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ITEM	SIGNATURE	ITEM	S	GIGNATUR	E			
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BEIJING BOE SPECIAL DISPLAY TECHNOLOGY

Approved

王成群

Countersigned

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刘俊国

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1.0 GENERAL DESCRIPTION

1.0.1 Introduction

TDA201-001V03 is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 20.1 inch diagonally measured active area with UXGA resolutions (1600 horizontal by 1200 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in 2 domain stripe and this module can display 16.7M colors. The TFT-LCD panel used for this module is adapted for a low reflection and higher color type.



1.0.2 Features

- High luminance
- High contrast ratio, wide viewing angle
- Wide operating temperature
- LVDS interface
- RoHS Compliant

1.0.3 Application

- TFT-LCD Monitor
- Industrial
- Vehicle

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1.0.4 General Spec	ification							
< Table 1. General Specifications >								
Parameter	Spe	Specification			Remarks			
Active area	408.0 (H) × 306.0	408.0 (H) $ imes$ 306.0(V)						
Number of pixels	1600(H) × 1200(V	1600(H) × 1200(V)						
Pixel pitch	0.065(H) × 0.065	(V)		mm				
Pixel arrangement	RGB 2 domain strip	be						
Display colors	16.7M			Colors	8bit			
Display mode	Normally Black							
Dimensional outline	432.0 (H) × 331.5	(V) $ imes$ 19.5(D)	typ.	mm	6max			
Weight	≤2.75	≤2.75						
Surface treatment	Haze 25%, 3H							
LED life	30,000	30,000 hr						
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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.

< Table 2. LCD Module Electrical Specifications > $[Ta = 25 \pm 2 \degree C]$

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage (LCD Module)	V_{DD}	11.5	12.5	V	
Back-light LED Forward Current	۱ _۴	-	120	mA	One LED
Back-light LED Pulse Forward Current	I _{FP}	-	240	mA	One LED
Operating Temperature	T _{OP}	-30	+70	°C	Noto 1
Storage Temperature	Τ _{ST}	-55	+85	°C	INULE. I

Note : 1) Temperature and relative humidity range are shown in the figure below. Wet bulb temperature should be 39 $^{\circ}$ C max. and no condensation of water.



A4(210 X 297)

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3.0 ELECTRICAL SPECIFICATIONS

3.0.1 TFT LCD Module

< Table 3. LCD Module Electrical Specifications > $[Ta = 25 \pm 2 \degree C]$

Values Symbol Unit Parameter Notes Min Тур Max Power Supply Input Voltage V_{DD} V 11.5 12 12.5 Note 1 **Power Supply Current** 220 450 I_{DD} mΑ -Differential input common V_{IH}=100mV, 1.2 V V_{com} 0.7 1.6 mode voltage V_{II} =-100mV P_n 3 3.5 W -**Power Consumption** 25 P_{BL} W 19 -P_{total} 22 29 W _

- Notes : 1. The supply voltage is measured and specified at the interface connector of LCM. The current draw and power consumption specified is for 5V at 25 °C Max value at White Pattern
 - 2. Calculated value for reference (VLED X ILED)

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3.2 Back-light Unit

< Table 4. LED Driving guideline specifications > Ta=25+/-2°C

Parameter		Min.	Тур.	Max.	Unit	Remarks
LED Forward Voltage	V _F	2.8	-	3.4	V	-
LED Forward Current	۱ _۶	-	120	-	mA	Single Channel
LED Power Consumption	P_{LED}	-	-	30.6	W	Note 1
LED Life-Time	N/A	30000			Hour	IF = 120mA Note 2
Power supply voltage for Back light	V_{LED}	42	46.5	51	V	
Power supply Current for Back light	I _{LED}	-	0.6	1.3	A	

Notes : 1. Calculator Value for reference $\rm I_F \times \rm V_F$ x15= $\rm P_{LED}$

