QiteX Advanced Display Solution

PRODUCT SPECIFICATION

PART NUMBER: QX-050WVGA0TLT01D V1
DESCRIPTION: TFT 5"wide 800*480 TN TTL 460CD

( )   Preliminary Specification
(V)   Approved Specification

Customer Name:	
Signature:	**Date:**

QiteX Advanced Display Solution		
PREPARED BY	**REVIEWED BY**	**SIGNATURE DATE**
Mia	*David*	2020/10/06

CONTENTS

RECORD OF REVISIONS

Revision	Date	Description	Page
Rev 1.0	2020/05/07	1st Edition	
Rev 1.1	2020/10/06	P/N change from QX-050WVGA0TLT01D-V1 to QX-050WVGA0TLT01D V1	

QiteX Advanced Display Solution

Precautions and Warranty

1.1 Precaution

1.1.1   Do not apply rough force such as bending or twisting to the module during assembly.

1.1.2   To assemble or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.

1.1.3   Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.

1.1.4   It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.

1.1.5   Always follow the correct power sequence when LCD module is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.

1.1.6   Do not pull the I/F connector in or out while the module is operating.

1.1.7   Do not disassemble the module, or insert anything into the Backlight unit

1.1.8   It is dangerous that moisture come into or contacted the LCD module, because moisture may damage LCD module when it is operating.

1.1.9   High temperature or humidity may reduce the performance of module. Please store LCD module

1.1.10   within the specified storage conditions.

1.1.11   The response time will become slowly below lower temperature.

1.1.12   Do not keep same pattern in a long period of time. It may cause image sticking on LCD.

1.1.13   Display may change color with different temperature.

1.1.14   The Module should be kept into anti-static bag or other containers resistant to static for storage.

1.1.15   If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.

1.1.16   After the module's end of life, it is not harmful in case of normal operation and storage.

1.2 Warranty

1.2.1   Our warranty liability is limited to repair and/or replacement. We will not be responsible for any consequential loss.

1.2.2   If possible, we suggest customer to use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used.

1. GENERAL DESCRIPTION

The specification is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This product is composed of a TFT-LCD panel, driver ICs and a backlight unit.

2.1 General Specifications

Features	Details	Unit
Display Size(Diagonal)	5"wide	
LCD type	TN TFT	
Display Mode	Transmissive/ Normally White	
Resolution	800 RGB x 480	Pixels
View Direction	12 O'clock	Best Image
Gray Scale Inversion Direction	6 O'clock	
Module Outline	120.7 (H) x 75.8 (V) x 3.1(T) * Note 1	mm
Active Area	108 (H) x 64.8(V)	mm
Pixel Size	135 (H) x 135(V)	um
Pixel Arrangement	RGB Vertical Stripe	
Polarizer Surface Treatment	Anti-Glare	
Display Colors	16.7M	
Interface	24-bit RGB interface	
With or Without Touch Panel	Without	
Weight (g)	TBD	g

Note1: Exclusive posts, FFC/FPC tail etc.

2. Absolute Maximum Ratings

3.1 Absolute Ratings of Environment

V_{SS}=0V, Ta=25ºC

Item	Symbol	Min.	Max.	Unit
Supply Voltage	VDD	-0.3	5.0	V
Storage temperature	T_{STG}	-30	80	ºC
Operating temperature	T_{OP}	-20	70	ºC

Note 1: If Ta below 50ºC, the maximal humidity is 90%RH, if Ta over 50ºC, absolute humidity should be less than 60%RH.

Note 2: The response time will be extremely slow when the operating temperature is around -10℃, and the back ground will become darker at high temperature operating.

3.2 Electrical Absolute Ratings

3.2.1 TFT LCD Module

Item		Symbol	Min.	Typ.	Max.	Unit
Supply Voltage		VDD	3.0	3.3	3.6	V
Logic Low input voltage		V_{IL}	0	-	0.3*VDD	V
Logic High input voltage		V_{IH}	0.7*VDD	-	VDD	V
Logic Low output voltage		V_{OL}	-	-	GND+0.4	V
Logic High output voltage		V_{OH}	VDD-0.4	-	-	V
Current Consumption All Black	Logic	$I_{CC+}I_{IN}$		TBD		mA
	Analog					

3.2.2 Backlight Unit

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Backlight Voltage	V_{LED}	Ta=25ºC, I_F=20mA/LED	19.6	22.4	23.8	V
Backlight Current	I_{LED}	Ta=25ºC, V_F=3.2V/LED	-	40	-	mA
Power dissipation	P_D		-	896	-	mW
Uniformity	Avg		75	80	-	%
LED working life(25℃)	-		-	40000	-	hrs
Drive method	Constant current					
LED Configuration	14 White LEDs(7 LEDs in one string and 2 groups in parallel)					

* Note1：Led life time defined as follows: The final brightness is at 50% of original brightness.

