

产品规格书

Product Specification

产品名
Product

TFT-LCD Module

机种名
Model

M185B30-056-186-0602

Record of Revisions

Rev.	Date	Sub-Model	Description of change
00	2020.09.02		N/A

General Description

1.1 Introduction

M185B30-56-186-0601 is a color active matrix TFT LCD open cell using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This open cell has a 18.5 inch diagonally measured active area with HD resolutions (1366 horizontal by 768 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors. The TFT-LCD panel used for this OC is adapted for a low reflection and higher color type.

1.2 Features

- LVDS Interface with 1 pixel / clock
- High-speed response
- 6-bit (Hi-FRC) color depth, display 16.7M colors
- High luminance and contrast ratio, low reflection and wide viewing angle
- DE (Data Enable) only
- RoHS/Halogen Free
- Gamma Correction
- Reverse type

1.3 Application

- Desktop Type of PC & Workstation Use
- Slim-Size Display for Stand-alone Monitor
- Display Terminals for Control System
- Monitors for Process Controller

General Information

Parameter	Specifications	Unit
Active area	409.8 (H) × 230.4 (V)	mm
Pixel Format	1366 (H) × 768 (V) 1pixel = R + G + B dot)	pixel
Pixel configuration	R, G, B vertical stripe	
Display mode	Normally Black	
Center Luminance of white	300(TYP)	Cd/m ²

Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	430.23	430.73	431.23	mm	
	Vertical(V)	254.1	254.6	255.1	mm	
	Depth(D)	8.25	8.55	8.85	mm	

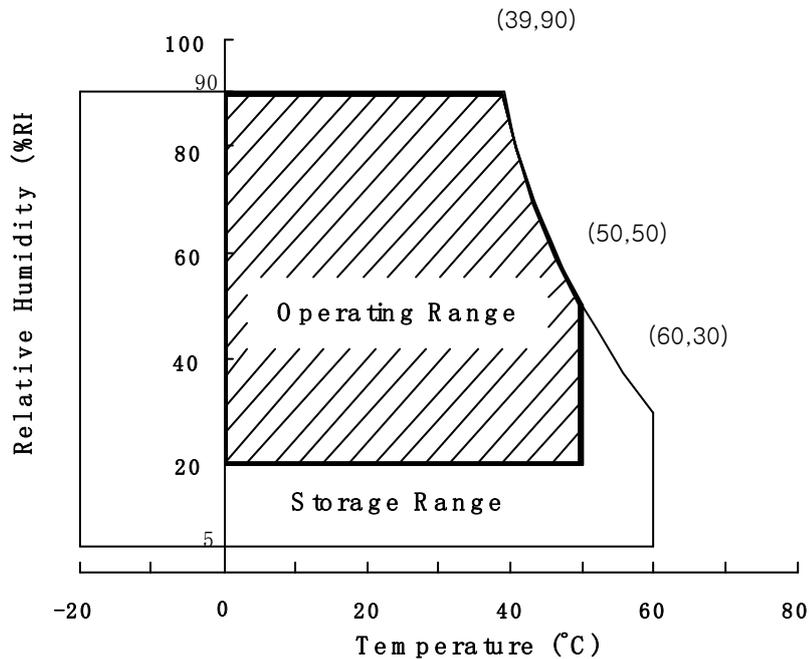
2.0 ABSOLUTE MAXIMUM RATINGS

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. Absolute Maximum Ratings > [VSS=GND=0V]

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	-0.3	5.5	V	Ta = 25 °C
Logic Supply Voltage	V_{IN}	VSS-0.3	$V_{DD}+0.3$	V	
Operating Temperature	T_{OP}	0	+50	°C	1)
Storage Temperature	T_{ST}	-20	+60	°C	1)

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



3.Optical Characteristics

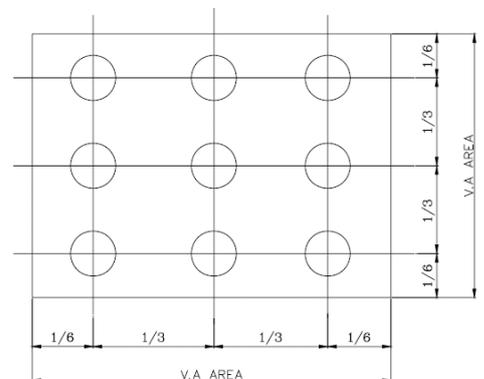
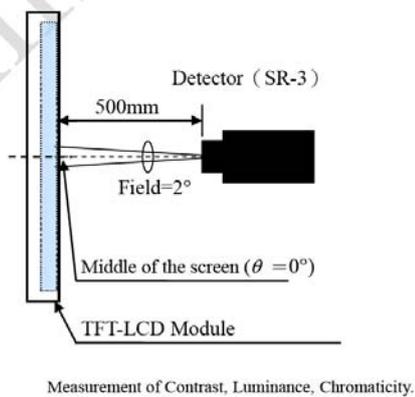
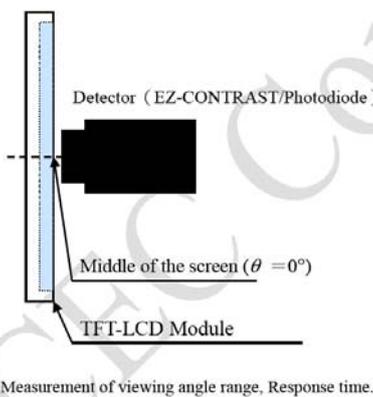
Ta = 25°C, Vcc = +12V, VINV = +24V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	$\theta_{21} + \theta_{22}$	CR>10	170	178	-	Deg.	[Note1,4]
	Vertical	$\theta_{11} + \theta_{12}$		170	178	-	Deg.	
Contrast ratio CR			$\theta = 0 \text{ deg.}$	700	1000	-	-	[Note2,4]
Response time		$T_r + T_f$		-	5	8	ms	[Note3,4]
Transmittance		T		-	5.2		%	
Chromaticity of white		x		TYP-0.03	TYP+0.03	0.303	-	[Note4]
		y				0.377	-	
Chromaticity of red		x				T.B.D	-	
		y				T.B.D	-	
Chromaticity of green		x				T.B.D	-	
		y				T.B.D	-	
Chromaticity of blue		x		T.B.D	-			
		y	T.B.D	-				
Center Luminance of white		YL	250	300		cd/m2		
Luminance uniformity		δw	75%	-	--	-		

*The measurement shall be executed 30 minutes after lighting at rating.

