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10.1 HD BYD Di2.1L TLCM Product Specification Rev.P0

SUPPLIER	Chengdu BOE Optoelectronics Technology CO., LTD
FG-Code	AV101HDT-A10-28PE
Model-Number	COG-PVLSZT060-03

ITEM	BUYER SIGNATURE	DATE
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ITEM	SUPPLIER SIGNATURE	DATE
Prepared	_____	_____
Reviewed	_____	_____
Approved	_____	_____

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1.0 GENERAL DESCRIPTION

1.1 Introduction

10.1 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 10.1 inch diagonally measured active area with resolutions (1280 horizontal by 720 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.

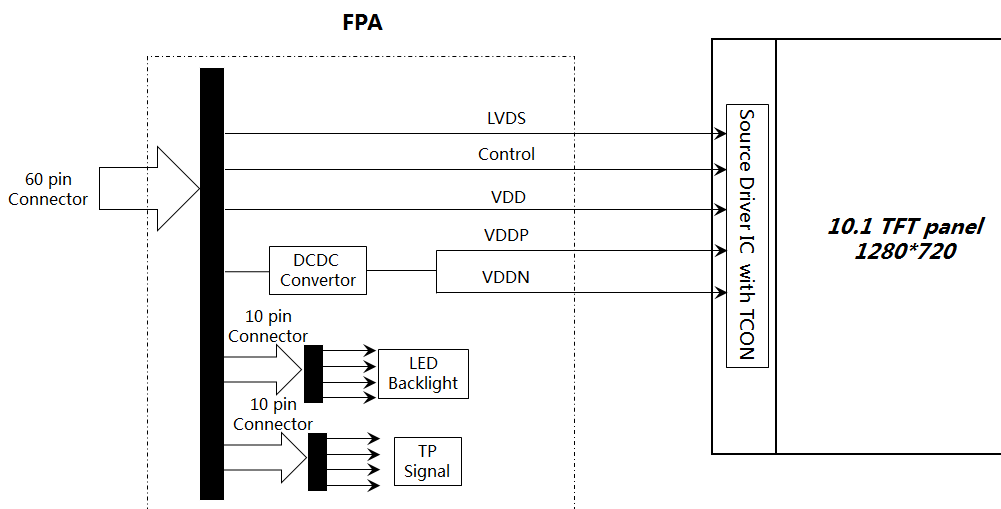


Figure 1-1 Block Diagram

1.2 Features

- Wide viewing angle (U/D/L/R) : 85/85/85/85
- Color Gamut : Typ.72%
- RoHS/Halogen Free
- LVDS Interface
- 0.5t glass

1.3 Application

- Vehicle-mounted Production

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1.4 General Specification

Table 1-1 General Specifications

Parameter	Specification	Unit	Remarks
Active Area	223.68(H) × 125.82(V)	mm	16:9
Number of Pixels	1280(H) × RGB × 720(V)	pixels	
Pixel Pitch	0.17475(H) × 0.17475 (V)	mm	
Pixel Arrangement	RGB Vertical stripe		
Display Colors	16.7M	colors	
Color Gamut	Typ72% Min67%	%	
Display Mode	Normally black		
Module Outline	247.86X160.65	mm	CG
Viewing Direction (Human Eye)	U/D/L/R Min 70/70/70/70 Typ 85/85/85/85		
Polarizer Surface Coating	HC		Upper

Note:

1. At the U/D/L/R direction, the viewing angle is same;

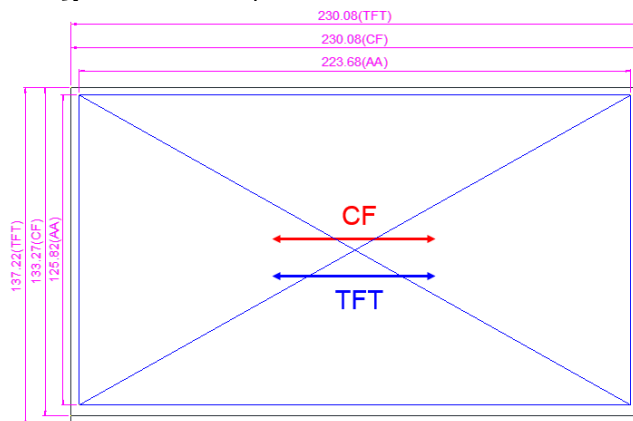
1.5. The TFT and CF Align Direction:

Figure 1-3 The TFT and CF Align Direction

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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
LCD Logic Voltage	VDD	-0.3	4	V	Ta=25+/-2°C
LCD Gamma Positive	VSP	-7.7	0.3	V	
LCD Gamma Negative	VSN	-0.3	7.7	V	
LCD Gate On Voltage	VGH	7.2	24	V	VGH-VGL < 32
LCD Gate Off Voltage	VGL	-15	-8	V	
Operating Temperature (Humidity)	T _{OP}	-30	+85	°C	
	RH	-	90	%	At 60°C
Storage Temperature (Humidity)	T _{ST}	-40	+90	°C	
	RH	-	90	%	At 60°C

Note 1: Stresses above those listed under “Absolute Maximum Rating” may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at the se or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extended periods may a ffect device reliability.

