

EXAMINED BY :	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-0009520
Sam Chou		ISSUE : JAN.29, 2024
APPROVED BY:		TOTAL PAGE : 29
<i>Elvis Wu</i>		VERSION : 5

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

ETML101025LDYA

(RoHS)

FOR MESSRS :

CUSTOMER'S APPROVAL

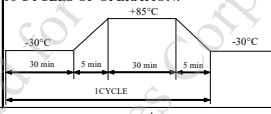
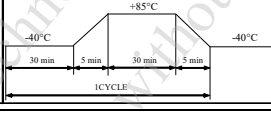
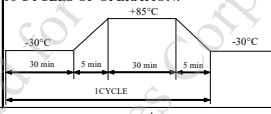
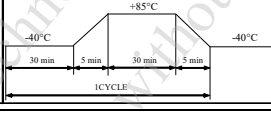
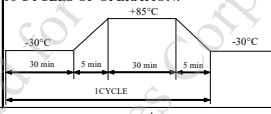
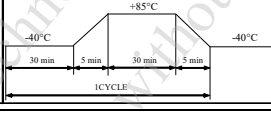
DATE :

BY :

DOC . FIRST ISSUE

RECORDS OF REVISION

MAR.30, 2023

DATE	REVISED PAGE NO.	SUMMARY																								
MAY.10, 2023	1	1.2 DATA SHEET FOR CAPACITIVE TOUCH PANEL CONTROLLER/DRIVER PLEASE REFER TO: TOUCHNETIS AX80A→TOUCHNETIX AX80A																								
	3	3.3 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS AMBIENT TEMPERATURE: STORAGE: MIN.= -30°C → - 40°C																								
	13	8. BLOCK DIAGRAM PIN.15: NC→RESET ; PIN.16: NC→STBYB																								
	15	10.1 TFT LCM (CN1) <table border="1"> <tr> <th>PIN NO.</th> <th>SYMBOL</th> <th>FUNCTION</th> </tr> <tr> <td>15</td> <td>NC</td> <td>NON CONNECTION</td> </tr> <tr> <td>16</td> <td>NC</td> <td>NON CONNECTION</td> </tr> </table> <table border="1"> <tr> <th>PIN NO.</th> <th>SYMBOL</th> <th>FUNCTION</th> </tr> <tr> <td>15</td> <td>RESET</td> <td>RESET PIN</td> </tr> <tr> <td>16</td> <td>STBYB</td> <td>STANDBY MODE</td> </tr> </table>	PIN NO.	SYMBOL	FUNCTION	15	NC	NON CONNECTION	16	NC	NON CONNECTION	PIN NO.	SYMBOL	FUNCTION	15	RESET	RESET PIN	16	STBYB	STANDBY MODE						
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SEP.22, 2023	26	14.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE <table border="1"> <tr> <th>NO.</th> <th>ITEM</th> <th>DESCRIPTION</th> </tr> <tr> <td>4</td> <td>LOW TEMPERATURE TEST (STORAGE)</td> <td>THE SAMPLE SHOULD BE ALLOWED TO STAND AT -30°C FOR 240 HRS</td> </tr> <tr> <td>6</td> <td>THERMAL SHOCK (NOT OPERATED)</td> <td>THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION:  </td> </tr> </table> <table border="1"> <tr> <th>NO.</th> <th>ITEM</th> <th>DESCRIPTION</th> </tr> <tr> <td>4</td> <td>LOW TEMPERATURE TEST (STORAGE)</td> <td>THE SAMPLE SHOULD BE ALLOWED TO STAND AT -40°C FOR 240 HRS</td> </tr> <tr> <td>6</td> <td>THERMAL SHOCK (NOT OPERATED)</td> <td>THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION:  </td> </tr> </table>	NO.	ITEM	DESCRIPTION	4	LOW TEMPERATURE TEST (STORAGE)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -30°C FOR 240 HRS	6	THERMAL SHOCK (NOT OPERATED)	THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION: 	NO.	ITEM	DESCRIPTION	4	LOW TEMPERATURE TEST (STORAGE)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -40°C FOR 240 HRS	6	THERMAL SHOCK (NOT OPERATED)	THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION: 						
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1	1.1 DATA SHEETS FOR LCD PANEL CONTROLLER/DRIVER PLEASE REFER TO : SITRONIX ST5821DG SITRONIX ST5084DC ↓ FITIPOWER EK79202B																									
2	2.1 TFT LCD MODULE MECHANICAL SPECIFICATIONS (3)MODULE SIZE : 234.2W * 158.2H *13.8D (MAX.) mm→ 234.2W * 158.2H *14.0D (MAX.) mm (4)VIEWING AREA : 218.96W * 137.6H mm→ 217.96W * 136.6H mm																									
3	2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS (3)VIEWING AREA : 218.96W * 137.6H mm→217.96W * 136.6H mm																									
	3	3.1 LCD MODULE ELECTRICAL ABSOLUTE MAXIMUM RATINGS <table border="1"> <tr> <th>ITEM</th> <th>SYMBOL</th> <th>MIN.</th> <th>MAX.</th> <th>UNIT</th> <th>REMARK</th> </tr> <tr> <td>POWER SUPPLY VOLTAGE</td> <td>VDD-VSS</td> <td>-0.3</td> <td>5.0</td> <td>V</td> <td></td> </tr> </table> <table border="1"> <tr> <th>ITEM</th> <th>SYMBOL</th> <th>MIN.</th> <th>MAX.</th> <th>UNIT</th> <th>REMARK</th> </tr> <tr> <td>POWER SUPPLY VOLTAGE</td> <td>VDD-VSS</td> <td>-0.5</td> <td>4.0</td> <td>V</td> <td></td> </tr> </table>	ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK	POWER SUPPLY VOLTAGE	VDD-VSS	-0.3	5.0	V		ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK	POWER SUPPLY VOLTAGE	VDD-VSS	-0.5	4.0	V	
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		3.3 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS NOTE(3) : 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.)→ WET BULB TEMPERATURE SHOULD BE LOWER THAN 57.8°C, AND NO CONDENSATION OF WATER. ≥ BESIDES, PROTECT THE MODULE FROM STATIC ELECTRICITY.																								

RECORDS OF REVISION

SEP.22, 2023

DATE	REVISED PAGE NO.	SUMMARY
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SEP.22, 2023	16	10.1 TFT LCM (CN1)
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PIN_NO.	SYMBOL	FUNCTION	PIN_NO.	SYMBOL	FUNCTION
1	R20	NEGATIVE TRANSMISSION DATA OF PIXEL0	1	NC	NON CONNECTION
2	R20	POSITIVE TRANSMISSION DATA OF PIXEL0	2	R21	NEGATIVE TRANSMISSION DATA OF PIXEL3
3	R21	NEGATIVE TRANSMISSION DATA OF PIXEL1	3	R21	POSITIVE TRANSMISSION DATA OF PIXEL3
4	R21	POSITIVE TRANSMISSION DATA OF PIXEL1	4	VSS	GROUND
5	R22	NEGATIVE TRANSMISSION DATA OF PIXEL2	5	R22	NEGATIVE OF CLOCK
6	R22	POSITIVE TRANSMISSION DATA OF PIXEL2	6	R22	POSITIVE OF CLOCK
7	VSS	GROUND	7	VSS	GROUND
8	R23	NEGATIVE OF CLOCK	8	R23	NEGATIVE TRANSMISSION DATA OF PIXEL2
9	R23	POSITIVE OF CLOCK	9	R23	POSITIVE TRANSMISSION DATA OF PIXEL2
10	R24	NEGATIVE TRANSMISSION DATA OF PIXEL3	10	VSS	GROUND
11	R24	POSITIVE TRANSMISSION DATA OF PIXEL3	11	R24	NEGATIVE TRANSMISSION DATA OF PIXEL1
12	NC	NON CONNECTION	12	R24	POSITIVE TRANSMISSION DATA OF PIXEL1
13	NC	NON CONNECTION	13	VSS	GROUND
14	VSS	GROUND	14	R20	NEGATIVE TRANSMISSION DATA OF PIXEL0
15	RESET	RESET PIN	15	R20	POSITIVE TRANSMISSION DATA OF PIXEL0
16	STBYB	STANDBY MODE	16	VSS	GROUND
17	VSS	GROUND	17	NC	NON CONNECTION
18	NC	NON CONNECTION	18	NC	NON CONNECTION
19	NC	NON CONNECTION	19	VSS	GROUND
20	NC	NON CONNECTION	20	NC	NON CONNECTION
21	NC	NON CONNECTION	21	NC	NON CONNECTION
22	NC	NON CONNECTION	22	VSS	GROUND
23	NC	NON CONNECTION	23	VSS	GROUND
24	VSS	GROUND	24	NC	NON CONNECTION
25	NC	NON CONNECTION	25	NC	NON CONNECTION
26	NC	NON CONNECTION	26	NC	NON CONNECTION
27	NC	NON CONNECTION	27	VDD	POWER SUPPLY VOLTAGE
28	VDD	POWER SUPPLY VOLTAGE	28	VDD	POWER SUPPLY VOLTAGE
29	VDD	POWER SUPPLY VOLTAGE	29	VDD	POWER SUPPLY VOLTAGE
30	VDD	POWER SUPPLY VOLTAGE	30	NC	NON CONNECTION

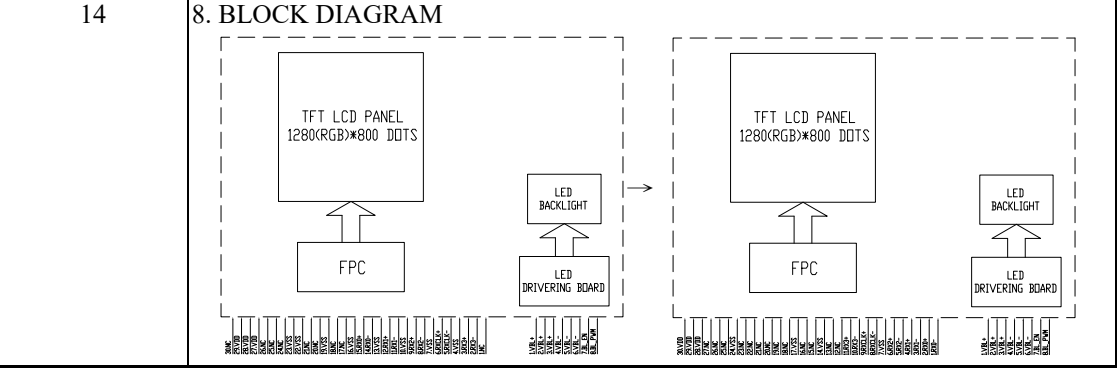
21	13.2.4 INSPECTION METHOD
	MINOR DEFECT : AQL 1.0→AQL 1.5

22	13.3 DEFECTS CLASSIFICATION
	MINOR DEFECT : AQL 1.0→AQL 1.5

23, 24	13.3 DEFECTS CLASSIFICATION
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OCT.23, 2023	1	2. MECHANICAL SPECIFICATIONS
		(8)LCD TYPE:TFT, IPS, TRANSMISSIVE, NORMALLY BLACK→ TFT, IPS, TRANSMISSIVE, NORMALLY BLACK, ANTI-GLARE

11	6.1 OPTICAL CHARACTERISTICS
	ITEM:CONTRAST RATIO(CENTER),MIN.:(800)→(600),TYP.:(1000)→(800)



