

**Product Specification**

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# NHD-4.3-480272EF-ASXP-T

## TFT Liquid Crystal Display

<b>NHD-</b>	Newhaven Display
<b>4.3-</b>	4.3" Diagonal
<b>320240-</b>	480xRGBx272 Pixels
<b>EF-</b>	Model
<b>A-</b>	Built-In Driver / No Controller
<b>S-</b>	High Brightness, White LED Backlight
<b>X-</b>	TFT
<b>P-</b>	IPS, Wide Temperature
<b>T-</b>	4-Wire Resistive Touch Panel

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## Additional Resources

- **Support Forum:** <https://support.newhavendisplay.com/hc/en-us/community/topics>
- **Github:** <https://github.com/newhavendisplay>
- **Example Code:** [https://www.newhavendisplay.com/example\\_code.html](https://www.newhavendisplay.com/example_code.html)
- **Knowledge Center:** [https://www.newhavendisplay.com/knowledge\\_center.html](https://www.newhavendisplay.com/knowledge_center.html)
- **Quality Center:** [https://www.newhavendisplay.com/quality\\_center.html](https://www.newhavendisplay.com/quality_center.html)
- **Precautions for using LCDs/LCMs:** <https://www.newhavendisplay.com/specs/precautions.pdf>
- **Warranty / Terms & Conditions:** <https://www.newhavendisplay.com/terms.html>

