DATASHEET

12/25/2017

Fema Part Number

GM19201080A-185-TVX2-H	
	18.5” Full Color TFT
	1920X1080 Resolution
	High Brightness 600 nits (typical)
	Optional Projected Capacitive Touch

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1. HANDLING PRECAUTIONS

1) Since front polarizer is easily damaged, pay attention not to scratch it.
2) Be sure to turn off power supply when inserting or disconnecting from input connector.
3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
4) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
6) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.
7) Do not open or modify the Module Assembly.
8) Do not press the reflector sheet at the back of the module to any directions.
9) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
10) After installation of the TFT Module into an enclosure, do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.

2. General Description

2.1, Overview

This specification applies to the 18.5 inch color IPS-like TFT-LCD module with 2-ch LVDS interface. This module supports the WUXGA -1920(H) x 1080(V) screen format and 16.7M colors (RGB 8-bits).

The LED driver is not included.

2.2 Features

- High brightness display, 600nits.
- LED backlight
- Wide view angle (IPS-like)
- WUXGA (1920x1080 pixels) full HD resolution
- RoHS Compliance

2.3 Application

Industrial Application; especial for outdoor kiosk and digital signage display.

2.4 Display Specifications

Items	Unit	Specification
Screen Diagonal	mm	469.16(18.47”)
Active Area	mm	408.96 (H) x 230.04 (V)
Pixels H x V	pixels	1920(x3) x 1080
Pixels Pitch	um	213 (per one triad) x 213
Pixel Arrangement		RGB Vertical stripe
Display mode		AHVA mode, normally black
White luminance (center)	Cd/m^2	600 (Typ.)
Contrast ratio		1,000 (Typ.)
Optical Response Time	msec	TBD (Typ. on/off)
Normal Input Voltage VDD	Volt	5
Power Consumption (VDD Line + LED lines)	Watt	26.2 (Typ.) (TBD) VDD line:2.7 W, all black pattern; LED=23.5W
Weight	Grams	TBD (Typ.)
Physical size	mm	430.4 (W) x 254.6 (H) Typ. x 12.0(D)Typ
Electrical Interface		Dual Channel LVDS
Support Colors		16.7 M colors (RGB 8-bits)
Surface Treatment		Anti-Glare, 3H
Temperature range Operating Storage (Shipping)	 ^0C ^0C	 -20 ~ 70 (TFT surface temperature) -20 ~ 70
RoHS Compliance		RoHS Compliance

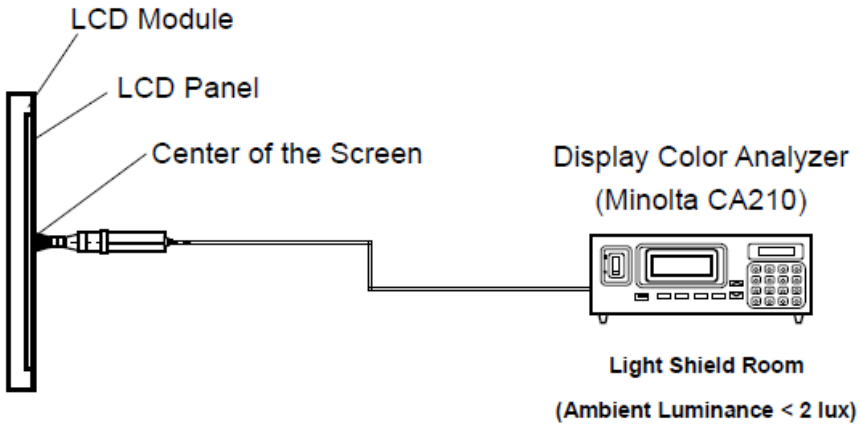
2.5 Optical Characteristics

The following optical characteristics are measured under stable condition at 25 ^{0}C

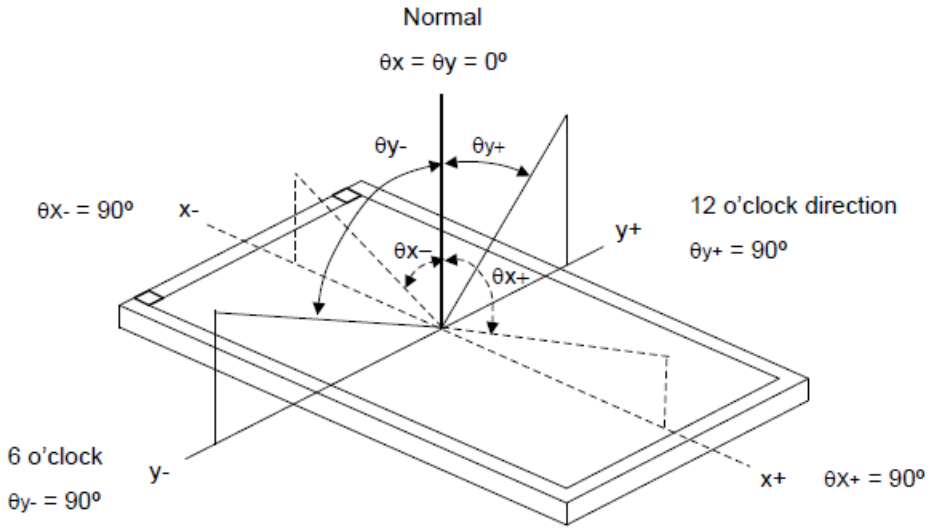
Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right) CR=10 (Left)		89 89		2
		Vertical (Up) CR=10 (Down)		89 89		
Contrast Ratio		Normal Direction	800	1000		3
Response Time	msec	Raising time (T_{rR})		10	20	4
		Falling time (T_{rF})		10	20	
		Raising + Falling		20	40	
Color / Chromaticity Coordinates (CIE)		Red x	Typ -0.05	0.646	Typ +0.05	5
		Red y		0.333		
		Green x		0.305		
		Green y		0.615		
		Blue x		0.155		
		Blue y		0.060		
Color coordinates (CIE) White		White x		0.310		
		White y		0.340		
Center Luminance	Cd/m^2		480	600		6
Luminance Uniformity	%		75	80		7
Crosstalk (in 60 Hz)	%				1.5	
Flicker	dB				-20	

Note 1: Measurement method

The LCD module should be stabilized at given temperature for 0.5 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.



