

EXAMINED BY :	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-0009065
Lucica Lu		ISSUE : OCT.28, 2020
APPROVED BY:		TOTAL PAGE : 25
Vincent Uh		VERSION : 2

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
MODEL NO. : <u>ET043023UDBA</u> (RoHS) FOR MESSRS : _____		
CUSTOMER'S APPROVAL DATE : _____ BY : _____		

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL NO.

ET043023UDBA

VERSION

2

PAGE

0-1

DOC . FIRST ISSUE

SEP.03, 2020

RECORDS OF REVISION

DATE	REVISED PAGE NO.	SUMMARY																													
OCT.28, 2020	3	4. ELECTRICAL CHARACTERISTICS LED LIFE TIME: CONDITION: IF=120mA→IF=50mA																													
	12	8. BLOCK DIAGRAM MODIFY PIN NO.: 45.CS(NC)/ID1→45.CS/ID1, 46.SDIN(NC)/ID2→46.SDIN/ID2, 47.SCK(NC)/ID3→47.SCK/ID3																													
	15	10. INTERFACE SIGNALS <table border="1"> <thead> <tr> <th>PIN NO.</th><th>SYMBOL</th><th>FUNCTION</th></tr> </thead> <tbody> <tr> <td>45</td><td>CS(NC)/ID1</td><td>CS FOR LCM-DRIVER SPI-PORT/ID1(NC)</td></tr> <tr> <td>46</td><td>SDIN(NC)/ID2</td><td>SDIN FOR LCM-DRIVER SPI-PORT/ID2(PULL HIGH TO VDD)</td></tr> <tr> <td>47</td><td>SCK(NC)/ID3</td><td>SCK FOR LCM-DRIVER SPI-PORT/ID3(PULL LOW TO VSS)</td></tr> <tr> <td>48</td><td>DISPLAY CONTROL/ID4</td><td>DISPLAY/ID4(NC)</td></tr> </tbody> </table> ↓ <table border="1"> <thead> <tr> <th>PIN NO.</th><th>SYMBOL</th><th>FUNCTION</th></tr> </thead> <tbody> <tr> <td>45</td><td>CS/ID1</td><td>CS FOR LCM-DRIVER SPI-PORT/ID1(SIZE INFO, NOT USED)</td></tr> <tr> <td>46</td><td>SDIN/ID2</td><td>SDIN FOR LCM-DRIVER SPI-PORT/ID2(SIZE INFO, PULL HIGH TO VDD, INTERNAL: 10KΩ)</td></tr> <tr> <td>47</td><td>SCK/ID3</td><td>SCK FOR LCM-DRIVER SPI-PORT/ID3(SIZE INFO, PULL LOW TO VSS, INTERNAL: 10KΩ)</td></tr> <tr> <td>48</td><td>DISPLAY CONTROL/ID4</td><td>DISPLAY/ID4(SIZE INFO, NOT USED)</td></tr> </tbody> </table>	PIN NO.	SYMBOL	FUNCTION	45	CS(NC)/ID1	CS FOR LCM-DRIVER SPI-PORT/ID1(NC)	46	SDIN(NC)/ID2	SDIN FOR LCM-DRIVER SPI-PORT/ID2(PULL HIGH TO VDD)	47	SCK(NC)/ID3	SCK FOR LCM-DRIVER SPI-PORT/ID3(PULL LOW TO VSS)	48	DISPLAY CONTROL/ID4	DISPLAY/ID4(NC)	PIN NO.	SYMBOL	FUNCTION	45	CS/ID1	CS FOR LCM-DRIVER SPI-PORT/ID1(SIZE INFO, NOT USED)	46	SDIN/ID2	SDIN FOR LCM-DRIVER SPI-PORT/ID2(SIZE INFO, PULL HIGH TO VDD, INTERNAL: 10KΩ)	47	SCK/ID3	SCK FOR LCM-DRIVER SPI-PORT/ID3(SIZE INFO, PULL LOW TO VSS, INTERNAL: 10KΩ)	48	DISPLAY CONTROL/ID4
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1. GENERAL SPECIFICATIONS

1.1 DATA SHEETS FOR CONTROLLER/DRIVER

PLEASE REFER TO :

SITRONIX SC7283

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) DIAGONALS	4.3 inch
(2) NUMBER OF DOTS	480W * (RGB) * 272H DOTS
(3) MODULE SIZE	105.5W * 67.2H * 4.5D mm (NOT INCLUDED FPC)
(4) VIEWING AREA	99W * 56H mm
(5) ACTIVE AREA	95.04W * 53.856H mm
(6) DOT SIZE	0.066W * 0.198H mm
(7) PIXEL PITCH	0.198W * 0.198H mm
(8) LCD TYPE	TFT , IPS , TRANSMISSIVE , NORMALLY BLACK
(9) COLOR	16.7M
(10) VIEWING DIRECTION	SUPER WIDE VIEW
(11) BACK LIGHT	LED , COLOR : WHITE
(12) INTERFACE MODE	RGB 24 BIT PARALLEL (SYNC/DE/SYNC-DE MODE)

3. ABSOLUTE MAXIMUM RATINGS

3.1 LCD MODULE ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	-0.3	4.0	V	—
POWER SUPPLY VOLTAGE FOR LED DRIVER	VBL+-VSS	5.0	15.0	V	
STATIC ELECTRICITY	—	—	—	V	NOTE (1)

NOTE (1) : LCM SHOULD BE GROUND DURING LCM HANDLING.

NOTE (2) : THE ABSOLUTE MAXIMUM RATING VALUES OF THIS PRODUCT ARE NOT ALLOWED TO BE EXCEEDED AT ANY TIMES. SHOULD A MODULE BE USED WITH ANY OF THE ABSOLUTE MAXIMUM RATINGS EXCEEDED, THE CHARACTERISTICS OF THE MODULE MAY NOT BE RECOVERED, OR IN AN EXTREME CASE, THE MODULE MAY BE PERMANENTLY DESTROYED.

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 (2)		NOTE (2)		WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s ² (0.25 G)	—	11.76 m/s ² (1.2 G)	5~20Hz, 1HR 20~500Hz(20Hz), 1HR 20~500Hz(500Hz), 1HR X,Y,Z,TOTAL 3HRS
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.

NOTE (4) : WHEN THE LCD MODULE IS OPERATED AT A HIGHER AMBIENT TEMPERATURE THAN 80°C, THE PWM DUTY CYCLE OF THE LED BACKLIGHT SHOULD BE ADJUSTED TO BE LESS THAN TBD. IF THE MODULE IS OPERATED AT A HIGHER DUTY CYCLE THAN TBD, THEN THERE IS A POSSIBILITY OF DISTORTION AND IRREGULARITY OF THE PICTURE DUE TO LIQUID CRYSTAL BEHAVIOR.

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C

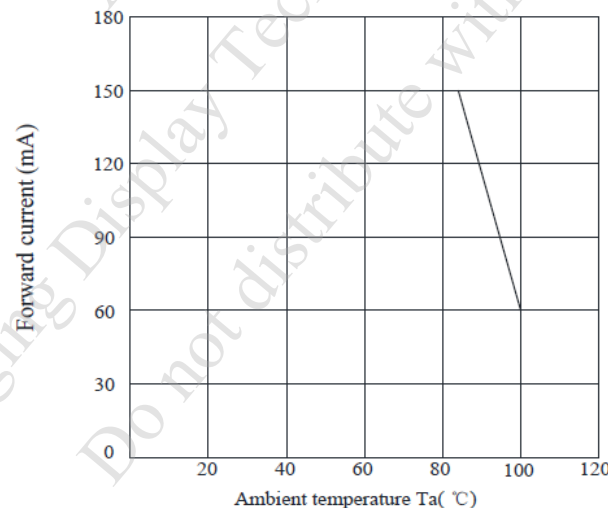
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	—	3.0	3.3	3.6	V	
POWER SUPPLY CURRENT	IDD	VDD-VSS =3.3V	—	25	40	mA	NOTE (1)
LOGIC HIGH INPUT VOLTAGE	V _{IH}	—	0.7*VDD	—	VDD	V	
LOGIC LOW INPUT VOLTAGE	V _{IL}	—	VSS	—	0.3*VDD	V	
LOGIC HIGH OUTPUT VOLTAGE	V _{OH}	I _{OH} = -1.0mA	VDD-0.4	—	VDD	V	
LOGIC LOW OUTPUT VOLTAGE	V _{OL}	I _{OL} = +1.0mA	VSS	—	VSS+0.4	V	
POWER SUPPLY VOLTAGE FOR LED DRIVER	VBL+-VSS	—	5	12	15	V	
POWER SUPPLY CURRENT FOR LED DRIVER	IBL	VBL+-VSS =12V LED B/L=ON	—	(120)	(160)	mA	
LED LIFE TIME	—	IF=50mA (PER LED)	50K	—	—	HRS	NOTE (4) NOTE (5)