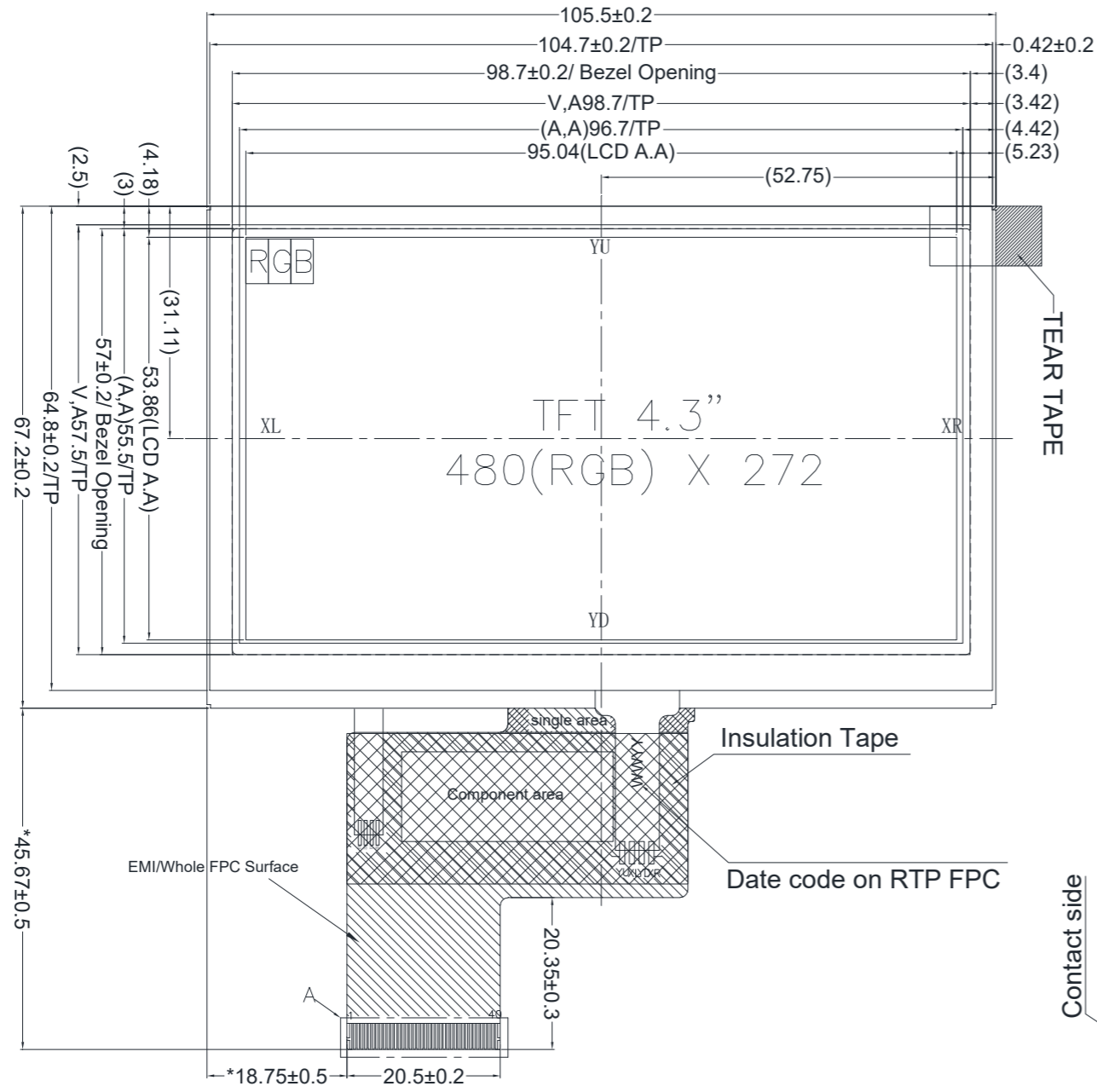


## Document Revision History

Revision	Date	Description	Changed By
0	2/18/2022	Initial Release	CJ
1	5/03/2022	Updated Optical Characteristics	CJ
2	6/01/2022	Updated Typ. Backlight Lifetime	ZP
3	6/08/2022	RGB Interface Mode Selection Included. Backlight Typ. Rating Updated.	ZP

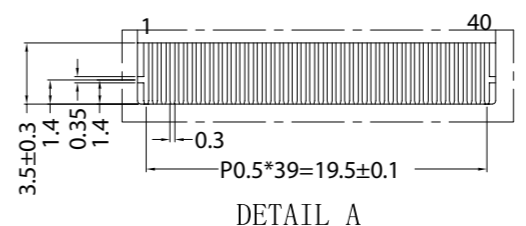
# Mechanical Drawing

SYMBOL	REVISION	DATE

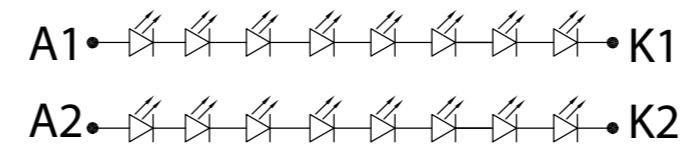


## TFT Pinout:

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



- Product Description: 4.3" IPS TFT w/ Resistive Touch
1. TFT Driver IC: SC7283
  2. TFT Interface: 24-Bit RGB
  3. TFT Power Requirement: 3.3V, Backlight: 40mA (25.6V (Typ))
  4. Optical Features: Normally Black, Transmissive, 1000 cd/m<sup>2</sup>
  5. TFT Mating Connector: 40pin, 0.5mm pitch; Ex.Molex 54104-4031
  6. FPC: EMI Shielded FPC Cable



B/L CIRCUIT DIAGRAM

<b>Standard Tolerance:</b> (Unless otherwise specified)  Linear: ±0.3mm			
	Drawing/Part Number: <b>NHD-4.3-480272EF-ASXP-T</b>	Revision: 1A	
<b>Unless otherwise specified:</b> • Dimensions are in Millimeters • Third Angle Projection	Drawn By: C. Johnson	Approved By: C. Johnson	
	Drawn Date: 2/18/2022	Approved Date: 2/18/2022	
<b>Do Not Scale Drawing</b>		Sheet 1 of 1	
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## Pin Description

TFT:

Pin No.	Symbol	External Connection	Function Description
1	LED-	LED Power Supply	Ground for Backlight
2	LED+	LED Power Supply	Backlight Power Supply (40mA @ 25.6V)
3	GND	Power Supply	Ground
4	V <sub>DD</sub>	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	CLKIN	MPU	Clock for input data (Rising Edge)
31	STBYB	MPU	1: Normal Operation; 0: Standby Mode
32	HSD	MPU	Line synchronization signal
33	VSD	MPU	Frame synchronization signal
34	DEN	MPU	Data Enable signal
35	NC	-	No Connect
36	GND	Power Supply	Ground
37	XR	Touch Controller	Right
38	YD	Touch Controller	Down
39	XL	Touch Controller	Left
40	YU	Touch Controller	Up

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

**Backlight connector:** on LCD connector

**Mates with:** ---

## RGB Interface Mode Selection

The Sitronix SC7283 driver IC is user configurable for DE Mode, SYNC mode, or SYNC-DE mode RGB interface.

