TFT LCD Approval Specification

MODEL NO.:M190A1-C0A

Customer : InnoLux

Approved by : _____

Note :

記錄	工作	審核	角色	投票
2008-05-14 17:00:22 CST	PMMD II Director	kevin_wu(吳柏勳 /56520/54894)	Director	Accept

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REVISION HISTORY

Version	Date	Section	Description
Ver. 1.0	Nov, 08 '07	-	M190A1-C0A specifications was first issued.
Ver. 1.1	Feb.20 '08	3	Deleted Vg-On maximum value and Vg-Off minimum value.
		4.1	Changed TAB1 Pin numbers 7 define from "Test" to "LR".
			Add Note "2. LR default value is Vss (ground)"
		4.2	Changed scan pin define from "TEST" to "LR"
Ver. 2.0	Mar. 31 '08		M190A1-C0A approval specifications was first issued.
Ver. 2.1	Apr. 23 '08	6.2	Figure 6-2 Stacking method is changed
Ver. 3.0	May 13 '08	5.2	Color coordinate limit is modified to typ.+-0.02

1.GENERAL DESCRIPTION

1.1 OVERVIEW

The M190A1-C0A is a 19-inch wide LCD cell with thin film transistors as active elements and contains 1440x900 pixels. Each pixel is divided into red, green and blue dot, which are arranged in vertical stripe. The cell is normally white mode, and can be applied to the transmission type display. Backlight unit (BLU) and circuit board for the cell are not built in.

1.2 FEATURES

- Wide viewing angle
- High contrast ratio
- Fast response time
- WXGA+ (1440 x 900 pixels) resolution

1.3 APPLICATION

- LCD Monitor
- LCD TV

1.4 GENERAL SPECIFICATIONS

Item		Specification	Unit
Max Panel Dimension (TFT)		419.84 X 266.05	mm
Glass thickness(TFT/ CF)		0.7/0.7	mm
Active Area		408.24 (H) x 255.15 (V) (18.95” diagonal)	mm
Driver Element		a-si TFT active matrix	-
Pixel Number		1440X R.G.B X 900	pixel
Pixel Pitch		0.2835 (H) X 0.2835 (V)	mm
Pixel Arrangement		RGB vertical stripe	-
Transmissive Mode		Normally white	-
Surface Treatment		Hard coating (3H), AG (Haze 25%)	-
Polarizer Type		E -Wide View	-
Polarizer Dimension	TFT	415.84 X 262.15	mm
	CF	415.84 X 262.15	mm
Polarizer Thickness	TFT	0.21	mm
	CF	0.21	mm
Weight		438(typ.)	g

2. ABSOLUTE MAXIMUM RATINGS

1. Storage condition : With shipping package.
2. Storage temperature range : 25±5 ℃.
3. Storage humidity range : 50±10% RH.
4. Shelf life : 30 days

