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OPTOELECTRONICS

Doc. No.:
Issued Date: Apr. 15, 2008
Model No.: M260J3-P01

Approval

TFT LCD Approval Specification

MODEL NO.: M260J3-P01

Customer : _____

Approved by : _____

Note :

記錄	工作	審核	角色	投票
2008-04-24 17:43:26 CST	PMMD Director	kj_cheng(鄭光容 /56505/54419/14107)	Director (deputy)	Accept

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Version 2.0

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REVISION HISTORY

Version	Date	Section	Description
Ver. 2.0	Apr, 15 '08	-	M260J3-P01 Approval Specifications was first issued.

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1. GENERAL DESCRIPTION

1.1 OVERVIEW

The M260J3-P01 is a 25.54-inch wide TFT LCD cell with driver ICs and a 30-pins-2ch-LVDS circuit board. The product supports 1920 x 1200 WUXGA mode and can display up to 16.7M colors. The backlight unit is not built in.

1.2 FEATURES

- Extra-wide viewing angle

- High contrast ratio

- Fast response time

- High color saturation

- WUXGA (1920 x 1200 pixels) resolution

- DE (Data Enable) only mode

- LVDS (Low Voltage Differential Signaling) interface

- RoHS Compliance

1.3 APPLICATION

- TFT LCD Monitor

- TFT LCD TV

- Workstation & desktop monitor

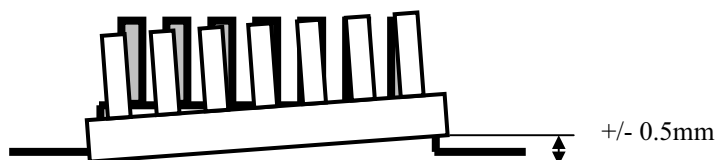- Display terminals for AV application

1.4 GENERAL SPECIFICATI0NS

Item	Specification	Unit	Note
Diagonal Size	25.54	inch	
Active Area	550.08 (H) x 343.8 (V)	mm	(1)
Driver Element	a-si TFT active matrix	-	-
Pixel Number	1920 x R.G.B. x 1200	pixel	-
Pixel Pitch	0.2865 (H) x 0.2865 (V)	mm	-
Pixel Arrangement	RGB vertical stripe	-	-
Display Colors	16.7M	color	-
Transmissive Mode	Normally White	-	-
Surface Treatment	Hard coating (3H), Anti-glare (Haze 25%)	-	-

1.5 MECHANICAL SPECIFICATIONS

Item	Min.	Typ.	Max.	Unit	Note
Weight	-	-	865	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.

(2) Connector mounting position

+/- 0.5mm

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2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT (BASED ON CMO MODULE M260J3-L01)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T_{ST}	-20	+60	ºC	(1)
Operating Ambient Temperature	T_{OP}	0	+50	ºC	(1), (2)

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

      (a) 90 %RH Max. (Ta $\leqq$ 40 ºC).

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

      (c) No condensation.

Note (2) The temperature of panel display surface area should be 0 ºC Min. and 60 ºC Max.

Relative Humidity (%RH)

Operating Range

Storage Range
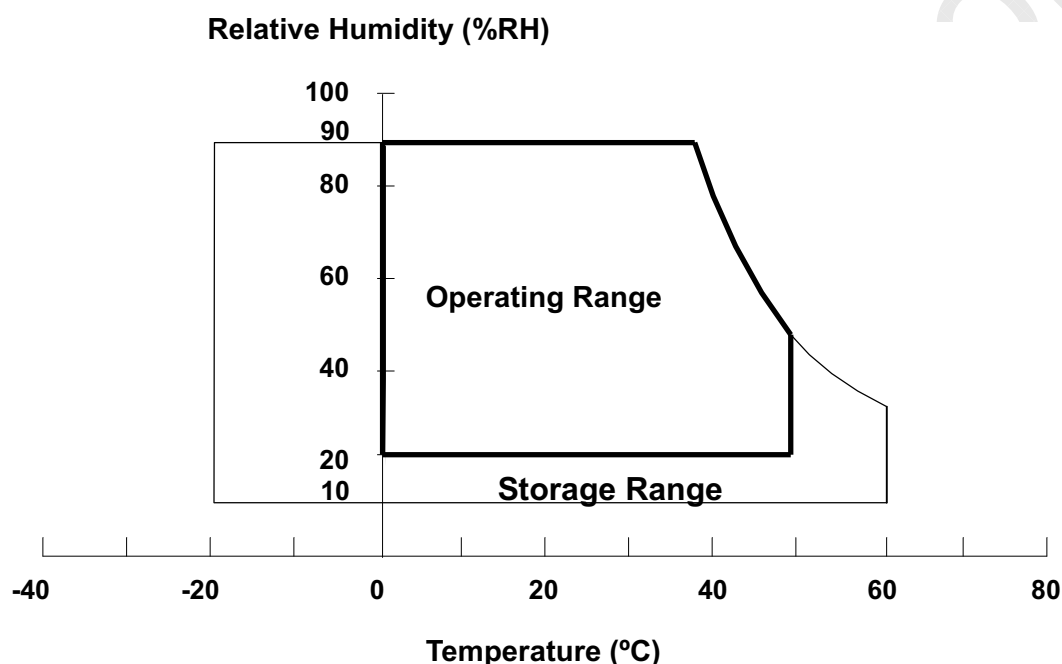
Temperature (ºC)

2.2 ABSOLUTE RATINGS OF ENVIRONMENT (OPEN CELL)

High temperature or humidity may reduce the performance of panel. Please store LCD panel within the specified storage conditions.

    Storage Condition: With packing.

    Storage temperature range: 25±5 ºC.

    Storage humidity range: 50±10%RH.

