

SPECIFICATION

OF

LIQUID CRYSTAL DISPLAY MODULE



CUSTOMER : URT-STD

Model No. : UMSH-8013MD-1T

Model version : 5

Document Revision : 7

CUSTOMER APPROVED SIGNATURE			

This specification need to be signed by purchaser or customer as a specification of products production and delivery from URT. Without signature of this specification , any purchase order for this model no. will be treated and considered that this specification is automatically acknowledged and accepted by purchaser or customer.

This document has been signed by Digital Signature Approval System

Revision record

Document Revision	Model No. Version No.	Description	Revision by
0	UMSH-8013MC-T Version No. 0		W.L.Tsai Nick Liu 12-Sep-2006
1	UMSH-8013MD-T Version No. 0	1.Modify backlight from CCFL to LED 2.Modify module number fromUMSH-8013MC-T to UMSH-8013MD-T	W.L.Tsai Nick Liu 12-Sep-2006
2	UMSH-8013MD-1T Version No. 0	1.Add Timing controller ,Vcom and DC/DC Converter 2.Modify module number from UMSH-8013MD-T toUMSH-8013MD-1T	W.L.Tsai Nick Liu 12-Sep-2006
3	UMSH-8013MC-1T Version No. 1	1.3 Outline dimension add suggested connector	W.L.Tsai Nick Liu 13-Sep-2006
4	UMSH-8013MC-1T Version No. 2	1.Add AC Characteristic and DC Characteristic	W.L.Tsai Nick Liu 1-Jun-2007
5	UMSH-8013MC-1T Version No. 3	1.Modify block diagram and interface pin	W.L.Tsai Nick Liu 20-Jun-2007
6	UMSH-8013MC-1T Version No. 4	1.Modify the Mechanical specifications.	Flyon Liao Jeffry Chen 15-Oct-2007
7	UMSH-8013MC-1T Version No. 5	1.Modify the backlight Specification	Jeffry Chen Flyon Liao 22-Oct-2007
Revision 7 ; UMSH-8013MD-1T Ver. 5 ; October-22-2007			Page: 2

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1. BASIC SPECIFICATION

1.1 Mechanical specifications

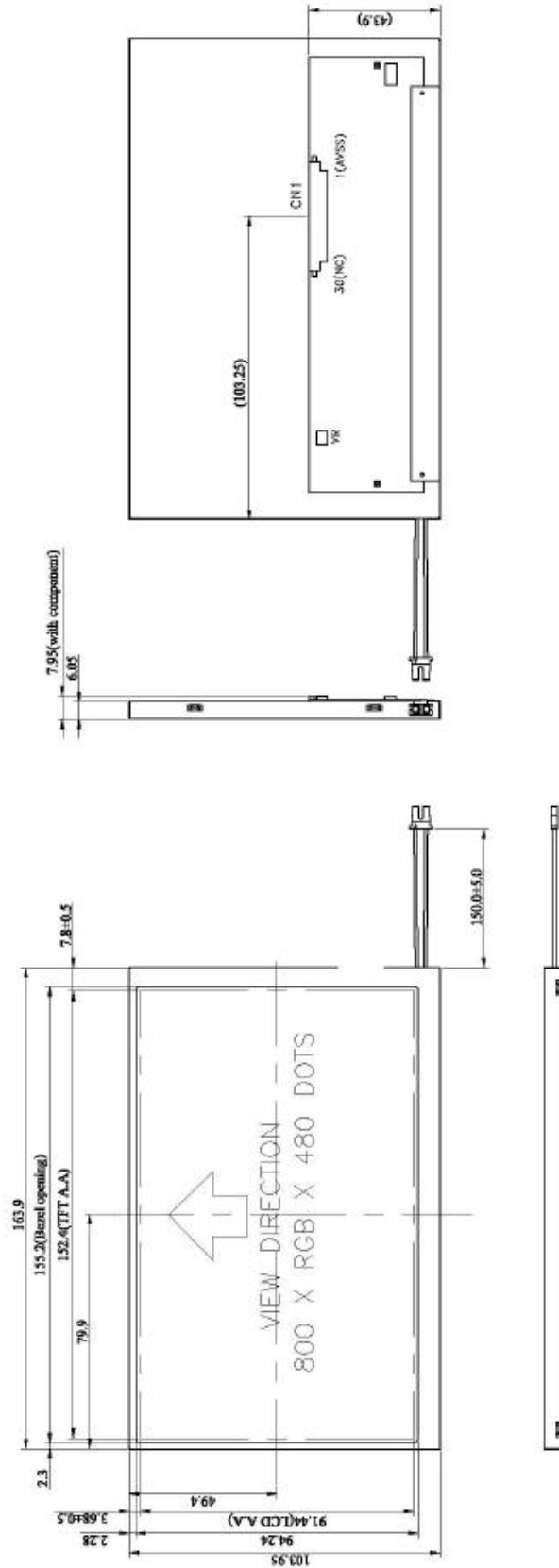
Items	Nominal Dimension	Unit
Active screen size	7" diagonal	-
Dot Matrix	800*RBG*480 Dots	Pixel
Module Size (W x H x T)	163.9 x 103.95 x 7.95	mm.
Viewing Area (W x H)	155.2 x 94.24	mm.
Active Area (W x H)	152.4 x 91.44	mm.
Pixel Pitch (W×H)	0.1905x0.1905	mm.
Color depth	262K	color
Electrical Interface(data)	LVDS	-
Driving IC Package	COG	-

1.2 Display specification

Display	Descriptions	Note
LCD Type	a-Si TFT	-
LCD Mode	TN / Normal white	-
Polarizer Mode	Transmissive	-
Polarizer Surface	Normal	-
Pixel arrangement	RGB-stripe	-
Backlight Type	LED	-
Viewing Direction	6 O'clock Direction	-

Color tone is slightly changed by temperature and driving voltage.

