# NHD-4.3-480272EF-ATXL#-T

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

| | |
|---|---|
| NHD- | Newhaven Display |
| 4.3- | 4.3” Diagonal |
| 480272- | 480xRGBx272 pixels |
| EF- | Model |
| A- | Built-in driver / No Controller |
| T- | White LED backlight |
| X- | TFT |
| L- | 6:00 optimum view, Wide Temp |
| #- | **RoHS Compliant** |
| T- | 4-wire Resistive touch panel |


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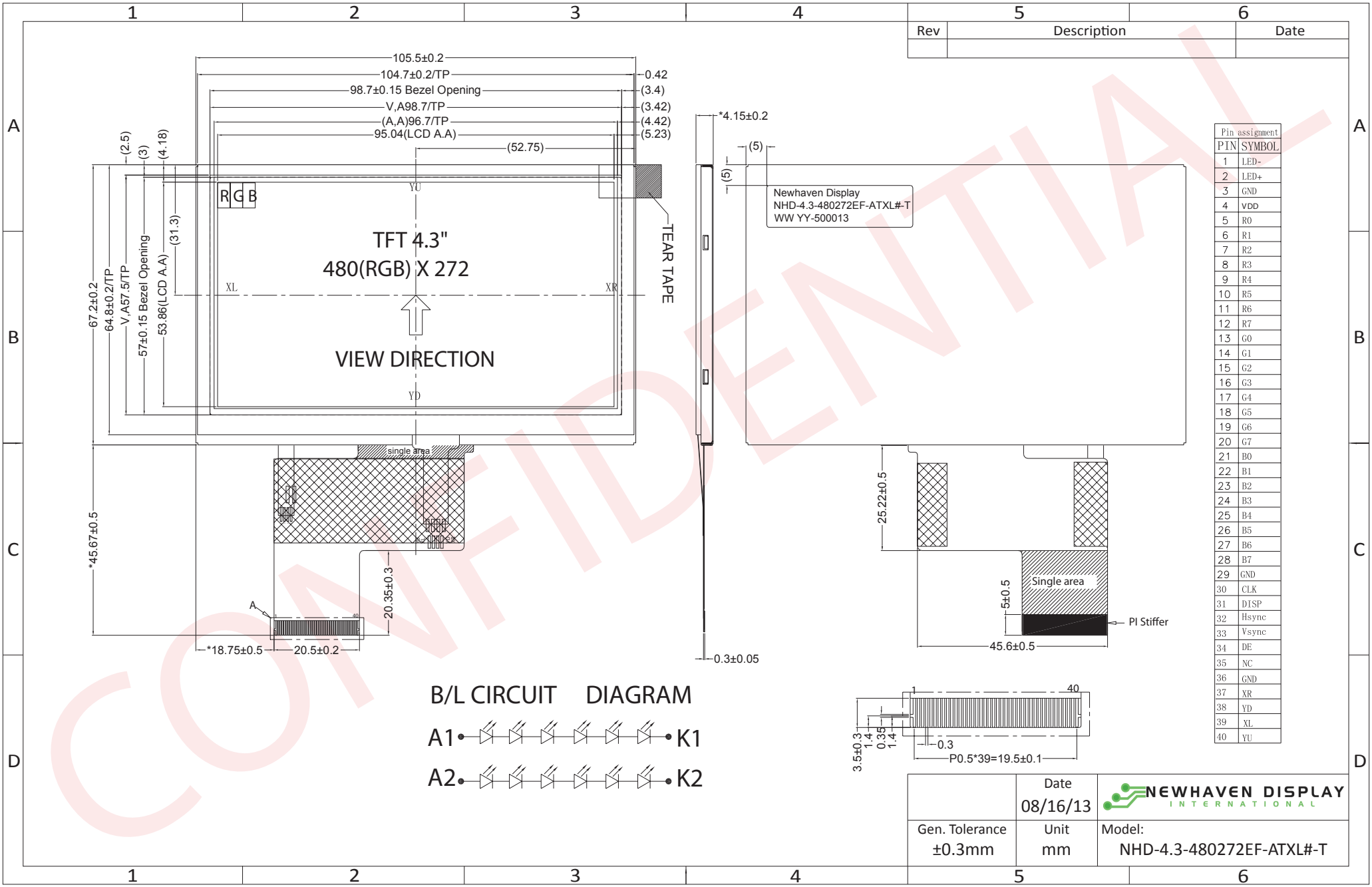
## Document Revision History

