■Preliminary Specification

□Approval Specification

# TFT-LCD Module

# MODEL NO.

# BVS185FHM-N81

**Customer:**

**Model NO:** BVS185FHM-N81

**Part NO:**

**APPROVED BY** **SIGNATURE**

| Approved By | Checked By | | Prepared By |
|---|---|---|---|
| | | | |

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## Revision History

| Version | date | Modified page | Description | Producer |
|---|---|---|---|---|
| 01 | 2021.08.19 | All | First released | |
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## 1. General Description

QV185FHB-N81 is a color active matrix TFT LCD MDL 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 FHD resolutions (1920 horizontal by 1080 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 is adapted for a low reflection and higher color type.

## 2. General Information

| | |
|---|---|
| BLU TYP | ELED |
| OC model | BOE QV 185FHB-N81 |
| resolution ratio | 1920(H) ×1080(V) |
| Active Screen Size(mm) | 408.7(H) ×230.0(V) |
| Opencel Outline Dimension(mm) | 18.5 " |
| refresh rate | 60HZ(Typ.) 75(Max) |
| Weight(Kg) | NA |
| Maximum brightness of module | Normal brightness version：230(MIN)250(TYP) |
| Maximum value of factory control (factory value) | 200(TYP)（The specific value is set by the customer software） |
| Pixel arrangement | 213*213(um) |
| Display Operation Mode | IPS Mode; Normally Black； |
| Viewing Angle (CR≥10) | Viewing angle free R/L 88 (Typ.), U/D 88(Typ.) |
| Color Gamut | Normal gamut version：68%(Min.)72%（TYP） (NTSC CIE1931) |
| OC Surface Treatment | Anti-Glare, 3H |
| Display colors | 16.7M |

## 3. Optical Characteristics（For module units）

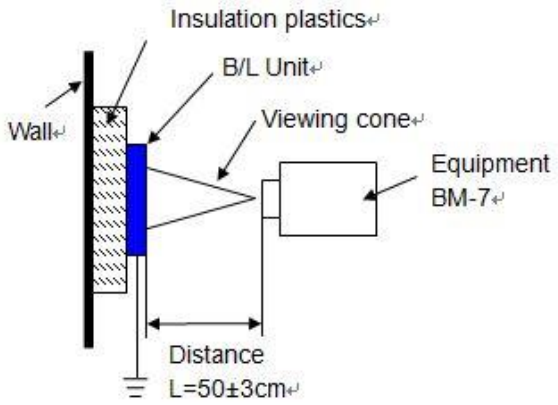
| Item | | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|---|
| Contrast Ratio | | C/R | - | 1000 | - | | Note(3) |
| Response Time | | G to G | - | 14 | -20 | msec | Note(4) |
| Luminance(Module maximum central) | | Lc | 210 | 250 | | Nits | Note(5) |
| Brightness Uniformity ( 9 Points) | | Lu | 75 | - | - | % | Note(6) |
| Color Chromaticity (Central) | White | Wx | Typ. -0.03 | 0.313 | Typ. +0.03 | — | CIE 1931(x, y) [Base On Customer data] |
| | | Wy | | 0.329 | | — | |
| | Red | Rx | | 0.640 | | — | |
| | | Ry | Typ. -0.02 | 0.330 | Typ. -0.03 | — | |
| | Green | Gx | | 0.300 | | — | |
| | | Gy | | 0.600 | | — | |
| olor Chromaticity (Central) | Blue | Bx | | 0.140 | | | |
| | | By | | 0.060 | | — | |
| Color Gamut | - | | 72 | — | — | % | NTSC |
| Color Uniformity ( 9 pts, L/) | △x/y | | — | 0.4 | — | | Color Uniformity ( 9 pts, L/) |
| Viewing Angle (CR≥10) | Horizontal | $\theta_H$ | - | 178 | - | Degree | Note(7) |
| | Vertical | $\theta_V$ | - | - | - | | |

Remark：LCM brightness should be test by power supply not by driver board.