1.3 Outline dimension



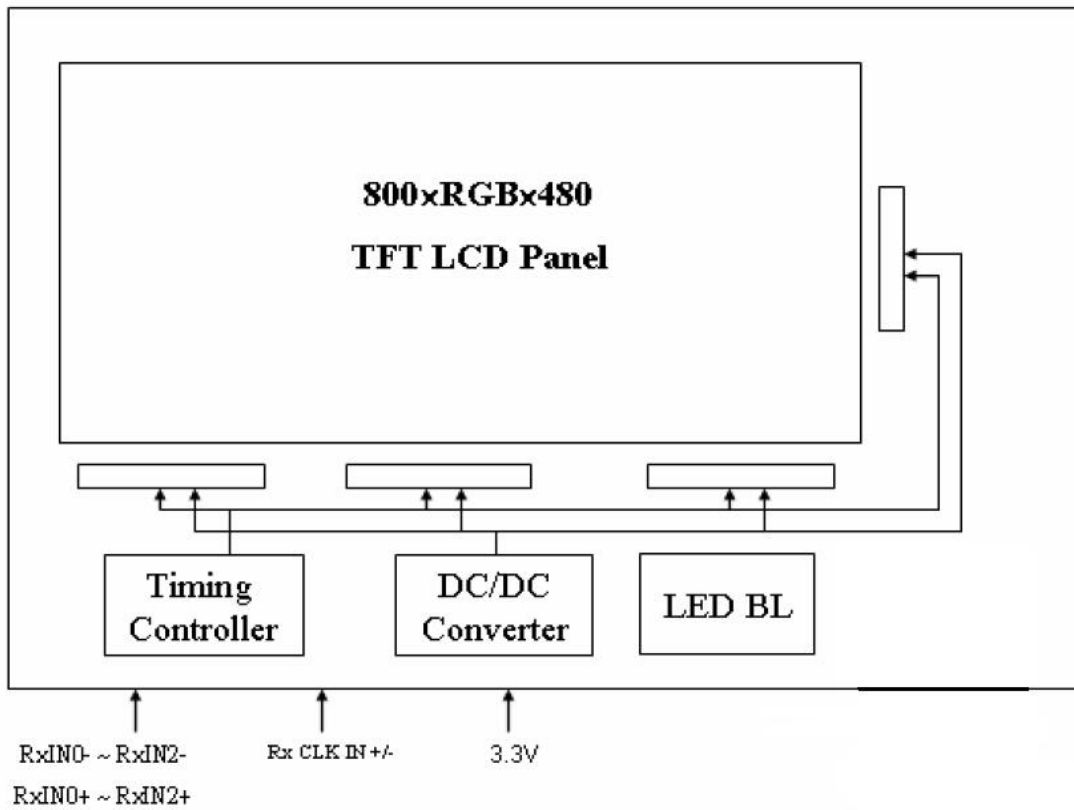
NOTE:

1. LCD : TFT TYPE, TRANSMISSIVE MODE, NORMAL WHITE
2. SURFACE TREATMENT : Anti-Glare
3. VIEWING DIRECTION : 6 O'CLOCK
4. Top : -30°C~85°C, Tst : -40°C~95°C
5. LUMINANCE : 450 cd/m² (TYP)
6. TOLERANCE FOR NOT ASSIGNED : ±0.3 mm
7. RoHS-COMPLIANT
8. BACKLIGHT : LED
9. TFT PIXEL SIZE : 0.1905 X 0.1905 mm
10. CN1 : STARCONN 093F30-B0B01A

11. BACKLIGHT CONNECTOR JST BHSR-02VS-1(N)

12. BACKLIGHT RECOMMENDED MATING CONNECTOR: JST SM02B-BHSS-1-TB or BHSMR-02VS

1.4 Block diagram:



1.5 Interface pin :

Pin No.	Pin Symbol	Description
1	AVSS	Power Ground
2~3	VCC	Power Supply for Digital circuit
4~6	NC	NO connection
7	AVSS	Power Ground
8	RXIN0-	Negative LVDS differential data inputs
9	RXIN0+	Positive LVDS differential data inputs
10	AVSS	Power Ground
11	RXIN1-	Negative LVDS differential data inputs
12	RXIN1+	Positive LVDS differential data inputs
13	AVSS	Power Ground
14	RXIN2-	Negative LVDS differential data inputs
15	RXIN2+	Positive LVDS differential data inputs
16	AVSS	Power Ground
17	RXCLK-	Negative LVDS differential clock inputs
18	RXCLK+	Positive LVDS differential clock inputs
19	AVSS	Power Ground
20~21	NC	NO connection
22	AVSS	Power Ground
23~27	NC	NO connection
28	AVSS	Power Ground
29~30	NC	NO connection

2. ELECTRICAL CHARACTERISTICS

2.1 Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Note
Input Voltage	Vcc	-0.3	4.0	V	
Signal Input Voltage	RxIN0+ ~ RxIN2+ RxIN0- ~ RxIN2- Rx CLK IN +/-	-0.3	Vcc+0.3	V	
Static Electricity	VESDc	-200	+200	V	【Note1】
	VESDm	-15K	+15K	V	
ICC Rush Current	IRUSH	-	1	A	【Note2】

【Note1】

Test Condition: IEC 61000-4-2 ,

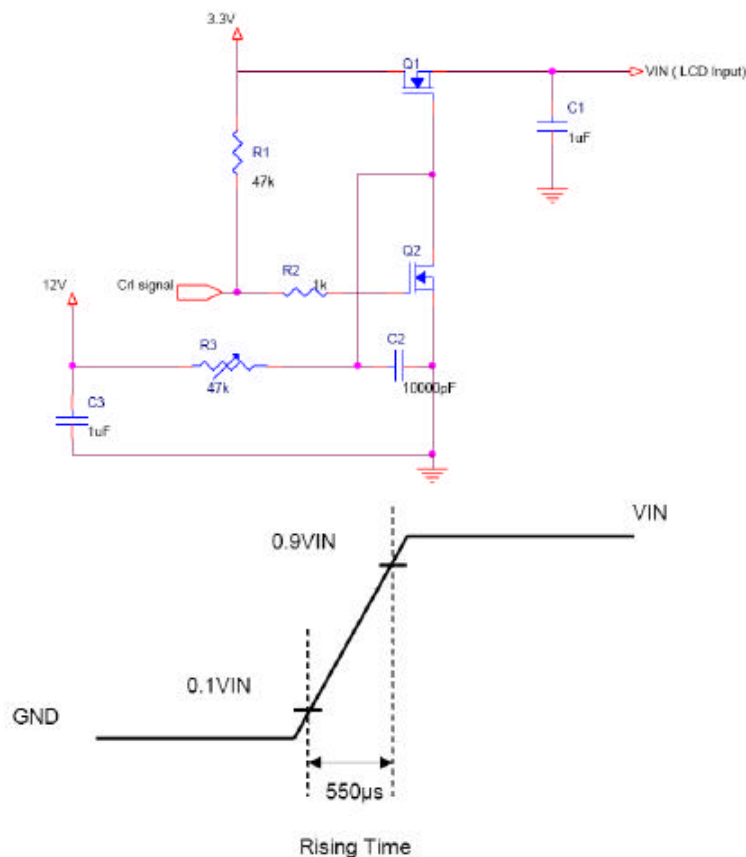
VESDc : Contact discharge to input connector

VESDm : Discontact discharge to module

【Note2】

Control signal:High(+3.3V)→Low(GND)

Supply Voltage of rising time should be from R3 and C2 tune to 550 us.



