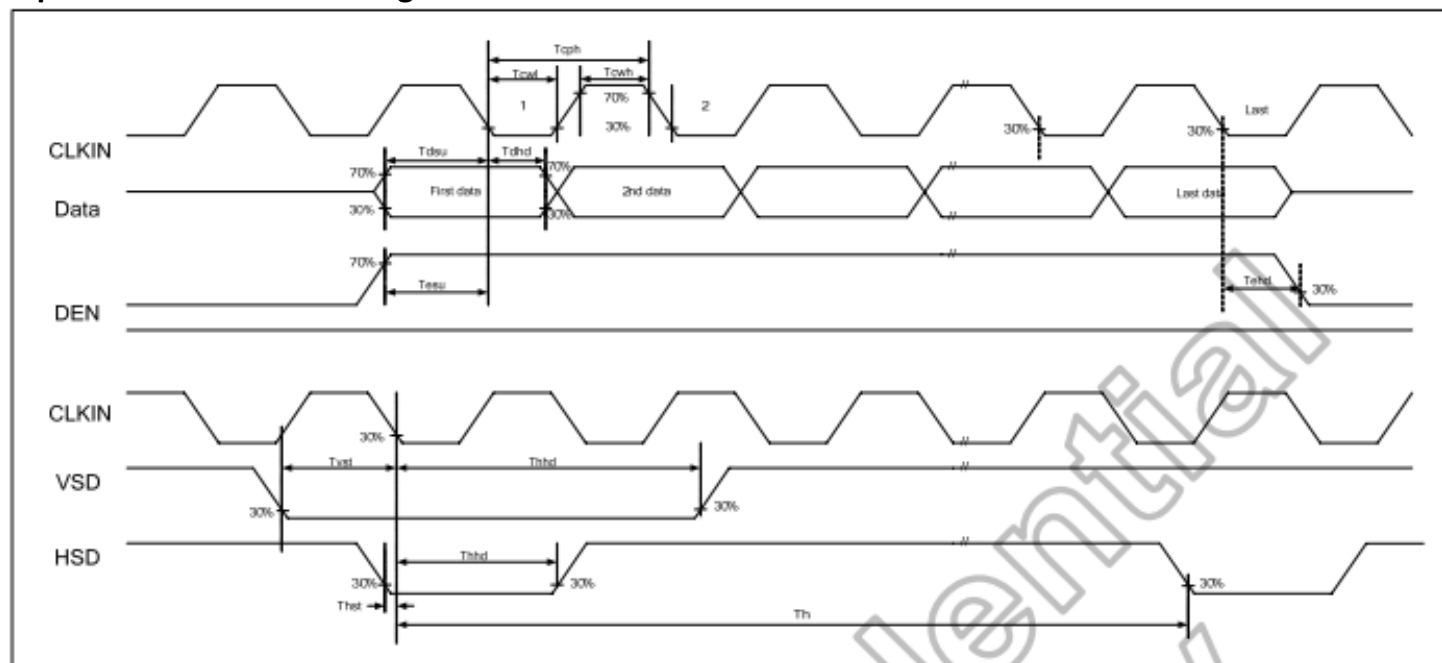
## Vertical Timing



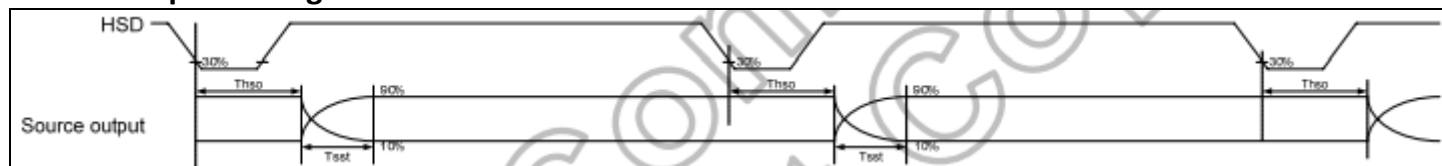
## Parallel 24-bit RGB mode

| Parameter                      | Symbol | Min. | Typ. | Max. | Unit  | Conditions    |
|--------------------------------|--------|------|------|------|-------|---------------|
| CLKIN Frequency                | Fclk   | -    | 40   | 50   | MHz   | VDD=3.0V~3.6V |
| CLKIN Cycle Time               | Tclk   | 20   | 25   | -    | ns    | -             |
| CLKIN Pulse Duty               | Tcwh   | 40   | 50   | 60   | %     | Tclk          |
| Time from HSD to Source Output | Thso   | 64   |      |      | CLKIN | -             |
| Time from HSD to LD            | Thld   | 64   |      |      | CLKIN | -             |
| Time from HSD to STV           | Thstv  | 2    |      |      | CLKIN | -             |
| Time from HSD to CKV           | Thckv  | 20   |      |      | CLKIN | -             |
| Time from HSD to OEV           | Thoev  | 4    |      |      | CLKIN | -             |
| LD Pulse Width                 | Twld   | 10   |      |      | CLKIN | -             |
| CKV Pulse Width                | Twckv  | 66   |      |      | CLKIN | -             |
| OEV Pulse Width                | Twoev  | 74   |      |      | CLKIN | -             |

