CUSTOMER APPROVAL SHEET

Company Name	
MODEL	C154UAT01.0
CUSTOMER APPROVED	Title : Name :

☐ **APPROVAL FOR SPECIFICATIONS ONLY (Spec. Ver. 0.0)**

☐ **APPROVAL FOR SPECIFICATIONS AND ES SAMPLE (Spec. Ver. 0.0)**

☐ **APPROVAL FOR SPECIFICATIONS AND CS SAMPLE (Spec. Ver. 0.0)**

☐ **CUSTOMER REMARK :**

1 Li-Hsin Rd. 2. Science-Based Industrial Park
Hsinchu 300, Taiwan, R.O.C.
Tel: +886-3-500-8899
Fax: +886-3-577-2730

Doc. Version	0.0
Total Page	28
Date	2019/01/09

Product Specification

15.4” COLOR TFT-LCD MODULE

MODEL NAME: C154UAT01.0

<◆>Preliminary Specification

< >Final Specification

Note: The content of this specification is subject to change.

Record of Revision

Version	Revise Date	Page	Content
0.0	2019/01/09		First draft.

Contents

A. General Description 5
B. Features 5
C. Physical Specifications 6
1. TFT LCD Panel 6
D. Outline Dimension 7
1. TFT-LCD Module 7
E. Electrical Specifications 8
1. TFT LCD Panel Pin Assignment 8
2. Differential Input Data Format ..... 错误！未定义书签。
3. Input Timing Diagram ..... 错误！未定义书签。
4. Absolute Maximum Ratings ..... 错误！未定义书签。
5. DC Electrical Characteristics ..... 错误！未定义书签。
a. Power Specification ..... 错误！未定义书签。
b. Signal DC Electrical Characteristics ..... 错误！未定义书签。
c. Backlight Driving Conditions (Note 1) ..... 错误！未定义书签。
6. AC Electrical Characteristics ..... 错误！未定义书签。
a. Input AC characteristics ..... 错误！未定义书签。
b. Differential signal AC characteristics ..... 错误！未定义书签。
7. Power on/off sequence ..... 错误！未定义书签。
a. Power on sequence: ..... 错误！未定义书签。
F. Optical specifications (all for reference) 13
G. Reliability Test Items(Note 1~3) 15
H. Packing and Marking 16
1. Packing Form 16
2. Module/Panel Label Information 17
3. Carton Label Information 17
4. Warehouse storage condition: 17

A. General Description

C154UAN01.0 is an a-Si & Tran missive type Thin Film Transistor Liquid crystal Display (TFT-LCD) with AHVA (Advanced Hyper View Angle) technology. This model is composed of a TFT-LCD, drivers, PCBA, and a backlight unit, and TCON (timing controller).

B. Features

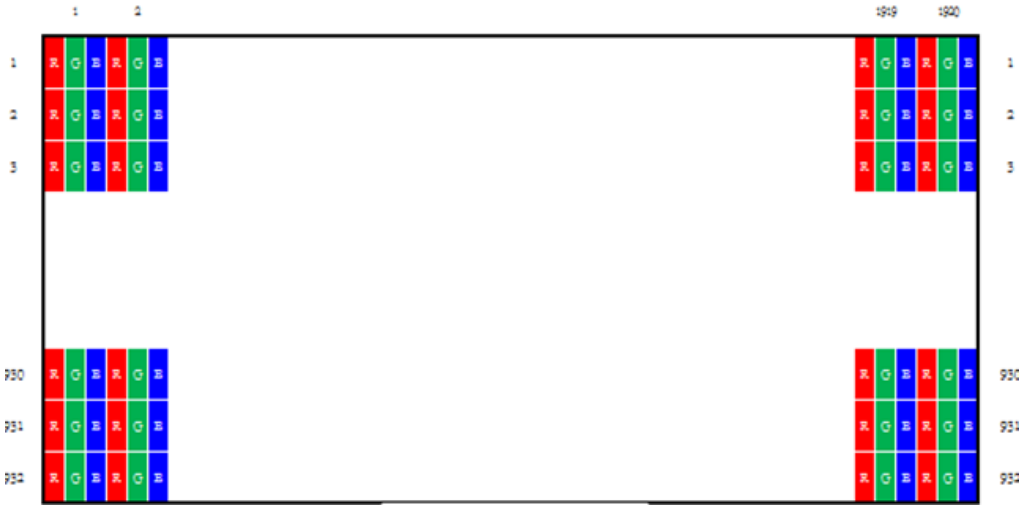
- 15.4”-inch display
- 1920 RGB x 1200 resolution in RGB stripe dot arrangement
- Interfaces: 2 port LVDS (VESA/JEIDA,DE mode,RGB 24 bits)
- AHVA – wide view technology
- Advanced Hyper View Angle – Normal Black wide view technology
- AG/AR surface treatment (R< 3%; SCI)

