




# SPECIFICATIONS FOR MODULE

CUSTOMER	廣達
MODEL	WD-FD070V-NFLWf VER. 5
CUSTOMER APPROVED	

APPROVED BY	CHECKED BY	ORGANIZED BY
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- APPROVAL FOR SPECIFICATIONS ONLY
- APPROVAL FOR SPECIFICATIONS AND SAMPLE 112020540-1.1

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## History of Version

Version	Contents	Date	Note
a1	New Version	2011.Mar.14	SPEC
a2	Change by Customer Change IC : HX8520A ITE IT7260	2011.Mar.24	SPEC
a3	Change by Customer 4.1 LCM Mechanical Diagram	2011.Mar.28	SPEC
a4	Change by Customer 4.1 LCM Mechanical Diagram	2011.Mar.30	SPEC
a5	Change by Customer 4.1 LCM Mechanical Diagram	2011.Apr.07	SPEC
a6	Change by Customer 4.1 LCM Mechanical Diagram	2011.Apr.11	SPEC
a7	Change by Customer Customer : QCI 4.1 LCM Mechanical Diagram	2011.Jun.02	SPEC
a8	Change by Customer 3.1 LCM Electro-optical Characteristics Luminance 4.1 LCM Mechanical Diagram 4.2 Packing Method 5.1-6. Inspection specification 5.2 Standard Specification for Reliability 6.1 Product Substances Management Documentation	2011.Jun.14	SPEC
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b3	Change by Customer 4.1 LCM Mechanical Diagram	2011/8/10	SPEC
b4	Change by Customer 4.1 LCM Mechanical Diagram 4.2 Packing Method	2011/9/2	Sample
f1	Change by Customer Without AS coating	2012/02/15	SPEC
f2	Change by Customer 4.1 LCM Mechanical Diagram	2012/02/21	SPEC
f3	For sample	2012/03/27	Sample
f4	Modify 1.6 LCM BAR CODE INFORMATION	2012/4/10	Sample
f5	Change by Customer Add 4.2 CMI LCM BAR CODE INFORMATION 4.3 WINTEK PRINT DATECODE INFORMATION	2012/6/26	Sample

# Contents

Page

Absolute Maximum Ratings .....	4
<b>(1) LCM.....</b>	<b>4</b>
1.1 Electrical Characteristics.....	4
1.2 Interface Pin Function .....	5
1.3 Timing Characteristic.....	7
1.4 Power ON/OFF SEQUENCE .....	10
<b>(2) FIP(Field Induced Pad) .....</b>	<b>11</b>
2.1 FIP Electrical Characteristics.....	11
2.2 FIP Interface Pin Function.....	11
2.3 FIP Interface Diagram .....	12
2.4 FIP Schematic.....	12
2.5 FIP Timing Characteristic .....	13
2.6 FIP Protocol .....	14
<b>(3) Electro-optical Unitss .....</b>	<b>15</b>
3.1 LCM Electro-optical Characteristics .....	15
3.2 Optical Definitions .....	19
<b>(4) LCM Mechanical Units.....</b>	<b>20</b>
4.1 LCM Mechanical Diagram.....	20
4.2 CMI LCM BAR CODE INFORMATION.....	21
4.3 WINTEK PRINT DATECODE INFORMATION .....	21
4.4 Packing Method .....	22
<b>(5) Quality Units.....</b>	<b>23</b>
5.1 Specification of Quality Assurance .....	23
5.2 Standard Specification for Reliability .....	36
5.3 Precautions in Use of LCM.....	39
<b>(6) Substance Management Units .....</b>	<b>40</b>
6.1 Product Substances Management Documentation.....	40

## Absolute Maximum Ratings

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Operating Temperature	TOP	-20	-	+60	
Storage Temperature	TST	-30	-	+70	
Supply Voltage for Analog	VCI-VSS	-0.3	-	5.0	V
Supply Voltage for Digital	VDD-VSS	6.5	-	13.5	V
Static Electricity	Be sure that you are grounded when handling LCM.				

### (1) LCM

#### 1.1 Electrical Characteristics

(Ta=25 )

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage for Analog	VCI	-	10.8	11	11.2	V
Supply Voltage for Digital	VDD	-	3.0	3.3	3.6	V
Input Signal High Voltage	VIH	-	0.7VDD	-	VDD	V
Input Signal Low Voltage	VIL	-	0	-	0.3VDD	V
Output Signal High Voltage	VOH	-	-	-	-	V
Output Signal Low Voltage	VOL	-	-	-	-	V
Supply Current for Analog	*ICI	VCI=11V	-	25	30	mA
Supply Current for Digital	*IDD	VDD=3.3V	-	50	60	mA
Used IC						

\*ICI Measurement condition is for all pixels on

\*IDD Measurement condition is for all pixels on

## 1.2 Interface Pin Function

### CN1:

NO	SYMBOL	I / O	FUNCTION
1	VCOM	P	Common Voltage
2	VDD	P	Power Voltage for digital circuit
3	VDD	P	Power Voltage for digital circuit
4	NC	-	No connection
5	Reset	I	Global reset pin
6	STBYB	I	Standby mode, Normally pulled high STBYB = "1", normal operation STBYB = "0", timing controller, source driver will turn off, all output are High-Z
7	GND	P	Ground
8	RXIN0-	I	- LVDS differential data input
9	RXIN0+	I	+ LVDS differential data input
10	GND	P	Ground
11	RXIN1-	I	- LVDS differential data input
12	RXIN1+	I	+ LVDS differential data input
13	GND	P	Ground
14	RXIN2-	I	- LVDS differential data input
15	RXIN2+	I	+ LVDS differential data input
16	GND	P	Ground
17	RXCLKIN-	I	- LVDS differential data input
18	RXCLKIN+	I	+ LVDS differential data input
19	GND	P	Ground
20	RXIN3-	I	- LVDS differential data input
21	RXIN3+	I	+ LVDS differential data input
22	GND	P	Ground
23	NC	-	No connection
24	NC	-	No connection
25	GND	P	Ground
26	NC	-	No connection
27	DIMO	O	Backlight CABC controller signal output
28	SELB	I	6bit/8bit mode select
29	AVDD	P	Power for Analog Circuit
30	GND	P	Ground
31	LED-	P	LED Cathode
32	LED-	P	LED Cathode
33	L/R	I	Horizontal inversion
34	U/D	I	Vertical inversion
35	VGL	P	Gate OFF Voltage

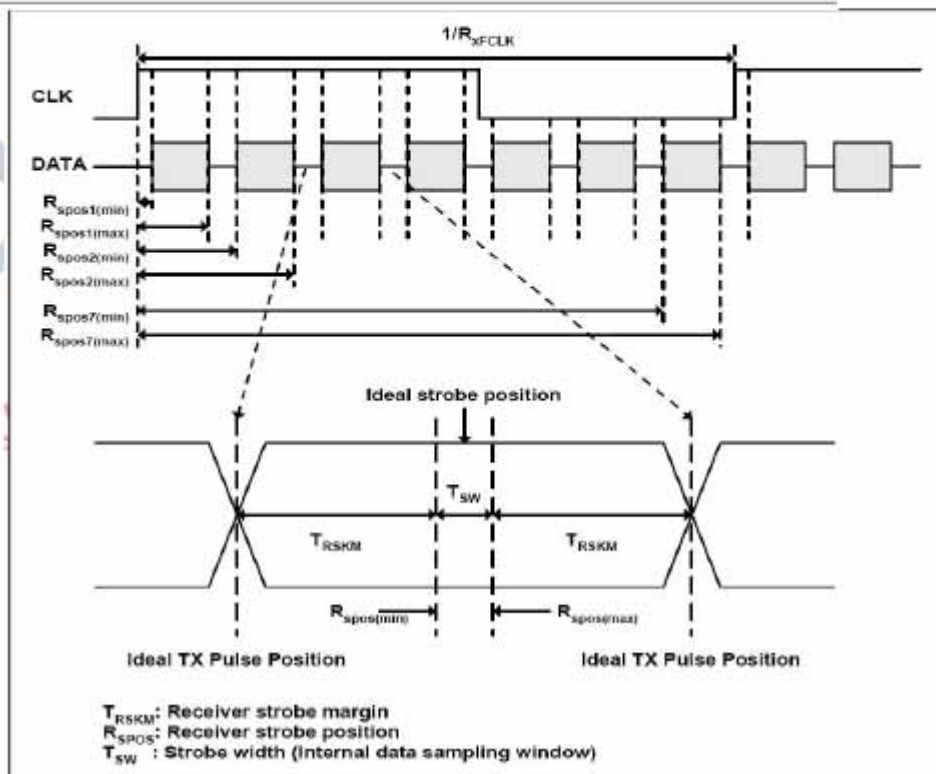
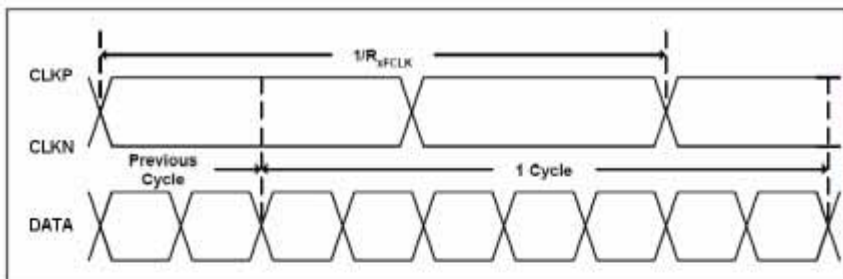
36	CABCEN1	I	CABC H/W enable
37	CABCEN0	I	CABC H/W enable
38	VGH	P	Gate ON Voltage
39	LED+	P	LED Anode
40	LED+	P	LED Anode

## 1.3 Timing Characteristic

### 1.3.1. AC Electrical Characteristics

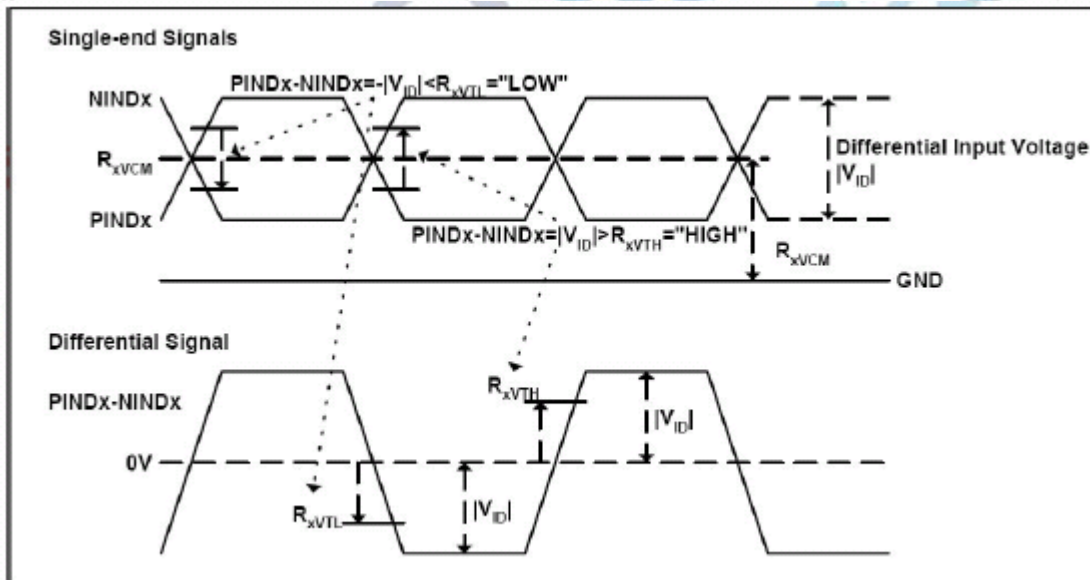
Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock frequency	$R_{XFCLK}$	40.8	51.2	71	MHz	
Input data skew margin	$T_{RSKM}$	500	-	-	ps	
Clock high time	$T_{LVCH}$	-	$4/(7 * R_{XFCLK})$	-	ns	
Clock low time	$T_{LVCL}$	-	$3/(7 * R_{XFCLK})$	-	ns	

### 1.3.2. Input Clock and Data Timing Diagram



### 1.3.3. DC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Differential input high Threshold voltage	$R_{xVTH}$	-	-	+0.1	V	$R_{xVCM}=1.2V$
Differential input low Threshold voltage	$R_{xVTL}$	-0.1	-	-	V	
Input voltage range (singled-end)	$R_{xVIN}$	0	-	2.4	V	
Differential input common mode voltage	$R_{xVCM}$	$ V_{ID} /2$	-	$2.4- V_{ID} /2$	V	
Differential voltage	$ V_{ID} $	0.2	-	0.6	V	
Differential input leakage current	$R_{VxIIZ}$	-10	-	+10	$\mu A$	



