ORIENT DISPLAY
Your Total LCD Solution Provider

Specification for TFT

AFK128128A0-1.44N6NTM

Revision V02

A	Orient Display
FK	TFT Type
128128	Resolution 128 x 128
A0	Serial A0
1.44	1.44'', Module Dimension 35 x 30 x 2.6 mm
N	TN Display
6	6 o'clock
N	Top: -20~+70°C; Tstr: -30~+80°C
T	Transmissive
M	Medium Brightness, 500 cd/m2
/	No Touch Panel
/	Controller ST7735S Or Compatible
/	8080 MCU / SPI 4-wires Interface

Records of Revision

DATE	REF.PAGE PARAGRAPH DRAWING No.	REVISED No.	SUMMARY	REMARK
2019-10-24		V01	First Issue	
2021-04-22		V02	Update interface Pin Function	

Contents

1. General Specification

Item	Contents	Unit
LCD TYPE	TFT/TRANSMISSIVE	
MODULE SIZE (W*H*T)	30*35*2.6	MM
ACTIVE SIZE (W*H)	25.5*26.5	MM
PIXEL PITCH (W*H)	0.1992*0.2070	MM
NUMBER OF DOTS	128*128	
DRIVER IC	ST7735S	
INTERFACE TYPE	8080 MCU/SPI 4-WIRES	
TOP POLARIZER TYPE	GLARE	
RECOMMEND VIEWING DIRECTION	6	O'CLOCK
GRAY SCALE INVERSION DIRECTION	12	O'CLOCK
BACKLIGHT TYPE	2-DIES WHITE LED	
TOUCH PANEL TYPE	-	

2. Mechanical Drawing

ITEAM	PARAMETERS	ITEAM	PARAMETERS	ITEAM	PARAMETERS	ITEAM	PARAMETERS
DISPLAY TYPE	TN/NORMAL WHITE	VIEWING DIRECTION	6 O'CLOCK	LCD OPERATING VOLTAGE	/	IC	ST7735S
RESOLUTION (H*V)	1.44" 128*128 PIXELS	OPERATION TEMPERURE	-20℃ TO +70℃	LOGIC VOLTAGE(VDD)	2.8V	BACKLIGHT	2-CHIP WHITE LED
POLARIZER TYPE	TRANSMISSIVE	STORAGE TEMPERATURE	-30℃ to +80℃	SURFACE LUMINANCE	500 Nits	CONNECTOR	ZIF

IM2	SP14W	DATA BASE	INTERFACE	
		D0~D7	MCU	
1	/	D0	3-lines SPI	
0	1	D0	4-lines SPI	

PIN DESCRIPTIO

PIN	SYMBOL
1	A
2	K
3	VDD
4	GND
5	IM2
6	SPI4W
7	/CS
8	RESET
9	RD
10	WR
11	RS
12	D7
13	D6
14	D5
15	D4
16	D3
17	D2
18	D1
19	D0
20	GND

Detail: A
Scale: 40:1

LED CIRCUIT DIAGRAM
5.4V~6.8V@15MA

128 RGB x128DOTS
16 Color Bits
Viewing direction
6 O'CLOCK

DOUBLE SIDE TAPE
T:0.1MM

TITLE	TFT	PART NO.	AFK128128A0-1.44N6NTM
REV.	V00	CUSTOMER NO.	AFK128128A0-1.44N6NTM
SCALE	FIT	UNIT	mm	3rd ANGLE	SHEET 1 of 1
ROHS/REACH COMPLIANT	YES	CUSTOMER'S APPROVAL	
UNMARKED TOLERANCE	±0.2		

ORIENT DISPLAY

REV.	SYMBOL	DESCRIPTION
V00	-	FIRST ISSUE

DATE OCT-19-2019

3. Block Diagram

The block diagram shows a "Connection with Host" block on the left connecting to the Timing Controller / Driver IC ST7735S block via signals: RS, VDD, VSS, RESET, SPI3W/SPI4W, SDA, SCL, /CS. The Driver IC connects to the 1.44″ TFT LCD Panel 128(RGB)*128 via S1, S384, G160, G1. The Connection with Host also connects to the BL Circuit(2-Dies LED) via LED A and LED K.

4. Interface Pin Function

Pin No.	Symbol	Description
1	A	Backlight LED Power.
2	K	Backlight LED Ground.
3	VDD	Power supply.
4	GND	Power ground.
5	IM2	Select the MCU interface mode.
6	SPI4W	The pin=1,4-line SPI Enable.
7	/CS	Chip Selection Pin.
8	RESET	Hardware Reset.
9	RD	Read enable in mcu parallel interface.
10	WR	Write enable in mcu parallel interface; In 4-line SPI, this pin is used as D/CX(data/command selection).
11	RS	Data or command select; In Serial interface, this is used as SCL.
12	D7	Data bus
13	D6	Data bus
14	D5	Data bus
15	D4	Data bus
16	D3	Data bus
17	D2	Data bus
18	D1	Data bus
19	D0	Data bus; D0 is the serial input/output signal is serial interface mode
20	GND	Power ground

Note1. In serial interface, D[7:1] are not used and should be fixed at VDDI or DGND level.

5. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply voltage for analog	VDD	-0.3	4.6	V
Supply voltage for logic	VDD	-0.3	4.6	V
Supply current (One LED)	I_{LED}		30	mA
Operating temperature	T_{OP}	-20	+70	°C
Storage temperature	T_{ST}	-30	+80	°C

Note: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

6. Electrical Characteristics

6.1 Input Power

Item	Symbol	Min	Typ.	Max	Unit	Applicable terminal
Supply Voltage for Analog	VDD	2.5	2.8	3.3	V	
Supply Voltage for Logic	VDD	1.65	1.8/2.8	3.3	V	
Input Voltage	V_{IL}	GND	-	0.3VDD	V	
	V_{IH}	0.8 VDD	-	VDD		
Input leakage Current	I_{LKG}	-1		1	μA	

6.2 Backlight Driving Conditions

Item	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V_F	5.4	6.4	6.8	V	I_L =15mA
Current for LED Backlight	I_L		15	-	mA	
Power Consumption	P		0.096		W	
LED Life Time		30,000	50,000		Hr	Note

Note: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25℃

7. Optical Characteristics

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN	TYP.	MAX		
Luminance		L	I_L =15mA	400	500	700	Cd/m^2	
Contrast Ratio		CR	θ=0°		-			
Response Time		T_{ON}	25℃		30		ms	
		T_{OFF}						
CIE Color Coordinate	Red	X_R	Viewing normal angle					
		Y_R						
	Green	X_G						
		Y_G						
	Blue	X_B						
		Y_B						
	White	X_W		0.255	0.295	0.335		
		Y_W		0.288	0.328	0.368		
Viewing Angle	Hor.	θ_{X+}	CR≥10		45		Degree	
		θ_{X-}			45			
	Ver.	θ_{Y+}			35			
		θ_{Y-}			15			
Uniformity		Un		80			%	

Note 1: Definition of Viewing Angle **θx** and **θ**y:
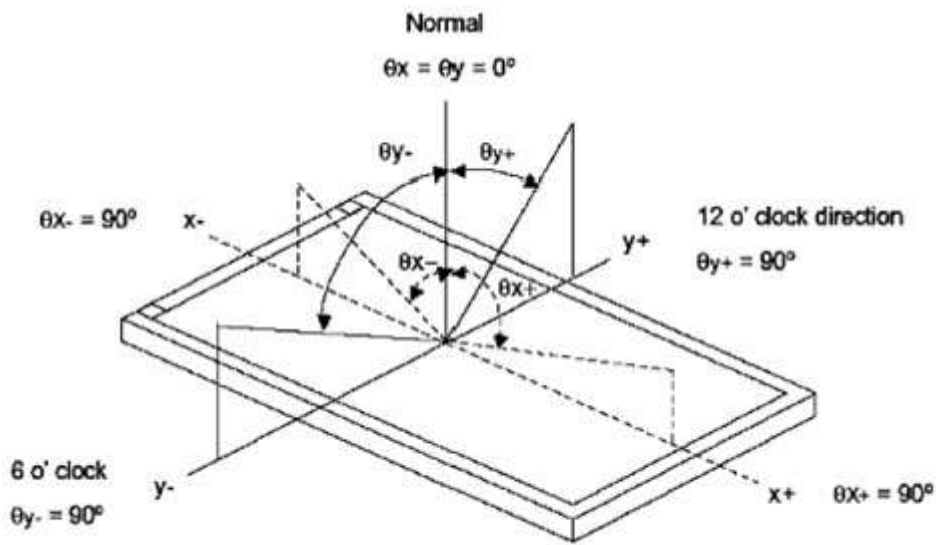
Note 2: Definition of contrast ratio CR:

$$CR= \frac{Luminance\ of\ white\ state}{Luminance\ of\ black\ state}$$

Note 3: Definition of Response Time(Tr,Tf)
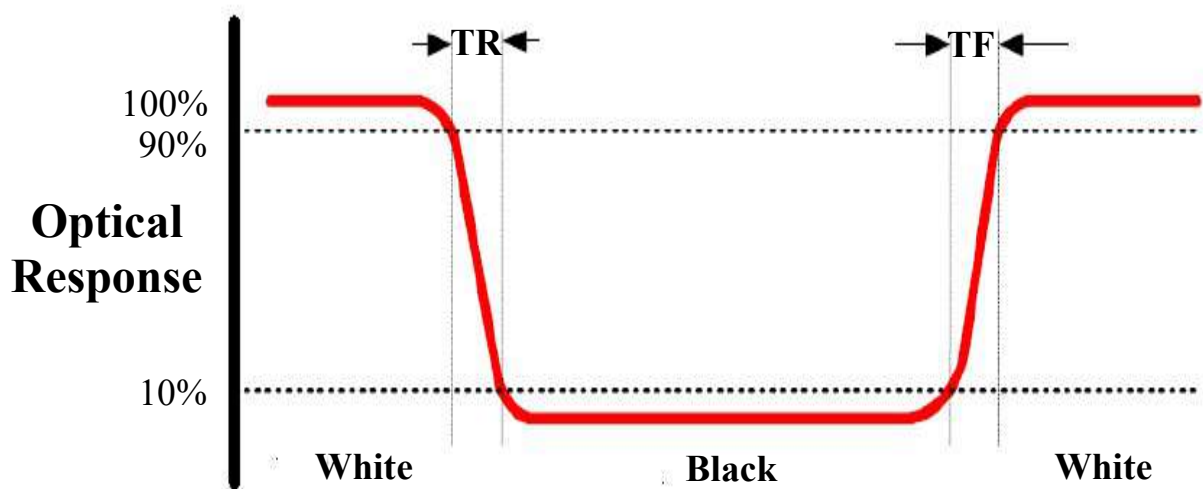
Note 4: Definition of Luminance

