



SPECIFICATIONS FOR LCD MODULE

CUSTOMER	STD
MODEL	WM-Y0906Z-6CLWa VER. 02
CUSTOMER APPROVED	

APPROVED BY	CHECKED BY	ORGANIZED BY
		

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History of Version

Version	Contents	Date	Note
a1	NEW VERSION	22.Mar.2004	SPEC.
a2	SAMPLE	22.Apr.2004	SAMPLE & SPEC.

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Reference Data :
Solomon SSD1770 Specifications

(1) Electronic Units

1.1 Absolute Maximum Ratings

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
OPERATING TEMPERATURE	T_{OP}	-20	-	+70	°C
STORAGE TEMPERATURE	T_{ST}	-40	-	+80	°C
INPUT VOLTAGE	V_I	$V_{SS}-0.3$	-	+4.0	V
SUPPLY VOLTAGE FOR LOGIC	$V_{DD}-V_{SS}$	-0.3	-	+4.0	V
SUPPLY VOLTAGE FOR LCD	$V_{OUT}-V_{SS}$ (V_{LCD})	-0.3	-	+15.0	V
STATIC ELETRICITY	Be sure that you are grounded when handing LCM.				

1.2 Electrical Characteristics

($T_a=25^{\circ}\text{C}$, $V_{DD}=2.8\text{V}$)

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
SUPPLY VOLTAGE FOR LOGIC	$V_{DD}-V_{SS}$	-	2.66	2.8	2.94	V
SUPPLY VOLTAGE FOR BOOSTER	$V_{CI}-V_{SS}$	-	2.66	2.8	2.94	V
INPUT HIGH VOL.	V_{IH}	-	$0.8V_{DD}$	-	V_{DD}	V
INPUT LOW VOL.	V_{IL}	-	V_{SS}	-	$0.2V_{DD}$	V
OUTPUT HIGH VOL.	V_{OH}	$I_{OH}=-100\mu\text{A}$	$0.9V_{DD}$	-	V_{DD}	V
OUTPUT LOW VOL.	V_{OL}	$I_{OL}=100\mu\text{A}$	V_{SS}	-	$0.1V_{DD}$	V
SUPPLY CURRENT FOR LOGIC	$*I_{DD}$	-	-	0.8	1.2	mA
USED IC	SSD1770					

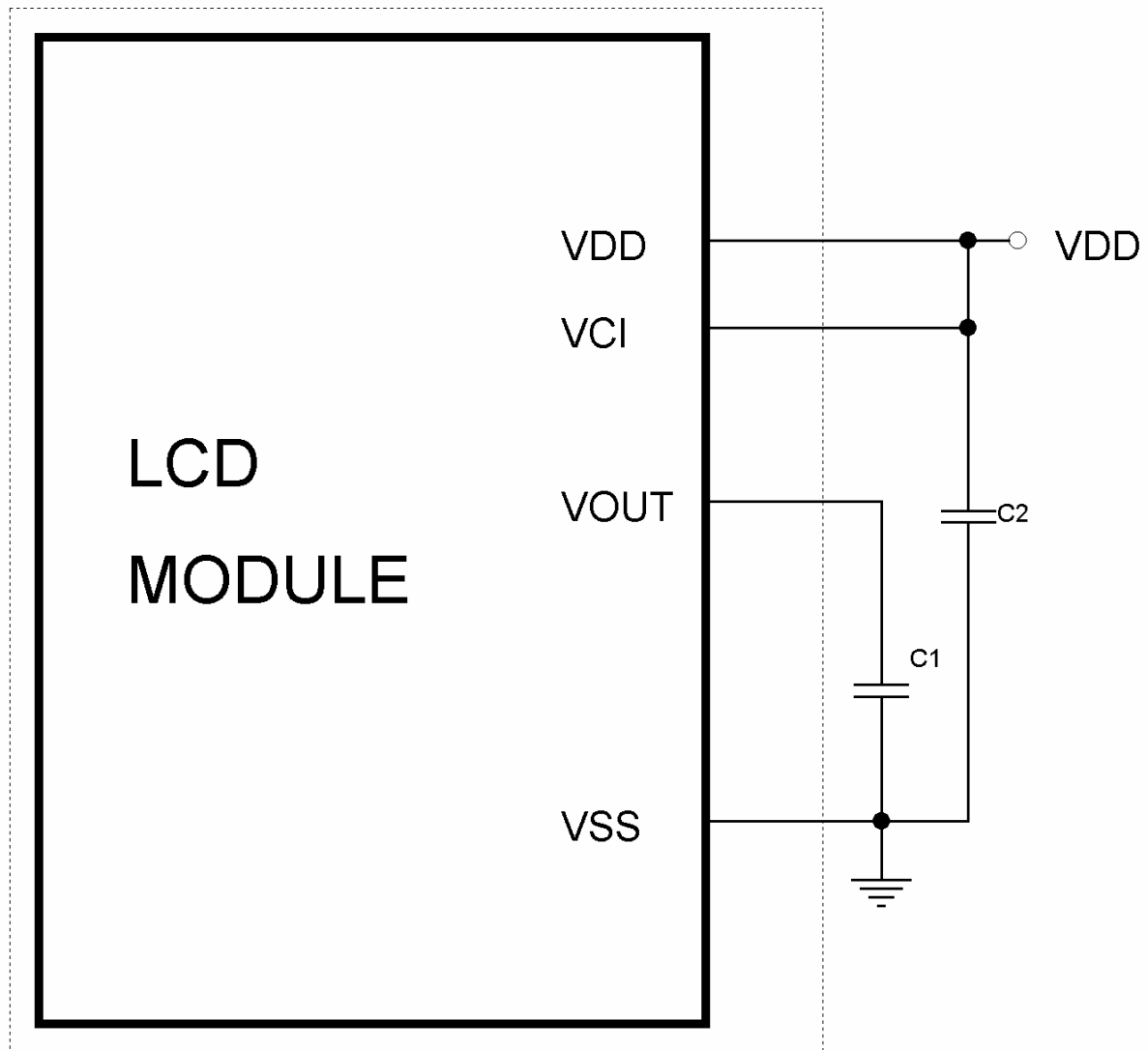
* I_{DD} Measurement condition is for all pixels on display

1.3 Interface Pin Function

CN1:

NO	SYMBOL	I / O	FUNCTION
1.	LEDA	P	LED POWER SUPPLY CATHODE INPUT
2.	LEDK	P	LED POWER SUPPLY ANODE INPUT
3.	PS0	I	INTERFACE MODE SELECTION INPUT PS1=L,PS0=L; 4-LINE SERIAL PS1=L,PS0=H; 8-BIT 8080 PARALLEL PS1=H,PS0=L; 3-LINE SERIAL PS1=H,PS0=H; 8-BIT 68000 PARALLEL
4.	PS1	I	
5.	/CS	I	CHIP SELECTION INPUT
6.	/RES	I	RESET SIGNAL INPUT
7.	RS	I	DATA/COMMAND CONTROL
8.	/WR	I	6800 MODE : READ/WRITE SELECTION INPUT 8080 MODE : WRITE CONTROL SIGNAL INPUT
9.	/RD	I	6800 MODE : ENABLE SIGNAL 8080 MODE : READ CONTROL SIGNAL INPUT
10.	D0	I/O	8 BIT DATA BUS
11.	D1	I/O	
12.	D2	I/O	
13.	D3	I/O	
14.	D4	I/O	
15.	D5	I/O	
16.	D6(SCK)	I/O	
17.	D7(SDA)	I/O	
18.	VDD	P	POWER SUPPLY FOR LOGIC
19.	VCI	P	REFERENCE VOLTAGE INPUT FOR INTERNAL DC-DC CONVERTER
20.	VSS	P	GROUND
21.	VOUT	P	POWER SUPPLY FOR LCD
22.	NC	-	NO CONECTION

