

Product Specification

PART NUMBER # REV: FLC-173MME8200001#00

DESCRIPTION: TFT 17.3" w, 1920(H)*1080(V), eDP,
16.7M Color, 250CD

- Preliminary Specification
- Approved Specification

Customer Name:	
Signature:	Date:

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Revision History

Version	Date	Page	Description	Note
V1.0	2022/11/24		First Edition	

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1. GENERAL DESCRIPTION

1.1 Description

17.3 inch is a Color Active Matrix Liquid Crystal Display Module composed of a TFT LCD panel and LED backlight system. The screen format is intended to support the 1920 x 1080 screen and 16.7 M colors.

1.2 Product Summary

The following items are summary on the table under Ta=25 °C condition:

No.	Item	Specification	Unit
1	Display Size	17.3" w	Inch
2	Pixel Number	1920 (H) x 3(RGB)x 1080 (V)	Pixels
3	Outline Dimension	389.89(W)×227.01(H)×3.3(D) 389.89(W)×238.01(H)×3.5 max.(D)	mm
4	Active Area	381.89 (W) x 214.81 (H)	mm
5	Pixel Pitch	0.1989(W) x 0.1989(H)	mm
6	Display Colors	16.7M colors (8bit RGB)	
7	Pixel Arrangement	RGB vertical stripe	-
8	Display Mode	Normally Black	-
9	Electrical Interface	eDP1.2 (eDP w/o PSR)	-
10	Surface Treatment	Anti-glare	-
11	Brightness	250 (Typ.)	cd/m2
12	Contrast Ratio	800 (Typ.)	-
13	Power Supply Voltage	3.3V for LCD – 12V for Backlight	
14	Power Consumption	LCD: 0.96W Backlight System: 4W Total: 4.96W	W

2. ABSOLUTE MAXIMUM RATING

2.1 Electrical Absolute Rating

Item	Symbol	Values			Unit	Note
		Min	Typ	Max		
Power Supply Voltage	VDD	-0.3	-	4.0	V	Ta=25±2°C Note (1)

2.2 Environment Absolute Rating

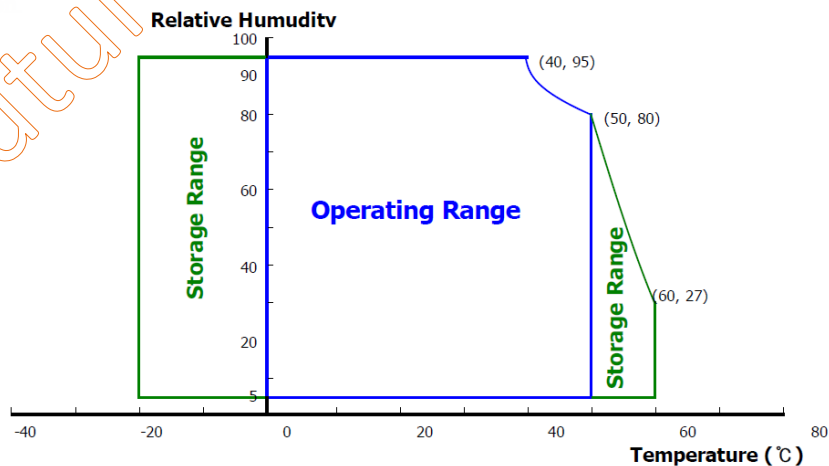
Item	Symbol	Values			Unit	Note
		Min	Typ	Max.		
Operating Temperature	Top	0	-	+50	°C	Ta=25±2°C Note (2)
Storage Temperature	Tstg	-20	-	+60	°C	

Note (1) Permanent damage to the device may occur if maximum values are exceeded functional operation should be restricted to the condition described under normal operating conditions.

Note (2) Temperature and relative humidity range are shown in the figure below. 95 % RH Max. (40 °C ≥ Ta) Maximum wet - bulb temperature at 39 °C or less. (Ta > 40 °C) No condensation.

Note (3) In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before test.

Note (4) Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.