3. Suggestive Driving Condition

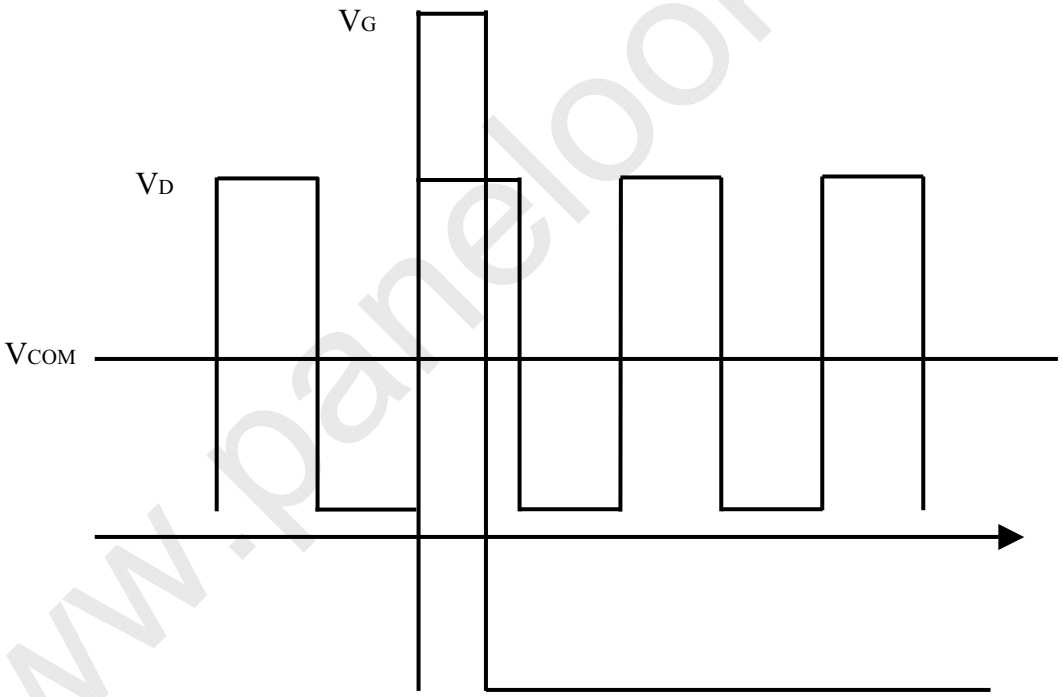
Item				Min.	Typ.	Max.	Unit
Driving Voltage	V_G	On		23.5	24.1	-	V
		Off		-	-6.8	-6.5	V
	V_D	B	Gam1	-	11.70	-	V
			Gam14	-	0.16	-	V
		W	Gam7	-	6.13	-	V
			Gam8	-	5.80	-	V
	V_{COM}	Center		-	5.38	-	V
	G↓-D offset			2	-	-	us
	Charging time			-	11.4	-	us

B: Black pattern

W: White pattern

Gamma Voltage : Gam1 > Gam2 > Gam3 > … > Gam10 G↓: gate pulse falling edge

DRIVING TIMING DIAGRAM



4. PANEL PIN DEFINITION

4.1 DATA PIN DEFINE

pin number	TAB1	TAB2~5	TAB6
1	dummy	dummy	dummy
2	dummy	dummy	dummy
3	dummy	dummy	dummy
4	Test	Test	Test
5	Test	Test	Test
6	Test	dummy	dummy
7	LR	dummy	dummy
8	XAO	dummy	dummy
9	OE	dummy	dummy
10	CPV	dummy	dummy
11	STV2	dummy	dummy
12	STV1	dummy	dummy
13	VSS	dummy	dummy
14	VSS	dummy	dummy
15	VDD	dummy	dummy
16	VDD	dummy	dummy
17	VGL	dummy	dummy
18	VGL	dummy	dummy
19	VGL	dummy	dummy
20	VGL	dummy	dummy
21	dummy	dummy	dummy
22	VGH	dummy	dummy
23	VGH	dummy	dummy
24	VGH	dummy	dummy
25	VCOM	VCOM	VCOM
26	VCOM	VCOM	VCOM
27	VST	dummy	dummy
28	VST	dummy	dummy
29	VCOM	VCOM	VCOM
30	Test	Test	Test
31~750	OUT1~720	OUT1~720	OUT1~720
751	Test	Test	Test
752	dummy	dummy	Test
753	Vcom	Vcom	VCOM
754	dummy	dummy	VST
755	dummy	dummy	VST

