NV116WHM-T00-v3.0

Product Specification

Rev. P.0

HEFEI XINSHENG OPTOELECTRONICS TECHNOLOGY CO.,LTD

REVISION HISTORY

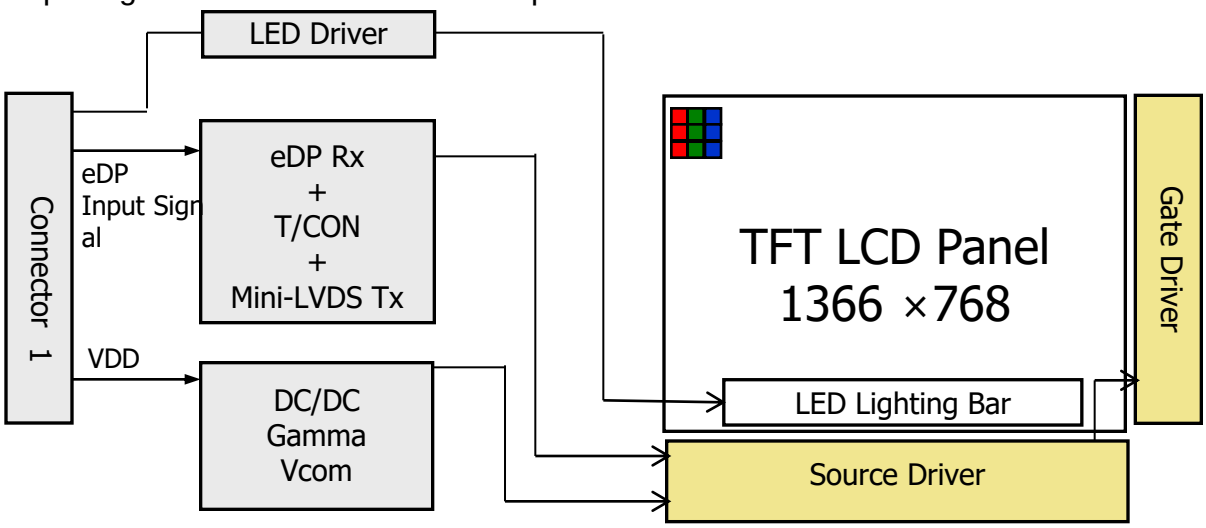
REV.	ECN No.	DESCRIPTION OF CHANGES	DATE	PREPARED
P0	-	Initial Release	10/31	章善财
P1	-	Add Touch sequence	11/6	章善财

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

NV116WHM-T00 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 11.6 inch diagonally measured active area with FHD 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 262,144 colors. The TFT-LCD panel used for this module is a low reflection and higher color type. Therefore, this module is suitable for Notebook PC. The LED Driver for back-light driving is built in this model.
All input signals are eDP interface compatible.



1.2 Features

- 1 lane eDP1.2 Interface with 2.7Gbps Link Rates
- Thin and light weight
- 6-bit color depth, display 262K colors
- Green Product (RoHS & Halogen free product)
- On board LED Driving circuit
- Low driving voltage and low power consumption
- On board EDID chip

1.3 Application

- Notebook PC Without Touch function

1.4 General Specification

1.4.1.General LCM Specification(Table 1.)

<Table 1. General Specifications>

Parameter	Specification	Unit	Remarks
Active area	256.125(H) × 144.0(V)	mm	11.6''
Number of pixels	1366 (H) × 768 (V)	pixels	HD
Pixel pitch	0.1875(H) × 0.1875 (V)	mm	
Pixel arrangement	RGB Vertical stripe		
Display colors	262K	colors	
Display mode	Normally Black		
Dimensional outline	268±0.5 x 168±0.5 *3.2max (W/ PCBA) 268±0.5 x 158±0.5 *3.0max (W/O PCBA)	mm	W/O CG
Weight	200(max)	g	W/O CG
Surface Treatment	Glare		
Back-light	Lower Down side, 1-LED Lighting Bar type		Note 1
Power consumption	P_D :0.7(max)	W	@mosaic pattern
	P_T :0.15(max)	W	Touch
	P_{BL} :1.8(max.)	W	
	Total:2.65(max)	W	@mosaic pattern

1.4.2.General Touch Specification(Table 2.)

<Table 2. General Touch Specifications>

Parameter	Specification	Unit	Remarks
Type of Touch Sensor	Mutual Capacitance		
Touch Structure	On Cell		
Panel Size	11.6”		
Total Thickness	3.2 max / PCBA	mm	W/O CG
Interface	IIC		
Report Rate	100Hz		1 point touch
Multi-Touch Point	10 points		
Input method	Finger		
Touch panel sensor IC	eKTH5012		
Channel	TX30 RX52		
Support OS	Google Chrome		
TP Power Consumption	150 max.	mW	Up to config

2.0 ABSOLUTE MAXIMUM RATINGS

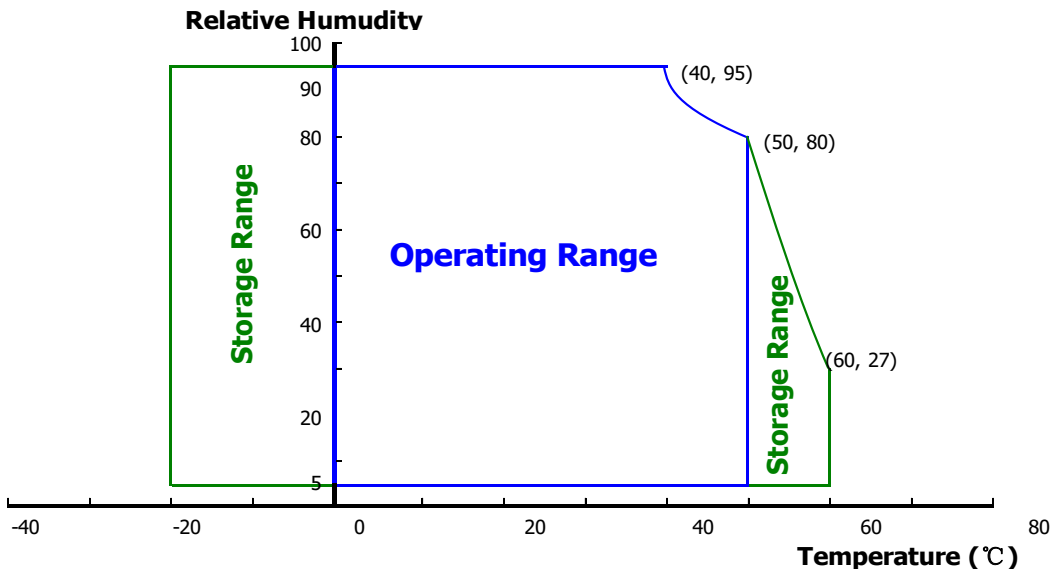
The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 3. Absolute Maximum Ratings> Ta=25+/-2°C

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	-0.3	4.0	V	Note 1
Logic Supply Voltage	V_{IN}	V_{ss}-0.3	V_{DD}+0.3	V	
Operating Temperature	T_{OP}	0	+50	℃	Note 2
Storage Temperature	T_{ST}	-20	+60	℃	

Notes : 1. Permanent damage to the device may occur if maximum values are exceeded functional operation should be restricted to the condition described under normal operating conditions.

2. Temperature and relative humidity range are shown in the figure below.
95 % RH Max. (40 ^{O}C ≥ Ta)
Maximum wet - bulb temperature at 39 ^{O}C or less. (Ta > 40 ^{O}C) No condensation.