RECORDS OF REVISION	DOC . FIRST ISSUE	SEP.22, 2023
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RECORDS OF REVISION	DOC . FIRST ISSUE	SEP.22, 2023
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DATE	REVISED PAGE NO.	SUMMARY																																																																																																																		
JAN.29, 2024	5	4.2 CAPACITIVE TOUCH PANEL ELECTRICAL CHARACTERISTICS ITEM:POWER SUPPLY CURRENT, TYP.:(250)→145, MAX.:(325)→190																																																																																																																		
	11	6.1 OPTICAL CHARACTERISTICS <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>ITEM</th> <th>SYMBOL</th> <th>MIN.</th> <th>TYP.</th> <th>MAX.</th> </tr> </thead> <tbody> <tr> <td>CONTRAST RATIO (CENTER)</td> <td>CR</td> <td>(600)</td> <td>(800)</td> <td>—</td> </tr> <tr> <td rowspan="12">COLOR CHROMATICITY (CENTER)</td> <td rowspan="2">WHITE</td> <td>Wx</td> <td>(0.26)</td> <td>(0.31)</td> <td>(0.36)</td> </tr> <tr> <td>Wy</td> <td>(0.29)</td> <td>(0.34)</td> <td>(0.39)</td> </tr> <tr> <td rowspan="2">RED</td> <td>Rx</td> <td>(0.54)</td> <td>(0.59)</td> <td>(0.64)</td> </tr> <tr> <td>Ry</td> <td>(0.31)</td> <td>(0.36)</td> <td>(0.41)</td> </tr> <tr> <td rowspan="2">GREEN</td> <td>Gx</td> <td>(0.28)</td> <td>(0.33)</td> <td>(0.38)</td> </tr> <tr> <td>Gy</td> <td>(0.53)</td> <td>(0.58)</td> <td>(0.63)</td> </tr> <tr> <td rowspan="2">BLUE</td> <td>Bx</td> <td>(0.11)</td> <td>(0.16)</td> <td>(0.21)</td> </tr> <tr> <td>By</td> <td>(0.09)</td> <td>(0.14)</td> <td>(0.19)</td> </tr> <tr> <td>THE BRIGHTNESS OF MODULE(CENTER)</td> <td>B</td> <td>(1250)</td> <td>(1350)</td> <td>—</td> </tr> <tr> <td>THE UNIFORMITY OF MODULE</td> <td>—</td> <td>(70)</td> <td>—</td> <td>—</td> </tr> </tbody> </table> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>ITEM</th> <th>SYMBOL</th> <th>MIN.</th> <th>TYP.</th> <th>MAX.</th> </tr> </thead> <tbody> <tr> <td>CONTRAST RATIO (CENTER)</td> <td>CR</td> <td>600</td> <td>800</td> <td>—</td> </tr> <tr> <td rowspan="12">COLOR CHROMATICITY (CENTER)</td> <td rowspan="2">WHITE</td> <td>Wx</td> <td>0.26</td> <td>0.31</td> <td>0.36</td> </tr> <tr> <td>Wy</td> <td>0.30</td> <td>0.35</td> <td>0.40</td> </tr> <tr> <td rowspan="2">RED</td> <td>Rx</td> <td>0.55</td> <td>0.60</td> <td>0.65</td> </tr> <tr> <td>Ry</td> <td>0.30</td> <td>0.35</td> <td>0.40</td> </tr> <tr> <td rowspan="2">GREEN</td> <td>Gx</td> <td>0.26</td> <td>0.31</td> <td>0.36</td> </tr> <tr> <td>Gy</td> <td>0.52</td> <td>0.57</td> <td>0.62</td> </tr> <tr> <td rowspan="2">BLUE</td> <td>Bx</td> <td>0.10</td> <td>0.15</td> <td>0.20</td> </tr> <tr> <td>By</td> <td>0.11</td> <td>0.16</td> <td>0.21</td> </tr> <tr> <td>THE BRIGHTNESS OF MODULE(CENTER)</td> <td>B</td> <td>1250</td> <td>1350</td> <td>—</td> </tr> <tr> <td>THE UNIFORMITY OF MODULE</td> <td>—</td> <td>70</td> <td>—</td> <td>—</td> </tr> </tbody> </table>	ITEM	SYMBOL	MIN.	TYP.	MAX.	CONTRAST RATIO (CENTER)	CR	(600)	(800)	—	COLOR CHROMATICITY (CENTER)	WHITE	Wx	(0.26)	(0.31)	(0.36)	Wy	(0.29)	(0.34)	(0.39)	RED	Rx	(0.54)	(0.59)	(0.64)	Ry	(0.31)	(0.36)	(0.41)	GREEN	Gx	(0.28)	(0.33)	(0.38)	Gy	(0.53)	(0.58)	(0.63)	BLUE	Bx	(0.11)	(0.16)	(0.21)	By	(0.09)	(0.14)	(0.19)	THE BRIGHTNESS OF MODULE(CENTER)	B	(1250)	(1350)	—	THE UNIFORMITY OF MODULE	—	(70)	—	—	ITEM	SYMBOL	MIN.	TYP.	MAX.	CONTRAST RATIO (CENTER)	CR	600	800	—	COLOR CHROMATICITY (CENTER)	WHITE	Wx	0.26	0.31	0.36	Wy	0.30	0.35	0.40	RED	Rx	0.55	0.60	0.65	Ry	0.30	0.35	0.40	GREEN	Gx	0.26	0.31	0.36	Gy	0.52	0.57	0.62	BLUE	Bx	0.10	0.15	0.20	By	0.11	0.16	0.21	THE BRIGHTNESS OF MODULE(CENTER)	B	1250	1350	—	THE UNIFORMITY OF MODULE	—	70	—	—
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		23	13.3 DEFECTS CLASSIFICATION NO.3, ITEM:DOT DEFECT, CRITERIA:2.: ITEMS:BRIGHT DOT: RANDOM, ACCEPTABLE COUNT: N=0→N≤1 ITEMS:TOTAL BRIGHT AND DARK DOT, ACCEPTABLE COUNT: N≤4→N≤5																																																																																																																	

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1. GENERAL SPECIFICATIONS

1.1 DATA SHEETS FOR LCD PANEL CONTROLLER/DRIVER
PLEASE REFER TO :

FITIPower EK79202B

1.2 DATA SHEET FOR CAPACITIVE TOUCH PANEL CONTROLLER/DRIVER
PLEASE REFER TO :

TOUCHNETIX AX80A

1.3 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

2.1 TFT LCD MODULE MECHANICAL SPECIFICATIONS

(1) DISPLAY SIZE	-----	10.1 inch
(2) NUMBER OF DOTS	-----	1280(RGB)W * 800H DOTS
(3) MODULE SIZE	-----	234.2W * 158.2H *14.0D (MAX.) mm
(4) VIEWING AREA	-----	217.96W * 136.6H mm
(5) ACTIVE AREA	-----	216.96W * 135.6H mm
(6) DOT SIZE	-----	0.0565W * 0.1695H mm
(7) PIXEL SIZE	-----	0.1695W * 0.1695H mm
(8) LCD TYPE	-----	TFT, IPS, TRANSMISSIVE, NORMALLY BLACK, ANTI-GLARE
(9) COLOR	-----	16.7M
(10) VIEWING DIRECTION	-----	SUPER WIDE VIEW
(11) BACK LIGHT	-----	LED , COLOR : WHITE
(12) INTERFACE MODE	-----	LVDS (8BIT)
(13) WEIGHT	-----	462g

2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS

- (1) TOUCH PANEL SIZE ----- 10.1 inch
- (2) OUTER DIMENSION ----- 234.2W * 158.2H * 1.8D mm
(NOT INCLUDED FPC)
- (3) VIEWING AREA ----- 217.96W * 136.6H mm
- (4) ACTIVE AREA ----- 217.96W * 136.6H mm
- (5) INPUT TYPE ----- MULTI TOUCH
- (6) NUMBER OF TOUCH SENSOR ----- 42*26 SENSORS
- (7) RESOLUTION ----- 65536 * 65536
- (8) INTERFACE MODE ----- I2C

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3. ABSOLUTE MAXIMUM RATINGS

3.1 LCD MODULE ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	-0.5	4.0	V	
STATIC ELECTRICITY	—	—	—	V	NOTE (1)
POWER SUPPLY VOLTAGE FOR LED DRIVER	VBL+-VBL-	-0.3	27	V	

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 CAPACITIVE TOUCH PANEL ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD1-VSS1	-0.3	4	V	

3.3 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-30 °C	85 °C	-40 °C	85 °C	NOTE (1),(2),(3),(4)
HUMIDITY	NOTE (3)		NOTE (3)		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)	—	490.0 m/s ² (50 G)	10ms XYZ DIRECTIONS 1 TIME EACH

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) : WET BULB TEMPERATURE SHOULD BE LOWER THAN 57.8°C, AND NO CONDENSATION OF WATER. BESIDES, PROTECT THE MODULE FROM STATIC ELECTRICITY.

NOTE (4) : WHEN THE LCD MODULE IS OPERATED AT A HIGHER AMBIENT TEMPERATURE THAN 60°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

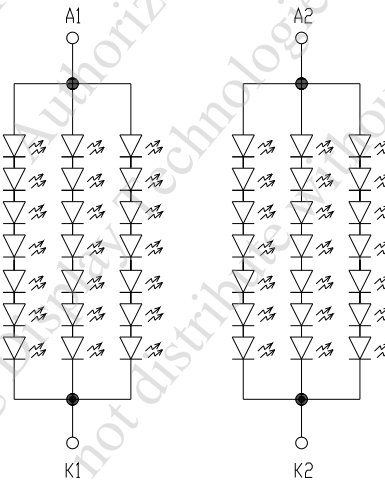
4.1 LCD MODULE ELECTRICAL CHARACTERISTICS

Ta = 25 °C

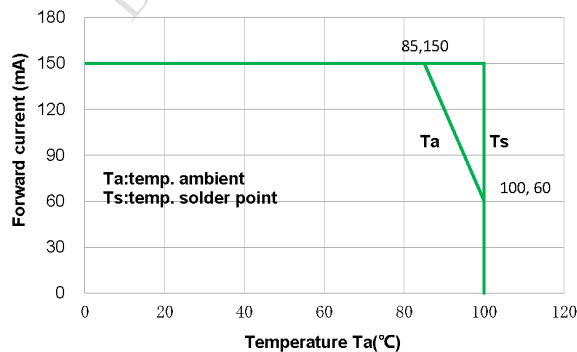
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	—	3.15	3.3	3.45	V	
LOGIC HIGH INPUT VOLTAGE	VIH	—	0.8VDD	—	VDD	V	
LOGIC LOW INPUT VOLTAGE	VIL	—	VSS	—	0.2VDD	V	
LOGIC HIGH OUTPUT VOLTAGE	VOH	—	0.8VDD	—	VDD	V	
LOGIC LOW OUTPUT VOLTAGE	VOL	—	VSS	—	0.2VDD	V	
POWER SUPPLY CURRENT	IDD	VDD-VSS =3.3V	—	360	470	mA	NOTE (1)
POWER SUPPLY VOLTAGE FOR LED DRIVER	VBL+ -VBL-	—	11.5	12.0	12.5	V	NOTE (2)
LOGIC HIGH INPUT VOLTAGE FOR BL_EN, BL_PWM	VIH	—	1.6	—	—	V	
LOGIC LOW INPUT VOLTAGE FOR BL_EN, BL_PWM	VIL	—	—	—	0.8	V	
POWER SUPPLY CURRENT FOR LED DRIVER	IBL	VBL+ -VBL- =12.0V LED B/L=ON PWM=100%	—	810	1050	mA	
LED LIFE TIME	—	IF=70 mA (PER LED)	50000	—	—	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 LIFE TIME :

LCM LUMINANCE BECOMES HALF OF THE INITIAL VALUE.

