Product Specification
AU OPTRONICS CORPORATION

(   ) **Preliminary Specifications**
(V) **Final Specifications**

Module	8.0" 4:3 Color TFT-LCD with LED Backlight design
Model Name	**B080XAN01.0**
Note	*LED Backlight Design*

Customer	Date
Checked & Approved by	**Date**

Note: This Specification is subject to change without notice.

Approved by	Date
Winston Lin	01/16/2013
Prepared by	
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DMPBU Marketing Division
AU Optronics corporation

Product Specification
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Contents

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 nor 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.

11) After installation of the TFT Module into an enclosure (Notebook PC Bezel, for example), 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.

12) Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950 or UL1950), or be applied exemption.

13) Disconnecting power supply before handling LCD modules, it can prevent electric shock, DO NOT TOUCH the electrode parts, cables, connectors and LED circuit part of TFT module that a LED light bar build in as a light source of back light unit. It can prevent electrostatic breakdown.

2. General Description

B080XAN01 V0 is a Color Active Matrix Liquid Crystal Display composed of a TFT LCD panel, a driver circuit, and LED backlight system. The screen format is intended to support the 4:3 XGA, 768(H) x1024(V) screen and 262k colors (RGB 6-bits data driver) with LED backlight driving circuit. All input signals are MIPI interface compatible.

B080XAN01 V0 is designed for a display unit of notebook style personal computer and industrial machine.

2.1 General Specification

Items	Unit	Specifications
Screen Diagona	[mm]	199.68
Active Area	[mm]	119.808 (H) x 159.744(V)
Pixels H x V		768 x 3(RGB) x 1024
Pixel Pitch	[mm]	0.156 X 0.156
Pixel Format		R.G.B. Vertical Stripe
Display Mode		Normally Black
White Luminance (ILED=21.8mA) (Note: I_{LED} is LED current)	[cd/m^2]	400 typ. (5 points average)
Luminance Uniformity		0.75 min. (5 points)
Contrast Ratio		800 typ
Response Time	[ms]	25 typ /35 Max
Nominal Input Voltage VDD	[Volt]	+3.3 typ.
Power Consumption	[Watt]	Logic Power: 0.79W max @ white
		BLU Power: 1.518W max
Weight	[Grams]	70 max (65 typ) (Base Panel)

| Physical Size (panel only)	[mm]		Min.	Typ.	Max.
		Length	170.92	171.07	171.37
		Width	128.75	129	129.25
		Thickness (W/O PCBA)	---	---	2.01
		Thickness (W/ PCBA)	---	---	4.81
Support Color		16.7M colors (RGB 6-bit)			
Temperature Range Operating Storage (Non-Operating)	[°C] [°C]	0 to +50 -20 to +60			
RoHS Compliance		RoHS Compliance			

2.2 Optical Characteristics

The optical characteristics are measured under stable conditions at 25℃ (Room Temperature) :

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
White Luminance I_{LED}=21.8mA		5 points average	---	400	---	cd/m^2	1, 4, 5.
Viewing Angle	θ_R θ_L	Horizontal (Right) CR = 10 (Left)	---	89 89	---	degree	4, 9
	ψ_H ψ_L	Vertical (Upper) CR = 10 (Lower)	---	89 89	---		
Luminance Uniformity	δ_{5P}	5 Points	0.75	---	---		1, 3, 4
Luminance Uniformity	δ_{13P}	13 Points	0.7				
Contrast Ratio	CR		---	800	---		4, 6
Cross talk	%		---	---	4		4, 7
Response Time	T_{RT}	Rising + Falling	---	25	35	msec	4, 8
Red	Rx		0.575	0.605	0.635		
	Ry		0.315	0.345	0.375		
Green	Gx		0.287	0.327	0.367		
	Gy		0.540	0.570	0.600		
Blue	Bx		0.125	0.155	0.185		
	By		0.087	0.117	0.147		

				0.283	0.313	0.343		
	White	Wx		0.283	0.313	0.343		
		Wy		0.299	0.329	0.359		
NTSC		%		-	50	-		

Note 1: 5 points position (Ref: Active area)
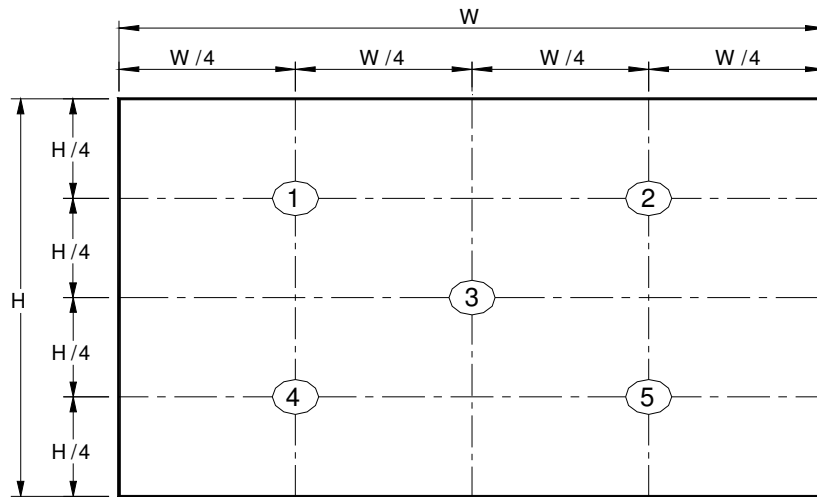
**Note 2**: 13 points position (Ref: Active area)
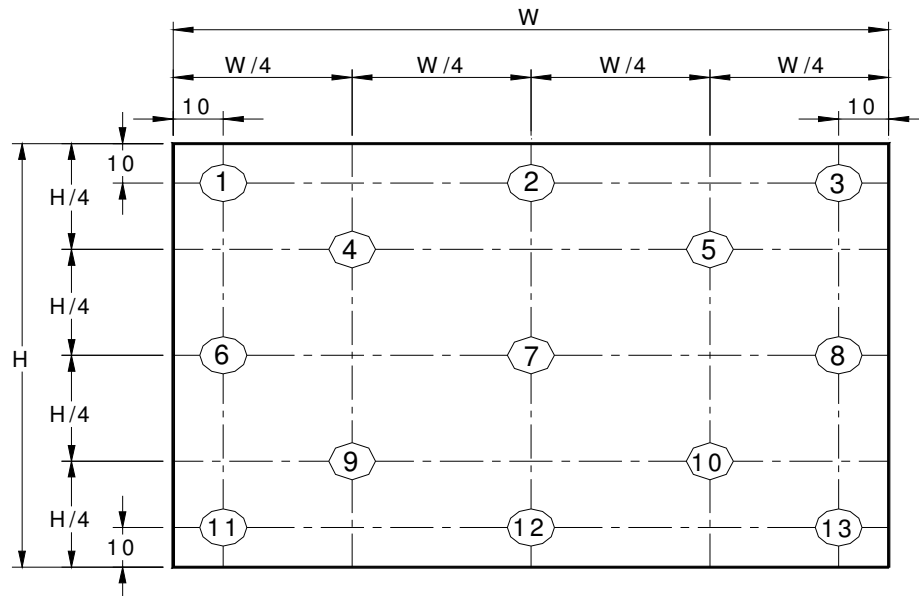
Note 3: The luminance uniformity of 5 or13 points is defined by dividing the maximum luminance values by the minimum test point luminance

$$\delta_{W5} = \frac{\text{Maximum Brightness of five points}}{\text{Minimum Brightness of five points}}$$

$$\delta_{W13} = \frac{\text{Maximum Brightness of thirteen points}}{\text{Minimum Brightness of thirteen points}}$$

Note 4: Measurement method

The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a stable, windless and dark room, and it should be measured in the center of screen.