C. Physical Specifications

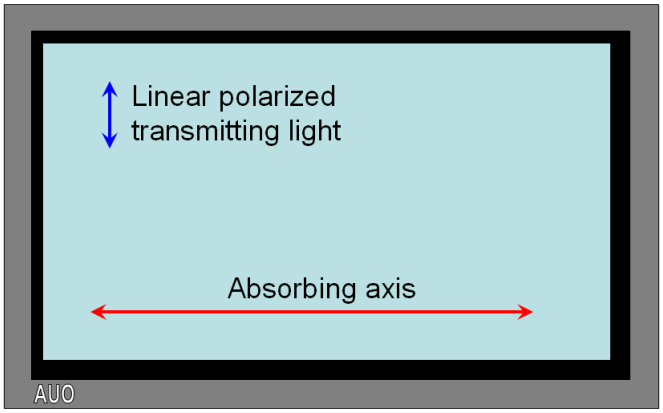
1. TFT LCD Panel

NO.	Item	Unit	Specification	Remark
1	Display Resolution	dot	**1920 RGB(H)x 1200(V)**	
2	Active Area	mm	**330.624 x 206.64 mm**	
3	Screen Size	inch	**15.4”(Diagonal)**	
4	Dot Pitch	μm	**0.1722 (H) x 0.0574(V) RGB**	
5	Color Configuration	–	**R. G. B. Stripe**	Note 1
6	Color Depth	–	**16.7 M colors**	
7	Overall Dimension	mm	**355.046 mm x 232.02 mm**	
8	Weight	g	**1300 ± 10 %**	
9	Display Mode	–	**Normally Black**	
10	Surface Treatment	–	**AG/AR/AF**	

Note 1: Below figure shows dot stripe arrangement.

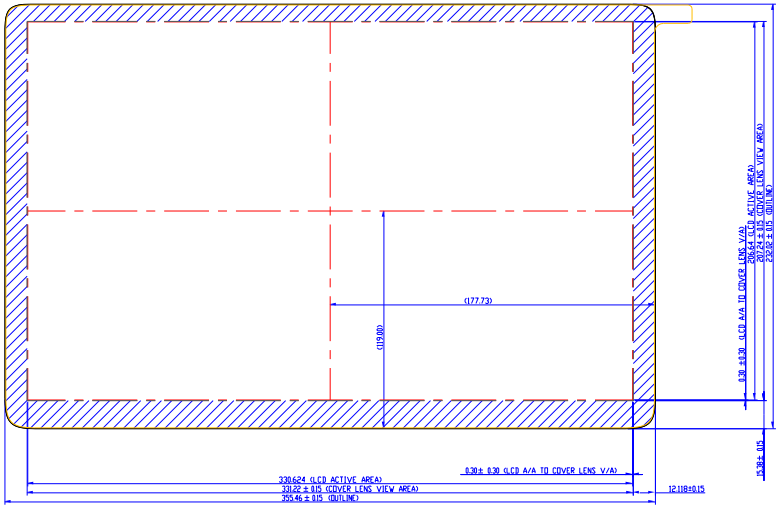


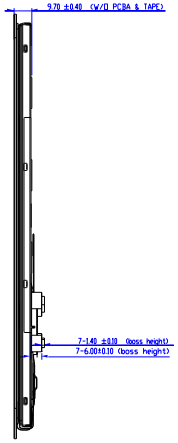
Below figure shows dot stripe arrangement.

