

PRODUCT SPECIFICATION

PART NUMBER: QX-070WSVGAMLD00D

DESCRIPTION: TFT 7"wide 1024*600 IPS OpenLVDS 400CD

Rev:2.0

- Preliminary Specification
- Approved Specification

Customer Name:	
Signature:	Date:

QiteX Advanced Display Solution		
PREPARED BY	REVIEWED BY	SIGNATURE DATE
<i>Joy Tseng</i>	<i>David</i>	<i>2019/11/26</i>

1. 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.

2. 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)	7" w	
LCD type	IPS TFT	
Display Mode	Transmissive/ Normally Black	
Resolution	1024 RGB x 600	Pixels
View Direction	Full View	Best Image
Module Outline	164.9(H) x 100(V) x 3.35(T) (Note1)	mm
Active Area	154.21(H) x 85.92(V)	mm
Pixel Size	0.1506(H) x 0.1432(V)	mm
Pixel Arrangement	RGB Vertical Stripe	
Polarizer Surface Treatment	Glare	
Display Colors	262K/16.7M	
Interface	6/8bit LVDS interface	
With or Without Touch Panel	Without	
Operating Temperature	-20~70	°C
Storage Temperature	-30~80	°C
Weight	110	g

Note: Exclusive posts, FFC/FPC tail etc.

3. Absolute Maximum Ratings

3.1 Absolute Ratings of Environment

V_{SS}=0V, Ta=25°C

Item	Symbol	Min.	Max.	Unit
Supply Voltage	VDD	-0.5	5.0	V
Storage temperature	T _{stg}	-30	+80	°C
Operating temperature	T _{op}	-20	+70	°C

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

Note 2: The response time will be extremely slow when the operating temperature is around -10°C, 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	2.3	3.3	3.6	V
	AVDD	-	9.6	-	V
	VGH	-	18	-	V
	VGL	-	-6	-	V
	VCOMH	-	3.3	-	V
	VCOML	-	3.1	-	V
Differential input high threshold voltage	RxVTH	-	-	0.1	V
Differential input low threshold voltage	RxVTL	-0.1	-	-	V
Input voltage range (singled-end)	RxVIN	0	-	2.4	V

3.2.2 Backlight Unit

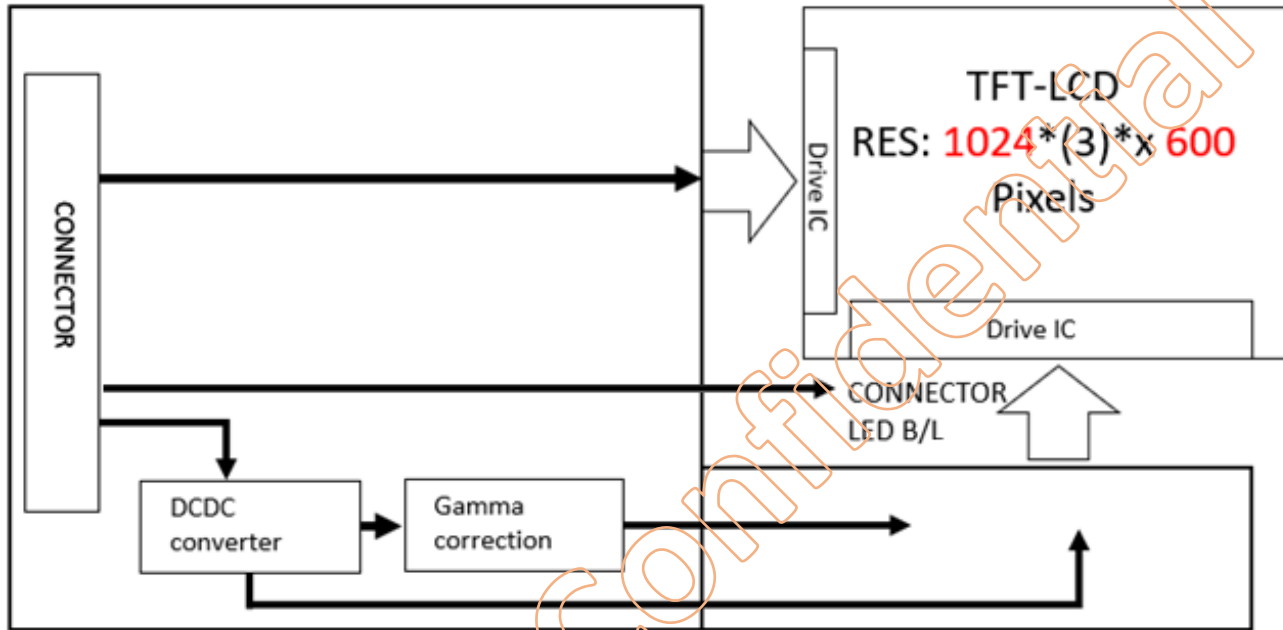
Item	Symbol	Condition	Min.	Typ.	Max	Unit
Forward Voltage	V _F	T _a =25 °C, I _F =20mA/LED	8.4	9.6	10.2	V
Forward Current	I _F	T _a =25 °C, V _F =3.2V/LED	-	160	-	mA
Power dissipation	P _D	-	-	1536	-	mW
Uniformity	Avg	-	-	80	-	%
LED working life(25°C)	-	-	-	40000	-	Hrs
Drive method	Constant current					
LED Configuration	24 White LEDs (3 LEDs in one string and 8 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 T_a=25±2 °C, 60%RH±5%, Typical operating life time is estimated data, led power dissipation is evaluated by led supplier