Center of the screen
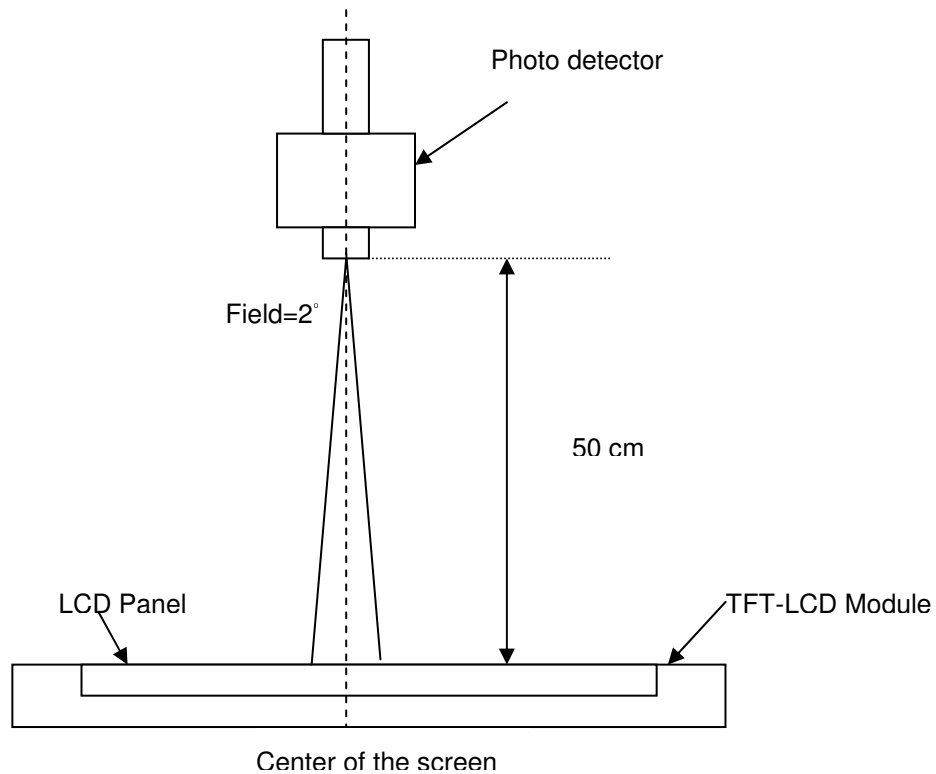
Note 5： Definition of Average Luminance of White (Y_L):

Measure the luminance of gray level 63 at 5 points，Y_L = [L (1)+ L (2)+ L (3)+ L (4)+ L (5)] / 5

L (x) is corresponding to the luminance of the point X at Figure in Note (1).

Note 6： Definition of contrast ratio:

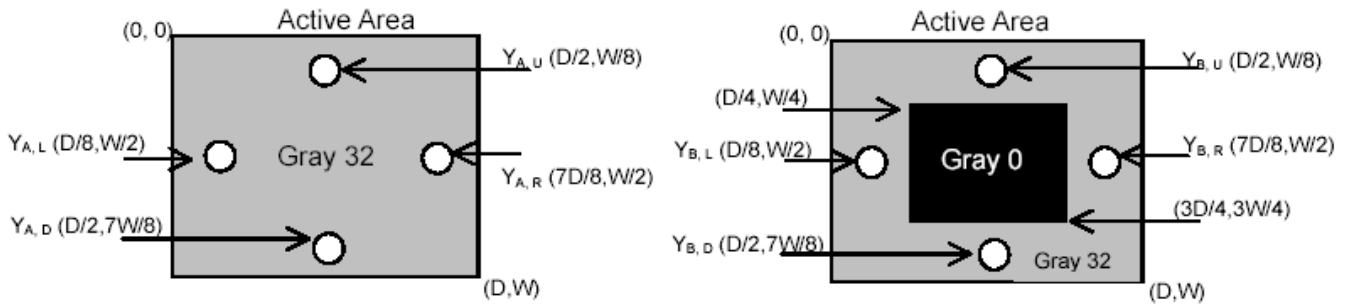Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "White" state}}{\text{Brightness on the "Black" state}}$$

Note 7： Definition of Cross Talk (CT)

$$CT = |Y_B - Y_A| / Y_A \times 100 \ (\%)$$

Where

Y_A = Luminance of measured location without gray level 0 pattern (cd/m2)

Y_B = Luminance of measured location with gray level 0 pattern (cd/m2)

Note 8: Definition of response time:

The output signals of BM-7 or equivalent are measured when the input signals are changed from "Black" to "White" (falling time) and from "White" to "Black" (rising time), respectively. The response time interval between the 10% and 90% of amplitudes. Refer to figure as below.
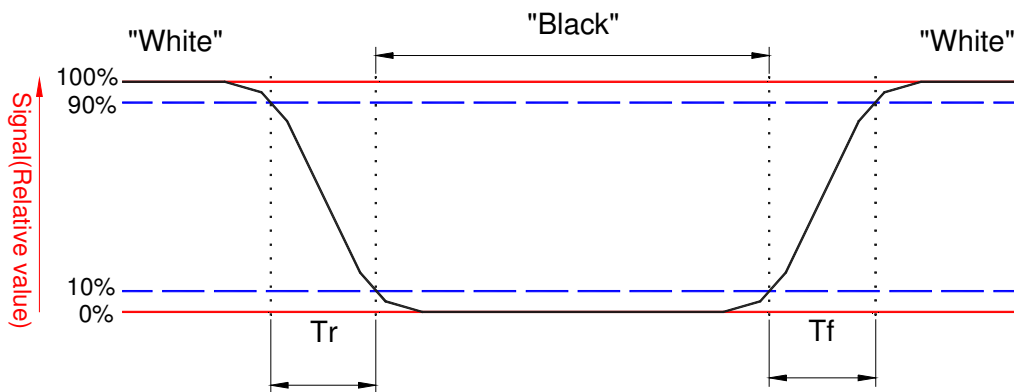