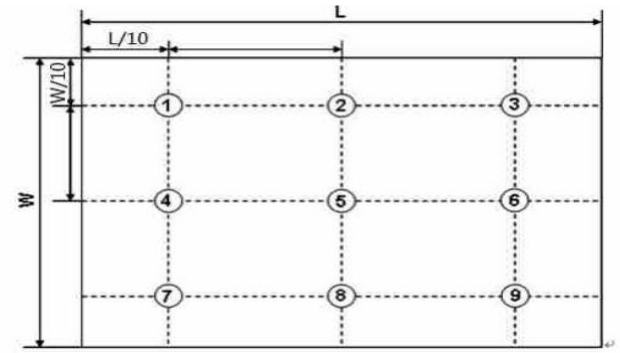
NOTE:

1) Test measurement:

The relationship between LCM and BM-7 as the following drawing




2) Test point:




3) Definition of Contrast Ratio (C/R):

$$C/R = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

4) Definition of Response time:

G to G : The time for transitions between specific gray levels

-31→63,63→95,95→127,127→159,159→191,191→223 grays and viceversa

-G to G typ. : Average time at rising and falling for gray transition except the transition

5) Definition of Luminance : Luminance of white at center point⑤

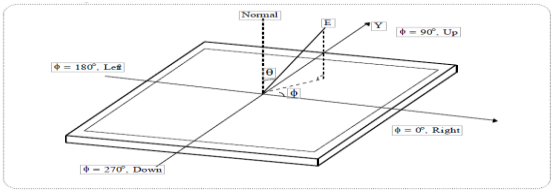
6) Definition of 9 points brightness uniformity:

$$Lu = 100\% \times \frac{L_{min}}{L_{max}}$$

$L_{max:}$ Maximum Luminance of white at point①~point⑨;

$L_{min:}$ Minimum Luminance of white at point①~point⑨;

7) Definition of Viewing Angle(CR≥10):