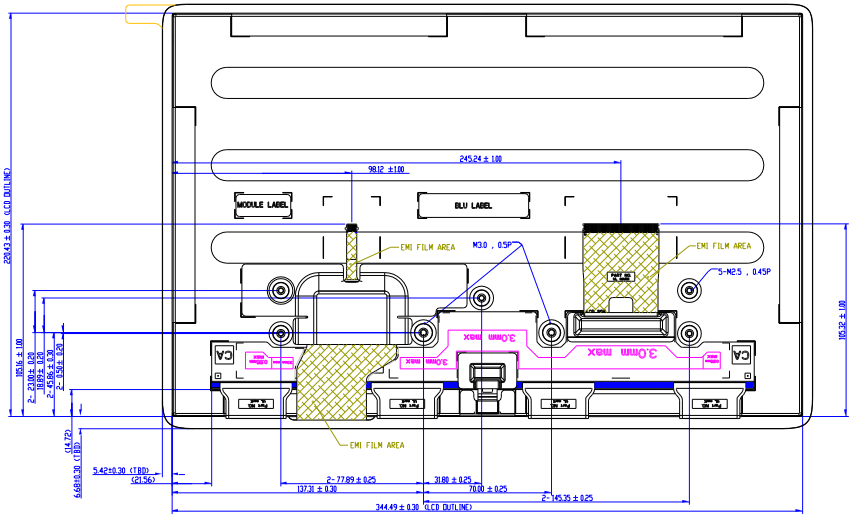


D. Outline Dimension

1. TFT-LCD Module







Notes:
1.General tolerance: ±0.3mm
2.The bending radius of FPC should be larger than 0.6mm
3.( ) means reference dimension.
4. M2.5 , 0.45P boss allowed torque of screw tightened up into BOSS user hole is MAX 8 Kgf-cm
5. M3.0 , 0.5P boss boss allowed torque of screw tightened up into BOSS user hole is MAX 10 Kgf-cm
6.I/F connector type : Hirose FH52-105-0.55H
8.Transfer FPC system side connector type: IRISO IMAS 968BS-80A-GFA
9.Conductor don't contact FPC edge with EMI film area

