AV081SKM-N80-5HP0
Product Specification Rev.P0

SUPPLIER	Chengdu BOE Optoelectronics Technology CO., LTD
FG-Code	**AV081SKM-N80-5HP0**

ITEM	BUYER SIGNATURE	DATE

ITEM	SUPPLIER SIGNATURE	DATE
Prepared		
Reviewed		
Approved		

REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
0	-	Initial Release	2024.07.18	ALL

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

8.1 inch module is a color active matrix TFT LCD module using amorphous silicon TFT‘s (Thin Film Transistors) as an active switching devices. It is a transmissive type display operating in the normal black. The TFT-LCD has a 8.1 inch diagonally measured active area with resolutions (600 horizontal by 1600 vertical pixel arrays). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this panel can display 16.7M colors.

1.2 Features

- 8-bit color depth, display 16. 7M colors
- MIPI Interface
- High luminance and contrast ratio, low reflection and wide viewing angle
- RoHS Compliant
- 7*24hrs usage support with dynamic video

1.3 Application

- Vehicle Rearview Mirror
- Smart home appliances

1.4 General Specification

Table 1-1 General Specifications

Parameter	Specification	Unit	Remarks
Active Area	72.234(H) x 192.624(V)	mm	
Number Of Pixels	600(H) ×1600(V) (1 pixel = R + G + B dots)	pixels	
Pixel Pitch	0.04013(H) ×0.12039(V)	mm	
Pixel Arrangement	RGB Vertical stripe		
Display Mode	Normally Black		
Display Colors	16.7M	colors	
Contrast Ratio	typ.1200		Center
Viewing Angle(CR>10)	typ.85/85/85/85	deg.	U/D/L/R
Response Time	max.30	ms	
Color Gamut	typ.64%		NTSC
Transmittance	Typ. 4.45% , Min 4.0%		
Outline Dimension	202.67(H)*78.43 (V)* 4.6	mm	4.6Without Film, Fpc, Compoe,CNT
Weight	115	g	
Back-light	Edge side, 1-LED Lighting Bar Type		

2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2-1

Table 2-1 Environment Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Remarks
	VCC	3.0	3.6	V	Ta=25+/-2°C
LCD Gamma Positive	VSP	-	6	V	
LCD Gamma Negative	VSN	-6	-	V	
Operating Temperature (Humidity)	T_{OP}	-20	+70	℃	
	RH	-	90	%	At 60°C
Storage Temperature (Humidity)	T_{ST}	-30	+80	℃	
	RH	-	90	%	At 60°C

3.0 ELECTRICAL SPECIFICATIONS

3.1 The LCD Module Electrical Interface Connection

Table 3-1 Pin Assignments for the LCD

(Recommended Connector type: AFC01-S40FCA-00)

PIN	SYMBOL	I/O	Description	Remark
1	GND		Ground	
2	D0P		MIPI data input	
3	D0N		MIPI data input	
4	GND		Ground	
5	D1P		MIPI data input	
6	D1N		MIPI data input	
7	GND		Ground	
8	CLKP		MIPI clock input	
9	CLKN		MIPI clock input	
10	GND		Ground	
11	D2P		MIPI data input	
12	D2N		MIPI data input	
13	GND		Ground	
14	D3P		MIPI data input	
15	D3N		MIPI data input	
16	GND		Ground	
17	GND		Ground	
18	NC		No Connect	
19	NC		No Connect	
20	NC		No Connect	

PIN	SYMBOL	I/O	Description	Remark
21	NC		No Connect	
22	NC		No Connect	
23	NC		No Connect	
24	RESET		RESET pin 3.3V	
25	NC		No Connect	
26	NC		No Connect	
27	GND		Ground	
28	LEDK		LED Negative	
29	LEDK		LED Negative	
30	GND		Ground	
31	NC		No Connect	
32	GND		Ground	
33	GND		Ground	
34	NC		No Connect	
35	LEDA		LED Positive	
36	LEDA		LED Positive	
37	GND		Ground	
38	VCC	P	Power supply for digital circuits +3.3V input	note1
39	VCC	P	Power supply for digital circuits +3.3V input	note1
40	NC		No Connect	

Remark:

1. For “I/O”, “I” is input; “O” is output; “P” is power or Ground ; “NC” is passive;

3.2 Scan direction setting as the picture below

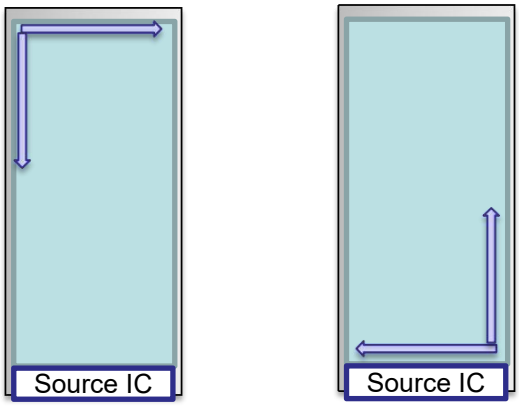


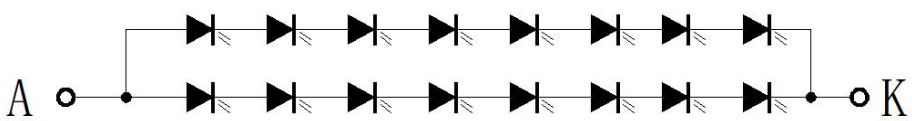
Figure 3-1 The U/D direction setting

SS_PANEL: Reverse the source scan direction. - 1: enable reverse the source scan direction. - 0: normal scan direction from S1->S1440. GS_PANEL: Reverse the vertical scan direction. - 1: Enable reverse the vertical scan direction. - 0: Normal vertical scan direction.

3.3 BackLight LED driver

< Table 3-2. LED Driving guideline specifications > Ta=25+/-2°C

Parameter	Symbol	Values			Unit	Notes
		Min.	Typ.	Max.		
BLU Supply Voltage	V_{led}	21.6	24.0	26.4	V	
BLU Supply Current	I_{led}		75	80	mA	
Number of LED	-	16			Piece	



Remark: For “I/O”, “I” is input; “O” is output; “P” is power or Ground ; “NC” is passive

3.4 Electrical Specifications

Table 3-3 Electrical Specifications Ta=25+/-2°C

Parameter		Symbol	Values			Unit	Remark
			Min	Typ.	Max		
	Voltage	VCC	3.0	3.3	3.6	V	
	Current	I_{VCC}	77	81	88	mA	
TFT Gamma positive Power	Voltage	VSP	4.5	5.5	6.2	V	
TFT Gamma Negative Power	Voltage	VSN	-6.2	-5.5	-4.5	V	
Supply current of LED backlight		Per string	/	50	/	mA	18LED
Total Supply current of LED Backlight		I_{LED}Total	/	75	80	mA	2 strings
Supply voltage of LED backlight		Per string	21.6	24.0	26.4	V	8 strings
LED Power consumption of		Total	/	2.823	/	W	Note3
LED Lifetime		-	50000			Hrs	IF=50mA, T_A=25℃, LT50

