SPECIFICATIONS FOR LCD MODULE

CUSTOMER	STD
MODEL	WM-F3224V4-6FLWa VER. 2
CUSTOMER APPROVED	

APPROVED BY	CHECKED BY	ORGANIZED BY
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☐ **APPROVAL FOR SPECIFICATIONS ONLY**

■ **APPROVAL FOR SPECIFICATIONS AND SAMPLE (17030656)**

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History of Version

Version	Contents	Date	Note
a1	New version	1.Nov.2006	SPEC.
a2	**Change as follow by Wintek** Modify 1.1 Absolute Maximum Ratings Modify 1.2 Electrical Characteristics Modify 1.5-2 Initialization Table Modify 2.1 Electro-optical Characteristics Modify 3.1 Mechanical Specification Modify 3.2 Mechanical Diagram Modify 3.3 Back-light Specification	19.Apr.2007	SPEC SAMPLE

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(1) Electronic Units

1.1 Absolute Maximum Ratings

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Operating Temperature	T_{OP}	-20	-	+70	℃	-
Storage Temperature	T_{ST}	-30	-	+80	℃	-
input voltage range	V_{DD}	-0.5	-	4.0	V	-
Digital input voltage range	V_{DDD}	-0.5	-	2.15	V	-
Static Electricity	Be sure that you are grounded when handing LCM					

Note1: If the module exceeds the absolute maximum ratings, it may be damaged permanently .Also, if the module operated with the absolute maximum ratings for a long time, its reliability may drop.

1.2 Electrical Characteristics

MAIN PANEL (Ta=25℃,V_{DD}=3.3V)

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	Remark
Input power voltage		V_{DD}	-	3.0	3.3	3.6	V	-
Input power voltage		V_{DDD}		1.7	1.8	1.9	V	-
Input Signal Voltage	H Level	V_{IH}	-	0.7* V_{DDD}	-	V_{DDD}	V	-
	L Level	V_{IL}	-	V_{SS}	-	0.3* V_{DDD}	V	
Output Signal Voltage	H Level	V_{OH}	-	0.8*V_{DDD}	-	V_{DDD}	V	-
	L Level	V_{OL}	-	V_{SS}	-	0.2*V_{DDD}	V	
Supply Current		*I_{DD}	-	-	8.5	9.5	mA	-
Supply Current		*I_{DDD}	-	-	0.3	1	mA	

*I_{DD}, *I_{DDD} Measurement condition is for all pixels on display.
*To avoid image residual, the same picture could not display to exceed one hour.

1.3 Interface Pin Function

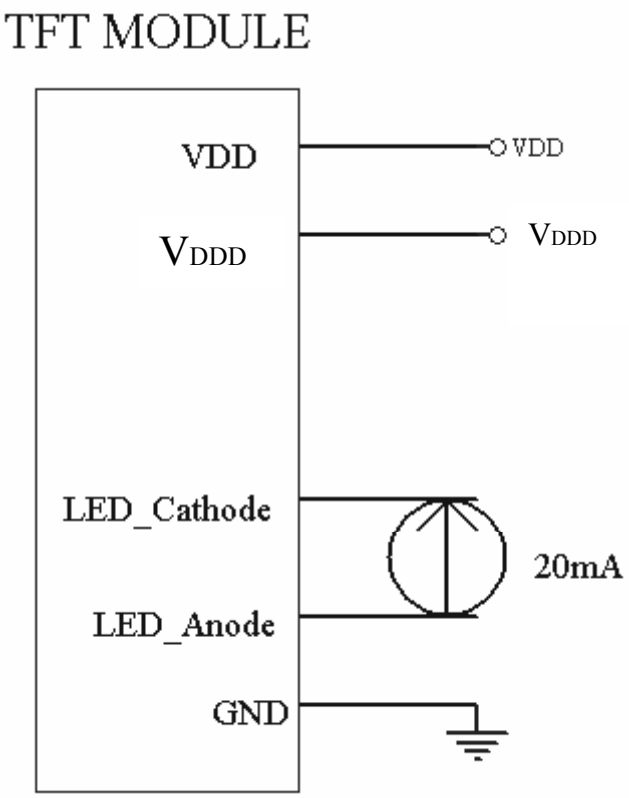
NO.	SYMBOL	I/O	FUNCTION
1	LED _Cathode	I	Cathode of series LED
2	LED _Cathode	I	
3	LED _Anode	I	Anode of series LED
4	LED _Anode	I	
5	GND	P	Ground
6	X1	I/O	X _Right
7	Y1	I/O	Y _Bottom
8	X2	I/O	X _Left
9	Y2	I/O	Y _Up
10	GND	P	GND
11	NC	-	NO Connection
12	NC	-	
13	NC	-	NO Connection
14	RESET	I	RESET
15	CS	I	Chip Select(SPENB)
16	SCL	I	Serial Clock(SPCK)
17	SDI	I	Serial Data(SPDA)
18	DATA0	I	Blue Data (LSB)
19	DATA1	I	Blue Data
20	DATA2	I	Blue Data
21	DATA3	I	Blue Data
22	DATA4	I	Blue Data
23	DATA5	I	Blue Data(MSB)
24	NC		NO Connection
25	NC		NO Connection
26	DATA6	I	Green Data(LSB)
27	DATA7	I	Green Data
28	DATA8	I	Green Data

29	DATA9	I	Green Data
30	DATA10	I	Green Data
31	DATA11	I	Green Data(MSB0
32	NC		NO Connection
33	NC		NO Connection
34	DATA12	I	Red Data (LSB)
35	DATA13	I	Red Data
36	DATA14	I	Red Data
37	DATA15	I	Red Data
38	DATA16	I	Red Data
39	DATA17	I	Red Data(MSB)
40	NC		NO Connection
41	NC		NO Connection
42	HSYNC	I	Horizontal Synchronous Signal
43	VSYNC	I	Vertical Synchronous Signal
44	DOTCLK	I	Data clock (CLKIN)
45	NC		NO Connection
46	NC		
47	V_{DD}	P	input voltage
48	V_{DDD}	P	Digital input voltage
49	NC	-	NO Connection
50	NC		NO Connection
51	NC		
52	NC		NO Connection
53	NC		NO Connection
54	NC		NO Connection
55	NC		
56	NC		NO Connection
57	NC		

58	Enable	I	Data enabling signal
59	GND	P	Ground
60	GND	P	

(Recommend Connector : HIROSE FH12-60S-0.5SV or IRISO 9634 Series)