1.4 Power Supply for LCD Module

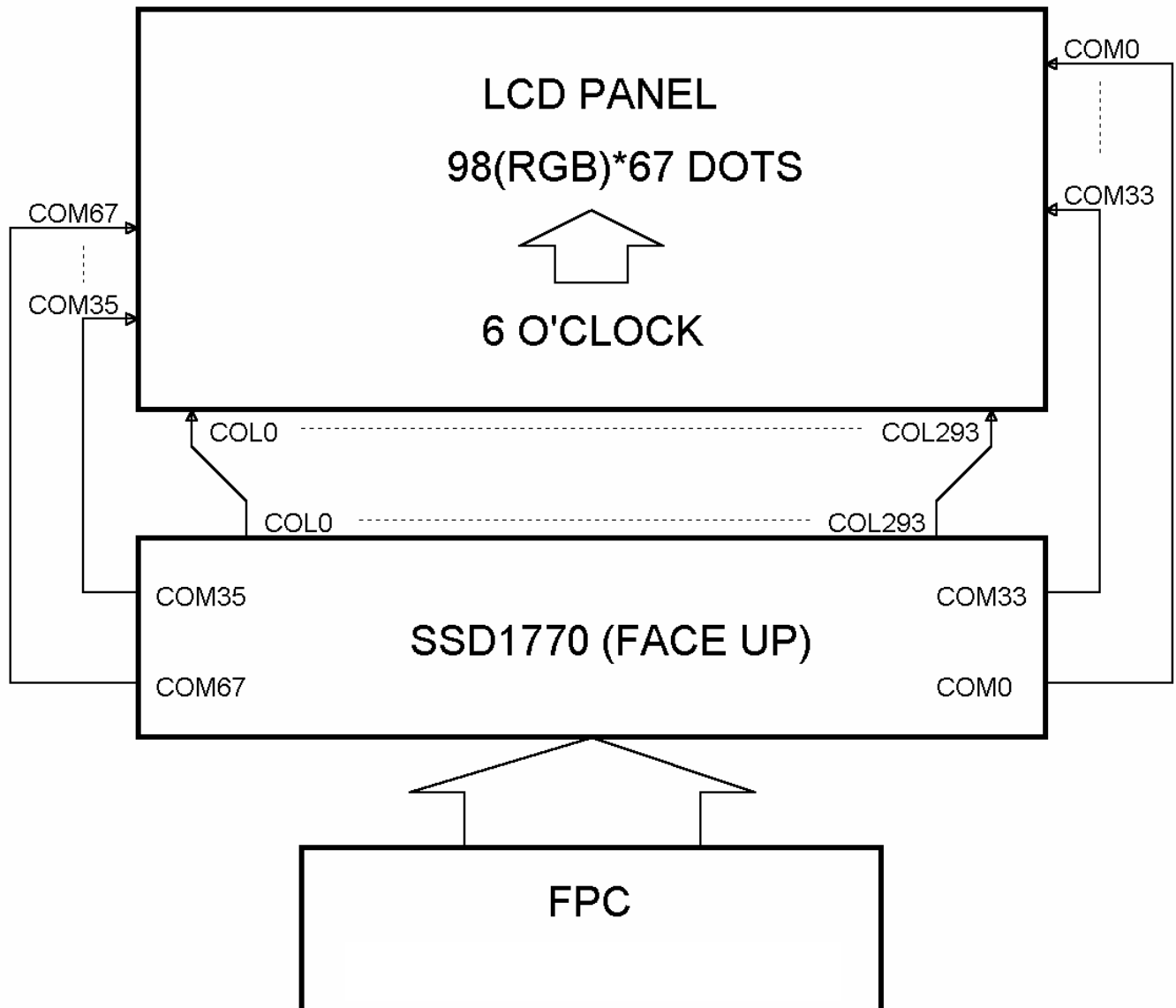


Note1: Using Internal Voltage Generator $V_{DD}=V_{CI}=2.8V$

Note2: We recommend $C1=2.2\mu F/25V$, 0805, X7R;
 $C2=1.0\mu F/25V$, 0805, X7R.

1.5 Block Diagram with Display Ram Address and Initialization Table

1.5.1 Block Diagram



2. RAM arrangements of 16 gray-scale

RGB Alignment using 16-levels gray scale mode																									
		Column																							
LCD Read Direction ↓	P11:0		0			0			1			1						51			51				
	Color		R1	G1	B1	R2	G2	B2	R1	G1	B1	R2	G2	B2				R1	G1	B1	R2	G2	B2		
	Data		D7	D3	D7	D3	D7	D3	D7	D3	D7	D3	D7	D3	D7	D3				D7	D3	D7	D3	D7	D3
			D6	D2	D6	D2	D6	D2	D6	D2	D6	D2	D6	D2	D6	D2				D6	D2	D6	D2	D6	D2
			D5	D1	D5	D1	D5	D1	D5	D1	D5	D1	D5	D1	D5	D1				D5	D1	D5	D1	D5	D1
	Page		D4	D0	D4	D0	D4	D0	D4	D0	D4	D0	D4	D0	D4	D0				D4	D0	D4	D0	D4	D0

COMMON
OUTPUTS

COM0
COM1
COM2
COM3
COM4
COM5
COM6
COM7
:
:
:
:
:
:
:
:
:
:
:
COM68
COM69
COM70
COM71
COM72
COM73
COM74
COM75
COM76
COM77
COM78
COM79
ICON

Table 8 - RAM arrangements of 16-levels gray scale mode

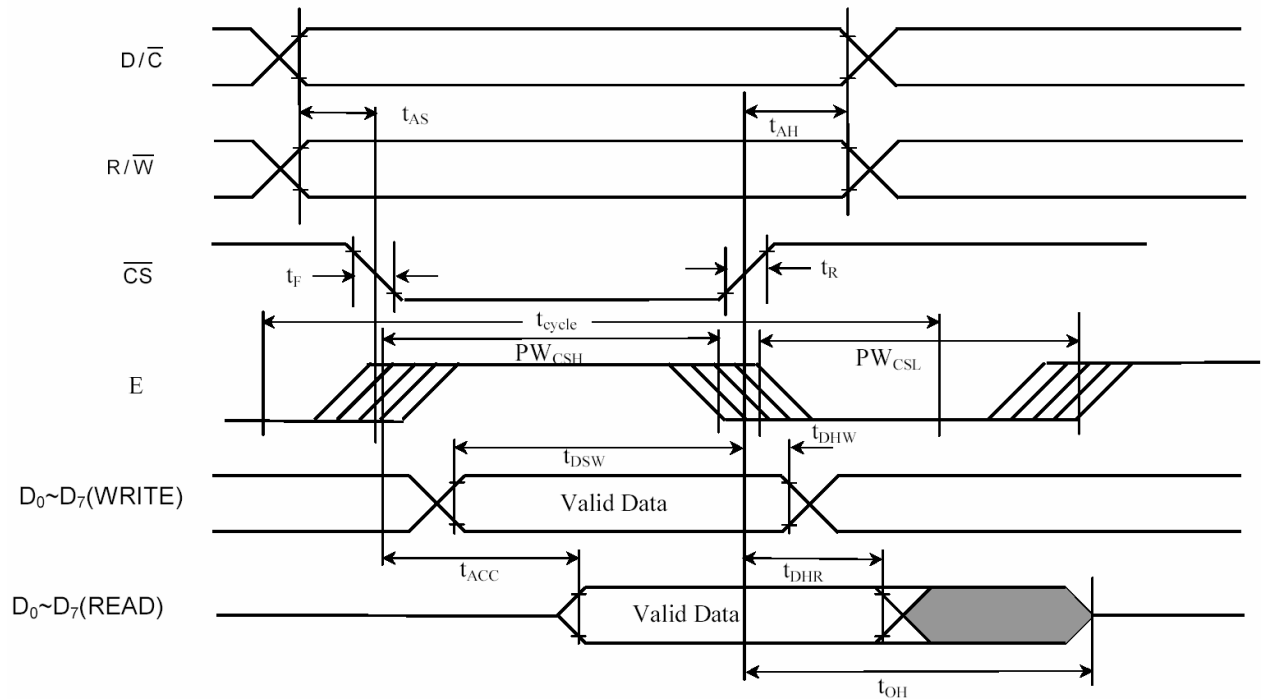
1.5.3 Initialization Table:

Instruction		Code	Description
1.	Enable/disable internal oscillator	11010001	Use Internal clock and Internal oscillator on
2.	Page address set	01110101 00000000 01000010	Set start page address=0 end page address=66
3.	Column address set	00010101 00000000 00110000	Set start column address=0 End column address=48
4.	Set COM scan direction	10111011 xxxx001	MUX68/80=VDD COM0→COM33, COM67→COM35
5.	Data output scan direction set	10111100 xxxxx000 xxxxx000 xxxxx010	Normal page/column/scan directions RGB color arrangement Select 12-bit/pixel mode (4k color)
6.	Display control set	11001010 xxxxxxxx xx010000 xxxxxxxx	Select driver duty = 1/68
7.	Set power control register	00100000 xxxx1111	Turns on the reference voltage generator Turns on the internal regulator and voltage follower Booster level 6X
8.	Set contrast control register & internal regulator resistor ratio	10000001 00100101 00000101	EVR=25H $1+R_2/R_1=7.16$
9.	Select PWM/FRC	11110111 00101000 00001100 00000101	Set 4 bits PWM
10.	Set Frame frequency and Nline Inversion	11110010 00001000 00000110	Frame frequency 78HZ Reset 7-line counter per frame
11.	Set temperature coefficient	11110100 00001000 01000100 00000001	Set average temperature gradient as -0.04%
12.	Normal/inverse display set	10100111	Inverse display
13.	Set biasing bias	11111011 xxxx0011	Bias=1/7

1.6 Timing Characteristic

6800 Parallel timing characteristics(PS0=H,PS1=H)

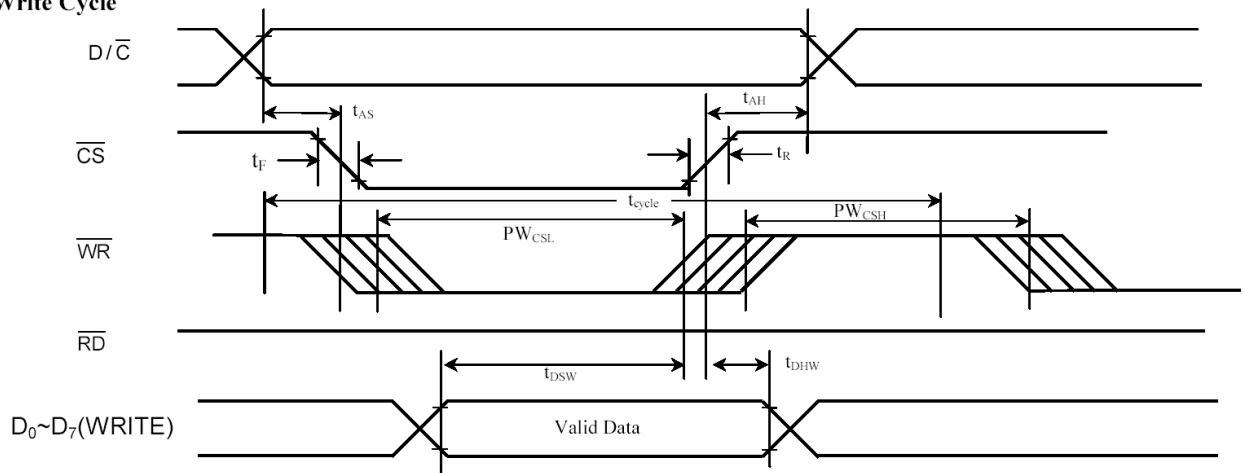
Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time (write cycle)	166.6	-	-	ns
t_{AS}	Address Setup Time	15	-	-	ns
t_{AH}	Address Hold Time	10	-	-	ns
t_{DSW}	Data Setup Time	10	-	-	ns
t_{DHW}	Data Hold Time	20	-	-	ns
t_{ACC}	Data Access Time	15	-	200	ns
t_{OH}	Output Hold time	20	-	60	ns



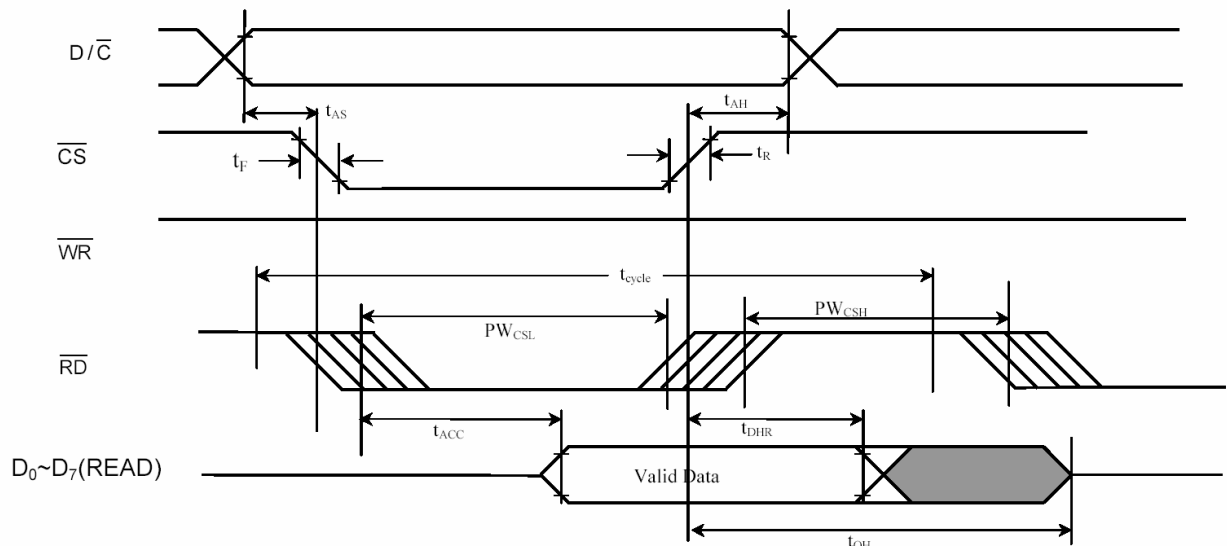
8080 Parallel timing characteristics(PS0=H,PS1=L)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time (write cycle)	166.6	-	-	ns
t_{AS}	Address Setup Time	15	-	-	ns
t_{AH}	Address Hold Time	10	-	-	ns
t_{DSW}	Data Setup Time	10	-	-	ns
t_{DHW}	Data Hold Time	20	-	-	ns
t_{ACC}	Data Access Time	15	-	170	ns
t_{OH}	Output Hold time	20	-	60	ns