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4. BLOCK DIAGRAM



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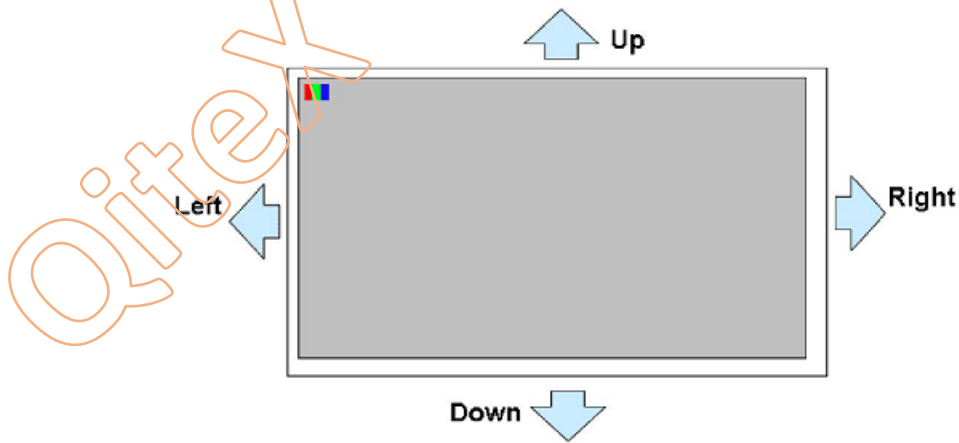
5. PIN CONNECTIONS

No.	Symbol	Function
1	VCOM	Common Voltage.
2	VDD	Power Supply
3	VDD	Power Supply
4	NC	No connection.
5	RESET	Global reset pin.
6	STBYB	Standby mode, Normally pulled high. STBYB="1", normal operation STBYB="0", timing controller, source driver will turn off
7	GND	Ground.
8	RXIN0-	-LVDS differential data input.
9	RXIN0+	+LVDS differential data input.
10	GND	Ground.
11	RXIN1-	-LVDS differential data input.
12	RXIN1+	+LVDS differential data input.
13	GND	Ground.
14	RXIN2-	-LVDS differential data input.
15	RXIN2+	+LVDS differential data input.
16	GND	Ground.
17	RXCLK-	-LVDS differential clock input.
18	RXCLK+	+LVDS differential clock input.
19	GND	Ground.
20	RXIN3-	-LVDS differential data input.
21	RXIN3+	+LVDS differential data input.
22	GND	Ground.
23	NC	No connection.
24	NC	No connection.
25	GND	Ground.
26	NC	No connection.
27	DIMO	Backlight CABC controller signal output
28	IFSEL	6/8bit mode select L: 8bit LVDS ; H: 6bit LVDS
29	AVDD	Power for Analog Circuit.