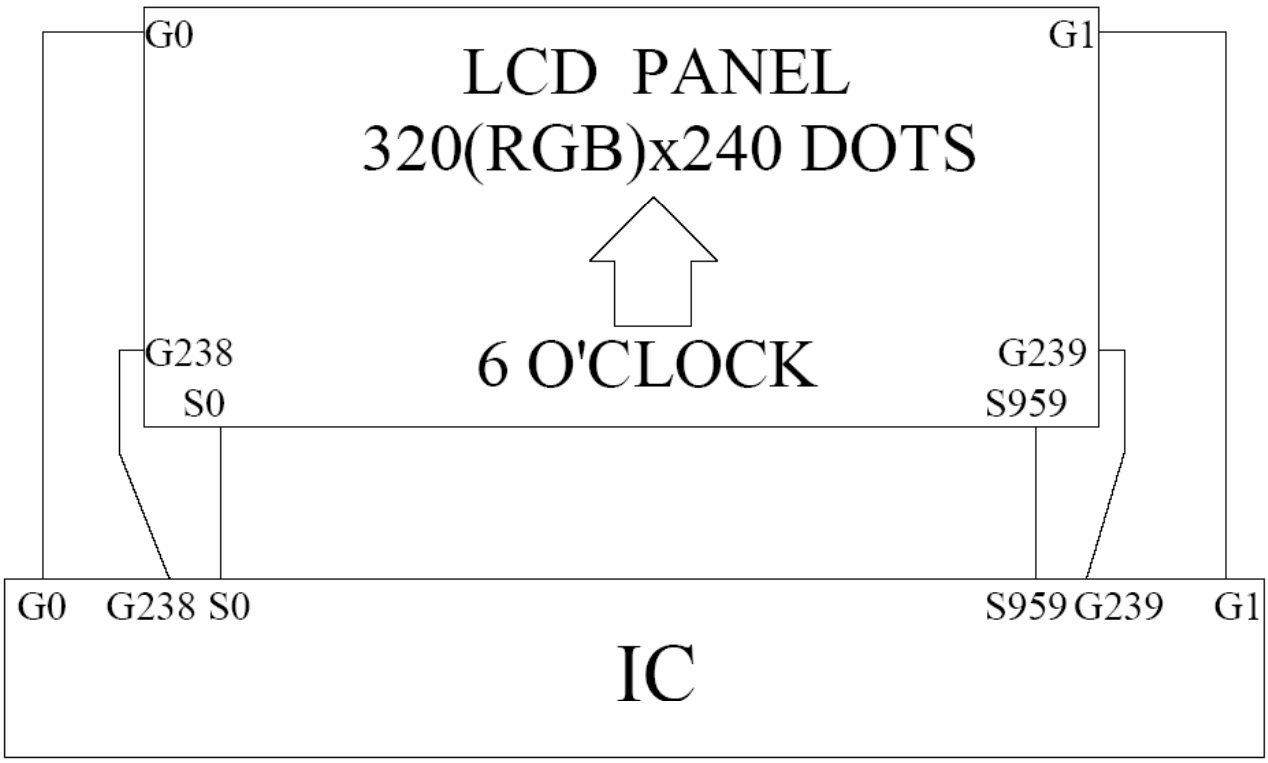
1.4 Power Supply for LCD Module



Note: The LED must be current driving.

1.5 Block Diagram with Display RAM Address

1.5.1 Block Diagram



1.5.2 Initialization Table

Note: The command is use serial interface to set register

Instruction		Code	Description
1	Software reset	0x01	Software reset
2	Sleep out	0x11	Sleep out
3	Booster ON	0x03	Booster ON
4	Display Inversion OFF	0x20	Inversion OFF
5	Memory Access Control	0x36 0x00	Default writing and scanning direction
6	Idle Mode	0x38	Idle Mode OFF
7	Interface Pixel Forma	0x3A 0x50	16 BPP
8	Set VLCD	0xB0 0x32	VLCD=4.0V
9	Set Gate Voltage	0xB1 0xAC	VGON=15V VGOFFL=-11.66V
10	Set VCOMH	0xB2 0x41	VCOMH= 3.3V
11	Set VCOML1	0xB3 0x23	VCOML1= -0.7V
12	Set VCOML2	0xB4 0x00	VCOML2=0V
13	Booster Multification Factor	0xC2 0x09	11 Cap Config, VGON 6X, VLCD 2X, VGOFF -5X
14	Driving Scheme Configuration	0xC3 0xDC	NO=8, SDT=2, EQ=3, PT=1
15	Select VCOML	0xC4 0x00	VCOML1
16	Gate Scan Position	0xC5 0x00	Start Gate Line G0
17	N-Line Inversion	0xC9 0x81	1 Line Inversion
18	Number of Lines	0xD4 0x00	240 Lines
19	Number of Columns	0xD5 0x00	320 Columns

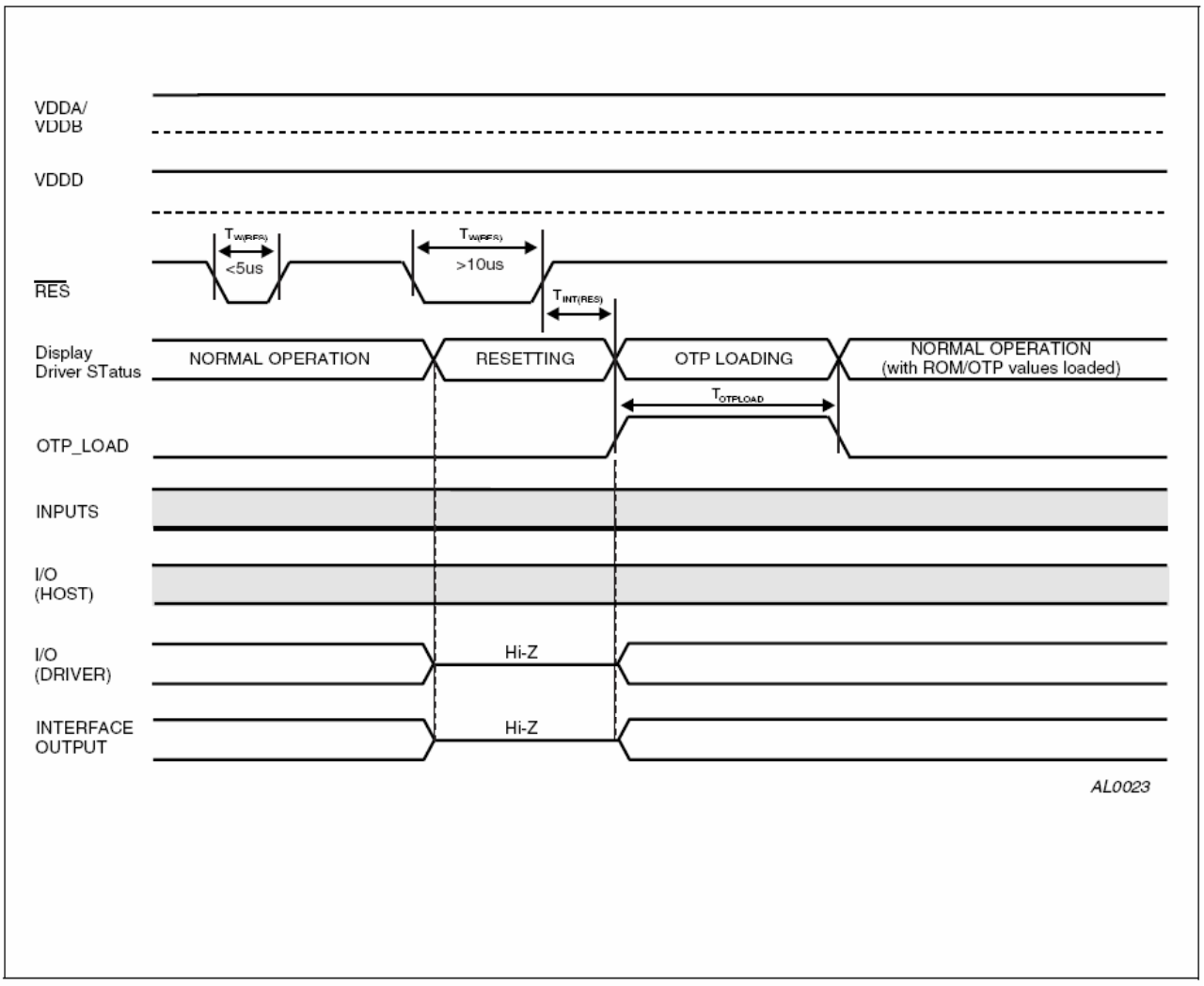
20	Set Horizontal Porch	0xD6 0x1B	HBP=27
21	Set Vertical Porch	0xD7 0x06	VBP=6
22	Driver Configuration	0xD8 0x00	Default driver configuration
23	Set Panel Type	0xD9 0x04	Normally White, Odd/Even display, Cap on Common
24	Gamma set	0XD2 0X23 0x29 0x21 0x21 0x00 0x02 0x01 0x2B 0x36	Gamma set
25	Gamma ratio	0xD3 0x25	Gamma ratio
26	Display ON	0x29	Display ON