Note 2: $VGH+|VGL| < 32V$. (最大值为IC理论值)

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3.0 ELECTRICAL SPECIFICATIONS**3.1 The LCD Module Electrical Interface Connection**

Table 3-1 Pin Assignments for the LCD
(Recommended Connector typ: FFSKL05017N60)

PIN	SYMBOL	I/O	Description	Remark
1	TP_AVDD	P	Voltage for touch panel	
2	TP_/INT	O	Interrupt pin	
3	TP_/RST	I	Reset pin for touch panel	
4	TP_SDA	I/O	I2C data pin	
5	TP_GND	P	GND for touch panel	
6	TP_SCL	I	I2C clock input pin	
7	NC	-	Dummy Pin	
8	TP_DVDD	P	Voltage for touch panel	
9	TP_GND	P	GND for touch panel	
10	NC	-	Dummy Pin	
11	GND	P	Ground	
12	D0N	I	Data channel 0 -	
13	D0P	I	Data channel 0 +	
14	GND	P	Ground	
15	D1N	I	Data channel 1 -	
16	D1P	I	Data channel 1 +	
17	GND	P	Ground	
18	CLKN	I	Clock channel -	
19	CLKP	I	Clock channel +	
20	GND	P	Ground	

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PIN	SYMBOL	I/O	Description	Remark
21	D2N	I	Data channel 2 -	
22	D2P	I	Data channel 2 +	
23	GND	P	Ground	
24	D3N	I	Data channel 3 -	
25	D3P	I	Data channel 3 +	
26	GND	P	Ground	
27	NC	-	Dummy Pin	
28	NC	-	Dummy Pin	
29	GND	P	Ground	
30	NC	-	Dummy Pin	
31	NC	-	Dummy Pin	
32	GND	P	Ground	
33	NC	-	Dummy Pin	
34	NC	-	Dummy Pin	
35	Fail_DET	O	Fail Detection single output	
36	NC	-	Dummy Pin	
37	NC	-	Dummy Pin	
38	VDD_OTP	I	OTP PIN	
39	NC	-	Dummy Pin	
40	NC	-	Dummy Pin	

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PIN	SYMBOL	I/O	Description	Remark
41	GND	P	Ground	
42	VDD	P	Power pin	
43	VDD	P	Power pin	
44	GND	P	Ground	
45	RESET	I	Reset Pin	
46	STBYB	I	Standby Pin	
47	SPI_CS	I	SPI chip select pin	
48	SPI_SCL	I	SPI Clock pin	
49	SPI_SDA	I/O	SPI Data pin	
50	NC	-	Dummy Pin	
51	LED A3+	P	Anode of LED backlight.	
52	LED A2+	P	Anode of LED backlight.	
53	LED A1+	P	Anode of LED backlight.	
54	NC	-	Dummy Pin	
55	NTC+	C	NTC Pin	
56	NTC-	C	NTC Pin	
57	NC	-	Dummy Pin	
58	LED K3	P	Cathode3 of LED backlight.	
59	LED K2	P	Cathode2 of LED backlight.	
60	LED K1	P	Cathode1 of LED backlight.	

Remark:

1. For "I/O", "I" is input; "O" is output; "P" is power ; "C" is passive
2. Pin "NC" means BOE will use it but customer don't need ,so please Customer don't connect it anything.

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3.2 Electrical Specifications

Table 3-3 Electrical Specifications

Ta=25+/-2°C

Parameter	Symbol	Values			Unit	Notes
		Min	Typ.	Max		
TFT Gate ON Voltage	VGH		20		V	
TFT Gate OFF Voltage	VGL		-10		V	
TFT Common Electrode Voltage	VCOM	-3	-	0	V	TBD
Voltage of VCC		3.15	3.3	3.45	V	
Current of VCC			400	600	mA	
Supply current of LED backlight	Per string		100	-	mA	9 LEDs
Total Supply current of LED Backlight	I _{LED} Total		300	-	mA	3 strings
Supply voltage of LED backlight	Per string	-	26.1	29.7	V	3 strings

Notes :

- 1: Current Max is based “Gray 255”; Current Typ. is based “Vertical Color Bar” ;
- 2: Frame rate=60HZ , VGH-VGL < 32V ;
- 3: BLU LED consists of 27 LEDs,3 strings * 9 packages, the typical drive current is 300 mA.
- 4: Each string LED should be drove by constant current separately.

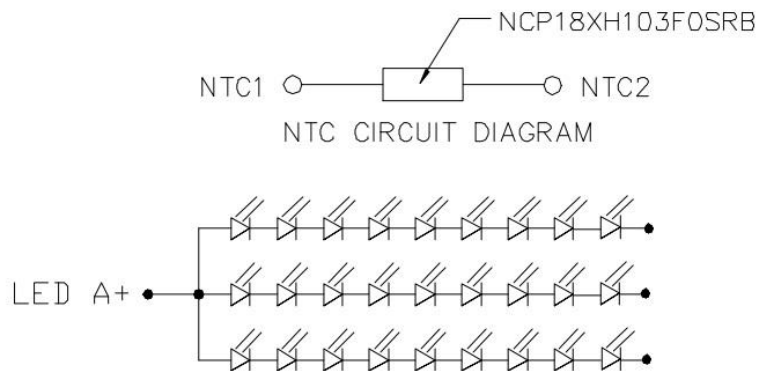


Figure 3-2 LED&NTC Diagram

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3.3 LVDS Signal Timing

Table 3-4 LVDS Signal Timing

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency	RxFCLK	57.1	58.1	85	MHz	
Horizontal Display Area	thd	1280			DCLK	
HS Period	th	1309	1322	1664	DCLK	
HS Blanking	Thb+thfp		42		DCLK	
Vertical Display Area	tvd	720			TH	
VS Period	tv	727	733	936	TH	
VS Blanking	Tvbp+tvfp		13		TH	
Clock period	TLVCYC	11.76			ns	
1 data bit time	UI		1/7		TLVCYC	
Clock high time	TLVCH	2.8	4	4.2	UI	
Clock low time	TLVCL	2.8	3	4.2	UI	
LVDS wake-up time	TENLVDS			150	us	

