

## PRODUCT SPECIFICATION

PART NUMBER # REV: QX-116FHD00MMP00D#00

DESCRIPTION: TFT 11.6"wide 1920\*1080 FULL View eDP 450CD

( ) Preliminary Specification

( V ) Approved Specification

<b>Customer Name:</b>	
<b>Signature:</b>	<b>Date:</b>

<b>QiteX FutureLabs Advanced Display Product Line</b>	
<b>PREPARED BY</b>	<b>REVIEWED BY</b>
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## Revision History

Spec Version	Date	Page	Description	Note
V1.0	2020/8/4		1 <sup>st</sup> initial	
V1.1	2020/9/7		Update Edition	
V1.2	2022/12/07		Add weight Current Consumption All White Add Chromaticity Transmissive modify optical characteristics note	P5 P6 P10 P11-13

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# 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)	11.6" w	
Display Mode	Transmissive /Normally black	
Resolution	1920 RGB x 1080	Pixels
View Direction	FULL View	Best Image
Module Outline	267.72(H) x 164.42(V) x 6.1(T) 267.72(H) x 164.42(V) x 8.3 max.(T) (Note1)	mm
Active Area	256.32(H) x 144.18(V)	mm
Pixel Size	133.5(H) x 133.5(V)	um
Pixel Arrangement	RGB Vertical stripe	
Display Colors	16.2 M	
Interface	eDP Interface	
With or Without Touch Panel	Without	-
Weight	330	g

Note1: Inclusive hooks, posts, FFC/FPC tail etc.

### 3. Absolute Maximum Ratings

#### 3.1 Absolute Ratings of Environment

V<sub>SS</sub>=0V, Ta=25 °C

Item	Symbol	Min.	Max.	Unit
Digital Supply Voltage	LCD_VDD	-0.3	4.0	V
Storage temperature	T <sub>STG</sub>	-30	+80	°C
Operating temperature	T <sub>OP</sub>	-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	LCD_VDD	3.0	3.3	3.6	V
Current Consumption All White	I <sub>DD</sub>	-	206	-	mA
Positive-going Input Threshold Voltage	VIT+	-	-	+100	mV
Negative-going Input Threshold Voltage	VIT-	-100	-	-	mV

##### 3.2.2 Backlight Unit

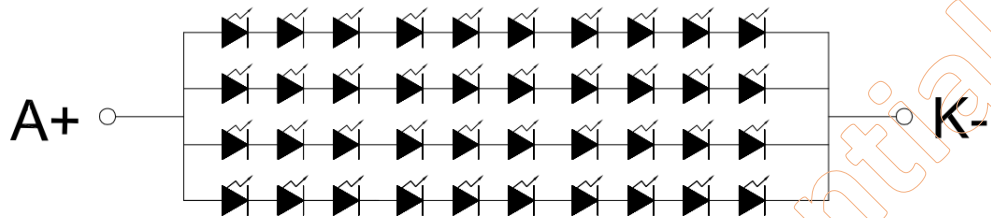
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V <sub>F</sub>	Ta=25 °C, I <sub>F</sub> =180mA	26	30	34	V
Forward Current	I <sub>F</sub>	-	-	180	240	mA
Power dissipation	P <sub>D</sub>	-	-	5400	8160	mW
LED working life(25°C)	-	-	-	40,000	-	Hrs
Drive method	Constant current					
LED Configuration	40 White LEDs (10 LEDs in one string and 4 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 °C,60%RH±5%, Typical operating life time is estimated data, led power dissipation is evaluated by led supplier