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

NOTE (2) : INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT



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



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

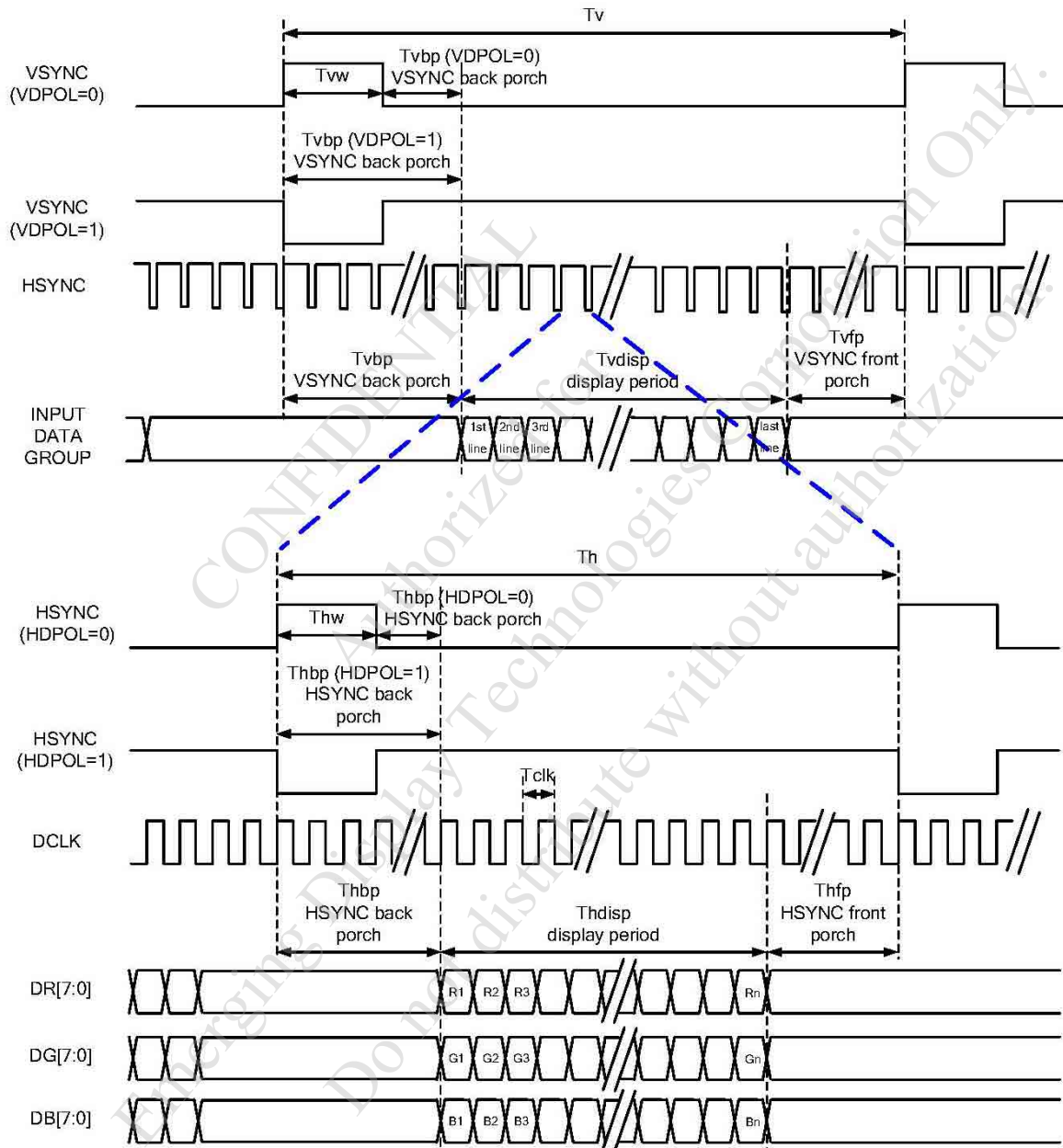
NOTE (5) : DEFINITIONS OF LIFE TIME :

LCM LUMINANCE BECOMES HALF OF THE INITIAL VALUE.

