EXAMINED BY : Dan Kao	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-0009373
		ISSUE : AUG.26, 2022
APPROVED BY: Justin Horng		TOTAL PAGE : 22
		VERSION : 4

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

ET070021DMA

(RoHS)

FOR MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

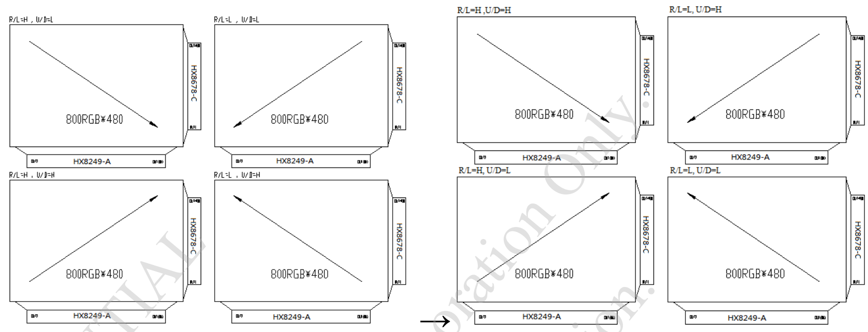
_____

BY :

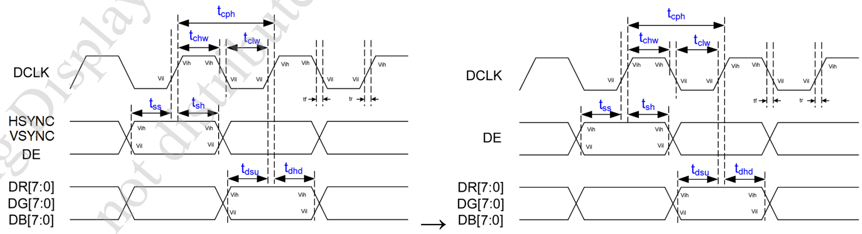
_____

RECORDS OF REVISION

DATE	REVISED PAGE NO.	SUMMARY
MAR.30, 2022	9	7. OUTLINE DIMENSIONS MARK △1 : MODIFY FPC COMPONENT AREA DIMENSION
JUL.07, 2022	9	7. OUTLINE DIMENSIONS MARK △2 : MODIFY INSULATED TAPE OUTLINE DIMENSION
	13	10.2 SELECTION OF SCANNING MODE



DATE	REVISED PAGE NO.	SUMMARY
AUG.26, 2022	1	2. MECHANICAL SPECIFICATIONS (12)INTERFACE MODE:RGB(18BIT)PARALLEL(DE/SYNC MODE)→ RGB(18BIT) PARALLEL(DE MODE ONLY) (13)WEIGHT:TBD→118g
	3	4. ELECTRICAL CHARACTERISTICS ITEM:POWER SUPPLY CURRENT, TYP.=(250)→200, MAX.=(400)→260, REMARK:VSS=0→NOTE(1) ITEM:POWER SUPPLY VOLTAGE FOR LED DRIVER, REMARK:NOTE (1)→NOTE (2) ITEM:LED LIFE TIME, REMARK:NOTE(1)→NOTE(4) NOTE(5) ADD NOTE(1):THE DISPLAY PATTERN IS ALL''WHITE''.
	4	5.1 INPUT SIGNAL TIMING



DELETE ITEM:VSYNC SETUP TIME
DELETE ITEM:VSYNC HOLD TIME
DELETE ITEM:HSYNC SETUP TIME
DELETE ITEM:HSYNC HOLD TIME

DATE	REVISED PAGE NO.	SUMMARY
	5	DELETE 5.2 SYNC MODE SIGNAL CHARACTERISTICS
	6	MODIFY 5.3 DE MODE SIGNAL CHARACTERISTICS→5.2 MODIFY 5.4 HARDWARE RESET TIMING→5.3
	7	6.1 OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.
VIEWING ANGLE		θ_{y+}	CR ≥ 10	θ_x=0°	(70)	(80)	—
		θ_{y-}			(70)	(80)	—
		θ_{x+}		θ_y=0°	(70)	(80)	—
		θ_{x-}			(70)	(80)	—
CONTRAST RATIO (CENTER)		CR	θx=0° , θy=0°		(650)	(850)	—
COLOR CHROMATICITY (CENTER)	WHITE	Wx	θx=0° , θy=0° IF = 160 mA NTSC : (68) %		(0.30)	(0.35)	(0.40)
		Wy			(0.30)	(0.35)	(0.40)
	RED	Rx			(0.58)	(0.63)	(0.68)
		RY			(0.30)	(0.35)	(0.40)
	GREEN	Gx			(0.27)	(0.32)	(0.37)
		Gy			(0.60)	(0.65)	(0.70)
	BLUE	Bx			(0.12)	(0.17)	(0.22)
		By			(0.02)	(0.07)	(0.12)

→

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.
VIEWING ANGLE		θ_{y+}	CR ≥ 10	θ_x=0°	70	80	—
		θ_{y-}			70	80	—
		θ_{x+}		θ_y=0°	70	80	—
		θ_{x-}			70	80	—
CONTRAST RATIO (CENTER)		CR	θx=0° , θy=0°		650	850	—
COLOR CHROMATICITY (CENTER)	WHITE	Wx	θx=0° , θy=0° IF = 160 mA NTSC : 72%		0.27	0.32	0.37
		Wy			0.30	0.35	0.40
	RED	Rx			0.59	0.64	0.69
		RY			0.29	0.34	0.39
	GREEN	Gx			0.30	0.35	0.40
		Gy			0.58	0.63	0.68
	BLUE	Bx			0.08	0.13	0.18
		By			0.02	0.07	0.12

RECORDS OF REVISION

DOC . FIRST ISSUE FEB.23, 2022

DATE	REVISED PAGE NO.	SUMMARY
AUG.26, 2022	10	8. BLOCK DIAGRAM 37. MODE→NC 39. HSYNC→NC 40. VSYNC→NC
	13	10. INTERFACE SIGNALS

PIN NO.	SYMBOL	I/O	FUNCTION
37	MODE	I	INPUT TIMING MODE, H:HSYNC+VSYNC MODE, L:DE ONLY
39	HSYNC	I	HORIZONTAL SYNC INPUT
40	VSYNC	I	VERTICAL SYNC INPUT

↓

PIN NO.	SYMBOL	I/O	FUNCTION
37	NC	—	NC
39	NC	—	NC
40	NC	—	NC

TABLE OF CONTENTS

1. GENERAL SPECIFICATIONS

1.1 DATA SHEETS FOR CONTROLLER/DRIVER

PLEASE REFER TO :