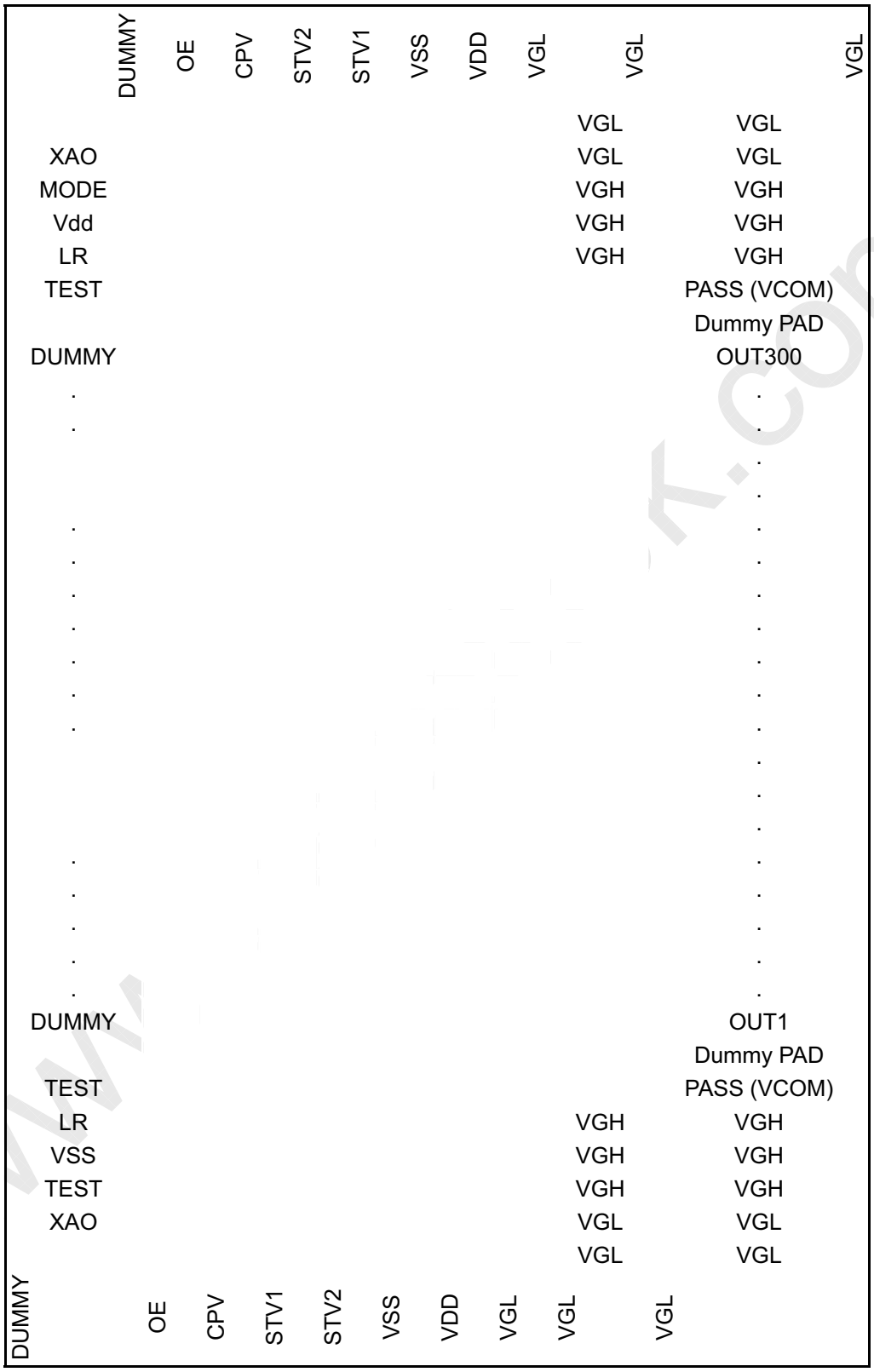
756	dummy	dummy	VGL
757	dummy	dummy	dummy
758	dummy	dummy	VCOM
759	dummy	dummy	VCOM
760	dummy	dummy	Test
761	VCOM	VCOM	VCOM
762	VCOM	VCOM	VCOM
763	Test	Test	Test
764	Test	Test	Test
765	dummy	dummy	dummy
766	dummy	dummy	dummy
767	dummy	dummy	dummy

Note: 1. Test pin is recommend for floating

2. LR default value is Vss (ground)

4.2 SCAN PIN DEFINE

Scan 1~3



5. OPTICAL CHARACTERISTICS

5.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Gamma voltage	-	Refer to Item 3 driving condition	V
Vcom	-	most suitable Vcom	V