## 4. Outline Dimension Characteristics

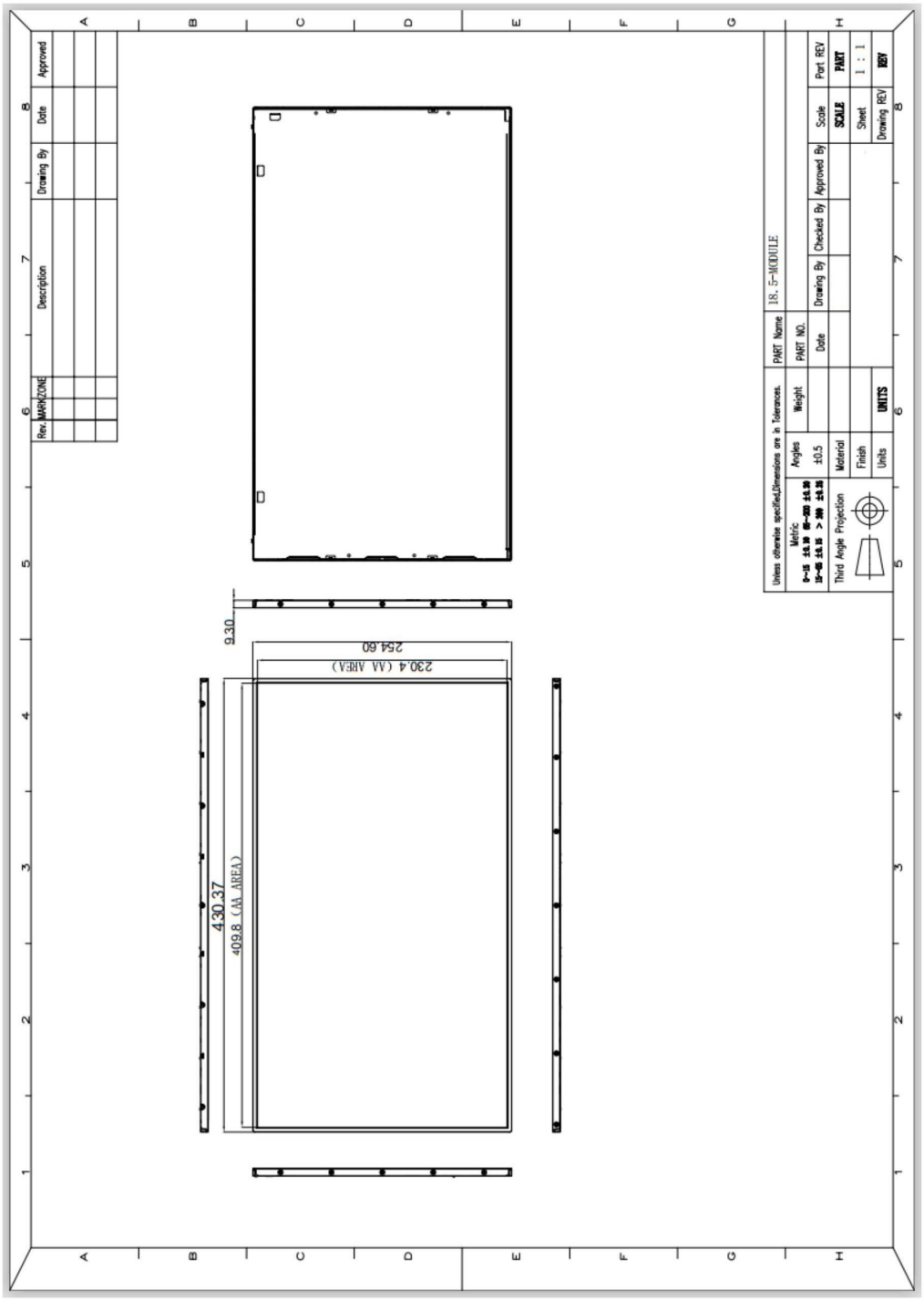
### a. Outline and Light sources

| Item | | Specification | Unit | Note |
|---|---|---|---|---|
| LCM | Outline area | 430.37(H) x254.6(V) | mm × mm | Outline dimension of module |
| | Thickness | 9.3 | mm | Thickness of module |
| | Weight (max.) | NA | g | |
| Light sources | Type | □Straight □L type □U type ■Others LED | | |
| | Arrangement | ■Edge lighting<br>(□up 0 set ■low 1 set □left0 set□ right0 set )<br>□Direct lighting | | |

### b. Operation Characteristics

| Item | Unit | Specification | Condition |
|---|---|---|---|
| Operation temperature | °C | -10~45 | Below 39°C wet bulb temperature |
| Operation humidity | % | 10~90 | |
| Storage temperature | °C | -20~60 | Below 39°C wet bulb temperature |
| Storage humidity | % | 10~90 | |

**c. Product outline dim：**



# 5: Electrical Specifications

## 5.1Absolute Maximum Rating

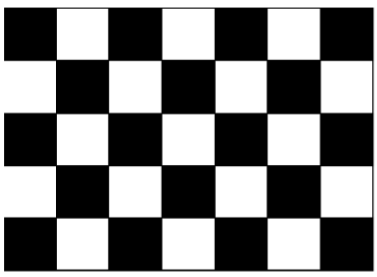
| Parameter | Symbol | Condition | Ratings | Unit | Remark |
|---|---|---|---|---|---|
| +5V supply voltage | VCC | Ta=25℃ | 0～+6 | V | |
| Storage temperature | Tstg | - | -20～+60 | ℃ | |
| Operation temperature | Topa | - | 0～+50 | ℃ | |

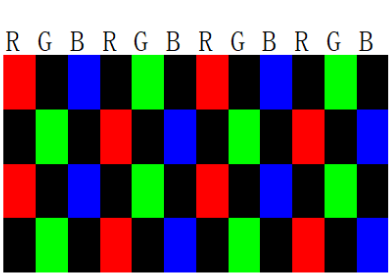
## 5.2 TFT LCD Open Cell

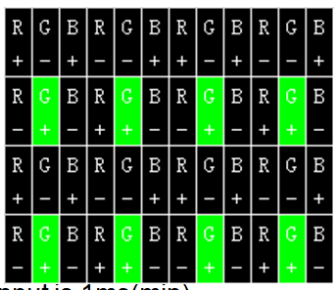
| Parameter | | Symbol | Values | | | Unit | Remark |
|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | | |
| Power Supply Input Voltage | | VDD | 4.5 | 5.0 | 5.5 | Vdc | |
| Power Supply Ripple Voltage | | VRP | - | - | 200 | mV | |
| Power Supply Current | | IDD | - | 400 | 1000 | mA | Note 1 |
| Power Consumption | | PDD | - | 2 | 5 | Watt | |
| Rush current | | IRUSH | - | | 3.0 | A | Note 2 |
| LVDS Interface | Differential Input High Threshold Voltage | VLVTH | +100 | - | +300 | mV | |
| | Differential Input Low Threshold Voltage | VLVTL | -300 | - | -100 | mV | |
| | Input Differential Voltage | \| VID \| | 200 | - | 600 | mV | |
| | Differential input common mode voltage | VCM | 1.0 | 1.2 | 1.5 | V | |