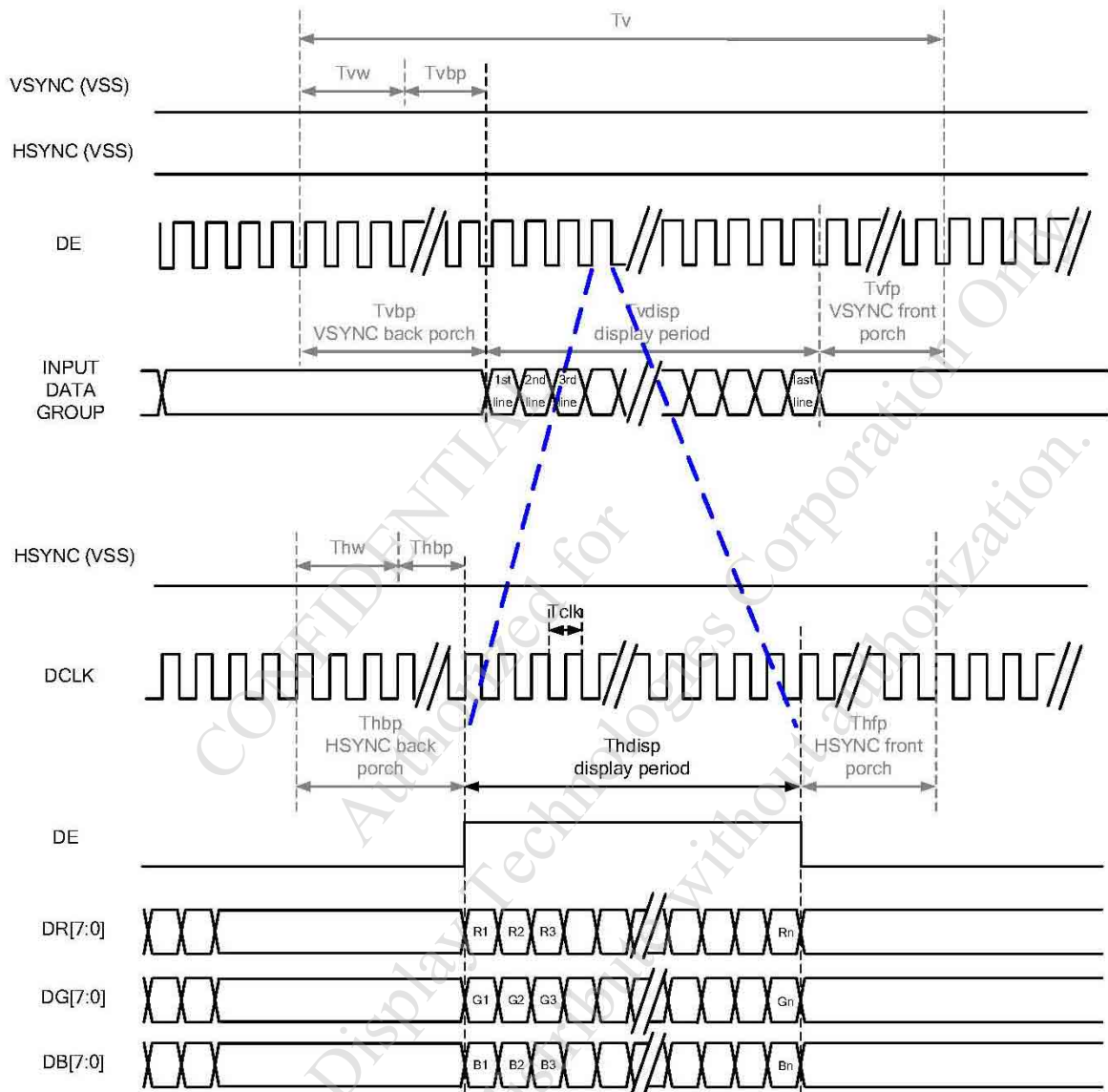
5. TIMING CHARACTERISTICS

5.1 LCD MODULE AC ELECTRICAL CHARACTERISTICS

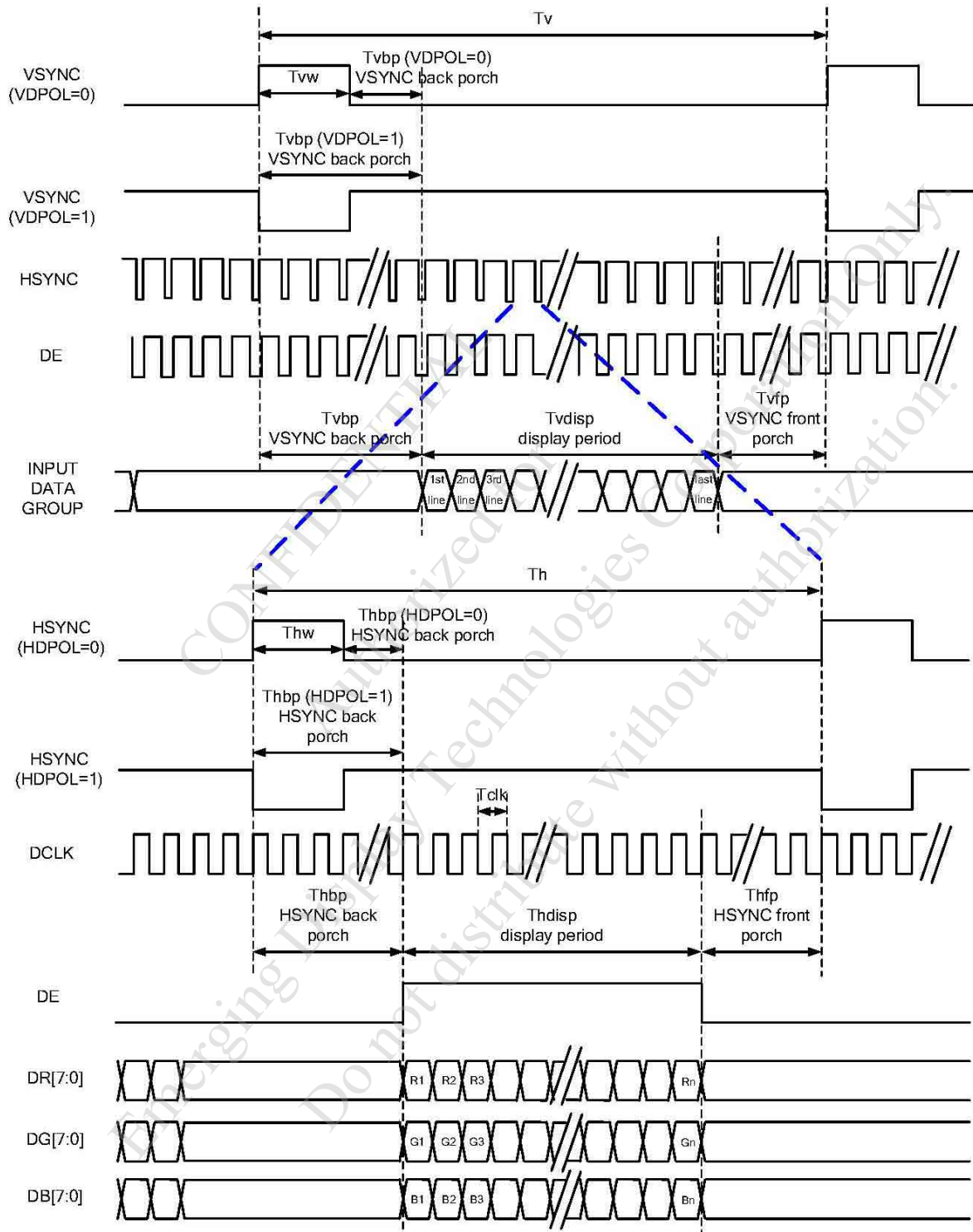
5.1.1 SYNC MODE



5.1.2 DE MODE



5.1.3 SYNC-DE MODE



5.1.4 PARALLEL 24 BIT RGB INPUT TIMING TABLE

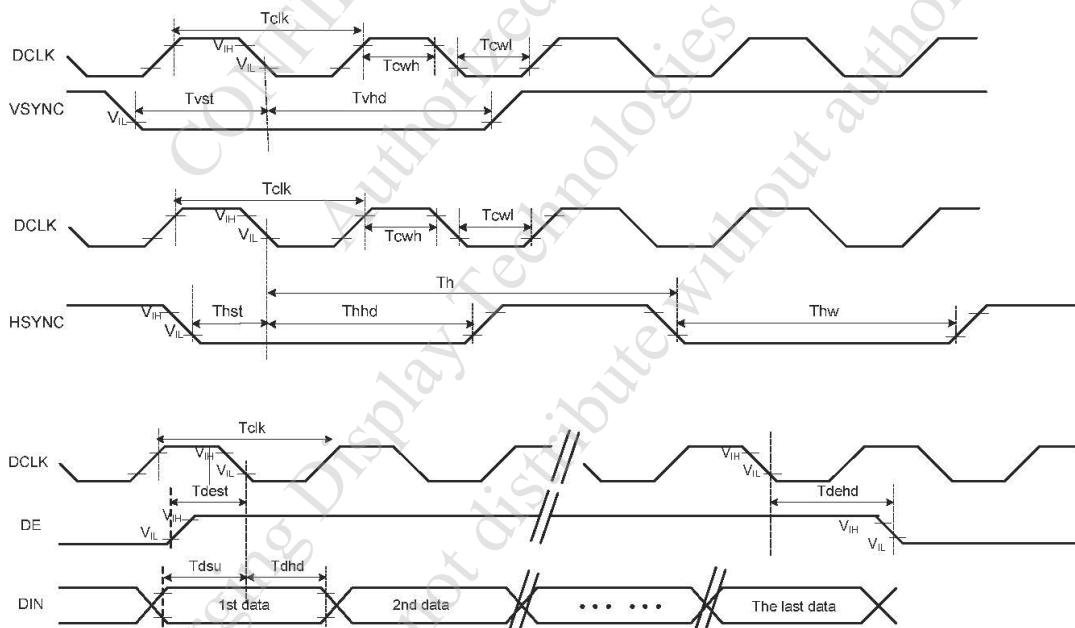
PARALLEL 24-BIT RGB INPUT TIMING

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
DCLK FREQUENCY	Fclk	8	9	12	MHz	
DCLK PERIOD	Tclk	83	111	125	ns	
HSYNC	PERIOD TIME	Th	485	531	598	DCLK
	DISPLAY PERIOD	Thdisp	—	480	—	DCLK
	BACK PORCH	Thbp	3	43	43	DCLK
	FRONT PORCH	Thfp	2	8	75	DCLK
	PULSE WIDTH	Thw	2	4	43	DCLK
VSYNC	PERIOD TIME	Tv	276	292	321	HSYNC
	DISPLAY PERIOD	Tvdisp	—	272	—	HSYNC
	BACK PORCH	Tvbp	2	12	12	HSYNC
	FRONT PORCH	Tvfp	2	8	37	HSYNC
	PULSE WIDTH	Tvw	2	4	12	HSYNC

NOTE: IT IS NECESSARY TO KEEP Tvbp =12 AND Thbp =43 IN SYNC MODE. DE MODE IS UNNECESSARY TO KEEP IT.