HIMAX HX8249-A
HIMAX HX8678-C

1.2 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	7 inch
(2)	NUMBER OF DOTS	800W * (RGB) * 480H DOTS
(3)	MODULE SIZE	165W * 104.44H *5.2D mm (WITHOUT FPC)
(4)	VIEWING AREA	154.4W * 93.44H mm
(5)	ACTIVE AREA	152.4W * 91.44H mm
(6)	DOT SIZE	0.0635W * 0.1905H mm
(7)	PIXEL SIZE	0.1905W * 0.1905H mm
(8)	LCD TYPE	TFT , IPS ,TRANSMISSIVE ,NORMALLY BLACK
(9)	COLOR	262K
(10)	VIEWING DIRECTION	SUPER WIDE VIEW
(11)	BACK LIGHT	LED , COLOR : WHITE
(12)	INTERFACE MODE	RGB(18BIT) PARALLEL (DE MODE ONLY)
(13)	WEIGHT	118g

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	VSS=0
LED BACKLIGHT POWER DISSIPATION	PD	—	2592	mW	
LED BACKLIGHT POWER CURRENT	IF	—	240	mA	

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20°C	70°C	-30°C	80°C	NOTE (1) , (2) , (3)
HUMIDITY	NOTE (2)		NOTE (2)		WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s^2 (0.25 G)	—	11.76 m/s^2 (1.2 G)	10~100 Hz XYZ DIRECTIONS 1 HR EACH
SHOCK	—	29.4 m/s^2 (3 G)	—	490 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)：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.)

NOTE (3)：BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.

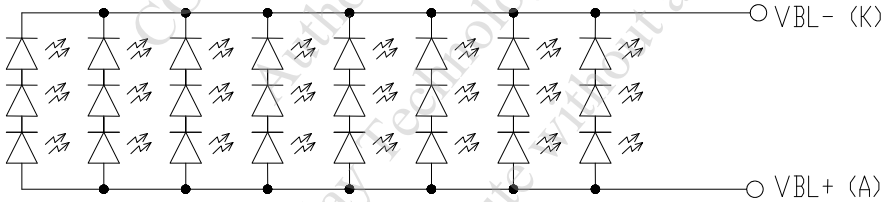
4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C

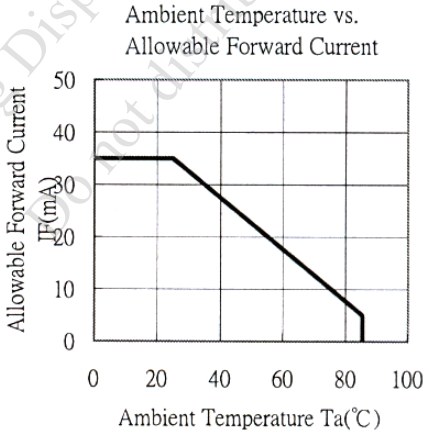
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	—	3.2	3.3	3.6	V	VSS=0
POWER SUPPLY CURRENT	IDD	VDD-VSS = 3.3V	—	200	260	mA	NOTE (1)
LOGIC LOW INPUT VOLTAGE	VIL	—	VSS-0.3	—	0.3*VDD	V	
LOGIC HIGH INPUT VOLTAGE	VIH	—	0.7*VDD	—	VDD+0.3	V	
LOGIC LOW OUTPUT VOLTAGE	VOL	—	VSS	—	VSS+0.4	V	
LOGIC HIGH OUTPUT VOLTAGE	VOH	—	VDD-0.4	—	—	V	
POWER SUPPLY VOLTAGE FORLED DRIVER	V_F	I_F=160mA	8.4	9.9	10.8	V	NOTE (2)
LED LIFE TIME	—	I_{LED}=20mA (PER. LED)	30K	—	—	hrs	NOTE (4) NOTE (5)

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

NOTE (2)：INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT.



NOTE (3) : AMBIENT TEMP. VS. ALLOWABLE FORWARD CURRENT. (PER. LED)