    Shelf life: 30days

2.3 ELECTRICAL ABSOLUTE RATINGS (OPEN CELL)

Item	Symbol	Value		Unit	Note
		Min	Max		
Power Supply Voltage	V_{CC}	-0.3	+6.0	V	(1)

Note (1) Permanent damage might occur if the module is operated at conditions exceeding the maximum values.

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3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD MODULE

Ta = 25 ± 2 ºC

| Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		Vcc	4.5	5.0	5.5	V	-
Ripple Voltage		V_{RP}	-	--	100	mV	-
Rush Current		I_{RUSH}	-	--	5	A	(2)
Power Supply Current	White	Icc	-	0.5	0.6	mA	(3)a
	Black		-	0.92	1.1	mA	(3)b
	Vertical Stripe		-	0.85	1.02	mA	(3)c
LVDS differential input voltage		Vid	100	-	600	mV	
LVDS common input voltage		Vic	--	1.2	--	V	

3.2 Vcc Power Dip Condition:

Vcc

4.5V

4.0V

Td
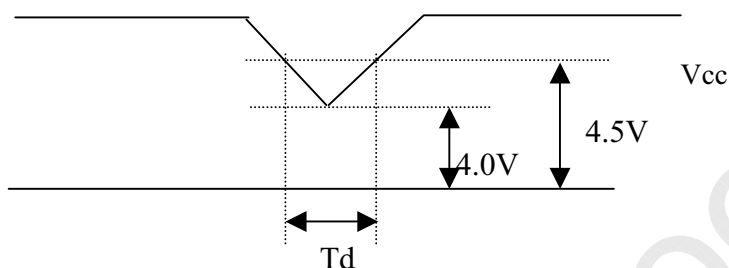
Dip condition: $4.0V \leq Vcc \leq 4.5V, Td \leq 20ms$

Note (1) The module is recommended to operate within specification ranges listed above for normal function.

Note (2) Measurement Conditions:

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Vcc rising time is 470μs

Vcc

0.9Vcc

0.1Vcc

GND
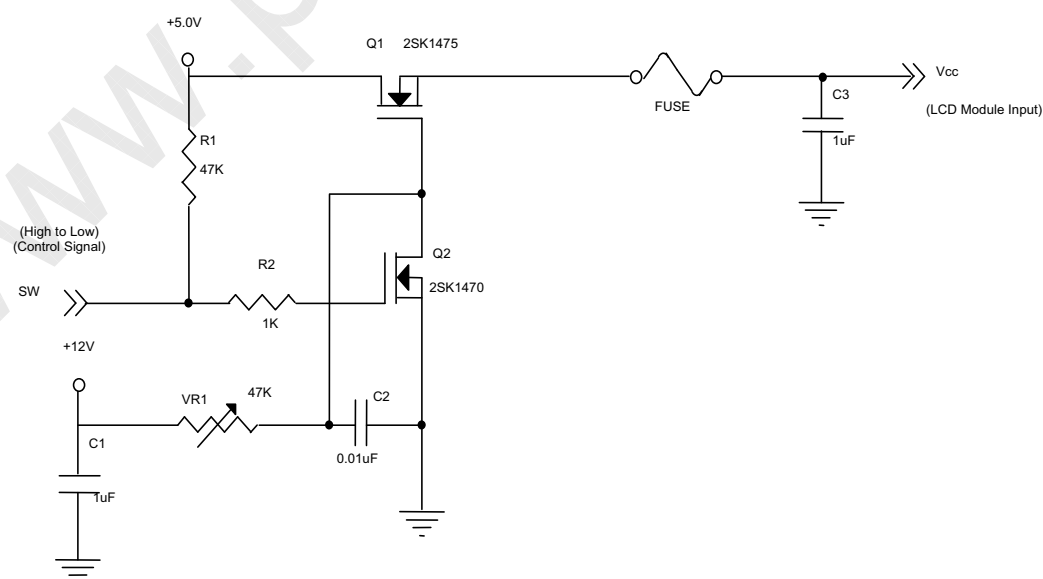
470μs
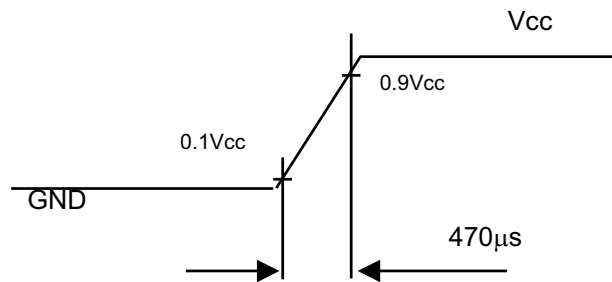
Note (3) The specified power supply current is under the conditions at Vcc = 5.0 V, Ta = 25 ± 2 °C, f_v = 60 Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern
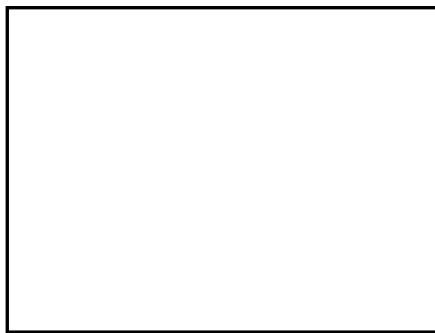
Active Area

b. Black Pattern

Active Area

c. Vertical Stripe Pattern

R	G	B	R	G	B
B	R	G	B	R	G	B	R
B	R	G	B	R	G	B	R
R	G	B	R	G	B

Active Area

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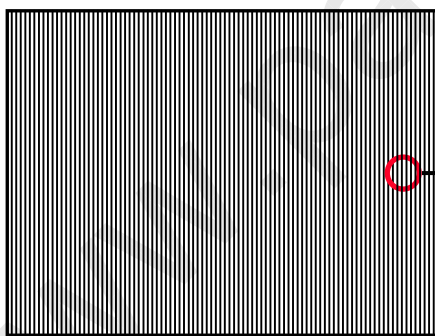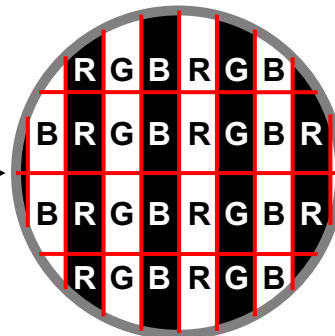
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4. BLOCK DIAGRAM