Write Cycle

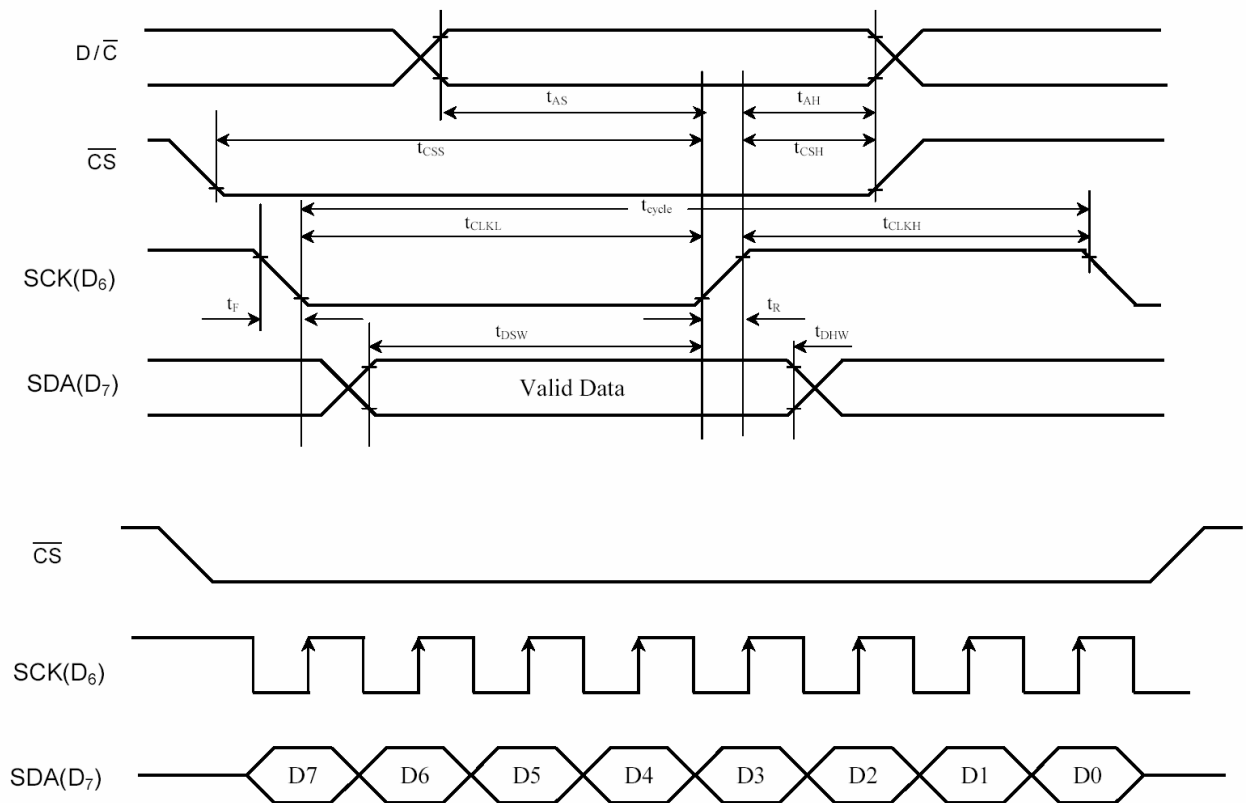


Read Cycle



Serial timing characteristics(PS0=L,PS1=L)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	66.6	-	-	ns
f_{CLK}	Serial Clock Cycle Time SPI Clock tolerance = +/- 2 ppm	-	-	15	MHz
t_{AS}	Register select Setup Time	90	-	-	ns
t_{AH}	Register select Hold Time	20	-	-	ns
t_{CSS}	Chip Select Setup Time	10	-	-	ns
t_{CSH}	Chip Select Hold Time	30	-	-	ns
t_{DSW}	Write Data Setup Time	10	-	-	ns
t_{DHW}	Write Data Hold Time	10	-	-	ns
t_{CLKL}	Clock Low Time	15	-	-	ns
t_{CLKH}	Clock High Time	15	-	-	ns

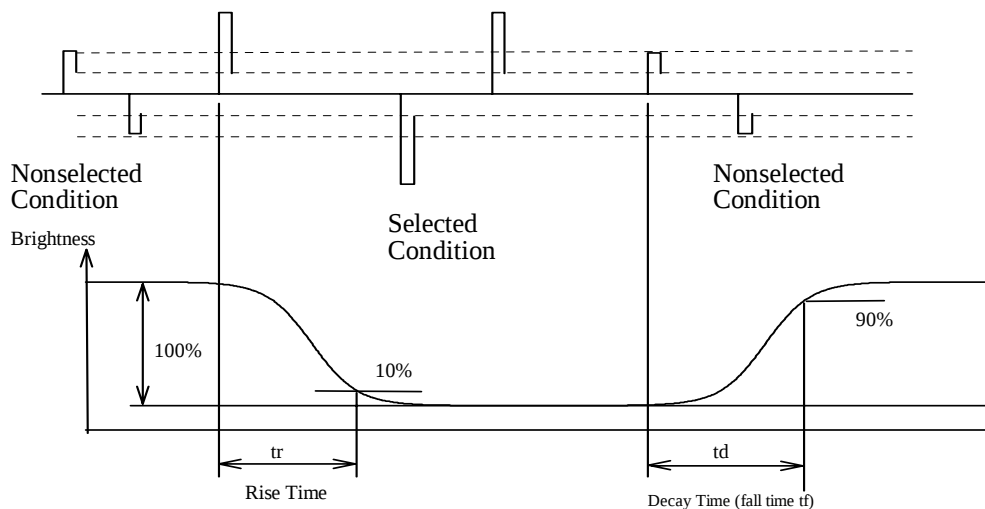


(2) Electro-optical Units

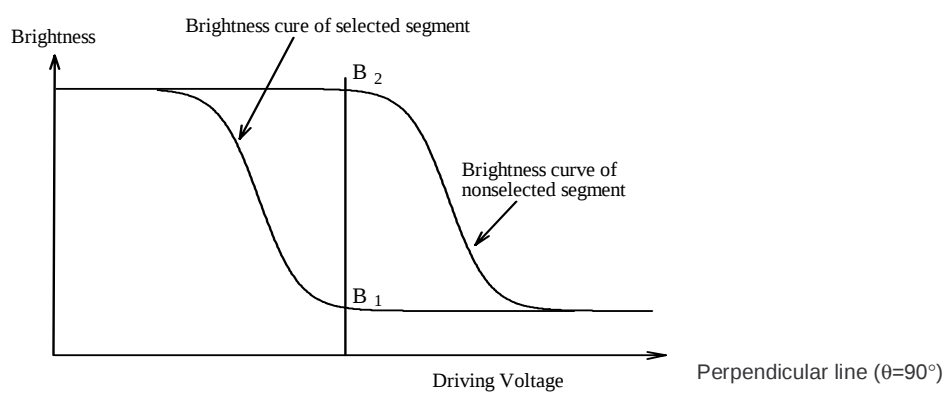
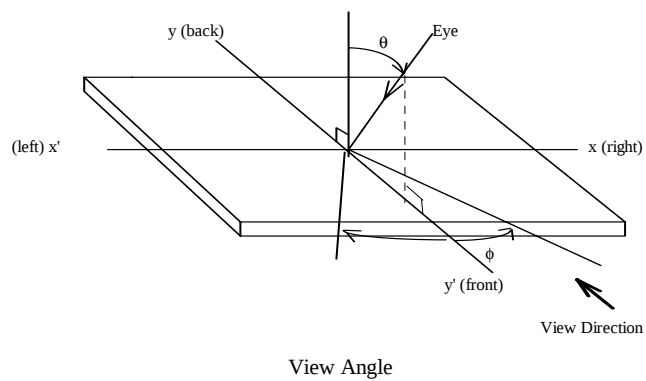
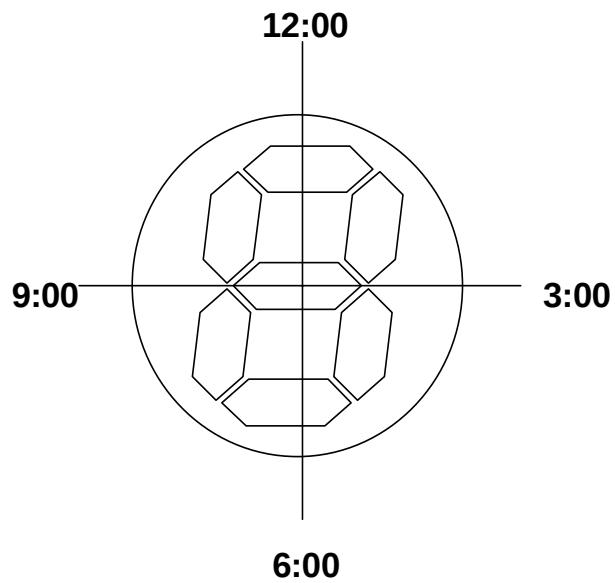
2.1 Electro-optical Characteristics