2. The LED Life-time define as the estimated time to 50% degradation of initial luminous.

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4.0 OPTICAL SPECIFICATION

4.0.1 Overview

The test of view angle range shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = $25\pm2^{\circ}$ C) with the equipment of Luminance meter system (PR-655 and CS-2000A) 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°. We refer to $\theta_{\emptyset}=0$ (= θ_3) as the 3 o'clock direction (the "right"), $\theta_{\emptyset}=90$ (= θ_{12}) as the 12 o'clock direction ("upward"), $\theta_{\emptyset}=180$ (= θ_9) as the 9 o'clock direction ("left") and $\theta_{\emptyset}=270$ (= θ_6) as the 6 o'clock direction ("bottom"). While scanning θ and/or \emptyset , the center of the measuring spot on the Display surface shall stay fixed. The luminance, color and uniformity (etc) should be tested by CS-2000A. The backlight should be operating for 10 minutes prior to measurement. VDD shall be 5 \pm 0.5V at 25°C. Optimum viewing angle direction is 6 'clock

Param	eter	Symbol	Condition	Min.	Тур.	Max.	Unit	Remark
	Horizontal	Θ_3		85	-	-	Deg.	
Viewing Angle range	HUHZUHlai	Θ	CP > 10	85	-	-	Deg.	Note 1
	Vertical	Θ_{12}	CK 2 10	85	-	-	Deg.	NOLE I
	ventical	Θ_6		85	-	-	Deg.	
Luminance Co	ntrast ratio	CŘ	Θ = 0°	600	800	-		Note 2
Luminance of White	Center 1point	Y _w		800	900	-	cd/m ²	Note 3
White Luminance uniformity	9 Points	ΔΥ9	Θ = 0°	80	-	-	%	Note 4
Reproduction	\//bito	Wx	$\mathbf{O} = \mathbf{O}$	Тур.	0.313	Тур.		Niete E
of color	vvnite	Wy	$\Theta = 0^{\circ}$	-0.03	0.339	+0.03		note 5
Response Time		T _{RT}	Ta= 25° C Θ = 0°	-	-	25	ms	Note 6
Colour Gamut			NTSC 1976	68	72	-	%	

<table 5.<="" th=""><th>Optical S</th><th>Specifications></th></table>	Optical S	Specifications>
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- Notes : 1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles 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 (see FIGURE 1).
 - Contrast measurements shall be made at viewing angle of Θ= 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 1) Luminance Contrast Ratio (CR) is defined mathematically.

Luminance when displaying a white raster

CR =

Luminance when displaying a black raster

- 3. Luminance of white is defined as luminance values of 9point max across 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 2 for a total of the measurements per display. The luminance is measured by BM-5A when the LED current is set at 60mA.
- The White luminance uniformity on LCD surface is then expressed as : ΔY = Minimum Luminance of 9 points / Maximum Luminance of 9 points (see FIGURE 2).
- 5. The color chromaticity coordinates specified in Table 5. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.
- The electro-optical response time measurements shall be made as FIGURE 3 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.
- Cross-Talk of one area of the LCD surface by another shall be measured by comparing the luminance (YA) of a 25mm diameter area, with all display pixels set to a gray level, to the luminance (YB) of that same area when any adjacent area is driven dark. (See FIGURE 4).



View angel range, uniformity, etc. measurement setup Flicker, measurement setup

Figure 2. White Luminance and Uniformity Measurement Locations (9 points)



Luminance of white is defined as luminance values of max 9 points across 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 2 for a total of the measurements per display.

The White luminance uniformity on LCD surface is then expressed as : Δ Y9 = Minimum Luminance of 9 points / Maximum Luminance of 9 points (see FIGURE 2).



The electro-optical response time measurements shall be made as shown in FIGURE 3 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr and 90% to 10% is Td.

Figure 4. Cross Modulation Test Description



Where:

YA = Initial luminance of measured area (cd/m2)

YB = Subsequent luminance of measured area (cd/m2)

The location measured will be exactly the same in both patterns

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5.0 INTERFACE C 5.0.1 Electrical Inter Interface Connect HF11 (JAE);12V input The connector int	CONNECTION. rface Connection tor: 30 pin LVDS connection t power supply. terface pin assignment	ector F76LARW s are listed in Ta	/-30S-1H (HIROS able 6.	SE) or FI-XB30SRL-

