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Product Specification

Product Name: M133NWF4 R0

Document Issue Date: 2017/02/09

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FQ-7-30-0-009-03D



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1.0 General Descriptions

1.1 Introduction

The M133NWF4 R0 is a Color Active Matrix Liquid Crystal Display with a back light system. The matrix uses a-Si Thin Film Transistor as a switching device. This TFT LCD has a 13.3 inch diagonally measured active display area with FHD resolution (1,920 horizontal by 1,080 vertical pixels array).

1.2 Features

- Supported FHD Resolution
- eDP Interface
- Wide View Angle
- Compatible with RoHS Standard

1.3 Product Summary

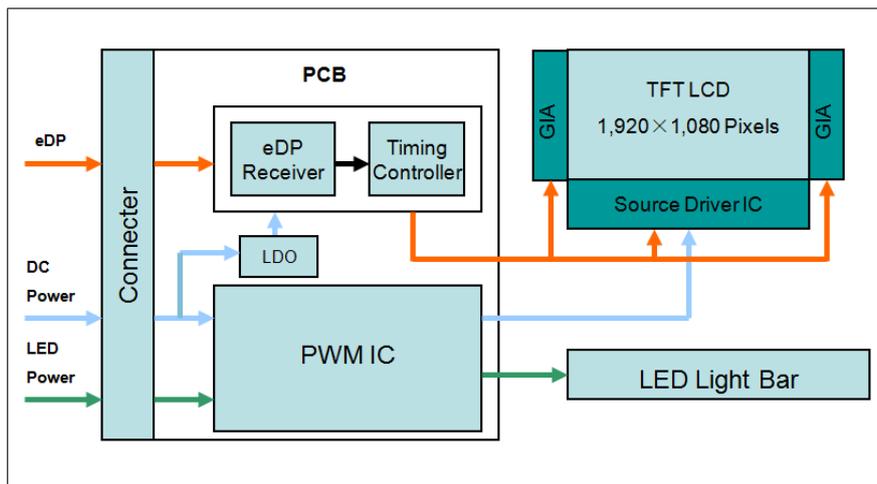
| Items | Specifications | Unit | |
|----------------------------------|---------------------------|---|----|
| Screen Diagonal | 13.3 | inch | |
| Active Area (H x V) | 293.76×165.24 | mm | |
| Number of Pixels (H x V) | 1,920 x 1,080 | - | |
| Pixel Pitch (H x V) | 0.1530 x 0.1530 | mm | |
| Pixel Arrangement | R.G.B. Vertical Stripe | - | |
| Display Mode | Normally Black | - | |
| White Luminance | 300 (Typ.) | cd /m ² | |
| Contrast Ratio | 1200 (Typ.) | - | |
| Response Time | 30(Typ.) | ms | |
| Input Voltage | 3.3(Typ.) | V | |
| Power Consumption | 3.7(Max.) @Mosaic Pattern | W | |
| Weight | 210(Max.) | g | |
| Outline Dimension (H x V x D) | PCB side | 300.26(Typ.) x 187.75(Typ.) x 2.50 (Max.) | mm |
| | LCD side | 300.26(Typ.) x 187.75(Typ.) x 2.40(Max.) | mm |
| Electrical Interface (Logic) | eDP | - | |
| Support Color | 16.7 M (6bit+HFRC) | - | |
| NTSC | 72(Typ.) | % | |
| Viewing Direction | All | - | |
| Surface Treatment | AG | - | |

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1.4 Functional Block Diagram

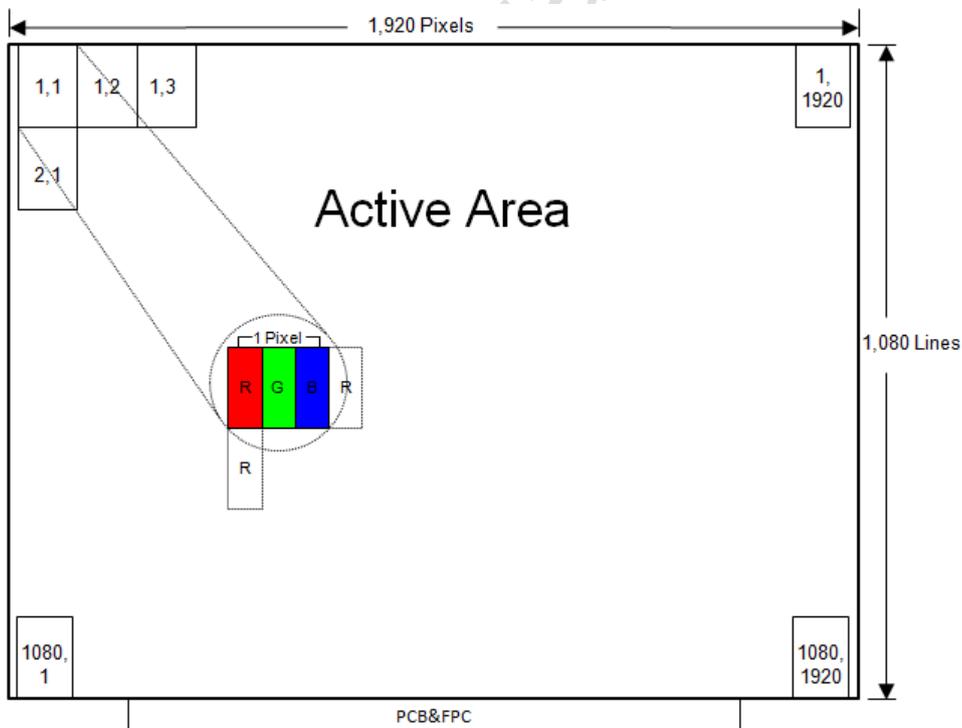
Figure 1 shows the functional block diagram of the LCD module.

Figure 1 Block Diagram



1.5 Pixel Mapping

Figure2 Pixel Mapping



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2.0 Absolute Maximum Ratings

Table 1 Electrical & Environment Absolute Rating

| Item | Symbol | Min. | Max. | Unit | Note |
|----------------------------|--------------|------|------|------|-----------------|
| Logic Supply Voltage | V_{DD} | -0.3 | 3.6 | V | (1),(2),(3),(4) |
| Logic Input Signal Voltage | V_{Signal} | 0.2 | 0.4 | V | |
| Operating Temperature | T_{gs} | 0 | 50 | °C | |
| Storage Temperature | T_a | -20 | 60 | °C | |

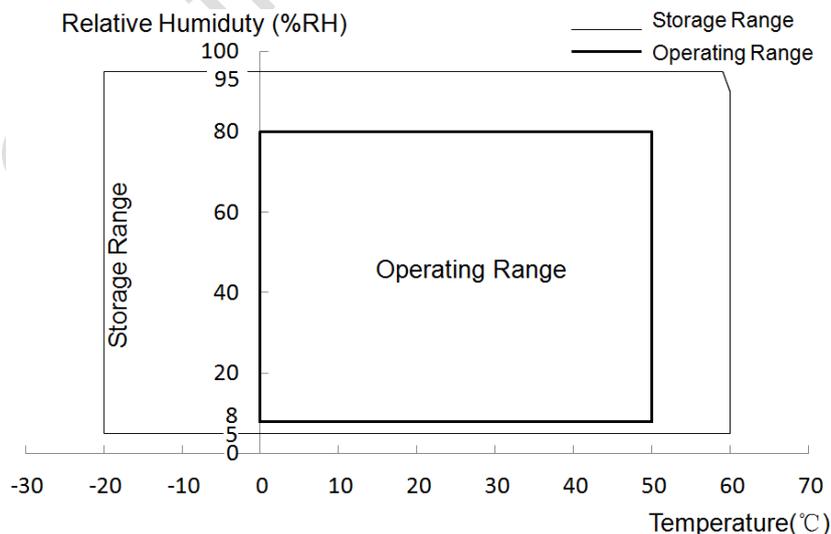
Note (1) All the parameters specified in the table are absolute maximum rating values that may cause faulty operation or unrecoverable damage, if exceeded. It is recommended to follow the typical value.