NOTE (4)：CONDITIONS; TA=25 °C, CONTINUOUS LIGHTING

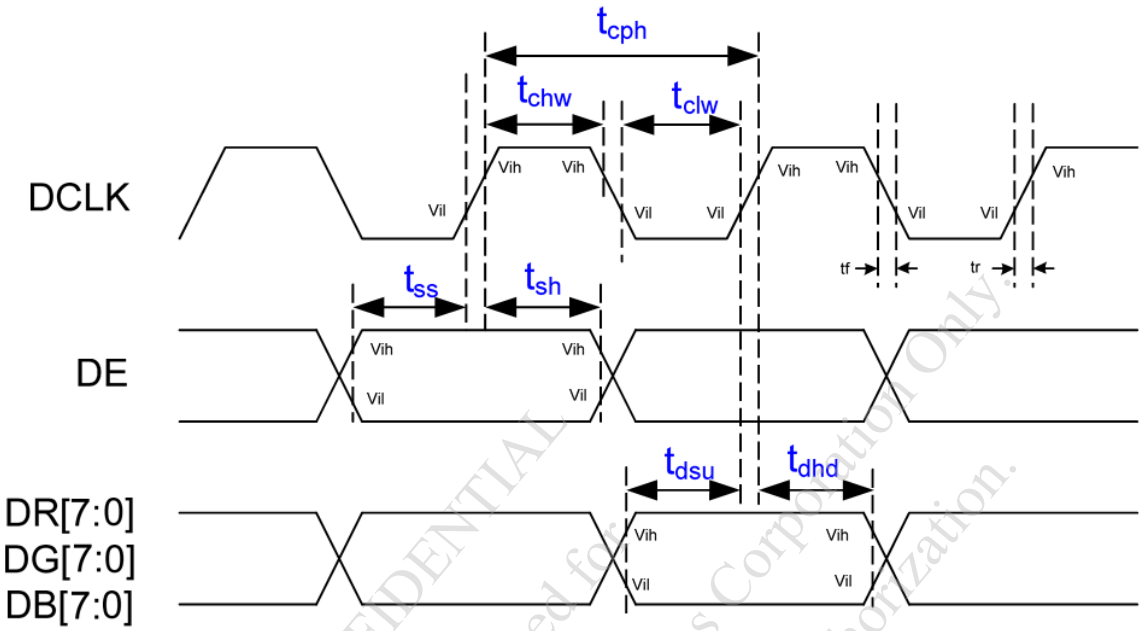
NOTE (5)：DEFINITIONS OF FAILURE

A. LCD LUMINANCE BECOMES HALF OF THE MINIMUM VALUE.

B. LED DOESN'T LIGHT NORMALLY

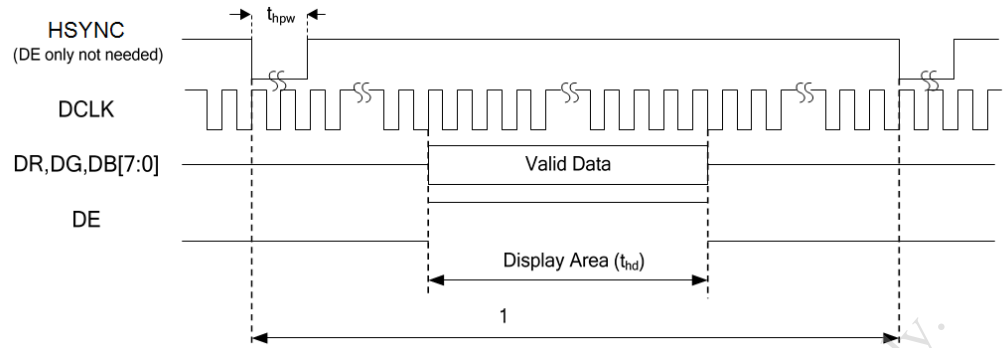
5. TIMING CHART

5.1 INPUT SIGNAL TIMING

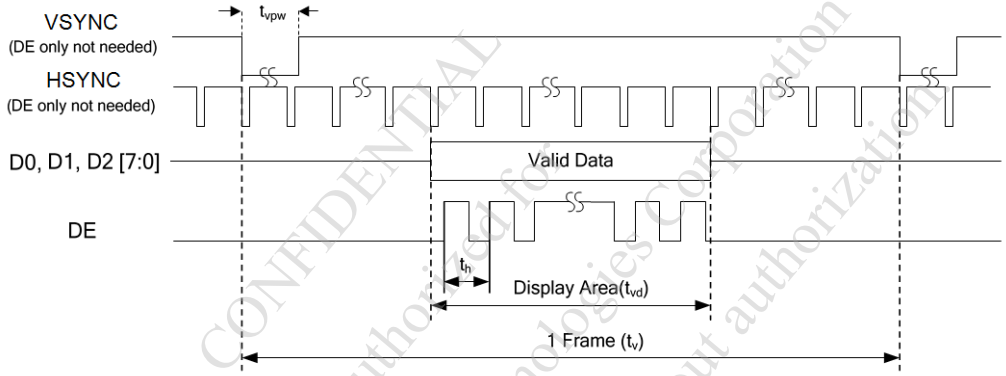


ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK PERIOD	Tcph	16.8	—	—	ns
DCLK CLOCK HIGH WIDTH	Tchw	6	—	—	ns
DCLK CLOCK LOW WIDTH	Tclw	6	—	—	ns
DE SETUP TIME	Tss	5	—	—	ns
DE HOLD TIME	Tsh	5	—	—	ns
DATA SETUP TIME	Tdsu	5	—	—	ns
DATA HOLD TIME	Tdhd	5	—	—	ns
INPUT SIGNAL RISING TIME	Tr	—	—	10	ns
INPUT SIGNAL FALLING TIME	Tf	—	—	10	ns

5.2 DE MODE SIGNAL CHARACTERISTICS



HORIZONTAL INPUT TIMING AT DE ONLY MODE

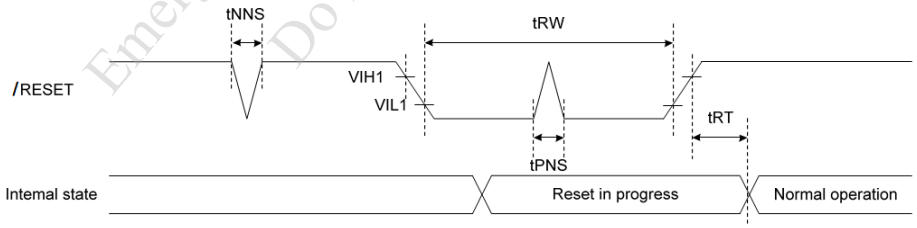


VERTICAL INPUT TIMING AT DE ONLY MODE

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK FREQUENCY	F_{DCLK}	25.2	27.2	30.5	MHz
HORIZONTAL VALID DATA	t_{hd}		800		DCLK
1 HORIZONTAL LINE	t_h	856	860	920	DCLK
VERTICAL VALID DATA	t_{vd}		480		H
1 VERTICAL FIELD	t_v	490	528	552	H

NOTE (1) : DCLK FREQUENCY MIN/MAX VALUE IS BASE ON FRAME RATE 60 Hz.

5.3 HARDWARE RESET TIMING



ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
RESET PULSE WIDTH	tRW	10	—	—	µs
RESET COMPLETE TIME	tRT	—	—	5	µs
POSITIVE SPIKE NOISE WIDTH	tPNS	—	—	100	ns
NEGATIVE SPIKE NOISE WIDTH	tNNS	—	—	100	ns

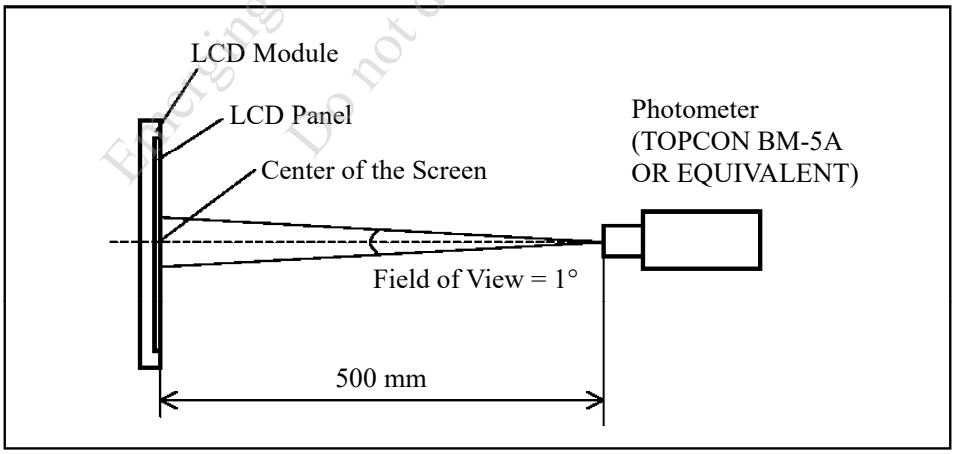
6. OPTICAL CHARACTERISTICS (NOTE1)