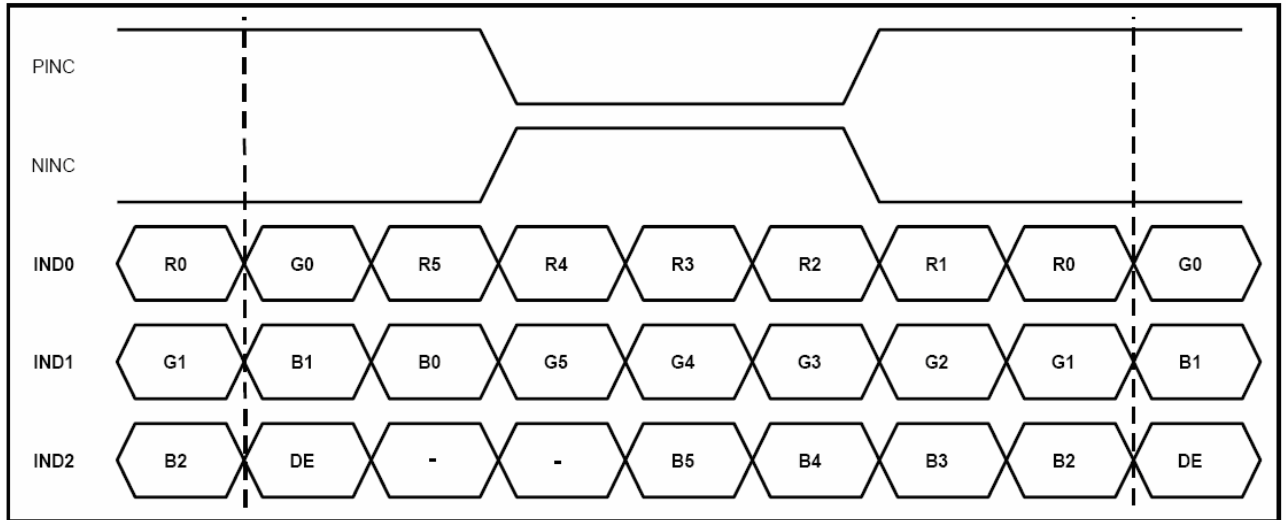
### 1.3.4. Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	40.8	51.2	67.2	MHZ	Frame rate =60HZ
Horizontal display area	thd	1024			DCLK	
HS period time	th	1114	1344	1400	DCLK	
HS Blanking	thb	90	320	376	DCLK	
Vertical display area	tvd	600			H	
VS period time	tv	610	635	800	H	
VS Blanking	thb	10	35	200	H	

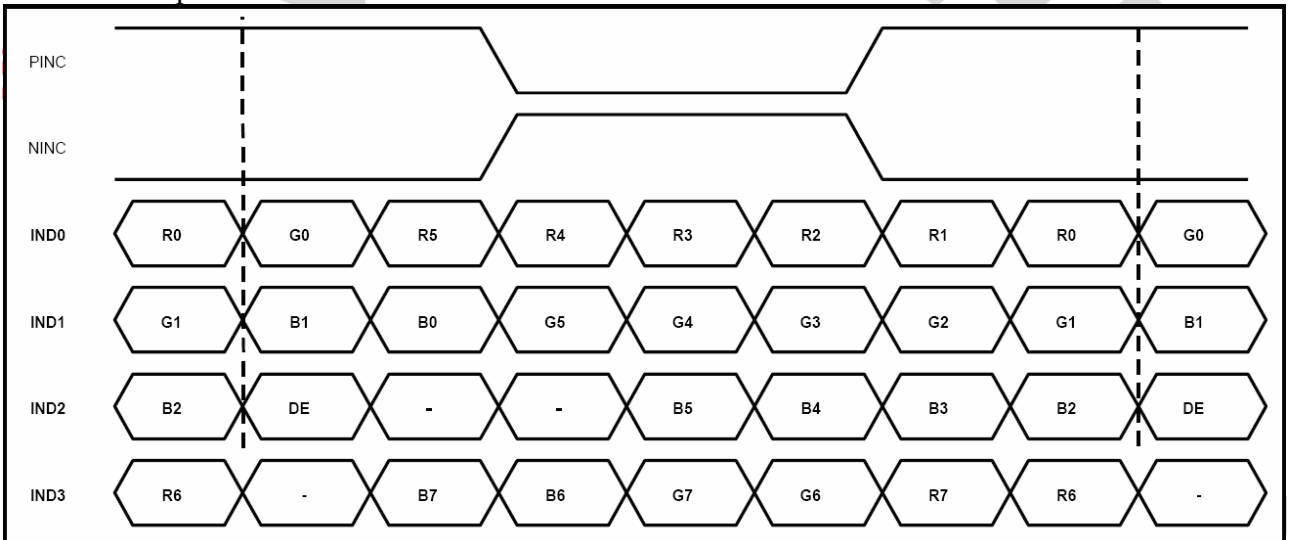


### 1.3.5. Data Input Format

#### 6bit LVDS input



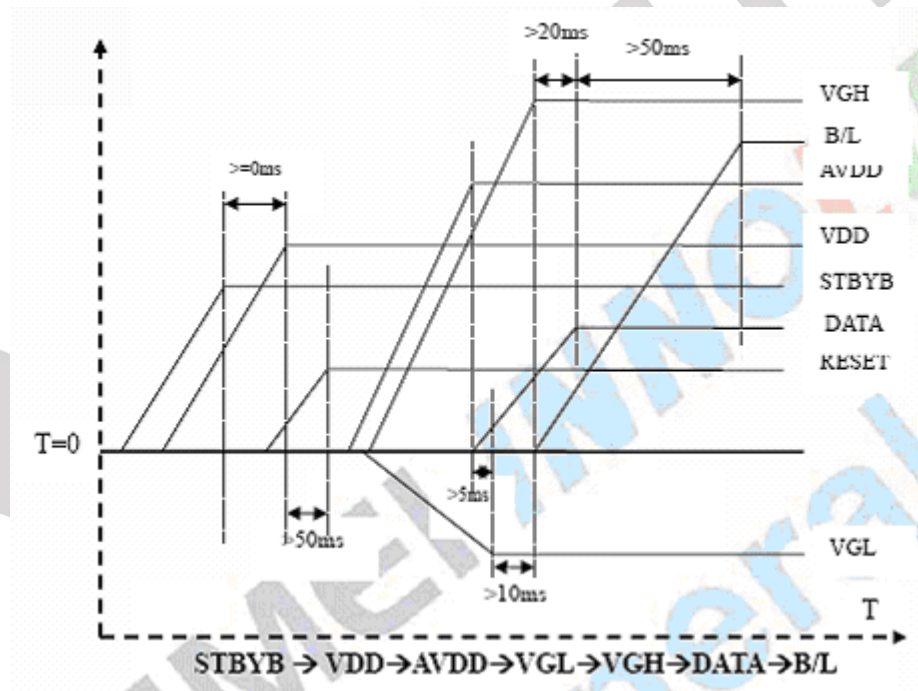
#### 8bit LVDS input



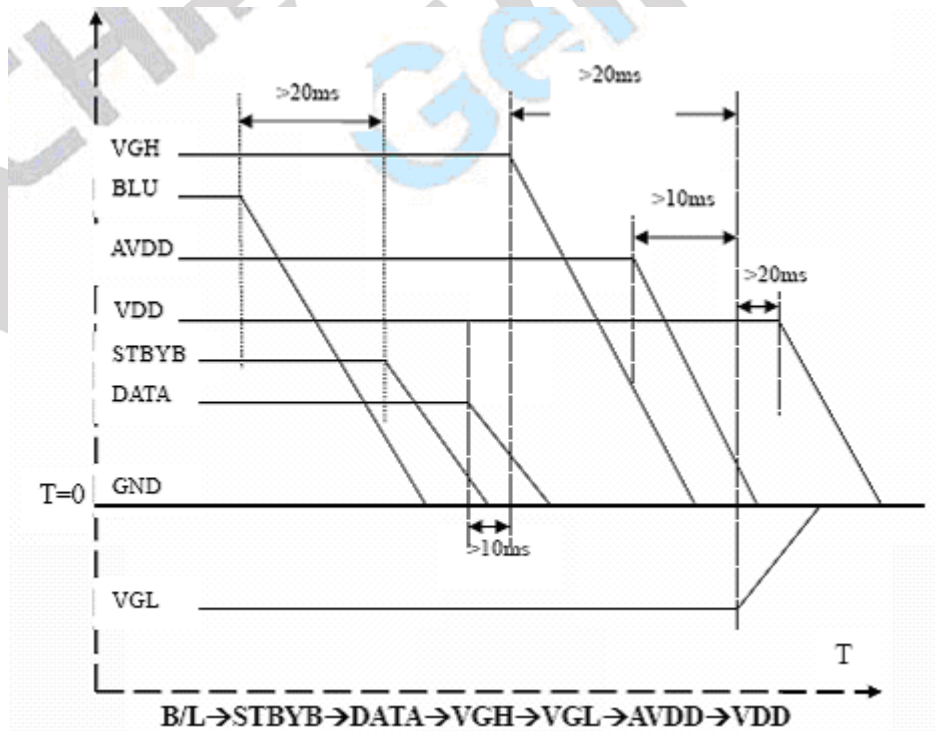
Note: Support DE timing mode only, SYNC mode not supported.

## 1.4 Power ON/OFF SEQUENCE

### 1.4-1 Power ON Sequence



### 1.4-2 Power OFF Sequence



## (2) FIP(Field Induced Pad)

### 2.1 FIP Electrical Characteristics

(Ta=25 )

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	Remark
Input Power Voltage	V <sub>DD_TP</sub>	-	3.2	3.3	3.4	V	-
Input Signal Voltage	H Level	V <sub>IH</sub>	0.7V <sub>DDTP</sub>	-	-	V	-
	L Level	V <sub>IL</sub>	-	-	0.3V <sub>DDTP</sub>	V	-
Output Signal Voltage	H Level	V <sub>OH</sub>	I <sub>oh</sub> =2mA	2.4	-	V	-
	L Level	V <sub>OL</sub>	I <sub>ol</sub> =2mA	0	-	0.4	V
Report Rate	-	One-finger	-	130	-	Hz	-
Interface	-	-	I2C			-	-
Touch Panel Resolution	-	-	1024x768			-	-
Supply Current	*IDD	V <sub>DD_TP</sub> =3.3V	-	-	TBD	mA	-
Input	Finger						-
Driver IC	ITE IT7260						-

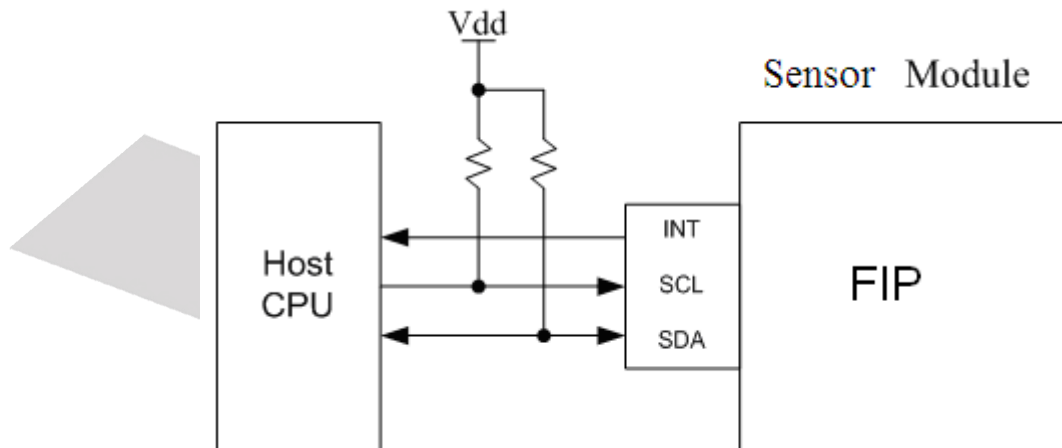
### 2.2 FIP Interface Pin Function

NO	SYMBOL	I/O	FUNCTION
1	VDDTP	P	Supply Voltage
2	INT	I	Interrupt pin
3	SCL	I/O	I2C SCL pin
4	SDA	I	I2C SDA pin
5	GND	P	Ground
6	NC	-	NC pin

## 2.3 FIP Interface Diagram

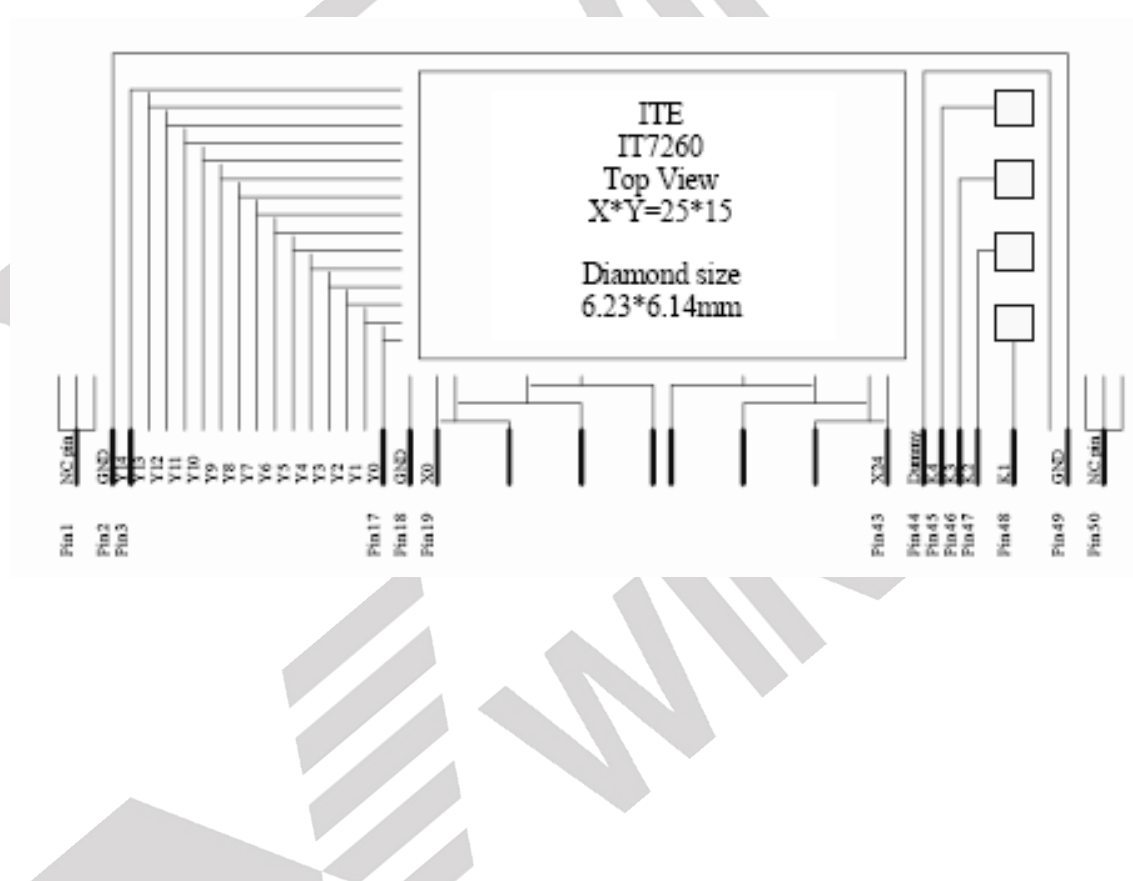
The system block diagram is as shown in below. There are three communication pins connected between CPU and Sensor Module, which are including external interrupt INT, I2C pins SCL and SDA. The INT is active low while the touch state is calculated by Sensor Module and the touch information can be translated via I2C communication interface. The I2C data format, protocol and report packet are described as following.

