



PROPRIETARY NOTE

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TITLE : HT121X02-100
Product Specification

HYDIS Technologies

SPEC. NUMBER S864-1440	PRODUCT GROUP TFT LCD	REV. 0	ISSUE DATE 2011. 06.03	PAGE 1 OF 32
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PRODUCT GROUP

REV

ISSUE DATE

TFT LCD PRODUCT

0

2011. 06.03

REVISION HISTORY

REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
0		▪ Initial Release	'11. 06. 03	B.M. Seo

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S864-1440

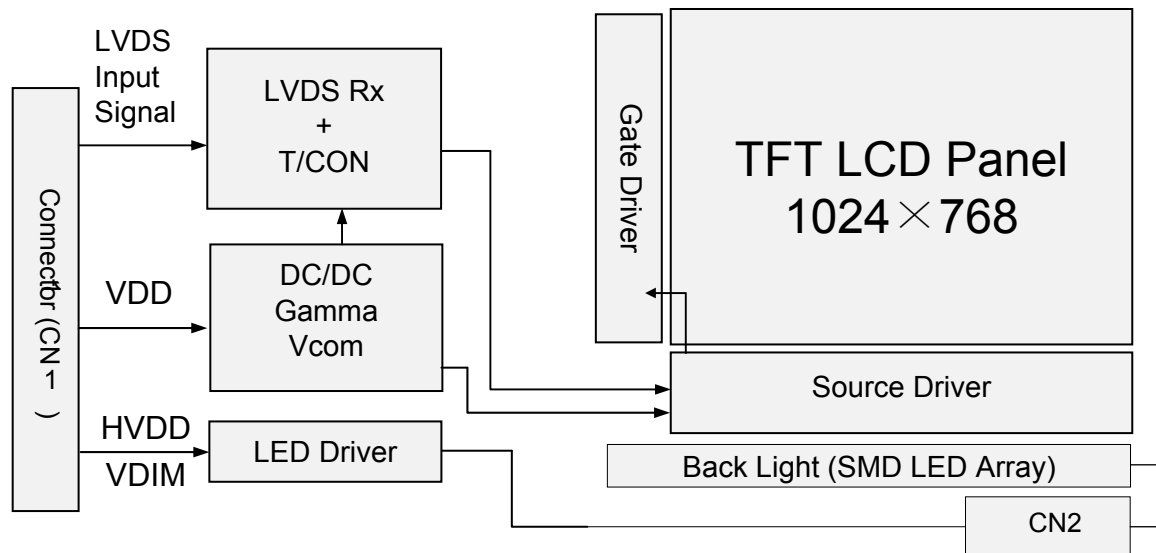
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1.0 GENERAL DESCRIPTION

1.1 Introduction

HT121X02-100 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 12.1 inch diagonally measured active area with XGA resolutions (1024 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.



- Thin and light weight
- 3.3 V power supply
- 12V Back-light Power Supply
- 1 Channel LVDS Interface
- SMD LED (Bottom side/Horizontal Direction)
- 262,144 colors
- Data enable signal mode
- No Mounting
- Bezelless
- On Board EDID chip
- Green Product (RoHS)
- Anti-Glare polarizer product

1.3 Application

- Notebook PC

1.4 General Specifications

<Table 1. General Specifications>

Parameter	Specification	Unit	Remarks
Active area	245.76 (H) × 184.32 (V)	mm	
Number of pixels	1024 (H) × 768 (V)	pixels	
Pixel pitch	0.240 (H) × 0.240 (V)	mm	
Pixel arrangement	RGB Vertical stripe		
Display colors	262,144	colors	
Display mode	Normally white		
Dimensional outline	256.8 x 198.2 x 2.6(4.4) Typ.	mm	Note1.
Weight	179 Typ.	g	
Back-light	LED (40EA) Array		
Surface treatment	Anti Glare Coating		

Note 1 : The numbers in parentheses refer to thickness of PCB side.

2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

<Table 2. Absolute Maximum Ratings>

Ta=25+/-2°C

Parameter	Symbol	Min.	Max.	Unit	Remarks
Logic Power Supply Voltage	V _{DD}	-0.3	4.0	V	
Logic Power Supply Voltage	V _{IN}	-0.3	V _{DD} +0.3	V	
Back-light Power Supply Voltage	HV _{DD}	-0.3	40	V	
Back-light LED Current	I _{LED}	-	30	mA	Note 1
Back-light LED Reverse Voltage	V _R	-	5	V	
Operating Temperature	T _{OP}	0	+50	°C	Note 1, Note 2
Storage Temperature	T _{SP}	-20	+60	°C	

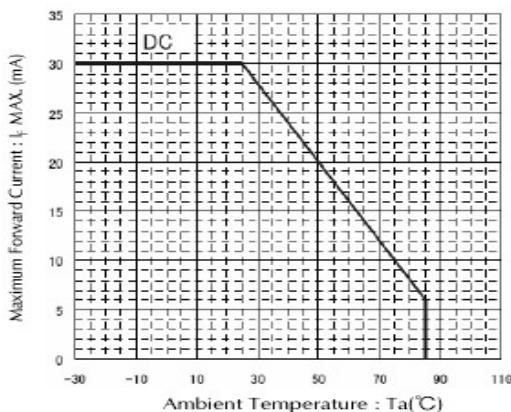
Note 1. Ambient temperature vs allowable forward current are shown in the figure below.

Note 2. Temperature and relative humidity range are shown in the figure below.

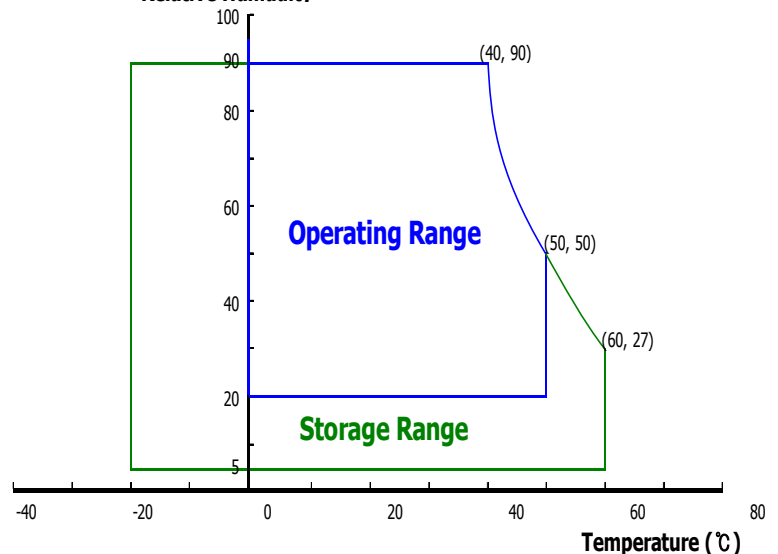
90% RH Max. (40°C ≥ Ta)

Maximum wet - bulb temperature at 39°C or less. (> 40°C) No condensation.