TENTATIVE

E. Electrical Specifications

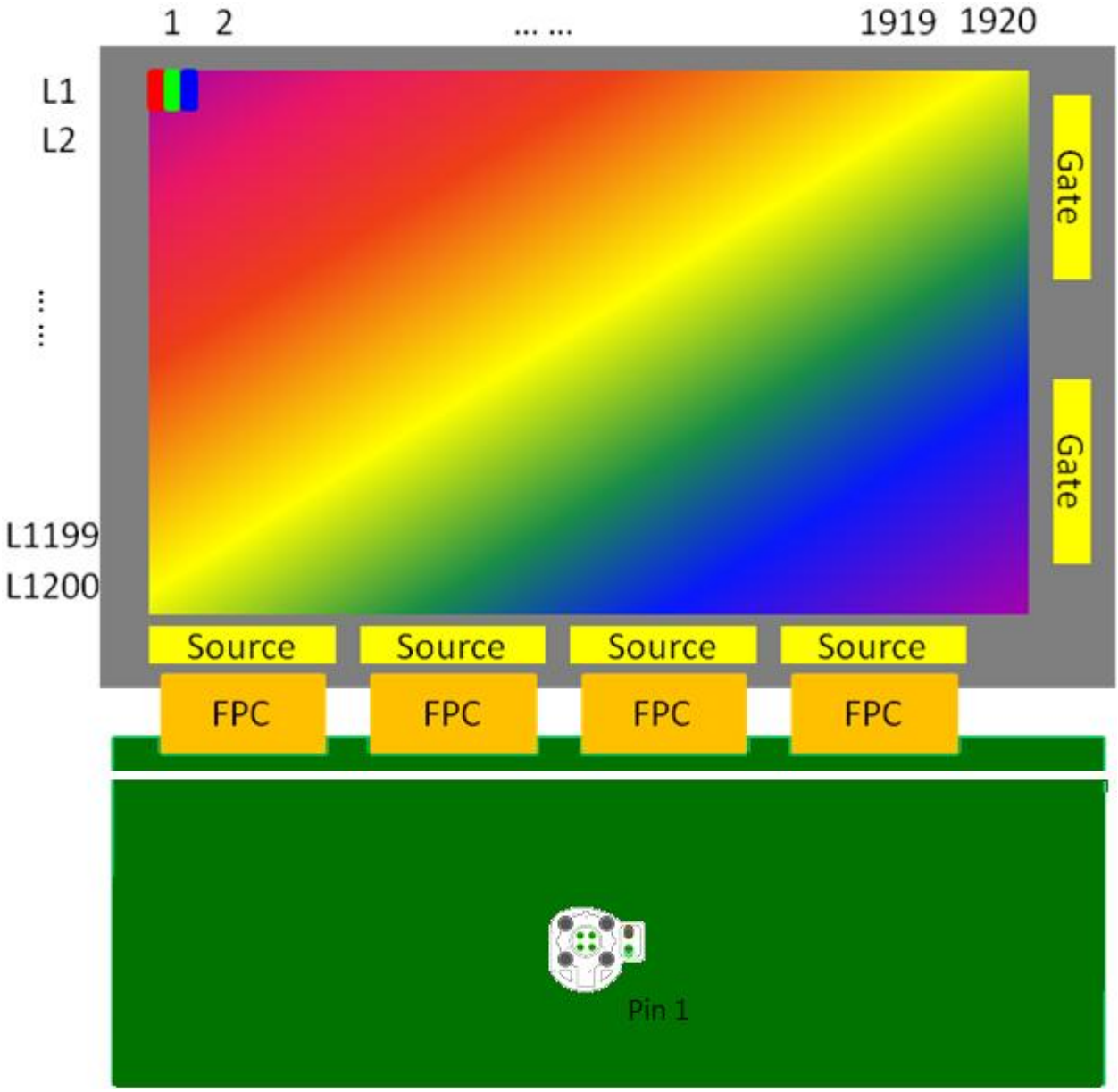
1. TFT LCD Panel Pin Assignment

HSD connector

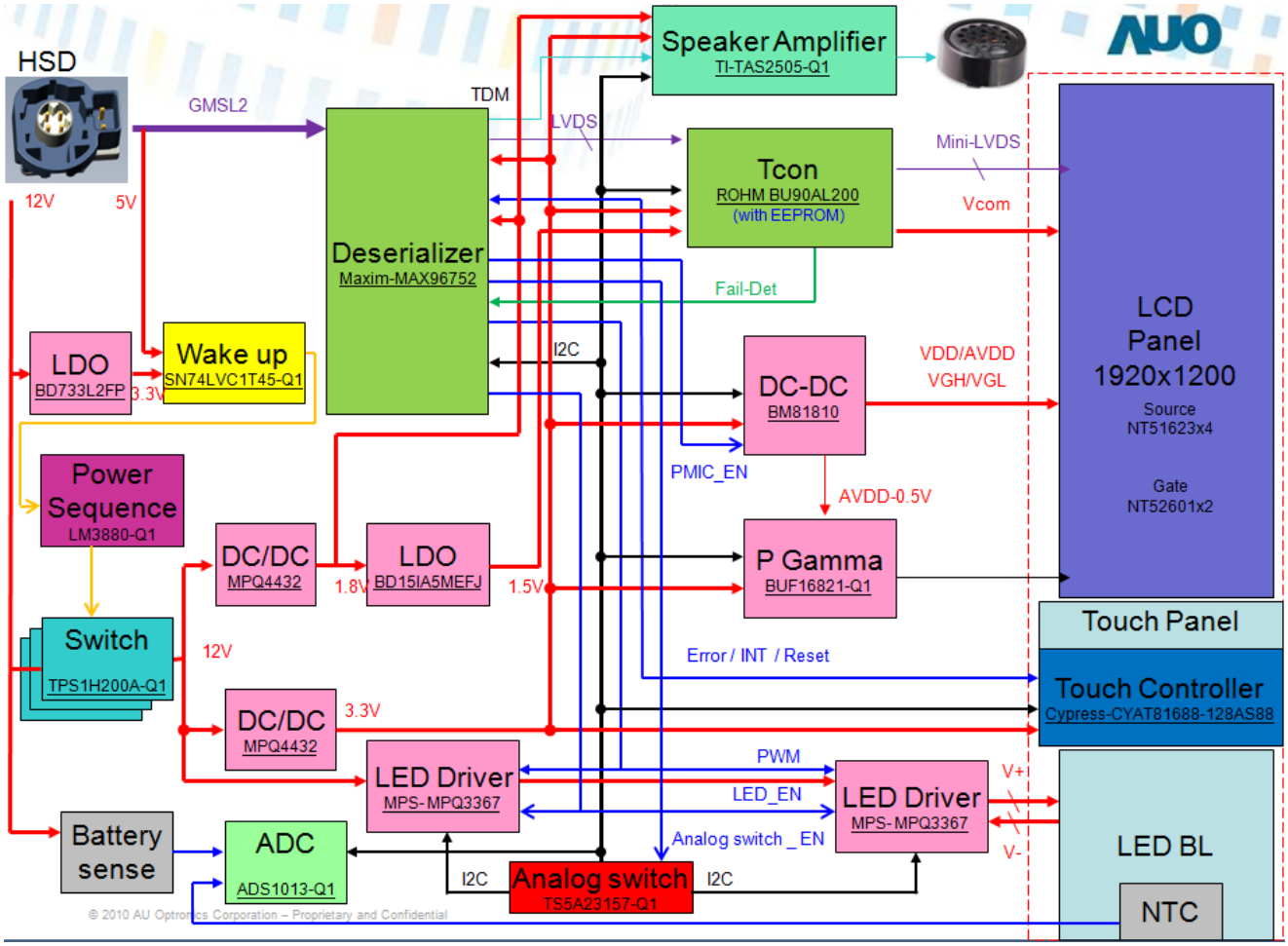
Recommended Connector: 99S10D-40MA5-D

No.	Pin Name	I/O	Description	Remarks
1	SIOA-	I	Negative LVDS differential data input	
2	SIOB-	I	Negative LVDS differential data input	
3	SIOA+	I	Positive LVDS differential data input	
4	SIOB+	I	Positive LVDS differential data input	
5	12Vin	I	System power 12V input	
6	GND	G	Ground	