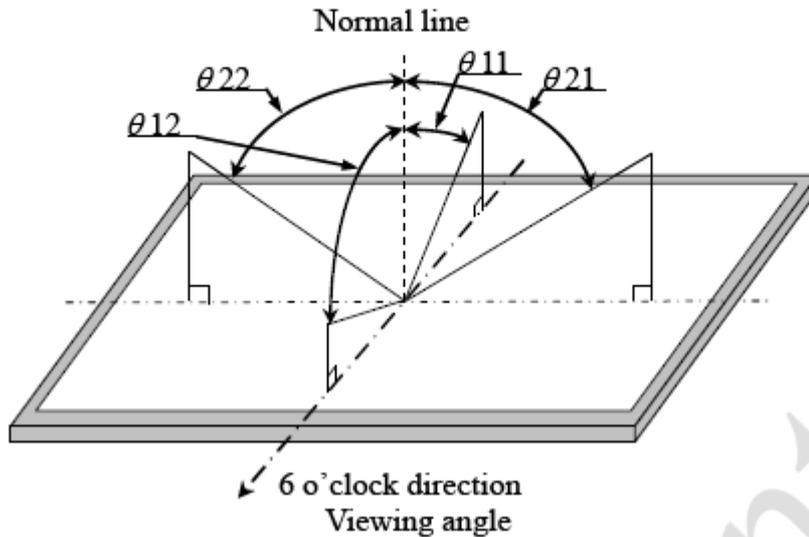
*These values are measured with CPL standard back light unit.

* The optical characteristics are measured using the following equipment.



测试点

[Note 1] Definitions of viewing angle range:



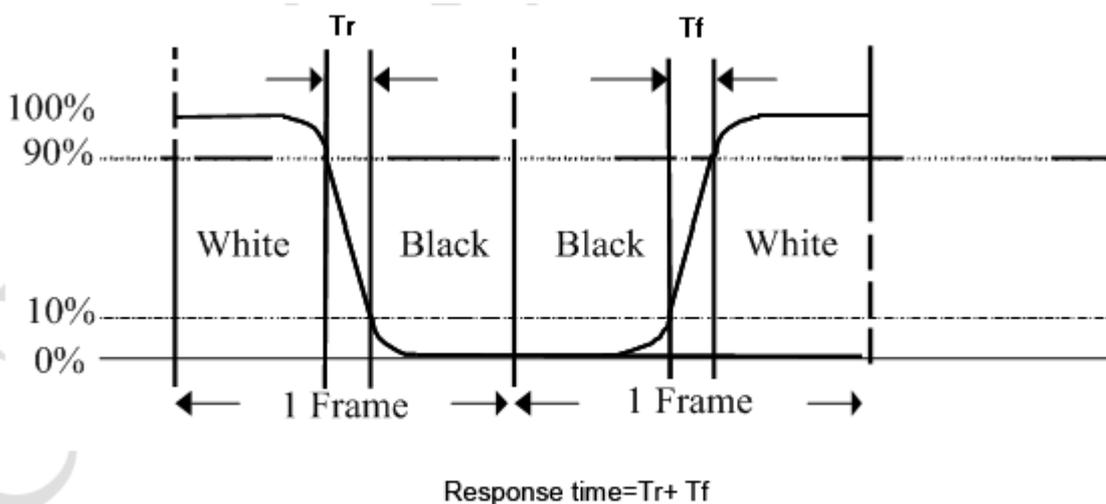
[Note 2] Definition of contrast ratio:

The contrast ratio is defined as the following.

$$\text{Contrast Ratio} = \frac{\text{Luminance (Brightness) with white screen}}{\text{Luminance (Brightness) with black screen}}$$

[Note 3] Definition of response time

The output signals of photo detector are measured when the input signals are changed from "Full White" to "Full Black" (rising time, T_r), and from "Full Black" to "Full White" (falling time, T_f), respectively. The response time is interval between the 10% and 90% (1 frame at 60 Hz) of amplitudes.



[Note 4] This shall be measured at center of the screen.

4.0 ELECTRICAL SPECIFICATIONS

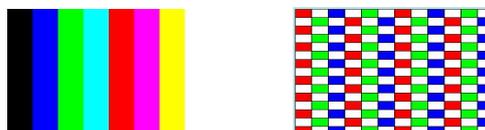
4.1 Electrical Specifications

[Ta =25±2 °C]

Parameter		Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	V _{DD}	4.5	5.0	5.5	V	Note1
Power Supply Current	I _{DD}	-	500	720	mA	
In-Rush Current	I _{RUSH}	-	2.0	3.0	A	Note 2
Permissible Input Ripple Voltage	V _{RF}	-	-	300	mV	Note1,3
High Level Differential Input Threshold Voltage	V _{IH}	-	-	+100	mV	
Low Level Differential Input Threshold Voltage	V _{IL}	-100	-	-	mV	
Differential input voltage	V _{ID}	200	-	600	mV	
Differential input common mode voltage	V _{cm}	1.0	1.2	1.5		V _{IH} =100mV, V _{IL} =-100mV
Power Consumption	P _D	-	2.5	3.6	W	@60Hz

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.
The current draw and power consumption specified is for VDD=5.0V, Frame rate=60Hz
Clock frequency 75.4MHz. Test Pattern of power supply current

- a) Typ : Color Test
- b) Max : Skip Sub-pixel



2. Duration of rush current is about 2 ms and rising time of VDD is 520 μs ± 20 %
3. Ripple Voltage should be covered by Input voltage Spec.