3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

< Table 4. Electrical specifications **>** Ta=25+/-2°C

Parameter		**Min.**	**Typ.**	**Max.**	**Unit**	**Remarks**
Power Supply Voltage	V_{DD}	3.0	3.3	3.6	V	Note 1
Permissible Input Ripple Voltage	V_{RF}	-	-	100	mV	At V_{DD} = 3.3V
Power Supply Current	I_{DD}	-	182	250	mA	Note 1
Differential Input Voltage	V_{ID}	120	-	600	mV	
Power Consumption	P_D	-	0.7	1.1	W	Note 1
	P_T		-	0.15	W	Touch
	P_{BL}	-	-	1.8	W	Note 2
	P_{total}	-	2.65	3.05	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 3.3V at 25℃.
a) Typ : Mosaic Pattern
b) Max R/G/B Pattern

3.2 Backlight Unit

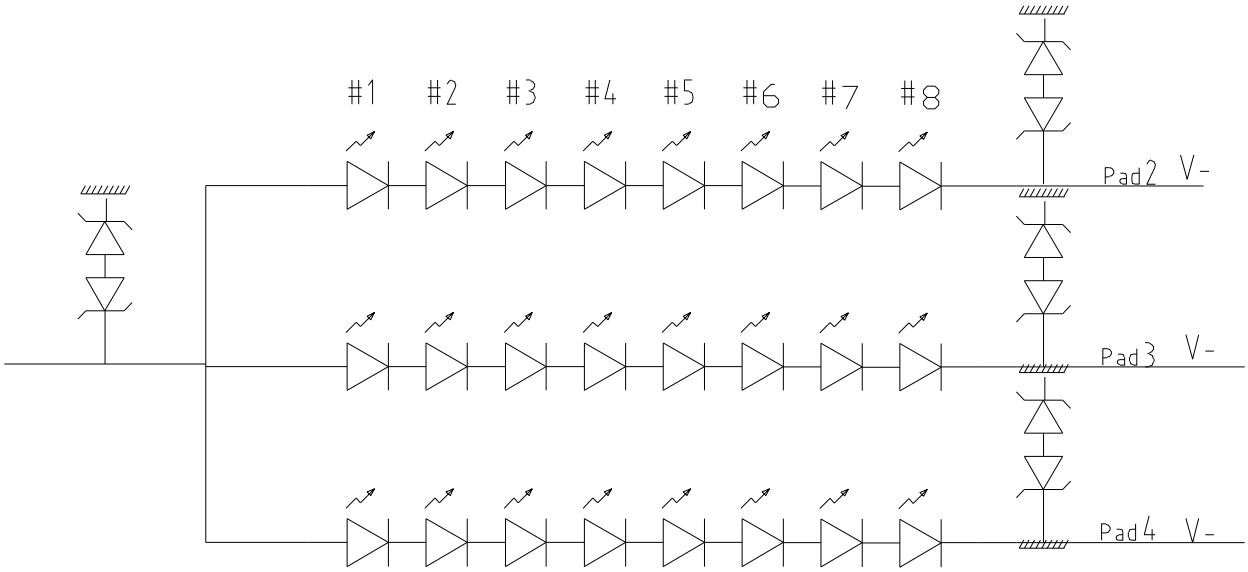
< Table 5. LED Driving guideline specifications >

Ta=25+/-2°C

Parameter			Min.	Typ.	Max.	Unit	Remarks
LED Forward Voltage		V_F	-	-	3.0	V	-
LED Forward Current		I_F	-	22	-	mA	-
LED Power Consumption		P_{LED}		-	1.8	W	Note 1
LED Life-Time		N/A	15,000	-	-	Hour	I_F = 20mA
Power supply voltage for LED Driver		V_{LED}	5.5	12	21	V	
EN Control Level	Backlight on		2.0		5.0	V	
	Backlight off		0		0.6	V	
PWM Control Level	PWM High Level		2.0		5.0	V	
	PWM Low Level		0		0.6	V	
PWM Control Frequency		F_{PWM}	200	-	10,000	Hz	
Duty Ratio		-	1	-	100	%	

Notes : 1. Power supply voltage12V for LED Driver
2. The LED Life-time define as the estimated time to 50% degradation of initial luminous.
3. 1% duty cycle is achievable with a dimming frequency less than 2KHz.

3.3 LED structure



4.0 OPTICAL SPECIFICATION

4.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and PR730) 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 θØ=0 (=θ3) as the 3 o'clock direction (the "right"), θØ=90 (= θ12) as the 12 o'clock direction ("upward"), θØ=180 (= θ9) as the 9 o'clock direction ("left") and θØ=270(= θ6) as the 6 o'clock direction ("bottom"). While scanning θand/or Ø, the center of the measuring spot on the Display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement. VDD shall be 3.3+/- 0.3V at 25°C. Optimum viewing angle direction is 6 'clock.

4.2 Optical Specifications

<Table 6. Optical Specifications>

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	80	85		Deg.	Note 1
		Θ_9		80	85	-	Deg.	
	Vertical	Θ_{12}		80	85	-	Deg.	
		Θ_6		80	85	-	Deg.	
Luminance Contrast ratio		CR	Θ = 0°	800	1200	-	-	
Luminance of White	5 Points	Y_w	Θ = 0° I_{LED} = 20mA	213	250	-	nit	
White Luminance uniformity	5 Points	ΔY5		80%	-	-	-	
	13 Points	ΔY13		60%	-	-	-	
White Chromaticity		x_w	Θ = 0°	0.283	0.313	0.343	-	
		y_w		0.299	0.329	0.359	-	
Reproduction of color	Red	x_R	Θ = 0°	-0.03	0.588	+0.03	-	
		y_R			0.348		-	
	Green	x_G			0.352		-	
		y_G			0.603		-	
	Blue	x_B			0.160		-	
		y_B			0.122		-	
Gamut		-	-	50	50	52	%	
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C Θ = 0°	-	30	35	ms	Note 6
Cross Talk		CT	Θ = 0°	-	-	2.0	%	

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).

2. 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.

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

3. Center Luminance of white is defined as luminance values of 5 point average 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.

4. The White luminance uniformity on LCD surface is then expressed as : ΔY =Minimum Luminance of 5(or 13) points / Maximum Luminance of 5(or 13) points.
(see FIGURE 2 and FIGURE 3).

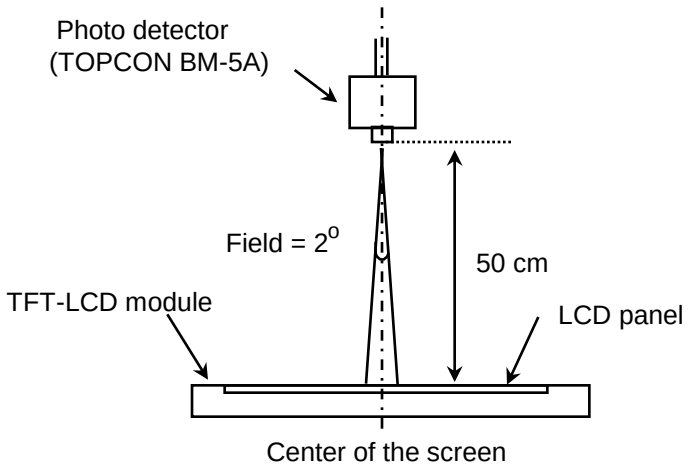
5. The color chromaticity coordinates specified in Table 5 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

6. The electro-optical response time measurements shall be made as FIGURE 4 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.

