CHI MEI OPTOELECTRONICS CORP.

Issue Date:Nov. 13, 2009
Model No.: V546H1-PH3
Approval

TFT LCD Approval Specification

MODEL NO.: V546H1-PH3

Customer: _____

Approved by:_____

Note:

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REVISION HISTORY

Version	Date	Page(New)	Section	Description
Ver. 0.0	Sep 21, 2009	All	All	The Tentative specification was first issued.
Ver. 1.0	Oct 26, 2009	5	1.2	To update specificiation of Contrast Ratio and Color Chromaticity
		5	1.2	To correct specificiation of Polarizer Surface Treatment
		7-11	2.3-5.1	To separate C/B spec from panel spec
		12	6.2	To update optical specificiation
		16	8.1	To updated Label format
Ver. 2.0	Nov. 13, 2009	5	1.2	To updated Cell Transparency/Polarizer Surface Treatment/Weight
		5	1.3	To updated Mechanical Specifications
		12	6.2	To updated Center Transmittance
		14	6.2	To updated Measurement Setup Fig.
		16	8.1	To updated Open Cell Lable

1. GENERAL DESCRIPTION

1.1 OVERVIEW

V546H1-PH3 is a 54.6" TFT Liquid Crystal Display cell with driver ICs and 4ch-LVDS interface. This product supports 1920 x 1080 Full HDTV format and can display 1.07G colors (8-bit+Hi-FRC/color). The backlight unit is not built-in.

1.2 FEATURES

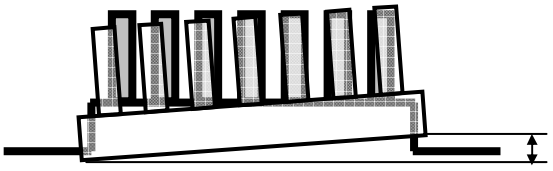
CHARACTERISTICS ITEMS	SPECIFICATIONS
Screen Diagonal [in]	54.6
Pixels [lines]	1920 × 1080
Active Area [mm]	1209.6(H) x 680.4(V) (54.6" diagonal)
Sub-Pixel Pitch [mm]	0.21(H) x 0.63(V)
Pixel Arrangement	RGB vertical stripe
Weight [g]	3422
Physical Size [mm]	1251.4(W) x 737(H) x 1.75(D) Typ
Display Mode	Transmissive mode / Normally black
Contrast Ratio	6000:1 Typ. (Typical value measured at CMO's module)
Glass thickness (Array / CF) [mm]	0.7 / 0.7
Viewing Angle (CR>20)	+88/-88(H),+88/-88(V) Typ. (Typical value measured at CMO's module)
Color Chromaticity	R=(0.655, 0.323) G=(0.297, 0.601) B=(0.143, 0.088) W=(0.329, 0.374) (Light source is the standard light source "C" which is defined by CIE and driving voltages are based on suitable gamma voltages.)
Cell Transparency [%]	5.6%Typ. (Typical value measured at CMO's module)
Polarizer Surface Treatment	Super Clear coating Hardness (3H)

1.3 MECHANICAL SPECIFICATIONS

Item	Min.	Typ.	Max.	Unit	Note
Weight	-	3422	-	g	-
I/F connector mounting position	The mounting inclination of the connector makes the screen center within ± 0.5mm as the horizontal.				(2)

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

Note (2) Connector mounting position



2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT (BASE ON CMO MODULE V546H1-LH1)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	TST	-20	+60	ºC	(1)
Operating Ambient Temperature	TOP	0	50	ºC	(1), (2)
Shock (Non-Operating)	SNOP	-	30	G	(3), (5)
Vibration (Non-Operating)	VNOP	-	1.0	G	(4), (5)

Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. (Ta ≦ 40 ºC).

(b) Wet-bulb temperature should be 39 ºC Max. (Ta > 40 ºC).

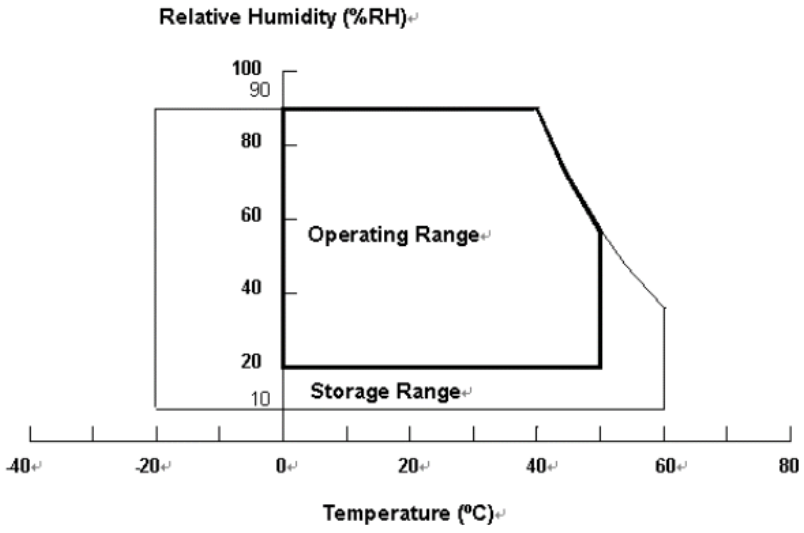
(c) No condensation.