1.6 Timing Characteristic

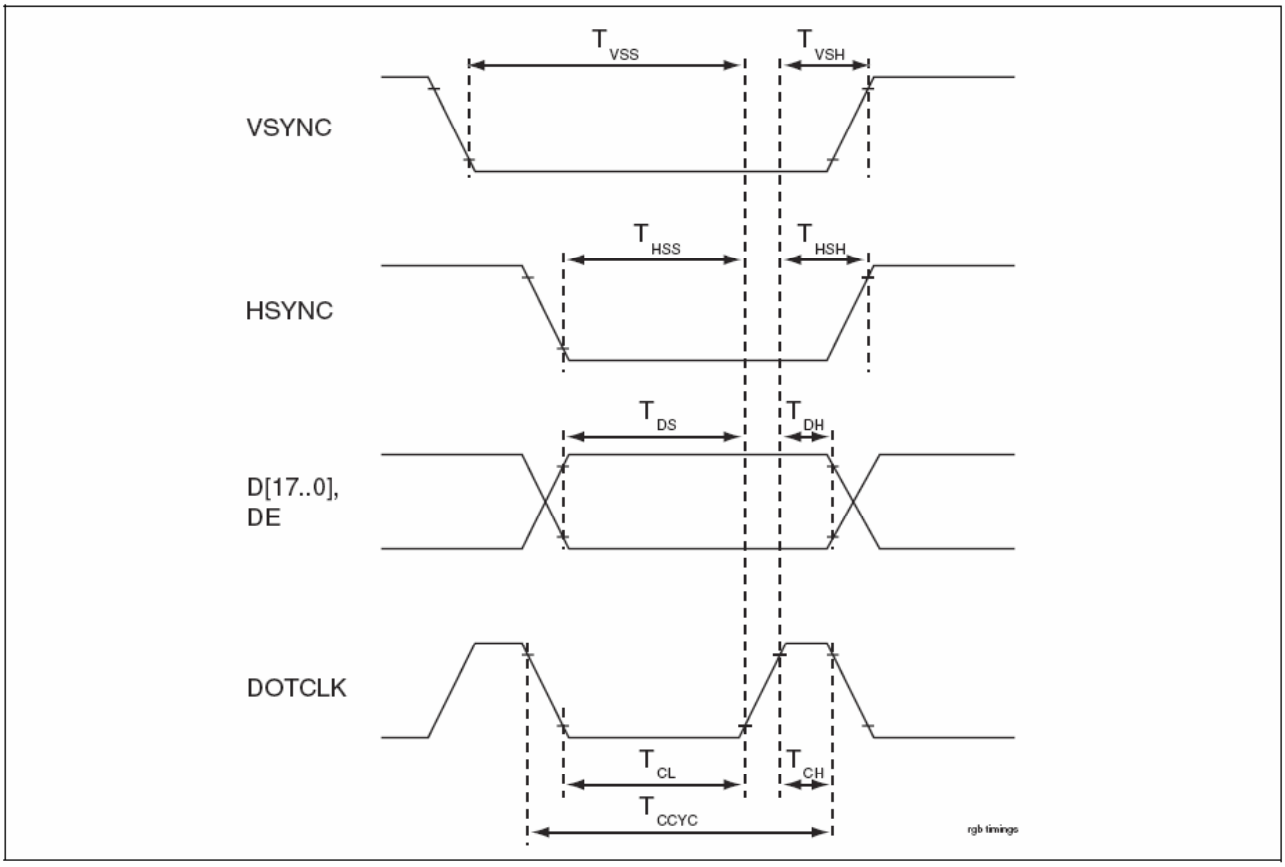
RESET Timing

(VDDD = 1.50 to 1.95 V; VDDA/VDDB = 2.2V to 3.6V; VSS/VSSA/VSSB = 0V; Tamb =-40 to 85°C; unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
INTERNAL OSCILLATOR						
$T_{w(RES)}$	$\overline{RES}$ LOW pulse width		10			µs
	Reset Pulse Rejection				5	µs
$T_{OTPLOAD}$	OTP Memory Read Time				5	ms
$T_{INT(RES)}$	Internal Logic Reset Time				5	µs
T_{VDD}	V_{DDD} vs. V_{DDA}/V_{DDB} Delay		0			µs



RGB Interface Timing



(VDDD = 1.50 to 1.95 V; VDDA/VDDB = 2.2V to 3.6V; VSS/VSSA/VSSB = 0V; Tamb =-40 to 85°C; unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
T_{CCYC}	Dot Clock cycle	60 (3.)		226 (4.)	ns
T_{CL}	Dot Clock pulse width "L"	15			ns
T_{CH}	Dot Clock pulse width "H"	15			ns
T_{VSS}	Vertical Sync Setup time	15			ns
T_{VSH}	Vertical Sync Hold time	15			ns
T_{HSS}	Horizontal Sync Setup time	15			ns
T_{HSH}	Horizontal Sync Hold time	15			ns
T_{DS}	Data and DE Sync Setup time	15			ns
T_{DH}	Data and DE Sync Hold time	15			ns

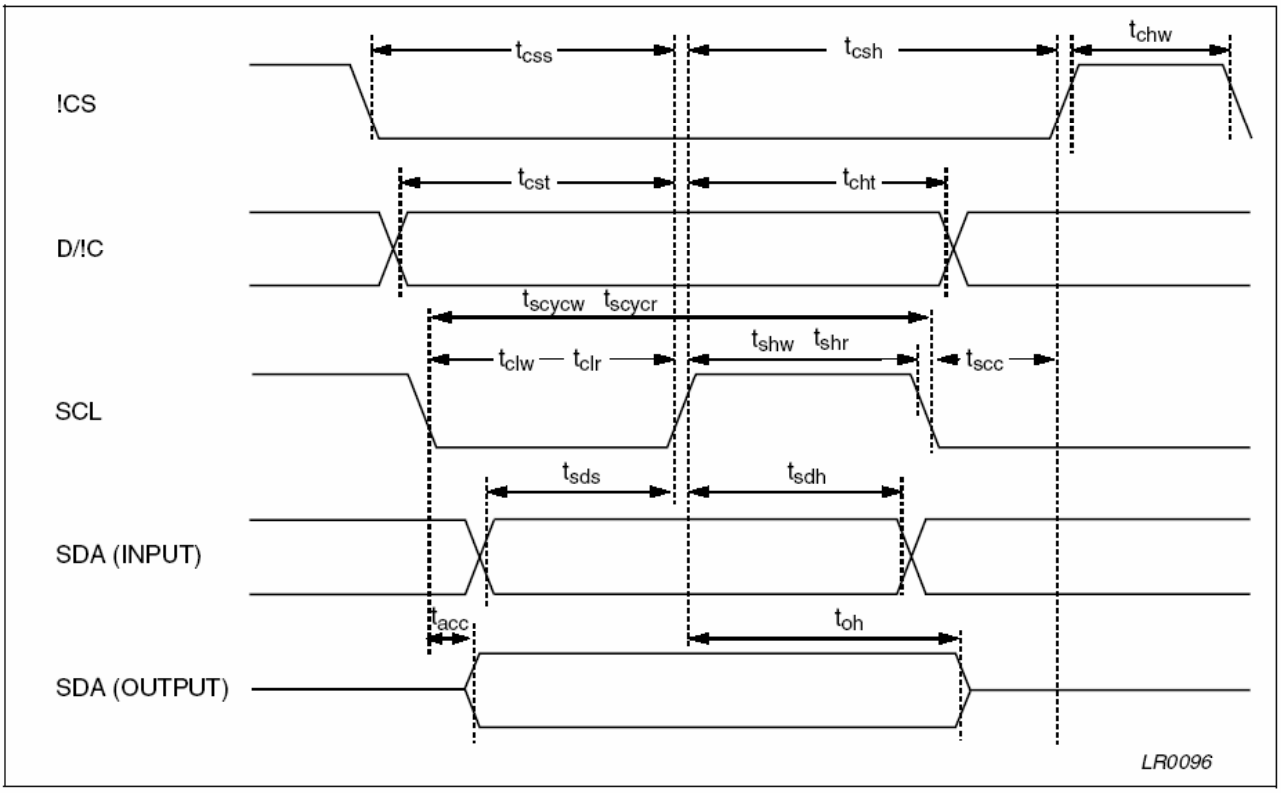
Notes: 1. Signal Rise and Fall times are equal or less than 20ns
2. Low state is 0.3xVDDD, high state is 0.7xVDDD
3. Refresh Rate = 65Hz
4. Refresh Rate = 50Hz

