NHD-4.3-480272EF-ATXL#

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 Optimal View, Wide Temperature
#-	**RoHS Compliant**

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Document Revision History

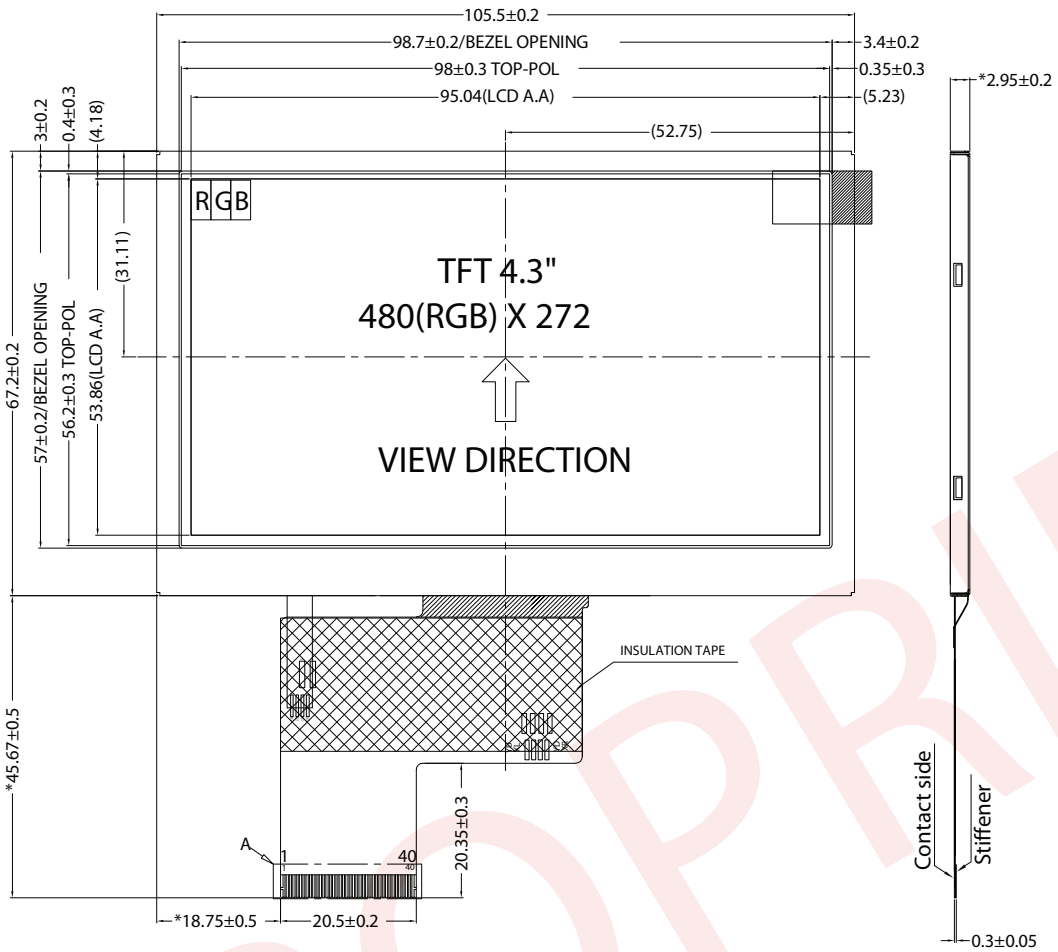
Revision	Date	Description	Changed by
0	8/29/2012	Initial Release	AK
1	7/11/2013	Mechanical and Optical characteristic updated	KA
2	2/14/2014	Mechanical drawing updated	KA
3	6/24/2014	Timing characteristics updated	ML
4	12/8/15	Datasheet Reformat, Backlight lifetime added	SB
5	11/10/16	Mechanical Drawing, Electrical Characteristics Updated	SB
6	2/28/16	Driver IC Updated	SB

