310 Genius Drive
Winter Park, FL 32789
Phone: 407-629-0500
Fax: 407-645-5376
sales@osddisplays.om
www.osddisplays.com

5.7” TFT LCD MODULE SPECIFICATION

MODEL NAME: OSD057ACA6A0

Record of Revision

Ver.	Revise Date	Page	Content	Modified By
A.0	2006/11/27	-	New specification was first issued	SF Chen

Table of Contents

1 GENERAL DESCRIPTION

1.1 Description

- ✓ Screen size: 5.7 inch diagonal
- ✓ Number of dots displayed: 230,400 dots
- ✓ Display Colors: 16 M colors
- ✓ Display mode: Normally white / Transmissive
- ✓ One chip solution with COG mounting
- ✓ DC2DC power supplies (VGH/VGL/VCOM voltage supply)
- ✓ Support 24-bit digital (8 bit × RGB) and CCIR_601/656 input timing
- ✓ Incorporated white LED back light unit (7 Groups × 3 LEDs are in Parallel type)

1.2 Physical specification

No.	Item	Specification	UNIT
1	Number of Dots	320 x RGB x 240	dot
2	Display Size (Diagonal)	5.7 inch	Inch
3	Dot Size	120 x 360	μm
4	Active Area	115.2 x 86.4	mm
5	Viewing Angle	6 O'clock with SWV polarizer	-
6	Color arrangement	RGB stripe	-
7	Dimension (W x H x D) *1	126.0 x 101.55 x 5.7	mm
8	Back-light	LED Back-light / White	-
9	Weight	T.B.D.	g

*1 The protrusions (FPC, parts) are excluded.

1.3 Environmental impact substances controlled for containing in products

The environmental impact substances we control are classified into 2 types as described below.

a. Prohibited substances:

LOI, in principle, does not produce any products containing or contaminated by substances of this type.

- Cadmiun (Cd) < 100 ppm
- Mercury (Hg) < 1000 ppm
- Hexavalent-Chromiun (Cr^{+6}) < 1000 ppm
- Polybrominated biphenylethers (PBDE) < 1000 ppm
- Polybrominated biphenyls (PBB) < 1000 ppm

b. Prohibited substances:

Desired not to be contained in or contaminate our products as far as possible and abolished by a targeted date. LOI moderately produces products containing substances of this type.

- Lead (Pb) < 1000 ppm

2 ABSOLUTE MAXIMUM RATINGS

2.1 Absolute maximum ratings

Item	Symbol	Value	Unit	Note
Power Voltage	VDD, AVDD	-0.3 to +7.0	V	GND=0
	VGH	-0.3 to +32.0	V	
	VGL	-22 to +0.3	V	
	VGH - VGL	-0.3 to +45.0	V	
Input Signal Voltage	V_{in}	-0.3 to VDD+0.3	V	
Logic OutputVoltage	V_{OUT}	-0.3 to +0.7	V	

2.2 Environmental absolute maximum ratings

Item	Symbol	Min.	Max.	unit	Note
Storage Temperature	Tstg	(-30)	(80)	℃	(1)
Operating Temperature (Ambient Temperature)	Topr	(-20)	(60)	℃	(1),(2)

Note:

(1) 95 % RH Max. (40℃ ≧Ta)

(2) In Case of below 0℃, the response time of liquid crystal (LC) becomes slower and the color of panel becomes darker than normal one.

3 Electrical characteristics

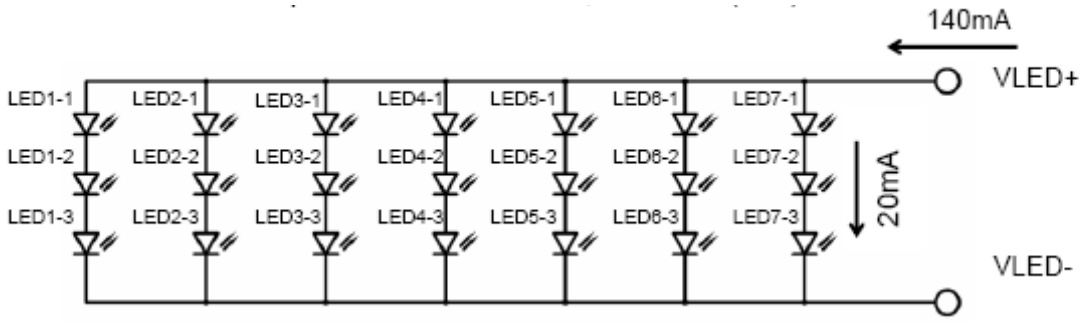
3.1 Typical operating conditions (GND=AVss =0V)