①**The Brightness Test Equipment Setup**

Field=2° (As measuring "black" image, field=2° is the best testing condition)

```
                    ┌─────────┐
                    │  BM-7   │
                    │         │
                    └─────────┘
            Field=2°    ▲
                      ┌─┴─┐
                     /│   │\
                    / │   │ \         ┌──── 50cm
                   /  │   │  \        │
                  /   │   │   \       │
   TFT-LCD Panel /    │   │    \      │
      ┌─────────/─────┼───┼─────\─────┤
   ───┤        ╱      │   │      ╲    │
      ╲       ╱       │   │       ╲   │
   ┌───────────────────────────────────┐
   │                  │                 │
   │                  │                 │
   └──────────────────┼─────────────────┘
                      ▲
              The center of the screen
```
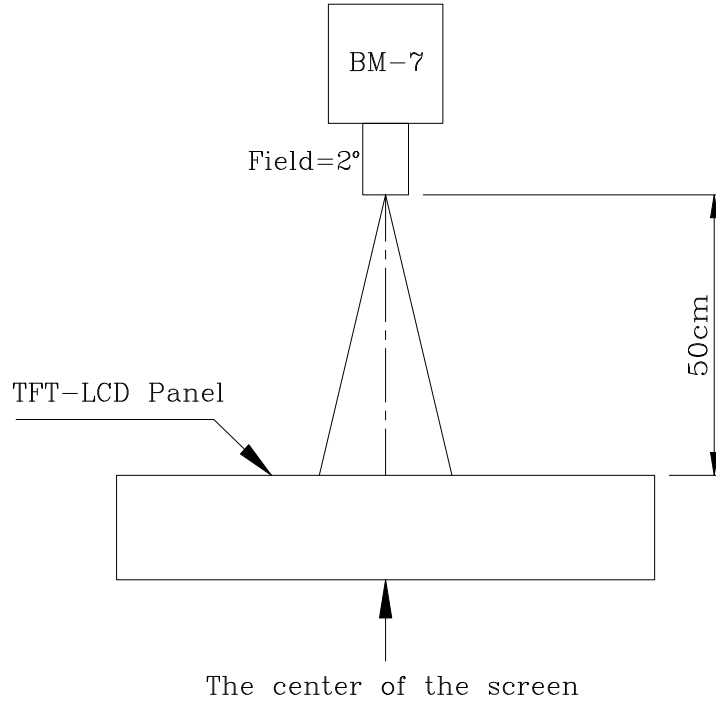
②**The Brightness Test Point Setup**

