

# LCM Specification

产品描述 Product Description	TFT LCD Module 1280 x 3RGB x 800 Dots 10.1 Inch TFT LCD
-----------------------------	---

## 一、基本特征 General Feature:

项目 Item	标准值 Standard Value	单位 Unit
显示尺寸 Display Size	10.1	英寸 Inch
分辨率 Number of Pixels	1280 (H) * 3(RGB) * 800 (V)	点 dots
显示区域 Active Area	216.96 (H) * 135.60 (V)	毫米 mm
外形尺寸 Outline Dimension	229.10(H) * 148.90(V) * 4.35(D) <TFT>	毫米 mm
观看方向 Viewing Direction	全 视角 FULL 0'clock	-
TFT 接口 TFT Interface	18/24-bit LVDS (默认 VESA 格式. 将 FPC 上 "R45" 接上 "OR" 电阻, 改成 JEIDA 格式 Default VESA format. Connect "R45" on the FPC to the "OR" resistor and change it to JEIDA format)	-
TFT 驱动芯片 TFT Driver IC	EK79202B1	-
TFT 驱动电压 TFT Driver Condition	VCI=3.3V(Typ)	伏 V
背光 Backlight	白色 LED/42 颗/6 LEDs 串联 7 路并联 White LED/42 PCS/6 LEDs serial 7 ways parallel	-
触摸屏 Touch Panel	<input checked="" type="checkbox"/> 不带触摸屏 <input type="checkbox"/> 带电阻触摸屏 <input type="checkbox"/> 带电容触摸屏 Without TP                      With RTP                      With CTP	-
电容触摸屏驱动芯片 CTP Driver IC	-	-
电容触摸屏驱动电压 CTP Driver Condition	-	伏 V
TFT 液晶工作温度 Operation Temperature	-20 ~ 70	摄氏度 ℃
TFT 液晶储存温度 Storage Temperature	-30 ~ 85	摄氏度 ℃