Note (2) The maximum operating temperature is based on the test condition that the surface temperature of display area is less than or equal to 65 ºC with LCD module alone in a temperature controlled chamber. Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 65 ºC. The range of operating temperature may degrade in case of improper thermal management in final product design.

Note (3) 11 ms, half sine wave, 1 time for ± X, ± Y, ± Z.

Note (4) 10 ~ 200 Hz, 10 min, 1 time each X, Y, Z.

Note (5) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.



2.2 PACKAGE STORAGE

Storage condition: With shipping package.

Storage temperature rang: 25±5℃

Storage humidity range: 50±10%RH

Shelf life: a month

2.3 ELECTRICAL ABSOLUTE RATINGS

2.3.1 ELECTRICAL ABSOLUTE RATINGS (OPEN CELL)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	V_{AA}	12	18	V	(1)
Power Supply Voltage	V_{GHP}	V_{DD}	V_{GL}+40	V	
Power Supply Voltage	V_{GL}	-15	-5	V	
Logic Input Voltage	V_{DD}	2.3	3.6	V	

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD MODULE

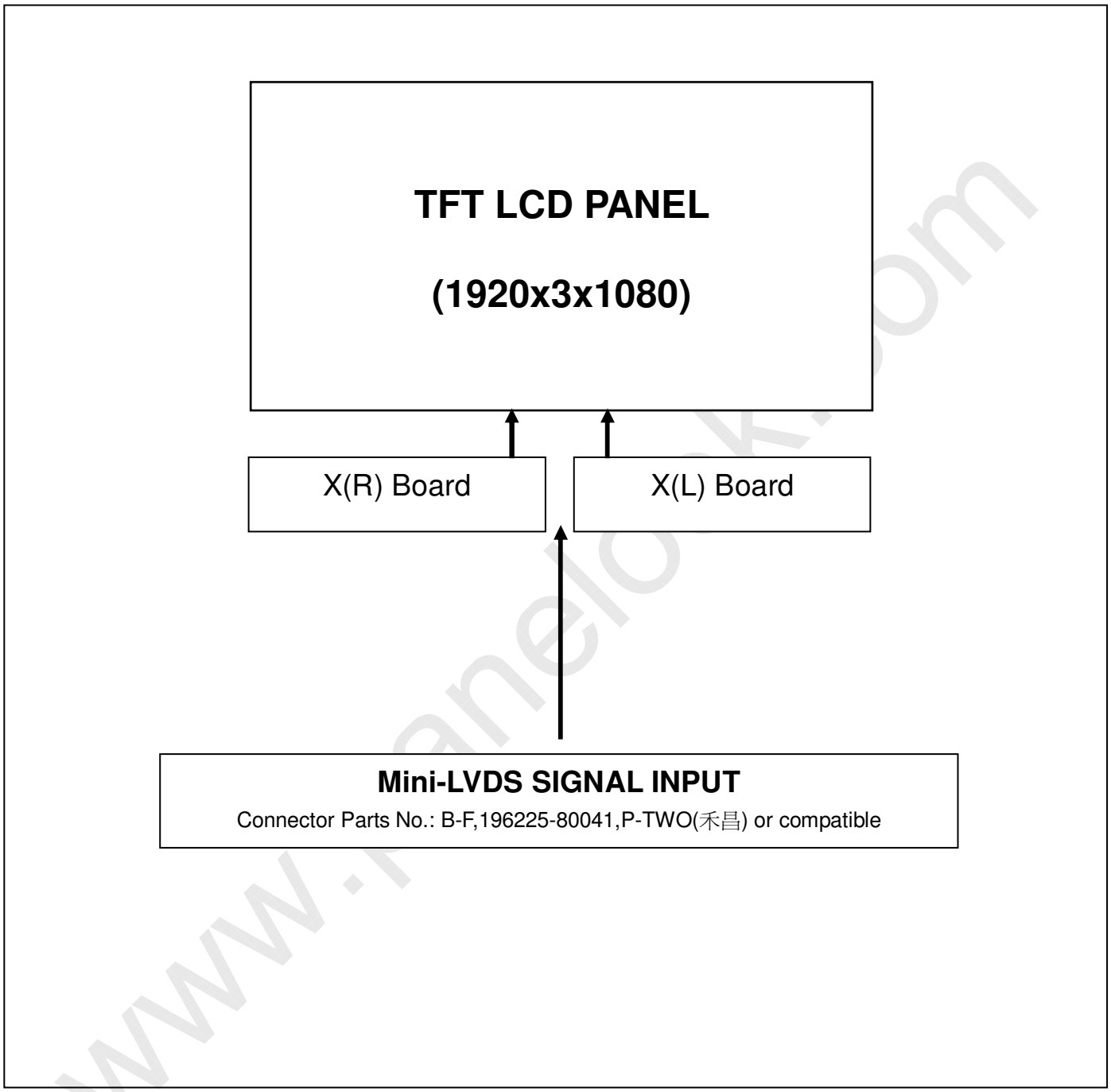
(Ta = 25 ± 2 ºC)