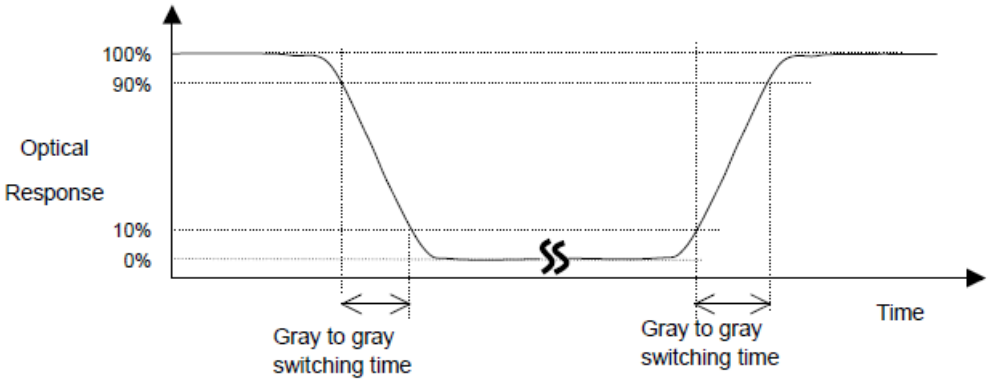
Note 2: Definition of viewing angle



Note 3: Contrast ratio is measured by Minolta CA210

Note 4: Definition of Response time

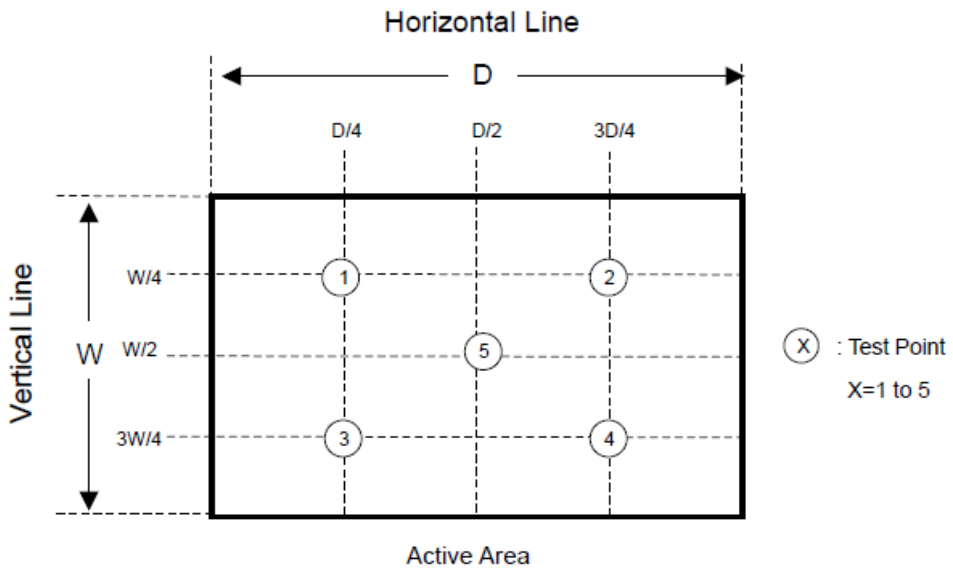
The output signals of photo detector are measured when the input signals are changed from “Full Black” to “Full White” (rising time), and from “Full White” to “Full Black” (falling time), respectively. The response time is interval between the 10% and 90% of amplitudes. Please refer to the figure as below.



Note 5: Color chromaticity and coordinates (CIE) is measured by Minolta CA210

Note 6: Center luminance is measured by Minolta CA210

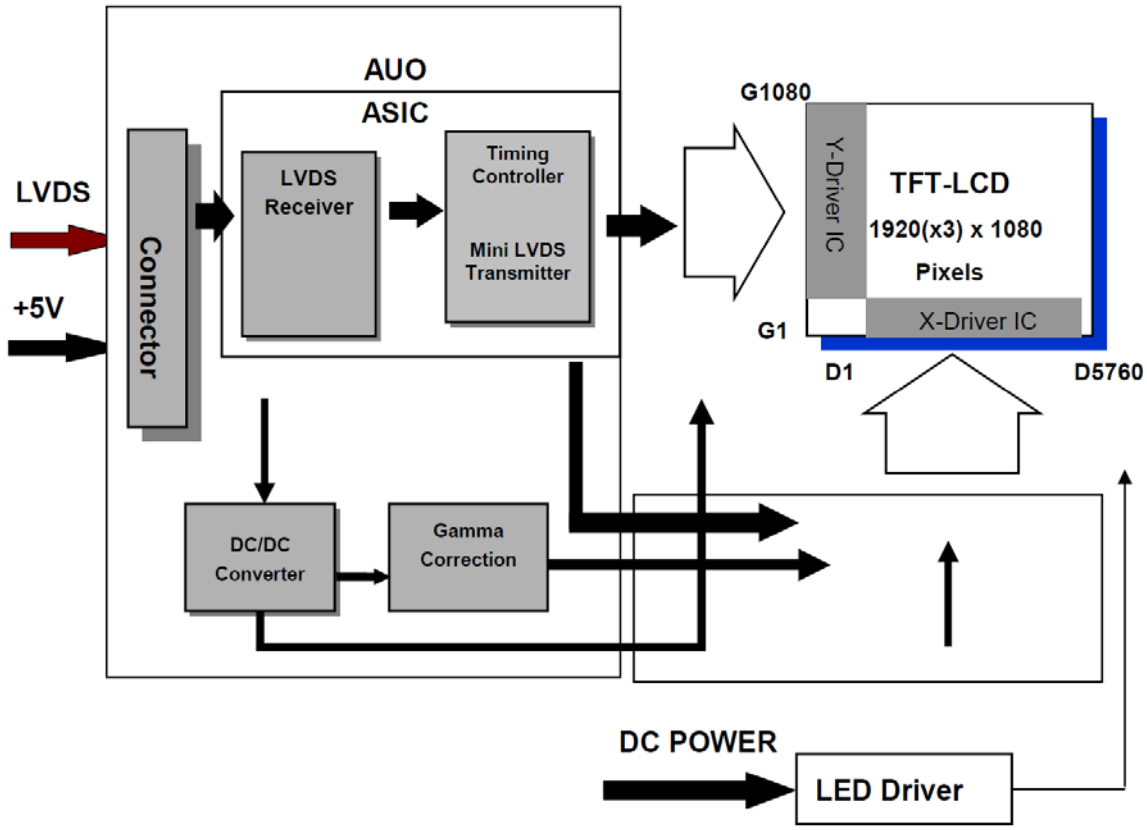
Note 7: Luminance uniformity of these 5 points is defined as below and measured by Minolta CA210