4.1 TFT LCD OPEN CELL

RXO0(+/-)
RXO1(+/-)
RXO2(+/-)
RXO3(+/-)
RXOC(+/-)
RXE0(+/-)
RXE1(+/-)
RXE2(+/-)
RXE3(+/-)
RXEC(+/-)
NC
Vcc
GND

INPUT CONNECTOR
(Starconn 093G30B0001A
or JAE FI-X30SSL-HF)

LVDS INPUT /
TIMING CONTROLLER

DC/DC CONVERTER &
REFERENCE VOLTAGE

SCAN DRIVER IC

TFT LCD PANEL
(1920x3x1200)

DATA DRIVER IC

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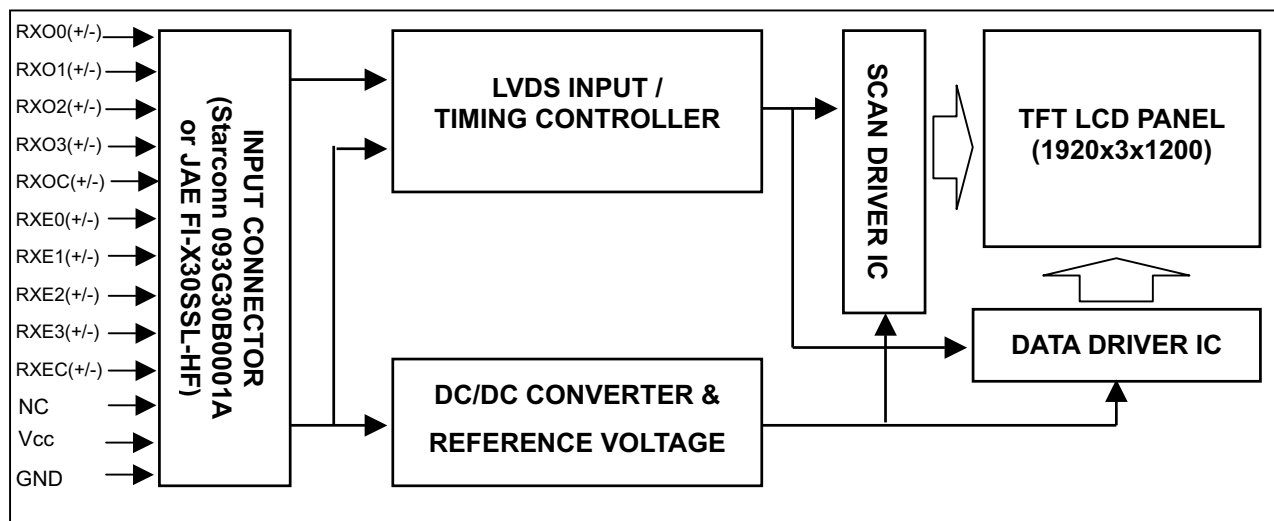
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5.3 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	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	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of Red	Red(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale Of Green	Green(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale Of Blue	Blue(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Note (1) 0: Low Level Voltage, 1: High Level Voltage

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6. INTERFACE TIMING

6.1 INPUT SIGNAL TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

| Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Clock	Frequency	Fc	50.0	77	83.0	MHz	-
	Period	Tc	-	13.0	-	ns	
	High Time	Tch	-	4/7	-	Tc	-
	Low Time	Tcl	-	3/7	-	Tc	-
LVDS Data	Setup Time	Tlvs	600	-	-	ps	-
	Hold Time	Tlvh	600	-	-	ps	-
Vertical Active Display Term	Frame Rate	Fr	40	60	63	Hz	Tv=Tvd+Tvb
	Total	Tv	1209	1235	1245	Th	-
	Display	Tvd	1200	1200	1200	Th	-
	Blank	Tvb	Tv-Tvd	35	Tv-Tvd	Th	-
Horizontal Active Display Term	Total	Th	1030	1040	1075	Tc	Th=Thd+Thb
	Display	Thd	960	960	960	Tc	-
	Blank	Thb	Th-Thd	80	Th-Thd	Tc	-

Note：(1) Because this module is operated by DE only mode, Hsync and Vsync input signals should be

set to low logic level or ground. Otherwise, this module would operate abnormally.