Note 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 $f_V$=60Hz and Clock frequency = 74.25MHz.
Test Pattern of power supply current

a) Typ : Mosaic 7X5 (L0/L255) b) Max : Skip 1 dot Pattern c) Flicker Pattern





Note 2 : The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)

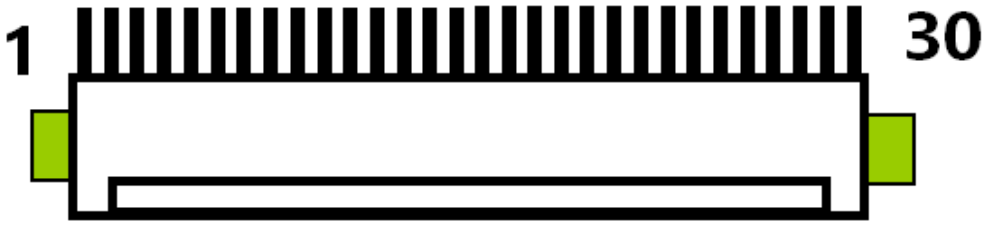
# 6: Interface Connection

## 6.1:Electrical interface Connection

- **LVDS Connector : IS100-L30O-C23(UJU), MSBKT2407P30HC(STM) or Equivalent.**
- **< Table 4. Open Cell Input Connector Pin Configuration >**

| Pin No | Symbol | Description | Pin No | Symbol | Description |
|---|---|---|---|---|---|
| 1 | RXO0- | Negative Transmission data of Pixel 0 (ODD) | 16 | RXE1+ | Positive Transmission data of Pixel 1 (EVEN) |
| 2 | RXO0+ | Positive Transmission data of Pixel 0 (ODD) | 17 | GNG | Power Ground |
| 3 | RXO1- | Negative Transmission data of Pixel 1 (ODD) | 18 | RXE2- | Negative Transmission data of Pixel 2 (EVEN) |
| 4 | RXO1+ | Positive Transmission data of Pixel 1 (ODD) | 19 | RXE2+ | Positive Transmission data of Pixel 2 (EVEN) |
| 5 | RXO2- | Negative Transmission data of Pixel 2 (ODD) | 20 | RXEC- | Negative Transmission Cloc k (EVEN) |
| 6 | RXO2+ | Positive Transmission data of Pixel 2 (ODD) | 21 | RXEC+ | Positive Transmission Clock (EVEN) |
| 7 | GND | Power Ground | 22 | RXE3- | Negative Transmission data of Pixel 3 (EVEN) |
| 8 | RXOC- | Negative Transmission Clock (ODD) | 23 | RXE3+ | Positive Transmission data of Pixel 3 (EVEN) |
| 9 | RXOC+ | Positive Transmission Clock (ODD) | 24 | GND | Power Ground |
| 10 | RXO3- | Negative Transmission data of Pixel 3 (ODD) | 25 | NC | No. Connection |
| 11 | RXO3+ | Positive Transmission data of Pixel 3 (ODD) | 26 | NC | No. Connection |
| 12 | RXE0- | Negative Transmission data of Pixel 0 (EVEN) | 27 | NC | No. Connection |
| 13 | RXE0+ | Positive Transmission data of Pixel 0 (EVEN) | 28 | VDD | Power Supply: +5V |
| 14 | GND | Power Ground | 29 | VDD | |
| 15 | RXE1- | Negative Transmission data of Pixel 1 (EVEN) | 30 | VDD | |

Note : Pin 24 should be connected with GND.



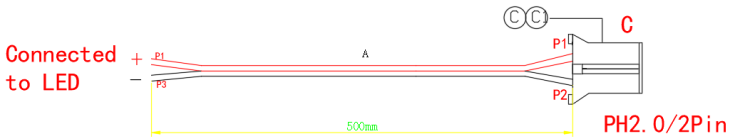

## 6.2：LVDS Interface

See OC specification for details.