Uniformity = (Min. Luminance of 5 points) / (Max. Luminance of 5 points)

3. **Functional Block Diagram**

The following diagram shows the functional block of the 18.5 inches Color TFT-LCD Module:



I/F PCB Interface:

FI-XB30SSRLA-HF-16-R3500 (JAE)

Mating Type:

FI-X30HL or FI-X30C2L-NPB

4. Absolute Maximum Ratings

Absolute maximum ratings of the module are as following:

4.1 TFT LCD Module

Items	Symbol	Min	Max	Unit	Conditions
Logic/ LCD drive voltage	VDD	-0.3	5.5	Volt	Note 1, 2

4.2 Backlight unit

Items	Symbol	Min	Max	Unit	Conditions
LED Current	I LED		1000	mA	Note 1, 2

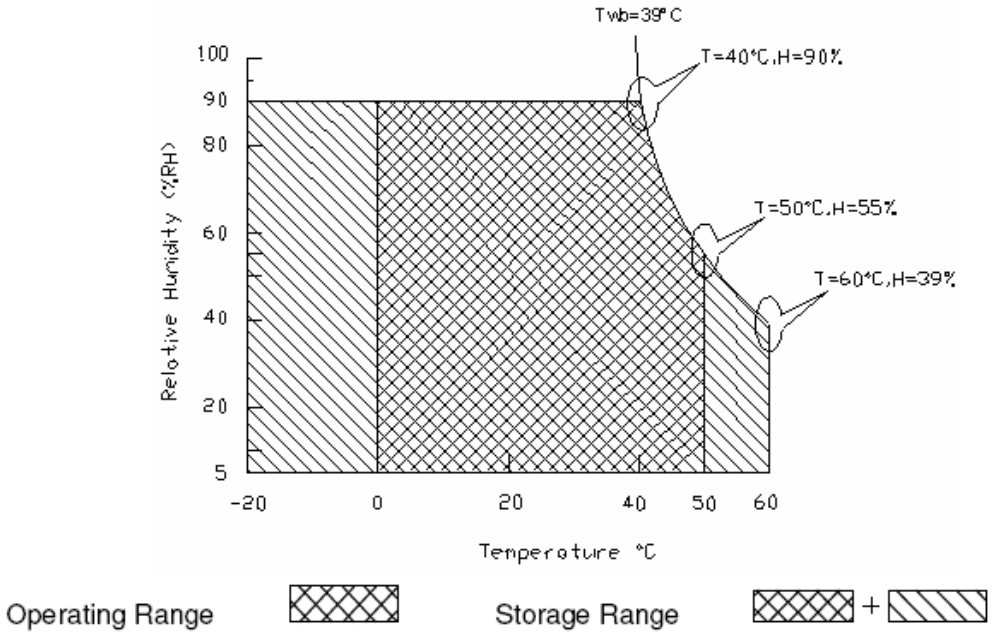
4.3 Absolute Ratings of Environment

Items	Symbol	Values			Unit	Conditions
		Min.	Typ.	Max.		
Operation temperature	T_{OP}	-20	-	70	^{0}C	Note 3
Operation Humidity	H_{OP}	5		90	%	
Storage temperature	T_{ST}	-20		70	^{0}C	
Storage Humidity	H_{ST}	5		90	%	

Note 1: With in Ta= 25℃

Note 2: Permanent damage to the device may occur if exceed maximum values

Note 3: For quality performance, please refer to IIS (Incoming Inspection Standard).



5. Electrical characteristics

5.1 TFT LCD Module

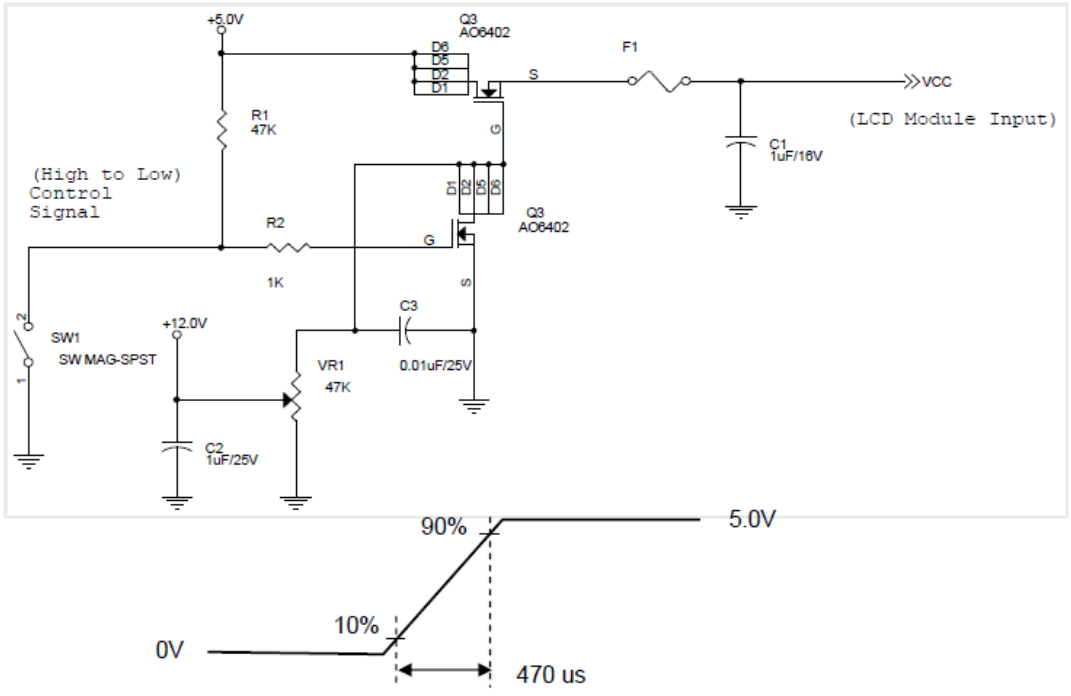
5.1.1 Power Specification

Input power specifications are as follows

Symbol	Parameter	Min	Typ.	Max	Unit	Conditions
VDD	Logic/ LCD Drive Voltage	4.5	5	5.5	Volt	+/- 10%
IDD	Input current		1.17	1.27	A	VDD=5V, All black pattern. At 60Hz, +30%
PDD	VDD power		2.7	3.4	W	VDD=5V, All black pattern. At 60Hz,
IRush	Inrush current			6.35	A	Note 1
VDDrp	Allowable Logic/LCD Drive Ripple Voltage			300	mV p-p	VDD=5V, All black pattern. At 60Hz,

Note 1: Measurement conditions:

The duration of rising time of input power is 470 us.