INPUT SIGNAL TIMING DIAGRAM

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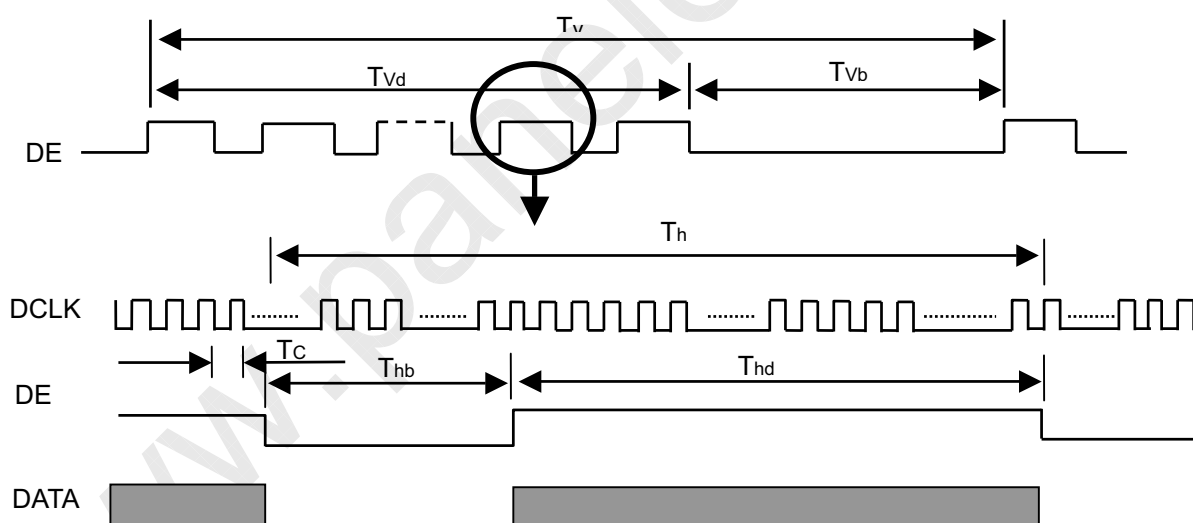
6.2 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD module, the power on/off sequence should follow the conditions shown in the following diagram.
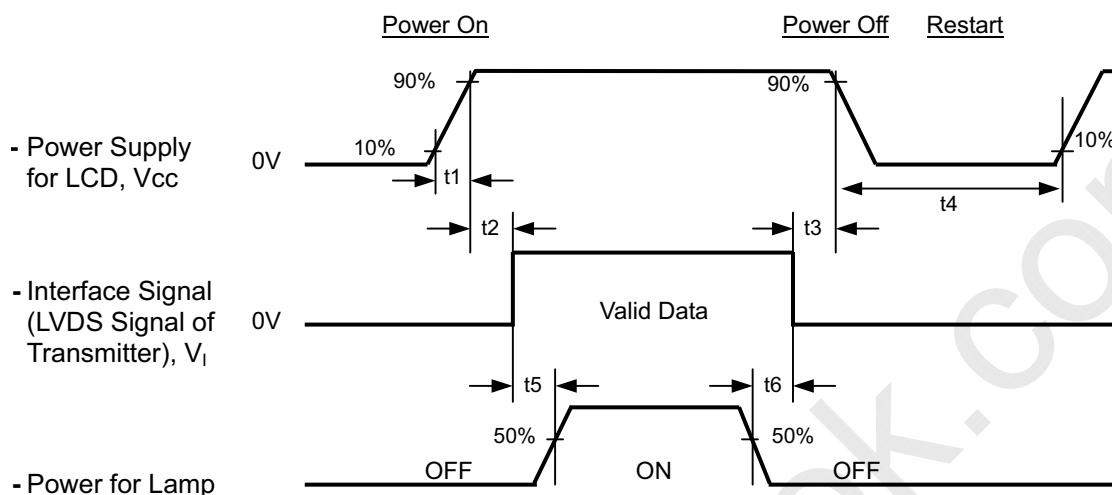
Timing Specifications:

$0.5 < t1 \leqq 10$ msec

$0 < t2 \leqq 50$ msec

$0 < t3 \leqq 50$ msec

$t4 \geqq 500$ msec

$t5 \geqq 500$ msec

$t6 \geqq 90$ msec

Note.

(1) The supply voltage of the external system for the module input should be the same as the definition of Vcc.

(2) Please apply the lamp voltage within the LCD operation range. When the backlight turns on before the LCD operation of the LCD turns off, the display may, instantly, function abnormally.

(3) In case of VCC = off level, please keep the level of input signals on the low or keep a high impedance.

(4) T4 should be measured after the module has been fully discharged between power on/off periods.

(5) Interface signal shall not be kept at high impedance when the power is on.

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7. OPTICAL CHARACTERISTICS

7.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V_{CC}	5.0	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
Inverter Current	I_L	7.0	mA
Inverter Driving Frequency	F_L	55±5	KHz
Inverter	CMO : 27-D017187 Darfon:VK13165101		

7.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown as below. The following items should be measured under the test conditions described in 7.1 and stable environment shown in Note (6).

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color Chromaticity	Red	Rcx	$\theta_x=0°$, $\theta_Y=0°$ CS-1000T Standard light source "C"	Typ - 0.03	0.648	Typ + 0.03	-	(0),(6)
		Rcy			0.331		-	
	Green	Gcx			0.278		-	
		Gcy			0.594		-	
	Blue	Bcx			0.144		-	
		Bcy			0.089		-	
	White	Wcx			0.320		-	
		Wcy			0.355		-	
Center Transmittance		T%	$\theta_x=0°$, $\theta_Y=0°$	8.8	9.9	---	%	(1), (8)
Contrast Ratio		CR	CS-1000T, CMO BLU with DBEFD	600	1000	---	-	(1), (3)
Response Time		T_R	$\theta_x=0°$, $\theta_Y=0°$	---	1	6	ms	(4)
		T_F		---	4	9	ms	
Transmittance uniformity		$\delta T\%$	$\theta_x=0°$, $\theta_Y=0°$ USB2000	---	1.4	1.5	-	(1), (7)
Viewing Angle	Horizontal	θ_x+	CR≥10 USB2000	75	85	---	Deg.	(1), (2) (6)
		θ_x-		75	85	---		
	Vertical	θ_Y+		70	80	---		
		θ_Y-		60	70	---		

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7.3 Flicker Adjustment

(1) Adjustment Pattern: 2H1V checker pattern as follows.