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Digital Power supply	VDD	3	3.3	3.6	V	
	AVDD	3.8	5	5.5	V	
	VGH	10	-	30	V	
	VGL	-17	-	-5	V	
Low level input voltage	V_{IL}	0	-	0.3VDD	V	
High level input voltage	V_{IH}	0.7VDD	-	VDD	V	
Analog operating current	I_{AVDD}	-	(7)	(12)	mA	
Digital operating current	I_{VDD}	-	(5)	(8)	mA	
VCOM High Voltage	V_{comH}	-	4.6	-	V	
VCOM Low Voltage	V_{comL}	-	-0.4	-	V	

3.2 Backlight driving conditions (LED)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	I_L		140	210	mA	Note 1
LED voltage	V_L	9.9	-	10.5	V	

Note 1: 7 Groups × 3 LEDs are in Parallel type.

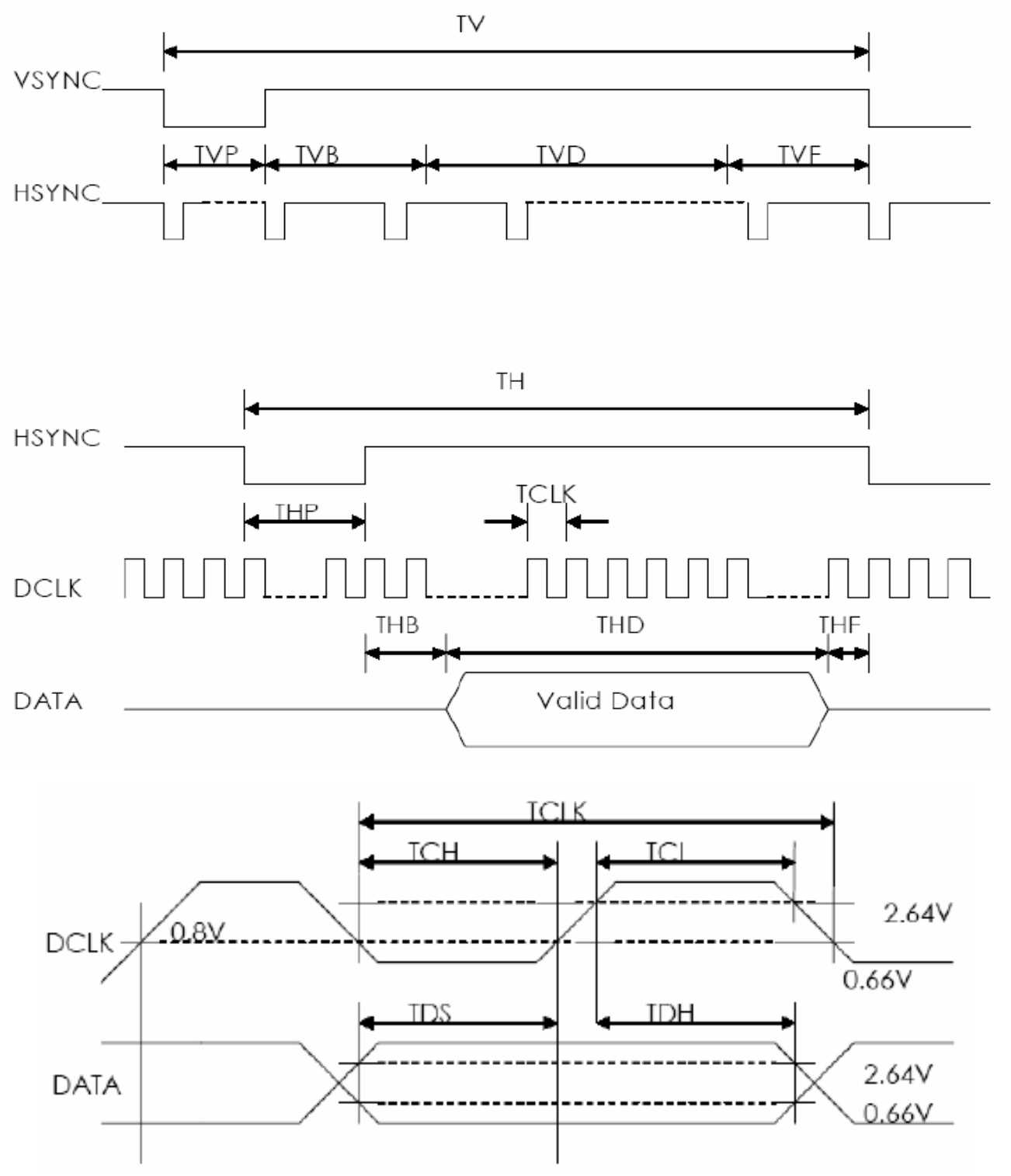


4 AC CHARACTERISTICS

4.1 Timing conditions

Signal	Item		Symbol	Min	Typ	Max	Unit
Dclk	Frequency		Dclk	-	6.4	-	MHZ
	High Time		Tch	-	78	-	ns
	Low Time		Tcl	-	78	-	ns
Data	Setup Time		Tds	12	-	-	ns
	Hold Time		Tdh	12	-	-	ns
Hsync	Period		TH	-	408	-	DCLK
	Pulse Width		Thp	-	30	-	DCLK
	Back-Porch		Thb	-	38	-	DCLK
	Display Period		Thd	-	320	-	DCLK
	Front-Porch		Thf	-	20	-	DCLK
Vsync	Period	NTSC	Tv	-	262.5	-	TH
		PAL			312.5		
	Pulse Width		Tvp	1	3	5	TH
	Back-Porch	NTSC	Tvb	-	15	-	TH
		PAL			23		
	Display Period		Tvd	-	240	-	TH
	Front-Porch	NTSC	Tvf	-	4.5	-	TH
		PAL			46.5		

