东莞奇创力显示器有限公司

Kitronix (Dong guan) Ltd.

FOR APPROVAL

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YOUR MODULE NO.: _____ OUR MODULE NO.: K430WQA-V3-F

YOUR SPEC NO.: _____ OUR FULL SPEC NO.: FS- K430WQA-V3-F -01

APPROVED BY		

APPROVED BY CUSTOMER

Kitronix (Dong Guan) Ltd.

No. A20, Luyi Road, Tianxin Country, Tangxia Town, Dongguan City, Guangdong Province.

K430WQA-V3-F

Product

Standard LCD Module
480 x RGB x 272 Dots
4.3” 16.7M colors TFT display
Wide temperature
With white LED backlight
With Touch Panel

Kitronix (Dong Guan) Ltd.
No. A20, Luyi Road, Tianxin Country, Tangxia Town, Dongguan City, Guangdong Province.

CONTENTS

1. Document revision history :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
01	2009.06.10	First Release.	Dai	

2. General Description

- 4.3”(diagonal), 480 x RGB x 272 dots, 16.7M colors, Normal white TN, TFT LCD module.
- Viewing Direction: 6 o’clock.
- Driving IC: SSD2123/SSD2127 or equivalent TFT controller/driver.
- RGB 24-bits
- With internal voltage booster.
- Logic voltage: 3.3V (typ.).

3. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter		Specifications	Unit
Outline dimensions		105.5(W) x 67.2(H) x 3.9(D) (Exclude FPC, cables of backlight)	mm
Color TFT 320xRGBx240	TP aiew area	96.70(W) x 55.50(H)	mm
	TP view area	98.70(W)x57.50(H)	mm
	LCD active area	95.04(W) x 53.856(H)	mm
	Display format	480 x RGB x 272	dots
	Color configuration	RGB Side-stripes	-
	Dot size	0. 198 (W) x 0.198(RGB)	mm
Weight		TBD	grams

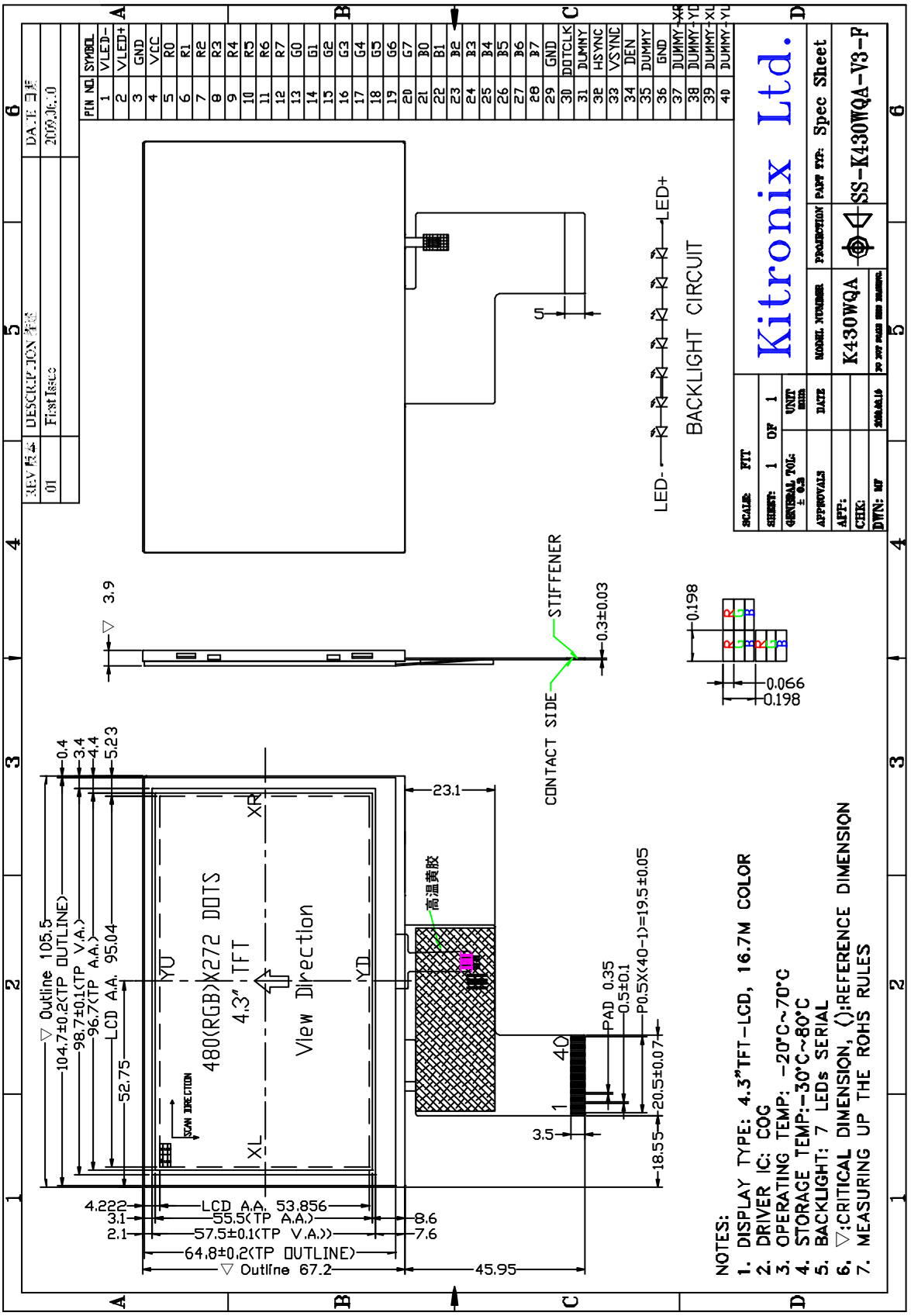


Figure 1: Outline Drawing

4. Interface signals

Table 2: Pin assignment

Pin No.	Symbol	Description
1	VLED-	Cathode of LED backlight.
2	VLED+	Anode of LED backlight (23.1V @ 20mA).
3	GND	Ground
4	VCC	Power supply (VCC = 3.3V).
5-12	[R0-R7]	RED Data Signal.
13-20	[G0-G7]	GREEN Data Signal.
21-28	[B0-B7]	BLUE Data Signal.
29	GND	Ground
30	DOTCLK	Pixel clock
31	DUMMY	NO CONNECT
32	HSYNC	Horizontal synchronizing signal.
33	VSYNC	Vertical synchronizing signal.
34	DEN	Data enable.
35	DUMMY	NO CONNECT
36	GND	Ground
37	XR	Terminal of touch panel
38	YD	
39	XL	
40	YU	