L128   L0

(2) Adjustment Method:

Flicker should be adjusted by turning the volume for flicker adjustment by the ceramic driver. It is adjusted to the point with least flickering of the whole screen. After making it surely overrun at once, it should be adjusted to the optimum point.
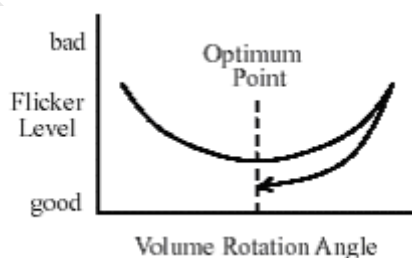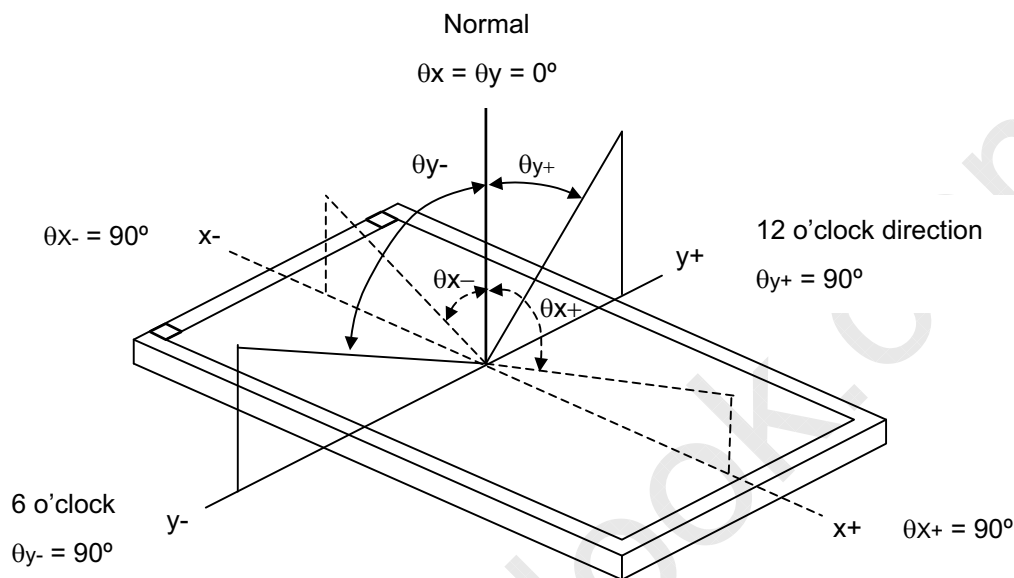

Note (0)   Light source is the standard light source "C" which is defined by CIE and driving voltages are based on suitable gamma voltages. The calculating method is as following：

1. Measure Module's and BLU's spectrums. White is without signal input and R, G, B are with signal input. BLU(for M260J3-L01) is supplied by CMO.

2. Calculate cell's spectrum.

3. Calculate cell's chromaticity by using the spectrum of standard light source "C"

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Note (1)   Light source is the BLU which is supplied by CMO and driving voltages are based on suitable gamma voltages.

Note (2) Definition of Viewing Angle (θx, θy):

Normal

$\theta x = \theta y = 0^\circ$

$\theta y-$ $\theta y+$

$\theta x- = 90^\circ$ x-

12 o'clock direction

$\theta x-$ y+ $\theta y+ = 90^\circ$

$\theta x+$

6 o'clock   y-

$\theta y- = 90^\circ$ x+ $\theta x+ = 90^\circ$

Note (3) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L255 / L0

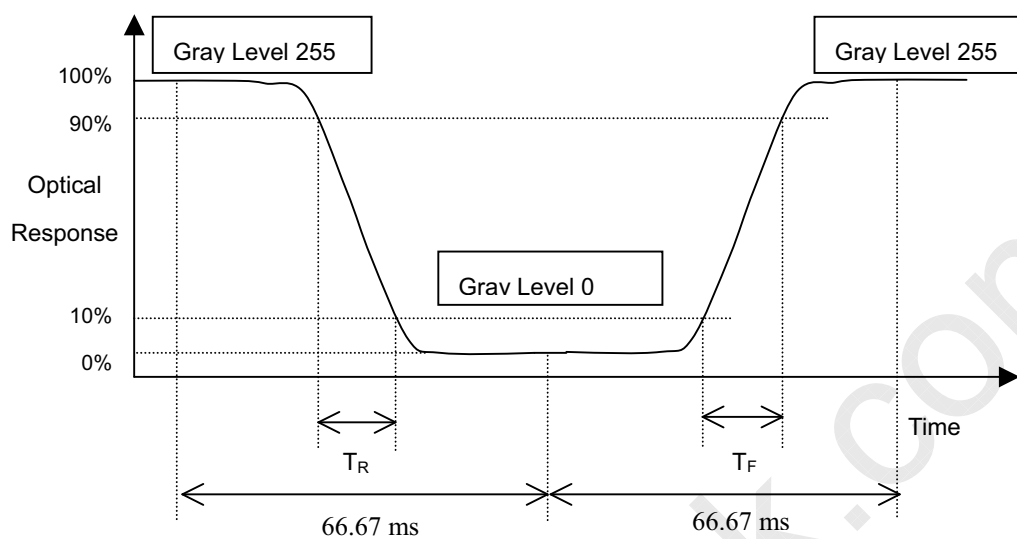L255: Luminance of gray level 255

L 0: Luminance of gray level 0

CR = CR (5)

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

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Note (4) Definition of Response Time (T_R, T_F):

Note (5) Definition of Luminance of White (L_C):

Measure the luminance of gray level 255 at center point

$L_C = L$ (5)

L (x) is corresponding to the luminance of the point X at Figure in Note (7).

Note (6) Measurement Setup:

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 windless room.