7. 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 5).

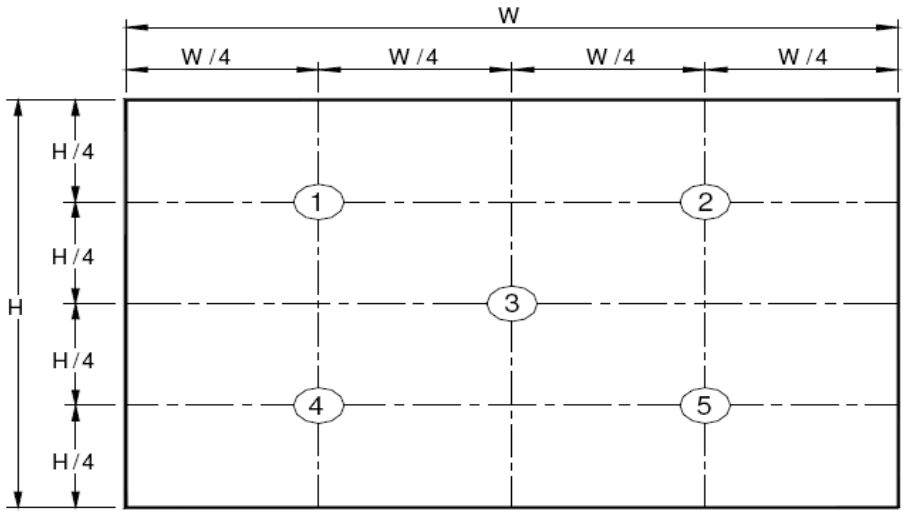
4.3 Optical measurements

Figure 1. Measurement Set Up



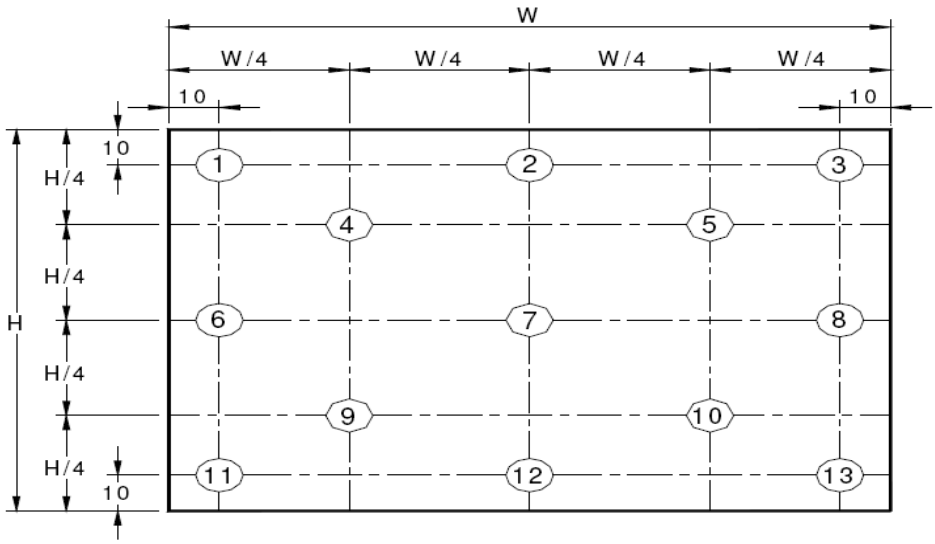
Optical characteristics measurement setup

Figure 2. White Luminance and Uniformity Measurement Locations (5 points)



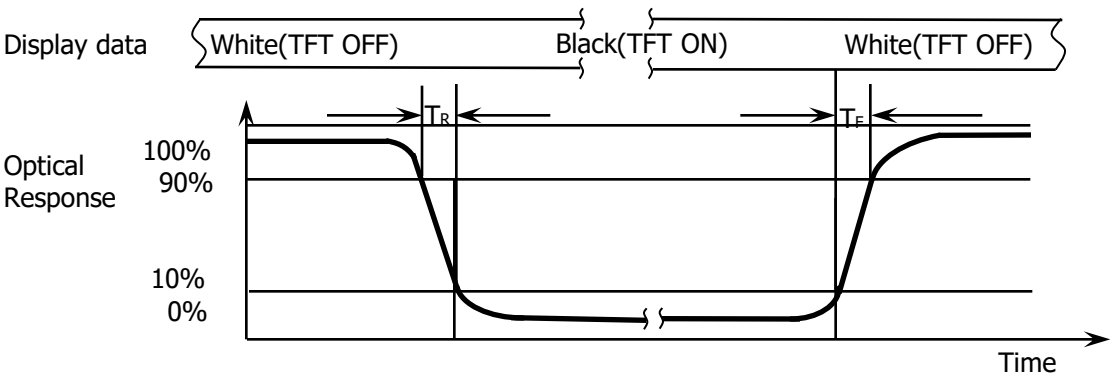
Center Luminance of white is defined as luminance values of center 5 points across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display.

Figure 3. Uniformity Measurement Locations (13 points)



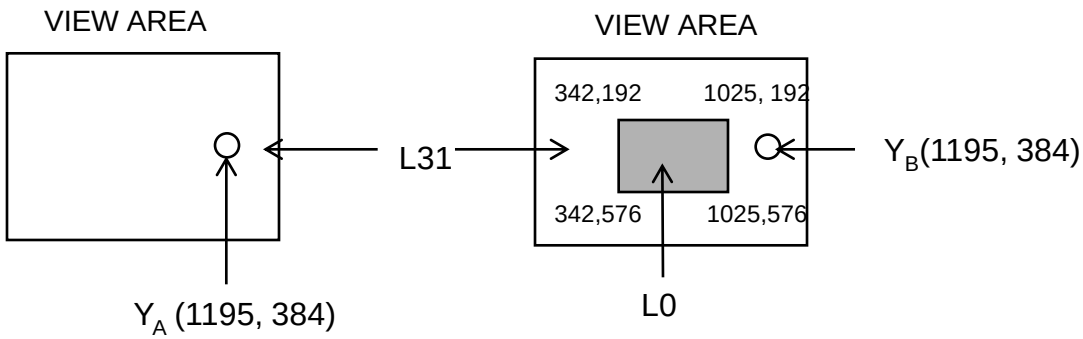
The White luminance uniformity on LCD surface is then expressed as : ΔY5 = Minimum Luminance of five points / Maximum Luminance of five points (see FIGURE 2) , ΔY13 = Minimum Luminance of 13 points /Maximum Luminance of 13 points (see FIGURE 3).

Figure 4. Response Time Testing



The electro-optical response time measurements shall be made as shown in FIGURE 4 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Td and 90% to 10% is Tr.

Figure 5. Cross Modulation Test Description



$$\text{Cross-Talk (\%)} = \left| \frac{Y_B - Y_A}{Y_A} \right| \times 100$$

Where:

Y_A = Initial luminance of measured area (cd/m^2)

Y_B = Subsequent luminance of measured area (cd/m^2)

The location measured will be exactly the same in both patterns

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 (Refer to FIGURE 5).

5.0 INTERFACE CONNECTION.

5.1 Electrical Interface Connection

The electronics interface connector is MSAK24025P40 or Compatible.
The connector interface pin assignments are listed in Table 6.