The environmental conducted under ambient air flow, at Ta=25±2 ºC,60%RH±5%, I_F=20mA/LED

BLOCK DIAGRAM

QiteX Advanced Display Solution
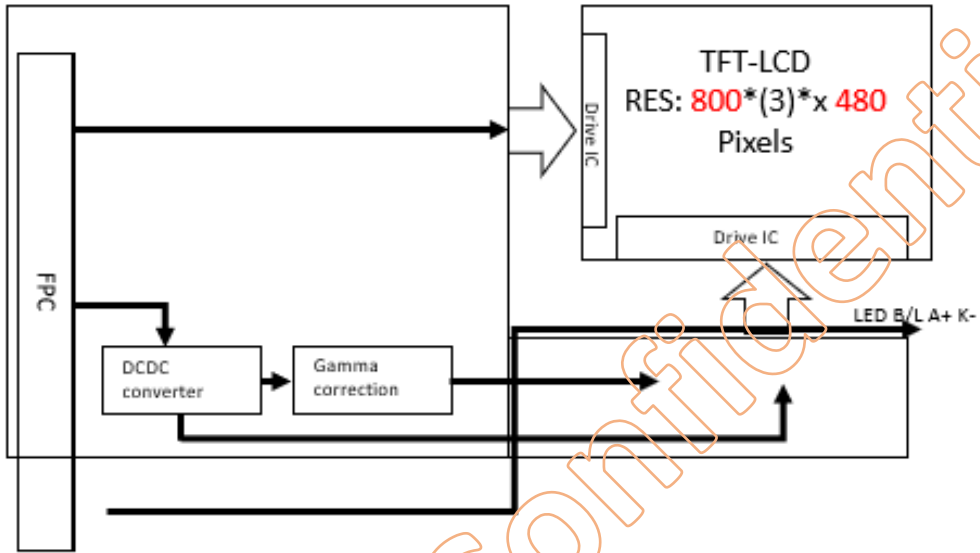
3. PIN CONNECTIONS

No.	Symbol	Function	Remark
1	VLED-	LED (Cathode).	
2	VLED+	LED (Anode).	
3	GND	Ground.	
4	VDD	Power voltage	
5	R0	Red data (LSB).	
6	R1	Red data.	
7	R2	Red data.	
8	R3	Red data.	
9	R4	Red data.	
10	R5	Red data.	
11	R6	Red data.	
12	R7	Red data (MSB).	
13	G0	Green data (LSB).	
14	G1	Green data.	
15	G2	Green data.	
16	G3	Green data.	
17	G4	Green data.	
18	G5	Green data.	
19	G6	Green data.	
20	G7	Green data (MSB).	
21	B0	Blue data (LSB).	
22	B1	Blue data.	
23	B2	Blue data.	
24	B3	Blue data.	
25	B4	Blue data.	
26	B5	Blue data.	
27	B6	Blue data.	
28	B7	Blue data (MSB).	
29	GND	Ground.	
30	CLKIN	Clock for input data. Data latched at falling edge of this signal.	
31	STBYB	Display on/off.	
32	HSD	Horizontal sync signal.	
33	VSD	Vertical sync signal.	