2.2 DC Characteristics

2.2.1 TFT LCD Power Voltage:

Ta=25°C

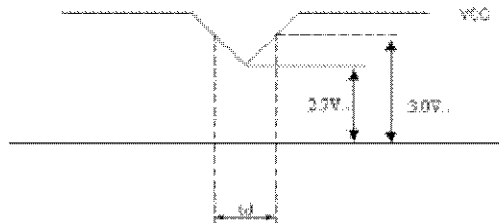
Item	Symbol	Min.	Typ	Max.	Unit	Note	
Power Supply Voltage For LCD	VCC	3.0	3.3	3.6	V	【Note1】	
Logic Input Voltage (LVDS:IN+,IN-)	Input Voltage	VIN	0	-	VCC	【Note2】	
	Common Mode Voltage	VCM	1.08	1.2	1.32	V	【Note2】
	Differential Input Voltage	VID	250	350	450	mV	【Note2】
	Threshold Voltage(high)	VTH	-	-	100	mV	【Note2】 When VCM=+1.2V
	Threshold Voltage(low)	VTL	-100	-	-	mV	【Note2】

Remarks :

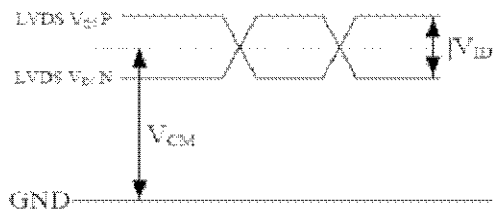
【Note1】

VCC -dip condition:

- 1) When $2.7V \leq VCC < 3.0V$, $td \leq 10ms$.
- 2) $VCC > 3.0V$, VCC-dip condition should be same as VCC-turn-on condition.



【Note2】 LVDS signal



$$|VID| = |VTH - VTL|$$

$$VCM = (VTH + VTL)/2$$

2-2.2 TFT LCD Current Consumption:

Item	Symbol	Min	Type	Max	Unit	Notes
LCD power current	ICC	--	150	200	mA	【Note1】

【Note1】

Typical: Under 64 gray pattern
Maximum: Under black pattern



(a)64 Gray Pattern



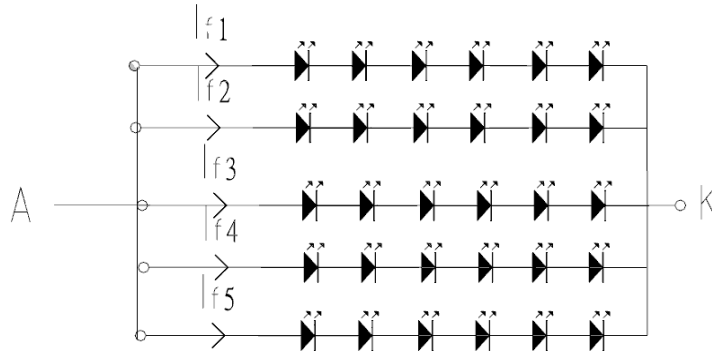
(b)Black Pattern

2-3 Back-light only Specification

Ta=25°C

Item	Symbol	Min.	Typ	Max.	Unit	Note
LED current	IL	--	100	--	mA	【Note1,2】
LED voltage	VL	--	19.5	(21.3)	V	【Note1,2】
Power consumption	WL	--	1.95	(2.13)	W	【Note1,2】

【Note1】 LED B/L circuit · If=100mA · A : Anode · K : Cathode ·

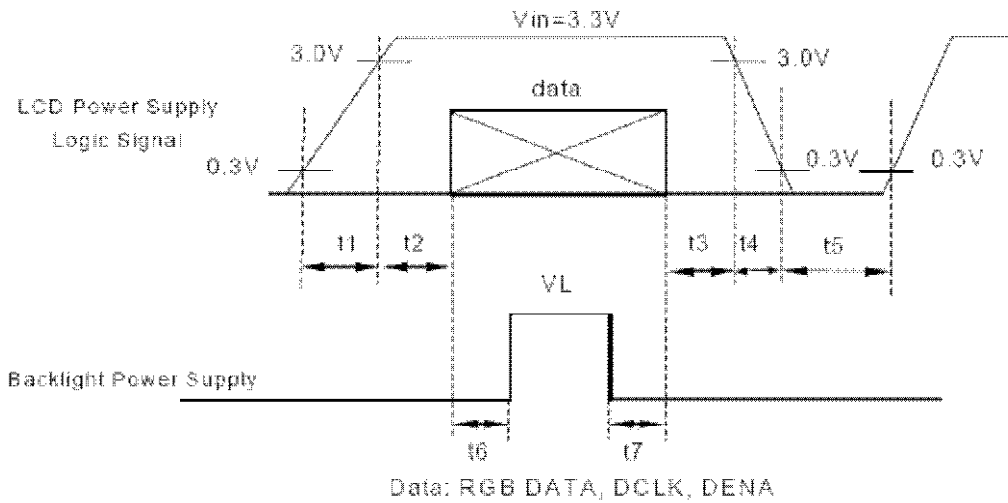


【Note2】 We suggest using the constant current control, IL=100mA, to avoid the leakage light and brightness quality issue.

2.4 AC Characteristics

2-4.1 Power · Signal sequence

$$\begin{array}{ll}
 t1 \leq 10\text{ms} & 1 \text{ sec} \leq t5 \\
 50\text{ms} \leq t2 & 200\text{ms} \leq t6 \\
 0 < t3 \leq 50\text{ms} & 200\text{ms} \leq t7 \\
 0 < t4 \leq 10\text{ms} &
 \end{array}$$