L/6	L/6	L/6	L/6

H/6, H/3, H/3, H/6

Active area H

L — Active area

Unit: mm
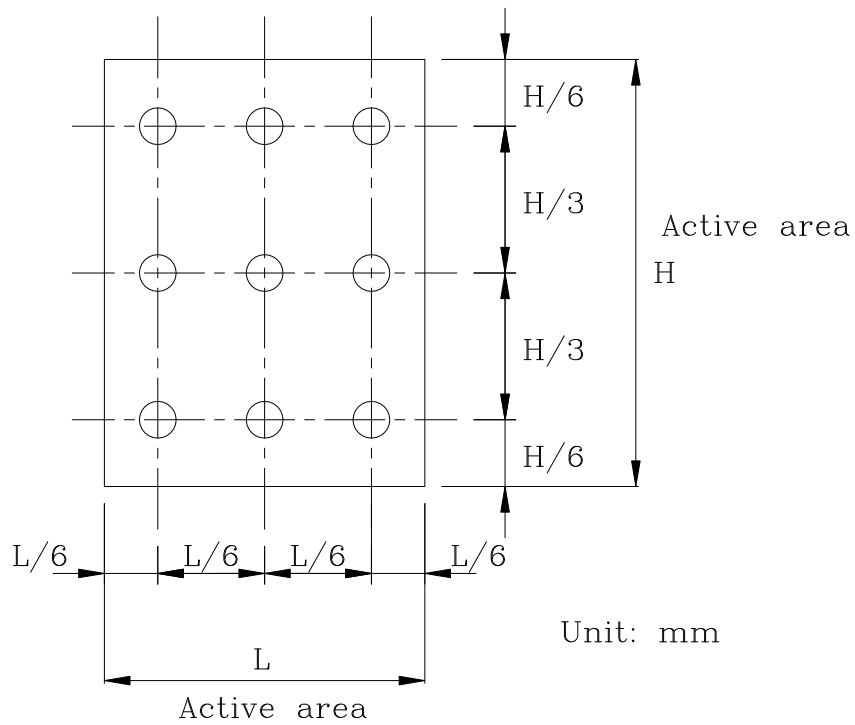
8. Timing Characteristics
8.1 SPI interface characteristic(4-line)
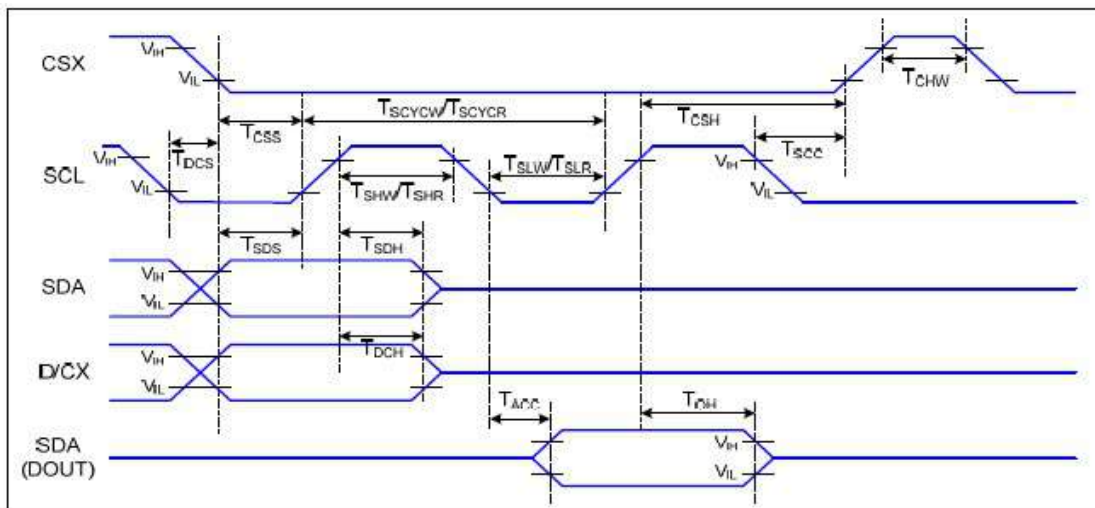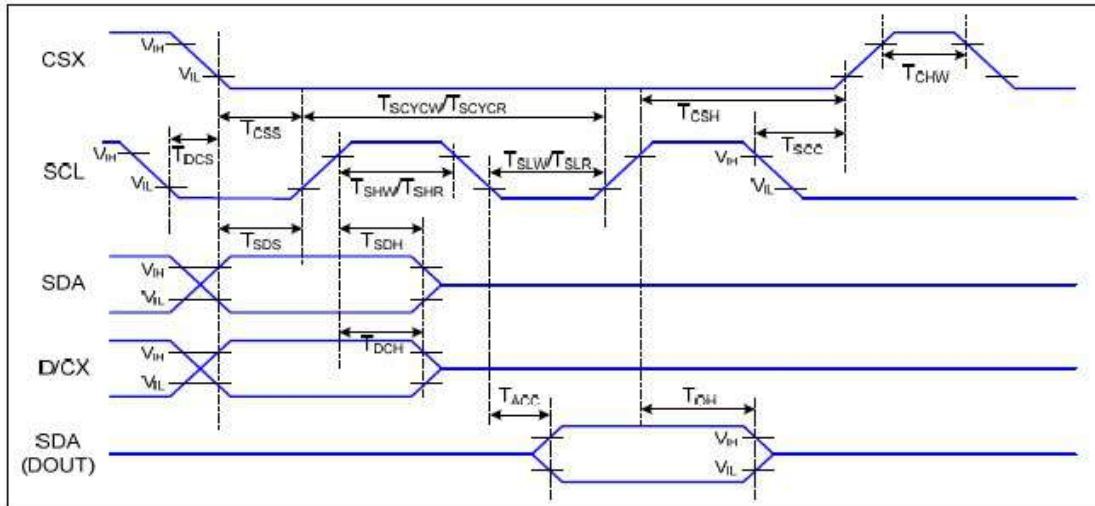
Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	TCSS	Chip Select Setup Time (Write)	45		ns	
	TCSH	Chip Select Hold Time (Write)	45		ns	
	TCSS	Chip Select Setup Time (Read)	60		ns	
	TSCC	Chip Select Hold Time (Read)	65		ns	
	TCHW	Chip Select "H" Pulse Width	40		ns	
SCL	TSCYCW	Serial Clock Cycle (Write)	66		ns	-Write Command & Data Ram
	TSHW	SCL "H" Pulse Width (Write)	15		ns	
	TSLW	SCL "L" Pulse Width (Write)	15		ns	
	TSCYCR	Serial Clock Cycle (Read)	150		ns	-Read Command & Data Ram
	TSHR	SCL "H" Pulse Width (Read)	60		ns	
	TSLR	SCL "L" Pulse Width (Read)	60		ns	
D/CX	TDCS	D/CX Setup Time	10		ns	
	TDCH	D/CX Hold Time	10		ns	
SDA (DIN) (DOUT)	TSDS	Data Setup Time	10		ns	For Maximum CL=30pF For Minimum CL=8pF
	TSDH	Data Hold Time	10		ns	
	TACC	Access Time	10	50	ns	
	TOH	Output Disable Time	15	50	ns	

Table 7 4-line Serial Interface Characteristics

Note : The rising time and falling time (Tr, Tf) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for input signals.