5.1 Back Light Unit

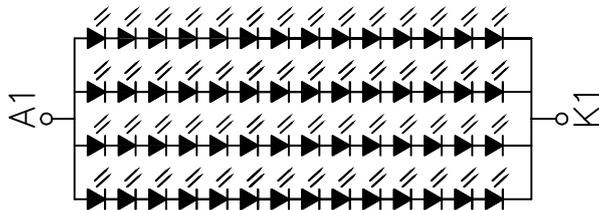
Led Light Bar characteristics

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Light Bar Input Voltage	VLED	39.2	42	49	V	IL=240mA
Light Bar Input Current	ILED		240		mA	(Duty 100%)
Power Consumption	PLED	9.40	10.08	11.76	W	
LED Life Time LBL		30000	50000		Hrs	Note (1)

Note (1). The lifetime is defined as the time which luminance of the LED decays to 50% compared to the initial value, Operating condition: Continuous operating at $T_a = 25 \pm 2^\circ\text{C}$, $I_L = 480\text{mA}$

5.2 . LED LIGHT BAR Electrical Circuit

LED light bar circuit is(4)Parallel (14)Series



6.0 SIGNAL TIMING SPECIFICATION

6.1 The MV185WHB-N20 is operated by the DE only.

Item	Symbols		Min	Typ	Max	Unit
DCLK	Period	tCLK	10.6	13.26	15.91	ns
	Frequency	-	62.9	75.4	94.3	MHz
Horizontal Display Term	Period	tHP	1446	1560	1936	tCLK
	Horizontal Valid	tHV	1366	1366	1366	tCLK
	Horizontal Blank	tHB	80	194	570	tCLK
	Frequency	fH	40.3	48.36	60.45	KHz
Vertical Display Term	Period	tVP	778	806	888	tHP
	Vertical Valid	tVV	768	768	768	tHP
	Vertical Blank	tVB	10	98	120	tHP
	Frequency	fV	50	60	75	Hz
LVDS Receiver clock	Input spread spectrum ratio	SSr	-3	-	+3	%

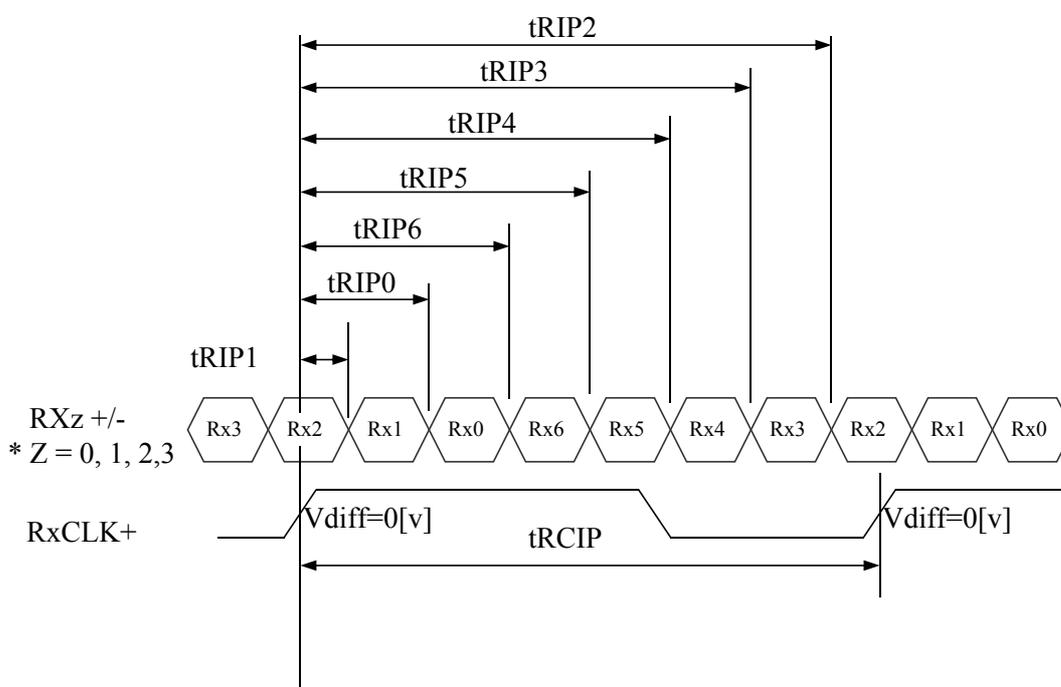
Note: The DCLK range at last line of V-blanking should be set in 0~987

6.2 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in Table 4.

<Table 4. LVDS Rx Interface Timing Specification>

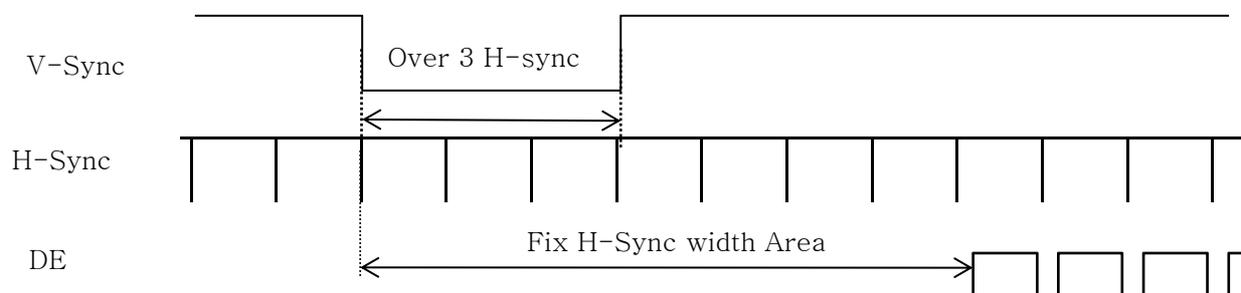
Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	10.60	13.26	15.91	nsec	
Input Data 0	tRIP1	-0.4	0.0	+0.4	nsec	
Input Data 1	tRIP0	tRCIP/7-0.4	tRCIP/7	tRCIP/7+0.4	nsec	
Input Data 2	tRIP6	2 × tRCIP/7-0.4	2 × tRCIP/7	2 × tRCIP/7+0.4	nsec	
Input Data 3	tRIP5	3 × tRCIP/7-0.4	3 × tRCIP/7	3 × tRCIP/7+0.4	nsec	
Input Data 4	tRIP4	4 × tRCIP/7-0.4	4 × tRCIP/7	4 × tRCIP/7+0.4	nsec	
Input Data 5	tRIP3	5 × tRCIP/7-0.4	5 × tRCIP/7	5 × tRCIP/7+0.4	nsec	
Input Data 6	tRIP2	6 × tRCIP/7-0.4	6 × tRCIP/7	6 × tRCIP/7+0.4	nsec	