Notes :

1. Current Max is based “Gray 255”; Current Typ is based “Vertical Color Bar” ;
2. Backlight power consumption is calculated by I_{LED} (Total) x V_{LED}
3. BLU LED : The total number of LEDs is 16；2ea/per string，8strings；The current value is typ. 75mA，typ.37.5mA/per string
4. IF is defined for one channel LED. Optical performance should be evaluated at Ta=25℃ only. If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data
5. each string LED should be drove by constant current separately

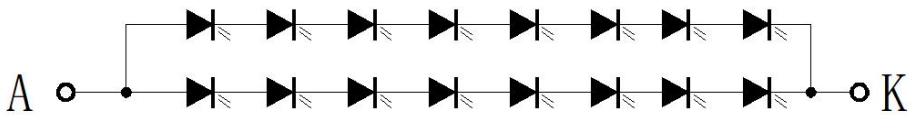
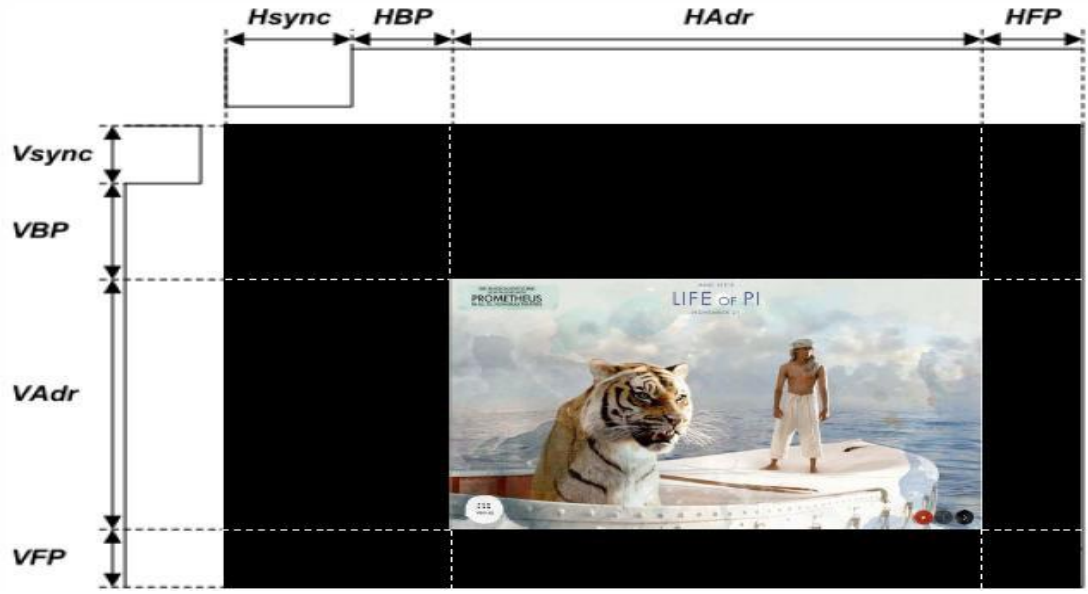


Figure 3-2 LED Diagram

3.5 MIPI Signal Timing

Table 3-4 MIPI Signal Timing

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Clock frequency	RxFCLK	-	71	75.0	MHz	
Horizontal Display Area	Thd		600		DCLK	
HS Pulse Width	Thpw	-	8	-	DCLK	
HS back porch	Thbp	-	58	-	DCLK	
HS front porch	Thfp	-	58	-	DCLK	
1 horizontal line	Th	-	724	-	DCLK	
Vertical Display Area	Tvd		1600		H	
VS Pulse Width	Tvpw	-	4	-	H	
VS back porch	Tvbp	-	16	-	H	
VS front porch	Tvfp	-	16	-	H	
1 vertical field	Tv	-	1636	-	H	
Frame rate	FR		60		HZ	



3.6 MIPI Interface

3.6.1High Speed Mode

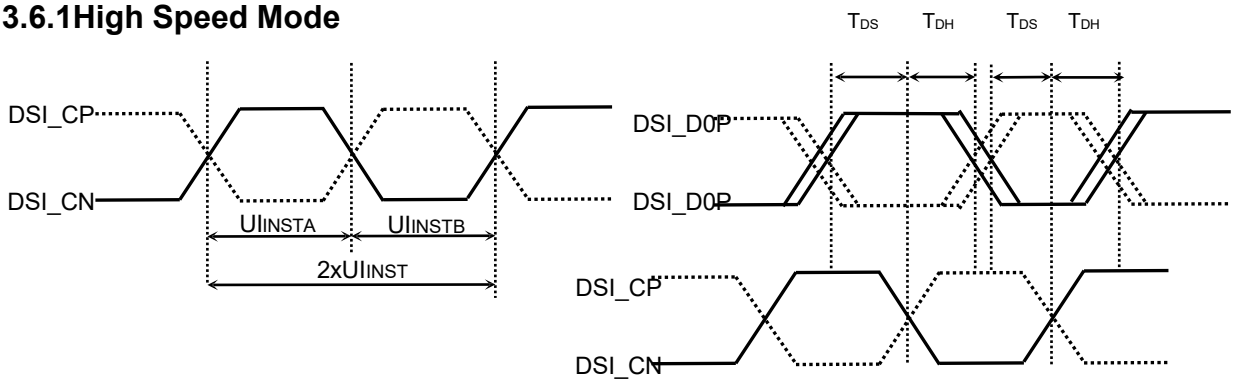


Figure 1: DSI clock timing Characteristics

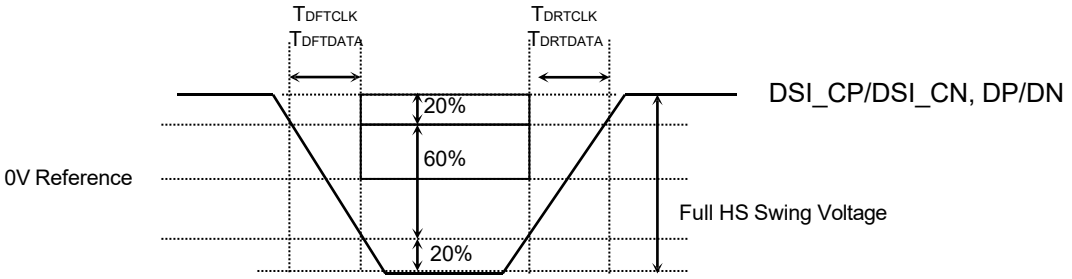


Figure 1: Rising and falling time on clock and data channel

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V,T_A = -30 to 70°C)

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Double UI instantaneous	2xUINST	4LANE：3.30 3LANE：2.85 @ VDDD=1.8V	-	25	ns
	UI instantaneous	UINSTA UINSTB	4LANE：1.67 3LANE：1.43 @ VDDD=1.8V	-	12.5	ns
DP/DN	Data to clock setup time	TDS	0.15xUI	-	-	ps
	Data to clock hold time	TDH	0.15xUI	-	-	ps
DSI_CP/ DSI_CN	Differential rise time for clock	TDRTCLK	150	-	0.3UI	ps
	Differential fall time for clock	TDFTCLK	150	-	0.3UI	ps
DP/DN	Differential rise time for data	TDRTDATA	150	-	0.3UI	ps
	Differential fall time for data	TDFTDATA	150	-	0.3UI	ps

