



CUSTOMER' S APPROVAL SPECIFICATIONS

MODEL: OT070HGDDDN-00
(With RoHS)

CUSTOMER: _____

Version: P0.1

C O N T E N T S

ISSUE:JUN.07.2012

Spec Condition preliminary

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CUSTOMER	Yudu Amson		
APPROVAL	APPROVAL	CHECKER	PREPARE



2.RECORD OF REVISION

Rev	DATE	PAGE	SUMMARY
0.1	2012.06.07	ALL	Preliminary specification was first issued.

Yudu Amson

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3.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	800 (R.G.B) X 480
(2)	Module Size(mm)	165.0(H) X 104.44(V) X 5.2(D)
(3)	Active Area(mm)	152.4(H) X 91.44(V)
(4)	Pixel Pitch(mm)	0.1905(H) X 0.1905(V)
(5)	LCD Model	TFT , Transmissive , Normally/white
(6)	Polarizer Model	Anti-glare
(7)	LED Backlight Color	White
(8)	Viewing Direction	12 O'clock
(9)	Gary Scale Inversion Direction	6 O'clock
(10)	Color Configuration	R.G.B Stripe
(11)	Driving Method	COG TYPE
(12)	Module Weight(g)	(127)

**Viewing direction for best image quality is different from TFT definition, there is the 180 degrees shift.

4. OUTLINE DIMENSIONS

[illegible]

5. INTERFACE PIN CONNECTION

5.1 LCM PANEL DRIVING SECTION

PIN NO.	SYMBOL	FUNCTION	REMARK
1	GND	Power Ground	
2	GND	Power Ground	
3	NC	Not Connect	
4	VCC	Power Supply for Digital Circuit	
5	VCC	Power Supply for Digital Circuit	
6	VCC	Power Supply for Digital Circuit	
7	VCC	Power Supply for Digital Circuit	
8	NC	Not Connect	
9	DE	Data Enable	
10	GND	Power Ground	
11	GND	Power Ground	
12	GND	Power Ground	
13	B5	Blue Data 5 (MSB)	
14	B4	Blue Data 4	
15	B3	Blue Data 3	
16	GND	Power Ground	
17	B2	Blue Data 2	
18	B1	Blue Data 1	
19	B0	Blue Data 0 (LSB)	
20	GND	Power Ground	
21	G5	Green Data 5 (MSB)	
22	G4	Green Data 4	
23	G3	Green Data 3	
24	GND	Power Ground	
25	G2	Green Data 2	
26	G1	Green Data 1	
27	G0	Green Data 0 (LSB)	
28	GND	Power Ground	
29	R5	Red Data 5 (MSB)	
30	R4	Red Data 4	
31	R3	Red Data 3	
32	GND	Power Ground	
33	R2	Red Data 2	
34	R1	Red Data 1	
35	R0	Red Data 0 (LSB)	
36	GND	Power Ground	
37	GND	Power Ground	
38	DCLK	Clock Signals ; Latch Data at the Falling Edge	
39	GND	Power Ground	
40	GND	Power Ground	

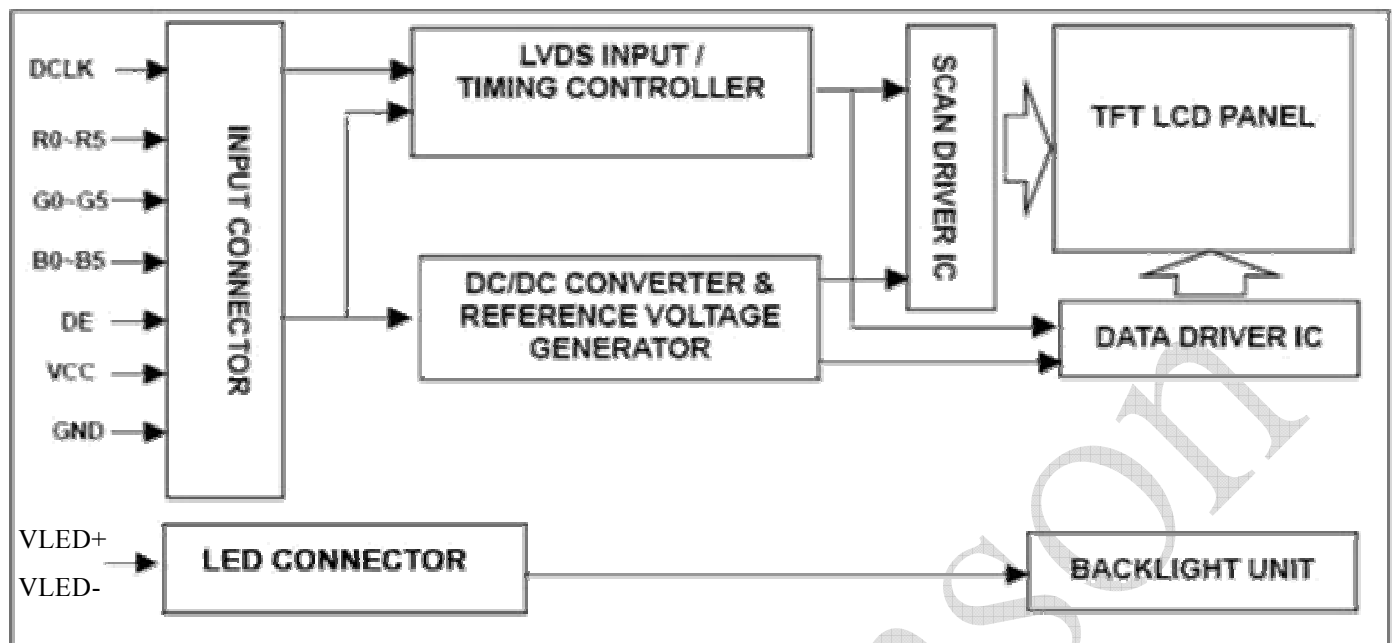
Note: User's connector part number is **PF050-40ZSG-F09-S** manufactured by UJU or equivalent.