* Vdiff = RXz+ - RXz- RXCLK+ - RXCLK-

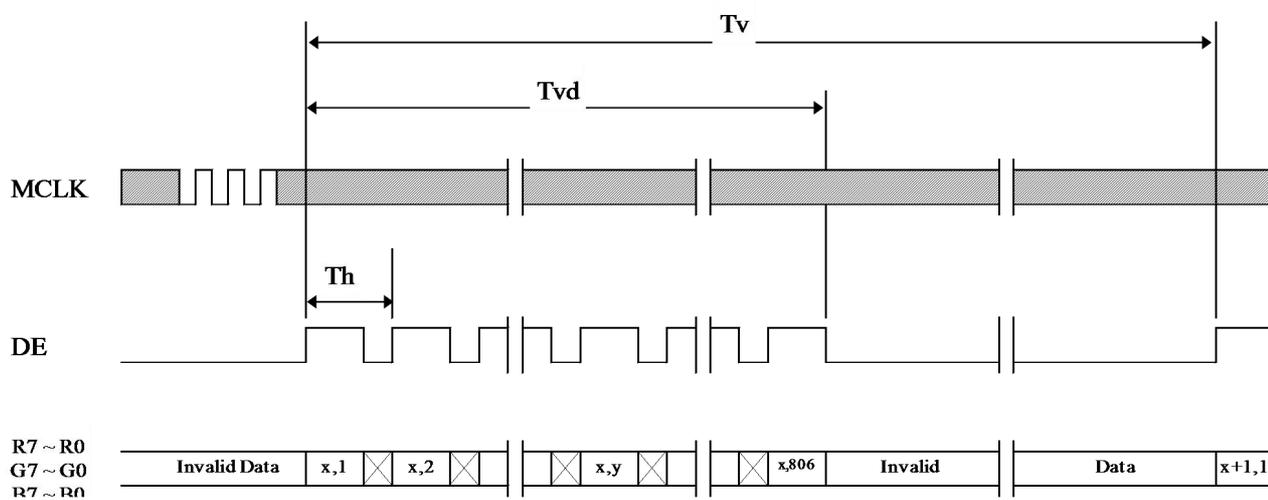
7.0 SIGNAL TIMING WAVEFORMS OF INTERFACE SIGNAL

7.1 Sync Timing Waveforms

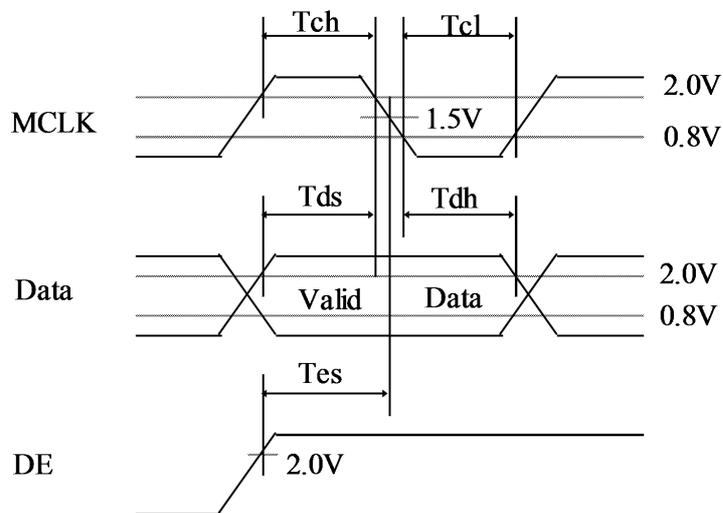
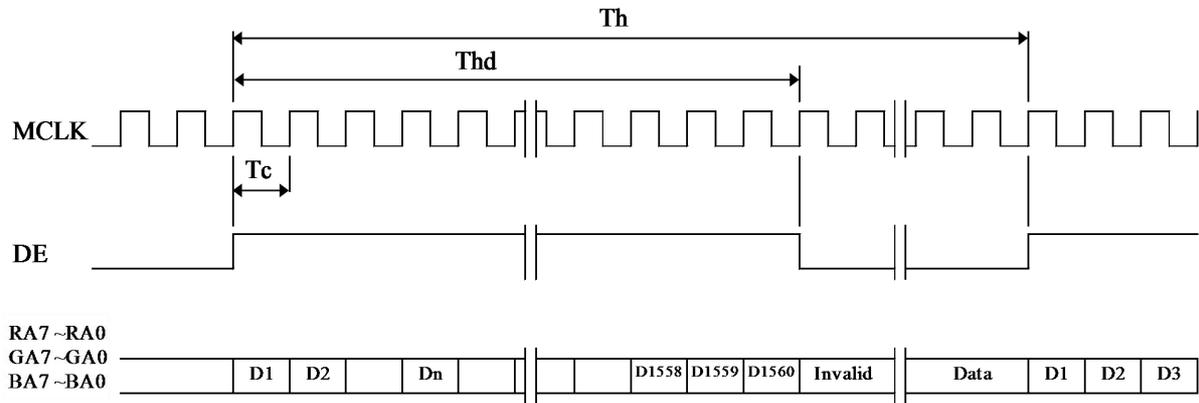


- 1) Need over 3 H-sync during V-Sync Low
- 2) Fix H-Sync width from V-Sync falling edge to first rising edge

7.2 Vertical Timing Waveforms



7.3 Horizontal Timing Waveforms



8.0 INTERFACE CONNECTION.

8.1 Electrical Interface Connection

- CN1 Module Side Connector : UJU IS100-L30R-C23or Equivalent
User Side Connector : JAE FI-X30H or Equivalent

Pin No	Symbol	Function	Remark
1	NC	Not Connect	
2	NC	Not Connect(*Reserved for LCD manufacturer's use)	
3	NC	Not Connect(*Reserved for LCD manufacturer's use)	
4	GND	Power Ground	
5	RX0-	Negative Transmission data of Pixel 0	
6	RX0+	Positive Transmission data of Pixel 0	
7	GND	Power Ground	
8	RX1-	Negative Transmission data of Pixel 1	
9	RX1+	Positive Transmission data of Pixel 1	
10	GND	Power Ground	
11	RX2-	Negative Transmission data of Pixel 2	
12	RX2+	Positive Transmission data of Pixel 2	
13	GND	Power Ground	
14	RXCLK-	Negative Transmission Clock	
15	RXCLK+	Positive Transmission Clock	
16	GND	Power Ground	
17	RX3-	Negative Transmission data of Pixel 3	
18	RX3+	Positive Transmission data of Pixel 3	
19	GND	Power Ground	
20	NC	Not Connect	
21	NC		
22	NC		
23	GND	Power Ground	
24	GND		
25	GND		
26	VDD	Power Supply: +5V	
27	VDD		
28	VDD		
29	VDD		
30	VDD		

