EXAMINED BY : Lucica Lu	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-0009461
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APPROVED BY: Vincent Wu		TOTAL PAGE : 24
		VERSION : 1

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

ET121030LDVA

(RoHS)

FOR MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO. ET121030LDVA	VERSION 1	PAGE 0-1

RECORDS OF REVISION

DOC . FIRST ISSUE

AUG.31, 2022

DATE	REVISED PAGE NO.	SUMMARY

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1. GENERAL SPECIFICATIONS

1.1 MATERIAL SAFETY DESCRIPTION
ASSEMBLIES SHALL COMPLY WITH EUROPEAN ROHS REQUIREMENTS, INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD, MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED BIPHENYLS (PBB) AND POLYBROMINATED
DIPHENYL ETHERS (PBDE), BIS(2-ETHYLHEXYL) PHTHALATE (DEHP), BUTYL BENZYL PHTHALATE (BBP), DIBUTYL PHTHALATE (DBP), DIISOBUTYL PHTHALATE (DIBP).

2. MECHANICAL SPECIFICATIONS

(1)	DISPLAY SIZE	12.1 inch
(2)	NUMBER OF DOTS	1024W(BGR) * 768H DOTS
(3)	MODULE SIZE	260.5W * 203H * 10.5D(MAX.) mm
(4)	VIEWING AREA	249W * 187.5H mm
(5)	ACTIVE AREA	245.76W * 184.32H mm
(6)	DOT SIZE	0.08W * 0.24H mm
(7)	PIXEL SIZE	0.24W * 0.24H mm
(8)	LCD TYPE	TFT, IPS, TRANSMISSIVE, NORMALLY BLACK, ANTI-GLARE
(9)	COLOR	262K/16.7M
(10)	VIEWING DIRECTION	SUPER WIDE VIEW
(11)	BACK LIGHT	LED , COLOR : WHITE
(12)	INTERFACE MODE	LVDS (6 BITS/8 BITS)
(13)	WEIGHT	TBD

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	-0.3	4.0	V	
POWER SUPPLY CURRENT FOR LED BACKLIGHT	ILED	—	1600	mA	

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-30°C	80°C	-30°C	80°C	NOTE (1) , (2) , (3), (4)
HUMIDITY	NOTE (4)		NOTE (4)		WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s^2 (0.25 G)	—	11.76m/s^2 (1.2 G)	10~100 Hz XYZ DIRECTIONS 1 HR EACH
SHOCK	—	29.4 m/s^2 (3 G)	—	490.0 m/s^2 (50 G)	10 ms XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (1)：THE ABSOLUTE MAXIMUM RATINGS OF THIS PRODUCT SHOULD NOT BE EXCEEDED AT ANY TIME. IF THESE RATINGS ARE EXCEEDED, THE PRODUCT'S PERFORMANCE IS NOT GUARANTEED AND THE PRODUCT MAY EXPERIENCE PERMANENT DAMAGE.

NOTE (2)：BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.

NOTE (3)：WHEN THE LCD MODULE IS OPERATED AT A HIGHER AMBIENT TEMPERATURE THAN 60°C, POWER SUPPLY CURRENT OF LED BACKLIGHT SHOULD BE ADJUSTED TO BE LESS THAN 70%. IF THE MODULE IS OPERATED AT A HIGHER CURRENT THAN 70%, THEN THERE IS A POSSIBILITY OF DISTORTION AND IRREGULARITY OF THE PICTURE DUE TO LIQUID CRYSTAL BEHAVIOR.

NOTE (4)：Ta ≤ 60°C：90%RH MAX. (96HRS MAX).

Ta > 60°C：ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90%RH AT 60°C (96HRS MAX).

4. ELECTRICAL CHARACTERISTICS

Ta=25°C

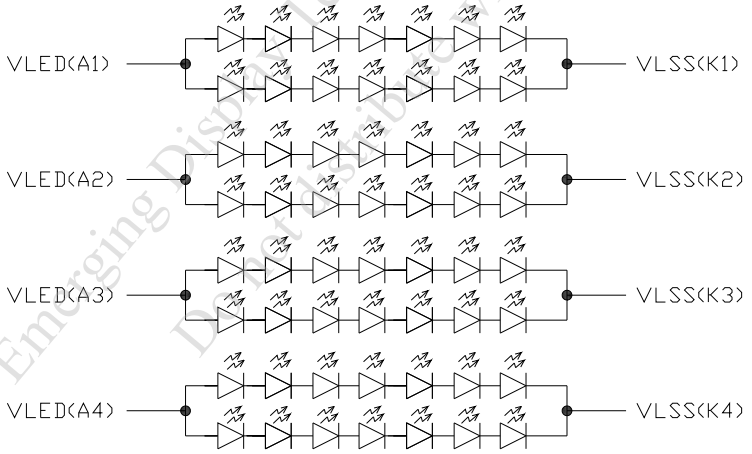
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	—	3.15	3.30	3.45	V	
POWER SUPPLY VOLTAGE FOR LED DRIVER	VBL+-VBL-	—	10.8	12.0	13.2	V	
POWER SUPPLY CURRENT	IDD	VDD-VSS=3.3V	—	123	179	mA	NOTE (1)
INPUT SIGNAL VOLTAGE	VIH	—	VDD* 0.7	—	VDD	V	
	VIL	—	0	—	VDD* 0.3	V	
POWER SUPPLY CURRENT FOR LED DRIVER	IBL	VBL+-VBL-=12V LED B/L=ON	—	(650)	(850)	mA	
POWER SUPPLY VOLTAGE FOR LED DRIVER	EN	VIH	2.5	—	—	V	
		VIL	—	—	0.8	V	
	PWM	VIH	2.5	—	—	V	
		VIL	—	—	0.8	V	
POWER SUPPLY VOLTAGE FOR LED BACKLIGHT	VLED-VLSS	ILED = 360mA	(17)	(20)	(22.8)	V	
LED LIFE TIME	—	ILED = 45mA (PER LED)	80K	100K	—	HRS	NOTE (2) NOTE (3)

NOTE (1)：THE DISPLAY PATTERN IS ALL “WHITE”.

NOTE (2)：CONDITIONS; Ta=25 °C, CONTINUOUS LIGHTING.

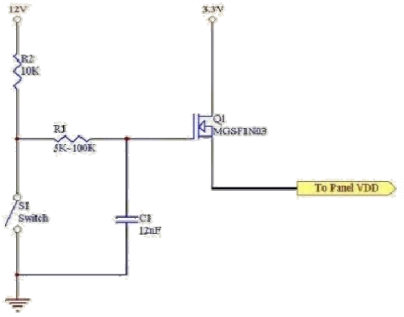
NOTE (3)：DEFINITIONS OF LIFE TIME：
LCM LUMINANCE BECOMES HALF OF THE INITIAL VALUE.

NOTE (4)：INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT：90 mA * 4 STRING = 360 mA
VLED-VLSS=VLED(A1)-VLSS(K1)=VLED(A2)-VLSS(K2)=VLED(A3)-VLSS(K3)=VLED(A4)-VLSS(K4)

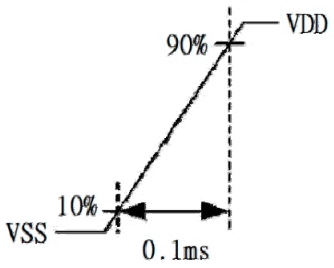


56 LED CHIPS

NOTE (5)：INRUSH CURRENT TEST CIRCUIT AND RISING TIME SETTING (POWER ON)



Test circuit

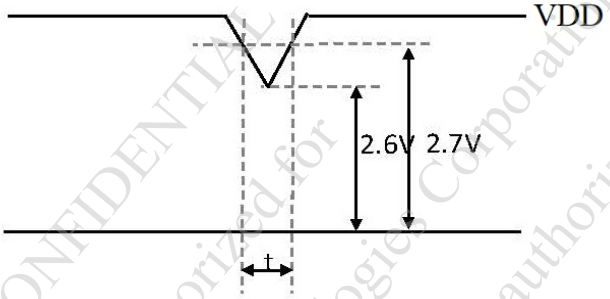


Rising time

NOTE (6)：VDD-DIP CONDITION

a.WHEN VDD>(2,7)V AND td>10ms, THIS PRODUCT SHOULD WORK NORMALLY.