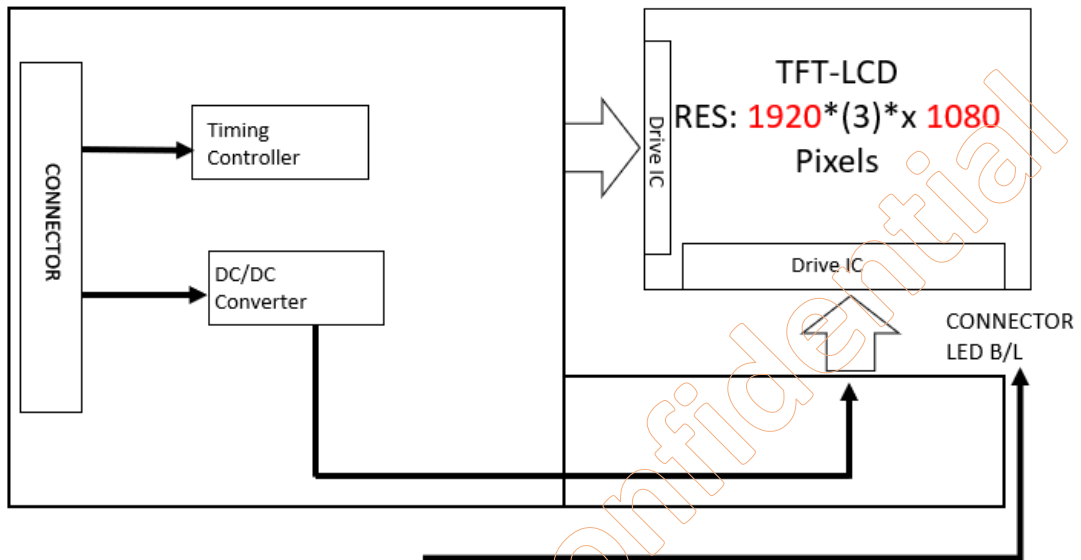
### 3.2.3 Backlighting circuit

## Backlighting circuit :



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## 4. BLOCK DIAGRAM





## 5. PIN CONNECTIONS

No.	Symbol	Function	Remark
1	NC	Reserved for LCD	NOTE1
2	H_GND	High Speed Ground	
3	Lane1_N	Complement Signal Link Lane 1	
4	Lane1_P	True Signal Link Lane 1	
5	H_GND	High Speed Ground	
6	Lane0_N	Complement Signal Link Lane 0	
7	Lane0_P	True Signal Link Lane 0	
8	H_GND	High Speed Ground	
9	AUX_CH_P	True Signal Auxiliary Channel	
10	AUX_CH_N	Complement Signal Auxiliary Channel	
11	H_GND	High Speed Ground	
12	LCD_VDD	LCD logic and driver power(3.3V)	
13	LCD_VDD	LCD logic and driver power(3.3V)	
14	NC	Reserved for LCD manufacturer's use	NOTE1
15	LCD_GND	LCD logic and driver ground	
16	LCD_GND	LCD logic and driver ground	
17	HPD	HPD signal pin	NOTE2
18	NC	No connection	
19	NC	No connection	
20	NC	No connection	
21	NC	No connection	
22	NC	No connection	
23	NC	No connection	
24	NC	No connection	
25	NC	No connection	
26	NC	No connection	
27	NC	No connection	
28	NC	No connection	
29	NC	No connection	
30	NC	No connection	

CONNECTOR : ISO50-L30-C10(PIN30)

BLU pin:

No.	Symbol	Function	Remark
1	A (White+)	Led anode	
2	K (Black-)	Led cathode	

CONNECTOR: JST BHSR-02VS-1(N)

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## 6. OPTICAL CHARACTERISTIC