Ambient Temperature vs. Maximum Forward Current



Relative Humidity



3.0 ELECTRICAL SPECIFICATIONS

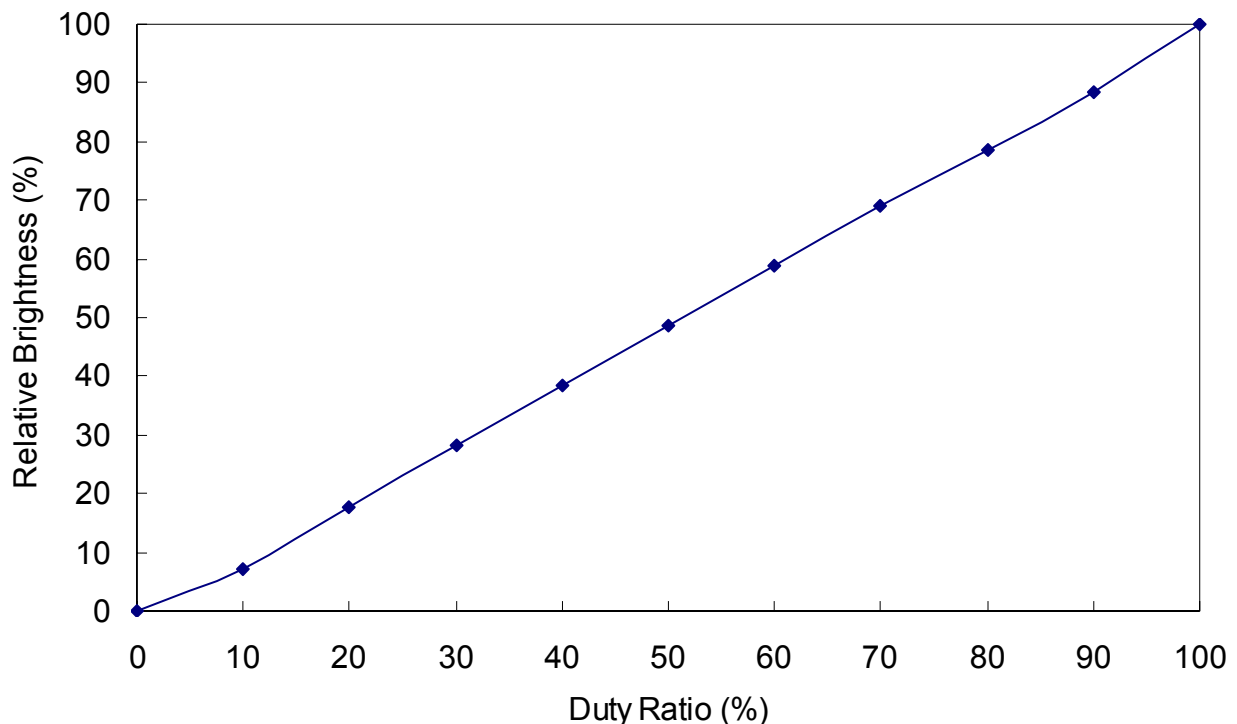
3.1 Electrical Specifications

< Table 3. Electrical Specifications >

Parameter		Min.	Typ.	Max.	Unit	Remarks
Logic Power Supply Voltage	V_{DD}	3.0	3.3	3.6	V	Note 1
Logic Power Supply Current	I_{DD}	-	250	-	mA	Note 1
Back-light Power Supply Voltage	HV_{DD}	7.0	12.0	20	V	Note 2
Back-light Power Supply Current	I_{HVDD}	-	238	-	mA	Note 2, 3
LED Driver's Efficiency	η	-	85	-	%	Note 2, 3
Back-light PWM Frequency	F_{PWM}	200	320	350	Hz	
High Level PWM Signal Voltage	V_{PWMH}	2.1	3.3	5.0	V	
Low Level PWM Signal Voltage	V_{PWML}	-	0	0.6	V	
High Level Differential Input Signal Voltage	V_{IH}	-	-	+100	mV	$V_{CM} = 1.2V$
Low Level Differential Input Signal Voltage	V_{IL}	-100	-	-	mV	
Back-light LED Voltage / Back-light LED Total Voltage	V_{LED} / V_{BL}	-	3.2/ 32	3.4/ 34	V	
Back-light LED Current / Back-light LED Total Current	I_{LED} / I_{BL}	-	19/ 76	20/ 80	mA	
Life Time		12,000	-	-	Hrs	Note 5
Power Consumption	P_D	-	0.83	-	W	Note 1
	P_{LED}	-	2.86	3.20	W	Note 3
	P_{total}	-	3.69	-	W	Note 1, 3

- 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°C.
a) Typ : Window XP pattern, b) Max : Vertical Sub line pattern
 2. The power supply voltage and current is measured and specified at the interface connector of LCM including LED Driver.
 3. Reference value, which is measured with LED Driver for 12V.
 4. Calculated value for reference ($V_{LED} \times I_{LED} \times \# \text{ of LEDs (40EA) }$).
 5. End of Life shall be determined by the time when any of the following is satisfied under continuous lighting at 25°C and $I_{LED} = 19\text{mA}$.
 - Intensity drops to 50% of the Initial Value (Luminance Spec.)
 - Based on LED

3.2 PWM Duty Ratio vs Brightness



4.0 OPTICAL SPECIFICATIONS

4.1 Overview

The test of optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = $25 \pm 2^\circ\text{C}$) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5A) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of Θ and Φ equal to 0° . We refer to $\Theta_{\phi=0}$ ($= \Theta_3$) as the 3 o'clock direction (the "right"), $\Theta_{\phi=90}$ ($= \Theta_{12}$) as the 12 o'clock direction ("upward"), $\Theta_{\phi=180}$ ($= \Theta_9$) as the 9 o'clock direction ("left") and $\Theta_{\phi=270}$ ($= \Theta_6$) as the 6 o'clock direction ("bottom"). While scanning Θ and/or Φ , the center of the measuring spot on the Display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement. V_{DD} shall be $3.3 \pm 0.3\text{V}$ at 25°C . Optimum viewing angle direction is 6 o'clock.

4.2 Optical Specifications

<Table 4. Optical Specifications>

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Viewing Angle Range	Horizontal	Θ_3	CR > 10	-	40	-	Deg.	Note 1
		Θ_9		-	40	-	Deg.	
	Vertical	Θ_{12}		-	10	-	Deg.	
		Θ_6		-	30	-	Deg.	
Luminance Contrast Ratio		CR	$\Theta = 0^\circ$	220	250	-		Note 2
Luminance of White	5 Points	Y_w		220	250	-	cd/m ²	
White Luminance Uniformity	5 Points	ΔY_5		80	-	-	%	Note 3
	13 Points	ΔY_{13}		60	-	-		
Color Chromaticity	White	W_x		0.284	0.314	0.344		Note 4
		W_y		0.305	0.335	0.365		
	Red	R_x		0.555	0.585	0.615		
		R_y		0.327	0.357	0.387		
	Green	G_x		0.315	0.345	0.375		
		G_y		0.538	0.568	0.598		
Blue	B_x	0.115	0.145	0.175				
	B_y	0.076	0.106	0.136				
Color Reproduction			-	45	-	%		
Response Time	Total	$(T_r + T_d)$	Ta= 25°C $\Theta = 0^\circ$	-	35	-	ms	Note 5
Cross Talk	CT		$\Theta = 0^\circ$	-	-	2.0	%	Note 6



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Note : 1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing 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 shown in page 11).

2. Contrast measurements shall be made at viewing angle of $\Theta = 0^\circ$ 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 shown in page 11)
Luminance Contrast Ratio (CR) is defined mathematically.