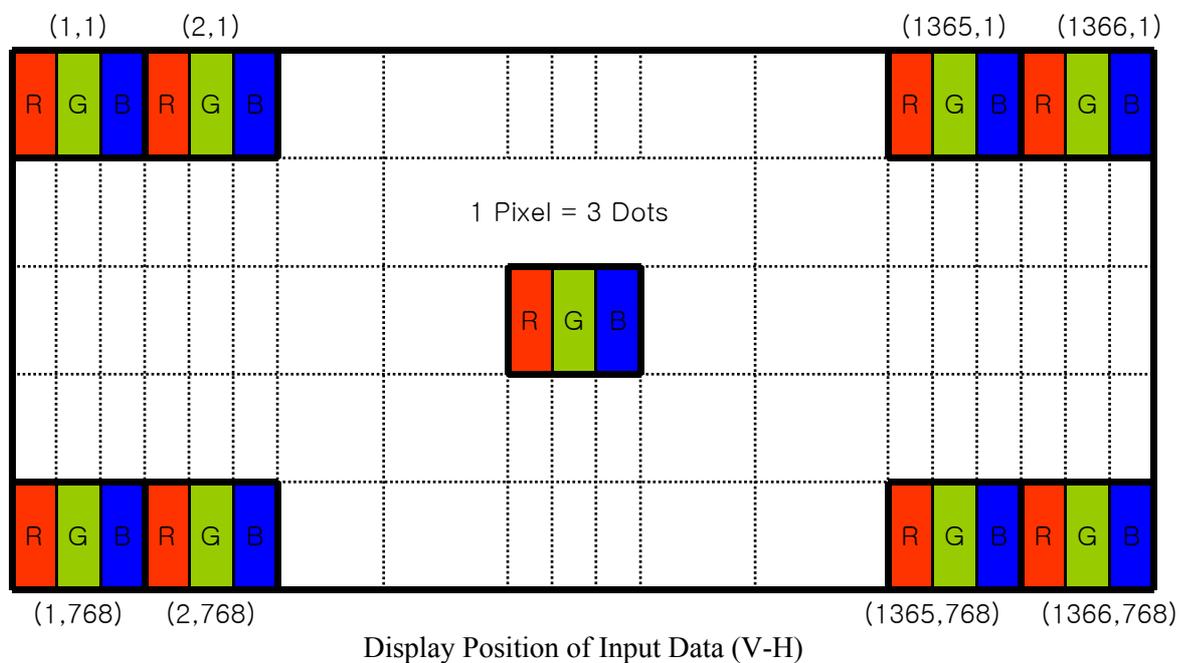
Note 1 : This pin should be connected with GND.

8.2 LVDS Interface (Tx; THC63LVDF83A or Equivalent)

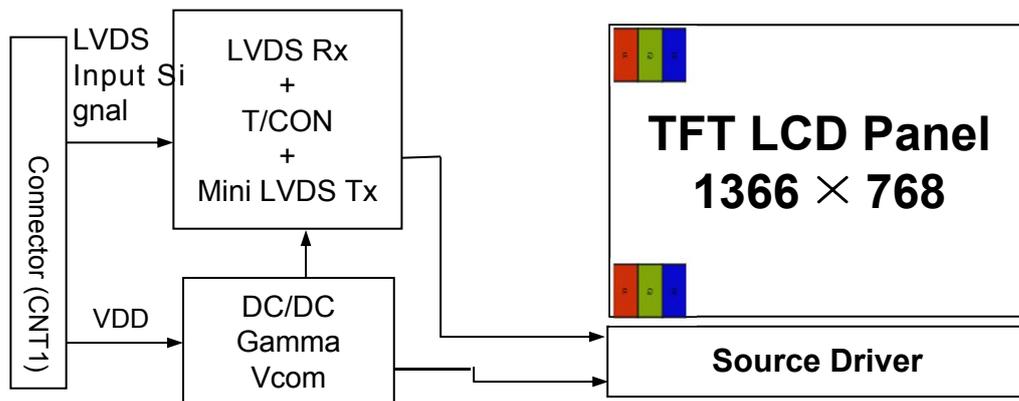
8.2.1 LVDS Interface

	Input Signal	Transmitter		Interface		MV185WHB-N20 (CN11)	Remark
		Pin No.	Pin No.	System (Tx)	TFT-LCD (Rx)	Pin No.	
LVDS	OR0	51	48 47	OUT0- OUT0+	RX0- RX0+	5 6	
	OR1	52					
	OR2	54					
	OR3	55					
	OR4	56					
	OR5	3					
	OG0	4	46 45	OUT1- OUT1+	RX1- RX1+	8 9	
	OG1	6					
	OG2	7					
	OG3	11					
	OG4	12					
	OG5	14					
	OB0	15	42 41	OUT2- OUT2+	RX2- RX2+	11 12	
	OB1	19					
	OB2	20					
	OB3	22					
	OB4	23					
	OB5	24					
	Hsync	27	40 39	CLK OUT- CLK OUT+	RX CLK- RX CLK+	14 15	
	Vsync	28					
	DE	30					
	MCLK	31	38 37	OUT3- OUT3+	RX3- RX3+	17 18	
	OR6	50					
	OR7	2					
	OG6	8					
OG7	10						
OB6	16						
OB7	18						
RSVD	25						