Note (2) All the contents of electro-optical specifications and display fineness are guaranteed under Normal Conditions. All the display fineness should be inspected under normal conditions. Normal conditions are defined as follow: Temperature: 25°C, Humidity: 55± 10%RH.

Note (3) Unpredictable results may occur when it was used in extreme conditions. T_a = Ambient Temperature, T_{gs} = Glass Surface Temperature. All the display fineness should be inspected under normal conditions.

Note (4) Temperature and relative humidity range are shown in the figure below. Wet bulb temperature should be lower than 46°C, and no condensation of water. Besides, protect the module from static electricity.

Figure 3 Absolute Ratings of Environment of the LCD Module



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3.0 Optical Characteristics

The optical characteristics are measured under stable conditions as following notes.

Table 2 Optical Characteristics

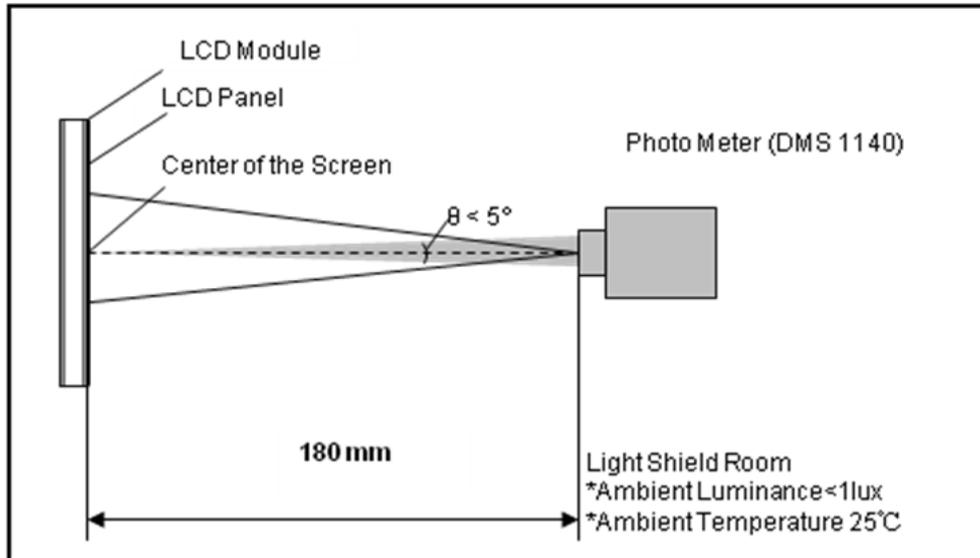
| Item | Conditions | Min. | Typ. | Max. | Unit | Note |
|---------------------------------|------------------|---------------|-------|---------------|-------------------|--|
| Viewing Angle (CR≥10) | Horizontal | θ_{x+} | 75 | 85 | - | degree (1),(2),(3),(4),(8) |
| | | θ_{x-} | 75 | 85 | - | |
| | Vertical | θ_{y+} | 75 | 85 | - | |
| | | θ_{y-} | 75 | 85 | - | |
| Contrast Ratio | Center | 1,000 | 1,200 | - | - | (1),(2),(4),(8) $\theta_x=\theta_y=0^\circ$ |
| Response Time | Rising + Falling | - | 30 | 35 | ms | (1),(2),(5),(8) $\theta_x=\theta_y=0^\circ$ |
| Color Chromaticity (CIE1931) | Red x | Typ. -0.03 | 0.640 | Typ. +0.03 | - | (1),(2),(3),(8) $\theta_x=\theta_y=0^\circ$ |
| | Red y | | 0.330 | | - | |
| | Green x | | 0.300 | | - | |
| | Green y | | 0.600 | | - | |
| | Blue x | | 0.150 | | - | |
| | Blue y | | 0.060 | | - | |
| | White x | | 0.313 | | - | |
| | White y | | 0.329 | | - | |
| NTSC | - | 67 | 72 | - | % | (1),(2),(3),(8) $\theta_x=\theta_y=0^\circ$ |
| White Luminance | 5 Points Average | 255 | 300 | 375 | cd/m ² | (1),(2),(6),(8) $\theta_x=\theta_y=0^\circ$ |
| Luminance Uniformity | 5 Points | 80 | - | - | % | (1),(2),(7),(8) $\theta_x=\theta_y=0^\circ$ |
| | 13 Points | 60 | - | - | | |

Note (1) Measurement Setup:

The LCD module should be stabilized at given ambient temperature (25°C) for 30 minutes to avoid abrupt temperature changing during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 30 minutes in the windless room.

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Figure 4 Measurement Setup



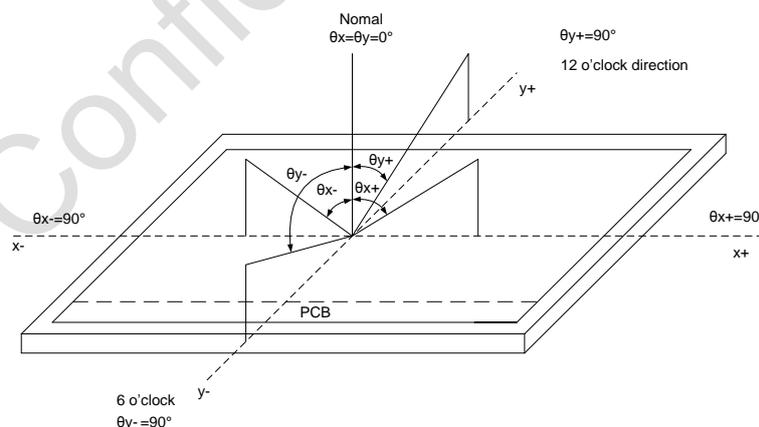
Note (2) The LED input parameter setting as:

$$V_{LED} = 12V$$

PWM_LED: Duty 100%

Note (3) Definition of Viewing Angle

Figure 5 Definition of Viewing Angle



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Note (4) Definition of Contrast Ratio (CR)

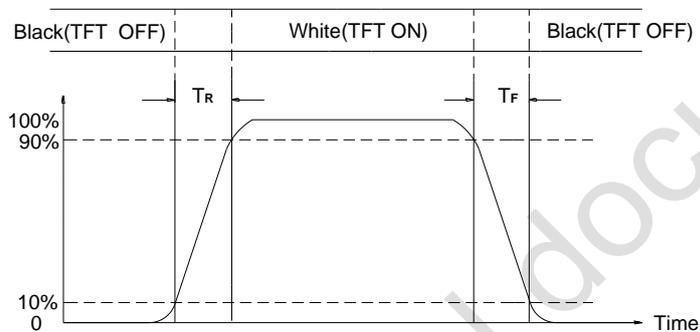
The contrast ratio can be calculated by the following expression:

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

L255: Luminance of gray level 255, L0: Luminance of gray level 0

Note (5) Definition of Response Time (T_R , T_F)

Figure 6 Definition of Response Time



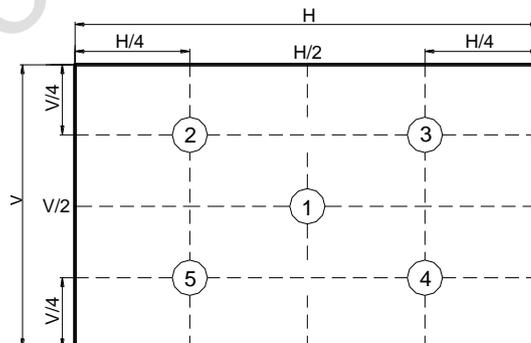
Note (6) Definition of Luminance White

Measure the luminance of gray level 255 (Ref.: Active Area)

$$\text{Display Luminance} = (L_1 + L_2 + L_3 + L_4 + L_5) / 5$$

H—Active Area Width, V—Active Area Height, L—Luminance

Figure 7 Measurement Locations of 5 Points



Note (7) Definition of Luminance Uniformity (Ref.: Active Area)