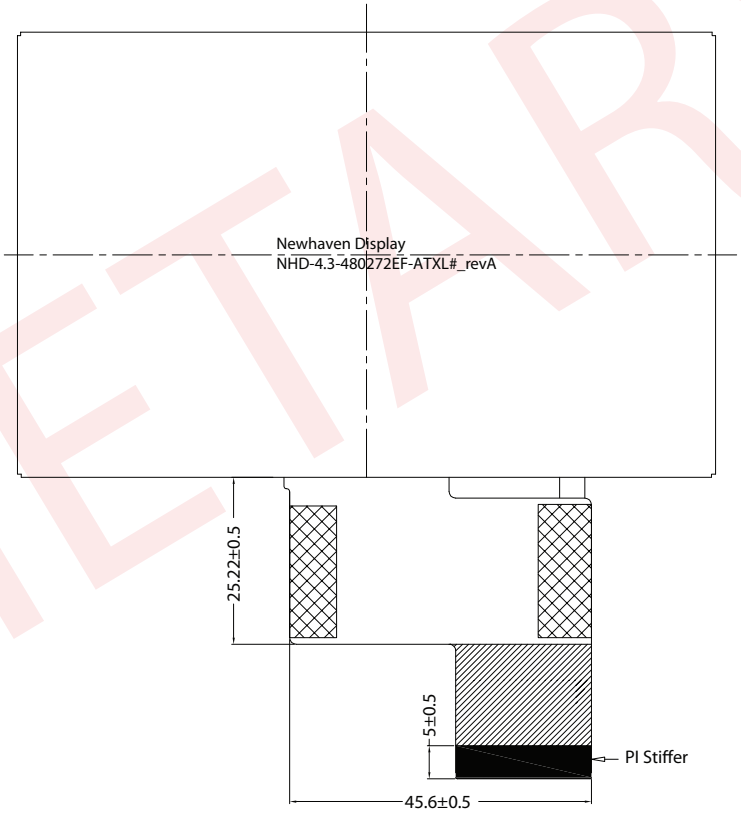
Functions and Features

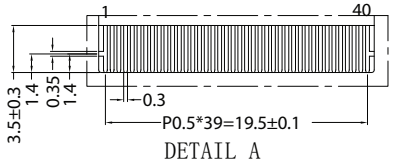
- **480xRGBx272 resolution, up to 16.7M colors**
- **12-LED backlight**
- **24-Bit RGB interface**
- **Resistive and Capacitive touch panel available**

Mechanical Drawing

Rev	Description	Date







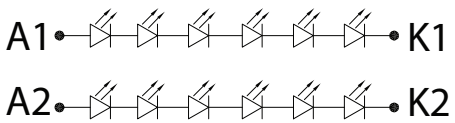
DETAIL A

Pin Assignment	
PIN	SYMBOL
1	LEDK
2	LEDA
3	GND
4	VCC
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	CLK
31	DISP
32	Hsync
33	Vsync
34	DEN
35	NC
36	GND
37	NC (YU)
38	NC (XL)
39	NC (YD)
40	NC (XR)

Notes:

1. Display Size: 4.3” TFT
2. Optimal View: 6:00
3. Display Mode: Transmissive / Normally White / Anti-Glare
4. Driver IC: ST7282T2
5. Supply Voltage: 3.3 V
6. Backlight: White LED / 40mA / 19.2V (Typ)
7. Brightness: 400 cd/m² (Typ)

B/L CIRCUIT DIAGRAM



Unit	NEWHAVEN DISPLAY INTERNATIONAL	
mm		
Gen. Tol.	Date	Part Number:
±0.3	03/31/17	NHD-4.3-480272EF-ATXL#

Pin Description

Pin No.	Symbol	External Connection	Function Description
1	LED-	Power Supply	Backlight Cathode (Ground)
2	LED+	Power Supply	Backlight Anode (40mA @ 19.2V)
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	DEN	MPU	Data Enable signal
35	NC	-	No Connect
36	GND	Power Supply	Ground
37	NC	-	No Connect
38	NC	-	No Connect
39	NC	-	No Connect
40	NC	-	No Connect