5.2 BACKLIGHT DRIVING PART

PIN NO.	SYMBOL	FUNCTION
1	VLED+	Red, LED_ Anode
2	VLED-	White, LED_ Cathode

Note: The backlight interface connector is a model **BHSR-02VS-1** manufactured by JST or equivalent. The matching connector part number is **SM02B-BHSS-1-TB** manufactured by JST or equivalent.

6. BLOCK DIAGRAM



7.ABSOLUTE MAXIMUM RATINGS

7.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

(GND=0V)

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
Power Supply Voltages	VCC	-0.3	+6.0	V	
Logic Output Voltage	V1	-0.3	VCC+0.3	V	Note 1

Note 1 : DCLK,DE,R0~R5,G0~G5,B0~B5

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		COMMENT
	MIN	MAX	MIN	MAX	
Ambient Temperature(°C)	-20	70	-30	80	Note 1,2,3
Humidity(% RH)	-	90	-	90	Note 4

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Operation Ta=70°C & -20°C ≤ 240Hrs.

Note 4 : Storage Ta=60°C & H=90% ≤ 240Hrs.

8.ELECTRICAL CHARACTERISTICS

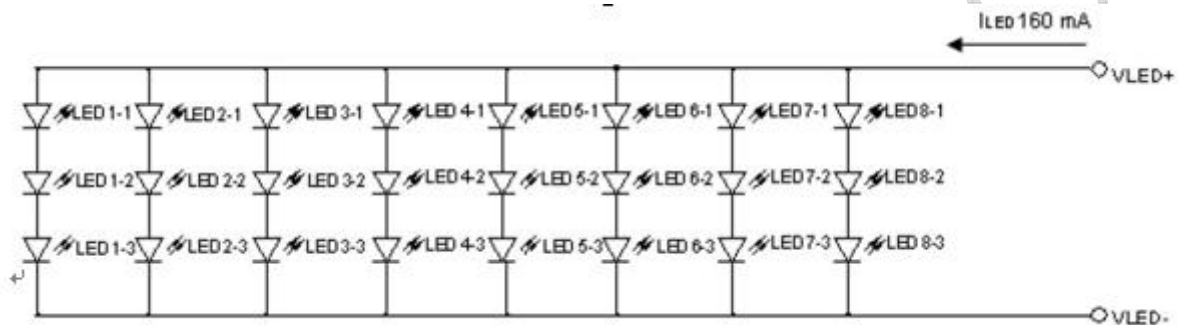
8.1 LCM ELECTRICAL CHARACTERISTICS

Ta=25°C

I T E M	SYMBOL	MIN.	TYP.	MAX.	UNIT
Power Voltage For LCD	VCC	3.0	3.3	3.6	V
	ICC**	-	200	260	mA
LED Driving Voltage	VLED	-	9.9	-	V
LED Driving Current (Note 1)	ILED	-	160	200	mA
Input High Voltage	V _{IH}	0.7V _{cc}	-	VCC	V
Input Low Voltage	V _{IL}	0	-	0.3VCC	V
LED Life Time (Note 2)	-	10000	20000	-	Hr

** Test pattern:black

Note 1 : There are 8 Groups LED shown as below , VLED=9.9V,ILED=160mA.



Note 2: Brightness to be decreased to 50% of the initial value.

9.OPTICAL CHARACTERISTICS

9.1 OPTICAL CHARACTERISTICS OF LCM PANEL

Ta=25°C

ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle $\Theta_x = \Theta_y$ $=0^\circ$	250	400	-	-	Note (1)
Response Time		TR		-	5	10	ms	Note (2)
		TF		-	11	26	ms	
Chromaticity	White	XW		(0.249)	(0.299)	(0.349)	-	Note (4)
		YW	(0.278)	(0.328)	(0.378)	-		
Viewing Angle	Hor.	Θ_{x+}	Viewing Angle $\Theta_x = \Theta_y$ $=0^\circ$ $CR \geq 10$	60	70	-	Deg.	Note (3)
		Θ_{x-}		60	70	-		
	Ver.	Θ_{y+}		50	60	-		
		Θ_{y-}		60	70	-		
Luminance		L	I_{LED} $=160mA$	450	500	-	cd/m2	
Luminance uniformity		YU		70	75	-	%	Note (5)