8.2 SPI interface characteristic(3-line)
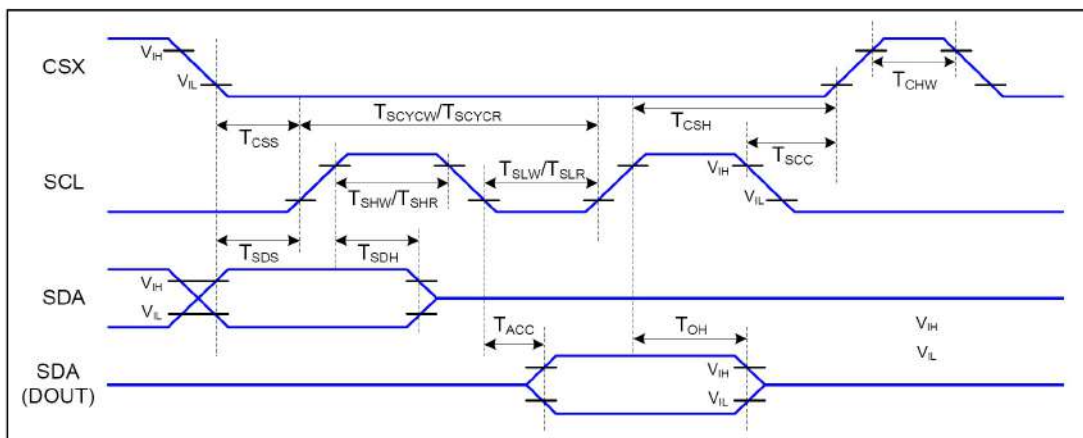
Figure 6 3-line Serial Interface Timing

Ta=25 ℃, VDDI=1.65~3.7V, VDD=2.5~4.8V

Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	TCSS	Chip Select Setup Time (Write)	15		ns	
	TCSH	Chip Select Hold Time (Write)	15		ns	
	TCSS	Chip Select Setup Time (Read)	60		ns	
	TSCC	Chip Select Hold Time (Read)	65		ns	
	TCHW	Chip Select "H" pulse width	40		ns	
SCL	TSCYCW	Serial Clock Cycle (Write)	66		ns	
	TSHW	SCL "H" Pulse Width (Write)	15		ns	
	TSLW	SCL "L" Pulse Width (Write)	15		ns	
	TSCYCR	Serial Clock Cycle (Read)	150		ns	
	TSHR	SCL "H" Pulse Width (Read)	60		ns	
	TSLR	SCL "L" Pulse Width (Read)	60		ns	
SDA (DIN) (DOUT)	TSDS	Data Setup Time	10		ns	For Maximum CL=30pF For Minimum CL=8pF
	TSDH	Data Hold Time	10		ns	
	TACC	Access Time	10	50	ns	
	TOH	Output Disable Time	15	50	ns	

Table 6 3-line Serial Interface Characteristics

Note : The rising time and falling time (Tr, Tf) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

9.Standard Specification for Reliability
9.1Standard Specification for Reliability of LCD Module

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70℃, 240 hours	IEC60068-21:2007 GB2423.2-2008
2	Low Temperature Operation	Ta = -20℃, 240 hours	IEC60068-2-1:2007 GB/2423.1-2008
3	High Temperature Storage	Ta = +80℃, 240 hours	IEC60068-21:2007 GB/2423.2-2008
4	Low Temperature Storage	Ta = -30℃, 240 hours	IEC60068-21:2007 GB/2423.1-2008
5	Storage at High Temperature and Humidity	Ta = +60℃, 90% RH max,240hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30℃ 30 min~+80℃ 30 min, Change time:5min, 20 Cycle	Start with cold temperature, End with high temperature, IEC60068-214:1984, GB/2423.22-2002
7	ESD	C=150pF,R=330Ω,5point/panel Air:±8Kv,5times; Contact:±4Kv,5times (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	IEC61000-42:2001 GB/T17626.2-2006
8	Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z (6 hours for total)	IEC60068-2-6:1982 GB/T2423.101995
9	Mechanical Shock (Non Op)	Half Sine Wave60G 6ms, ±X,±Y,±Z 3times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height:80cm, 1corner,3 edges,6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

Note1: Ts is the temperature of panel's surface.
Note2: Ta is the ambient temperature of sample.

9.2 Testing Conditions and Inspection Criteria

For the final test, the testing sample must be stored at room temperature for 24 hours. After the tests listed in Table 9.2, standard specifications for reliability will be executed in order to ensure stability.

No.	Item	Test Model	In section Criteria
01	Current Consumption	Refer To Specification	The current consumption should conform to the product specification.
02	Contrast	Refer To Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
03	Appearance	Visual inspection	Defect free.