I: Digital signal input, O: Digital signal output, G: GND, P: Power input, -: Not connect

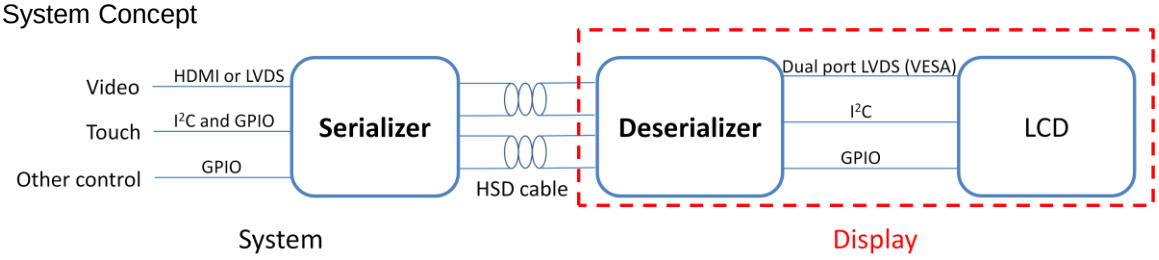


Note 1: The Pin 1 site on the PCB connector below the picture



2. Protocol Requirement

System Concept



Note 1: Deserializer and LCD communicate through LVDS.
Note 2: Coaxial cable is used as physical I/F between system and LCD
Note 3: See below table for internal communication protocol in LCD.

Video	Touch INT	Touch Information
Dual port LVDS (VESA)	GPIO	I^2C

MAX96752 PIN	MAX96752 function	CYAT81688-128AS88 function
8	SDA_RX	TP I2C SDA
9	SCL_TX	TP 12C SCL
28	GPIO07	TP_INT
41	GPIO04	TP_ERROR

45	GPIO02	TP_XRES

MAX96752 PIN	MAX96752 function	TAS2505 function
24	SD	DIN
25	SCK	BCLK
26	WS	WCLK

MAX96752 PIN	MAX96752 function	TAS2505 function
27	GPIO06	Fail-Det
12	GPIO10	Analog switch EN
29	GPIO08	PWM
40	GPIO03	LED_EN
42	GPIO05	PMIC EN

3.AC Electrical Characteristics

AC ELECTRICAL CHARACTERISTICS / Reference Clock Requirements (External Clock Input on X1, X2 floating) (Note 2)				
Frequency	f_{REF}		25	MHz
Frequency Stability + Frequency Tolerance	f_{TN}		±200	ppm
Input Jitter		Forward data rate = 6Gbps, Reverse data rate = 187Mbps, Sinusoidal jitter < 1MHz (rising edge)	600	ps p-p
		Forward data rate = 6Gbps, Reverse data rate = 1.5Gbps, Sinusoidal jitter < 1MHz (rising edge)	600	

4. LVDS Timing Diagram

Parameter		Symbol	Typ.	Unit.
DCLK frequency		F_{DCLK}	149.47	MHz
Data bit rate		F_{DATA}	1046.32	Mbit/sec
HSYNC	Period	T_H	2042	t_{DCLK}
	Display period	T_{HD}	1920	t_{DCLK}
	Blanking	T_{HBL}	122	t_{DCLK}
VSYNC	Period	T_V	1220	t_H
	Display period	T_{VD}	1200	t_H
	Blanking	T_{VBL}	20	t_H
Frame rate		$1/T_V$	60	Hz