### System block diagram



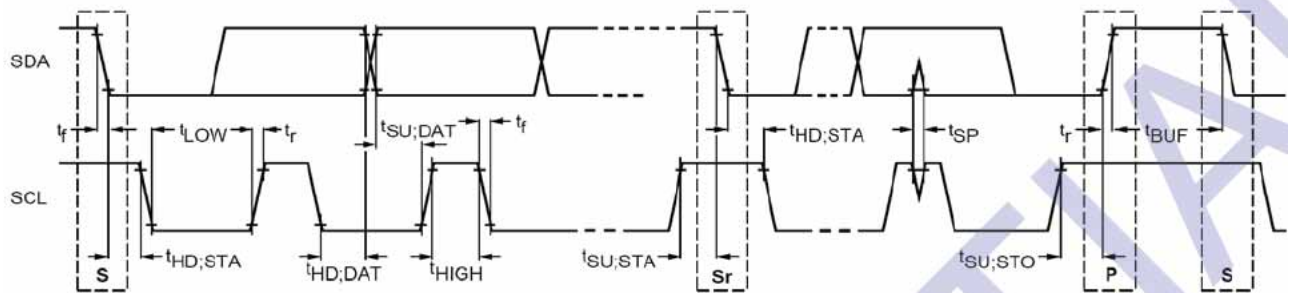
## 2.4 FIP Schematic

Sensor trace :



## 2.5 I2C Timing Characteristic

### I2C interface



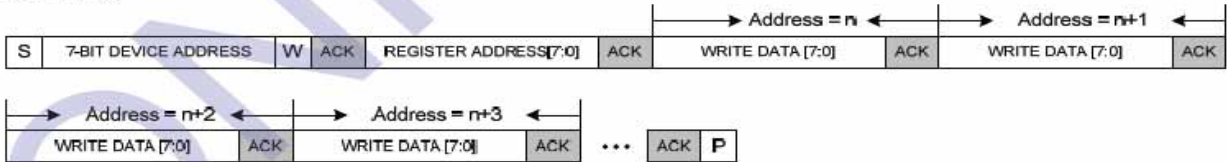
Symbol	Parameter	Min.	Max.	Unit
$f_{SCL}$	SCL clock frequency	1	400	kHz
$t_{HD,STA}$	Hold time (repeated) START condition After this period, the first clock pulse is generated.	0.6	-	us
$t_{LOW}$	LOW period of the SCL clock	1.3	-	us
$t_{HIGH}$	HIGH period of the SCL clock	0.6	-	us
$t_{SU,STA}$	Set-up time for a repeated START condition	0.6	-	us
$t_{HD,DAT}$	Data hold time	0	0.9	us
$t_{SU,DAT}$	Data setup time	100	-	ns
$t_r$	Rise time of both SDA and SCL signals	$20+0.1C_b$	300	ns
$t_f$	Fall time of both SDA and SCL signals	$20+0.1C_b$	300	ns
$t_{SU,STO}$	Set-up time for STOP condition	0.6	-	us
$t_{BUF}$	Bus free time between a STOP and START condition	1.3	-	us
$C_b$	Capacitive load for each bus line	-	400	pF
$V_{nL}$	Noise margin at the LOW level for each connected device (including hysteresis)	$0.1V_{DD}$	-	V
$V_{nH}$	Noise margin at the HIGH level for each connected device (including hysteresis)	$0.2V_{DD}$	-	V
$t_{timeout}$	Cumulative SCL low timeout limit	3	5	ms

## 2.6 I2C Protocol

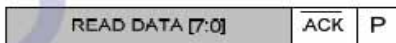
### Single Write



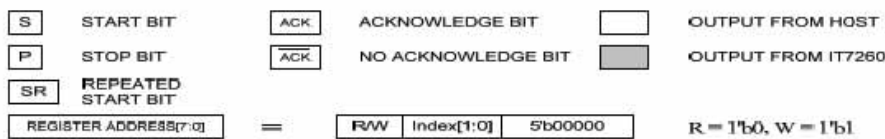
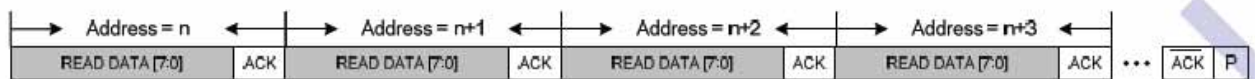
### Burst Write



### Single Read



### Burst Read



### (3) Electro-optical Unitss

#### 3.1 LCM Electro-optical Characteristics

ITEM	SYMBOL		CONDITION	MIN.	TYP.	MAX.	UNIT
View Angle (Transmissive)	$\psi = 90^\circ$ (12H)		CR $\geq$ 10		70	-	deg.
	$\psi = 270^\circ$ (6H)				75	-	deg.
	$\psi = 180^\circ$ (9H)				75	-	deg.
	$\psi = 0^\circ$ (3H)				75	-	deg.
Contrast Ratio (Transmissive)	CR		Ta=25	500	700	-	-
Response Time	Tr+Td		Ta=25	-	10	20	ms
Luminance	L		Normal = $=0^\circ$	280	350	-	cd/m2
Color Coordinate	Red	Rx	Normal = $=0$ Ta=25	-	TBD	-	-
		Ry		-	TBD	-	
	Green	Gx		-	TBD	-	
		Gy		-	TBD	-	
	Blue	Bx		-	TBD	-	
		By		-	TBD	-	
	White	Wx		0.26	0.31	0.36	
		Wy		0.28	0.33	0.38	
LCD Type	TFT , ( POSITIVE / Transmissive )						
Gray Inversion Direction	6:00						

Note 1: Definition of viewing angle

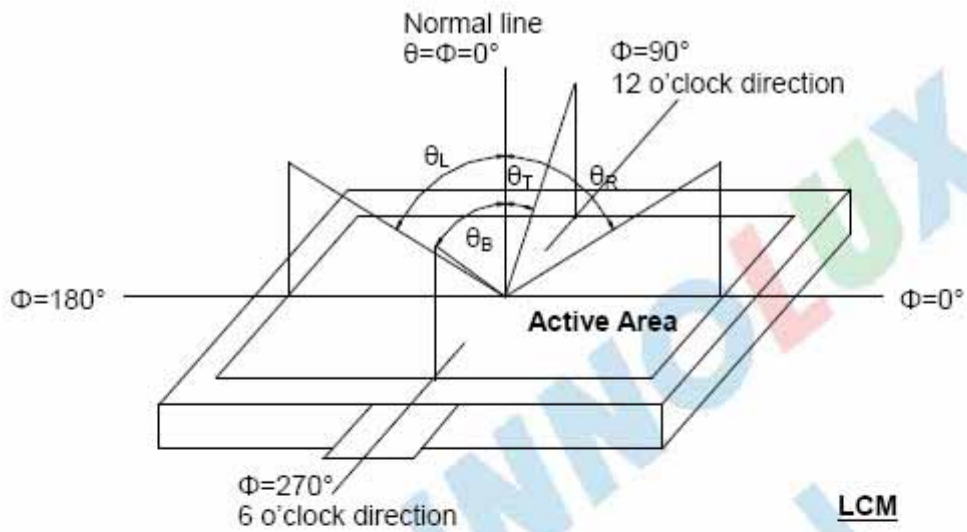


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view:  $1^\circ$  /Height: 500mm.)

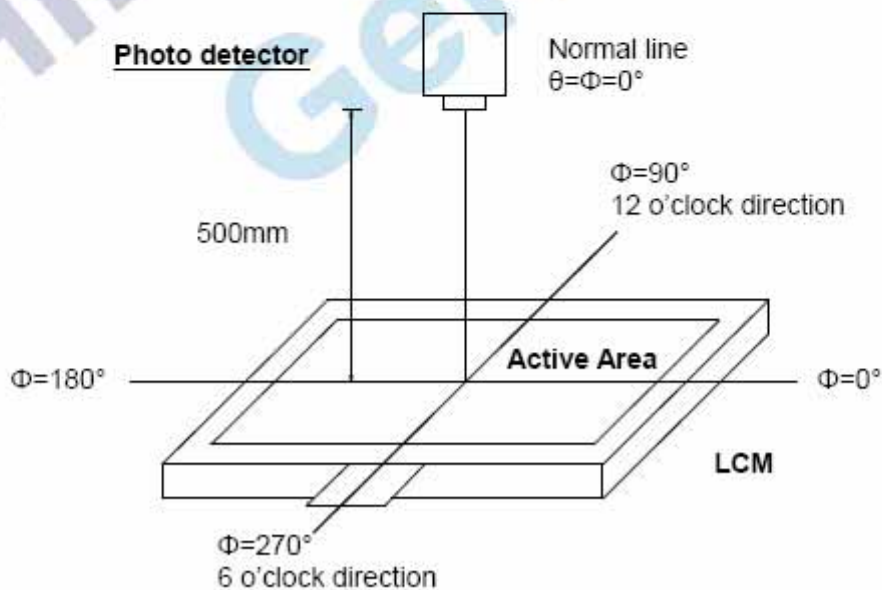


Fig. 4-2 Optical measurement system setup



Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time ( $T_{ON}$ ) is the time between photo detector output intensity changed from 90% to 10%. And fall time ( $T_{OFF}$ ) is the time between photo detector output intensity changed from 10% to 90%.

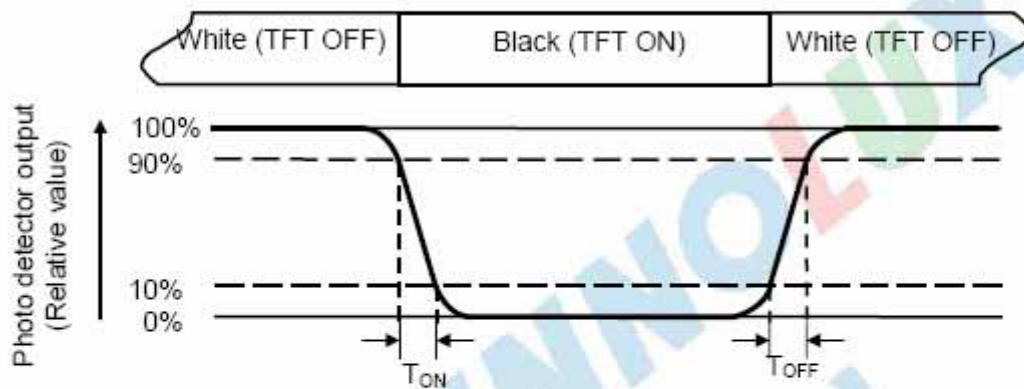


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is  $I_L=120\text{mA}$ .

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4 ).Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{\min}}{B_{\max}}$$

L-----Active area length      W----- Active area width

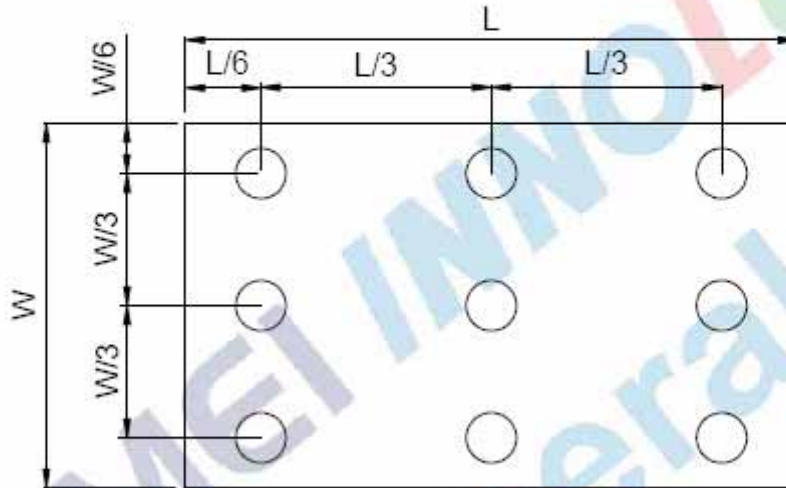
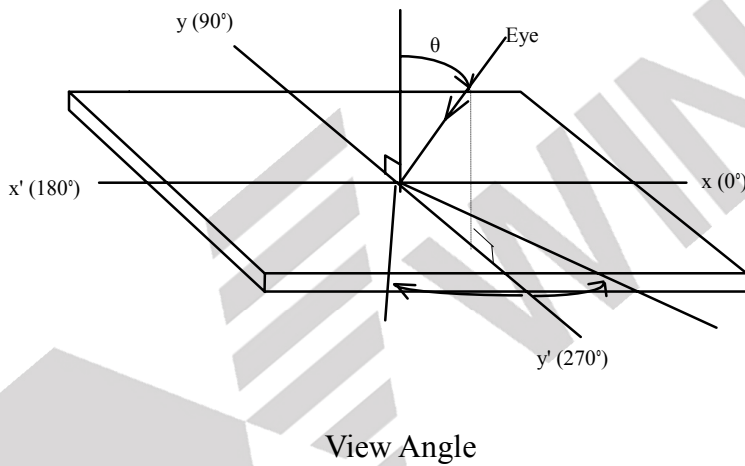
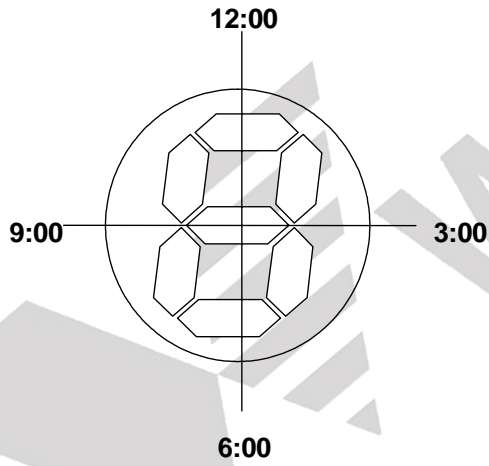


Fig. 4-4 Definition of measuring points

$B_{\max}$ : The measured maximum luminance of all measurement position.