9.3 MTBF

MTBF	Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (25±5℃), normal humidity (50±10% RH), and in area not exposed to direct sun light.

10.Specification of Quality Assurance

This standard of Quality Assurance confirms to the quality of LCD module products supplied by ODNA.

10.1 Quality Test

Before delivering, the supplier should conduct the following tests to confirm the quality of products.

- Electrical-Optical Characteristics: According to the individual specification to test the product.
- Appearance Characteristics: According to the individual specification to test the product.
- Reliability Characteristics: According to the definition of reliability on the specification for testing products.

10.2 Delivery Test

Before delivering, the supplier should conduct the delivery test.

- Test method: According to MIL-STD105E.General Inspection Level II take a single Time.
- The defects classify of AQL as following:
  Major defect: AQL = 0.65
  Minor defect: AQL = 1.5
  Total defects: AQL = 1.5

10.3 Non-conforming Analysis & Deal With Manners

10.3.1 Non-conforming Analysis

- Purchaser should provide the data detail of non-conforming sample and the non-conforming.
- After receiving the data detail from purchaser, the analysis of non-conforming should be finished within two weeks.
- If the analysis can't be finished on time, supplier must notice purchaser 3 days in advance.

10.3.2 Disposition of non-conforming

- If any product defect be found during assembling, supplier must change the good for every defect after confirmation.
- Both supplier and customer should analyze the reason and discuss the disposition of non-conforming when the reason of nonconforming is not sure.

10.4 Agreement items

Both parties should negotiate together when the following problems happen.
- There is any problem of standard of quality assurance, and both sides should agree that it must be modified.
- There is any argument item which does not record in the standard of quality assurance.
- Any other special problem.

10.5 Standard of The Product Appearance Test

10.5.1 Manner of appearance test

- The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30±5cm.
- When test the model of transmissive product must add the reflective plate.
- The test direction is base on around 10° of vertical line.
- Temperature: 25±5℃   Humidity: 60±10%RH
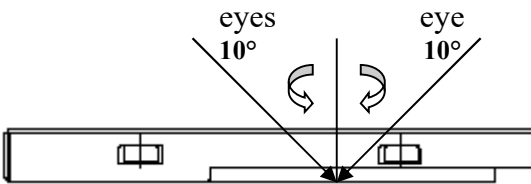
- Definition of area:
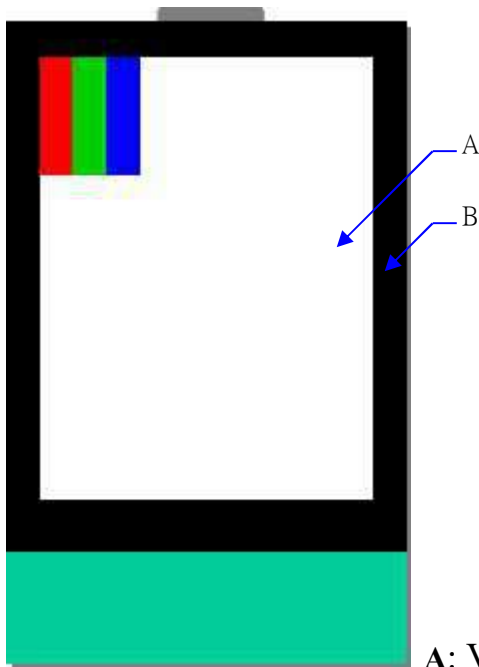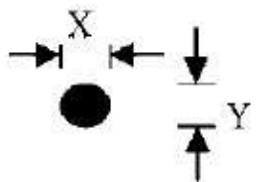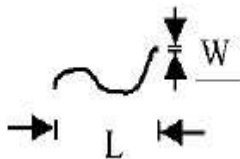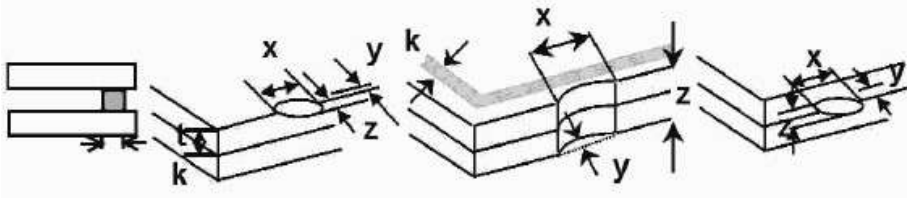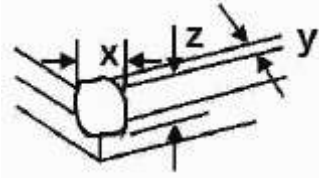
A: Viewing area B: Outside viewing area
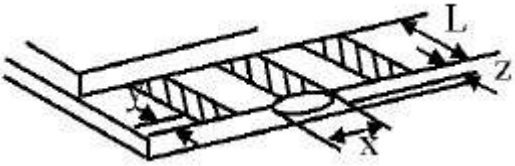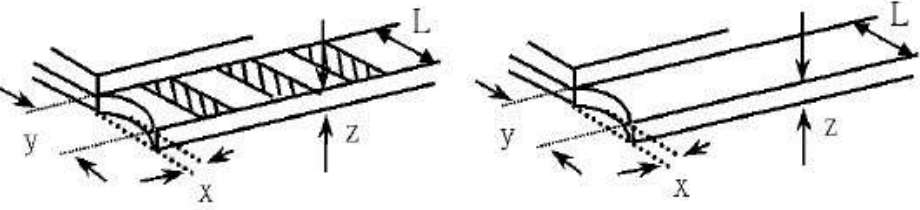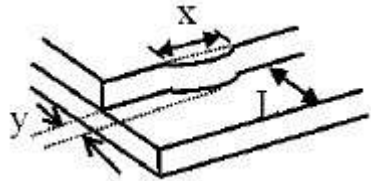
10.5.2 Basic principle