Recommended LCD connector: 0.5mm pitch 40-Conductor FFC. Molex p/n: 54132-4062
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	12	25	50	mA
"H" level input	V_{IH}	-	0.7 * V_{DD}	-	V_{DD}	V
"L" level input	V_{IL}	-	V_{SS}	-	0.3 * V_{DD}	V
Backlight Supply Current	I_{LED}	-	30	40	50	mA
Backlight Supply Voltage	I_{LED}	I_{LED} = 40mA	16.8	19.2	20.4	mA
Backlight Lifetime*	-	I_{LED} = 40mA T_{OP} = 25°C	20,000	50,000	-	Hrs.

*Backlight is current driven; do not supply more than 30 mA. 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-		-	70	-	º
	Left	θX-		-	70	-	º
	Right	θX+		-	70	-	º
Contrast Ratio		CR	-	400	500	-	-
Luminance		L_V	I_{LED} = 40 mA	320	400	-	cd/m^2
Response Time	Rise + Fall	T_R+T_F	T_{OP} = 25°C	-	25	30	ms

* Luminance is directly related to Backlight Supply Current.

Driver Information

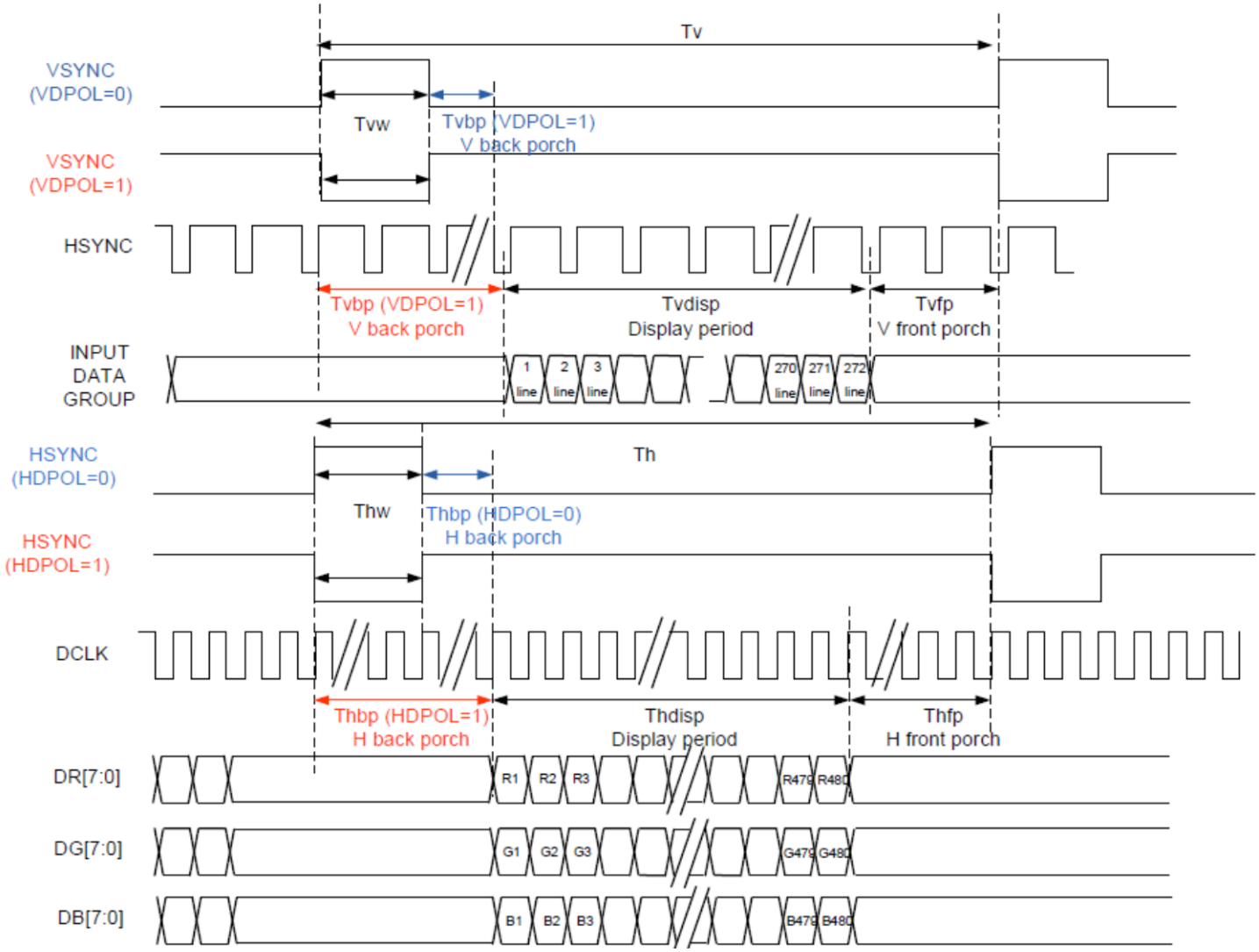
Built-in Sitronix ST7282T2 Driver.