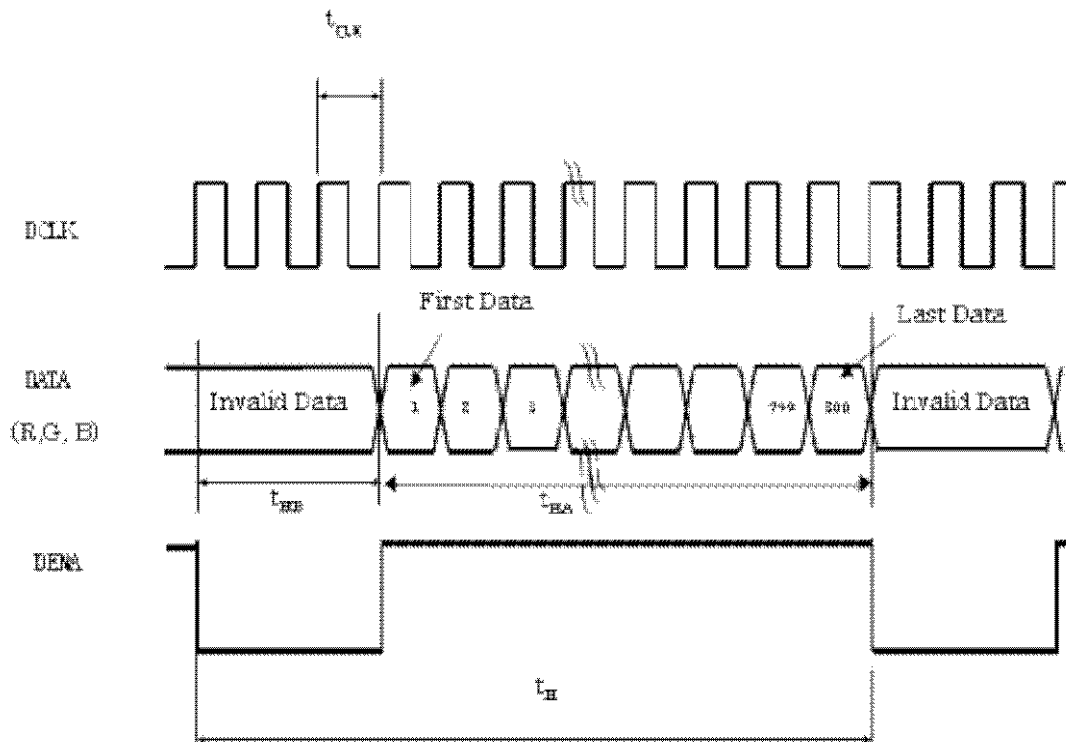
2-4-2 INPUT SIGNAL(DE ONLY MODE)

2-4-2 .1 Timing Specification

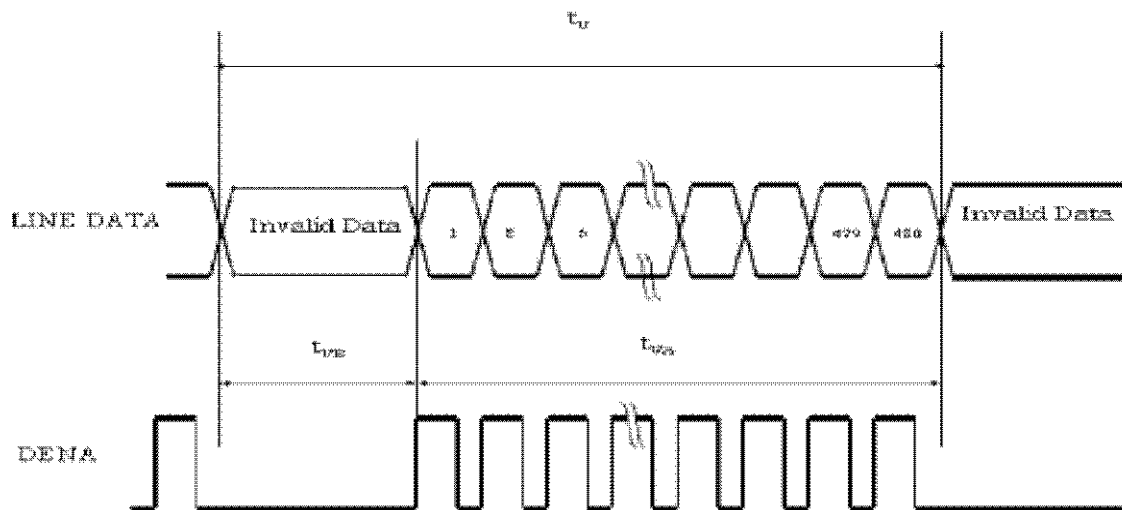
Item		Symbol	Min	Typ	Max	Unit	
CLK Frequency		fCLKin	25	27	32	MHz	
DENA	Horizontal	Horizontal total Time	t_H	850	900	950	tCLK
		Horizontal effective Time	t_{HA}	800	800	800	tCLK
		Horizontal Blank Time	t_{HB}	50	100	150	tCLK
	Vertical	Frame	fV	55	60	65	Hz
		Vertical total Time	t_V	490	500	520	t_H
		Vertical effective Time	t_{VA}	480	480	480	t_H
		Vertical Blank Time	t_{VB}	10	20	40	t_H

2-4-2 .2 Timing sequence(Timing chart)

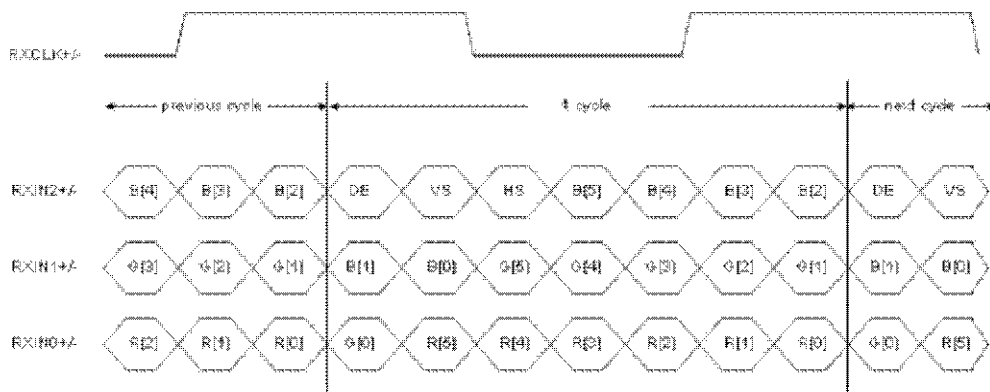
1.Horizontal Timing Sequence:



2. Vertical Timing Sequence:



3.LVDS Input Data mapping:



4. Color Data Assignment:

COLOR	INPUT DATA	R DATA						G DATA						B DATA					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
		MSB					LSB	MSB				LSB	MSB					LSB	
	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
BASIC	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
COLOR	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
RED																			
	RED(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
GREEN																			
	GREEN(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BLUE																			
	BLUE(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

Remarks:

(1)Definition of Gray Scale

color(n) : n is series of Gray Scale

The more n value is, the bright Gray Scale.