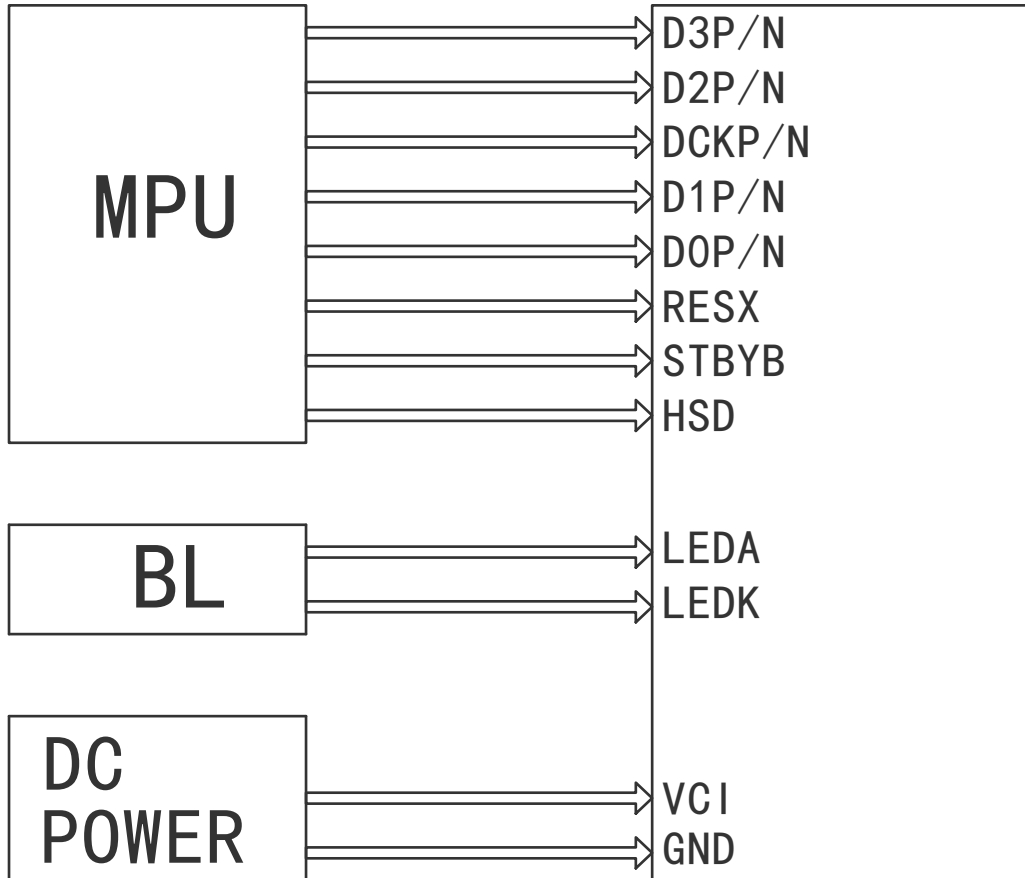


### 三、引脚说明 Pin Description

#### 3.1. 模组引脚说明 TFT Pin Description

引脚编号 Pin NO.	标号 Symbol	详细描述 Description
1	NC	Don't connect
2~3	VCI	Digital Power
4	NC	Don't connect
5	RESX	TFT Reset Pin.low in reset state
6	STBYB	Standby mode mode control. STBYB = " VCI" normal operation;STBYB = " GND" Standby mode
7	GND	Ground
8	D0N	LVDS data input pins
9	D0P	LVDS data input pins
10	GND	Ground
11	D1N	LVDS data input pins
12	D1P	LVDS data input pins
13	GND	Ground
14	D2N	LVDS data input pins
15	D2P	LVDS data input pins
16	GND	Ground
17	DCKN	LVDS clock input pins.
18	DCKP	LVDS clock input pins.
19	GND	Ground
20	D3N	LVDS data input pins
21	D3P	LVDS data input pins
22	GND	Ground
23~24	NC	Don't connect
25	GND	Ground
26~27	NC	Don't connect
28	HSD	18-bit / 24-bit input select. HSD=" VCI" 24 bit ; HSD=" GND" 18 bit
29	NC	Don't connect
30	GND	Ground
31~32	LEDK	LED Cathode
33~38	NC	Don't connect
39~40	LEDA	LED Anode
- - - END - - -		

### 3.2. 接线说明 Wiring instructions



## 四、电气特性 Electrical Characteristics

### 4.1. TFT 绝对最大额定值 TFT Absolute Maximum Ratings

项目 Item	标号 Symbol	条件 Condition	最小值 Min	典型值 Type	最大值 Max	单位 Unit
数字电源 Digital Power	VCI	-	-0.3	-	4.0	伏 V
I/O 电源电压 I/O Supply Voltage	VDDI	-	-0.3	-	4.0	伏 V
输入电压范围 Input Voltage Range	VIN	-	-0.3	-	VDDI	伏 V

注释 Note:

1. 超过上面列出的极限值可能会导致驱动 IC 永久损坏。这些值仅用于测试。IC 应在芯片特性条件下正常运行。如果不满足这些条件，IC 操作可能会出错，可靠性可能会下降。That the exceeds the Limiting Value listed above it may cause the driver IC permanent damage. These values are for test only. IC should be operated under the Chip Characteristic conditions for normal operation. If these conditions are not met, IC operation may be error and the reliability may be deteriorated.

2. 参数在工作温度范围内有效，除非另有说明。除非另有说明，所有电压均相对于 GND。Parameters are valid over operating temperature range unless otherwise specified. All voltages are with respect to GND unless otherwise noted.

### 4.2. TFT 面板工作条件 TFT Panel Operating Conditions

项目 Item	标号 Symbol	条件 Condition	最小值 Min	典型值 Type	最大值 Max	单位 Unit
数字电源 Digital Power	VCI	-	2.7	3.3	3.6	伏 V
输入电压 Input Voltage	Vih		0.8*VCI	-	VCI	伏 V
	Vil		GND	-	0.3*VCI	
待机电流 Standby Current	Isc	No Load@ FR=60Hz	-	-	-	微安 uA
工作电流 Operation Current	Ioc		-	-	-	毫安 mA

