YEEBO Limited

SPECIFICATION
FOR
LCD MODULE

MODULE NO: YB-TG19201080C02A-N-A0

Doc.Version:00

Customer Approval:

☐ Accept ☐ Reject

YEEBO	NAME	SIGNATURE	DATE
Prepare	Electronic Engineer		
Check	Mechanical Engineer		
Verify			
Approval			

■APPROVAL FOR SPECIFICATIONS ONLY
☐APPROVAL FOR SPECIFICATIONS AND SAMPLE

WIMRD005-02-C

Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

Record of Revision			
Version	Revise Date	Page	Content
00	2018/11/13	ALL	First Release

Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

Contents

1. General Specifications 4
2. Pin Assignment 5
3. Operation Specifications 6
3.1. Typical Operation Conditions 6
3.2. Power Sequence 6
3.3. Signal Timing Characteristics 9
4. Optical Specifications 10
5. Reliability Test Items 14
6. Mechanical Drawing 15
7. Package Drawing 17
8. General Precautions 17
8.1. Safety 17
8.2. Handling 17
8.3. Static Electricity 17
8.4. Storage 17
8.5. Cleaning 17

Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

1. General Specifications

No.	Item	Specification	Remark
1	LCD size	11.6 inch	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1920(W) RGB x 1080(H)	
4	Display mode	Normally Black, Transmissive	
5	Dot pitch	0.1335(w)x 0.1335(H)	
6	Active area	256.32(W) x 144.18(H) mm	
7	Module size	267.72(W) ×164.42(H) ×6.1(D) mm	Note 1
8	View direction(Gray inversion)	ALL	O clock
9	Surface treatment	Anti-Glare	
10	Color arrangement	RGB-stripe	
11	Interface	EDP	
12	Lcm power consumption	6.6W	TYP

Note 1: Refer to Mechanical Drawing.

Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

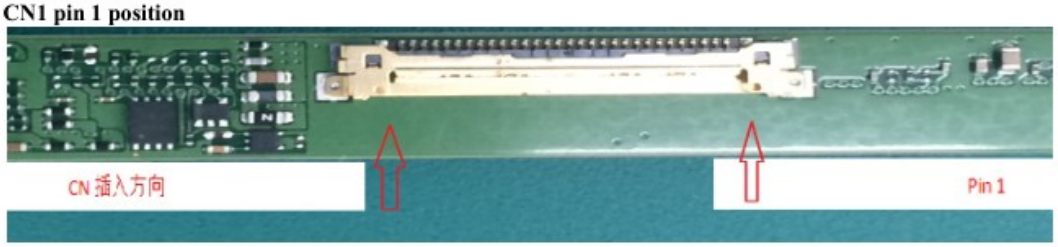
2. Pin Assignment

FPC Connector is used for the module electronics interface. The recommended model is 20455-030E-12 (I-PEX) manufactured by Hirose.

Pin No.	Symbol	I/O	Function	Remark
1	NC	-	No connect	
2	H_GND	P	High Speed Ground	
3	Lane1_N	I	Complement Signal Link Lane 1	
4	Lane1_P	I	True Signal Link Lane 1	
5	H_GND	P	High Speed Ground	
6	Lane0_N	I	Complement Signal Link Lane 0	
7	Lane0_P	I	True Signal Link Lane 0	
8	H_GND	P	High Speed Ground	
9	AUX_CH_P	I	True Signal Auxiliary Channel	
10	AUX_CH_N	I	Complement Signal Auxiliary Channel	
11	H_GND	P	High Speed Ground	
12-13	LCD_VCC	P	LCD logic and driver power(3.3V)	
14	NC	-	No connect	
15-16	LCD_GND	P	LCD logic and driver ground	
17	HPD	I	HPD Signal	
18-30	NC	-	No connect	

I: input; O: output; P: Power or Ground(0V).

Note:



Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

3. Operation Specifications

3.1. Typical Operation Conditions

Test condition: GND=0V, T_A=25 °C

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	LCD_VCC	3.0	3.3	3.6	V	
Current for Driver	LCD_VCC	-	280	-	MA	
Voltage for LED Backlight	V_L	24.5	27	31	V	Note 1
Crrent for LED Backlight	I_L	-	200	-	mA	
LED life time	-	50,000	-	-	Hr	Note 2

Note1: V_L=27V, I_L=200mA (Backlight circuit: 9series connection, 5 parallel connection), the ambient temperature is 25℃.