| Revision | Date | Description | Changed by |
|---|---|---|---|
| 0 | 8/29/2012 | Initial Release | AK |
| 1 | 7/12/2013 | Mechanical, Optical, Touch panel Characteristics updated | KA |
| 2 | 8/16/2013 | Mechanical drawing updated | KA |

## Functions and Features

- **480xRGBx272 resolution, up to 16.7M colors**
- **12-LED backlight**
- **24 bit RGB interface**
- **4-wire Resistive touch panel**

# Mechanical Drawing



## Pin Description

| Pin No. | Symbol | External Connection | Function Description |
|---|---|---|---|
| 1 | LED- | Power Supply | Ground for Backlight |
| 2 | LED+ | Power Supply | Backlight Power Supply (40mA @ 19.2V) |
| 3 | GND | Power Supply | Ground |
| 4 | VDD | Power Supply | Power supply 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 | CLK | MPU | Data sample Clock signal |
| 31 | DISP | MPU | Display ON/OFF signal |
| 32 | HSYNC | MPU | Line synchronization signal |
| 33 | VSYNC | MPU | Frame synchronization signal |
| 34 | DE | MPU | Data Enable signal |
| 35 | NC | - | No Connect |
| 36 | GND | Power Supply | Ground |
| 37 | XR | Touch Controller | Touch Panel Right |
| 38 | YD | Touch Controller | Touch Panel Down |
| 39 | XL | Touch Controller | Touch Pane Left |
| 40 | YU | Touch Controller | Touch Panel Up |

**Recommended LCD connector:** 0.5mm pitch 40-Conductor FFC. Molex p/n: 54132-4097
**Backlight connector:** on LCD connector **Mates with**: ---

## 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 (White screen) | IDD | | - | 24.24 | 28.78 | mA |
| Supply Current (Black screen) | IDD | | - | 25.76 | 30.30 | mA |
| "H" level input | Vih | | 0.8*VDD | - | VDD | V |
| "L" level input | Vil | | 0 | - | 0.2*VDD | V |
| | | | | | | |
| Backlight Supply Voltage | VLED | | - | 19.2 | 22 | V |
| Backlight Supply Current | ILED | | - | 40 | - | mA |
| Backlight Power Consumption | PBL | | - | 768 | - | mW |

## Optical Characteristics

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Viewing Angle – Top | | Cr ≥10 | - | 70 | - | ° |
| Viewing Angle – Bottom | | | - | 50 | - | ° |
| Viewing Angle – Left | | | - | 70 | - | ° |
| Viewing Angle – Right | | | - | 70 | - | ° |
| Contrast Ratio | Cr | | 400 | 500 | - | |
| Luminance | $Y_L$ | | - | 340 | - | $cd/m^2$ |
| Response Time | Tr+Tf | - | - | 25 | 30 | ms |

Viewing angles based on 12:00 gray scale inversion

## Touch Panel Characteristics

| Item | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|
| Linearity | -1.5 | - | 1.5 | % |
| Circuit Resistance – X-Axis | 350 | - | 1050 | Ω |
| Circuit Resistance – Y-Axis | 100 | - | 450 | Ω |
| Insulation Resistance | 20 | - | - | MΩ |
| Operating Voltage | - | - | 10 | V |
| Chattering | - | - | 15 | ms |
| Transmittance | 80 | - | - | % |
| Activation Force | 20 | - | 80 | g |
| Pen Writing Durability | 100,000 | - | - | Characters |
| Pitting Durability | 1,000,000 | - | - | Touches |
| Surface Hardness | 3 | - | - | H |
| Haze | 4 | 7 | 10 | % |

## Driver Information

Built-in Himax HX8257-A

Please download specification at http://www.newhavendisplay.com/app_notes/HX8257.pdf