Measure the luminance of gray level 255 at 5 points.

$$\text{Luminance Uniformity} = \text{Min.}(L_1, L_2, \dots, L_5) / \text{Max.}(L_1, L_2, \dots, L_5)$$

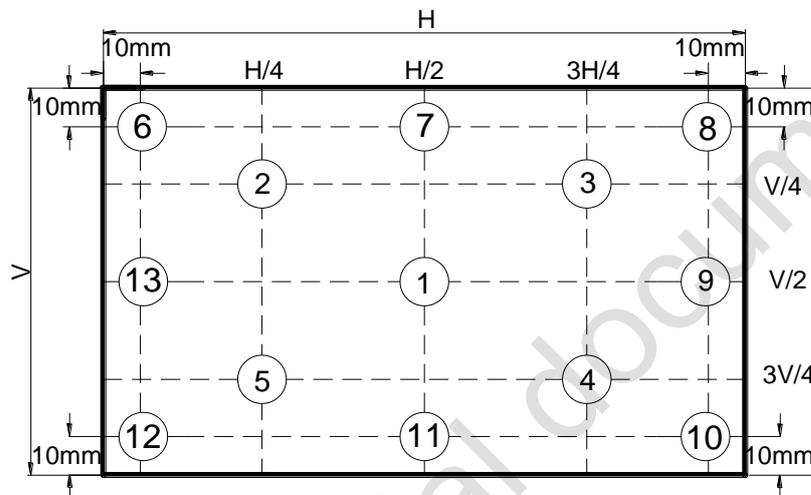
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Measure the luminance of gray level 255 at 13 points.

Luminance Uniformity= $\text{Min.}(L1, L2, \dots L13) / \text{Max.}(L1, L2, \dots L13)$

H—Active Area Width, V—Active Area Height, L—Luminance

Figure 8 Measurement Locations of 13 Points



Note (8) All optical data based on IVO given system & nominal parameter & testing machine in this document.



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4.0 Electrical Characteristics

4.1 Interface Connector

Table 3 Signal Connector Type

| Item | Description |
|---------------------|-----------------|
| Manufacturer / Type | IPEX 20455-030E |

Table 4 Signal Connector Pin Assignment

| Pin No. | Symbol | Description | Remarks |
|---------|-------------|--------------------------------------|---------|
| 1 | NC Reserved | Reserved for LCD manufacturer's use | - |
| 2 | GND | High Speed Ground | - |
| 3 | Lane1_N | Complement Signal Link Lane 1 | - |
| 4 | Lane1_P | True Signal Link Lane 1 | - |
| 5 | GND | High Speed Ground | - |
| 6 | Lane0_N | Complement Signal Link Lane 0 | - |
| 7 | Lane0_P | True Signal Link Lane 0 | - |
| 8 | GND | High Speed Ground | - |
| 9 | AUX_CH_P | True Signal Auxiliary Channel | - |
| 10 | AUX_CH_N | Complement Signal Auxiliary Channel | - |
| 11 | GND | High Speed Ground | - |
| 12 | VDD | LCD logic and driver power | - |
| 13 | VDD | LCD logic and driver power | - |
| 14 | NC | LCD Panel Self Test Enable | - |
| 15 | GND | LCD logic and driver ground | - |
| 16 | GND | LCD logic and driver ground | - |
| 17 | HPD | HPD signal pin | - |
| 18 | BL_GND | LED Backlight ground | - |
| 19 | BL_GND | LED Backlight ground | - |
| 20 | BL_GND | LED Backlight ground | - |
| 21 | BL_GND | LED Backlight ground | - |
| 22 | BL_ENABLE | LED Backlight control on/off control | - |
| 23 | BL_PWM | System PWM signal input for dimming | - |
| 24 | Hsync | Hsync for Pen Touch | - |
| 25 | NC Reserved | Reserved for LCD manufacturer's use | - |
| 26 | VLED | LED Backlight power (12V Typical) | - |
| 27 | VLED | LED Backlight power (12V Typical) | - |
| 28 | VLED | LED Backlight power (12V Typical) | - |

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|----|-------------|-------------------------------------|---|
| 29 | VLED | LED Backlight power (12V Typical) | - |
| 30 | NC Reserved | Reserved for LCD manufacturer's use | - |

4.2 Signal Electrical Characteristics

Table 5 Display Port Main Link

| Parameter | Description | Min. | Typ. | Max. | Unit |
|-------------------------|---|------|------|------|------|
| V_{CM} | Differentia Common Mode Voltage | 0 | - | 2.0 | V |
| $V_{Diff\ P-P}$ Level 1 | Differential Peak to Peak Voltage Level 1 | 0.34 | 0.40 | 0.46 | V |
| $V_{Diff\ P-P}$ Level 2 | Differential Peak to Peak Voltage Level 2 | 0.51 | 0.60 | 0.68 | V |
| $V_{Diff\ P-P}$ Level 3 | Differential Peak to Peak Voltage Level 3 | 0.69 | 0.80 | 0.92 | V |
| $V_{Diff\ P-P}$ Level 4 | Differential Peak to Peak Voltage Level 4 | 1.02 | 1.20 | 1.38 | V |

Note: (1) Input signals shall be low or Hi- resistance state when VDD is off.

(2) It is recommended to refer the specifications of VESA Display Port Standard V1.2 in detail.

(3) Follow as VESA display port standard V1.2 at both 1.62 and 2.7Gbps link rates.

Figure 9 Display Port Main Link Signal

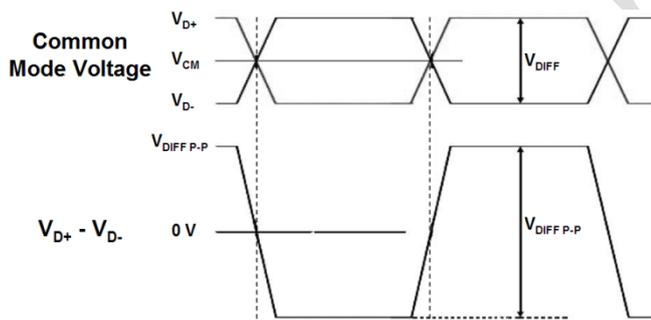


Figure 10 Display Port AUX_CH Signal

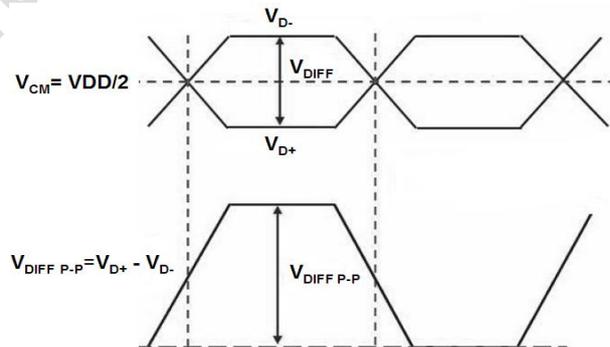


Table 6 Display Port AUX_CH

| Parameter | Description | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------------------|------|------------|------|------|
| V_{CM} | Differentia Common Mode Voltage | 0 | $V_{DD}/2$ | 2 | V |
| $V_{Diff\ P-P}$ | Differential Peak to Peak Voltage | 0.39 | - | 1.38 | V |

Note: Follow as VESA display port standard V1.2.



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Table 7 Display Port V_{HPD}

| Parameter | Description | Min. | Typ. | Max. | Unit |
|------------------|-------------|------|------|------|------|
| V _{HPD} | HPD Voltage | 2.25 | - | 3.60 | V |

Note: Follow as VESA display port standard V1.2.