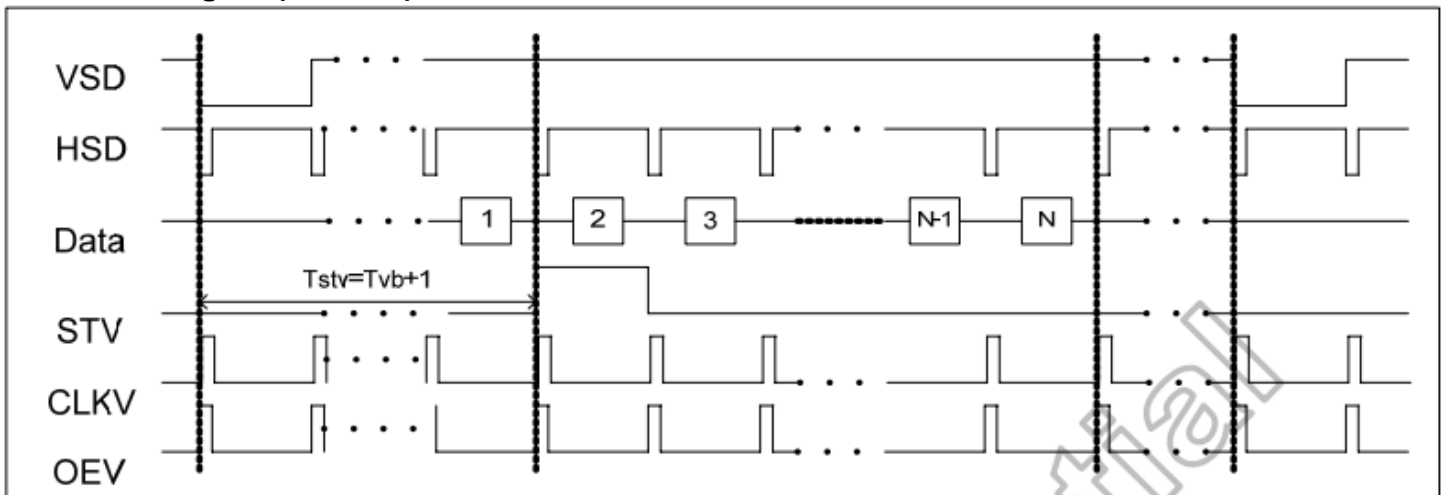
## Input Clock and Data Timing



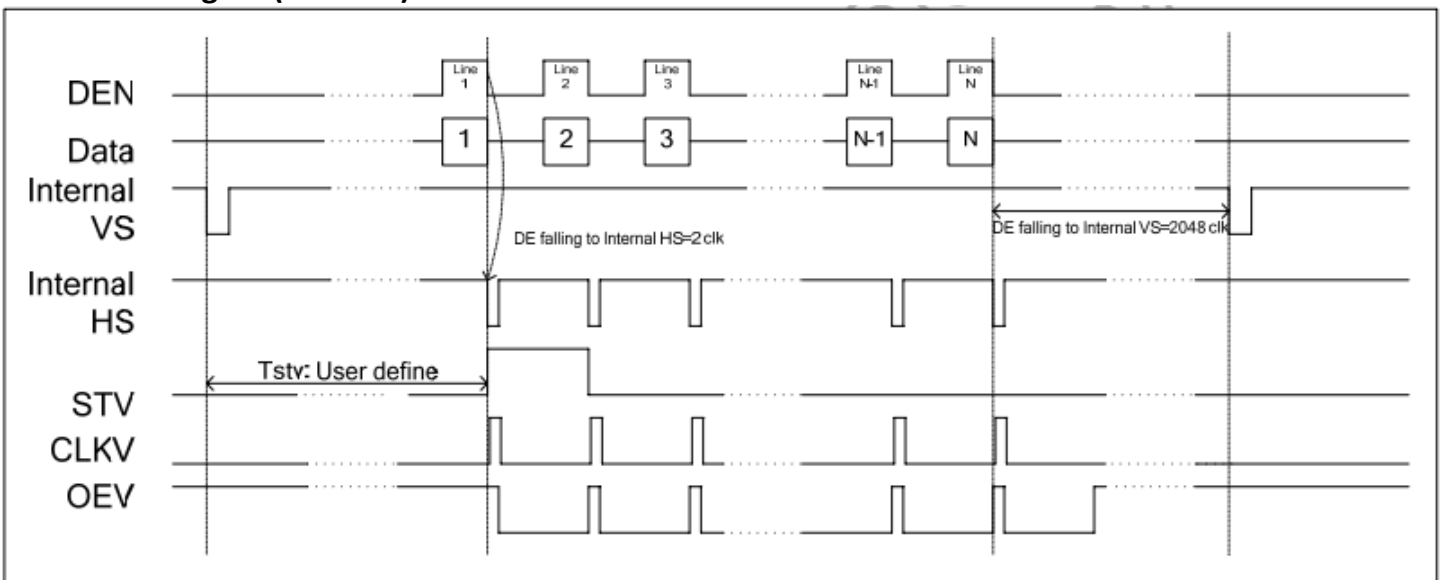