Timing Characteristics

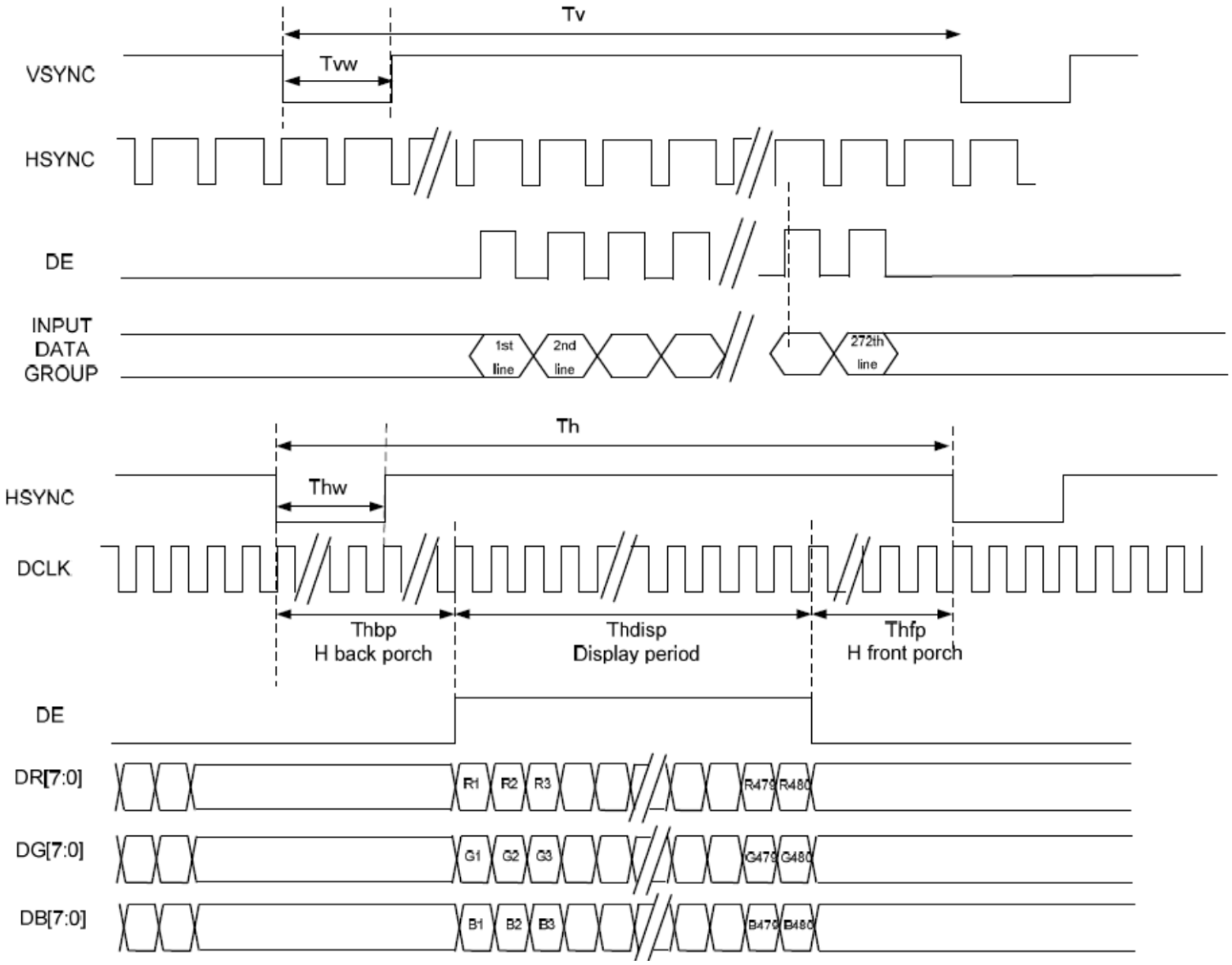
Parallel RGB input timing requirement

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		FCLK	9	12	15	MHz	
DCLK Period		TCLK	10	50	-	µS	R=10KΩ, 1µF
HSYNC	Period Time	Th	485	525	532	DCLK	
	Display Period	Thdisp	-	480	-	DCLK	
	Back Porch	Thbp	3	43	50	DCLK	By H_Blanking Setting
	Front Porch	Thfp	2	2	2	DCLK	
	Pulse Width	Thw	1	1	1	DCLK	
VSYNC	Period Time	Tv	275	285	303	H	
	Display Period	Tvdisp	-	272	-	H	
	Back Porch	Tvbp	2	12	30	H	By V_Blanking Setting
	Front Porch	Tvfp	1	1	1	H	
	Pulse Width	Tvw	1	1	1	H	