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

3. The White luminance uniformity on LCD surface is then expressed. (See FIGURE 2~3 shown in page 12)

$$\text{Uniformity } \Delta Y = \frac{\text{Minimum Luminance of 5(or 13) points}}{\text{Maximum Luminance of 5(or 13) points}} \times 100 (\%)$$

4. The color chromaticity coordinates specified in Table 4 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.

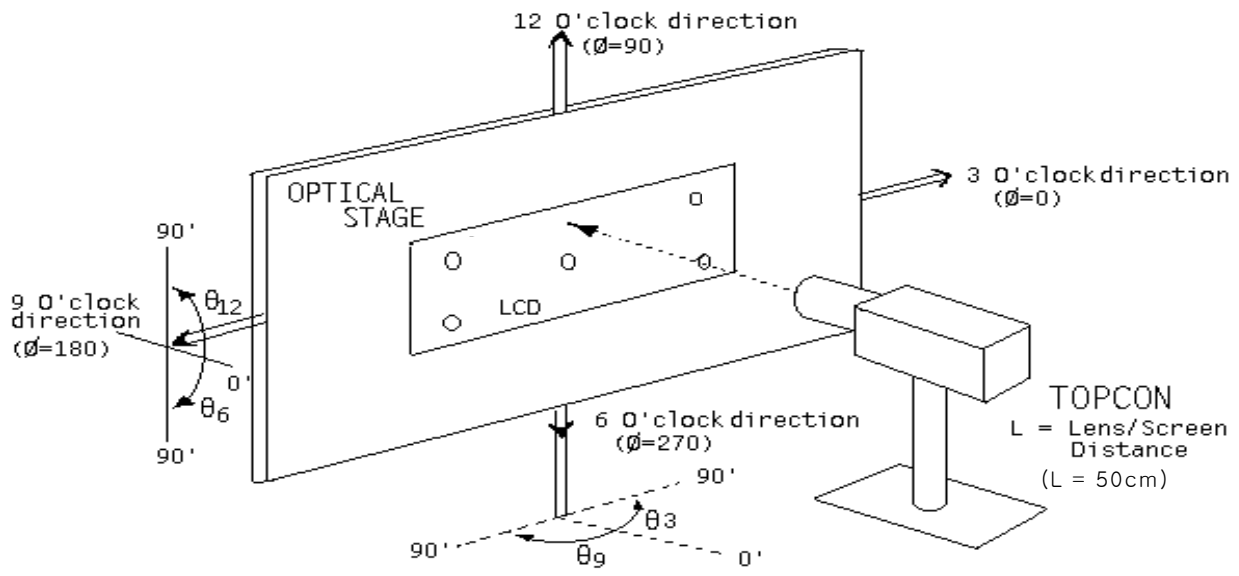
5. The electro-optical response time measurements shall be made as FIGURE 4 shown in page 13 by switching the "data" input signal OFF and ON. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td. (See FIGURE 4 shown in page 13)

6. 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 shown in page 13)

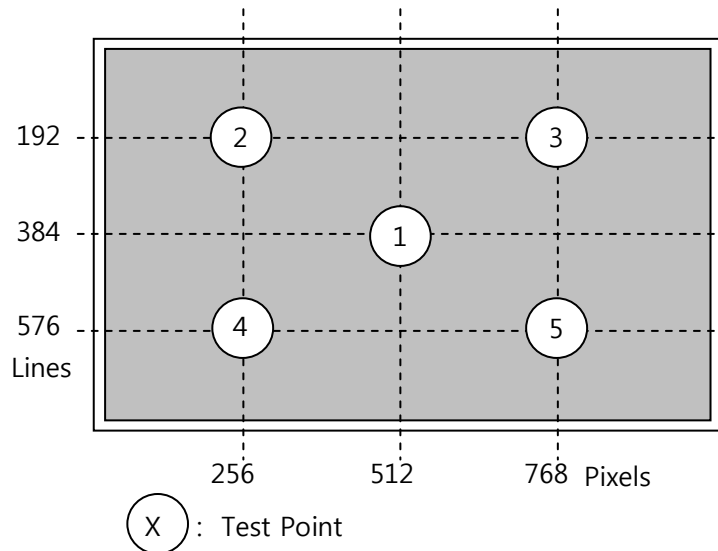
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4.3 Optical Measurements

Figure 1. Measurement Set Up



<Indoor>

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


Note.

Luminance of white is defined as luminance values of 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.

* $Y_w = (\text{Sum of 5 Points Luminance} / 5)$

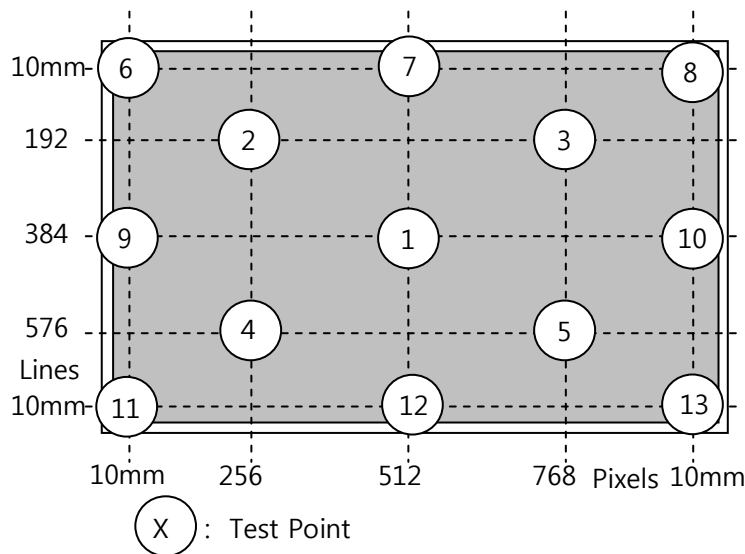
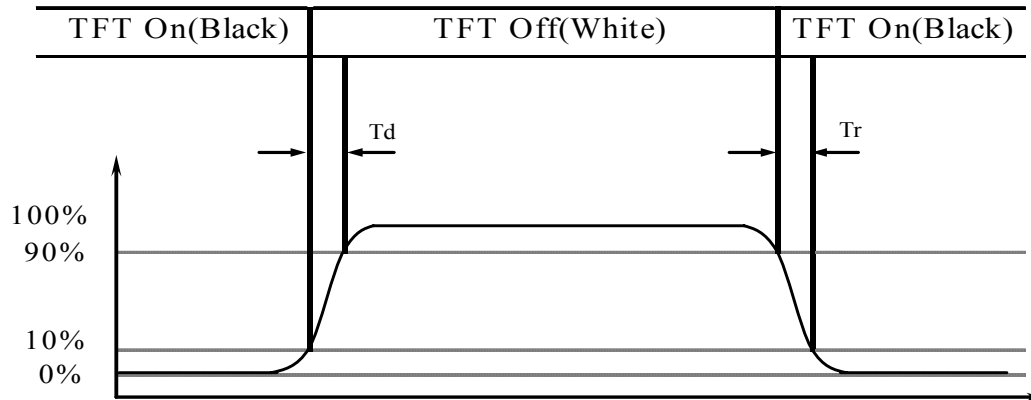
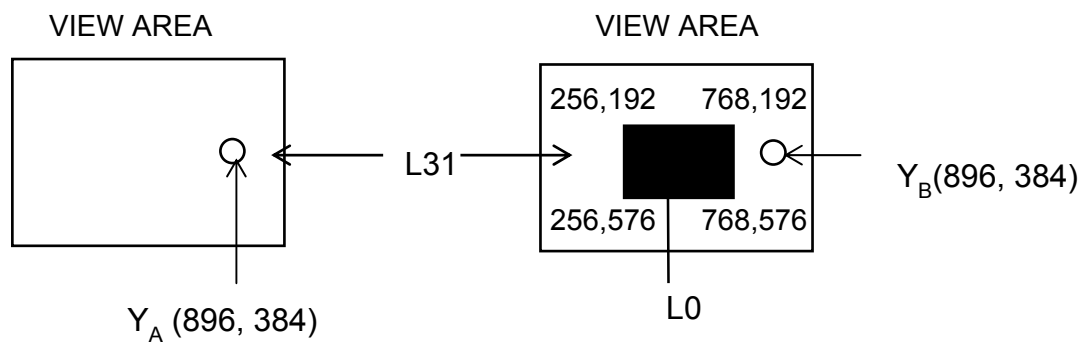
Figure 3. Uniformity Measurement Locations (13 points)


Figure 4. Response Time Testing

Figure 5. Cross Modulation Test Description


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

Where:

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

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

The location measured will be exactly the same in both patterns

5.0 INTERFACE CONNECTION.

5.1 Electrical Interface Connection

CN1	Interface connector	IPEX/ 20455-040E_40pin or equivalent
	User side connector	IPEX/ 20453-040T_40pin or equivalent