5.1.5 SYSTEM BUS TIMING FOR RGB INTERFACE



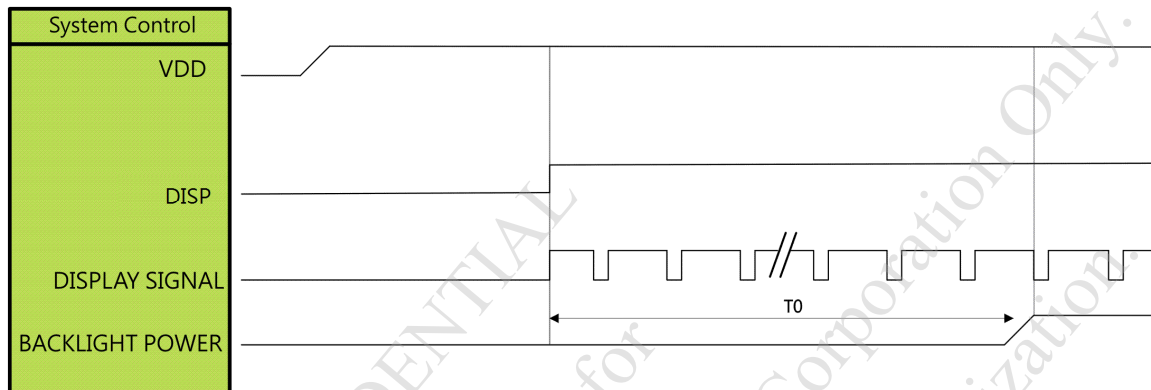
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
CLK PULSE DUTY	Tcw	40	50	60	%	
HSYNC WIDTH	Thw	2	—	—	DCLK	
HSYNC PERIOD	Th	55	60	65	us	
VSYNC SETUP TIME	Tvst	12	—	—	ns	
VSYNC HOLD TIME	Tvhd	12	—	—	ns	
HSYNC SETUP TIME	Thst	12	—	—	ns	
HSYNC HOLD TIME	Thhd	12	—	—	ns	
DATA SETUP TIME	Tdsu	12	—	—	ns	
DATA HOLD TIME	Tdhd	12	—	—	ns	
DE SETUP TIME	Tdest	12	—	—	ns	
DE HOLD TIME	Tdehd	12	—	—	ns	

5.2 LCD MODULE POWER ON-OFF TIMING SEQUENCE

5.2.1 POWER ON SEQUENCE

SYMBOL	DESCRIPTION	MIN. TIME	UNIT
T0	DISPLAY SIGNAL OUTPUT TO BACKLIGHT POWER ON	250	ms

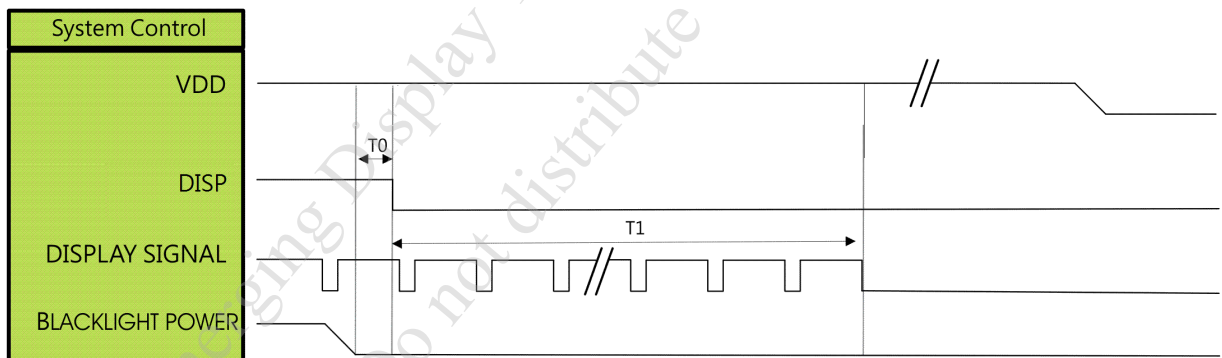
NOTE: RGB INTERFACE DISPLAY SIGNAL: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]



5.2.2 POWER OFF TIMING SEQUENCE

SYMBOL	DESCRIPTION	MIN. TIME	UNIT
T0	BACKLIGHT POWER OFF TO DISP="LOW"	5	ms
T1	DISP="LOW" TO IC INTERNAL VOLTAGE DISCHARGE COMPLETE	100	ms

NOTE: RGB INTERFACE DISPLAY SIGNAL: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]



6. OPTICAL CHARACTERISTICS (NOTE 1)

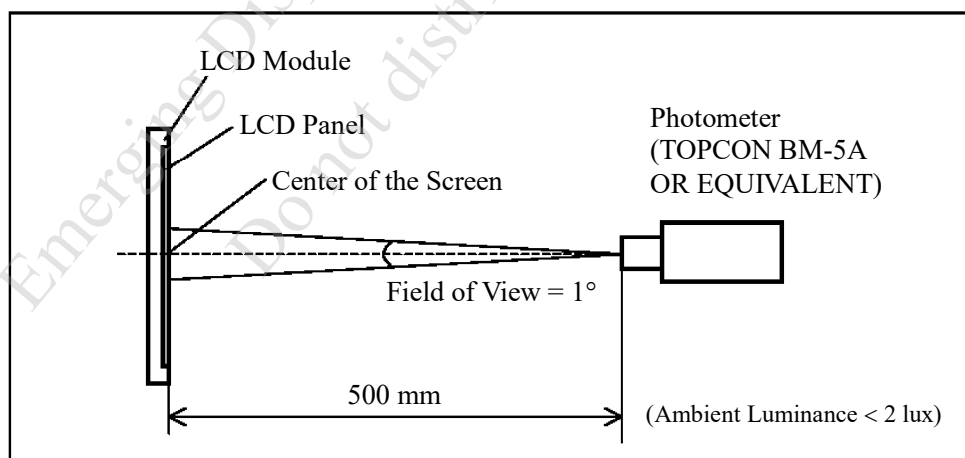
6.1 OPTICAL CHARACTERISTICS

Ta = 25°C

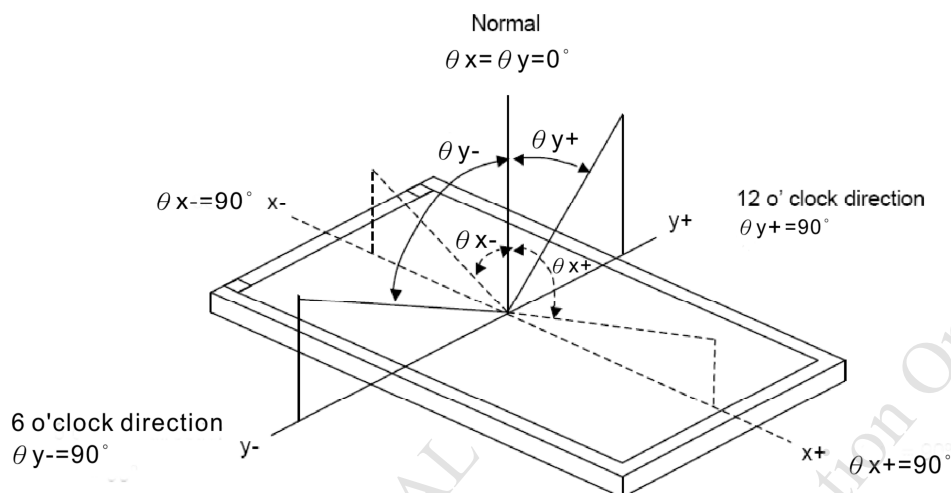
ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{y+}	CR ≥ 10	$\theta_x=0^\circ$	70	80	—	d e g .	NOTE (2) NOTE (3)
		θ_{y-}			70	80	—		
		θ_{x+}		$\theta_y=0^\circ$	70	80	—		
		θ_{x-}			70	80	—		
CONTRAST RATIO (CENTER)		CR	$\theta_x=0^\circ$, $\theta_y=0^\circ$		640	800	—	—	NOTE (3)
RESPONSE TIME		tr (rise)+ tf (fall)	$\theta_x=0^\circ$, $\theta_y=0^\circ$		—	30	40	msec	NOTE (4)
COLOR CHROMATICITY (CENTER)	WHITE	W _x	$\theta_x=0^\circ$, $\theta_y=0^\circ$ VDD-VSS=3.3V VBL+-VSS=12V (NTSC : 45%)		(0.27)	(0.32)	(0.37)	—	NOTE (5)
		W _y			(0.30)	(0.35)	(0.40)		
	RED	R _x			(0.55)	(0.60)	(0.65)	—	
		R _y			(0.31)	(0.36)	(0.41)		
	GREEN	G _x			(0.32)	(0.37)	(0.42)	—	
		G _y			(0.52)	(0.57)	(0.62)		
	BLUE	B _x			(0.10)	(0.15)	(0.20)	—	
		B _y			(0.04)	(0.09)	(0.14)		
THE BRIGHTNESS OF MODULE (CENTER)		B	$\theta_x=0^\circ$, $\theta_y=0^\circ$ VDD-VSS=3.3V VBL+-VSS=12V		(800)	(1000)	—	cd/m ²	NOTE (6)
THE BRIGHTNESS OF UNIFORMITY		—			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 :



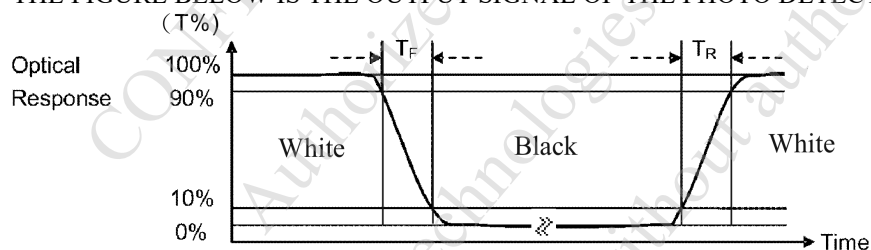
NOTE (3) : DEFINITION OF CONTRAST RATIO (CR) :

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.