4.2 CAPACITIVE TOUCH PANEL ELECTRICAL CHARACTERISTICS

Ta = 25 °C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE	VDD1-VSS1	—	3.15	3.30	3.45	V
LOGIC HIGH INPUT VOLTAGE	VIH	—	2.0	—	VDD1	V
LOGIC LOW INPUT VOLTAGE	VIL	—	-0.3	—	0.8	V
LOGIC HIGH OUTPUT VOLTAGE	VOH	—	2.4	—	VDD1	V
LOGIC LOW OUTPUT VOLTAGE	VOL	—	0	—	0.4	V
POWER SUPPLY CURRENT	IDD1	VDD1-VSS1 =3.30V	—	145	190	mA

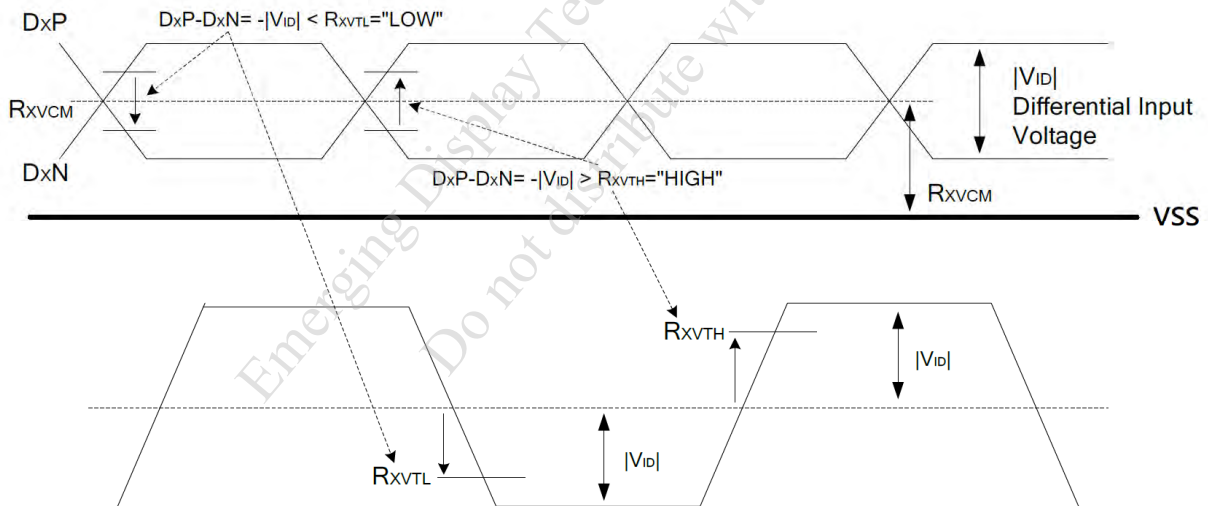
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5. TIMING CHARACTERISTICS

5.1 LVDS DC ELECTRICAL CHARACTERISTICS

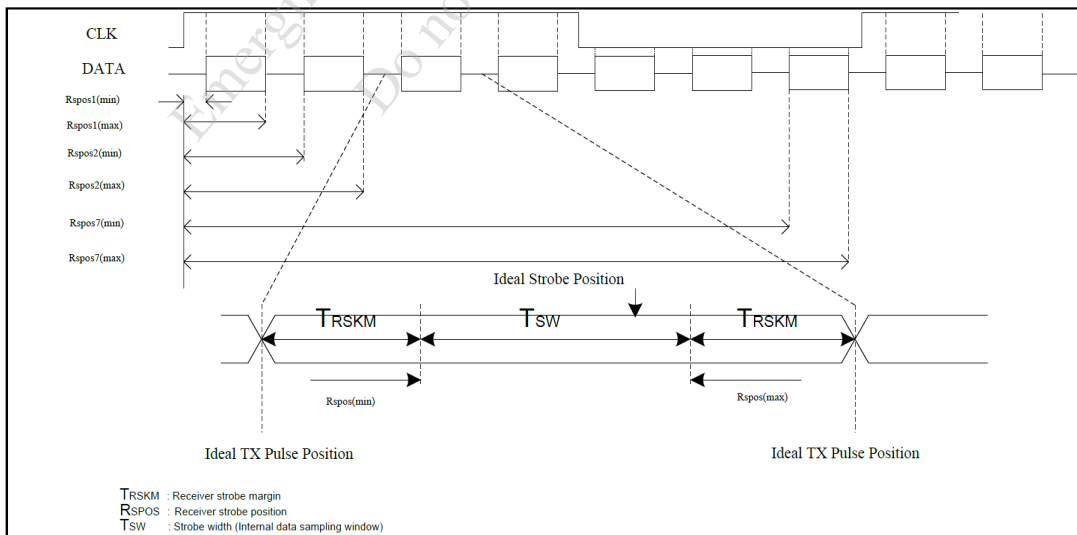
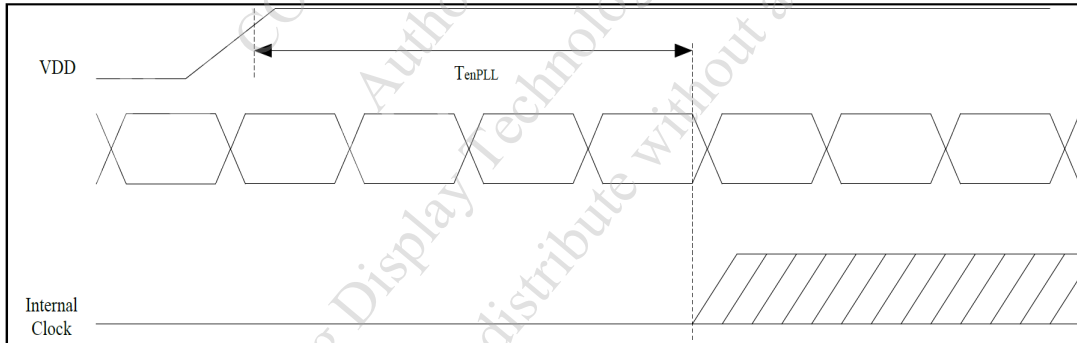
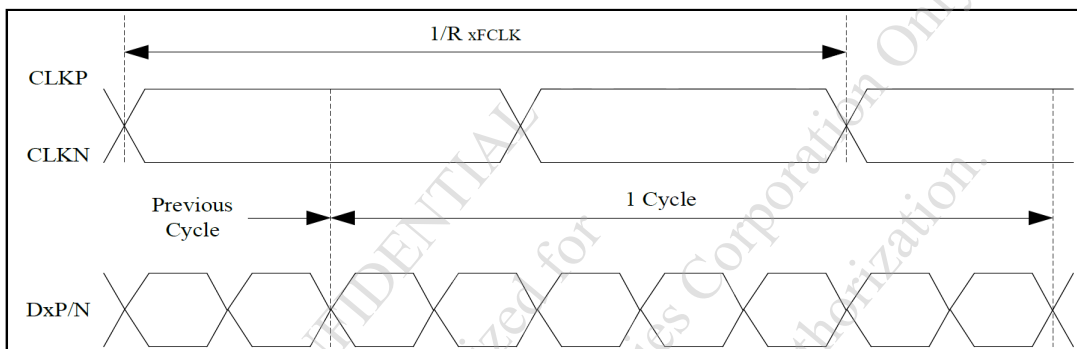
ITEM	SYMBOL	VALUES			UNIT	REMARK
		MIN.	TYP.	MAX.		
DIFFERENTIAL INPUT HIGH THRESHOLD VOLTAGE	R_{XVTH}	—	—	+0.1	V	$R_{XVCM}=1.2V$
DIFFERENTIAL INPUT LOW THRESHOLD VOLTAGE	R_{XVTL}	-0.1	—	—	V	
INPUT VOLTAGE RANGE (SINGLED-END)	R_{XVIN}	0.7	—	1.7	V	
DIFFERENTIAL INPUT COMMON MODE VOLTAGE	R_{XVCM}	1	1.2	1.4	V	$ V_{ID} =0.2$
DIFFERENTIAL INPUT IMPEDANCE	Z_{ID}	80	100	125	ohm	
DIFFERENTIAL INPUT VOLTAGE	$ V_{ID} $	0.2	—	0.6	V	
DIFFERENTIAL INPUT LEAKAGE CURRENT	I_{LCLVDS}	-10	—	+10	μA	
LVDS DIGITAL OPERATING CURRENT	I_{VDD}	—	15	20	mA	$F_{DCLK}=80MHz$, $V_{DD}=3.3V$ INPUT PATTERN: 55h->Aah->55h->Aah
LVDS DIGITAL STAND-BY CURRENT	I_{ST}	—	—	250	μA	CLOCK & ALL FUNCTIONS ARE STOPPED

Single-end
Signals



5.2 LVDS MODE AC ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	VALUES			UNIT	REMARK
		MIN.	TYP.	MAX.		
CLOCK FREQUENCY	R_{xFCLK}	30	—	TBD	MHz	REFER TO INPUT TIMING TABLE FOR EACH DISPLAY RESOLUTION
INPUT DATA SKEW MARGIN	T_{RSKM}	500	—	—	ps	
CLOCK HIGH TIME	T_{LVCH}	—	$4/(7 * R_{xFCLK})$	—	ns	$ VID = 200mV$ $R_{xVCM} = 1.2V$ $R_{xFCLK} = 81MHz$
CLOCK LOW TIME	T_{LVCL}	—	$3/(7 * R_{xFCLK})$	—	ns	
PLL WAKE-UP TIME	T_{enPLL}	—		150	us	



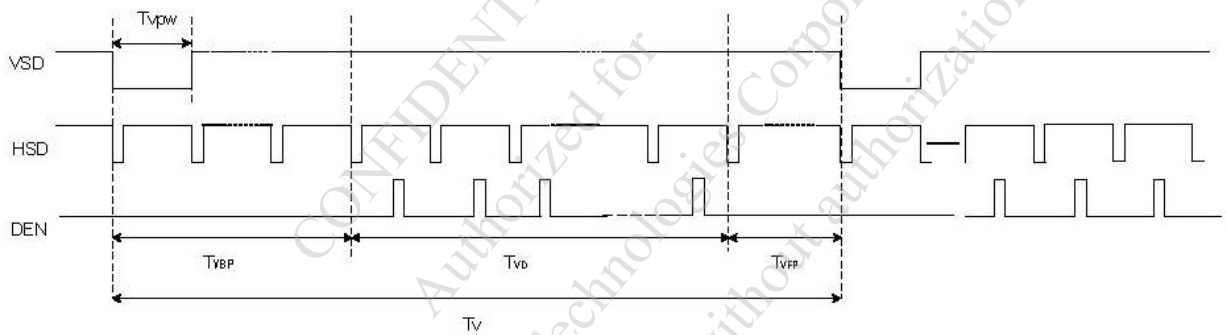
5.3 LVDS INTERFACE

LVDS INPUT TIMING TABLE (DE MODE)