#### 4.3. 背光工作条件 LED back light specification

项目 Item	标号 Symbol	条件 Condition	最小值 Min	典型值 Type	最大值 Max	单位 Uint
工作电压 Forward voltage	VF	If=3.2V/40mA /1-chip	18.0	19.2	20.4	伏 V
工作电流 Forward current	IF		-	280	-	毫安 mA
亮度 (带 LCD) Luminance (With LCD)	Lv	Without TP	-	1000	-	坎德拉/平 方米 cd/m <sup>2</sup>
		With CTP	-	-	-	
LED 寿命 LED life time	Hr	Ta=25±3 °C	20,000	30,000	-	小时 Hour

注释 Note:

1. LED 寿命 (Hr) 定义为在 Ta=25±3 °C, 上表所示的典型电压电流值条件下持续工作直至亮度低于 50% 的时间。LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 °C, typical IL value indicated in the above table until the brightness becomes less than 50%.

2. 以上结果是按 MTBF 计算方式预估判定的 LED 失效时间, 实际测试 LED 在 Ta=25±3 °C 点亮 5000H, 亮度衰减 8%. The above results are estimated and judged by the MTBF calculation method of the LED failure time. The actual test LED is lit for 5000H at Ta=25±3 °C, and the brightness decays by 8%.

## 五、液晶光学规格 TFT OPTICAL SPECIFICATION

### 5.1 概述 Overview

光学规格的测试应在暗室（环境亮度 1lux，温度=25 ±2℃）中使用亮度计系统（测角仪系统和TOPCON BM-5)设备进行测量,测试单元应位于大约 在  $\theta$  和  $\Phi$  等于 0 的视角下,距 LCD 表面 50cm 的距离。显示面上测量点的中心应保持固定。测量前背光应工作 30 分钟。

The test of Optical specifications shall be measured in a dark room (ambient luminance 1lux and temperature = 25 ±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of  $\theta$  and  $\Phi$  equal to 0 . The center of the measuring spot on the Display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement.

### 5.2 光学规格 Optical Specifications

参数 Parameter		标号 Symbol	条件 Condition	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit	备注 Remark
视角范围 Viewing Angle Range	水平 Horizontal	⊕左/L	CR>10	-	80	-	Deg.	Note 1
		⊕右/R		-	80	-	Deg.	
	垂直 Vertical	⊕上/U		-	80	-	Deg.	
		⊕下/D		-	80	-	Deg.	
对比度 Contrast ratio		CR	⊕ = 0°	-	1000	-	-	Note2
色域 Color Gamut		CG	CIE1931	-	-	-	%	
白色色度 White Chromaticity		Wx	⊕ = 0°	-0.03	0.322	+0.03	-	Note4 (Based on C Light)
		Wy			0.344		-	
色彩还原 Reproduct ion of color	红 Red	Rx			0.618		-	
		Ry			0.328		-	
	绿 Green	Gx			0.335		-	
		Gy			0.542		-	
	蓝 Blue	Bx			0.136		-	
		By			0.145		-	
响应时间（上升 + 下降） Response Time (Rising + Falling)		Tr+Tf	⊕ = 0° Ta= 25℃	-	25	35	ms	Note5

注释 Note:

1. 视角是对比度大于10的角度。视角确定为相对于光轴的水平或3、9点钟方向和垂直或6、12点钟方向 垂直于 LCD 表面（见图 1）。

Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o' clock direction and the vertical or 6, 12 o' clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).



2. 对比度测量应在  $\theta = 0$  的视角和 LCD 表面的中心进行。亮度测量时，视场中的所有像素首先设置为白色，然后设置为暗（黑色）状态。（参见图 1）亮度对比度（CR）是通过数学定义的。

Contrast measurements shall be made at viewing angle of  $\Theta = 0$  and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (see FIGUR 1) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. 透射率是没有 APF 和没有 CG 的值。

Transmittance is the Value without APF and without CG.

4. 上表中规定的色度坐标应由所有像素首先测量的光谱数据计算为红色、绿色、蓝色和白色。测量应在面板的中心进行。

The color chromaticity coordinates specified in the above table shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

5. 电光响应时间测量应如图 2 所示，通过打开和关闭“数据”输入信号来进行。亮度从 10%变化到90%所需的时间是 $T_r$ ，90%到10%是 $T_f$ 。

The electro-optical response time measurements shall be made as FIGURE 2 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is  $T_r$ , and 90% to 10% is  $T_f$ .