$B_{\min}$ : The measured minimum luminance of all measurement position.

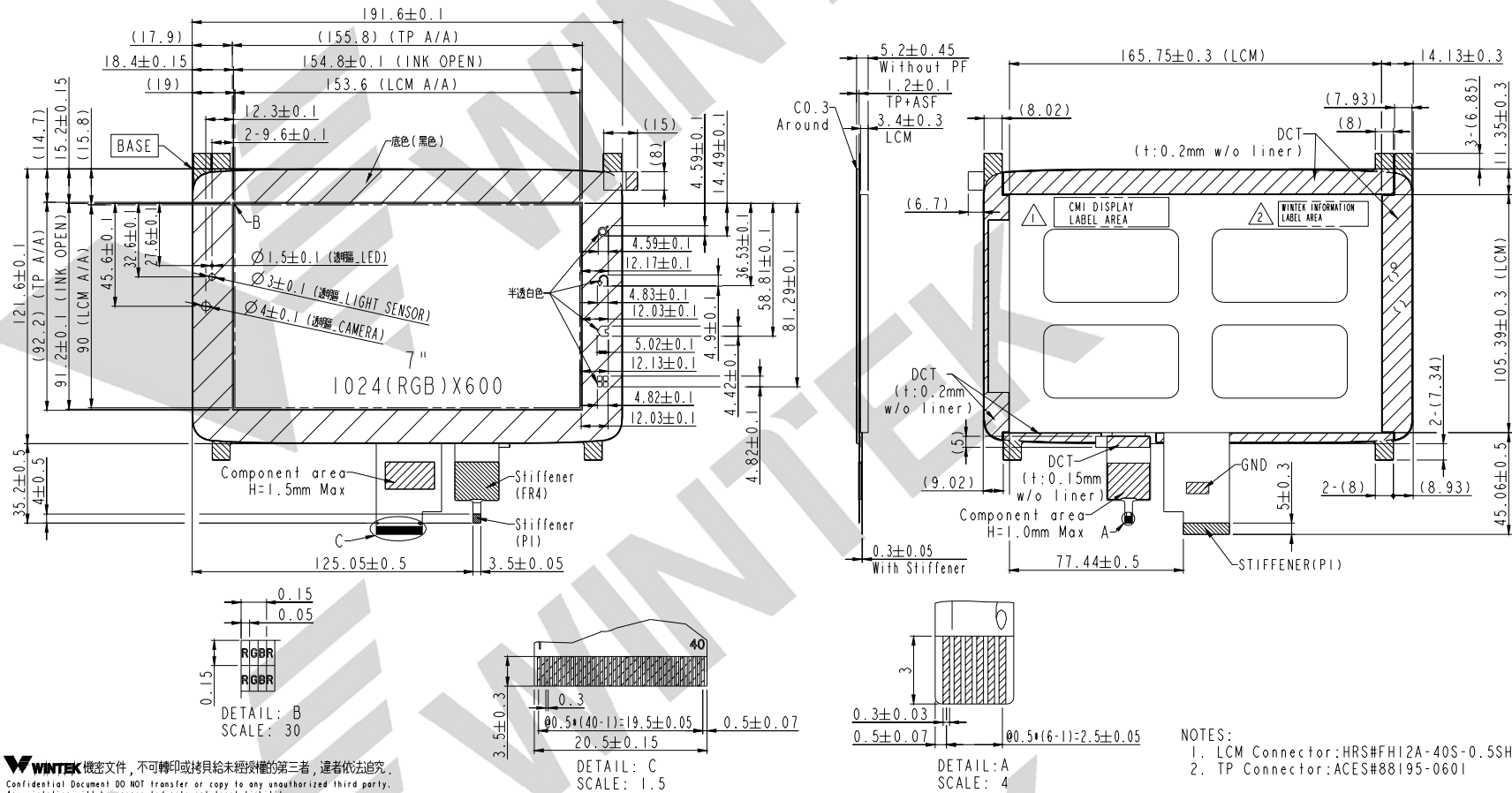
### 3.2 Optical Definitions



## (4) LCM Mechanical Units

### 4.1 LCM Mechanical Diagram

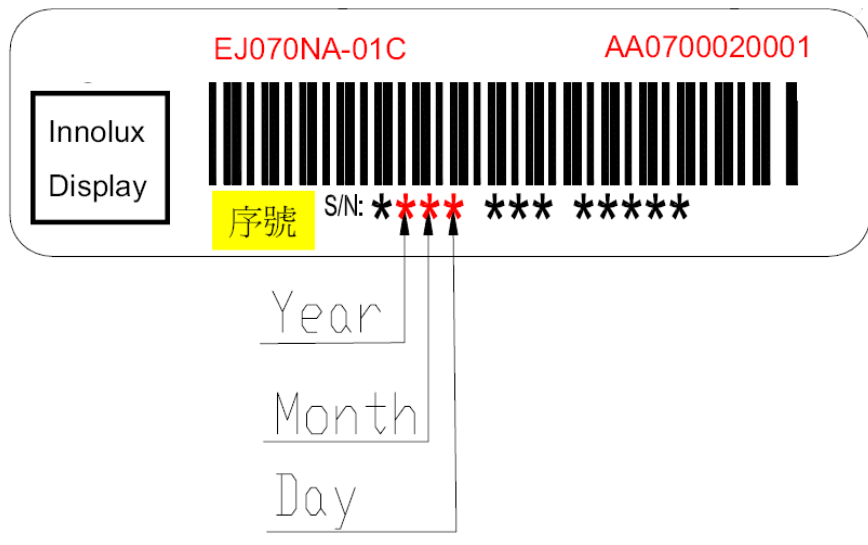
TOLERANCES NOT SPECIFIED: .X=±0.3 .XX=±0.30 .X°=±2° .XX°=±0.5°  
 (XXX.XX):REFERENCE DIMENSION (3) UNIT : mm



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 Any violation will be prosecuted relevant legal liability.

NOTES:  
 1. LCM Connector:HRS#FH12A-40S-0.5SH  
 2. TP Connector:ACES#88195-0601

## 4.2 CMI LCM BAR CODE INFORMATION



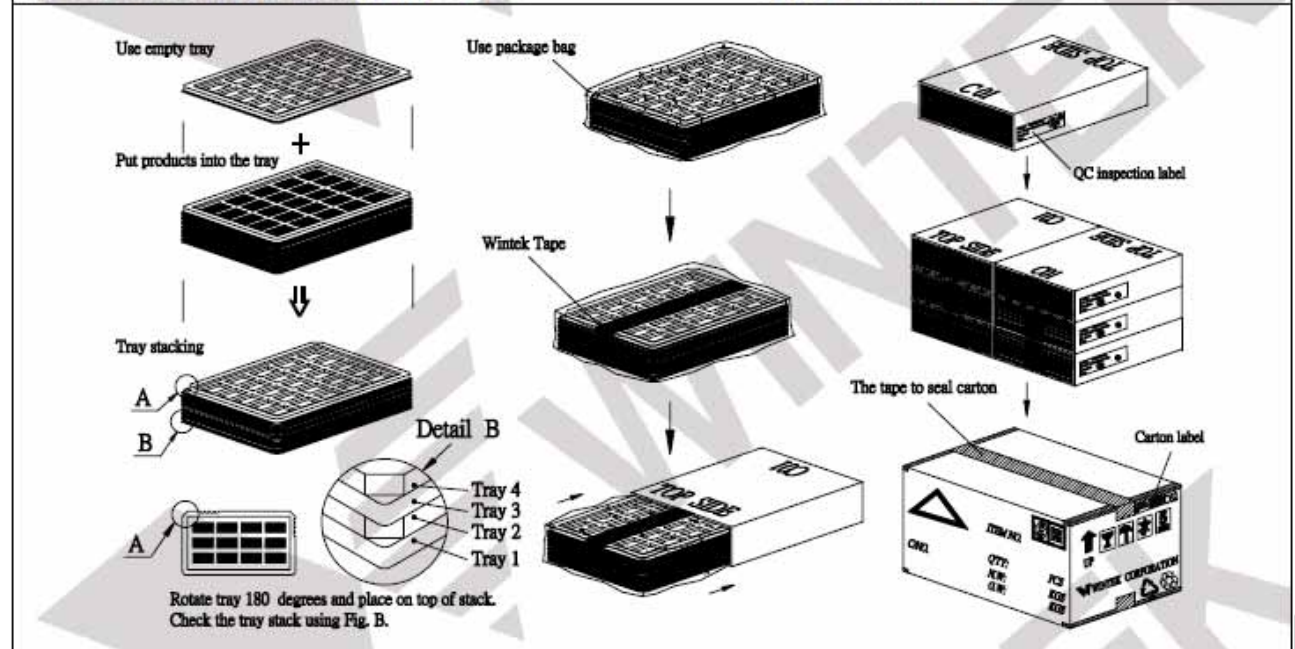
## 4.3 WINTEK PRINT DATECODE INFORMATION

WD-FD070V-NFLWf model xx/xx week/year  
XXXXXXXXXXXX LOT No:

## 4.4 Packing Method

Item	Model	Dimensions(mm)	Unit Weight(kg)	Quantity	
成品 (Product)	LCM	191.6*121.6	0.22	60	
Tray 盤 (Tray)	VR45	PET	320*217*16*1.0	0.1	36
包裝袋 (Package Bag)	C5	467*321*0.08	0.023	6	
內紙盒 (Product Box)	C01	320*219*70	0.131	6	
外紙箱 (Carton)	C62	475*345*250	0.857	1	
Label		85*70	0.002	1	
總重量 (Total Weight)		18.5 Kg ± 5%			

(1) LCM quantity per tray : no. per row	2 x no. per column 1 = 2
(2) LCM quantity per box : quantity per tray	2 x no. of trays 5 = 10
(3) Total LCM quantity in carton : quantity per box	10 x no. of boxes 6 = 60



		特記事項(Mark)
<p>(1). 品保標籤(QC Inspection Label)</p> <p>MODEL: (According to each order)</p> <p>LOT NO: (According to each order)</p> <p>QC CHECK: </p> <p>DATE:</p> <p>Qty:</p> <p>90.0</p> <p>32.0</p> <p>Label Color—Green</p>		
<p>(2). 外箱標籤(Carton Label)</p> <p>Quanta P/N: 3BNKZLAST20</p> <p>Manufacture P/N: WD-FD070V-NFLWb</p> <p>Qty: (依照數量規格表)</p> <p>Vendor code: WNK-WNK</p> <p>Date code: XXXX(年週)</p> <p>85</p> <p>70</p> <p>Label Color—White</p>		

## (5) Quality Units

### 5.1 Specification of Quality Assurance

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#### 5.1-1.Purpose

This standard for Quality Assurance should affirm the quality of LCD module products to supply to purchaser by WINTEK CORPORATION (Supplier).

#### 5.1-2.Standard for Quality Test

a. Inspection :

Before delivering, the supplier should take the following tests, and affirm the quality of product.

b. Electro-Optical Characteristics:

According to the individual specification to test the product.

c. Test of Appearance Characteristics:

According to the individual specification to test the product.

d. Test of Reliability Characteristics:

According to the definition of reliability on the specification for testing products.

e. Delivery Test:

Before delivering, the supplier should take the delivery test.

(i) Test method: According to **ANSI/ASQC Z1.4-2003.General Inspection Level take a single time.**

(ii) The defects classify of AQL as following:

Major defect: AQL=0.65

Minor defect: AQL=2.5

Total defects: AQL=2.5

#### 5.1-3.Nonconforming Analysis & Deal With Manners

a. Nonconforming analysis:

(i) Purchaser should supply the detail data of non-conforming sample and the non-suitable state.

(ii) After accepting the detail data from purchaser, the analysis of nonconforming should be finished in two weeks.

(iii) If supplier can not finish analysis on time, must announce purchaser before two weeks.

b. Disposition of nonconforming:

(i) If find any product defect of supplier during assembly time, supplier must change the good product for every defect after recognition.

(ii) Both supplier and customer should analyze the reason and discuss the disposition of nonconforming when the reason of nonconforming is not sure.

#### 5.1-4. Agreement items

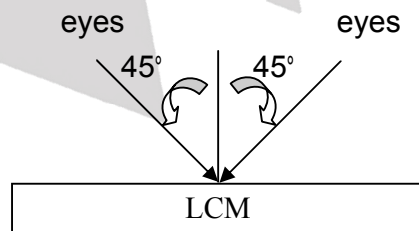
Both sides should discuss together when the following problems happen.

- a. There is any problem of standard of quality assurance, and both sides think that it must be modified.
- b. There is any argument item which does not record in the standard of quality assurance.
- c. Any other special problem.