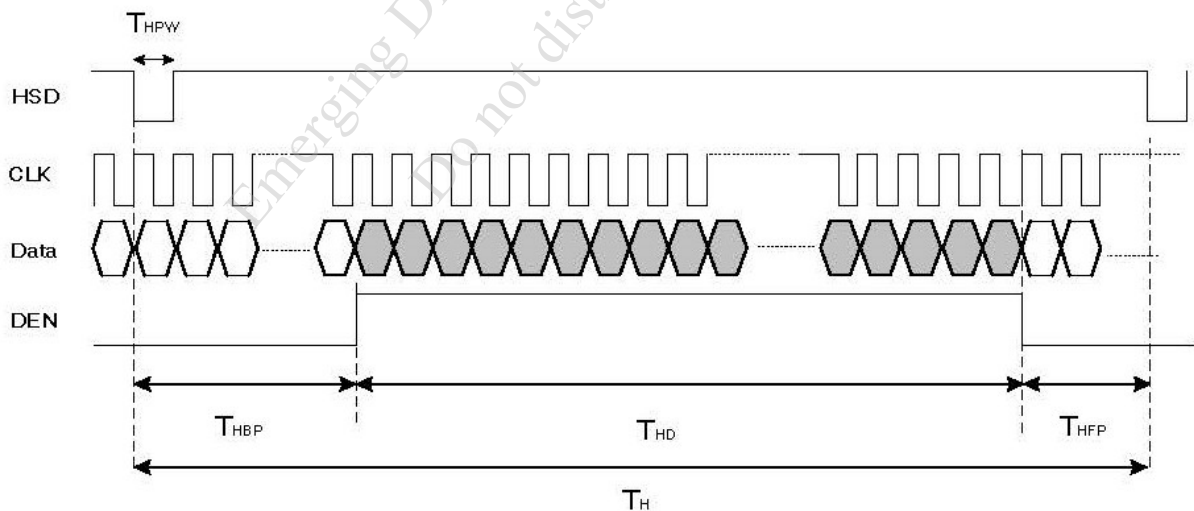
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK FREQUENCY @FRAME RATE=60Hz (LVDS)	F_{DCLK}	68.2	72.4	78.5	MHz
HORIZONTAL DISPLAY AREA	T_{HD}	1280			DCLK
HSYNC PERIOD TIME	T_H	1380	1440	1500	DCLK
HSYNC BLANKING	$T_{HBP}+T_{HFP}$	100	160	220	DCLK
VERTICAL DISPLAY AREA	T_{VD}	800			H
VSYNC PERIOD TIME	T_V	824	838	872	H
VSYNC BLANKING	$T_{VBP}+T_{VFP}$	24	38	72	H

NOTE : TIMING SETTING BASE ON 60Hz, FREQUENCY CAN BE ADJUSTED ACCORDING TO NEEDS, AS LONG AS IT DOES NOT AFFECT THE DISPLAY.

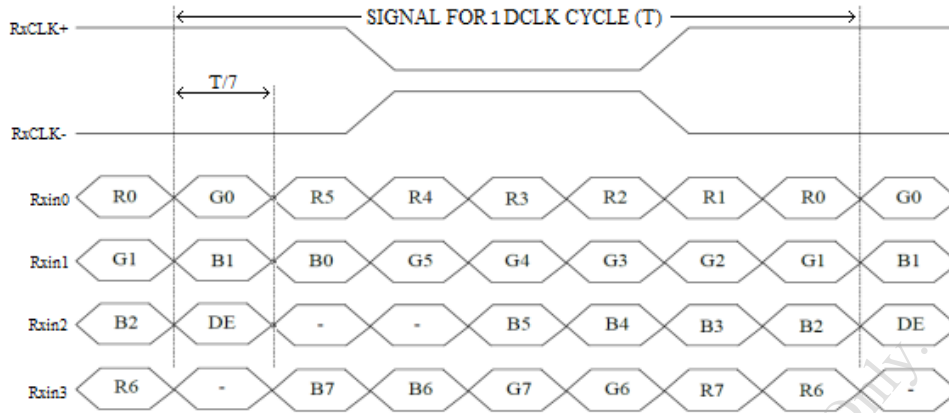
Vertical timing



Horizontal timing



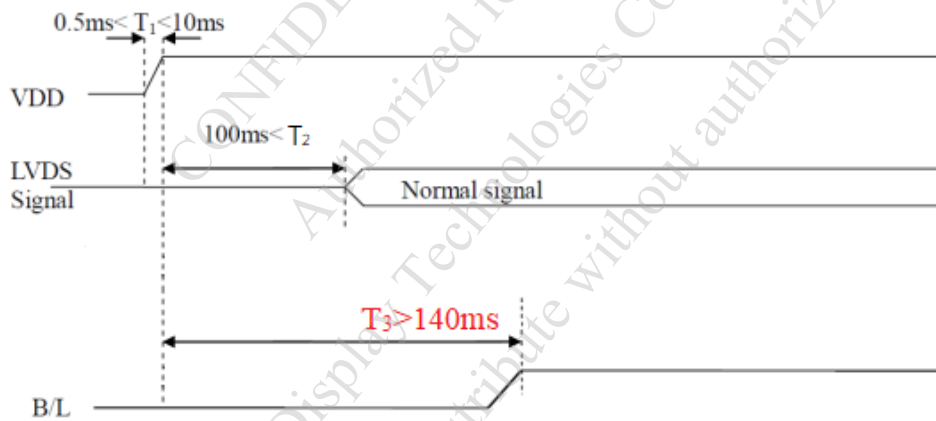
5.4 DATA INPUT FORMAT FOR LVDS



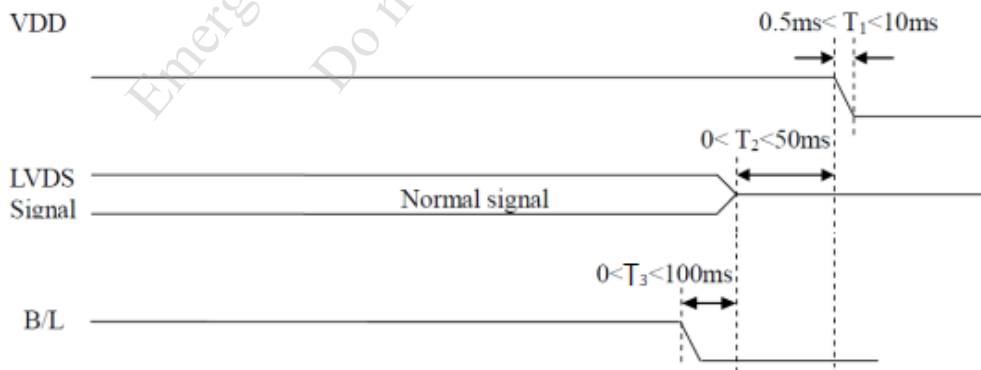
8BIT LVDS INPUT(VESA FORMAT)

5.5 POWER ON/OFF SEQUENCE

5.5.1 POWER ON SEQUENCE

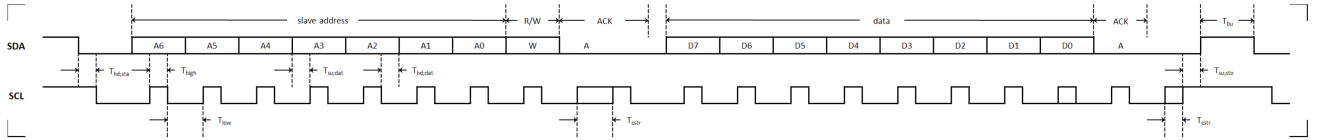


5.5.2 POWER OFF SEQUENCE



NOTE : VGH VOLTAGE SHOULD BE POWERED OFF EARLIER THAN VGL OR POWERED OFF AT THE SAME TIME.

5.6 CAPACITIVE TOUCH PANEL I2C INTERFACE TIMING CHARACTERISTICS



ITEM	SYMBOL	MIN.	MAX.	UNIT
START BIT HOLD TIME	Thd;sta	600	—	ns
CLOCK HIGH PERIOD	Thigh	600	—	ns
CLOCK LOW PERIOD	Tlow	1300	—	ns
DATA SETUP TIME	Tsu;dat	100	—	ns
DATA HOLD TIME	Thd;dat	0	—	ns
MAXIMUM CLOCK STRETCH BY SLAVE	Tcstr	—	5	ms
STOP BIT SETUP TIME	Tsu;sto	600	—	ns
BUS FREE TIME BETWEEN STOP AND START	Tbu	1300	—	ns

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6. OPTICAL CHARACTERISTICS

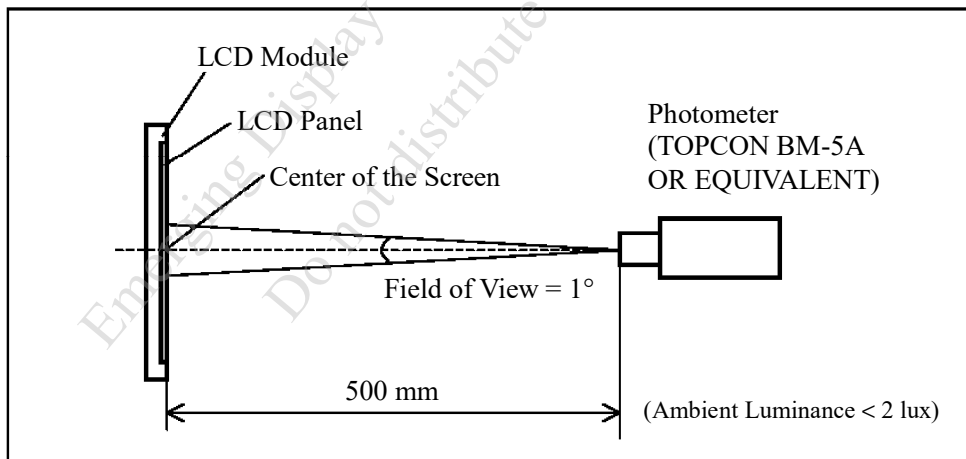
6.1 OPTICAL CHARACTERISTICS

Ta=25±2°C

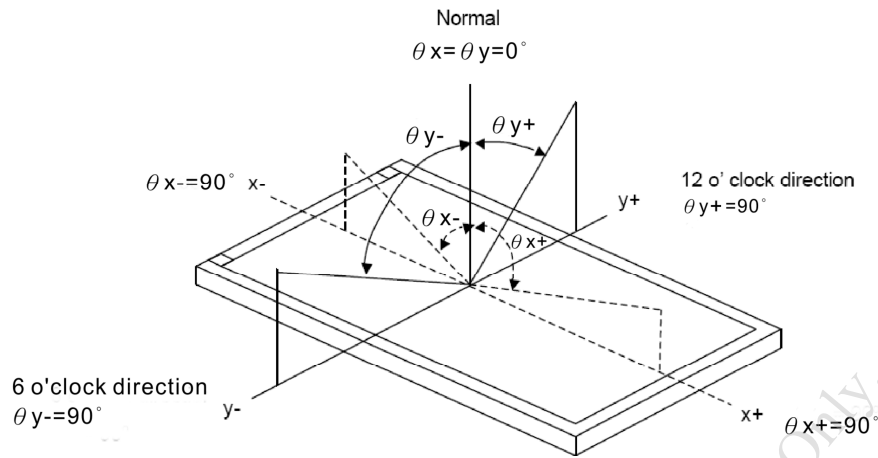
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK	
VIEWING ANGLE	θ_{y+}	CR≥10	$\theta_x=0^\circ$	75	85	—	deg	NOTE (2) NOTE (3)
	θ_{y-}			75	85	—	deg	
	θ_{x+}		$\theta_y=0^\circ$	75	85	—	deg	
	θ_{x-}			75	85	—	deg	
CONTRAST RATIO (CENTER)	CR	$\theta_x=0^\circ, \theta_y=0^\circ$	600	800	—	—	NOTE (3)	
RESPONSE TIME	T _R (rise) +T _F (fall)		—	25	50	msec	NOTE (4)	
COLOR CHROMATICITY (CENTER)	WHITE	$\theta_x=0^\circ, \theta_y=0^\circ$ VDD-VSS=3.3V VBL+-VBL-=12V LED B/L=ON PWM=100%	0.26	0.31	0.36	—	NOTE (5)	
			0.30	0.35	0.40			
	RED		0.55	0.60	0.65	—		
			0.30	0.35	0.40			
	GREEN		0.26	0.31	0.36	—		
			0.52	0.57	0.62			
	BLUE		0.10	0.15	0.20	—		
			0.11	0.16	0.21			
THE BRIGHTNESS OF MODULE(CENTER)	B	1250	1350	—	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 :