## 6.3 Back Light electrical parameters

Output Connector：PH2.0（2pin）

| Pin No. | Symbol |
|---|---|
| 1 | LED+ |
| 2 | LED- |



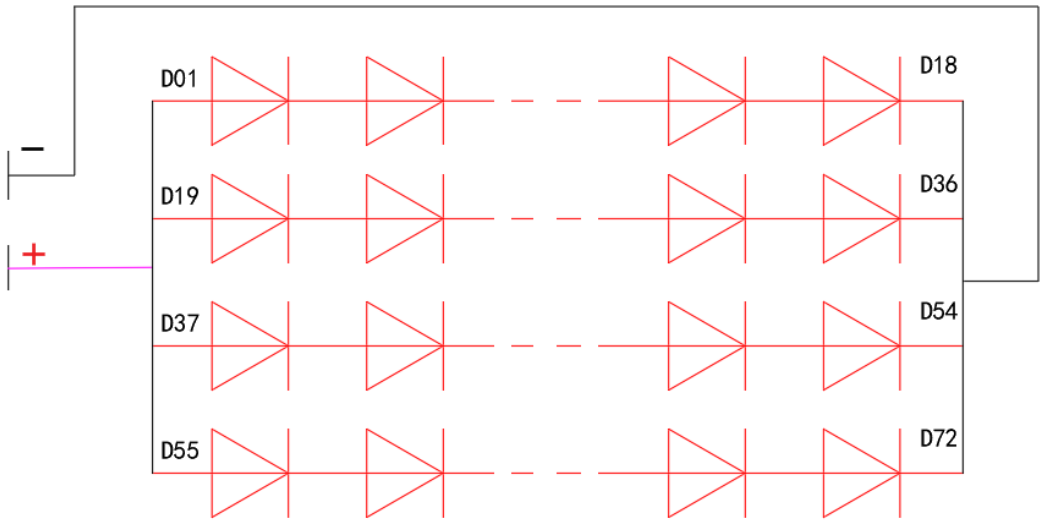

*环保ROSH*

| Serial number | Product number and specification | consumption | remarks |
|---|---|---|---|
| A | UL1061#28 红黑 两排线L=500MM | 2 | ZZ or EQ |
| C | HOUSING A2001H-P | 1 | JSY or EQ |
| C1 | TERMINAL A2001-TOP | 2 | JSY or EQ |

Line sequence:




1) LED Bar Parallel relationship：4P 18S /LED Bar (1pcs/module)



## 7: Signal Timing Spencification

See OC specification for details

## 8: Signal Timing Waveforma Of Interface Signal

See OC specification for details.

## 9:Electrical Characteristics（Backlight）：

| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| LED Light Bar input Voltage | $V_o$ | ---- | 39 | 43 | $V_{DC}$ | （Duty 100%） |
| LED Light Bar Input current | $I_{o1}$ | ---- | 240 | 270 | $mA_{DC}$ | （Duty 100%） |
| Power consumption | $P_o$ | ---- | 9.4 | 11.6 | W | V=66,I=0.24A/Channel |
| LED Life Time | $L_{LED}$ | ----- | 30000 | ---- | H | |

Note 1 : The heat dissipation of the whole machine should be good, and the temperature of the negative pin of the LED lamp should be lower than 65 ℃ (tested under the ambient temperature of 25 ℃).

## 10:Reliability Test

### a. Temperature/humidity stress testing

| NO | Test Items | Conditions | Remark |
|---|---|---|---|
| 1 | Thermal Shock Test (TST) | -10 ºC / 30min → 50 ºC /30min. 50cycles | Note14-1 |
| 2 | High Temperature Operating | Ta=45℃, 240 hours | |
| 3 | Low Temperature Operation | Ta= -10℃, 12 hours | |
| 4 | High Temperature and High Humidity Operating | Ta=45℃, 80%, 12hours | |
| 5 | High Temperature Storage | Ta=60℃, 240hours | |
| 6 | Low Temperature Storage | Ta=-20℃, 240hours | |

**Note14-1**:a. A cycle of rapid temperature change consists of varying the temperature from -20℃ to 60℃, and back again. Power is not applied during the test.

b. After finish temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

C，The above is only for bare metal module testing. Good heat dissipation shall be paid attention to in the design of the whole machine in the whole machine factory. Under the ambient temperature of 25 ℃, the temperature of the negative pin of the lamp bar in the temperature rise test of the whole machine shall be lower than 65 ℃.