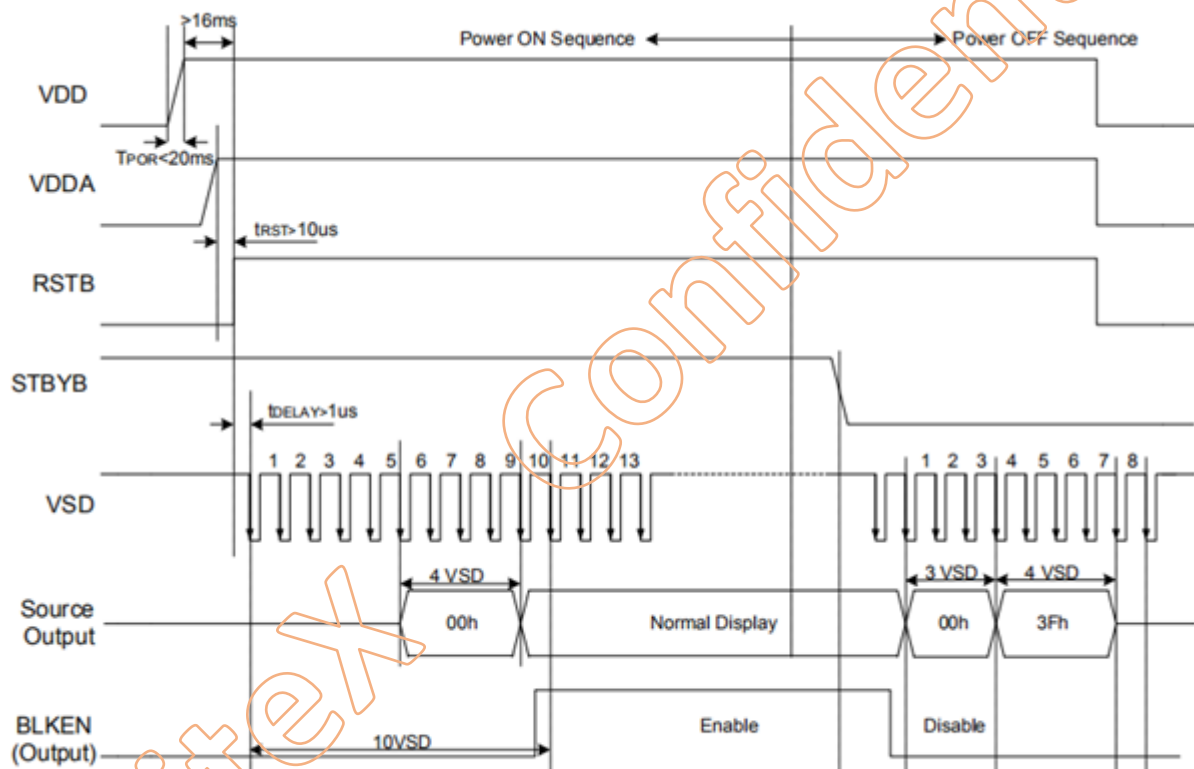| 34	DEN	Data enable.	
35	NC	No connection.	
36	GND	Ground.	
37	NC(XR)	No connection.	
38	NC(YD)	No connection.	
39	NC(XL)	No connection.	
40	NC(YU)	No connection.	

6. POWER ON/OFF SEQUENCE

To prevent the device damage from latch up, the power ON/OFF sequence shown below must be followed.

Power ON: VDD, DGND→VDDA, AGND →V1 to V14

Power OFF: V1 to V14 →VDDA, AGND→VDD, DGND

6.1 Power on/Off Sequence

Note: For prevent anormal operation, t_{RST} must be longer than 10us during Power ON sequence.

QiteX Advanced Display Solution

7. OPTICAL CHARACTERISTIC

7.1 Optical Characteristics

Item		Symbol	Condition	Specification			Unit	Note
				Min.	**Typ.**	**Max.**		
Viewing Angle	Horizontal	θX+	Center CR≥10	60	70	-	Deg.	Note 2
		θX-		60	70	-		
	Vertical	φY+		45	50	-		
		φY-		60	70	-		
Contrast ratio		CR	Normally viewing angle θX = φY =0º	400	500	-		Note 3
Luminance on TT (I_f=20mA/LED)		Lv		370	460	-	cd/m²	
Response time		TR+TF		-	25	50	ms	Note 4
Color Chromaticity	Red	XR			TBD		-	
		YR			TBD			
	Green	XG			TBD			
		YG			TBD			
	Blue	XB			TBD			
		YB			TBD			
	White	XW			TBD			
		YW			TBD			