## Source Output Timing



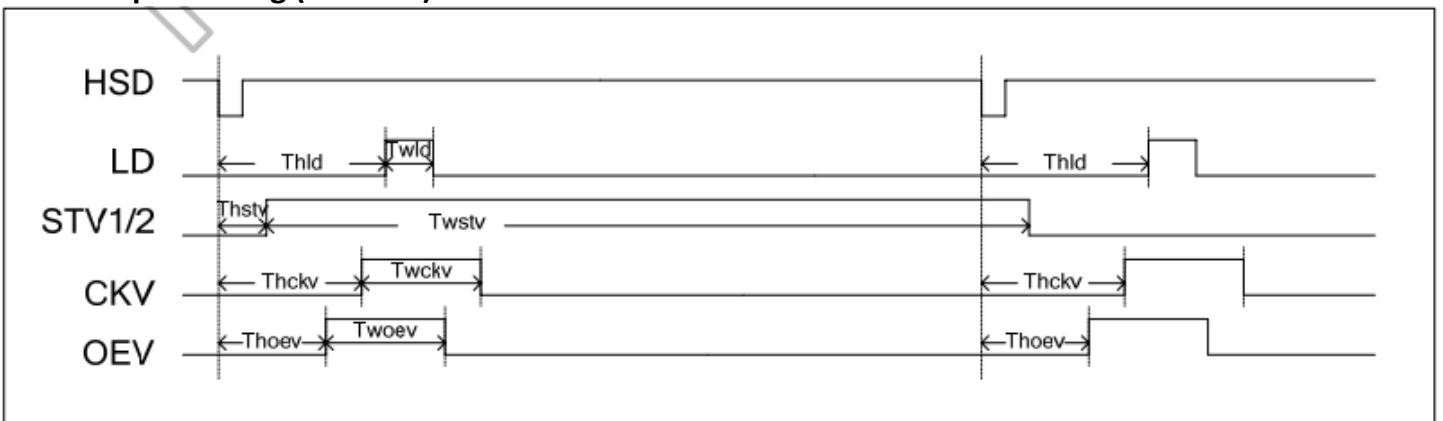
## Vertical Timing HV (Cascade)