5.2 OPTICAL SPECIFICATION

ITEM		Symbol	Condition	MIN.	TYP.	MAX.	UNIT	NOTE
Contrast Ratio		CR	θx=θy=0° CS-1000T	630	1000	-	%	4,1
Response Time (Black/White)		Tr	θx=θy=0°	---	1.5	6.5	ms	5,1
		Tf	θx=θy=0°	---	3.5	8.5	ms	
Center point Transmittance		T%	θx=θy=0° CS-1000T	5.0	5.6	-	%	7,1
Transmittance uniformity (13pts)		δT%	θx=θy=0°	-	1.25	1.4	-	6,1
Viewing Angle	Horizontal θx (θy=0°)	Right	CR≧10 BM-5A	75	85	-	Deg	2,3,1
		Left		75	85	-	Deg	
	Vertical θy (θx=0°)	Up		70	80	-	Deg	
		Down		70	80	-	Deg	
Color Coordinate at center point	Red	Rcx	θx=θy=0°	Typ -0.02	0.653	Typ +0.02	-	2,0
		Rcy	θx=θy=0°		0.329		-	
	Green	Gcx	θx=θy=0°		0.275		-	
		Gcy	θx=θy=0°		0.598		-	
	Blue	Bcx	θx=θy=0°		0.146		-	
		Bcy	θx=θy=0°		0.103		-	
	White	Wcx	θx=θy=0°		0.320		-	
		Wcy	θx=θy=0°		0.360		-	

Note (0)

Light source is the standard light source “C” which is defined by CIE and driving voltages are based on suitable gamma voltages. The calculating method is as following：

1.Measure Module’s and BLU’s spectrums. White is without signal input and R, G, B are with signal input. BLU is supplied by CMO.

2.Calculate cell’s spectrum.

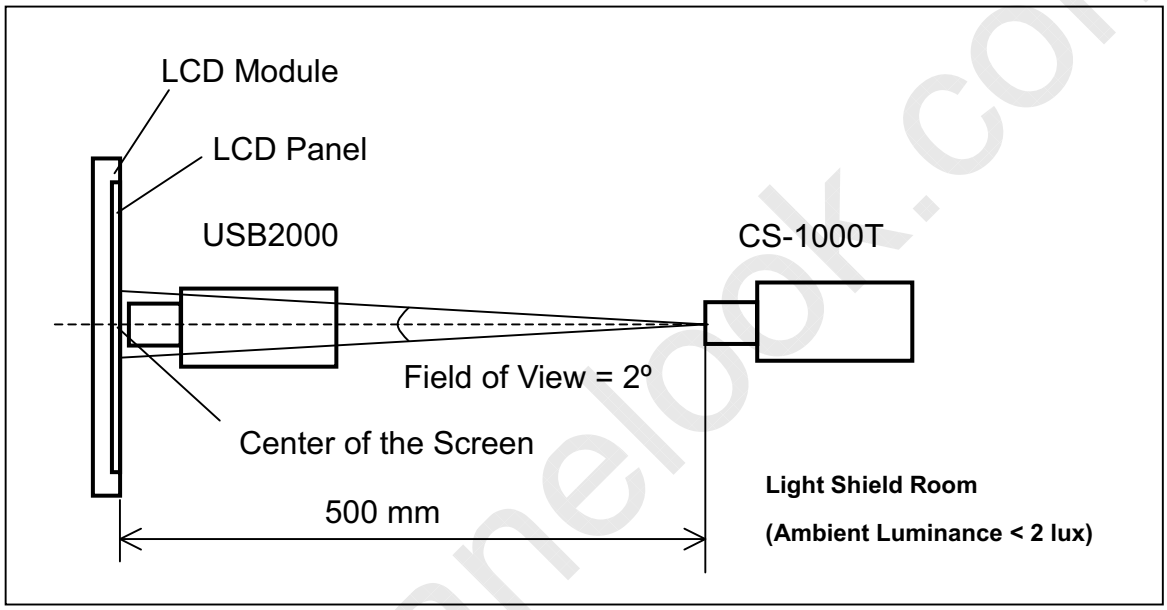
3.Calculate cell’s chromaticity by using the spectrum of standard light source “C”