4.2 AC Timing diagrams



5 OPTICAL CHARACTERISTICS

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in note (1).

Measuring equipment: BM-5A, BM-7

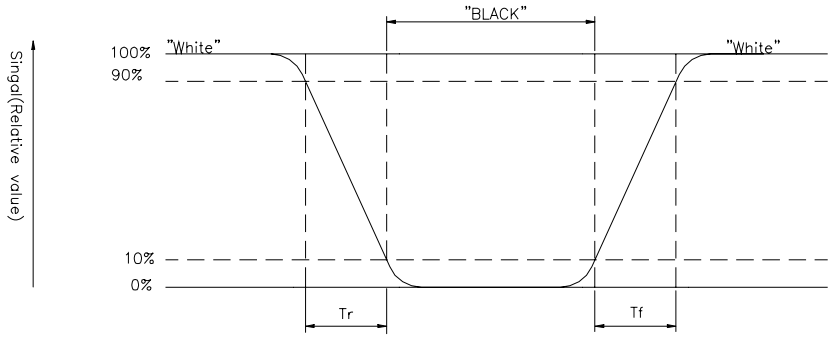
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time Rise Fall	Tr+Tf	25 ℃	25	35	50	ms	Note 4
Contrast ratio	CR	At optimized viewing angle	150	200	-		Note 5,6
Viewing angle Top Bottom Left Right		CR≧10	50 50 30 50	65 65 50 55	- - - -	deg.	Note 7
Brightness	B	θ =0°	300	350	-	nit	Note 8
White chromaticity	x	θ =0°	-	(0.30)	-		
	y	θ =0°	-	(0.32)	-		
Degree of Saturation (NTSC)			-	50	-	%	

Note 1: Ambient temperature =25℃, and LED current IL=20mA.

Note 2: To be measured in the dark room.

Note 3: To be measured on the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-5A, after 10 minutes operation.

Note 4: Definition of response time: The output signals of photo-detector 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 is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as shown below.

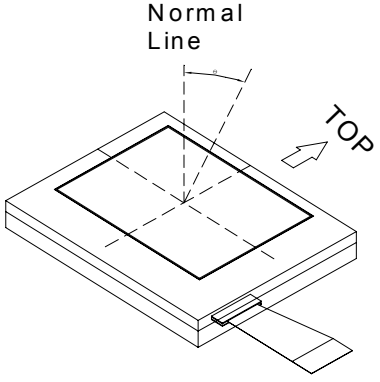


Note 5: Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Photo-detector output when LCD is at “White” state}}{\text{Photo-detector output when LCD is at “Black” state}}$$