Table 3-5: DSI High Speed Mode Characteristics

3.6.2 Low Speed Mode

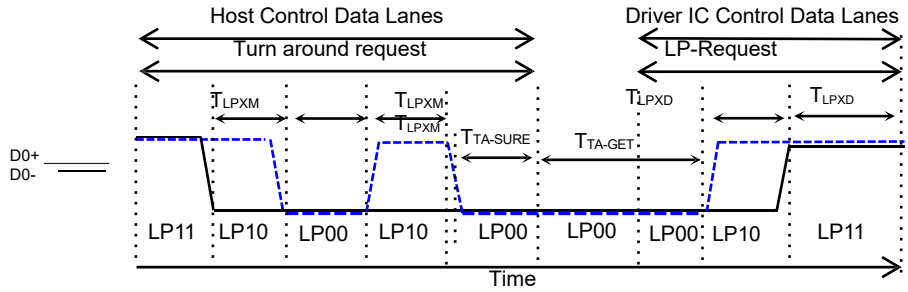


Figure 3: BTA from HOST to Display Module Timing

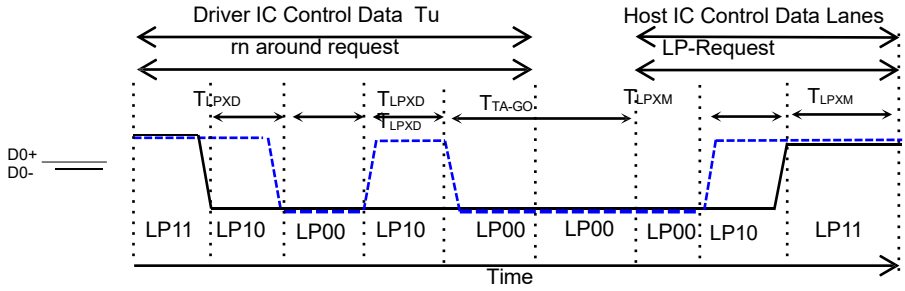
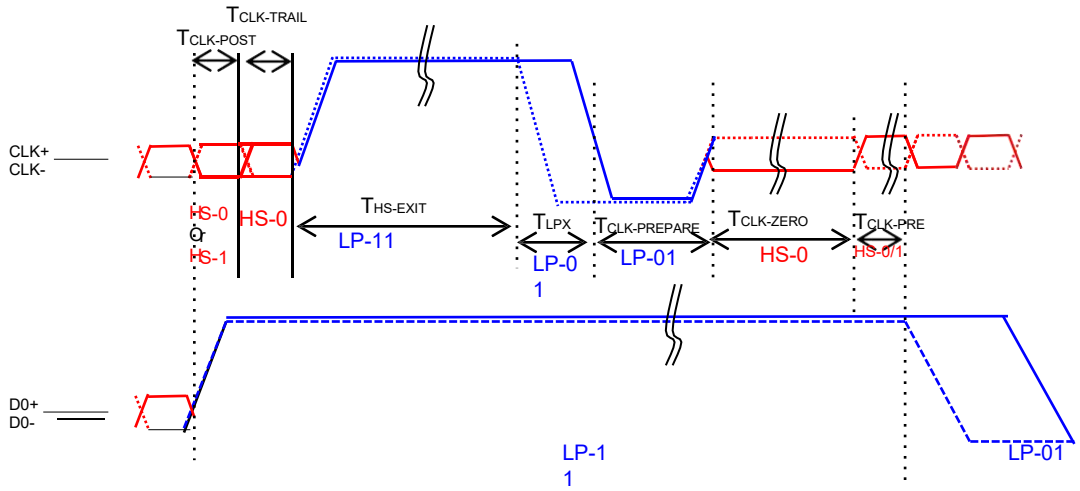


Figure 2: BTA from Display Module Timing to HOST

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.3V to 3.3V,T_A = -30 to 70°C)

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11 Host→ Display module	T_{LPXM}	50	-	-	ns
	Length of LP-00/LP01/LP10/LP11 Display module →Host	T_{LPXD}	50	-	-	ns
	Time-out before the MPU start driver	$T_{TA-SURE}$	T_{LPXD}	-	2xT_{LPXD}	ns
	Time to drive LP-00 by display module	T_{TA-GET}	5xT_{LPXD}	-	-	ns
	Time to drive LP-00 after turnaround request Host	T_{TAGO}	4xT_{LPXD}	-	-	ns

Table 3-6: DSI Low Power Mode Characteristics



Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Time that the MCU shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode	$T_{CLK-POST}$	60+52xUI	-	-	ns
	Time to drive HS differential state after last payload clock bit of a HS transmission burst	$T_{CLK-TRAIL}$	60	-	-	ns
	Time to drive LP-11 after HS burst	$T_{HS-EXIT}$	100	-	-	ns
	Time to drive LP-00 to prepare for HS transmission	$T_{CLK-PREPARE}$	38	-	95	ns
	Time-out at Clock Lane Display Module to enable HS Termination	$T_{CLK-TERM-EN}$	-	-	38	ns
	Minimum lead HS-0 drive period before starting Clock	$T_{CLK-PREPARE}$ + $T_{CLK-ZERO}$	300	-	-	ns
	Time that the HS clock shall be driven prior to any associated data Lane beginning the transition from LP to HS mode	$T_{CLK-PRE}$	8xUI			

Table 3-7: Clock Lanes High Speed Mode to/from Low Power Mode Timing

3.7 POWER on/off SEQUENCE

3.7.1 POWER on SEQUENCE

Hardware Reset would be applied when power on. The RESX is held at “H” by the host after both VCI and IOVCC have been applied. Otherwise, correct functionality will not be guaranteed. If RESX is held to “L” by the host during Power On, it must keep “L” at least 10μsec after both VCI and IOVCC applied. The power on sequence for different power input modes are shown below.