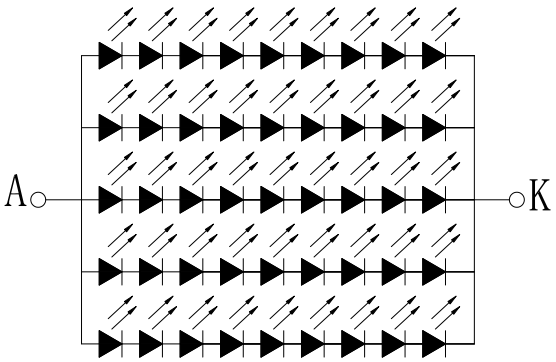


Fig. 3-1 LED test circuit diagram

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L =200mA . The LED lifetime could be decreased if operating I_L is larger than 225 mA.

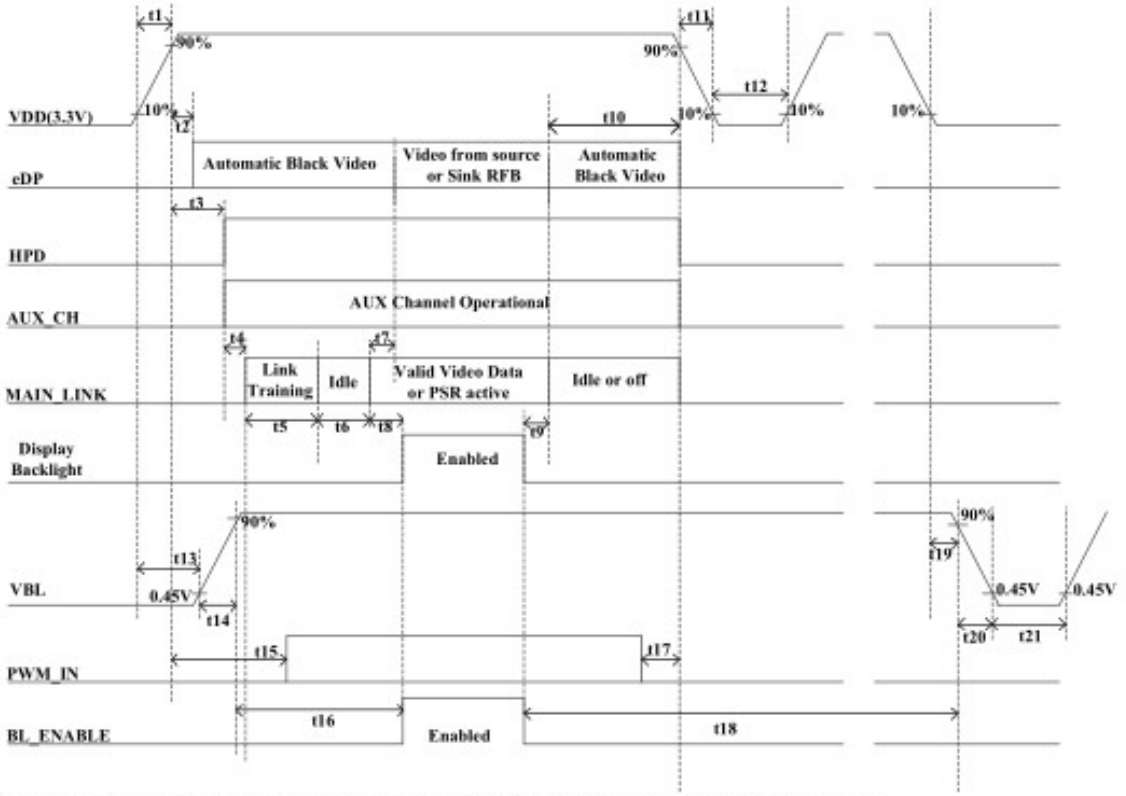
3.2. Power Sequence

Ta＝+25℃

DC Electrical Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
+3.3V supply voltage	VDD	+3.0	+3.3	+3.6	V	[Note 6-1-1]
Current dissipation	IDD	-	(212)	(364)	mA	[Note 6-1-2]
Inrush Current	Irush	-	-	TBD	A	[Note 6-1-3]
Permissible input ripple voltage	V_{RP}	-	-	100	mVp-p	VDD=+3.3V
eDP HPD Signal Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
HPD High level output voltage	VOH_{HPD}		VDD-0.1	-		
HPD Low level output voltage	VOL_{HPD}	-	0			
eDP AUX Channel Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Unit Interval for AUX channel	UI_{AUX}	0.4	0.5	0.6	μS	
Peak-to-peak voltage at TP1	$V_{AUX-DIFF-pp}$	0.32	-	1.36	V	
AUX DC Common mode Voltage	$V_{AUX-DC-CM}$	0	-	2.0	V	
AUX Short current limit	I_{AUX_SHORT}	-	-	90	mA	
AUX CH termination Cresistor	R_{AUX_TERM}	-	100	-	Ω	Differential input
AUX AC coupling capacitor	C_{AUX}	75	-	200	nF	
Number of pre-charge pulses	Pre-charge pulses	10	-	16	-	
eDP Main Link Receiver Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Link clock down spreading	Down_Spread_Amplitude	0		0.5	%	
Differential Peak-to-peak Input Voltage at Rx package pins	$V_{RX-DIFFp-p}$	120	-	1200	mV	