**DE Mode** is enabled when HSYNC and VSYNC signals are set to logic-low state, and DE signal is toggled high for valid pixel data. Data is clocked in using DCLK signal. DE mode is recommended to enable the SC7283 driver IC to synchronize the display image on TFT panel without depending on specific horizontal and vertical sync timing from host controller.

**SYNC mode** is enabled when the DE signal is set to logic-low state, and HSYNC and VSYNC signals are used to explicitly define the horizontal and vertical sync timing to synchronize the display image on TFT panel. Data is clocked in using DCLK signal. Any change to the HSYNC or VSYNC values may prevent the image from correctly appearing on the display.

**SYNC-DE Mode** is enabled when HSYNC and VSYNC signals are used to explicitly define the horizontal and vertical sync timing to synchronize the display image on TFT panel. DE signal is used as an additional indicator for transmission of valid pixel data. Data is clocked in using DCLK signal. Any change to the HSYNC or VSYNC values may prevent the image from correctly appearing on the display.

RGB Mode Selection Table	DCLK	HSYNC	VSYNC	DE
SYNC-DE Mode	Input	Input	Input	Input
SYNC Mode	Input	Input	Input	GND
DE Mode	Input	GND	GND	Input

## Electrical Characteristics

### TFT:

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	T <sub>OP</sub>	Absolute Max	-20	-	+70	°C
Storage Temperature Range	T <sub>ST</sub>	Absolute Max	-30	-	+80	°C
Supply Voltage	V <sub>DD</sub>	-	3.0	3.3	3.6	V
Supply Current	I <sub>DD</sub>	V <sub>DD</sub> = 3.3V	14	28	56	mA
"H" Level input	V <sub>IH</sub>	-	0.7 * V <sub>DD</sub>	-	V <sub>DD</sub>	V
"L" Level input	V <sub>IL</sub>	-	GND	-	0.3 * V <sub>DD</sub>	V
"H" Level output	V <sub>OH</sub>	-	V <sub>DD</sub> - 0.4	-	V <sub>DD</sub>	V
"L" Level output	V <sub>OL</sub>	-	GND	-	GND + 0.4	V
Backlight Supply Current	I <sub>LED</sub>	-	30	40	50	mA
Backlight Supply Voltage	V <sub>LED</sub>	I <sub>LED</sub> = 40mA	22.4	25.6	27.2	V
Backlight Lifetime*	-	T <sub>OP</sub> = 25°C	20,000	50,000	-	Hrs.

\*Backlight lifetime is rated as Hours until **half-brightness**, under normal operating conditions. The LED of the backlight is driven by current drain; drive voltage is for reference only. Drive voltage must be selected to ensure backlight current drain is below MAX level stated.

## Optical Characteristics:

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	
Optimal Viewing Angles	Top	CR ≥ 10	-	80	-	°	
	Bottom		-	80	-	°	
	Left		-	80	-	°	
	Right		-	80	-	°	
Contrast Ratio	CR	-	640	800	-	-	
Luminance	L <sub>V</sub>	I <sub>LED</sub> = 40 mA	620	1000	1200	cd/m <sup>2</sup>	
Response Time (Rise + Fall)	T <sub>R</sub> + T <sub>F</sub>	T <sub>OP</sub> = 25°C	-	30	40	ms	
Chromaticity	Red	X <sub>R</sub>	-	0.540	0.590	0.640	-
		Y <sub>R</sub>	-	0.305	0.355	0.405	-
	Green	X <sub>G</sub>	-	0.294	0.344	0.394	-
		Y <sub>G</sub>	-	0.542	0.592	0.642	-
	Blue	X <sub>B</sub>	-	0.093	0.143	0.193	-
		Y <sub>B</sub>	-	0.044	0.094	0.144	-
White	X <sub>W</sub>	-	0.240	0.290	0.340	-	
	Y <sub>W</sub>	-	0.275	0.325	0.375	-	

## Driver/Controller Information

### TFT:

Built-in SC7283 Source Driver.