4.3 Interface Timings

Table 8 Interface Timings

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|-----------------|--------|-------|-------|-------|--------|
| Clock Frequency | Fclk | 87.9 | 138.5 | 145.4 | MHz |
| H Total Time | HT | 2040 | 2080 | 2120 | Clocks |
| H Active Time | HA | 1,920 | | | Clocks |
| V Total Time | VT | 1104 | 1112 | 1120 | Lines |
| V Active Time | VA | 1,080 | | | Lines |
| Frame Rate | FV | 48 | 60 | 65 | Hz |

Note (1): $HT \cdot VT \cdot FV < 145.4 \text{MHz}$

Note (2): All reliabilities are specified for timing specification based on refresh rate of 60Hz.

However, M133NWF4 R0 has a good actual performance even at lower refresh rate (e.g. 48Hz) for power saving mode, whereas M133NWF4 R0 is secured only for function under lower refresh rate; 60Hz at Normal mode, 48Hz at Power save mode.



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4.4 Input Power Specifications

Input power specifications are as follows.

Table 9 Input Power Specifications

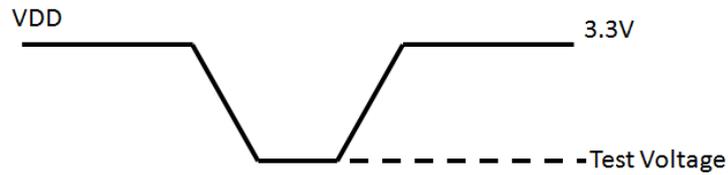
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note | |
|--|----------------------------|---------------|------|------|-------|-------------|---|
| <i>System Power Supply</i> | | | | | | | |
| LCD Drive Voltage (Logic) | V_{DD} | 3 | 3.3 | 3.6 | V | (1),(2),(3) | |
| VDD Current | Mosaic Pattern I_{DD} | - | - | 0.27 | A | (1),(4) | |
| VDD Power Consumption | Mosaic Pattern P_{DD} | - | - | 0.9 | W | | |
| Rush Current | I_{Rush} | - | - | 1.5 | A | (1),(5) | |
| Allowable Logic/LCD Drive Ripple Voltage | V_{VDD-RP} | - | - | 200 | mV | (1) | |
| <i>LED Power Supply</i> | | | | | | | |
| LED Input Voltage | V_{LED} | 5 | 12 | 21 | V | (1),(2) | |
| LED Power Consumption | P_{LED} | - | - | 2.8 | W | (1),(6) | |
| LED Forward Voltage | V_F | - | - | 3.0 | V | (1),(2) | |
| LED Forward Current | I_F | - | 19.3 | - | mA | | |
| PWM Signal Voltage | High | V_{PWM} | 2 | 3.3 | 3.6 | | V |
| | Low | | - | 0 | 0.8 | | |
| LED Enable Voltage | High | V_{LED_EN} | 2 | 3.3 | 3.6 | | V |
| | Low | | - | 0 | 0.8 | | |
| Input PWM Frequency | F_{PWM} | 100 | 200 | 1000 | Hz | (1),(2),(7) | |
| Duty Ratio | PWM | 1 | - | 100 | % | (1),(8) | |
| LED Life Time | LT | 15,000 | - | - | Hours | (1),(9) | |

Note (1) All of the specifications are guaranteed under normal conditions. Normal conditions are defined as follow: Temperature: 25°C, Humidity: 55± 10%RH.

Note (2) All of the absolute maximum ratings specified in the table, if exceeded, may cause faulty operation or unrecoverable damage. It is recommended to follow the typical value.

Note (3) VDD Power Dip Condition for Lenovo.

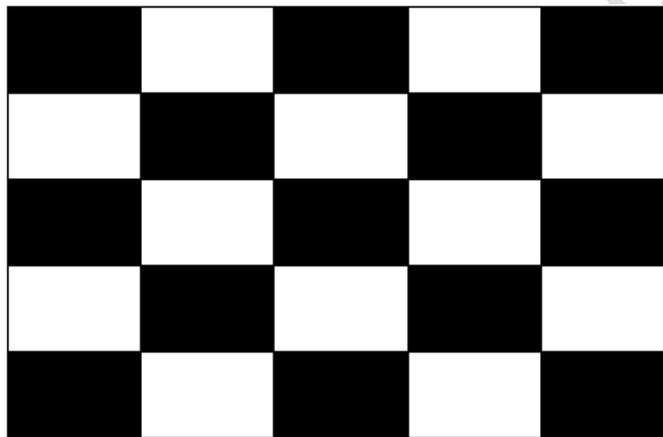
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Figure 11 VDD Power Dip


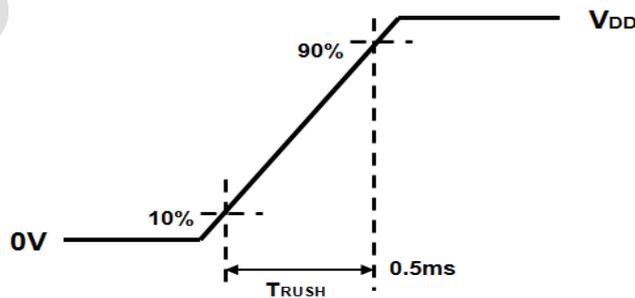
Test criteria:

- 1) $2.4 \leq \text{Test Voltage} \leq 3.3\text{V}$: Normal operation
- 2) $2.0\text{V} \leq \text{Test Voltage} < 2.4\text{V}$: No abnormal display after back to 3.3V input.

Note (4) The specified V_{DD} current and power consumption are measured under the $V_{DD} = 3.3\text{V}$, $F_V = 60\text{Hz}$ condition and Mosaic Pattern.

Figure 12 Mosaic pattern


Note (5) The figures below is the measuring condition of V_{DD} . Rush current can be measured when T_{RUSH} is 0.5 ms.

Figure 13 V_{DD} Rising Time


Note (6) The power consumption of LED Driver are under the $V_{LED} = 12.0\text{V}$, Dimming of Max luminance.

Note (7) Although acceptable range as defined, the dimming ratio is not effective at all conditions. The PWM frequency should be fixed and stable for more consistent luminance control at any



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specific level desired.

Note (8) The operation of LED Driver below minimum dimming ratio may cause flickering or reliability issue.

Note (9) The life time is determined as the sum of the lighting time till the luminance of LCD at the typical LED current reducing to 50% of the minimum value under normal operating condition.

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4.5 Power ON/OFF Sequence

Interface signals are also shown in the chart. Signals from any system shall be Hi- resistance state or low level when VDD voltage is off.