6.1 OPTICAL CHARACTERISTICS

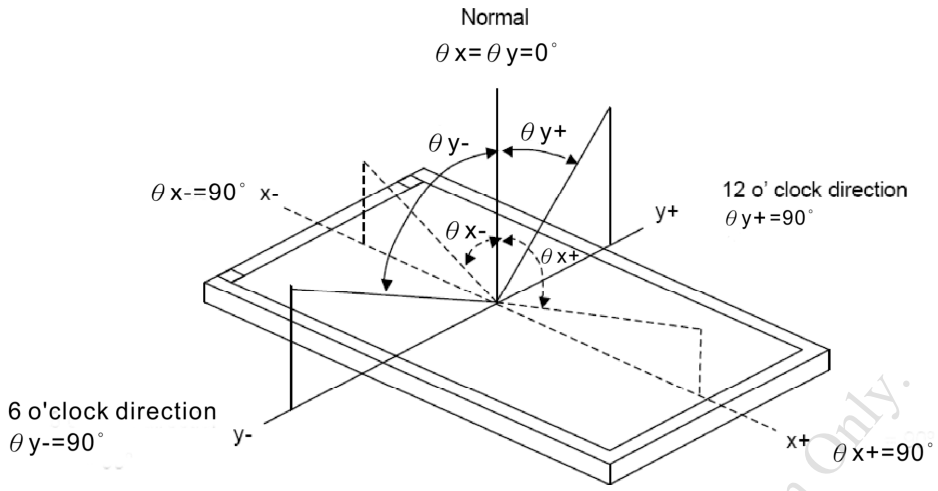
Ta = 25 ± 2 °C

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{y+}	CR ≥ 10	θ_x=0°	70	80	—	deg.	(2) (3)
		θ_{y-}			70	80	—		
		θ_{x+}		θ_y=0°	70	80	—		
		θ_{x-}			70	80	—		
CONTRAST RATIO (CENTER)		CR	θx=0° , θy=0°		650	850	—	—	(3)
RESPONSE TIME		T_R (rise) + T_F (fall)	θx=0° , θy=0°		—	25	35	msec	(4)
THE BRIGHTNESS OF MODULE (CENTER)		B	θx=0° , θy=0° IF = 160mA		300	350	—	cd/m^2	(5)
COLOR CHROMATICITY (CENTER)	WHITE	Wx	θx=0° , θy=0° IF = 160 mA NTSC : 72 %		0.27	0.32	0.37	—	(6)
		Wy			0.30	0.35	0.40		
	RED	Rx			0.59	0.64	0.69	—	
		RY			0.29	0.34	0.39		
	GREEN	Gx			0.30	0.35	0.40	—	
		Gy			0.58	0.63	0.68		
	BLUE	Bx			0.08	0.13	0.18	—	
		By			0.02	0.07	0.12		
THE UNIFORMITY OF MODULE		—	θx=0° , θy=0° IF = 160 mA		75	80	—	%	(5)

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 :

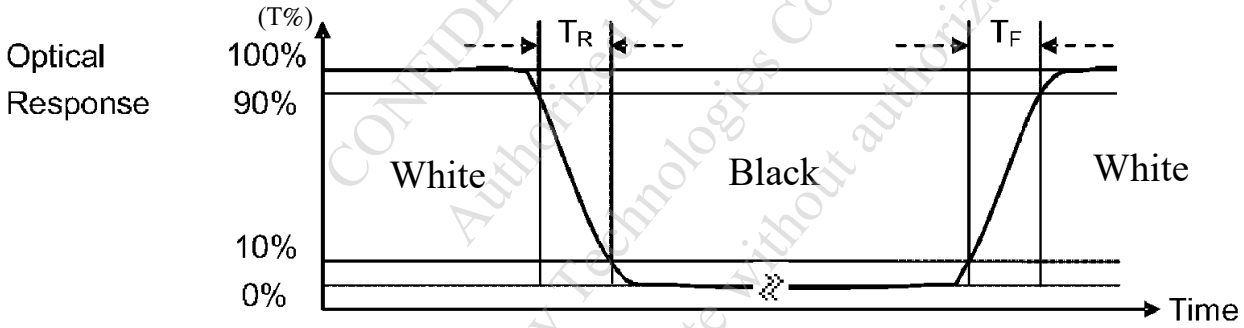


NOTE (3) : DEFINITION OF CONTRAST RATIO :

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

NOTE (4) : DEFINITION OF RESPONSE TIME : T_R AND T_F

THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.



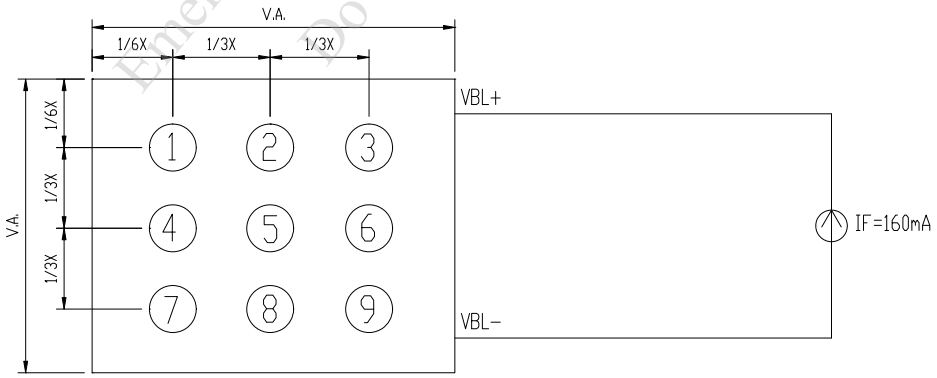
NOTE (5) : DEFINITION OF COLOR CHROMATICITY

(a)THE 100% TRANSMISSION IS DEFINED AS THE TRANSMISSION OF LCD PANEL WHEN ALL THE INPUT TERMINALS OF MODULE ARE ELECTRICALLY OPENED.