Note (1)

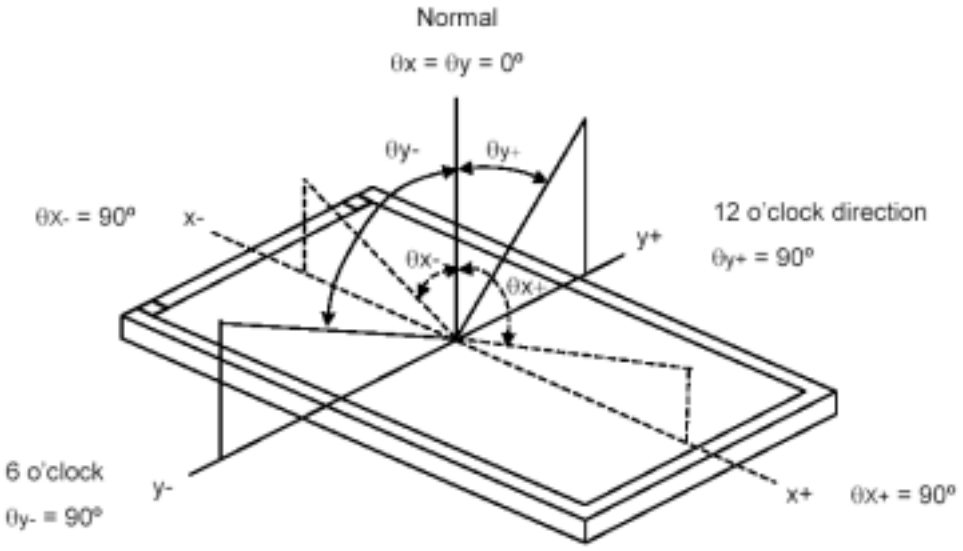
Light source is the BLU, which is supplied by CMO, and driving voltages are based on suitable gamma voltages. White is without signal input and R, G, B are with signal input. SPEC is judged by CMO's golden sample .

Note (2) : Measurement setup:

The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 20 minutes in a windless room.



Note (3) : Definition of viewing angle (θx ,θy):

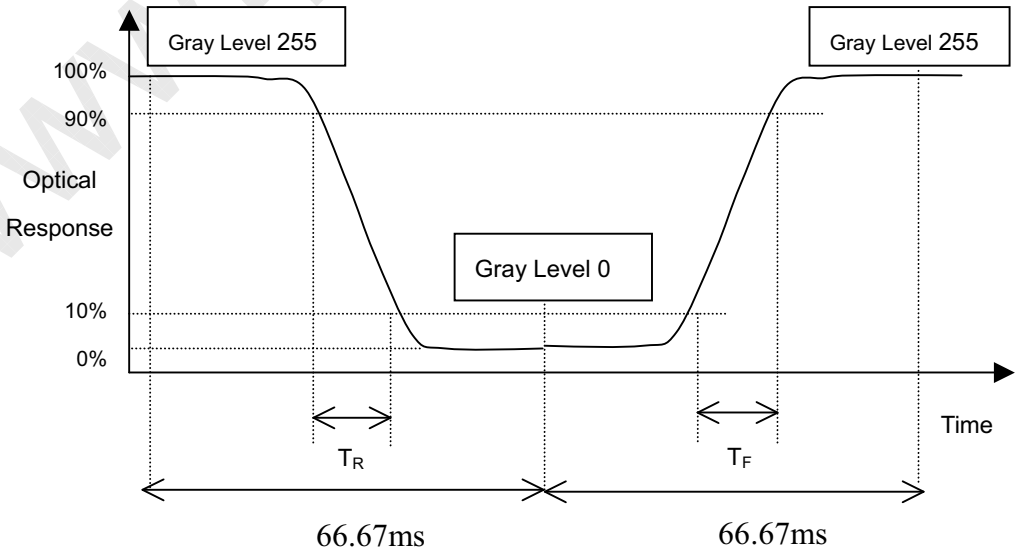


Note (4) : Definition of Contrast Ratio (CR):