3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD Module

Item	Symbol	Values			Unit	Note
		Min	Typ	Max		
Power supply voltage	V _{DD}	3.0	3.3	3.6	V	Note (1)
Power Current	I _{DD}	-	291	409	mA	Note (1)
Power Supply Inrush Current	I _{inrush}	-	-	1.5	A	Note (3)
Power Consumption	P _D	-	0.96	1.35		Note (1)
	P _{PL}	-	4	4	W	Note (2)
	P _{total}	-	4.96	5.35	W	Note (1)

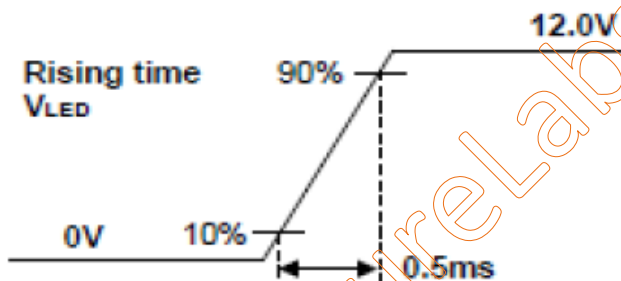
Note (1) The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for 3.3V at 25 °C.

- a) Typ : Mosaic pattern 8*8
- b) Max : R/G/B pattern

Note (2) Calculated value for reference ($V_{LED} \times I_{LED}$)

Note (3) Measure condition:



3.2 Backlight Characteristics

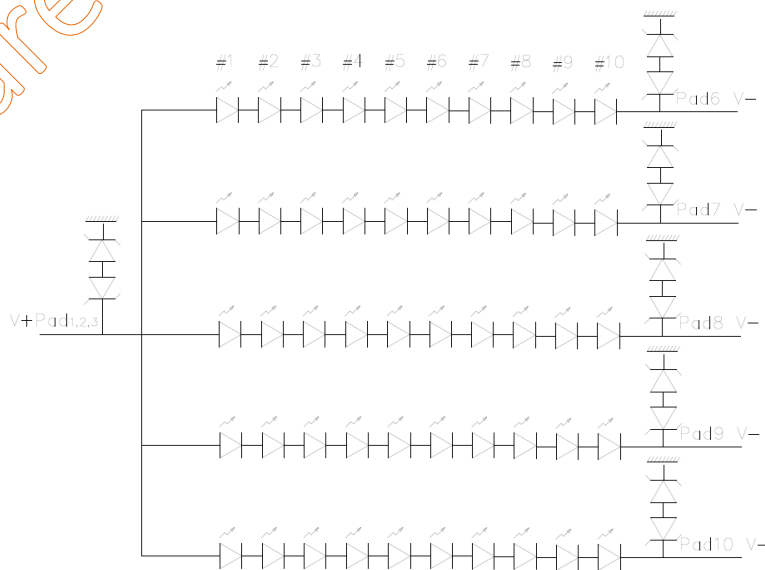
Parameter guideline for LED driving is under stable conditions at 25°C (Room Temperature):

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED Forward Voltage	V _F	-	-	3.0	V	
LED Forward Current	I _F	-	22.5	-	mA	
LED Power Consumption	P _{LED}	-	-	4.0	W	Note (1)
Power Supply Voltage for LED Driver	V _{LED}	5	12	21	V	
Power Supply Voltage for LED Driver Inrush	I _{LED Inrush}	-	-	1.5	A	
EN Control Level	Backlight On	1.5	-	3.3	V	
	Backlight Off	0	-	0.6	V	
LED PWM Duty Cycle	T _D	5	-	100	%	Note (3)
PWM Control Frequency	F _{PWM}	200	--	10K	HZ	
PWM Control Level	High Level	1.5	-	3.3	V	
	Low Level	0	-	0.6	V	
LED life time	Hr	15,000	-	-	Hours	I _F =22.5 mA

Note (1) Calculated value for reference I_F x V_F x50/Driver Efficiency

Note (2) The LED life-time define as the estimated time to 50% degradation of initial luminous