5. Absolute Maximum Ratings

5.1 Electrical Maximum Ratings – for IC Only

Table 3: Electrical Maximum Ratings – for IC

Parameter	Symbol	Min.	Max.	Unit	Note
Supply voltage	VCC	-0.3	5.0	V	1
LED forward current	If	--	30	mA	
LED reverse	Vr	--	5.0	V	

Note:

1.VCC, GND must be maintained.

2.The modules may be destroyed if they are used beyond the absolute maximum ratings.

5.2 Environmental Condition

Table 4

Item	Operating temperature (Topr)		Storage temperature (Tstg) (Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-20°C	+70°C	-30°C	+80°C	Dry
Humidity (Note 1)	80% max. RH for Ta ≤ 40°C < 50% RH for 40°C < Ta ≤ Maximum operating temperature				No condensation

Note 1: Product cannot sustain at extreme storage conditions for long time.

6. Electrical Specifications

Typical Electrical Characteristics

At Ta = 25 °C, VCC=IOVCC= 3.3V, GND=0V.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (logic)	VCC-GND		3	3.3	3.6	V
Input signal voltage	VIH		**0.8VCC**	-	VCC	V
	VIL		**0**	-	0.2VCC	V
Supply current (Logic & LCD)	ICC	VDD=3.3V	-	15	19	mA
Supply voltage of white LED backlight	VLED	Forward current =20 mA Number of LED dies = 7	-	23.1	24.1	V

7. Optical Characteristics

Table 7: Optical specifications

Items		Symbol	Condition	Specifications			Unit	Note
				Min.	Typ.	Max.		
Contrast Ratio		CR		400	500	-	-	
Response Time		T_R+T_F		-	35	-	ms	
Chromaticity	Red	X_R		(0.598)	(0.618)	(0.638)	-	
		Y_R		(0.298)	(0.318)	(0.338)	-	
	Green	X_G		(0.277)	(0.297)	(0.317)	-	
		Y_G		(0.525)	(0.545)	(0.565)	-	
	Blue	X_B		(0.114)	(0.134)	(0.154)	-	
		Y_B		(0.120)	(0.140)	(0.160)	-	
	White	X_W		(0.283)	(0.303)	(0.323)	-	
		Y_W		(0.320)	(0.340)	(0.360)	-	
Viewing angle	Hor.	$\phi1+\phi2$	Center CR=10	100	110	-	deg.	
	Ver.	$\theta1+\theta2$		120	130	-		
NTSC ratio					51.7		%	

Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

L63: Luminance of gray level 63

L0: Luminance of gray level 0

CR = CR (10)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (TR, TF):