Ratio of gray max (Gmax), gray min (Gmin), at the center point of panel.

$$CR = \frac{\text{Luminance with all pixel white (Gmax)}}{\text{Luminance with all pixel Black (Gmin)}}$$

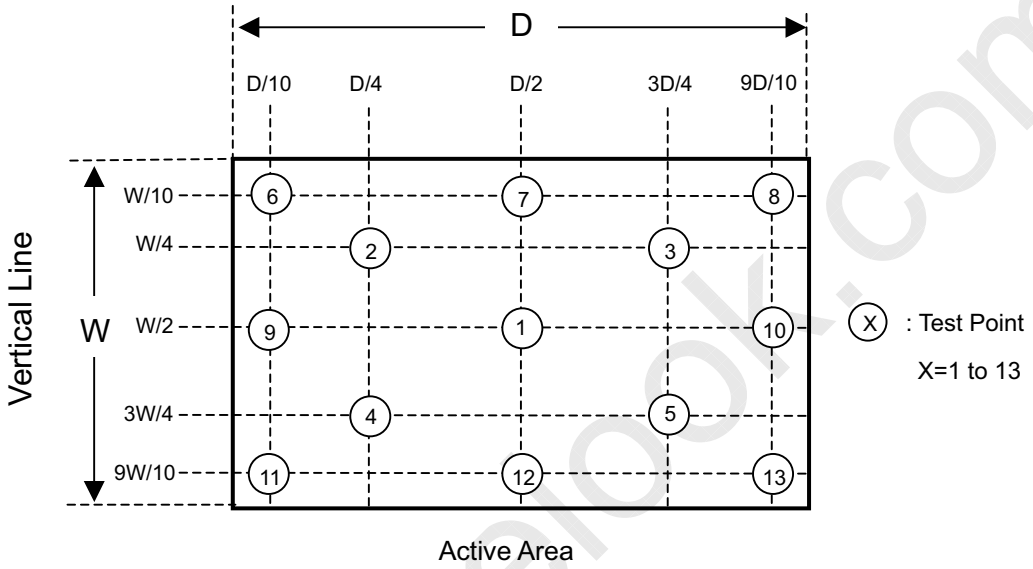
Note (5) : Definition of Response Time (T_R, T_F):



Note (6) : Definition of Transmittance Variation (δT%):

Measure the transmittance at 13 points

$$\delta T\% = \frac{\text{Maximum [T\%(1), T\%(2), … T\%(13)]}}{\text{Minimum [T\%(1), T\%(2), … T\%(13)]}}$$



Note (7) : Definition of Transmittance(T%):

Module is without signal input.

BLU is supplied by CMO .

$$\text{Transmittance} = \frac{\text{Luminance of LCD module}}{\text{Luminance of backlight}} * 100\%$$

6. PACKAGING

6.1.PACKING SPECIFICATION

1. 19 pcs LCD panel / 1 Box
2. Box Dimension: 462 (L) X366 (W) X 617(H) mm
3. Weight: Approximately 26.27Kg (38 cells per Carton)