Serial Interface Timing

(VDDD = 1.50 to 1.95 V; VDDA/VDDB = 2.2V to 3.6V; VSS/VSSA/VSSB = 0V; Tamb =-40 to 85°C; unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
F_{SCLKW}	Clock Frequency	Write			15	MHz
T_{scycw}	Clock Cycle SCL		66			ns
T_{shw}	SCL pulse width "H"		15			ns
T_{slw}	SCL Pulse width "L"		15			ns
F_{SCLKW}	Clock Frequency	Read			6.7	MHz
T_{scycr}	Clock Cycle SCL		150			ns
T_{shr}	SCL pulse width "H"		60			ns
T_{slr}	SCL Pulse width "L"		60			ns
T_{css}	$\overline{!CS}$ setup time	Write	10			ns
T_{csh}	!CS hold time		30			ns
T_{chw}	!CS minimum high time		20			ns
T_{cst}	D/$\overline{!C}$ setup time	Write	10			ns
T_{cht}	D/!C hold time		10			ns
T_{sds}	SDA (Input) setup time		10			ns
T_{sdh}	SDA (Input) hold time		10			ns
T_{acc}	SDA (Output) Access Time	Read	10		50	ns
T_{oh}	SDA (Output) Disable Time		15		50	ns

Notes: 1. Input signal's rise and fall time is equal to 15ns or less
2. Output signal's rise and fall time is equal to 15ns or less

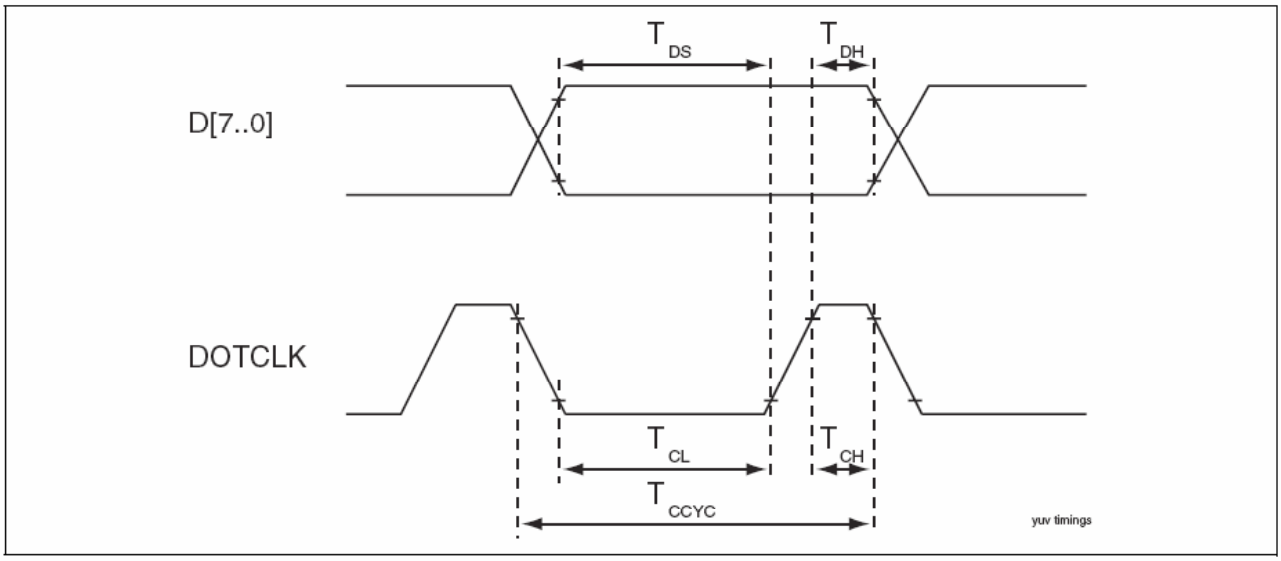


YCC Interface Timing

(VDDD = 1.50 to 1.95 V; VDDA/VDDB = 2.2V to 3.6V; VSS/VSSA/VSSB = 0V; Tamb =-40 to 85°C; unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
T_{CCYC}	Dot Clock cycle	60			ns
T_{CL}	Dot Clock pulse width "L"	15			ns
T_{CH}	Dot Clock pulse width "H"	15			ns
T_{DS}	Data and DE Sync Setup time	15			ns
T_{DH}	Data and DE Sync Hold time	15			ns

Notes: 1. Signal Rise and Fall times are equal or less than 20ns
2. Low state is 0.3xVDDD, high state is 0.7xVDDD



(2) Electro-optical Units

2.1 Electro-optical Characteristics

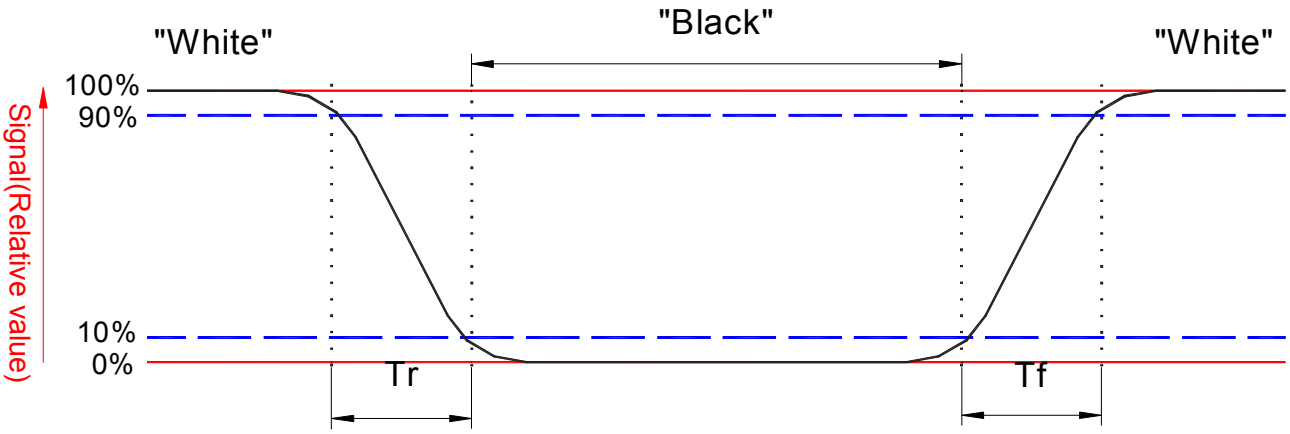
ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
VIEW ANGLE	Hor.	ϕ x	CR≧10	60	-	-	deg.
		ϕ x'		60	-	-	
	Ver.	θ y		60	-	-	
		θ y'		45	-	-	
CONTRAST RATIO		CR	Transmissive(Ta=25℃)	250	300		-
RESPONSE TIME		Tr+Td	Ta=25℃	-	24	-	ms
Red x-coord		Rx	Ta=25℃	0.54	0.6	0.66	-
Red y-coord		Ry		0.29	0.35	0.41	
Green x-coord		Gx		0.28	0.34	0.4	
Green x-coord		Gy		0.54	0.6	0.66	
Blue x-coord		Bx		0.08	0.14	0.20	
Blue x-coord		By		0.03	0.09	0.15	
White x-coord		Wx		0.26	0.32	0.38	
White x-coord		Wy		0.28	0.34	0.4	
LCD TYPE		TFT(Positive /Transmissive)					
VIEWING DIRECTION		6 O'CLOCK					