<Table 5. Electrical Interface Connection>

Pin No.	Symbol	Function	Pin No.	Symbol	Function
1	NC	No Connection	21	NC	No Connection
2	VCC	Logic & driver power : +3.3V	22	GND	LCM Ground
3	VCC	Logic & driver power : +3.3V	23	NC	No Connection
4	V EEDID	DDC Power (3.3V)	24	NC	No Connection
5	NC	No Connection	25	GND	LCM Ground
6	Clk EEDID	DDC Clock	26	NC	No Connection
7	DATA EEDID	DDC Data	27	NC	No Connection
8	ORX0-	LVDS Negative data signal (-)	28	GND	LCM Ground
9	ORX0+	LVDS Positive data signal (+)	29	NC	No Connection
10	GND	LCM Ground	30	NC	No Connection
11	ORX1-	LVDS Negative data signal (-)	31	GND	Ground (LED Backlight Ground)
12	ORX1+	LVDS Positive data signal (+)	32	GND	Ground (LED Backlight Ground)
13	GND	LCM Ground	33	GND	Ground (LED Backlight Ground)
14	ORX2-	LVDS Negative data signal (-)	34	NC	No Connection
15	ORX2+	LVDS Positive data signal (+)	35	PWM	PWM Brightness Control
16	GND	LCM Ground	36	LED_EN	LED Backlight On/Off
17	ORXC-	LVDS Negative clock signal (-)	37	NC	No Connection
18	ORXC+	LVDS Positive clock signal (+)	38	VLED	LED Backlight Power
19	GND	LCM Ground	39	VLED	LED Backlight Power
20	NC	No Connection	40	VLED	LED Backlight Power

5.2 LVDS Interface
LVDS Transmitter : THC63LVDM83A

<Table 6. LVDS Interface>

Input signal	Transmitter		Interface		IPEX 20455-040E_40p	Remark
	Pin No	Pin No	System (Tx)	TFT-LCD (Rx)	Pin No.	
R0	51	48 47	OUT0- OUT0+	IN0- IN0+	8 9	
R1	52					
R2	54					
R3	55					
R4	56					
R5	3					
G0	4	46 45	OUT1- OUT1+	IN1- IN1+	11 12	
G1	6					
G2	7					
G3	11					
G4	12					
G5	14					
B0	15	42 41	OUT2- OUT2+	IN2- IN2+	14 15	
B1	19					
B2	20					
B3	22					
B4	23					
B5	24					
HSYNC	27	40	CLKOUT-	CLKIN-	17	
VSYNC	28					
DE	30	39	CLKOUT+	CLKIN+	18	
MCLK	31					

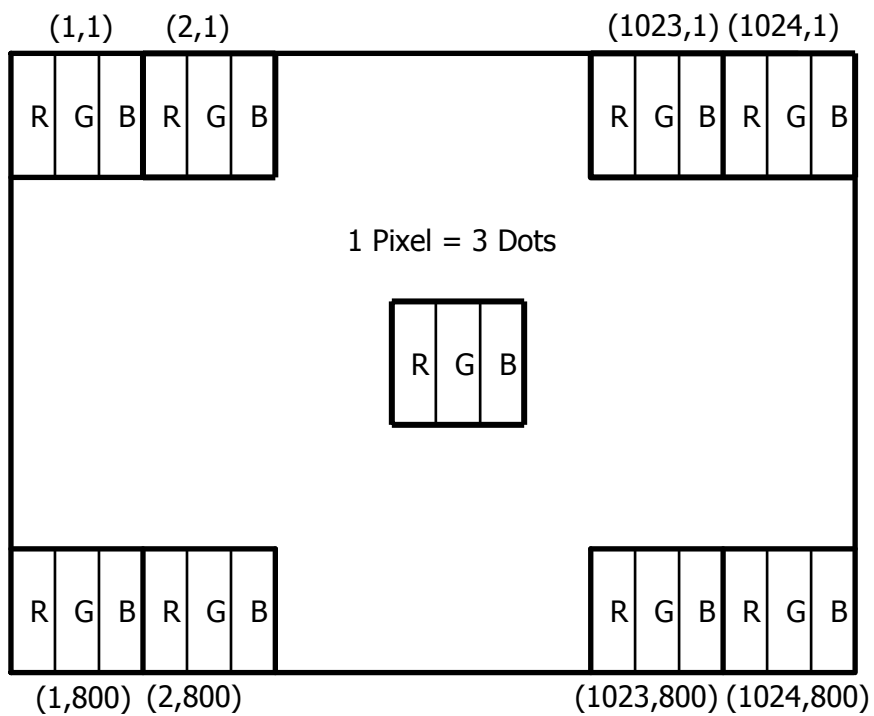
5.3 Back-light Interface

CN2 LED FPC Connector (20397-008E(8pin), Manufactured by IPEX)

<Table 7. Back-light Interface>

Pin No.	Symbol	Function	Remark
1	Anode1	LED Anode Power Supply	LED Anode Power Supply (3.2V X 10EA = 32V)
2	NC	Non-Connection	
3	NC	Non-Connection	
4	Cathode1	LED Cathode Power Supply	LED Cathode Power Supply
5	Cathode2	LED Cathode Power Supply	
6	Cathode3	LED Cathode Power Supply	
7	Cathode4	LED Cathode Power Supply	
8	NC	Non-Connection	

5.4 Data Input Format



6.0. SIGNAL TIMING SPECIFICATIONS

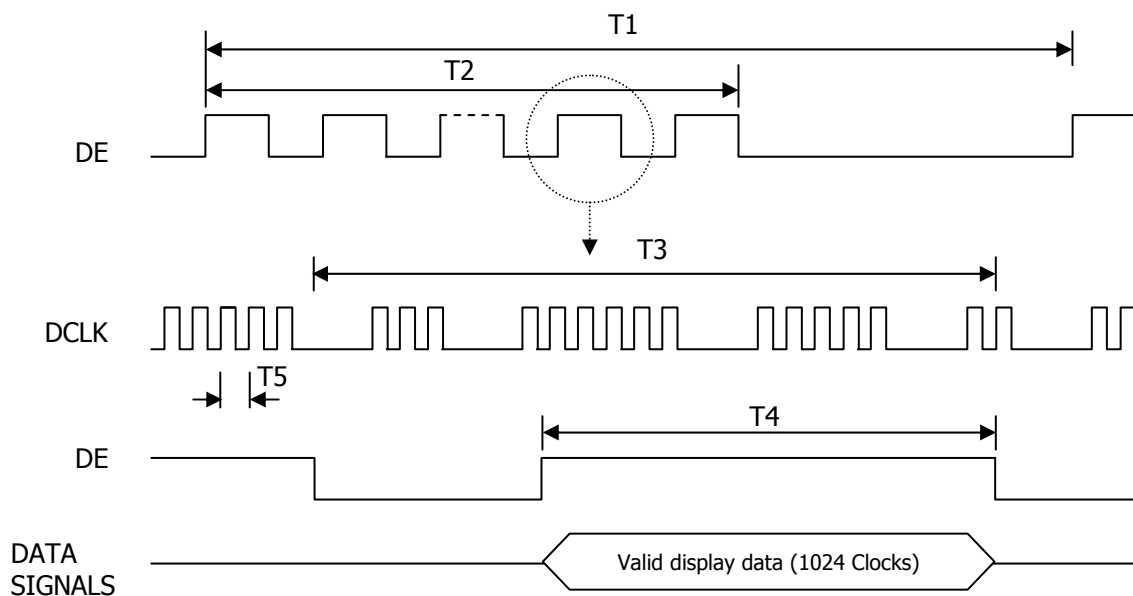
6.1 The 12.1" WXGA LCM is operated by the only DE (Data enable) mode (LVDS Transmitter Input)

<Table 8. Signal Timing Specifications>

Item	Symbol	Min.	Typ.	Max.	Unit
Frame Period	T1	778	790	-	Lines
Vertical Display Period	T2	-	768	-	Lines
One line Scanning Period	T3	1124	1184	-	Clocks
Horizontal Display Period	T4	-	1024	-	Clocks
Clock Frequency	1/T5	-	56.12	-	MHz