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V_{GH}	29.3	30	30.7	V	
		V_{GL}	-8.2	-8	-7.8	V	
		V_{AA}	17.5	17.7	17.9	V	
		V_{DD}	3.1	3.3	3.5	V	
Power Supply Current		I_{GH}	-	40	-	mA	
		I_{GL}	-	10	-	mA	
		I_{AA}	-	0.8	-	A	
		I_{33V}	-	0.4	-	A	
CMOS interface	Input High Threshold Voltage	V_{IH}	2.7	-	3.3	V	
	Input Low Threshold Voltage	V_{IL}	0	-	0.7	V	

Note (1) The module should be always operated within the above ranges.

4. BLOCK DIAGRAM OF INTERFACE

4.1 TFT LCD MODULE



5. INPUT TERMINAL PIN ASSIGNMENT

5.1 TFT LCD Module Input

CN1(XL) Connector Pin Assignment

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND	Ground	41	N.C.	No connection
2	MLB6N	B-Path mini-LVDS data signal	42	STV	Scan driver start pulse
3	MLB6P	B-Path mini-LVDS data signal	43	TP1	Mini-LVDS data latch
4	MLB5N	B-Path mini-LVDS data signal	44	EIO3	Data driver start pulse
5	MLB5P	B-Path mini-LVDS data signal	45	EIO4	Data driver start pulse
6	MLB4N	B-Path mini-LVDS data signal	46	VDASEL	Switch for half-VDDA
7	MLB4P	B-Path mini-LVDS data signal	47	GND	Ground
8	GND	Ground	48	GM18	Gamma power supply
9	MLBCKN	Data driver clock	49	GM17	Gamma power supply
10	MLBCKP	Data driver clock	50	GM16	Gamma power supply
11	GND	Ground	51	GM15	Gamma power supply
12	MLB2N	B-Path mini-LVDS data signal	52	GM14	Gamma power supply
13	MLB2P	B-Path mini-LVDS data signal	53	GM13	Gamma power supply
14	MLB1N	B-Path mini-LVDS data signal	54	GM12	Gamma power supply
15	MLB1P	B-Path mini-LVDS data signal	55	GM10	Gamma power supply
16	MLB0N	B-Path mini-LVDS data signal	56	GM9	Gamma power supply
17	MLB0P	B-Path mini-LVDS data signal	57	GM7	Gamma power supply
18	GND	Ground	58	GM6	Gamma power supply
19	MLA6N	A-Path mini-LVDS data signal	59	GM5	Gamma power supply
20	MLA6P	A-Path mini-LVDS data signal	60	GM4	Gamma power supply
21	MLA5N	A-Path mini-LVDS data signal	61	GM3	Gamma power supply
22	MLA5P	A-Path mini-LVDS data signal	62	GM2	Gamma power supply
23	MLA4N	A-Path mini-LVDS data signal	63	GM1	Gamma power supply
24	MLA4P	A-Path mini-LVDS data signal	64	GND	Ground
25	GND	Ground	65	VDDAH	Data driver power supply
26	MLACKN	Data driver clock	66	VDDAL	Data driver power supply
27	MLACKP	Data driver clock	67	GND	Ground
28	GND	Ground	68	VCM	Vcom power supply
29	MLA2N	A-Path mini-LVDS data signal	69	VCM	Vcom power supply
30	MLA2P	A-Path mini-LVDS data signal	70	GND	Ground
31	MLA1N	A-Path mini-LVDS data signal	71	VDDA	Data driver power supply
32	MLA1P	A-Path mini-LVDS data signal	72	VDDA	Data driver power supply
33	MLA0N	A-Path mini-LVDS data signal	73	GND	Ground
34	MLA0P	A-Path mini-LVDS data signal	74	VDD	Logic power supply
35	GND	Ground	75	VDD	Logic power supply
36	GND	Ground	76	VGL	Scan driver power supply
37	OE1	Scan driver output enable 1	77	VGL	Scan driver power supply
38	OE2	Scan driver output enable 2	78	VGH	Scan driver power supply
39	CKV	Scan driver clock	79	VGH	Scan driver power supply
40	POL	Polarity inverting input	80	GND	Ground