Figure1 Measurement Set Up

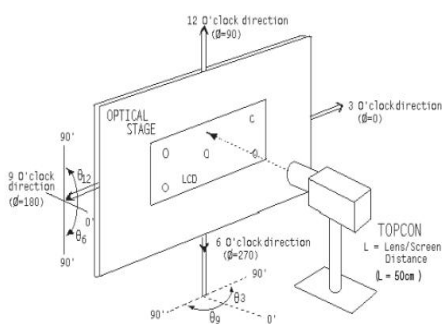


图 1

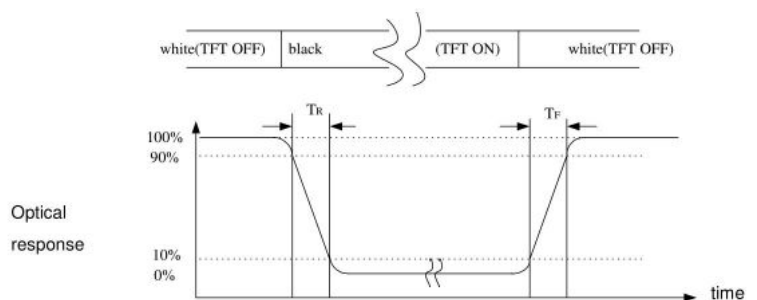
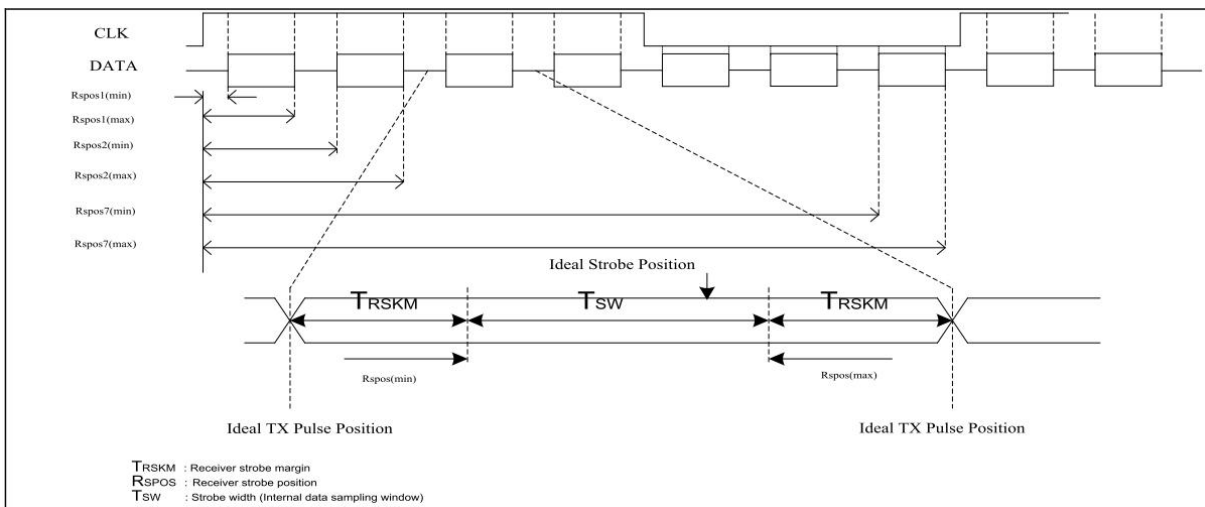
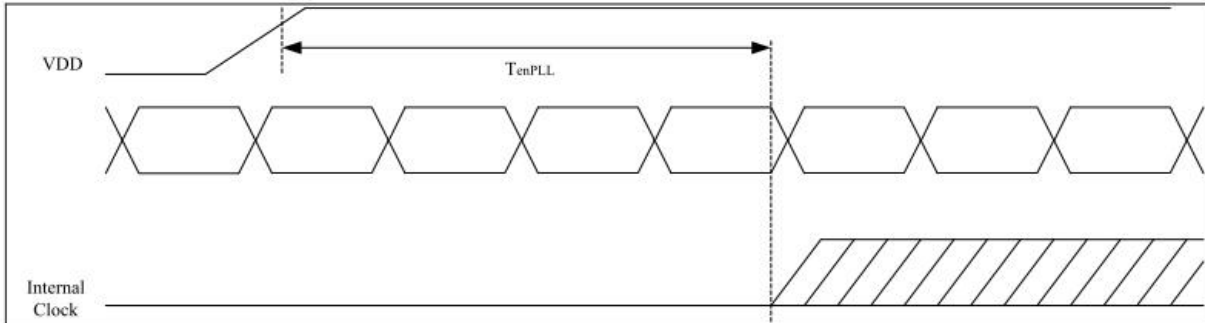
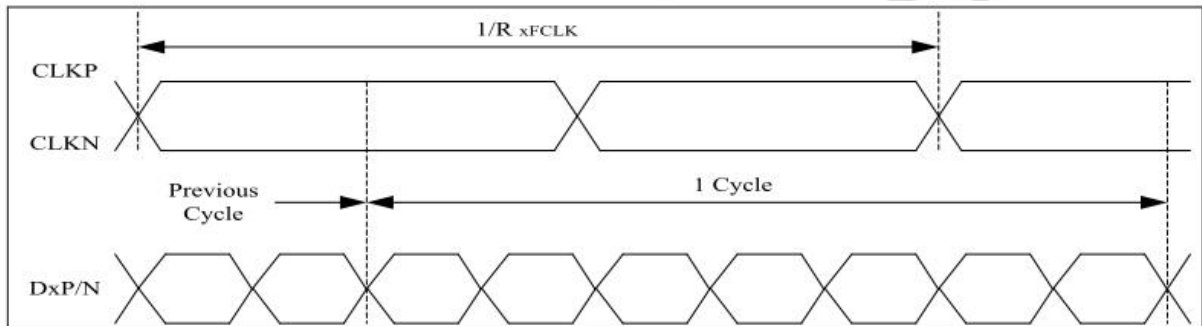