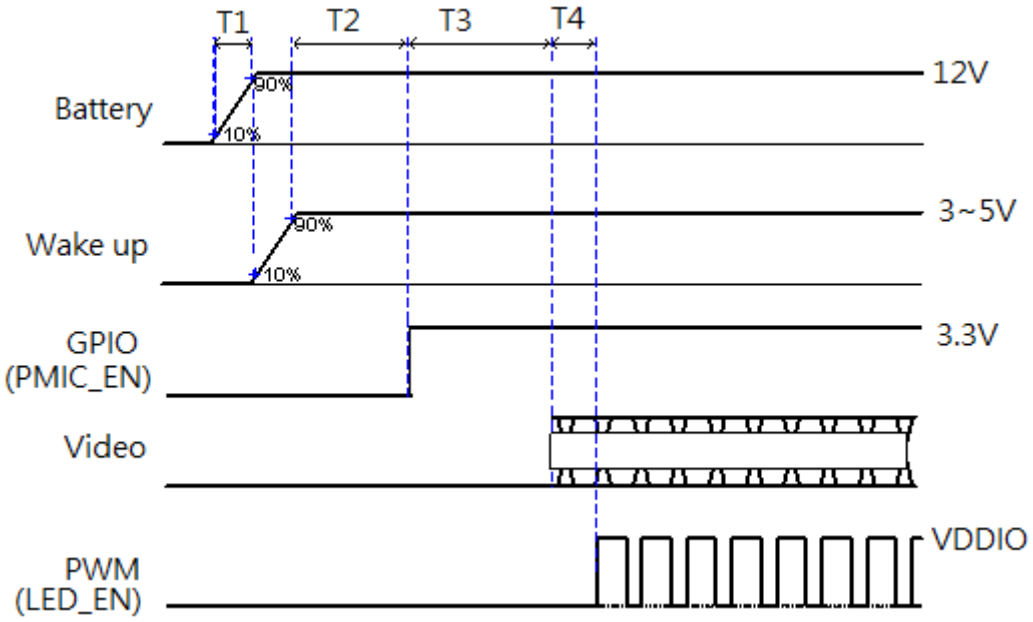
5. Power on/off sequence

The suggested LCD power sequence is below:

a. Power on sequence:

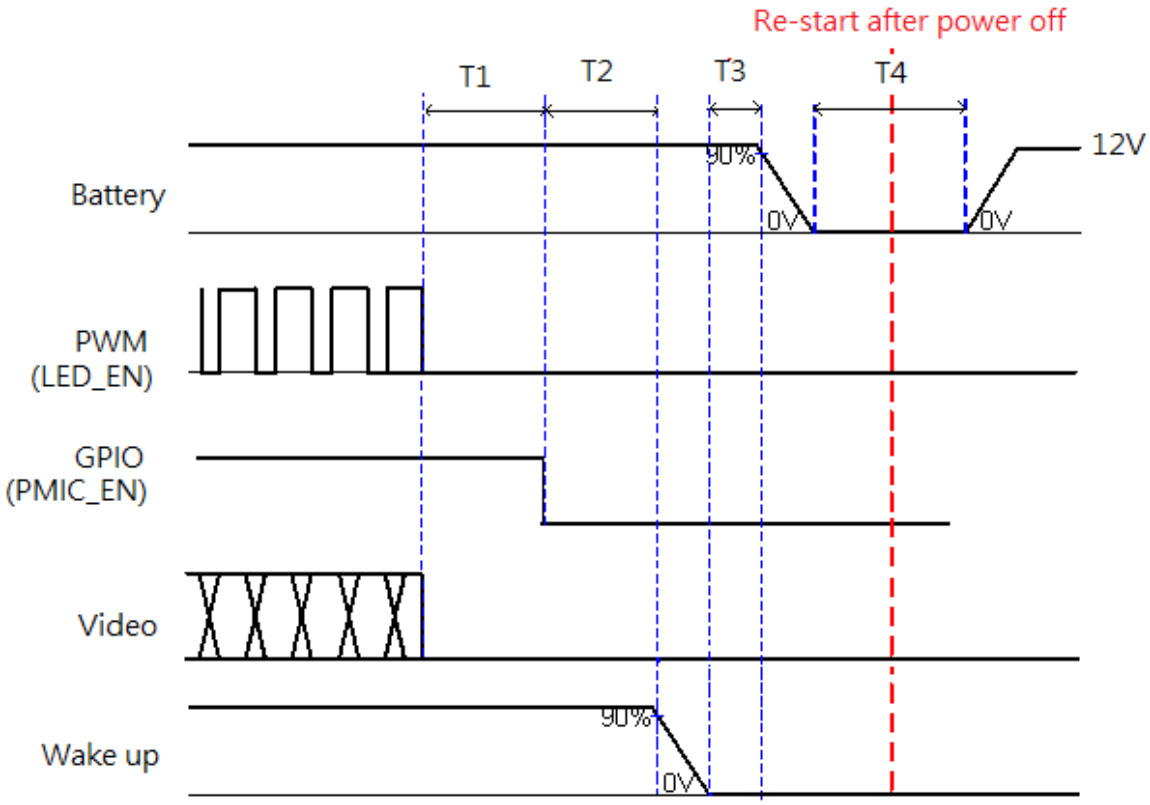
Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	-	-	-	ms

T2	-	55	-	ms
T3	-	83	-	ms
T4	-	2	-	Frame



b. Power off sequence:

Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	-	2	-	Frame
T2	10	-	-	ms
T3	-	50	-	ms
T4	1000	-	-	ms



All signals must be discharge to zero voltage when power off.