Note 9. Definition of viewing angle

Viewing angle is the measurement of contrast ratio $\geqq 10$, at the screen center, over a 180° horizontal and 180° vertical range (off-normal viewing angles). The 180° viewing angle range is broken down as follows; 90° (θ) horizontal left and right and 90° (Φ) vertical, high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotated about its center to develop the desired measurement viewing angle.
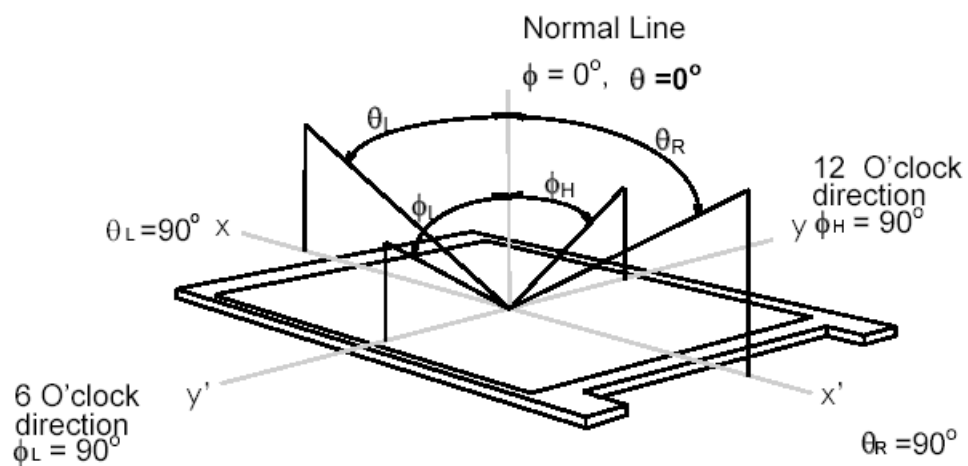
3. Functional Block Diagram

The following diagram shows the functional block of the 7.85 inches wide Color TFT/LCD 32 Pin one channel Module
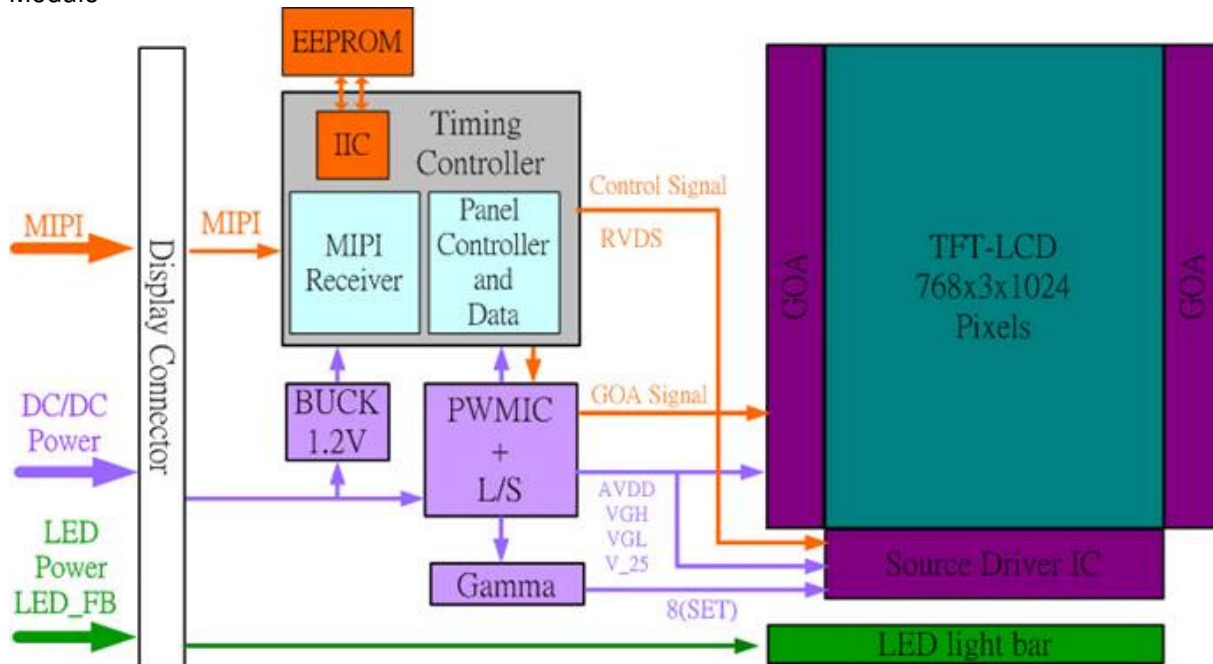
4. Absolute Maximum Ratings

An absolute maximum rating of the module is as following:

4.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	Vin	-0.3	+5	[Volt]	Note 1,2

4.2 Absolute Ratings of Environment

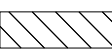| Item	Symbol	Min	Max	Unit	Conditions
Operating Temperature	TOP	0	+50	[^{o}C]	Note 4
Operation Humidity	HOP	5	95	[%RH]	Note 4
Storage Temperature	TST	-20	+60	[^{o}C]	Note 4
Storage Humidity	HST	5	95	[%RH]	Note 4

Note 1: At Ta (25℃)

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

Note 3: LED specification refer to section 5.2

Note 4: For quality performance, please refer to AUO IIS (Incoming Inspection Standard).

Twb=39℃   T=40℃, H=95%

T=60℃, H=55%

T=70℃, H=30%

Relative Humidity (%RH)

Temperature °C
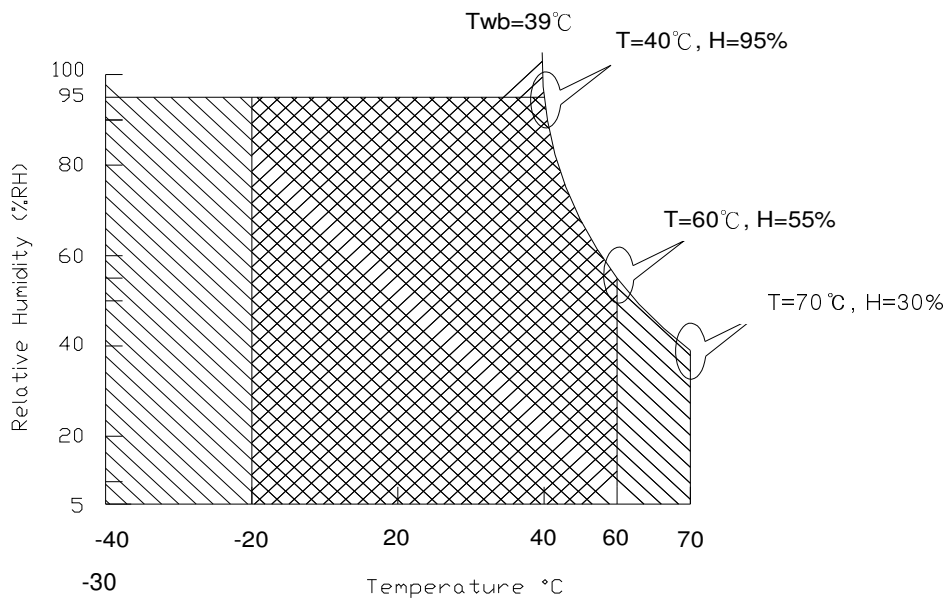
Operating Range   Storage Range

5. Electrical Characteristics

5.1 TFT LCD Module

5.1.1 Power Specification

Input power specifications are as follows;