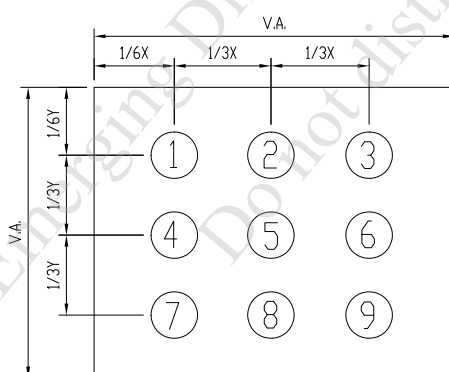
NOTE (5) : DEFINITION OF COLOR CHROMATICITY

(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

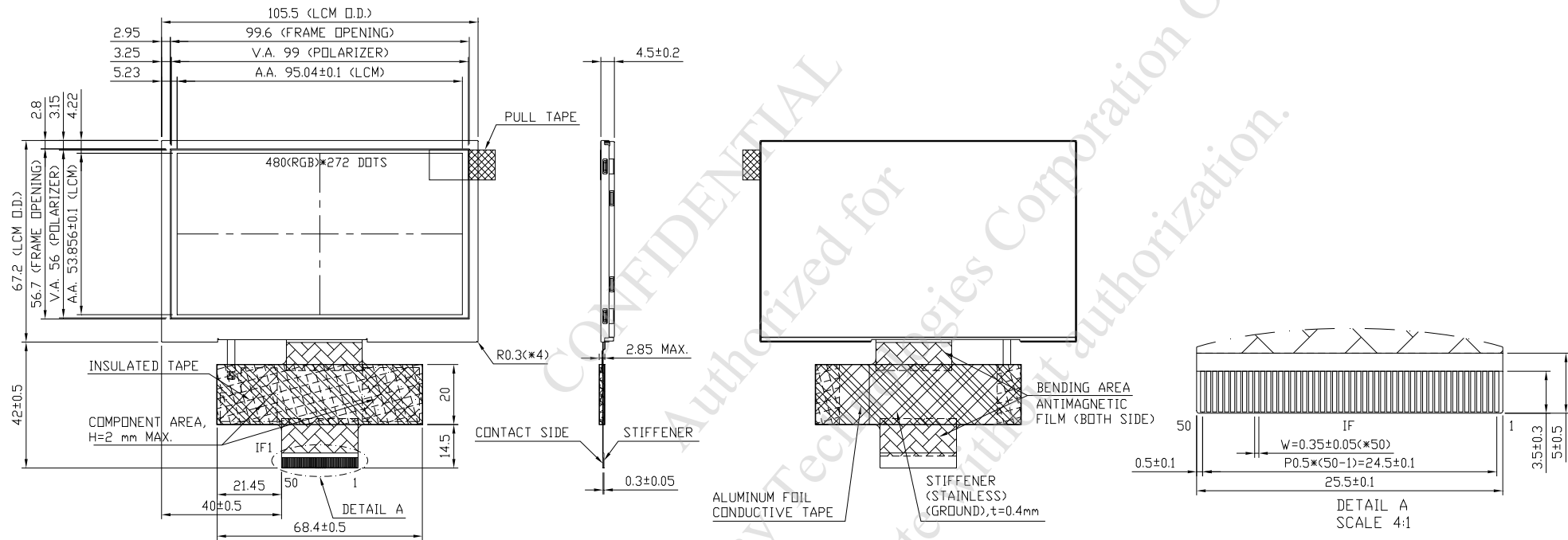


UNIT : mm

(b) THE BRIGHTNESS UNIFORMITY CALCULATING METHOD

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

7. OUTLINE DIMENSIONS



UNIT : mm

SCALE : NTS

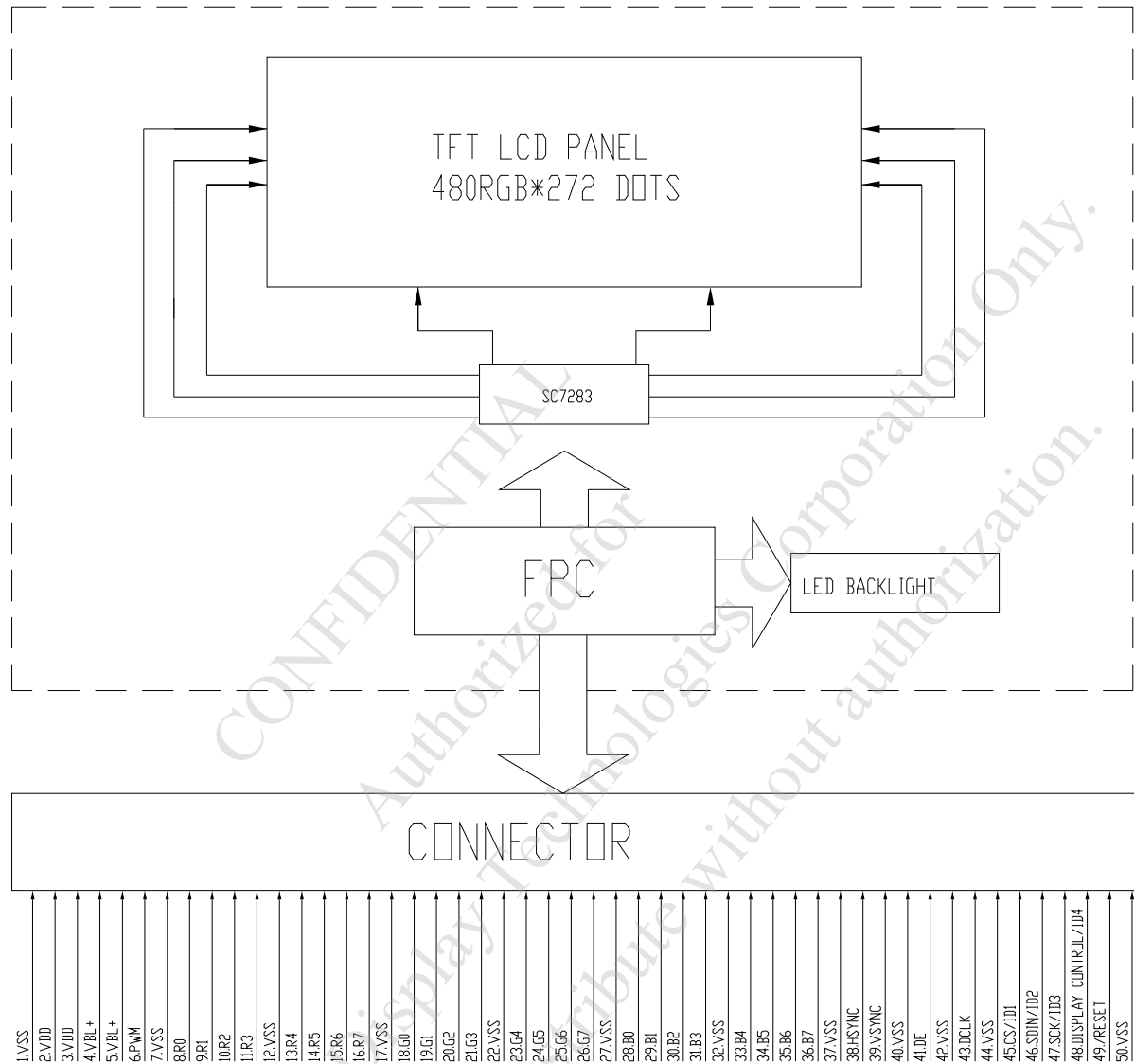
THIRD ANGLE PROJECTION

NOT SPECIFIED TOLERANCE IS ±0.3mm

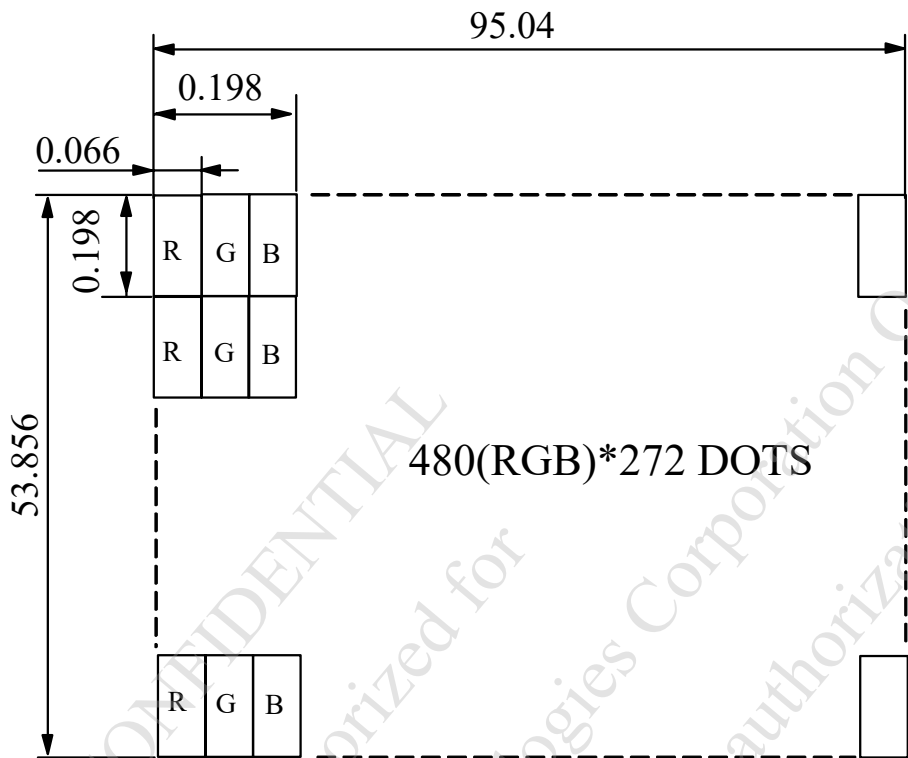
NOTE:

1. RECOMMEND MATCH CONNECTOR KYOCERA : 04 6240 050 SERIES

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	FUNCTION
1	VSS	GROUND
2	VDD	POWER FOR DIGITAL CIRCUIT.
3	VDD	POWER FOR DIGITAL CIRCUIT.
4	VBL+	POWER SUPPLY FOR LED DRIVER CIRCUIT
5	VBL+	POWER SUPPLY FOR LED DRIVER CIRCUIT
6	PWM	DIMMING CONTROL INPUT FOR BACKLIGHT. DO NOT ALLOW THIS PIN TO FLOAT.
7	VSS	GROUND
8	R0	RED DATA.
9	R1	RED DATA.
10	R2	RED DATA.
11	R3	RED DATA.
12	VSS	GROUND
13	R4	RED DATA.
14	R5	RED DATA.
15	R6	RED DATA.
16	R7	RED DATA.
17	VSS	GROUND
18	G0	GREEN DATA.
19	G1	GREEN DATA.
20	G2	GREEN DATA.
21	G3	GREEN DATA.
22	VSS	GROUND
23	G4	GREEN DATA.
24	G5	GREEN DATA.
25	G6	GREEN DATA.
26	G7	GREEN DATA.
27	VSS	GROUND
28	B0	BLUE DATA.
29	B1	BLUE DATA.
30	B2	BLUE DATA.
31	B3	BLUE DATA.
32	VSS	GROUND
33	B4	BLUE DATA.
34	B5	BLUE DATA.
35	B6	BLUE DATA.
36	B7	BLUE DATA.
37	VSS	GROUND
38	HSYNC	HORIZONTAL SYNC SIGNAL
39	VSNC	VERTICAL SYNC SIGNAL
40	VSS	GROUND
41	DE	INPUT DATA ENABLE CONTROL, WHEN DE MODE, ACTIVE HIGH TO ENABLE DATA INPUT, NORMALLY PULL LOW