Vin rising time

5.1.2 Signal Electrical Characteristics

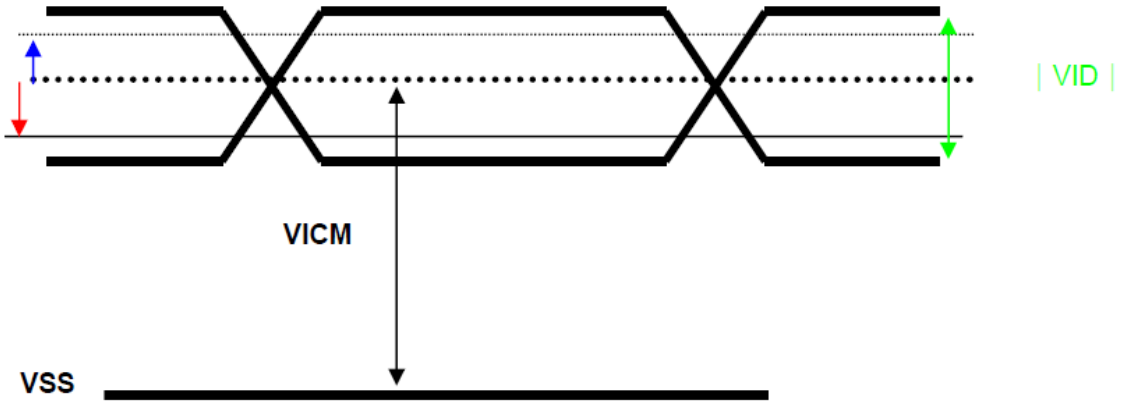
Input signal shall be low or Hi-Z state when VDD is off. Please refer to specification of SN75LVDS82DGG (Texas Instruments) in detail.

DC Characteristics of each signal are as following:

Characteristics of each signal are as following:

Symbol	Parameter	Min	Typ	Max	Unit	Condition
VTH	Differential Input High Threshold			+100	mV	VICM = 1.2V NOTE 1
VTL	Differential Input Low Threshold	-100			mV	VICM = 1.2V NOTE 1
|VID|	Input Differential Voltage	100		600	mV	NOTE 1
VICM	Differential Input Common Mode Voltage	+1.0	+1.2	+1.5	V	VTH-VTL = +/- 100mV(MAX) NOTE 1

Note 1: LVDS Signal Waveform



5.2 Backlight Unit

Parameter guideline is under stable conditions at 25℃ (Room Temperature):

Parameter	Min	Typ	Max	Unit	Note
LED voltage (VL)		37.2		[V]	
LED current (IL)		630		[mA]	(TBD)
LED power (PL)		23.5		W	
LED Life Time(LTLED)		50000		[Hour]	1

Note 1: The “LED lift time” is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25℃ and typical LED Current at 630 mA .

Note 2: PL=VL x IL x 1

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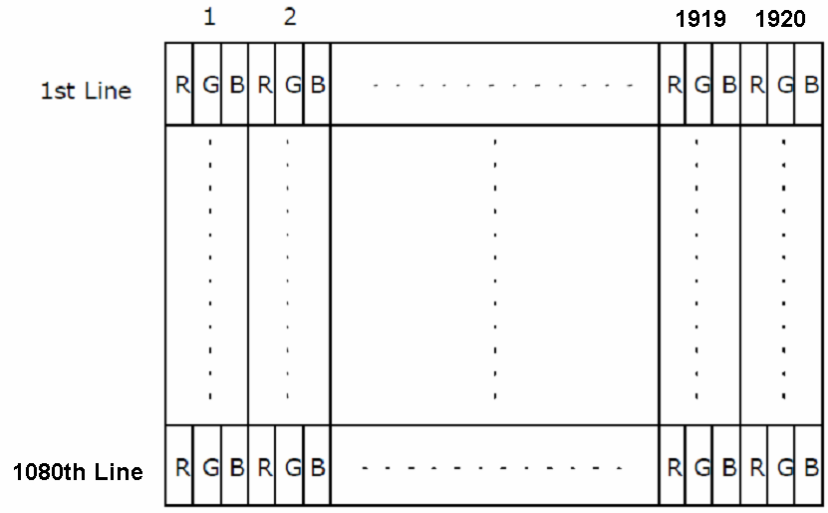
6. Signal Characteristic

6.1 Pixel Format Image

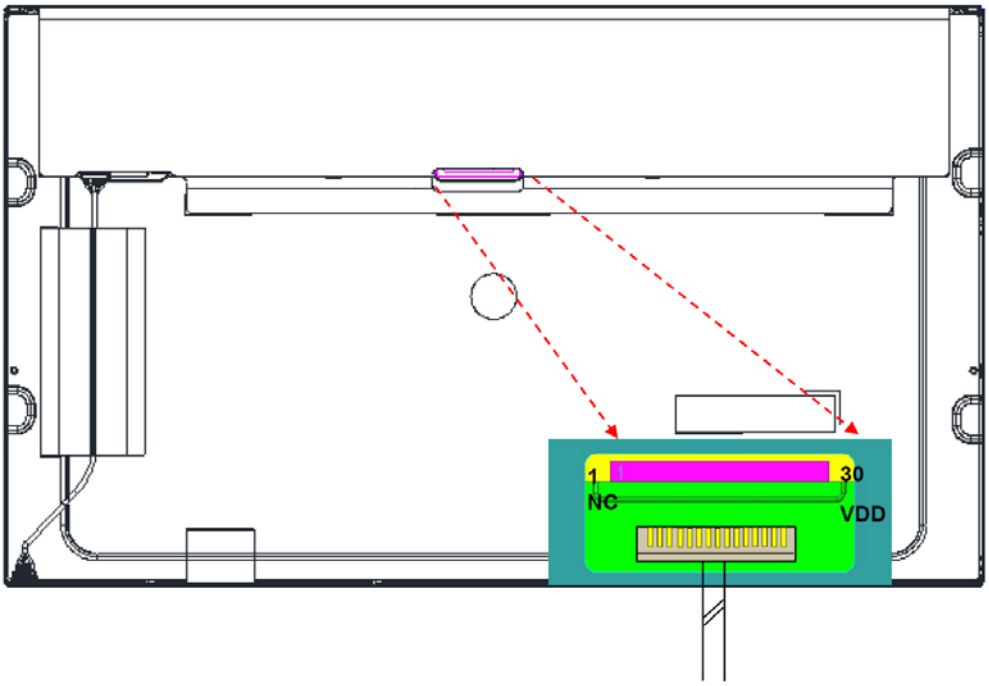
Following figure shows the relationship of the input signals and LCD pixel format.