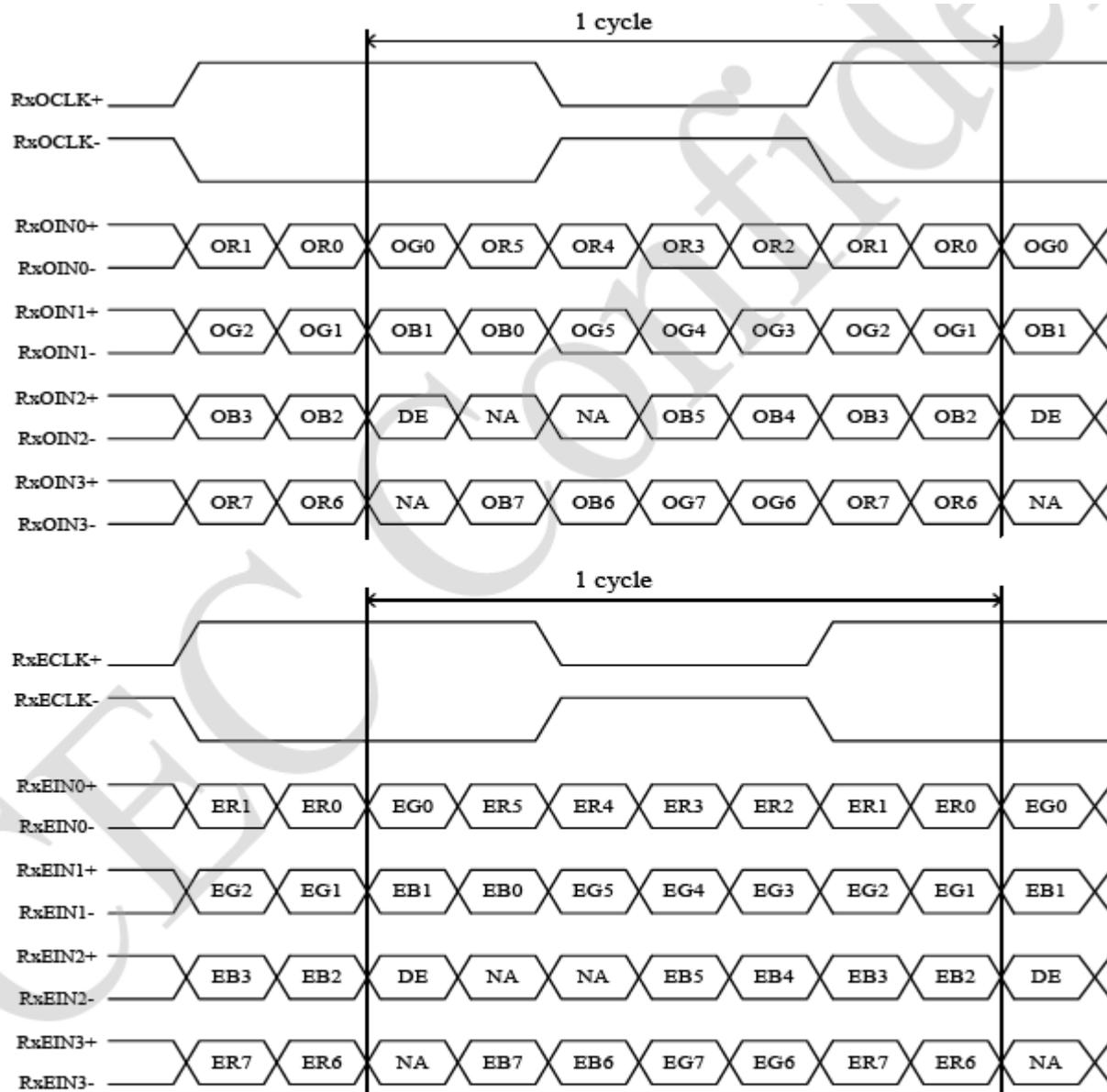
8.3 Data Input Format



8.4 Block Diagram (Open-Cell)



8.5 LVDS Interface



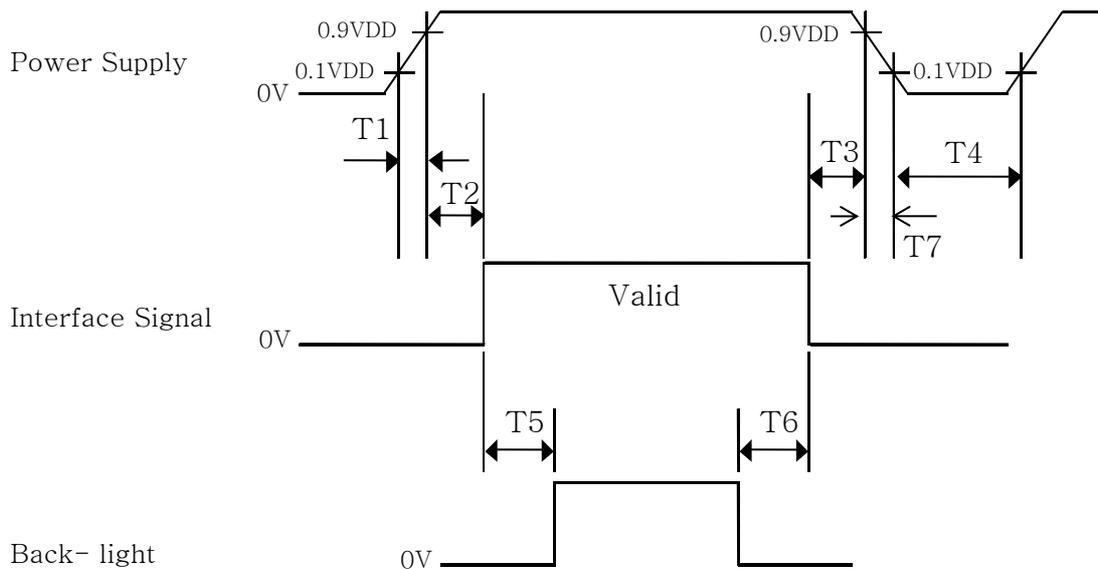
DE: Display Enable

NA: Not Available (Fixed Low)

R/G/B Data 7:MSB , R/G/B Data 0:LSB , O : "First Pixel Data" E : "Second Pixel Data"

9.0 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



- $0.5 \text{ ms} \leq T1 \leq 10 \text{ ms}$
- $0 \leq T2 \leq 50 \text{ ms}$
- $0 \leq T3 \leq 50 \text{ ms}$
- $1 \text{ sec} \leq T4$
- $200 \text{ ms} \leq T5$
- $200 \text{ ms} \leq T6$

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.
3. Back Light must be turn on after power for logic and interface signal are valid.
4. T7 decreases smoothly, there is none re-bouncing voltage.
5. The above power sequence be satisfied at these case
 - a. AC/DC Power On/Off
 - b. Mode Change(Resolution, Frequency, Timing, Sleep Mode, Color Depth Change, etc)

If not to follow power sequence, these is a risk of abnormal display.