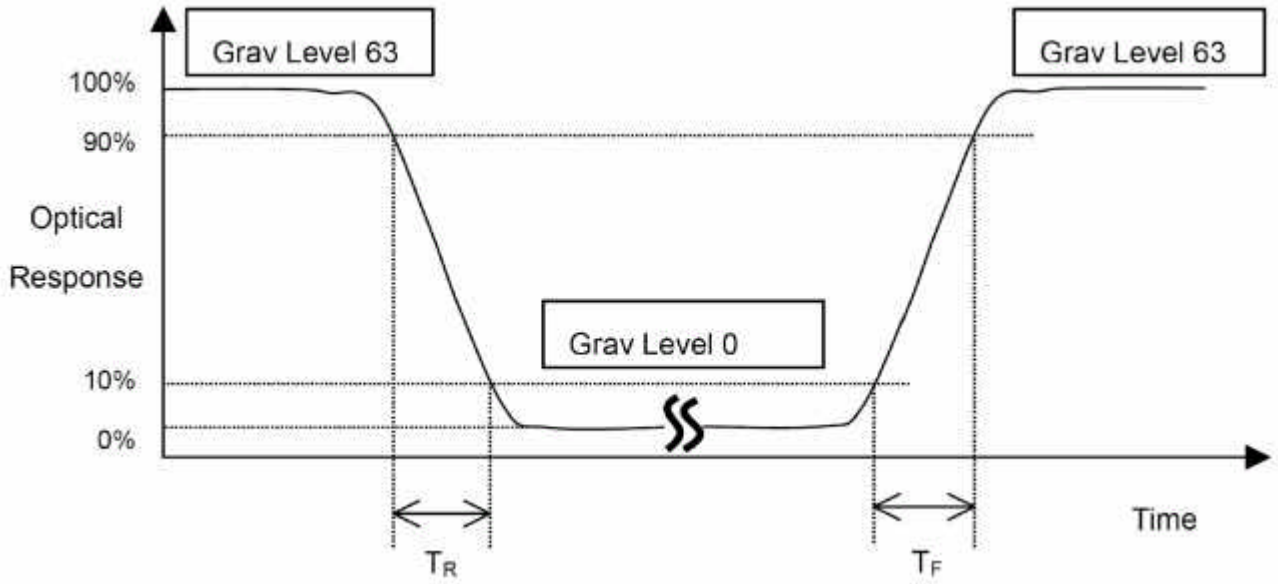


Figure 3

Note 3: Viewing Angle

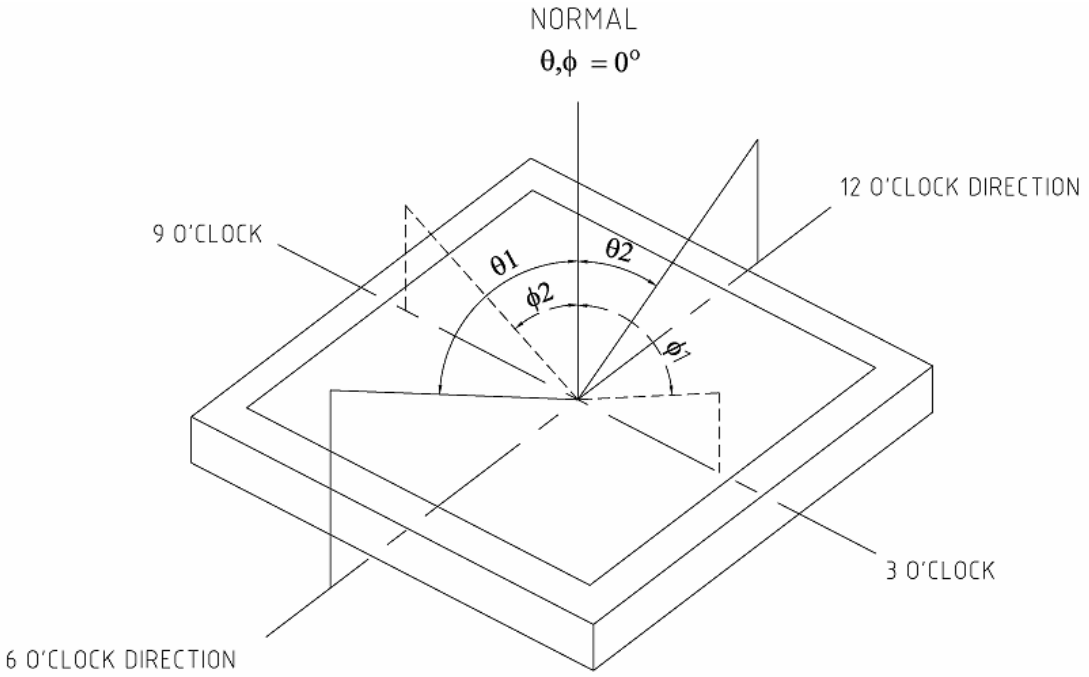


Figure 4

The above "Viewing Angle" is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 6 O'clock. Module maker can increase the "Viewing Angle" by applying Wide View Film.

Note 4: Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.

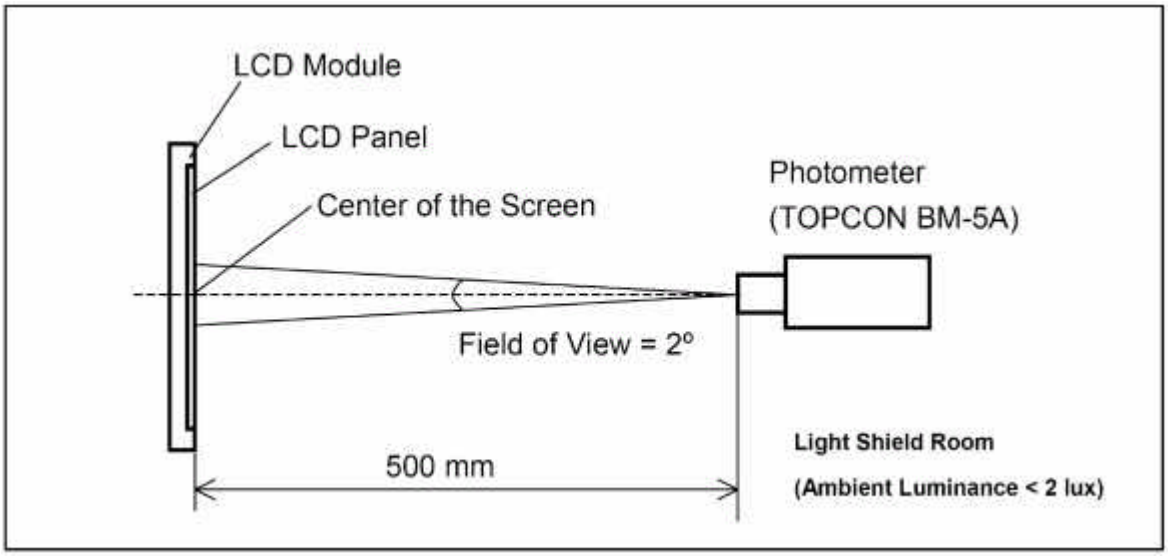
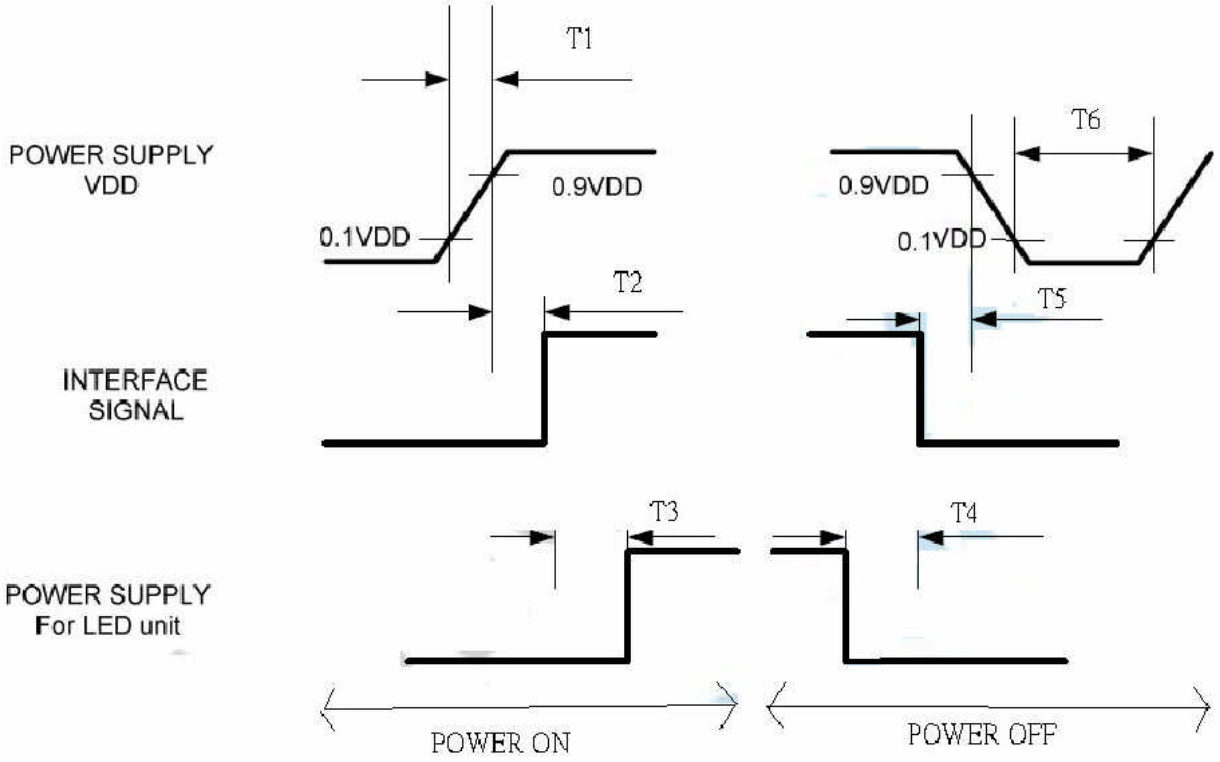