Note (3) 1% duty cycle is achievable with a dimming frequency less than 1KHz



LED Structure

4. Signal Characteristic

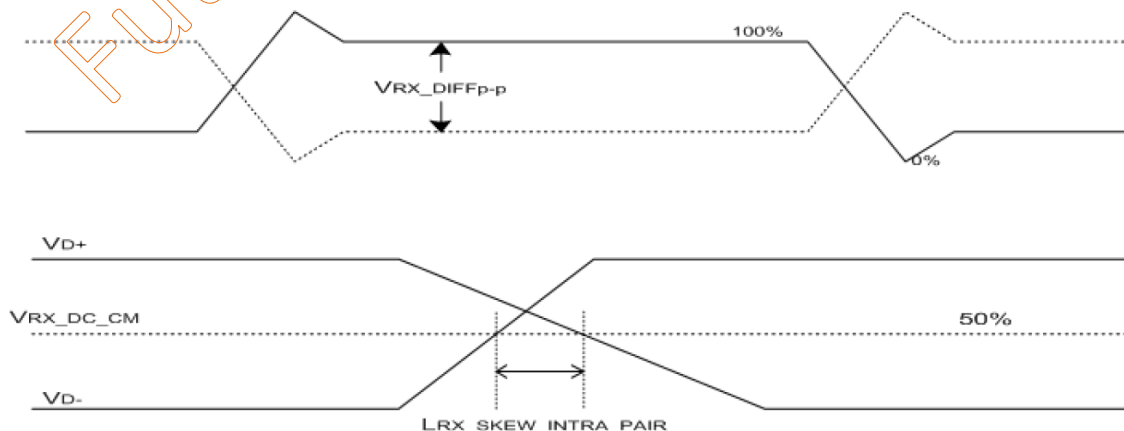
4.1 Timing Chart

Item	Symbol	Min.	Typ.	Max.	Unit
Clock Frequency	1/Tc	138	143.9	150.5	MHz
Frame Period	TV	1098	1120	1130	lines
		-	60	-	Hz
		-	16.7	-	ms
Vertical Display Period	Tvd	-	1080	-	lines
One Line Scanning Period	Th	2080	2142	2220	clocks
Horizontal Display Period	Thd	-	1920	-	clocks

Note: The above is as optimized setting.

4.2 eDP Rx Interface Timing Parameter

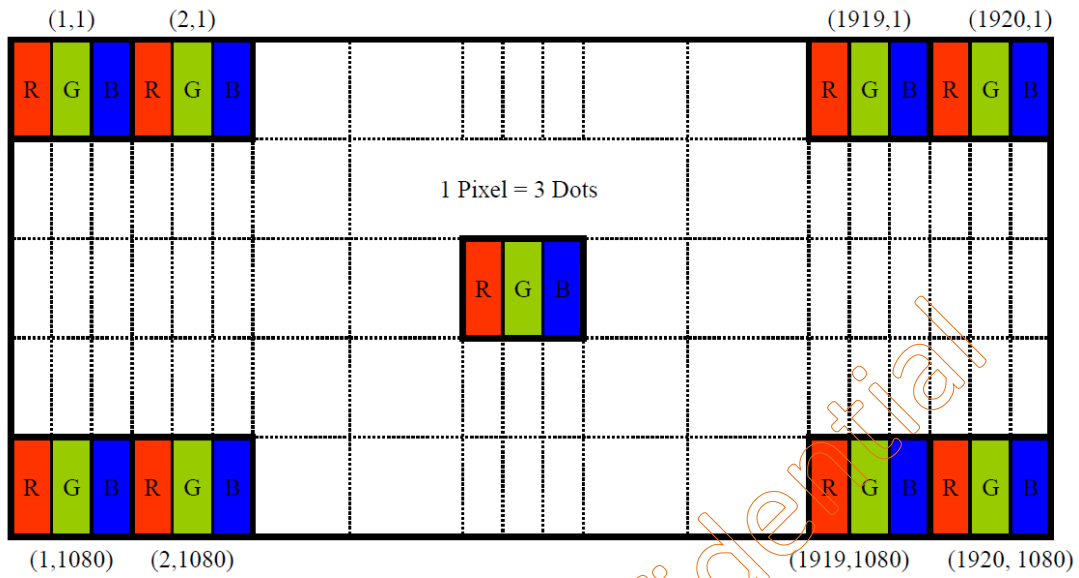
Item	Symbol	Min.	Typ.	Max.	Unit
Spread Spectrum Clock (Link Clock Down-Spreading)	ssc	0	-	0.5	%
Differential Peak-to-Peak Input Voltage at Package Pins	VRX-DIFFp-p	120	-	1320	mV
Rx input DC common mode voltage	VRX_DC_CM	0	-	2	V
Differential termination resistance	RRX-DIFF	80	-	120	Ω
Single-ended termination resistance	RRX-SE	40	-	60	Ω
Rx short circuit current limit	IRX_SHORT	-	-	50	mA
Intra-pair skew at Rx package pins (HBR) RX intra-pair skew tolerance at HBR	LRX_SKEW_INTRA_PAIR	-	-	60	ps