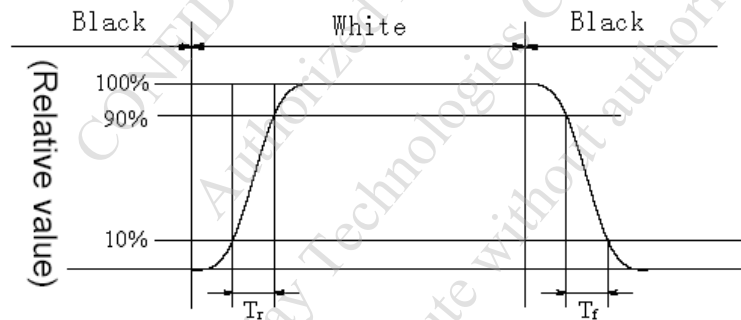


NOTE (3) : DEFINITION OF CONTRAST RATIO (CR) :
MEASURED AT THE CENTER POINT OF MODULE

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

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

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



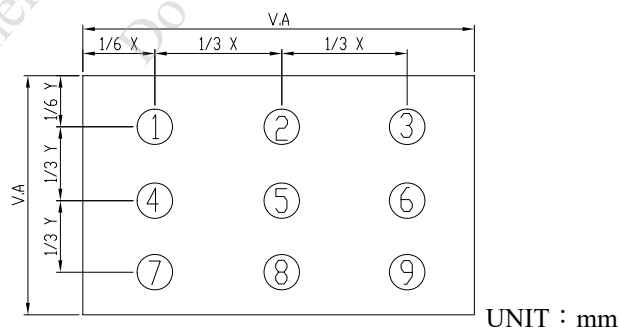
NOTE (5) : DEFINITION OF COLOR CHROMATICITY

(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.

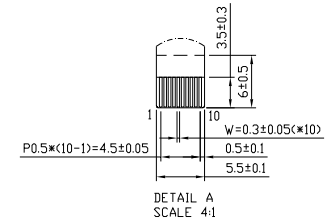
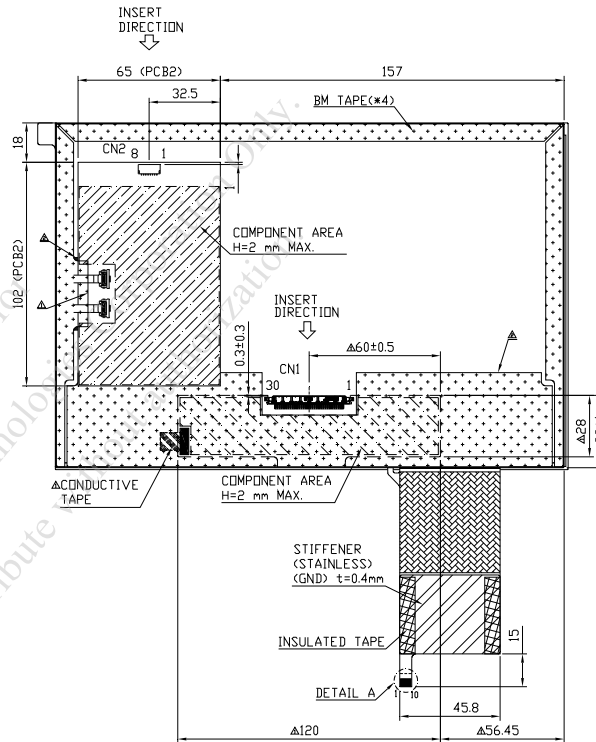
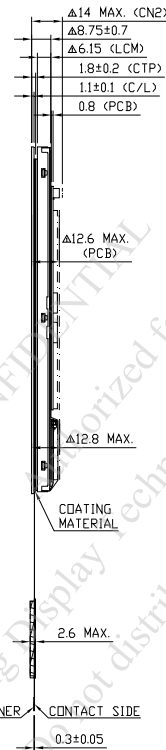
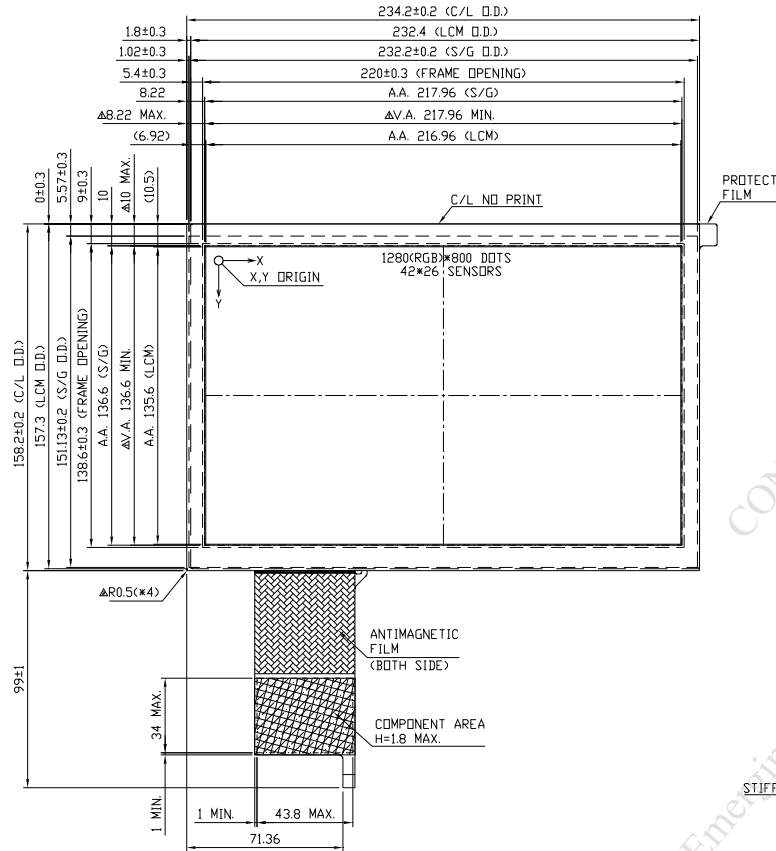
NOTE (7) : (a) DEFINITION OF BRIGHTNESS UNIFORMITY



(b) THE BRIGHTNESS UNIFORMITY CALCULATING METHOD

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

7. OUTLINE DIMENSIONS



UNIT : mm
SCALE : NTS

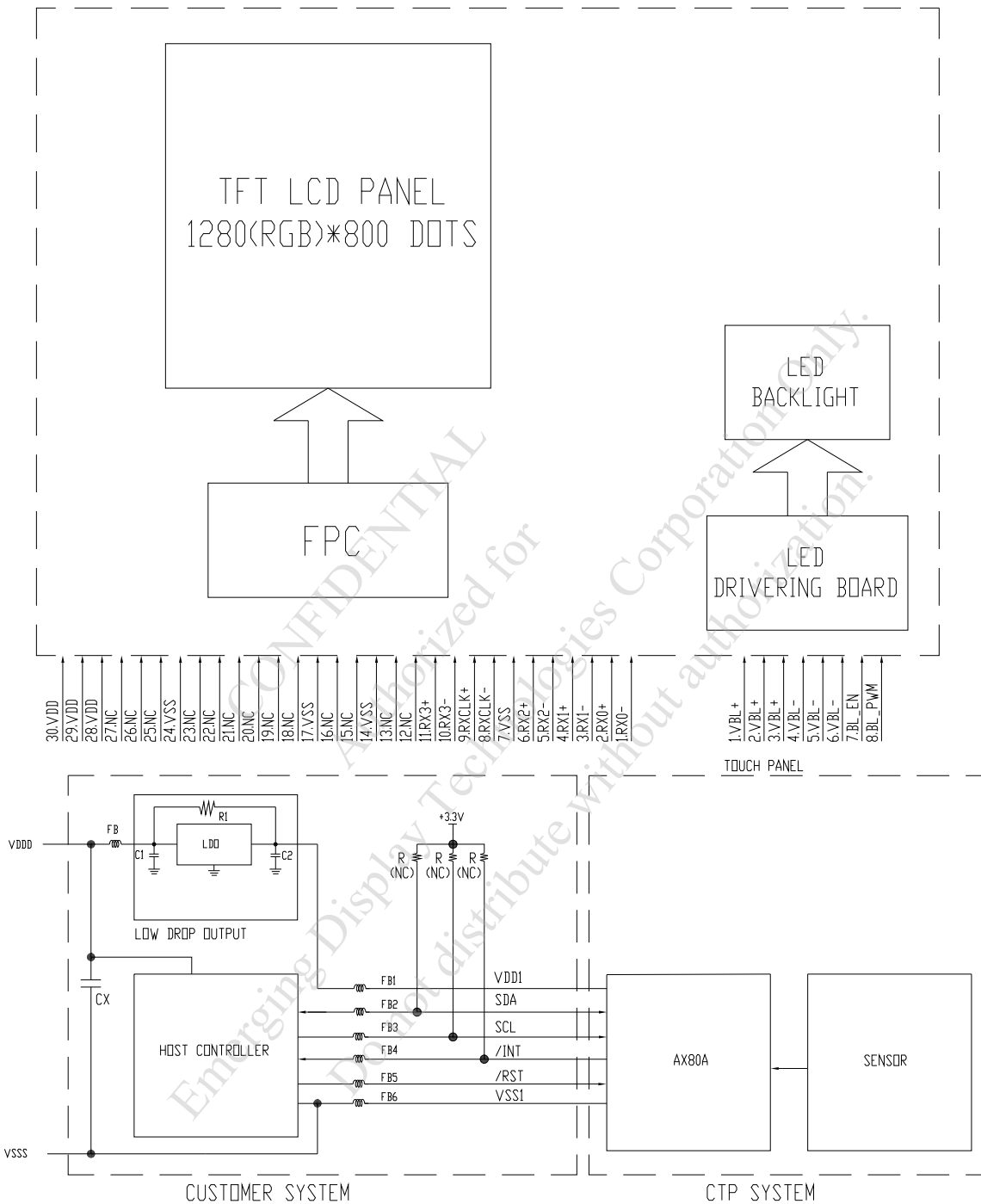
THIRD ANGLE PROJECTION

NOT SPECIFIED TOLERANCE IS ±0.5
MARK Δ MODIFY (NUMBER NOTE MODIFY VERSION)

NOTE :

- △△ 1.C/L GLASS : SODA LIME, NON-STRENGTHEN, CHAMFERED EDGES.
- 2.CN1: STM MSBKT2407P30HB OR EQUIVALENT.
- 3.CN2: JST SM08B-SRSS-TB OR EQUIVALENT.
- 4.FPC BENDING RADIUS SHOULD BE MORE THAN 1.0 mm.