## Timing Characteristics

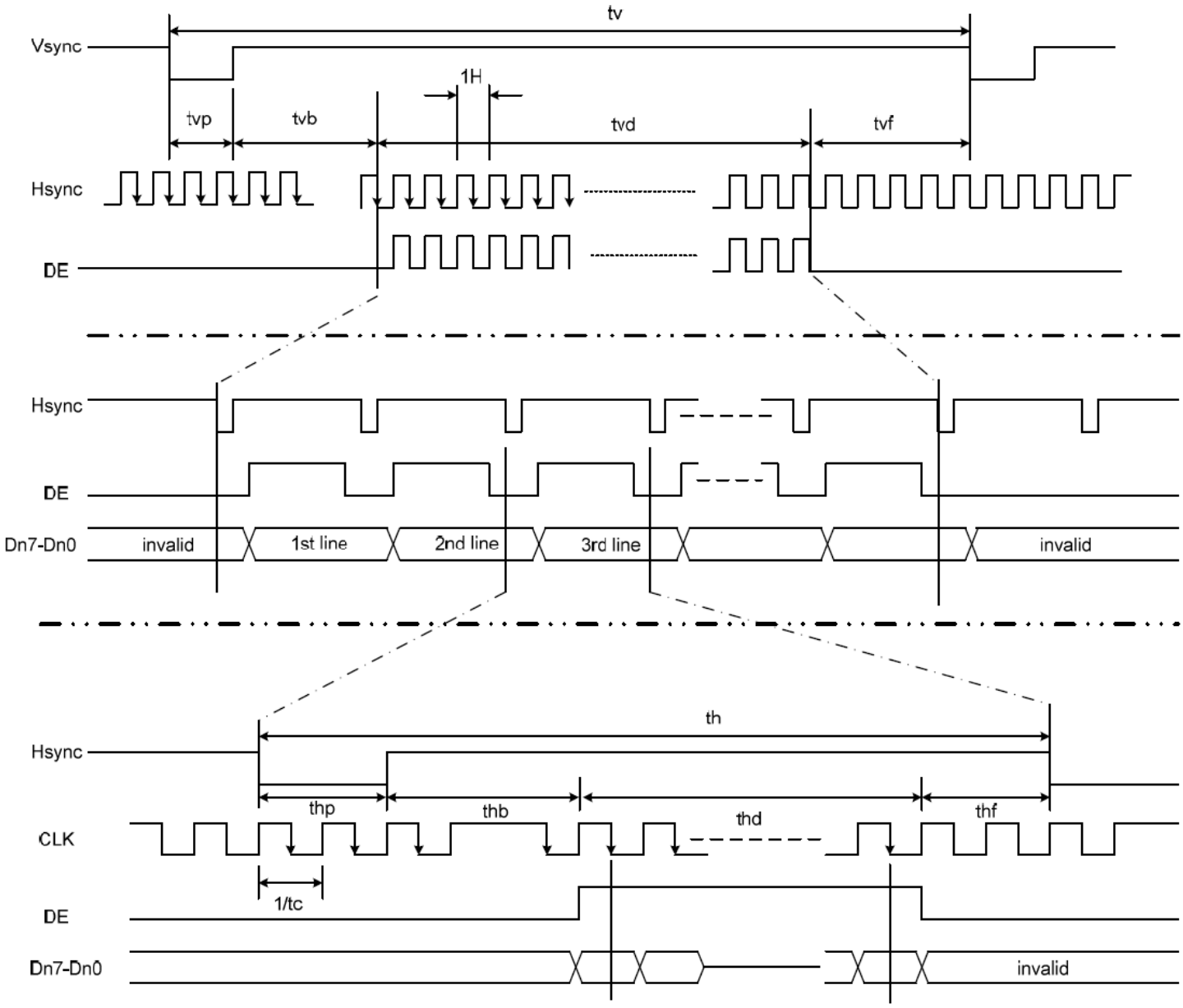
### Parallel RGB input timing requirement