30	GND	Ground.	
31	LEDK	LED Cathode	
32	LEDK	LED Cathode	
33	L/R	Horizontal inversion	Note 1
34	U/P	Vertical inversion	Note 1
35	VGL	Gate OFF Voltage.	
36	NC	No Connection	
37	NC	No Connection	
38	VGH	Gate ON Voltage.	
39	LEDA	LED Anode	
40	LEDA	LED Anode	

Note 1:

SHLR	UPDN	Data shifting
DVDD	GND	Left→Right , Up→Down(default)
GND	GND	Right→Left , Up→Down
DVDD	DVDD	Left→Right , Down→Up
GND	DVDD	Right→Left , Down→Up



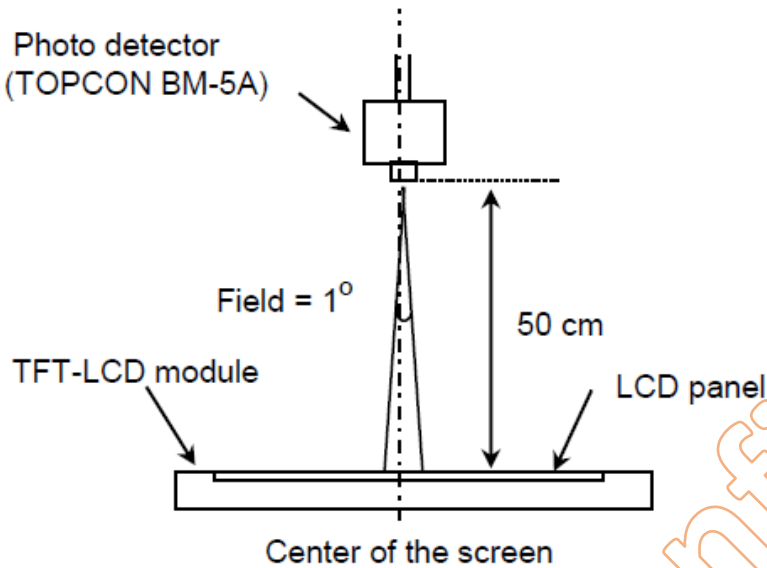
6. OPTICAL CHARACTERISTIC

6.1 Optical Characteristics

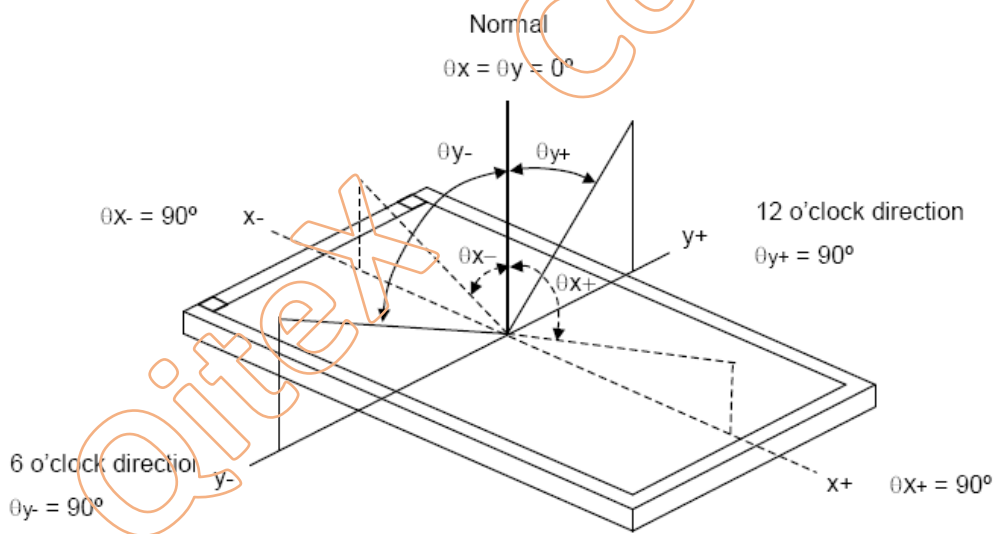
Ta=25°C, DVDD=3.3V

Item		Symbol	Condition	Specification			Unit	Note
				Min.	Typ.	Max.		
Viewing Angle	Horizontal	$\theta X+$	Center CR \geq 10	-	85	-	Deg.	Note 2
		$\theta X-$		-	85	-		