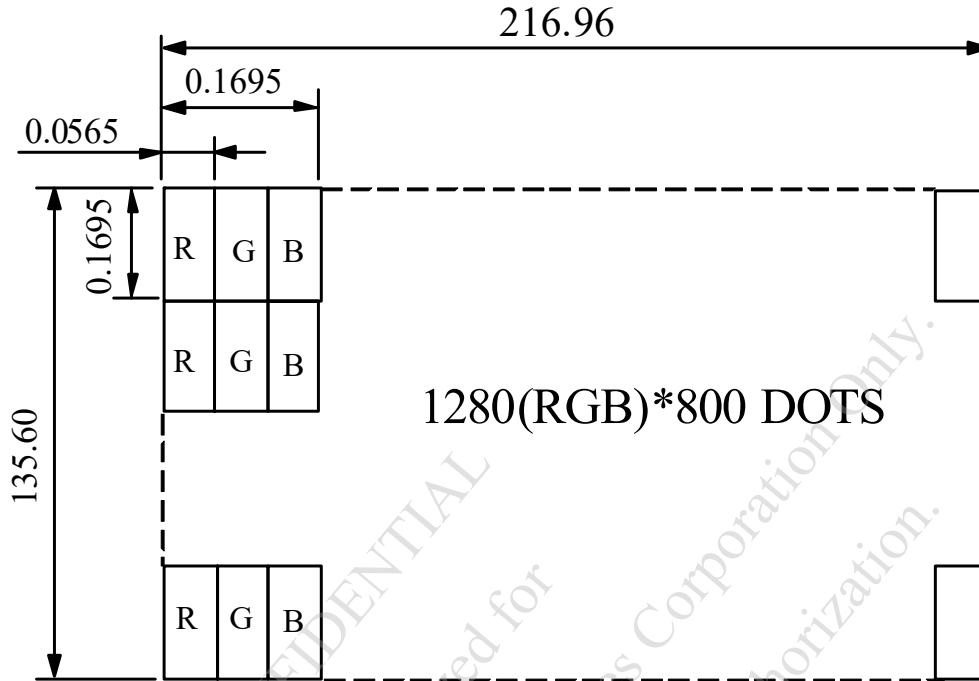
8. BLOCK DIAGRAM



NOTE (1) : THE STANDARD IIC COMMUNICATION INTERFACE, SUPREME SCL CLOCK IS 400 KHz, SLAVE ADDRESS CAN BE SET UP, SUPPORTS VDD1 LEVEL POWER, NEEDS PULL HIGH RESISTANCE AND THE PULL HIGH RESISTORS ARE BUILT-IN FPCA.FOR CUSTOMER SYSTEM CAN BE RESEVED THE PULL HIGH.

NOTE (2) : POWER SUPPLY SHALL BE CLEAN AND NOISE FREE. ADDITIONAL FILTERING OR A SEPARATE LDO (LOW DROP OUT) REGULATOR CAN BE REQUIRED. C1 AND C2 CAPACITORS RECOMMENDATION : 4.7μF OR 10 μF

9. DETAIL DRAWING OF DOT MATRIX



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

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10. INTERFACE SIGNALS

10.1 TFT LCM (CN1)

PIN NO.	SYMBOL	FUNCTION
1	RX0-	NEGATIVE TRANSMISSION DATA OF PIXEL0
2	RX0+	POSITIVE TRANSMISSION DATA OF PIXEL0
3	RX1-	NEGATIVE TRANSMISSION DATA OF PIXEL1
4	RX1+	POSITIVE TRANSMISSION DATA OF PIXEL1
5	RX2-	NEGATIVE TRANSMISSION DATA OF PIXEL2
6	RX2+	POSITIVE TRANSMISSION DATA OF PIXEL2
7	VSS	GROUND
8	RXCLK-	NEGATIVE OF CLOCK
9	RXCLK+	POSITIVE OF CLOCK
10	RX3-	NEGATIVE TRANSMISSION DATA OF PIXEL3
11	RX3+	POSITIVE TRANSMISSION DATA OF PIXEL3
12	NC	NON CONNECTION
13	NC	NON CONNECTION
14	VSS	GROUND
15	NC	NON CONNECTION
16	NC	NON CONNECTION
17	VSS	GROUND
18	NC	NON CONNECTION
19	NC	NON CONNECTION
20	NC	NON CONNECTION
21	NC	NON CONNECTION
22	NC	NON CONNECTION
23	NC	NON CONNECTION
24	VSS	GROUND
25	NC	NON CONNECTION
26	NC	NON CONNECTION
27	NC	NON CONNECTION
28	VDD	POWER SUPPLY VOLTAGE
29	VDD	POWER SUPPLY VOLTAGE
30	VDD	POWER SUPPLY VOLTAGE

10.2 LED BACKLIGHT (CN2)

PIN NO.	SYMBOL	FUNCTION
1	VBL+	POWER SUPPLY VOLTAGE FOR LED DRIVER(+)
2	VBL+	POWER SUPPLY VOLTAGE FOR LED DRIVER(+)
3	VBL+	POWER SUPPLY VOLTAGE FOR LED DRIVER(+)
4	VBL-	POWER SUPPLY VOLTAGE FOR LED DRIVER(-)
5	VBL-	POWER SUPPLY VOLTAGE FOR LED DRIVER(-)
6	VBL-	POWER SUPPLY VOLTAGE FOR LED DRIVER(-)
7	BL_EN	BACKLIGHT LED ON/OFF CONTROL
8	BL_PWM	BACKLIGHT LED BRIGHTNESS CONTROL

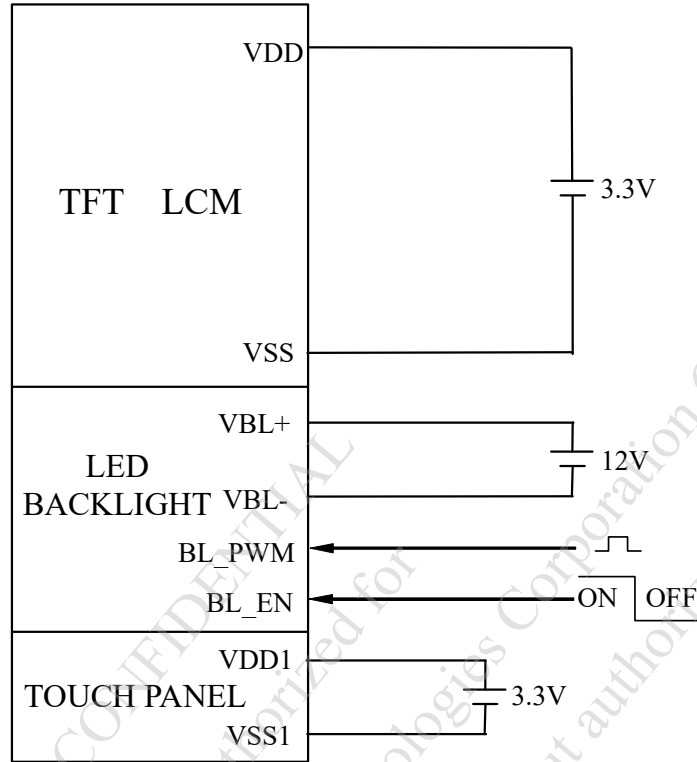
10.3 CTP

PIN NO.	SYMBOL	FUNCTION
1	VDD1	POWER SUPPLY VOLTAGE
2	/RST	EXTERNAL RESET, LOW IS ACTIVE
3	/INT	EXTERNAL INTERRUPT TO THE HOST
4	SDA	I2C DATA INPUT AND OUTPUT
5	SCL	I2C CLOCK INPUT
6	VSS1	GROUND
7	VSS1	GROUND
8	NC	NON CONNECTION
9	NC	NON CONNECTION
10	NC	NON CONNECTION

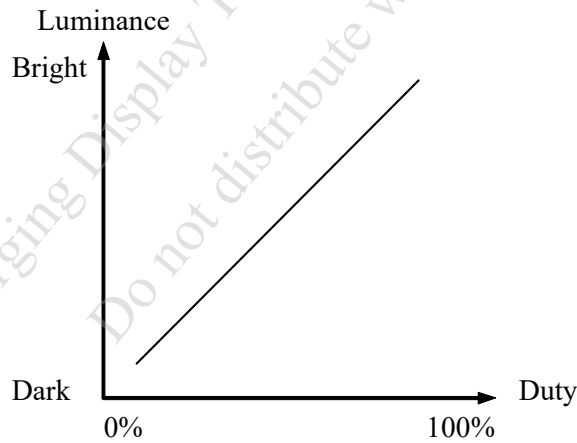
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11. POWER SUPPLY

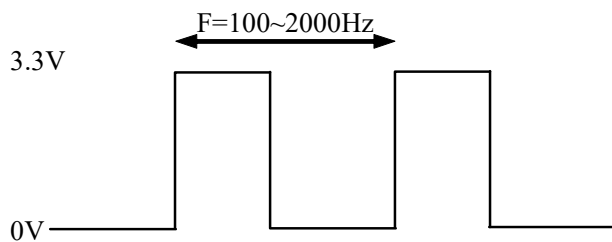
11.1 POWER SUPPLY FOR LCM



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 100~2000Hz AND DIMMING DUTY.



PWM Dimming Frequency[Hz]	Dimming Duty	
	Min[%]	Max[%]
100 <math>< F_{DIM} < 200</math>	0.1	100
200 <math>< F_{DIM} < 500</math>	0.4	100
200 <math>< F_{DIM} < 1K</math>	0.8	100
1K <math>< F_{DIM} < 2K</math>	1.5	100

12. CAPACITIVE TOUCH PANEL SPECIFICATION

12.1 OPTICAL CHARACTERISTICS

ITEM	CONDITION	MIN.	TYP.	MAX.	UNIT
TRANSPARENCY NOTE (1)	Ta = 25°C λ = 550nm	85	—	—	%

NOTE (1) : OPTICAL MEASUREMENT SHOULD BE EXECUTED AFTER PANEL IS SECURED. MEASUREMENT PROCESS SHOULD BE EXECUTED IN A STABLE, WINDLESS, AND DARK ROOM. OPTICAL SPECIFICATIONS SHOULD BE MEASURED BY SPECTROPHOTOMETER.

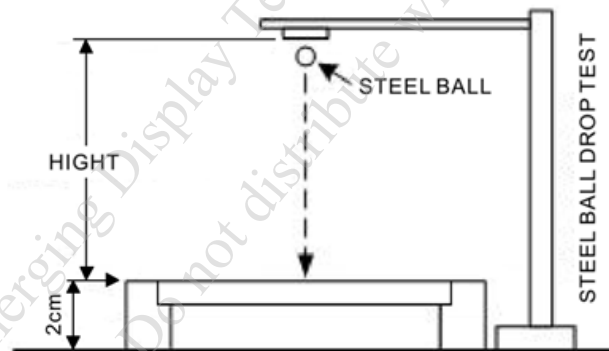
12.2 HARDNESS

ITEM	DESCRIPTION
SURFACE HARDNESS	7H (MIN.)