(2)Data:1-High,0-Low

3. OPTICAL CHARACTERISTICS

3.1 Characteristics

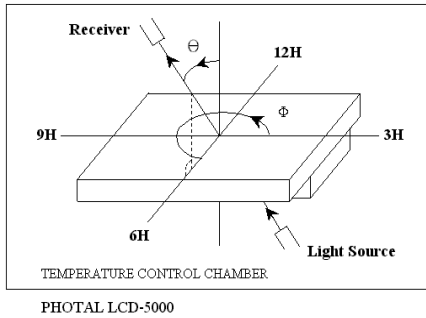
Electrical and Optical Characteristics

No.	Item	symbol / temp.	Min.	Typ.	Max.	Unit	Note	
1	Response Time	Tr+Tf $\theta = 0^\circ$	-	30	35	ms	2	
2	Viewing Angle	Front-Rear $\Theta 1$	CR>=10	90	110	-	degree	3
		Left-Right $\Theta 2$		120	140	-		
3	Contrast Ratio	Cr $\theta = 0^\circ$	300	400	-	-	4	
4	Red x-code	Rx	$\theta = 0^\circ$	TBD	TBD	TBD	-	5
	Red y-code	Ry		TBD	TBD	TBD		
	Green x-code	Gx		TBD	TBD	TBD		
	Green y-code	Gy		TBD	TBD	TBD		
	Blue x-code	Bx		TBD	TBD	TBD		
	Blue y-code	By		TBD	TBD	TBD		
	White x-code	Wx		0.26	0.31	0.36		
	White y-code	Wy		0.28	0.33	0.38		
	Brightness	Y		400	500	-		
5	Brightness Uniformity		70	80	-	%	6	

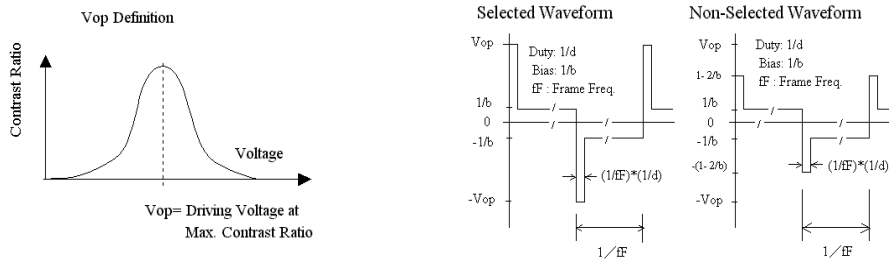
3.2 Definition of optical characteristics

Measurement condition :

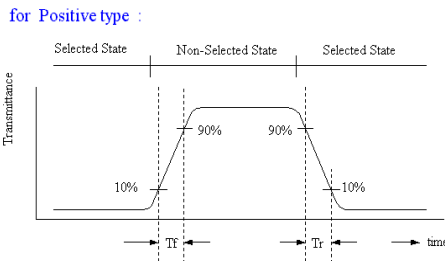
Transmissive and Transflective type



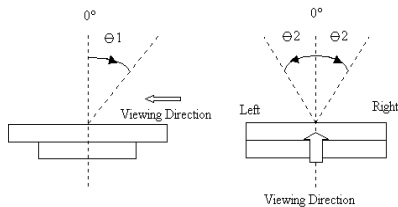
[Note 1] Definition of LCD Driving Vop and Waveform :



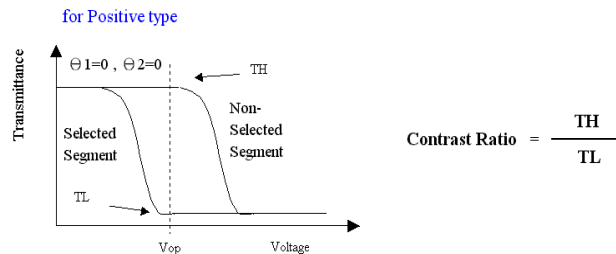
[Note 2] Definition of Response Time



[Note 3] Definition of Viewing Angle :



[Note 4] Definition of Contrast Ratio :



4. RELIABILITY :

Item No	Items	Condition
1	High temperature operating	85 °C , 200 hours
2	Low temperature operating	-30 °C , 200 hours
3	High temperature storage	95 °C , 200 hours
4	Low temperature storage	-40 °C , 200 hours
5	High temperature & humidity storage	60°C, 90%RH, 100 hours
6	Thermal Shock storage	-40°C, 30min.<=> 95°C, 30min. 10 Cycles
7	Vibration test	10 => 55 =>10 => 55 => 10 Hz , within 1 minute Amplitude : 1.5mm. 15 minutes for each Direction (X,Y,Z)
8	Drop test	Packed, 100CM free fall, 6 sides, 1 corner, 3edges
9	Life time	50,000 hours 25°C , 70%RH below , specification condition driving

- * One single product test for only one item.
- * Judgment after test : keep in room temperature for more than 2 hours.
 - Current consumption < 2 times of initial value
 - Contrast > 1/2 initial value
 - Function : work normally

5. PRODUCT HANDLING AND APPLICATION

PRECAUTION FOR HANDLING LCM

- The LCD module contains a C-MOS LSI. People who operate the LCM should wear ESD protection equipment to prevent ESD hurt on products.
- Do not input any signal before power is turned on.
- Do not take LCM from its packaging bag until it is assembled.
- Peel off the LCM protective film slowly since static electricity may be generated.
- Pay attention to the humidity of the work shop, 50~60%RH is satisfactory.
- Use a non-leak iron for soldering LCM.
- Do not touch the display surface or connection terminals area with bare hands. Smudges on the display surface reduce the insulation between terminals.
- Cautions for soldering to LCM:
Condition for soldering I/O terminals:
Temperature at iron tip :280°C±10°C.
Soldering time : 3~4sec./ terminals.
Type of solder : Eutectic solder(rosin flux filled).

PRECAUTION IN USE OF LCD

- Do not contact or scratch the front surface and the contact pads of a LCD panel with hard materials such as metal or glass or with one's nail.
- To clean the surface, wipe it gently with soft cloth dampened by alcohol.
- Do not attempt to wipe off the contact pads.
- Keep LCD panels away from direct sunlight, also avoid them in high-temperature & high humidity environment for a long period.
- Do not drive LCD panels by DC voltage.
- Do not expose LCD panels to organic solvent.
- Liquid in LCD is hazardous substance. In case a contact with liquid crystal material is occurred, be sure to immediately wash such material away by soap and water.
- The polarizer is easily damaged and should be handled with special care. Don't press or rub it with hard objects.

PRECAUTION FOR STORING LCM

- To avoid degradation of the device, do not store the module under the conditions of direct sunlight, high temperature or high humidity. Keep the module in bags designed to prevent static electricity charging under low temperature / normal humidity conditions (avoid high temperature / high humidity and low temperature below 0°C)

USING ON MEDICAL CARE, SAFETY OR HAZARDOUS APPLICATION OR SYSTEM

- For the application in medical care, safety and hazardous products or systems, an authorization from URT is required. URT will not be responsible for any damage or loss which is caused by the products without any authorization given by URT.
- This product is not allowed to be designed and used for military application and/or purpose.
- The delivery of this product to the countries and/or regions where embargoes are imposed by U.N. is prohibited.