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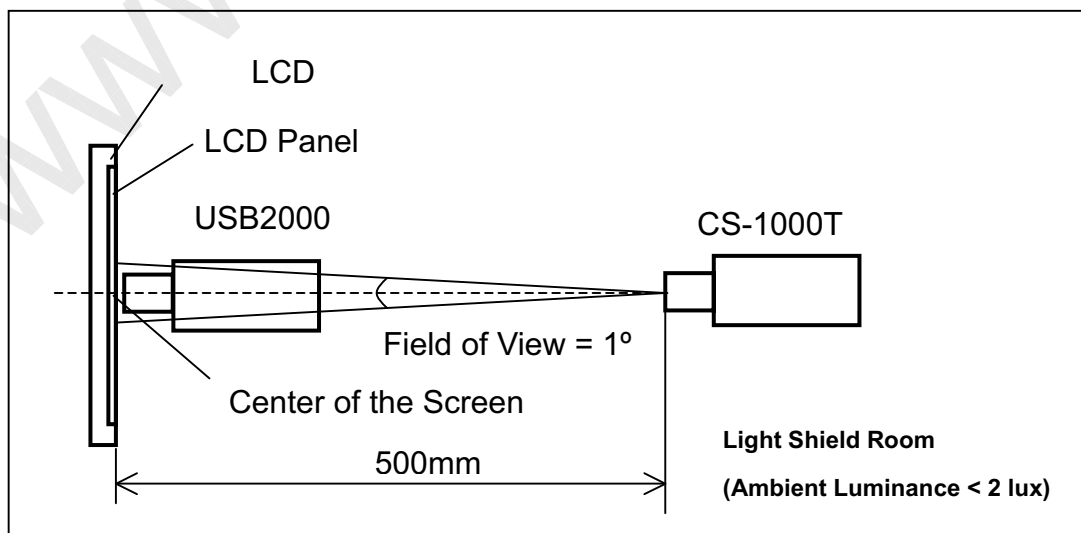
Note (7) Definition of Transmittance Variation (δT%):

Measure the transmittance at 9 points

$$\delta T\% = \frac{\text{Maximum } [L\,(1),\, L\,(2),\ldots\ldots\ldots L\,(12),\, L\,(9)]}{\text{Minimum } [L\,(1),\, L\,(2),\ldots\ldots\ldots L\,(12),\, L\,(9)]}$$

Horizontal Line
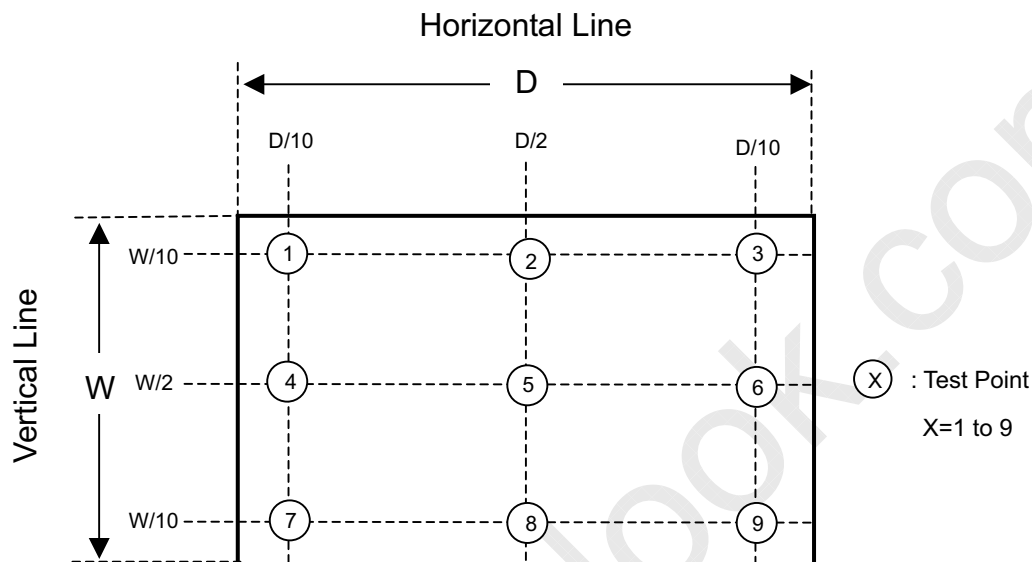
Note (8) Definition of Transmittance (T%):   Active Area

Module is without signal input.

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

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8. PACKAGING

8.1 PACKING SPECIFICATIONS

(1) 13 open cells / 1 Box

(2) Box dimensions: 840 (L) X 575 (W) X 320 (H) mm

(3) Weight: approximately 22Kg (13 open cells per box)

8.2 PACKING METHOD

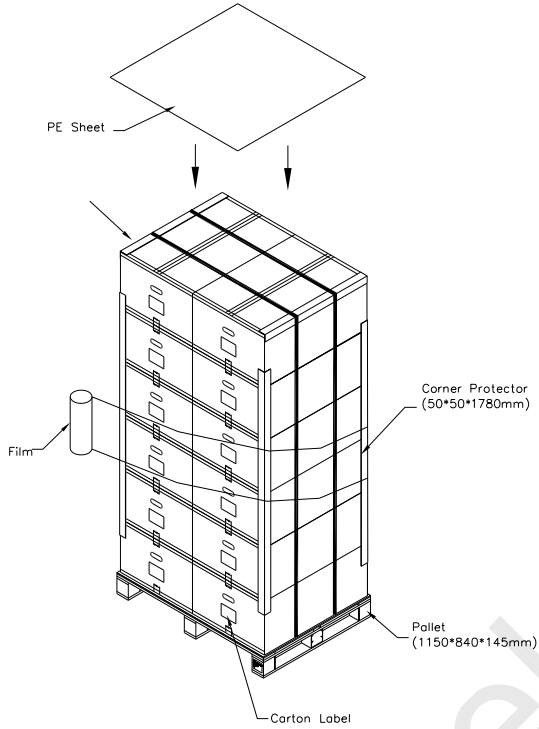(1) Carton Packing should have no failure in the following reliability test items