3.4 Signal Format

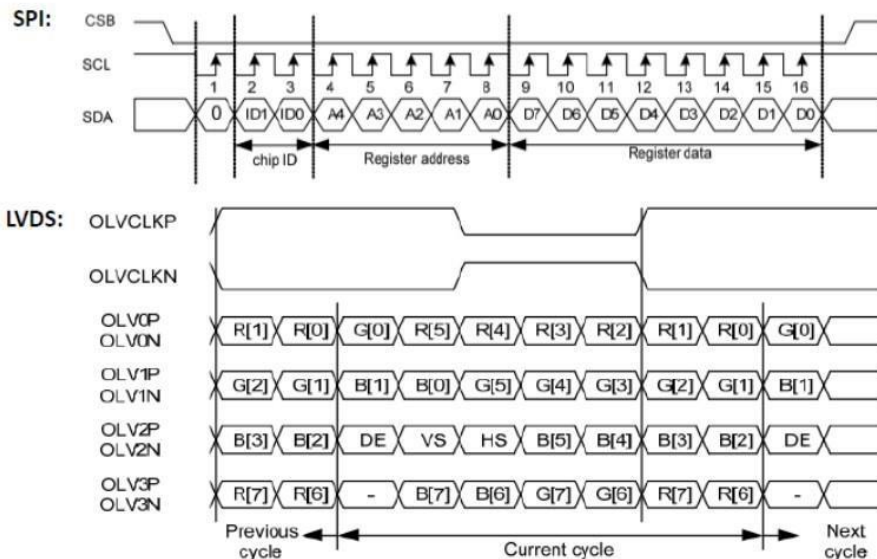


Figure 3-3 Signal Format

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3.5 LVDS DC Characteristics

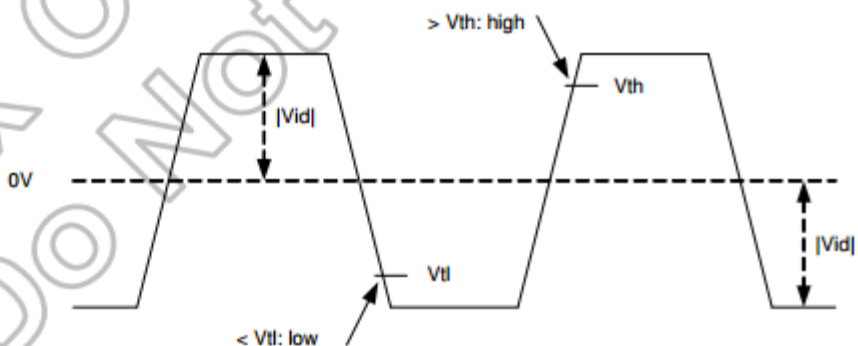
Table 3-5 LVDS DC Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Differential input high Threshold voltage	R_{TH}	-	-	+0.1	V
Differential input low threshold voltage	R_{TL}	-0.1	-	-	V
Differential input common Mode voltage	R_{CM}	1	1.2	$1.7 - V_{ID} /2$	V
LVDS input voltage	V_{INLV}	0.7		1.7	V
Differential input voltage	$ V_{ID} $	0.1		0.6	V
Differential input leakage Current	$R_{V_{ILK}}$	-10	-	+10	μA

Single-ended:
LVCLKP(R),
LVCLKN(R),
LVD[3:0]P(R),
LVD[3:0]N(R)



Differential:
LVCLKP(R)-LVCLKN(R),
LVD[3:0]P(R)-
LVD[3:0]N(R)



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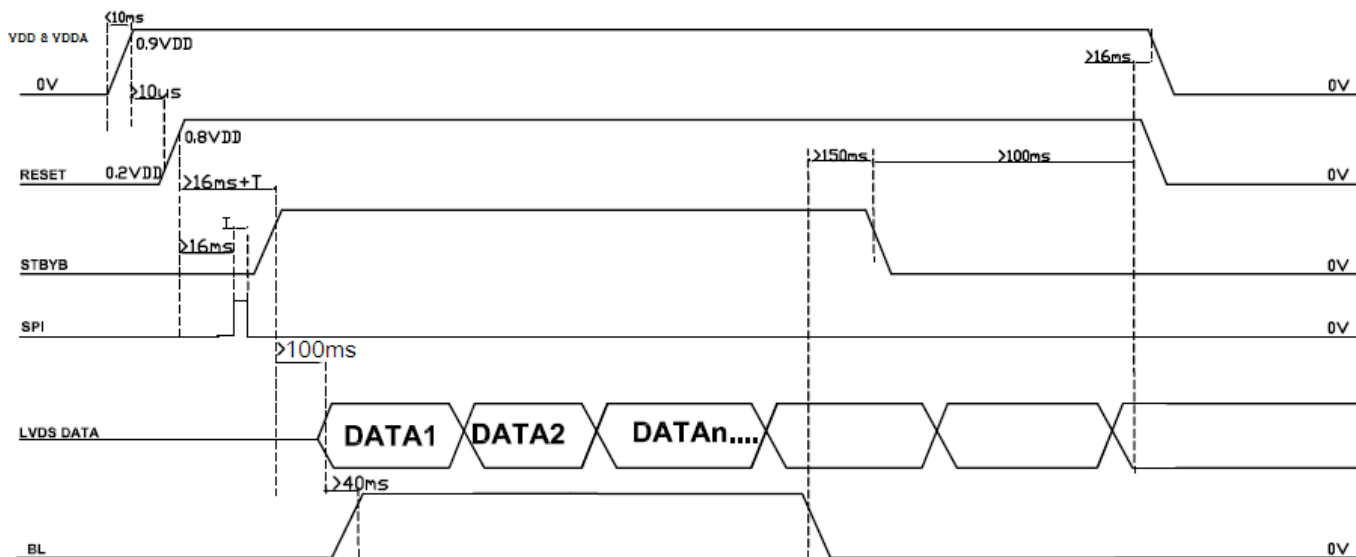
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3.6 Power on/off sequence

Figure 3-4 Power on/off sequence



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4.0 Touch Panel Characteristics

GENERAL DESCRIPTION

- 10.1" OGS Solution
- Mutual Type Projected Capacitive Touch Panel (with Cypress CYAT816 58-64AS48 controller)
- TP supply voltage: 3.3V
- I2C interface for touch panel
- Chemical Strengthen glass with AGARAF Film
- Optically bonded touch panel to TFT
- "RoHS" compliance

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4.1 Touch Panel Characteristics

Table 4-1 Touch panel features

Item	Contents	Unit
Type	Mutual type projected capacitive touch panel	-
Interface	I2C (Up to 400kbits/sec)	-
Function	Provide (X, Y) coordinates and number of touch points	-
No. of touch	5 touches	-
Sensing area	Ø8 (Typ.) finger touch	mm
Resolution	1280 x 720	-
Orientation	(0,0) in the upper left corner	
Input mode	Finger or capacitive pen	-
Uniformity(均匀性)	> 85%	
Accuracy (准确性)	中心区域≤1.5mm, 边缘区域≤2.0mm	
Linearity (线性性)	中心区域≤1.5mm, 边缘区域≤2.0mm	
Sensitivity (灵敏性)	无断线, 且中心区域≤1.5mm	
Multi-Points Minimum Distance (点间距)	最小间距≤15mm	
Jitter (抖动)	抖动≤1.5mm	

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4.2 Typical Electrical Characteristics for Touch Panel

At Ta = 25°C, TP_VDD(TP_VDDA & TP_VDDD)=3.3V, TP_GND=0V.