Table 3-8 Power ON Sequence Timing

Symbol	Description	Value			Unit	Remark
		Min.	Typ.	Max.		
T_{on1}	Delay time of IOVCC to VCI	0			ms	
T_{on2}	Delay time of IOVCC to VSP	0			ms	
T1	IOVCC rising time	-		2	ms	
T2	Delay time of IOVCC to valid RESX to “H”	10			ms	
T3	Delay time of RESX “H” to initial code ready	20			ms	
T4	Delay time of IOVCC (HS_VCC) to MIPI bus ready	0		T2	ms	
T5	RESX “L” period	10			us	
T6	Delay time of initial code reloaded to video packet transmit	120			ms	

Power on sequence: PCCS [1:0] = [1,0]

Applied Power: IOVCC, VCI

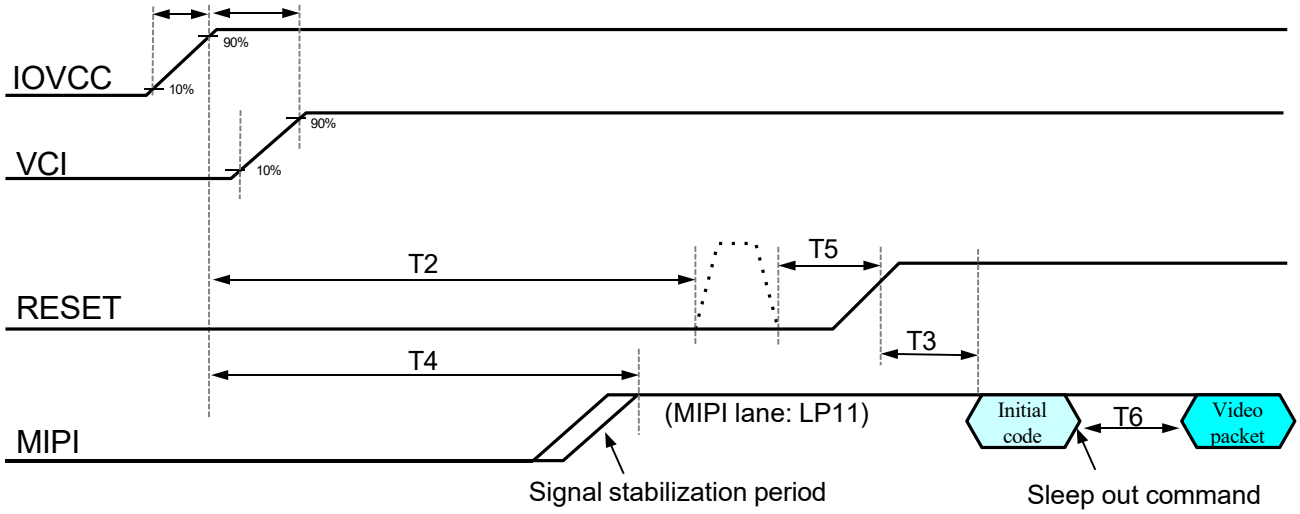


Figure3 Power on sequence at PCCS[1:0]=[1,0] mode

Note1: Unless otherwise specified, timings herein show cross point at 50% of signal/power level.

3.7.2 POWER off SEQUENCE

PCCS[1:0] = [1,0] Application Power: IOVCC, VCI,

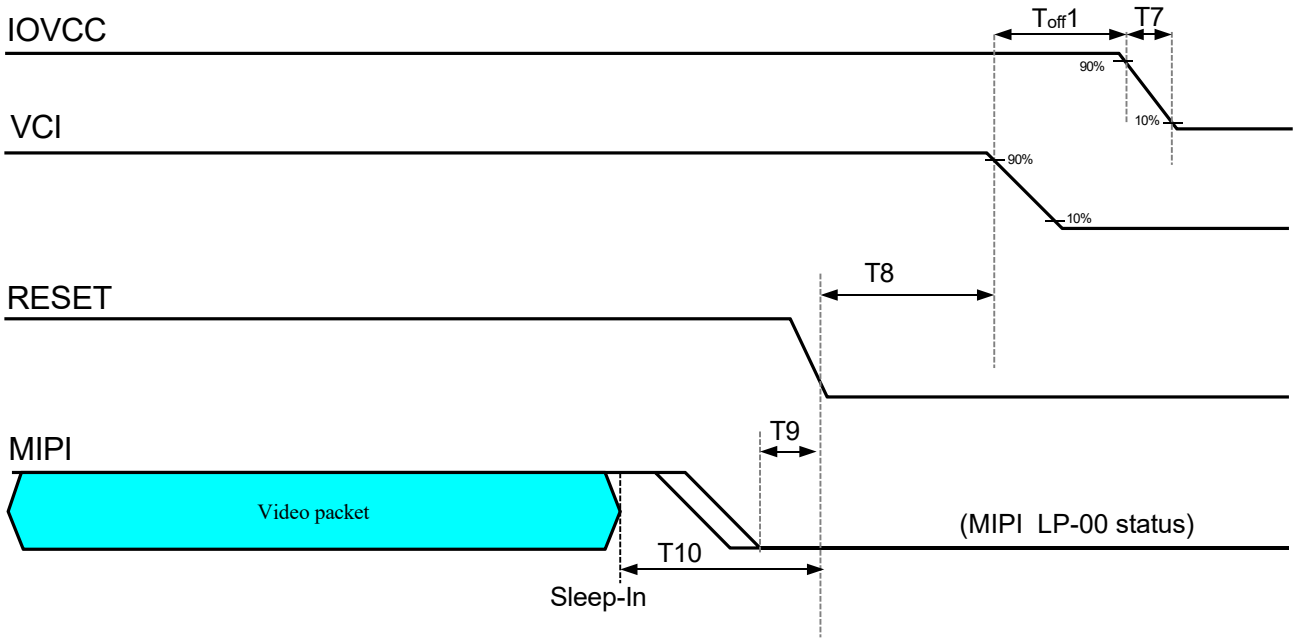


Figure 4 Power off sequence at PCCS[1:0]=[1,0] mode

Note1: Unless otherwise specified, timings herein show cross point at 50% of signal/power level.

Symbol	Description	Value			Unit	Remark
		Min.	Typ.	Max.		
T_{off1}	Delay time of VCI to IOVCC	1			ms	
T7	IOVCC down time	-		2	ms	
T8	Delay time of IOVCC to valid RESX to “L”	10			ms	
T9	Delay time of RESX “H” to initial code end	10			ms	
T10	Delay time of IOVCC (HS_VCC) to MIPI bus end	120			ms	

Table 3-9Power off Sequence Timing

4.0 OPTICAL SPECIFICATIONS

4.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = 25±2℃) with the equipment of Luminance meter and test unit shall be lo cated at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ eq ual 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.

Table 4-1 Optical Specifications

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle Range	Horizontal	Θ_3	CR > 10	80	85	-	Deg.	Note1
		Θ_9		80	85	-	Deg.	
	Vertical	Θ_{12}		80	85	-	Deg.	
		Θ_6		80	85	-	Deg.	
Contrast Ratio		CR	Θ = 0°	1000	1200	-		Note2
Average Luminous Intensit				450	500		cd/m²	Note3,4
Reproduction of color		Rx	Θ = 0°	-0.03	0.604	+0.03		@C light Simulation result, actual value will be updated after samples be tested. Note5
		Ry			0.351			
		Gx			0.291			
		Gy			0.569			
		Bx			0.139			
		By			0.045			
		Wx			0.235			
		Wy			0.245			
Color Gamut			Θ = 0°	58	64	-	%	
Response Time		Tr	Ta= 25° C Θ = 0°	-		30	ms	Note6
		Tf		-			ms	
		Tgray		-	-	-	ms	

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit.	Remark
Flicker	-		-	-	-20	dB	@L127 Note 7
Gamma		Perpendicular	1.9	2.2	2.5		@25℃
Crosstalk			-	-	2%	-	@25℃