6. DATE CODE OF PRODUCTS

- Date code will be shown on each product :

- Y MM DD - XXX

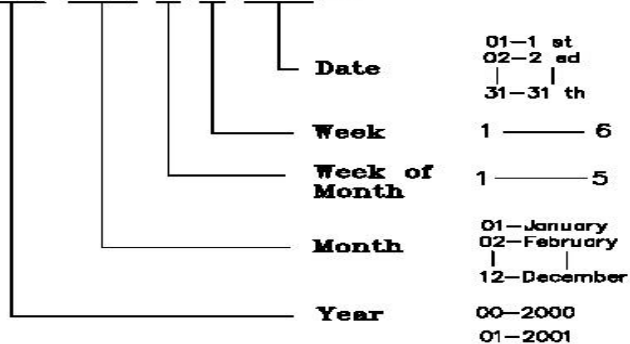
| | | |
Year Month Day - Production lots

- Example: 2 1 2 2 3 - 0 0 3 ==>Year 2002, Dec.,23rd , Batch no.03

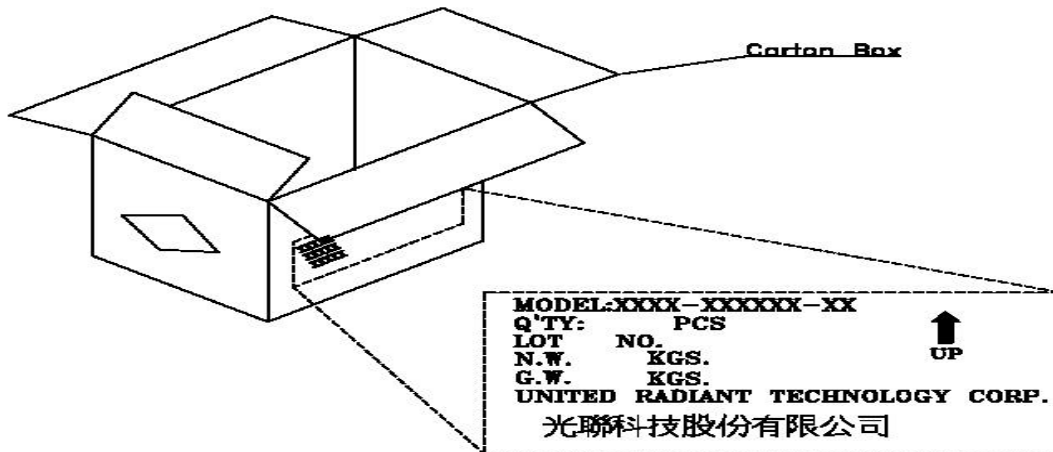
7. PACKING

Instruction of lot number:

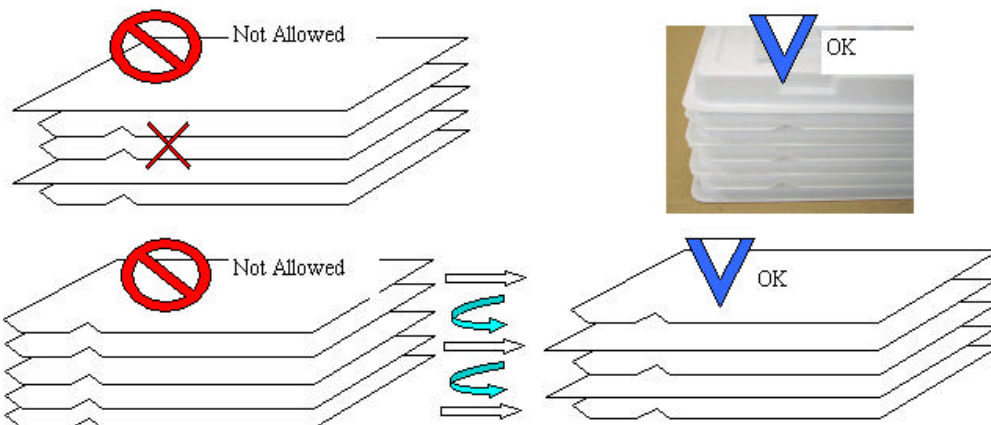
LOT NO. : 0 0 0 8 3 5 2 5 (EX)



Label of carton:



Packing tray must be stacked with alternated direction to each others.
To tacks packing trays in same direction will cause product damaged.