10. Precautions

- a) Because the Open-Cell is weak to static electricity, please do not touch the terminal with bare hands.
- b) Since the front polarizer is easily damaged, pay attention not to scratch it.
- c) Since long contact with drops of water may cause discoloration or spots, please wipe off them as soon as put on the screen.
- d) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
- e) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface. Handle with care.
- f) Precautions of peeling off the protection film:
 - Be sure to peel off slowly (recommended more than 7sec) and constant speed.
 - Peeling direction shown in Fig. 5.
 - Be sure to ground person with adequate methods such as the anti-static wrist band.
 - Be sure to ground S-PWBs while peeling off the protection film.
 - Ionized air should be blown to the surface while peeling off.
 - The protection film must not touch drivers and S-PWBs.
 - If adhesive may remain on the polarizer after the protection film peeled off, please remove with isopropyl-alcohol.

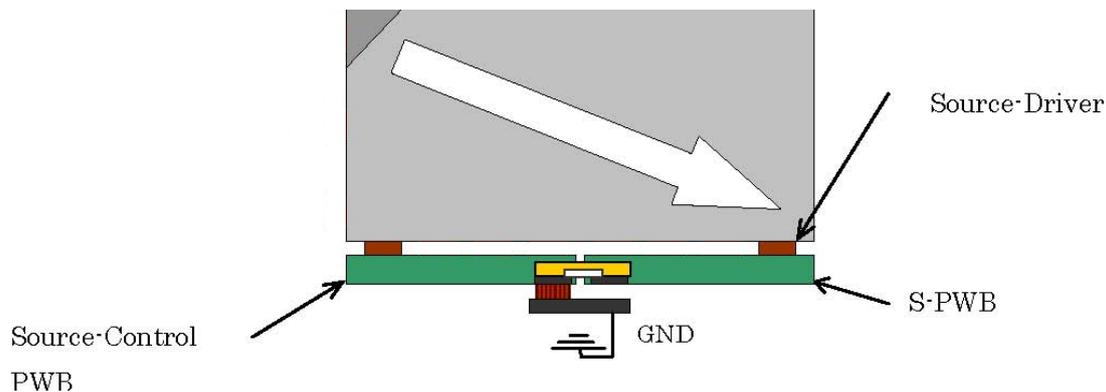


Fig.5 Direction of peeling off

- g) Since the Open-Cell consists of TFT and electronic circuits with CMOS-ICs, which are very weak to electrostatic discharge, persons who are handling a Open-Cell should be grounded through adequate methods such as an anti-static wrist band. Connector pins should not be touched directly with bare hands.
- h) Avoiding COF damage, do not bend PWB to display side when handling the open cell, recommend coating silicon or tuffy on front and back side of COF.

·Reference: Process control standard of CPL.

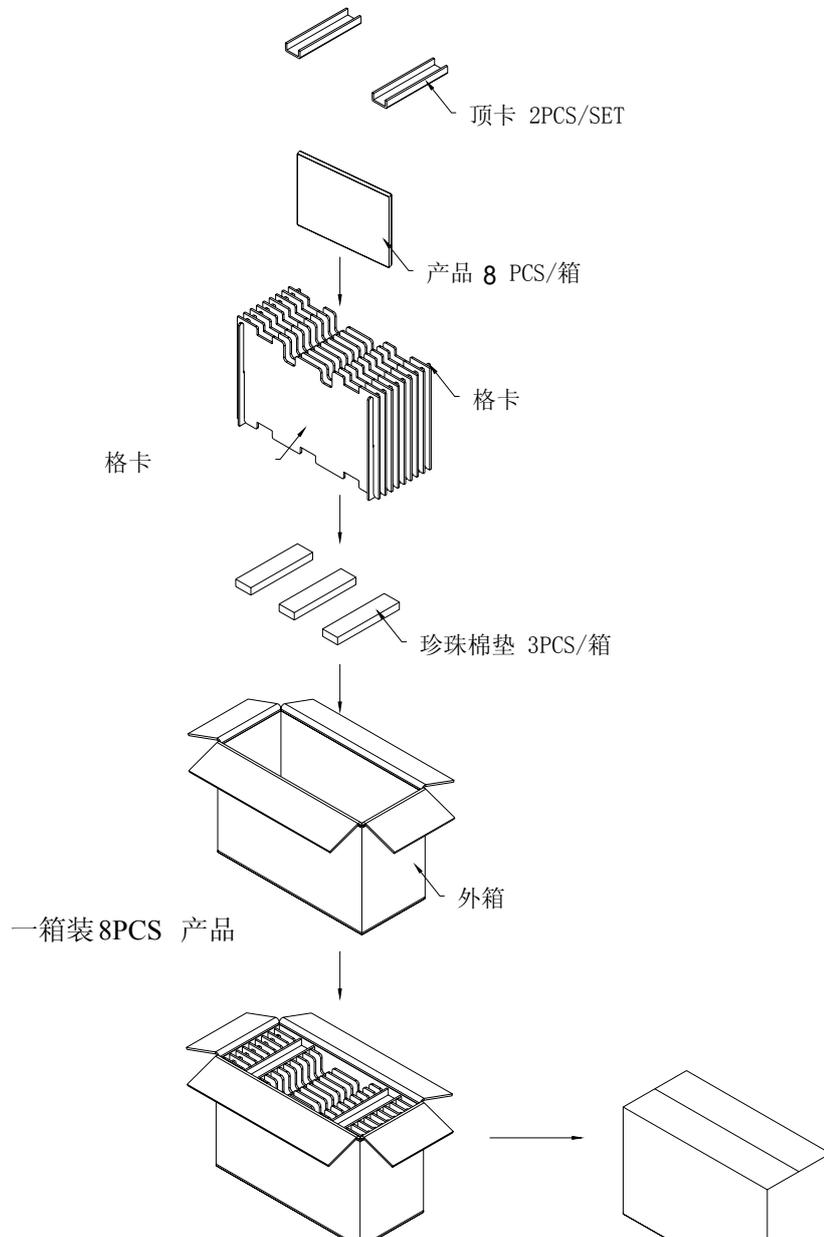
	item	Management standard value and performance standard
1	Anti-static mat(shelf)	1 to 50 [Mega ohm]
2	Anti-static mat(floor, desk)	1 to 100 [Mega ohm]
3	Ionizer	Attenuate from $\pm 1000V$ to $\pm 100V$ within two seconds.
4	Anti-static wrist band	0.8 to 10 [Mega ohm]
5	Anti-static wrist band entry and ground resistance	Below 1000 [ohm]
6	Temperature	22 to 26 [$^{\circ}C$]
7	Humidity	60 to 70 [%]