(480RGBx272, $T_A$=25°C, VDDIO=1.8V to 3.6V, DVSS=0V)

| Parameter | Symbol | Spec. | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| Clock cycle | $f_{CLK}$ (1) | - | 9 | 15 | MHz |
| Hsync cycle | 1/th | - | 17.14 | - | KHz |
| Vsync cycle | 1/tv | - | 59.94 | - | Hz |
| Horizontal Signal | | | | | |
| Horizontal cycle | th | 525 | 525 | 605 | CLK |
| Horizontal display period | thd | 480 | 480 | 480 | CLK |
| Horizontal front porch | thf | 2 | 2 | 82 | CLK |
| Horizontal pulse width | thp (2) | 2 | 41 | 41 | CLK |
| Horizontal back porch | thb (2) | 2 | 2 | 41 | CLK |
| Vertical Signal | | | | | |
| Vertical cycle | tv | 285 | 286 | 511 | H (1) |
| Vertical display period | tvd | 272 | 272 | 272 | H (1) |
| Vertical front porch | tvf | 1 | 2 | 227 | H (1) |
| Vertical pulse width | tvp (2) | 1 | 10 | 11 | H (1) |
| Vertical back porch | tvb (2) | 1 | 2 | 11 | H (1) |

Note: (1) Unit: CLK=1/$f_{CLK}$, H=th,

(2)It is necessary to keep tvp+tvb=12 and thp+thb=43 in sync mode. DE mode is unnecessary to keep it.