6.3 Signal Description

The module using a pair of LVDS receiver SN75LVDS82(Texas Instruments) or compatible. LVDS is a differential signal technology for LCD interface and high speed data transfer device. Transmitter shall be SN75LVDS83(negative edge sampling) or compatible**.** The first LVDS port(RxOxxx) transmits odd pixels while the second LVDS port(RxExxx) transmits even pixels.

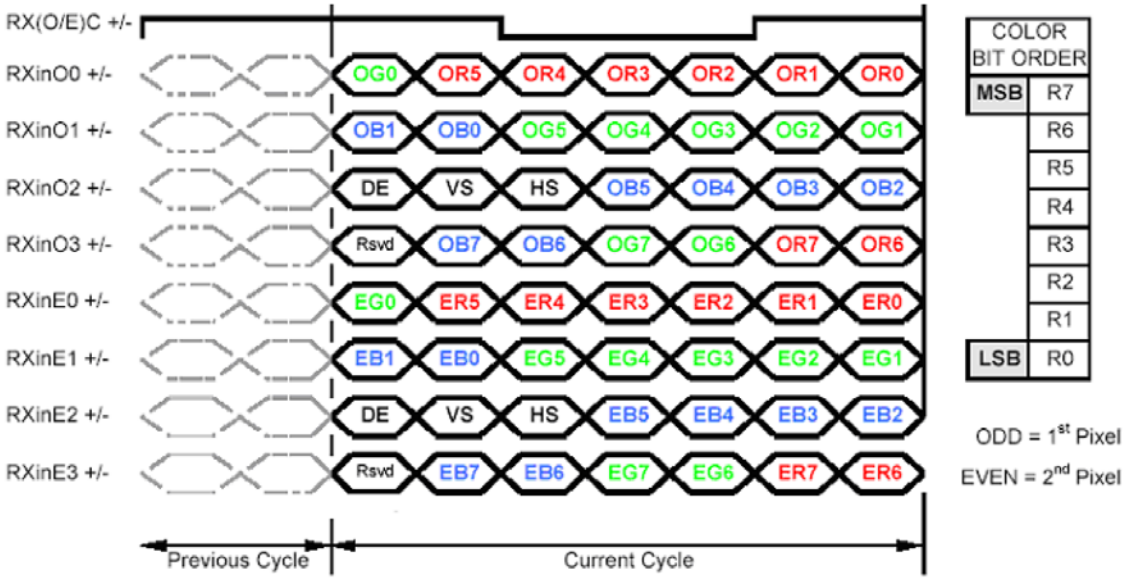
PIN #	SIGNAL NAME	DESCRIPTION
1	RXOIN0-	Negative LVDS differential data input (Odd data)
2	RXOIN0+	Positive LVDS differential data input (Odd data)
3	RXOIN1-	Negative LVDS differential data input (Odd data)
4	RXOIN1+	Positive LVDS differential data input (Odd data)
5	RXOIN2-	Negative LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG)
6	RXOIN2+	Positive LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG)
7	GND	Power Ground
8	RXOCLKIN-	Negative LVDS differential clock input (Odd clock)
9	RXOCLKIN+	Positive LVDS differential clock input (Odd clock)
10	RXOIN3-	Negative LVDS differential data input (Odd data)
11	RXOIN3+	Positive LVDS differential data input (Odd data)
12	RXEIN0-	Negative LVDS differential data input (Even data)
13	RXEIN0+	Positive LVDS differential data input (Even data)
14	GND	Power Ground
15	RXEIN1-	Negative LVDS differential data input (Even data)
16	RXEIN1+	Positive LVDS differential data input (Even data)
17	GND	Power Ground
18	RXEIN2-	Negative LVDS differential data input (Even data)
19	RXEIN2+	Positive LVDS differential data input (Even data)
20	RXECLKIN-	Negative LVDS differential clock input (Even clock)
21	RXECLKIN+	Positive LVDS differential clock input (Even clock)
22	RXEIN3-	Negative LVDS differential data input (Even data)
23	RXEIN3+	Positive LVDS differential data input (Even data)
24	GND	Power GND
25	NC	NC
26	NC	NC
27	NC	NC
28	VDD	+5.0V Power Supply
29	VDD	+5.0V Power Supply
30	VDD	+5.0V Power Supply



Note2: Input signals of clock shall be the same timing.

Note3: Please follow TV VESA Pin Assignment.

6.4 The Input Data Format



Note1: Normally DE mode only. VS and HS on EVEN channel are not used.

Note2: Please follow VESA.

Note3: 8-bits signal input.