4.3 Input Signals, Basic Display Colors & Gray Scale Of Colors

	Colors & Gray scale	Data signal																							
		R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7
Basic colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Light Blue	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Purple	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray scale of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△				↑								↑								↑				
	▽				↓								↓								↓				
	Brighter	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray scale of Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△				↑								↑								↑				
	▽				↓								↓								↓				
	Brighter	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	▽	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray scale of Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	△				↑								↑								↑				
	▽				↓								↓								↓				
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray scale of White & Black	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	△				↑								↑								↑				
	▽				↓								↓								↓				
	Brighter	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1
	▽	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

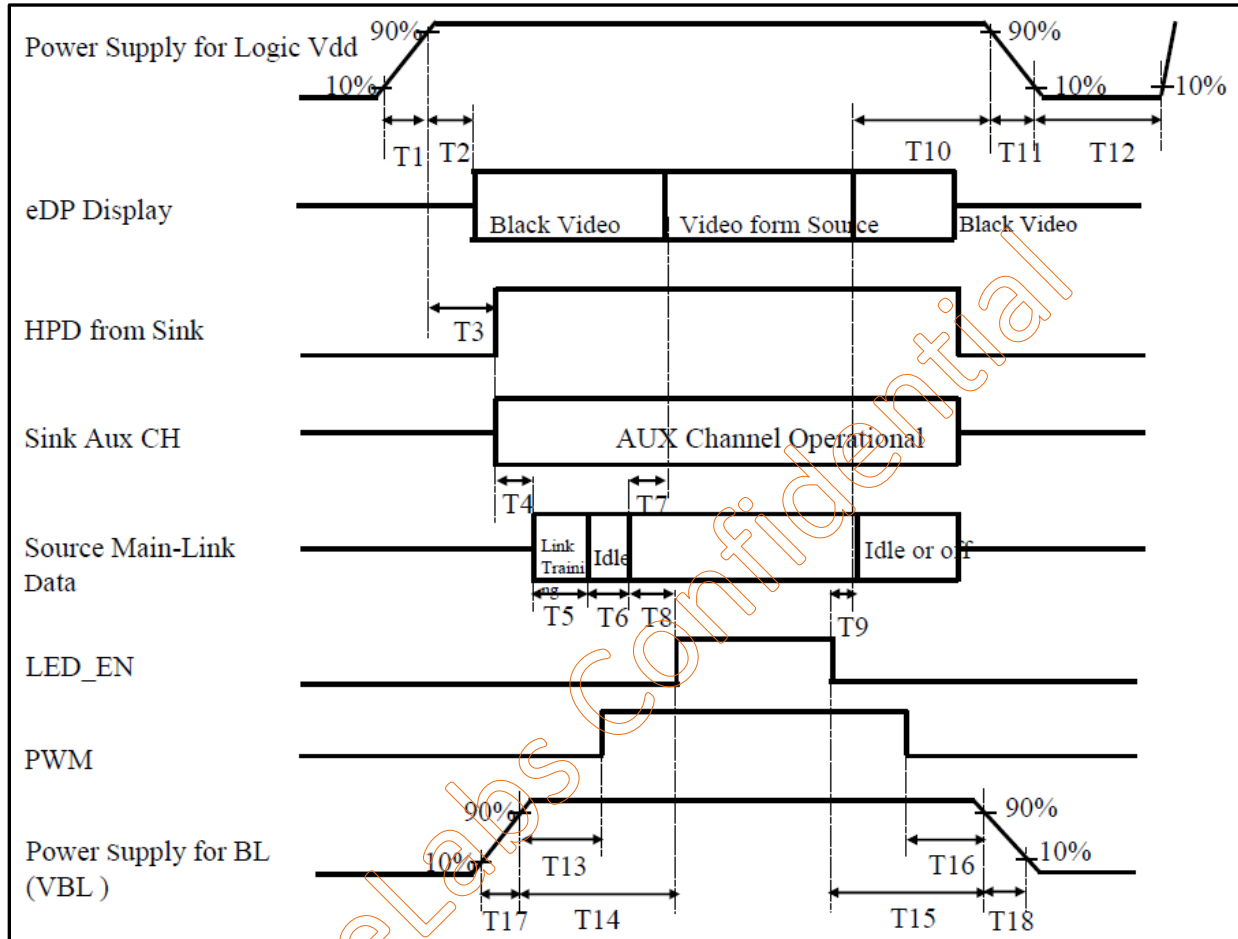
4.4 Data Input Format



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4.5 Power Sequence

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



- $0.5\text{ms} \leq T1 \leq 10\text{ms}$
- $0\text{ms} < T2 \leq 200\text{ms}$
- $0\text{ms} < T3 \leq 200\text{ms}$
- $T3+T4+T5+T6+T8 > 200\text{ms}$
- $0\text{ms} < T7 \leq 50\text{ms}$
- $50\text{ms} < T8$
- $0\text{ms} < T9$
- $0\text{ms} < T10 < 500\text{ms}$
- $0.5\text{ms} \leq T11 \leq 10\text{ms}$
- $500\text{ms} \leq T12$
- $0\text{ms} < T13$
- $0\text{ms} < T14$
- $0\text{ms} < T15$
- $0\text{ms} < T16$
- $0.5\text{ms} \leq T17$
- $0.5\text{ms} \leq T18$

Note (1) When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.