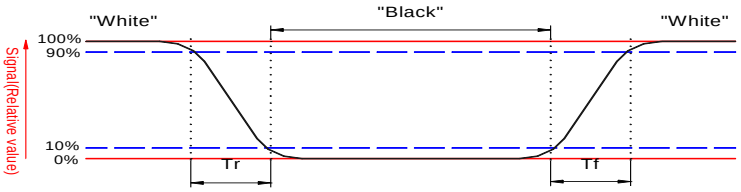
F. Optical specifications (all for reference)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response Time Rise Fall	Tr+Tf	θ=0°, 25˚C	-	20	30	ms	Note 3
		θ=0°, 0˚C	-	45	60		
		θ=0°, -20˚C		135	150		
		θ=0°, -30˚C		300	350		
Viewing Angle Top Bottom Left Right		CR ≧ 10	70 70 70 70	80 80 80 80	-	deg.	Note 7, 8
Contrast ratio	CR	θ = 0°	1200 (wait for DVT sample check)	-	-		Note 4, 5, 6
Brightness	Y_L	T: 25°C; θ=0°	640	800		%	Note 2, 6, 9
Uniformity (White)		θ=0°-	80			%	Note 6, 11
White Chromaticity	X	θ=0°	0.264	0.304	0.344		Note 7
	Y	θ=0°	0.302	0.342	0.382		
Red Chromaticity	X	θ=0°	0.644	0.674	0.704		
	Y	θ=0°	0.283	0.313	0.343		
Green Chromaticity	X	θ=0°	0.240	0.270	0.300		
	Y	θ=0°	0.614	0.644	0.674		
Blue Chromaticity	X	θ=0°	0.119	0.149	0.179		
	Y	θ=0°	0.028	0.058	0.088		
NTSC	NTSC	θ=0°	80%	85%			

Note 1: Measurement should be performed in the dark room, optical ambient temperature = 25 °C.

Note 2: To be measured in the center area of TFT-LCD with a field angle of 1° by Topcon luminance meter SR3, after 10 minutes operation and warm up 30 minutes.

Note 3: Definition of response time:
The output signals of photo detector are measured when the input signals are changed from “black state” to “white state” (falling time) and from “white state” to “black state” (rising time), respectively.



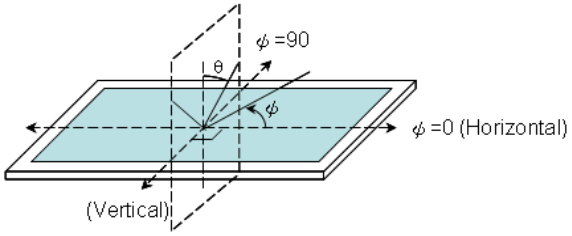
Note 4: Based on liquid crystal characteristics, the response time will become slower and the color of panel will become darker than the above optical specification when ambient temperature is below 25 °C.

$$\text{Contrastratio} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

Note 5: Contrast ratio is calculated with the following formula.

Note 6: White Vdata=V1 or V18
Black Vdata=V9 or V10
(For definition of V1, V9, V10 & V18, please refer to Appendix)
The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 7: Definition of viewing angle: refer to figure as below.

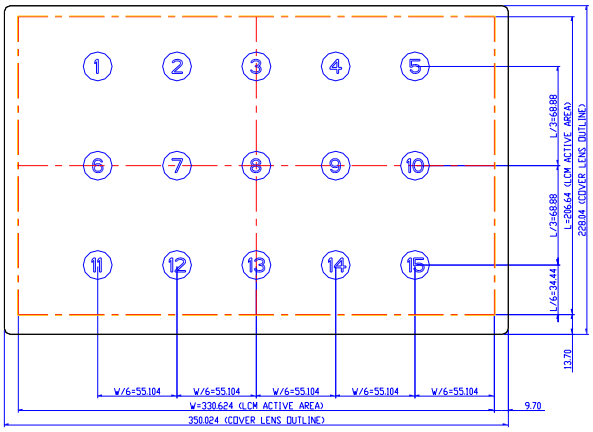


Note 8: Viewing angles are measured at the center of the panel when all the input terminals of LCD oanel are electrically opened.