42	VSS	GROUND
43	DCLK	DOT DATA CLOCK

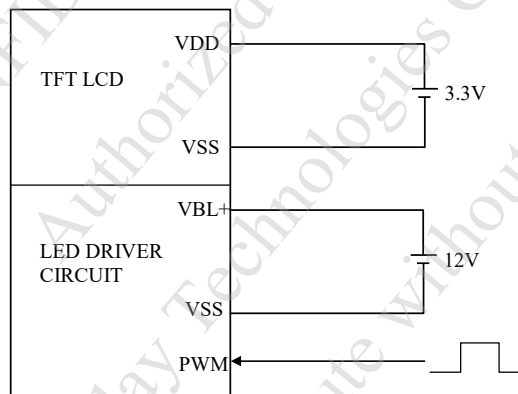
PIN NO.	SYMBOL	FUNCTION
44	VSS	GROUND
45	CS/ID1	CS FOR LCM-DRIVER SPI-PORT/ID1(SIZE INFO, NOT USED)
46	SDIN/ID2	SDIN FOR LCM-DRIVER SPI-PORT/ID2(SIZE INFO, PULL HIGH TO VDD, INTERNAL: 10KΩ)
47	SCK/ID3	SCK FOR LCM-DRIVER SPI-PORT/ID3(SIZE INFO, PULL LOW TO VSS, INTERNAL: 10KΩ)
48	DISPLAY CONTROL/ID4	DISPLAY/ID4(SIZE INFO, NOT USED)
49	/RESET	GLOBAL RESET(LOW ACTIVE).
50	VSS	GROUND

RGB MODE SELECTION TABLE	DCLK	HSYNC	VSNC	DE
SYNC-DE MODE	INPUT	INPUT	INPUT	INPUT
SYNC MODE	INPUT	INPUT	INPUT	VSS
DE MODE	INPUT	VSS	VSS	INPUT

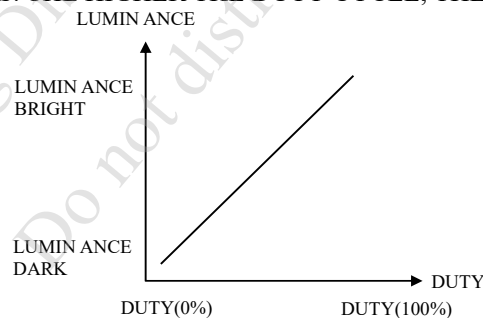
NOTE: "INPUT" MEANS THESE SIGNALS ARE DRIVEN BY HOST SIDE.

11. POWER SUPPLY

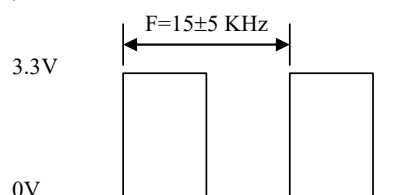
11.1 POWER SUPPLY FOR LCM



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=0~3.3V , OPERATION FREQUENCY : 15±5KHz



f_{PWM} (Hz)	DMIN	DMAX
$10.0k < f \leq 15.0k$	1.50%	100%
$15.0k < f \leq 20.0k$	2.00%	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 : $45 \pm 5\text{cm}$

(2)VIEWING ANGLE : $\pm 45^\circ$

$\pm 45^\circ$ (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°

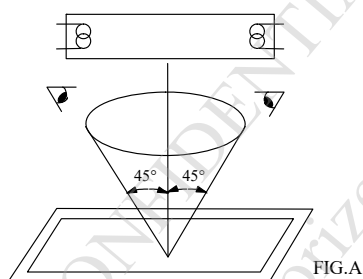


FIG.A

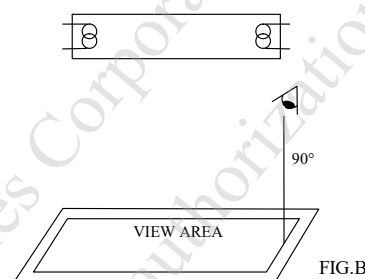


FIG.B

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		$25 \pm 5^\circ\text{C}$
AMBIENT HUMIDITY		$65 \pm 20\% \text{RH}$
AMBIENT ILLUMINATION	COSMETIC INSPECTION	600~800 lux
	FUNCTIONAL INSPECTION	300~500 lux
INSPECTION TIME		10 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