Table 4-2 DC characteristics of touch panel

Parameter	Symbol	Min.	Typ.	Max.	Unit
Analog supply voltage	VDDD	3.2	3.3	3.4	V
Digital supply voltage	VDDA	3.2	3.3	3.4	V
VDDD active current	IDDD_ACT	-	TBC	26 (TBC)	mA
VDDA active current	IDDA_ACT	-	TBC	26 (TBC)	mA

4.3 Touch Panel Timing Characteristics

4.3.1 Reset timing

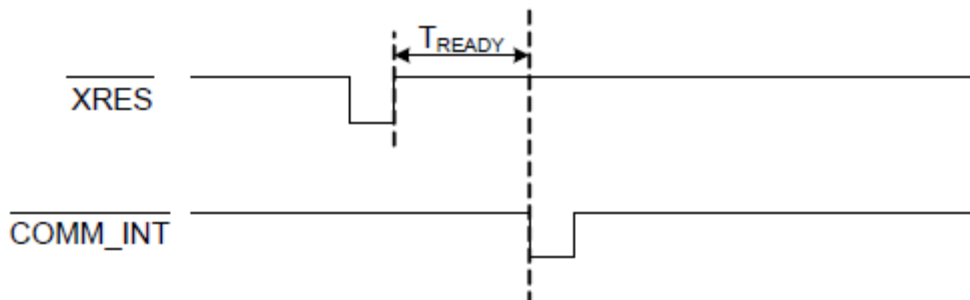


Figure 4-1 COMM_INT Timing Diagram

4.3.2 I2C Device Address for the Touch IC

Table 4-3 Format of SLA+W and SLA+R

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Device Address: 0x24							Read/Write

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5.0 OPTICAL SPECIFICATIONS

5.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = $25 \pm 2^\circ\text{C}$) 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 θ and Φ 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.

Table 5-1 Optical Specifications

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	70	85	-	Deg.	Note 1
		Θ_9		70	85	-	Deg.	
	Vertical	Θ_{12}		70	85	-	Deg.	
		Θ_6		70	85	-	Deg.	
Luminance Contrast ratio		CR	$\Theta = 0^\circ$ (Center) Normal Viewing Angle	800	1000	-		
White luminance uniformity		ΔY		80	85		%	Note 4
NTSC		%		67	72			
White Chromaticity		x_w		Typ-0.03	Typ+0.03	0.295	-	Actual value will be updated after samples b e tested. Note 5
		y_w	0.320			-		
Reproduction of color	Red	x_R	0.646			-		
		y_R	0.329			-		
	Green	x_G	0.318			-		
		y_G	0.620			-		
	Blue	x_B	0.146			-		
		y_B	0.080			-		
Response Time (Rising / Falling)		T_{RT}	25°C -30°C	-	-	30 500	ms	Note 6
BLU De-rating		T	65°C	-	-	35%		F 5-4

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Parameter	Condition	Min.	Typ.	Max.	Remark
Luminance	$\Theta = 0^\circ$ (Center) Normal Viewing Angle	600nit	700nit	-	on cover glass surface
Flicker		-	-	-30db	@+25°C , center , test picture : 1+2 dot inversion
Crosstalk				2%	
Gamma		1.9	2.2	2.5	@25°C

Note :

- 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.
- Contrast measurements shall be made at viewing angle of $\theta = 0^\circ$ 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 1 shown in Appendix)
Luminance Contrast Ratio (CR) is defined mathematically.

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

- 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 for a total of the measurements per display.
- The White luminance uniformity on LCD surface is then expressed as :
 $\Delta Y = (\text{Minimum Luminance of 9points} / \text{Maximum Luminance of 9points}) * 100$
- The color chromaticity coordinates specified in Table 4. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white.
- The electro-optical response time measurements shall be made as FIGURE 5 shown in Appendix by switching the "data" input signal ON and OFF. The times needed for the transmittance to change from 10% to 90% is T_r , and 90% to 10% is T_f .

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5.2 OPTICAL TEST APPENDIX

Figure 5-1 The Definition of V_{th} & V_{sat}

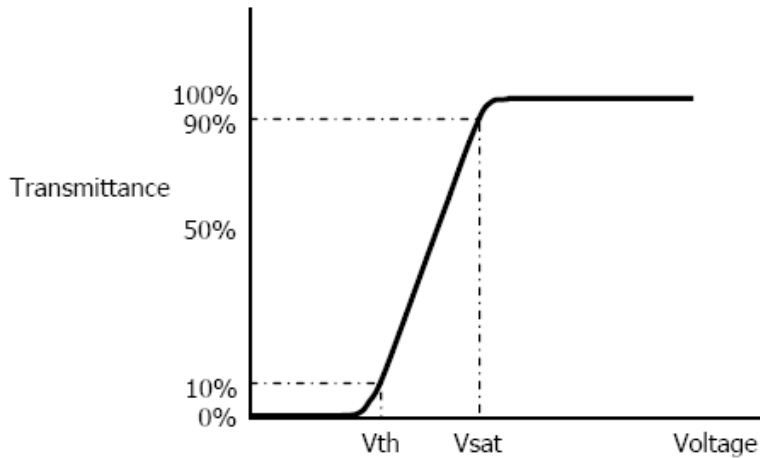
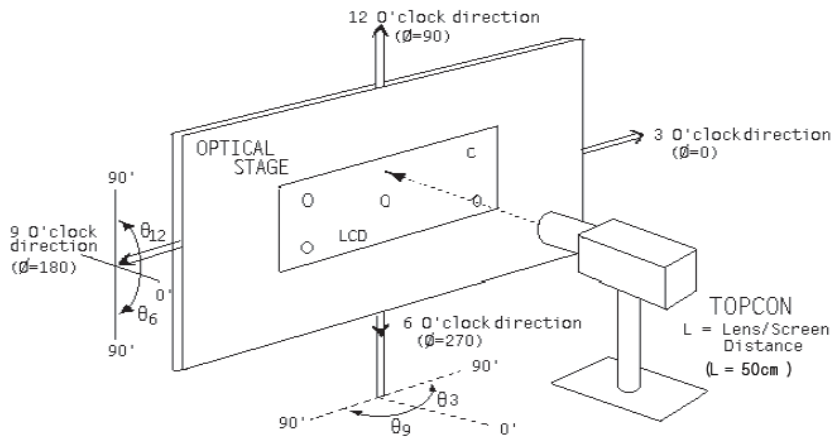