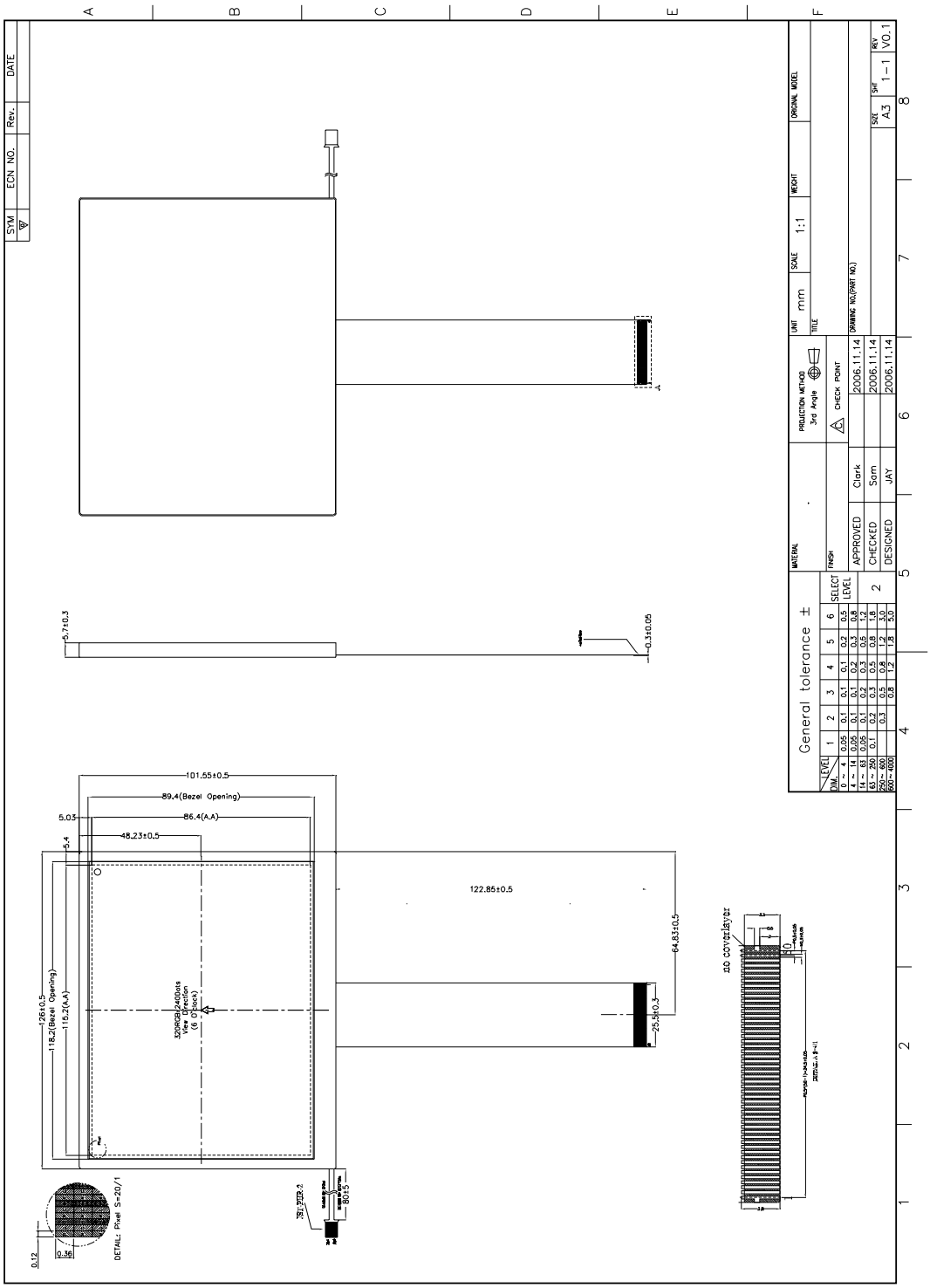
Note 6: White Vi =Vi50 ± 1.5V
Black Vi =Vi50 ± 2.0V
“±” means that the analog input signal swings in phase with VCOM signal.
“∓” means that the analog input signal swings out of phase with VCOM signal.
“Vi50” : The analog input voltage when transmission is 50%
The 100% transmission is defined as the 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: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