	Vertical	$\phi Y+$		-	85	-		
		$\phi Y-$		-	85	-		
NTSC Ratio(Gamut)				-	50	-	%	
Contrast ratio		CR		-	800	-		Note 3
Luminance on TFT($I_f = 20\text{mA/LED}$)		Lv	Normally viewing angle $\theta X = \phi Y = 0^\circ$	290	400	-	cd/m ²	
Response time		TR+TF		-	30	40	ms	Note 4
Color Chromaticity	Red	XR		-0.05	0.589	+0.05	-	
		YR			0.344			
	Green	XG			0.301			
		YG			0.577			
	Blue	XB			0.146			
		YB			0.092			
	White	XW			0.275			
		YW			0.312			

* 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.

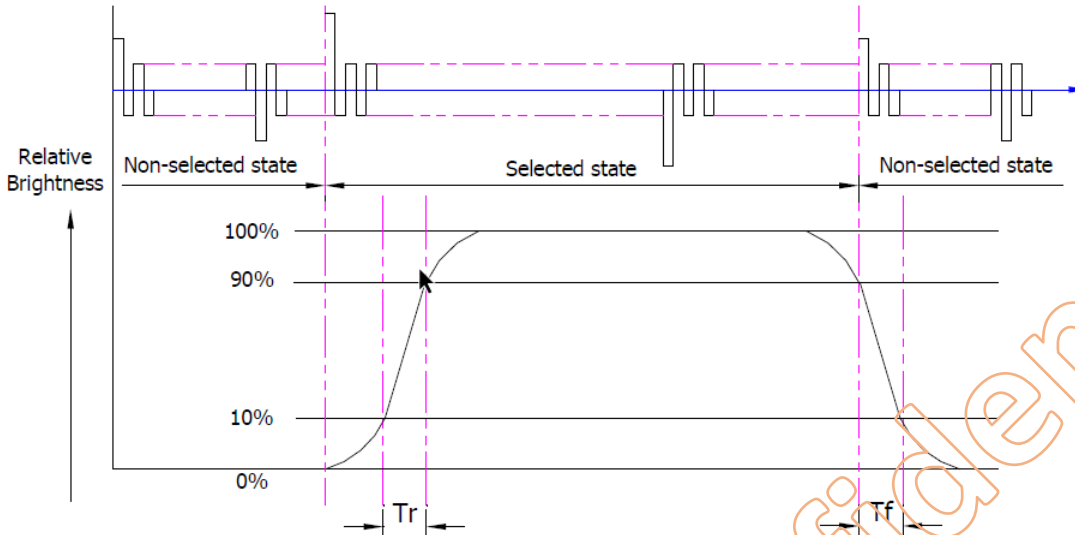
The measurement condition is:

Measuring Equipment	Eldim or Equivalent
Measuring Point Diameter	3mm//1mm
Measuring Point Location	Active Area center 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