Measured By :

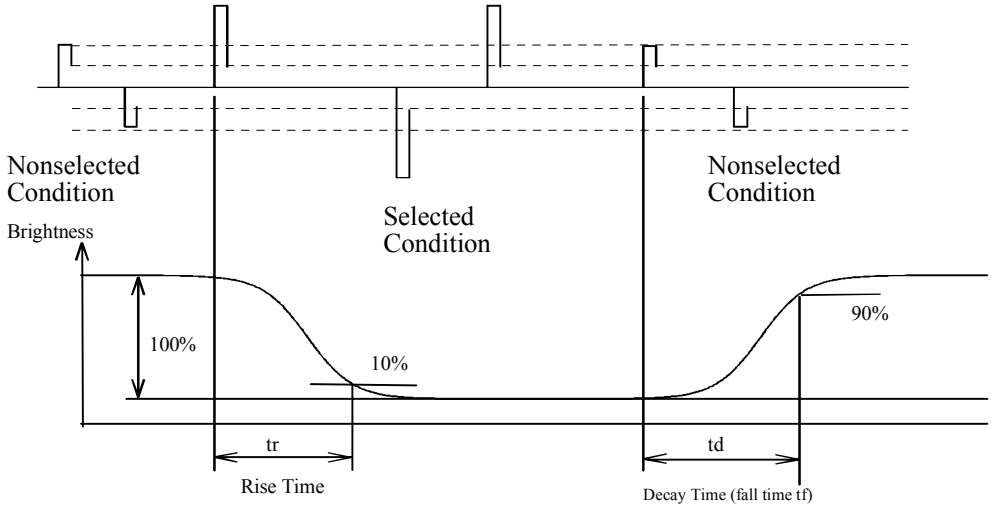
Autronic DMS : CR、Viewing Angle、Response TimePhoto Research PR-705, base on D65:Chromaticity、Transmissive Ratio

2. 2 Optical Definitions

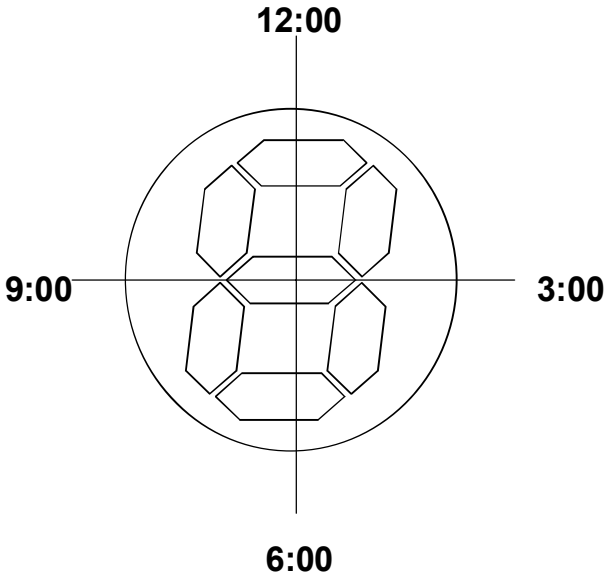
Response time for Main panel

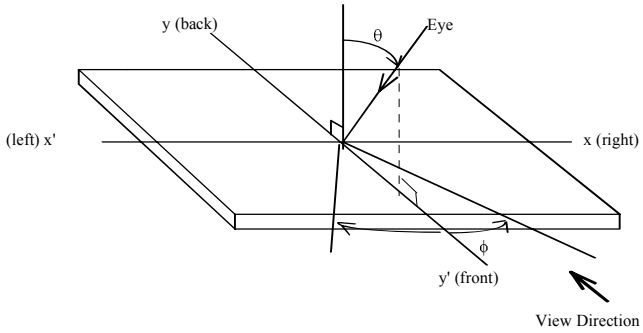


Response time for Sub panel

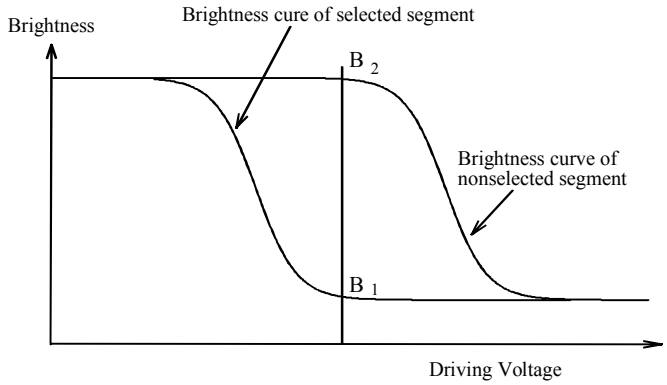


Response Time





View Angle



Perpendicular line (θ=90°)

$$\text{Contrast ratio} = \frac{\text{Brightness at nonselected segment (B2)}}{\text{Brightness at selected segment (B1)}}$$

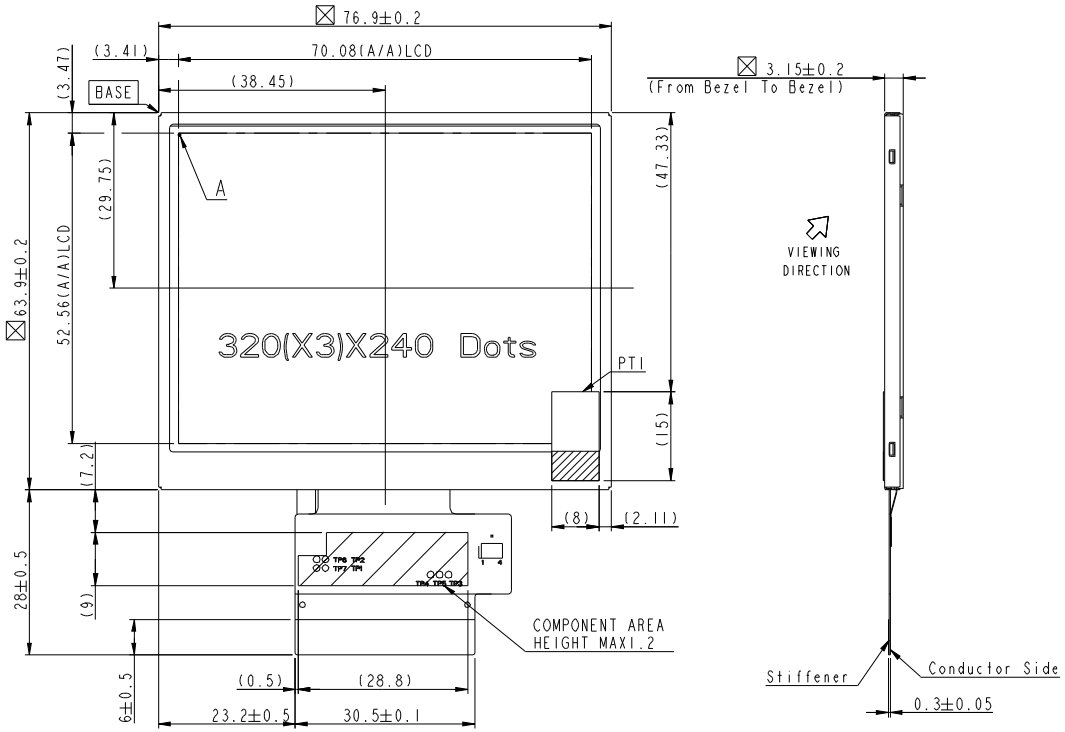
Contrast ration (CR)