(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

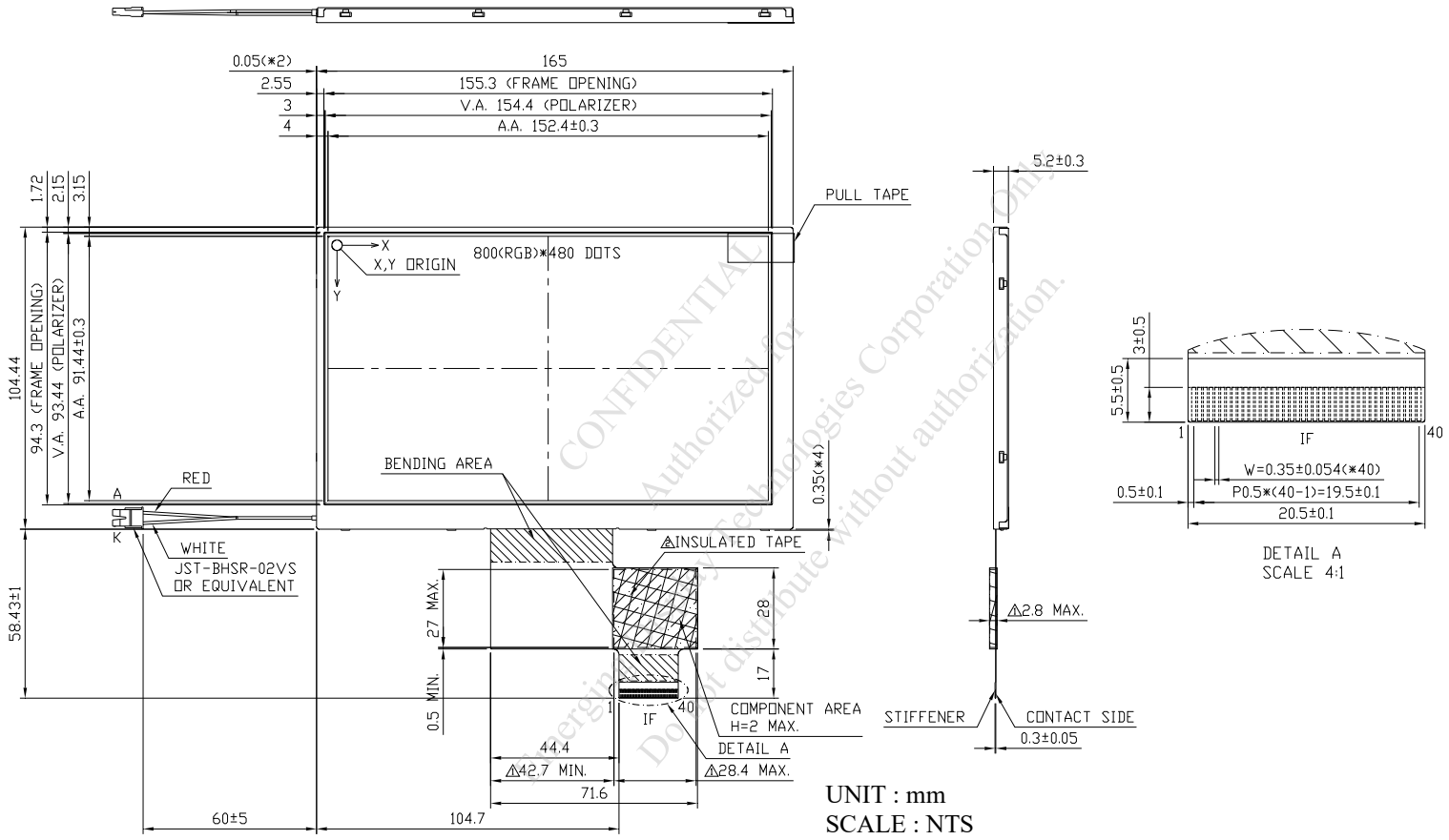


UNIT : mm

(b)THE BRIGHTNESS UNIFORMITY CALCULATING METHOD

$$\text{UNIFORMITY}: \left[\frac{\text{MINIMUM BRIGHTNESS}}{\text{MAXIMUM BRIGHTNESS}}\right] \times 100\%$$