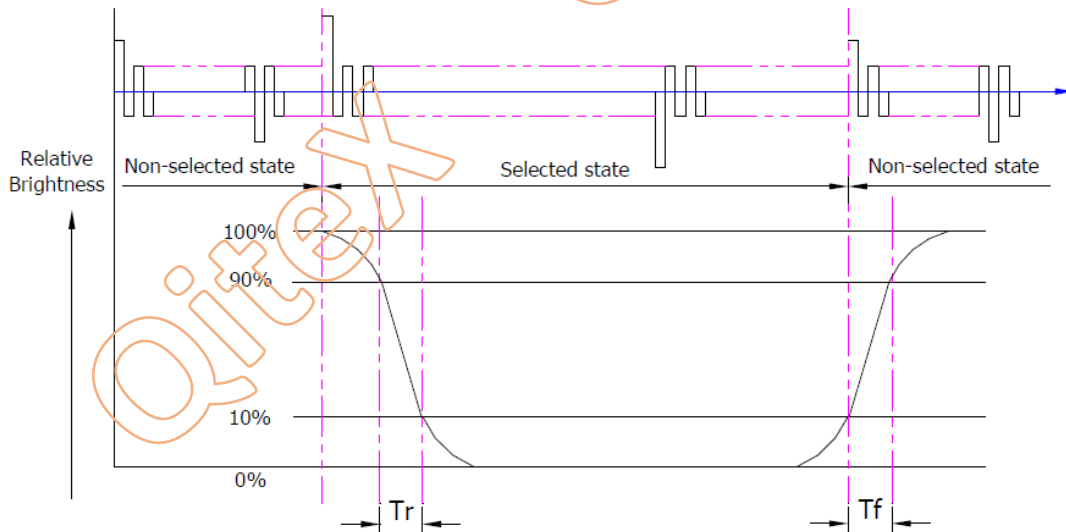
*** Note 4: Definition of Response Time:**

Normally Black Type (Negative)



- (1) T_r is the time it takes to change from non-selected stage with relative luminance 10% to selected state with relative luminance 90%.
- (2) T_f is the time it takes to change from selected state with relative luminance 90% to non-selected state with relative luminance 10%.

Normally White Type (Positive)



- (1) T_r is the time it takes to change from non-selected stage with relative luminance 90% to selected state with relative luminance 10%.
- (2) T_f is the time it takes to change from selected state with relative luminance 10% to non-selected state with relative luminance 90%;

* Measuring machine: LCD-5100 or EQUI

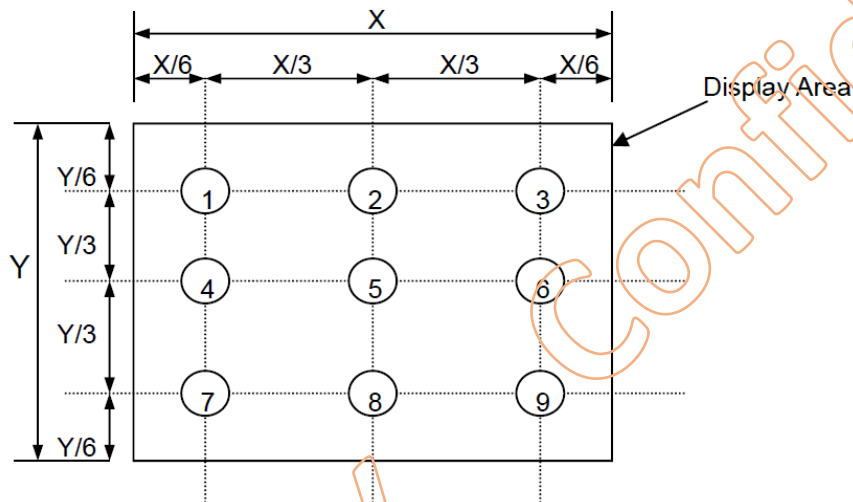
* Note 5: Definition of Surface Luminance, Uniformity and Transmittance