Figure 14 Power Sequence

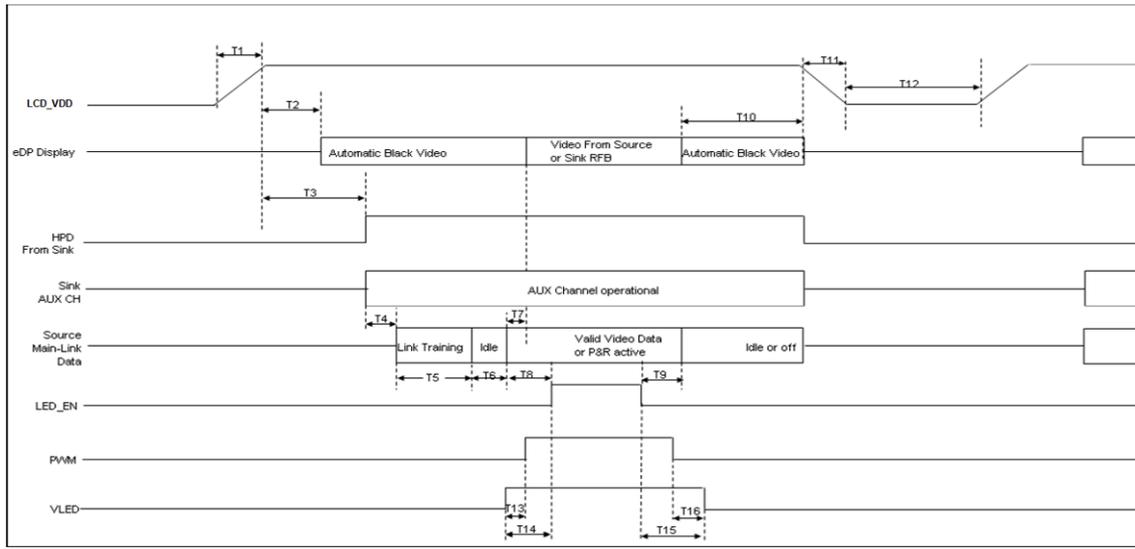


Table 10 Power Sequencing Requirements

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|--------|------|------|------|------|
| VDD Rise Time (10% to 90%) | T1 | 0.5 | - | 10 | ms |
| Delay from VDD to automatic Black Video generation | T2 | 0 | - | 200 | ms |
| Delay from VDD to HPD high | T3 | 0 | - | 200 | ms |
| Delay from HPD high to link training initialization | T4 | - | - | - | ms |
| Link training duration | T5 | - | - | - | ms |
| Link idle | T6 | - | - | - | ms |
| Delay from valid video data from Source to video on display | T7 | 0 | - | 50 | ms |
| Delay from valid video data from Source to backlight enable | T8 | - | - | - | ms |
| Delay from backlight disable to end of valid video data | T9 | - | - | - | ms |
| Delay from end of valid video data from Source to VDD off | T10 | 0 | - | 500 | ms |
| VDD fall time (90% to 10%) | T11 | 0 | - | 10 | ms |
| VDD off time | T12 | 500 | - | - | ms |
| Delay from VLED to PWM | T13 | 0 | - | - | ms |
| Delay from VLED to backlight enable | T14 | 0 | - | - | ms |
| Delay from backlight disable to VLED off | T15 | 0 | - | - | ms |
| Delay from PWM off to VLED off | T16 | 0 | - | - | ms |

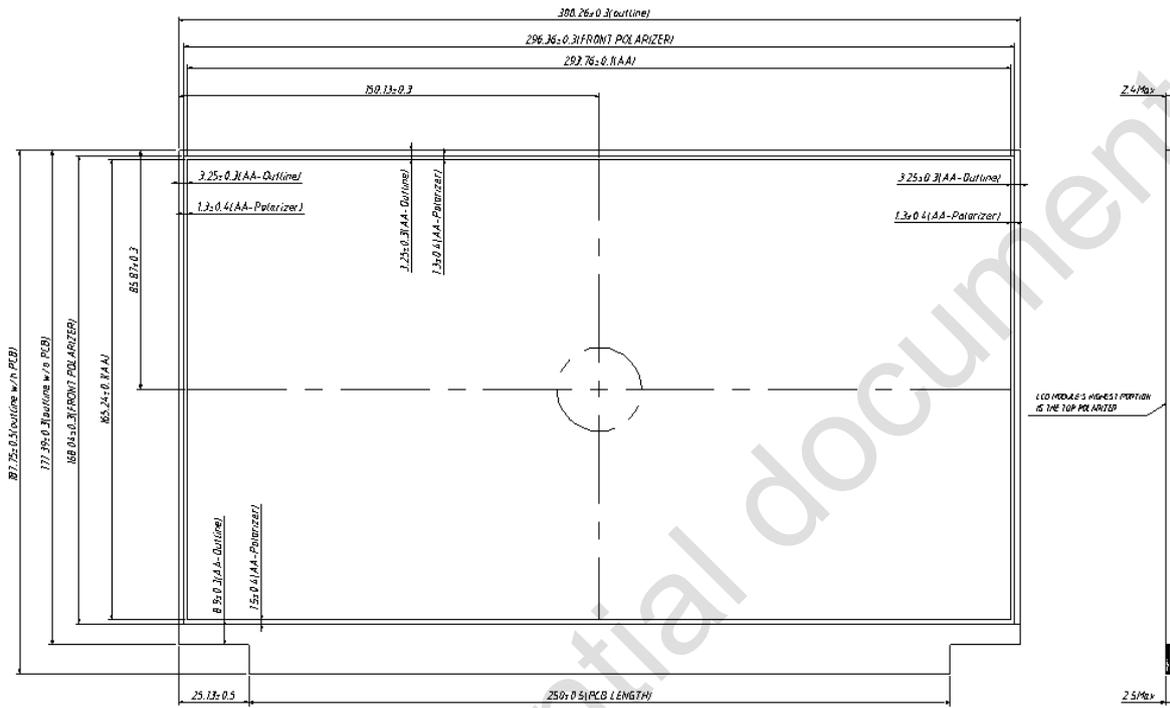


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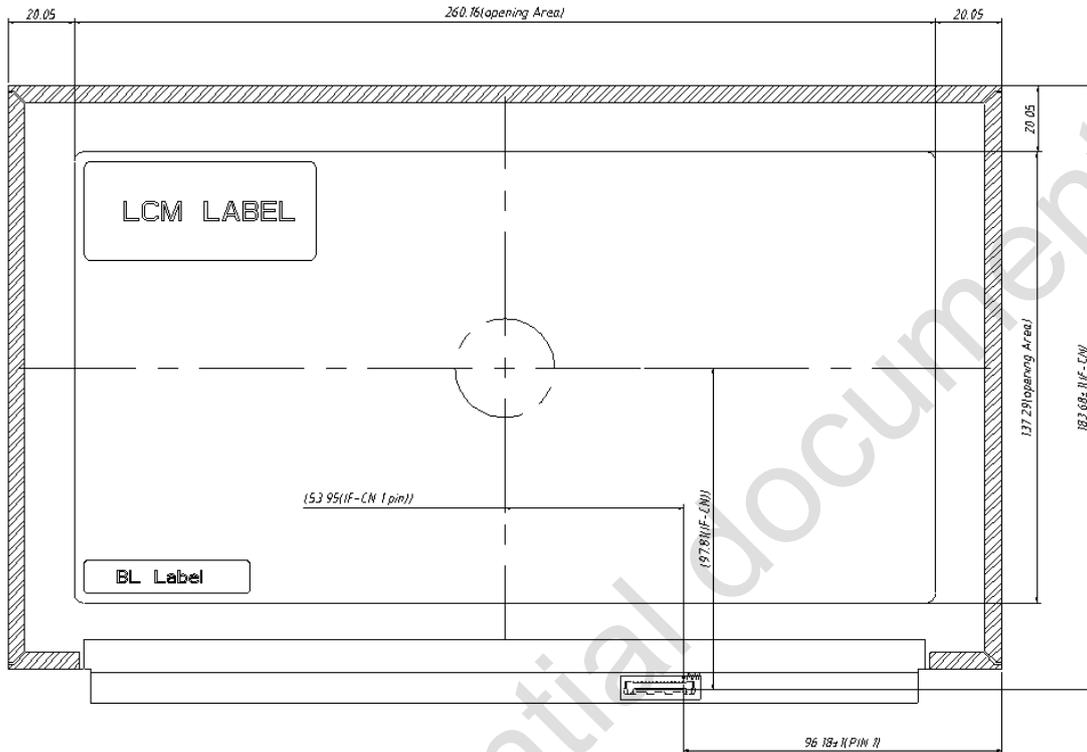
5.0 Mechanical Characteristics

5.1 Outline Drawing

Figure 15 Reference Outline Drawing (Front Side)



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Figure 16 Reference Outline Drawing (Back Side)


5.2 Dimension Specifications

Table 11 Module Dimension Specifications

| Item | Min. | Typ. | Max. | Unit |
|-----------|----------|--------|--------|------|
| Width | 299.96 | 300.26 | 300.56 | mm |
| Height | 187.25 | 187.75 | 188.25 | mm |
| Thickness | PCB side | - | 2.5 | mm |
| | LCD side | - | 2.4 | mm |
| Weight | - | - | 210 | g |

| | | | | | |
|----------------|-----------------------------------|------------|------------|----------|-------|
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6.0 Reliability Conditions