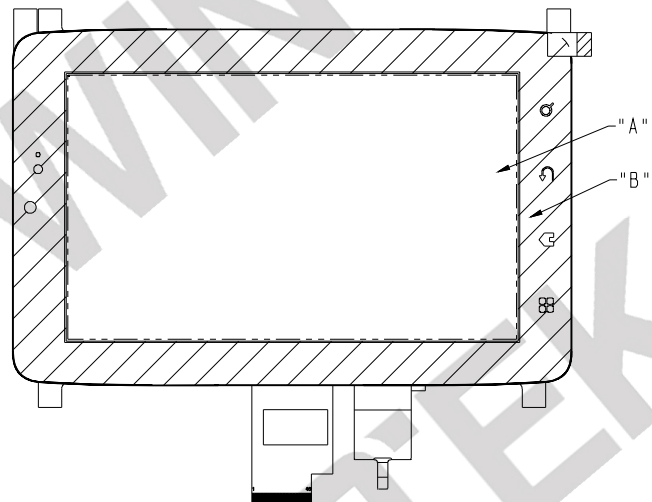
#### 5.1-5. Standard of The Product Appearance Test

a. Manner of appearance test:

- (i) The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30 cm.
- (ii) When display on use front-light test, while display off use back-light test.
- (iii) The test direction is base on about around 45° of vertical line.



(iv) Definition of area:



A Area : Viewing area.

B Area : Out of viewing area (Outside viewing area)

Any defect at area B could be ignored. If customer has particular requirement, this requirement should be clearly defined in inspection specification. If inspection specification has defined other criteria, the final judgement should follow the inspection specification .

b. Basic principle:

- (i) It will accord to the AQL when the standard can not be described.
- (ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.
- (iii) Must add new item on time when it is necessary.



## 5.1-6. Inspection specification



<b>Wintek Display TFT Module Inspection Criteria</b>		NO. M1L070012 Inspection Criteria
REVISION DATE: 2010/10/19	Version: V5.0	PAGE: 1 OF 10

## Wintek Display TFT Module Inspection Criteria

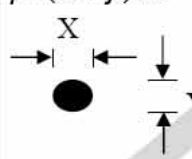
NOTE – All of the modification on inspection criteria are needed to record by proposer with signing.

<b>Wintek Display TFT Module Inspection Criteria</b>		<b>NO. M1L070012</b>
REVISION DATE: 2010/10/19		Version: V5.0
		PAGE: 2 OF 10

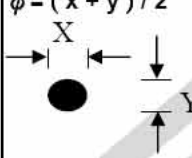
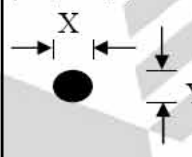
**Change History:**

ISSUE	DATE	ORIGINATOR	DETAILS OF CHANGE	PAGE
V1.0	2007,09,18	Alvin Wang	New Version	1~9
V2.0	2007,10,04	Alvin Wang	<b>Update Sec 02_LCM black, white spot, Inner dirt, bright and color dot.</b>	3,4
V3.0	2008,06,17	Shyn-Jeng Chen	<b>Update Sec 02_LCM black, white spot, Inner dirt, bright and color dot</b> Item 2.1.1: Modify table and regarding... Item 2.1.2: Modify table and regarding... Item 2.2.1: Modify table and regarding... Item 2.2.2: Modify table and regarding... Item 2.3.1: Modify table and regarding... Item 2.3.2: Modify table and regarding... <b>Update Sec 03_LCM Naked line, black&amp; white line.</b> Item 3.1.1: Modify table and regarding... Item 3.1.2: Modify table and regarding... Item 3.2.1: Modify table and regarding... Item 3.2.2: Modify table and regarding... Item 3.3.1: Modify table and regarding... Item 3.3.2: Modify table and regarding... <b>Update Sec 04_LCM Dot defect.</b> Item 4.1: Modify Dot defect inspection criteria; <b>Update Sec 05_LCM Polarizer.</b> Item 5.1: Modify Polarizer Bubble, dent, concave &convex dot inspection criteria;	3 3 4 4 4 4 5 5 5 5 6 6 6 7
V4.0	2009,12,11	Shyn-Jeng Chen	<b>Update Sec 03_LCM Naked line, black&amp; white line.</b> Item 3.1.1: Modify the LCM from CSTN to TFT. Item 3.2.1: Modify the LCM from CSTN to TFT. Item 3.3.1: Modify the LCM from CSTN to TFT.	5 5 6
V5.0	2010,10,19	Shyn-Jeng Chen	<b>Update Sec 02_LCM Black white spot, Inner dirt, bright and color dot</b> Item 2.4 : Add 8" ≤ Sample Size inspection criteria. Reason : To Standard 8" ≤ Sample Size inspection criteria. <b>Update Sec 03_Naked line, Black white line</b> Item 3.4 : Add 8" ≤ Sample Size inspection criteria. Reason : To Standard 8" ≤ Sample Size inspection criteria.	5 7

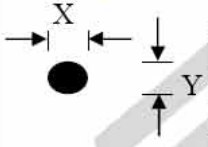
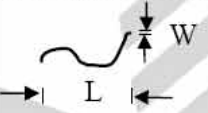
<b>Wintek Display TFT Module Inspection Criteria</b>		NO. M1L070012 Inspection Criteria
REVISION DATE: 2010/10/19	Version: V5.0	PAGE: 3 OF 10

No	Item	Criterion	AQL															
01	General test	1.1 Missing vertical or horizontal line, shallow vertical or horizontal line. 1.2 Missing character (including missing dot or excess dot), missing icon. 1.3 Display malfunction. 1.4 Stripe of same width or slanting stripe defect. (Tolerance: $\pm 45^\circ$ ) 1.5 No function or no display. 1.6 Current consumption, chromaticity and brightness exceed in product Specification. (The above Current consumption specified max. value) 1.7 Picture scanning program must be complete and continuous. 1.8 LCD viewing angle defect/error. 1.9 Mixed product types or versions. 1.10 For Touch Panel product test, T/P function must be normal.	Major defect															
02	LCM black, White spot, Inner dirt, bright and color dot	LCD Size < 3" Size inspection criteria  2.1 Spot type: (as following fig)  2.1.1 Applicable to LCM TFT, not including Touch Panel. $\phi = (x + y) / 2$  <table border="1"> <thead> <tr> <th>Size</th> <th>Acceptable Q'TY</th> <th>Minimum separated distance</th> </tr> </thead> <tbody> <tr> <td><math>\psi \leq 0.1\text{mm}</math></td> <td>Ignore</td> <td>Ignore (Accept dense)</td> </tr> <tr> <td><math>0.1\text{mm} &lt; \psi \leq 0.25\text{mm}</math></td> <td>Ignore</td> <td>Ignore (Accept no dense)</td> </tr> <tr> <td><math>0.25\text{mm} &lt; \psi \leq 0.35\text{mm}</math></td> <td>2</td> <td>5mm</td> </tr> <tr> <td><math>\psi &gt; 0.35\text{mm}</math></td> <td>0</td> <td>--</td> </tr> </tbody> </table>	Size	Acceptable Q'TY	Minimum separated distance	$\psi \leq 0.1\text{mm}$	Ignore	Ignore (Accept dense)	$0.1\text{mm} < \psi \leq 0.25\text{mm}$	Ignore	Ignore (Accept no dense)	$0.25\text{mm} < \psi \leq 0.35\text{mm}$	2	5mm	$\psi > 0.35\text{mm}$	0	--	Minor Defect
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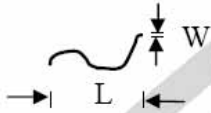

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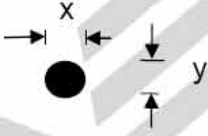

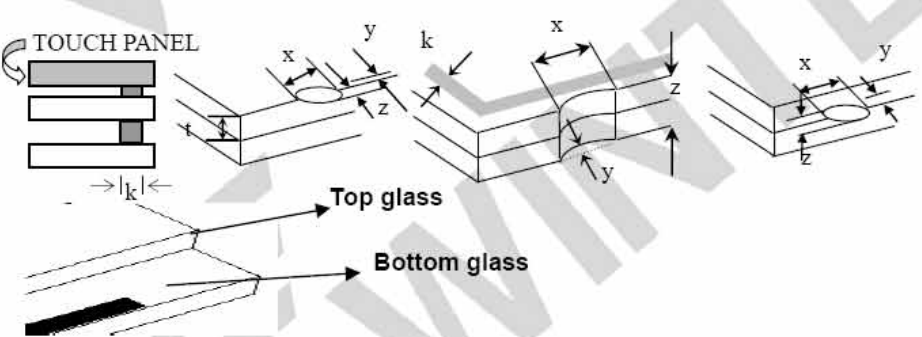
<b>Wintek Display TFT Module Inspection Criteria</b>		<b>NO. M1L070012</b>
REVISION DATE: 2010/10/19	Version: V5.0	Inspection Criteria
		PAGE: 6 OF 10

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<b>Wintek Display TFT Module Inspection Criteria</b>		<b>NO. M1L070012</b>
REVISION DATE: 2010/10/19		Version: V5.0
		PAGE: 7 OF 10

8" ≤ LCD Size Size inspection criteria																																
03	Naked line, black & white line	<p>3.4 Line type : ( as following fig )</p> <p>3.4.1 Applicable to LCM TFT, not including Touch Panel.</p>  <table border="1"> <thead> <tr> <th>Length (L)</th> <th>Width (W)</th> <th>Acceptable Q'TY</th> </tr> </thead> <tbody> <tr> <td>Ignore</td> <td><math>W \leq 0.03\text{mm}</math></td> <td>Ignore</td> </tr> <tr> <td><math>L \leq 8.0\text{mm}</math></td> <td><math>0.03\text{mm} &lt; W \leq 0.05\text{mm}</math></td> <td>8</td> </tr> <tr> <td><math>L \leq 5.0\text{mm}</math></td> <td><math>0.05\text{mm} &lt; W \leq 0.1\text{mm}</math></td> <td>6</td> </tr> <tr> <td>-</td> <td><math>0.1\text{mm} &lt; W</math></td> <td>0</td> </tr> </tbody> </table> <p>3.4.2 Touch Panel judgment specification as follow.</p> <table border="1"> <thead> <tr> <th>Length (L)</th> <th>Width (W)</th> <th>Acceptable Q'TY</th> </tr> </thead> <tbody> <tr> <td>Ignore</td> <td><math>W \leq 0.03\text{mm}</math></td> <td>Ignore</td> </tr> <tr> <td><math>L \leq 12.0\text{mm}</math></td> <td><math>0.03\text{mm} &lt; W \leq 0.05\text{mm}</math></td> <td>9</td> </tr> <tr> <td><math>L \leq 6.0\text{mm}</math></td> <td><math>0.05\text{mm} &lt; W \leq 0.1\text{mm}</math></td> <td>7</td> </tr> <tr> <td>-</td> <td><math>0.1\text{mm} &lt; W</math></td> <td>0</td> </tr> </tbody> </table> <p>Note: Applicable to all sizes.            ◎ Ignore non-viewing area            ◎ Judge as OK sample if defect is invisible in square viewing angle.</p>	Length (L)	Width (W)	Acceptable Q'TY	Ignore	$W \leq 0.03\text{mm}$	Ignore	$L \leq 8.0\text{mm}$	$0.03\text{mm} < W \leq 0.05\text{mm}$	8	$L \leq 5.0\text{mm}$	$0.05\text{mm} < W \leq 0.1\text{mm}$	6	-	$0.1\text{mm} < W$	0	Length (L)	Width (W)	Acceptable Q'TY	Ignore	$W \leq 0.03\text{mm}$	Ignore	$L \leq 12.0\text{mm}$	$0.03\text{mm} < W \leq 0.05\text{mm}$	9	$L \leq 6.0\text{mm}$	$0.05\text{mm} < W \leq 0.1\text{mm}$	7	-	$0.1\text{mm} < W$	0
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04	Dot defect	<p>4.1 Dot defect ( Array defect, clear and unclear included ) : ( as following fig )            ( applicable to TFT LCM, including T/P )</p>  <table border="1"> <thead> <tr> <th>Term</th> <th>Size</th> <th>Sub-pixel disabled</th> </tr> </thead> <tbody> <tr> <td>Inspect in pixel displayed</td> <td>LCD Size &lt; 3"</td> <td>3 (Note 1)</td> </tr> <tr> <td>Inspect in pixel displayed</td> <td>3" ≤ LCD Size ≤ 5"</td> <td>6 (Note 1)</td> </tr> <tr> <td>Inspect in pixel displayed</td> <td>5" &lt; LCD Size</td> <td>10 (Note 1)</td> </tr> </tbody> </table> <p>Note 1: The distance of 2-separated Sub-pixel failures within 5mm is not allowed.            ◎ Ignore non-viewing area.</p>	Term	Size	Sub-pixel disabled	Inspect in pixel displayed	LCD Size < 3"	3 (Note 1)	Inspect in pixel displayed	3" ≤ LCD Size ≤ 5"	6 (Note 1)	Inspect in pixel displayed	5" < LCD Size	10 (Note 1)																		
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<b>Wintek Display TFT Module Inspection Criteria</b>		<b>NO. M1L070012</b>
REVISION DATE: 2010/10/19	Version: V5.0	<b>Inspection Criteria</b>
		PAGE: 8 OF 10