Differential Return Loss at 1.35GHz at Rx package pins	$RL_{RX-DIFF}$	9	-	-	dB	
Differential termination resistance	$R_{RX-TERM}$	-	100	-	Ω	
RX short circuit Current Limit	$I_{RX-SHORT}$	-	-	50	mA	
Lane Intra-pair Skew at RX package pins	$T_{RX-SKEW-INTRA-PAIR-High-Bit-Rate}$	-	-	TBD	ps	

ON-OFF conditions for supply voltage:

Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019



[Note] Do not keep the interface signal high-impedance or unusual signal when power is on.

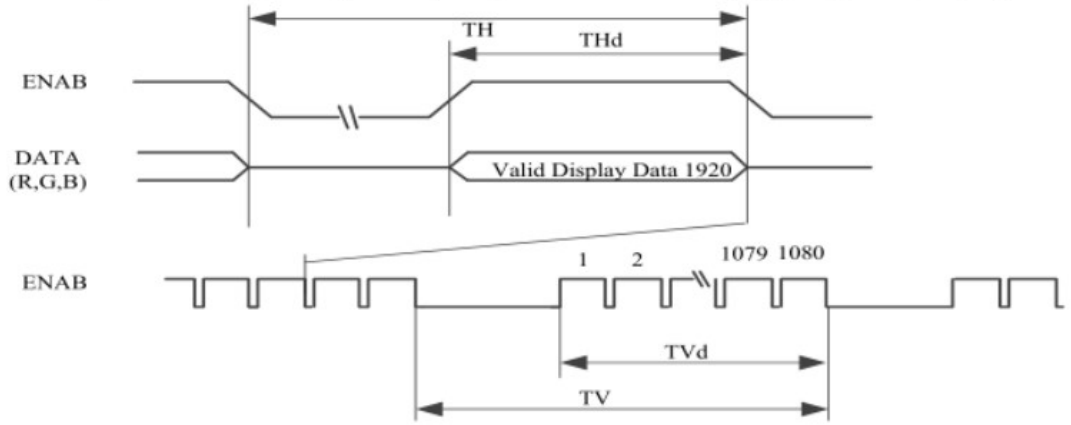
Symbol	Min	Max	Unit	Note
t1	(0.5)	(10)	ms	
t2	0	100	ms	
t3	0	(100)	ms	
(t4)	-	-	ms	
(t5)	-	-	ms	
(t6)	-	-	ms	
(t7)	(0)	(50)	ms	
(t8)			ms	
(t9)			ms	
(t10)	(0)	(500)	ms	
t11	(1)	50	ms	[Note1]
t12	500	-	ms	
(t13)	-	-	ms	
t14	0.5	10	ms	
t15	(100)		ms	
(t16)	-	-	ms	
t17	0	-	ms	
(t18)	-	-	ms	
t19	-	-	ms	
t20	(0.1)	-	ms	
t21	(100)		ms	

Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

3.3. Signal Timing Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	$1/T_C$	–	138.5	–	MHz	[Note7-1-1]
Data enable signal	Horizontal period	TH	–	2080	–	clock	
				15.02		μs	
	Horizontal period (High)	THd	-	1920	-	clock	
	Vertical period	TV	–	1111	–	line	
			-	16.685	-	ms	
	Vertical period (High)	TVd	–	1080	–	line	

[Note 7-1-1] In case of using the long vertical period, the deterioration of display quality, flicker, etc, may occur.



Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θL	Φ=180° (9 o'clock)	80	89	-	degree	Note 1
	θR	Φ=0°(3 o'clock)	80	89	-		
	θT	Φ=90° (12 o'clock)	80	89	-		
	θB	Φ=270° (6 o'clock)	80	89	-		
Response time	TON+ TOFF	Normal θ =Φ=0°	-	25	-	msec	Note 2
Contrast ratio	CR		700	1000	-	-	Note 3
Color chromaticity	WX		0.27	0.31	0.35	-	Note 4 Note 5 Note 6
	WY		0.29	0.33	0.37	-	
Luminance	L		600	700	-	cd/m^2	Note 6
Luminance uniformity	YU		70	75	-	%	Note 7

The test systems refer to Note 2.

Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

Note 1: Definition of viewing angle range

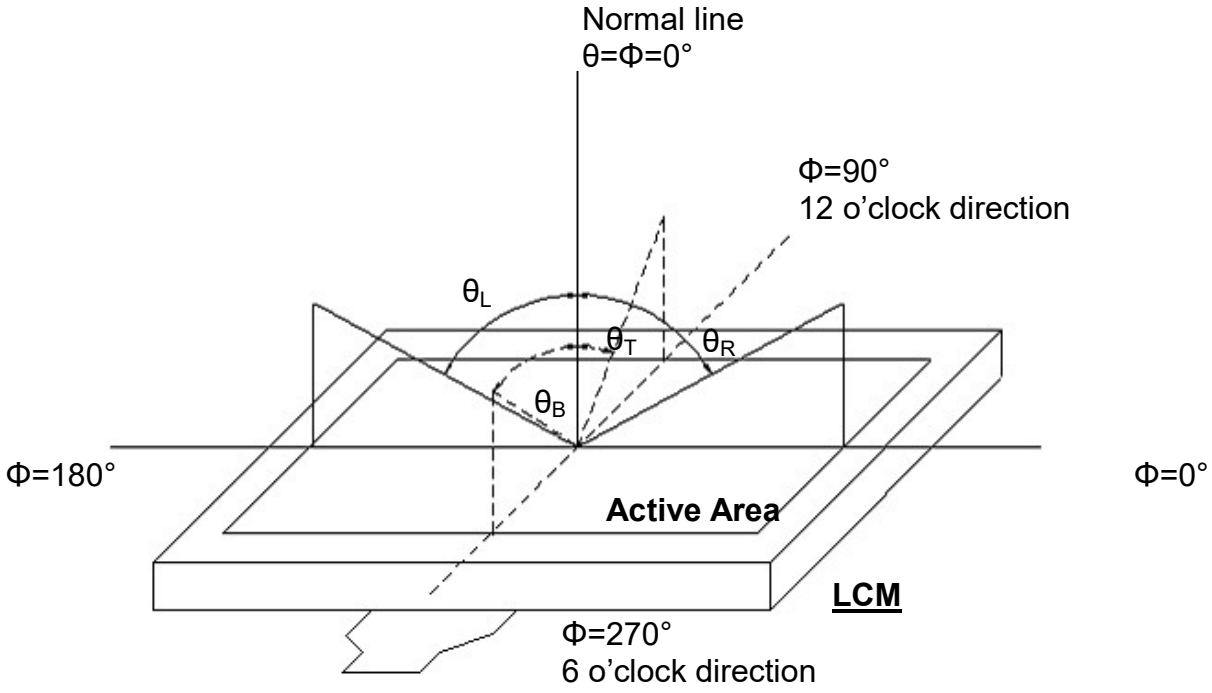


Fig. 4-2 Definition of viewing angle

Note 2: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

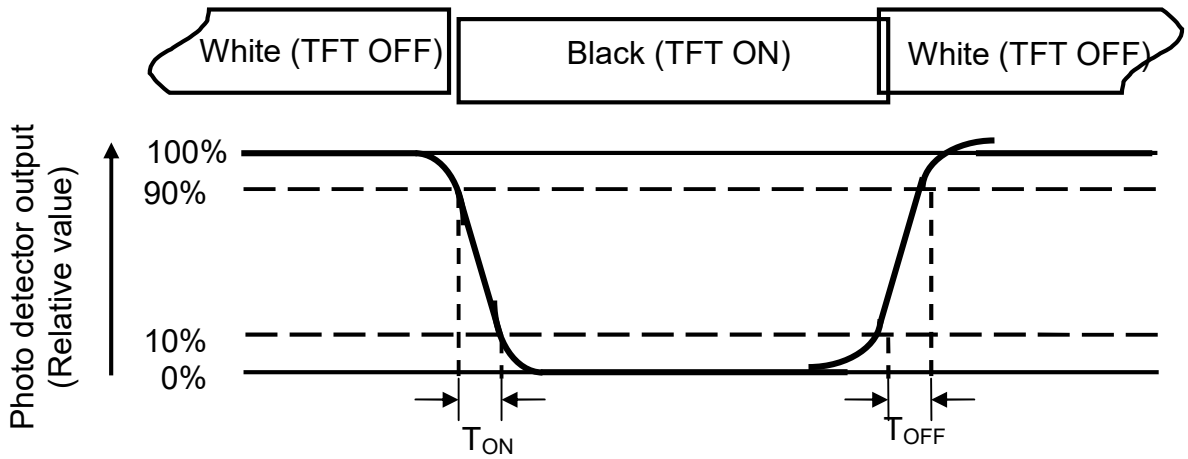
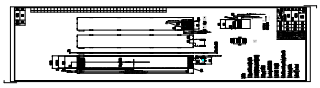


Fig. 4-3 Definition of response time

Note 3: Definition of contrast ratio



Note 4: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm, Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/ Field of view: 1° /Height: 500mm.) or CA-210.