<Table 7. Pin Assignments for the Interface Connector>

Terminal	Symbol	Functions
Pin No.	Symbol	Description
1	NC	No Connection(Reserved for DCR)
2	H_GND	High speed Ground
3	NC	No Connection
4	NC	No Connection
5	H_GND	Ground
6	LANE0_N	eDP RX channel 0 negative
7	LANE0_P	eDP RX channel 0 positive
8	H_GND	Ground
9	AUX_CH_P	eDP AUX CH positive
10	AUX_CH_N	eDP AUX CH negative
11	H_GND	Ground
12	LCD_VCC	Power Supply, 3.3V (typ.)
13	LCD_VCC	Power Supply, 3.3V (typ.)
14	LCD_Self_Test	Panel self test enable
15	H_GND	Ground
16	H_GND	Ground
17	HPD	Hot plug detect output
18	BL_GND	LED Ground
19	BL_GND	LED Ground
20	BL_GND	LED Ground
21	BL_GND	LED Ground
22	BL_ENABLE	LED enable pin(+3.3V Input)
23	BL_PWM	System PWM Signal Input
24	H-sync	H-sync
25	NC	No Connection
26	BL_POWER	LED Power Supply 5V-21V
27	BL_POWER	LED Power Supply 5V-21V
28	BL_POWER	LED Power Supply 5V-21V
29	BL_POWER	LED Power Supply 5V-21V
30	Color_EN	Color _EN

5.0 INTERFACE CONNECTION.

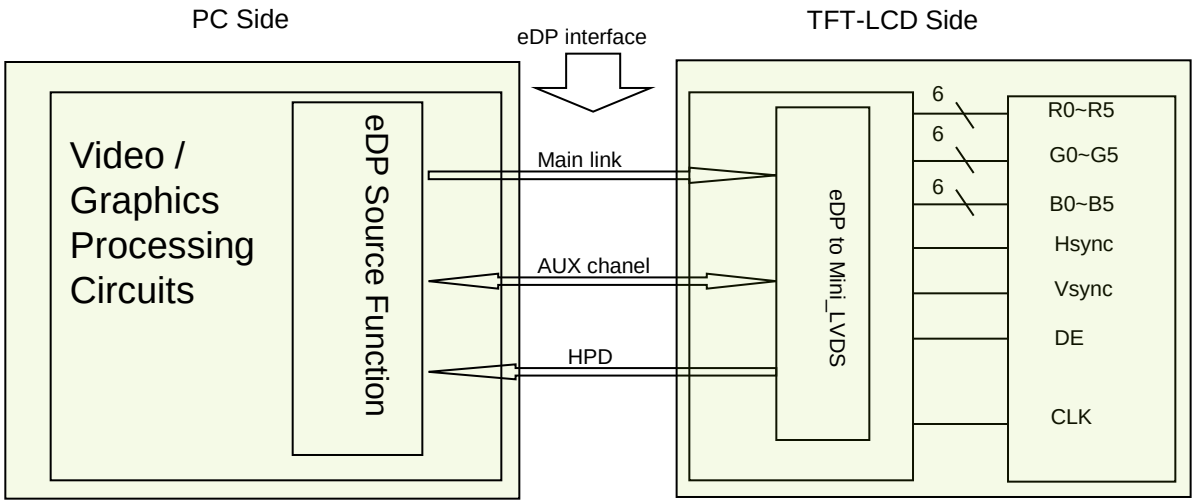
5.1 Electrical Interface Connection

The electronics interface connector is MSAK24025P40 or Compatible.
The connector interface pin assignments are listed in Table 6.

<Table 8. Pin Assignments for the Interface Connector>

Terminal	Symbol	Functions
Pin No.	Symbol	Description
31	TP_D-	USB Data- for Touch(NC for I2C Input)
32	TP_D+	USB Data+ for Touch(NC for I2C Input)
33	GND	Ground
34	VTSP	Touch panel power supply(3.3V)
35	VTSP	Touch panel power supply(3.3V)
36	NC	Reserve for Touch function enable
37	TP_CLK	I2C Clock for Touch
38	TP_Data	I2C Data for Touch
39	TP_I2C INT	Touch panel I2C-INT
40	TP_RST	Touch panel IC reset, Low active

5.2. eDP Interface



Note. Transmitter: NT71810 or equivalent.
Transmitter is not contained in Module.

5.3.eDP Input signal

Lane 0	
R0-5:0	G0-5:4
G0-3.0	B0-5:2
B0-1:0	R1-5:0
G1-5:0	B1-5:4
B1-3:0	R2-5:2
R2-1:0	G2-5:0
B2-5:0	R3-5:4
R3-3:0	G3-5:2
G3-1:0	B3-5:0

5.4 Back-light & LCM Interface Connection

<Table 9. Pin Assignments for the BLU & LCM Connector>

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	NC	No connection	6	NC	No connection
2	LED1	LED cathode connection	7	Vout	LED anode connection
3	LED2	LED cathode connection	8	Vout	LED anode connection
4	LED3	LED cathode connection	9	Vout	LED anode connection
5	NC	No connection			

6.0 SIGNAL TIMING SPECIFICATION

6.1 The NV116WHM-T00 is operated by the DE only.

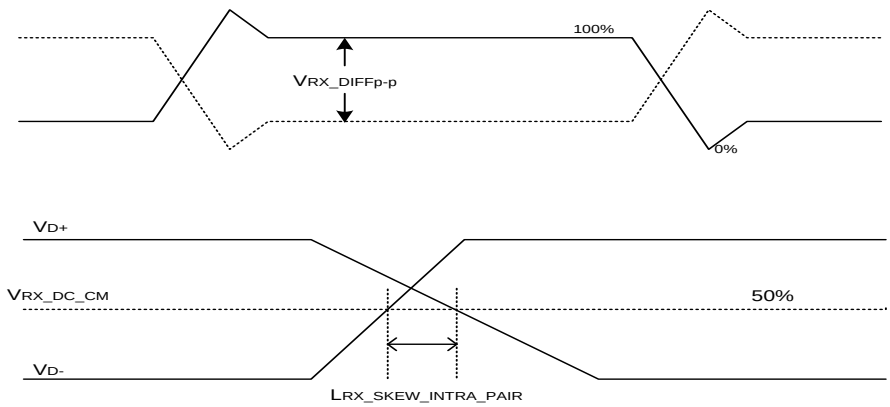
Item		Symbols	Min	Typ	Max	Unit
Clock	Frequency	1/Tc	67.5	72.3	76.3	*MHz*
	High Time	Tch	-	*4/7*	-	*Tc*
	Low Time	Tcl	-	*3/7*	-	*Tc*
Frame Period※		Tv	*778*	*790*	*802*	*lines*
			48	*60*	*60*	*Hz*
			20.8	*16.7*	*16.7*	*ms*
Vertical Display Period		Tvd	*768*	*768*	*768*	*lines*
One line Scanning Period		Th	*1446*	*1466*	*1586*	*clocks*
Horizontal Display Period		Thd	*1366*	*1366*	*1366*	*clocks*

6.2 eDP Rx Interface Timing Parameter

The specification of the eDP Rx interface timing parameter is shown in Table 8.