6 OUTLINE DIMENSION



7 INTERFACE PIN CONNECTION

0.5mm Pitch FPC

Pin No.	Symbol	I/O	Description	Remark
1	IF1	I	Input data format control (Note1)	Note1
2	IF2	I	Input data format control (Note1)	Note1
3	POL	O	Polarity Signal connect to VCOM driving circuit.	Note3
4	RESET	I	Hardware reset.	
5	SPENA	I	Chip select	Note2
6	SPCL	I	Serial Clock	Note2
7	SPDA	I/O	Serial Data	
8	B0	I	Blue Data bit (LSB)	
9	B1	I	Blue Data bit	
10	B2	I	Blue Data bit	
11	B3	I	Blue Data bit	
12	B4	I	Blue Data bit	
13	B5	I	Blue Data bit	
14	B6	I	Blue Data bit	
15	B7	I	Blue Data bit (MSB)	
16	G0	I	Green Data bit (LSB)	
17	G1	I	Green Data bit	
18	G2	I	Green Data bit	
19	G3	I	Green Data bit	
20	G4	I	Green Data bit	
21	G5	I	Green Data bit	
22	G6	I	Green Data bit	
23	G7	I	Green Data bit (MSB)	
24	R0	I	Red Data bit (LSB)	
25	R1	I	Red Data bit	
26	R2	I	Red Data bit	
27	R3	I	Red Data bit	
28	R4	I	Red Data bit	
29	R5	I	Red Data bit	
30	R6	I	Red Data bit	
31	R7	I	Red Data bit (MSB)	
32	Hsync	I	Horizontal synchronous signal	
33	Vsync	I	Vertical synchronous signal	
34	Data CLK	I	Dot data clock	
35	AVDD(analog)	I	Analog power: 4.5V~5.5V	

36	AVDD(analog)	I	Analog power: 4.5V~5.5V	
37	VDD(Digital)	I	Digital power: 3V~3.6V	
38	VDD(Digital)	I	Digital power: 3V~3.6V	
39	NPC	O	NTSC/PAL mode Auto detection result H:NTSC/L:PAL	
40	VGL	I	Gate off power	
41	VGL	I	Gate off power	
42	UD	I	Up/Down scan setting. H: Reverse scan / L: Normal scan	
43	VGH	I	Gate on power	
44	LRC	I	Shift direction of device internal shift register control.	
45	GND	I	GROUND	
46	VCOM	I	VCOM driving input	Note3
47	VCOM	I	VCOM driving input	
48	ENB	I	Data enable input.Normally pull low.	Note4
49	GND	I	GROUND	
50	GND	I	GROUND	

NOTE：

1. Control the input data format.

IF2,IF1	Input data format
L,L(default)	Serial RGB
L,H	Parallel RGB
H,L	CCIR601
H,H	CCIR656

2. Pin 5、Pin 6 usually pull high.
3. The polarity of VCOM (Pin 46, 47) should be generated from POL (Pin 3).
4. For digital RGB input data format, both SYNC mode and DE+SYNC mode are supported. If ENB signal is fixed low, SYNC mode is used. Otherwise, DE+SYNC mode is used.