For other reliability standards, please refer to the quality standard of Mastar .

### b. Mechanical testing for package

The products out of the module shall not fall, and shall be handled with care.

### c. Module Storage requirements

We highly recommend to comply with the criteria in the table below.

| Item | Unit | Min. | Max. |
|---|---|---|---|
| Storage Temperature | (℃) | 5 | 35 |
| Storage Humidity | (%rH) | 35 | 75 |
| Storage Life | 6 Months | | |
| Storage Condition | - The storage room should provide good ventilation and temperature control.<br>- Products should not be placed on the floor, but on the Pallet away from a wall.<br>- Prevent products from direct sunlight, moisture nor water ; Be cautious of a build up of condensation.<br>- Avoid other hazardous environment while storing goods. | | |
| Long-term Storage Process | More than 3months Storage or Low temp. Delivery/under5℃ Storage,<br>→On the 20℃ 50%rH Condition, More than 24hr release. | | |

When storing modules as spares for a long time, the following precautions are necessary.

(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Please make sure to protect the product from strong light exposure, water or moisture. Be careful for condensation.

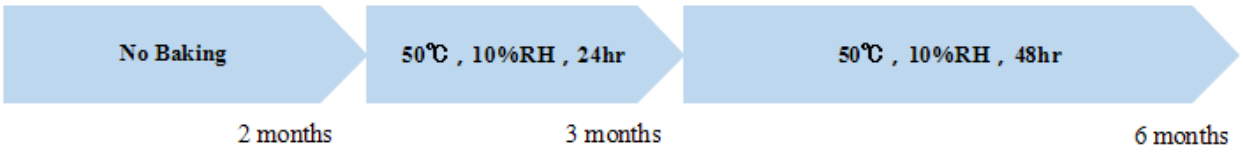
(2) Control of ventilation and temperature is necessary.

(3) The polarizer surface should not come in contact with any other object.

(4) Do not leave the module in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 5 to 35℃ and humidity of 35 ~ 75%RH.

(5) Storage Period : 6 months.

(6) Please keep the modules at a circumstance shown below:



# 11:Products and box labels

## d.1 Product label




Module barcode coding rule management content

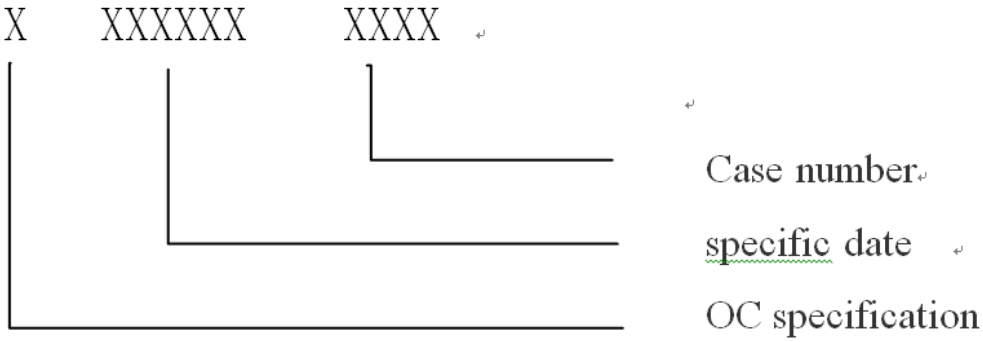
MSD XXXXX XXX XXX X XXXXX

- XXXXX: Representative serial number
- X: OC specification
- XXX: Customer company name abbreviation
- XXX: "FHD" OR "QHD"
- XXX: Factory model
- MSD: For "maxtar"

### d.2 Box label

| | |
|---|---|
| 客户 | [redacted] |
| 订单编号 | |
| 物料编码 | [redacted] |
| 产品名称 | [redacted]"Module |
| 箱号 | [redacted] |
| 产品数量 | [redacted]PCS |
| 日期 | 2021/08/24 |
| MADE IN CHINA RoHS Pb | |

Module outer box coding rule management content



## 12.1:Packing

### a. Package specification

(1)16pcs LCD TV Module/Carton, 15 Carton/Pallet

(2) Carton Dimension : NA

(3) Pallet Dimension :NA

### b. Packing method