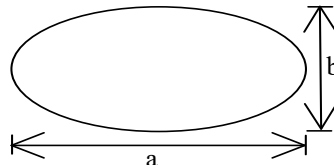
MINOR DEFECT : AQL 1.0

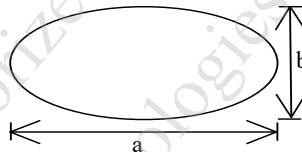
12.3 INSPECTION STANDARDS

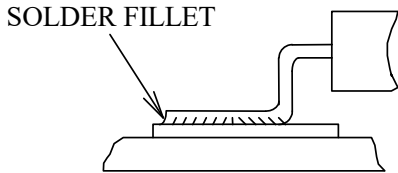
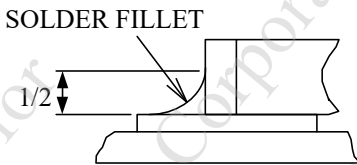
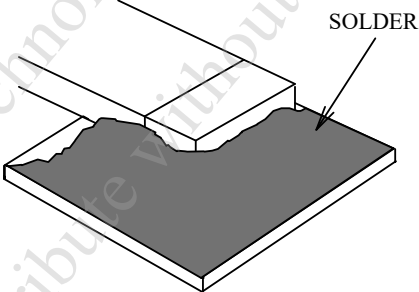
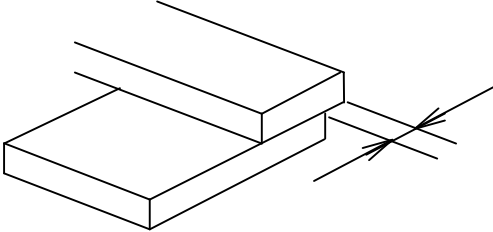
12.3.1 VISUAL DEFECTS CLASSIFICATION

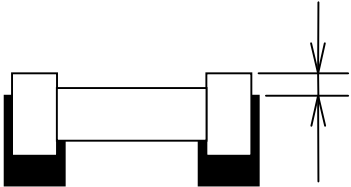
TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS - EX: DISCONNECTION, SHORT CIRCUIT ETC	0.65
	2.BACKLIGHT	• NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION	
	3.DIMENSIONS	• SUBJECT TO INDIVIDUAL ACCEPTANCE 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	

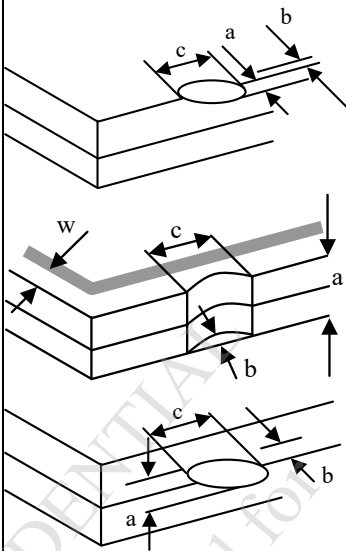
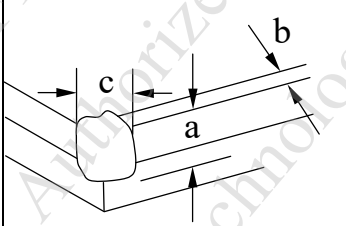
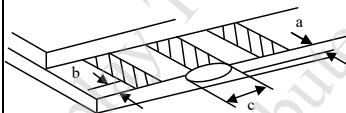
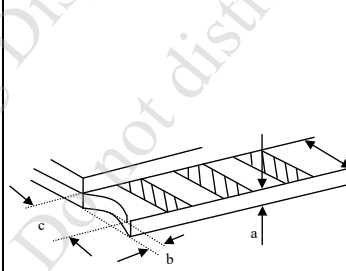
12.3.2 MODULE DEFECTS CLASSIFICATION

NO.	ITEM	CRITERIA												
1	DISPLAY ON INSPECTION	1. INCORRECT PATTERN 2. MISSING SEGMENT 3. DIM SEGMENT 4. OPERATING VOLTAGE BEYOND SPEC												
2	OVERALL DIMENSIONS	1. OVERALL DIMENSION BEYOND SPEC												
3	DOT DEFECT	1. INSPECTION PATTERN: FULL WHITE, FULL BLACK, RED, GREEN AND BLUE SCREENS. 2.<table><tr><th>ITEMS</th><th>ACCEPTABLE COUNT</th></tr><tr><td>BRIGHT DOT</td><td>$N \leq 2$</td></tr><tr><td>DARK DOT</td><td>$N \leq 3$</td></tr><tr><td>TOTAL BRIGHT AND DARK DOTS</td><td>$N \leq 4$</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 MUST 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.	ITEMS	ACCEPTABLE COUNT	BRIGHT DOT	$N \leq 2$	DARK DOT	$N \leq 3$	TOTAL BRIGHT AND DARK DOTS	$N \leq 4$				
ITEMS	ACCEPTABLE COUNT													
BRIGHT DOT	$N \leq 2$													
DARK DOT	$N \leq 3$													
TOTAL BRIGHT AND DARK DOTS	$N \leq 4$													
4	FOREIGN BLACK/WHITE/ BRIGHT LINE	<table><tr><th>LENGTH : L</th><th>WIDTH : W</th><th>PERMISSIBLE NO.</th></tr><tr><td>$L \leq 0.3$</td><td>$W \leq 0.05$</td><td>IGNORE</td></tr><tr><td>$0.3 < L \leq 3.0$</td><td>$0.05 < W \leq 0.1$</td><td>4</td></tr><tr><td>$3.0 < L$</td><td>$0.1 < W$</td><td>NONE</td></tr></table> WIDTH : W mm, LENGTH : L mm	LENGTH : L	WIDTH : W	PERMISSIBLE NO.	$L \leq 0.3$	$W \leq 0.05$	IGNORE	$0.3 < L \leq 3.0$	$0.05 < W \leq 0.1$	4	$3.0 < L$	$0.1 < W$	NONE
LENGTH : L	WIDTH : W	PERMISSIBLE NO.												
$L \leq 0.3$	$W \leq 0.05$	IGNORE												
$0.3 < L \leq 3.0$	$0.05 < W \leq 0.1$	4												
$3.0 < L$	$0.1 < W$	NONE												
5	POLARIZER SCRATCHES	<table><tr><th>LENGTH : L</th><th>WIDTH : W</th><th>PERMISSIBLE NO.</th></tr><tr><td>$L \leq 0.3$</td><td>$W \leq 0.05$</td><td>IGNORE</td></tr><tr><td>$0.3 < L \leq 3.0$</td><td>$0.05 < W \leq 0.1$</td><td>4</td></tr><tr><td>$3.0 < L$</td><td>$0.1 < W$</td><td>NONE</td></tr></table> WIDTH : W mm, LENGTH : L mm	LENGTH : L	WIDTH : W	PERMISSIBLE NO.	$L \leq 0.3$	$W \leq 0.05$	IGNORE	$0.3 < L \leq 3.0$	$0.05 < W \leq 0.1$	4	$3.0 < L$	$0.1 < W$	NONE
LENGTH : L	WIDTH : W	PERMISSIBLE NO.												
$L \leq 0.3$	$W \leq 0.05$	IGNORE												
$0.3 < L \leq 3.0$	$0.05 < W \leq 0.1$	4												
$3.0 < L$	$0.1 < W$	NONE												
6	FOREIGN MATTER \ BLACK SPOTS \ WHITE SPOTS \ DENT (INCLUDING LIGHT LEAKAGE DUE TO POLARIZING PLATES PINHOLES, ETC.)	<table><tr><th>AVERAGE DIAMETER (mm): D</th><th>NUMBER OF PIECES PERMITTED</th></tr><tr><td>$D \leq 0.15$</td><td>IGNORE</td></tr><tr><td>$0.15 < D \leq 0.5$</td><td>4</td></tr><tr><td>$0.5 < D$</td><td>NONE</td></tr></table> NOTE : DIAMETER $D=(a+b)/2$ 	AVERAGE DIAMETER (mm): D	NUMBER OF PIECES PERMITTED	$D \leq 0.15$	IGNORE	$0.15 < D \leq 0.5$	4	$0.5 < D$	NONE				
AVERAGE DIAMETER (mm): D	NUMBER OF PIECES PERMITTED													
$D \leq 0.15$	IGNORE													
$0.15 < D \leq 0.5$	4													
$0.5 < D$	NONE													