<Table 10. eDP Rx Interface Timing Specification>

Item	Symbol	Min	Typ	Max	Unit	Remark
Spread spectrum clock	ssc		0.5		%	
Differential peak-to-peak input voltage at package pins	$V_{RX-DIFFp-p}$	120	0	1200	mV	
Rx input DC common mode voltage	$V_{RX\_DC\_CM}$	-	GND	-	V	
Differential termination resistance	$R_{RX-DIFF}$	80	100	120	Ω	
Single-ended termination resistance	R_{RX-SE}	45	50	55	Ω	
Rx short circuit current limit	I_{RX_SHORT}	0	-	50	mA	
Intra-pair skew at Rx package pins (HBR) RX intra-pair skew tolerance at HBR	$L_{RX\_SKEW\_INTRA\_PAIR}$	-	-	100	ps	



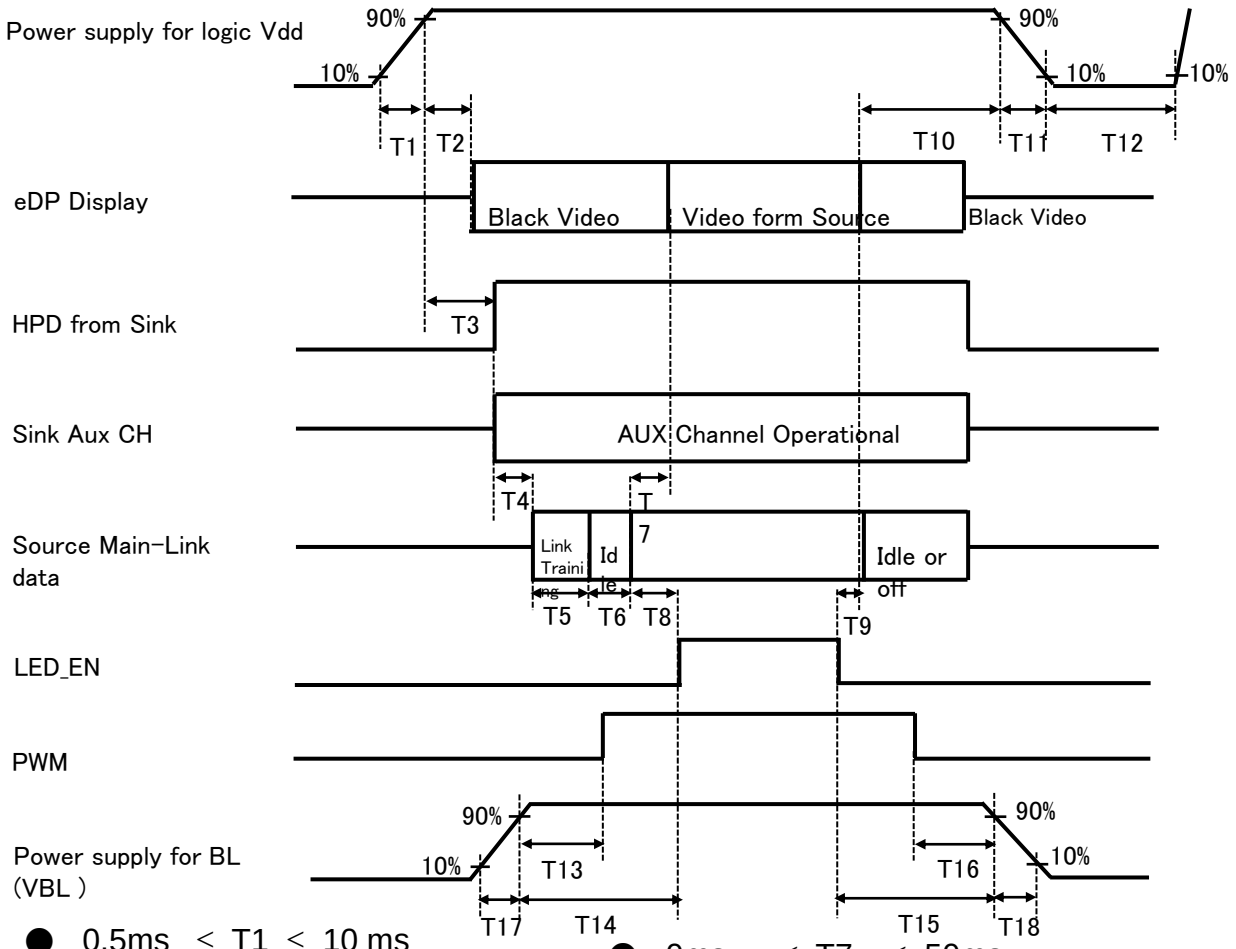
7.0 INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS

	Colors & Gray scale	Data signal																	
		R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5
Basic colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Light Blue	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Purple	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	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
Gray scale of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△ ▽	↑ ↓						↑ ↓						↑ ↓					
	Brighter	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	▽	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray scale of Green	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	1	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	△ ▽	↑ ↓						↑ ↓						↑ ↓					
	Brighter	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
	▽	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Gray scale of Blue	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	0	0	0	0	0	0	1	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	△ ▽	↑ ↓						↓ ↓						↑ ↓					
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
Gray scale of White & Black	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
	Darker	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
	△ ▽	↑ ↓						↑ ↓						↑ ↓					
	Brighter	1	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1
	▽	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

8.0 POWER SEQUENCE

8.1 TFT LCD POWER SEQUENCE

To prevent a latch-up or DC operation of the LCD module, the power on/off seq uence shall be as shown in below



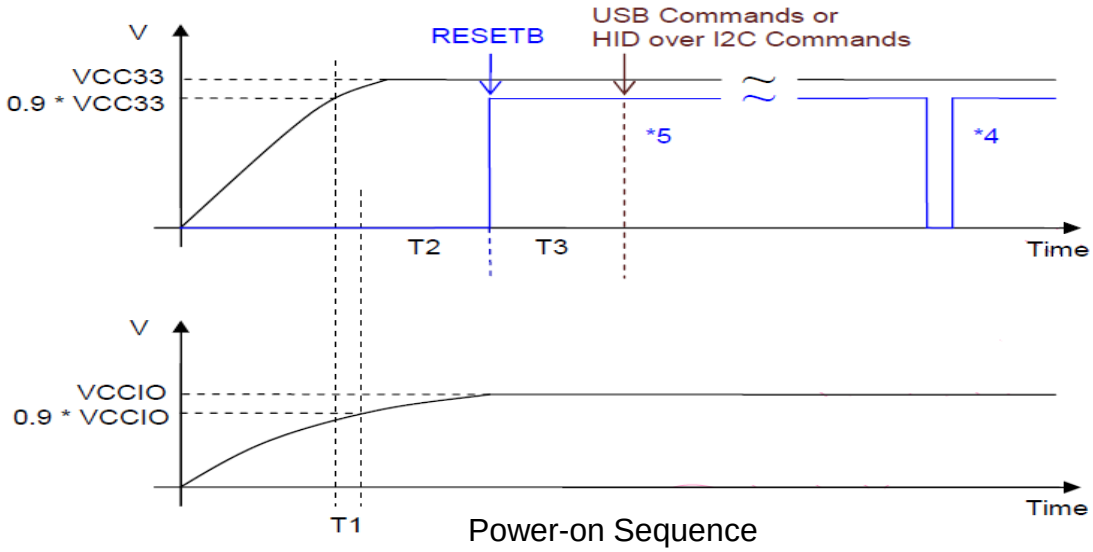
- 0.5ms ≤ T1 ≤ 10 ms
- 0ms ≤ T2 ≤ 200 ms
- 0ms ≤ T3 ≤ 200 ms
- 0ms ≤ T13
- 0ms ≤ T14
- 0ms ≤ T17
- 200ms < T3+T4+T5+T6+T8
- 0ms ≤ T7 ≤ 50ms
- 0ms ≤ T10 ≤ 500 ms
- 0ms ≤ T11 ≤ 10 ms
- 500ms ≤ T12
- 0ms ≤ T15
- 0ms ≤ T16
- 0ms ≤ T18
- 0ms < T9