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
VIEW ANGLE (V)	θ	$CR \geq 2$	-55	-	+55	deg.
VIEW ANGLE (H)	ϕ	$CR \geq 2$	-45	-	+45	deg.
CONTRAST RATIO	CR	Reflective($T_a=25^\circ\text{C}$)	-	6	-	-
		Transmissive($T_a=25^\circ\text{C}$)	-	12	-	-
RESPONSE TIME	t_r	$T_a=25^\circ\text{C}$	-	200	-	ms
RESPONSE TIME	t_d	$T_a=25^\circ\text{C}$	-	150	-	ms
Red x-coord	Rx	$T_a=25^\circ\text{C}$	-	0.427	-	-
Red y-coord	Ry		-	0.302	-	
Green x-coord	Gx		-	0.299	-	
Green y-coord	Gy		-	0.365	-	
Blue x-coord	Bx		-	0.188	-	
Blue y-coord	By		-	0.204	-	
White x-coord	Wx		-	0.301	-	
White y-coord	Wy		-	0.315	-	

2.2 Optical Definitions



Response Time



$$\text{Contrast ratio} = \frac{\text{Brightness at nonselected segment (B}_2\text{)}}{\text{Brightness at selected segment (B}_1\text{)}}$$

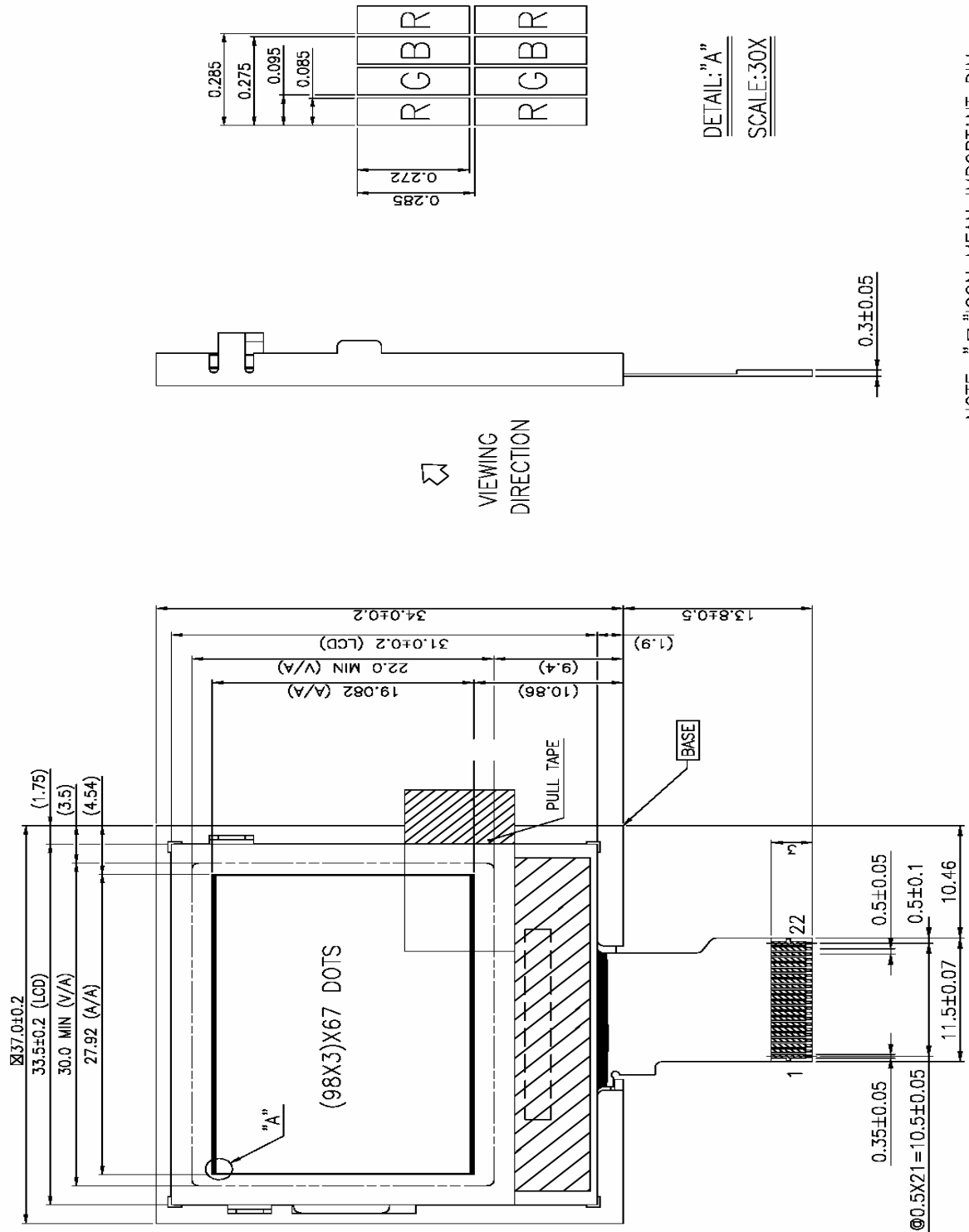
Contrast ratio (CR)