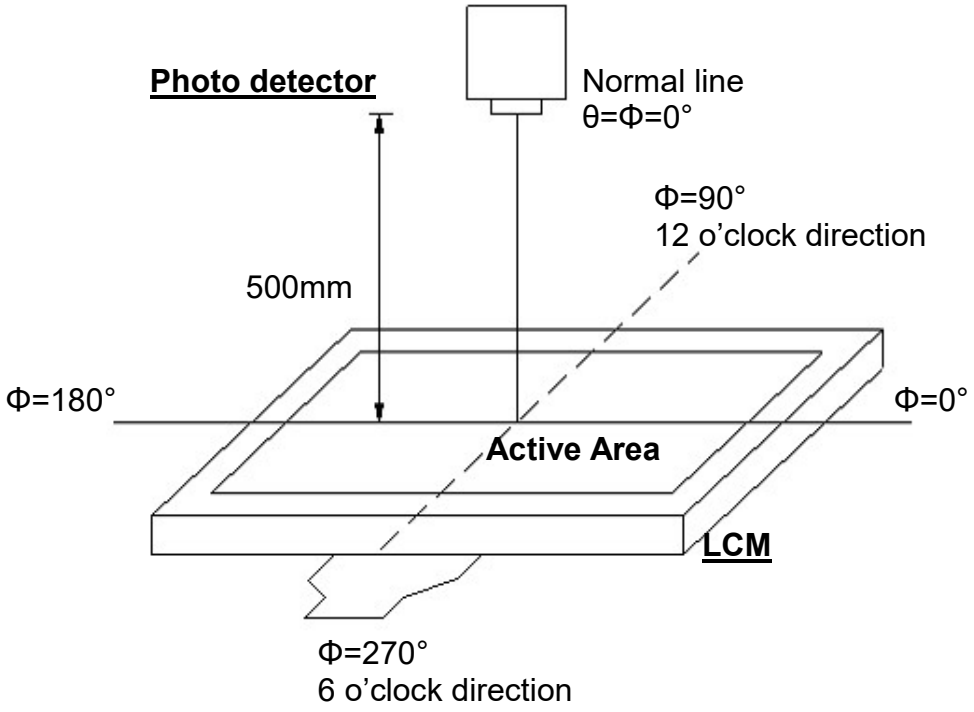


Fig. 4-4 Optical measurement system setup

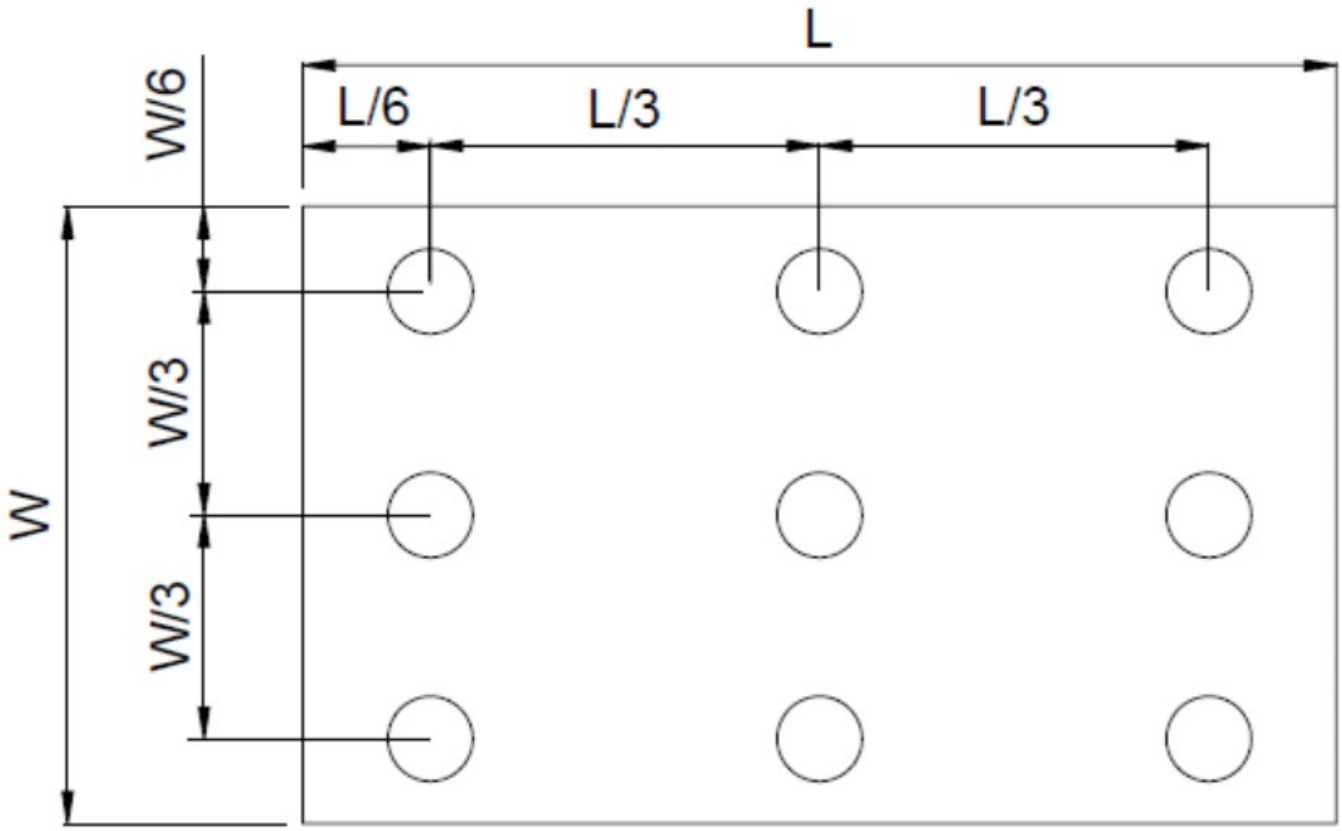
Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is I_L=200mA .

Note 7: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas(Refer to Fig. 4-5).
Every measuring point is placed at the center of each measuring area.

$$Luminance\ \ Uniformity\ (Yu) = \frac{B_{min}}{B_{max}}$$

L-------Active area length W----- Active area width



B_{MAX}: The measured maximum luminance of all measurement position.
B_{MIN}: The measured minimum luminance of all measurement position.