The power specification are measured under 25℃ and frame frenquency under 60Hz

Symble	Parameter	Min	Typ	Max	Units	Note
VDD	Logic/LCD Drive Voltage	3.4	3.7	4.3	[Volt]	
PDD	VDD Power	-	-	0.79	[Watt]	Note 1
IDD	IDD Current	-	-	-	[mA]	Note 1
IRush	Inrush Current	-	-	-	[mA]	Note 2
VDDrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	-	[mV] p-p	

Note 1 : Maximum Measurement Condition：White Pattern at 3.3V driving voltage. ($P_{max}=V_{3.3} \times I_{white}$)

Note 2：Measure Condition

Vin rising time
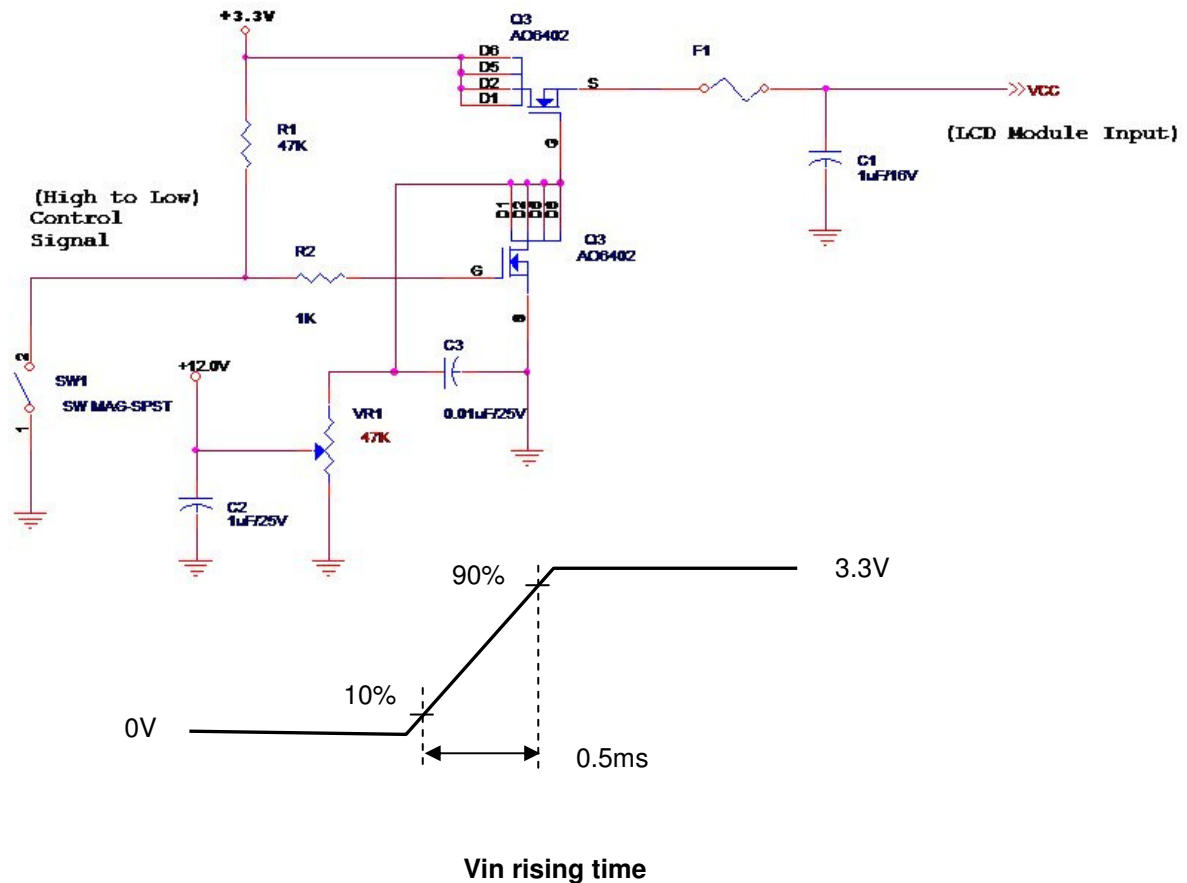
5.1.2 Signal Electrical Characteristics

Input signals shall be low or High-impedance state when VDD is off.

MIPI DC/AC Characteristics are as follows;

MIPI Receiver Differential Input (DC Characteristics)					
Symbol	Parameter	Min	Typ	Max	Unit
BR_{MIPI}	Input data bit rate	-	513	560	Mbps
V_{IDTH}	Differential input high threshold (HS Rx mode)	-	-	70	mV
V_{IDTL}	Differential input low threshold (HS Rx mode)	-70	-	-	mV
V_{IHHS}	Single-end input high voltage (HS Rx mode)	-	-	460	mV
V_{ILHS}	Single-end input low voltage (HS Rx mode)	-40	-	-	mV
Z_{ID}	Differential input impedance	80	100	125	Ω
V_{IHLP}	Logic 1 input voltage (LP Rx mode)	880	-	-	mV
V_{ILLP}	Logic 0 input voltage (LP Rx mode)	-	-	550	mV
V_{HYST}	Input hysteresis	25	-	-	V
V_{IHCD}	Logic 1 contention threshold	450	-	-	mV
V_{ILCD}	Logic 0 contention threshold	-	-	200	mV
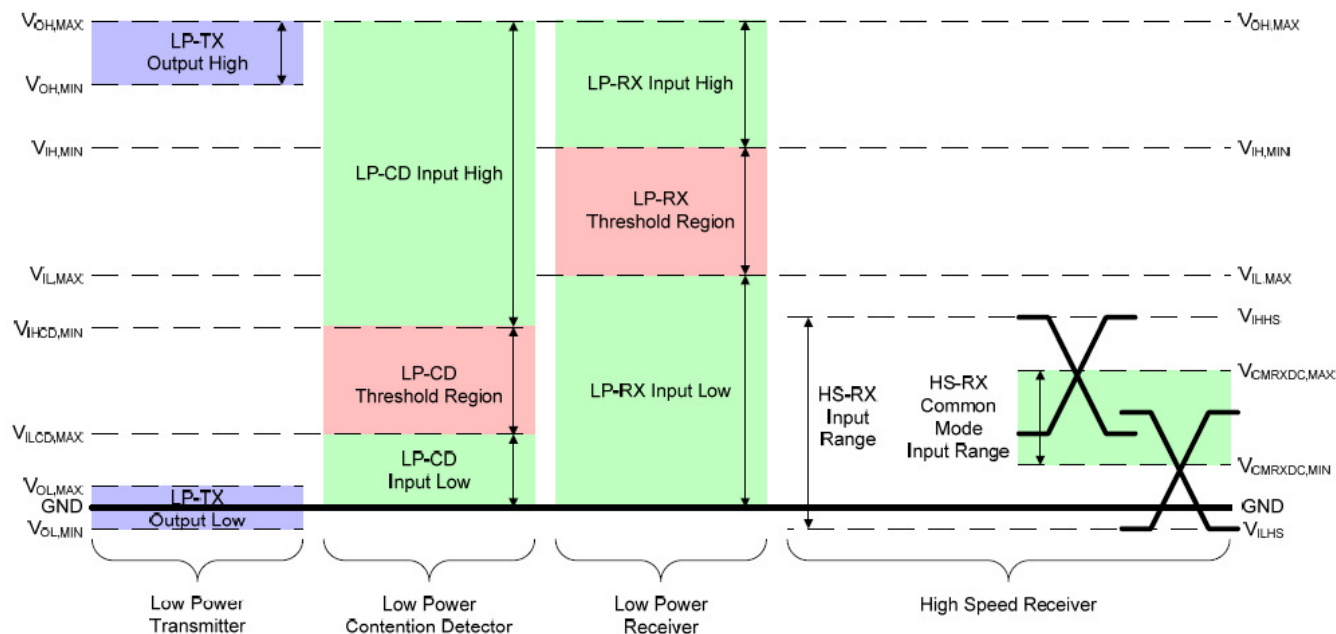
MIPI Receiver Input AC Electrical Characteristics						
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\Delta V_{CMRX(HF)}$	Common-mode interference beyond 450MHz		-	-	100	mV
$\Delta V_{CMRX(LF)}$	Common-mode interference 50MHz ~ 450MHz		-50	-	50	mV
C_{CM}	Common-mode termination		-	-	60	pF