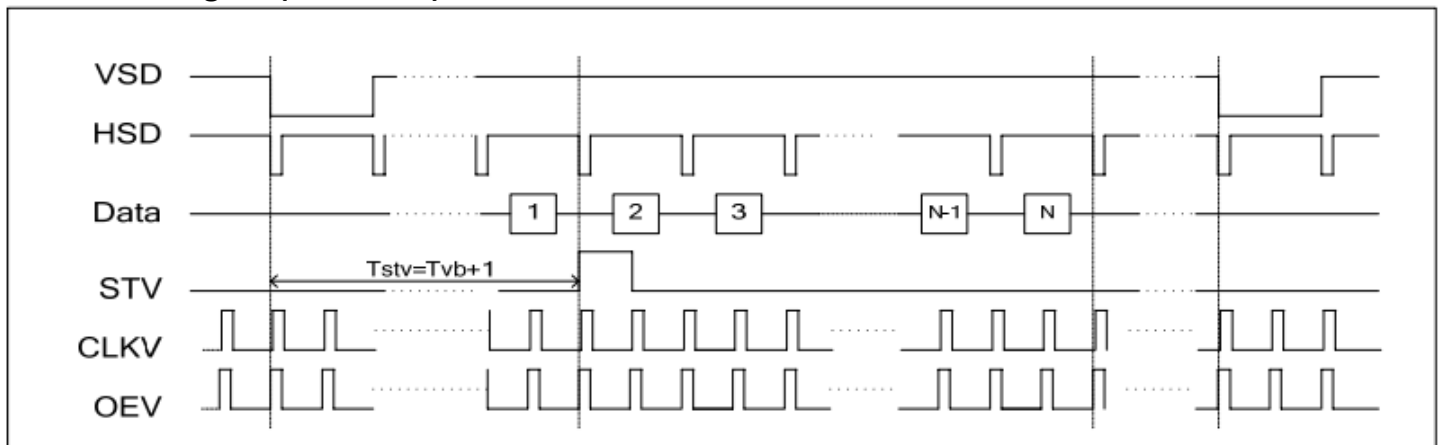
## Vertical Timing DE (Cascade)