- When the standard can not be described, AQL will be applied.
- The sample of the lowest acceptable quality level must be negotiated by both supplier and customer when any dispute happened.
- New item must be added on time when it is necessary.
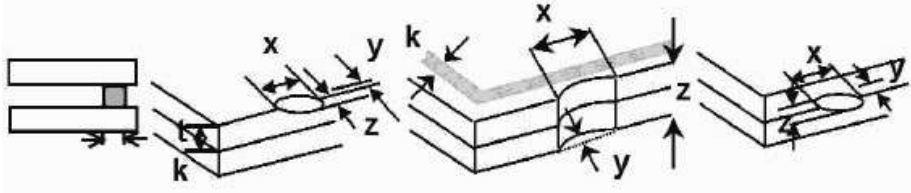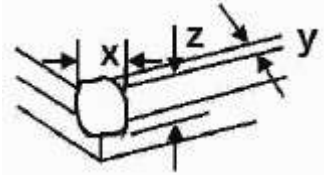
10.6 Inspection Specification
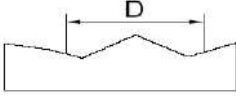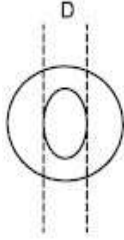
NO.	Item	Criterion	AQL
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Flicker	0.65
02	Black or White spots or Bright spots or Color spots on LCD (Display only)	2.1 White and black or color spots on display $\leqq$ 0.25mm, no more than Five spots. 2.2 Densely spaced: No more than three spots within 3mm.	1.5
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $\Phi = (X+Y) / 2$ *(drawing of round spot with X and Y dimensions)* <table><tr><td>Size(mm)</td><td>Acceptable Q'ty</td></tr><tr><td>$\Phi \leqq 0.10$</td><td>Accept no dense</td></tr><tr><td>$0.10 < \Phi \leqq 0.20$</td><td>2</td></tr><tr><td>$0.20 < \Phi \leqq 0.25$</td><td>2</td></tr><tr><td>$0.25 < \Phi \leqq 0.30$</td><td>1</td></tr><tr><td>$0.30 < \Phi$</td><td>0</td></tr></table> * Densely spaced: No more than two spots within 3mm. 3.2 Line type: (As following drawing) *(drawing of line with W width and L length)* <table><tr><td>Length(mm)</td><td>Width(mm)</td><td>Acceptable Q'ty</td></tr><tr><td>---</td><td>$W \leqq 0.02$</td><td>Accept no dense</td></tr><tr><td>$L \leqq 3.0$</td><td>$0.02 < W \leqq 0.05$</td><td rowspan="2">2</td></tr><tr><td>$L \leqq 2.5$</td><td>$0.03 < W \leqq 0.08$</td></tr><tr><td>---</td><td>$0.08 < W$</td><td>Rejection</td></tr></table> * Densely spaced: No more than two lines within 3mm.	1.5 1.5

NO.	Item	Criterion		AQL
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction	<table><tr><td>Size Φ(mm)</td><td>Acceptable Q'ty</td></tr><tr><td>Φ≦0.30</td><td>Accept no dense</td></tr><tr><td>0.30< Φ≦0.50</td><td>0</td></tr><tr><td>0.50< Φ≦1.00</td><td>0</td></tr><tr><td>1.00< Φ</td><td>0</td></tr><tr><td>Total Q'ty</td><td>0</td></tr></table>	1.5
05	Scratches	Follow NO.3 -2 Line Type.		

NO.	Item	Criterion	AQL
06	Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 6.1 General glass chip: 6.1.1 Chip on panel surface and crack between panels: 	1.5

For item 06, the criterion area contains:

6.1.1 Chip on panel surface and crack between panels:

z: Chip thickness	y: Chip width	x: Chip length
Z≦1/2t	Not over viewing area	x≦2MM
1/2t< z≦2t	Not exceed 1/3k	x≦2MM

⊙ Unit: mm
⊙ If there are 2 or more chips, x is the total length of each chip

6.1.2 Corner crack:

z: Chip thickness	y: Chip width	x: Chip length
Z≦1/2t	Not over viewing area	x≦2MM
1/2t< z≦2t	Not exceed 1/3k	x≦2MM