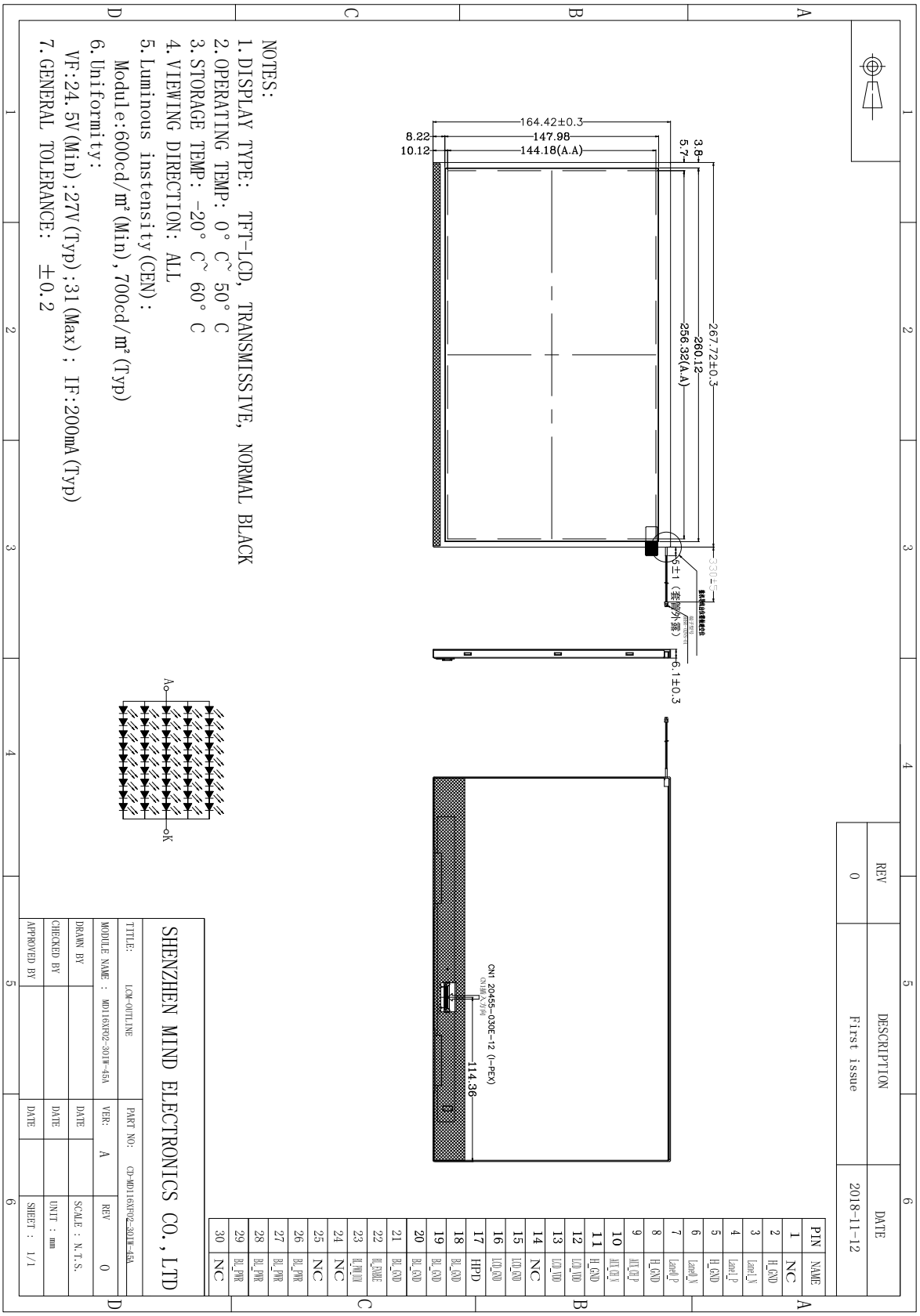
Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

5. Reliability Test Items

Item	Test Conditions	Criterion
High Temperature Storage	Ta = 60℃ 120hrs	A,B,C,D,E
Low Temperature Storage	Ta = -20℃ 120hrs	A,B,C,D,E
High Temperature Operation	Ts = 50℃ 120hrs	A,B,C,D,E
Low Temperature Operation	Ta =0℃ 120hrs	A,B,C,D,E
Operate at High Temperature and Humidity	+50℃, 90%RH 120hrs	A,B,C,D,E
Thermal Shock	0℃/30 min ~ +60℃/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.	A,B,C,D,E
Vibration Test	Sweep:10Hz~55Hz~10Hz 2G 2 hours for each direction of X. Y. Z. (6 hours for total)	A,B,C,D,E
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (6 hours for total)	A,B,C,D,E
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	A,B,C,D,E
Electro Static Discharge	Contact=+/-4KV, Air=+/-8KV,(R=330R,C=150pF), 1 sec,9point,10times/point;	A,B,C,D,E

※ Criterion:
A.LCM each function is OK,.
B.LCM appearance inspection without abnormalities (Including scratch, damage, corrosion and serious deformation)
C.LCM brightness above the Min. value of Spec.
D. Luminance uniformity above the Min. value of Spec.
E. Color chromaticity within tolerance range

6. Mechanical Drawing



Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

7.Package Drawing

TDB

Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

8. General Precautions

8.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

8.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

8.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

8.4. Storage

1. Store the module in a dark room where must keep at 25±10℃ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

8.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019