CN1(XR) Connector Pin Assignment

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND	Ground	41	MLD2P	D-Path mini-LVDS data signal
2	VGH	Scan driver power supply	42	MLD1N	D-Path mini-LVDS data signal
3	VGH	Scan driver power supply	43	MLD1P	D-Path mini-LVDS data signal
4	VGL	Scan driver power supply	44	MLD0N	D-Path mini-LVDS data signal
5	VGL	Scan driver power supply	45	MLD0P	D-Path mini-LVDS data signal
6	VDD	Logic power supply	46	GND	Ground
7	VDD	Logic power supply	47	MLC6N	C-Path mini-LVDS data signal
8	GND	Ground	48	MLC6P	C-Path mini-LVDS data signal
9	VDDA	Data driver power supply	49	MLC5N	C-Path mini-LVDS data signal
10	VDDA	Data driver power supply	50	MLC5P	C-Path mini-LVDS data signal
11	GND	Ground	51	MLC4N	C-Path mini-LVDS data signal
12	VCM	Vcom power supply	52	MLC4P	C-Path mini-LVDS data signal
13	VCM	Vcom power supply	53	GND	Ground
14	GND	Ground	54	MLCCKN	Data driver clock
15	VDDAL	Data driver power supply	55	MLCCKP	Data driver clock
16	VDDAH	Data driver power supply	56	GND	Ground
17	GND	Ground	57	MLC2N	C-Path mini-LVDS data signal
18	VSCM	VSCM Power supply	58	MLC2P	C-Path mini-LVDS data signal
19	VDASEL	Switch for half-VDDA	59	MLC1N	C-Path mini-LVDS data signal
20	EIO4	Data driver start pulse	60	MLC1P	C-Path mini-LVDS data signal
21	EIO3	Data driver start pulse	61	MLC0N	C-Path mini-LVDS data signal
22	TP1	Mini-LVDS data latch	62	MLC0P	C-Path mini-LVDS data signal
23	STV	Scan driver start pulse	63	GND	Ground
24	N.C.	No connection	64	GM18	Gamma power supply
25	POL	Polarity inverting input	65	GM17	Gamma power supply
26	CKV	Scan driver clock	66	GM16	Gamma power supply
27	OE2	Scan driver output enable 2	67	GM15	Gamma power supply
28	OE1	Scan driver output enable 1	68	GM14	Gamma power supply
29	GND	Ground	69	GM13	Gamma power supply
30	MLD6N	D-Path mini-LVDS data signal	70	GM12	Gamma power supply
31	MLD6P	D-Path mini-LVDS data signal	71	GM10	Gamma power supply
32	MLD5N	D-Path mini-LVDS data signal	72	GM9	Gamma power supply
33	MLD5P	D-Path mini-LVDS data signal	73	GM7	Gamma power supply
34	MLD4N	D-Path mini-LVDS data signal	74	GM6	Gamma power supply
35	MLD4P	D-Path mini-LVDS data signal	75	GM5	Gamma power supply
36	GND	Ground	76	GM4	Gamma power supply
37	MLDCKN	Data driver clock	77	GM3	Gamma power supply
38	MLDCKP	Data driver clock	78	GM2	Gamma power supply
39	GND	Ground	79	GM1	Gamma power supply
40	MLD2N	D-Path mini-LVDS data signal	80	GND	Ground

Note (1) CN1 Connector Part No.: B-F,196225-80041,P-TWO(禾昌)

6. OPTICAL CHARACTERISTICS

6.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V_{CC}	12	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
Vertical Frame Rate	Fr	120	Hz

6.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown in 6.2. The following items should be measured under the test conditions described in 6.1 and stable environment shown in Note (7).