<Table 6. Pin Assignments for the Interface Connector>

Pin No.	Symbol	Functions	Pin No.	Symbol	Functions
1	VCC	+12V power supply	16	RBIN0-	LVDS EVEN Data0-
2	VCC	+12V power supply	17	VSS	GND
3	VCC	+12V power supply	18	VSS	GND
4	VCC	+12V power supply	19	RAIN3+	LVDS ODD Data3+
5	VSS	GND	20	RAIN3-	LVDS ODD Data3-
6	VSS	GND	21	CKAIN+	LVDS ODD Clock+
7	RBIN3+	LVDS EVEN Data3+	22	CKAIN-	LVDS ODD Clock-
8	RBIN3-	LVDS EVEN Data3-	23	RAIN2+	LVDS ODD Data2+
9	CKBIN+	LVDS EVEN Clock+	24	RAIN2-	LVDS ODD Data2-
10	CKBIN-	LVDS EVEN Clock-	25	RAIN1+	LVDS ODD Data1+
11	RBIN2+	LVDS EVEN Data2+	26	RAIN1-	LVDS ODD Data1-
12	RBIN2-	LVDS EVEN Data2-	27	RAIN0+	LVDS ODD Data0+
13	RBIN1+	LVDS EVEN Data1+	28	RAIN0-	LVDS ODD Data0-
14	RBIN1-	LVDS EVEN Data1-	29	VSS	GND
15	RBIN0+	LVDS EVEN Data0+	30	NC	No connection

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Interface Connector: The connector of BLU H112K-P06N-11B



<Table 7. Pin Assignments for the Interface Connector of LED

Pin No	Symbol	Description
1	VLED	LED power supply
2	IRLED1	LED current sense for string1
3	IRLED2	LED current sense for string2
4	IRLED3	LED current sense for string3
5	IRLED4	LED current sense for string4



Display Position of Input Data (V-H)

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6.0 SIGNAL TIMING SPECIFICATION

6.0.1 The TDA201-001V03 is operated by the DE only.

Daramatar	Symbol		Value		Unit
Parameter	Symbol	Min.	Тур.	Max.	Unit
Clock Frequency	1/Tclock	75.7	90	113.6	Mhz
Horizontal active timing	HVD	-	1600	-	Clocks
Hsync pulse width	HSW	-	192	-	Clocks
Horizontal Back porch	HBP	-	560	-	Clocks
Horizontal front porch	HFP	-	64	-	Clocks
Vertical active timing	VVD	-	1200	-	Lines
Vsync pulse width	VSW	-	3	-	Lines
Vertical Back porch	VBP	-	50	-	Lines
Vertical front porch	VFP	-	1	-	Lines