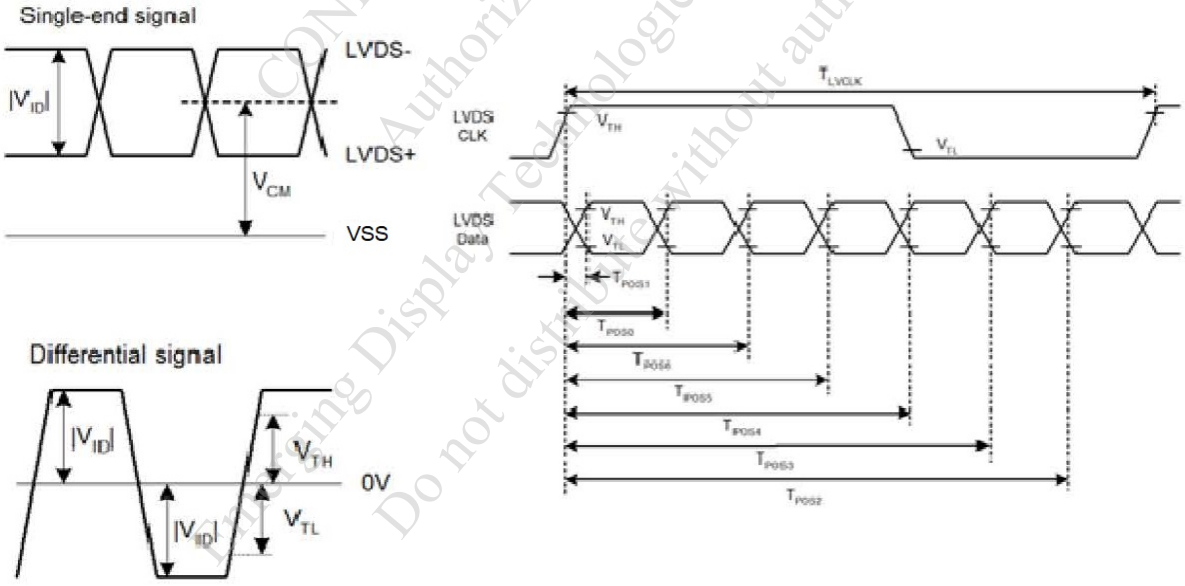
b.IT SHOULD BE RETURNED NORMALLY AFTER VDD RETURN TO MORE THAN (2.7)V EVEN IF VDD DROPS (2.6)V AND OPERATION STOPS.



5. TIMING CHARACTERISTICS

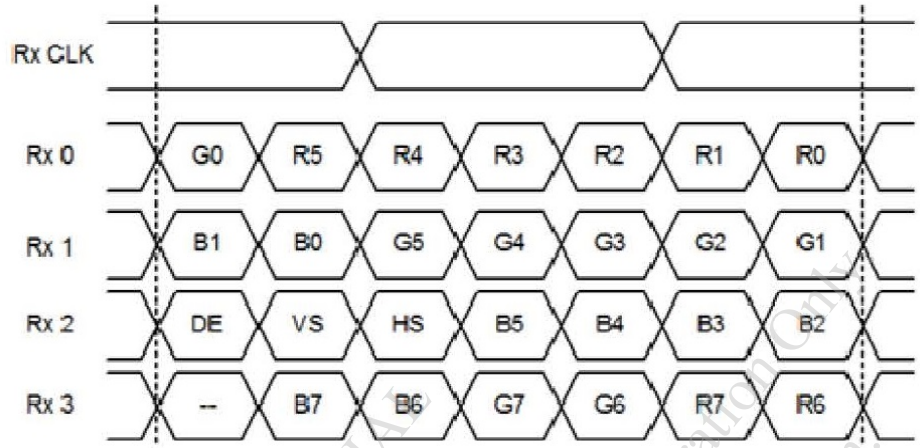
5.1 SWITCHING CHARACTERISTICS FOR LVDS RECEIVER

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
DIFFERENTIAL INPUT HIGH THRESHOLD	V_{TH}	—	—	200	mV	
DIFFERENTIAL INPUT LOW THRESHOLD	V_{TL}	-200	—	—	mV	
DIFFERENTIAL INPUT COMMON MODE VOLTAGE	V_{CM}	1.0	1.2	1.7-|VID|/2	V	
INPUT LEAKAGE CURRENT	I_{IN}	-10	—	10	uA	RX+/-, XC+/-
DIFFERENTIAL INPUT VOLTAGE	$\|V_{ID}\|$	200	—	600	mV	
1 DATA BIT TIME	UI	—	1/7	—	T_{LVCLK}	
POSITION 1	T_{POS1}	-0.25	0	0.25	UI	
POSITION 0	T_{POS0}	0.75	1	1.25	UI	
POSITION 6	T_{POS6}	1.75	2	2.25	UI	
POSITION 5	T_{POS5}	2.75	3	3.25	UI	
POSITION 4	T_{POS4}	3.75	4	4.25	UI	
POSITION 3	T_{POS3}	4.75	5	5.25	UI	
POSITION 2	T_{POS2}	5.75	6	6.25	UI	

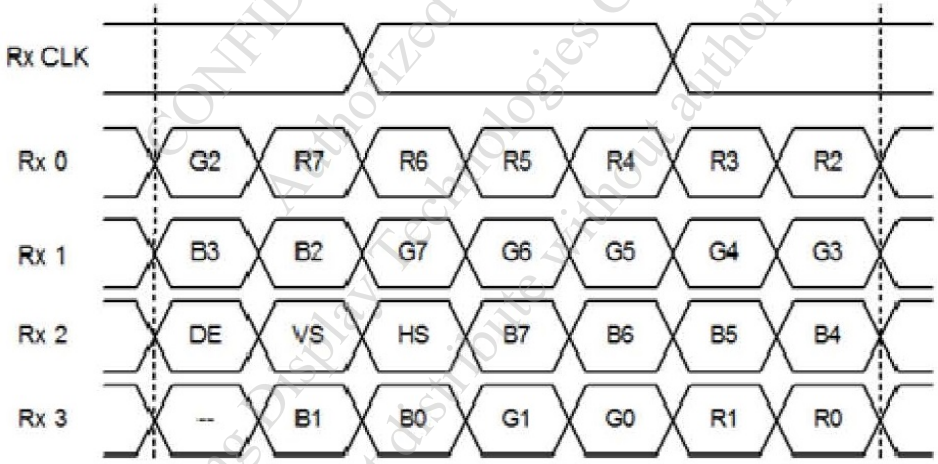


5.2 BIT LVDS INPUT

8-BIT LVDS FORMAT (VESA)

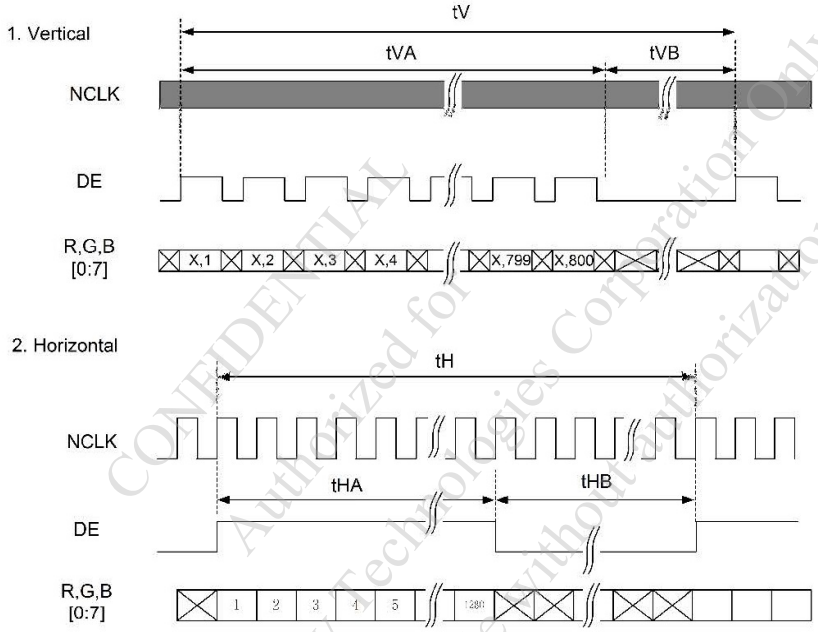


8-BIT LVDS FORMAT (JEIDA)