7. OUTLINE DIMENSIONS

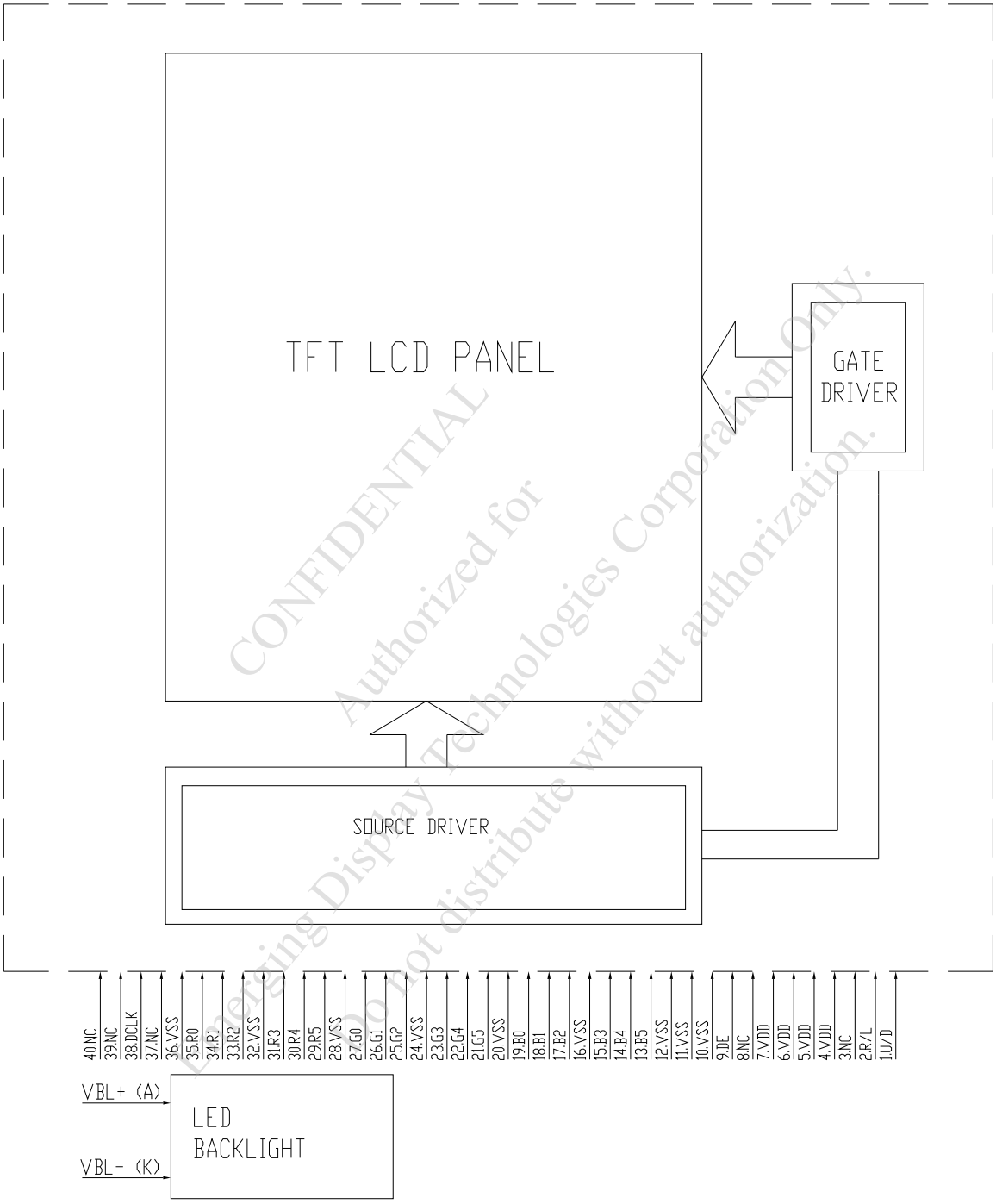


UNIT : mm
SCALE : NTS

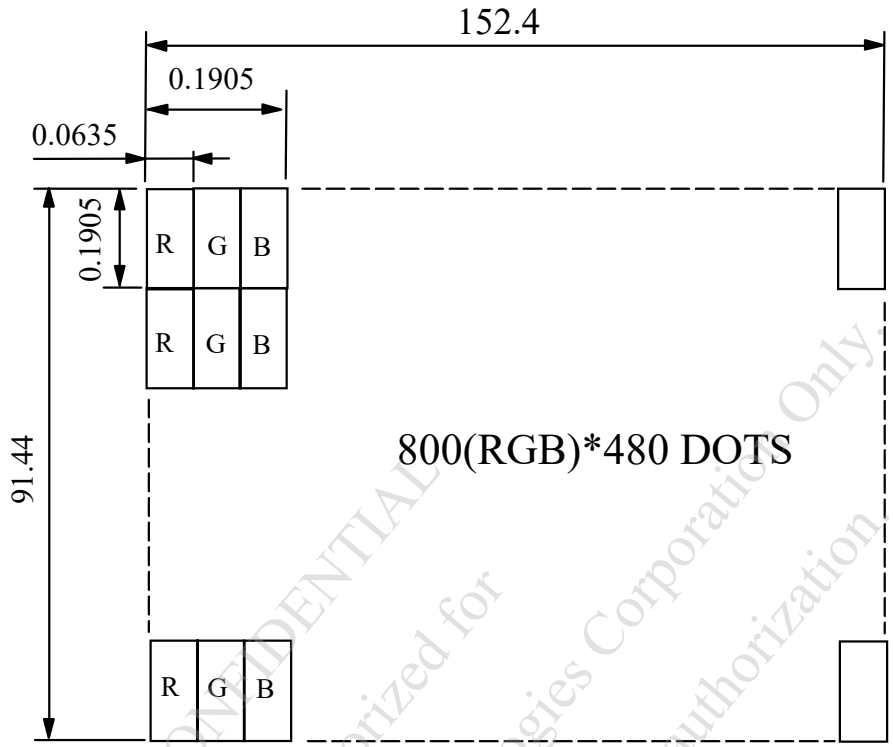
THIRD ANGLE PROJECTION

NOT SPECIFIED TOLERANCE IS ± 0.5mm
MARK△2MODIFY (NUMBER NOTE MODIFY VERSION)
NOTE:
1.RECOMMEND MATCH CONNECTOR: KYOCERA 04 6240 040 SERIES
2.FPC BENDING RADIUS SHOULD BE MORE THAN 1.0 mm.

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

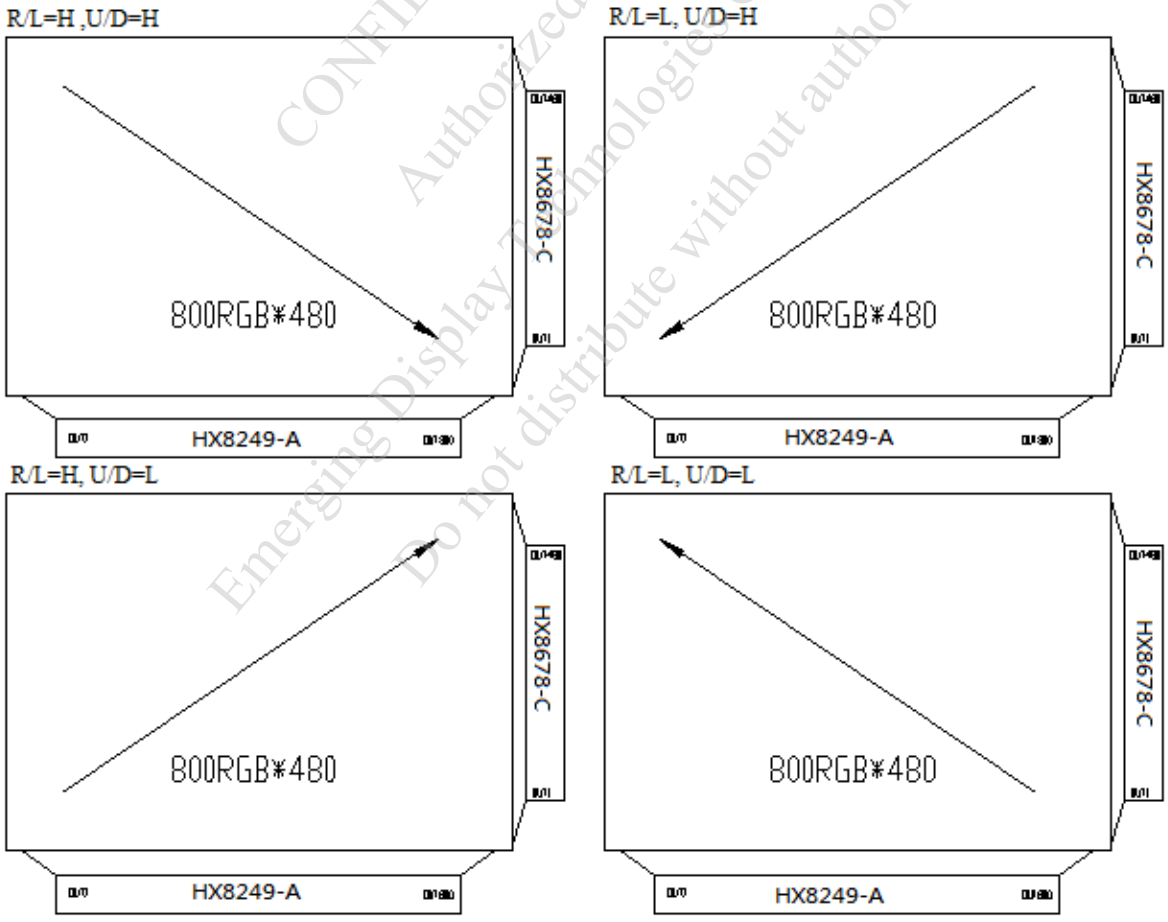
PIN NO	SYMBOL	I/O	FUNCTION
1	U/D	I	U/D=H:OUT1→OUT2→ ------- →OUT480 U/D=L:OUT480→ ------- →OUT2→ OUT1
2	R/L	I	R/L= H:OUT1→OUT2→ ------- →OUT800 R/L=L:OUT800→ ------- →OUT2→ OUT1
3	NC	—	NC
4	VDD	P	POWER SUPPLY (3.3V)
5	VDD	P	POWER SUPPLY (3.3V)
6	VDD	P	POWER SUPPLY (3.3V)
7	VDD	P	POWER SUPPLY (3.3V)
8	NC	—	NC
9	DE	I	DATA ENABLE INPUT
10	VSS	P	GROUND
11	VSS	P	GROUND
12	VSS	P	GROUND
13	B5	I	BLUE DATA BIT5
14	B4	I	BLUE DATA BIT4
15	B3	I	BLUE DATA BIT3
16	VSS	P	GROUND
17	B2	I	BLUE DATA BIT2
18	B1	I	BLUE DATA BIT1
19	B0	I	BLUE DATA BIT0
20	VSS	P	GROUND
21	G5	I	GREEN DATA BIT 5
22	G4	I	GREEN DATA BIT 4
23	G3	I	GREEN DATA BIT 3
24	VSS	P	GROUND
25	G2	I	GREEN DATA BIT 2
26	G1	I	GREEN DATA BIT 1
27	G0	I	GREEN DATA BIT 0
28	VSS	P	GROUND
29	R5	I	RED DATA BIT 5
30	R4	I	RED DATA BIT 4