6.5 Interface Timing

6.5.1 Timing Characteristics

Signal	Item	Symbol	Min	Typ	Max	Unit
V-section	Period	Tv	1090	1100	1160	Th
	Active	Tdisp(v)	1080	1080	1080	Th
	Blanking	Tbp(v)+Tfp(v)+PWvs	10	20	80	Th
H-section	Period	Th	1000	1088	1120	Tclk
	Active	Tdisp(h)	960	960	960	Tclk
	Blanking	Tbp(h)+Tfp(h)+PWhs	40	128	160	Tclk
Clock	Period	Tclk	11.76	13.89	15.38	ns
	Frequency	Freq.	60	72	87.5	MHz
Frame Rate	Frame Rate	1/Tv	50	60	75	Hz

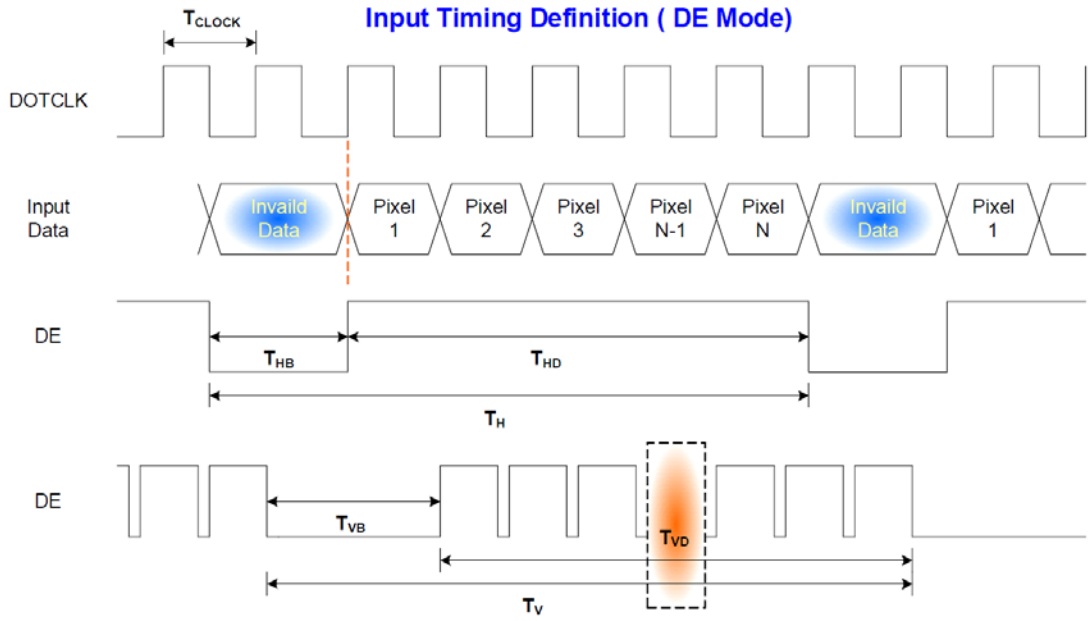
Note 1: Only DE mode operation.

The input of Hsync & Vsync signal does not have an effect upon the LCD normal operation.

Note 2: The performance of the electro-optical characteristics may be influenced by variance of the vertical refresh rates.

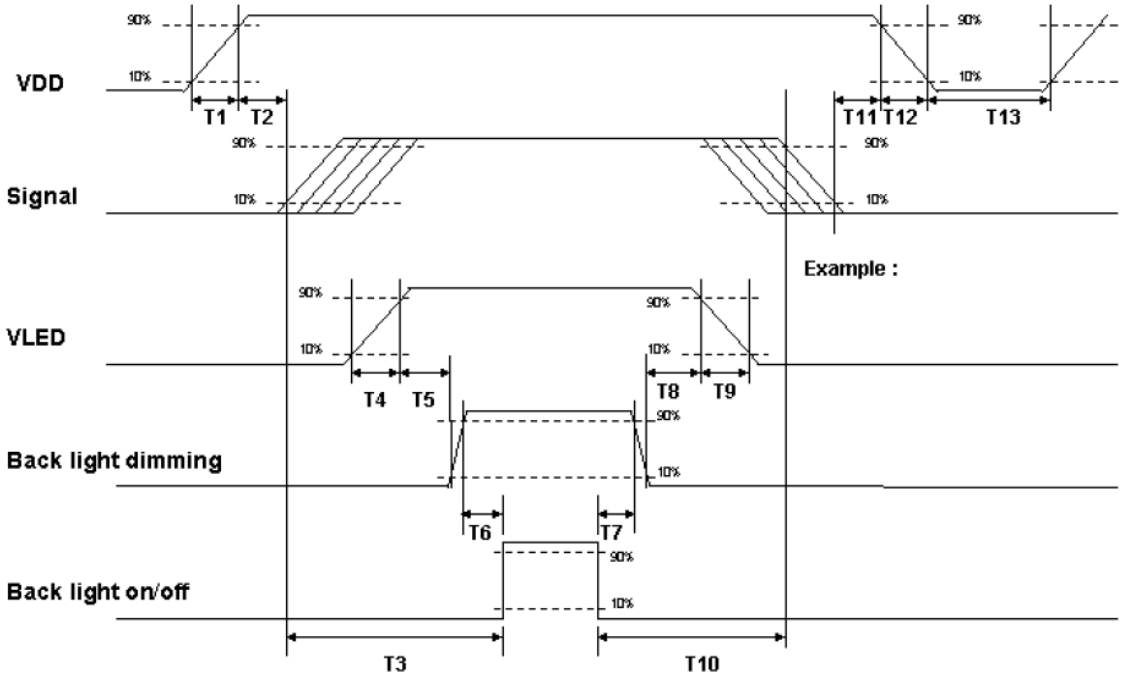
Note 3: Horizontal period should be even.

6.5.2 Input Timing Diagram



6.6 Power ON/OFF Sequence

VDD power and LED on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Power ON/OFF sequence timing

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.5	--	10	[ms]
T2	30	40	50	[ms]
T3	200	--	--	[ms]
T4	0.5	--	10	[ms]
T5	10	--	--	[ms]
T6	10	--	--	[ms]
T7	0	--	--	[ms]
T8	10	--	--	[ms]
T9	--	--	10	[ms]
T10	110	--	--	[ms]
T11	0	16	50	[ms]
T12	--	--	10	[ms]
T13	1000	--	--	[ms]

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

Note2: Input signals of odd and even clock shall be the same timing.