Figure 5

8. AC Characteristics

8.1 Power on/off sequence

Description	Symbol	Parameter
VDD Power ON	T1	≤10 mS
Interface signal start	T2	≥100 mS
LED power ON	T3	≥200 mS
LED power OFF	T4	≥200 mS
Interface signal end	T5	≥100 mS
VDD power OFF	T6	≥1 S



8.2 RGB 24-bit timing (VDD=3.3V)

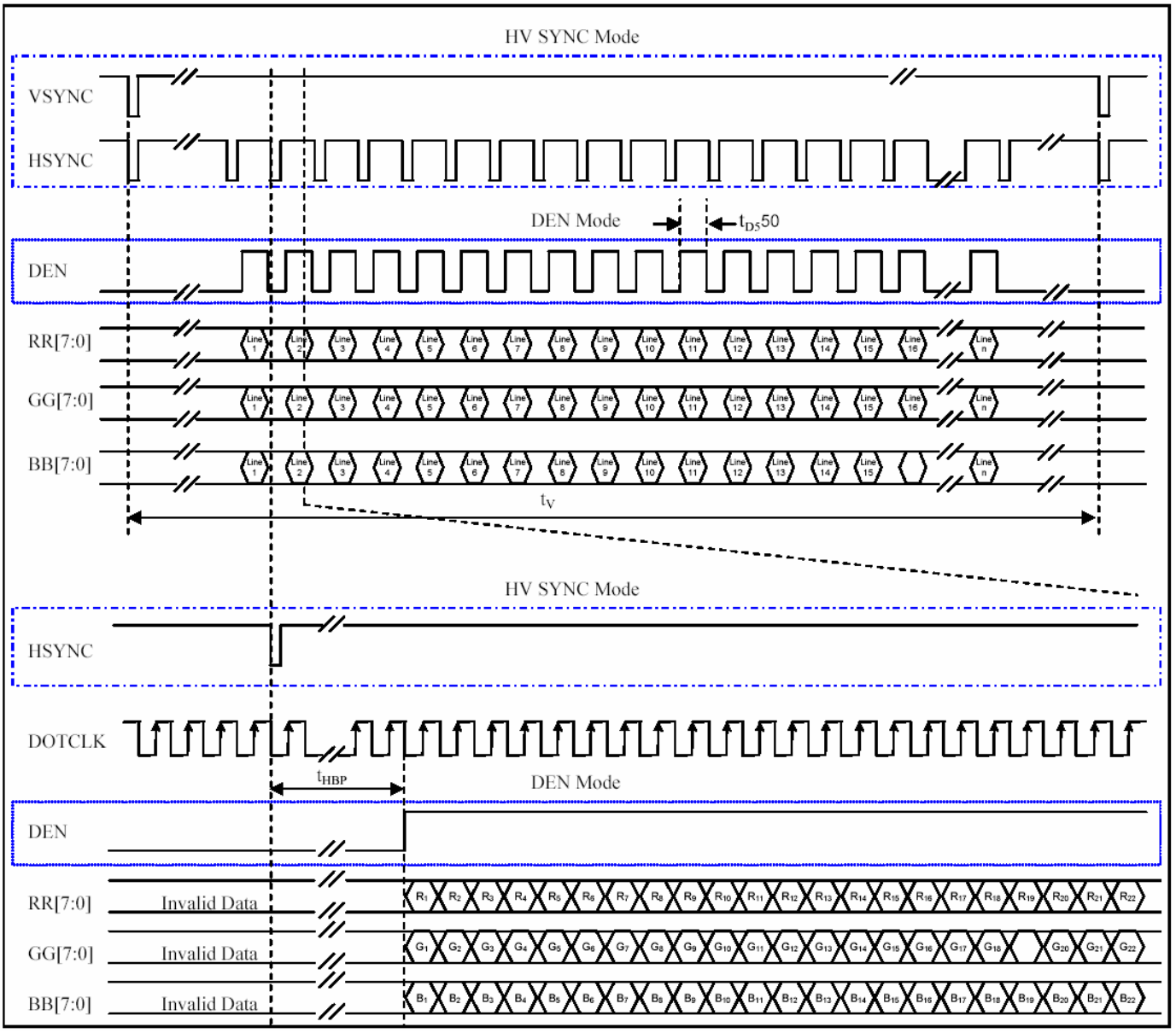
8.2.1 HV SYNC mode timing

Characteristics		Symbol	HV SYNC Mode	Units
Dotclk Frequency		$1/t_{DOTCLK}$	8.54	MHz
Horizontal	One Line Period	t_H	512	t_{DOTCLK}
	Active Data Period	t_{data}	480	t_{DOTCLK}
	Horizontal Back Porch	t_{HBP}	16	t_{DOTCLK}
	Horizontal Front Porch	t_{HFP}	16	t_{DOTCLK}
Vertical	One Field Period	t_V	278	t_H
	Active Line period	t_{AL}	272	t_H
	Vertical Back Porch	t_{VBP}	4	t_H
	Vertical Front Porch	t_{VFP}	2	t_H