HS RX Scheme
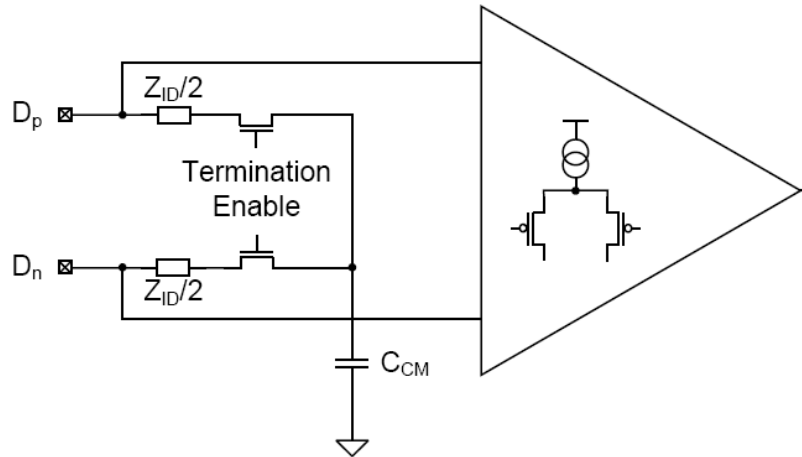
LP Receiver AC Specifications						
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
e_{SPIKE}	Input pulse rejection		-	-	300	V · ps
T_{MIN-RX}	Minimum pulse width response		50	-	-	ns
V_{INT}	Peak interference amplitude		-	-	200	mV
f_{INT}	Interference frequency		450	-	-	MHz

Input Glitch Rejection of Low-Power Receivers
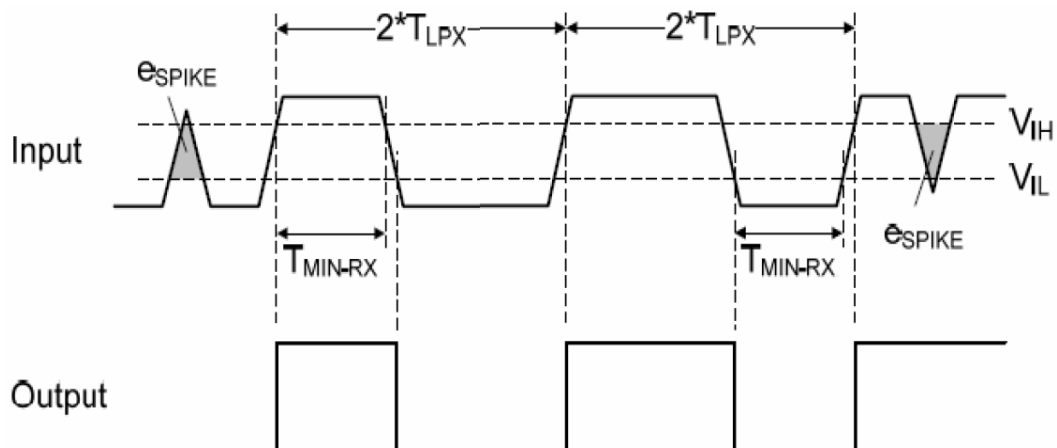
5.2 Backlight Unit

5.2.1 LED characteristics

| Parameter	Symbol	Min	Typ	Max	Units	Condition
Backlight Power Consumption	PLED	-	-	1.518	[Watt]	(Ta=25℃@21.8mA)
LED Life-Time	N/A	10,000	-	-	Hour	(Ta=25℃@21.8mA) Note1.

Note 1. The LED life-time define as the estimated time to 50% degradation of initial luminous.

Note 2. Every LED string consists of 10 pcs LED chip

6. Signal Interface Characteristic

6.1 Pixel Format Image

Following figure shows the relationship of the input signals and LCD pixel format.
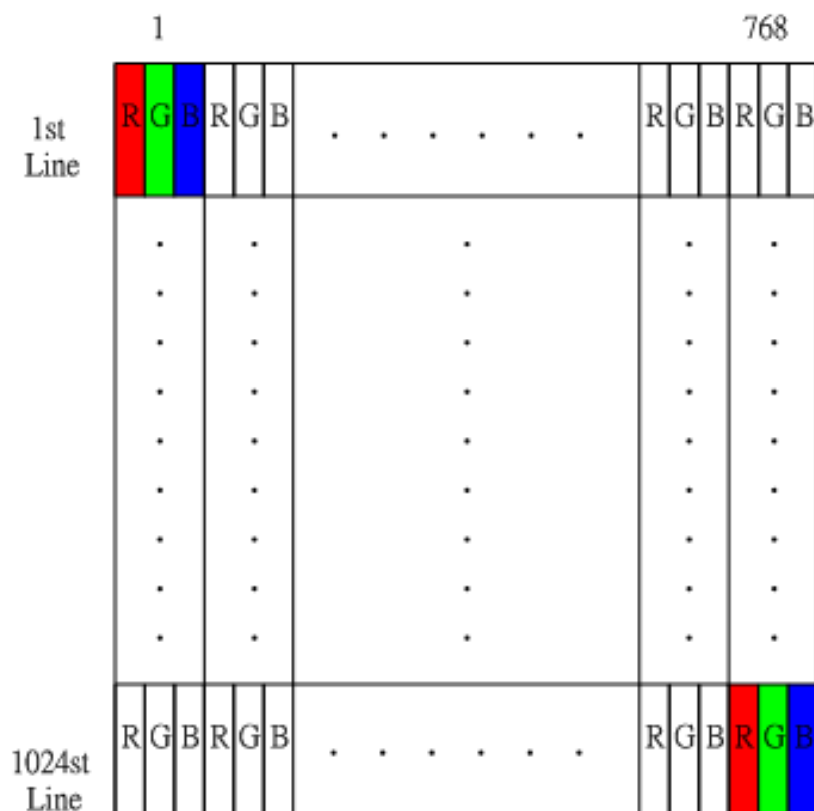
6.2 Integration Interface Requirement

