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NHD-4.3-480272EF-ASXN#-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
S-	Sunlight Readable
X-	TFT
N-	TN, Wide Temperature
#-	**RoHS Compliant**
T-	4-wire Resistive Touch Panel

Newhaven Display International, Inc.

2661 Galvin Ct.

Elgin IL, 60124

Ph: 847-844-8795 Fax: 847-844-8796

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nhtech@newhavendisplay.com nhsales@newhavendisplay.com

Document Revision History

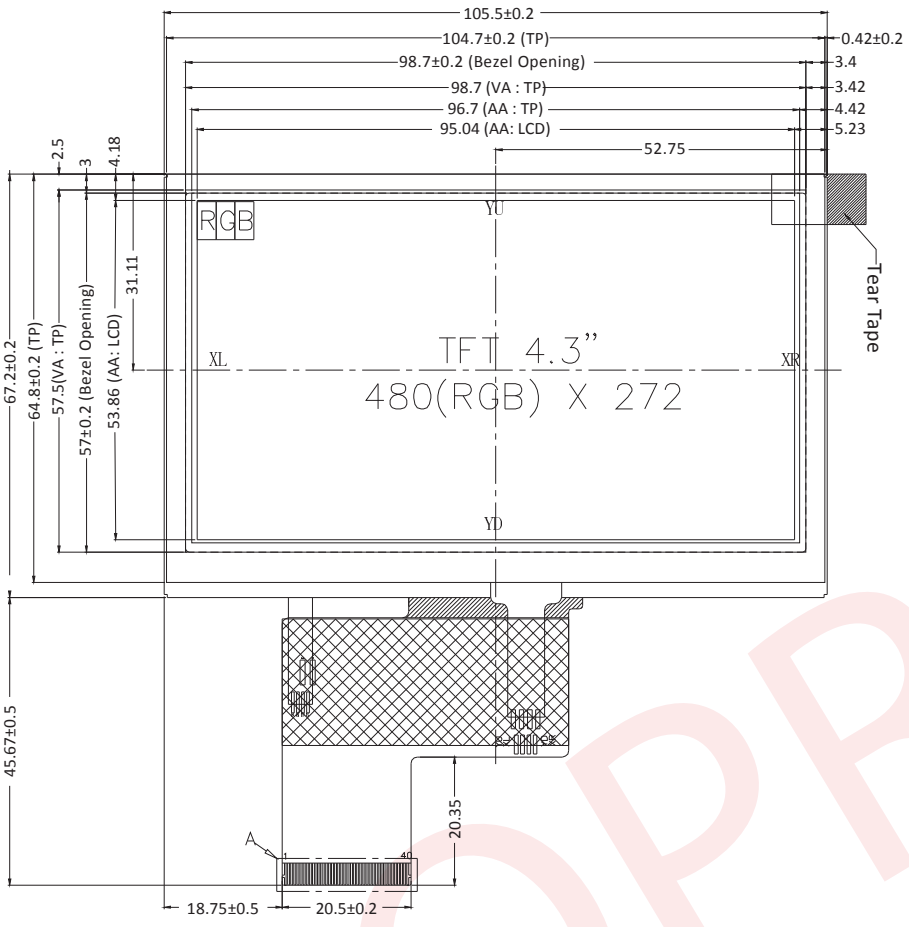
Revision	Date	Description	Changed by
0	9/22/15	Initial Release	SB
1	1/13/17	Mechanical Drawing, Electrical & Optical Char. Updated	SB