8.2.2 DEN mode timing

Characteristics		Symbol	DEN Mode	Units
Serial Clock Frequency		$1/t_{DOTCLK}$	8.54	MHz
Horizontal	One Line Period	t_H	512	t_{DOTCLK}
	Active Data Period	t_{data}	480	t_{DOTCLK}
	Data Enable Period	t_{DEN}	480	t_{DOTCLK}
Vertical	One Field Period	t_V	278	t_H
	Active Line period	t_{AL}	272	t_H

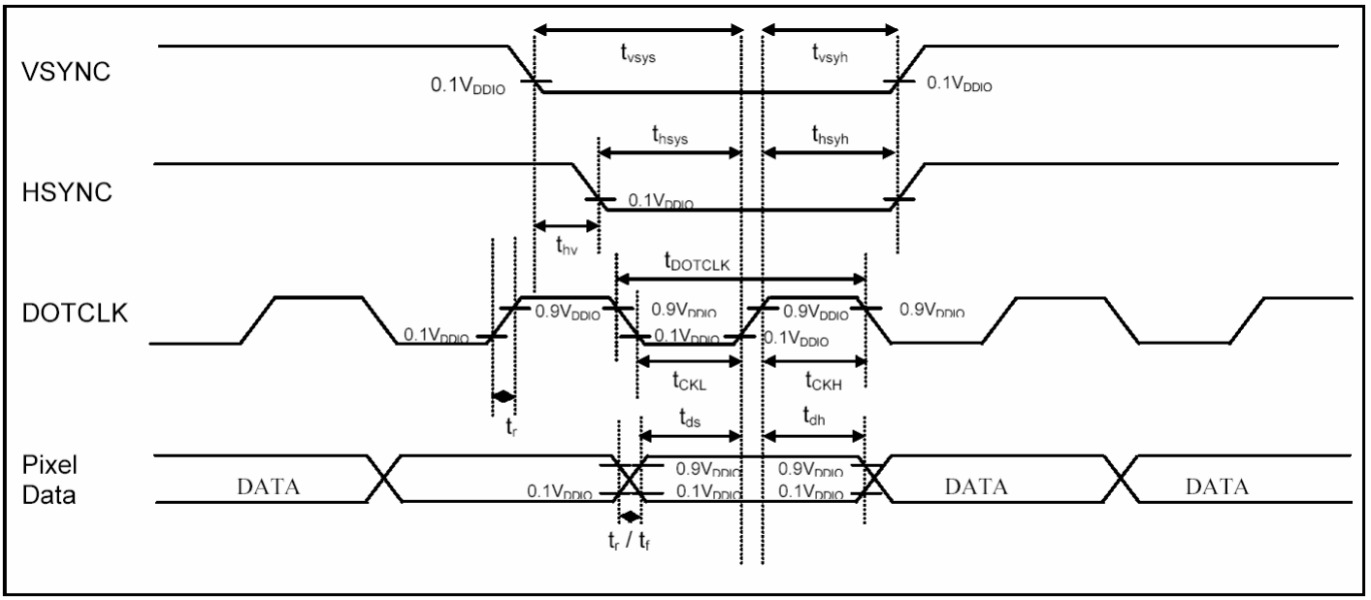
8.2.3 RGB 24-bit timing diagram



8.2.4 Pixel clock timing

Characteristics		Symbol	Min	Typ	Max	Units
DOTCLK Frequency	24 bits parallel	f_{DOTCLK}	-	-	14	MHz
	8 bits serial		-	-	-	
DOTCLK Period	24 bits parallel	t_{DOTCLK}	71.4	-	-	nSec
	8 bits serial		-	-	-	
Pixel Clock Period	24 bits parallel	t_{PIXCLK}	-	1	-	t_{DOTCLK}
	8 bits serial		-	3	-	
Pixel Clock Freq.	24 bits parallel	f_{PIXCLK}	-	-	14	MHz
	8 bits serial					
Vertical Sync Setup Time		t_{vsys}	5	-	-	nSec
Vertical Sync Hold Time		t_{vsyh}	5	-	-	nSec
Horizontal Sync Setup Time		t_{hsys}	5	-	-	nSec
Horizontal Sync Hold Time		t_{hsyh}	5	-	-	nSec
Phase difference of Sync Signal Falling Edge		t_{hv}	0	-	480	t_{DOTCLK}
DOTCLK Low Period		t_{CKL}	18	-	-	nSec
DOTCLK High Period		t_{CKH}	18	-	-	nSec
Data Setup Time		t_{ds}	10	-	-	nSec
Data hold Time		t_{dh}	15	-	-	nSec
Reset pulse width		t_{RES}	10	-	-	uSec
Rise / Fall time		t_r / t_f	5	-	25	nSec

8.2.4 Pixel clock timing diagram



9. Reliability Test Item

Test Item	Sample Type	Test Condition	Test result determinant gist
High temperature storage	Normal temperature	70±3℃;96H	the inspection of appearance and function character.
	Wide temperature	80±3℃;96H	
Low temperature storage	Normal temperature	-20±3℃;120H	
	Wide temperature	-30±3℃;120H	
High temperature /humidity storage	Normal temperature	50℃±3℃,90%±3%RH;96H	
	Wide temperature	60℃±3℃,90%±3%RH;96H	
High temperature operation	Normal temperature	60±3℃;96H	no objection of the function character; no fatal objection of the appearance.
	Wide temperature	70±3℃;96H	
Low temperature operation	Normal temperature	0±3℃;96H	
	Wide temperature	-20±3℃;96H	
High temperature /humidity operation	Normal temperature	40℃±3℃,90%±3%RH;96H	
	Wide temperature	50℃±3℃,90%±3%RH;96H	
Temperature Shock	Normal temperature	-20±3℃,30min? 70±3℃,30 min;10cycle	inspect the objections appearance、function & the whole structure
	Wide temperature	-30±3℃,30min 80±3,30min;10cycle	The inspection of appearance、function & the whole structure