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

5.5.1. Surface Luminance: $LV = \text{average (LP1:LP9)}$

5.5.2. Uniformity = $\text{Minimal (LP1:LP9) / Maximal (LP1:LP9) * 100\%}$

5.5.3. Transmittance = $LV \text{ on LCD} / LV \text{ on Backlight} * 100\%$



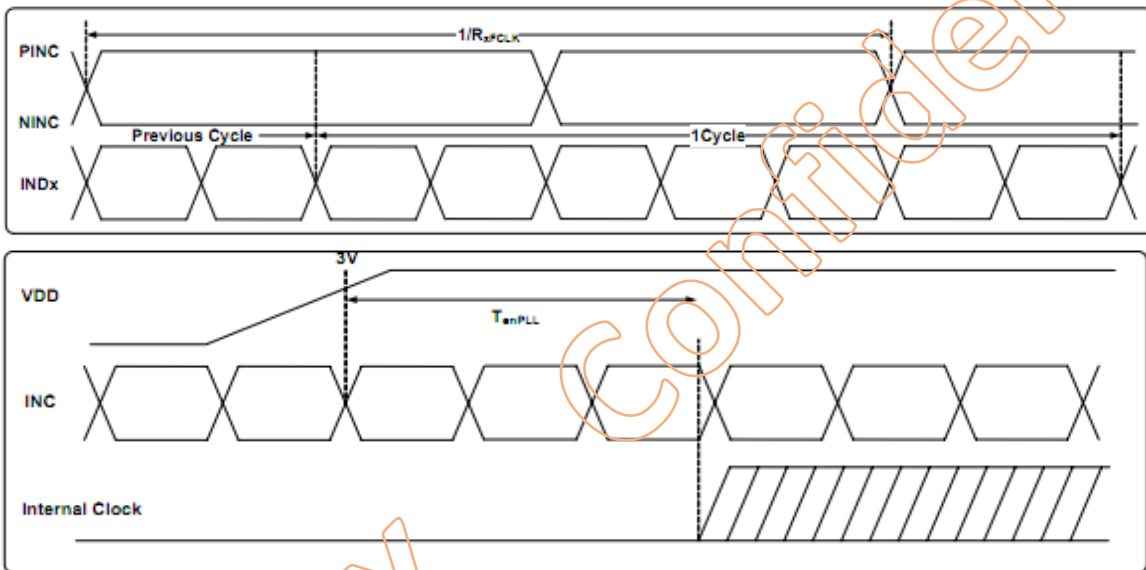
7. SIGNAL CHARACTERISTICS

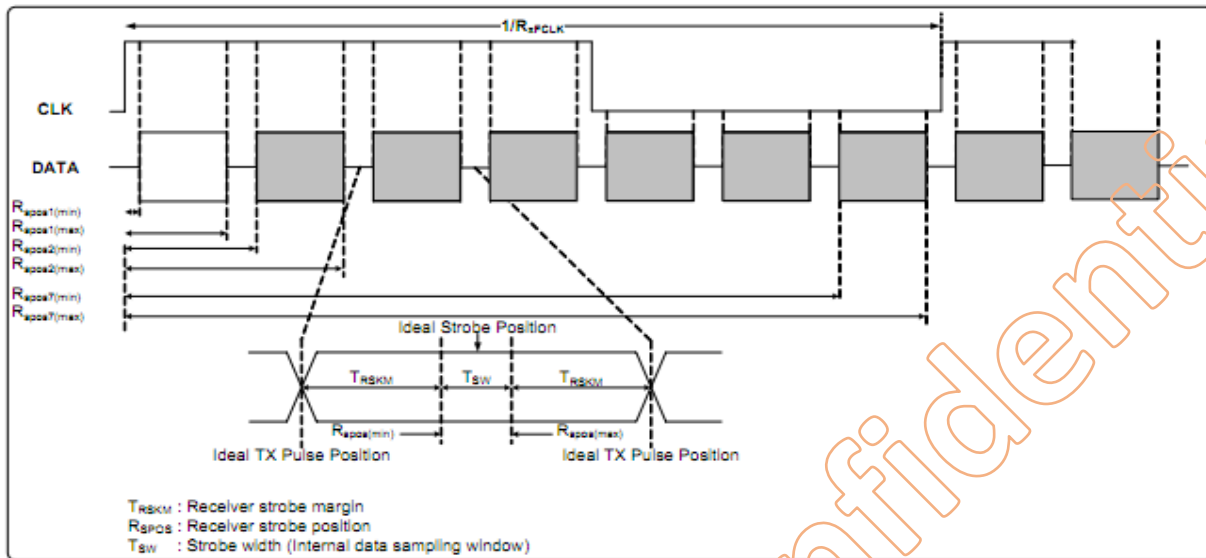
7.1 LVDS mode AC electrical characteristics