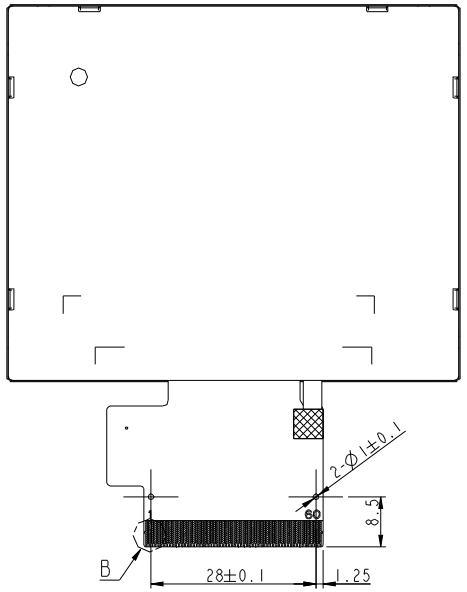
(3) Mechanical Units

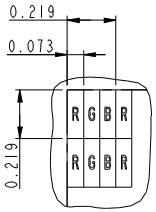
3.1 Mechanical Specification

ITEM	STANDARD VALUE	UNIT
NUMBER OF DOTS	320 (RGB) X 240	dots
MODULE DIMENSION	76.9 (W) X 63.9 (H) X 3.25 (T)	mm
ACTIVE AREA	70.08 X 52.56	mm
DOT SIZE	0.072(W) X 0.219 (H)	mm
Pixel SIZE	0.219(W) X 0.219 (H)	mm
APPROX. WEIGHT	30.9	g

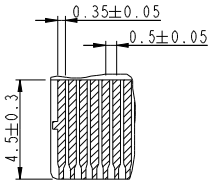
3.2 Mechanical Diagram







DETAIL:A
SCALE:30



DETAIL:B
SCALE:3

NOTE:"☒"ICON MEAN IMPORTANT DIM
Connector type:HIROSE FH12-60S-0.5SV
IRISO 9634 Serise

3.3 Back-light Specification

LED Backlight Styles:

The LED chips are distributed over the whole light area of the illumination unit, which gives the most uniform light.

3.3-1 Data About LED Backlight:

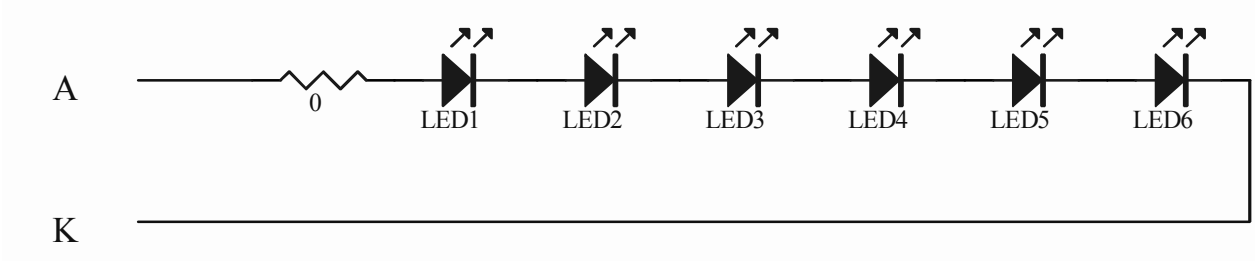
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
Supply Current 1	I_{AK1}	-	20	-	mA		$V_{AK1} \leqq 17.6V$
Reverse Voltage (Single chip)	V_R	-	-	5.0	V	-	-
Luminous Intensity	I_V	200	250	-	cd/m^2	$I_{AK1,2,}$ =20mA	1 (With LCD)
Luminous Intensity Ratio	-	-	30	-	%	$I_{AK1,2,}$ =20mA	2

NOTE：

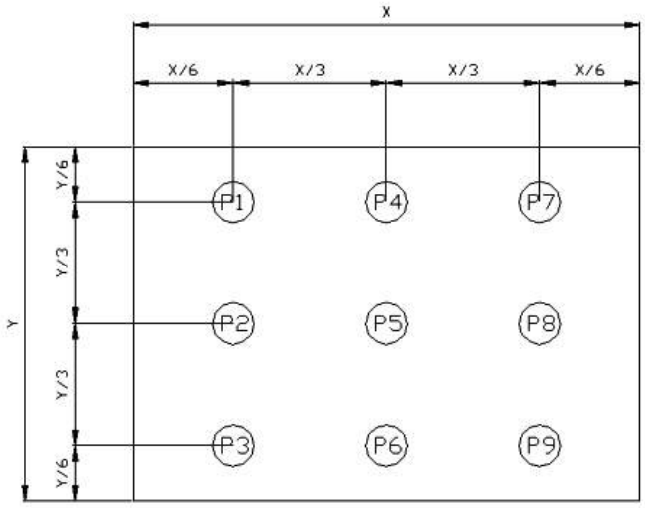
1. Average Luminous Intensity Of P1 – P9
2. Luminous Intensity Ratio =(MAX – MIN)/MAX × 100%

NOTE： 1.Average Luminous Intensity Of P1 – P9 (With LCD panel)
2.Luminous Intensity Ratio = (MAX – MIN/MAX)×100%

3.3-2Internal Circuit Diagram



3.3-3 MEASURED METHOD：(X*Y Light Area)



Hole Diameter φ3mm;1 to 9 per Position Measured Luminous Intensity

3.4 Packing Method

1. Packaging Material : (per carton)

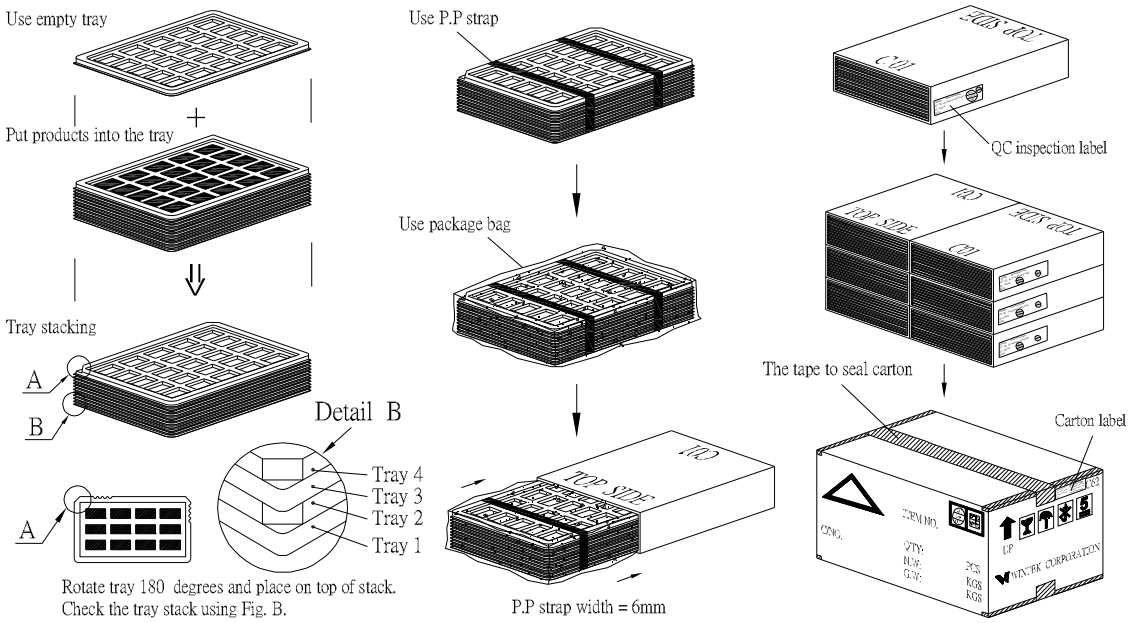
NO.	Item	Model		Dimensions (mm)	Unit Weight (Kg)	Quantity
1	LCM Module	WM-F3224V4-6FLWa		76.9*63.9	0.0304	324
2	Tray	VJ74	PS	320*217*12*0.6	0.06	60
3	Product Box	C01		320*219*70	0.131	6
4	Carton	C61		475*345*389	1.208	1
5	Package Bag	C5		467*321*0.08	0.023	6
6	Total Weight	15.6		Kg± 5%		