Figure 5-2 Measurement Set Up



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Figure 5-3 Response Time Testing

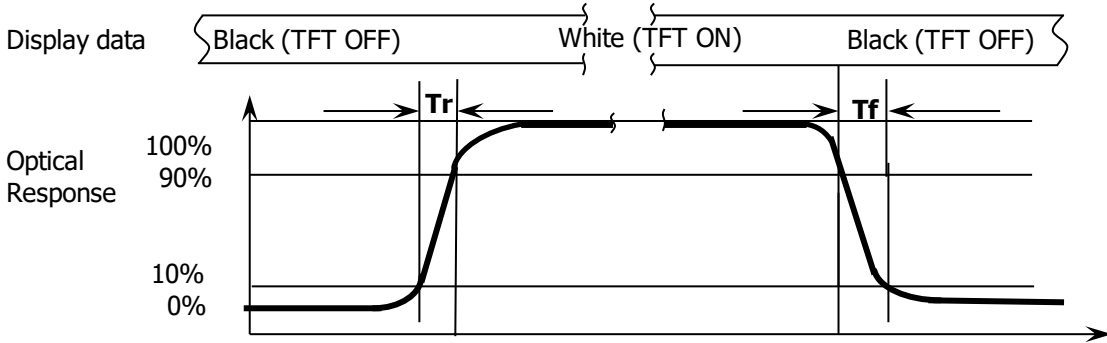
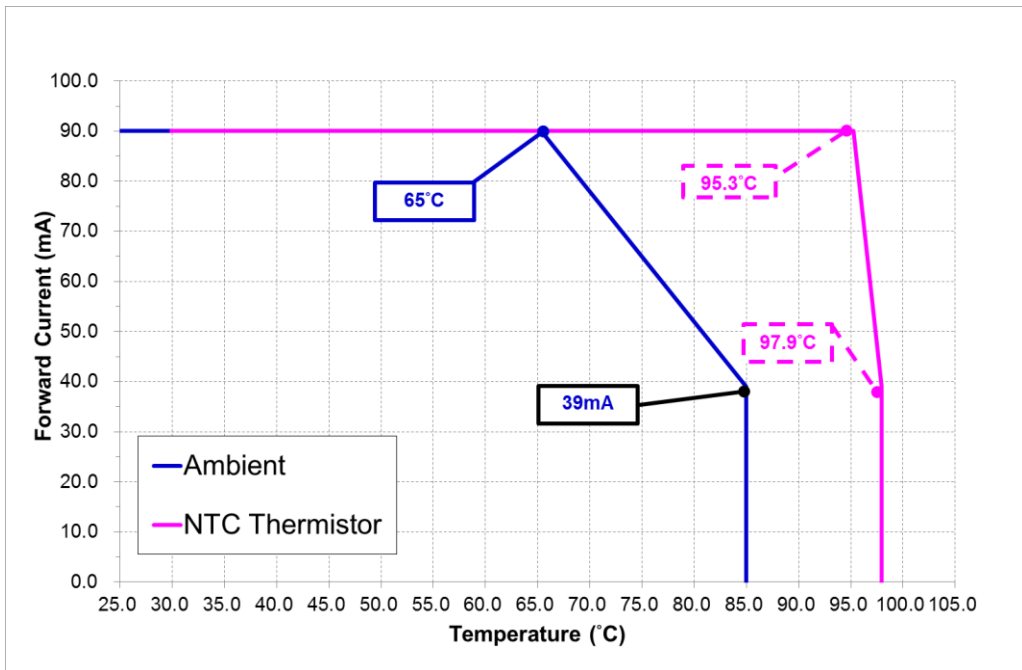


Figure 4-4 De-rating Curve



Note : this is simulation result, will be updated on actual test, the luminance will decrease to about 35%~40% of original performance when operation at 85°C

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TEMP. (deg. C)	RESISTANCE (k ohm)	TEMP. (deg. C)	RESISTANCE (k ohm)
-40	195.6520	+35	6.9479
-35	148.1710	+40	5.8336
-30	113.3471	+45	4.9169
-25	87.5588	+50	4.1609
-20	68.2367	+55	3.535
-15	53.6496	+60	3.0143
-10	42.5062	+65	2.5861
-5	33.8922	+70	2.2275
0	27.2186	+75	1.9245
+5	22.0211	+80	1.6685
+10	17.9255	+85	1.4521
+15	14.6735	+90	1.2680
+20	12.0805	+95	1.1096
+25	10.0000	+100	0.9738
+30	8.3145	+105	0.8580

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6.0 MECHANICAL CHARACTERISTICS**6.1 Dimensional Requirements**

Figure in next page shows mechanical outlines for the panel.