Note (2) Do not keep the interface signal high impedance when power is on. Backlight must be turn on after power for logic and interface signal are valid.

5. INTERFACE PIN DESCRIPTION

5.1 LCM Connector PIN Assignment

The electronics interface connector is IPEX 20455-030E-66 or Compatible.

Pin No.	Symbol	Description
1	NC	No Connection
2	H_GND	Ground
3	LANE1_N	eDP RX Channel 1 Negative
4	LANE1_P	eDP RX Channel 1 Positive
5	H_GND	Ground
6	LANE0_N	eDP RX Channel 0 Negative
7	LANE0_P	eDP RX Channel 0 Positive
8	H_GND	Ground
9	AUX_CH_P	eDP AUX CH Positive
10	AUX_CH_N	eDP AUX CH Negative
11	H_GND	Ground
12	LCD_VCC	Power Supply, 3.3V (typ.)
13	LCD_VCC	Power Supply, 3.3V (typ.)
14	NC	No Connection
15	H_GND	Ground
16	H_GND	Ground
17	HPD	Hot Plug Detect Output
18	BL_GND	LED Ground
19	BL_GND	LED Ground
20	BL_GND	LED Ground
21	BL_GND	LED Ground
22	BL_ENABLE	LED Enable Pin
23	BL_PWM	System PWM Signal Input

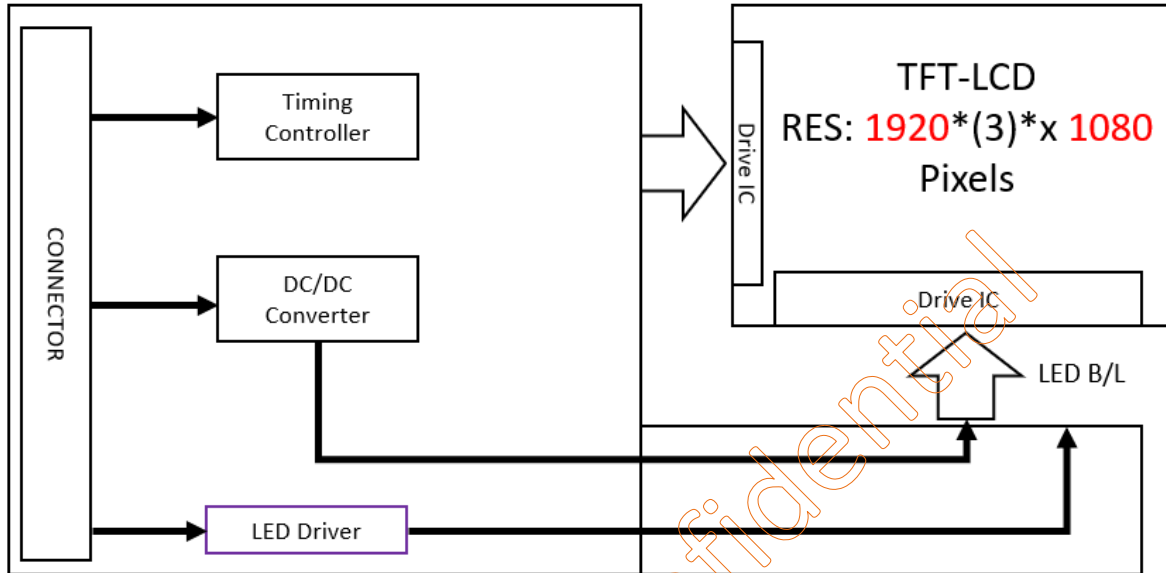
24	NC	No Connection
25	NC	No Connection
26	BL_POWER	LED Power Supply 5V-21V
27	BL_POWER	LED Power Supply 5V-21V
28	BL_POWER	LED Power Supply 5V-21V
29	BL_POWER	LED Power Supply 5V-21V
30	NC	No Connection

5.2 Signal Connector

Connector Name / Description	For Signal Connector
Manufacturer	IPEX
Type/ Part Number	20455-030E-66
Mating Housing/ Part Number	I-PEX 20454-030T

6. BLOCK DIAGRAM

The following diagram shows the functional block of the TFT module:



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7. OPTICAL CHARACTERISTIC

The optical characteristics are measured under stable conditions at room temperature 25 °C.