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

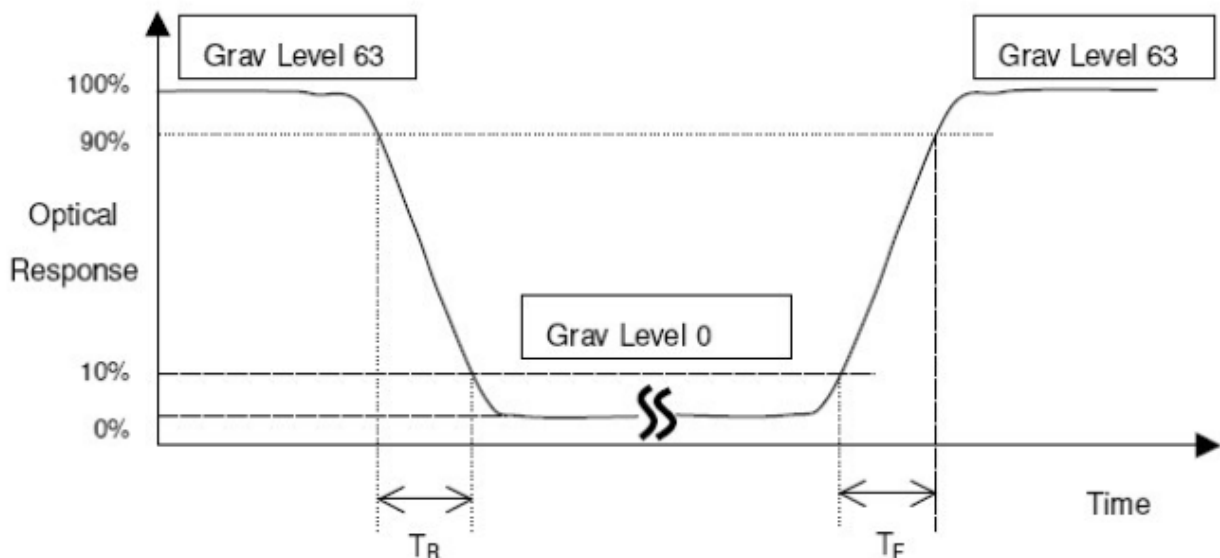
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

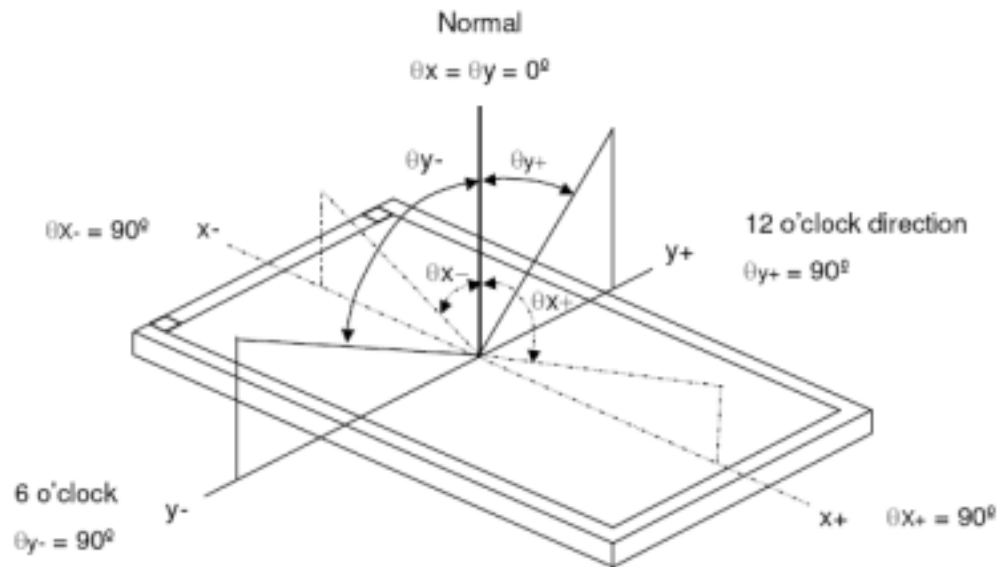
$$CR = CR (5)$$

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

*Note (2) Definition of Response Time (T_R , T_F):