(3) Mechanical Units

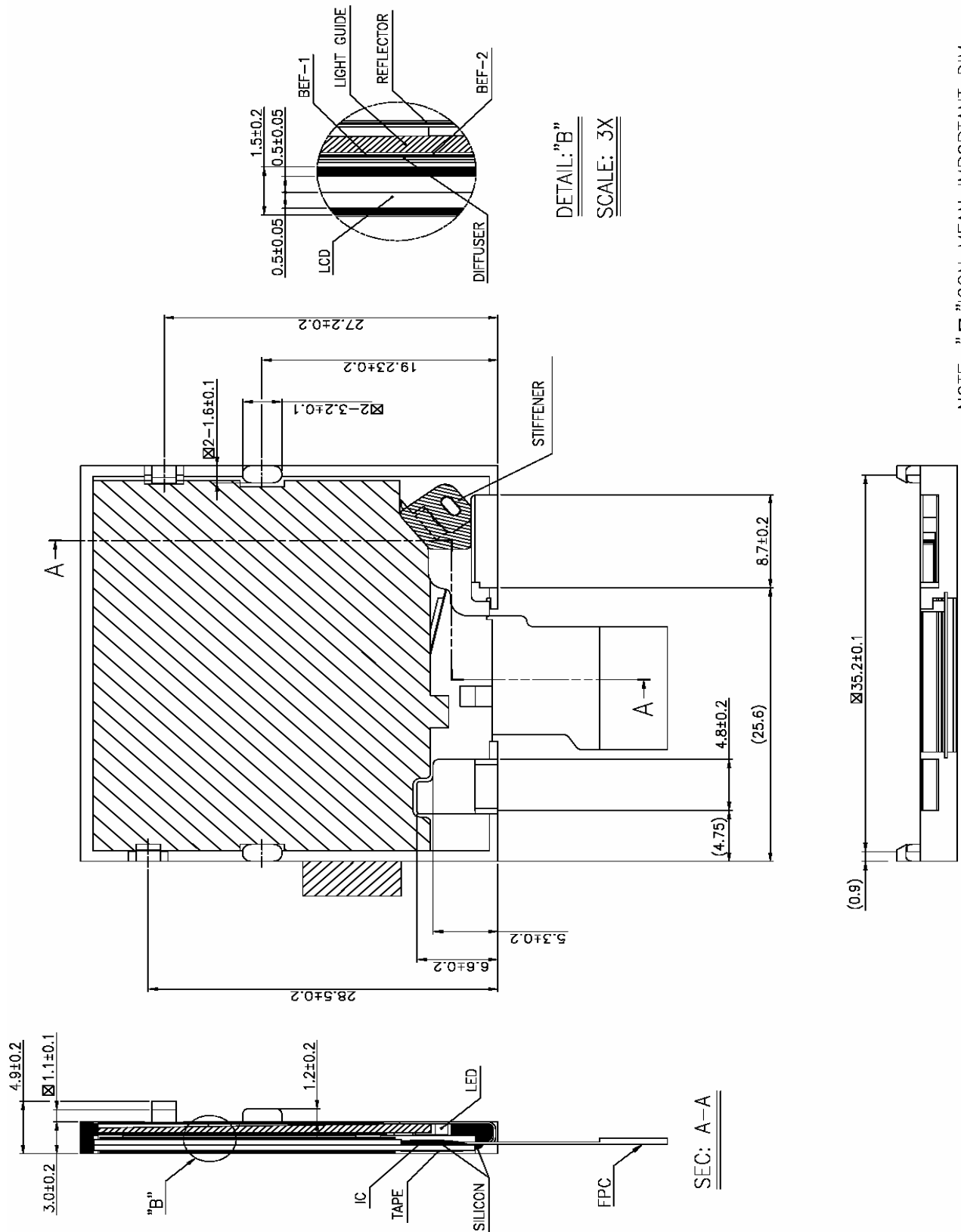
3.1 Mechanical Specification

ITEM	STANDARD VALUE	UNIT
NUMBER OF DOTS	98(RGB) × 67	dots
MODULE DIMENSION	37.0 (W) × 47.8 (H) × 4.9 (T)	mm
VIEWING AREA	30.0 MIN. (W) × 22.0 MIN. (H)	mm
ACTIVE AREA	27.92 (W) × 19.082 (H)	mm
DOT SIZE	0.275 (W) × 0.272 (H)	mm
DOT PITCH	0.285 (W) × 0.285 (H)	mm
APPROX. WEIGHT	4.6	g
BACK LIGHT	WHITE	

3.2 Mechanical Diagram



NOTE: "X" ICON MEAN IMPORTANT DIM



3.3 Back-light Specification

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

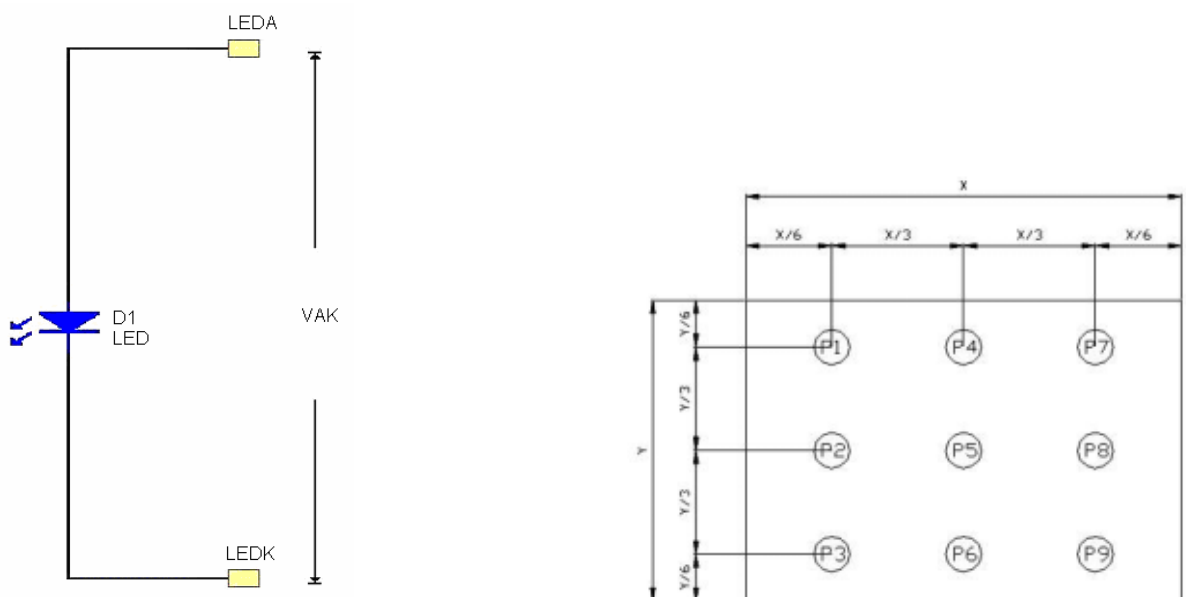
1. Data About LED Backlight:

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
Supply Current	I_F	-	30	-	mA	$V_{AK}=3.5V$	-
Forward Voltage (V_{AK})	V_{AK}	-	3.5	-	V	$I_F=30mA$	-
Reverse Voltage (Single chip)	V_R	-	-	5.0	V	-	-
Luminous Intensity	I_V	-	60	-	cd/m ²	$I_F=30mA$	1 (With LCD)
Luminous Intensity Ratio	-	70	-	-	%	$I_F=30mA$	2

NOTE:

1. Average Luminous Intensity of P1 – P9
2. Luminous Intensity Uniformity = $\text{MIN.} / \text{MAX.} \times 100\%$

3. Measured Method : (X*Y : Light Area)



(Effective spatial Distribution)

Hole Diameter φ 3mm; 1 to 9 per Position Measured Luminous Intensity

3.4 Packing Method

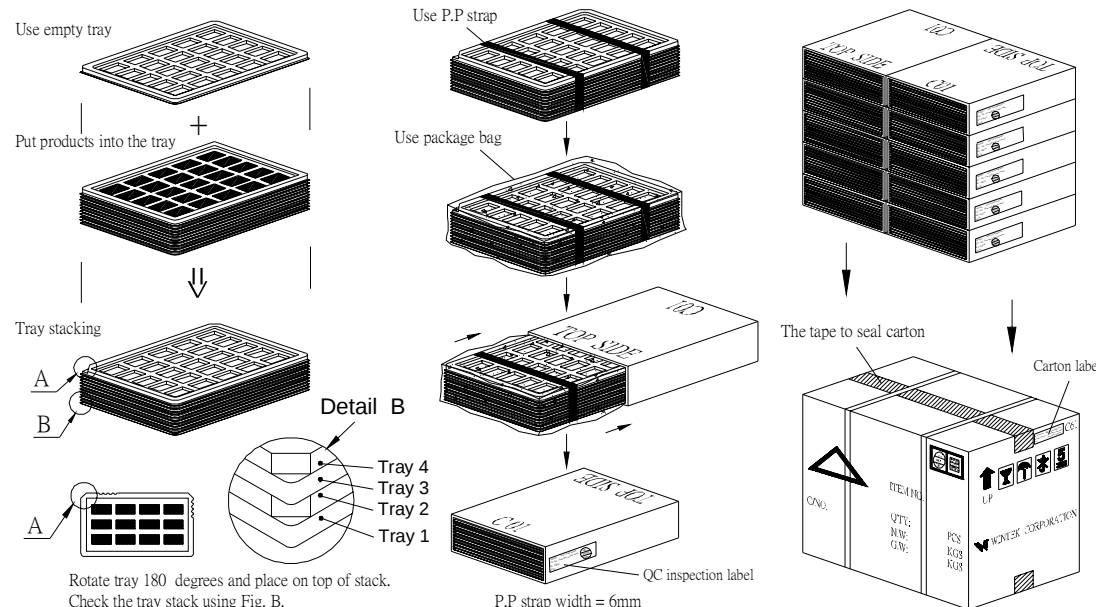
1. Packaging Material : (per carton)						
NO.	Item	Model		Dimensions (mm)	Unit Weight (Kg)	Quantity
1	LCM Module	WM-Y0906Z-6CLWa		37.0*43.15	0.0046	1680
2	Tray	V558	PETA	320*217*12*0.4	0.04	110
3	Product Box	C01		320*219*70	0.131	10
4	Carton	C61		475*345*389	1.208	1
5	Package Bag	C5		467*321*0.08	0.023	10
6	Total Weight	13.7		Kg± 5%		