Please download specification at: [https://www.newhavendisplay.com/resources\\_dataFiles/datasheets/LCDs/SC7283.pdf](https://www.newhavendisplay.com/resources_dataFiles/datasheets/LCDs/SC7283.pdf)



## 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	75	-	-	%
Activation Force	30	-	120	g
Pen Writing Durability	20,000	-	-	Characters
Pitting Durability	1,000,000	-	-	Touches
Surface Hardness	3	-	-	H
Haze	2	4	6	%

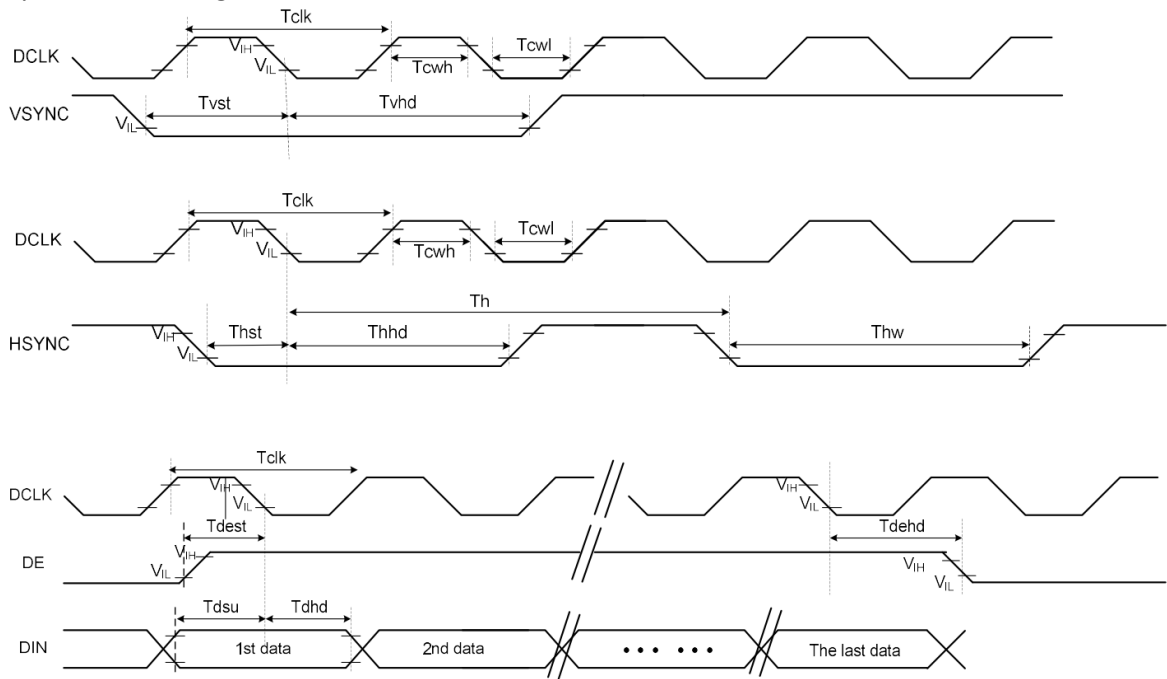
# Timing Characteristics – TFT Display

## Horizontal and Vertical Input Timing

Item		Symbol	Min.	Typ.	Max.	Unit
DCLK Frequency		Fclk	8	9	12	MHz
DCLK Period		Tclk	83	111	125	ns
HSYNC	Period Time	Th	485	531	598	DCLK
	Display Period	Thd	480			DCLK
	Back Porch	Thb	3	43	43	DCLK
	Front Porch	Thfp	2	8	75	DCLK
	Pulse Width	Thpw	2	4	43	DCLK
VSYNC	Period Time	Tv	276	292	321	H
	Display Period	Tvd	-	272	-	H
	Back Porch	Tvbp	2	12	12	H
	Front Porch	Tvfp	2	8	37	H
	Pulse Width	Tvpw	2	4	12	H