Note 9: Transmittance is measured at the center of the display.
Measuring conditions:
(1) Ambient temperature: Ta=25 degreeC;
(2) Display:white
(3) Light source: Defined by BHTC BLU (W/O DEBEF).

Note 10: The viewing angles are measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note 11: T% Uniformity of these 15 points is defined as below:

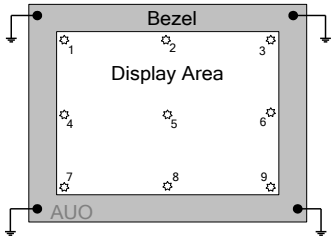


When measuring the transmittance, the cell must be free from any stress.

G. Reliability Test Items(Note 1~3)

No.	Test items	Conditions		Remark
1	High temperature storage	Ta= 95 °C	504 Hrs	
2	Low temperature storage	Ta= -40 °C	240 Hrs	
3	High temperature operation	Ta= 85 °C	240 Hrs	
4	Low temperature operation	Ta= -40 °C	240 Hrs	
5	High temperature and high humidity	Ta= 60 °C, 90 % RH	240 Hrs	
6	Heat shock	-30 °C ~ 85 °C / 100 cycles 1 Hrs/cycle		
7	Vibration (with carton)	Random vibration: 0.015 G^2/Hz from 5 ~ 200 Hz –6 dB/Octave from 200 ~ 500 Hz		
8	Drop (with carton)	Height: 60 cm 1 corner, 3 edges, 6 surfaces		

Note 1: Ta: Ambient temperature
Note 2: In the standard condition, there is no display function NG issue occurred. All the cosmetic specification is judged before the reliability stress.
Note 3: I_L = 70mA
Note 4: Test techniques follow IEC61000-4-2 standard.Class B – Some performance degradation allowed. No data lost. Self-recoverable. No hardware failures.



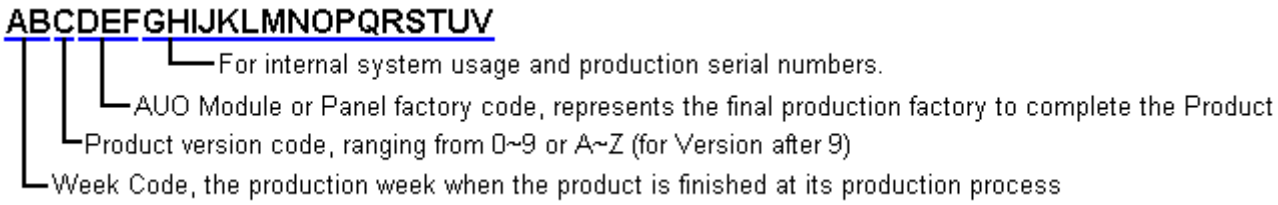
H. Packing and Marking

1. Packing Form

Fig. 10. Packing diagram

2. Module/Panel Label Information

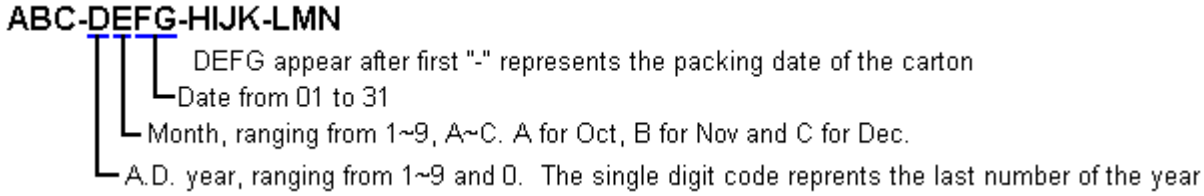
The module/panel (collectively called as the “Product”) will be attached with a label of Shipping Number which represents the identification of the Product at a specific location. Refer to the Product outline drawing for detailed location and size of the label. The label is composed of a 22-digit serial number with the following definition:



Example:
501M06ZL06123456781Z05:
Product Manufacturing Week Code: WK50
Product Version: Version 1
Product Manufacturing Factory: M06

3. Carton Label Information

The packing carton will be attached with a carton label where packing Q’ty, AUO Model Name, AUO Part Number, Customer Part Number (Optional) and a series of Carton Number in 13 or 14 digits are printed. The Carton Number is appearing in the following format:



Refer to the drawing of packing format for the location and size of the carton label.

4. Warehouse storage condition:

Room temperature: 25 +/- 5 degrees
Humidity: 30% ~ 70%