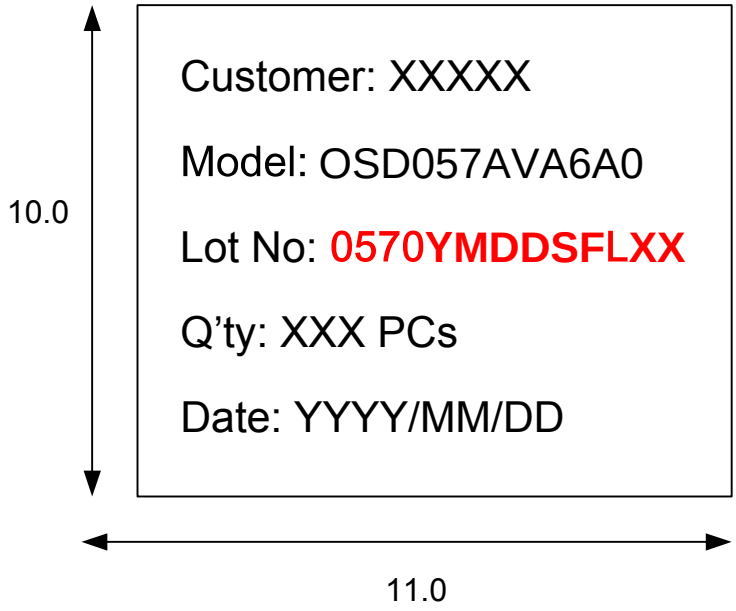
8 PACKING FORM

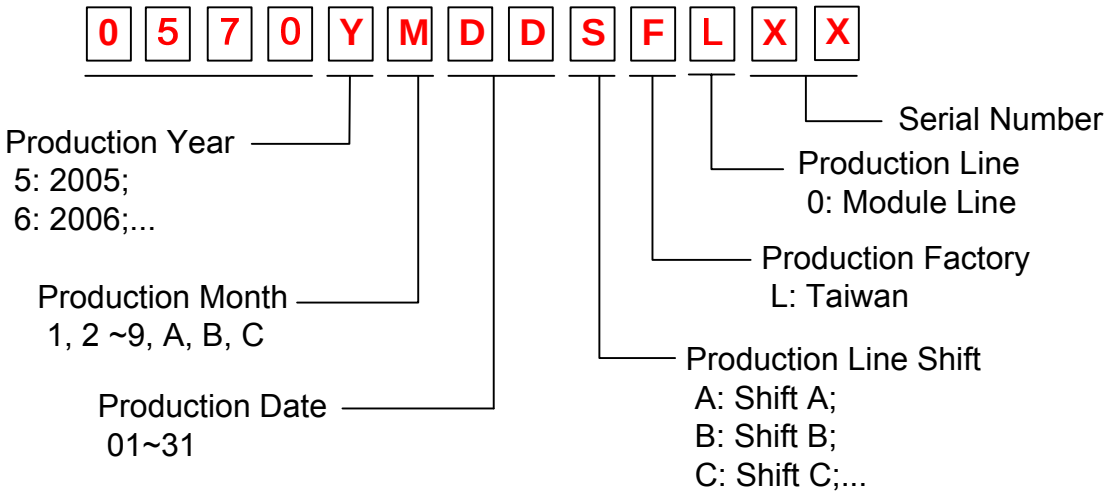
T. B. D.