Table 12 Reliability Condition

| Item | Package | Test Conditions | Note |
|---|-----------|--|--|
| High Temperature/High Humidity Operating Test | Module | $T_{gs}=(50^{\circ}\text{C}, 80\%\text{RH}, 1000 \text{ hours})$ | (1),(2),(3), (4) |
| Low Temperature Operating Test | Module | $T_a=0^{\circ}\text{C}, 500 \text{ hours}$ | |
| High Temperature Storage Test | Module | $T_a=60^{\circ}\text{C}, 240 \text{ hours}$ | (1),(3),(4) |
| Low Temperature Storage Test | Module | $T_a=-20^{\circ}\text{C}, 240 \text{ hours}$ | |
| Shock Non-operating Test | Module | 210G, 3ms half-sine $\pm x \pm y \pm z$ each axis/1times 50G, 18msec Trapezoidal $\pm x \pm y \pm z$ each axis/1times | (1),(3),(5) |
| Vibration Non-operating Test | Module | 1.5G , 10~200 Hz , x · y · z each axis/30min. | |
| ESD Test | Operating | Module | (1),(2),(6) |
| | | Contact | |
| | | Air | $\pm 15\text{KV}, 150\text{pF}(330\text{Ohm})$ |

Note (1) A sample can only have one test. Outward appearance, image quality and optical data can only be checked at normal conditions according to the IVO document before reliable test. Only check the function of the module after reliability test.

Note (2) The setting of electrical parameters should follow the typical value before reliability test.

Note (3) During the test, it is unaccepted to have condensate water remains. Besides, protect the module from static electricity.

Note (4) The sample must be released for 24 hours under normal conditions before judging.

Furthermore, all the judgment must be made under normal conditions. Normal conditions are defined as follow: Temperature: 25°C , Humidity: $55 \pm 10\%\text{RH}$. T_a = Ambient Temperature, T_{gs} = Glass Surface Temperature.

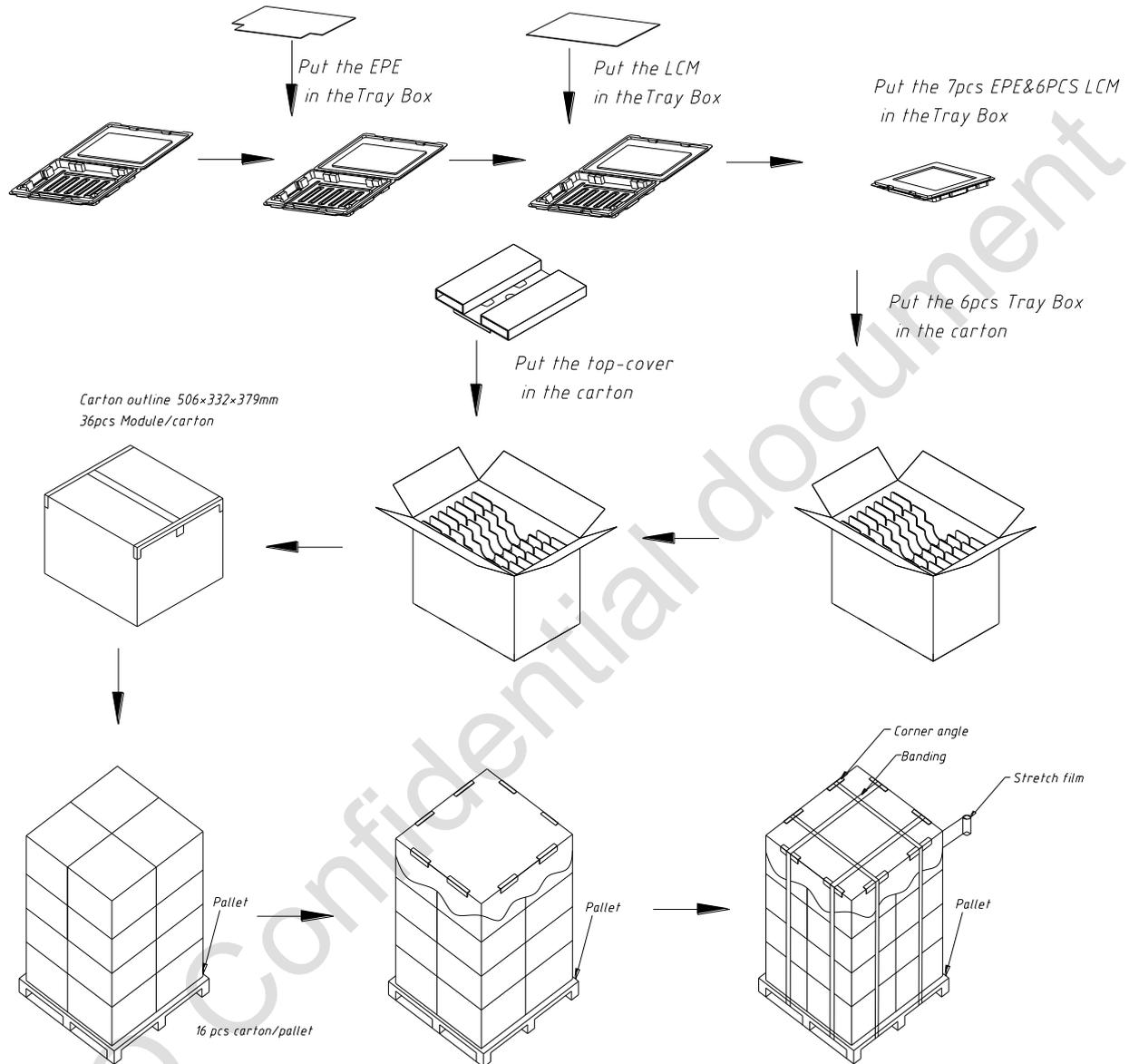
Note (5) The module should be fixed firmly in order to avoid twisting and bending.

Note (6) It could be regarded as pass, when the module recovers from function fault caused by ESD after resetting.

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7.0 Package Specification

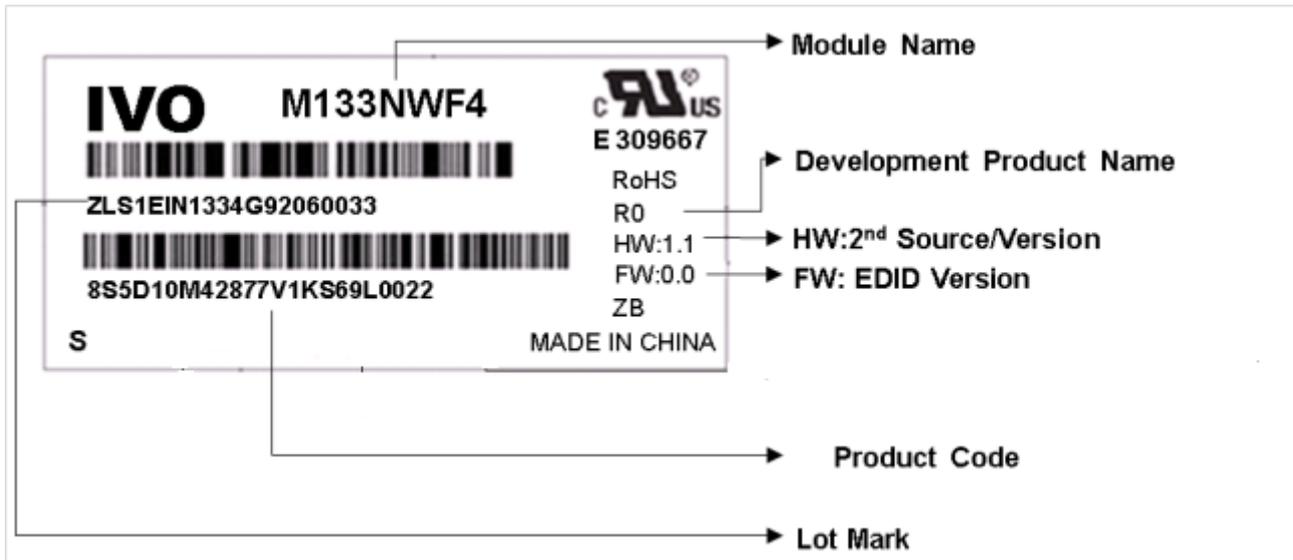
Figure 18 Packing Method





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8.0 Lot Mark



Note: This picture is only an example.