Notes:

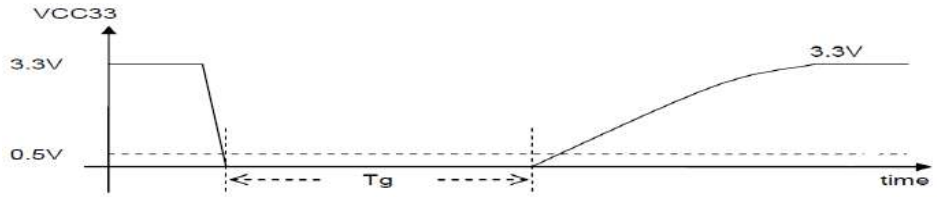
1. When the power supply VDD is 0V, keep the level of input signals on the low or k eep high impedance.
2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

8.0 POWER SEQUENCE

8.2 TOUCH POWER SEQUENCE



Power-on Sequence



Power off and then Power On Sequence

- 0ms ≤ T1
- 500us ≤ T2
- 300ms ≤ T3
- 10us ≤ Tg

Notes:

1. RESETB is a Schmitt Trigger input.
   The spec is as follows:
   VIH=1.73V/VIL=1.13V @VCCIO=3.3V
   VIH=1.03V/VIL=0.608V @VCCIO=1.8V
2. In case of HID over I2C, T3>=300 ms. The host should NOT send HID over I2C commands until 300ms after RESETB is pelled high.
3. During power off, the VCC33 must be lower than 0.5V for at least 10us(i.e. Tg>10us)to make sure the touch controller be correctly reset.

9.0 Connector Description

Physical interface is described as for the connector on LCM.
These connectors are capable of accommodating the following signals and will be following components.

9.1 TFT LCD Module

Connector Name /Description	**For Signal Connector**
Manufacturer	IPEX
Type/ Part Number	I-PEX20455-040E-66
Mating housing/ Part Number	JAE HD1S040HA1 or compatible

10.0 MECHANICAL CHARACTERISTICS

10.1 Dimensional Requirements

FIGURE 6 shows mechanical outlines for the model NV116WHM-T00
Other parameters are shown in Table 9.

<Table 11. Dimensional Parameters>

Parameter	Specification	Unit
Active Area	256.125(H) ×144.0(V)	
Number of pixels	1366 (H) ×768 (V)	
Pixel pitch	0.1875(H) ×0.1875 (V)	mm
Pixel arrangement	RGB Vertical stripe	
Display colors	262K	
Display mode	Normally Black	
Dimensional outline	268±0.5 x 168±0.5 *3.2max (W/ PCBA) 268±0.5 x 158±0.5 *3.0max (W/O PCBA)	mm
Weight	200(max)	gram
Back Light	LED, Horizontal-LED Array type	

10.2 Mounting

See FIGURE 6.

10.3 Glare and Polarizer Hardness.

The surface of the LCD has a Glare coating to minimize reflection and a coating to reduce scratching.

10.4 Light Leakage

There shall not be visible 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 250lux.

11.0 RELIABILITY TEST

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

<Table 12. Reliability test>

No	Test Items	Conditions
1	High temperature storage test	Ta = 60 ℃, 240 hrs
2	Low temperature storage test	Ta = -20 ℃, 240 hrs
3	High temperature & high humidity operation test	Ta = 50 ℃, 80%RH, 240 hrs
4	High temperature operation test	Ta = 60 ℃, 240 hrs
5	Low temperature operation test	Ta = 0 ℃, 240 hrs
6	Thermal shock	Ta = -20 ℃ ↔ 60 ℃ (0.5 hr), 100 cycle
7	Drop (non-operating)	60cm/1 corner/3 edges/6 faces
8	Shock test (non-operating)	220G, Half Sine Wave 2msec ±X,±Y,±Z Once for each direction
9	Electro-static discharge test (non-operating)	Air : 150 pF, 330Ω, 15 KV Contact : 150 pF, 330Ω, 8 KV

12.0 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.
- Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.

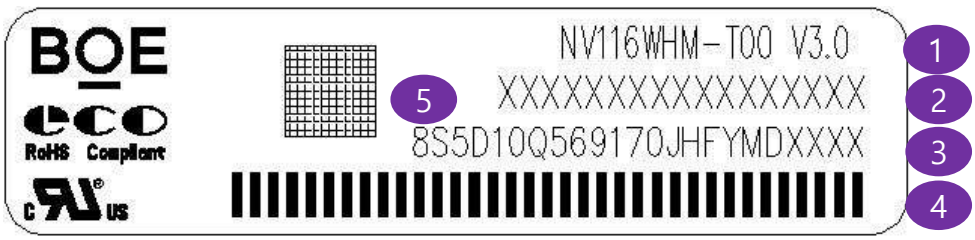
(4) Cautions for the atmosphere
- Dew drop atmosphere should be avoided.
- Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

(5) Cautions for the module characteristics
- Do 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.

13.0 LABEL

(1) LCM label



1.FG-CODE： NV116WHM-T00-3940

2. MDL ID

3. 8S码：5D10Q56917

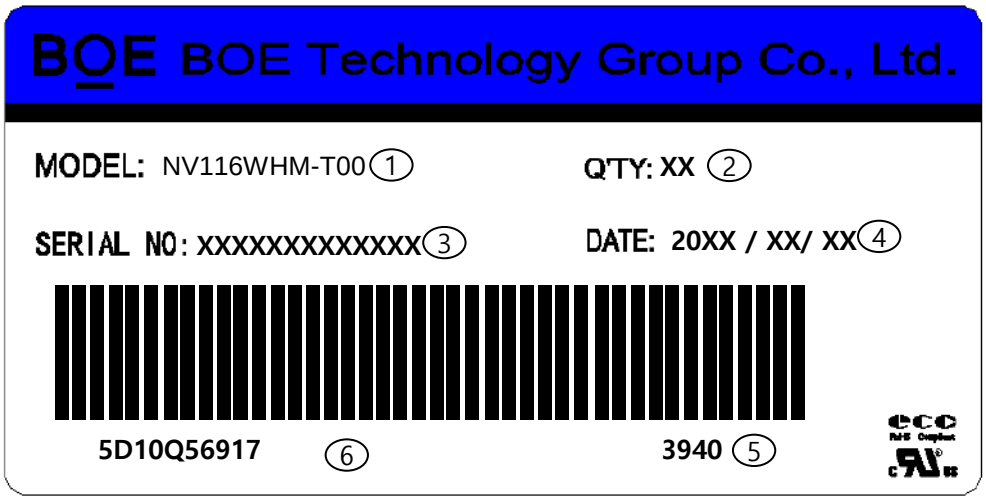
4. MDL ID对应条形码

5. 8S码对应二维码

LCM ID 编码规则:

序列号	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
代码	X	X	S	3	X	X	X	3	9	4	0	X	X	X	X	X	X
描述	GBN		等级	B3	年		月	FG-Code后4位				Serial Number					

(2) Box label



1. FG-CODE：NV116WHM-T00
2. Box 产品数量
3. Box ID
4. Box Packing 日期
5. FG-CODE 后四位：3940
6. 客户料号：5D10Q56917

Box ID 编码规则

序列号	1	2	3	4	5	6	7	8	9	10	11	12	13
代码	X	X	S	3	X	X	X	X	X	X	X	X	X
描述	GBN代码		等级	B3	年份		月	Rev	Serial Number				