MODEL NO: UM*

T.B.D pcs / Tray

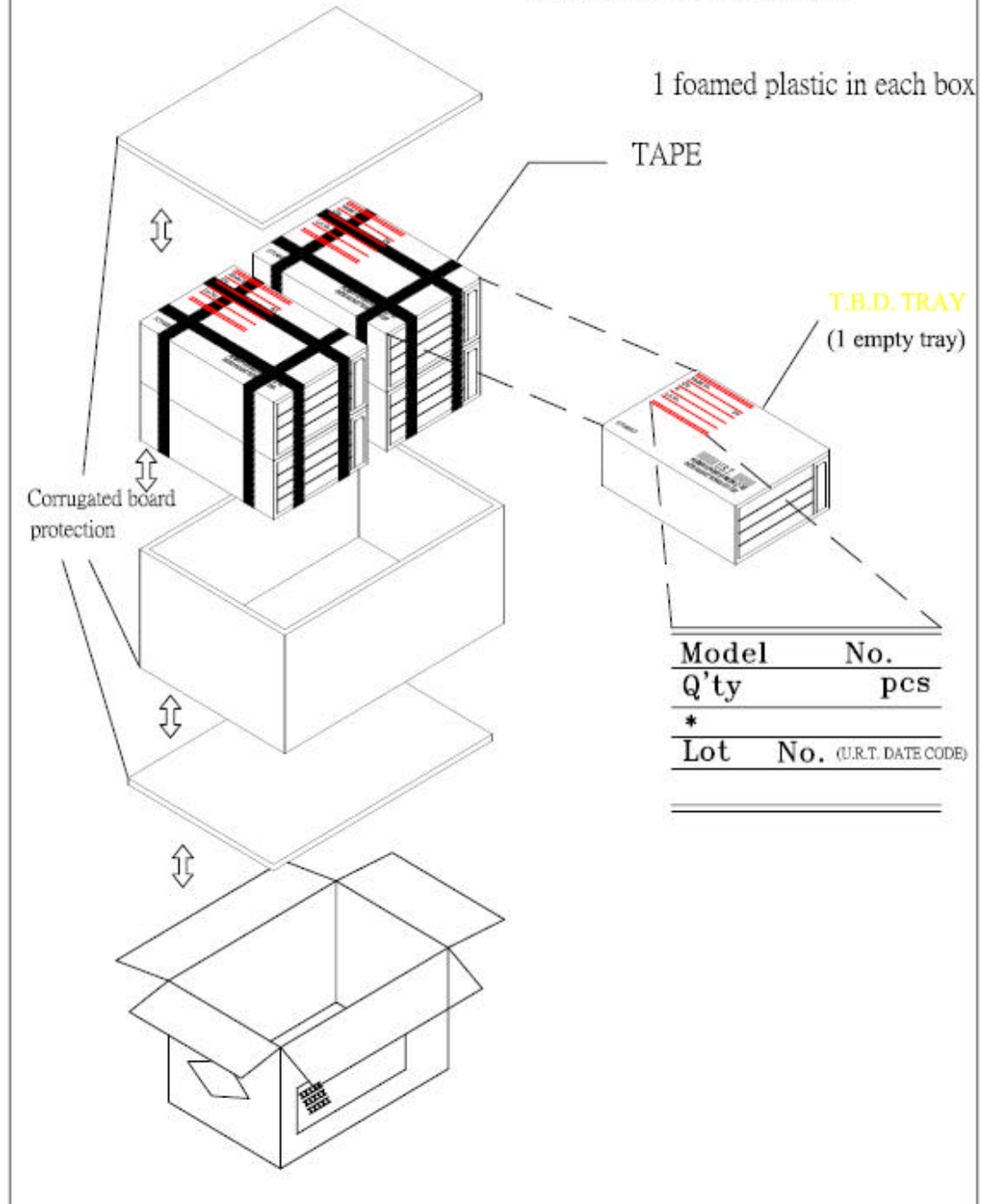
T.B.D Tray / Box

T.B.D Box / Carton

T.B.D pcs / Carton

NOTE:

- (1) Be warned, the direction of the tray has to turn it by 180 degree before stack it up. Otherwise, it will be packager's responsibility!!
- (2) Safe Stack : 5 cartons only



8. INSPECTION STANDARD

8.1. QUALITY :

THE QUALITY OF GOODS SUPPLIED TO PURCHASER SHALL COME UP TO THE FOLLOWING STANDARD.

8.1.1. THE METHOD OF PRESERVING GOODS

AFTER DELIVERY OF GOODS FROM U.R.T. TO PURCHASER. PURCHASER SHALL CONTROL THE LCM AT -10 °C ~ 40 °C ,AND IT MIGHT BE DESIRABLE TO KEEP AT THE NORMAL ROOM TEMPERATURE AND HUMIDITY UNTIL INCOMING INSPECTION OR THROWING INTO PROCESS LINE.

8.1.2. INCOMING INSPECTION

(A) THE METHOD OF INSPECTION

IF PURCHASER MAKE AN INCOMING INSPECTION , A SAMPLING PLAN SHALL BE APPLIED ON THE CONDITION THAT QUALITY OF ONE DELIVERY SHALL BE REGARDED AS ONE LOT.

(B) THE STANDARD OF QUALITY

ISO-2859-1 (or MIL-STD-105E) , LEVEL II SINGLE PLAN.

CLASS	AQL(%)
CRITICAL	0.4 %
MAJOR	0.65 %
MINOR	2.5 %
TOTAL	2.5 %

EVERY ITEM SHALL BE INSPECTED ACCORDING TO THE CLASS.

(C) MEASURE

IF AS THE RESULT OF ABOVE RECEIVING INSPECTION , A LOT OUT IS DISCOVERED. PURCHASER SHALL BE INFORM SELLER OF IT WITHIN SEVEN DAYS. BUT FIRST SHIPMENT WITHIN FOURTEEN DAYS.

8.1.3. WARRANTY POLICY

U.R.T. WILL PROVIDE ONE-YEAR WARRANTY FOR THE PRODUCTS ONLY IF UNDER SPECIFICATION OPERATING CONDITIONS. U.R.T. WILL REPLACE NEW PRODUCTS FOR THESE DEFECT PRODUCTS WHICH UNDER WARRANTY PERIOD AND BELONG TO THE RESPONSIBILITY OF U.R.T.

8.2. CHECKING CONDITION

8.2.1. CHECKING DIRECTION SHALL BE IN THE 45 DEGREE AREA TO FACE THE SAMPLE.

8.2.2. CHECKER SHALL SEE OVER 30 cm. WITH BARE EYES FAR FROM SAMPLE AND USING 2 PCS. OF 20W FLUORESCENT LAMP.

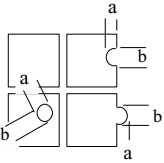
8.3. INSPECTION PLAN :

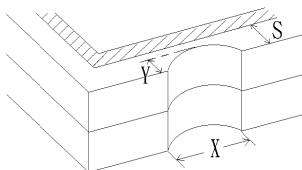
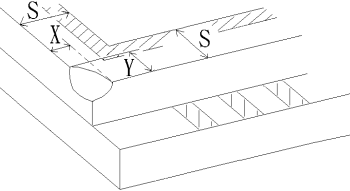
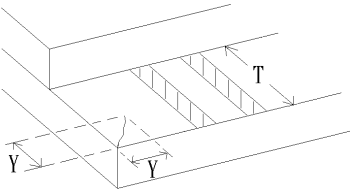
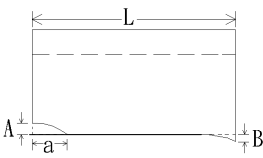
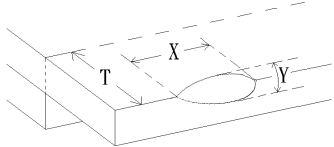
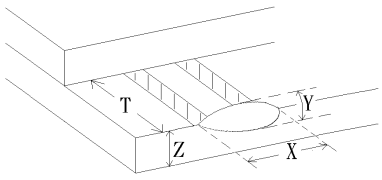
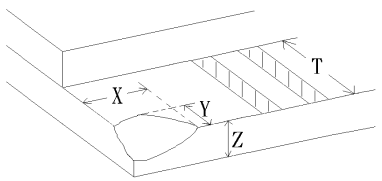
CLASS	ITEM	JUDGEMENT	CLASS
PACKING & INDICATE	1. OUTSIDE AND INSIDE PACKAGE INDICATIONS	"MODEL NO." , "LOT NO." AND "QUANTITY" SHOULD INDICATE ON THE PACKAGE.	Minor
	2. MODEL MIXED AND QUANTITY	OTHER MODEL MIXED.....REJECTED QUANTITY SHORT OR OVER.....REJECTED	Critical
	3. PRODUCT INDICATION	"MODEL NO." SHOULD INDICATE ON THE PRODUCT	Major
ASSEMBLY	4. DIMENSION, LCD GLASS SCRATCH AND SCRIBE DEFECT.	ACCORDING TO SPECIFICATION OR DRAWING.	Major
APPEARANCE	5. VIEWING AREA	POLARIZER EDGE OR LCD'S SEALING LINE IS VISABLE IN THE VIEWING AREAREJECTED	Minor
	6. BLEMISH 、 BLACK SPOT 、 WHITE SPOT IN THE LCD AND LCD GLASS CRACKS	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	7. BLEMISH 、 BLACK SPOT WHITE SPOT AND SCRATCH ON THE POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	8. BUBBLE IN POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	9. LCD'S RAINBOW COLOR	STRONG DEVIATION COLOR (OR NEWTON RING) OF LCD.....REJECTED. OR ACCORDING TO LIMITED SAMPLE (IF NEEDED, AND INSIDE VIEWING AREA)	Minor
ELECTRICAL	10. ELECTRICAL AND OPTICAL CHARACTERISTICS	ACCORDING TO SPECIFICATION OR DRAWING . (INSIDE VIEWING AREA)	Critical
	11.MISSING LINE	MISSING DOT 、 LINE 、 CHARACTERREJECTED	Critical
	12.SHORT CIRCUIT 、 WRONG PATTERN DISPLAY	NON DISPLAY 、 WRONG PATTERN DISPLAY 、 CURRENT CONSUMPTION OUT OF SPECIFICATION..... REJECTED	Critical
	13. PIN HOLE 、 PATTERN DEFORMITY	ACCORDING TO STANDARD OF VISUAL INSPECTION	Minor