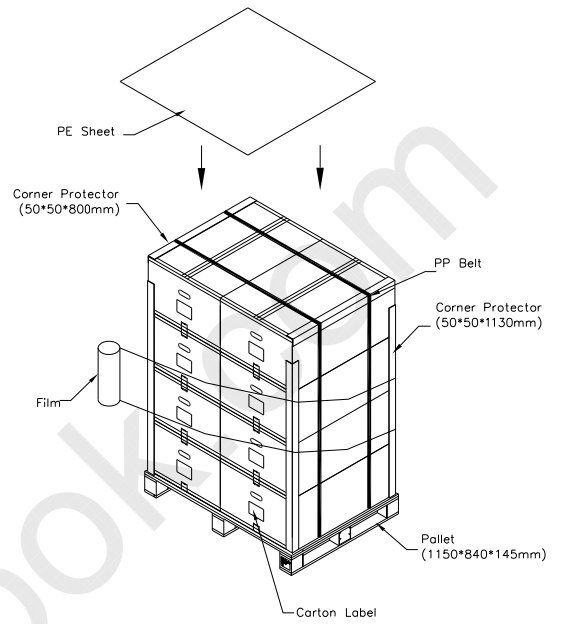| Test Item	Test Conditions	Note
Packing Vibration	ISTA STANDARD Random, Frequency Range: 1 – 200 Hz Top & Bottom: 30 minutes (+Z), 10 min (-Z), Right & Left: 10 minutes (X) Back & Forth 10 minutes (Y)	Non Operation

(2) Packing method.
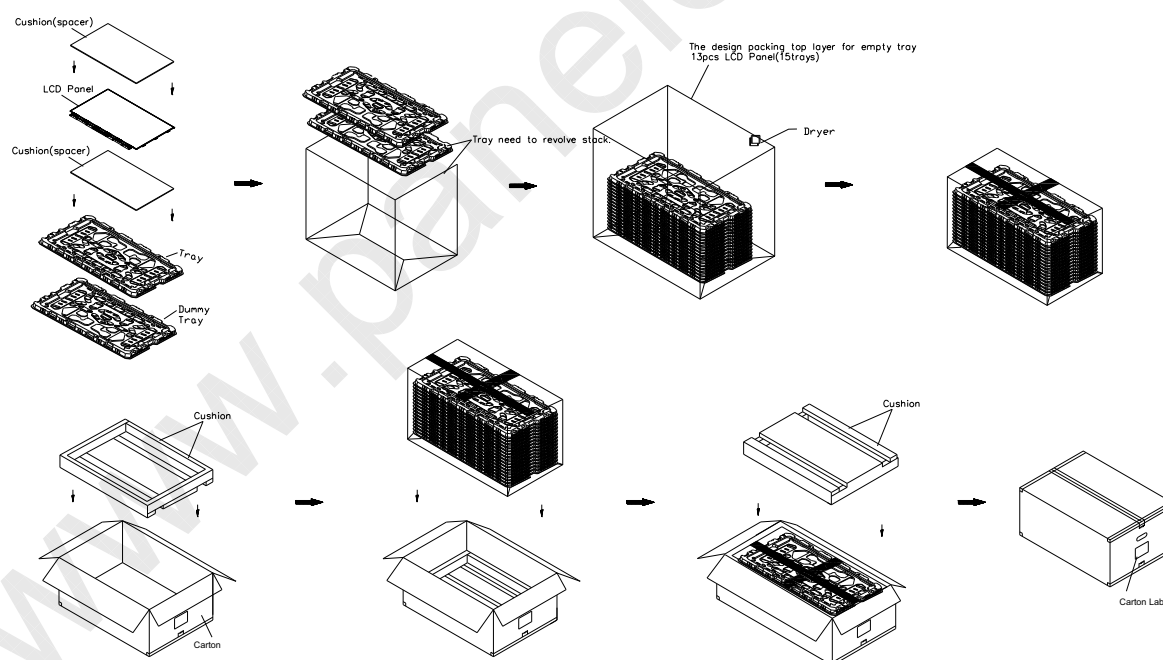
Carton dimensions: 840(L)x575(W)x315(H)mm
Weight : Approx.22.8Kg(13 panels per carton)

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Sea and Land Transportation

Air Transportation

PE Sheet

Film

Corner Protector
(50*50*1780mm)

Pallet
(1150*840*145mm)

Carton Label

PE Sheet

Corner Protector
(50*50*800mm)

PP Belt

Film

Corner Protector
(50*50*1130mm)

Pallet
(1150*840*145mm)

Carton Label

Version 2.0

CHI MEI
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9. DEFINITION OF LABELS

9.1 CMO OPEN CELL LABEL

The barcode nameplate is pasted on each OPEN CELL as illustration for CMO internal control.

M260J3-P01   RoHS   Rev.XX

CM26J31XXXXXLXXLYMDNNNN

Barcode definition:

Serial ID: CM-26J31-X-X-X-XX-L-XX-L-YMD-NNNN

Code	Meaning	Description
CM	Supplier code	CMO=CM
26J31	Model number	M260J3-P01=26J31
X	Revision code	C1:1 ,C2:2……
X	Source driver IC code	Century=1, CLL=2, Demos=3, Epson=4, Fujitsu=5, Himax=6, Hitachi=7, Hynix=8, LDI=9, Matsushita=A, NEC=B, Novatec=C, OKI=D, Philips=E, Renasas=F, Samsung=G, Sanyo=H, Sharp=I, TI=J, Topro=K, Toshiba=L, Windbond=M
X	Gate driver IC code	
XX	Cell location	Tainan, Taiwan=TN
L	Cell line #	0~12=1~C
XX	Module location	Tainan, Taiwan=TN
L	Module line #	0~12=1~C
YMD	Year, month, day	Year: 2001=1, 2002=2, 2003=3, 2004=4… Month: 1~12=1, 2, 3, ~, 9, A, B, C Day: 1~31= 1, 2, 3, ~, 9, A, B, C, ~, T, U, V
NNNN	Serial number	Manufacturing sequence of product