## AC Characteristics

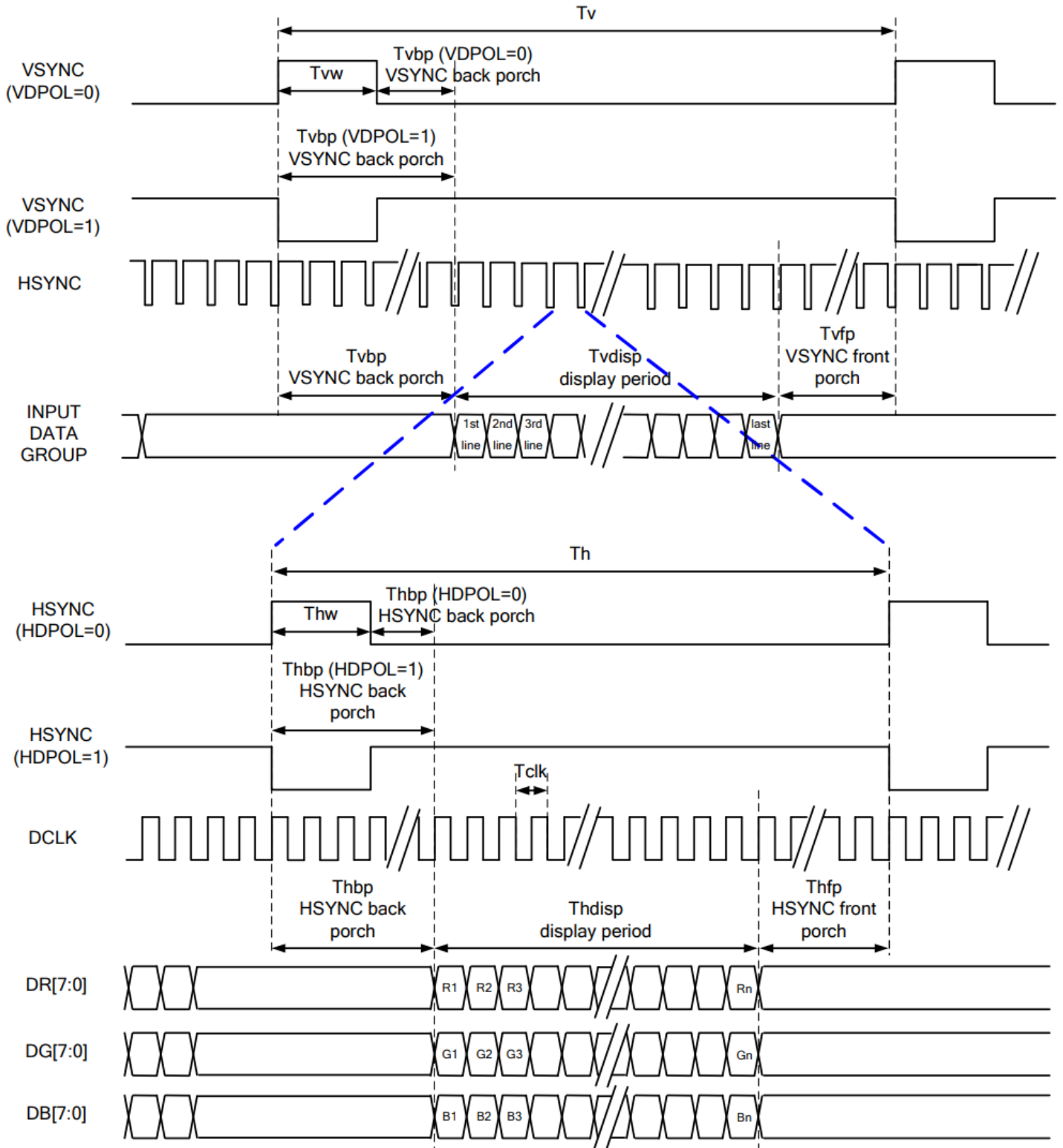
### System Bus Timing for RGB Interface

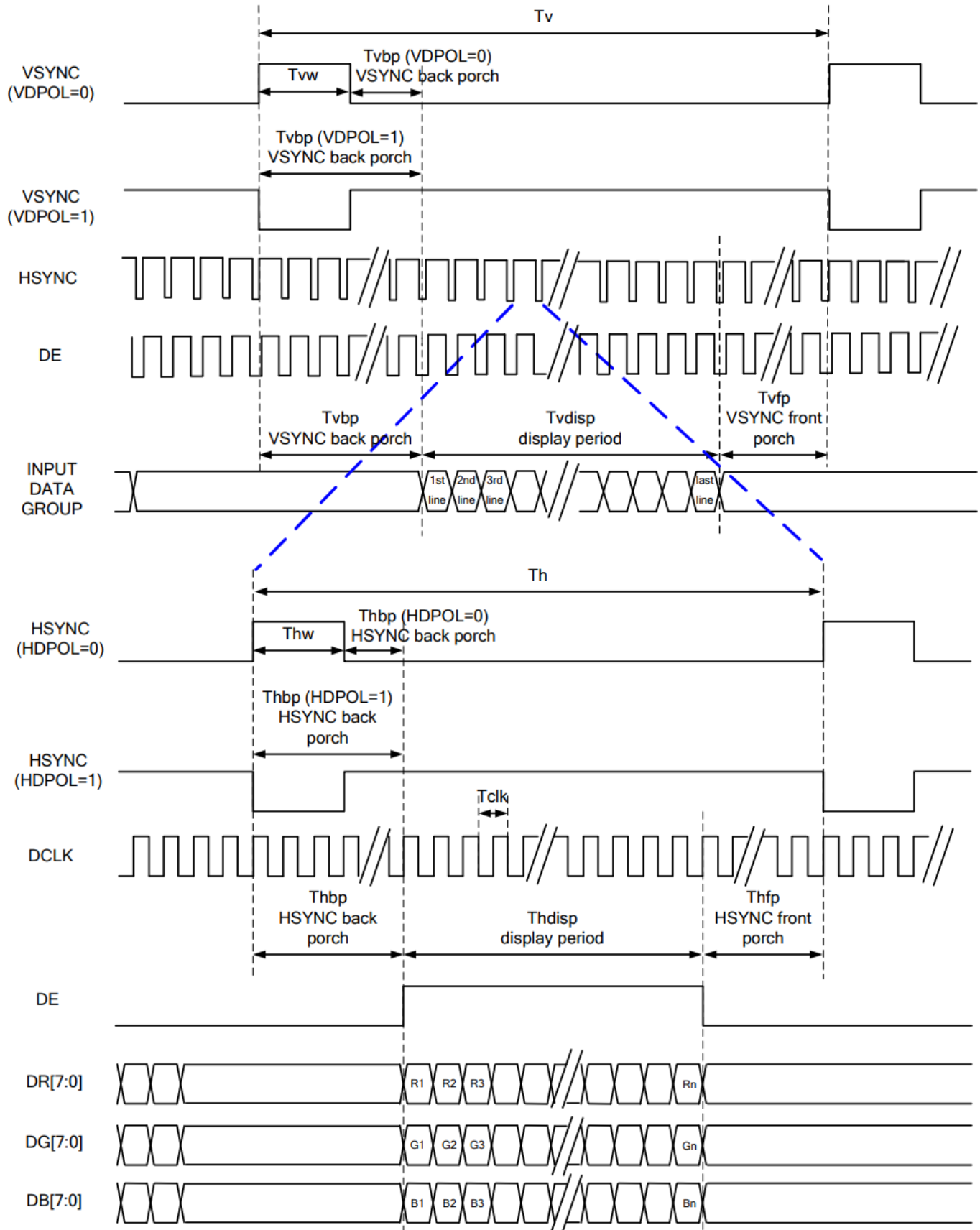


Parameter	Symbol	Min	Typ	Max	Unit	Conditions
CLKIN pulse duty	T <sub>cwh</sub>	40	50	60	%	
HSYNC width	T <sub>hw</sub>	2	-	-	DCLK	
HSYNC period	T <sub>h</sub>	55	60	65	us	
VSYNC setup time	T <sub>vst</sub>	12	-	-	ns	
VSYNC hold time	T <sub>vhd</sub>	12	-	-	ns	
HSYNC setup time	T <sub>hst</sub>	12	-	-	ns	
HSYNC hold time	T <sub>hhd</sub>	12	-	-	ns	
Data setup time	T <sub>dsu</sub>	12	-	-	ns	
Data hold time	T <sub>dhd</sub>	12	-	-	ns	
DE setup time	T <sub>dest</sub>	12	-	-	ns	
DE hold time	T <sub>dhd</sub>	12	-	-	ns	