Note 1: The method of optical measurement:
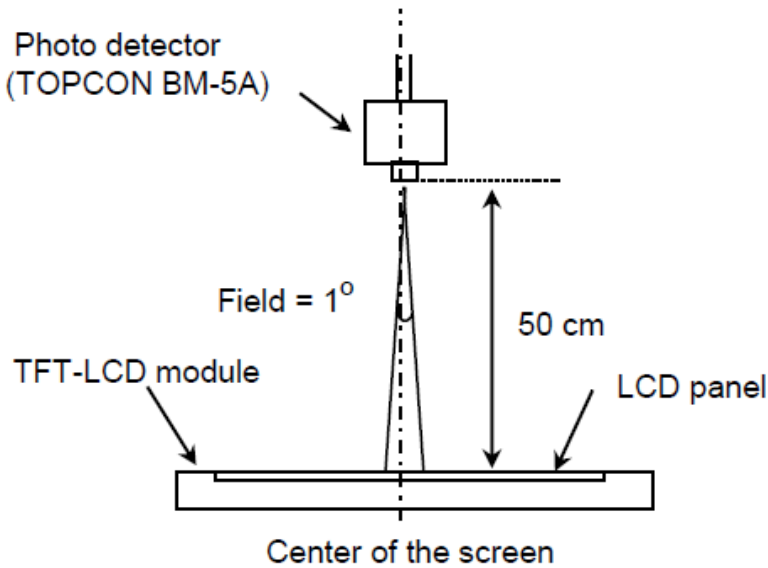
Note 2: Definition of Viewing Angles:
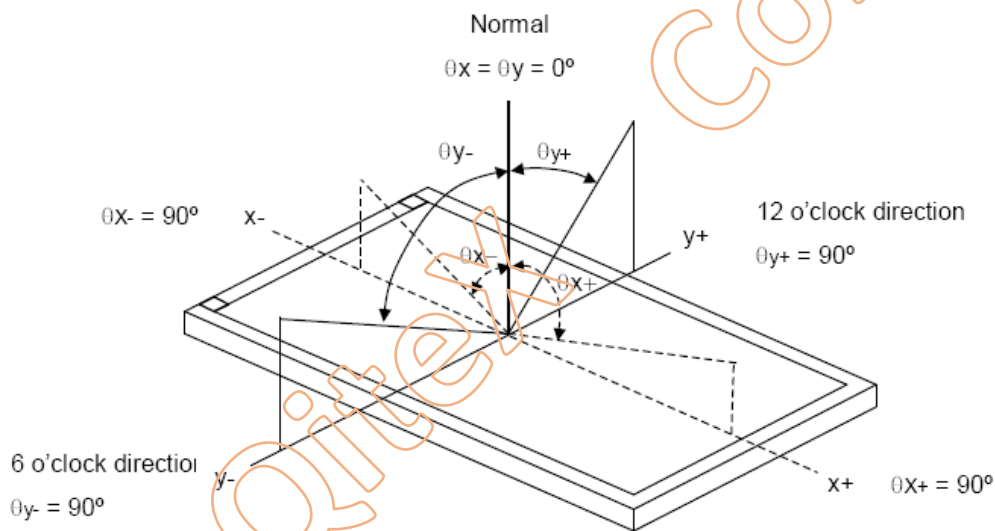
Note 3: Definition of Contrast ratio

Contrast is measured perpendicular to display surface in reflective and transmissive mode.

The measurement condition is:

Measuring Equipment	Eldim or Equivalent
Measuring Point Diameter	3mm//1mm
Measuring Point Location	Active Area centre point
Test pattern	A: All Pixels white
	B: All Pixel black
Contrast setting	Maximum

Definitions: CR (Contrast) = Luminance of White Pixel / Luminance of Black Pixel

Note 4: Definition of Response Time:
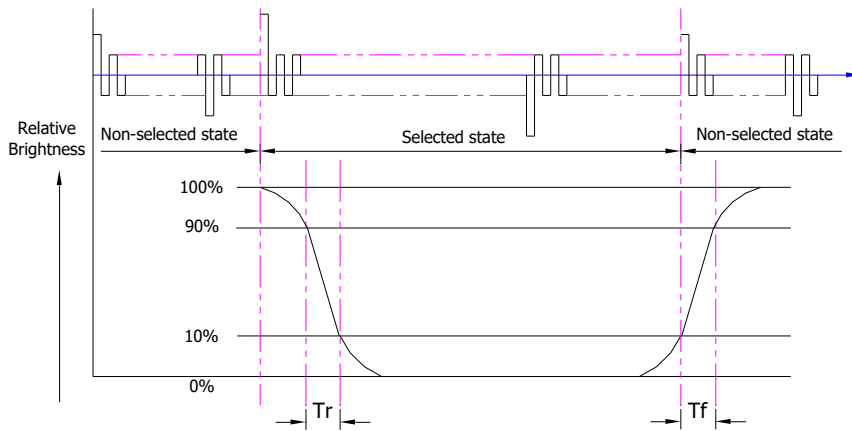
Note 5: Definition of Surface Luminance, Uniformity and Transmittance

Using the transmissive mode measurement approach, measure the white screen luminance of the display panel and backlight.