10. Suggestions for using LCD modules

10.1 Handling of LCM

1. The LCD screen is made of glass. Don't give excessive external shock, or drop from a high place.
2. If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
3. Don't apply excessive force on the surface of the LCM.
4. If the surface is contaminated ,clean it with soft cloth. If the LCM is severely contaminated , use Isopropyl alcohol/Ethyl alcohol to clean. Other solvents may damage the polarizer . The following solvents is especially prohibited: water , ketone Aromatic solvents etc.
5. Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
6. Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
7. Don’t disassemble the LCM.
8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
    - Be sure to ground the body when handling the LCD modules.
    - Tools required for assembling, such as soldering irons, must be properly grounded.
    - To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.
    - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
9. Do not alter, modify or change the the shape of the tab on the metal frame.
10. Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.

11. Do not damage or modify the pattern writing on the printed circuit board.
12. Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector
13. Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
14. Do not drop, bend or twist LCM.

10.2 Storage

1. Store in an ambient temperature of 5 to 45 °C, and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
2. Storage in a clean environment, free from dust, active gas, and solvent.
3. Store in antistatic container.

11. Inspection Standard

This specification is made to be used as the standard acceptance/rejection criteria for Color mobile phone LCM with touch pannel.

11.1 Sample plan and Inspection condition

11.1.1 Sample plan

Sampling plan according to MIL-STD-105E , normal level 2 and based on:

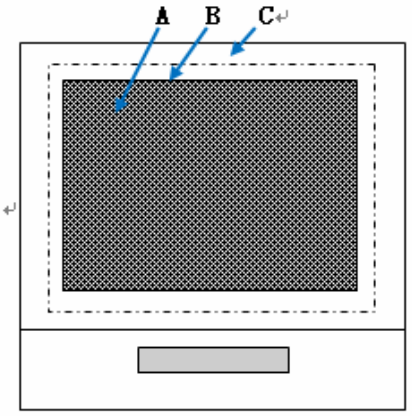
Major defect: AQL 0.65;

Minor defect: AQL 1.5.

11.1.2 Inspection condition

Viewing distance for cosmetic inspection is about 30cm with bare eyes, and under an environment of 20~40W light intensity, all directions for inspecting the sample should be within 45 against perpendicular line.

11.2 Definition of inspection zone in LCD



Inspection zones in an LCD

Zone A: character/Digit area;

Zone B: viewing area except Zone A (ZoneA+ZoneB=minimum Viewing area);

Zone C: Outside viewing area (invisible area after assembly in customer's product);

Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for quality and assembly of customer's product. Defects are classified as major defects and minor defects according to the degree of defectiveness defined herein.

11.3 Major defects and Minor defects

11.3.1 Major defects

A major defect is a defect that is likely to result in failure, or to reduce the usability of the product for its intended purpose.

11.3.1.1 Abnormal operation: modules cannot display normally;

11.3.1.2 Line defect;

11.3.1.3 There is serious distortion or sharp burr on mechanical housing;

11.3.1.4 Glass breakage.

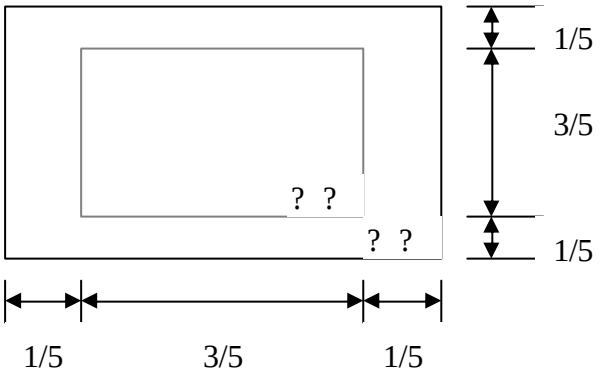
11.3.2 Minor defects:

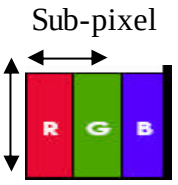
A minor defect is a defect that is not likely to reduce the usability of the product for its intended purpose.

11.3.2.1 Dot defect:

11.3.2.1.1 Inspection pattern : Full white, full black, red, green and blue screens;

11.3.2.1.2 Criteria :(acceptable);





Note: 1. Dot defect is defined as the defective area of the dot area is larger than 50% of the dot area . And the bright dot defect must be visible through 5% ND filter.

2. Except for the allowed numbers of adjacent dots, the distance between dot defects should be more than 3mm apart.

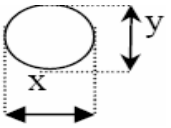
11.3.2.1.3 The definitions of the inner display area and outer display area.

11.4 Inspection standards table:

11.4.1 Major defect

Item No.	Items to be	Inspection Standard	Classification of defects
11.4.1.1	All functional defects	1) No display 2) Display abnormally 3) Missing vertical/horizontal segment 4) Short circuit 5) Back-light no lighting, flickering and abnormal lighting.	Major
11.4.1.2	Missing	Missing component	
11.4.1.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.	
11.4.1.4	linearity	No more than 1.5%	