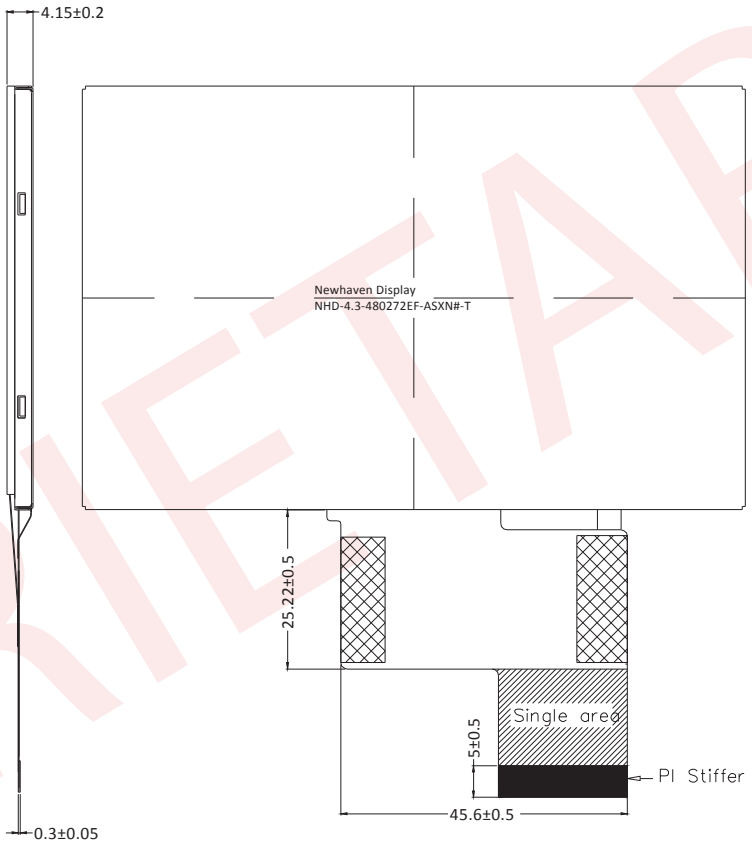
Functions and Features

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

Mechanical Drawing

Rev	Description	Date



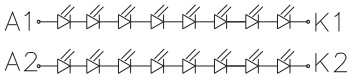


Detail A

Pin No.	Symbol
1	LED-
2	LED+
3	GND
4	VDD
5-12	[R0-R7]
13-20	[G0-G7]
21-28	[B0-B7]
29	GND
30	CLK
31	DISP
32	HSYNC
33	VSYNC
34	DE
35	NC
36	GND
37	XR
38	YD
39	XL
40	YU

Notes:

1. Display Size:	4.3" TFT
2. Display Mode:	Transmissive/ Normally White / Anti Glare
3. Optimal View:	6:00
4. Driver IC:	HX8257-A
5. Supply Voltage:	3.3V
6. Backlight:	White LED / 25.6V / 40 mA (Typ)
7. Luminance:	780 cd/m²
8. Touch Panel:	4-Wire Resistive
9. 3M Brightness Enhancement Film	



B/L CIRCUIT DIAGRAM

Unit		
mm	NEWHAVEN DISPLAY INTERNATIONAL	
Gen. Tol.	Date	Part Number:
±0.3	01/13/17	NHD-4.3-480272EF-ASXN#-T

Pin Description

Pin No.	Symbol	External Connection	Function Description
1	LED-	Power Supply	Backlight Cathode
2	LED+	Power Supply	Backlight Anode (40mA @ 25.6V)
3	GND	Power Supply	Ground
4	V_{DD}	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	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: 54104-4033
Backlight connector: on LCD connector **Mates with**: ---

Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	T_{OP}	Absolute Max	-20	-	+70	°C
Storage Temperature Range	T_{ST}	Absolute Max	-30	-	+80	°C
Supply Voltage	V_{DD}	-	3.0	3.3	3.6	V
Supply Current	I_{DD}	V_{DD} = 3.3V	14	28	56	mA
"H" level input	V_{IH}	-	0.8 * V_{DD}	-	V_{DD}	V
"L" level input	V_{IL}	-	GND	-	0.3 * V_{DD}	V
	V_{OH}	-	0.9 * V_{DD}	-	V_{DD}	V
	V_{OL}	-	GND	-	0.1 * V_{DD}	V
Backlight Supply Voltage	V_{LED}	-	23.2	25.6	26.4	V
Backlight Supply Current	I_{LED}	V_{LED} = 25.6V	30	40	50	mA
Backlight Lifetime*	-	I_{LED} = 40mA T_{OP} = 25°C	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	φY+	CR ≥ 10	-	50	-	º
	Bottom	φY-		-	60	-	º
	Left	θX-		-	60	-	º
	Right	θX+		-	60	-	º
Contrast Ratio		CR	-	400	500	-	-
Luminance		L_V	I_{LED} = 40mA	620	780	-	cd/m^2
Response Time	Rise + Fall	$T_R + T_F$	T_{OP} = 25°C	-	25	30	ms