2. Packaging Specifications and Quantity :

(1) LCM quantity per tray : quantity per row 6 x quantity per column 4 = 24

(2) LCM quantity per box : quantity per tray 24 x quantity of trays 7 = 168

(3) Total LCM quantity in carton : quantity per box 168 x quantity of boxes 10 = 1680



Use empty tray

Put products into the tray

Tray stacking

Detail B

Tray 4

Tray 3

Tray 2

Tray 1

Rotate tray 180 degrees and place on top of stack.
Check the tray stack using Fig. B.

Use P.P strap

Use package bag

The tape to seal carton

Carton label

QC inspection label

P.P strap width = 6mm

3. Label Specifications :		Remark
(1) QC Inspection Label		
MODEL: WM-X0906W-6CLWa LOT NO: (According to each order) QC CHECK: QC DATE OK DATE: 90.0 32.0 Label Color----Green		
(2) Carton Label		
Wintek Part No: WM-X0906W-6CLWa Purchase Order No: (According to each order) Q'ty: (According to shipping) 105.0 42.4 Label Color----White		

(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

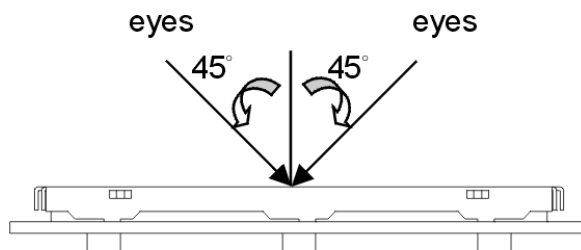
Both sides should discuss together when the following problems happen.

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

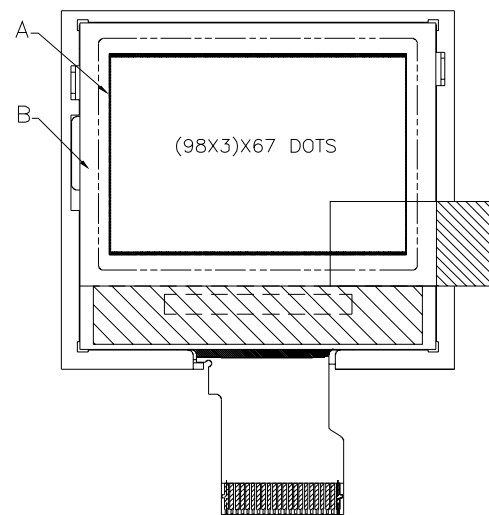
4.1-5. Standard of The Product Appearance Test

a. Manner of appearance test:

- The test must be under $20W \times 2$ or $40W$ fluorescent light, and the distance of view must be at 30 cm.
- When test the model of transmissive product must add the reflective plate.
- The test direction is base on about around 45° of vertical line.



(iv) Definition of area:



A Area : Viewing area.

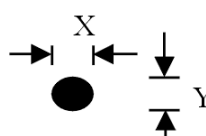
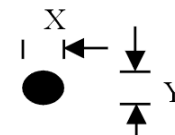
B Area : Out of viewing area.
(Outside viewing area)

b. Basic principle:

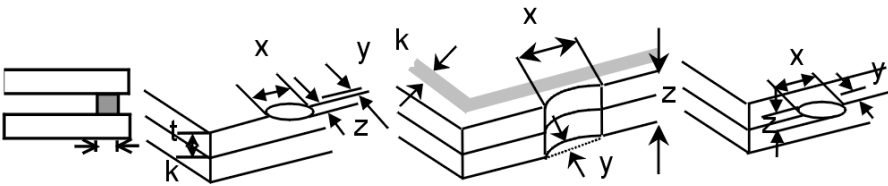
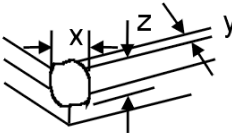
- It will accord to the AQL when the standard can not be described.
- The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.
- Must add new item on time when it is necessary.

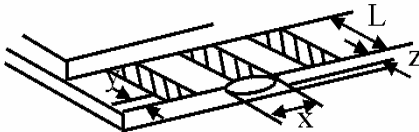
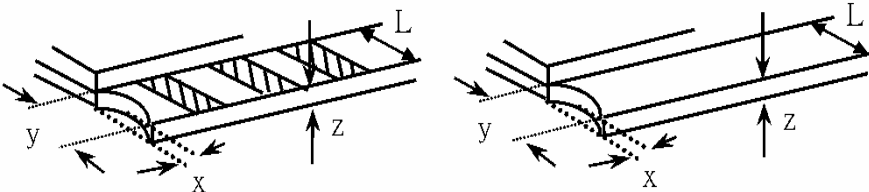
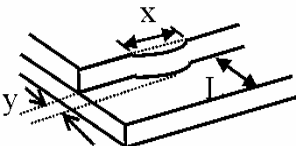
c. Standard of inspection:(Unit: mm)

4.1-6. Inspection specification

NO	Item	Criterion	AQL																		
01	Electrical Testing	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.	0.65																		
02	LCD black spots, white spots	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>$\phi \leq 0.20$</td> <td>Ignore</td> <td></td> </tr> <tr> <td>$0.20 < \phi \leq 0.30$</td> <td>10</td> <td>10mm</td> </tr> <tr> <td>$0.30 < \phi \leq 0.40$</td> <td>5</td> <td>30mm</td> </tr> <tr> <td>$0.40 < \phi$</td> <td>0</td> <td></td> </tr> </table>	Diameter (mm)	Number	Min. Space	$\phi \leq 0.20$	Ignore		$0.20 < \phi \leq 0.30$	10	10mm	$0.30 < \phi \leq 0.40$	5	30mm	$0.40 < \phi$	0		2.5			
	Diameter (mm)	Number	Min. Space																		
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$0.40 < \phi$	0																				
	LCD black spots, white blurred spots	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>$\phi \leq 0.25$</td> <td>Ignore</td> <td></td> </tr> <tr> <td>$0.25 < \phi \leq 0.35$</td> <td>10</td> <td>20mm</td> </tr> <tr> <td>$0.35 < \phi \leq 0.50$</td> <td>4</td> <td>20mm</td> </tr> <tr> <td>$0.50 < \phi \leq 0.75$</td> <td>3</td> <td>50mm</td> </tr> <tr> <td>$0.75 < \phi$</td> <td>0</td> <td></td> </tr> </table>	Diameter (mm)	Number	Min. Space	$\phi \leq 0.25$	Ignore		$0.25 < \phi \leq 0.35$	10	20mm	$0.35 < \phi \leq 0.50$	4	20mm	$0.50 < \phi \leq 0.75$	3	50mm	$0.75 < \phi$	0		2.5
Diameter (mm)	Number	Min. Space																			
$\phi \leq 0.25$	Ignore																				
$0.25 < \phi \leq 0.35$	10	20mm																			
$0.35 < \phi \leq 0.50$	4	20mm																			
$0.50 < \phi \leq 0.75$	3	50mm																			
$0.75 < \phi$	0																				