Table 6-1 Dimensional Parameters

Parameter	Specification	Unit
Active Area	223.68(H) × 125.82(V)	mm
Number of Pixels	1280(H) × 720(V)	Pixels
Pixel Pitch	0.17475(H) × RGB × 0.17475(V)	mm
Pixel Arrangement	RGB Vertical stripe	
Display Colors	16.7M	colors
Display Mode	Normally black	
Module Thickness	7.54	mm
Module Outline	247.86X160.65 (CG)	mm
AA-MDL outline L/R/U/D	12.09/12.09/17.417/17.413	mm

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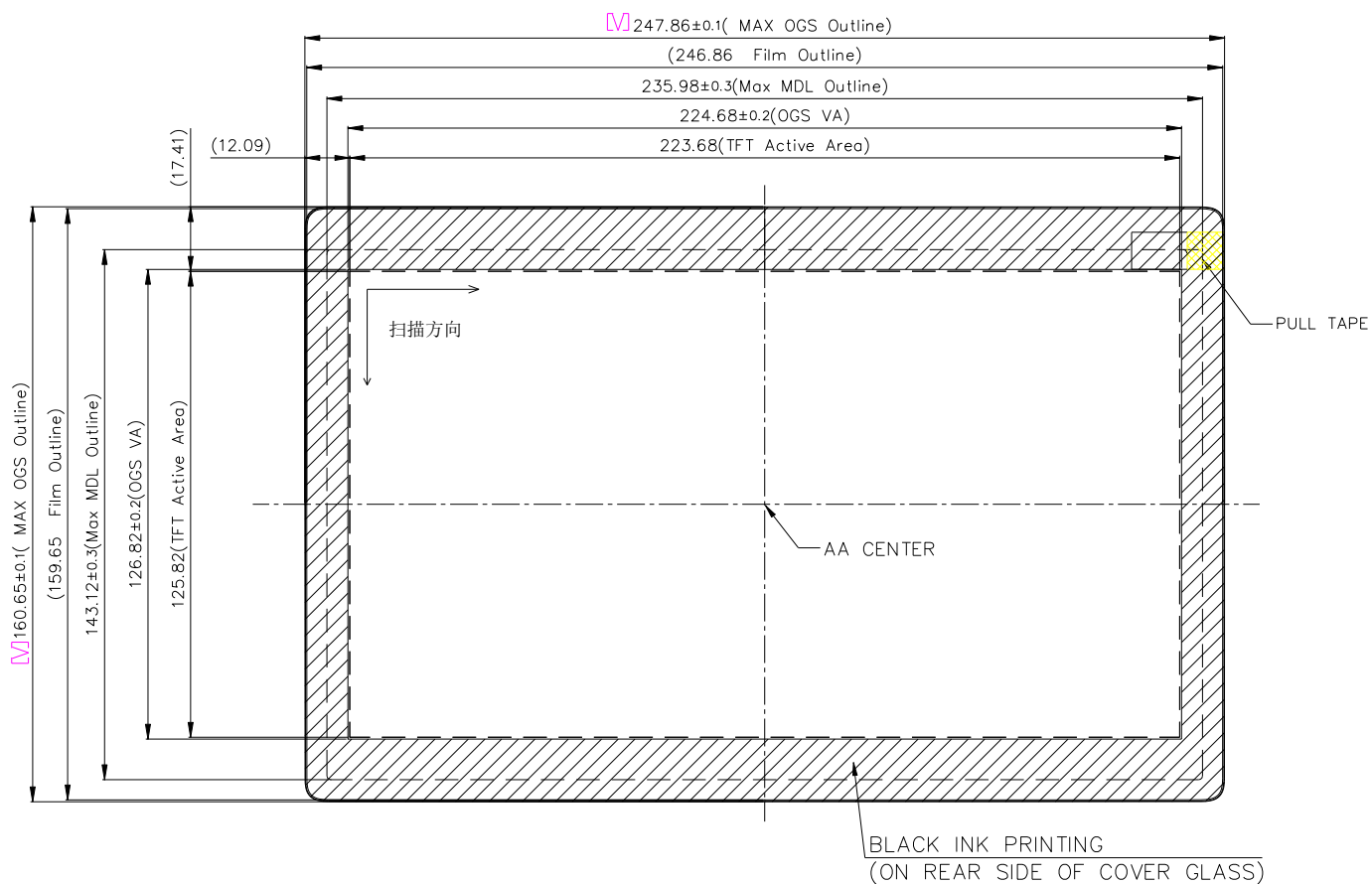
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6.2 Outline (Front)