6.2.1 MIPI Connector Description

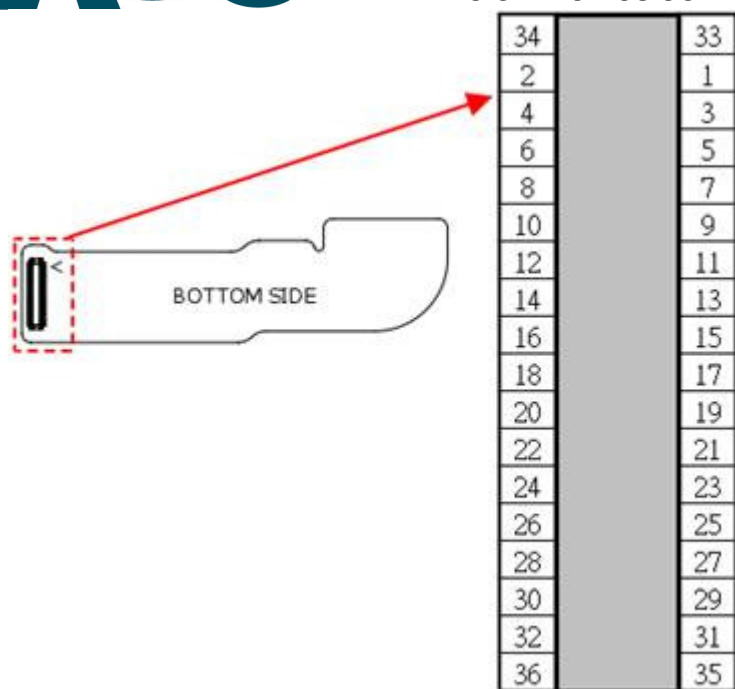Physical interface is described as for the connector on module.

These connectors are capable of accommodating the following signals and will be following components.

Connector Name / Designation	For Signal Connector
Manufacturer	JAPAN AVIATION ELECTRONICS
Type / Part Number	AA07-P032VA1
Mating Housing/Part Number	B2B

6.2.2 MIPI Pin Assignment

MIPI is a differential signal technology for LCD interface and high speed data transfer device.

No.	Pin Name	Description
1	GND	Ground
2	VCC	Power Supply
3	MIPI_DATA3_N	MIPI data pair 3 negative signal
4	VCC	Power Supply
5	MIPI_DATA3_P	MIPI data pair 3 positive signal
6	VCC	Power Supply
7	GND	Ground
8	VCC	Power Supply
9	MIPI_DATA2_N	MIPI data pair 2 negative signal
10	VCC	Power Supply
11	MIPI_DATA2_P	MIPI data pair 2 positive signal
12	GND	Ground
13	GND	Ground
14	RST	RESET
15	MIPI_DATA1_N	MIPI data pair 1 negative signal
16	GND	Ground
17	MIPI_DATA1_P	MIPI data pair 1 positive signal
18	LED_FB3	BL Feedback pin
19	GND	Ground
20	LED_FB2	BL Feedback pin
21	MIPI_DATA0_N	MIPI data pair 0 negative signal
22	LED_FB1	BL Feedback pin
23	MIPI_DATA0_P	MIPI data pair 0 positive signal
24	LED_FB0	BL Feedback pin
25	GND	Ground
26	LED_FB4	BL Feedback pin
27	MIPI_CLK_N	MIPI Clock negative signal
28	LED_FB5	BL Feedback pin
29	MIPI_CLK_P	MIPI Clock positive signal
30	LED PW	LED Anode
31	GND	Ground
32	LED PW	LED Anode

34		33
2		1
4		3
6		5
8		7
10		9
12		11
14		13
16		15
18		17
20		19
22		21
24		23
26		25
28		27
30		29
32		31
36		35

BOTTOM SIDE

Note1: Input signals shall be low or High-impedance state when VDD is

6.3 MIPI Interface Timing

6.4.1 Timing Characteristics
Basically, interface timings should match the 768x1024 /60Hz manufacturing guide line timing.

Parameter		Symbol	Min.	Typ.	Max.	Unit
Frame Rate		---	---	60	---	Hz
Clock frequency		1/ T_{Clock}	---	64	---	MHz
Vertical Section	Period	T_V	---	1140	---	T_{Line}
	Active	T_{VD}		1024		
	Blanking	T_{VB}	---	116	---	
Horizontal Section	Period	T_H	---	948	---	T_{Clock}
	Active	T_{HD}		768		
	Blanking	T_{HB}	---	180	---	

6.4 Power ON/OFF Sequence
Power on/off sequence is as follows. Interface signals and LED on/off sequence are also shown in the chart.
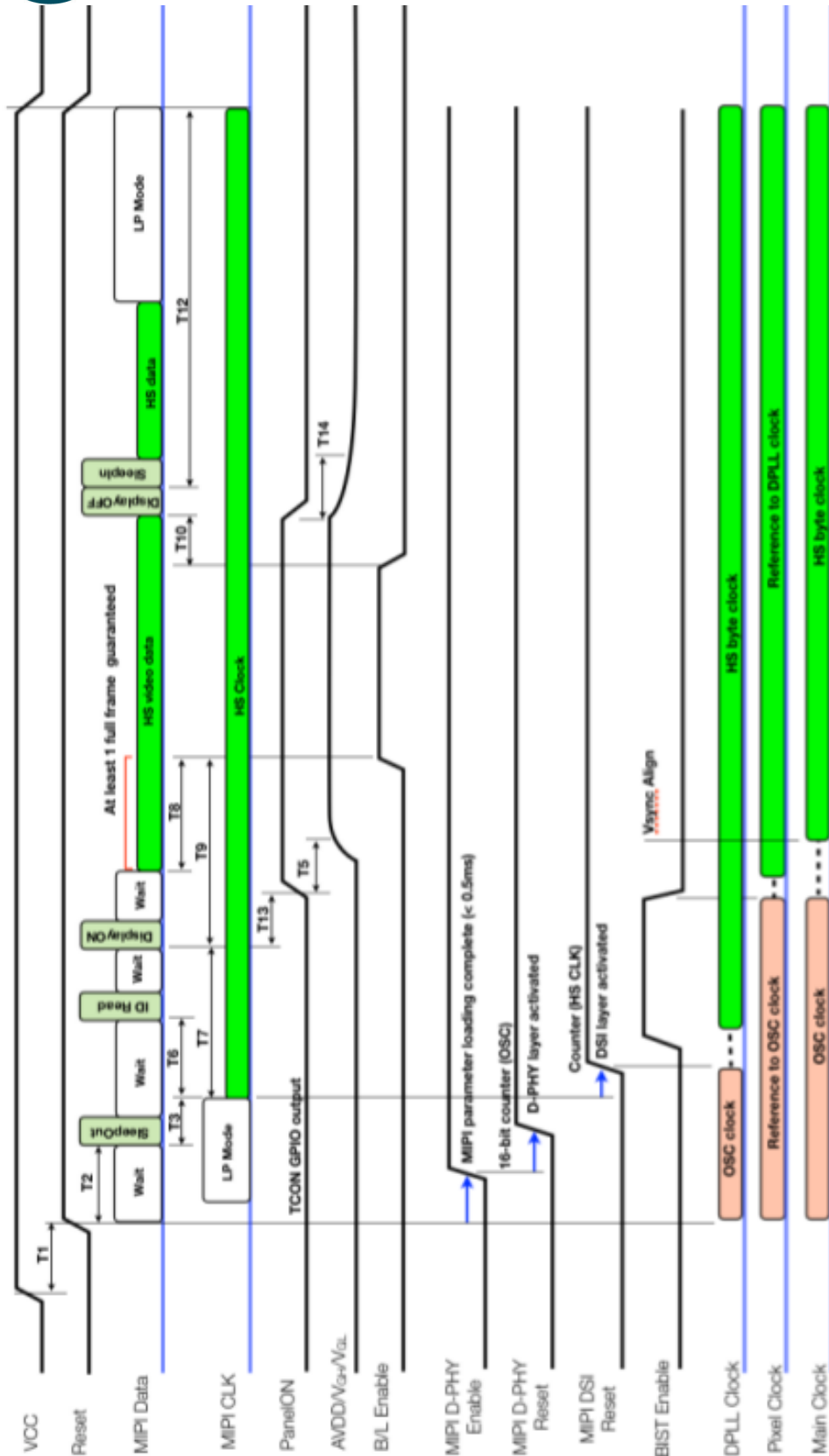
Unit : [ms] unless specicied otherwise