NO	Item	Criterion	AQL																							
03	LCD black spots, white spots	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>$W \leq 0.03$</td> <td>Ignore</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.03 < W \leq 0.05$</td> <td>6</td> </tr> <tr> <td>$L \leq 2.5$</td> <td>$0.05 < W \leq 0.10$</td> <td>1</td> </tr> <tr> <td>----</td> <td>$0.10 < W$</td> <td>0</td> </tr> </table>	Length (mm)	Width (mm)	Number	-----	$W \leq 0.03$	Ignore	$L \leq 3.0$	$0.03 < W \leq 0.05$	6	$L \leq 2.5$	$0.05 < W \leq 0.10$	1	----	$0.10 < W$	0	2.5								
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LCD black spots, white spots	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>$L \leq 1.2$</td> <td>$W \leq 0.25$</td> <td>2</td> <td>20</td> </tr> <tr> <td>$L \leq 1.5$</td> <td>$W \leq 0.20$</td> <td>3</td> <td>20</td> </tr> <tr> <td>$L \leq 2.0$</td> <td>$W \leq 0.15$</td> <td>3</td> <td>20</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$W \leq 0.10$</td> <td>4</td> <td>20</td> </tr> <tr> <td colspan="2">Whole number</td> <td colspan="2">6</td> </tr> </table>	Length (mm)	Width (mm)	Number	Space (mm)	$L \leq 1.2$	$W \leq 0.25$	2	20	$L \leq 1.5$	$W \leq 0.20$	3	20	$L \leq 2.0$	$W \leq 0.15$	3	20	$L \leq 3.0$	$W \leq 0.10$	4	20	Whole number		6		2.5
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$L \leq 3.0$	$W \leq 0.10$	4	20																							
Whole number		6																								
04	Polarizer bubbles	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 QTY</th> </tr> <tr> <td>$\psi \leq 0.20$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.20 < \psi \leq 0.50$</td> <td>3</td> </tr> <tr> <td>$0.50 < \psi \leq 1.00$</td> <td>2</td> </tr> <tr> <td>$1.00 < \psi$</td> <td>0</td> </tr> <tr> <td>Total Q' TY</td> <td>3</td> </tr> </table>	Size ψ	Acceptable QTY	$\psi \leq 0.20$	Accept no dense	$0.20 < \psi \leq 0.50$	3	$0.50 < \psi \leq 1.00$	2	$1.00 < \psi$	0	Total Q' TY	3	2.5											
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$1.00 < \psi$	0																									
Total Q' TY	3																									
05	Scratches	Follow NO.3 LCD black spots, white spots, contamination																								

NO	Item	Criterion	AQL																		
06	Chipped glass	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><td>z : Chip thickness</td><td>y : Chip width</td><td>x : Chip length</td></tr><tr><td>$Z \leq 1/2t$</td><td>Not over viewing area</td><td>$x \leq 1/8a$</td></tr><tr><td>$1/2t < z \leq 2t$</td><td>Not exceed 1/3k</td><td>$x \leq 1/8a$</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><td>z : Chip thickness</td><td>y : Chip width</td><td>x : Chip length</td></tr><tr><td>$Z \leq 1/2t$</td><td>Not over viewing area</td><td>$x \leq 1/8a$</td></tr><tr><td>$1/2t < z \leq 2t$</td><td>Not exceed 1/3k</td><td>$x \leq 1/8a$</td></tr></table> ⊙ If there are 2 or more chips, x is the total length of each chip.	z : Chip thickness	y : Chip width	x : Chip length	$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	z : Chip thickness	y : Chip width	x : Chip length	$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	2.5
		z : Chip thickness	y : Chip width	x : Chip length																	
$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$																			
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z : Chip thickness	y : Chip width	x : Chip length																			
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$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$																			

NO	Item	Criterion	AQL																
06	Glass crack	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><td>y : Chip width</td><td>x : Chip length</td><td>z : Chip thickness</td></tr><tr><td>$y \leq 0.5 \text{ mm}$</td><td>$x \leq 1/8a$</td><td>$0 < z \leq t$</td></tr></table> 6.2.2 Non-conductive portion :  <table><tr><td>y : Chip width</td><td>x : Chip length</td><td>z : Chip thickness</td></tr><tr><td>$y \leq L$</td><td>$x \leq 1/8a$</td><td>$0 < z \leq t$</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><td>y : width</td><td>x : length</td></tr><tr><td>$y \leq 1/3L$</td><td>$x \leq a$</td></tr></table>	y : Chip width	x : Chip length	z : Chip thickness	$y \leq 0.5 \text{ mm}$	$x \leq 1/8a$	$0 < z \leq t$	y : Chip width	x : Chip length	z : Chip thickness	$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$	y : width	x : length	$y \leq 1/3L$	$x \leq a$	2.5
		y : Chip width	x : Chip length	z : Chip thickness															
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$y \leq 1/3L$	$x \leq a$																		

NO	Item	Criterion	AQL
07	Cracked glass	The LCD with extensive crack is not acceptable.	2.5
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.	0.65 2.5 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.	2.5 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.	2.5 2.5 0.65 2.5 2.5 0.65 0.65 2.5
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.	2.5 2.5 2.5 0.65

NO	Item	Criterion	AQL
12	General appearance	12.1 No oxidation, contamination, curves or, bends on interface Pin (OLB) of TCP.	2.5
		12.2 No cracks on interface pin (OLB) of TCP.	0.65
		12.3 No contamination, solder residue or solder balls on product.	2.5
		12.4 The IC on the TCP may not be damaged, circuits.	2.5
		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.	2.5
		12.6 The residual rosin or tin oil of soldering (component or chip component) is not burned into brown or black color.	2.5
		12.7 Sealant on top of the ITO circuit has not hardened	2.5
		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°C for 240 (-0, +48) hours under driving condition.
02	Low temperature operation	The sample should be allowed to stand at -20°C for 240 (-0, +48) hours under driving condition.
03	High temperature resistance	The sample should be allowed to stand at +80°C 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 -40°C 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°C , 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. The polarizer should be allowed to stand at +60°C , 90% RH MAX for 96 hours.
06	Thermal shock resistance	The sample should be allowed to stand the following 10 cycles of operation: -40°C for 30 minutes → normal temperature for 5 minutes → +80°C for 30 minutes → normal temperature for 5 minutes , as one cycle.
07	ESD (Electrostatic Discharge)	Human Body Model: 2000 volt electrical discharge from a 100 pF capacitor to the tested device in series with a 1500 ohm resistor. Apply V_{DD} & V_{SS} to LCD module unit. Test for functionality no missing lines after the discharge, but LCD module may reset. Machine Model: 200 volt electrical discharge from a 200 pF capacitor to the tested device with no series resistance. Apply to V_{DD} & V_{SS} to LCD module unit without including hand phone. Test for functionality no any missing line after the discharge but LCD module can be reset if display off.

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 ($25 \pm 10^{\circ}\text{C}$), normal humidity ($45 \pm 20\% \text{ RH}$), and in area not exposed to direct sun light. (Life time of backlight, please refer to Data about backlight.)
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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.

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°C to 45°C, 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 high quality solder. (60-63% tin mixed with lead)
- Iron: no higher than 260°C and less than 3-4 sec during soldering.
- Soldering: only to the I/O terminals.
- 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.