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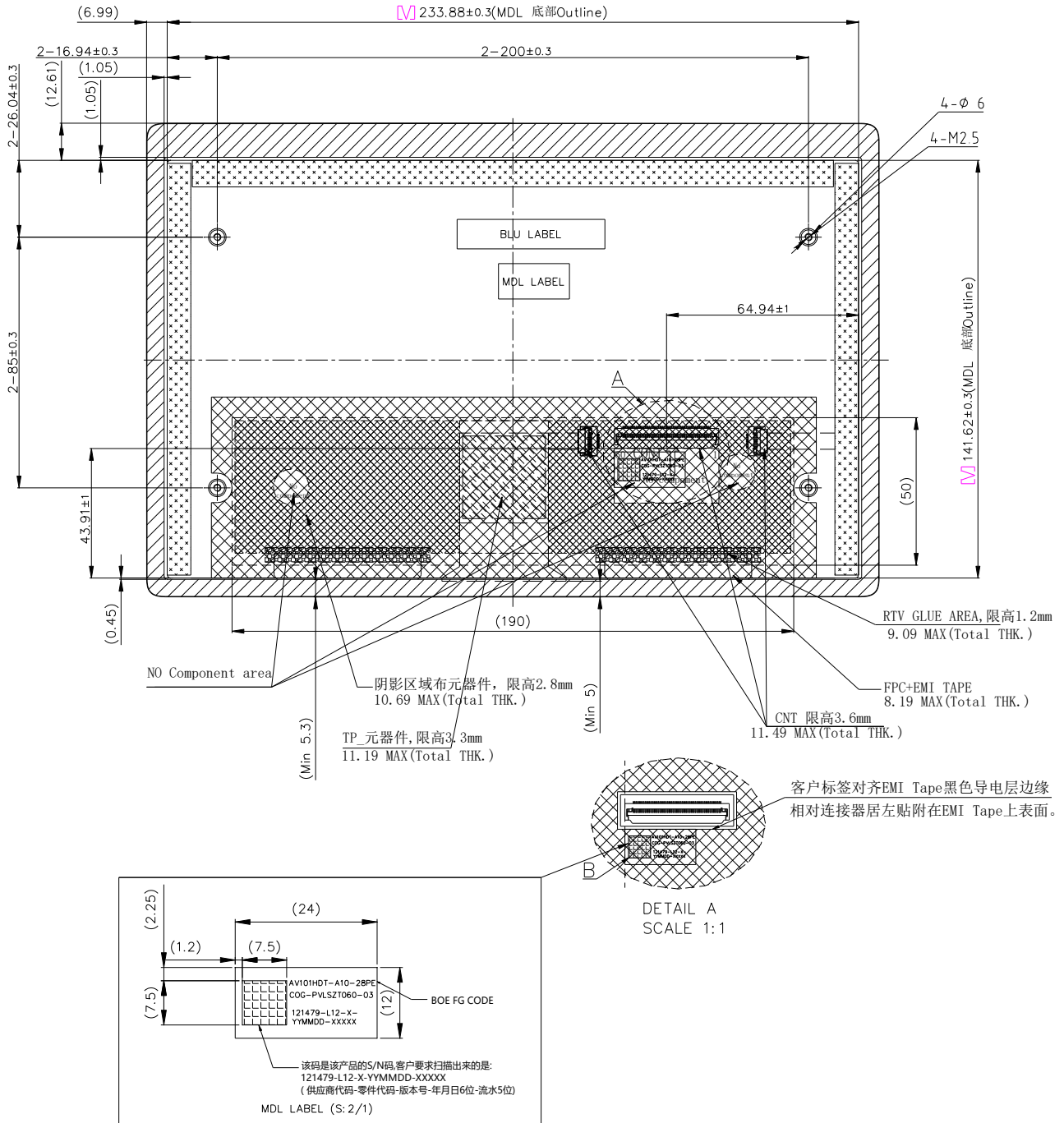
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6.3 Outline (Rear)



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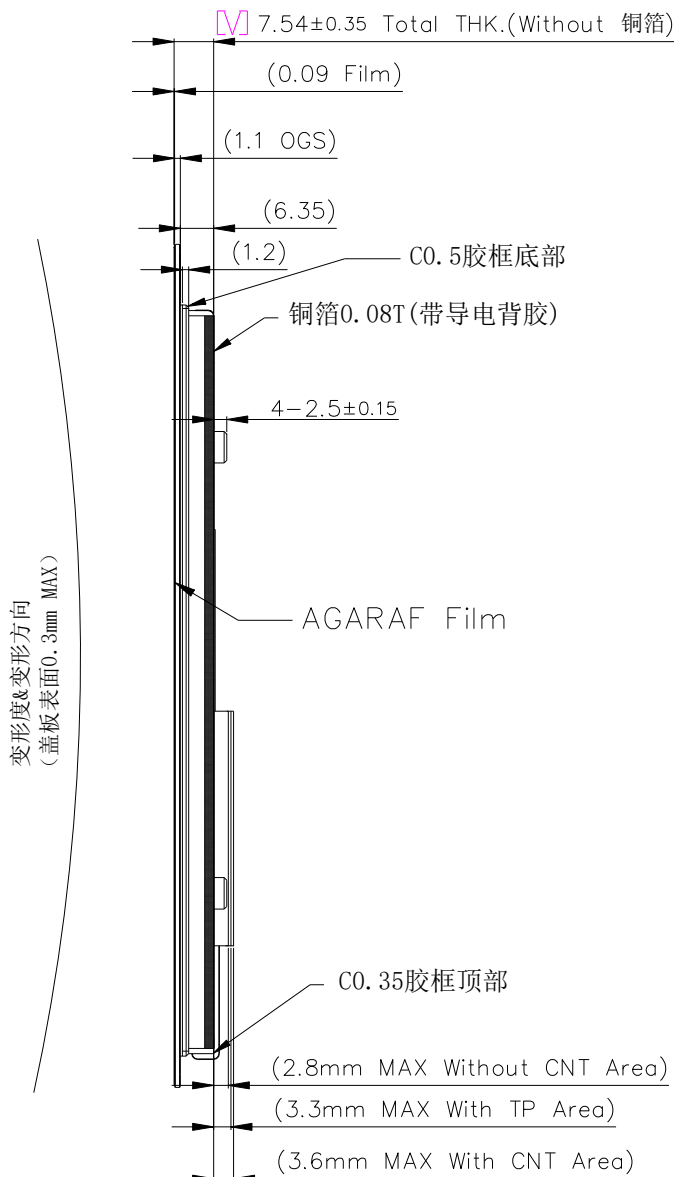
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6.4 Outline (Side)



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7.0 RELIABILITY

Table 7-1 Reliability test

No	Test Items	Conditions	Remark
1	High temperature storage test	Ta = 90 °C, 600 hrs	
2	Low temperature storage test	Ta = -40 °C, 600 hrs	
3	High temperature operation test	Ta = 85°C, 600 hrs	
4	Low temperature operation test	Ta = -30 °C, 600 hrs	
5	High temperature & high humidity operation test	Ta = 60 °C, 90%RH, 600 hrs	
6	Thermal shock	Ta = -40 °C ↔ 85 °C (1 hr), temp change < 30s, 120 cycle	
7	Image Sticking	Burn in 6*6 chess, 1h@65°C, inspection pattern 50% grey, perpendicular, after 30s≤L1	Note3
8	ESD test	Air Voltage:±15KV classB Contact Voltage:±8KV classB R: 330Ω C: 150pF Air Voltage: ±4/6KV 待测试后确认 Contact Voltage: ±4/6KV待测试后确认 R: 330Ω C: 150pF	Note2
9	整机振动测试	产品按Q/BYDQ-A1901.707.3—2018中4.1.3.1.3乘用车车身配件的振动试验的要求进行振动试验, (旋转多媒体时,横屏和竖屏状态都要做;分两组实验),振动时所使用的温度变化循环曲线按Q/BYDQ-A1901.707.3—2015中4.1.1.4图1的要求进行试验, Top.min=-30°C,Top.max=70°C。加速度有效值:27.4m/s ² ; 频率从5Hz~2000Hz。试验后产品应满足功能状态A的要求。	BOE不单独做该项测试。由客户端整机做测试,如客户端整机测试出现问题,BOE协助改善。具体测试要求见文末附件1.比亚迪整机测试要求..