7.0 SIGNAL TIMING WAVEFORMS

7.1 Timing Waveforms of Interface Signal

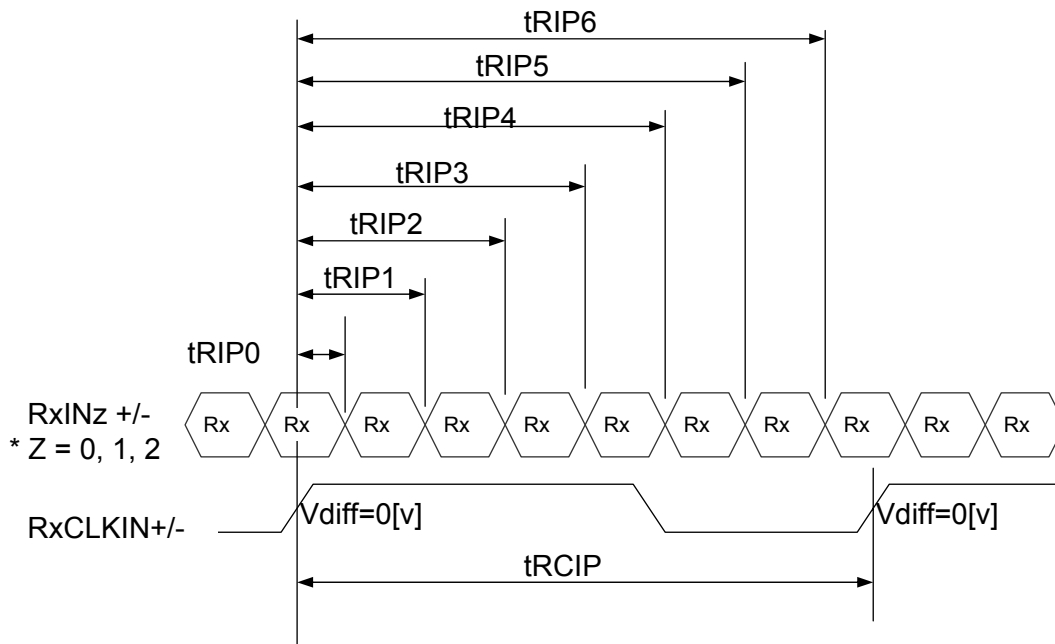


7.2 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter

< Table 9. LVDS Rx Interface Timing Specification >

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
CLKIN Period	tRCIP	12.50	17.82	25.00	nsec	
Input Data 0	tRIP0	-0.4	0.0	+0.4	nsec	
Input Data 1	tRIP1	tRCIP/7-0.4	tRCIP/7	tRCIP/7+0.4	nsec	
Input Data 2	tRIP2	2 × tRCIP/7-0.4	2 × tRCIP/7	2 × tRCIP/7+0.4	nsec	
Input Data 3	tRIP3	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	tRIP5	5 × tRCIP/7-0.4	5 × tRCIP/7	5 × tRCIP/7+0.4	nsec	
Input Data 6	tRIP6	6 × tRCIP/7-0.4	6 × tRCIP/7	6 × tRCIP/7+0.4	nsec	





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

Each color is displayed in sixty-four gray scales from a 6 bit data signal input. A total of 262,144 colors are derived from the resultant 18 bit data.

< Table 10. Input signal, Basic display colors & Gray scale of colors >

Colors & Gray Scale	Red Data						Green Data						Blue Data						
	R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0	
Basic Colors	Black	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	1	1	1	1	1	1	
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	
	Cyan	0	0	0	0	0	0	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	
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	
	White	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	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
	Darker	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
	△	↓						↓						↓					
	▽	↓						↓						↓					
	Brighter	1	1	1	1	0	1	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	
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	0	0	0	1	0	0	0	0	0	0	
	Darker	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
	△	↓						↓						↓					
	▽	↓						↓						↓					
	Brighter	0	0	0	0	0	0	1	1	1	1	0	1	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	
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	0	0	0	1	
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
	△	↓						↓						↓					
	▽	↓						↓						↓					
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	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	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	
	Darker	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	
	△	↓						↓						↓					
	▽	↓						↓						↓					
	Brighter	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	0	1	
	▽	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	0	
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

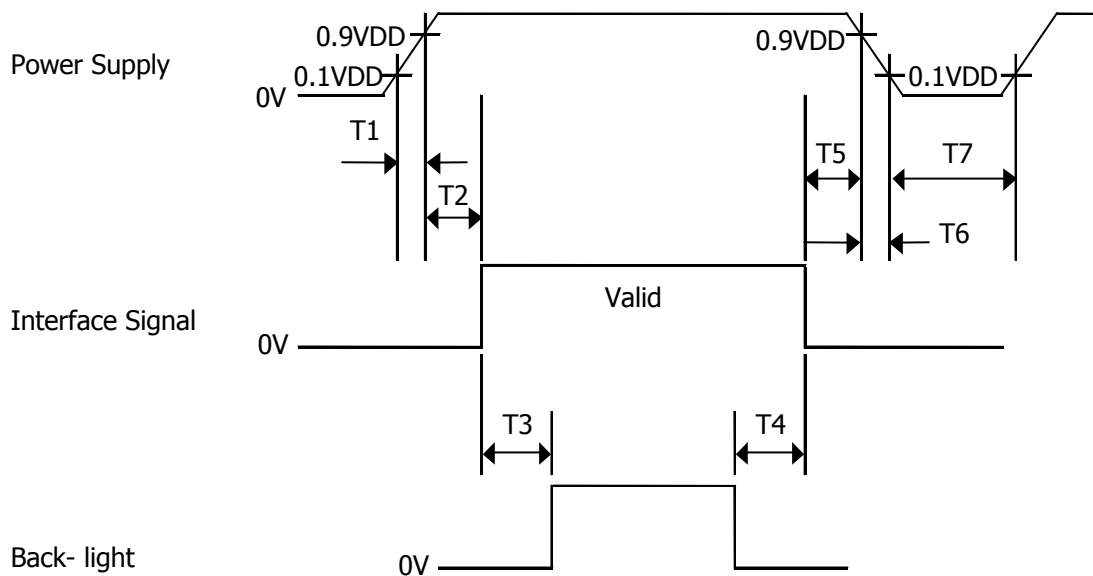
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9.0 POWER SEQUENCE

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



- $0 < T1 \leq 10 \text{ ms}$
- $0 < T2 \leq 50 \text{ ms}$
- $200 \text{ ms} \leq T3$
- $200 \text{ ms} \leq T4$
- $0 \leq T5 \leq 50 \text{ ms}$
- $0 \leq T6 \leq 10 \text{ ms}$
- $150 \text{ ms} \leq T7$

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.