9 DESIGNATION OF LOT MARK

9.1 Lot Mark on Packing Label

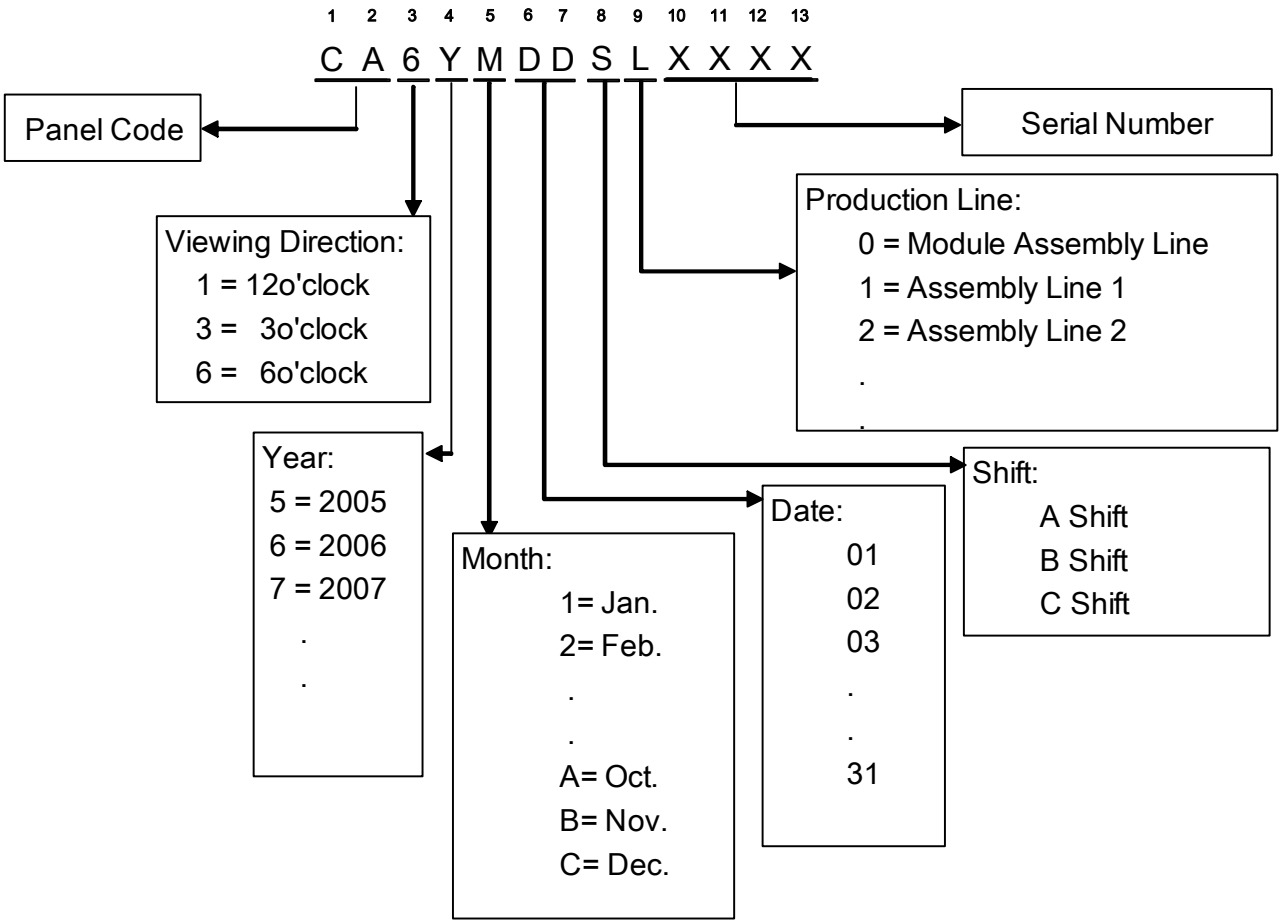
Lot Number on Outer Carton Box





9.2 Production Lot Mark of LCD Module

The production lot of module is specified on the back of FPC follows. The lot mark is consisted of 13-digit number.



10 RELIABILITY DATA

No	Test items	Conditions	Remark
1	High temperature storage	Ta=80℃, 240 Hrs	
2	Low temperature storage	Ta=-30℃, 240Hrs	
3	High temperature operation	Ta=70℃, 240Hrs	
4	Low temperature operation	Ta=-20℃, 240Hrs	
5	High temperature and high humidity	Ta=40℃, 90%RH, 240Hrs (No condensation of dew)	Operation
6	Thermal shock	Ta=-30℃ (0.5H) ~ 80℃ (0.5H) / 50 cycles	Non-operation
7	Electrostatic discharge	±200V, 200pF(0Ω), once for each terminal	Non-operation
8	Vibration (with carton)	Random vibration: $0.015G^2$/Hz from 5～200Hz -6dB/Octave from 200～500Hz	IEC 68-34
9	Drop (with carton)	Height: 60cm 1 corner, 3 edges ,6 surfaces	

Note: Ta: Ambient temperature.

11 PRECAUTIONS

11.1 Handling

(1) When the module is assembled, it should be attached to the system firmly. Be careful not to twist and bend the module.

(2) Refrain from strong mechanical shock and / or any force to the module. In addition to damage, this may cause improper operation or damage to the module and back-light unit.

(3) Note that the polarizer is very fragile and could be easily damaged. Do not press or scratch the surface harder than a B pencil lead.

(4) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.

(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Don’t use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(7) 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, legs or clothes, it must be washed away thoroughly with soap.

(8) Protect the module from static; it may cause damage to the CMOS Gate Array IC.

(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(10) Do not disassemble the module.

(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

(12) Pins of I/F connector shall not be touched directly with bare hands.

11.2 Storage

(1) Do not leave the panel in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35oC and relative humidity of less than 70%.

(2) Do not store the TFT-LCD module in direct sunlight.

(3) The module shall be stored in a dark place. It is prohibited to apply sunlight or fluorescent light during the store.

11.3 Operation

(1) Do not connect; disconnect the module in the “Power on” condition.

(2) Power supply should always be turned on/off by the chapter 8 TFT-LCD Driver IC Operation Algorithms.

11.4 Others

(1) The Liquid crystal is deteriorated by ultra violet, do not leave it in direct sunlight and strong ultraviolet ray for many hours.

(2) Avoid condensation of water. It may result in improper operation or disconnection of electrode.

(3) Do not exceed the absolute maximum rating value. (the supply voltage variation, input voltage variation in part contents and environmental temperature and so on). Otherwise the panel may be damaged.

(4) If the panel displays the same pattern continuously for a long period of time, it can be the situation when the image" Sticks" to the screen.

(5) His panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.