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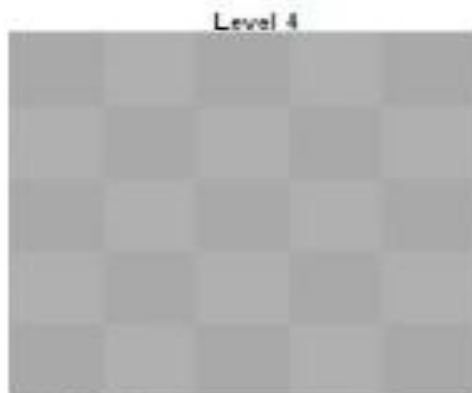
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- Note :
1. After the reliability test, the product only guarantee function normally without any fatal defect (non-display, line defect, abnormal display etc).
 2. CLASSB, 有异常, 可恢复, 比如闪屏。
因为整机ESD水平不仅与模组相关, 也与系统相关, 如果客户在做整机ESD测试时出现问题并与TLCM相关, BOE承诺配合客户进行ESD改善。

3.



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8.0 Packing

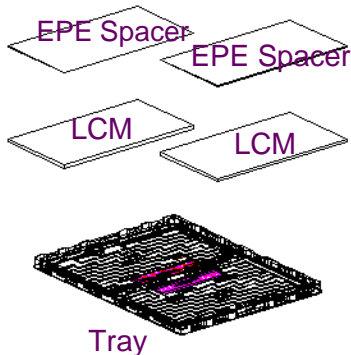
8.1. Packing Description

- Put a LCM into a Tray

Put an EPE Spacer on surface of each LCM

- Capacity: 2pcs / Tray

1



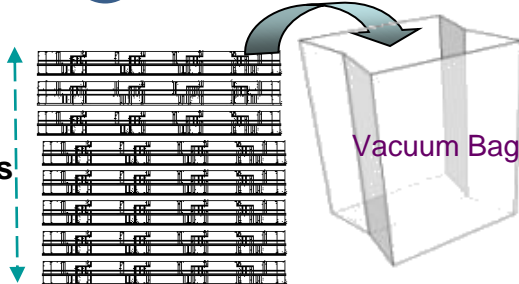
- Put 9pcs PET Trays into a Vacuum Bag

- (Include: put an empty Tray on top)

2



9Layers



- Put all PET Trays with Vacuum Bags into an Inner Box.

3

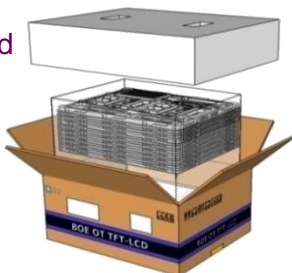
Put an EPE Board on top and an EPE Board on bottom.

- Capacity: 16pcs modules / Inner Box



EPE Board

Inner Box



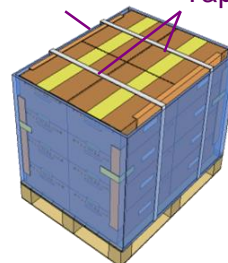
4

- 12 (2*2*3) Inner Boxes / Pallet

- Capacity: 192pcs/Pallet



Corner Tape



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9.0 PRODUCT SERIAL NUMBER

AV101HDM-N10	B2	 MADE IN CHINA
 XXXX XXXXXXXXXXXXXXXXXXXXX	 XX-XXXXXX-XXXXX-XXX-XXXX	



- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Control Number 2. Rank / Grade 3. Line Classification 4. Year (2001 : 01, 2002 : 02, ...) | <ul style="list-style-type: none"> 5. Month (1,2,3, ... , 9, X, Y, Z) 6. Internal Use 7. Serial Number |
|---|---|

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10.0 PRECAUTIONS

10.1 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 PCB or 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 PCB or 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.
- (14) The ITO pad area needs special careful caution because it could be easily corroded. Do not contact the ITO pad area with HCFC, Soldering flux, Chlorine, Sulfur, saliva or fingerprint. To prevent the ITO corrosion, customers are recommended that the ITO area would be covered by UV or silicon.

注：① (4)(6)(7)(8) 涉及到Pol相关条目适用于OC/MDL出货产品，针对Q/Single建议改为LCD surface

②第(14)条适用于Q/Single出货产品

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10.2 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 PCB 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.

注：①(1)涉及到Pol相关条目适用于OC/MDL出货产品，针对Q/Single建议改为LCD surface
②(6)(7)涉及到connector相关适用于MDL出货产品

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10.3 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 or other conductivity-treated fibers.

10.4 Precautions for Strong Light Exposure

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.

10.5 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°C~ 40°C, 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.

10.6 Handling Precautions for Protection Film (不适用于Q/Single出货产品)

- (1) Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, If possible, under ESD control device like ion 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.

10.7 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.

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- (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 mean malfunction 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.

10.8 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) In order to prevent potential problems, flicker should be adjusted by optimizing the Vcom value in customer LCM. (适用于Q panel/single/OC出货)
- (3) 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.
- (4) For the crash damaged or unnecessary LCD, it is recommended to wash off liquid crystalby either of solvents such as acetone and ethanol an should be burned up later.
- (5) 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.
- (6) If the liquid crystal should get in your eyes, flush your eyes with running water for at least fifteen minutes.
- (7) Client needs to add heat dissipation design , such as fan, water cooling , etc.
- (8) After assembling into modules, guarantee that the temperature rise of panel surface does not exceed 20 C at room temperature.
- (9) Customers need to drive current down according to derating curve.

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附件1



比亚迪振动测试条件