- **SYNC Mode Timing**



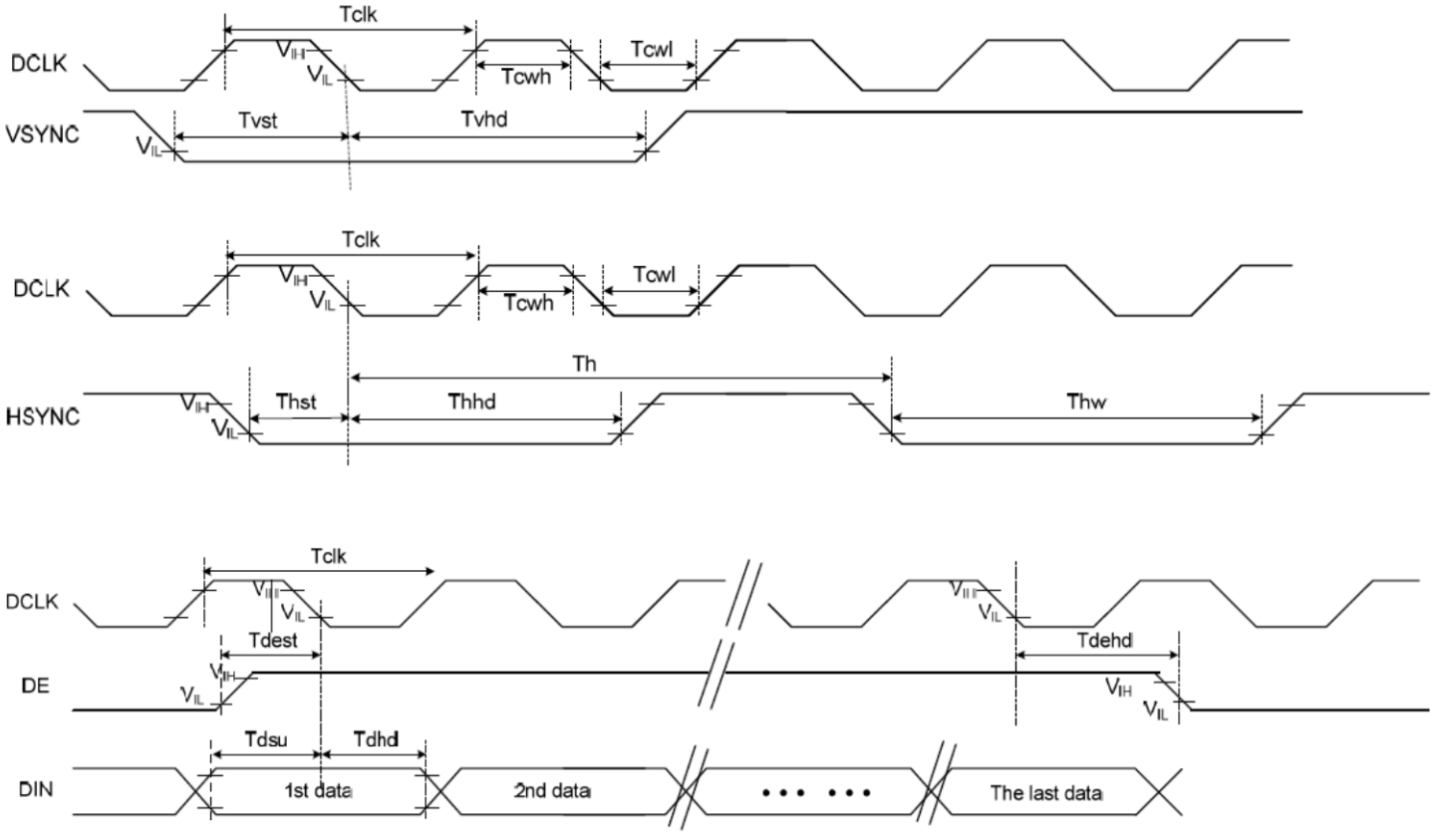
- **SYNC-DE Mode Timing**



Input setup timing requirement

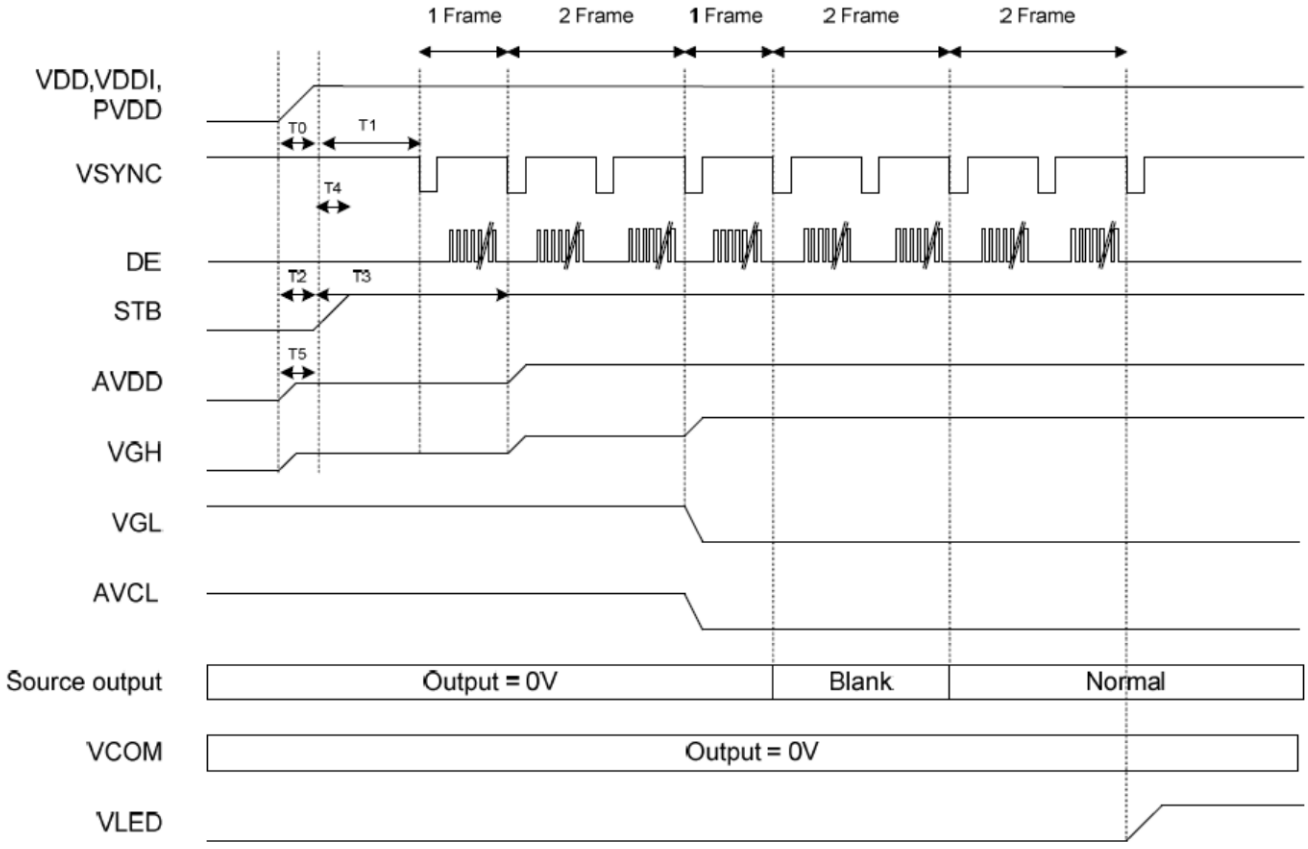
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
System Operation Timing						
V_{DD} Power Source Slew Time	TPOR	-	-	20	ms	From 0V to 99% V_{DD}
GRB Pulse Width	tRSTW	10	50	-	µS	R=10KΩ, 1µF
Input / Output Timing						
CLK pulse Duty	TCW	40	50	60	%	
Hsync Width	Thw	1	-	-	DCLK	
Hsync Period	Th	50	60	65	µS	
Vsync setup time	Tvst	12	-	-	ns	
Vsync hold time	Tvhd	12	-	-	ns	
Hsync setup time	Thst	12	-	-	ns	
Hsync hold time	Thhd	12	-	-	ns	
Data setup time	Tdsu	12	-	-	ns	
Data hold time	Tdhd	12	-	-	ns	
SD output stable time	Tst	-	-	12	µS	Output settled within +20mV Loading = 6.8k+28.2pF
GD output rise and fall time	Tgst	-	-	6	µS	Output settled (5%~95%) Loading = 4.7k+29.8pF

