SPECIFICATION

MODEL NO: SGP18T-00

CUSTOMER: _____

Customer Approval:
    ☐ Approve Specification Only
    ☐ Approve Specification and Sample

APPROVED BY
DATE:

ISSUED DATE: 2010/05/21

PREPARED BY	CHEEK BY	APPROVED BY
付祥强	--	--

RECORDS OF REVISION

DATE	REF.PAGE PARAGRAPH DRAWING No.	REVISED No.	SUMMARY	REMARK
2010/05/21	ALL	0.0	FIRST ISSUE	

Contents

SGP Electronic Science and Technology

1. Introduction

1.1 Scope of application

This specification applies to the Negative type TFT transmissive dot matrix LCD module that is supplied by   SGP electronic science and technology. This LCD module should be designed for mobile phone use. LCD specification: Dots 128xRGBx160.
As to basic specification of the driver IC, refer to the IC (ILI9163B) specification and datasheet.

1.2 Structure:

Double display structure:
TFT Module + FPC
FULL 65k or 262k Color 1.8 inch TFT LCD size for LCD;
One bare chip with gold bump (COG) TECH;
SPI interface;

1.3 TFT features:

Structure: TFT PANNEL+IC+FPC;
Transmissive Type LCD
128 dot-source and 160 dot-gate outputs;
65k or 262k Color can be selected by software;
White LED back light;
SPI interface;
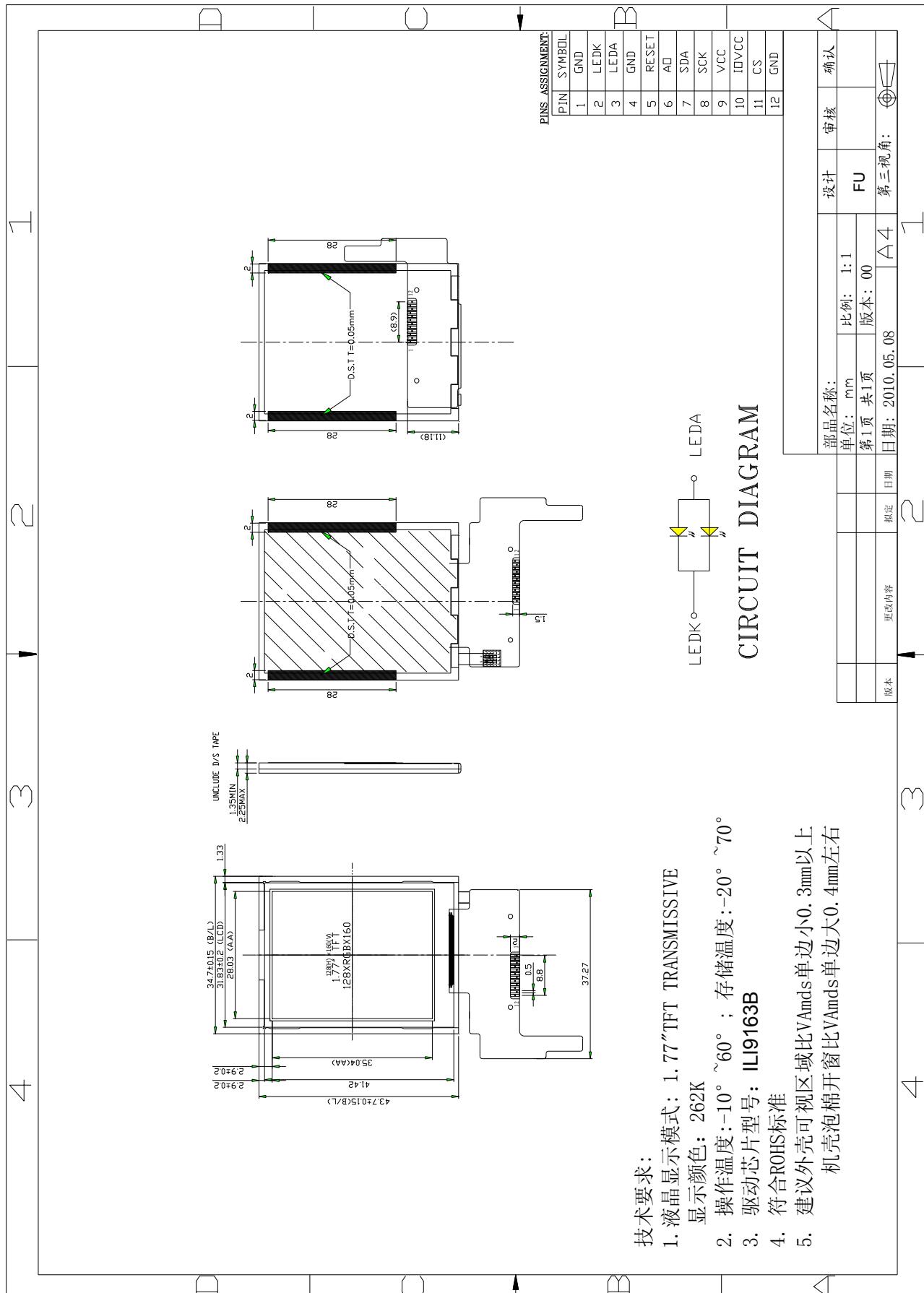
1.4 Applications:

Mobile phone

SGP Electronic Science and Technology

2. General specification

ITEM	Standard value	UNIT
LCD Type	TFT Transmissive	---
Driver element	a-Si TFT Active matrix	
Number of Dots	128*(RGB)*160	Dots
Pixel Arrangement	RGB Vertical Stripe	
Dot Pitch (W*H)	0.219*0.219	mm
Active Area	28.032*35.04	mm
Viewing Area (W*H)	/	mm
Glass Area (W*H)	31.83*41.42	mm
Viewing Direction	12 O' clock	
Control IC	ILI9163B	
Module Size(W*H*T)	34.7*43.7*2.25	mm
Approx. Weight	TBD	g
Back Light	2 White LED	
Touch Panel Type	----	
Touch Panel Active Area	----	mm
Touch Panel View Area	----	mm

3. Mechanical drawing

PINS ASSIGNMENT

PIN	SYMBOL
1	GND
2	LEDK
3	LEDA
4	GND
5	RESET
6	A0
7	SDA
8	SCK
9	VCC
10	IOVCC
11	CS
12	GND

确认

设计 FU
审核
第三视角：

比例： 1：1
版本： 00
A4

部品名称：
单位： mm
第1页 共1页
日期： 2010.05.08

拟定
日期
更改内容
版本

CIRCUIT DIAGRAM

LEDA
LEDK

D.S.T=0.05mm
(8.9)
(11.18)
28
2

INCLUDE D/S TAPE
1.35MIN
2.25MAX
1.33

34.7±0.15 (B/L)
31.83±0.2 (LCD)
28.03 (AA)
35.04(AA)
41.42
43.7±0.15(B/L)
2.9±0.2
2.9±0.2
1.77"TFT
128×RGB×160
37.27
0.5
8.8

技术要求：
1. 液晶显示模式：1.77"TFT TRANSMISSIVE
   显示颜色：262K
2. 操作温度：-10°~60°；存储温度：-20°~70°
3. 驱动芯片型号：ILI9163B
4. 符合ROHS标准
5. 建议外壳可视区域区比VAmds单边小0.3mm以上
   机壳泡棉开窗比VAmds单边大0.4mm左右

4. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Supply voltage for logic	V_{DD}	−0.3	4.6	V
Input voltage for logic	V_{IN}	−0.5	V_{DD} +0.3	V
Supply current (One LED)	I_{LED}	15	20	mA
Operating temperature	T_{OP}	−20	+70	°C
Storage temperature	T_{ST}	−30	+80	°C
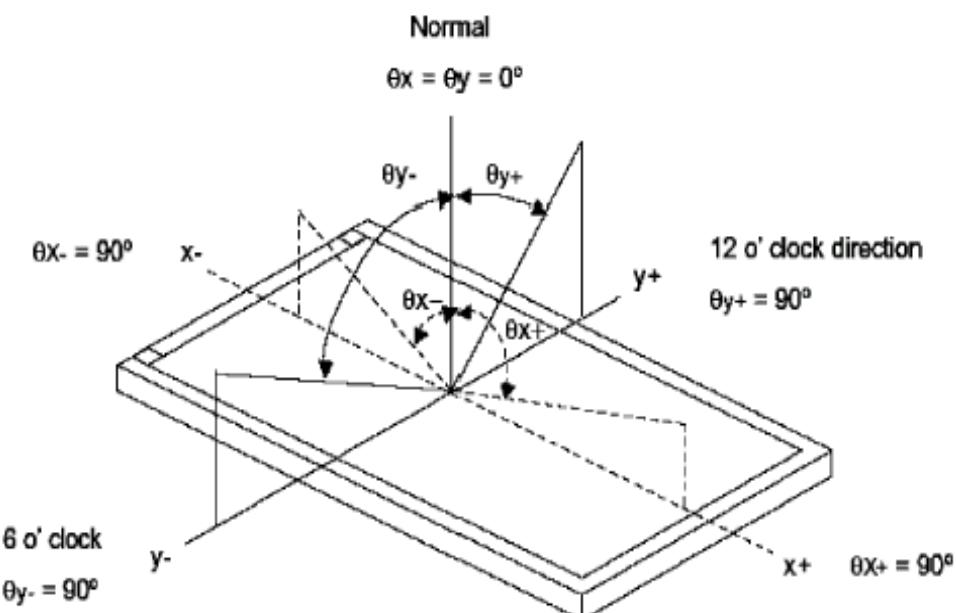
5. ELECTRICAL CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit	Applicable terminal
Supply voltage for logic	V_{DD}	2.5	2.8	3.0	V	V_{DD}
Input voltage	V_{IL}	–	–	0.2 V_{DD}	V	
	V_{IH}	0.8 V_{DD}	–	V_{DD}	V	
Input leakage current	I_{LKG}				μ A	
LED Forward voltage	V_f	3.0	3.2	3.4	V	−−
Input backlight current	I_{LED}	–	15	–	mA	

6. OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN.	TYP.	MAX		
Brightness		B		TBD	TBD	--	Cd/m^2	
Contrast Ratio		CR		150	250	--	--	
Response Time		Tr+Tf		--	30	50	ms	
CIE Color coordinate	Red	X_R	Viewing normal angle	–	TBD	–		All left side data are based on SGP product reference only
		Y_R		–	TBD	–		
	Green	X_G		–	TBD	–		
		Y_G		–	TBD	–		
	Blue	X_B		–	TBD	–		
		Y_B		–	TBD	–		
	White	X_W		–	TBD	–		
		Y_W		–	TBD	–		
Viewing Angle	Hor.	θ_{X+}	Center CR>=10	--	45	--	Deg.	
		θ_{X-}		--	45	--		
	Ver.	θ_{Y+}		--	35	--		
		θ_{Y-}		--	15	--		
Uniformity		Un		--	60	--	%	
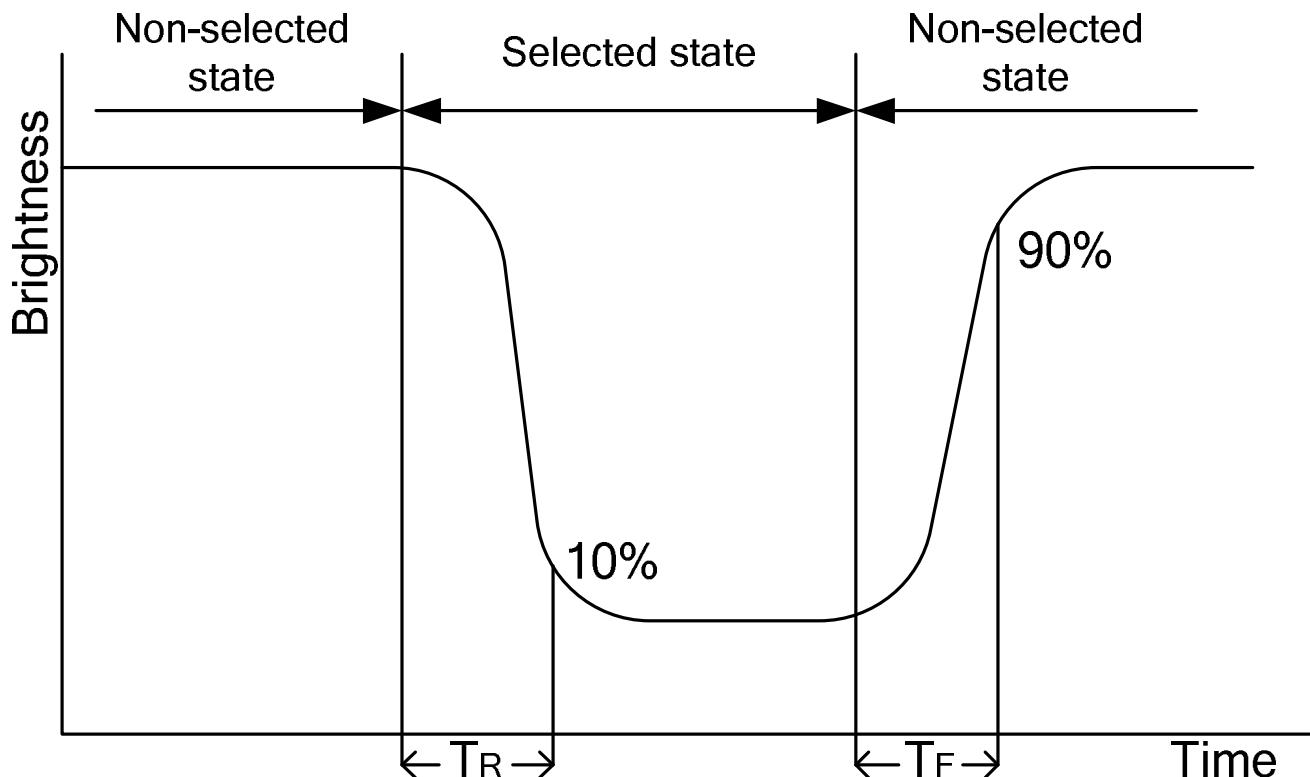
Note 1 : Definition of Viewing Angleθ_X andθ_Y :

Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Brightness of non-selected dots (white)}}{\text{Brightness of selected dots (black)}}$$

Note 3: Definition of response time (T_R, T_F)

7. MCU Interface Pin Function

NO.	SYMBOL	Description
1	GND	Ground
2	LEDK	LED Cathode
3	LEDA	LED Anode
4	GND	Ground
5	RESET	Reset input pin ,When RESET_B is " L" , initialization is executed Data Bus:
6	A0	Register select input pin
7	SDI	The serial output/input signal
8	SCK	Serial clock input pin
9	VCC	Power +2.8V
10	IOVCC	Power 1.8V--2.8V
11	/CS	Chip selection
12	GND	Ground

9.LCM Quality Criteria

9.1 VISUAL & FUNCTION INSPECTION STANDARD

9.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.
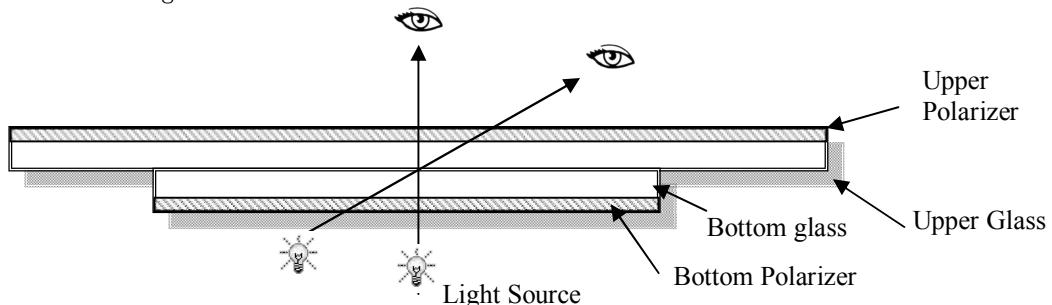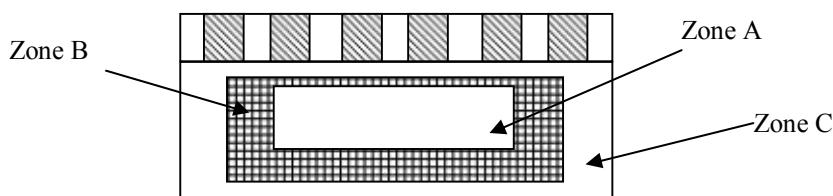
Temperature : 25±5℃
Humidity :   65%±10%RH
Viewing Angle : Normal viewing Angle.
Illumination: Single fluorescent lamp (300 to 700Lux)
Viewing distance:30-50cm

Upper Polarizer
Upper Glass
Bottom glass
Bottom Polarizer
Light Source

9.1.2 Definition

Zone B
Zone A
Zone C

Zone A : Effective Viewing Area(Character or Digit can be seen)
Zone B : Viewing Area except Zone A
Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)
Note:
        As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function
     or appearance after assembly by customer.