图 2

## 六、LVDS 时序 LVDS Timing

### 6.1. LVDS 交流特性 LVDS AC characteristic

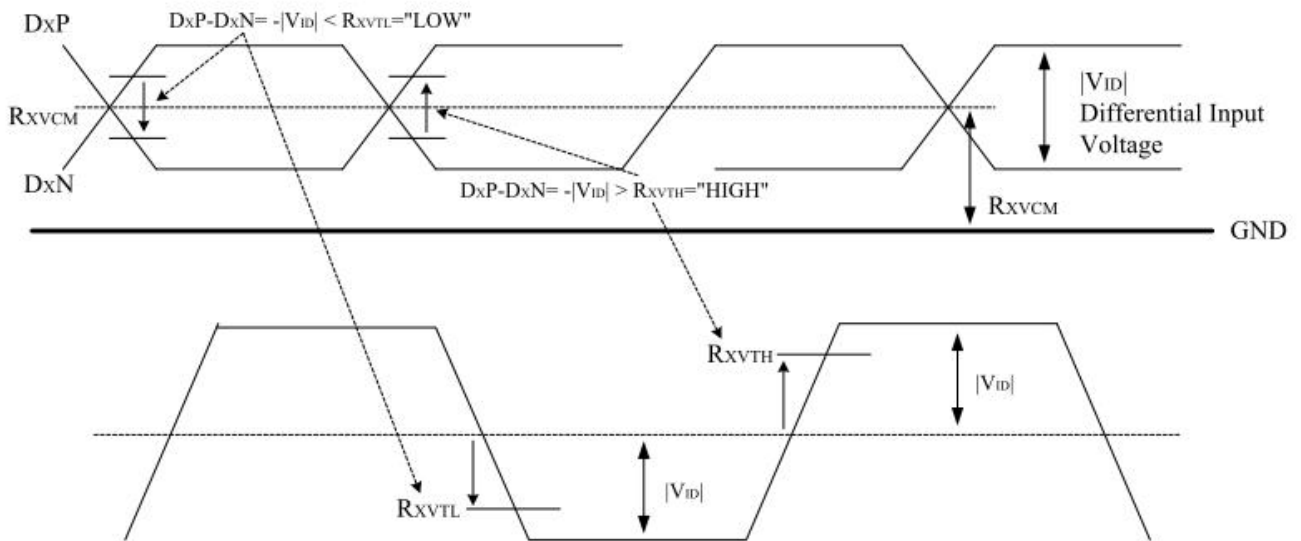
Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	$R_{x\text{FCLK}}$	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	$T_{\text{RSKM}}$	500	-	-	ps	$ V_{\text{ID}}  = 200\text{mV}$ $R_{\text{xVCM}} = 1.2\text{V}$ $R_{\text{xFCLK}} = 81\text{MHz}$
Clock high time	$T_{\text{LVCH}}$	-	$4/(7 * R_{\text{xFCLK}})$	-	ns	
Clock low time	$T_{\text{LVCL}}$	-	$3/(7 * R_{\text{xFCLK}})$	-	ns	
PLL wake-up time	$T_{\text{enPLL}}$	-	-	150	us	