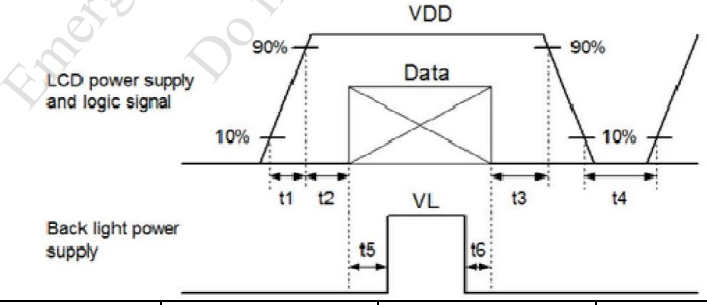
5.3 INTERFACE TIMING (DE MODE ONLY)

ITEM			SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK	FREQUENCY		fCLK	51.15	53.82	60.45	MHz
	PERIOD		fCLK	17.797	18.581	19.549	ns
DENA	HORIZONTAL	ACTIVE TIME	tHA	1024	1024	1024	tCLK
		BLANKING TIME	tHB	80	100	120	tCLK
		FREQUENCY	fH	43.065	47.88	52.845	kHz
		PERIOD	tH	18.923	20.886	23.221	us
	VERTICAL	ACTIVE TIME	tVA	768	768	768	tH
		BLANKING TIME	tVB	15	30	45	tH
		FREQUENCY	fV	55	60	65	Hz
		PERIOD	fV	15.385	16.667	18.182	ms



NOTE (1)：ALL TIMING PARAMETERS SHOULD BE CONSTANT IN EACH FRAME.
NOTE (2)：BLANKING TIME TOLERANCE (BASE IN IC SPECIFICATION) ：
3≥| tVBN - tVBN-1 |≥0

5.4 POWER SEQUENCE



ITEM	MIN.	MAX.	UNITS
t1	0.1	10	ms
t2	0	50	ms
t3	0	50	ms
t4	500	—	ms
t5	(220)	—	ms
t6	0	—	ms

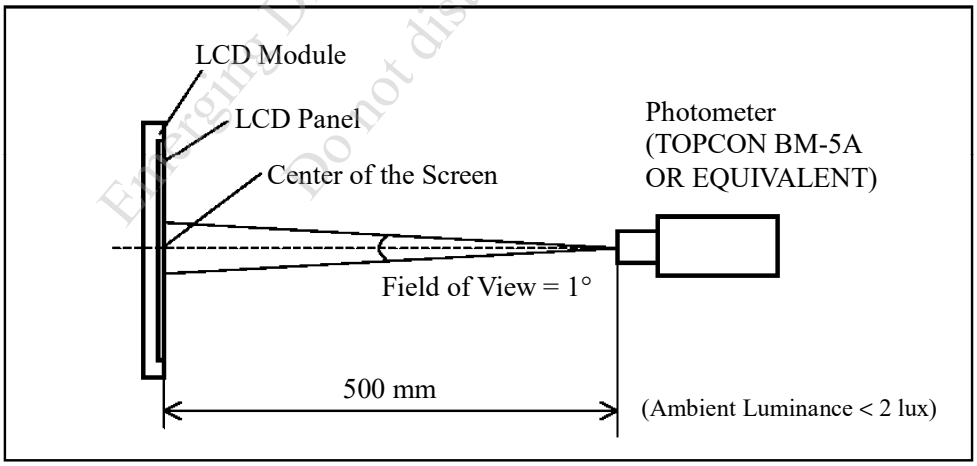
6. OPTICAL CHARACTERISTICS

6.1 OPTICAL CHARACTERISTICS

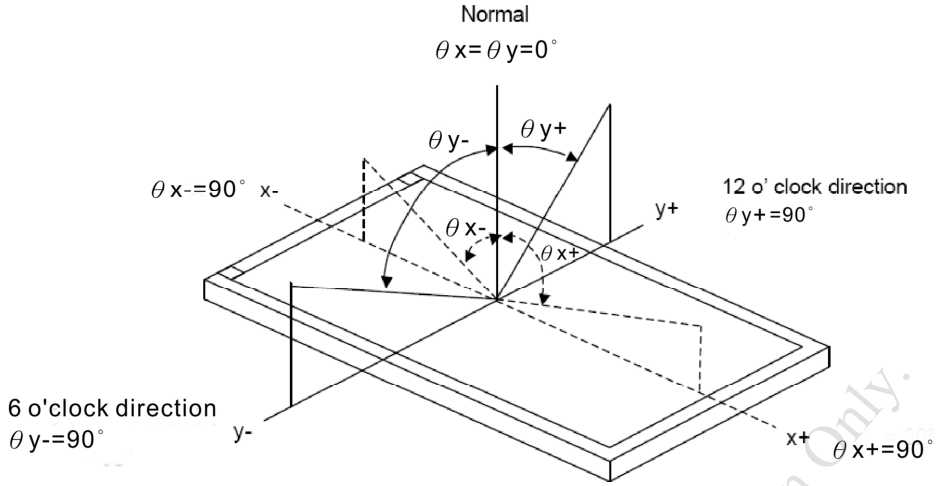
Ta = 25 ± 2 °C

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{y+}	CR ≥ 10	θ_x=0°	75	88	—	deg	NOTE (2) NOTE (3)
		θ_{y-}			75	88	—	deg	
		θ_{x+}		θ_y=0°	75	88	—	deg	
		θ_{x-}			75	88	—	deg	
CONTRAST RATIO (CENTER)		CR	θx=0° , θy=0°		—	1000	—	—	NOTE (3)
RESPONSE TIME		Tr (rise)	θx=0° , θy=0°		—	10	15	msec	NOTE (4)
		Tf (fall)			—	20	25	msec	
COLOR CHROMATICITY (CENTER)	WHITE	Wx	θx=0° , θy=0° VDD-VSS=3.3V VBL+-VBL-=12V NTSC : 65%		(0.26)	(0.31)	(0.36)	—	NOTE (5)
		Wy			(0.30)	(0.35)	(0.40)		
	RED	Rx			(0.60)	(0.65)	(0.70)	—	
		Ry			(0.30)	(0.35)	(0.40)		
	GREEN	Gx			(0.28)	(0.33)	(0.38)	—	
		Gy			(0.57)	(0.62)	(0.67)		
	BLUE	Bx			(0.09)	(0.14)	(0.19)	—	
		By			(0.06)	(0.11)	(0.16)		
THE BRIGHTNESS OF MODULE (CENTER)		B			(1200)	(1300)	—	cd/m^2	NOTE (6)
THE UNIFORMITY OF MODULE		—			70	—	—	%	NOTE (7)

NOTE (1)：TEST CONDITION：
AFTER STABILIZING AND LEAVING THE PANEL ALONE AT A GIVEN TEMPERATURE FOR 30 MINUTES. MEASUREMENT SHOULD BE EXECUTED IN A STABLE, WINDLESS, AND DARK ROOM.