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Clock frequency	RxFCLK	26.2	-	71	MHz
Input data skew margin	T _{RSKM}	500			pS
Clock high time	T _{LVCH}	-	$4/(7 * RxFCLK)$	-	ns
Clock low time	T _{LVCL}	-	$3/(7 * RxFCLK)$	-	ns
PLL wake-up time	T _{emPLL}	-	-	150	us

Condition;

|VID|=400mV; RxVCM =1.2V RxFCLK = 71MHz

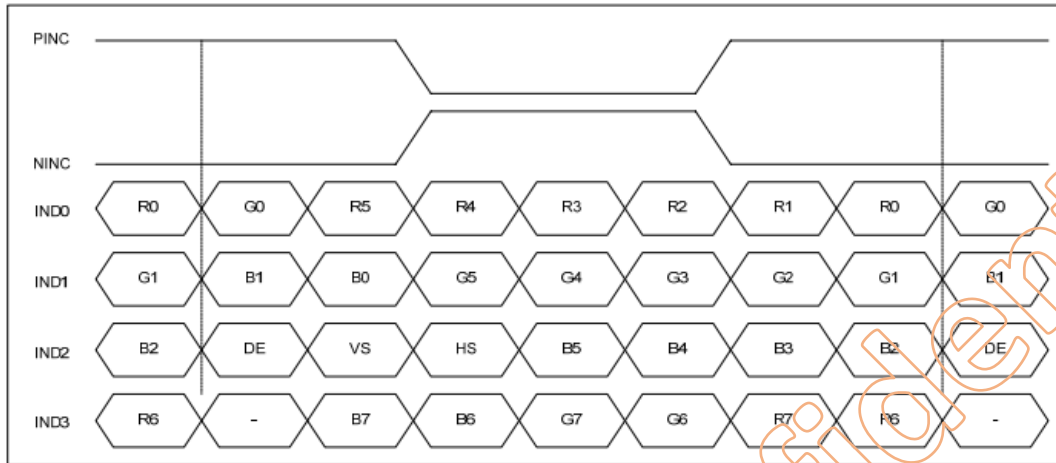




Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Modulation Frequency	SSC _{MF}	23	-	93	KHZ
Modulation Rate	SSC _{MR}	-	-	+/- 3	%