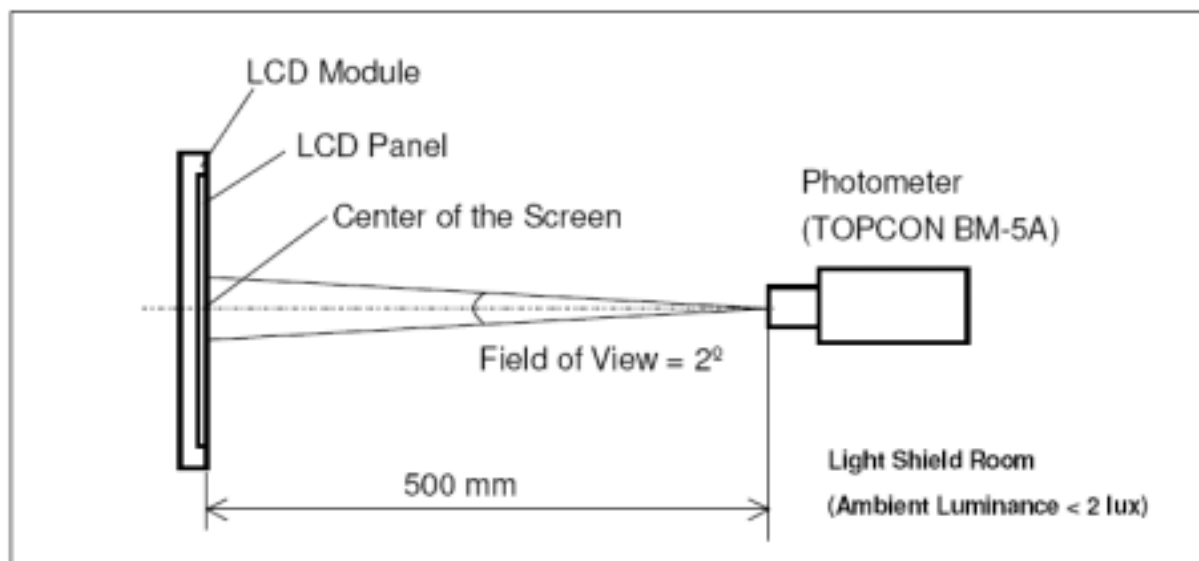


*Note(3) Definition of Viewing Angle

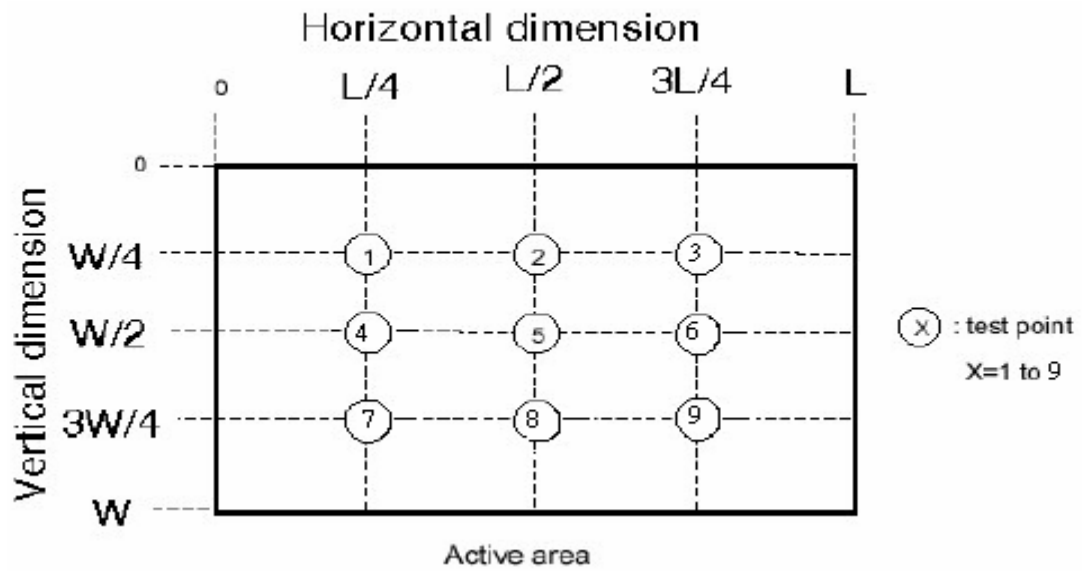


*Note (4) Measurement Set-Up:

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



*Note (5)



$$\left(1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right) \times 100\% > 70\%$$

10. AC CHARACTERISTICS

10.1 AC ELECTRICAL CHARACTERISTICS

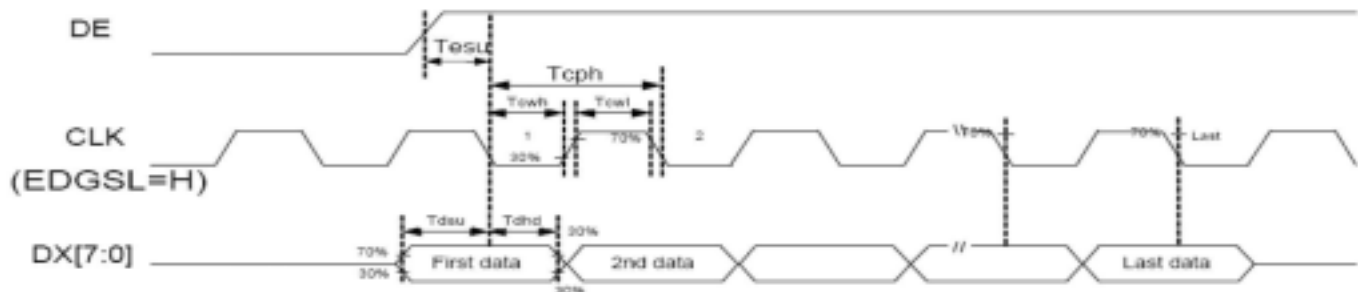
Frame rate range : 60Hz~65Hz

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Data setup	Tdsu	6	-	-	ns
Data hold time	Tdhd	6	-	-	ns
DE setup time	Tesu	6	-	-	ns
CLK frequency	FCPH	29.40	33.26	42.48	MHz
CLK period	TCPH	23.54	30.06	34.01	ns
CLK pulse duty	TCWH	40	50	60	%
CLK pulse duty	TCWL	40	50	60	%
DE period	T _{DEH} +T _{DEL}	1000	1056	1200	TCPH
DE pulse width	T _{DEH}	-	800	-	TCPH
DE frame blanking	T _{DEB}	10	45	110	T _{DEH} +T _{DEL}
DE frame width	T _{DE}	-	480	-	T _{DEH} +T _{DEL}