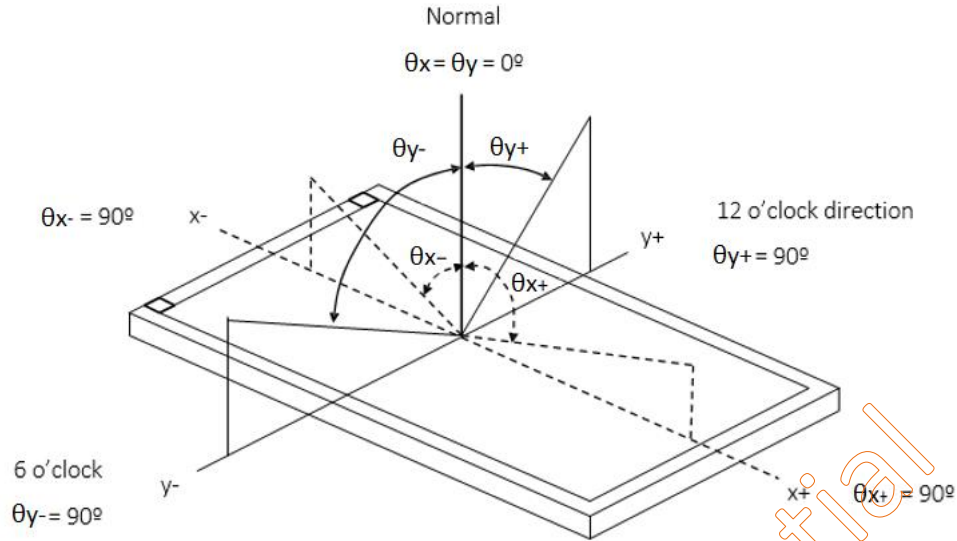
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\theta_x=0^\circ$	640	800	-	-	(2)(5)
Response Time (Rising+Falling)		TRT	25°C	-	16	25	ms	(3)
Center Luminance of White		LC	$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing angle at normal direction	212.5	250	-	cd/m ²	(4)(5)
Brightness uniformity				80	-	-		(5)(6)
Chromaticity	Red	Rx		Typ. -0.03	Typ. +0.03	0.580	-	(1) (5)
		Ry				0.360	-	
	Green	Gx				0.351	-	
		Gy				0.584	-	
	Blue	Bx				0.168	-	
		By				0.137	-	
	White	Wx				0.313	-	
		Wy				0.329	-	
Viewing Angle	Horizontal	θ_{x+}	CR>10	80	85	-	Deg.	(1)(5)
		θ_{x-}		80	85	-		
	Vertical	θ_{y+}		80	85	-		
		θ_{y-}		80	85	-		