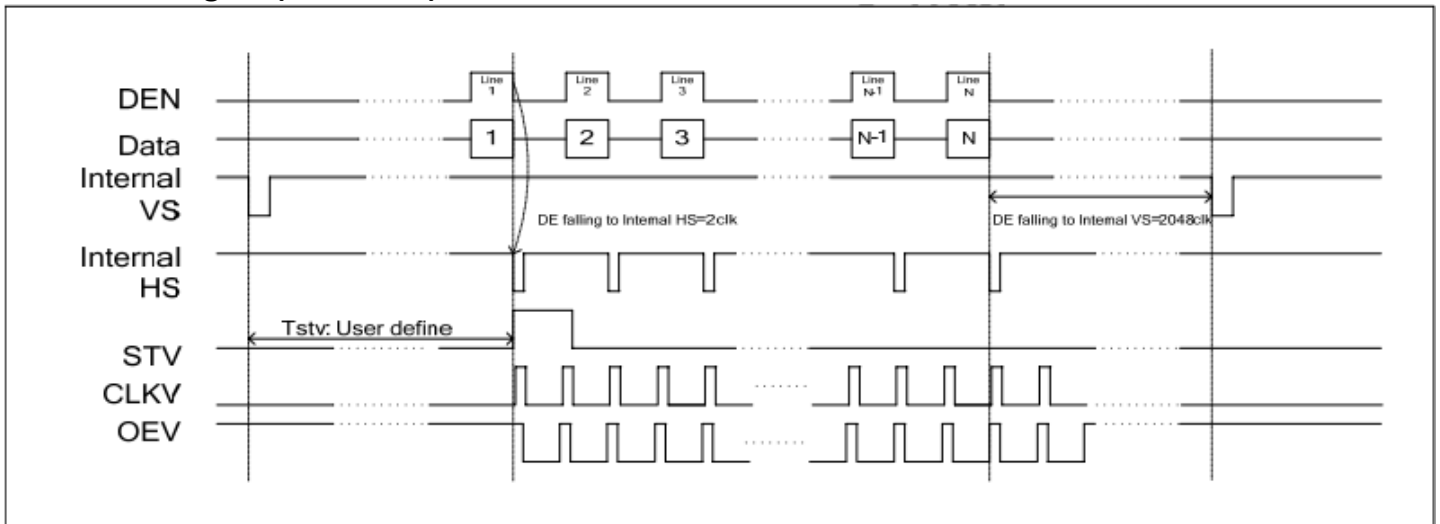
## Gate Output Timing (Cascade)



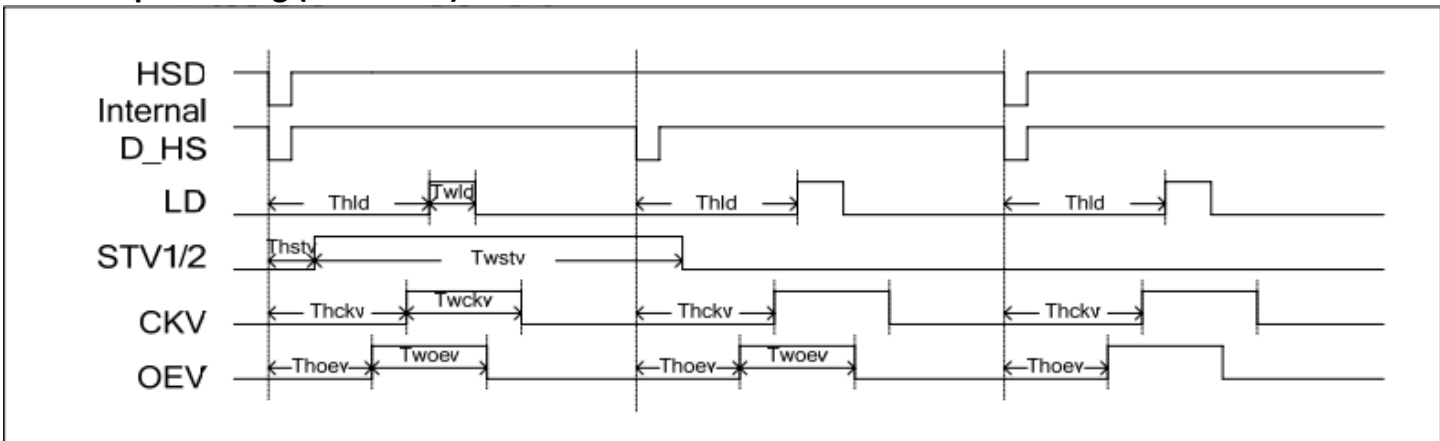
## Vertical Timing HV (Dual Gate)