05	Polarizer	<p>5.1 Bubble, dent, concave &amp; convex dot</p> <p>⊙ If bubble and concave &amp; convex dot are easily visible, judged by black spot Specification.</p> <p>⊙ If defect can only be found in particularly fixed angle, judged by this Specification.</p> $\phi = (x+y) / 2$  <table border="1" data-bbox="742 667 1396 896"> <thead> <tr> <th>Size</th> <th>Acceptable Q'TY</th> </tr> </thead> <tbody> <tr> <td><math>\phi \leq 0.20</math></td> <td>Ignore (accept no dense)</td> </tr> <tr> <td><math>0.20 &lt; \phi \leq 0.50</math></td> <td>3</td> </tr> <tr> <td><math>0.50 &lt; \phi \leq 1.00</math></td> <td>2</td> </tr> <tr> <td><math>1.00 &lt; \phi</math></td> <td>0</td> </tr> <tr> <td><b>Total QTY</b></td> <td><b>3</b></td> </tr> </tbody> </table> <p>⊙ Judge as OK sample if defect is invisible in square viewing angle.          ⊙ If defect can be found in square fixed angle, judged by the rule above.          ⊙ Ignore non-viewing area          ⊙ Applicable to whole size.</p>	Size	Acceptable Q'TY	$\phi \leq 0.20$	Ignore (accept no dense)	$0.20 < \phi \leq 0.50$	3	$0.50 < \phi \leq 1.00$	2	$1.00 < \phi$	0	<b>Total QTY</b>	<b>3</b>	Minor Defect
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$1.00 < \phi$	0														
<b>Total QTY</b>	<b>3</b>														
06	Scratches	<p>5.2 Polarizer falling off glue must less than <math>\leq 0.5\text{mm}</math>.</p> 	Minor Defect												
06	Scratches	Follow No 03 Naked line, black & white line													
07	Chipped glass	<p>Symbols :</p> <p>x: Chip length y: Chip width z: Chip thickness k: Sealant width          t: Glass thickness a: LCD length L: Electrode terminal length          T: T/P thickness</p> <p>7.1 General glass chip :</p> <p>7.1.1 Chip on the panel surface and crack between panels :</p> 	Minor Defect												

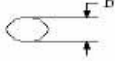



<b>Wintek Display TFT Module Inspection Criteria</b>		<b>NO. M1L070012</b>
REVISION DATE: 2010/10/19	Version: V5.0	Inspection Criteria
		PAGE: 9 OF 10

07	Chipped glass	<p>a. General TFT product (T/P not included, LCD viewable) :</p> <table border="1"> <thead> <tr> <th>Scope</th> <th>z : Chip thickness</th> <th>y : Chip width</th> <th>x : Chip length</th> </tr> </thead> <tbody> <tr> <td>Top, bottom glass</td> <td><math>z \leq 1/2t</math></td> <td><math>y \leq 0.8</math></td> <td>Ignore</td> </tr> <tr> <td>Top, bottom glass</td> <td><math>1/2t &lt; z &lt; t</math></td> <td><math>y \leq 0.6</math></td> <td>Ignore</td> </tr> <tr> <td>Top glass</td> <td><math>z = t</math></td> <td><math>y \leq 0.5(\text{Note 1})</math></td> <td>Ignore</td> </tr> <tr> <td>Bottom glass</td> <td><math>z = t</math></td> <td><math>y \leq 0.3(\text{Note 1})</math></td> <td>Ignore</td> </tr> </tbody> </table> <p>⊙ If chip width <math>\leq 0.10\text{mm}</math>, length and width should be omitted.          ⊙ Chip length should not affect LCM assembly.          Note 1: No damage or destruction of electrode circuit, conductible point and alignment mark.</p> <p>b. T/P product : (T/P glass)</p> <table border="1"> <thead> <tr> <th>x : length</th> <th>y : width</th> <th>z : thickness</th> </tr> </thead> <tbody> <tr> <td><math>x \leq 5.0\text{mm}</math></td> <td><math>y \leq 2.0\text{mm}</math></td> <td><math>z \leq T</math> (Ignore)</td> </tr> </tbody> </table> <p>⊙ If there are two or more chips, x is the total length of each chip.          ( For LCM+T/P structure, judged by T/P specification.</p> <p>c. LCD has been protected and not viewable</p> <p>⊙ Chip length should not affect LCM assembly.          ⊙ Chip thickness and width should not damage or destroy electrode circuit, conductible point and alignment mark.</p>	Scope	z : Chip thickness	y : Chip width	x : Chip length	Top, bottom glass	$z \leq 1/2t$	$y \leq 0.8$	Ignore	Top, bottom glass	$1/2t < z < t$	$y \leq 0.6$	Ignore	Top glass	$z = t$	$y \leq 0.5(\text{Note 1})$	Ignore	Bottom glass	$z = t$	$y \leq 0.3(\text{Note 1})$	Ignore	x : length	y : width	z : thickness	$x \leq 5.0\text{mm}$	$y \leq 2.0\text{mm}$	$z \leq T$ (Ignore)	Minor Defect
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08	Corner crack	<p>8.1 Corner crack</p> <p>a. General LCD TFT product (T/P not included, LCD viewable)</p> <table border="1"> <thead> <tr> <th>z : Chip thickness</th> <th>y : Chip width</th> <th>x : Chip length</th> </tr> </thead> <tbody> <tr> <td><math>z \leq 1/2t</math></td> <td><math>y \leq 1.0</math></td> <td>Ignore</td> </tr> <tr> <td><math>1/2t &lt; z \leq 2t</math></td> <td><math>y \leq 1.0</math> (Note 2)</td> <td>Ignore</td> </tr> </tbody> </table> <p>⊙ If chip width <math>\leq 0.10\text{mm}</math>, length and width should be omitted.          ⊙ Chip length should not affect LCM assembly.          Note2: No damage or destruction of electrode circuit, conductible point and alignment mark.</p>	z : Chip thickness	y : Chip width	x : Chip length	$z \leq 1/2t$	$y \leq 1.0$	Ignore	$1/2t < z \leq 2t$	$y \leq 1.0$ (Note 2)	Ignore	Minor Defect																	
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<b>Wintek Display TFT Module Inspection Criteria</b>		NO. M1L070012 Inspection Criteria
REVISION DATE: 2010/10/19	Version: V5.0	PAGE: 10 OF 10

08	Corner crack	<p>b. T/P product included : (T/P glass)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">x : length</td> <td style="text-align: center;">y : width</td> <td style="text-align: center;">z : thickness</td> </tr> <tr> <td style="text-align: center;"><math>x \leq 3.0\text{mm}</math></td> <td style="text-align: center;"><math>y \leq 3.0\text{mm}</math></td> <td style="text-align: center;"><math>z \leq T</math></td> </tr> </table> <ul style="list-style-type: none"> <li>⊙ Retain 1/2 width of T/P circuit for conductance.</li> <li>⊙ If there are two or more chips, x is the total length of each chip.</li> <li>⊙ For LCM + T/P structure · judged by T/P specification.</li> </ul> <p>c. LCD has been protected and not viewable</p> <ul style="list-style-type: none"> <li>⊙ Chip length should not affect LCM assembly.</li> <li>⊙ Chip thickness and width should not damage or destroy electrode circuit, conductible point and alignment mark.</li> </ul>	x : length	y : width	z : thickness	$x \leq 3.0\text{mm}$	$y \leq 3.0\text{mm}$	$z \leq T$	Minor Defect
x : length	y : width	z : thickness							
$x \leq 3.0\text{mm}$	$y \leq 3.0\text{mm}$	$z \leq T$							

Defect Type		Specification Size	Count(N)	Major	Minor
Dot Shape (Particle · Scratch and Bubbles in display area) 		$D \leq 0.25 \text{ mm}$	Ignored		
		$0.25 \text{ mm} < D \leq 0.5 \text{ mm}$	$N \leq 3$		•
		$D > 0.5 \text{ mm}$	$N=0$		
Newton Ring (Only for Touch panel)		$D \leq 70 \text{ mm}$	$N \leq 4$		•
		$D > 70 \text{ mm}$	$N=0$		
TSP Fish Eyes (Only for Touch panel) (Bubble/Dent)		$0.1 \text{ mm} < D \leq 0.2 \text{ mm}$	$N \leq 4$		•
		$0.2 \text{ mm} < D \leq 0.3 \text{ mm}$	$N \leq 3$		•
		$0.3 \text{ mm} < D \leq 0.4 \text{ mm}$	$N \leq 2$		
Line Shape (Particles · Scratch · Lint and Bubbles in display area) 		$W \leq 0.01 \text{ mm}$	Ignored		
		$0.01 \text{ mm} < W \leq 0.05 \text{ mm}$ and $L \leq 3 \text{ mm}$	$N \leq 3$		•
		$W > 0.05 \text{ mm}$ or $L > 3 \text{ mm}$	$N=0$		
Bubble in cell (active area)		It should be found by eyes			•
Bezel	Scratch	No harm			•
	Dirt				•
	Wrap				•
	Sunken				•
Label	No label	No			•
	Inverted label				•
	Broken				•
	Dirt	Word can be read.			•
	Not clear	No			•
	Word out of shape				•
	Mistake	No			•
	Position	Be attached on right position			•
Screw	Not enough	No			•
	Limp	No			•
Connector	Connection status	No bend on pins and damage			•
FPC/FFC	Broken	No			•

## 5.2 Standard Specification for Reliability



產品名稱：顯示器/觸控 模組 Product Name : Display/TP Module		<b>模組信賴性規格</b> <b>Product Reliability Test Standard</b>		頁次 Page : 1/3 規範編號 No : M3ET090001
適用範圍 Applied Scope		含電容式觸控面板中小尺寸顯示器模組 Medium/Small Size Display Module with Capacitive Touch Panel		
版本 Version	修改者 Reviser	版次履歷 History	日期 Date	
V1.0	陳世正	New Version 新版本	2009,01,06	
V2.0	陳世正	1. To modify High temperature resistance Description. To delete the statement" and allowing it stand for 30 minutes." 修改耐高溫性描述 刪除 allow it stand for 30 minutes 的描述 2. To modify Low temperature resistance Description. To delete the statement" and allowing it stand for 24 hours." 修改耐低溫性描述 刪除 allow it stand for 24 hours 的描述 3. To modify Chinese-English Version 修改為中英文版本	2009,02,23	
V3.0	陳世正	1. To modify cycle times of Thermal shock resistance from 20 to 30 times 修改耐熱衝擊性循環次數由 20 次改為 30 次 2. To modify Product Name and Applied Scope 修改產品名稱及適用範圍	2010,11,19	
2009/1/06 發行 Issued : 2009/1/06		核准 Approval	審查 Survey	提案 Proposal
2010/11/29 第 2 次修訂 Revision : the 2 Edition		王文宏	林志強	陳世正

產品名稱：顯示器/觸控 模組 Product Name : Display/TP Module	模組信賴性規格 Product Reliability Test Standard	頁次 Page : 2/3 規範編號 No : M3ET090001
適用範圍 Applied Scope	含電容式觸控面板中小尺寸顯示器模組 Medium/Small Size Display Module with Capacitive Touch Panel	

## 1. Standard Specifications for Reliability of LCD Module

### 液晶顯示器模組信賴性規格

NO	Test Item	測試條件 / Description of Test Condition
01	High temperature Operation 高溫操作	Operating temperature (high) of the sample should be allowed to stand for 240 hours under driving condition. 在高溫動態條件下放置 240 小時
02	Low temperature Operation 低溫操作	Operating temperature (low) of the sample should be allowed to stand for 240 hours under driving condition. 在低溫動態條件下放置 240 小時
03	High temperature resistance 耐高溫性	Storage temperature (high) of the sample should be allowed to stand for 240 hours under no-load condition, and then returning it to normal temperature condition. 在高溫靜態條件下放置 240 小時，然後將它放回室溫條件
04	Low temperature resistance 耐低溫性	Storage temperature (low) of the sample should be allowed to stand for 240 hours under no-load condition, then returning it to normal temperature condition. 在低溫靜態條件下放置 240 小時，然後將它放回室溫條件
05	Moisture resistance 耐濕性	The sample should be allowed to stand at 60 °C, 90% RH MAX for 240 hours under no-load condition excluding the polarizer, then taking it out and drying it at normal temperature. 在 60 °C 最大濕度 90% RH 的靜態條件下放置 240 小時，然後將它放回室溫條件下晾乾
06	Thermal shock resistance 耐熱衝擊性	The sample should be allowed to stand the following 30 cycles of storage: Storage temperature (low) for 30 minutes → normal temperature for 5 minutes → storage temperature (high) for 30 minutes → normal temperature for 5 minutes as one cycle. 產品在以下環境中循環 30 次： 低溫條件中 30 分鐘 室溫下 5 分鐘 高溫條件下 30 分鐘 室溫下 5 分鐘 以上為一個循環

Notes : Please refer to section 1.1 Absolute Maximum Ratings to mention the operating temperature and storage temperature.

注意：請參考 section 1.1 操作溫度與存儲溫度的等級

產品名稱：顯示器/觸控 模組 Product Name : Display/TP Module	<b>模組信賴性規格</b> <b>Product Reliability Test Standard</b>	頁次 Page : 3/3 規範編號 No : M3ET090001
適用範圍 Applied Scope	含電容式觸控面板中小尺寸顯示器模組 Medium/Small Size Display Module with Capacitive Touch Panel	

## 2. Testing Conditions and Inspection Criteria

### 測試條件&檢驗規範

For the final test the testing sample must be stored at room temperature for 24 hours, after the tests listed in Table 4.2-1, Standard specifications for Reliability have been executed in order to ensure stability.

在 4.2-1 表中的信賴性試驗完成後，模組必須在室溫環境下放置 24 小時再進行最終檢驗，以保證測試結果的可靠性。

NO	Item	Test Model	Inspection Criteria
01	Current Consumption 耗電流	Refer To Specification 參考規格表	The current consumption should conform to the product specification. 耗電流應符合產品規格表
02	Contrast 對比度	Refer To Specification 參考規格表	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests. 經過測試後的對比度必須大於測試前的一半
03	Appearance 視效	Visual inspection 目測	Defect free. 無缺陷

## 3. Life Time

Life time 壽命	<p>Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (<math>25 \pm 10^{\circ}\text{C}</math>), normal humidity (<math>45 \pm 20\% \text{RH}</math>), and in area not exposed to direct sun light. (Life time of backlight, please refer to “Data about backlight”.)</p> <p>在室溫(<math>25 \pm 10^{\circ}\text{C}</math>),正常濕度(<math>45 \pm 20\% \text{RH}</math>)無直接日光照射條件下正常操作或存儲, 在 50000 小時內功能, 特性, 視效等應該無明顯衰退(背光壽命請參考“Data about backlight”)</p>
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Note: From our experience the life time of high humidity operation and high temperature operation as above mentioned could be achieved.