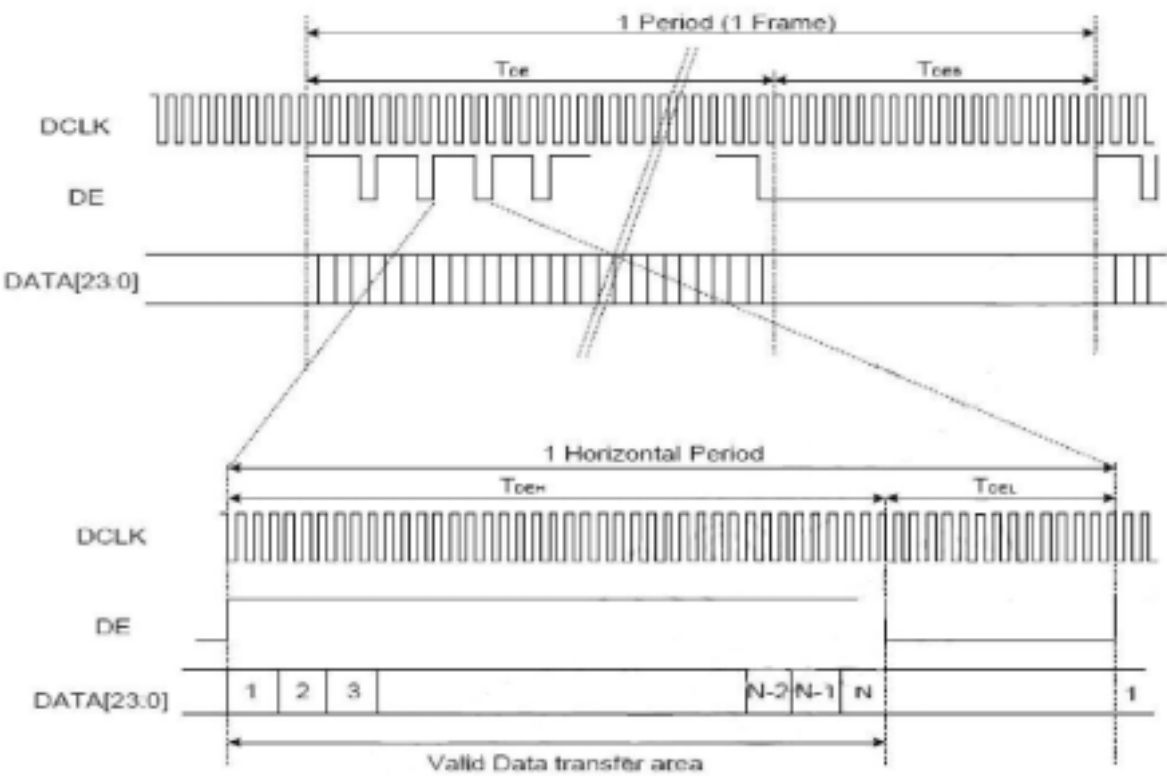
Note : We suggest using the typical value , so it can have better performance.

10.2 TIMING CONTROLLER TIMING CHART

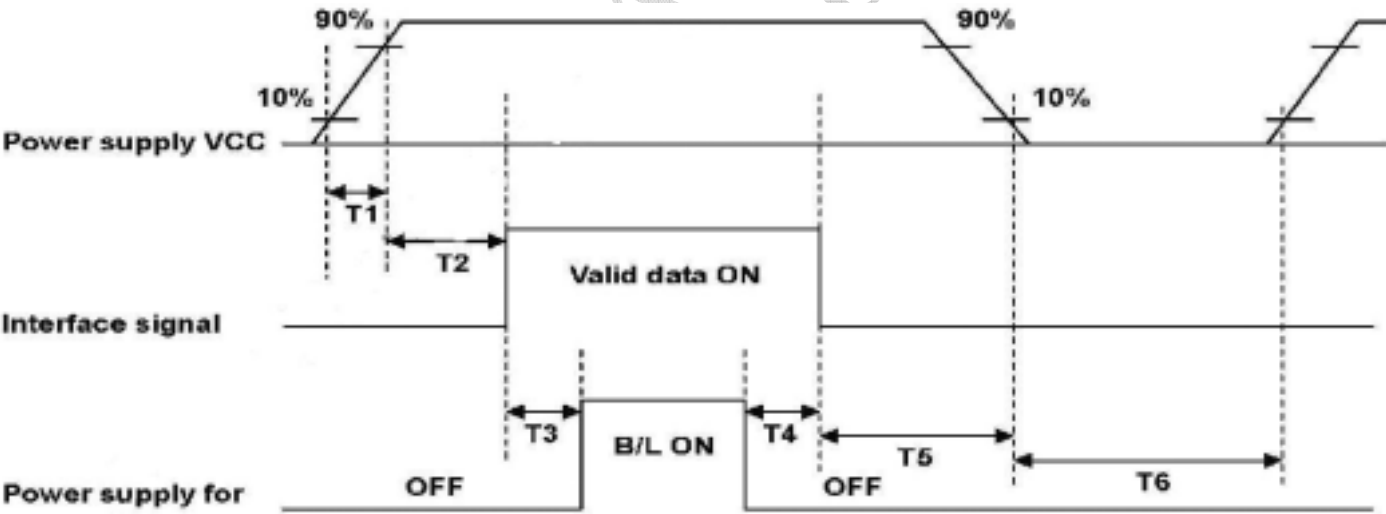
Clock and Data input waveforms



10.3 DATA INPUT FORMAT



10.4 POWER ON/OFF SEQUENCE



PARAMETER	MIN.	TYP.	MAX.	UNIT
T1	1	-	2	ms
T2	0	60	-	ms
T3	200	-	-	ms
T4	200	-	-	ms
T5	1	-	-	ms
T6	1000	-	-	ms