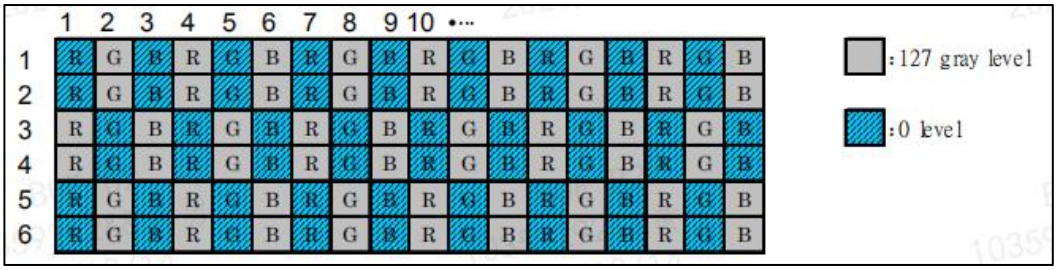
Notes :

These items are measured using the following equipment:
- View angle range/Color: SR-ULIR
- Contrast ratio: CA-310/SR-ULIR
- Response time @ room temperature: TRD-100A

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing 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.
2. 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 FIGURE 4-1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. Center trans of white is defined as the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 4-2 for a total of the measurements per display.
4. The luminance uniformity on LCD surface is measured 9 points, see FIGURE 4-3
5. The color chromaticity coordinates specified in Table 4-1. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. (MDL) Measurements shall be made at the center of the C/F.
6. The electro-optical response time measurements shall be made as FIGURE 4-4. Tg2g is the biggest value in the table with * mark as below. The grey levels to be measured are also defined in the below table. The measurement timing is 90%~10% or 10%~90% during grey level change.
7. The following flicker test pattern is used:



4.2 OPTICAL TEST APPENDIX

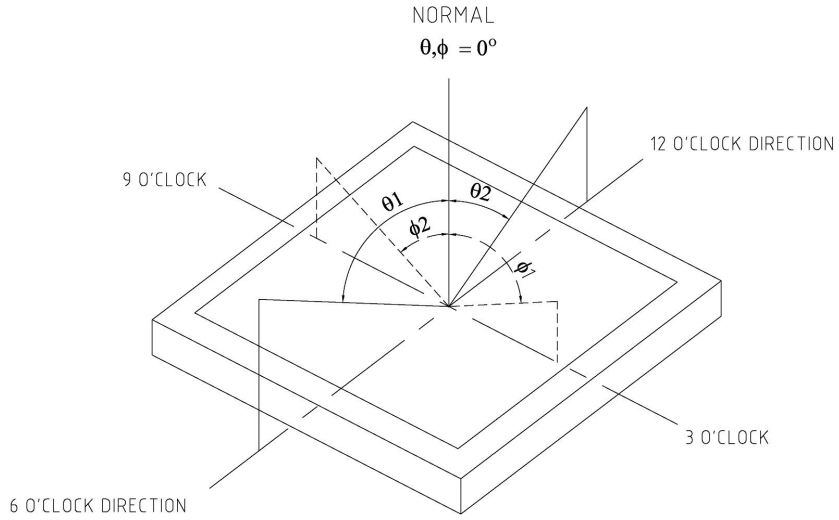


Figure 4-1 Viewing angle

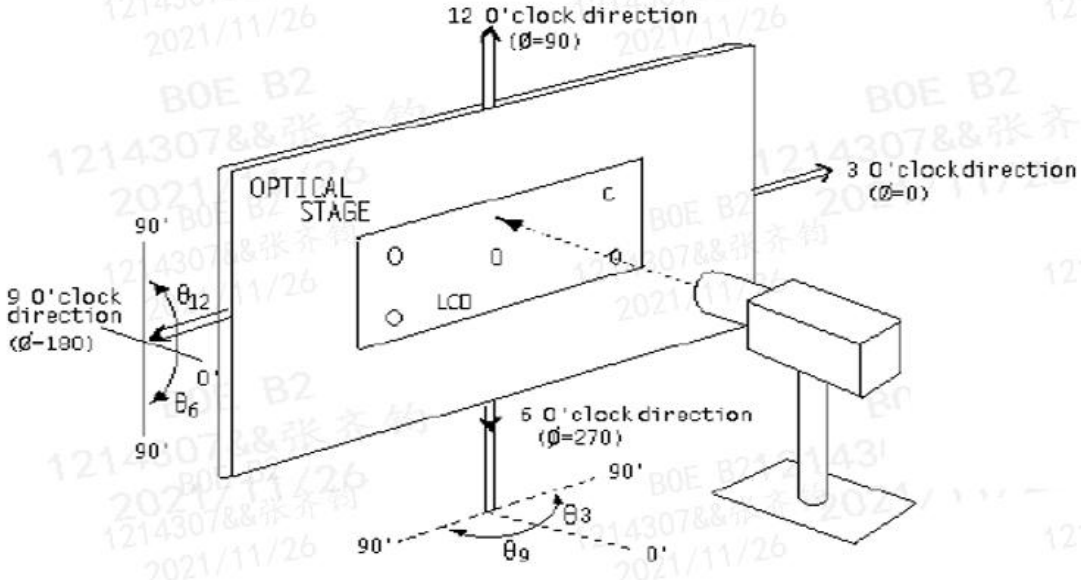
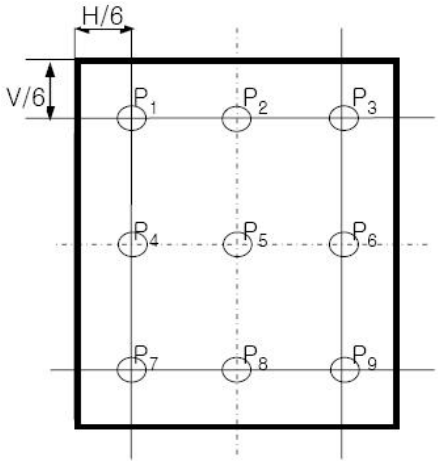


Figure 4-2 Luminance measurement method



H: Horizontal value of AA
V: Vertical value of AA

$$\text{Uniformity (\%) } \Delta Y = \frac{\text{Minimum Luminance of 9points}}{\text{Maximum Luminance of 9points}} \times 100\%$$