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR		4500	6000	-	-	(2),(4)
Response Time		Gray to gray	θ_x=0°, θ_Y =0° With CMO Module	-	4.5	(9)	ms	(2),(5)
Center Transmittance		T%		-	5.6	-	%	(2),(8)
White Variation		δW		-	-	1.3	-	(2),(7)
Color Chromaticity	Red	Rcx	θ_x=0°, θ_Y =0° CS-2000 Standard light source "C"	Typ - 0.03	0.655	Typ + 0.03	-	(1),(6)
		Rcy			0.323		-	
	Green	Gcx			0.297		-	
		Gcy			0.601		-	
	Blue	Bcx			0.143		-	
		Bcy			0.088		-	
	White	Wcx			0.329		-	
		Wcy			0.374		-	
Viewing Angle	Horizontal	θ_x+	CR≥20 With CMO Module	80	88	-	Deg.	(2),(3)
		θ_x-		80	88	-		
	Vertical	θ_Y+		80	88	-		
		θ_Y-		80	88	-		

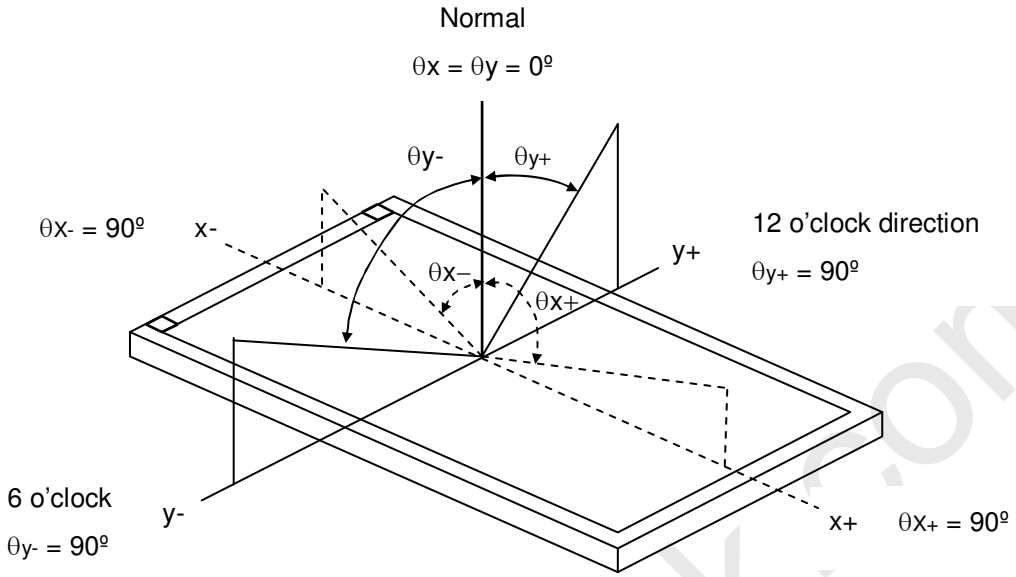
Note (1) Light source is the standard light source "C" which is defined by CIE and driving voltages are based on suitable gamma voltages. The calculating method is as following：

1. Measure Module's and BLU's spectrums. W, R, G, B are with signal input. BLU(for V546H1-LH1) is supplied by CMO.
2. Calculate cell's spectrum.
3. Calculate cell's chromaticity by using the spectrum of standard light source "C"

Note (2) Light source is the BLU which is supplied by CMO and driving voltages are based on suitable gamma voltages.

Note (3) Definition of Viewing Angle (θx, θy):

Viewing angles are measured by Autronic Conoscope Cono-80



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

The contrast ratio can be calculated by the following expression.

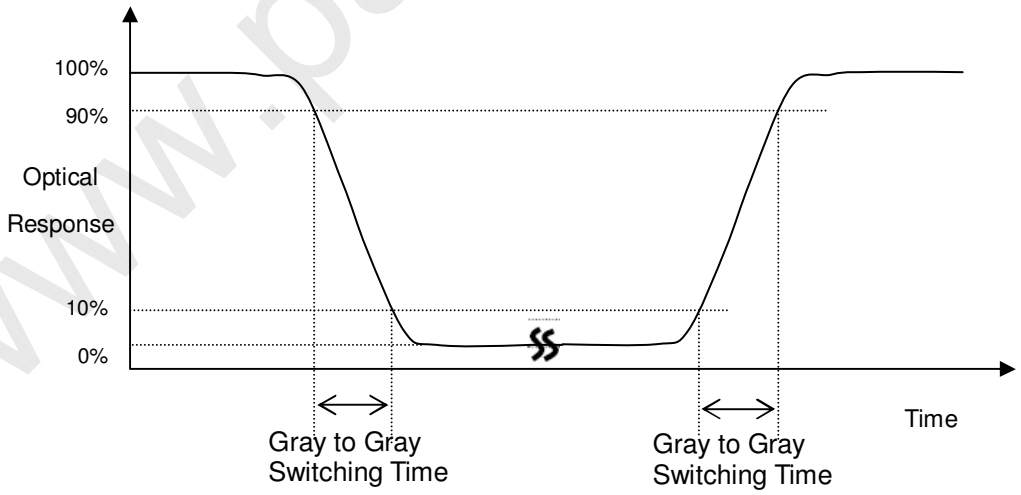
Contrast Ratio (CR) = L1023 / L0

L1023: Luminance of gray level 1023

L 0: Luminance of gray level 0

CR = CR (1), where CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (7).