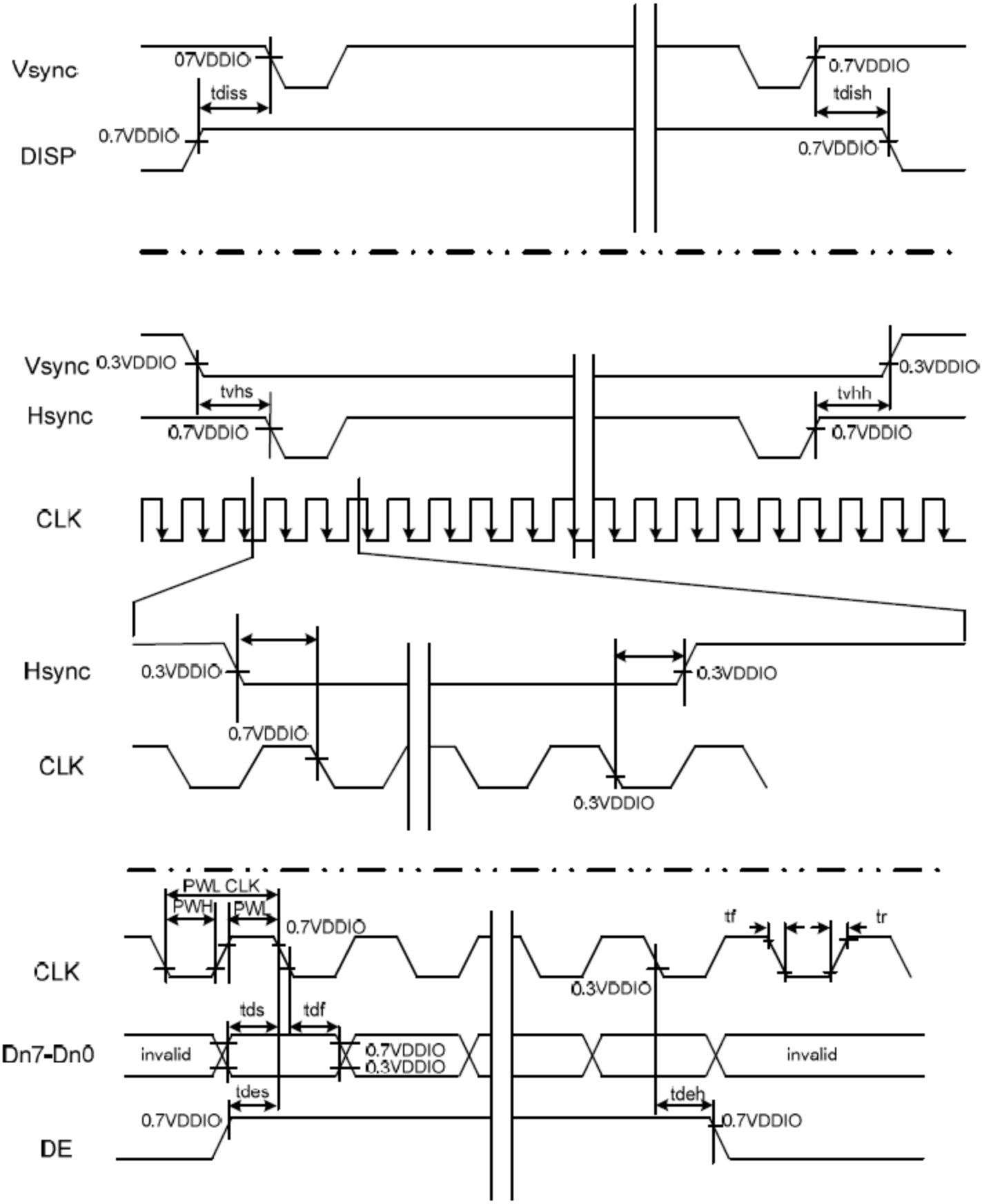

tv
Vsync
1H
tvp
tvb
tvd
tvf
Hsync
DE
Hsync
DE
Dn7-Dn0
invalid
1st line
2nd line
3rd line
invalid
th
Hsync
thp
thb
thd
thf
CLK
1/tc
DE
Dn7-Dn0
invalid

**Input setup timing requirement**

($T_A$=25°C, VDDIO=1.8V to 3.6V, DVSS= 0V, tr [1]=tf [1]=2ns)

| Parameter | Symbol | Spec. | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| DISP setup time | $t_{diss}$ | 10 | - | - | ns |
| DISP hold time | $t_{dish}$ | 10 | - | - | ns |
| Clock period | $PW_{CLK}$ [2] | 66.7 | - | - | ns |
| Clock pulse high period | PWH [2] | 26.7 | - | - | ns |
| Clock pulse low period | PWL [2] | 26.7 | - | - | ns |
| Hsync setup time | $t_{hs}$ | 10 | - | - | ns |
| Hsync hold time | $t_{hh}$ | 10 | - | - | ns |
| Data setup time | $t_{ds}$ | 10 | - | - | ns |
| Data hold time | $t_{dh}$ | 10 | - | - | ns |
| DE setup time | $t_{des}$ | 10 | - | - | ns |
| DE hold time | $t_{deh}$ | 10 | - | - | ns |
| Vsync setup time | $t_{vhs}$ | 10 | - | - | ns |
| Vsync hold time | $t_{vhh}$ | 10 | - | - | ns |

Note: (1) tr, tf is defined 10% to 90% of signal amplitude.
(2) For parallel interface, maximum clock frequency is 15MHz.


Vsync
07VDDIO
tdiss
0.7VDDIO
DISP
0.7VDDIO
tdish
0.7VDDIO
Vsync
0.3VDDIO
tvhs
Hsync
0.7VDDIO
0.3VDDIO
tvhh
0.7VDDIO
CLK
Hsync
0.3VDDIO
0.3VDDIO
0.7VDDIO
CLK
0.3VDDIO
PWL CLK
PWH
PWL
0.7VDDIO
tf
tr
CLK
0.3VDDIO
tds
tdf
Dn7-Dn0
invalid
0.7VDDIO
0.3VDDIO
invalid
tdes
tdeh
0.7VDDIO
0.7VDDIO
DE

## 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 , 200hrs | 2 |
| Low Temperature storage | Endurance test applying the low storage temperature for a long time. | -30°C , 200hrs | 1,2 |
| High Temperature Operation | Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time. | +70°C 200hrs | 2 |
| Low Temperature Operation | Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time. | -20°C , 200hrs | 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. | +60°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. | -20°C,30min -> 25°C,5min -<br>>70°C,30min = 1 cycle<br>10 cycles | |
| Vibration test | Endurance test applying vibration to simulate transportation and use. | 10-55Hz , 15mm 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

## Warranty Information and Terms & Conditions

http://www.newhavendisplay.com/index.php?main_page=terms