6.2 PACKING METHOD

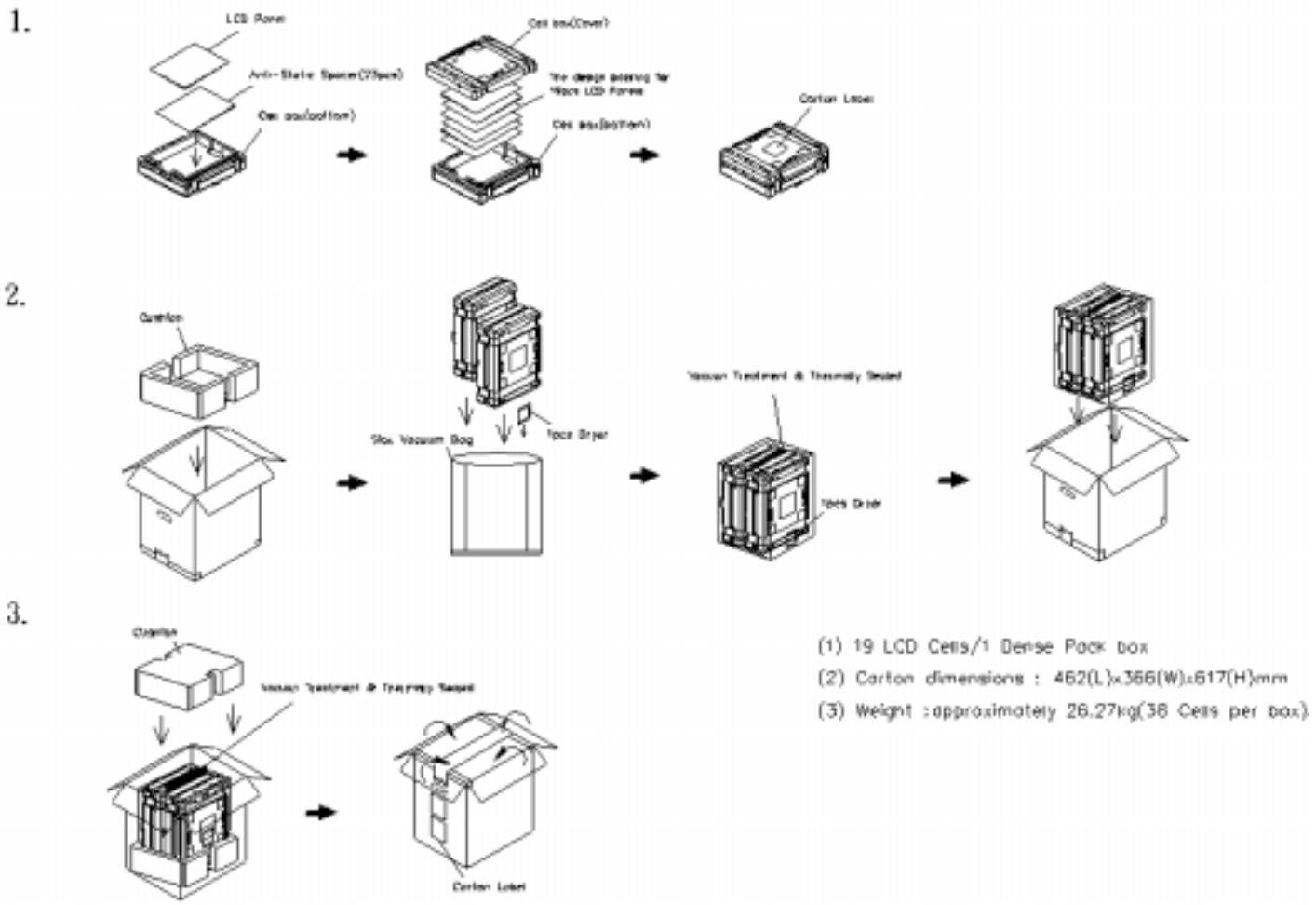


Figure. 6-1 Packing method

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Pallet Stack:L1100*W970*H2011mm
Weight: Approx 485kg