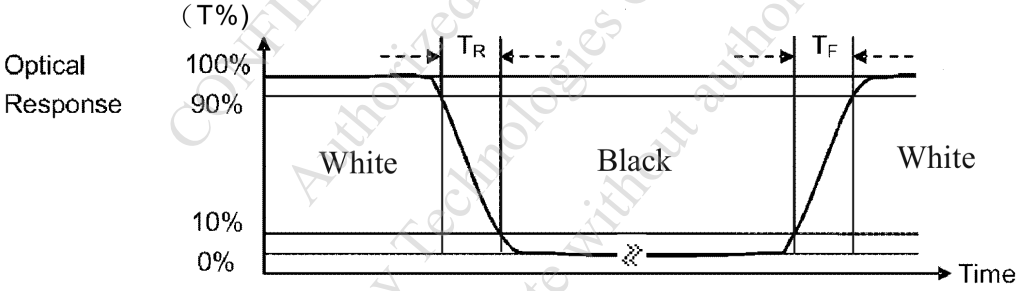
NOTE (2)：DEFINITION OF VIEWING ANGLE :



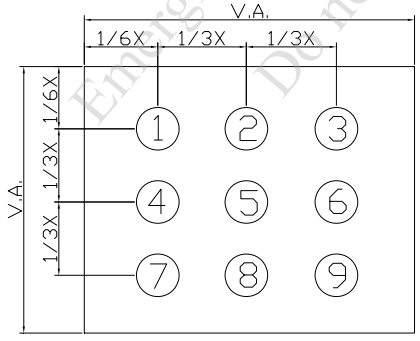
NOTE (3)：DEFINITION OF CONTRAST RATIO (CR) :
MEASURED AT THE CENTER POINT OF MODULE

$$\text{CONTRAST RATIO(CR)} = \frac{\text{BRIGHTNESS MEASURED WHEN LCD IS AT "WHITE STATE"}}{\text{BRIGHTNESS MEASURED WHEN LCD IS AT "BLACK STATE"}}$$

NOTE (4)：DEFINITION OF RESPONSE TIME : T_R AND T_F
THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.



NOTE (5)：DEFINITION OF COLOR CHROMATICITY
(a)100% RGB PIXEL DATA TRANSMISSION WHEN ALL THE INPUT TERMINALS OF MODULE ARE ELECTRICALLY POWERED ON.
(b)MEASURED AT THE CENTER POINT OF MODULE
NOTE (6)：MEASURED THE BRIGHTNESS OF WHITE STATE AT CENTER POINT.
NOTE (7)：(a)DEFINITION OF BRIGHTNESS UNIFORMITY

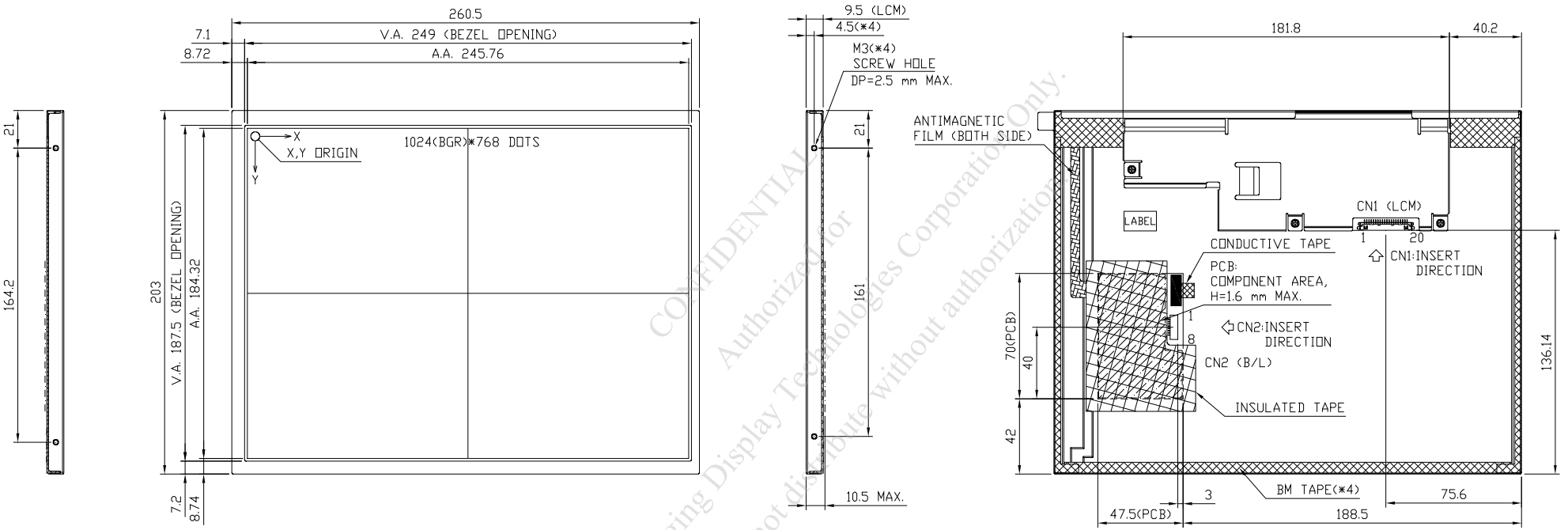


UNIT：mm

(b)THE BRIGHTNESS UNIFORMITY CALCULATING METHOD

$$\text{UNIFORMITY}：\frac{\text{MINIMUM BRIGHTNESS}}{\text{MAXIMUM BRIGHTNESS}} * 100\%$$