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	-	-	10	ms
Transmittance	80	-	-	%
Activation Force	30	-	120	g
Pen Writing Durability	20,000	-	-	Characters
Pitting Durability	1,000,000	-	-	Touches
Surface Hardness	3	-	-	H
Haze	4	7	10	%

Driver Information

Built-in Himax HX8257-A driver.
Please download specification at http://www.newhavendisplay.com/app_notes/HX8257.pdf

Timing Characteristics

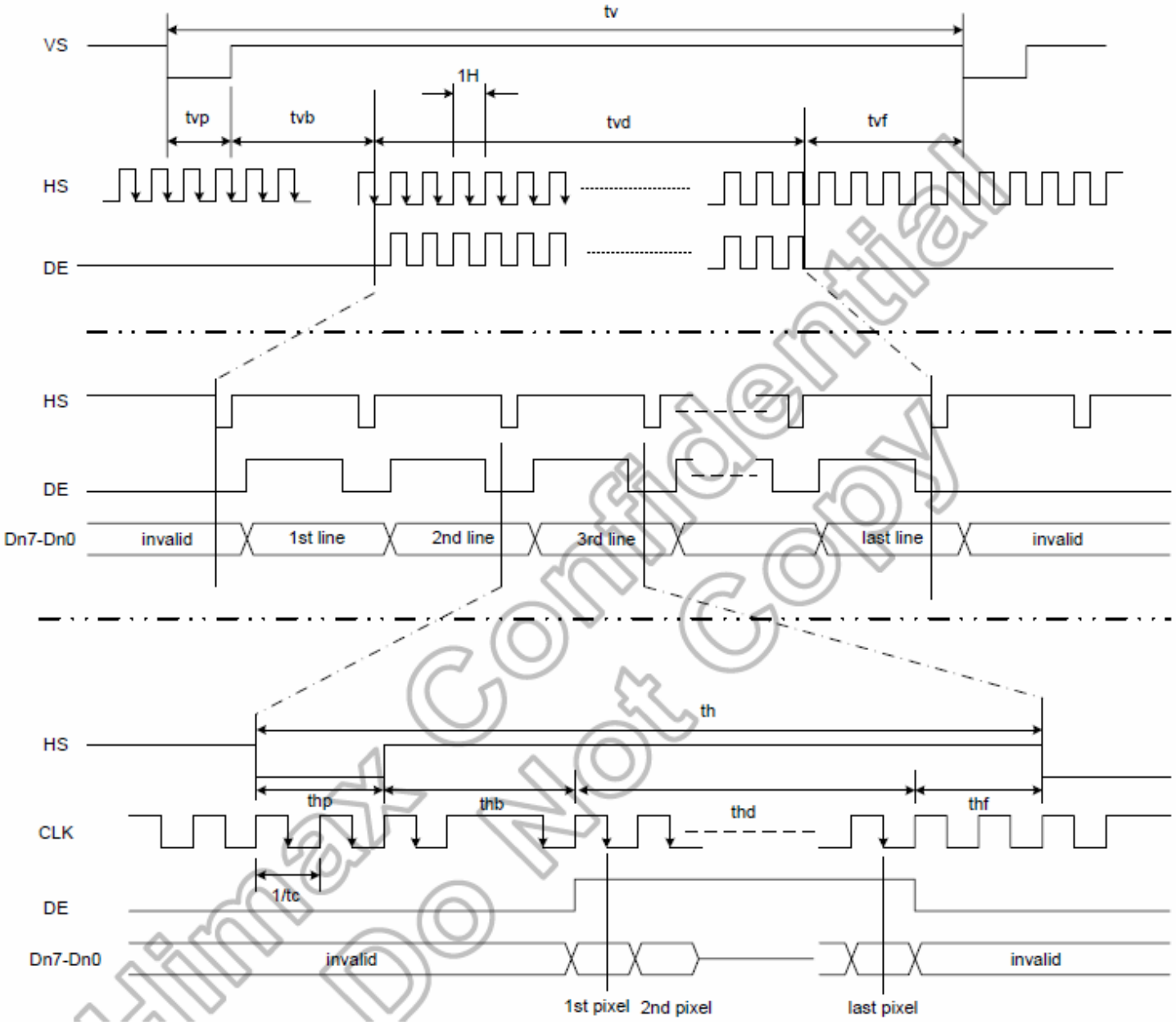
Parallel RGB input timing requirement

(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	399	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.