Figure 4-3 Luminance uniformity

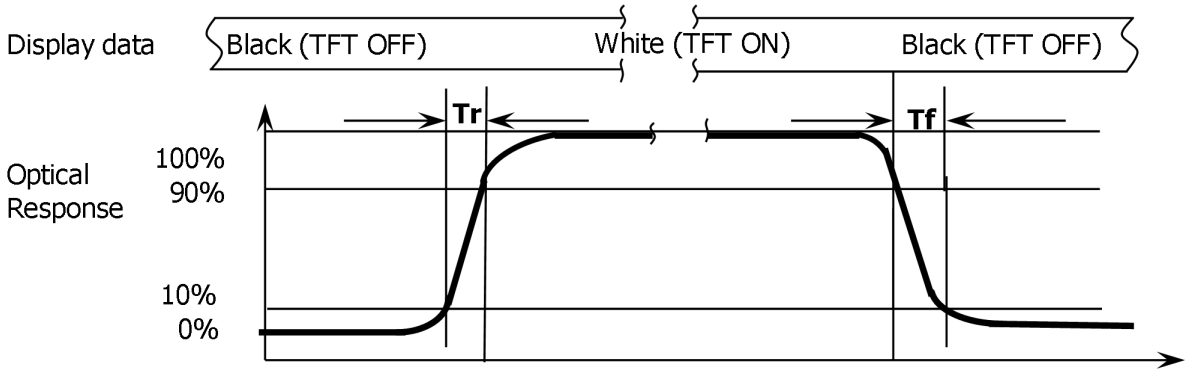


Figure 4-4 Response Time Testing

5.0 MECHANICAL CHARACTERISTICS

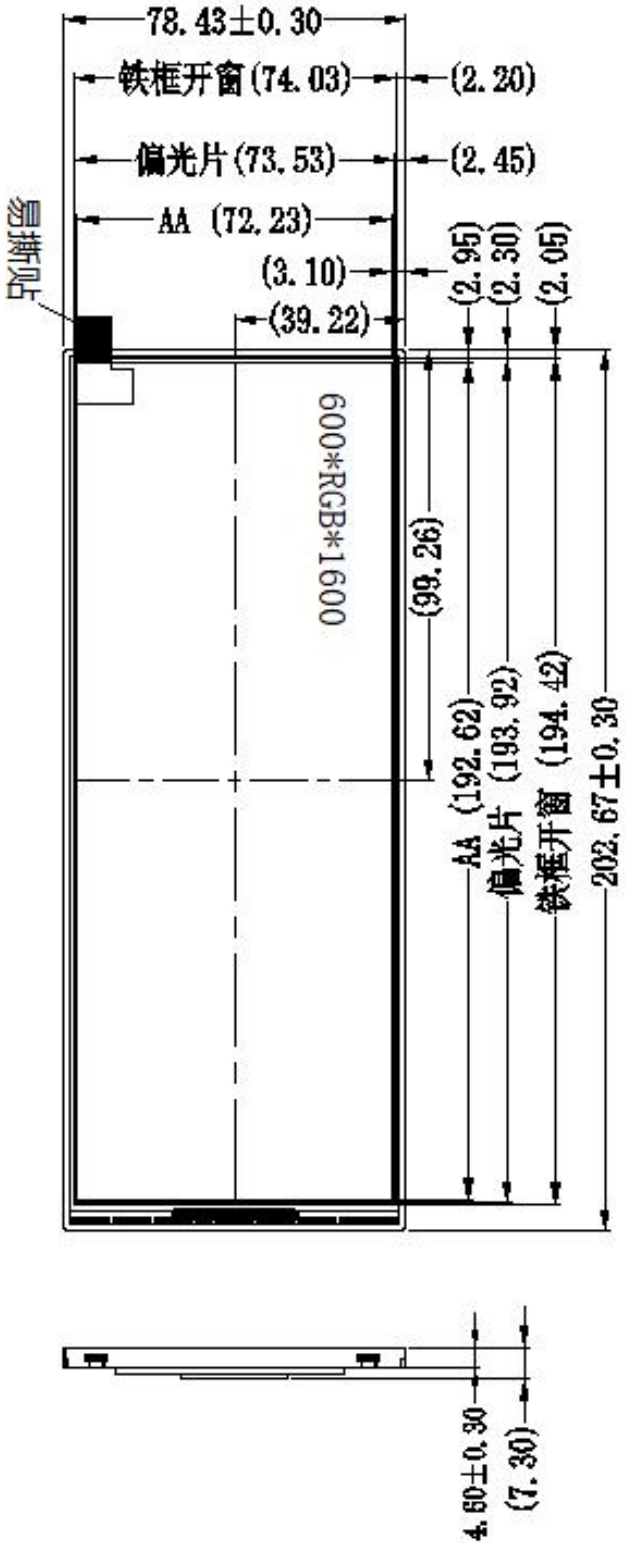
5.1 Dimensional Requirements

Figure in next page shows mechanical outlines for the MDL.

Table 5-1 Dimensional Parameters

Parameter	Specification	Unit
Active Area	72.234(H) x 192.624(V)	mm
Number of pixels	600(H) ×1600(V)	Pixels
Pixel pitch	0.04013(H) ×0.12039(V)	mm
Pixel arrangement	RGB Vertical stripe	
Display colors	16.7M	colors
Display mode	Normally black	
Module thickness	4.6	Without Film, Fpc,Compoe,CNT
Module outline	202.67(H)*78.43 (V)	mm
AA-MDL outline L/R/U/D	2.95/7.1/3.1/3.1	mm

5.2 Outline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(2.20)
偏光片(73.53)
(2.45)
AA (72.23)
(3.10)
(39.22)
(2.95)
(2.30)
(2.05)
参照点
600*RGB*1600
(99.26)
AA (192.62)
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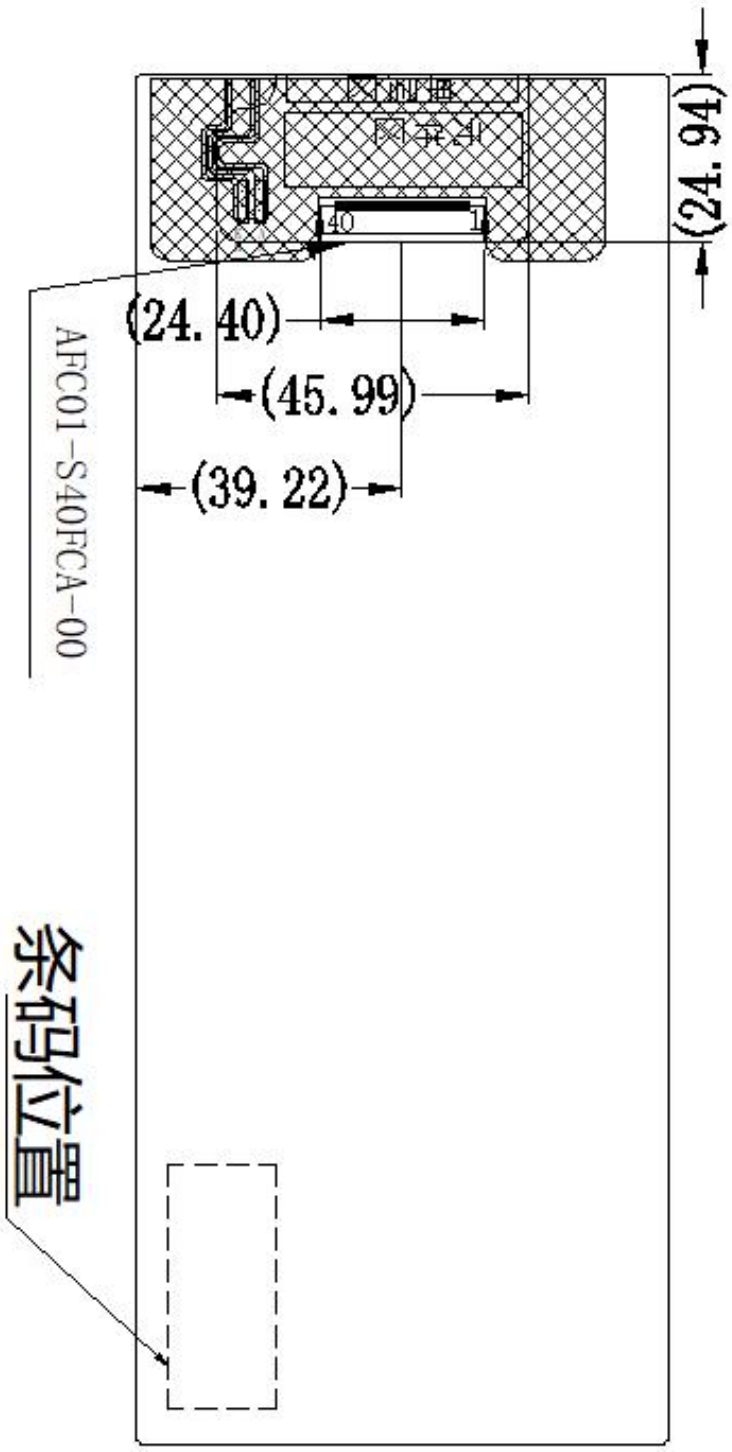
4.60±0.30
(7.30)