Condition: LVDS clock=71MHz center spread

7.1.1 Data input format

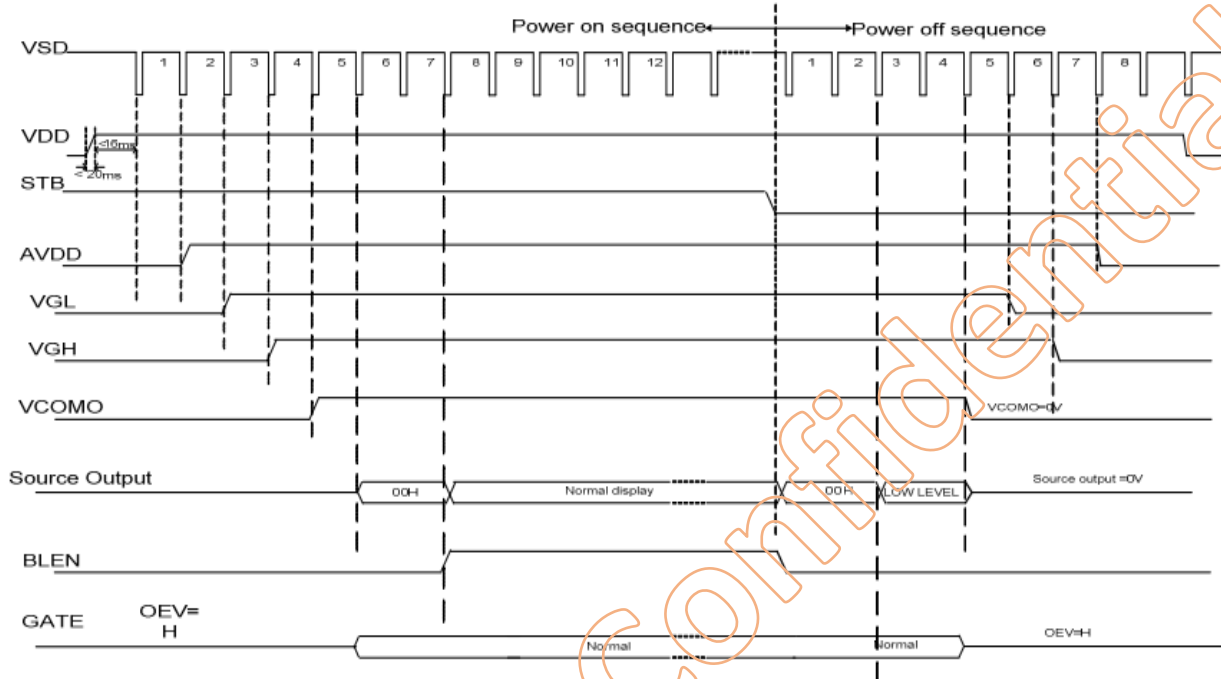


8-bit LVDS input

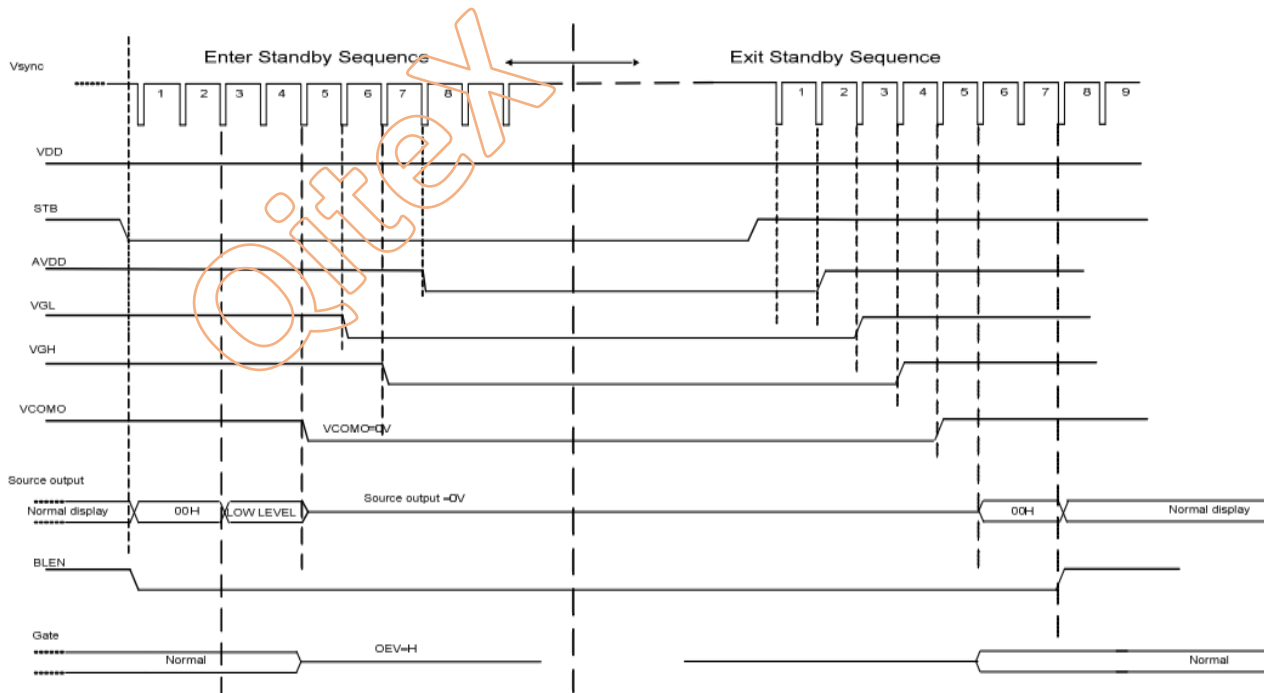


6-bit LVDS input

7.2 Power On/Off Sequence



Power On/Off timing chart



Enter and Exit Standby Mode timing chart

8. OUTLINE DRAWING