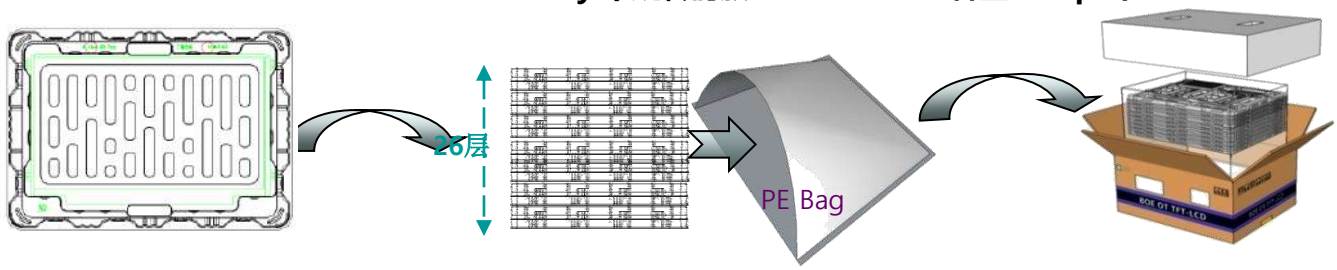
14.0 PACKING INFORMATION

14.1 Packing order

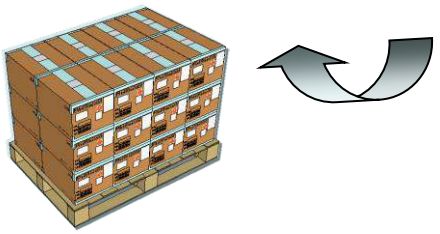
-. 将 1pcs MDL 平放入Tray,
CF 侧向上放置;
- 产品上放置1pcs 垫片

-. 将26pcs PET Tray 平放入PE Bag
顶部1pcs 空Tray
-. Tray 不旋转码放

- 将PET Tray堆码后平放入Inner Box
- 上下放置EPE Board
-. 容量：25pcs/Inner Box



-. 每个Pallet上放3层Box
1层8箱,共计24ea Box
-. Pallet外进行缠膜包装
-. 容量: 600pcs/Pallet



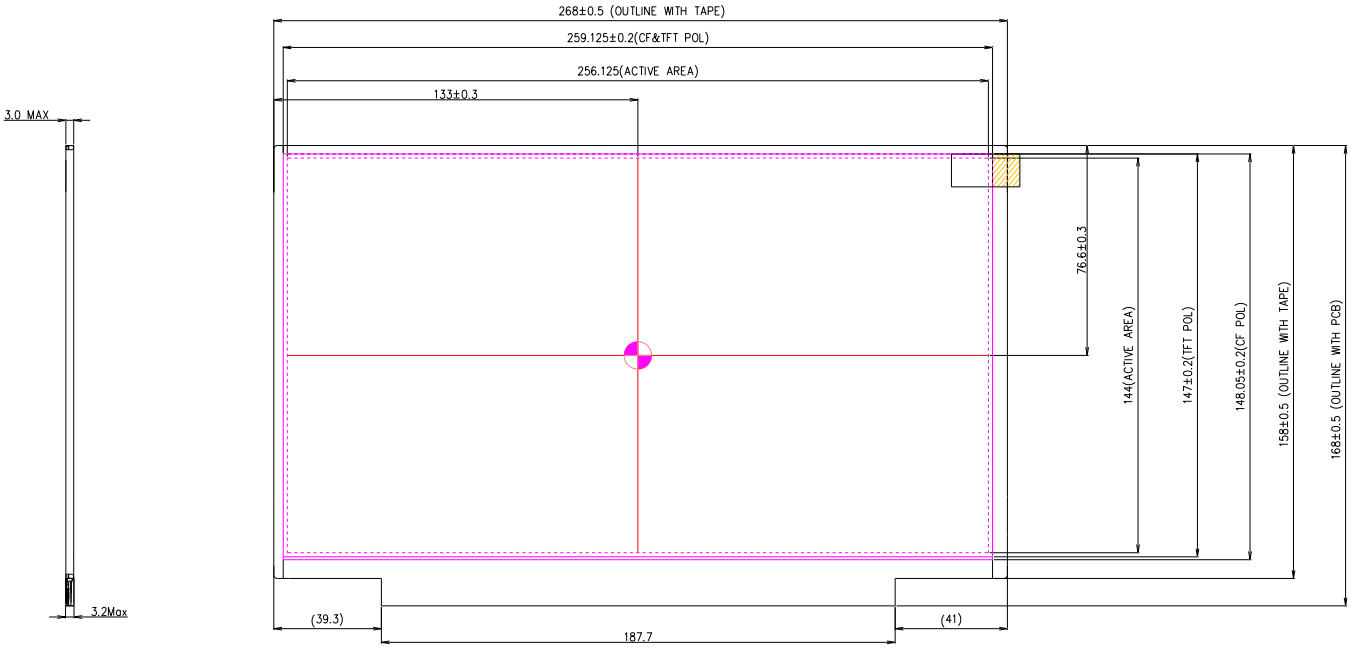
14.2 Notes

- Box Dimension: 24Box/Pallet
- Package Quantity in one Box: 25pcs

15.0 MECHANICAL OUTLINE DIMENSION

15.1 Outline Dimension

Figure 6. Outline Dimensions (Front view)