PIN NO	SYMBOL	I/O	FUNCTION
31	R3	I	RED DATA BIT 3
32	VSS	P	GROUND
33	R2	I	RED DATA BIT 2
34	R1	I	RED DATA BIT 1
35	R0	I	RED DATA BIT 0
36	VSS	P	GROUND
37	NC	—	NC
38	DCLK	I	DOT DATA COLOCK
39	NC	—	NC
40	NC	—	NC

10.1 LED B/L INTERFACE

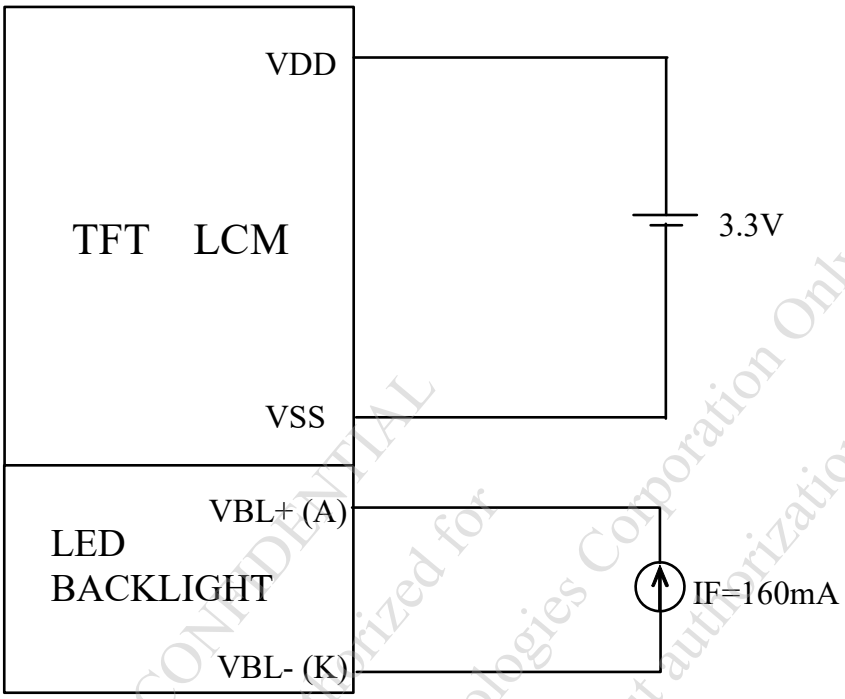
PIN NO	SYMBOL	FUNCTION
1	VBL+(A)	POWER SUPPLY FOR LED BACKLIGHT (ANODE)
2	VBL-(K)	POWER SUPPLY FOR LED BACKLIGHT (CATHODE)