NO.	ITEM	CRITERIA																								
7	BUBBLES OF POLARIZER /DIRT/CF FAIL /SURFACE STAINS	<table><tr><td></td><td>AVERAGE DIAMETER (mm) : D</td><td>NUMBER OF PIECES PERMITTED</td></tr><tr><td rowspan="3">BUBBLE ON THE POLARIZER</td><td>$D \leq 0.25$</td><td>IGNORE</td></tr><tr><td>$0.25 < D \leq 0.5$</td><td>$N \leq 5$</td></tr><tr><td>$0.5 < D$</td><td>NONE</td></tr><tr><td rowspan="3">SURFACE STAINS / DIRT / DENT</td><td>$D < 0.25$</td><td>IGNORE</td></tr><tr><td>$0.25 < D \leq 0.4$</td><td>$N \leq 3$</td></tr><tr><td>$D > 0.4$</td><td>NONE</td></tr><tr><td rowspan="3">CF FAIL / SPOT</td><td>$D < 0.1$</td><td>IGNORE</td></tr><tr><td>$0.1 < D \leq 0.3$</td><td>$N \leq 3$</td></tr><tr><td>$D > 0.3$</td><td>NONE</td></tr></table>		AVERAGE DIAMETER (mm) : D	NUMBER OF PIECES PERMITTED	BUBBLE ON THE POLARIZER	$D \leq 0.25$	IGNORE	$0.25 < D \leq 0.5$	$N \leq 5$	$0.5 < D$	NONE	SURFACE STAINS / DIRT / DENT	$D < 0.25$	IGNORE	$0.25 < D \leq 0.4$	$N \leq 3$	$D > 0.4$	NONE	CF FAIL / SPOT	$D < 0.1$	IGNORE	$0.1 < D \leq 0.3$	$N \leq 3$	$D > 0.3$	NONE
			AVERAGE DIAMETER (mm) : D	NUMBER OF PIECES PERMITTED																						
		BUBBLE ON THE POLARIZER	$D \leq 0.25$	IGNORE																						
			$0.25 < D \leq 0.5$	$N \leq 5$																						
			$0.5 < D$	NONE																						
		SURFACE STAINS / DIRT / DENT	$D < 0.25$	IGNORE																						
			$0.25 < D \leq 0.4$	$N \leq 3$																						
			$D > 0.4$	NONE																						
		CF FAIL / SPOT	$D < 0.1$	IGNORE																						
			$0.1 < D \leq 0.3$	$N \leq 3$																						
			$D > 0.3$	NONE																						
		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 EXTRANEIOUS 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																								
																										
8	LINE DEFECT ON DISPLAY	OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED																								
9	MURA ON DISPLAY	IT'S OK IF MURA IS SLIGHT VISIBLE THROUGH 6% ND FILTER																								
10	UNEVEN COLOR SPREAD, COLORATION	1. TO BE DETERMINED BASED UPON THE STANDARD SAMPLE.																								
11	BEZEL APPEARANCE	1. BEZEL MAY NOT HAVE RUST, BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION. 2. BEZEL MUST COMPLY WITH JOB SPECIFICATIONS.																								
12	PCB	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.																								

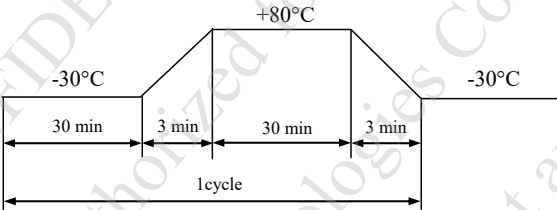
NO.	ITEM	CRITERIA
13	SOLDERING	1. NO SOLDERING FOUND ON THE SPECIFIED PLACE 2. INSUFFICIENT SOLDER (a)LSI, IC A POOR WETTING OF SOLDER IS BETWEEN LOWER BEND OR "HEEL" OF LEAD AND PAD  (b)CHIP COMPONENT · SOLDER IS LESS THAN 50% OF SIDES AND FRONT FACE WETTING  · SOLDER WETS 3 SIDES OF TERMINAL, BUT LESS 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.

NO.	ITEM	CRITERIA									
16	CRACKED GLASS	THE LCD WITH EXTENSIVE CRACK IS NOT ACCEPTABLE									
		GENERAL GLASS CHIP :  <table><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>$\leq t/2$</td><td>< VIEWING AREA</td><td>$\leq 1/8X$</td></tr><tr><td>$t/2 > , \leq 2t$</td><td>$\leq W/2$</td><td>$\leq 1/8X$</td></tr></table> *W=DISTANCE BETWEEN SEALANT AREA AND LCD PANEL EDGE X = LCD SIDE LENGTH t = GLASS THICKNESS	a	b	c	$\leq t/2$	< VIEWING AREA	$\leq 1/8X$	$t/2 > , \leq 2t$	$\leq W/2$	$\leq 1/8X$
		a	b	c							
		$\leq t/2$	< VIEWING AREA	$\leq 1/8X$							
$t/2 > , \leq 2t$	$\leq W/2$	$\leq 1/8X$									
CORNER PART :  <table><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>$\leq t/2$</td><td>< VIEWING AREA</td><td>$\leq 1/8X$</td></tr><tr><td>$> t/2 , \leq 2t$</td><td>$\leq W/2$</td><td>$\leq 1/8X$</td></tr></table> *W=DISTANCE BETWEEN SEALANT AREA AND LCD PANEL EDGE X = LCD SIDE LENGTH t = GLASS THICKNESS	a	b	c	$\leq t/2$	< VIEWING AREA	$\leq 1/8X$	$> t/2 , \leq 2t$	$\leq W/2$	$\leq 1/8X$		
a	b	c									
$\leq t/2$	< VIEWING AREA	$\leq 1/8X$									
$> t/2 , \leq 2t$	$\leq W/2$	$\leq 1/8X$									
CHIP ON ELECTRODE PAD  <table><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>$\leq t$</td><td>$\leq 0.5\text{mm}$</td><td>$\leq 1/8X$</td></tr></table> * X=LCD SIDE WIDTH t=GLASS THICKNESS	a	b	c	$\leq t$	$\leq 0.5\text{mm}$	$\leq 1/8X$					
a	b	c									
$\leq t$	$\leq 0.5\text{mm}$	$\leq 1/8X$									
 <table><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>$\leq t$</td><td>$\leq 1/8X$</td><td>$\leq L$</td></tr></table> *X=LCD SIDE WIDTH t = GLASS THICKNESS L=ELECTRODE PAD LENGTH ①IF GLASS CHIPPING THE ITO TERMINAL, OVER 2/3 OF THE ITO MUST REMAIN AND BE, INSPECTED ACCORDING TO ELECTRODE TERMINAL SPECIFICATIONS ②IF THE PRODUCT WILL BE HEAT SEALED BY THE CUSTOMER, THE ALIGNMENT MARK MUST NOT BE DAMAGED	a	b	c	$\leq t$	$\leq 1/8X$	$\leq L$					
a	b	c									
$\leq t$	$\leq 1/8X$	$\leq L$									

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 $\pm 12KV$ CONTACT DISCHARGE $\pm 8KV$ (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 80°C, THE PWM DUTY CYCLE OF THE LED BACKLIGHT SHOULD BE ADJUSTED TO BE LESS THAN TBD. IF THE MODULE IS OPERATED AT A HIGHER DUTY CYCLE THAN TBD, THEN THERE IS A POSSIBILITY OF DISTORTION AND IRREGULARITY OF THE PICTURE DUE TO LIQUID CRYSTAL BEHAVIOR.

13.2 TESTING CONDITIONS AND INSPECTION CRITERIA

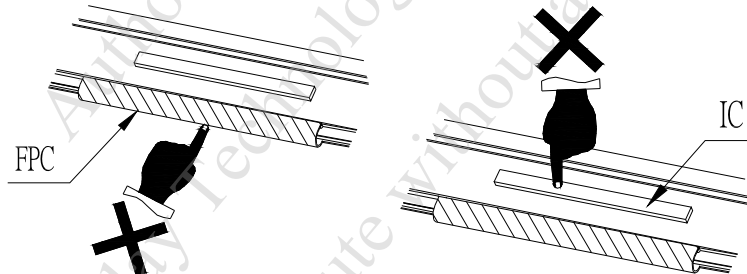
FOR THE FINAL TEST THE TESTING SAMPLE MUST BE STORED AT ROOM TEMPERATURE FOR 24 HOURS, AFTER THE TESTS LISTED IN TABLE 13.1, STANDARD SPECIFICATIONS FOR RELIABILITY HAVE BEEN EXECUTED IN ORDER TO ENSURE STABILITY.

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 HANDLING

- 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.