11.4.2 Cosmetic Defect (spot defect)

<table>
<tr><th>Item No</th><th>Itemsto be</th><th>Inspection Standard</th><th>Classification of defects</th></tr>
<tr><td>11.4.2.1</td><td>Clear Spots
Black and white
Spot defect
Pinhole,
Foreign Particle,
polarizer Dirt</td><td>For dark/white spot, sizeFis defined as F=(x +y)/2 
<table><tr><th>Zone
Size(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><td></td><td>A</td><td>B</td><td>C</td></tr><tr><td>F =0.1</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.10< F =0.15</td><td colspan="2">2</td></tr><tr><td>0.15< F =0.20</td><td colspan="2">1</td></tr><tr><td>F > 0.20</td><td colspan="2">0</td></tr></table></td><td>Minor</td></tr>
<tr><td>11.4.2.2</td><td>Clear Spots
TP Dirt</td><td><table><tr><th>Zone
Size(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><td></td><td>A</td><td>B</td><td>C</td></tr><tr><td>F =0.1</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.10< F =0.15</td><td colspan="2">2</td></tr><tr><td>0.15< F =0.25</td><td colspan="2">1</td></tr><tr><td>F > 0.25</td><td colspan="2">0</td></tr></table></td><td>Minor</td></tr>
<tr><td>11.4.2.3</td><td>Dim Spots
Circle shaped and dim edged defects</td><td><table><tr><th>Zone
Size(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><td></td><td>A</td><td>B</td><td>C</td></tr><tr><td>F =0.2</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.20< F =0.4</td><td colspan="2">2</td></tr><tr><td>0.4< F =0.6</td><td colspan="2">1</td></tr><tr><td>F > 0.6</td><td colspan="2">0</td></tr></table></td><td>Minor</td></tr>
<tr><td>11.4.2.4</td><td>Dot defect</td><td>dot =sub-pixel
<table><tr><th></th><th colspan="2">Acceptable Qty</th></tr><tr><td></td><td>I</td><td>II</td></tr><tr><td>Bright dot</td><td>0</td><td>2</td></tr><tr><td>Dark dot</td><td>1</td><td>2</td></tr></table>The distance of two point >5mm</td><td>Minor</td></tr>
</table>

11.4.3 Cosmetic Defect (linear defect)

<table>
<tr><th>Item No</th><th>Items to be</th><th>Inspection Standard</th><th>Classification of defects</th></tr>
<tr><td>11.4.3.1</td><td>Line defect
Black line,
White line,
Foreign material on polarizer</td><td><table><tr><th colspan="2">Size(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><td rowspan="2">L(Length)</td><td rowspan="2">W(Width)</td><td colspan="3">zone</td></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>Ignore</td><td>W=0.02</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>L=3.0</td><td>0.02< W=0.03</td><td colspan="2">2</td></tr><tr><td>L=2.0</td><td>0.03< W=0.05</td><td colspan="2">1</td></tr><tr><td></td><td>W> 0.05</td><td colspan="2">Define as spot defect</td></tr></table></td><td>Minor</td></tr>
</table>

11.4.3.2 Foreign Material on TP film — Minor

The line can be seen after mobile phone in the operating condition:

Size(mm)		Acceptable Qty		
L(Length)	W(Width)	zone		
		A	B	C
Ignore	W=0.03	Ignore		Ignore
L=3.0	0.03＜W=0.05	3		
	W> 0.05	Define as spot defect		

11.4.3.3 **Dim line defect** Polarizer &BL scratch TP film scratch — Minor

If the scratch can be seen after mobile phone cover assembling or in the operating condition, judge by the line defect of 11.4.3.1. If the scratch can be seen only in non-operating condition or some special angle, judge by the following.

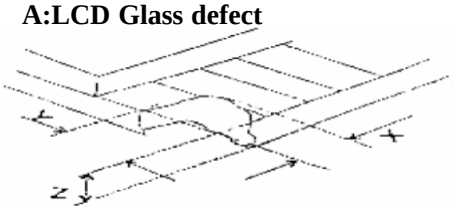
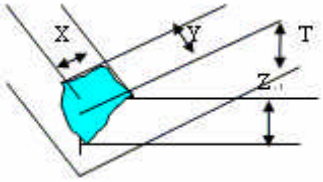
Size(mm)		Acceptable Qty		
L(Length)	W(Width)	zone		
		A	B	C
Ignore	W=0.02	Ignore		Ignore
L=3.0	0.02< W=0.03	2		
L=2.0	0.03< W=0.05	1		
	W> 0.05	Define as spot defect		

11.4.3.4 Polarize Air bubble — Minor

Air bubbles between glass & polarizer

	Acceptable Qty		
	A	B	C
F=0.2	Ignore		Ignore
0.20< F=0.3	2		
0.3< F=0.5	1		
F> 0.5	0		

11.4.4 Chipping Defect

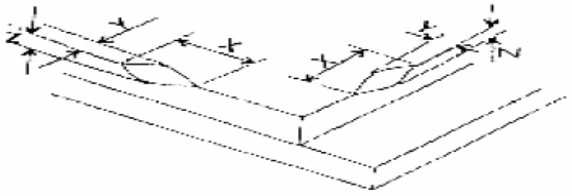
Item No	Items to be	Inspection Standard	Classification of defects
11.4.4.1	Glass defect	Chips on corner **A:LCD Glass defect**  Notes: S=contact pad length Chips on the corner of terminal shall not be allowed to extend into the ITO pad or expose perimeter seal. **B:TP Glass defect** 	Minor

X	Y	Z
=0.2	=S	Disregard

X	Y	Z
=3.0	=3.0	Disregard

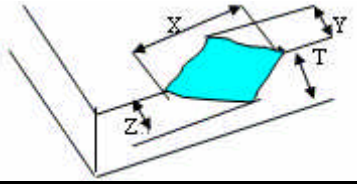
Usual surface cracks

A:LCD Glass defect



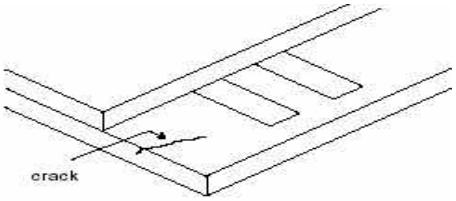
X	Y	Z
=3.0	<Inner border line of the seal	Disregard

B:TP Glass defect



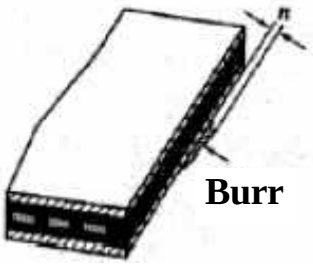
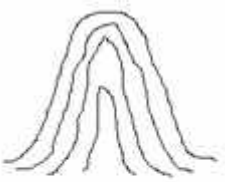
X	Y	Z
=6.0	=2.0	Disregard

Crack: Cracks tend to break are not allowed.