⊙ Unit: mm
⊙ If there are 2 or more chips, x is the total length of each chip

NO.	Item	Criterion	AQL
07	Glass crack	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 7.2 Protrusion over terminal: 7.2.1 Chip on electrode pad: | y: Chip width	x: Chip length	z: Chip thickness
---	---	---
$y \leqq 0.5mm$	$x \leqq 2MM$	$0 < z \leqq t$ | 7.2.2 Non-conductive portion: | y: Chip width	x: Chip length	z: Chip thickness
---	---	---
$y \leqq L$	$x \leqq 2MM$	$0 < z \leqq t$ | ⊙ If there chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications. ⊙ If the product will be heat sealed by the customer, the alignment mark must mot be damaged. 7.2.3 Substrate protuberance and internal crack | y: width	x: length
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$y \leqq 1/3L$	$X \leqq 2MM$		1.5

NO.	Item	Criterion	AQL
08	Cracked glass	No crack is allowed.	1.5
09	Backlight elements	9.1 Illumination source flickers when lit. 9.2 Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 9.3 Backlight doesn't light or color is wrong.	1.5 1.5 0.65
10	Bezel	No scratches with W>0.1 and Length>2.5mm.	1.5
11	PCB、COB	11.1 COB seal may not have pinholes larger than 0.2mm or contamination. 11.2 COB seal surface may not have pinholes through to the IC. 11.3 The height of the COB should not exceed the height indicated in the assembly diagram. 11.4 There may not be more than 2mm of sealant outside the seal area on PCB. And there should be no more than three places. 11.5 Parts on PCB must be the same as on the production characteristic chart, There should be no wrong parts, missing parts or excess parts. 11.6 The jumper on the PCB should conform to the product characteristic chart.	1.5 1.5 1.5 1.5 0.65 0.65
12	FPC	FPC damage per IPC guidelines.(IPC-A-610) Nicks or damage along the edges of the flexible printed cir-cuitry and cutouts,providing the penetration does not exceed 50% of the distance from the edge to the nearest conductor to 2.5mm[0.1in], Whichever is less.	1.5
13	Soldering	13.1 No cold solder joints, missing solder connections, oxidation or icicle. 13.2 No short circuits in components on PCB or FPC. 13.3 Soldering per IPC guidelines.(IPC-A-610)	1.5 0.65

NO.	Item	Criterion	AQL
14	Touch Panel Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Touch Panel Total thickness a: LCD side length L: Electrode pad length 14.1 General glass chip: 14.1.1 Chip on panel surface and crack between panels: ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 14.1.2 Corner crack: ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip	1.5

14.1.1 table:

z: Chip thickness	y: Chip width	x: Chip length
$Z \leqq t$	$\leqq 1/2$ k and not over viewing area	$x \leqq 2MM$

14.1.2 table:

z: Chip thickness	y: Chip width	x: Chip length
$z \leqq t$	$\leqq 1/2$ k and not over viewing area	$x \leqq 2MM$

NO.	Item	Criterion	AQL
15	Touch Panel(Fish eye、dent and bubble on film)	<table><tr><td>SIZE(mm)</td><td>Acceptable Q'ty</td></tr><tr><td>Φ≦0.2</td><td>Accept no dense</td></tr><tr><td>0.2< D ≦0.4</td><td>5</td></tr><tr><td>0.4< D ≦0.5</td><td>2</td></tr><tr><td>0.5< D</td><td>0</td></tr></table>	1.5
16	Touch Panel Newton ring	Newton ring dimension ≦ 1/2 touch panel area and not affect font and line distortion(≦2.5%) , it is acceptable.	1.5
17	Touch Panel Linearity	Less than 1.5% is acceptable.	1.5
18	LCD Ripple	Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g	1.5
19	General appearance	19.1 Pin type must match type in specification sheet. 19.2 LCD pin loose or missing pins. 19.3 Product packaging must the same as specified on packaging specification sheet. 19.4 Product dimension and structure must conform to product specification sheet.	0.65 0.65 0.65 0.65

11. Handling Precaution

11.1 Handling of LCM

- Avoid external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance, do not lick or swallow. When the liquid is attaching to your hand, skin, cloth, etc., wash it thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.
- The operators should wear protections whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.
- The modules should be kept in antistatic bags or other containers resistant to static for storage.
- The module is coated with a film to protect the display surface, be careful when peeling off this protective film since static electricity may be generated.

11.2 Storage

- Store it in an ambient temperature of $25\pm10\,^\circ\text{C}$, and in a relative humidity of $50\pm10\%$RH. Don't expose to sunlight or fluorescent light.
- Store it in a clean environment, free from dust, active gas, and solvent.
- Store it in anti-static electricity container.
- Store it without any physical load.

11.3 Soldering

- Use only soldering irons with proper grounding and no leakage.
- Iron: no higher than $280\pm10\,^\circ\text{C}$ and less than 3 sec during hand soldering.
- Rewiring: no more than 2 times.

12. Packing Method

No.	Item	Dimensions(mm)	Quantity	Remark
1	LCM Module	30*35*2.6	900PCS	
2	TRAY	375*330*12 (include 36pcs products/one pallet)	26PCS	
3	LARGE CARTON	405*355*250 (include 900pcs products/one carton)	1PCS	