8.1 20 Lot Mark

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|

Code 1,2,4,5,6,7,8,9,10,11,16: IVO internal flow control code.

Code 3: Production Location.

Code 12: Production Year.

Code 13: Production Month.

Code 14,15: Production Day.

Code 17,18,19,20: Serial Number.

8.2 Product Barcode

Base on the requirement of customer.

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9.0 General Precaution

9.1 Using Restriction

This product is not authorized for using in life supporting systems, aircraft navigation control systems, military systems and any other appliance where performance failure could be life-threatening or lead to be catastrophic.

9.2 Operation Precaution

(1) The LCD product should be operated under normal conditions.

Normal conditions are defined as below:

Temperature: 25°C

Humidity: 55±10%

Display pattern: continually changing pattern (Not stationary)

(2) Brightness and response time depend on the temperature. (It needs more time to reach normal brightness in low temperature.)

(3) It is necessary for you to pay attention to condensation when the ambient temperature drops suddenly. Condensate water would damage the polarizer and electrical contacted parts of the module. Besides, smear or spot will remain after condensate water evaporating.

(4) If the absolute maximum rating value was exceeded, it may damage the module.

(5) Do not adjust the variable resistor located on the module.

(6) Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding may be important to minimize the interference.

(7) Image sticking may occur when the module displayed the same pattern for long time.

(8) Do not connect or disconnect the module in the “power on” condition. Power supply should always be turned on/off by the “power on/off sequence”

(9) Ultra-violet ray filter is necessary for outdoor operation.

9.3 Mounting Precaution

(1) All the operators should be electrically grounded and with Ion-blown equipment turning on when mounting or handling. Dressing finger-stalls out of the gloves is important for keeping the panel clean during the incoming inspection and the process of assembly.

(2) It is unacceptable that the material of cover case contains acetic or chloric. Besides, any other material that could generate corrosive gas or cause circuit break by electro-chemical reaction is not desirable.

(3) The case on which a module is mounted should have sufficient strength so that external force is not transmitted to the module directly.

(4) It is obvious that you should adopt radiation structure to satisfy the temperature specification.

(5) It should be attached to the system tightly by using all holes for mounting, when the module is assembled. Be careful not to apply uneven force to the module, especially to the PCB on the back.

(6) A transparent protective film needs to be attached to the surface of the module.



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(7) Do not press or scratch the polarizer exposed with anything harder than HB pencil lead. In addition, don't touch the pin exposed with bare hands directly.

(8) Clean the polarizer gently with absorbent cotton or soft cloth when it is dirty.

(9) Wipe off saliva or water droplet as soon as possible. Otherwise, it may cause deformation and fading of color.

(10) Desirable cleaners are IPA (Isopropyl Alcohol) or hexane. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(11) Do not disassemble or modify the module. It may damage sensitive parts in the LCD module, and cause scratches or dust remains. IVO does not warrant the module, if you disassemble or modify the module.

9.4 Handling Precaution

(1) Static electricity will generate between the film and polarizer, when the protection film is peeled off. It should be peeled off slowly and carefully by operators who are electrically grounded and with Ion-blown equipment turning on. Besides, it is recommended to peel off the film from the bonding area.

(2) The protection film is attached to the polarizer with a small amount of glue. When the module with protection film attached is stored for a long time, a little glue may remain after peeling.

(3) If the liquid crystal material leaks from the panel, keep it away from the eyes and mouth. In case of contact with hands, legs or clothes, it must be clean with soap thoroughly.

9.5 Storage Precaution

When storing modules as spares for long time, the following precautions must be executed.

(1) Store them in a dark place. Do not expose to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.

(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

(3) It is recommended to use it in a short-time period, after it's unpacked. Otherwise, we would not guarantee the quality.

9.6 Others

When disposing LCD module, obey the local environmental regulations.



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10.0 EDID Table Format

| EDID Table Format | | | | | |
|-------------------|---------------|---|-------------|-------------|-------------|
| Address (DEC) | Address (HEX) | Field Name & Comments | Value (HEX) | Value (BIN) | Value (DEC) |
| 0 | 0 | Header | 00 | 00000000 | 0 |
| 1 | 1 | Header | FF | 11111111 | 255 |
| 2 | 2 | Header | FF | 11111111 | 255 |
| 3 | 3 | Header | FF | 11111111 | 255 |
| 4 | 4 | Header | FF | 11111111 | 255 |
| 5 | 5 | Header | FF | 11111111 | 255 |
| 6 | 6 | Header | FF | 11111111 | 255 |
| 7 | 7 | Header | 00 | 00000000 | 0 |
| 8 | 8 | manufacture code | 26 | 00100110 | 38 |
| 9 | 9 | manufacture code | CF | 11001111 | 207 |
| 10 | A | Product Code | 36 | 00110110 | 54 |
| 11 | B | Product Code | 05 | 00000101 | 5 |
| 12 | C | LCD module Serial No - ("0" if not used) | 00 | 00000000 | 0 |
| 13 | D | LCD module Serial No - ("0" if not used) | 00 | 00000000 | 0 |
| 14 | E | LCD module Serial No - ("0" if not used) | 00 | 00000000 | 0 |
| 15 | F | LCD module Serial No - ("0" if not used) | 00 | 00000000 | 0 |
| 16 | 10 | Week of manufacture | 00 | 00000000 | 0 |
| 17 | 11 | Year of manufacture | 1A | 00011010 | 26 |
| 18 | 12 | EDID Structure Ver # = 1 | 01 | 00000001 | 1 |
| 19 | 13 | EDID revision # = 3 | 04 | 00000100 | 4 |
| 20 | 14 | Video I/P definition = Digital I/P (80h) | A5 | 10100101 | 165 |
| 21 | 15 | Max H image size = (Rounded to cm) | 1D | 00011101 | 29 |
| 22 | 16 | Max V image size = (Rounded to cm) | 11 | 00010001 | 17 |



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|----|----|---|----|----------|-----|
| 23 | 17 | Display Gamma | 78 | 01111000 | 120 |
| 24 | 18 | Feature support (no DPMS, Active off, RGB, timing BLK 1) | 0A | 00001010 | 10 |
| 25 | 19 | Red/Green Low bits (RxRy/GxGy) | DE | 11011110 | 222 |
| 26 | 1A | Blue/White Low bits (BxBY/WxWy) | 50 | 01010000 | 80 |
| 27 | 1B | Red X Rx | A3 | 10100011 | 163 |
| 28 | 1C | Red Y Ry | 54 | 01010100 | 84 |
| 29 | 1D | Green X Gx | 4C | 01001100 | 76 |
| 30 | 1E | Green Y Gy | 99 | 10011001 | 153 |
| 31 | 1F | Blue X Bx | 26 | 00100110 | 38 |
| 32 | 20 | Blue Y By | 0F | 00001111 | 15 |
| 33 | 21 | White X Wx | 50 | 01010000 | 80 |
| 34 | 22 | White Y Wy | 54 | 01010100 | 84 |
| 35 | 23 | Established timings 1 (00h if not used) | 00 | 00000000 | 0 |
| 36 | 24 | Established timing 2 (00h if not used) | 00 | 00000000 | 0 |
| 37 | 25 | Manufacturer's timings (00h if not used) | 00 | 00000000 | 0 |
| 38 | 26 | Standard timing ID1 (01h if not used) | 01 | 00000001 | 1 |
| 39 | 27 | Standard timing ID1 (01h if not used) | 01 | 00000001 | 1 |
| 40 | 28 | Standard timing ID2 (01h if not used) | 01 | 00000001 | 1 |
| 41 | 29 | Standard timing ID2 (01h if not used) | 01 | 00000001 | 1 |
| 42 | 2A | Standard timing ID3 (01h if not used) | 01 | 00000001 | 1 |
| 43 | 2B | Standard timing ID3 (01h if not used) | 01 | 00000001 | 1 |
| 44 | 2C | Standard timing ID4 (01h if not used) | 01 | 00000001 | 1 |