11. RELIABILITY TEST

Ta = 25°C

ENVIRONMENTAL TEST					
NO.	ITEM	CONDITIONS	TIME PERIOD	SAMPLE	REMARK
1	High Temperature Storage	80°C	240HRS	3	
2	Low Temperature Storage	-30±3°C	240HRS	3	
3	High Temperature Humidity Storage	60°C 90%RH	240HRS	3	NOTE(2)
4	High Temperature Operation	70°C	240HRS	3	NOTE(2)
5	Low Temperature Operation	-20°C	240HRS	3	NOTE(2)
6	Temperature Cycle	-20°C←25°C→70°C (30min) (5min) (30min)	50CYCLE	3	NOTE(2)

※(Supply voltage for logic system=3.3V. Supply voltage for LCD system = Operating voltage at 25°C)

NOTE 1 : a. THE MODULE SHOULD WORK PROPERLY.

b. BEFORE AND AFTER FUNCTION TEST, THE DIFFERENCE OF CONSUMPTIVE CURRENT.SHOULD BE WITHIN 10%

NOTE 2 : a. THE MODULE SHOULD WORK PROPERLY.

b. THE MODLUE WON'T BE DEFORMATIVE, COLOR CHANGEABLE OR BROKEN.

c. THE MODULES CAN'T BE APART.

12. LCM INSPECTION STANDARD

12.1 QUALITY LEVEL

INSPECTION PLAN:

SAMPLING LEVEL: II, normal inspection, single sampling inspection

Sampling Plan		MIL-STD-105E
		Normal Inspection, Single Sampling
		Level II
AQL	Major Defect	0.65%
	Minor Defect	1.0%

12.2 ENVIRONMENT CONDITIONS:

Ambient Temperature		25°C±5°C
Ambient Humidity		65±5%RH
Ambient Illumination	Cosmetic Inspection	300~700 Lux
	Functional Inspection	300~700 Lux

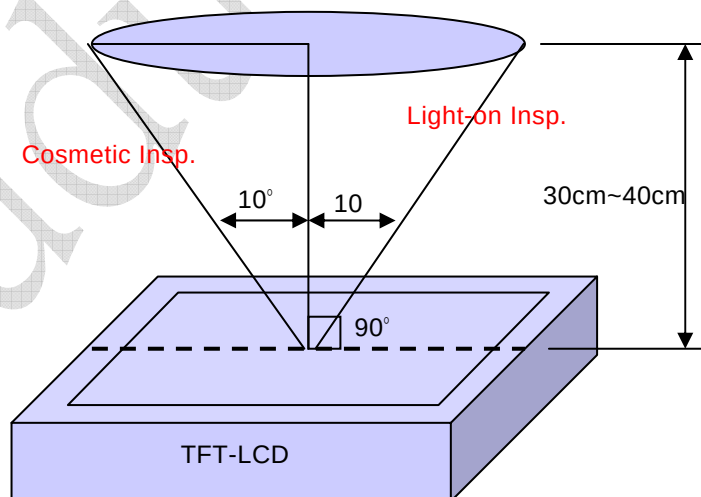
12.3 INSPECTION CONDITION:

(1) Inspection Distance: 35cm ±5cm

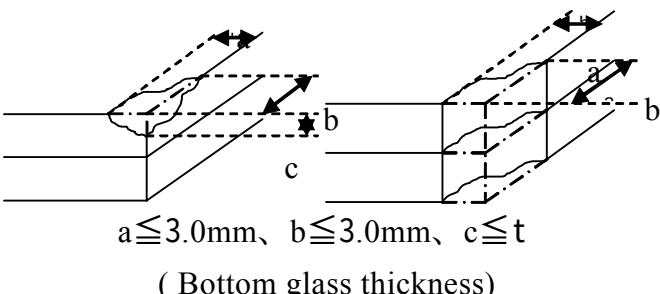
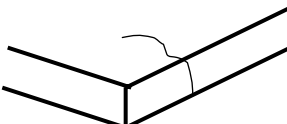
(2) View Angle:

Light-on Inspection Angle: ±10°

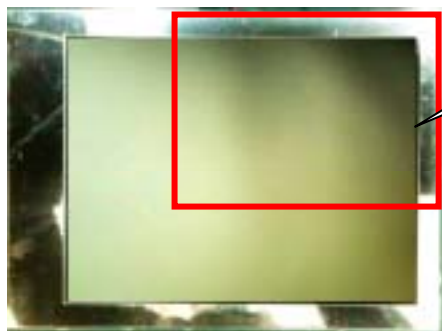
Cosmetic Inspection Angle: ±10°



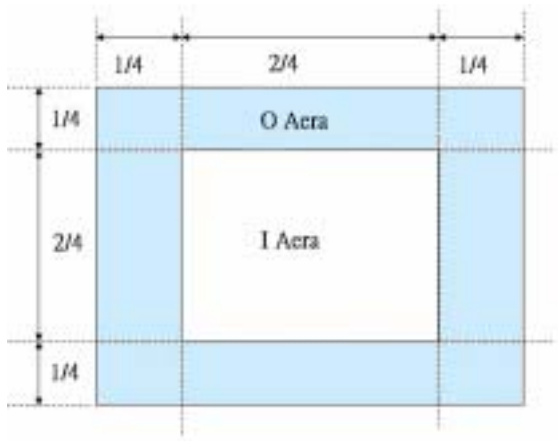
12.4 COSMETIC INSPECTION(PANEL):

ITEM	JUDGMENT CRITERIA	CLASSIFICATION
Chipping on Panel/Touch Panel	 $a \leq 3.0\text{mm}$, $b \leq 3.0\text{mm}$, $c \leq t$ (Bottom glass thickness)	MA
Scratch on Panel/Touch Panel *Note-2	$W \leq 0.05\text{mm}$ and $L \leq 8\text{mm}$: Ignored $0.05\text{mm} < W \leq 0.1\text{mm}$ and $L \leq 8\text{mm}$: $N \leq 3$ $W > 0.1\text{mm}$ or $L > 8\text{mm}$, Not allowed	MI
Bubble or Dent on Panel/Touch Panel *Note-3	$D \leq 0.2\text{mm}$: Ignored $0.2\text{mm} < D \leq 0.6\text{mm}$: $N \leq 4$ $D > 0.3\text{mm}$: Not allowed	MI
Panel/Touch Panel Crack	 Not Allowed crack	MA
Bezel Deformation	Obvious deformation is not allowed	MI
Bezel Oxidation	Not allowed if it rusts continuously over 1 cm (It is out of warranty with rusted tin plate)	MI
Bezel Scratch	$L \leq 20\text{mm}$, $W \leq 0.3\text{ mm}$, $N \leq 7$	MI
Metal Squash Dent /Flange(Front Side)	$D(W) \leq 1\text{ mm}$, $L \leq 3$, $N \leq 4$;	MI
B/L High Voltage Wire Denudation	Not allowed	MA
Polarizer flaw or leak out resin	Defect is defined as the active area.	MI
Outline Dimension	Must in Spec, refer to related product spec.	MI

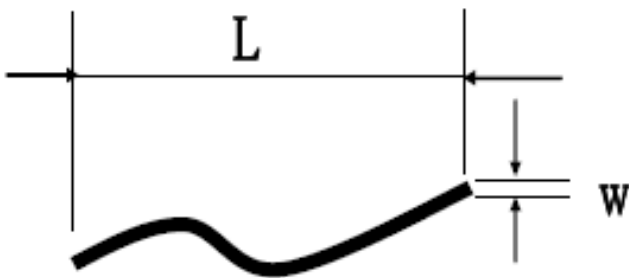
12.5 FUNCTIONAL INSPECTION:

ITEM	JUDGMENT CRITERIA			CLASSIFICATION
Point Defect	Bright dot	Random	2	MI
		2 dots adjacent	1	
	Dark dot	Random	3	
		2 dots adjacent	1	
	Total Dot Defect		4	
Line Defect	Obvious vertical or horizontal line defect is not allowed.			MA
Mura	1. Under the normal examination angle of view, the picture has the non-uniform phenomenon.			MI
				
	2. Weak defect will be defined as Mura if it can be Observed through ND filter 6%			
				
Foreign Material in spot shape *Note-3	D ≤0.25 mm		Ignored	MI
	0.25mm < D ≤ 0.5mm		N ≤ 3	
	D > 0.5mm		N=0	
Foreign Material in line or spiral shape *Note-4	W ≤ 0.01 mm		Ignored	MI
	0.01mm<W ≤ 0.05mm and L ≤ 3mm		N ≤ 3	
	W > 0.05mm or L > 3 mm		N=0	
Display Function Abnormal	No Malfunction can be allowed			MA