10.0 MECHANICAL CHARACTERISTICS

10.1 Dimensional Requirements

Figure 6 & 7 (located in 11.0) shows mechanical outlines for the model

< Table 11. Dimensional Requirements >

Parameter	Specification	Unit
Active Area	245.76(H) X 184.32(V)	mm
Number of pixels	1024(H) X 768(V) (1 pixel = R + G + B dots)	
Pixel pitch	0.240(H) X 0.240(V)	
Pixel arrangement	RGB Vertical stripe	
Display colors	262,144	
Display mode	Normally White	
Outline dimension	$256.8 \pm 0.3(H) \times 198.2(V) \pm 0.3 \times 2.6(4.4)(D) \pm 0.3$	mm
Weight	179 Typ.	g
Back-light	SMD LED (40EA) Array	

10.2 Anti-Glare and Polarizer Hardness.

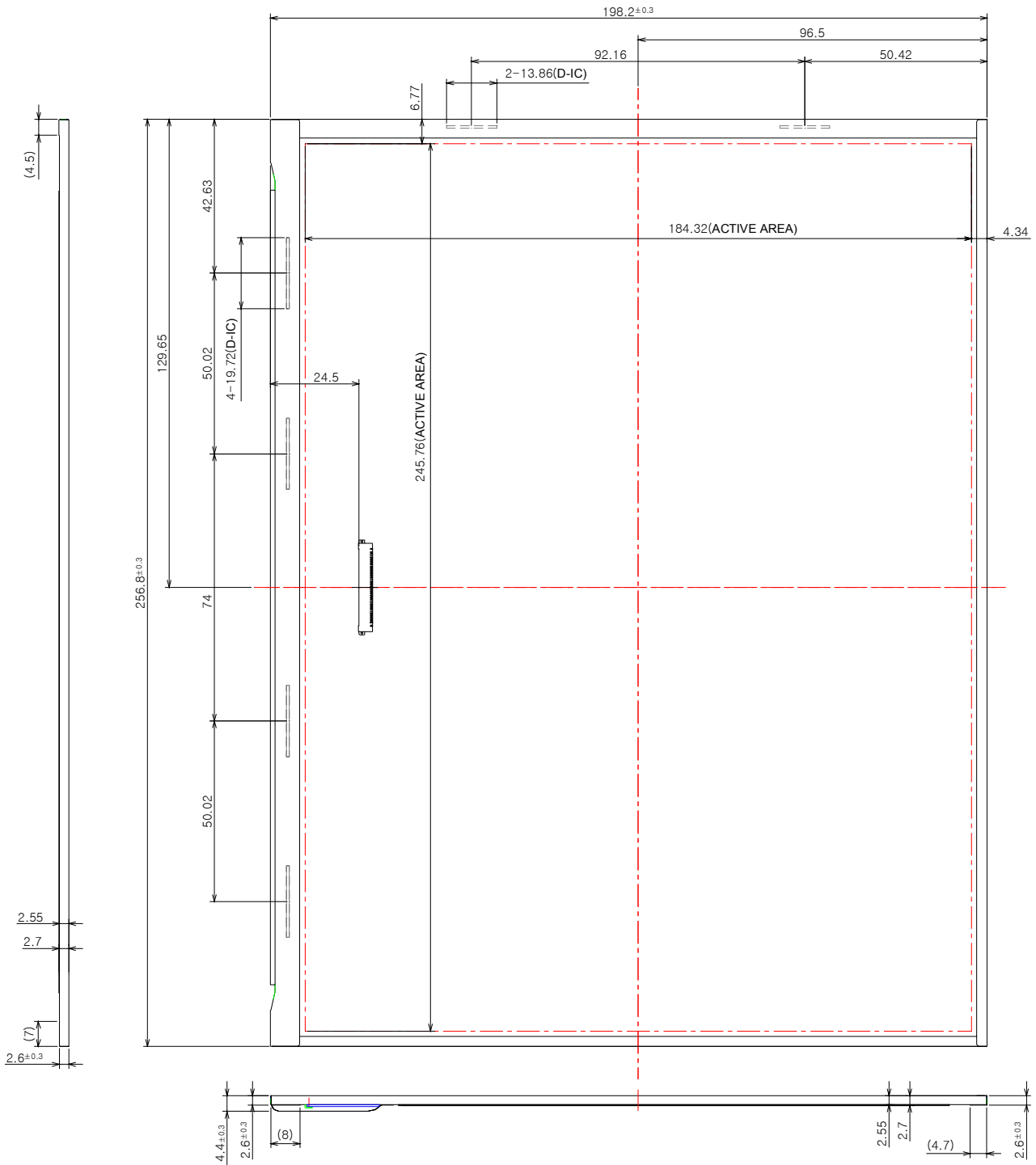
The surface of the LCD has an anti-glare coating to minimize reflection and a coating to reduce scratching.

10.3 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 150lux. The manufacture shall furnish limit samples of the panel showing the light leakage acceptable.

11.0 Mechanical Drawing

Figure 6. TFT-LCD Module Outline Dimension (Front View)



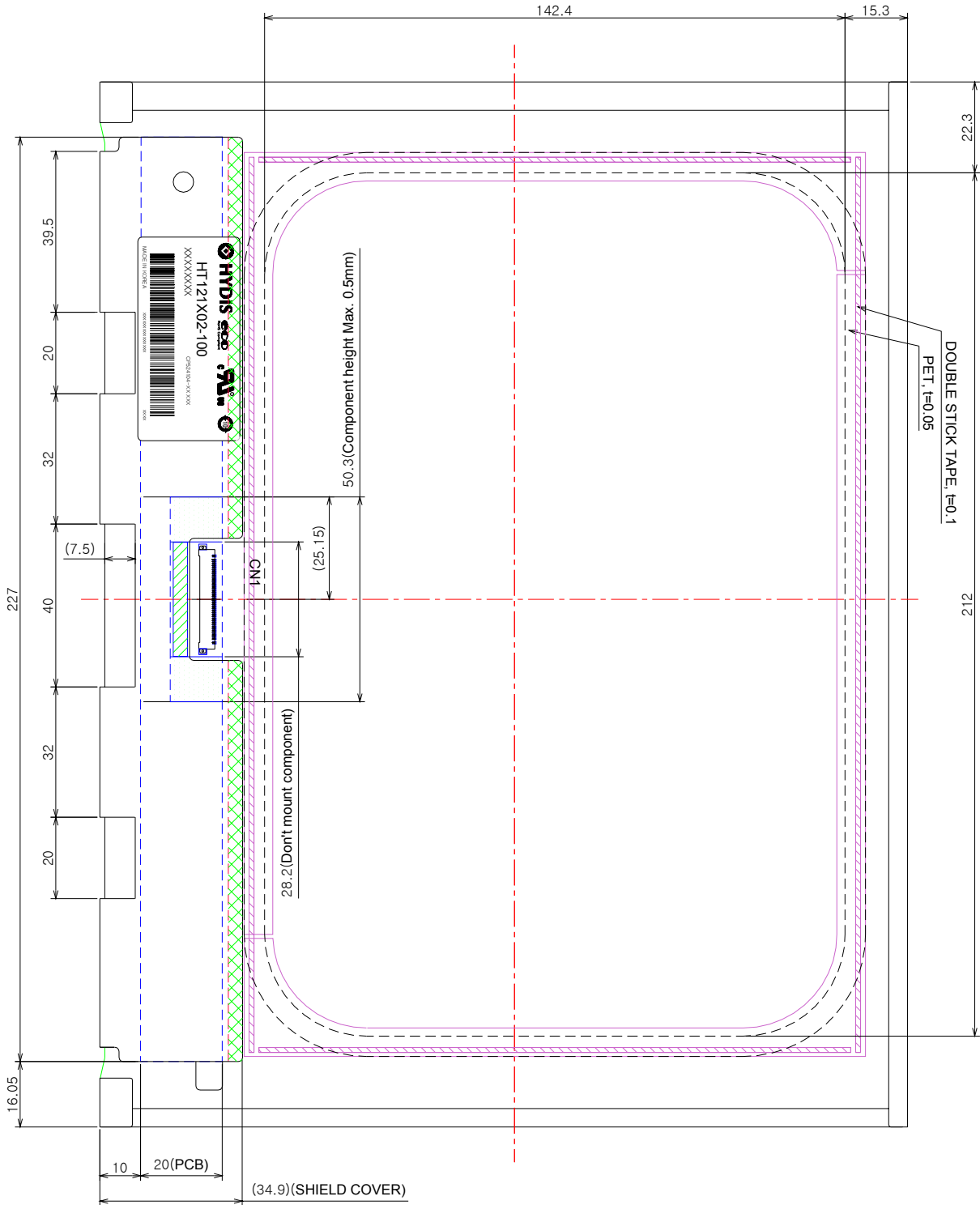
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Figure 7. TFT-LCD Module Outline Dimensions (Rear view)



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12.0 RELIABILITY TEST

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

<Table 12. Reliability Test>

No	Test Item	Conditions
1	High temperature storage test	Ta = 60 °C, 240 hrs
2	Low temperature storage test	Ta = -20 °C, 240 hrs
3	High temperature & high humidity operation test	Ta = 50 °C, 80%RH, 240hrs
4	High temperature operation test	Ta = 50 °C, 240 hrs
5	Low temperature operation test	Ta = 0 °C, 240 hrs
6	Thermal shock	Ta = -20 °C ↔ 60 °C (30 min), 100 cycle
7	Vibration test (non-operating)	Frequency : 10~500Hz Gravity/AMP : 1.5G Period : X,Y,Z 30min
8	Shock test (non-operating)	Gravity : 220G Pulse width : 2ms, half sine wave ±X, ±Y, ±Z Once for each direction
9	Electro-static discharge test (non-operating)	Air : 150pF, 330ohm, 15KV Contact : 150pF, 330ohm, 8KV

13.0 HANDLING & CAUTIONS

13.1 Cautions when taking out the module

- Pick the pouch only, when taking out module from a shipping package.