Note (5) Definition of Gray to Gray Switching Time:

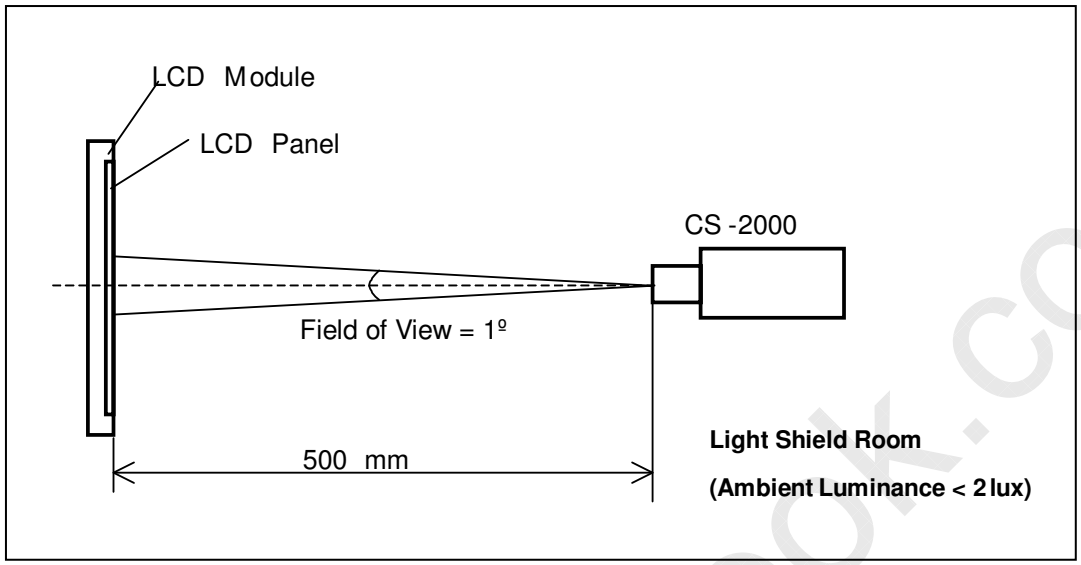


The driving signal means the signal of gray level 0, 255,511,767,and 1023.

Gray to gray average time means the average switching time of gray level 0 ,255,511,767,1023 to each other .

Note (6) Measurement Setup:

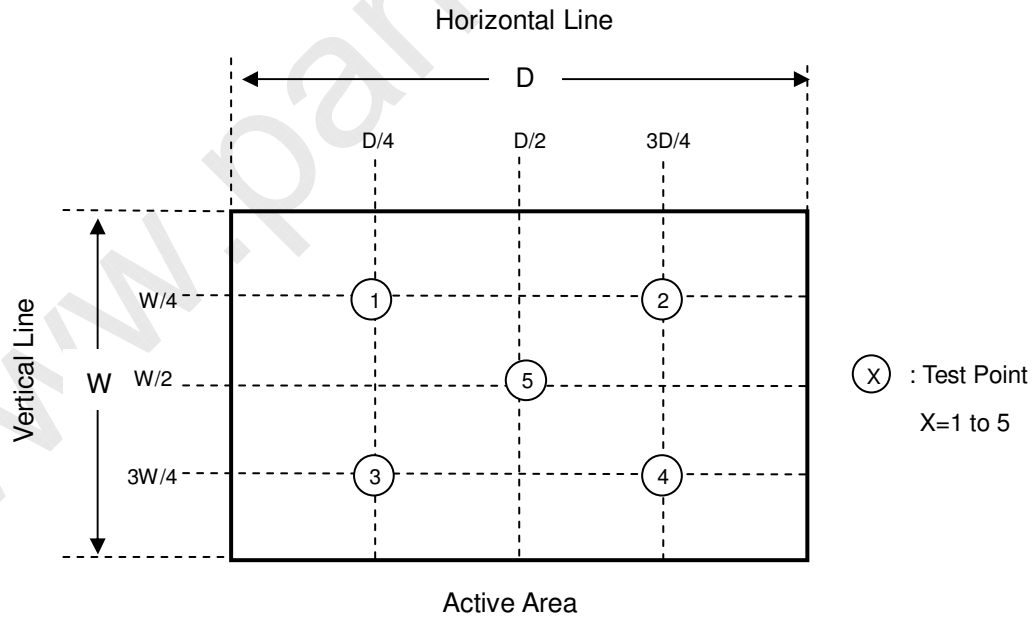
The LCD module should be stabilized at given temperature for 1 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 1 hour in a windless room.