(24.94)
40
1
(24.40)
(45.99)
(39.22)
AFC01-S40FCA-00
条码位置

6.0 RELIABILITY

Table 6-1 Reliability test

No	Test Items	Conditions	Remark
1	High temperature storage test	Ta =80 ℃, 240 hrs	
2	Low temperature storage test	Ta = -30 ℃, 240 hrs	
3	High temperature operation test	Ta = 70℃, 240 hrs	
4	Low temperature operation test	Ta = -20 ℃, 240 hrs	
5	High temperature & high humidity operation test	Ta = 60 ℃, 90%RH, 240 hrs	
6	Thermal shock	Ta = -30 ℃ ↔ 80 ℃ (0.5 hr), 50 cycle	Non-operation
7	Image Sticking	5*5 Pattern, 1hrs 25℃±2℃ check pattern Gray 127, after 5 mins, the mura must be disappeared completely	
8	ESD test	Air Voltage:±8KV Contact Voltage:±4KV R: 330Ω C: 150pF 5 time	Class B Note 3
9	Vibration Test	Random: 0.015G^2/Hz, 5~200Hz -6dB/Octave, 200~400Hz XY 8H	Note 2

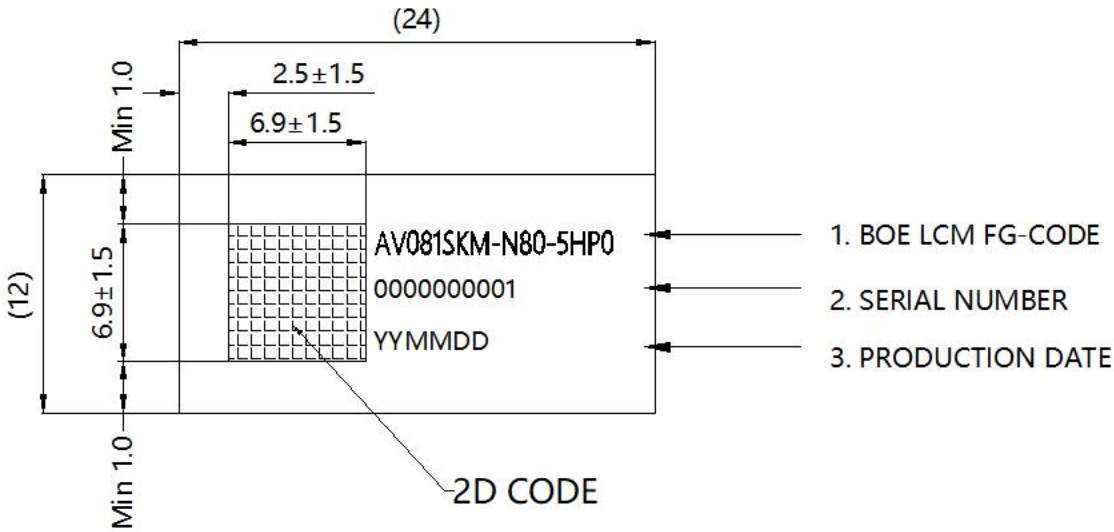
Notes

1.After the reliability test, the product only guarantee function normally without any fatal defect (non-display, line defect, abnormal display etc). All the cosmetic specification is judged before the reliability test.

2.For module internal structure robustness test purpose only. Customer application clusterd esign should take care of overall mounting robustness with display module.

3. class B (function returns to normal after discharge). Like a flickering. Because the ESD is not only related to the module, but also related to the system, if the customer ESD test problems related to TLCM, BOE promises to cooperate with the customer to improve ESD.

7.0 PRODUCT LABEL



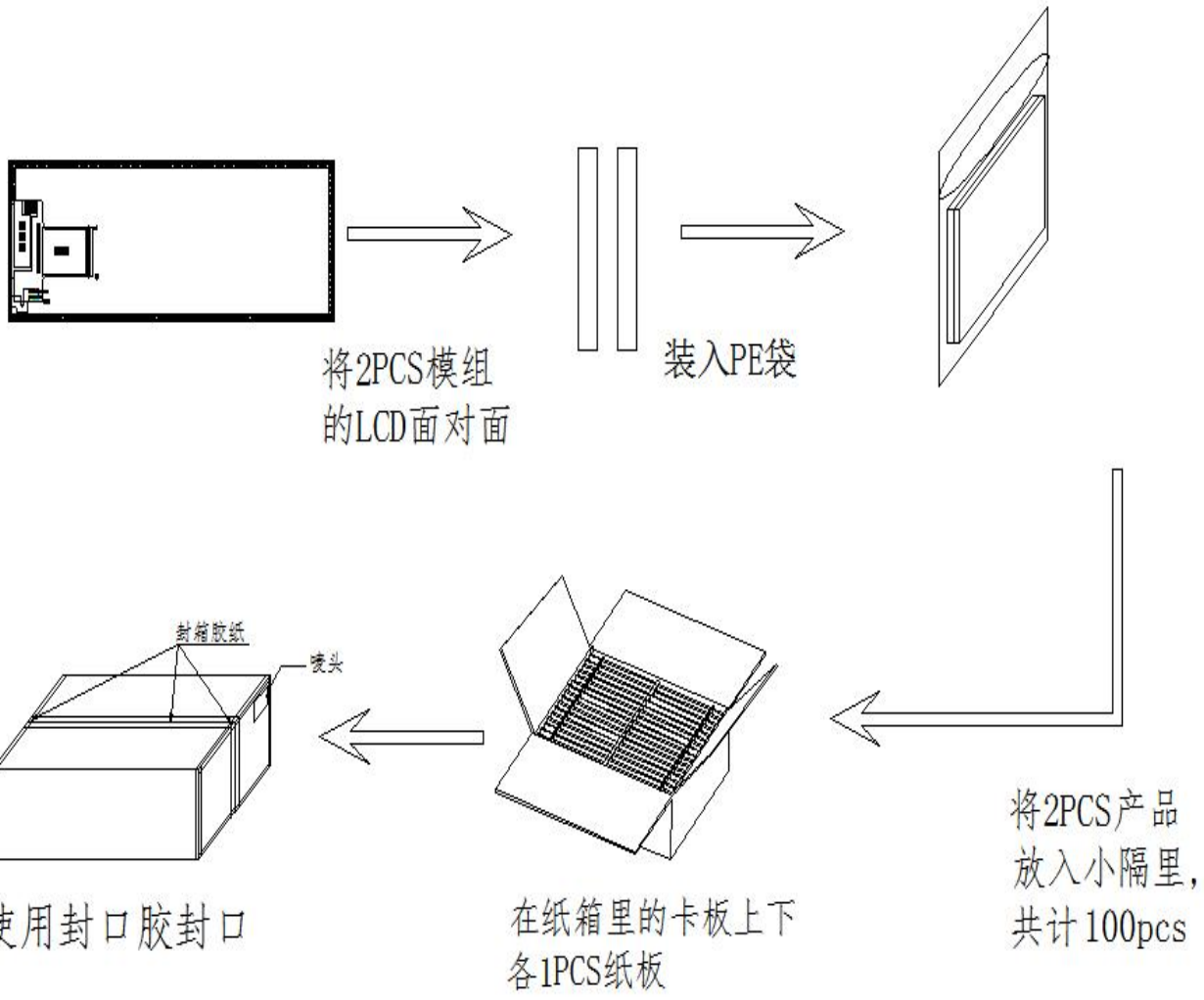
2D CODE CONTENT:

AV081SKM-N80-5HP0 0000000001 YYMMDD

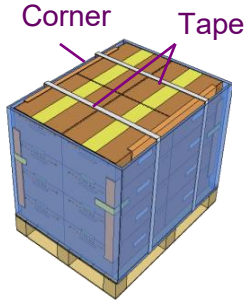
- PRODUCTION DATE (YYMMDD) (6 DIGITS)
- SERIAL NUMBER (10 DIGITS)
- BOE PROJECT FG-CODE (17 DIGITS)

LCM LABEL (SCALE 2:1)

8.0 Packing



. 30（6*5） Inner Boxes / Pallet
.Capacity: 3000pcs/Pallet



9.0 PRECAUTIONS

9.1 Handing

1. Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
2. You must mount a module using specified mounting holes (Details refer to the drawings).
3. Please make sure to avoid external forces applied to the Source FPC and D-IC during the process of handling or assembling. If not, It causes panel damage or malfunction.
4. Note that polarizers are very fragile and could be easily damaged. Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
5. Do not pull or fold the source D-IC which connect the source FPC and the panel. Do not pull or fold the LED wire.
6. After removing the protective film, when the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with alcohol or purified water. Do not strong polar solvent because they cause chemical damage to the polarizer
7. Wipe off saliva or water drops as soon as possible. Their long time contact with .polarizer causes deformations and color fading.
8. Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
9. Since the LCD is made of glass, do not apply strong mechanical impact or static load onto it. Handling with care since shock, vibration, and careless handling may seriously affect the product. If it falls from a high place or receives a strong shock, the glass may be broken.
10. Do not disassemble the module.
11. To determine the optimum mounting angle, refer to the viewing angle range in the specification for each model.

12. If the customer's set presses the main parts of the LCD, the LCD may show the abnormal display. But this phenomenon does not mean the malfunction of the LCD and should be pressed by the way of mutual agreement.
13. Do not drop water or any chemicals onto the LCD’s surface.

9.2 Operating Precautions

1. Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
2. Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference.
3. The electrochemical reaction caused by DC voltage will lead to LCD degradation, so DC drive should be avoided.
4. The LCD modules use C-MOS LSI drivers, so customers are recommended that any unused input terminal would be connected to Vdd or Vss, do not input any signals before power is turn on, and ground you body, work/assembly area, assembly equipments to protect against static electricity.
5. Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on) Otherwise the Module may be damaged.
6. Design the length of cable to connect between the connector for back-light and the converter as short as possible and the shorter cable shall be connected directly. The longer cable between that of back-light and that of converter may cause the luminance of LED to lower and need a higher startup voltage(Vs).
7. Connectors are precise devices for connecting FPC and transmitting electrical signals. Operators should insert and unplug MDL in parallel when assembling MDL.
8. Do not connect or disconnect the cable to/ from the module at the "Power On" condition.
9. When the module is operating, do not lose CLK, HS,VS signals. If any one these signals is lost, the LCD panel would be damaged.

10. Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.
11. Do not re-adjust variable resistor or switch etc.

8.1 Electrostatic Discharge Control

1. Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly. Keep products as far away from static electricity as possible.
2. Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing orother conductivity-treated fibers.

9.4 Precautions for Strong Light Exposure

1. Strong light exposure causes degradation of polarizer and color filter. It is not allowed to store or run directly in strong light or in high temperature and humidity for a long time.

9.5 Storage Precautions

1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.
2. The LCD modules should be stored under the storage temperature range. the recommend condition is: Temperature : 0℃~ 40℃, Relatively humidity: ≤80%, and no more than 1 year.
3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

9.6 Handling Precautions for Protection Film

1. Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, If possible, under ESD control device likeion blower, and the humidity of working room should be kept over 50%RH to reduce the risk of static charge.
2. In handling the LCD, wear non-charged material gloves. And the conducting wrist to the earth and the conducting shoes to the earth are necessary.

9.7 Operation Condition Guide

1. Lifetime in this spec. is guaranteed only when Commercial Display is used according to operating usages.
2. Module used in unnormal orientation mode，need to confirm with the manufacturer.
3. Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on) Otherwise the Module may be damaged.
4. Dew drop atmosphere should be avoided.
5. The storage room should be equipped with a good ventilation facility, which has a temperature controlling system.
6. When expose to drastic fluctuation of temperature (hot to cold or cold to hot),the LCD may be affected; Specifically, drastic temperature fluctuation from cold to hot ,produces dew on the LCD's surface which may affect the operation of the polarizer and the LCD.
7. Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD may turn black at temperature above its operational range. However those phenomena do not meanmalfunction or out of order with the LCD. The LCD will revert to normal operation once the temperature returns to the recommended temperature range for normal operation.

9.8 Others

1. When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.
2. 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, legs or clothes, it must be washed away thoroughly with soap.
3. For the crash damaged or unnecessary LCD, it is recommended to wash off liquid crystaly either of solvents such as acetone and ethanol an should be burned up later.
4. If you should swallow the liquid crystal, first, wash your mouth thoroughly with water,then drink a lot of water and induce vomiting, and then, consult a physician.
5. If the liquid crystal should get in your eyes, flush your eyes with running water for atleast fifteen minutes.
6. Client needs to add heat dissipation design , such as fan, water cooling , etc.
7. After assembling into modules, guarantee that the temperature rise of panel surface doesnot exceed 20 C at room temperature.
8. Customers need to drive current down according to derating curve.