2. Packaging Specifications and Quantity :

(1) LCM quantity per tray : quantity per row 3 x quantity per column 2 = 6

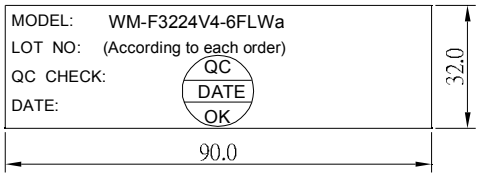
(2) LCM quantity per box : quantity per tray 6 x quantity of trays 9 = 54

(3) Total LCM quantity in carton : quantity per box 54 x quantity of boxes 6 = 324



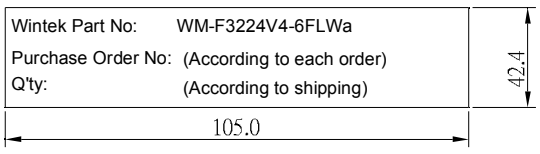
3. Label Specifications :

(1) QC Inspection Label



Label Color----Green

(2) Carton Label



Label Color----White

Remark

(4) Quality Units

4.1 Specification of Quality Assurance

4.1-1.Purpose

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

4.1-2.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 Z1.4-1993.General Inspection Level Ⅱ 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

4.1-3.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.

4.1-4. 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.

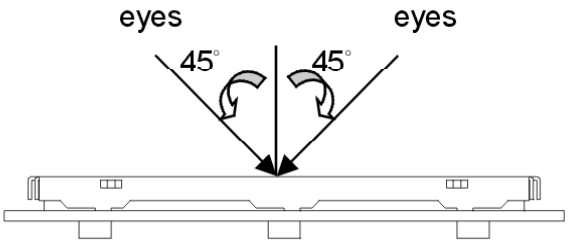
4.1-5. Standard of The Product Appearance Test

a. Manner of appearance test:

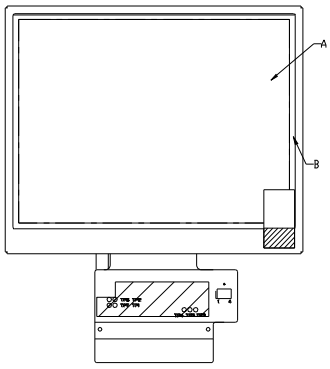
(i) The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30 cm.

(ii) When test the model of transmissive product must add the reflective plate.

(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)

b. Basic principle:

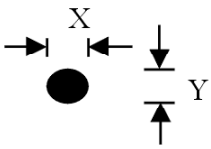
(i) It will accord to the AQL when the standard can not be described.

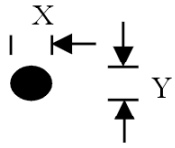
(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

(iii) Must add new item on time when it is necessary.

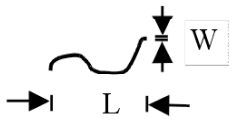
c. Standard of inspection:(Unit: mm)

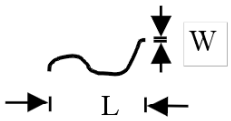
4.1-7. Inspection specification

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>01</td><td>Electrical Testing</td><td>1.1 Missing vertical, horizontal segment, segment contrast defect.
1.2 Missing character , dot or icon.
1.3 Display malfunction.
1.4 No function or no display.
1.5 Current consumption exceeds product specifications.
1.6 LCD viewing angle defect.
1.7 Mixed product types.
1.8 Contrast defect.</td><td>0.65</td></tr>
<tr><td rowspan="2">02</td><td rowspan="2">LCD black spots, white spots
LCD black spots, white blurred spots</td><td>2.1 Round type：non display
$\phi = (x + y) / 2$
 

<table>
<tr><th>Diameter (mm)</th><th>Number</th><th>Min. Space</th></tr>
<tr><td>$\phi \leqq 0.20$</td><td>Ignore</td><td></td></tr>
<tr><td>$0.20 < \phi \leqq 0.30$</td><td>10</td><td>10mm</td></tr>
<tr><td>$0.30 < \phi \leqq 0.40$</td><td>5</td><td>30mm</td></tr>
<tr><td>$0.40 < \phi$</td><td>0</td><td></td></tr>
</table></td><td>1.5</td></tr>
<tr><td>2.2 Round type：at light condition or display
$\phi = (x + y) / 2$
 

<table>
<tr><th>Diameter (mm)</th><th>Number</th><th>Min. Space</th></tr>
<tr><td>$\phi \leqq 0.25$</td><td>Ignore</td><td></td></tr>
<tr><td>$0.25 < \phi \leqq 0.35$</td><td>10</td><td>20mm</td></tr>
<tr><td>$0.35 < \phi \leqq 0.50$</td><td>4</td><td>20mm</td></tr>
<tr><td>$0.50 < \phi \leqq 0.75$</td><td>3</td><td>50mm</td></tr>
<tr><td>$0.75 < \phi$</td><td>0</td><td></td></tr>
</table></td><td>1.5</td></tr>
</table>

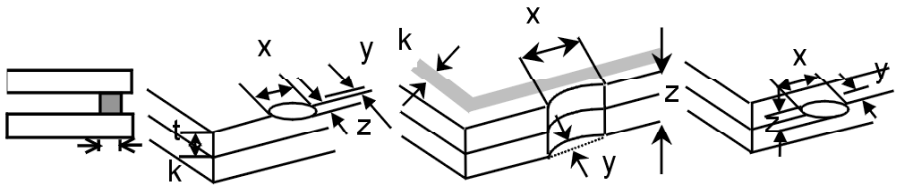
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td rowspan="2">03</td><td>LCD black spots, white spots</td><td>3.1 Line type： At non-light condition or non-display
 

<table>
<tr><th>Length (mm)</th><th>Width (mm)</th><th>Number</th></tr>
<tr><td>-----</td><td>W≦0.03</td><td>Ignore</td></tr>
<tr><td>L≦3.0</td><td>0.03＜W≦0.05</td><td>6</td></tr>
<tr><td>L≦2.5</td><td>0.05＜W≦0.10</td><td>1</td></tr>
<tr><td>----</td><td>0.10＜W</td><td>0</td></tr>
</table></td><td>1.5</td></tr>
<tr><td>LCD black spots, white spots</td><td>3.2 Line type：At light condition or display
 

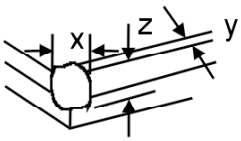
<table>
<tr><th>Length (mm)</th><th>Width (mm)</th><th>Number</th><th>Space (mm)</th></tr>
<tr><td>L≦1.2</td><td>W≦0.25</td><td>2</td><td>20</td></tr>
<tr><td>L≦1.5</td><td>W≦0.20</td><td>3</td><td>20</td></tr>
<tr><td>L≦2.0</td><td>W≦0.15</td><td>3</td><td>20</td></tr>
<tr><td>L≦3.0</td><td>W≦0.10</td><td>4</td><td>20</td></tr>
<tr><td colspan="2">Whole number</td><td colspan="2">6</td></tr>
</table></td><td>1.5</td></tr>
<tr><td>04</td><td>Polarizer bubbles</td><td>If bubbles are visible, judge using black spot specifications ,not easy To find, must check in specify direction
<table>
<tr><th>Size ψ</th><th>Acceptable Q□TY</th></tr>
<tr><td>ψ ≦0.20</td><td>Accept no dense</td></tr>
<tr><td>0.20＜ψ≦0.50</td><td>3</td></tr>
<tr><td>0.50＜ψ≦1.00</td><td>2</td></tr>
<tr><td>1.00＜ψ</td><td>0</td></tr>
<tr><td>Total Q’ TY</td><td>3</td></tr>
</table></td><td>1.5</td></tr>
<tr><td>05</td><td>Scratches</td><td colspan="2">Follow NO.3 LCD black spots, white spots, contamination</td></tr>
</table>