7. OUTLINE DIMENSIONS

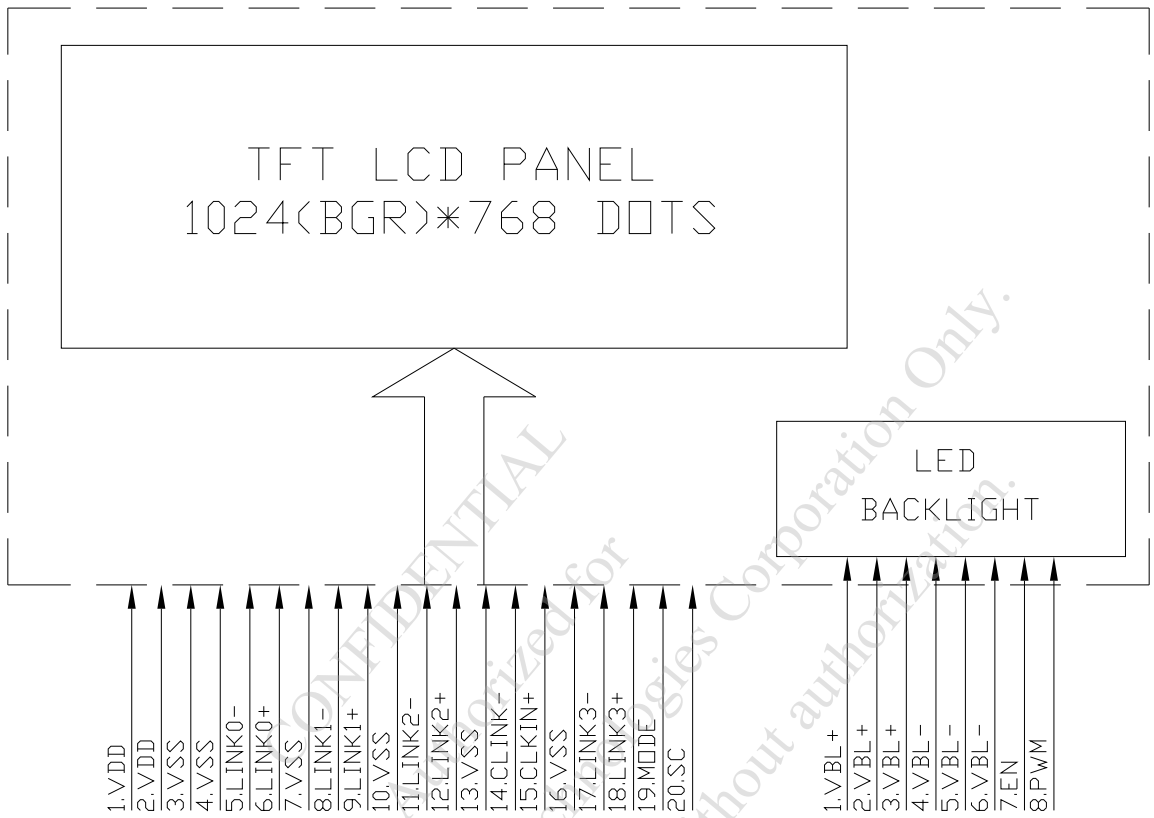


UNIT : mm
SCALE : NTS

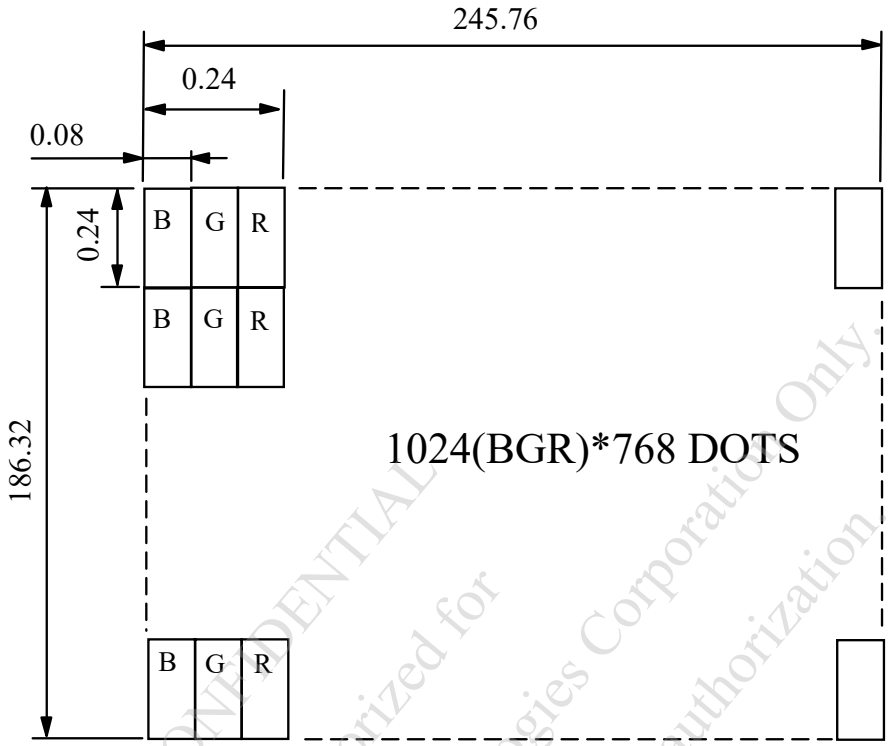
THIRD ANGLE PROJECTION

NOT SPECIFIED TOLERANCE IS ± 0.5mm
NOTE :
1.CN1 : 20186-020E-11F(I-PEX) OR EQUIVALENT
2.CN2 : FI-S8P-HFE(JAE) OR EQUIVALENT
3.RECOMMENDED APPLIED TORQUE BELOW 0.49 Nm

8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



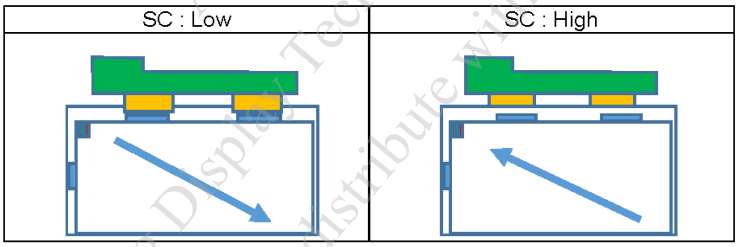
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1
DOTS MATRIX TOLERANCE IS ± 0.01

10. INTERFACE SIGNALS

10.1 CN1

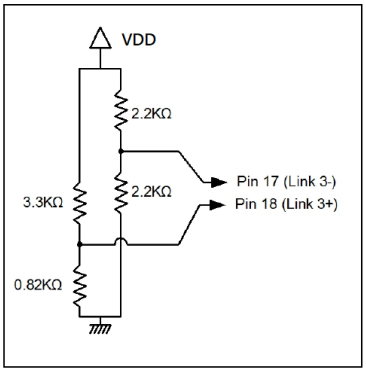
PIN NO.	SYMBOL	FUNCTION (ISP 6 BIT COMPATIBILITY MODE)		FUNCTION (ISP 8 BIT COMPATIBILITY MODE)
		6BIT INPUT (JEIDA)	8BIT INPUT (JEIDA)	8BIT INPUT (VESA)
1	VDD	POWER SUPPLY(+3.3V)		
2	VDD	POWER SUPPLY(+3.3V)		
3	VSS	GROUND		
4	VSS	GROUND		
5	LINK0-	R0,R1,R2,R3,R4,R5, G0	R2,R3,R4,R5,R6,R7, G2	R0,R1,R2,R3,R4,R5, G0
6	LINK0+	R0,R1,R2,R3,R4,R5, G0	R2,R3,R4,R5,R6,R7, G2	R0,R1,R2,R3,R4,R5, G0
7	VSS	GROUND		
8	LINK1-	G1,G2,G3,G4,G5, B0,B1	G3,G4,G5,G6,G7, B2,B3	G1,G2,G3,G4,G5, B0,B1
9	LINK1+	G1,G2,G3,G4,G5, B0,B1	G3,G4,G5,G6,G7, B2,B3	G1,G2,G3,G4,G5, B0,B1
10	VSS	GROUND		
11	LINK2-	B2,B3,B4,B5, DE	B4,B5,B6,B7, DE	B2,B3,B4,B5, DE
12	LINK2+	B2,B3,B4,B5, DE	B4,B5,B6,B7, DE	B2,B3,B4,B5, DE
13	VSS	GROUND		
14	CLINK-	-LVDS DIFFERENTIAL CLOCK INPUT		
15	CLINK+	+LVDS DIFFERENTIAL CLOCK INPUT		
16	VSS	GROUND		
17	LINK3-	LVDS DATA HIGH***	R0,R1,G0,G1,B0,B1	R6,R7,G6,G7,B6,B7
18	LINK3+	LVDS DATA LOW***	R0,R1,G0,G1,B0,B1	R6,R7,G6,G7,B6,B7
19	MODE	LOW : JEIDA FORMAT**		HIGH : VESA FORMAT **
20	SC	SCAN DIRECTION SELECTOR (LOW: NORMAL; HIGH: REVERSE)*		

*SCAN DIRECTION SELECTOR(SC):



**THE PIN19 (MODE) AND PIN 20 (SC) ARE SET HIGH BY THE INTERNAL RESISTOR OF THE DRIVER IC.
SUGGEST TO SET HIGH OR PULL VSS INSTEAD OF FLOATING.

***THE PIN 17 AND PIN 18 SHOULD BE SET THE CONSTANT LEVEL OF THE LVDS FORMAT IN THE JEIDA 6BIT MODE.
REFERENCE ONLY

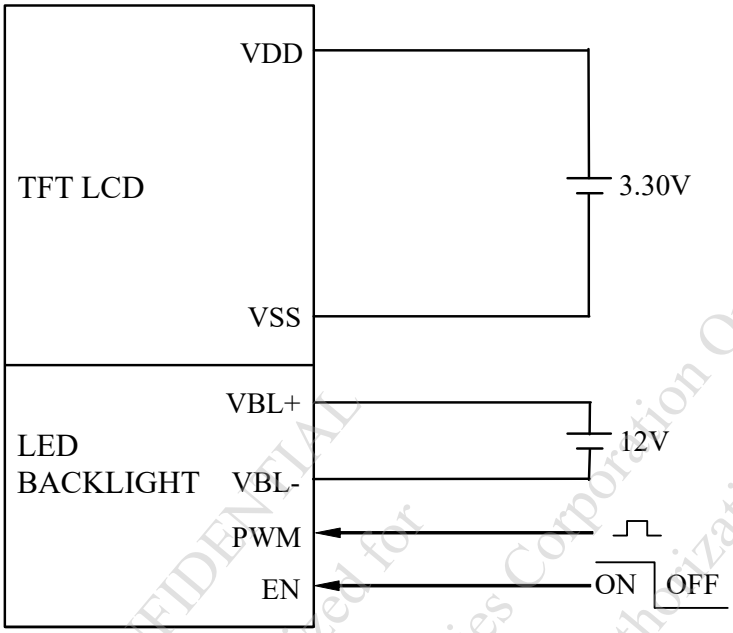


10.2 CN2

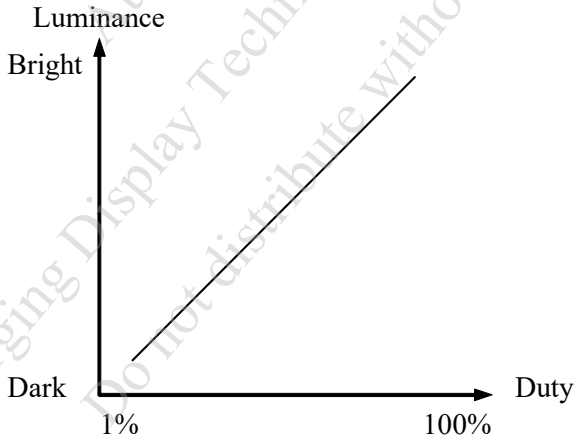
PIN NO.	SYMBOL	FUNCTION
1	VBL+	POWER SUPPLY VOLTAGE FOR LED BACKLIGHT
2	VBL+	POWER SUPPLY VOLTAGE FOR LED BACKLIGHT
3	VBL+	POWER SUPPLY VOLTAGE FOR LED BACKLIGHT
4	VBL-	GROUND
5	VBL-	GROUND
6	VBL-	GROUND
7	EN	LED ENABLE PIN
8	PWM	ADJUST FOR LED BRIGHTNESS