5.5.1 Surface Luminance: LV = average (LP1:LP9)

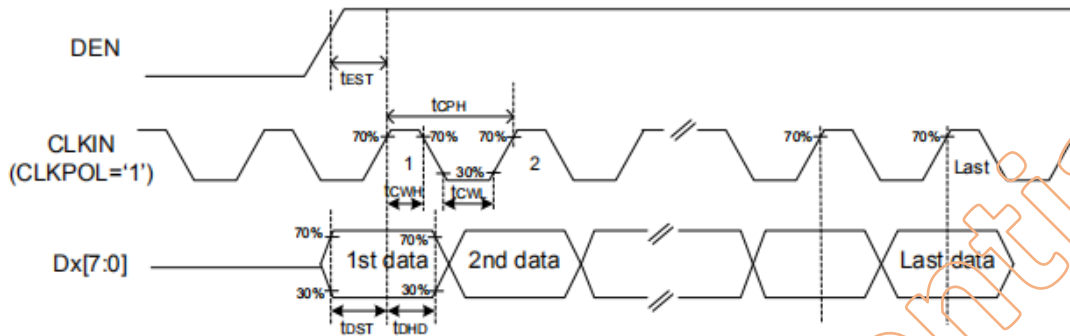5.5.2 Uniformity = Minimal (LP1:LP9) / Maximal (LP1:LP9) * 100%
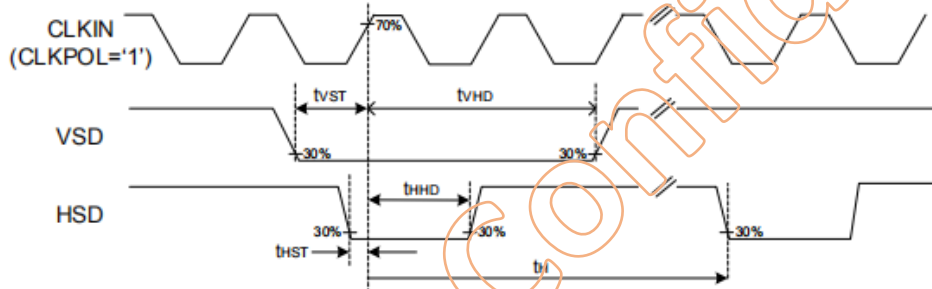
5.5.3 Transmittance = LV on LCD / LV on Backlight * 100%
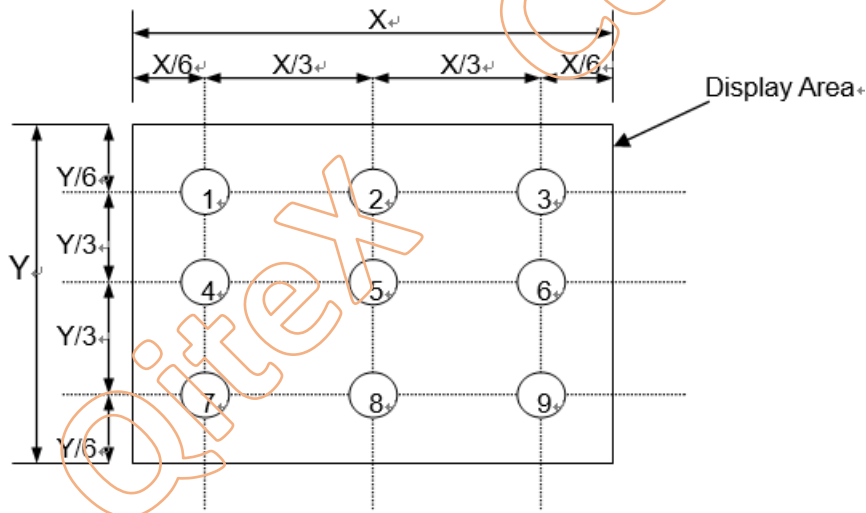
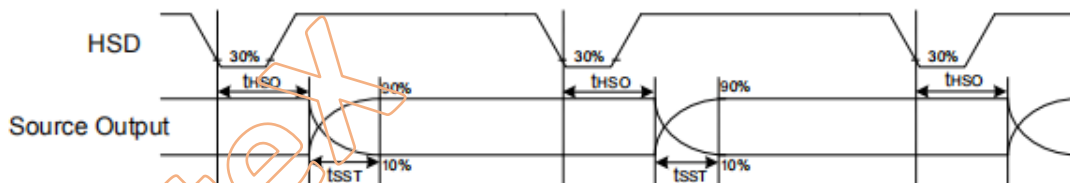# 8. SIGNAL CHARACTERISTICS