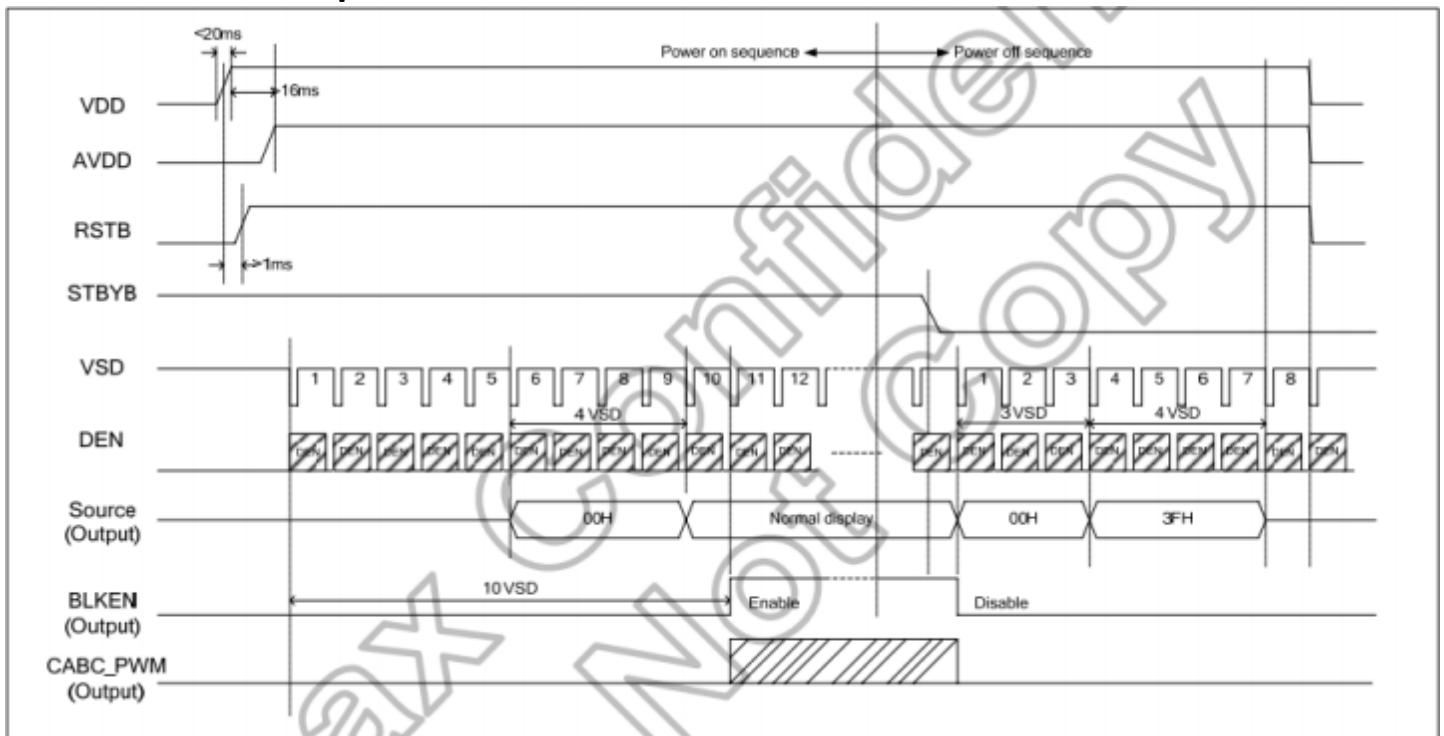
## Vertical Timing DE (Dual Gate)