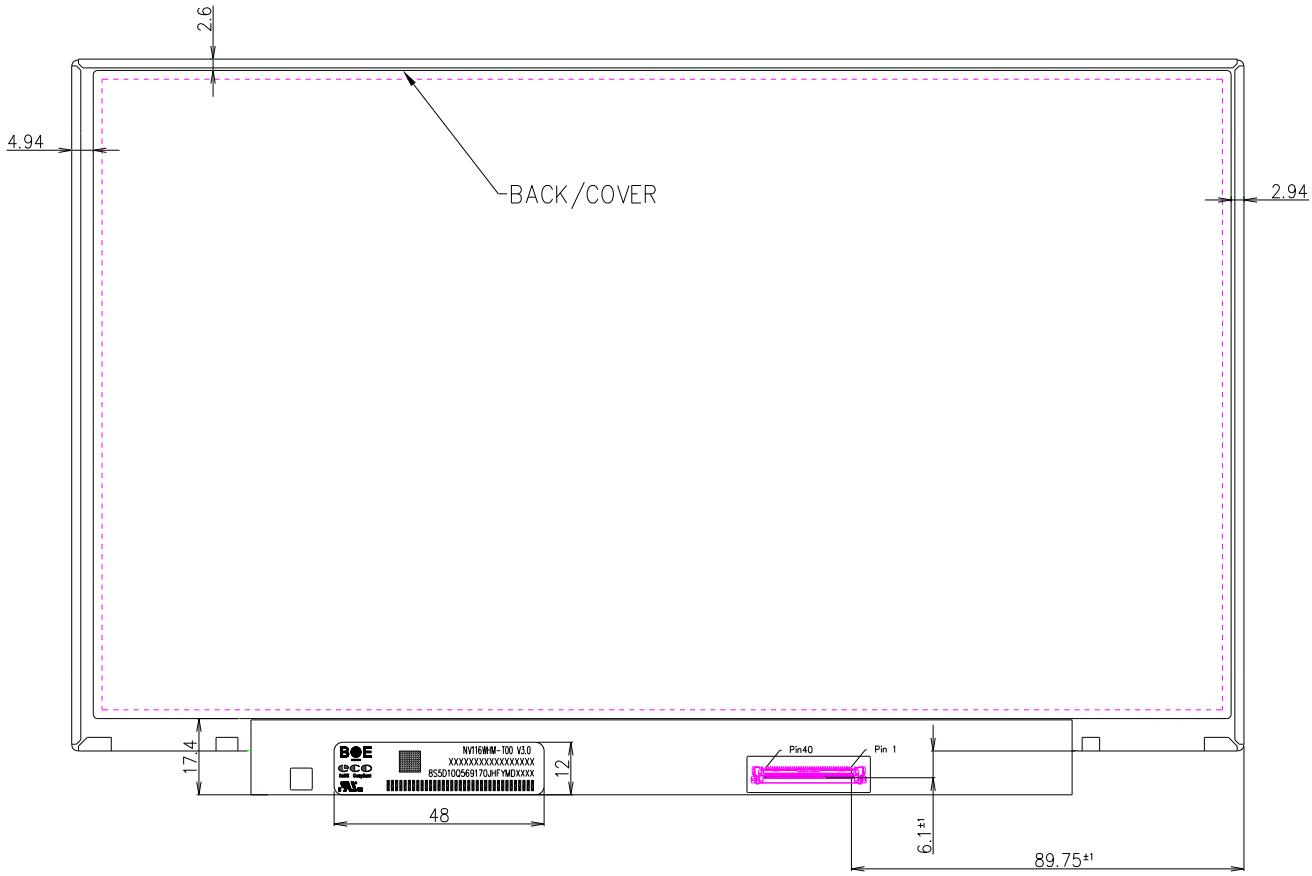


Side view

Front view

15.2 Total Solution Outline Dimension

Figure 7. Outline Dimensions (Rear view)



Back view

16.0 EDID Table

Address (HEX)	Function	Hex	Dec	crc	Input values.	Notes
00	Header	00	0		0	EDID Header
01		FF	255		255	
02		FF	255		255	
03		FF	255		255	
04		FF	255		255	
05		FF	255		255	
06		FF	255		255	
07		00	0		0	
08	ID Manufacturer Name	09	9		BOE	ID = BOE
09		E5	229			
0A	ID Product Code	70	112		1904	ID = 1904
0B		07	7			
0C	32-bit serial No.	00	0			
0D		00	0			
0E		00	0			
0F		00	0			
10	Week of manufacture	01	1		1	
11	Year of Manufacture	1B	27		2017	Manufactured in 2017
12	EDID Structure Ver.	01	1		1	EDID Ver 1.0
13	EDID revision #	03	3		3	EDID Rev. 0.3
14	Video input definition	95	149		-	digital signal/DP input
15	Max H image size	1A	26		26	26 cm (Approx)
16	Max V image size	0E	14		14	14 cm (Approx)
17	Display Gamma	78	120		2.2	Gamma curve = 2.2
18	Feature support	0A	10			RGB display, Preferred Timming mode
19	Red/Green low bits	DD	221		-	Red / Green Low Bits
1A	Blue/White low bits	C0	192		-	Blue / White Low Bits
1B	Red x high bits	96	150	602	0.588	Red (x) = 10010110(0.588)
1C	Red y high bits	59	89	356	0.348	Red (y) = 01011001(0.348)
1D	Green x high bits	5A	90	360	0.352	Green (x) =01011010(0.352)
1E	Green y high bits	9A	154	617	0.603	Green (y) = 10011010(0.603)
1F	Blue x high bits	29	41	163	0.160	Blue (x) = 00101001(0.160)
20	BLue y high bits	1C	28	114	0.112	Blue (y) = 00011100(0.112)
21	White x high bits	50	80	320	0.313	White (x) = 01010000 (0.313)
22	White y high bits	54	84	336	0.329	White (y) = 01010100 (0.329)
23	Established timing 1	00	0		-	
24	Established timing 2	00	0		-	

25	Established timing 3	00	0		-	
26	Standard timing #1	01	1			Not Used
27		01	1			
28	Standard timing #2	01	1			Not Used
29		01	1			
2A	Standard timing #3	01	1			Not Used
2B		01	1			
2C	Standard timing #4	01	1			Not Used
2D		01	1			
2E	Standard timing #5	01	1			Not Used
2F		01	1			
30	Standard timing #6	01	1			Not Used
31		01	1			
32	Standard timing #7	01	1			Not Used
33		01	1			
34	Standard timing #8	01	1			Not Used
35		01	1			
36	Detailed timing/monitor descriptor #1	6B	107		70.2	70.19208MHz Main clock
37		1B	27			
38		56	86		1366	Hor Active = 1366
39		64	100		100	Hor Blanking = 100
3A		50	80		-	4 bits of Hor. Active + 4 bits of Hor. Blanking
3B		00	0		768	Ver Active = 768
3C		1E	30		30	Ver Blanking = 30
3D		30	48		-	4 bits of Ver. Active + 4 bits of Ver. Blanking
3E		26	38		38	Hor Sync Offset = 38
3F		16	22		22	H Sync Pulse Width = 22
40		44	68		4	V sync Offset = 4 line
41		00	0		4	V Sync Pulse width : 4 line
42		00	0		256	Horizontal Image Size = 256 mm (Low 8 bits)
43		90	144		144	Vertical Image Size = 144 mm (Low 8 bits)
44		10	16		-	4 bits of Hor Image Size + 4 bits of Ver Image Size
45		00	0		0	Hor Border (pixels)
46		00	0		0	Vertical Border (Lines)
47		1A	26			Refer to right table

48	Detailed timing/monitor descriptor #2	00	0		0.0	0MHz Main clock
49		00	0			
4A		00	0		0	Hor Active = 0
4B		00	0		0	Hor Blanking = 0
4C		00	0		-	4 bits of Hor. Active + 4 bits of Hor. Blanking
4D		00	0		0	Ver Active = 768
4E		00	0		0	Ver Blanking = 0
4F		00	0		-	4 bits of Ver. Active + 4 bits of Ver. Blanking
50		00	0		0	Hor Sync Offset = 0
51		00	0		0	H Sync Pulse Width = 0
52		00	0		0	V sync Offset = 0 line
53		00	0		0	V Sync Pulse width : 0 line
54		00	0		0	Horizontal Image Size = 0 mm (Low 8 bits)
55		00	0		0	Vertical Image Size = 0 mm (Low 8 bits)
56		00	0		-	4 bits of Hor Image Size + 4 bits of Ver Image Size
57		00	0		0	Hor Border (pixels)
58		00	0		0	Vertical Border (Lines)
59		0	0			
5A	Detailed timing/monitor descriptor #3	00	0			ASCII Data Sting Tag
5B		00	0			
5C		00	0			
5D		FE	254			
5E		00	0			
5F		42	66		B	Manufacture name : BOE HF
60		4F	79		O	
61		45	69		E	
62		20	32			
63		48	72		H	
64		46	70		F	
65		0A	10			
66		20	32			
67		20	32			
68		20	32			
69		20	32			
6A		20	32			
6B		20	32			

6C	Detailed timing/monitor descriptor #4	00	0			Product Name Tag (ASCII)
6D		00	0			
6E		00	0			
6F		FE	254			
70		00	0			
71		4E	78		N	Model name : NV116WHM-T00
72		56	86		V	
73		31	49		1	
74		31	49		1	
75		36	54		6	
76		57	87		W	
77		48	72		H	
78		4D	77		M	
79		2D	45		-	
7A		54	84		T	
7B		30	48		0	
7C		30	48		0	
7D		0A	10			
7E	Extension flag	00	0			
7F	Checksum	90	144	144	-	