7.0 Connector & Pin Assignment

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

7.1 TFT LCD Module

Connector Name / Designation	Interface Connector / Interface card
Manufacturer	JAE
Type Part Number	FI-XB30SSRLA-HF-16-R3500 (JAE)
Mating Housing Part Number	FI-X30HL or FI-X30C2L-NPB

7.1.1 Pin Assignment

Pin#	Signal Name	Pin#	Signal Name
1	RxOIN0-	2	RxOIN0+
3	RxOIN1-	4	RxOIN1+
5	RxOIN2-	6	RxOIN2+
7	VSS	8	RxOCLKIN-
9	RxOCLKIN+	10	RxOIN3-
11	RxOIN3+	12	RxEIN0-
13	RxEIN0+	14	VSS
15	RxEIN1-	16	RxEIN1+
17	VSS	18	RxEIN2-
19	RxEIN2+	20	RxECLKIN-
21	RxECLKIN+	22	RxEIN3-
23	RxEIN3+	24	VSS
25	NC	26	NC
27	NC	28	VCC
29	VCC	30	VCC

7.2 Backlight Unit

Pin No.	Symbol	I/O	Function	Remark
1	VLED+	P	Power for LED backlight anode	White
2	VLED-	P	Power for LED backlight cathode	Black

LED Light Bar Connector is used for the integral backlight system. The recommended model is BHSR-02VS-1 manufactured by JST.

8. Reliability Test

Environment test conditions are listed as following table.

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 50℃, 80%RH, 300hours	
High Temperature Operation (HTO)	Ta= 70℃, 50%RH, 300hours	3
Low Temperature Operation (LTO)	Ta= -20℃, 300hours	
High Temperature Storage (HTS)	Ta= 70℃, 300hours	
Low Temperature Storage (LTS)	Ta= -20℃, 300hours	
Vibration Test (Non-operation)	Acceleration: 1.5 Grms Wave: Random Frequency: 10 - 200 Hz Sweep: 30 Minutes each Axis (X, Y, Z)	
Shock Test (Non-operation)	Acceleration: 50 G Wave: Half-sine Active Time: 20 ms Direction: ±X, ±Y, ±Z (one time for each Axis)	
Drop Test	Height: 60 cm, package test	
Thermal Shock Test (TST)	-20℃/30min, 60℃/30min, 100 cycles	
On/Off Test	On/10sec, Off/10sec, 30,000 cycles	
ESD (ElectroStatic Discharge)	Contact Discharge: ± 8KV, 150pF(330Ω) 1sec, 9 points, 25 times/ point.	
	Air Discharge: ± 15KV, 150pF(330Ω) 1sec 9 points, 25 times/ point.	

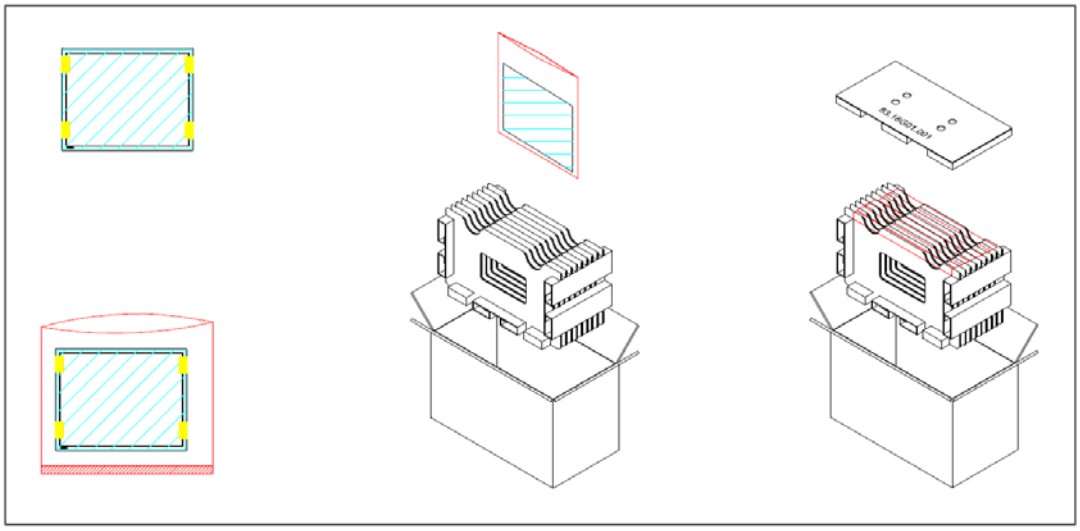
Note 1: The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -20℃ to 60℃, and back again. Power is not applied during the test. After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

Note 2: According to EN61000-4-2 , ESD class B: Some performance degradation allowed. No data lost. Self-recoverable. No hardware failures.

Note 3: The test items are tested by open frame type chassis.

9. Shipping Label & Package

(TBD)



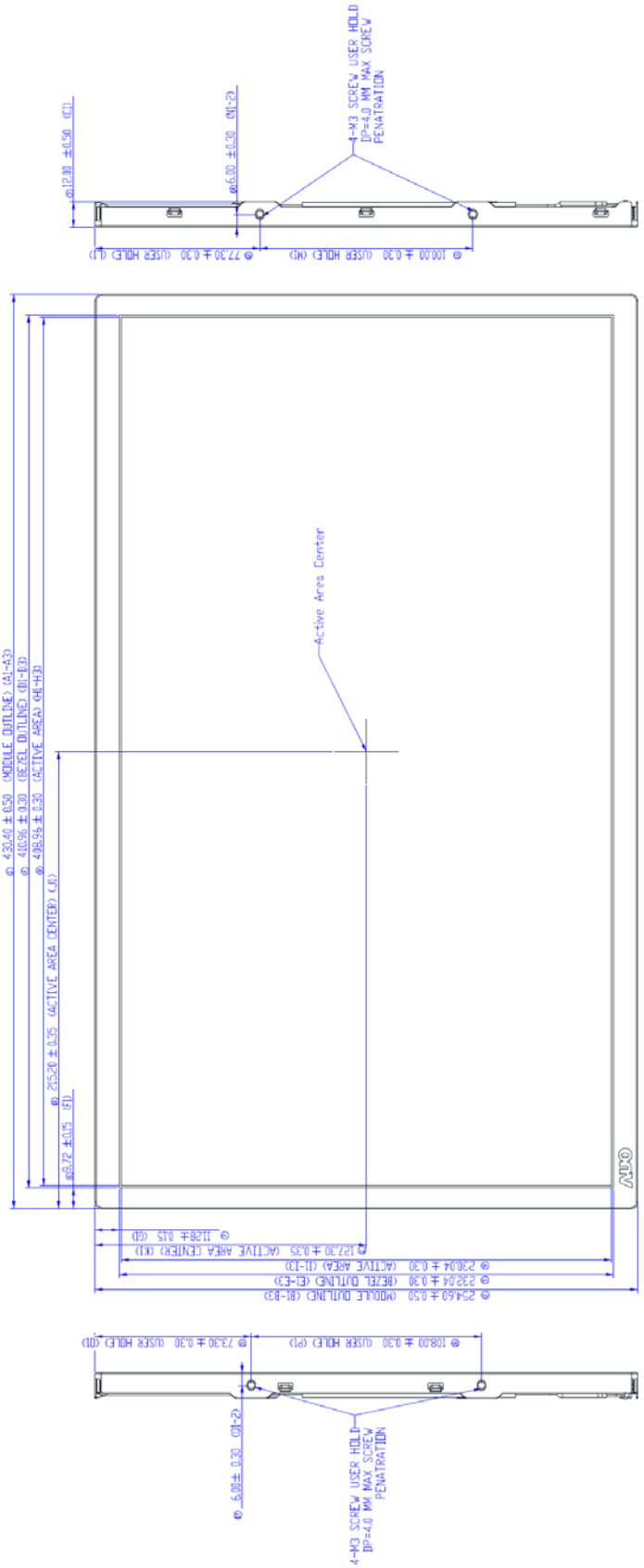
Max capacity：8 TFT-LCD module per carton