11. POWER SUPPLY

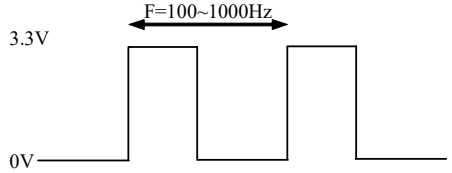
11.1 POWER SUPPLY FOR LCM



NOTE (1)：ADJUST THE PWM SIGNAL IN ORDER TO CONTROL LED BACKLIGHT'S BRIGHTNESS. THE HIGHER THE DUTY CYCLE, THE HIGHER THE BRIGHTNESS



NOTE (2)：PWM SIGNAL OPERATION FREQUENCY IS 100~1000Hz.



F_{PWM} (Hz)	DMIN	DMAX
100 < F ≤ 200	0.1%	100%
200 < F ≤500	0.4%	100%
500 < F ≤1k	0.8%	100%

12. INSPECTION CRITERIA

12.1 APPLICATION

THIS INSPECTION STANDARD IS TO BE APPLIED TO THE LCD MODULE DELIVERED FROM EMERGING DISPLAY TECHNOLOGIES CORP.(E.D.T) TO CUSTOMERS

12.2 INSPECTION CONDITIONS

12.2.1 (1)OBSERVATION DISTANCE：45±5cm

(2)VIEWING ANGLE：±45°

±45° (FOR SECTION WITHIN VIEWING AREA), REFER TO FIG.A

90° (FOR SECTION OUTSIDE OF VIEWING AREA), REF TO FIG.B

PERPENDICULAR TO MODULE SURFACE

VIEWING ANGLE SHOULD BE SMALLER THAN 45°

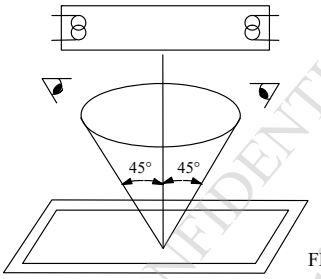


FIG.A

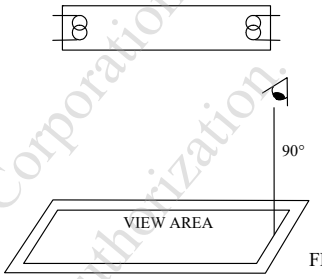


FIG.B

THE INSPECTION CRITERIA IS ACCORDING TO LINE OF SIGHT. INSPECTION SHALL BE MADE WITHIN THE HALF SECTION OF THE VIEWING CONE GENERATED BY LINE SEGMENT OF 45° WITH RESPECT TO THE VERTICAL AXIS FROM CENTER VERTEX OF LCD, THE FLUORESCENT LAMP AND THE CONE AXIS MUST BE PERPENDICULAR TO THE LCD SURFACE.

IF THE DEFECTS ARE OUTSIDE OF VIEWING AREA, IT SHALL BE INSPECTED BY 90° WITH RESPECT TO THE VERTICAL AXIS FROM EDGE OF VIEWING AREA.

12.2.2 ENVIRONMENT CONDITIONS：

AMBIENT TEMPERATURE		25±5°C
AMBIENT HUMIDITY		65 ± 20%RH
AMBIENT ILLUMINATION	COSMETIC INSPECTION	600~800 lux
	FUNCTIONAL INSPECTION	300~500 lux
INSPECTION TIME		15 secs

12.2.3 INSPECTION LOT

QUANTITY PER DELIVERY LOT FOR EACH MODEL

12.2.4 INSPECTION METHOD

A SAMPLING INSPECTION SHALL BE MADE ACCORDING TO THE FOLLOWING PROVISIONS TO JUDGE THE ACCEPTABILITY

(a)APPLICABLE STANDARD：

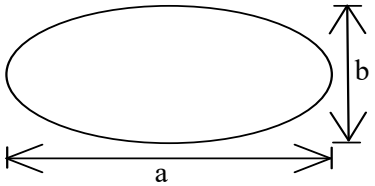
ANSI/ ASQ Z1.4 NORMAL INSPECTION LEVEL II

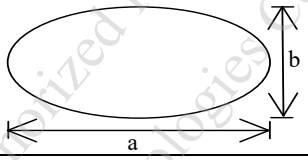
(b)AQL：MAJOR DEFECT：AQL 0.65

MINOR DEFECT：AQL 1.0

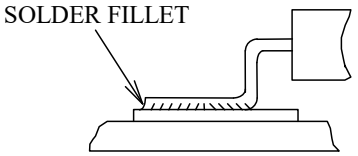
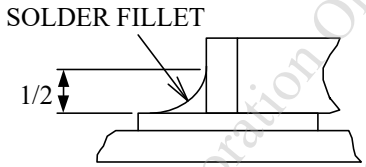
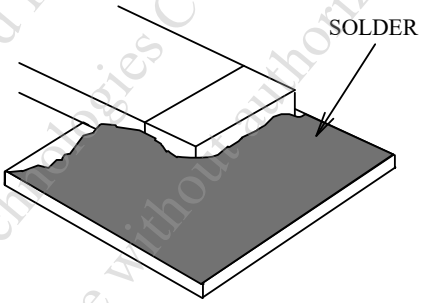
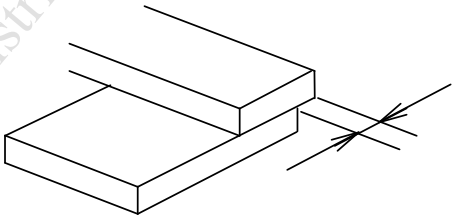
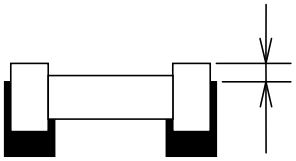
12.3 DEFECTS CLASSIFICATION

TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	DISPLAY ON	• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS EX: DISCONNECTION, SHORT CIRCUIT ETC	0.65
	BACKLIGHT	• NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION	
	DIMENSIONS	• SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS	
MINOR DEFECT	DISPLAY ZONE (VIEWING AREA)	• BLACK/WHITE SPOT / CIRCULAR TYPE • BUBBLES ON POLARIZER • NEWTON RING • BLACK/WHITE LINE / LINEAR TYPE • SCRATCH • CONTAMINATION • UNEVEN COLOR SPREAD	1.0
	BEZEL ZONE	• STAINS • SCRATCHES • FOREIGN MATTER	
	SOLDERING	• INSUFFICIENT SOLDER • SOLDERED IN INCORRECT POSITION • CONVEX SOLDERING SPOT • SOLDER BALLS • SOLDER SCRAPS	
	DISPLAY ON (ALL ON)	• LIGHT LINE	