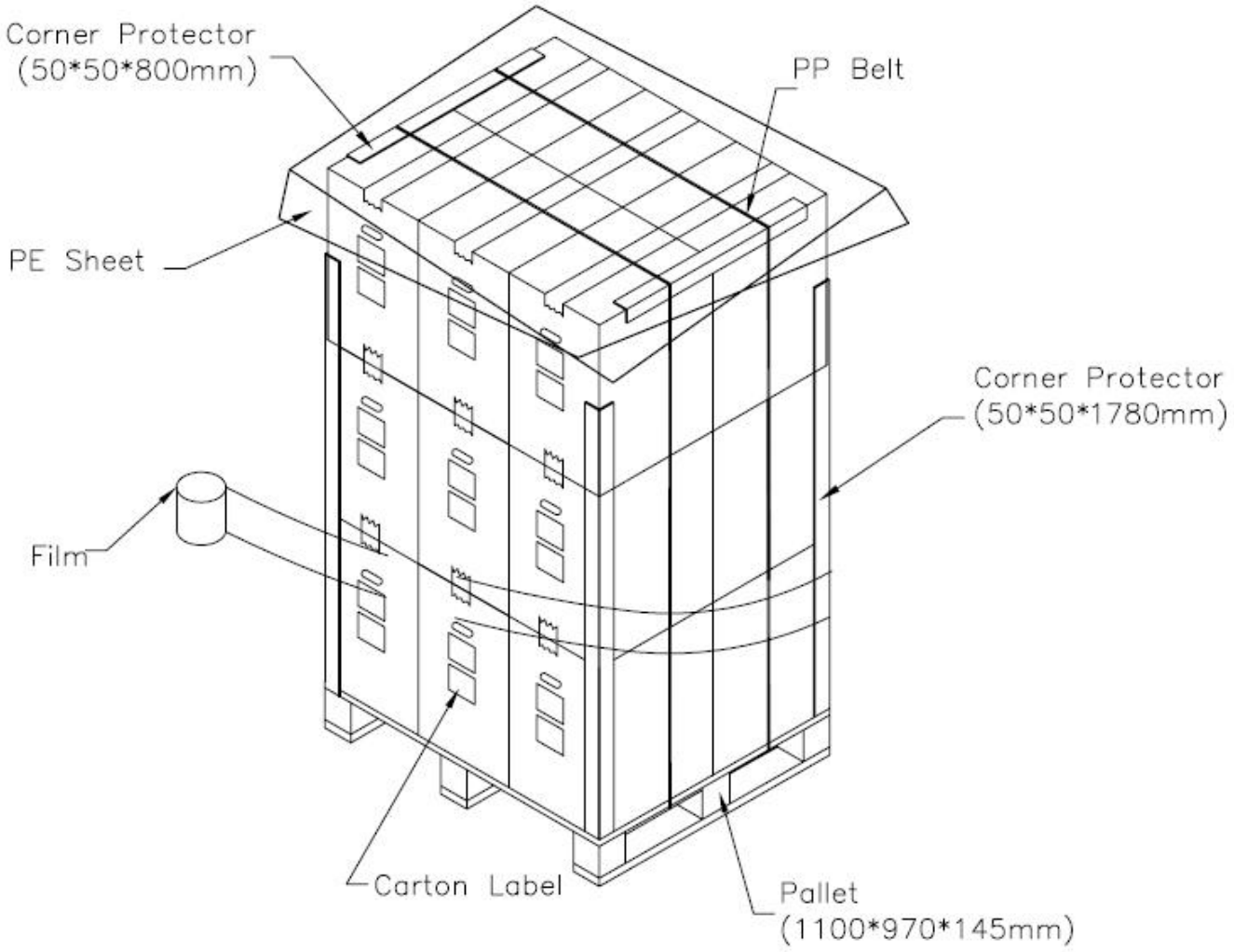

Figure. 6-2 Stacking method

7. DEFINITION OF LABEL

1. Mode Name: M190A1- C0A
2. Panel Type: version control
3. Quantity: 19pcs / PP box
4. Case ID: serial number.
5. Note: Notification, if necessary.
6. Barcode: Case ID in code39 format

Figure. 7-1 Carton Label

8. PRECAUTIONS

8.1 ASSEMBLY AND HANDLING PRECAUTIONS

1. Do not apply rough force such as bending or twisting to the cell during assembly.
2. To assemble or install cell into customer's module can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
3. It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.
4. Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
5. It is dangerous that moisture come into or contacted the LCD panel, because moisture may damage TFT circuit .
6. High temperature or humidity may reduce the performance of cell. Please store LCD cell within the specified storage conditions.

8.2 SAFETY PRECAUTIONS

1. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.