Note (7) Definition of White Variation (δW):

Measure the luminance of gray level 1023 at 5 points

δW = Maximum [L (1), L (2), L (3), L (4), L (5)] / Minimum [L (1), L (2), L (3), L (4), L (5)]



Note (8) Definition of Transmittance (T%):

Module is without signal input.

$$\text{Transmittance} = \frac{\text{Luminance of LCD module at 1023 gray}}{\text{Luminance of backlight}} * 100\%$$

7. PRECAUTIONS

7.1 ASSEMBLY AND HANDLING PRECAUTIONS

[1] Do not apply rough force such as bending or twisting to the module during assembly.

[2] It is recommended to assemble or to install a module into the user's system in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.

[3] Do not apply pressure or impulse to the module to prevent the damage of LCD panel and Backlight.

[4] Always follow the correct power-on sequence when the LCD module is turned on. This can prevent the damage and latch-up of the CMOS LSI chips.

[5] Do not plug in or pull out the I/F connector while the module is in operation.

[6] Do not disassemble the module.

[7] Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.

[8] Moisture can easily penetrate into LCD module and may cause the damage during operation.

[9] When storing modules as spares for a long time, the following precaution is necessary.

[9.1] Do not leave the module in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35℃at normal humidity without condensation.

[9.2] The module shall be stored in dark place. Do not store the TFT-LCD module in direct sunlight or fluorescent light.

[10] When ambient temperature is lower than 10ºC, the display quality might be reduced. For example, the response time will become slow, and the starting voltage of CCFL will be higher than that of room temperature.

7.2 SAFETY PRECAUTIONS

[1] The startup voltage of a Backlight is approximately 1000 Volts. It may cause an electrical shock while assembling with the inverter. Do not disassemble the module or insert anything into the Backlight unit.

[2] 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.

[3] After the module's end of life, it is not harmful in case of normal operation and storage.

8. DEFINITION OF LABELS

8.1 OPEN CELL LABEL

The barcode nameplate is pasted on each open cell as illustration for CMO internal contro

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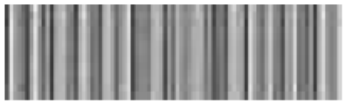
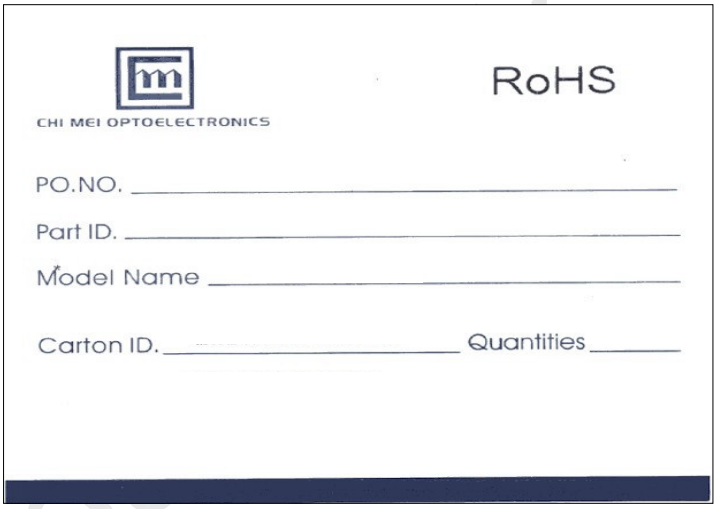


XXXXXXXXXXXXX

Made in China

8.2 CARTON LABEL

The barcode nameplate is pasted on each box as illustration, and its definitions are as following explanation.



(a) Model Name: V546H1-PH3

(b) Carton ID: CMO internal control

(c) Quantities: 6 pcs

9. PACKAGING

9.1 PACKAGING SPECIFICATIONS

(1) 6 LCD TV Panels / 1 Box

(2) Box dimensions : 1454 (L) X 994 (W) X 210 (H)

(3) Weight : approximately 42Kg (6 panels per box)