9.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class Ⅱ
AQL:
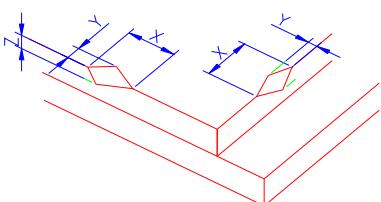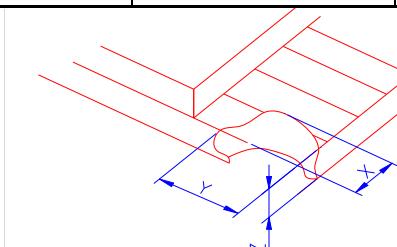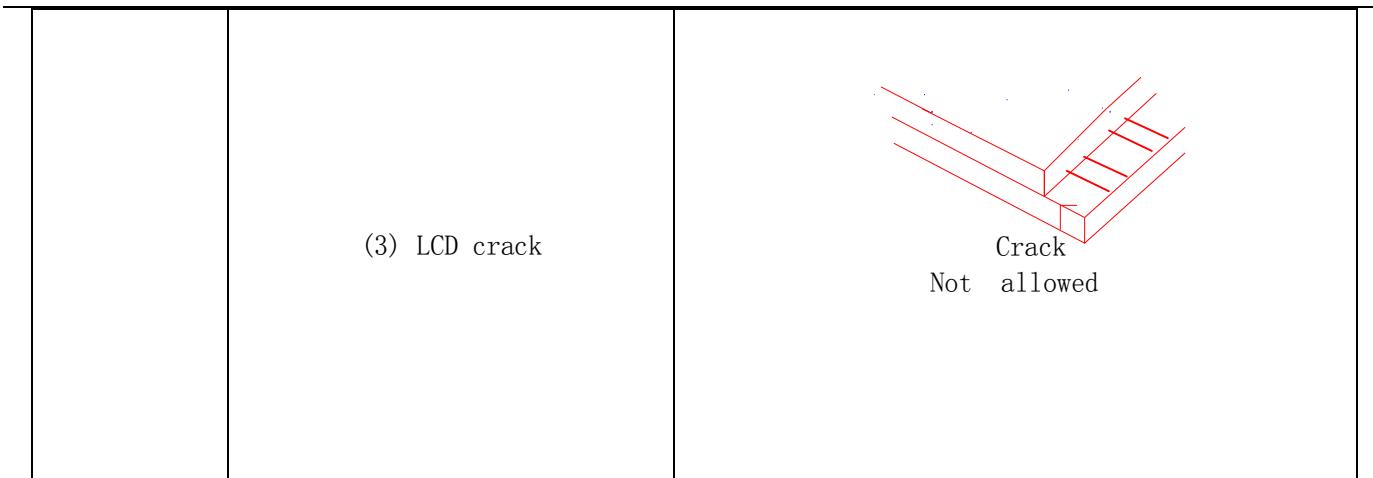
Major defect	Minor defect
0.65	1.5
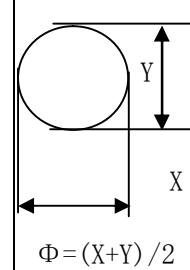
LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	
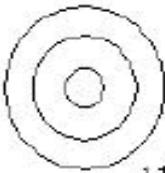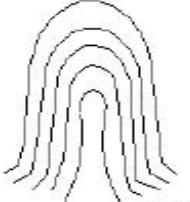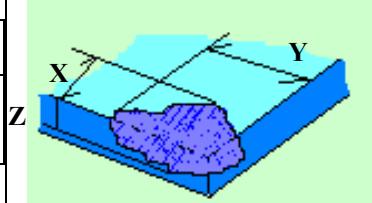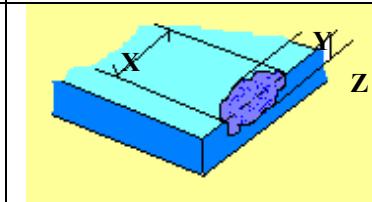
9.1.4 Criteria (Visual)

Number	Items	Criteria(mm)
1.0 LCD Crack/Broken NOTE: X: Length Y: Width Z: Height L: Length of ITO, T: Height of LCD	(1) The edge of LCD broken	 | X	Y	Z
≤3.0mm	<Inner border line of the seal	≤T	
	(2)LCD corner broken	 | X	Y	Z
≤3.0mm	≤L	≤T	

	(3) LCD crack	\n\nCrack\nNot allowed

Number	Items	Criteria (mm)
2.0	Spot defect	① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)

$\Phi=(X+Y)/2$

Size (mm) \ Zone	Acceptable Qty		
	A	B	C
$\Phi \leqq 0.10$	Ignore		Ignore
$0.10<\Phi \leqq 0.15$	3(distance$\geqq$10mm)		
$0.15<\Phi \leqq 0.2$	1		
$0.2<\Phi$	0		