注意：根據我們的經驗，高溫高濕操作可能會超出以上提到的。

## 5.3 Precautions in Use of LCM

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### 5.3-1 Handling of LCM

- Don't give external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.

### 5.3-2 Storage

- Store in an ambient temperature of  $25 \pm 5$  , and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
- Storage in a clean environment, free from dust, active gas, and solvent.
- Store in anti-static electricity container.
- Store without any physical load.

### 5.3-3 Soldering

- Use the Sn-Ag-Cu (96.5, 3.0, 0.5) solder
- Iron : Temperature 300 and less than 5-6 sec during soldering.
- Rewiring : no more than 3 times.

### 5.3-4 Assembly

The front polarizer is covered with a protective foil which should be removed before use.

## (6) Substance Management Units

### 6.1 Product Substances Management Documentation

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	1/20

History of Version				
Version	Description	Date	Creator	Approver
1	本檢驗規格依據環資"客戶產品環保規範"	30-Nov-2005	盧承劭	陳志明
2	依據客戶"Quanta Material Restricted for Use", 2008.09.01 文件進行修訂	3-Sep-2008	王永豪	吳學智
3	依據客戶"Quanta Material Restricted for Use", 2010.02.24 文件進行修訂	2010/07/20	連志賢	尤鵬智
4	依據客戶"Quanta Material Restricted for Use", 2011.05.01 文件進行修訂	2011/6/30	鐘凱彥	王國欣



RoHS Directive Requirements	No	C21-4		
	VER	4	Page	2/20

### A. Prohibited Substances List (禁用物質表)

Item 項目	Material 管制物質	Controlled Applications 管制範圍	Unit 單位	Compliance Level 環保等級		
				EP	EU	EUL
1	2,4,6-Tri-t-Butylphenol 三異丁基苯	All applications 所有範圍均適用	ppm	N.D	-	-
2	4-Nitrobiphenyl and its salt 4-硝基聯和它的鹽	All applications 所有範圍均適用	ppm	N.D	-	-
3	Aldrin 艾氏劑	All applications 所有範圍均適用	ppm	N.D	-	-
4	Alkylphenols 烷基苯酚	All applications 所有範圍均適用	ppm	1000	-	-
5	Asbestos and its Compounds 石棉和它的化合物	All applications 所有範圍均適用	ppm	N.D	-	-
6	Azocolourants and azodyes which form certain aromatic amines 偶氮染料和顏料構成某些芳香胺	(1) In textile and leather articles which may come into direct and prolonged contact with human skin. 紡織和皮革品 (2) In colorants for textile and leather articles. 有著色紡織和皮革品	ppm	(1)30 (2)1000	-	-
7	Benzene 苯	All applications 所有範圍均適用	ppm	(1)5 (Free status) (2)1000 (article)	-	-

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	3/20

8	Bis(chloromethyl)ether 雙醚	All applications 所有範圍均適用	ppm	N.D	-	-
9	Chlordanes 氯丹	All applications 所有範圍均適用	ppm	N.D	-	-
10	Chlorinated Hydrocarbons 氯化碳氫化合物	(1)All applications 所有範圍均適用 (3) In cleaning agents and adhesives. 清潔劑和膠黏劑	ppm	(1)1000 (2)N.D	-	-
11	Coal Tar Distillates, heavy oils 煤焦油餾分油、重油	All applications 所有範圍均適用	ppm	1000	-	-
12	Coal Tar Distillates, heavy oils,pyrene fraction 煤焦油餾分油、重油、芘分數	All applications 所有範圍均適用	ppm	1000	-	-
13	Coal Tar Distillates, heavy oils, pyrene fraction 煤焦油餾分油、重油、芘分數	Wood 木材	ppm	N.D	-	-
14	Coal Tar Residues, pitch distn 煤焦油殘渣、瀝青輕油	All applications 所有範圍均適用	ppm	1000	-	-
15	Creosote, coal tar, tar oils, anthracene substances 木餾油、煤焦油、焦油、蔥物質	Prohibited for the treatment of wood 禁止為治療木材	ppm	N.D	-	-
16	Cyclohexane 環己烷	Adhesive 膠粘劑	ppm	1000	-	-
17	DDT 二氯二苯三氯乙烷	All applications 所有範圍均適用	ppm	N.D	-	-
18	Dibutyltin (DBT) compounds 二丁基錫化合物	All applications 所有範圍均適用	ppm	1000	-	-
19	Dieldrin 殺蟲劑	All applications 所有範圍均適用	ppm	N.D	-	-

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	4/20

20	Dimethylformamide (DMF) 二甲基甲醯胺	All applications 所有範圍均適用	ppm	0.1	-	-
21	Dioctyltin (DOT) compounds 二辛基錫化合物	Textile and leather	ppm	1000	-	-
22	Dioxins 戴奧辛	All applications 所有範圍均適用	ppm	N.D	-	-
23	Diphenylether, octabromo derivative (C <sub>12</sub> H <sub>2</sub> Br <sub>8</sub> O) 二苯醚·八溴衍生物	All applications 所有範圍均適用	ppm	1000	-	-
24	Di-u-oxo-di-n-butylstanniohydrox Yborane (DBB) 二-m-氧-二-n-丁基-錫羥基 xy 硼烷	In preparations 準備	ppm	1000	-	-
25	Endrin 殺蟲藥	All applications 所有範圍均適用	ppm	N.D	-	-
26	Expanded polystyrene (EPS) 聚苯乙烯	Packaging to South Korea 包裝給南韓	ppm	N.D	-	-
27	Fluorinated Greenhouse Gases 氟化溫室氣體	All applications 所有範圍均適用	ppm	N.D	-	-
28	Formaldehyde 甲醛	(1) Wooden material in electronic and mechanical components of final product. 木製材料在電子 和機械的完成品 零件 (2) Textile 紡織品	ppm	(1) N.D (2) 75	-	-
29	Halogenated Diphenyl Methanes 鹵代甲烷二苯基	All applications 所有範圍均適用	ppm	N.D	-	-

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	5/20

30	Hexachlorobenzene 六氯苯	All applications 所有範圍均適用	ppm	N.D	-	-
31	Hexachlorobutadiene 六氯丁二烯	All applications 所有範圍均適用	ppm	N.D	-	-
32	Hexachlorobenzene isomers(HCH) 六氯苯異構體	All applications 所有範圍均適用	ppm	N.D	-	-
33	Kelthane 三氯殺醇	All applications 所有範圍均適用	ppm	N.D	-	-
34	Lead carbonates 鉛碳酸鹽	Paint 塗料	ppm	100	-	-
35	Lead sulphates 鉛硫酸鹽	Paint 塗料	ppm	100	-	-
36	Methyl chloroform 甲基氯仿	All applications 所有範圍均適用	ppm	N.D	-	-
37	Mirex 滅蟻靈	All applications 所有範圍均適用	ppm	N.D	-	-
38	Monomethyl-dibromo-diphenylmethane bromobenzylbromotoluene, mixture of isomers(DBBT) 单甲基二溴二苯基甲烷	All applications 所有範圍均適用	ppm	1000	-	-
39	N,N'-ditolyl-p-phenylenediamin, N-tolyl-N'-xyly l-p-phenylenediamine or N, N'-dixylyl-p-phenylene diamine 二甲苯基对苯二胺	All applications 所有範圍均適用	ppm	N.D	-	-
40	Nickel and its Compounds 鎳和它的化合物	Components that intended to come into direct and prolonged contact with the skin 會跟皮膚長期接 觸的物質	ppm	0.5ug/cm2/week	-	-

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	6/20

41	Nonylphenol/ethoxylates (NP/NPEs) and related substances 壬基酚/聚氧乙烯醚和 有關物質	All applications 所有範圍均適用	ppm	1000	-	-
42	Organic Tin compounds 有機的錫化合物	All applications 所有範圍均適用	ppm	N.D	-	-
43	Ozone Depleting Substances 消耗臭氧層物質	All applications 所有範圍均適用	ppm	N.D	-	-
44	Pentachlorophenol(PCP) and its salts and esters 五氯苯酚及其鹽類和酯類	All applications 所有範圍均適用	ppm	1000	-	-
45	Perfluorooctane sulfonates (PFOS) 全氟辛烷磺酸鹽	(1)All application, exception is applicable to PFOS directive 所有範圍均適用 例外於 PFOS 指令  (2)In preparations, exception is applicable to PFOS directive 在準備工作均適用 例外於 PFOS 指令  (3)Textile, Leather and coating 紡織·皮革·塗	ppm	(1)1000 (2)50 (3)1 (4)-	-	-

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	7/20

		料 (4)PFOS using in part is application for exemption of PFOS directive PFOS 使用部分 申請豁免 PFOS 指令				
46	Polychlorinated Biphenyls (PCBs) and specific substitutes 多氯聯苯和具體的替代品	All applications 所有範圍均適用	ppm	N.D	-	-
47	Polychlorinated dibenzodioxins (PCDDs) 多氯二苯	All applications 所有範圍均適用	ppm	N.D	-	-
48	Polychlorinated dibenzofurans (PCDDs) 多氯二苯並呋喃	All applications 所有範圍均適用	ppm	N.D	-	-
49	Polychlorinated Naphthalenes (PCNs) 多氯化萘	All applications 所有範圍均適用	ppm	N.D	-	-
50	Polychlorinated Terphenyls (PCTs) 多氯三聯苯	All applications 所有範圍均適用	ppm	N.D	-	-
51	Polycyclic aromatic hydrocarbons (PAHs) 多環芳香烴	(1)Long-term skin contact: External cases for portable device, Desktop keyboard and mouse, Portable computer input devices, External Power Suppliers, Cables	ppm	(1)Benzo[a]pyren:1 Sum 16 PAH (EPA):10 (2)Benzo[a]pyren:20 Sum 16 PAH(EPA):200	-	-

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	8/20

	<p>長期皮膚接觸： 外部案件的便攜設備，台式機的鍵盤和鼠標，便攜式計算機的輸入設備，外部電源供應器，電纜</p> <p>(2)Short-term skin contact or without skin contact: External cases for stationary devices, Desktop PCs, Monitors, External Power Suppliers, Power Cables</p> <p>短期皮膚接觸或不接觸皮膚：外部案件的固定裝置，桌上型電腦，顯示器，外部電源供應器，電源線</p> <p>(3)Testing and Validation of Polycyclic Aromatic Hydrocarbons (PAH) in the course of</p>				
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RoHS Directive Requirements	No	C21-4		
	VER	4	Page	9/20

		GS-Mark Certification, Zek 01-08 測試和驗證的多環芳烴 (PAH) 在使用過程中的 GS - Mark 認證, ZEK 01-08				
52	Radioactive Substances (Radioactive Isotope) 放射性物質	All applications 所有範圍均適用	ppm	N.D	-	-
53	Specific benzotriazole 特定苯並三氮唑	All applications 所有範圍均適用	ppm	N.D	-	-
54	Toluene 甲苯	In adhesives and spray paints	ppm	1000	-	-
55	Toxaphene 毒殺芬	All applications 所有範圍均適用	ppm	N.D	-	-
56	Tri-(1-aziiridinyI) 三(1-氮丙啶基)	textile articles 紡織製品	ppm	N.D	-	-
57	Tri-(2,3-dibromo-propyl) Phosphate 三(2,3-二溴丙基)磷酸酯	textile articles 紡織製品	ppm	N.D	-	-
58	Tri-substituted organostannic Compounds 三取代有機錫化合物	All applications 所有範圍均適用	ppm	1000	-	-
59	Yellow Phosphorus 黃磷	All applications 所有範圍均適用	ppm	N.D	-	-



RoHS Directive Requirements	No	C21-4		
	VER	4	Page	10/20

## B. Halogen-Free (HF) Requirements

### 無鹵素(Halogen Free)要求規範

Item 項目	Material 管制物質	Controlled Applications 管制範圍	Unit 單位	Compliance Level 環保等級		
				EP	EU	EUL
1	Bromine (Br) 溴	All applications 所有範圍均適用	ppm	900	-	-
2	Chlorine (Cl) 氯	All applications 所有範圍均適用	ppm	900	-	-
3	Total Br+Cl 總溴和總氯	All applications 所有範圍均適用	ppm	1500	-	-
備註	1. N.D: Not Detected (< MDL 低於最低偵測極限) 2. Environmental compliance level 環保等級定義如下圖					

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	11/20

### 溴和氯物質(Bromine and Chlorine Substance)要求規範

Item 項目	Material 管制物質	Controlled Applications 管制範圍	Unit 單位	Compliance Level 環保等級		
				EP	EU	EUL
1	Brominated Flame Retardants (BFRs) 溴	All applications with no exceptions 所有範圍均適用沒有例外	ppm	900	-	-
2	Chlorinated Flame Retardants (CFRs) 氯	All applications with no exceptions 所有範圍均適用沒有例外	ppm	900	-	-
3	Polyvinyl chloride (PVC) 聚氯乙烯	All applications with no exceptions 所有範圍均適用沒有例外	ppm	Negative	-	-
4	Tertabromobisphenol A, TBBPA 四溴双酚 A	All applications 所有範圍均適用	Ppm	900		
5	Hexabromocyclododecane (HBCCD) 六溴环十二烷	All applications 所有範圍均適用	Ppm	900		
6	Short-chain Chlorinated Paraffins (C10-C13) 短鍊氯化石蠟	All applications 所有範圍均適用	Ppm	900		
7	Medium-chained chlorinated paraffins C14-C17 (MCCP) 中鍊氯化石蠟	All applications 所有範圍均適用	ppm	900		