9.2 PACKAGING METHOD

Figures 10-1 and 10-2 are the packing method

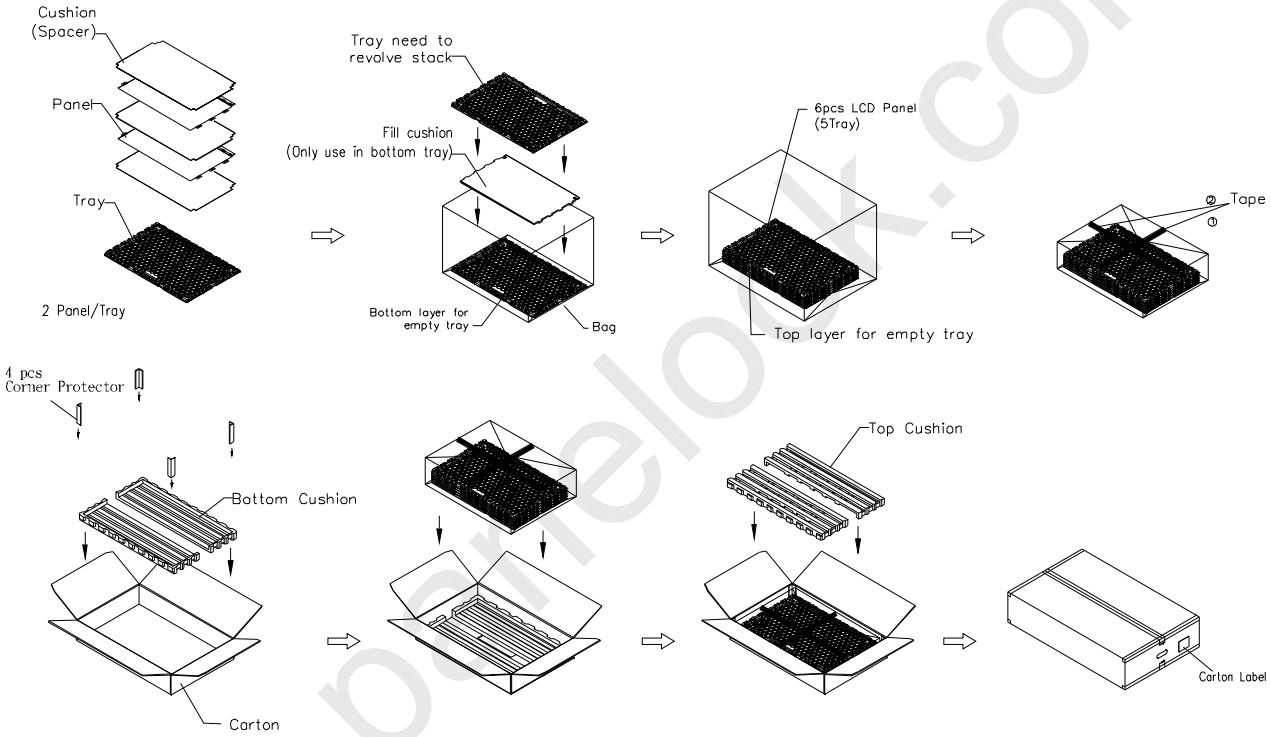
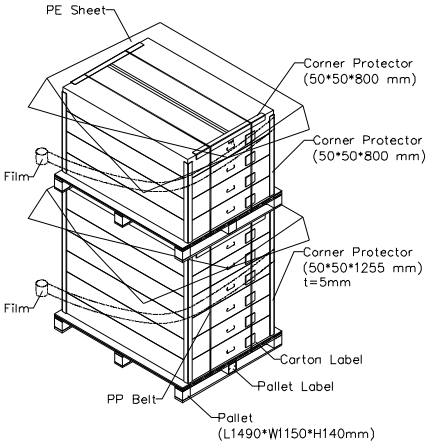
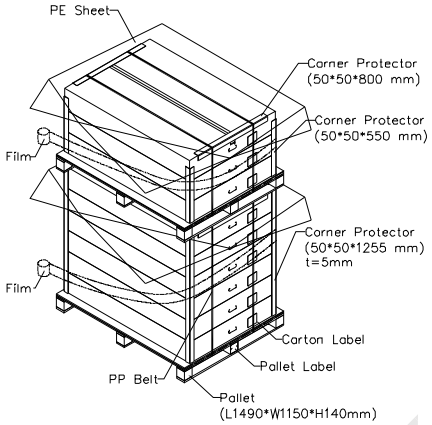


Figure.10-1 packing method

Sea / Land Transportation
(40ft HQ Container)
Gross: 450kg



Sea / Land Transportation
Gross: 408kg



Air Transportation
Gross: 267kg

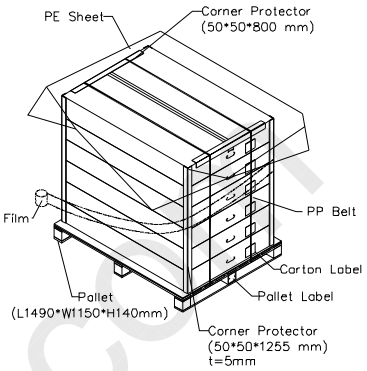


Figure.10-2 packing method

10. MECHANICAL CHARACTERISTICS