<table>
<tr><th>NO.</th><th>ITEM</th><th>CRITERIA</th></tr>
<tr><td>1</td><td>DISPLAY ON INSPECTION</td><td>(1) INCORRECT PATTERN
(2) MISSING SEGMENT
(3) DIM SEGMENT
(4) OPERATING VOLTAGE BEYOND SPEC</td></tr>
<tr><td>2</td><td>OVERALL DIMENSIONS</td><td>OVERALL DIMENSION BEYOND SPEC</td></tr>
<tr><td>3</td><td>DOT DEFECT</td><td>(1) INSPECTION PATTERN: FULL WHITE, FULL BLACK, RED, GREEN AND BLUE SCREENS.
(2)
<table>
<tr><th colspan="2">ITEM</th><th>ACCEPTABLE COUNT</th></tr>
<tr><td rowspan="3">BRIGHT DOT</td><td>RANDOM</td><td>N ≤ 3</td></tr>
<tr><td>2 DOTS ADJACENT (PAIR)</td><td>N ≤ 1</td></tr>
<tr><td>3 DOTS ADJACENT OR MORE</td><td>N = 0</td></tr>
<tr><td rowspan="3">DARK DOT</td><td>RANDOM</td><td>N ≤ 4</td></tr>
<tr><td>2 DOTS ADJACENT (PAIR)</td><td>N ≤ 1</td></tr>
<tr><td>3 DOTS ADJACENT OR MORE</td><td>N = 0</td></tr>
<tr><td rowspan="2">DISTANCE</td><td>MINIMUM DISTANCE BETWEEN BRIGHT DOTS</td><td>L≧5mm</td></tr>
<tr><td>MINIMUM DISTANCE BETWEEN DARK DOTS</td><td>L≧5mm</td></tr>
<tr><td colspan="2">TOTAL BRIGHT AND DARK DOT</td><td>N ≤ 5</td></tr>
</table>
NOTE：
(1)THE DEFINITION OF DOT：
THE SIZE OF A DEFECTIVE DOT OVER 1/2 OF WHOLE DOT IS REGARDED AS ONE DEFECTIVE DOT.
(2)BRIGHT DOT：
DOTS APPEAR BRIGHT AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER BLACK PATTERN.
THE BRIGHT DOT DEFECT MUST BE VISIBLE THROUGH 5% ND FILTER.
(3)DARK DOT：
DOTS APPEAR DARK AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER PURE RED, GREEN, BLUE PICTURE.</td></tr>
<tr><td>4</td><td>FOREIGN BLACK/WHITE/ BRIGHT LINE/ OF VIEWING AREA</td><td>
<table>
<tr><th>LENGTH：L</th><th>WIDTH：W</th><th>PERMISSIBLE NO.</th></tr>
<tr><td>—</td><td>W ≤ 0.05</td><td>IGNORE</td></tr>
<tr><td>0.3 < L ≤ 2.0</td><td>0.05 < W ≤ 0.1</td><td>4</td></tr>
<tr><td>L > 2.0</td><td>W > 0.1</td><td>NONE</td></tr>
</table>
WIDTH：W mm, LENGTH： L mm</td></tr>
<tr><td>5</td><td>FOREIGN MATTER \ BLACK SPOTS \ WHITE SPOTS \ DENT (INCLUDING LIGHT LEAKAGE DUE TO POLARIZING PLATES PINHOLES, ETC.)</td><td>
<table>
<tr><th>AVERAGE DIAMETER (mm): D</th><th>NUMBER OF PIECES PERMITTED</th></tr>
<tr><td>D ≤ 0.15</td><td>IGNORE</td></tr>
<tr><td>0.15 < D ≤ 0.5</td><td>5</td></tr>
<tr><td>0.5 < D</td><td>NONE</td></tr>
</table>
NOTE ：DIAMETER D=(a+b)/2
 
</td></tr>
</table>

<table>
<tr><th>NO.</th><th>ITEM</th><th>CRITERIA</th></tr>
<tr><td>6</td><td>BUBBLES ON POLARIZER /SURFACE STAINS /DIRT/CF FAIL/SPOT</td><td>
<table>
<tr><th></th><th>AVERAGE DIAMETER (mm)：D</th><th>NUMBER OF PIECES PERMITTED</th></tr>
<tr><td rowspan="3">BUBBLE ON THE POLARIZER</td><td>D ≤ 0.25</td><td>IGNORE</td></tr>
<tr><td>0.25 < D ≤ 0.5</td><td>3</td></tr>
<tr><td>D > 0.5</td><td>0</td></tr>
<tr><td rowspan="3">POLARIZER SCRATCH</td><td>W < 0.05</td><td>IGNORE</td></tr>
<tr><td>0.05 < W ≤ 0.2,
2.0 < L ≤ 5</td><td>4</td></tr>
<tr><td>W > 0.2 ,L >5</td><td>0</td></tr>
<tr><td rowspan="3">CF FAIL / SPOT</td><td>D < 0.25</td><td>IGNORE</td></tr>
<tr><td>0.25 < D ≤ 0.5</td><td>4</td></tr>
<tr><td>D > 0.5</td><td>0</td></tr>
</table>
NOTE : (1)POLARIZER BUBBLE IS DEFINED AS THE BUBBLE APPEARS ON ACTIVE DISPLAY AREA. THE DEFECT OF POLARIZER BUBBLE SHALL BE IGNORED IF THE POLARIZER BUBBLE APPEARS ON THE OUTSIDE OF ACTIVE DISPLAY AREA.
(2)THE EXTRANEOUS SUBSTANCE IS DEFINED AS IT CAN BE OBSERVED WHEN THE MODULE IS POWER ON.
(3)THE DEFINITION OF AVERAGE DIAMETER, D IS DEFINED AS FOLLOWING.
AVERAGE DIAMETER (D)=(a+b)/2
 

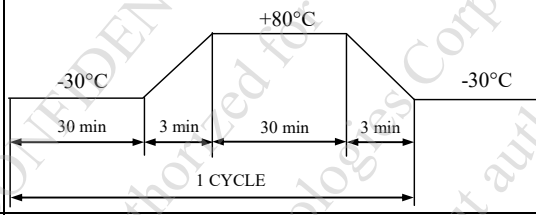
</td></tr>
<tr><td>7</td><td>LINE DEFECT ON DISPLAY</td><td>OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED</td></tr>
<tr><td>8</td><td>MURA ON DISPLAY</td><td>IT’S OK IF MURA IS SLIGHT VISIBLE THROUGH 5% ND FILTER</td></tr>
<tr><td>9</td><td>UNEVEN COLOR SPREAD, COLORATION</td><td>TO BE DETERMINED BASED UPON THE LIMITED SAMPLE.</td></tr>
<tr><td>10</td><td>BEZEL APPEARANCE</td><td>(1)BEZEL MAY NOT HAVE RUST, BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION.
(2)BEZEL MUST COMPLY WITH JOB SPECIFICATIONS.</td></tr>
<tr><td>11</td><td>PCB</td><td>(1)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.
(2)NO OXIDATION OR CONTAMINATION PCB TERMINALS.
(3)PARTS ON PCB MUST BE THE SAME AS ON THE PRODUCTION CHARACTERISTIC CHART.
THERE SHOULD BE NO WRONG PARTS, MISSING PARTS OR EXCESS PARTS.
(4)THE JUMPER ON THE PCB SHOULD CONFORM TO THE PRODUCT CHARACTERISTIC CHART.
(5)IF SOLDER GETS ON BEZEL TAB PADS, LED PAD, ZEBRA PAD OR SCREW HOLD PAD; MAKE SURE IT IS SMOOTHED DOWN.</td></tr>
</table>

NO.	ITEM	CRITERIA
12	SOLDERING	(1)NO SOLDERING FOUND ON THE SPECIFIED PLACE (2)INSUFFICIENT SOLDER (a)LSI, IC A POOR WETTING OF SOLDER IS BETWEEN LOWER BEND OR "HEEL" OF LEAD AND PAD  (b)CHIP COMPONENT · SOLDER IS LESS THAN 50% OF SIDES AND FRONT FACE WETTING  · SOLDER WETS 3 SIDES OF TERMINAL, BUT LESS THAN 25% OF SIDES AND FRONT SURFACE AREA ARE COVERED  (3)PARTS ALIGNMENT (a)LSI, IC LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE  (b)CHIP COMPONENT COMPONENT IS OFF CENTER, AND MORE THAN 50% OF THE LEADS IS OFF THE PAD OUTLINE  (4)NO UNMELTED SOLDER PASTE MAY BE PRESENT ON THE PCB. (5)NO COLD SOLDER JOINTS, MISSING SOLDER CONNECTIONS, OXIDATION OR ICICLE. (6)NO RESIDUE OR SOLDER BALLS ON PCB. (7)NO SHORT CIRCUITS IN COMPONENTS ON PCB.