12.3 DURABILITY

USING STEEL BALL AND FALLING ON TOUCH PANEL SURFACE, FROM THE HEIGHT MUST PASS BELOW CONDITIONS :

ITEM	CONDITION	INSPECTION METHOD	DESCRIPTION
STEEL BALL DROP TEST	WEIGHT : 67g HEIGHT OF FALL : 30 cm	VISUAL INSPECTION	SIGN OF FRACTURE OR DAMAGE IS NOT ACCEPTABLE 3 TIMES/ 1 POINTS, 25°C(CENTER POINT)

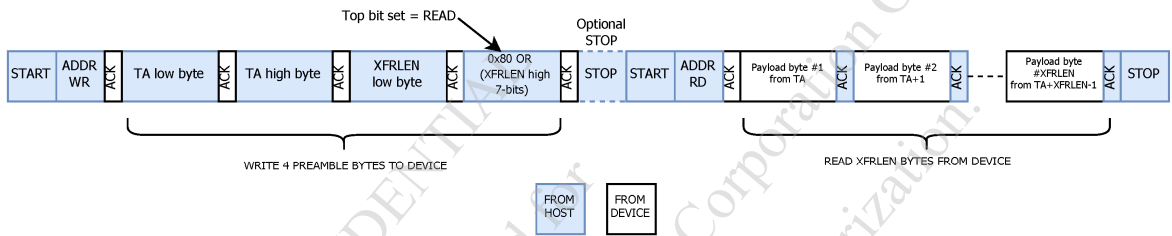


12.4 PROTOCOL

12.4.1 I2C BUS PROTOCOL

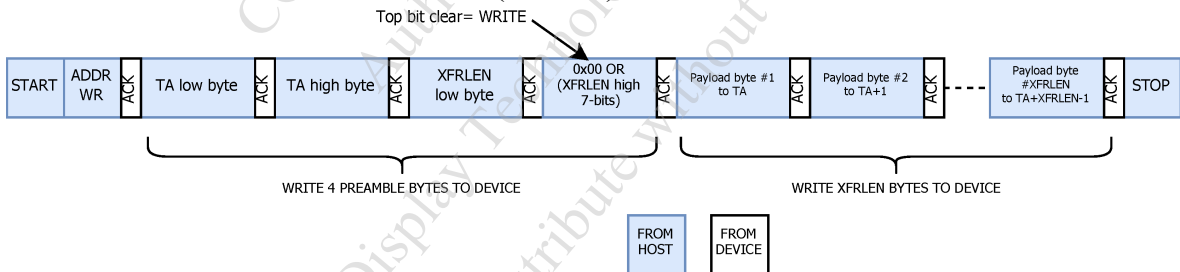
IN THE FOLLOWING DIAGRAMS ADDR IS THE 7-BIT I2C BUS ADDRESS, START/STOP ARE THE NORMAL BUS START AND STOP CONDITIONS RESPECTIVELY, WR DENOTES THAT THE 8TH BIT OF THE ADDRESS BYTE IS CLEAR TO REQUEST A WRITE TRANSFER WHEREAS RD DENOTES THAT IT IS SET TO REQUEST A READ TRANSFER. THE DEVICE WILL APPLY A CLOCK STRETCH WHEN IT NEEDS TO DECODE OR PREPARE DATA BETWEEN THE VARIOUS PHASES.

DATA FROM DEVICE TO HOST (READ)



I2C READ TRANSFER

DATA FROM HOST TO DEVICE (WRITE)



I2C WRITE TRANSFER

SLAVE I2C ADDRESS=0x66

13. INSPECTION CRITERIA

13.1 APPLICATION

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

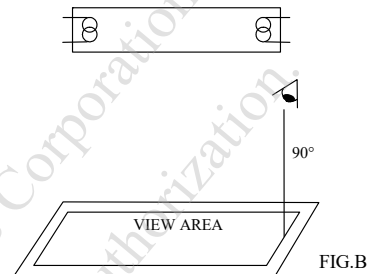
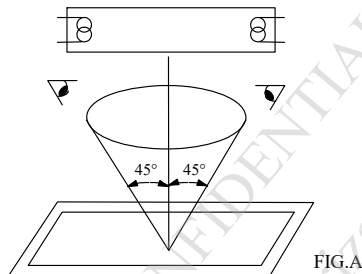
13.2 INSPECTION CONDITIONS

14.2.1 (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°



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.

13.2.2 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

13.2.3 INSPECTION LOT

QUANTITY PER DELIVERY LOT FOR EACH MODEL

13.2.4 INSPECTION METHOD

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

(a)APPLICABLE STANDARD :

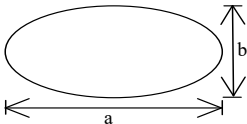
ANSI/ ASQ Z1.4 NORMAL INSPECTION LEVEL II

(b)AQL : MAJOR DEFECT : AQL 0.65

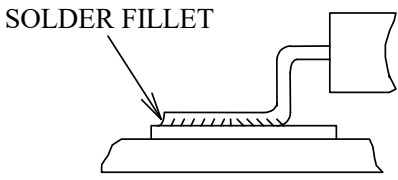
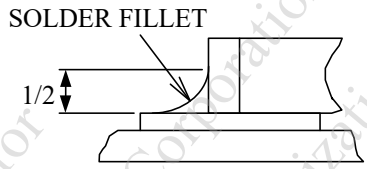
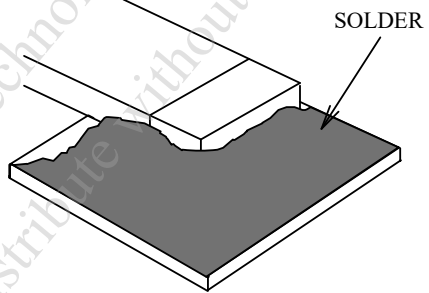
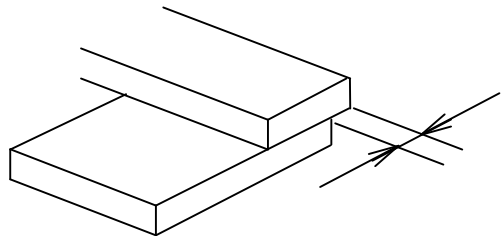
MINOR DEFECT : AQL 1.5

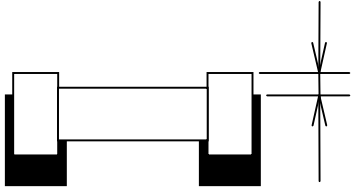
13.3 DEFECTS CLASSIFICATION

TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	<ul style="list-style-type: none"> • DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS EX: DISCONNECTION, SHORT CIRCUIT ETC 	0.65
	2.CTP FUNCTION	<ul style="list-style-type: none"> • NO FUNCTION • BROKEN LINE • FALSE TOUCH 	
	3.BACKLIGHT	<ul style="list-style-type: none"> • NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION 	
	4.DIMENSIONS	<ul style="list-style-type: none"> • SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS 	
MINOR DEFECT	1.DISPLAY ZONE (VIEWING AREA)	<ul style="list-style-type: none"> • BLACK/WHITE SPOT / CIRCULAR TYPE • BUBBLES ON POLARIZER • NEWTON RING • BLACK/WHITE LINE / LINEAR TYPE • SCRATCH • CONTAMINATION • UNEVEN COLOR SPREAD 	1.5
	2.BEZEL ZONE	<ul style="list-style-type: none"> • STAINS • SCRATCHES • FOREIGN MATTER 	
	3.SOLDERING	<ul style="list-style-type: none"> • INSUFFICIENT SOLDER • SOLDERED IN INCORRECT POSITION • CONVEX SOLDERING SPOT • SOLDER BALLS • SOLDER SCRAPS 	
	4.DISPLAY ON (ALL ON)	<ul style="list-style-type: none"> • LIGHT LINE 	

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	<p>1. INSPECTION PATTERN: FULL WHITE, FULL BLACK, RED, GREEN AND BLUE SCREENS.</p> <p>2.</p> <table border="1"> <thead> <tr> <th>ITEMS</th> <th></th> <th>ACCEPTABLE COUNT</th> </tr> </thead> <tbody> <tr> <td rowspan="3">BRIGHT DOT</td> <td>RANDOM</td> <td>N≤1</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≤4</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="2">DISTANCE</td> <td>MINIMUM DISTANCE BETWEEN BRIGHT DOT</td> <td>—</td> </tr> <tr> <td>MINIMUM DISTANCE BETWEEN DARK DOTS</td> <td>L≥15mm</td> </tr> <tr> <td colspan="2">TOTAL BRIGHT AND DARK DOT</td> <td>N≤5</td> </tr> <tr> <td colspan="2">MICRO BRIGHT DOT</td> <td>N=0</td> </tr> <tr> <td colspan="2">SMALL BRIGHT DOT</td> <td>(1)N≤4 (2)N≤3 WITHIN 20mm DIAMETER AREA</td> </tr> </tbody> </table> <p>NOTE :</p> <ol style="list-style-type: none"> 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 BRIGHT DOT : DOTS APPEAR BRIGHT AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER BLACK PATTERN. 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	RANDOM	N≤1	2 DOTS ADJACENT (PAIR)	N=0	3 DOTS ADJACENT OR MORE	N=0	DARK DOT	RANDOM	N≤4	2 DOTS ADJACENT (PAIR)	N=0	3 DOTS ADJACENT OR MORE	N=0	DISTANCE	MINIMUM DISTANCE BETWEEN BRIGHT DOT	—	MINIMUM DISTANCE BETWEEN DARK DOTS	L≥15mm	TOTAL BRIGHT AND DARK DOT		N≤5	MICRO BRIGHT DOT		N=0	SMALL BRIGHT DOT		(1)N≤4 (2)N≤3 WITHIN 20mm DIAMETER AREA
ITEMS		ACCEPTABLE COUNT																															
BRIGHT DOT	RANDOM	N≤1																															
	2 DOTS ADJACENT (PAIR)	N=0																															
	3 DOTS ADJACENT OR MORE	N=0																															
DARK DOT	RANDOM	N≤4																															
	2 DOTS ADJACENT (PAIR)	N=0																															
	3 DOTS ADJACENT OR MORE	N=0																															
DISTANCE	MINIMUM DISTANCE BETWEEN BRIGHT DOT	—																															
	MINIMUM DISTANCE BETWEEN DARK DOTS	L≥15mm																															
TOTAL BRIGHT AND DARK DOT		N≤5																															
MICRO BRIGHT DOT		N=0																															
SMALL BRIGHT DOT		(1)N≤4 (2)N≤3 WITHIN 20mm DIAMETER AREA																															
4	BUBBLES ON POLARIZER /SURFACE STAINS /DIRT/CF FAIL/SPOT	<table border="1"> <thead> <tr> <th></th> <th>AVERAGE DIAMETER (mm) : D</th> <th>NUMBER OF PIECES PERMITTED</th> </tr> </thead> <tbody> <tr> <td rowspan="3">BUBBLE ON THE POLARIZER</td> <td>D ≤ 0.3</td> <td>IGNORE</td> </tr> <tr> <td>0.3 < 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 ≤ 6</td> </tr> <tr> <td>0.5 < D</td> <td>NONE</td> </tr> <tr> <td rowspan="3">SCRATCHES</td> <td>W ≤ 0.05</td> <td>IGNORE</td> </tr> <tr> <td>0.05 < W , 2 < L ≤ 5</td> <td>N ≤ 4</td> </tr> <tr> <td>0.1 < W</td> <td>NONE</td> </tr> </tbody> </table> <p>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.</p> <p>2. THE EXTRANEIOUS SUBSTANCE IS DEFINED AS IT CAN BE OBSERVED WHEN THE MODULE IS POWER ON. THE DEFINITION OF AVERAGE DIAMETER, D IS DEFINED AS FOLLOWING. AVERAGE DIAMETER (D)=(a+b)/2</p> 		AVERAGE DIAMETER (mm) : D	NUMBER OF PIECES PERMITTED	BUBBLE ON THE POLARIZER	D ≤ 0.3	IGNORE	0.3 < D ≤ 0.5	N ≤ 5	0.5 < D	NONE	SURFACE STAINS	D ≤ 0.1	IGNORE	0.1 < D ≤ 0.5	N ≤ 6	0.5 < D	NONE	SCRATCHES	W ≤ 0.05	IGNORE	0.05 < W , 2 < L ≤ 5	N ≤ 4	0.1 < W	NONE							
	AVERAGE DIAMETER (mm) : D	NUMBER OF PIECES PERMITTED																															
BUBBLE ON THE POLARIZER	D ≤ 0.3	IGNORE																															
	0.3 < D ≤ 0.5	N ≤ 5																															
	0.5 < D	NONE																															
SURFACE STAINS	D ≤ 0.1	IGNORE																															
	0.1 < D ≤ 0.5	N ≤ 6																															
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SCRATCHES	W ≤ 0.05	IGNORE																															
	0.05 < W , 2 < L ≤ 5	N ≤ 4																															
	0.1 < W	NONE																															