6.0.2 Timing diagrams of interface signal



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	L	CM PRODU	СТ						P0.1 2015.12.2																		
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	7.0 INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS																										
	Color & Gray Scale																										
	Color & G	Gray Scale			R	led	Dat	ta			Inj	put	Da Gr	ta S ·eer	Sigr Di Di	1al ata					B	lue	Da	ta			
	Color & G	Gray Scale	 R7	R6	R5	R4	Dat R3	ta R2	R1	R0	Inj G7	put G6	Da Gr G5	ta S eer G4	Sign Da G3	nal ata G2	G1	G0	B7	B6	B B5	lue B4	Da B3	ta B2	B1	B0	
	Color & G	Gray Scale Black	R7 0	R6 0	R 5 0	ed R4 0	Dat R3 0	ta R2 0	R1 0	R0 0	Inj G7 0	put G6 0	Da Gr G5 0	ta S eer G4 0	G3	nal ata G2 0	G1 0	G0 0	B7 0	B6 0	B B5 0	lue B4 0	Da B3 0	ta B2 0	B1 0	B0 0	
	Color & C	Gray Scale Black Blue	R7 0 0	R6 0 0	R5 0	Red R4 0	Dat R3 0	ta R2 0	R1 0 0	R0 0 0	In G7 0	G 6 0	Da Gr G5 0	ta S eer G4 0	Sign D G 0 0	nal ata G2 0 0	G1 0 0	G0 0 0	B7 0 1	B6 0 1	B B5 0 1	lue B4 0	Da B3 0	ta B2 0 1	B1 0 1	B0 0 1	
	Color & G	Gray Scale Black Blue Green	R7 0 0 0	R6 0 0	R5 0 0	Red R4 0 0 0	Dat R3 0 0	ta R2 0 0	R1 0 0	R0 0 0	In G7 0 1	G6 0 0	Da Gr G5 0 0 1	ta S eer G4 0 1	Sign D G 3 0 1	nal ata G2 0 0	G1 0 1	G0 0 1	B7 0 1 0	B6 0 1 0	B B5 0 1 0	lue B4 0 1	Da B3 0 1	ta B2 0 1 0	B1 0 1 0	B0 0 1 0	
	Color & G	Black Blue Green Cyan	R7 0 0 0 0	R6 0 0 0	R5 0 0 0 0	ed R4 0 0 0 0	Dat R3 0 0 0	ta R2 0 0 0	R1 0 0 0	R0 0 0 0	In G7 0 1 1	G6 0 1 1	Da Gr G5 0 0 1 1	ta \$ ceer G4 0 1 1	G 3 0 0 1	ata G2 0 1 1	G1 0 1 1	G0 0 1 1	B7 0 1 0 1	B6 0 1 0 1	B 0 1 0 1	lue B4 0 1 0 1	Da B3 0 1 0 1	ta B2 0 1 0 1	B1 0 1 0 1	B0 0 1 0 1	
	Color & G	Black Blue Green Cyan Red	R7 0 0 0 0 1	R6 0 0 0 1	R5 0 0 0 0	R4 0 0 0 0 1	Dat R3 0 0 0 0 1	ta R2 0 0 0 0 1	R1 0 0 0 1	R0 0 0 0 1	In G7 0 1 1 0	G6 0 1 1 0	Da G1 G5 0 0 1 1 0	ta \$ eer G4 0 1 1 0	D ign D i G 3 0 0 1 1 0	ata G2 0 1 1 0	G1 0 1 1 0	G0 0 1 1 0	B7 0 1 0 1 0	B6 0 1 0 1 0	B 0 1 0 1 0	lue B4 0 1 0 1 0	Da B3 0 1 0 1 0	ta B2 0 1 0 1 0	B1 0 1 0 1 0	B0 0 1 0 1 0	
	Color & C	Black Blue Green Cyan Red Magenta	R7 0 0 0 1 1	R6 0 0 0 1 1	R5 0 0 0 1 1	Rd R4 0 0 1	Dat R3 0 0 0 1 1	ta R2 0 0 0 1 1	R1 0 0 0 1 1	R0 0 0 0 1 1	Inj G7 0 1 1 0 0	G6 0 1 1 0 0	Da Gr G5 0 1 1 0 0 0	ta S eer G4 0 1 1 0 0	D iana D ian	nal G2 0 1 1 0 0	G1 0 1 1 0 0	G0 0 1 1 0 0	B7 0 1 0 1 0 1	B6 0 1 0 1 0 1	B 0 1 0 1 0 1	Image: blue B4 0 1 0 1 0 1 0 1	Da B3 0 1 0 1 0 1 0	ta B2 0 1 0 1 0 1	B1 0 1 0 1 0 1	B0 0 1 0 1 0 1	
	Color & C Basic Colors	Black Blue Green Cyan Red Magenta Yellow	R7 0 0 0 1 1 1 1	R6 0 0 0 1 1 1 1	R5 0 0 0 1 1 1	R4 0 0 0 1 1	Dat R3 0 0 0 1 1 1	ta R2 0 0 0 1 1 1	R1 0 0 0 1 1 1	R0 0 0 0 1 1 1	Inj G7 0 1 1 0 0 1	G6 0 1 1 0 0 1	Da Gr G5 0 0 1 1 0 0 1	ta S G4 0 1 1 0 0 1	Sign G G O O I I O I I O I I I I I I I I	nal ata G2 0 1 1 0 0 1 1 0 1	G1 0 1 1 0 0 1	G0 0 1 1 0 0 1	B7 0 1 0 1 0 1 0	B6 0 1 0 1 0 1 0	B 5 0 1 0 1 0 1 0	Image: blue B4 0 1 0 1 0 1 0 1 0	Da B3 0 1 0 1 0 1 0	ta B2 0 1 0 1 0 1 0	B1 0 1 0 1 0 1 0	B0 0 1 0 1 0 1 0	