13.2 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 (epoxy) 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.



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13.3 Cautions for the operation

- When the module is operating, do not lose MCLK, DE signals. If any one of these signals were lost, the LCD panel would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.

13.4 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.

13.5 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.

13.6 Other cautions

- Do not re-adjust variable resistor or switch etc.
- When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

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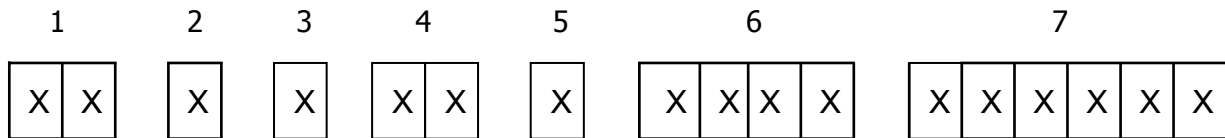
14.0 LABELS

14.1 Product Label



Size : 50 x 25

HYDIS Barcode



No 1. Control Number

No 2. Rank / Grade

No 3. Line Classification (HYDIS : H)

No 4. Year (5 : 2005, 6 : 2006, ...)

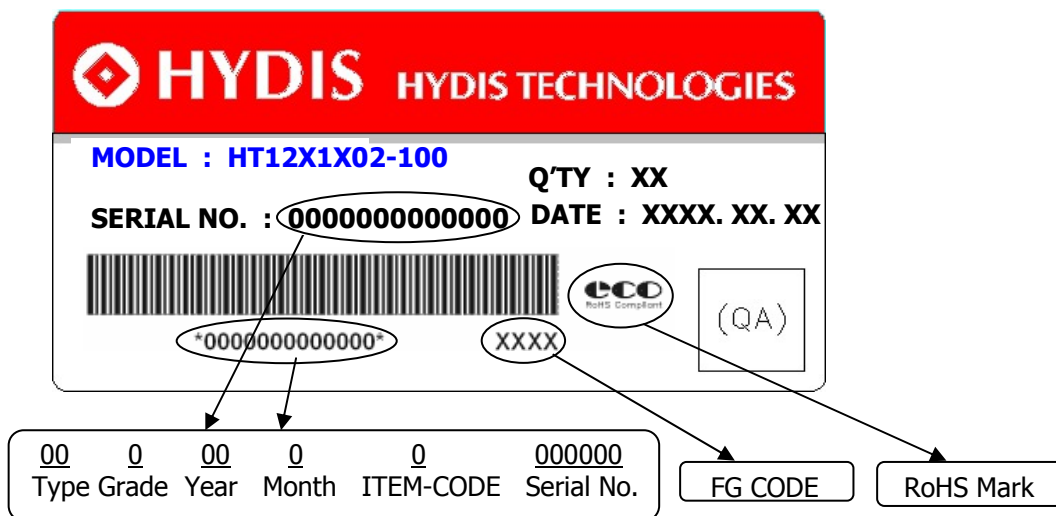
No 5. Month (1, 2, 3, ..., 9, X, Y, Z)

No 6. FG Code

No 7. Serial Number

14.2 Packing Label

Size : 108 x 56



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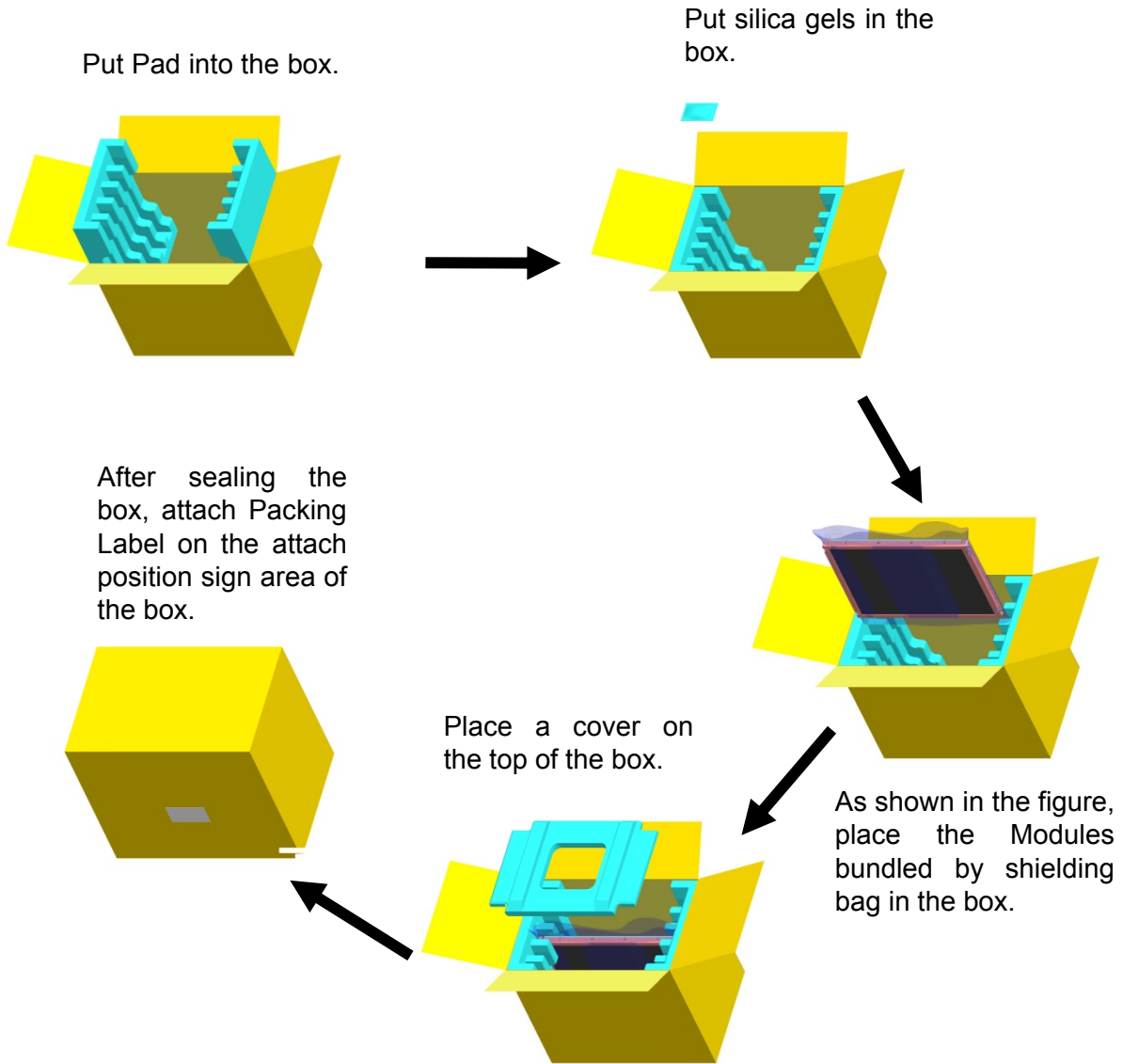
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15.0 PACKING INFORMATION