### 6.1 Optical Characteristics

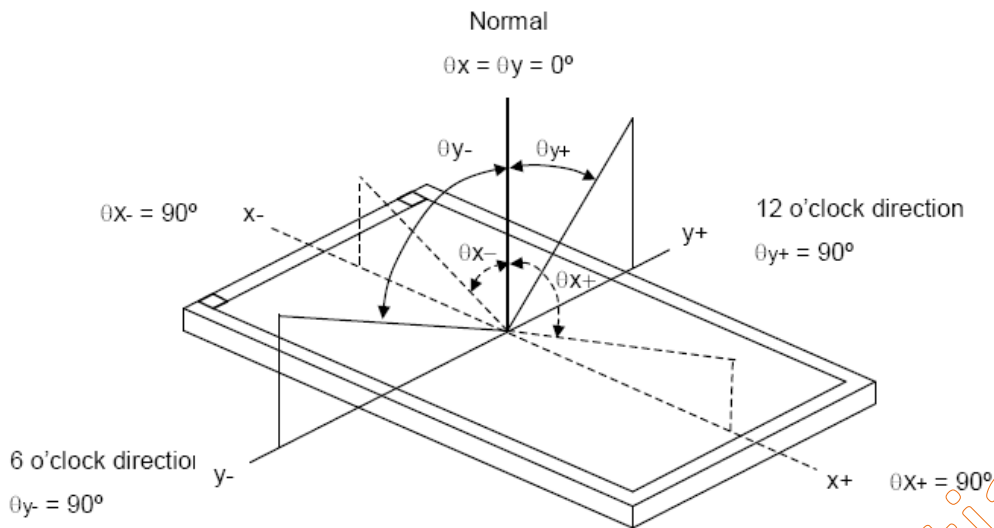
Item	Symbol	Condition	Specification			Unit	Note
			Min.	Typ.	Max.		
Viewing Angle	Horizontal	$\theta X+$	-	(85)	-	Deg.	Note 1
		$\theta X-$	-	(85)	-		
	Vertical	$\phi Y+$	-	(85)	-		
		$\phi Y-$	-	(85)	-		
NTSC Ratio(Gamut)			-	TBD	-	%	
Contrast ratio			800	1000	-		Note 2
Uniformity		Avg	70	80		%	Note 4
Luminance on TFT ( $I_f=40mA/LED$ )		Lv	360	450	-	cd/m <sup>2</sup>	Note 4
Response time		TR+TF	-	30	35	ms	Note 3
Color Chromaticity	Red	XR	0.594	0.644	0.694	-	
		YR	0.282	0.332	0.382		
	Green	XG	0.208	0.258	0.308		
		YG	0.593	0.643	0.693		
	Blue	XB	0.090	0.140	0.190		
		YB	0.026	0.076	0.126		
	White	XW	0.231	0.281	0.331		
		YW	0.291	0.341	0.391		

The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance <2 lux, and at room temperature).

The room temperature is 25°C±2°C

Note 1: Definition of Viewing Angle

Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or the vertical clock direction with respect to the optical axis which is normal to the LCD surface.

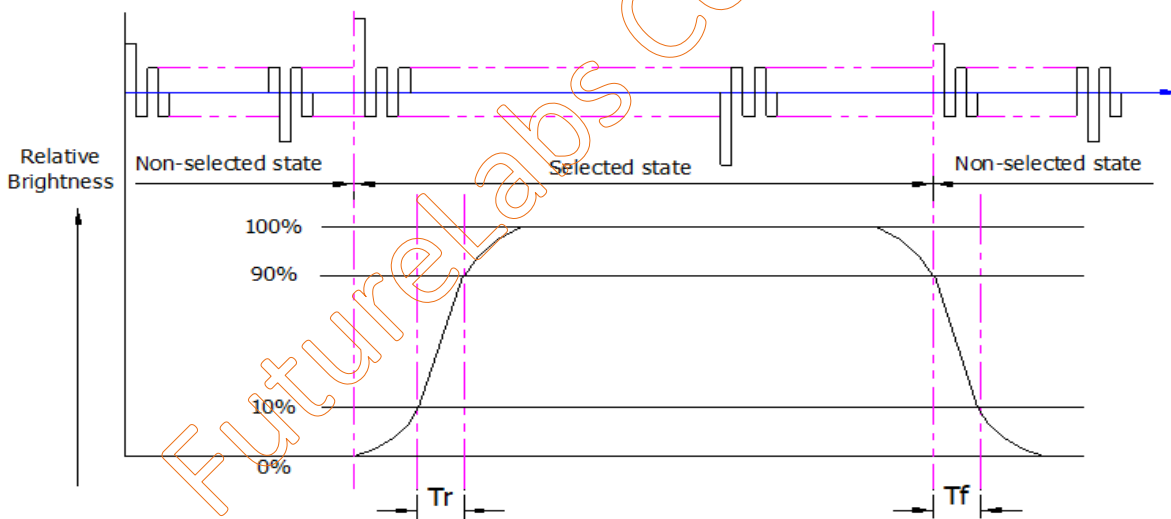


Note 2: Definition of Contrast Ratio (CR)