- i) Since the Open-Cell has some PWBs, please take care to keep them off any stress or pressure when handling or installing the Open-Cell, otherwise some of electronic parts on them may be damaged.
- j) Be sure to turn off the power supply when inserting or disconnecting the cable.
- k) Be sure to design the module and cabinet so that the Open-Cell can be installed without any extra stress such as warp or twist.
- l) When handling and assembling Open-Cells into module and cabinets, please be noted that long-term storage in the

environment of oxidization or deoxidization gas and the use of materials such as reagent, solvent, adhesive, resin, etc. which generate these gasses, may cause corrosion and discoloration of the Open-Cell.

- m) Applying too much force and stress to PWBs and drivers may cause a malfunction electrically and mechanically.
- n) The Open-Cell has high frequency circuits. Sufficient suppression to EMI should be done by system manufactures.
- o) Please be careful since image retention may occur when a fixed pattern is displayed for a long time.
- p) The chemical compound, which causes the destruction of ozone layer, is not being used.
- q) This Open-Cell module is corresponded to ROHS.
- r) When any question or issue occurs, it shall be solved by mutual discussion.

11.Packing form



12. Carton storage condition

a) Temperature: 0°C to 40°C

b) Humidity: 95%RH or less

Reference condition: 20°C to 35°C, 85%RH or less (summer)

: 5°C to 15°C, 85%RH or less (winter)

The total storage time (40°C, 95%RH): 240H or less

c) Sunlight:

Be sure to shelter a product from the direct sunlight.

d) Atmosphere:

Do not store in a place where exists the risk of corrosive gas (such as acid and alkali) or volatile solvents.

e) Prevent condensation:

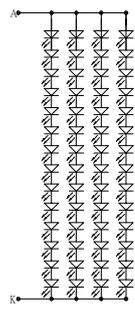
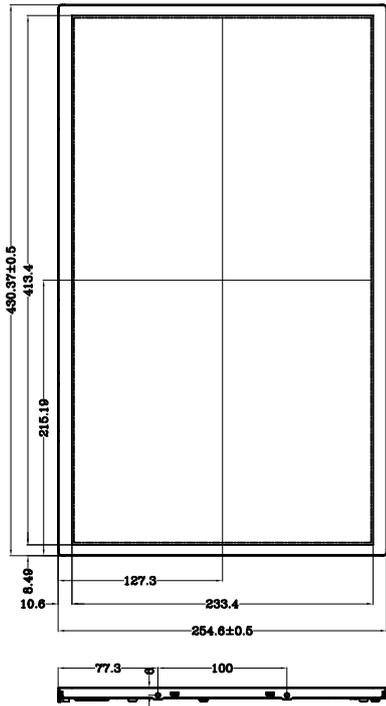
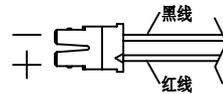
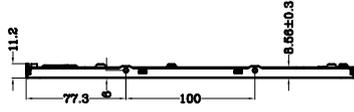
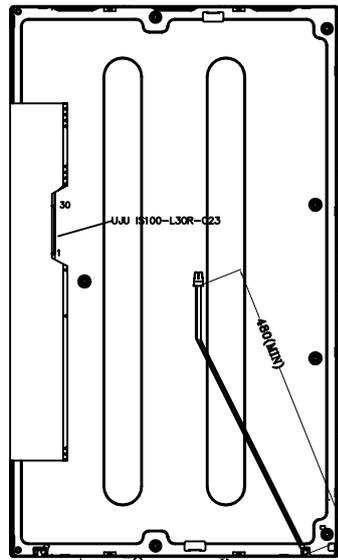
Be sure to put cartons on a palette or base, don't put it on the floor, and store them keeping off the wall. Please take care of ventilation in storehouse and around cartons, and control temperature not to change abruptly beyond the natural environment.

f) Storage life: 1 year

13. Reliability test item

No.	Test item	Condition
1	High temperature storage test	Ta=60°C 72h
2	Low temperature storage test	Ta=-20°C 72h
3	High temperature and high humidity operation test	Ta=40°C ; 80%RH 72h (No condensation)
4	High temperature operation test	Ta=50°C 72h
5	Low temperature operation test	Ta=0°C 72h

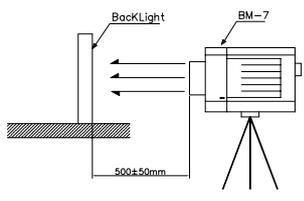
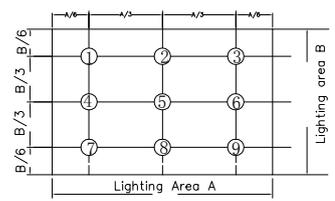
Above tests are executed under the LED module conditions.



备注：带“☆”为重要尺寸，重点测量，（）内尺寸为参考尺寸，不做测量。

ELECTRICAL/OPRICAL CHARACTERISTICS AT Ta=25°C

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	REMARK	
Center Luminous Intensity	Iv □ BLU					IF=240mA, 4*14=56EA	
	Iv ■ LCM	250	300		cd/m ²		
Backlight coordinaies(B/L)	X						
	Y						
LCM coordinaies	X	0.273	0.303	0.333			
	Y	0.347	0.377	0.407			
Forward Voltage	Vf		42		V		
Luminous Tolerance	Iv-m	75	80		%		(min/max) *100



REV	DATE	REVISER	REVISED DESCRIPTIONS	MODEL NO 产品料号 M185B30-056-186-0602 版本: A0	APPROVED BY 确认	CHECKED BY 审核	DRAWN BY 设计
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