②Dim spot (LCD/TP/Polarizer dim dot, light leakage、dark spot)

Size (mm) \ Zone	Acceptable Qty		
	A	B	C
$\Phi \leqq 0.1$	Ignore		Ignore
$0.1<\Phi \leqq 0.2$	2(distance$\geqq$10mm)		
$0.2<\Phi \leqq 0.3$	1		
$\Phi>0.3$	0		

③ Polarizer accidented spot

Size (mm) \ Zone	Acceptable Qty		
	A	B	C
$\Phi \leqq 0.2$	Ignore		Ignore
$0.2<\Phi \leqq 0.5$	2(distance$\geqq$10mm)		
$\Phi>0.5$	0		

	Line defect (LCD/TP /Polarizer black/white line, scratch, stain)	Width(mm)	Length(mm)	Acceptable Qty		
				A	B	C
		Φ≤0.03	Ignore	Ignore		Ignore
		0.03<W≤0.05	L≤3.0	N≤2		
		0.05<W≤0.08	L≤2.0	N≤2		
		0.08<W	Define as spot defect			

		Size (mm)　　Zone	Acceptable Qty		
			A	B	C
3.0	Polarizer Bubble	Φ≤0.2	Ignore		Ignore
		0.2<Φ≤0.4	2(distance≧10mm)		
		0.4<Φ≤0.6	1		
		0.6<Φ	0		

4.0	SMT	According to IPC-A-610C class Ⅱ standard . Function defect and missing part are major defect ,the others are minor defect.

			Size Φ(mm)	Acceptable Qty		
		TP bubble/ accidented spot		A	B	C
			Φ≤0.1	Ignore		Ignore
			0.1<Φ≤0.2	2		
			0.2<Φ≤0.3	1		
			0.3<Φ	0		
		Assembly deflection	beyond the edge of backlight ≤0.15mm			

5.0	TP Related	Newton Ring	Newton Ring area>1/3 TP area NG Newton Ring area≤1/3 TP area OK	
		TP corner broken X：length Y：width Z：height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤3.0mm</td><td>Y≤3.0mm</td><td>Z<LCD thickness</td></tr></table> * Circuitry broken is not allowed.	
		TP edge broken X：length Y：width Z：height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤6.0mm</td><td>Y≤2.0mm</td><td>Z<LCD thickness</td></tr></table> * Circuitry broken is not allowed.	

<u>Criteria (functional items)</u>

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed

9.2 Handling Precautions

9.2.1 Avoid static electricity damaging the LSI.

9.2.2 Do not remove the panel or frame from the module .

9.2.3 The polarizing plate of the display is very fragile . So, please handle it very carefully.

9.2.4 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of the plate.

9.2.5 The color tone of display and background of LCM has the possibility to be changed in the storage temperature range.

9.2.6 Pay attention to the working environment, as the element may be destroyed by static electricity.

--Be sure to ground human body and electric appliance during work.

--Avoid working in a dry environment to minimize the generations of static electricity.

--Static electricity may be generated when the protective film is fast peeled off.

9.2.7 When soldering the terminal of LCM, make certain the AC power source of soldering iron does not leak.

10.4.8 If the display surface becomes contaminated ,breathe on the surface and gently wipe it with a soft-dry- clean cloth .If it is heavily contaminated ,moisten cloth with the following solvent(ex:Ethyl alcohol).Solvents other than those above-mentioned may damage the polarizer(Especially ,do not use them .ex: Warter / Ketone)

9.3 Operation instructions

9.3.1 It is recommended to drive the LCD within the specified voltage limits, try to adjust the operating voltage for the optimal contrast, the color and contrast of LCD panel will varies at different temperature.

9.3.2 Response time is greatly delayed at low operating temperature range. However, this does not mean the LCD will be out of the order, It will recover when it returns to the specified temperature range.

9.3.3 If the display area is pushed hard during operation, the display will become abnormal.

9.3.4 Do not operate the LCD at the environments over the specified conditions, this may cause damage on the LCD and shorten the lifetime.

9.4 Storage instructions:

9.4.1 Store LCDs in a sealed polyethylene bag.

9.4.2 Store LCDs in a dark place, Do not expose to sunlight or fluorescent light. Keep the temperature between 0℃and 35℃.

9.4.3 Avoid the polarizer touch any other object, (It is recommended to store them in the container in which they were shipped.)