Parameter	Symbol	Min	Typ	Max	Remarks
Reset de-assertion delay	T1	5	10	-	
Reset to first LP command (SLEEP_OUT)	T2	5	6	10	
SLEEP_OUT to HS clock enable	T3	4(us)	-	-	
AVdd Turn-ON delay	T5	-	-	3.5	From **PanelON** assertion
HS clock enable to vendor ID reading	T6	25	-	-	Prior to this, vendor ID should be ready at internal register.
HS clock enable to DISPLAY_ON	T7	100	-	-	
Valid video data to B/L ON	T8	16.67	33.33	-	At least one full frame guaranteed
DISPLAY_ON to B/L ON	T9	83.35	-	-	Black and normal frames mixed
B/L OFF to DISPLAY_OFF	T10	16.67	-	-	At least one full frame guaranteed
SLEEP_IN to HS clock disable & Reset	T12	100	-	-	
DISPLAY_ON to **PanelON**	T13	-	-	5	TCON internal programmable delay
AVdd power discharge time	T14	-	-	5	Decided by decoupling capacitance

Note1. T4 and T11 are irrelevant to TCON timing, so omitted.
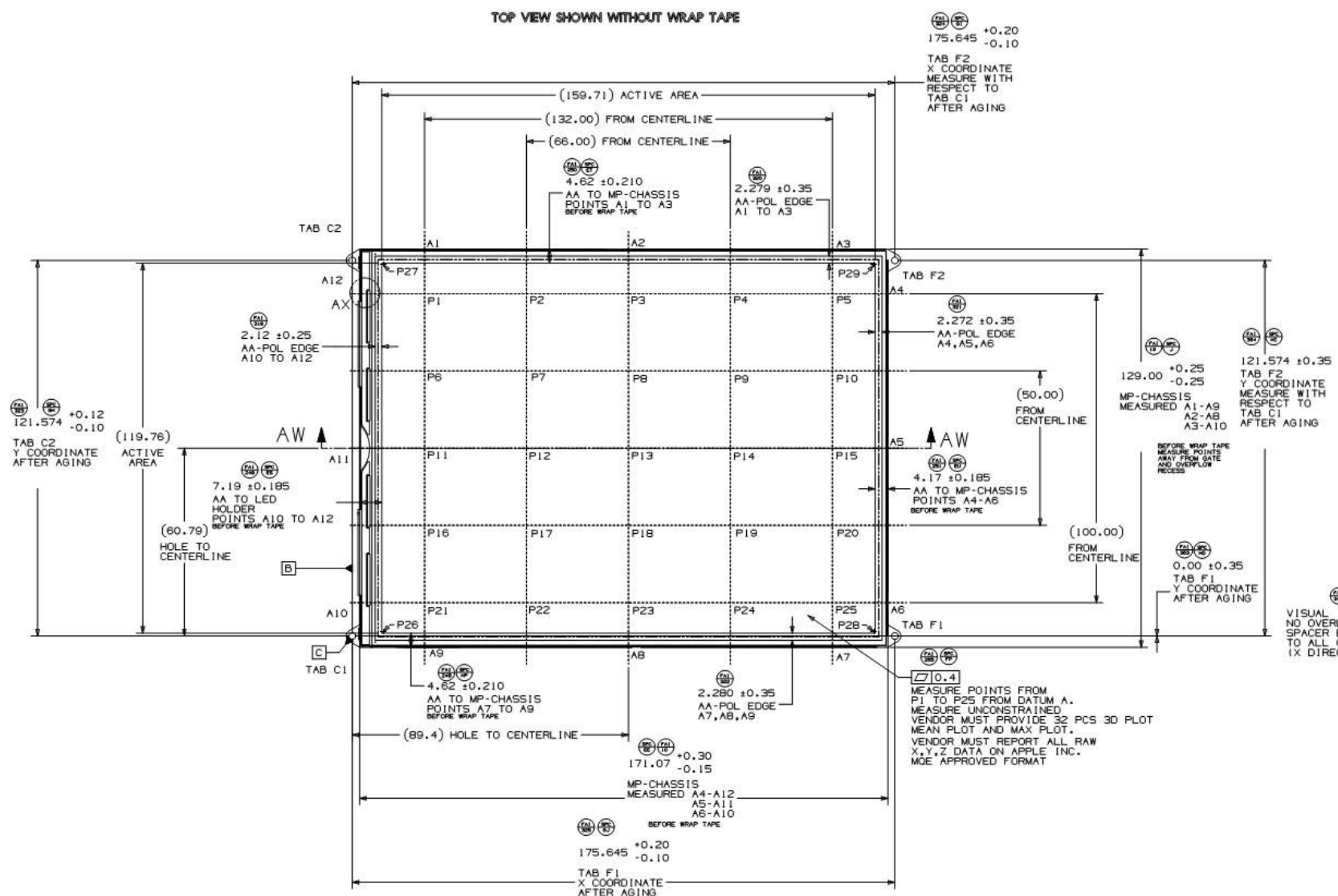Note2. TCON should finish its parameter loading and vendor ID loading within T2+T3+T6

7.Mechanical Characteristics

LCM Outline Dimension

7.1 Standard Front View

TOP VIEW SHOWN WITHOUT WRAP TAPE

7.2 Standard Rear View

0.66 ±0.40 (FAL 343)
TAPE MUST NOT TOUCH
COMPONENT PADS. TAPE
MUST COVER GROUND PADS.

(FAL 326)
1.50 ±0.40
TAPE TO
CAN EDGE

(FAL 270)
0.70 ±0.40
TAPE TO
CAN EDGE

(FAL 327)
1.50 ±0.40
TAPE TO
CAN EDGE

AJ

SHIELD CAN

AJ

0.66 ±0.40 (FAL 344)
TAPE MUST NOT TOUCH
COMPONENT PADS. TAPE
MUST COVER GROUND PADS.