Measure the viewing angle of  $\Theta = 0$  and at the center of the LCD surface. Luminance with all pixels in white state divide by Luminance with all pixels in Black state

Note 3: Definition of Response Time:

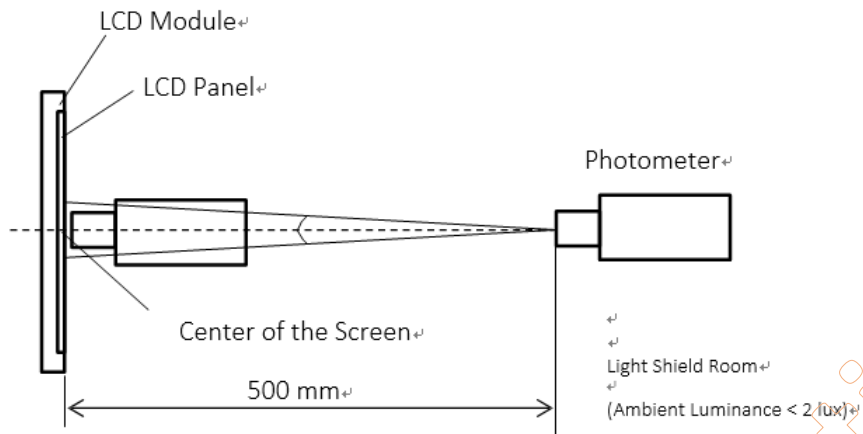
The response time is set initially by defining the "Rising Time ( $T_R$ )" and the "Falling Time ( $T_F$ )" respectively. Please refer the figure to the followings:



Note 4: Definition of Brightness (L)

Measure the center area of the panel and the viewing angle of the  $\theta_x = \theta_y = 0^\circ$

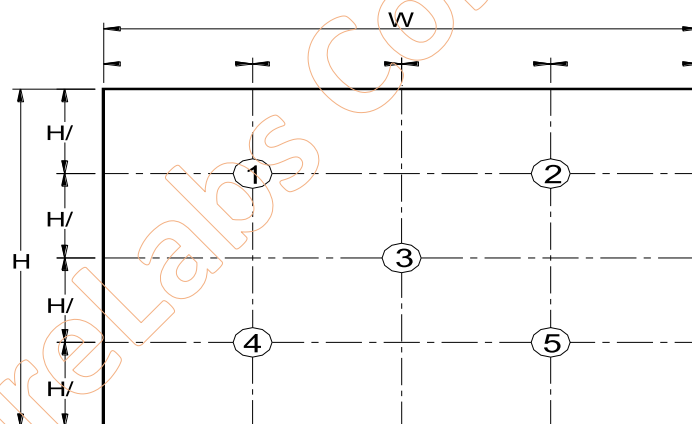
Note 5: The method of optical measurement:



Note 6: Definition of White Variation ( $\delta W$ ):

Measure the luminance of gray level 255 at 5 points

$$\delta W = \text{Minimum} [L (1), L (2), L (3), L (4), L (5) ] / \text{Maximum} [L (1), L (2), L (3), L (4), L (5)] * 100\%$$