Max weight: 15.0 kg per carton

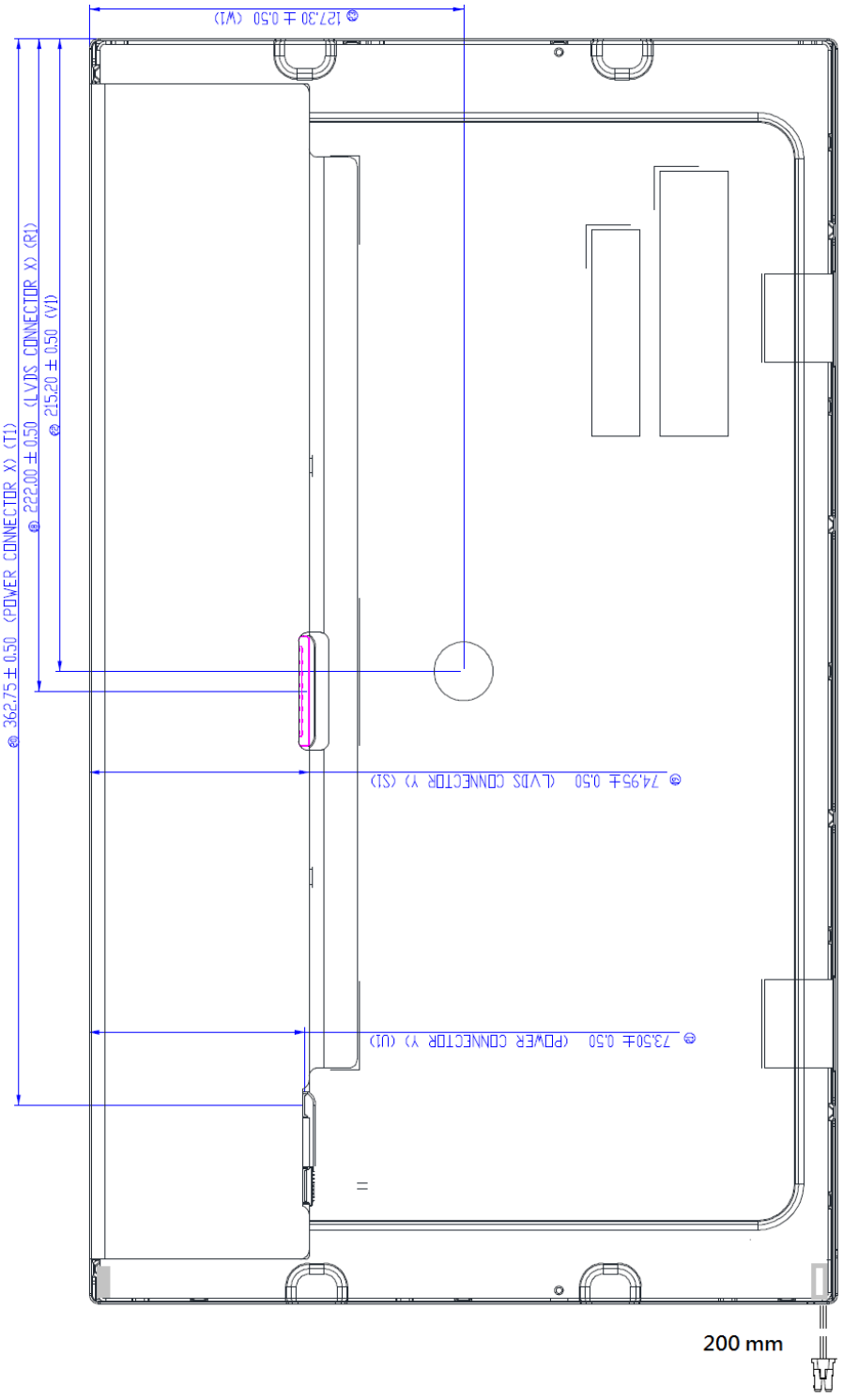
Outside dimension of carton: 520mm(L)* 280mm(W)*352mm(H)

Pallet size： 1140 mm *1060 mm * 135mm

10. Mechanical Characteristic (mm)



NOTES:
1. PRELIMINARY DRAWING FOR REFERANCE ONLY.
2. THE DIMENSION EXCLUDES DEFORATION.
3. TOLERANCE WITHOUT SPECIFID TO ± 0.5mm.
4. TORQUE OF M3 USER HOLE SHOULD BE WITHIN 4 KGF-CM AND RE-SCREW 10 TIMES.
5. MODULE THICKNESS SHOULD BE 12.5mm MAX.
6. USER HOLE SCREW PENTRATION 4.0mm MAX.
7. CHECK CODES ARE 1-23.


362.75 ± 0.50 (POWER CONNECTOR X) (T1)
222.00 ± 0.50 (LVDS CONNECTOR X) (R1)
215.20 ± 0.50 (V1)
127.30 ± 0.50 (W1)
74.95± 0.50 (LVDS CONNECTOR Y) (S1)
73.50± 0.50 (POWER CONNECTOR Y) (U1)
200 mm