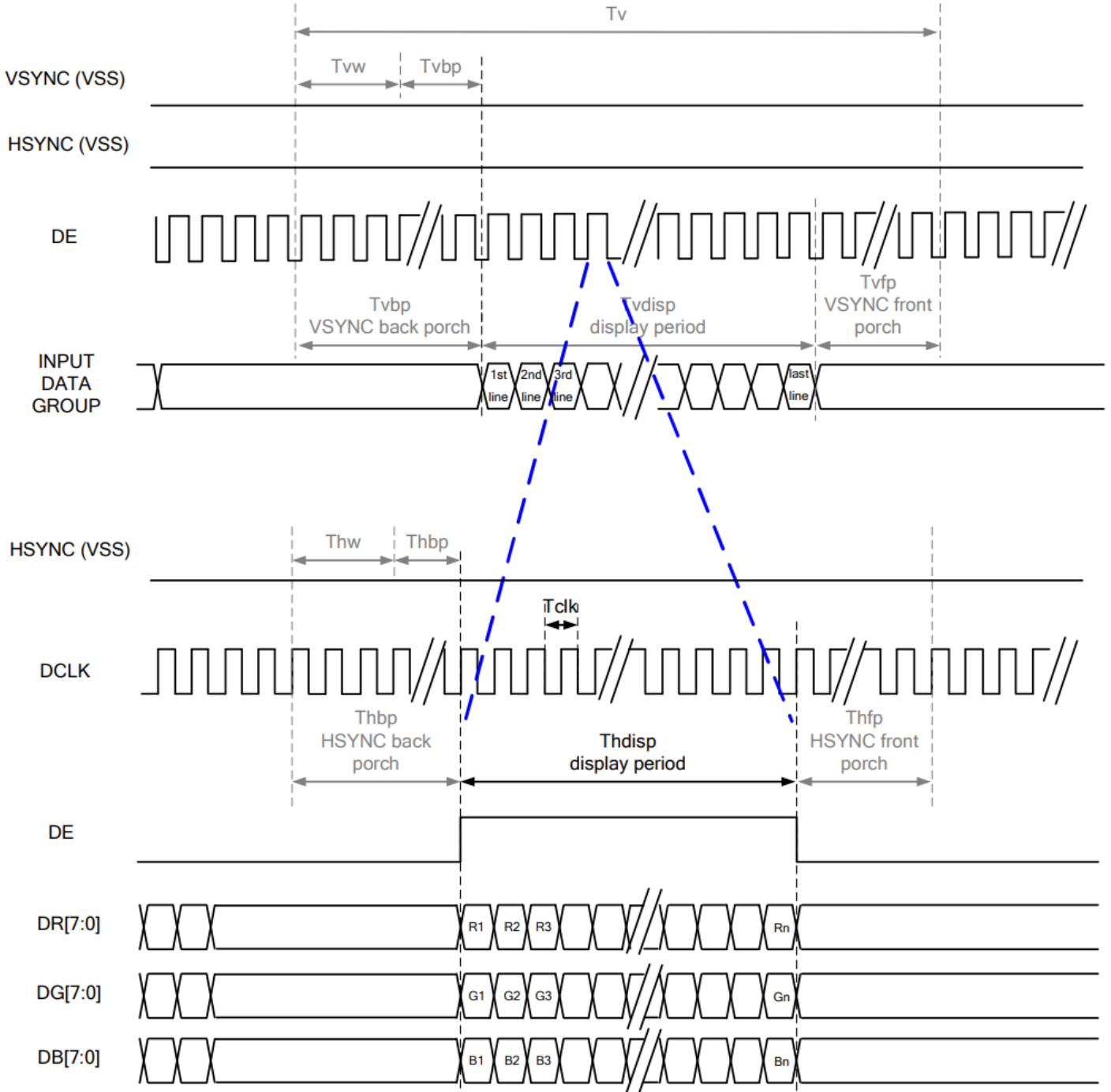




**SYNC Mode**


**SYNC-DE Mode**


### DE Mode

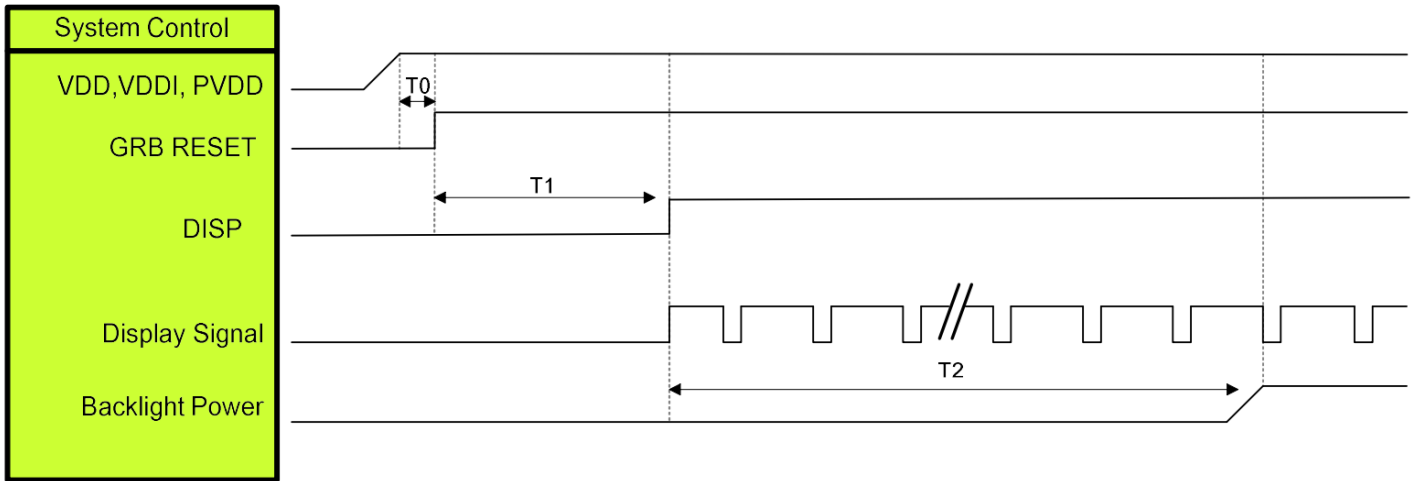


RGB Mode Selection Table	DCLK	HSYNC	VSYNC	DE
SYNC - DE Mode	Input	Input	Input	Input
SYNC Mode	Input	Input	Input	GND
DE Mode	Input	GND	GND	Input

Note: "Input" means these signals are driven by host side.

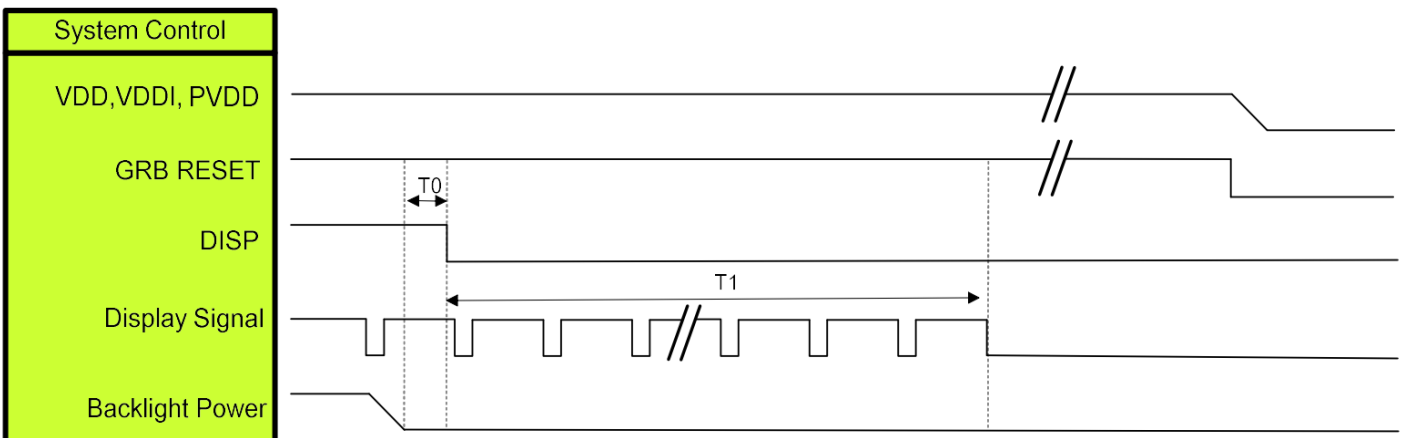
## Power ON/OFF Sequence

### 1. Power On Sequence



Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET= "High" to DISP="High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms

### 2. Power Off Sequence



Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP="Low"	5	ms
T1	DISP="Low" to IC internal voltage discharge complete	80	ms

## 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 Storage	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.	-20°C,60min -> 70°C,60min = 1 cycle 20 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-50Hz , 5G Acceleration 30 minutes in each of 3 directions (X, Y, Z)	3
Static electricity test	Endurance test applying electric static discharge.	Air: ±8kV 150pF/330Ω, 5 Times	
		Contact: ±4kV 150pF/330Ω, 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.

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