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|----|----|---|----|----------|-----|
| 45 | 2D | Standard timing ID4 (01h if not used) | 01 | 00000001 | 1 |
| 46 | 2E | Standard timing ID5 (01h if not used) | 01 | 00000001 | 1 |
| 47 | 2F | Standard timing ID5 (01h if not used) | 01 | 00000001 | 1 |
| 48 | 30 | Standard timing ID6 (01h if not used) | 01 | 00000001 | 1 |
| 49 | 31 | Standard timing ID6 (01h if not used) | 01 | 00000001 | 1 |
| 50 | 32 | Standard timing ID7 (01h if not used) | 01 | 00000001 | 1 |
| 51 | 33 | Standard timing ID7 (01h if not used) | 01 | 00000001 | 1 |
| 52 | 34 | Standard timing ID8 (01h if not used) | 01 | 00000001 | 1 |
| 53 | 35 | Standard timing ID8 (01h if not used) | 01 | 00000001 | 1 |
| 54 | 36 | Pixel Clock LSB | 38 | 00111000 | 56 |
| 55 | 37 | Pixel Clock HSB | 36 | 00110110 | 54 |
| 56 | 38 | Horizontal Active (lower 8 bits) | 80 | 10000000 | 128 |
| 57 | 39 | Hor blanking (lower 8 bits) | A0 | 10100000 | 160 |
| 58 | 3A | Horizontal Active/Horizontal blanking (upper4:4 bits) | 70 | 01110000 | 112 |
| 59 | 3B | Vertical active(lower 8 bits) | 38 | 00111000 | 56 |
| 60 | 3C | Vertical blanking(lower 8 bits) | 20 | 00100000 | 32 |
| 61 | 3D | Vertical Active : Vertical Blanking (upper4:4 bits) | 40 | 01000000 | 64 |
| 62 | 3E | Horizontal Sync Offset | 18 | 00011000 | 24 |
| 63 | 3F | Horizontal Sync Pulse Width | 30 | 00110000 | 48 |
| 64 | 40 | Vertical Sync Offset , Sync Width | 3C | 00111100 | 60 |
| 65 | 41 | Horizontal Vertical Sync Offset/Width upper 2 bits | 00 | 00000000 | 0 |
| 66 | 42 | Horizontal Image Size | 26 | 00100110 | 38 |



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|----|----|--|----|----------|-----|
| 67 | 43 | Vertical image Size | A5 | 10100101 | 165 |
| 68 | 44 | Horizontal Image Size / Vertical image size | 10 | 00010000 | 16 |
| 69 | 45 | Horizontal Border = (0 for Notebook LCD) | 00 | 00000000 | 0 |
| 70 | 46 | Vertical Border = (0 for Notebook LCD) | 00 | 00000000 | 0 |
| 71 | 47 | Non-interlaced, Normal, no stereo, Separate sync, H/V pol Negatives, | 19 | 00011001 | 25 |
| 72 | 48 | Timing Descriptor #2 | 00 | 00000000 | 0 |
| 73 | 49 | | 00 | 00000000 | 0 |
| 74 | 4A | | 00 | 00000000 | 0 |
| 75 | 4B | | 00 | 00000000 | 0 |
| 76 | 4C | | 00 | 00000000 | 0 |
| 77 | 4D | | 00 | 00000000 | 0 |
| 78 | 4E | | 00 | 00000000 | 0 |
| 79 | 4F | | 00 | 00000000 | 0 |
| 80 | 50 | | 00 | 00000000 | 0 |
| 81 | 51 | | 00 | 00000000 | 0 |
| 82 | 52 | | 00 | 00000000 | 0 |
| 83 | 53 | | 00 | 00000000 | 0 |
| 84 | 54 | | 00 | 00000000 | 0 |
| 85 | 55 | | 00 | 00000000 | 0 |
| 86 | 56 | | 00 | 00000000 | 0 |
| 87 | 57 | | 00 | 00000000 | 0 |
| 88 | 58 | | 00 | 00000000 | 0 |
| 89 | 59 | | 00 | 00000000 | 0 |
| 90 | 5A | Detailed timing/monitor descriptor#3 | 00 | 00000000 | 0 |
| 91 | 5B | Flag | 00 | 00000000 | 0 |
| 92 | 5C | Flag | 00 | 00000000 | 0 |



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|-----|----|--|----|----------|-----|
| 93 | 5D | Range limits | FE | 11111110 | 254 |
| 94 | 5E | Flag | 00 | 00000000 | 0 |
| 95 | 5F | Min. Vertical Freq | 49 | 01001001 | 73 |
| 96 | 60 | Max. Vertical Freq | 6E | 01101110 | 110 |
| 97 | 61 | Min. Horizontal Freq | 66 | 01100110 | 102 |
| 98 | 62 | Max. Horizontal Freq | 6F | 01101111 | 111 |
| 99 | 63 | Max. Pixel Clock Freq | 56 | 01010110 | 86 |
| 100 | 64 | | 69 | 01101001 | 105 |
| 101 | 65 | | 73 | 01110011 | 115 |
| 102 | 66 | | 69 | 01101001 | 105 |
| 103 | 67 | | 6F | 01101111 | 111 |
| 104 | 68 | | 6E | 01101110 | 110 |
| 105 | 69 | New line character indicates end of ASCII string | 0A | 00001010 | 10 |
| 106 | 6A | | 20 | 00100000 | 32 |
| 107 | 6B | | 20 | 00100000 | 32 |
| 108 | 6C | Detailed timing/monitor descriptor #4 | 00 | 00000000 | 0 |
| 109 | 6D | | 00 | 00000000 | 0 |
| 110 | 6E | | 00 | 00000000 | 0 |
| 111 | 6F | FE (hex) defines ASCII string | FE | 11111110 | 254 |
| 112 | 70 | Flag | 00 | 00000000 | 0 |
| 113 | 71 | Manufacture P/N | 4D | 01001101 | 77 |
| 114 | 72 | Manufacture P/N | 31 | 00110001 | 49 |
| 115 | 73 | Manufacture P/N | 33 | 00110011 | 51 |
| 116 | 74 | Manufacture P/N | 33 | 00110011 | 51 |
| 117 | 75 | Manufacture P/N | 4E | 01001110 | 78 |
| 118 | 76 | Manufacture P/N | 57 | 01010111 | 87 |
| 119 | 77 | Manufacture P/N | 46 | 01000110 | 70 |
| 120 | 78 | Manufacture P/N | 34 | 00110100 | 52 |
| 121 | 79 | Manufacture P/N | 20 | 00100000 | 32 |



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|-----|----|--|----|----------|----|
| 122 | 7A | Manufacture P/N | 52 | 01010010 | 82 |
| 123 | 7B | Manufacture P/N | 30 | 00110000 | 48 |
| 124 | 7C | New line character indicates end of ASCII string | 20 | 00100000 | 32 |
| 125 | 7D | | 0A | 00001010 | 10 |
| 126 | 7E | Extension Flag = 00 | 00 | 00000000 | 0 |
| 127 | 7F | Checksum | 48 | 01001000 | 72 |