NO.	ITEM	CRITERIA										
5	BLACK/WHITE SPOT CIRCULAR TYPE	<p>THE FOLLOWING BLACK/WHITE SPOT ARE WITHIN THE VIEWING AREA. AVERAGE DIAMETER : D (mm)</p> <table border="1"> <thead> <tr> <th>SIZE D</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>$D \leq 0.3$</td> <td>IGNORE</td> </tr> <tr> <td>$0.3 < D \leq 0.5$</td> <td>6</td> </tr> <tr> <td>$D > 0.5$</td> <td>0</td> </tr> </tbody> </table> <p>NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.</p>		SIZE D	PERMISSIBLE NO.	$D \leq 0.3$	IGNORE	$0.3 < D \leq 0.5$	6	$D > 0.5$	0	
SIZE D	PERMISSIBLE NO.											
$D \leq 0.3$	IGNORE											
$0.3 < D \leq 0.5$	6											
$D > 0.5$	0											
6	SCRATCH	<p>THE FOLLOWING SCRATCH IS WITHIN THE VIEWING AREA. WIDTH : W (mm) , LENGTH : L (mm)</p> <table border="1"> <thead> <tr> <th>SIZE W & L</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>$W \leq 0.07$</td> <td>IGNORE</td> </tr> <tr> <td>$0.07 < W \leq 0.1, L \leq 10$</td> <td>6</td> </tr> <tr> <td>$W > 0.1$</td> <td>0</td> </tr> </tbody> </table> <p>NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.</p>		SIZE W & L	PERMISSIBLE NO.	$W \leq 0.07$	IGNORE	$0.07 < W \leq 0.1, L \leq 10$	6	$W > 0.1$	0	
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$W > 0.1$	0											
7	BLACK / WHITE LINE LINEAR TYPE / FOREIGN FIBER	<p>THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA. WIDTH : W (mm) , LENGTH : L (mm)</p> <table border="1"> <thead> <tr> <th>SIZE W & L</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>$W \leq 0.07$</td> <td>IGNORE</td> </tr> <tr> <td>$0.07 < W \leq 0.1, L \leq 10$</td> <td>6</td> </tr> <tr> <td>$W > 0.1$</td> <td>0</td> </tr> </tbody> </table> <p>NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.</p>		SIZE W & L	PERMISSIBLE NO.	$W \leq 0.07$	IGNORE	$0.07 < W \leq 0.1, L \leq 10$	6	$W > 0.1$	0	
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8	BUBBLE / DENT FOR OPTICAL BONDING	<p>BUBBLES WITHIN VIEWING AREA. AVERAGE DIAMETER : D (mm)</p> <table border="1"> <thead> <tr> <th>SIZE D</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>$D \leq 0.3$</td> <td>IGNORE</td> </tr> <tr> <td>$0.3 < D \leq 0.5$</td> <td>6</td> </tr> <tr> <td>$D > 0.5$</td> <td>0</td> </tr> </tbody> </table> <p>NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.</p>		SIZE D	PERMISSIBLE NO.	$D \leq 0.3$	IGNORE	$0.3 < D \leq 0.5$	6	$D > 0.5$	0	
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9	CHIPPING	<table border="1"> <tr> <td>CORNER</td> <td>$X \leq 3 \text{ mm} , Y \leq 3 \text{ mm} \cdot Z \leq t$ (t : THICKNESS)</td> </tr> <tr> <td>EDGE</td> <td>$X \leq 6 \text{ mm} , Y \leq 1 \text{ mm} , Z < t$ (t : THICKNESS)</td> </tr> </table>	CORNER	$X \leq 3 \text{ mm} , Y \leq 3 \text{ mm} \cdot Z \leq t$ (t : THICKNESS)	EDGE	$X \leq 6 \text{ mm} , Y \leq 1 \text{ mm} , Z < t$ (t : THICKNESS)						
CORNER	$X \leq 3 \text{ mm} , Y \leq 3 \text{ mm} \cdot Z \leq t$ (t : THICKNESS)											
EDGE	$X \leq 6 \text{ mm} , Y \leq 1 \text{ mm} , Z < t$ (t : THICKNESS)											
10	CRACKED GLASS	NOT ACCEPTABLE										
11	LINE DEFECT ON DISPLAY	OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED										
12	MURA ON DISPLAY	MURA NOT VISIBLE THROUGH 5% ND FILTER										
13	UNEVEN COLOR SPREAD, COLORATION	1. TO BE DETERMINED BASED UPON THE STANDARD SAMPLE.										
14	BEZEL APPEARANCE	<p>1. BEZEL MAY NOT HAVE RUST, BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION.</p> <p>2. BEZEL MUST COMPLY WITH JOB SPECIFICATIONS.</p>										
15	PCB	<p>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.</p> <p>2. NO OXIDATION OR CONTAMINATION PCB TERMINALS.</p> <p>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.</p> <p>4. THE JUMPER ON THE PCB SHOULD CONFORM TO THE PRODUCT CHARACTERISTIC CHART.</p> <p>5. IF SOLDER GETS ON BEZEL TAB PADS, LED PAD, ZEBRA PAD OR CREW HOLD PAD; SMAKE SURE IT IS SMOOTHED DOWN.</p>										

NO.	ITEM	CRITERIA
16	SOLDERING	<p>1. NO SOLDERING FOUND ON THE SPECIFIED PLACE</p> <p>2. INSUFFICIENT SOLDER</p> <p>(a) LSI, IC A POOR WETTING OF SOLDER IS BETWEEN LOWER BEND OR "HEEL" OF LEAD AND PAD</p>  <p>(b) CHIP COMPONENT · SOLDER IS LESS THAN 50% OF SIDES AND FRONT FACE WETTING</p>  <p>· SOLDER WETS 3 SIDES OF TERMINAL, BUT LESS THAN 25% OF SIDES AND FRONT SURFACE AREA ARE COVERED</p>  <p>3. PARTS ALIGNMENT</p> <p>(a) LSI, IC LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE</p> 

NO.	ITEM	CRITERIA
16	SOLDERING	<p>(b)CHIP COMPONENT COMPONENT IS OFF CENTER, AND MORE THAN 50% OF THE LEADS IS OFF THE PAD OUTLINE</p>  <p>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.</p>
17	BACKLIGHT	<p>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.</p>
18	GENERAL APPEARANCE	<p>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.</p>

14. RELIABILITY TEST

14.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE

NO.	ITEM	DESCRIPTION
1	HIGH TEMPERATURE TEST(OPERATION)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +85°C FOR 240 HRS
2	LOW TEMPERATURE TEST(OPERATION)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -30°C FOR 240 HRS
3	HIGH TEMPERATURE TEST (STORAGE)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +85°C FOR 240 HRS
4	LOW TEMPERATURE TEST (STORAGE)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -40°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)	<p>THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION:</p>
7	ESD (ELECTROSTATIC DISCHARGE) (NOT OPERATED)	<p>AIR DISCHARGE ± 12KV CONTACT DISCHARGE ± 8KV (ACCORDING TO IEC-61000-4-2)</p>

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) : THERE IS NO DISPLAY FUNCTION NG ISSUE OCCURRED, ALL THE COSMETIC SPECIFICATION IS JUDGED BEFORE THE RELIABILITY STRESS.

NOTE (3) : THE MODULE SHOULDN'T BE TESTED MORE THAN ONE CONDITION, AND ALL THE TEST CONDITIONS ARE INDEPENDENT.

NOTE (4) : WHEN THE LCD MODULE IS OPERATED AT A HIGHER AMBIENT TEMPERATURE THAN 60°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.

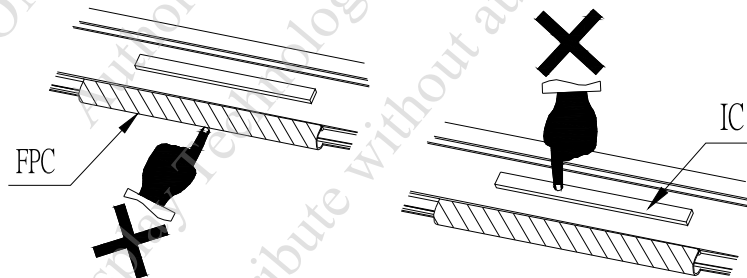
NOTE (5) : TESTING CONDITIONS AND INSPECTION CRITERIA

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

15. CAUTION

15.1 OPERATION

- 15.1.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .
- 15.1.2 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 .
- 15.1.3 ADJUST THE LC DRIVING VOLTAGE TO OBTAIN THE OPTIMUM CONTRAST.
- 15.1.4 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 .
- 15.1.5 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!



15.2 NOTICE

- 15.2.1 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 .
- 15.2.2 DO NOT DISASSEMBLE . EDT SHALL NOT BE HELD RESPONSIBLE IF THE MODULE IS DISASSEMBLED AND UPON THE REASSEMBLY THE MODULE FAILED .
- 15.2.3 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 .
- 15.2.4 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 .
- 15.2.5 DON'T GIVE EXTERNAL SHOCK.
- 15.2.6 DON'T APPLY EXCESSIVE FORCE ON THE SURFACE.
- 15.2.7 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.
- 15.2.8 DON'T OPERATE IT ABOVE THE ABSOLUTE MAXIMUM RATING.
- 15.2.9 STORAGE IN A CLEAN ENVIRONMENT, FREE FROM DUST, ACTIVE GAS AND SOLVENT.
- 15.2.10 STORE WITHOUT ANY PHYSICAL LOAD.
- 15.2.11 REWIRING: NO MORE THAN 3 TIMES.