NO.	ITEM	CRITERIA
13	BACKLIGHT	(1)NO LIGHT (2)FLICKERING AND OTHER ABNORMAL ILLUMINATION (3)SPOTS OR SCRATCHES THAT APPEAR WHEN LIT MUST BE JUDGED USING LCD SPOT, LINES AND CONTAMINATION STANDARDS. (4)BACKLIGHT DOESN'T LIGHT OR COLOR IS WRONG.
14	GENERAL APPEARANCE	(1)NO OXIDATION, CONTAMINATION, CURVES OR, BENDS ON INTERFACE PIN (OLB) OF TCP. (2)NO CRACKS ON INTERFACE PIN (OLB) OF TCP. (3)NO CONTAMINATION, SOLDER RESIDUE OR SOLDER BALLS ON PRODUCT. (4)THE IC ON THE TCP MAY NOT BE DAMAGED, CIRCUITS. (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. (6)THE RESIDUAL ROSIN OR TIN OIL OF SOLDERING (COMPONENT OR CHIP COMPONENT) IS NOT BURNED INTO BROWN OR BLACK COLOR. (7)SEALANT ON TOP OF THE ITO CIRCUIT HAS NOT HARDENED. (8)PIN TYPE MUST MATCH TYPE IN SPECIFICATION SHEET. (9)LCD PIN LOOSE OR MISSING PINS. (10)PRODUCT PACKAGING MUST BE THE SAME AS SPECIFIED ON PACKAGING SPECIFICATION SHEET. (11)PRODUCT DIMENSION AND STRUCTURE MUST CONFORM TO PRODUCT SPECIFICATION SHEET. (12)THE APPEARANCE OF HEAT SEAL SHOULD NOT ADMIT ANY DIRT AND BREAK.

13. RELIABILITY TEST

13.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE

NO.	ITEM	DESCRIPTION
1	HIGH TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +80°C FOR 240 HRS
2	LOW TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -30°C FOR 240 HRS
3	HIGH TEMPERATURE STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +80°C FOR 240 HRS
4	LOW TEMPERATURE STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -30°C FOR 240 HRS
5	HIGH TEMPERATURE / HUMIDITY TEST STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT 60°C , 90% RH 240 HRS
6	THERMAL SHOCK (NOT OPERATED)	THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION: 
7	ESD (ELECTROSTATIC DISCHARGE) (NOT OPERATED)	AIR DISCHARGE ± 12KV CONTACT DISCHARGE ± 8KV (ACCORDING TO IEC-61000-4-2)

NOTE (1)：THE TEST SAMPLES HAVE RECOVERY TIME FOR 2 HOURS AT ROOM TEMPERATURE BEFORE THE FUNCTION CHECK. IN THE STANDARD CONDITIONS, THERE IS NO DISPLAY FUNCTION NG ISSUE OCCURRED.

NOTE (2)：WHEN THE LCD MODULE IS OPERATED AT A HIGHER AMBIENT TEMPERATURE THAN 60°C, POWER SUPPLY CURRENT OF LED BACKLIGHT SHOULD BE ADJUSTED TO BE LESS THAN 70%. IF THE MODULE IS OPERATED AT A HIGHER CURRENT THAN 70%, THEN THERE IS A POSSIBILITY OF DISTORTION AND IRREGULARITY OF THE PICTURE DUE TO LIQUID CRYSTAL BEHAVIOR.

13.2 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 13.1, STANDARD SPECIFICATIONS FOR RELIABILITY HAVE BEEN EXECUTED IN ORDER TO ENSURE STABILITY.

NO.	ITEM	TEST MODEL	INSPECTION CRITERIA
1	CURRENT CONSUMPTION	REFER TO SPECIFICATION	THE CURRENT CONSUMPTION SHOULD CONFORM TO THE PRODUCT SPECIFICATION.
2	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.
3	APPEARANCE	VISUAL INSPECTION	DEFECT FREE

14. CAUTION

14.1 OPERATION

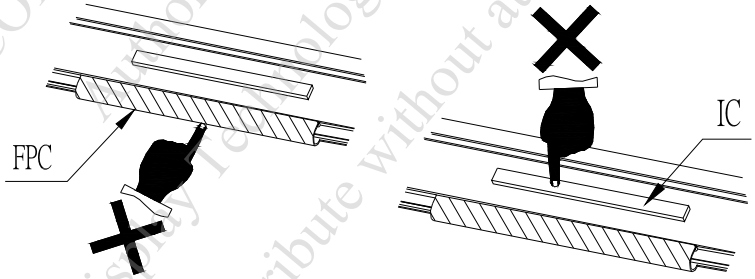
14.1.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .

14.1.2 USE THE MODULE WITHIN SPECIFIED TEMPERATURE ; LOWER TEMPERATURE CAUSES THE RETARDATION OF BLINKING SPEED OF THE DISPLAY ; HIGHER TEMPERATURE MAKES OVERALL DISPLAY DISCOLOR . WHEN THE TEMPERATURE RETURNS TO NORMALITY, THE DISPLAY WILL OPERATE NORMALLY.

14.1.3 ADJUST THE LC DRIVING VOLTAGE TO OBTAIN THE OPTIMUM CONTRAST .

14.1.4 POWER ON SEQUENCE INPUT SIGNALS SHOULD NOT BE SUPPLIED TO LCD MODULE BEFORE POWER SUPPLY VOLTAGE IS APPLIED AND REACHES THE SPECIFIED VALUE.
IF ABOVE SEQUENCE IS NOT FOLLOWED , CMOS LSIS OF LCD MODULES MAY BE DAMAGED DUE TO LATCH - UP PROBLEM.

14.1.5 NOT ALLOWED TO INFLICT ANY EXTERNAL STRESS AND TO CAUSE ANY MECHANICAL INTERFERENCE ON THE BENDING AREA OF FPC DURING THE TAIL BENDING BACKWARDS!
DO NOT STRESS FPC AND IC ON THE MODULE!



14.2 NOTICE

14.2.1 USE A GROUNDED SOLDERING IRON WHEN SOLDERING CONNECTOR I/O TERMINALS . FOR SOLDERING OR REPAIRING, TAKE PRECAUTION AGAINST THE TEMPERATURE OF THE SOLDERING IRON AND THE SOLDERING TIME TO PREVENT PEELING OFF THE THROUGH-HOLE-PAD .

14.2.2 DO NOT DISASSEMBLE . EDT SHALL NOT BE HELD RESPONSIBLE IF THE MODULE IS DISASSEMBLED AND UPON THE REASSEMBLY THE MODULE FAILED.

14.2.3 DO NOT CHARGE STATIC ELECTRICITY, AS THE CIRCUIT OF THIS MODULE CONTAINS CMOS LSIS. A WORKMAN'S BODY SHOULD ALWAYS BE STATIC-PROTECTED BY USE OF AN ESD STRAP. WORKING CLOTHES FOR SUCH PERSONNEL SHOULD BE OF STATIC-PROTECTED MATERIAL.

14.2.4 ALWAYS GROUND THE ELECTRICALLY-POWERED DRIVER BEFORE USING IT TO INSTALL THE LCD MODULE. WHILE CLEANING THE WORK STATION BY VACUUM CLEANER, DO NOT BRING THE SUCKING MOUTH NEAR THE MODULE ; STATIC ELECTRICITY OF THE ELECTRICALLY-POWERED DRIVER OR THE VACUUM CLEANER MAY DESTROY THE MODULE.

14.2.5 DON’T GIVE EXTERNAL SHOCK.

14.2.6 DON’T APPLY EXCESSIVE FORCE ON THE SURFACE.

14.2.7 LIQUID IN LCD IS HAZARDOUS SUBSTANCE. MUST NOT LICK AND SWALLOW.
WHEN THE LIQUID IS ATTACH TO YOUR, SKIN, CLOTH ETC. WASH IT OUT THOROUGHLY AND IMMEDIATELY.

14.2.8 DON’T OPERATE IT ABOVE THE ABSOLUTE MAXIMUM RATING.

14.2.9 STORAGE IN A CLEAN ENVIRONMENT, FREE FROM DUST, ACTIVE GAS, AND SOLVENT.

14.2.10 STORE WITHOUT ANY PHYSICAL LOAD.

14.2.11 REWIRING: NO MORE THAN 3 TIMES.