10.2 SELECTION OF SCANNING MODE



11. POWER SUPPLY

11.1 POWER SUPPLY FOR LCM



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

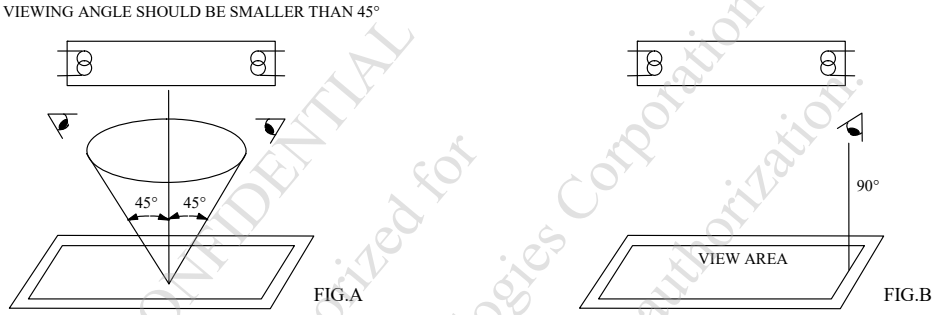


FIG.A FIG.B

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

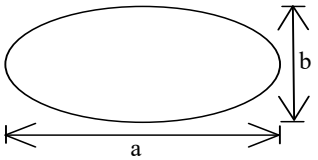
MINOR DEFECT：AQL 1.0

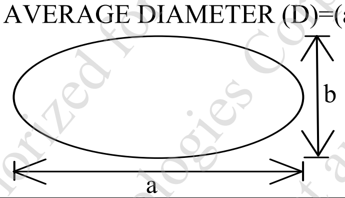
12.3 INSPECTION STANDARDS

12.3.1 VISUAL DEFECTS CLASSIFICATION

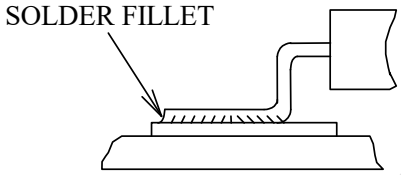
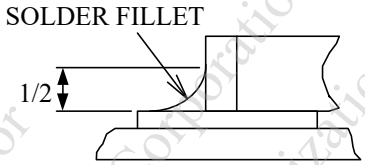
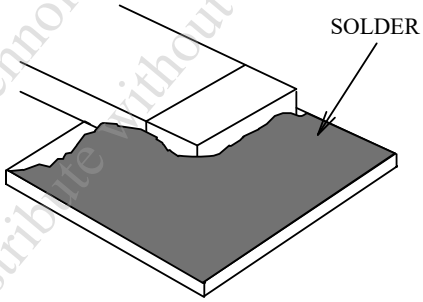
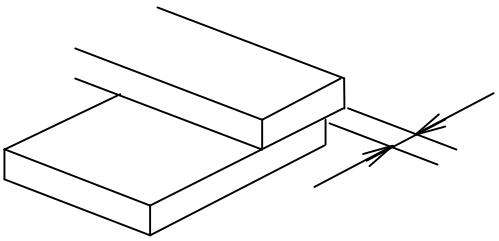
TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS EX: DISCONNECTION, SHORT CIRCUIT ETC	0.65
	2.BACKLIGHT	• NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION	
	3.DIMENSIONS	• SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS	
MINOR DEFECT	1.DISPLAY ZONE	• BLACK/WHITE SPOT • BUBBLES ON POLARIZER • NEWTON RING • BLACK/WHITE LINE • SCRATCH • CONTAMINATION • LEVER COLOR SPREAD	1.0
	2.BEZEL ZONE	• STAINS • SCRATCHES • FOREIGN MATTER	
	3.SOLDERING	• INSUFFICIENT SOLDER • SOLDERED IN INCORRECT POSITION • CONVEX SOLDERING SPOT • SOLDER BALLS • SOLDER SCRAPS	
	4.DISPLAY ON (ALL ON)	• LIGHT LINE	

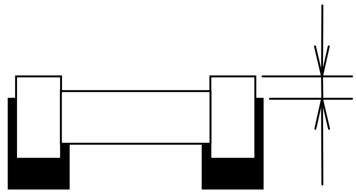
12.3.2 MODULE DEFECTS CLASSIFICATION

<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>(1)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 = 0</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 ≤ 5</td></tr>
<tr><td>2 DOTS ADJACENT (PAIR)</td><td>N = 0</td></tr>
<tr><td>3 DOTS ADJACENT OR MORE</td><td>N = 0</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.
THE BRIGHT DOT DEFECT MOST BE VISIBLE THROUGH A 5% ND FILTER
2. BRIGHT DOT：
DOTS APPEAR BRIGHT AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER BLACK PATTERN.
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>L ≤ 5.0</td><td>0.05 < W ≤ 0.1</td><td>4</td></tr>
<tr><td>5.0 < L</td><td>0.1 < W</td><td>NONE</td></tr>
</table>
WIDTH：W mm, LENGTH： L mm</td></tr>
<tr><td>5</td><td>POLARIZER SCRATCHES</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>L ≤ 5.0</td><td>0.05 < W ≤ 0.1</td><td>4</td></tr>
<tr><td>5.0 < L</td><td>0.1 < W</td><td>NONE</td></tr>
</table>
WIDTH：W mm, LENGTH： L mm</td></tr>
<tr><td>6</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>4</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>7</td><td>BUBBLES OF POLARIZER /DIRT/CF FAIL /SURFACE STAINS</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>N ≤ 5</td></tr>
<tr><td>0.5 < D</td><td>NONE</td></tr>
<tr><td rowspan="3">SURFACE STAINS</td><td>D ≤ 0.1</td><td>IGNORE</td></tr>
<tr><td>0.1 < D ≤ 0.5</td><td>N ≤ 4</td></tr>
<tr><td>0.5 < D</td><td>NONE</td></tr>
<tr><td rowspan="3">CF FAIL / SPOT</td><td>D ≤ 0.1</td><td>IGNORE</td></tr>
<tr><td>0.1 < D ≤ 0.5</td><td>N ≤ 4</td></tr>
<tr><td>0.5 < D</td><td>NONE</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


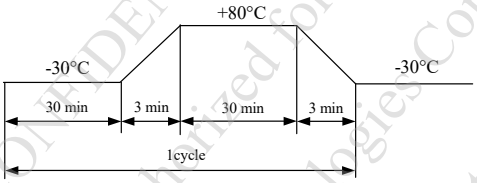
</td></tr>
<tr><td>8</td><td>LINE DEFECT ON DISPLAY</td><td>OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED</td></tr>
<tr><td>9</td><td>MURA ON DISPLAY</td><td>NOT VISIBLE THROUGH 5% ND FILTER OR JUDGED BY LIMIT SAMPLE IF NECESSARY.</td></tr>
<tr><td>10</td><td>UNEVEN COLOR SPREAD, COLORATION</td><td>(1)TO BE DETERMINED BASED UPON THE STANDARD SAMPLE.</td></tr>
<tr><td>11</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>12</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
13	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 

NO.	ITEM	CRITERIA
13	SOLDERING	(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.
14	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.
15	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 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 +70°C FOR 240 hrs
2	LOW TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -20°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 TEMP / 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)：TESTING CONDITIONS AND INSPECTION CRITERIA

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

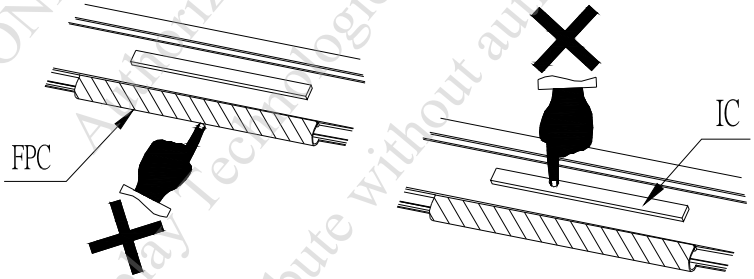
14.1.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .

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.