## 6.2. LVDS 直流电气特性 LVDS DC electrical characteristics

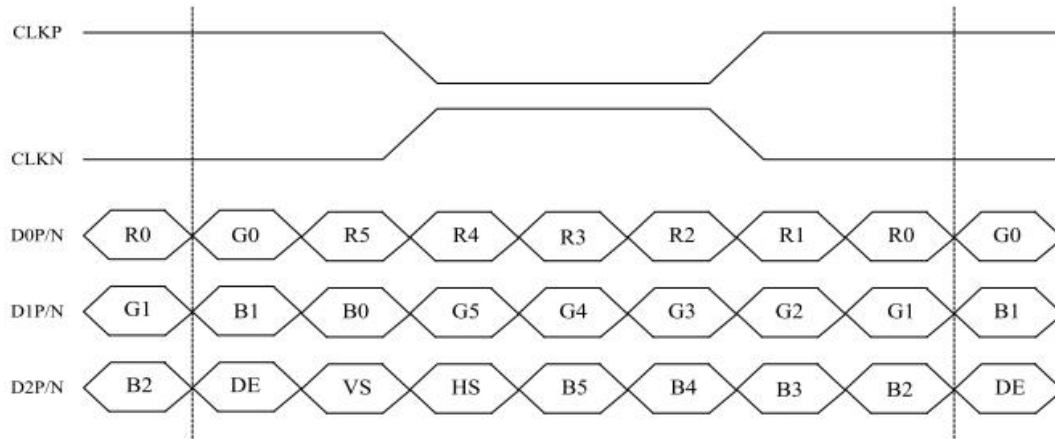
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	$R_{XVTH}$	+0.1	0.2	0.3	V	$R_{XVCM}=1.2V$
Differential input low threshold voltage	$R_{XVTL}$	-0.3	-0.2	-0.1	V	
Input voltage range (singled-end)	$R_{XVIN}$	0.7	-	1.7	V	
Differential input common mode voltage	$R_{XVCM}$	1	1.2	1.4	V	$ V_{ID} =0.2$
Differential input impedance	$Z_{ID}$	80	100	125	ohm	
Differential input voltage	$ V_{ID} $	0.2	-	0.6	V	
Differential input leakage current	$I_{LCLVDS}$	-10	-	+10	$\mu A$	
LVDS Digital Operating Current	$I_{VDD}$	-	15	20	mA	$F_{DCLK}=80MHz, V_{DD}=3.3V$ , Input pattern: 55h->Aah->55h->Aah
LVDS Digital Stand-by Current	$I_{ST}$	-	-	250	$\mu A$	Clock & all Functions are stopped