Dasic Colors	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
	Magenta	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
	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
	\bigtriangleup	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale	\bigtriangleup				,	1							,	1							,	Ì			
of Red	\bigtriangledown				,	ļ							,	Ļ								-			
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	\bigtriangledown	1	1	1	1	1	1	1	0	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
	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
	\bigtriangleup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Gray Scale	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
of Green	\bigtriangleup				,	1							,	1							,	1			
01 Ofeen	\bigtriangledown					ļ								Ļ											
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	\bigtriangledown	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	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
	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
	\bigtriangleup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Gray Scale	\bigtriangleup				,	1							,	1							,	1			
of Blue	\bigtriangledown					ļ								Ļ											
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	\bigtriangledown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	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
	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
	\bigtriangleup	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Grav Scale	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
of White	\bigtriangleup				,	1							,	1								1			
of white	\bigtriangledown					ļ								Ļ											
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	\bigtriangledown	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	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

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8.0 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 ms ≤ T1 ≤10 ms
- 0 ≤ T2 ≤ 50 ms
- 0 ≤ T3 50 ms
- 1 sec ≤ T4
- 200 ms ≤ T5
- 200 ms ≤ T6

Notes:

- 1. When the power supply VDD 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.

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9.0 MECHANICAL CHARACTERISTICS

9.0.1 Dimensional Requirements

Parameter	Specification		
Active Area	408 (H) $ imes$ 306(V)	mm	
Number of pixels	1600(H) X1200 (V) (1 pixel = R + G + B dots)	pixels	
Pixel pitch	0.065(H) $ imes$ 0.065(V)	mm	
Pixel arrangement	RGB 2 domain stripe		
Display colors	16.7M (8bit)	colors	
Display mode	Normally Black		
Dimensional outline	432 (H) $ imes$ 331.5(V) $ imes$ 19.5(D) (typ.)	mm	
Weight	2.75	kg	
Back-light	Edge side, 1-LED Lighting Bar Type		
LED life	30,000	hr	

<Table 8. Dimensional Parameters>

9.0.2 Mounting

See FIGURE 5&6.

9.0.3 Glare and Polarizer Hardness.

The surface of the LCD has a hard coating to reduce scratching.

9.0.4 Light Leakage

There shall not be obvious light from the back-lighting system around the edges of the screen as seen from a distance 50cm from the screen with an overhead light level of 150lux.

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10.0 RELIABILITY TEST

The Reliability test items and its conditions are shown in below.

<Table 9. Reliability test>

ltem	Test condition	
High temperature stora	85 ℃, 48 hrs	
Low temperature storage	-55 ℃, 24 hrs	
High temperature & high humidit	40℃,90%-95%RH, 96hrs	
High temperature operat	tion	70 ℃, 2hrs
Low temperature operat	-30℃, 2hrs	
Thermal shock	-55 °C ↔ 85 °C (2 hr), 5 cycles	
High Temperature and Stable State		70 ℃, 96hrs
Vibration test	Frequency	10~57Hz,amplitude : ±0.075mm ; 57~500Hz , acceleration : 10m/s ²
	Period	$\pm X$, $\pm Y$, $\pm Z$ 1h/direction
	Gravity	500m/s ²
Shock test	Pulse width	11msec, half-sine wave
	Direction	±X, ±Y, ±Z 3times/direction
ESD	Air	±4k
	Contact	±4k

Note1:

2hr is keeping temperature time,When the temperature reach -55 $^\circ\! {\rm C}$ or 80 $^\circ\! {\rm C}\,$;

Note2:

ESD Test based on GB/T17626 , Store capacitance is 15pF.Released resistance is 330Ω

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11.0 HANDLING & CAUTIONS							
 (1) Cautions when taking out the module Pick the pouch only, when taking out module from a shipping package. (2) Cautions for handling the module As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible. As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD module should be avoided. As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning. Do not pull the interface connector in or out while the LCD module is operating. Put the module display side down on a flat horizontal plane. Handle connectors and cables with care. (3) Cautions for the operation When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged. 							
 (4) Cautions for the atmosphere Dew drop atmosphere should be avoided. Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended. 							
(C) Coutions for the m	ممثلمات ملمم وممام ماريام مم				I. I		

- (5) Cautions for the module characteristicsDo not apply fixed pattern data signal to the LCD module at product aging.
 - Applying fixed pattern for a long time may cause image sticking.
- (6) Other cautions
 - Do not disassemble and/or re-assemble LCD module.
 - Do not re-adjust variable resistor or switch etc.
 - When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.









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