9.2 CARTON LABEL

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

RoHS

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PO.NO. _____

Part ID. _____

Model Name ___ M260J3 -P01

Carton ID. __ XXXXXXXXXXXXXX __ Quantities __13__

(a) Model Name: M260J3 –P01

(b) Carton ID: CMO internal control

(c) Quantities: 13 pcs

Version 2.0

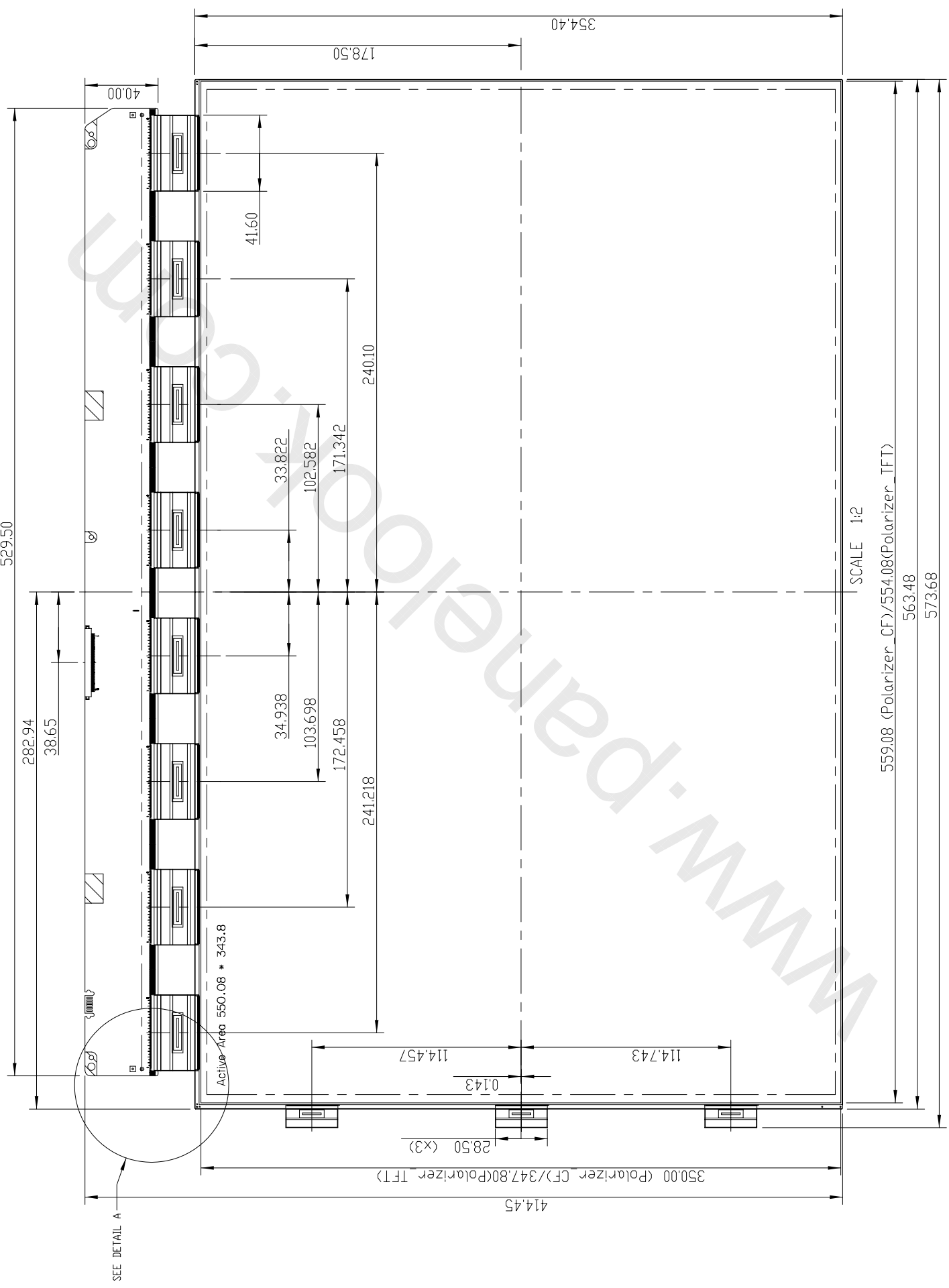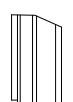**CHI MEI**
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10. PRECAUTIONS

10.1 ASSEMBLY AND HANDLING PRECAUTIONS

(1) Do not apply rough force such as bending or twisting to the product during assembly.

(2) To assemble backlight or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.

(3) It is not permitted to have pressure or impulse on the module because the LCD panel will be damaged.

(4) Always follow the correct power sequence when the product is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.

(5) Do not pull the I/F connector in or out while the module is operating.

(6) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.

(7) It is dangerous that moisture come into or contacted the product, because moisture may damage the product when it is operating.

(8) High temperature or humidity may reduce the performance of module. Please store this product within the specified storage conditions.

(9) When ambient temperature is lower than 10ºC may reduce the display quality. For example, the response time will become slowly.

10.2 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.

(2) After the product's end of life, it is not harmful in case of normal operation and storage.

11. MECHANICAL DRAWING

Version 2.0

SCALE

SCALE 1:2

354.40

178.50

40.00

41.60

240.10

33.822

102.582

171.342

34.938

103.698

172.458

241.218

529.50

282.94

38.65

Active Area 550.08 * 343.8

559.08 (Polarizer_CF)/554.08(Polarizer_TFT)

563.48

573.68

114.457

114.743

0.143

28.50 (x3)

350.00 (Polarizer_CF)/347.80(Polarizer_TFT)

414.45

SEE DETAIL A

A 1:1