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	12/20

### C. Substances for reporting (物質的報告)

Item 項目	Material 管制物質	Controlled Applications 管制範圍	Unit 單位	Compliance Level 環保等級		
				EP	EU	EUL
1	Antimony its compounds 錫及其化合物	All applications 所有範圍	ppm	-	-	-
2	Antimony Trioxide (Sb2O3) 三氧化二錫	All applications 所有範圍	ppm	-	-	-
3	Arsenic and its compounds 砷及其化合物	All applications 所有範圍	ppm	-	-	-
4	Beryllium and its compounds 鈹及其化合物	All applications 所有範圍	ppm	-	-	-
5	Bismuth and its compounds 鉍及其化合物	All applications 所有範圍	ppm	-	-	-
6	Bisphenol A 雙酚 A	All applications 所有範圍	ppm	-	-	-
7	Brominated Flame Retardants 溴化阻燃劑	All applications 所有範圍	ppm	-	-	-
8	Chlorinated Flame Retardants (CFRs) 氯化阻燃劑	All applications 所有範圍	ppm	-	-	-
9	DHTDMAC, DODMAC/DSDMAC, DTDMAC (surfactants and its compounds) 表面活性劑及其化合物	All applications 所有範圍	ppm	-	-	-
10	Expanded polystyrene (EPS) 發泡聚苯乙烯	All packaging Materials 所有包裝材料	ppm	-	-	-
11	Hexabromocyclododecane (HBCDD) 六溴	All applications 所有範圍	ppm	-	-	-
12	Medium-chained chlorinated	All applications	ppm	-	-	-

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	13/20

	paraffins C14-17(MCCP) 中鏈氯化石蠟	所有範圍				
13	Musk ketone 麝香酮	All applications 所有範圍	ppm	-	-	-
14	Nickel and its Compounds 鎳及其化合物	All applications 所有範圍	ppm	-	-	-
15	Phthalates(other than DEHP, DBP, BBP, DINP, DIDP, DnOP, DnHP, DIBP) 鄰苯二甲酸鹽類	All applications 所有範圍	ppm	-	-	-
16	Bis(2-ethylhexyl) phthalate(DEHP) 鄰苯二甲酸二(2-乙基己基)酯	All applications 所有範圍	ppm	-	-	-
17	Dibutyl Phthalate (DBP) 鄰苯二甲酸二丁酯	All applications 所有範圍	ppm	-	-	-
18	Benzyl butyl phthalate (BBP) 苯二甲酸苄丁酯	All applications 所有範圍	ppm	-	-	-
19	Diisononyl phthalate (DINP) 二異壬酯	All applications 所有範圍	ppm	-	-	-
20	Diisodecyl phthalate (DIDP) 二異癸酯	All applications 所有範圍	ppm	-	-	-
21	Di-n-octyl phthalate (DOnP) 鄰苯二甲酸二丁酯	All applications 所有範圍	ppm	-	-	-
22	Di-n-hexyl phthalate (DnHP) 苯二甲酸二己酯	All applications 所有範圍	ppm	-	-	-
23	Diisobutyl phthalate (DIBP) 鄰苯二甲酸二異丁酯	All applications 所有範圍	ppm	-	-	-
24	Perchlorate Compounds 高氯酸鹽	Batteries and Battery Packs 電池及電池包裝	ppm	-	-	-
25	Perfluorooctyl acid (PFOA) and individual salts and	All applications 所有範圍	ppm	-	-	-

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	14/20

	esters of PFOA 全氟辛酸					
26	Phosphorus (P) and its compounds 所有範圍	All applications 所有範圍	ppm	-	-	-
27	Polyvinyl chloride (PVC) 聚氯乙稀	All applications 所有範圍	ppm	-	-	-
28	Selenium and its compounds 硒及其化合物	All applications 所有範圍	ppm	-	-	-
29	Short-chain Chlorinated Paraffins (C10-C13) 短鏈氯化石蠟	All applications 所有範圍	ppm	-	-	-
30	Tetrabromobisphenol A, TBBPA 四溴雙酚 A	All applications 所有範圍	ppm	-	-	-
31	Triclosan 三氯沙	All applications 所有範圍	ppm	-	-	-

## G. REACH Requirements (REACH 要求規範)

跟據最新的 Substances of Very High Concern (SVHC)列表, 請依循 REACH 網站和 Green Quant 網站

(1) REACH 網站:

[http://ec.europa.eu/environment/chemicals/reach/reach\\_intro.htm](http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm)

[http://echa.europa.eu/chem\\_data/authorisation\\_process/candidate\\_list\\_table\\_en.asp](http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp)

(2) Green Quanta 網站:

<http://green.quantatw.com/index.htm>

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	15/20

### EU RoHS Exemptions(歐盟排外條款)

Items	Exemption Clauses
1	Mercury in compact fluorescent lamps not exceeding 5 mg per lamp 小型日光燈中的汞含量不得超過 5 毫克/燈
2	Mercury in straight fluorescent lamps for general purposes not exceeding: - halophosphate 10 mg - triphosphate with normal lifetime 5 mg - triphosphate with long lifetime 8 mg. 一般用途的直管日光燈中的汞含量不得超過： - 含鹵素磷酸鹽 10 毫克 - 三磷酸鹽 5 毫克 - 長效三磷酸鹽 8 毫克
3	Mercury in straight fluorescent lamps for special purposes. 特殊用途的直管日光燈中的汞含量
4	Mercury in other lamps not specifically mentioned in annex of 2002/95/EC. 2002/95/EC 附件中未特別提及的其它照明燈中的汞含量
5	Lead in glass of cathode ray tubes, electronic components and fluorescent tubes. 陰極射線管、電子零件和發光管的玻璃內的鉛含量
6	Lead as an alloying element in steel containing up to 0.35% lead by weight, aluminium containing up to 0.4% lead by weight and as a copper alloy containing up to 4% lead by weight. 鋼中合金元素中的鉛含量達 0.35%、鋁含量達 0.4%、銅合金中的鉛含量達 4%
7	- lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead) - lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission as well as network management for Telecommunications - Lead in electronic ceramic parts (e.g.piezoelectronic devices) - 高熔點鉍錫中的鉛(如：鉛含量 ≥85% 的合金中的鉛)； - 用於伺服器、記憶體和存儲陣列系統的焊料中的鉛。用於交換、信號產生和傳輸、以及電信網路管理的網路基礎設施設備焊料中的鉛 - 電子陶瓷零件中的鉛 (e.g.piezoelectronic devices)

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	16/20

8	<p>Cadmium and its compounds in electrical contacts and cadmium plating except for applications banned under Directive 91/338/EEC (1) amending Directive 76/769/EEC (2) relating to restrictions on the marketing and use of certain dangerous substances and preparations</p> <p>電接點中的鎘及鎘化合物以及 91/338/EEC 指令限制範圍以外的鎘電鍍層中的鎘</p>
9	<p>Hexavalent chromium as an anti-corrosion of the carbon steel cooling system in absorption refrigerators.</p> <p>在電冰箱中作為碳鋼冷藏系統防腐劑的六價鉻</p>
10	<p>Lead used in compliant pin connector systems</p> <p>順應針連接系統中使用的鉛</p>
11	<p>Lead as a coating material for the thermal conduction module c-ring</p> <p>熱導槍釘模組塗層中所用的鉛</p>
12	<p>Lead and cadmium in optical and filter glass</p> <p>光學玻璃及濾光玻璃中所用的鉛及鎘</p>
13	<p>Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80% and less than 85% by weight</p> <p>微處理器針腳及封裝連接所使用的含兩種以上組成焊料中的鉛 (鉛含量在 80%-85% 之間)</p>
14	<p>Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit Flip Chip packages</p> <p>用於焊接半導體終端和集成電路板載體焊料中的鉛</p>
15	<p>DecaBDE in polymeric applications</p> <p>聚合體中使用的十溴聯苯醚</p>
16	<p>Lead in lead-bronze bearing shells and bulbs</p> <p>在鉛-銅軸承外殼的鉛</p>
17	<p>Lead in linear incandescent lamps with silicate coated tubes</p> <p>管狀白熾燈矽酸鹽塗層燈管中的鉛</p>
18	<p>Lead halide as radiant agent in High Intensity Discharge (HID) lamps used for professional reprography applications</p> <p>用於專業複印設備之高強度放電燈 (HID) 中的鹵化鉛發光劑</p>

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	17/20

19	<p>Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP (BaSi2O5:Pb) as well as when used as specially lamps for diazo-printing reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as SMS ((Sr,Ba)2MgSi2O7:Pb).</p> <p>仿日曬含磷 (例如: BSP) 放電燈中螢光粉的鉛活化劑 (鉛含量 1%以下), 以及二氮化合物印刷、平版印刷複印、捕蟲器、光化學及硬化製程使用的含磷 (例如: SMS) 放電燈中螢光粉的鉛活化劑</p>
20	<p>Lead with PbBiSn-Hg and PbInSn-Hg in specific compositions as main amalgam and with PbSn-Hg as auxiliary amalgam in very compact Energy Saving Lamps (ESL)</p> <p>小型省能燈泡中含 PbBiSn-Hg 及 PbInSn-Hg 成分之主要汞合金中的鉛以及含 PbSn- 之輔助汞合金中的鉛</p>
21	<p>Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for Liquid Crystal Displays (LCD)</p> <p>液晶顯示器中連接前後平版螢光燈基質的玻璃中的氧化鉛</p>
22	<p>Lead and cadmium in printing inks for the application of enamels on borosilicate glass.</p> <p>用於硼矽玻璃瓷漆的印墨中的鉛及鎘</p>
23	<p>Lead as impurity in RIG (rare earth iron gamet) Faraday rotators used for fibre optic communication systems.</p> <p>用於光纖通訊系統, 以稀土鐵石榴石晶體製成的法拉第旋轉器中作為雜質的鉛</p>
24	<p>Lead in finishes of fine pitch components other than connectors with a pitch of 0.65mm or less with NiFe lead frames and lead in finishes of fine pitch components other than connectors with a pitch of 0.65mm or less with coppler lead frames.</p> <p>小螺距零件表面材料所含的鉛</p>
25	<p>Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors.</p> <p>通孔盤狀及平面陣列陶瓷多層電容器焊料所含的鉛</p>



RoHS Directive Requirements	No	C21-4		
	VER	4	Page	18/20

26	Lead oxide in plasma display panels (PDP) and surface conduction electron emitter displays (SED) used in structural elements, notably in the front and rare glass dielectric layer, the bus electrode, the black stripe, the address electrode, the barrier ribs, the seal frit and fritting as well as in print pastes 電漿顯示器及表面傳導式電子發射顯示器的構件所用的氧化鉛
27	Lead oxide in the glass envelope of Black Light Blue (BLB) lamps. 藍黑燈管 (BLB) 玻璃外罩所含的氧化鉛
28	Lead alloys as solder for transducers used in high-powered (designated to operate for several hours at acoustic power levels of 125 dB SPL and above) loudspeakers. 在大功率揚聲器中作為轉換器焊料的鉛合金 (2006/691/EC)
29	Lead bound in crystal glass as defined in Annex I (Category 1,2,3 and 4) of Council Directive 69/493/EEC 在第 69/493/EEC 號指令附件 1 第 1、2、3 及 4 分類定義下之水晶玻璃鉛
30	Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers with sound pressure levels of 100 dB (A) and more. 音壓大於 100dB(A) 的大功率揚聲器中，與音圈轉換器連接電導體之電機/機械銲料中的鎘合金
31	Lead in soldering materials in mercury free flat fluorescent lamps (which e.g. are used for liquid crystal displays, design or industrial lighting). 無汞平板螢光燈 (例如用於液晶螢幕、設計或工業照明) 中的銲料所含的鉛
32	Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes. 氬及氪雷射管中，使用於視窗結構的密封玻璃中的氧化鉛
33	Lead in solders for the soldering of thin copper wires of 100um diameter and less in power transformers. 鉛焊料的銲接細銅線直徑為 100um 的少的電力變壓器
34	Lead in cermet-based trimmer potentiometer elements. 金屬陶瓷中的鉛的微調電位器元件

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	19/20

35	Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body. 鉛電鍍層的高電壓二極管的基礎上的硼酸鋅玻璃體內
36	Cadmium and cadmium oxide in thick film pastes used on aluminum bonded beryllium oxide. 鎘和氧化鎘的厚膜漿料用於鋁結合氧化鈹
37	Cadmium in color converting II-VI LEDs (<10ug Cd per mm <sup>2</sup> of light-emitting area) for use in solid state illumination or display systems 鎘在色彩轉換 II - VI 發光二極管 (<10ug 鎘每平方毫米的發光區) 統計使用固體照明或顯示系統

Note: The exemption list is being reviewed and subject to adjustment in the coming months.

RoHS Directive Requirements	No	C21-4		
	VER	4	Page	20/20

### Exemptions in 2006/122/EC (PFOS Directive)

Items	Exemption Clauses
1	Photoresists or anti reflective coatings for photolithography processes 照相平版印刷程序的光阻或抗反射塗層
2	Photographic ocatings applied to films, papers, or printing plates, 用於膠捲、相紙或印版的照相塗層
3	Mist suppressants for non-decorative hard chromium (VI) plating and wetting agents for use in controlled electroplating systems where the amount of PFOS released into the environment is minimised, by fully applying relevant best available techniques developed within the framework of Council Directive 96/61/EC of 24 September 1996 concerning intergrated pollution prevention and control 非裝飾性六價鉻鍍層的抗霧劑，或受控制的電鍍系統的潤濕劑，其中 PFOS 排放到環境中的量採用在理事會 1996 年 9 月 24 日發佈的 96/61/EC 指令“關於整合污染防治和控制”的基礎上形成的相關的最佳技術來降到最低
4	Hydraulic fluids for aviation 液壓機液體