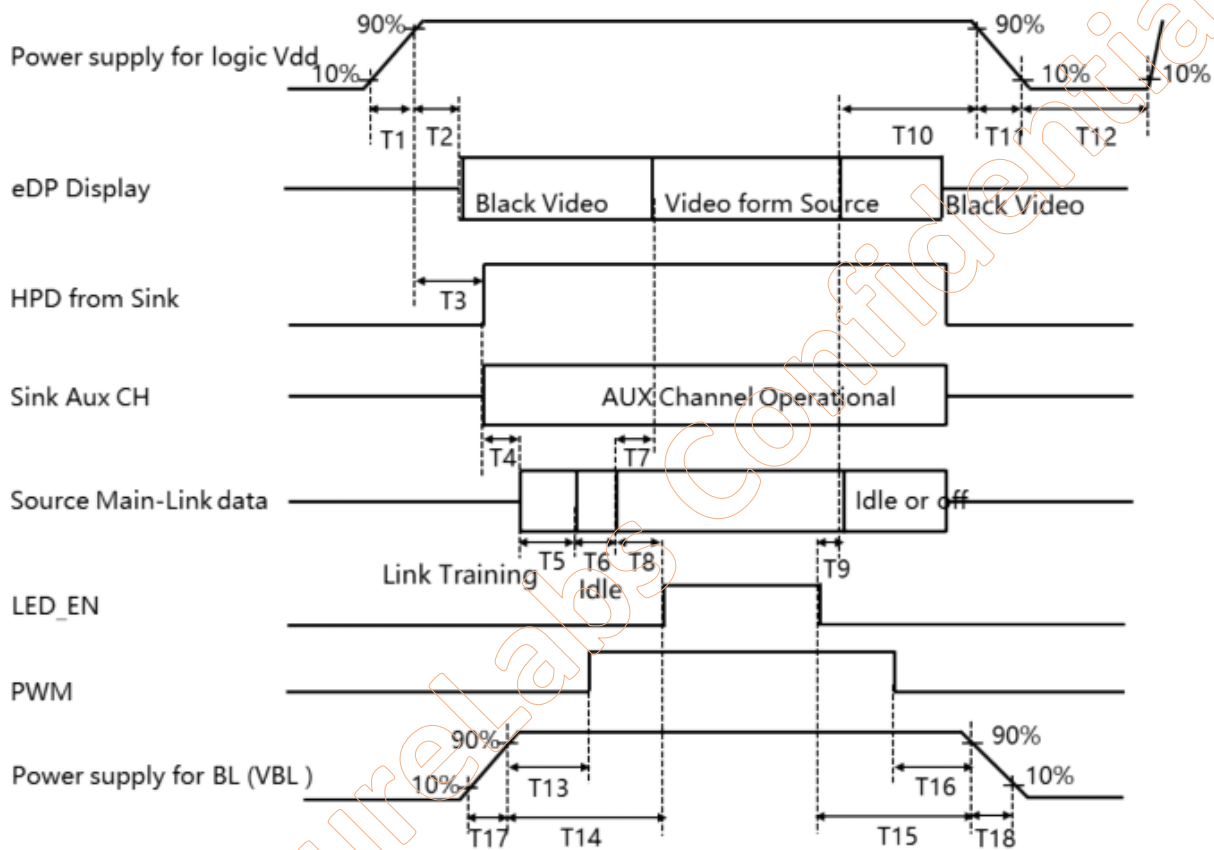


## 7. SIGNAL CHARACTERISTICS

### 7.1 AC Electrical Characteristics

ON-OFF conditions for supply voltage

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below



- $0.5\text{ms} \leq T_1 \leq 10\text{ms}$
- $0\text{ms} \leq T_2 \leq 200\text{ms}$
- $0\text{ms} \leq T_3 \leq 200\text{ms}$
- $0\text{ms} \leq T_{13}$
- $0\text{ms} \leq T_{14}$
- $0\text{ms} \leq T_{17}$
- $80\text{ms} \leq T_8$
- $0\text{ms} \leq T_7 \leq 50\text{ms}$
- $0\text{ms} \leq T_{10} \leq 500\text{ms}$
- $0.5\text{ms} \leq T_{11} \leq 10\text{ms}$
- $500\text{ms} \leq T_{12}$
- $0\text{ms} \leq T_{15}$
- $0\text{ms} \leq T_{16}$
- $0\text{ms} \leq T_{18}$

**Notes:**

1. When the power supply V<sub>DD</sub> is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

## 7.2 Timing Characteristics

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	-	141.4	-	MHz
Horizontal display area	thd	1920			pixel
HSYNC period time	th	-	2142	-	pixel
HSYNC blanking	thb+thfp	-	222	-	pixel
Vertical display area	Tvd	1080			H
Frequency	fV	48	60	65	Hz
VSYNC period time	Tv	-	1100	-	H
VSYNC blanking	Tvb+Tvfp	-	20	-	H

\* Note: In case of using the long vertical period, the deterioration of display quality, flicker, etc, may occur.

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