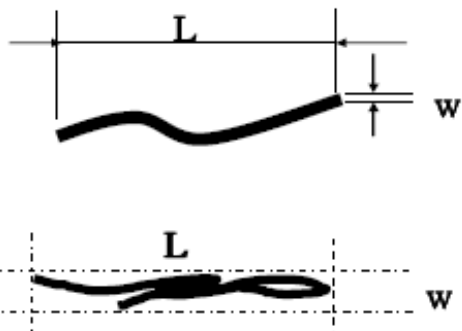
Note 1 : /O Area Definition



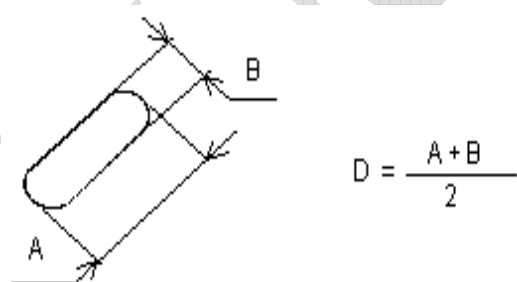
Note 2 : Polarizer Scratch



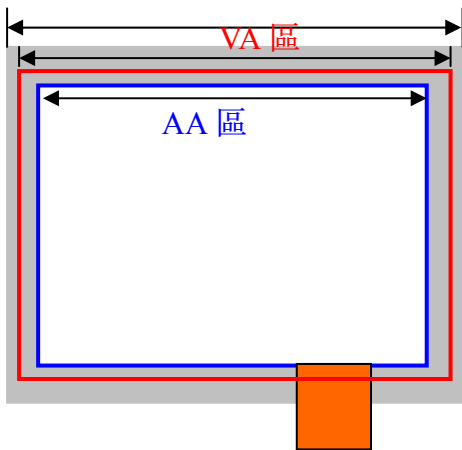
Note 3 : Line or Spiral Foreign Material



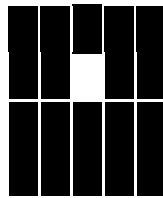
Note 4 : Spot Foreign Material



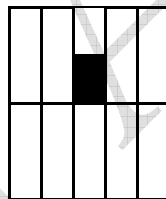
Note 5 : TP Inspection Area Definition



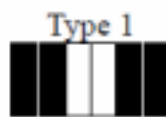
Note 6 : Bright dot defect description:



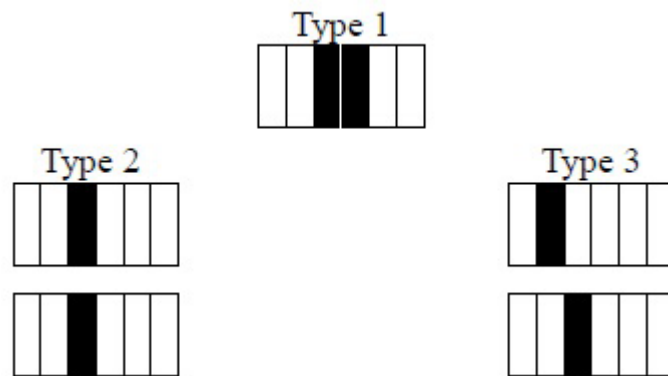
Note 7 : Dark dot defect description:



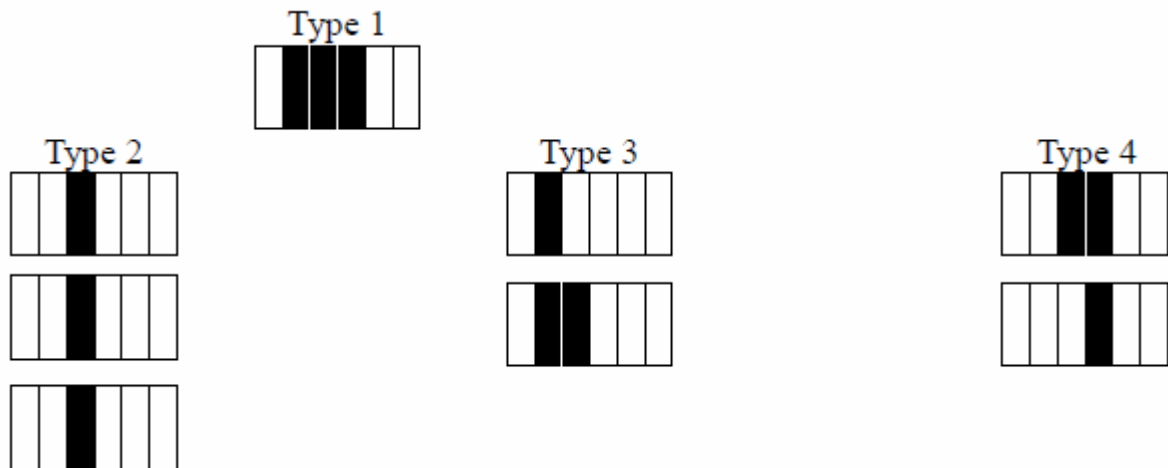
Note 8 : Bright dot defect description- Two adjacent.



Note 9 : Dark dot defect description- Two adjacent.

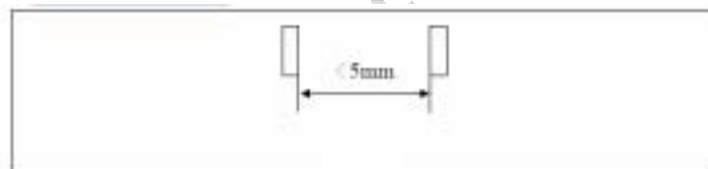


Note 10 : Dark dot defect description- Three adjacent.

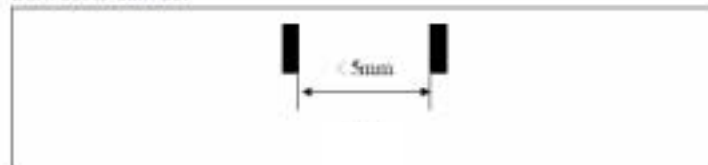


Note 11 : Minimum distance between dot defects

Bright dot to bright dot.



Dark dot to dark dot



Bright dot to dark dot