15.1 Packing order

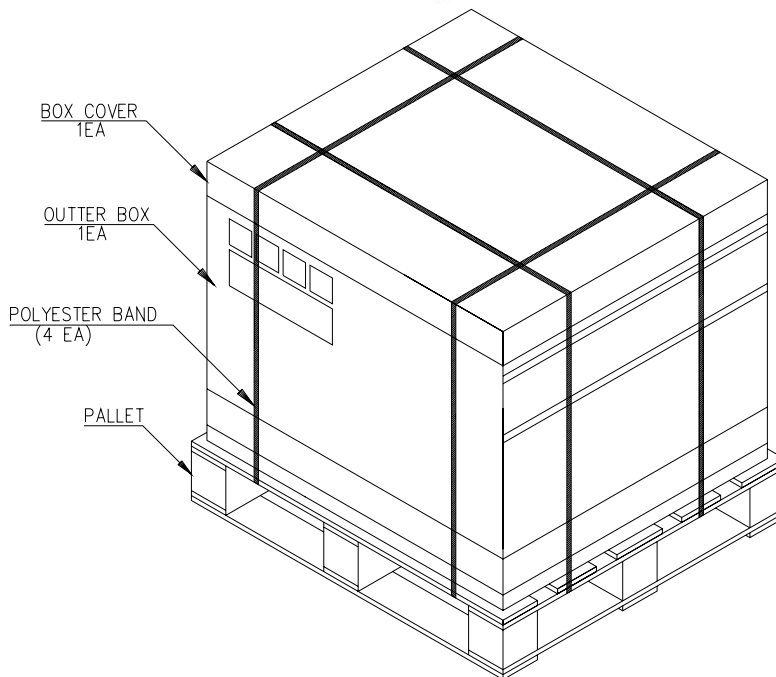
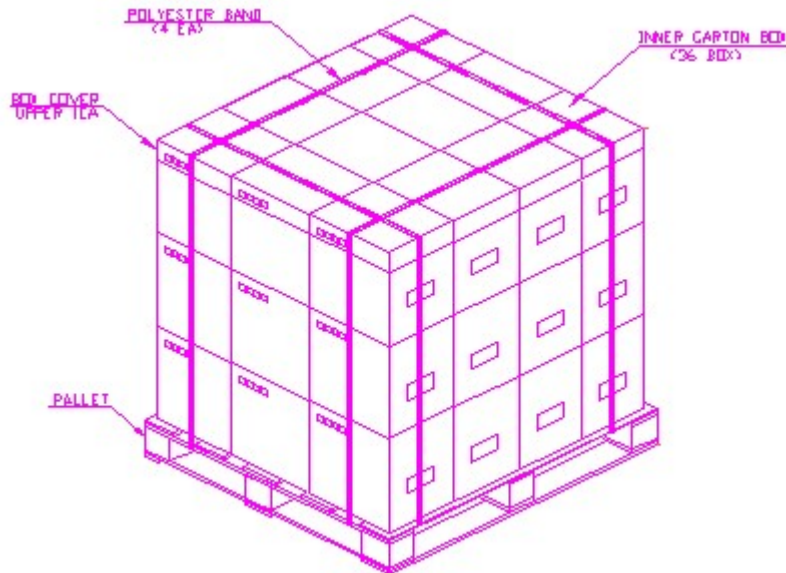


15.2 Notes

- Box Dimension : 349.0mm(W) X 261.0mm(D) X 311.0mm(H)
- Package Quantity in one Box : 10 pcs

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15.3 Pallet Packing



*** Note**

- Pallet Dimension : : 1100 mm (L) × 1100 mm (W) × 120 mm (H)
- Package Quantity in one Box : 10pcs
- Box Quantity in one Pallet : 36 box



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16.0 EDID Table (1/4)

EDID chip is 24LC024 (Microchip) or equivalent .

Address (HEX)	Function	Hex	Dec	values.	Notes
00	Header	00	0		EDID Header
01		FF	255		
02		FF	255		
03		FF	255		
04		FF	255		
05		FF	255		
06		FF	255		
07		00	0		
08	ID Manufacturer Name	09	9		
09		E5	229		
0A	ID Product Code	B7	183	1207	CODE = 1207
0B		04	4		
0C	32-bit serial No.	00	0		
0D		00	0		
0E		00	0		
0F		00	0		
10	Week of manufacture	00	0		
11	Year of Manufacture	14	20	2010	Manufactured in 2010
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	80	128		
15	Max H image size	19	25	25	24.5 cm (Approx)
16	Max V image size	12	18	18	18.4 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	D1	209		Red / Green Low Bits
1A	Blue/White low bits	B6	182		Blue / White Low Bits
1B	Red x high bits	94	148		Rx
1C	Red y high bits	56	86		Ry
1D	Green x high bits	4F	79		Gx
1E	Green y high bits	8B	139		Gy
1F	Blue x high bits	26	38		Bx
20	Blue y high bits	27	39		By
21	White x high bits	53	83		Wx
22	White y high bits	59	89		Wy

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16.0 EDID Table (2/4)

Address (HEX)	Function	Hex	Dec	values.	Notes
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 (60Hz)	EC	236	56.12	56.12MHz Main clock
37		15	21		
38		00	0	1024	Hor Active = 1024
39		A0	160	160	Hor Blanking = 160
3A		40	64		4 bits of Hor. Active + 4 bits of Hor. Blanking
3B		00	0	768	Ver Active = 768
3C		16	22	22	Ver Blanking = 22
3D		30	48		4 bits of Ver. Active + 4 bits of Ver. Blanking
3E		30	48	48	Hor Sync Offset = 48
3F		20	32	32	H Sync Pulse Width = 32
40		34	52	3	V sync Offset = 3 line
41		00	0	4	V Sync Pulse width : 4 line
42		F6	246	245	Horizontal Image Size = 245 mm (Low 8 bits)
43		B8	184	184	Vertical Image Size = 184 mm (Low 8 bits)
44		00	0		4 bits of Hor Image Size + 4 bits of Ver Image Size
45		00	0		Hor Border (pixels)
46		00	0		Vertical Border (Lines)
47		19	25		

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16.0 EDID Table (3/4)

Address (HEX)	Function	Hex	Dec	values.	Notes
48	Detailed timing/monitor descriptor #2	00	0		
49		00	0		
4A		00	0		
4B		FE	254		
4C		00	0		
4D		0A	10		
4E		20	32		
4F		20	32		
50		20	32		
51		20	32		
52		20	32		
53		20	32		
54		20	32		
55		20	32		
56		20	32		
57		20	32		
58	20	32			
59	20	32			
5A	Detailed timing/monitor descriptor #3	00	0		
5B		00	0		
5C		00	0		
5D		FE	254		
5E		00	0		
5F		48	72	H	
60		59	89	Y	
61		44	68	D	
62		49	73	I	
63		53	83	S	
64		0A	10		
65		20	32		
66		20	32		
67		20	32		
68	20	32			
69	20	32			
6A	20	32			
6B	20	32			

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16.0 EDID Table (4/4)

Address (HEX)	Function	Hex	Dec	values.	Notes
6C	Detailed timing/monitor descriptor #4	00	0		Product Name Tag (ASCII)
6D		00	0		
6E		00	0		
6F		FE	254		
70		00	0		Model name : HT121X02-100
71		48	72	H	
72		54	84	T	
73		31	49	1	
74		32	50	2	
75		31	49	1	
76		58	88	X	
77		30	48	0	
78		32	50	2	
79		2D	45	-	
7A		31	49	1	
7B		30	48	0	
7C	30	48	0		
7D	0A	10			
7E	Extension flag	00	0		
7F	Checksum	B1			

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