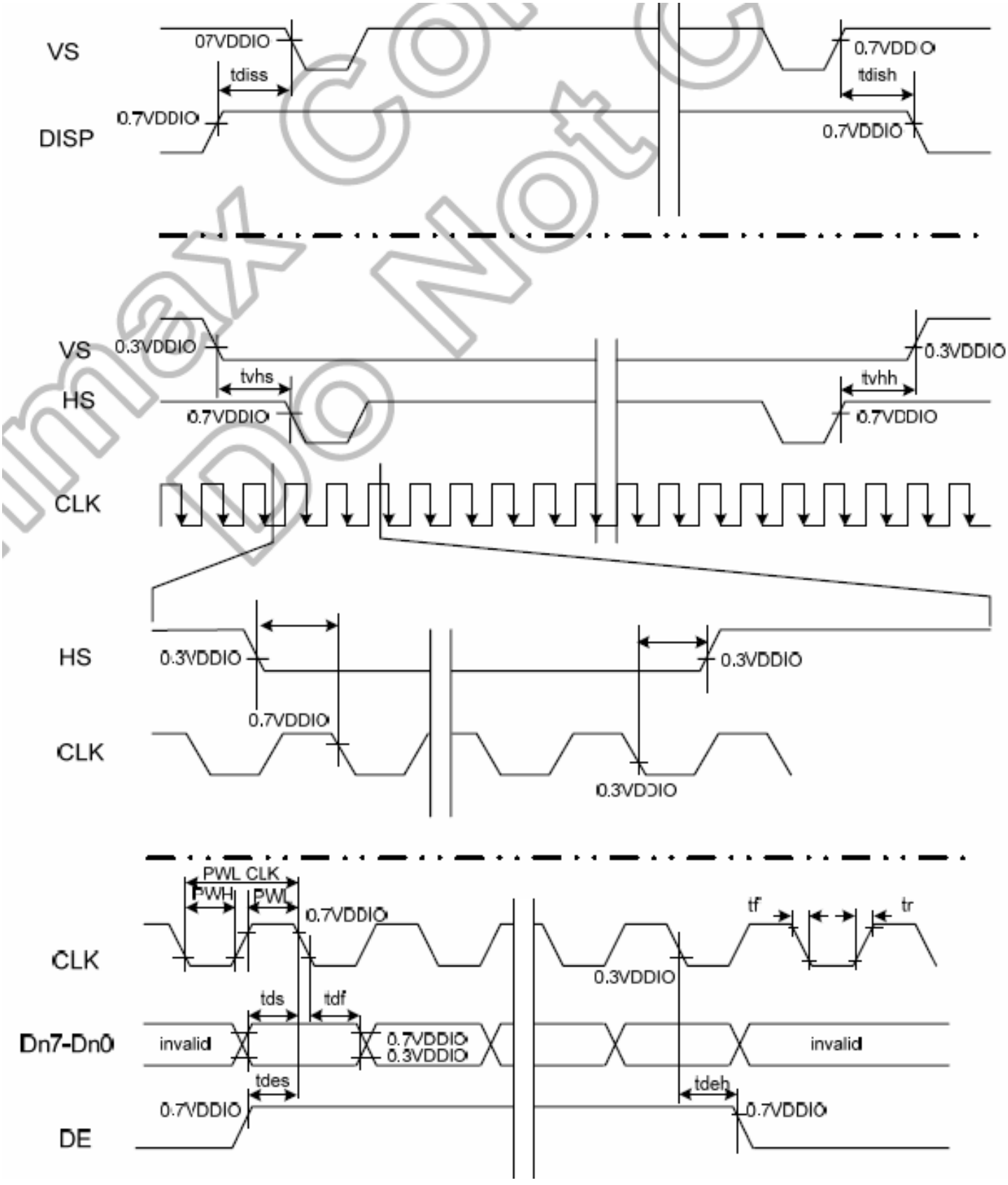


Input setup timing requirement

(T_A =25ºC, 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.



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.	+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 - >70°C,30min = 1 cycle 10 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-55Hz , 15mm amplitude. 60 sec in each of 3 directions X,Y,Z For 15 minutes	3
Static electricity test	Endurance test applying electric static discharge.	V_S=8KV, R_S=330Ω, C_S=150pF 5 Times	

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

See Terms & Conditions at http://www.newhavendisplay.com/index.php?main_page=terms