### Single-end Signals

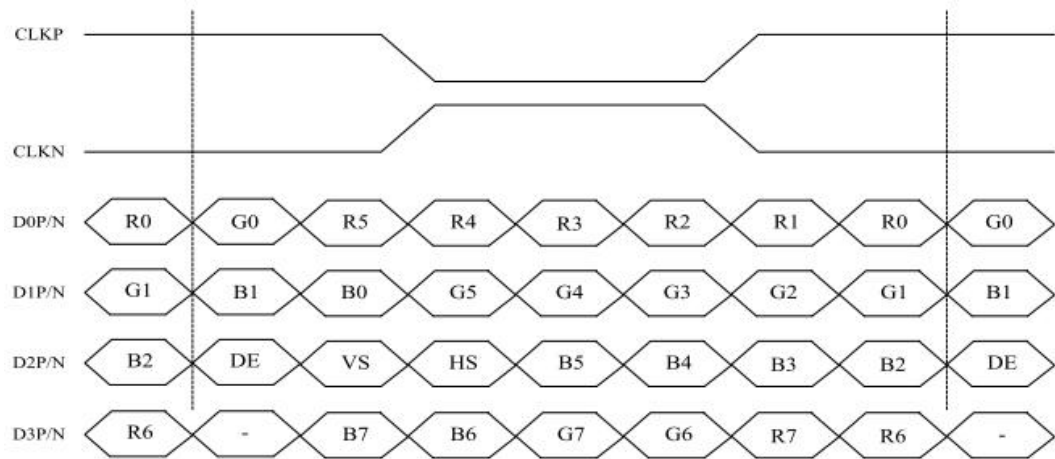


### 6.3. LVDS 的数据输入格式 Data input format for LVDS

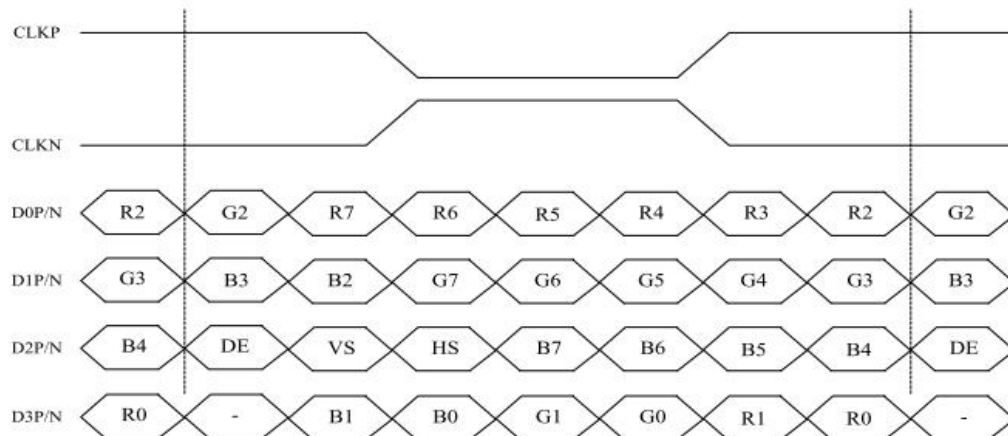
#### (1) VESA 18-bit LVDS



#### (2) VESA 24-bit LVDS



#### (3) JEDIA 24-bit LVDS



#### 6.4. LVDS 输入时序表 LVDS Input Timing Table

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60Hz (LVDS)	F <sub>DCLK</sub>	66.3	72.4	78.9	MHz
HSYNC period time	T <sub>H</sub>	1380	1440	1500	DCLK
Horizontal display area	T <sub>HD</sub>	1280			DCLK
HSYNC pulse width	T <sub>HPW</sub>	Min.	2		
		Typ.	-		
		Max.	40		
HSYNC back porch(with pulse width)	T <sub>HBP</sub>	88	88	88	DCLK
HSYNC front porch	T <sub>HFP</sub>	12	72	132	DCLK
VSYNC period time	T <sub>V</sub>	824	838	872	H
Vertical display area	T <sub>VD</sub>	800			H
VSYNC pulse width	T <sub>VPW</sub>	Min.	2		H
		Typ.	-		
		Max.	20		
VSYNC back porch(with pulse width)	T <sub>VBP</sub>	23	23	23	H
VSYNC front porch	T <sub>VFP</sub>	1	15	49	H

#### 6.5. 复位时序 Reset Timing

当复位引脚的 RESETB 等于低电平时，它将处于复位状态。When RESETB of the reset pin equals to Low, it will be in the condition of reset.

当它处于复位状态时，会使设备恢复初始设置。When it is in the condition of reset, it will make the device recover the initial set.

但是，为了避免复位噪声导致复位，有一种机制来判断是否需要复位。However, in order to avoid the reset noise cause reset, there is a mechanism to judge about whether the reset is needed or not.

低时的闭合区间可以如下所示。The closed interval of Low can be shown as the following.

Parameter	Symbol	Conditions	Spec.			Unit
			Min.	Typ.	Max	
Reset low pulse width	Trst		20	-	-	μs