- **Clock And Data Input Timing Diagram**



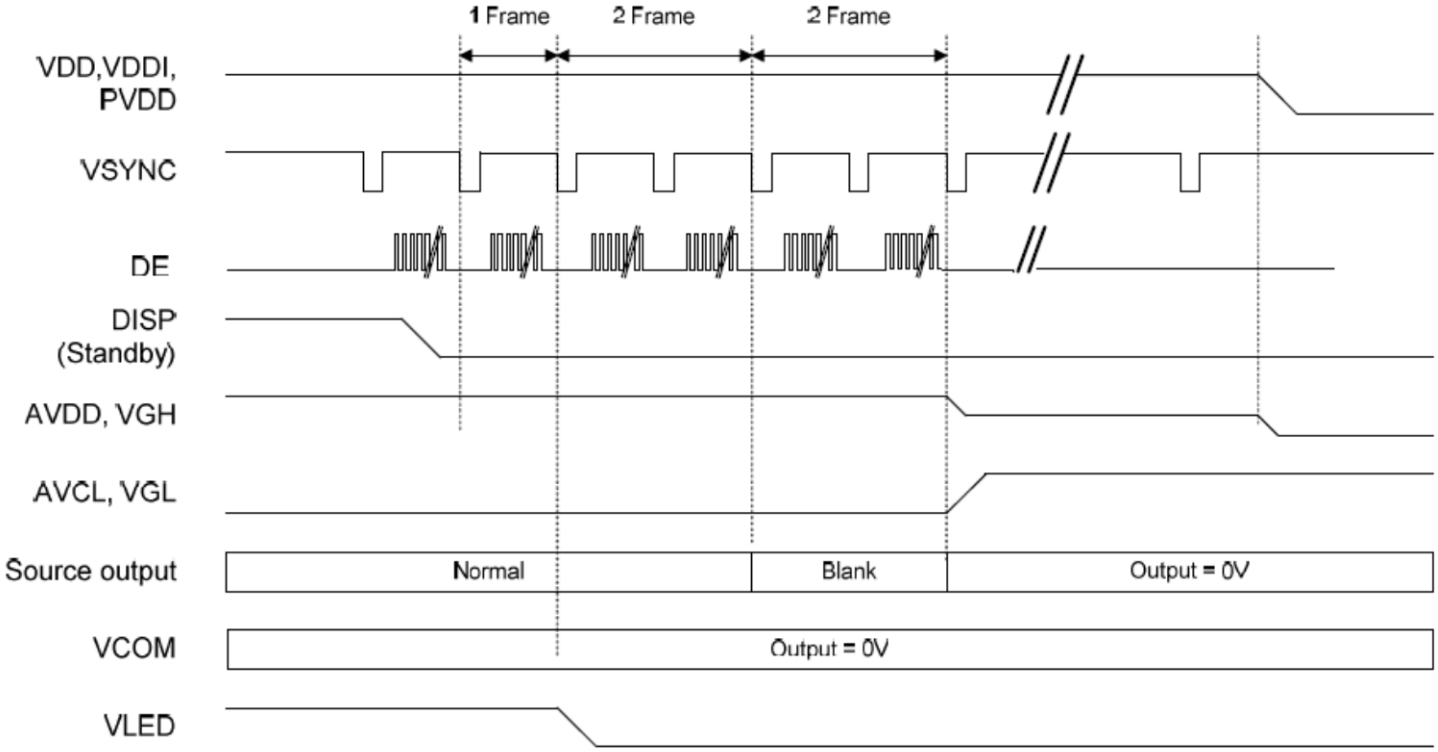
Power On/Off Sequence

- **Power On Sequence**



	Description	Min. Time
T0	Determined by the external power	
T1	Time from stable VDD, VDDI, PVDD set-up to the first VSYNC	T1=0
T2	Time from AVDD=0V to AVDD=3.3V	T2=T0
T3	Time from AVDD=3.3V to AVDD=6.0V	T3=T1+ (1*Frame)
T4	Time from stable VDD, VDDI, PVDD set-up to DISP asserted	T4=0
T5	Time from VGH=0V to VGH=3.3V	T5=T0

- **Power Off 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 , 96 Hrs.	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C , 96 Hrs.	1,2
High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.	+70°C , 96 Hrs.	2
Low Temperature Operation	Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.	-20°C , 96 Hrs.	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 , 96 Hrs.	1,2
Thermal Shock resistance	Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.	-20°C,60min -> 25°C,5min - >70°C,60min = 1 cycle 20 cycles	-
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-50Hz , 15mm amplitude. 30 Min. Each Direction X,Y,Z	3
Static electricity test	Endurance test applying electric static discharge.	Air: V_S=±8KV, Contact: V_S=±4KV 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

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