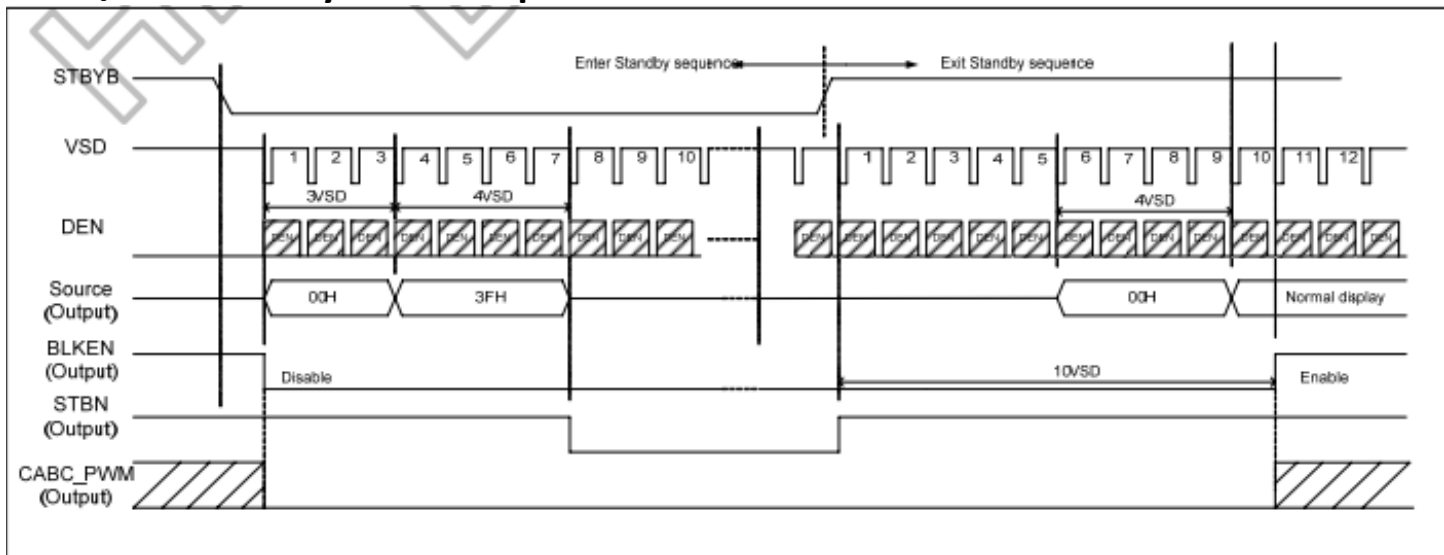
## Gate Output Timing (Dual Gate)



## Power ON/OFF Sequence



## Enter/Exit Standby Mode Sequence



## Quality Information

| Test Item                             | Content of Test                                                                                                                 | Test Condition                                                                          | Note |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------|
| High Temperature storage              | Endurance test applying the high storage temperature for a long time.                                                           | +80°C , 96hrs                                                                           | 2    |
| Low Temperature storage               | Endurance test applying the low storage temperature for a long time.                                                            | -30°C , 96hrs                                                                           | 1,2  |
| High Temperature Operation            | Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.                    | +70°C, 96hrs                                                                            | 2    |
| Low Temperature Operation             | Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.                     | -20°C , 96hrs                                                                           | 1,2  |
| High Temperature / Humidity Operation | Endurance test applying the electric stress (voltage & current) and the high thermal with high humidity stress for a long time. | +50°C , 90% RH , 96hrs                                                                  | 1,2  |
| Thermal Shock resistance              | Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.                  | -30°C, 30min -> 80°C, 30min,<br>Change time: 5min,<br>10 cycles                         |      |
| Vibration test                        | Endurance test applying vibration to simulate transportation and use.                                                           | 10-55Hz , 1.5mm amplitude.<br>60 sec in each of 3 directions<br>X,Y,Z<br>For 15 minutes | 3    |
| Static electricity test               | Endurance test applying electric static discharge.                                                                              | VS=800V, RS=1.5kΩ, CS=100pF<br>One time                                                 |      |

**Note 1:** No condensation to be observed.

**Note 2:** Conducted after 4 hours of storage at 25°C, 0%RH.

**Note 3:** Test performed on product itself, not inside a container.

## Precautions for using LCDs/LCMs

See Precautions at [www.newhavendisplay.com/specs/precautions.pdf](http://www.newhavendisplay.com/specs/precautions.pdf)

## Warranty Information

See Terms and Conditions at [http://www.newhavendisplay.com/index.php?main\\_page=terms](http://www.newhavendisplay.com/index.php?main_page=terms)

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- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
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- Работу по проектам и поставку образцов.
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- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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