(FAL 271)
0.70 ±0.40
TAPE TO TCON

(FAL 272) (SPC GK)
0.25 MIN
TAPE EDGE TO
CONNECTOR PADS

(10.7)

(FAL 231) (SPC GW)
8.29 ±0.35
BOARD EDGE
TO MP-CHASSIS

AL

(2.59)
S5,S6

B080XAN01.0

8. Shipping and Package

8.1 Carton Package

Panel   Spacer

PP Board

30pcs panel

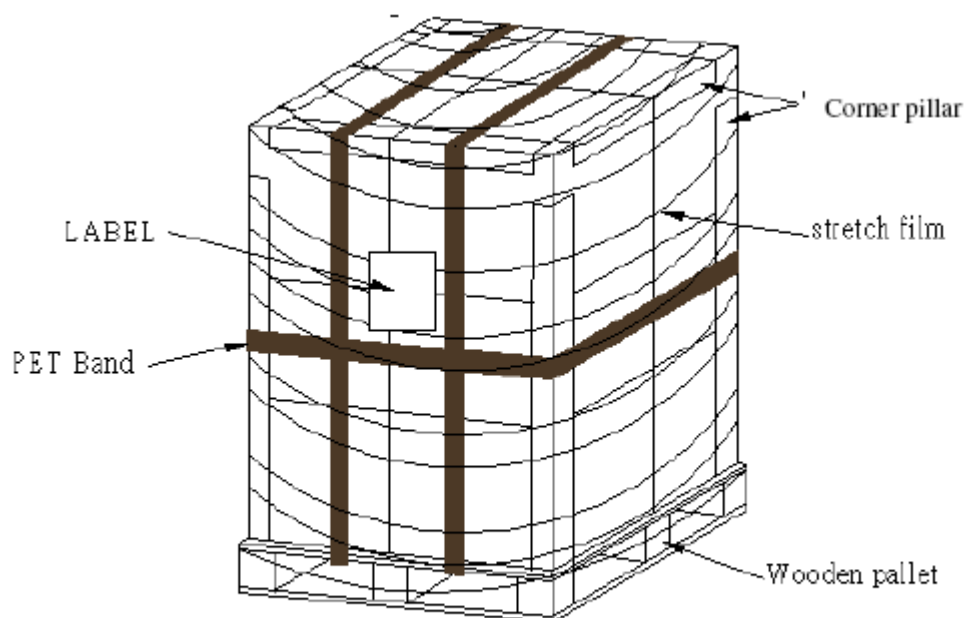30pcs panel
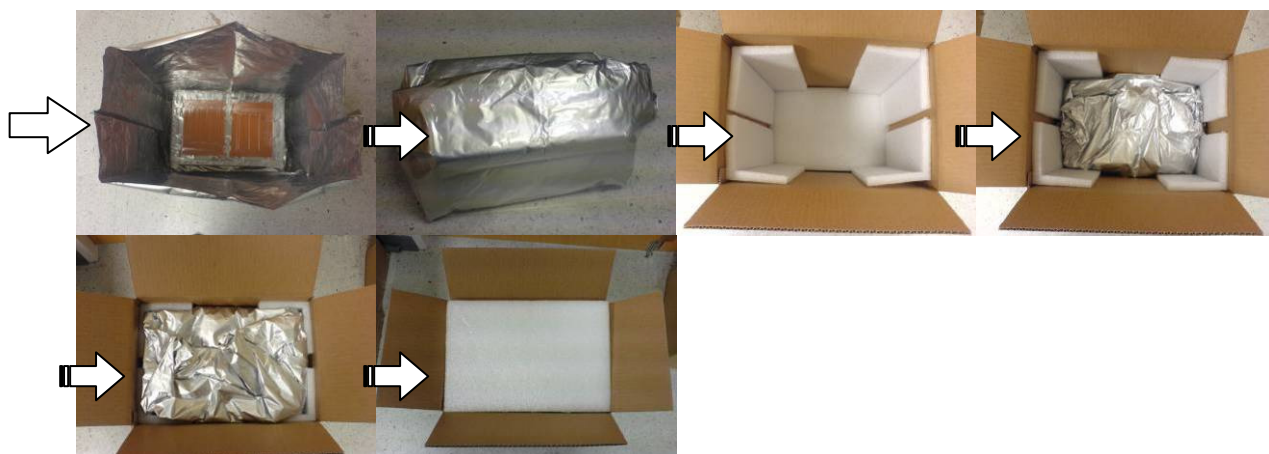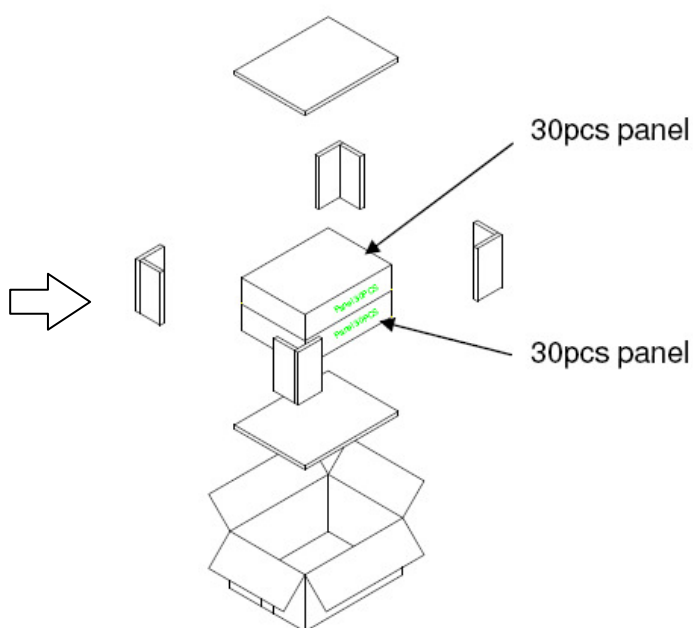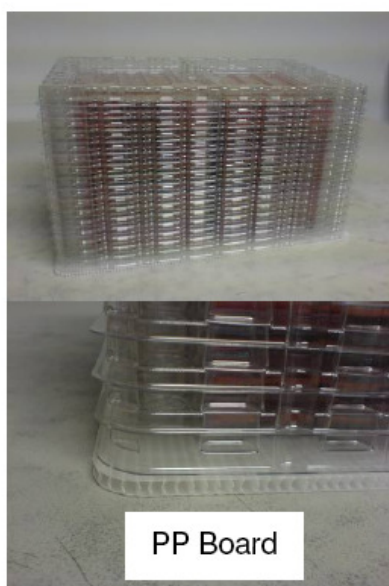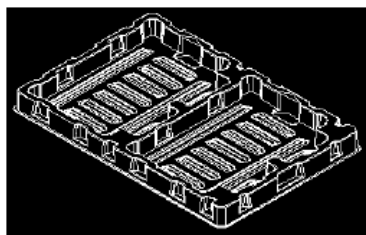
- Pallet : 1150mm* 840mm*132mm
- Stretch film : 500mm (W)*300M (L)
- Corner angle : L type fiber board
- PET band : 19mm (W)
- Label : 220mm*200mm

8.2 Shipping Package of Palletizing Sequence

單層 pallet 打棧示意圖