11.4.5 Parts Defect

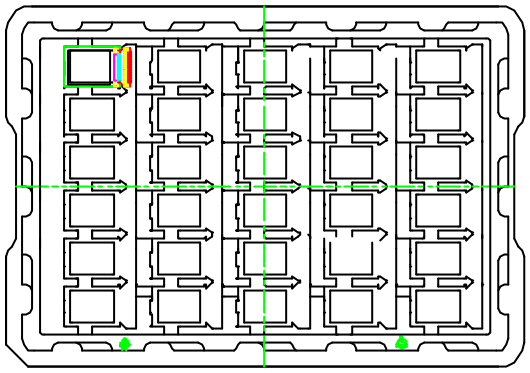
Item No	Items to be	Inspection Standard	Classification of defects
11.4.5.1	Parts contra position	1、Not allow IC and FPC/heat-seal lead width is more than 50% beyond lead pattern. 2、Not allow chip or solder component is off center more than 50% of the pad outline.	Major
11.4.5.2	SMT	According to the <Acceptability of electronic assemblies>IPC-A-610C class 2 standard. Component missing or function defect are Major defect, the others are Minor defect.	Major
11.4.5.3	TP Defect	1、 Pattern font： Pattern fonts are clear and symmetrical, pattern fonts filter lightly are allowed; The fort line is not allow to thinner or thicker than 1/3 of normal size, and swing is not more than 0.1mm. the line is smooth and not broken.  **Pattern font** 2、The wing forward in the side of Visual Area： The length of wing forward inside of the Visual Area: n=0.2mm；Not excess 3 point, and the distance D=20mm。	Major

		  **Burr** 3、Film impression: With operation, must be invisibility. 4、Touch panel knob：if writing function normally, it could be allowed.  **TP knob** 5、 Newton ring Without operation, the color circle of Regularity or Non-regularity from the normal or slope angle of view. 1、Regularity： The area of the newton ring is less than 1/3 area of the touch panel; and no character affected and line distorted after touch panel lightening. It's ok. 2、 Non-regularity ： The area of the Newton ring is less than the 1/2 area of touch panel with lightening. And no character affected and line   **Regular** **Irregular**	
11.4.5.4	Backlight elements	1 Illumination source flickers when lit. 2 Spots or scratches that appear when lit must be judged using LCD spot, lines and contamination standards. 3 Backlight doesn't light or color is wrong	Major
11.4.5.5	Soldering	1 No unmelted solder paste may be present on the FPC 2 No cold solder joints, missing solder connections, oxidation or icicle. 3 No short circuits in components on FPC	Major

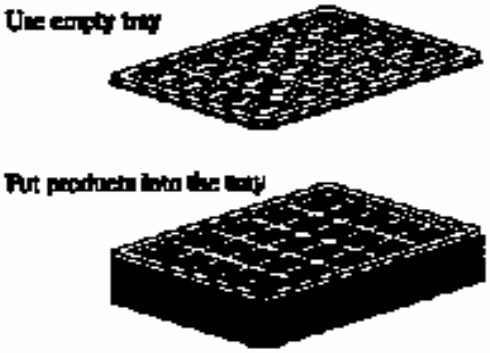
12. Packing (Reference only)

Packing Method

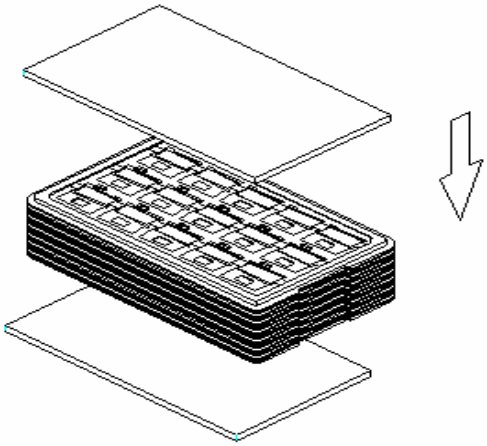
(1)



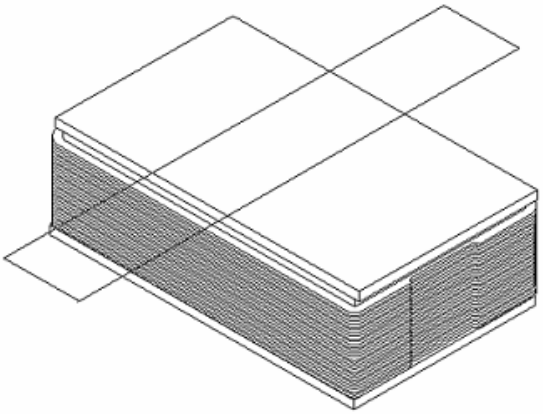
(2)



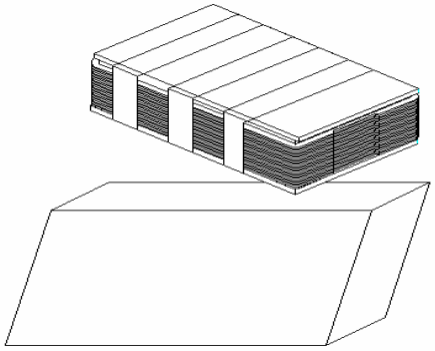
(3)



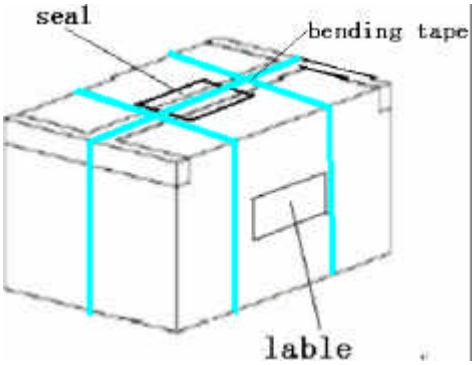
(4)



(5)



(6)



1. Put module into tray cavity :
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above:
4. Fix the cardboard to the tray stack with adhesive tape:
5. Put the tray stack into carton.
6. Carton sealing with adhesive tape.

- END -