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>06</td><td>Chipped glass</td><td>
Symbols：
x：Chip length　y：Chip width　z：Chip thickness
k：Seal width　t：Glass thickness　a：LCD side length
L：Electrode pad length

6.1　General glass chip ：

6.1.1Chip on panel surface and crack between panels：


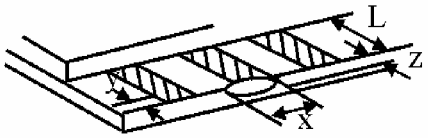
<table>
<tr><th>z：Chip thickness</th><th>y：Chip width</th><th>x：Chip length</th></tr>
<tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr>
<tr><td>1/2t＜z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr>
</table>
⊙If there are 2 or more chips, x is the total length of each chip.

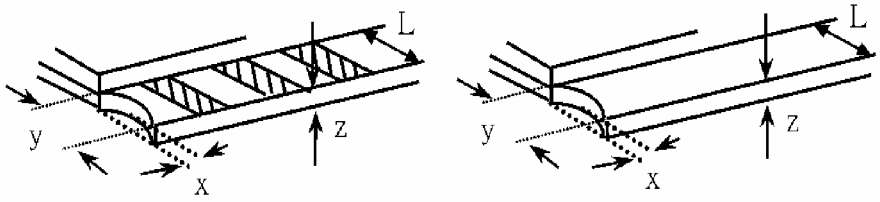
6.1.2 Corner crack：


<table>
<tr><th>z：Chip thickness</th><th>y：Chip width</th><th>x：Chip length</th></tr>
<tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr>
<tr><td>1/2t＜z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr>
</table>
⊙ If there are 2 or more chips, x is the total length of each chip.
</td><td>1.5</td></tr>
</table>

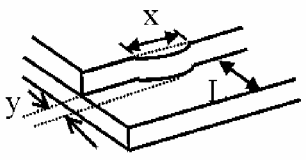
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>06</td><td>Glass crack</td><td>
Symbols：
x：Chip length　y：Chip width　z：Chip thickness
k：Seal width　t：Glass thickness　a：LCD side length
L：Electrode pad length

6.2　Protrusion over terminal：

6.2.1 Chip on electrode pad：


<table>
<tr><th>y：Chip width</th><th>x：Chip length</th><th>z：Chip thickness</th></tr>
<tr><td>y≦ 0.5 mm</td><td>x≦1/8a</td><td>0 ＜ z ≦t</td></tr>
</table>
6.2.2 Non-conductive portion：


<table>
<tr><th>y：Chip width</th><th>x：Chip length</th><th>z：Chip thickness</th></tr>
<tr><td>y≦ L</td><td>x≦1/8a</td><td>0 ＜ z ≦t</td></tr>
</table>
⊙If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.
⊙If the product will be heat sealed by the customer, the alignment mark must not be damaged.

6.2.3 Substrate protuberance and internal crack.


<table>
<tr><th>y： width</th><th>x：length</th></tr>
<tr><td>y≦ 1/3L</td><td>x ≦ a</td></tr>
</table>
</td><td>1.5</td></tr>
</table>

NO	Item	Criterion	AQL
07	Cracked glass	The LCD with extensive crack is not acceptable.	**1.5**
08	Backlight elements	8.1 Illumination source flickers when lit. 8.2 Spots or scratches that appear when lit must be judged . using LCD spot, lines and contamination standards. 8.3 Backlight doesn t light or color is wrong.	**1.5** 0.65
09	Bezel	9.1 Bezel may not have rust, be deformed or have fingerprints, stains or other contamination. 9.2 Bezel must comply with job specifications.	**1.5** 0.65
10	PCB、COB	10.1 COB seal may not have pinholes larger than 0.2mm or contamination. 10.2 COB seal surface may not have pinholes through to the IC. 10.3 The height of the COB should not exceed the height indicated in the assembly diagram. 10.4 There may not be more than 2mm of sealant outside the seal area on the PCB. And there should be no more than three places. 10.5 No oxidation or contamination PCB terminals. 10.6 Parts on PCB must be the same as on the production characteristic chart. There should be no wrong parts, missing parts or excess parts. 10.7 The jumper on the PCB should conform to the product characteristic chart. 10.8 If solder gets on bezel tab pads, LED pad, zebra pad or screw hole pad, make sure it is smoothed down.	**1.5** **1.5** 0.65 **1.5** **1.5** 0.65 0.65 **1.5**
11	Soldering	11.1 No unmelted solder paste may be present on the PCB. 11.2 No cold solder joints, missing solder connections, oxidation or icicle. 11.3 No residue or solder balls on PCB. 11.4 No short circuits in components on PCB.	**1.5** **1.5** **1.5** 0.65

NO	Item	Criterion	AQL
12	General appearance	12.1 No oxidation, contamination, curves or, bends on interface Pin (OLB) of TCP.	**1.5**
		12.2 No cracks on interface pin (OLB) of TCP.	0.65
		12.3 No contamination, solder residue or solder balls on product.	**1.5**
		12.4 The IC on the TCP may not be damaged, circuits.	**1.5**
		12.5 The uppermost edge of the protective strip on the interface pin must be present or look as if it cause the interface pin to sever.	**1.5**
		12.6 The residual rosin or tin oil of soldering (component or chip component) is not burned into brown or black color.	**1.5**
		12.7 Sealant on top of the ITO circuit has not hardened	**1.5**
		12.8 Pin type must match type in specification sheet.	0.65
		12.9 LCD pin loose or missing pins.	0.65
		12.10 Product packaging must the same as specified on packaging specification sheet.	0.65
		12.11 Product dimension and structure must conform to product specification sheet .	0.65
		12.12 The appearance of Heat Seal should not admit any dirt and break.	

4.2 Standard Specification for Reliability

4.2-1.Standard Specifications for Reliability of LCD Module

No	Item	Description
01	High temperature operation	The sample should be allowed to stand at 70 ℃ for 240 (-0, +48) hours under driving condition.
02	Low temperature operation	The sample should be allowed to stand at -20 ℃ for 240 (-0, +48) hours under driving condition.
03	High temperature resistance	The sample should be allowed to stand at 80 ℃ for 240 (-0,+48) hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 30 minutes.
04	Low temperature resistance	The sample should be allowed to stand at -30 ℃ for 240 (-0,+48) hours under no-load condition, then returning it to normal temperature condition, and allowing it stand for 24 hours.
05	Moisture resistance	The sample should be allowed to stand at 60 ℃, 90 % RH MAX for 240 (-0,+48) hours under no-load condition excluding the polarizer, then taking it out and drying it at normal temperature.
06	Thermal shock resistance	The sample should be allowed to stand the following 10 cycles of operation: -40℃ for 30 minutes → normal temperature for 5 minutes → +80℃ for 30 minutes → normal temperature for 5 minutes , as one cycle.

4.2-2.Testing Conditions and Inspection Criteria

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

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

4.2-3.Life Time

Life time	Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (25 ±10℃), normal humidity (45 ±20% RH), and in area not exposed to direct sun light. (Life time of backlight, please refer to Data about backlight.)

Note: From our experience the life time of high humidity operation and high temperature operation as above mentioned could be achieved.

4.3 Precautions in Use of LCM

4.3-1 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.

4.3-2 Storage

- Store in an ambient temperature of 5℃ to 45℃, 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.

4.3-3 Soldering

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

4.3-4 Assembly

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