8.1 AC Electrical Characteristics

8.3 Interface Timings

8.2.1 Timing

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Horizontal display area	thd		800		DCLK
Clkin frequency	fCLK	-	33.3	50	MHz
1 Horizontal Line	th	862	1056	1200	DCLK
HS pulse width	thpw	1	-	40	DCLK
HSD Back porch	thb	46	46	46	DCLK
HSD Front Porch	thfp	16	210	354	DCLK

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd	-	480	-	HSD
VSD period time	tv	510	525	650	
VSD pulse width	tvpw	1	-	20	
VSD Back porch	tvb	23	23	23	
VSD Front Porch	tvfp	7	22	147	

8.2.2 Data Input Format

Horizontal input timing diagram
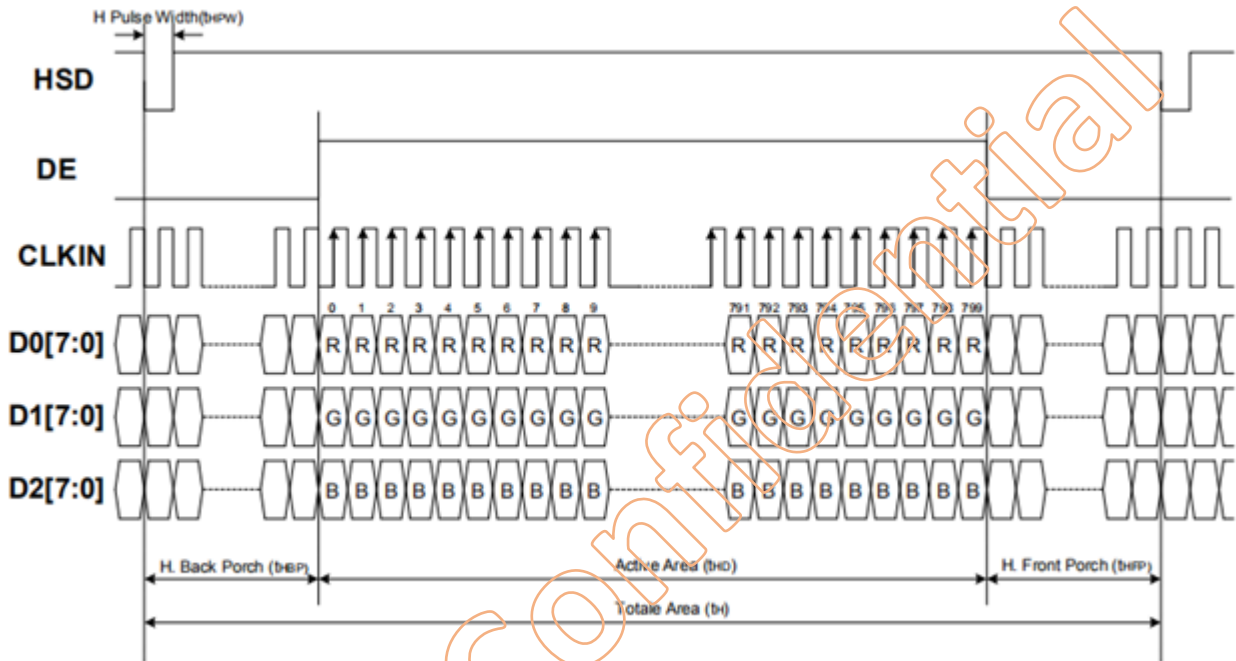
Vertical input timing diagram

10. OUTLINE DRAWING