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8.4. STANDARD OF VISUAL INSPECTION

NO.	CLASS	ITEM	JUDGEMENT												
8.4.1	MINOR	· BLEMISH · BLACK SPOT · WHITE SPOT IN THE LCD. · BLEMISH · BLACK SPOT · WHITE SPOT AND SCRATCH ON THE POLARIZER	(A) ROUND TYPE: unit : mm. <table border="1"> <thead> <tr> <th>DIAMETER (mm.)</th> <th>ACCEPTABLE Q'TY</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.1$</td> <td>DISREGARD</td> </tr> <tr> <td>$0.1 < \Phi \leq 0.2$</td> <td>5</td> </tr> <tr> <td>$0.2 < \Phi \leq 0.3$</td> <td>3</td> </tr> <tr> <td>$0.3 < \Phi$</td> <td>0</td> </tr> </tbody> </table>	DIAMETER (mm.)	ACCEPTABLE Q'TY	$\Phi \leq 0.1$	DISREGARD	$0.1 < \Phi \leq 0.2$	5	$0.2 < \Phi \leq 0.3$	3	$0.3 < \Phi$	0		
			DIAMETER (mm.)	ACCEPTABLE Q'TY											
$\Phi \leq 0.1$	DISREGARD														
$0.1 < \Phi \leq 0.2$	5														
$0.2 < \Phi \leq 0.3$	3														
$0.3 < \Phi$	0														
(B) LINER TYPE: unit : mm. <table border="1"> <thead> <tr> <th>LENGTH</th> <th>WIDTH</th> <th>ACCEPTABLE Q'TY</th> </tr> </thead> <tbody> <tr> <td>-----</td> <td>$W \leq 0.03$</td> <td>DISREGARD</td> </tr> <tr> <td>$L \leq 5.0$</td> <td>$0.03 < W \leq 0.05$</td> <td>5</td> </tr> <tr> <td>$L \leq 5.0$</td> <td>$0.05 < W \leq 0.07$</td> <td>2</td> </tr> <tr> <td>-----</td> <td>$0.07 < W$</td> <td>FOLLOW ROUND TYPE</td> </tr> </tbody> </table>	LENGTH	WIDTH	ACCEPTABLE Q'TY	-----	$W \leq 0.03$	DISREGARD	$L \leq 5.0$	$0.03 < W \leq 0.05$	5	$L \leq 5.0$	$0.05 < W \leq 0.07$	2	-----	$0.07 < W$	FOLLOW ROUND TYPE
LENGTH	WIDTH	ACCEPTABLE Q'TY													
-----	$W \leq 0.03$	DISREGARD													
$L \leq 5.0$	$0.03 < W \leq 0.05$	5													
$L \leq 5.0$	$0.05 < W \leq 0.07$	2													
-----	$0.07 < W$	FOLLOW ROUND TYPE													
8.4.2	MINOR	BUBBLE IN POLARIZER	unit : mm. <table border="1"> <thead> <tr> <th>DIAMETER</th> <th>ACCEPTABLE Q'TY</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.3$</td> <td>DISREGARD</td> </tr> <tr> <td>$0.3 < \Phi \leq 0.5$</td> <td>3</td> </tr> <tr> <td>$0.5 < \Phi \leq 1.0$</td> <td>1</td> </tr> <tr> <td>$1.0 < \Phi$</td> <td>0</td> </tr> </tbody> </table>	DIAMETER	ACCEPTABLE Q'TY	$\Phi \leq 0.3$	DISREGARD	$0.3 < \Phi \leq 0.5$	3	$0.5 < \Phi \leq 1.0$	1	$1.0 < \Phi$	0		
DIAMETER	ACCEPTABLE Q'TY														
$\Phi \leq 0.3$	DISREGARD														
$0.3 < \Phi \leq 0.5$	3														
$0.5 < \Phi \leq 1.0$	1														
$1.0 < \Phi$	0														
8.4.3	MINOR	PIN HOLE · PATTERN DEFORMITY	unit : mm.  <table border="1"> <thead> <tr> <th>DIAMETER</th> <th>ACC. Q'TY</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.1$</td> <td>DISREGARD</td> </tr> <tr> <td>$0.1 < \Phi \leq 0.25$</td> <td>3</td> </tr> <tr> <td>$0.25 < \Phi$</td> <td>0</td> </tr> </tbody> </table>	DIAMETER	ACC. Q'TY	$\Phi \leq 0.1$	DISREGARD	$0.1 < \Phi \leq 0.25$	3	$0.25 < \Phi$	0				
DIAMETER	ACC. Q'TY														
$\Phi \leq 0.1$	DISREGARD														
$0.1 < \Phi \leq 0.25$	3														
$0.25 < \Phi$	0														

NO.	CLASS	ITEM	JUDGEMENT
8.4.4	MINOR	CHIPPING	 $Y > S$ REJ.
8.4.5	MINOR	CHIPPING	 $or Y > S$ REJ.
8.4.6	MAJOR	GLASS CRACK	 $Y > (1/2) T$ REJ.
8.4.7	MAJOR	SCRIBE DEFECT	 $a > L/3, A > 1.5mm.$ REJ. B: ACCORDING TO DIMENSION
8.4.8	MINOR	CHIPPING (ON THE TERMINAL AREA)	 $\Phi = (x+y)/2 > 2.5 \text{ mm}$ REJ.
8.4.9	MINOR	CHIPPING (ON THE TERMINAL SURFACE)	 $Y > (1/3) T$ REJ.
8.4.10	MINOR	CHIPPING	 $Y > T$ REJ.