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

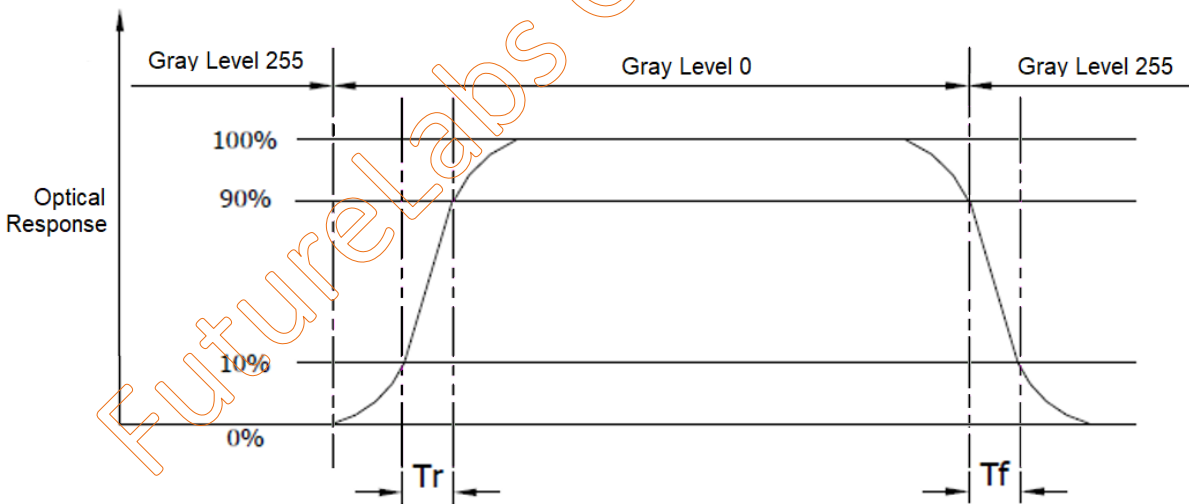


Note 2: Definition of Contrast Ratio (CR)

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:

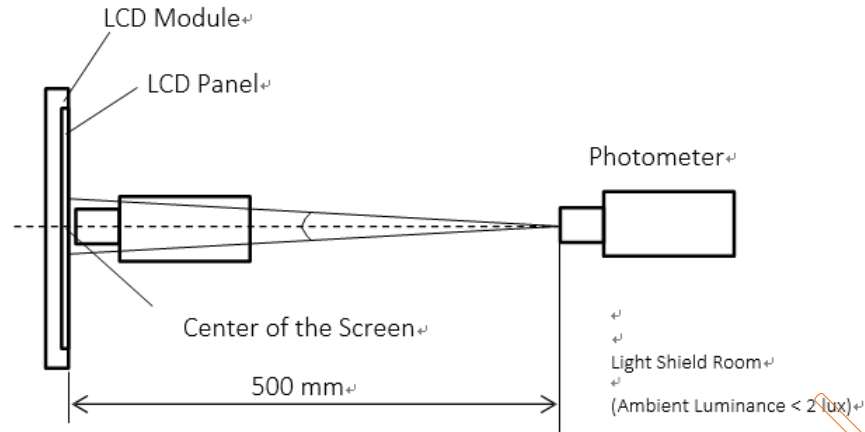
The response time is set initially by defining the "Rising Time (TR)" and the "Falling Time (TF)" respectively. Please refer the figure to the followings:



Note 4: Definition of Brightness (L)

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

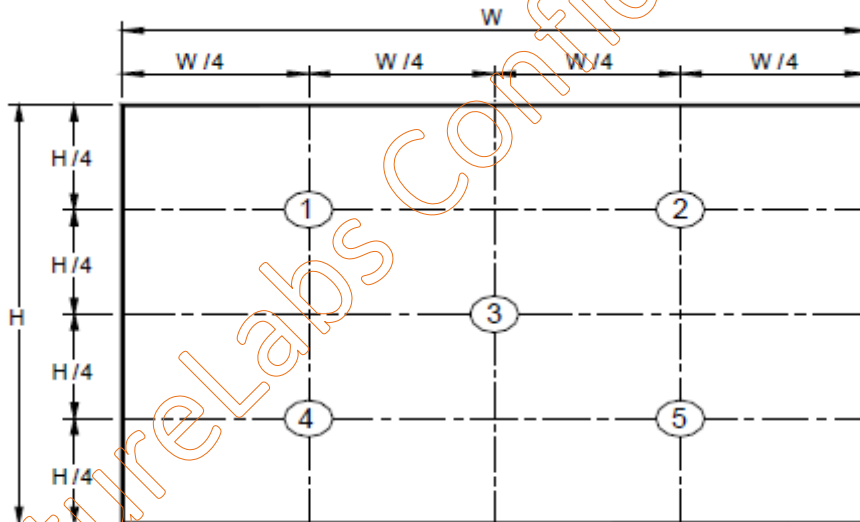
Note 5: The method of optical measurement:



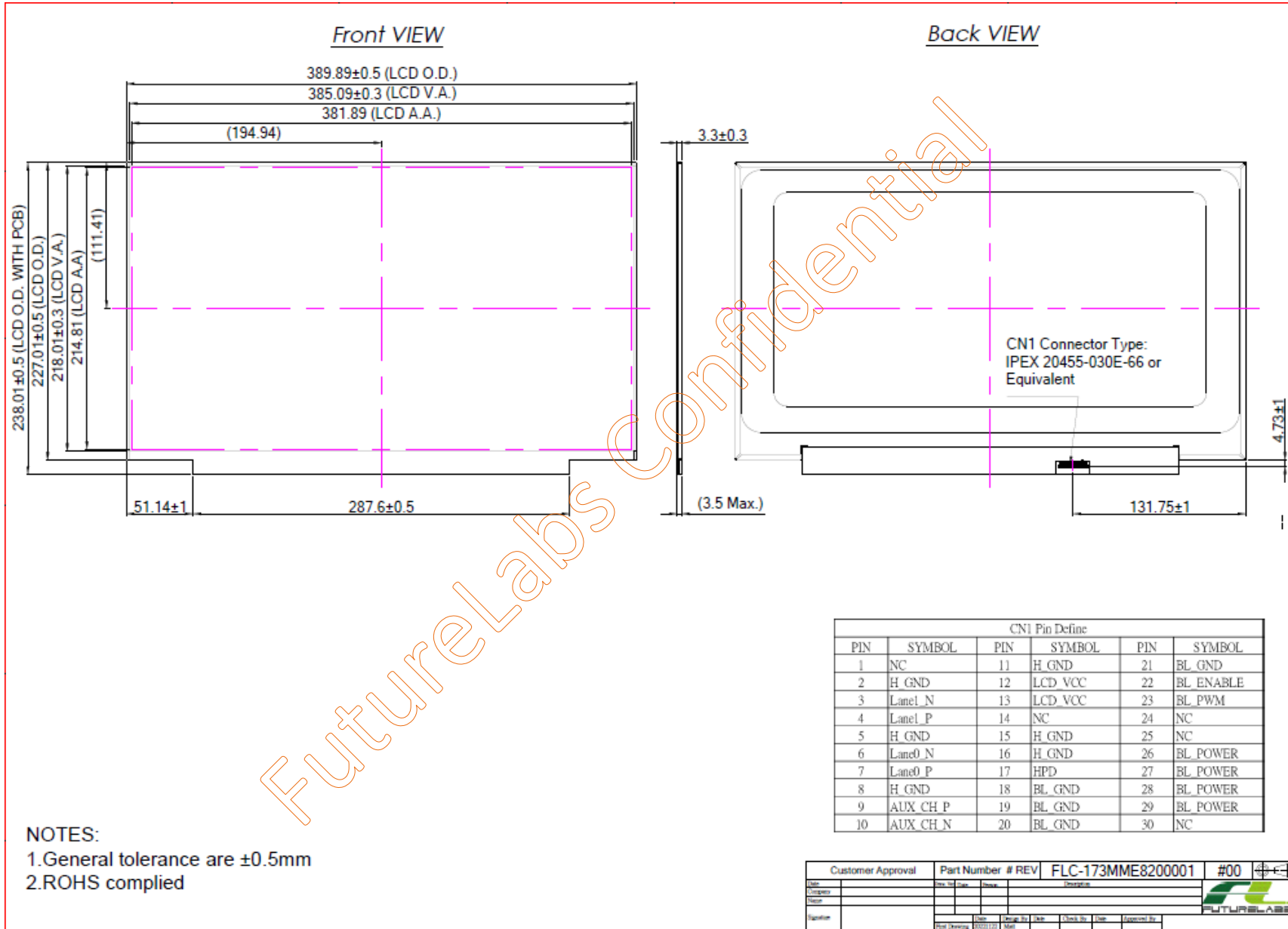
Note 6: Definition of White Variation (δW):

Measure the luminance of gray level 255 at 5 points

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



8 DIMENSION AND DRAWING



9 PRECAUTION AND PRODUCT HANDLING

- Do not apply the external force such as bending or twisting to the LCD panel and backlight during assembly.
- Do not insert and plug out the input connector while the LCD panel is operating.
- Do not take apart the panel or frame from LCD module assembly or insert anything into the backlight unit.
- Do not keep the same pattern in a long period of time, it may cause image sticking on LCD panel. Can use shuffle content periodically if fixed pattern is displayed on the screen.
- Do not touch the display area with bare hands, this will stain the display area.
- Pay attention to handle lead wire of backlight, that is not tugged in connect with LED driver.
- Do not change variable resistance settings in LCD panel, it may cause not satisfy of LCD characteristics specification.
- The surface of LCD panel's polarizer is very soft and easily scratched, please use a very soft dry cloth without chemicals for cleaning.
- To avoid the static electricity to damage the CMOS LSI, the operator should be grounded when in contact with the LCD panel, and also to all electrical equipment.
- Need to follow the correct power frequency when LCD panel is connecting and operating, this can avoid damage to CMOS LSI during latch-up.
- Need to store the LCD panel indoor without the exposure of sunlight where the temperature is $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and the humidity is below 60% RH.