EXAMINED BY : C. H. Chu	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-0010040
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APPROVED BY: Yung Chang Hu		TOTAL PAGE : 23
		VERSION : 1

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

ETEMB121027XDRAM

(RoHS)

FOR MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO.	VERSION	PAGE
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RECORDS OF REVISION

DOC . FIRST ISSUE

MAY.11, 2026

DATE	REVISED PAGE NO.	SUMMARY

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1. GENERAL SPECIFICATIONS

1.1 DATA SHEETS FOR EMBEDDED SYSTEM MCU DRIVER
PLEASE REFER TO :

STM32H7S7

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

ILITEK ILI2521

1.3 DATA SHEETS FOR LCD MODULE CONTROLLER/DRIVER
PLEASE REFER TO :

FITIPOWER EK79202B

1.4 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 EMBEDDED SYSTEM MECHANICAL SPECIFICATIONS

(1) DISPLAY SIZE	12.1 inch
(2) NUMBER OF DOTS	1280(RGB)W * 800H DOTS
(3) MODULE SIZE	301.92W * 204H *30.4D (MAX.) mm
(4) VIEWING AREA	261.92W *164H mm
(5) ACTIVE AREA	261.12W * 163.2H mm
(6) DOT SIZE	0.068W * 0.204H mm
(7) PIXEL SIZE	0.204W * 0.204H mm
(8) LCD TYPE	TFT, IPS, TRANSMISSIVE, NORMALLY BLACK
(9) COLOR	16.7M
(10) VIEWING DIRECTION	SUPER WIDE VIEW
(11) BACKLIGHT	LED , COLOR : WHITE
(12) INTERFACE MODE	Ethernet(10/100 BASE, include MAC address), RS485,CAN FD, USB (TYPE C)
(13) WEIGHT	935g

2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS

(1) TOUCH PANEL SIZE ---------- 12.1 inch
(2) OUTER DIMENSION ---------- 301.92W * 204H mm
(3) ACTIVE AREA ---------- 262.5W * 164.58H mm
(4) INPUT TYPE ---------- MULTI TOUCH *
(5) NUMBER OF TOUCH SENSOR ---------- 50*31 SENSORS

*NOTE: ACCORDING TO IMPLEMENTATION DESIGN

3. ABSOLUTE MAXIMUM RATINGS

3.1 EMBEDDED SYSTEM ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER VOLTAGE FOR CN1	VP_IN	-0.3	+40	V	VSS=0
INPUT VOLTAGE	VIN	-0.3	4.0	V	

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 (3)		NOTE (3)		WITHOUT CONDENSATION
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

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

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

NOTE (3)：Ta ≤ 60°C：90%RH MAX.
Ta > 60°C：ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90%RH AT 60°C.

4. ELECTRICAL CHARACTERISTICS

4.1 EMBEDDED SYSTEM ELECTRICAL CHARACTERISTICS

Ta = 25 °C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE FOR CN1	VP_IN	—	7	12	24	V	VSS=0
POWER SUPPLY CURRENT	IVP_IN	VP_IN=7V	—	1620	1945	mA	—
	IVP_IN	VP_IN=12V	—	880	1055	mA	—
	IVP_IN	VP_IN=24V	—	420	520	mA	—
LED LIFE TIME	—	—	30K	—	—	HRS	NOTE (2) NOTE (3)

NOTE (1)：VIL/VIH/VOL/VOH REFER TO STM32H7S7 DATA SHEET
NOTE (2)：CONDITIONS; Ta=25°C, CONTINUOUS LIGHTING
NOTE (3)：DEFINITIONS OF LIFE TIME：
LCD LUMINANCE BECOMES HALF OF THE INITIAL VALUE.

5. TIMING CHARACTERISTICS

REFER TO STM32H7S7 DATA SHEET

6. MCU CHARACTERISTICS

ITEM	MEMORY SIZE		REMARK
	INTERNAL	EXTERNAL	
RAM	620 KB	32 MB	
FLASH	64 KB	64 MB	
EEPROM	—	2K bit	INCLUDE MAC ADDRESS

7. OPTICAL CHARACTERISTICS

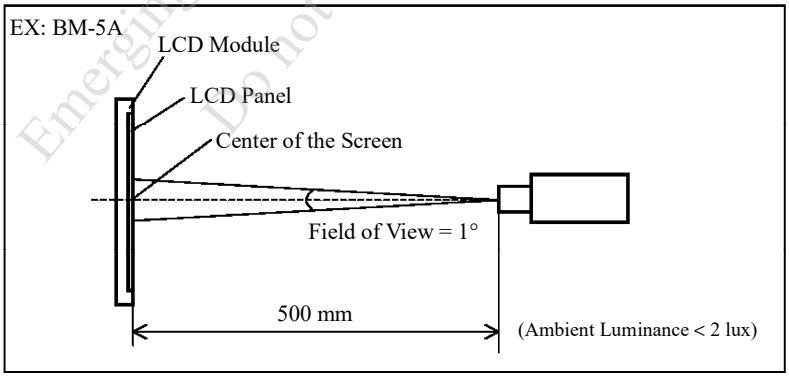
7.1 OPTICAL SPECIFICATIONS

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{y+}	CR ≥ 10	θ_x=0°	80	85	—	deg.	NOTE (2) NOTE (3)
		θ_{y-}			80	85	—		
		θ_{x+}		θ_y=0°	80	85	—		
		θ_{x-}			80	85	—		
CONTRAST RATIO (CENTER)		CR	θx=0° , θy=0°		1000	1200	—	—	NOTE (3)
RESPONSE TIME		TR+TF			—	30	35	msec	NOTE (4)
COLOR CHROMATICITY (CENTER)	WHITE	Wx	θx=0° , θy=0°		0.26	0.31	0.36	—	NOTE (5)
		Wy			0.26	0.31	0.36		
	RED	Rx			0.60	0.65	0.70	—	
		Ry			0.28	0.33	0.38		
	GREEN	Gx			0.26	0.31	0.36	—	
		Gy			0.56	0.61	0.66		
	BLUE	Bx			0.10	0.15	0.20	—	
		By			0.00	0.05	0.10		
COLOR GAMUT		NTSC			—	74	—	—	
THE BRIGHTNESS OF MODULE (CENTER)		B			680	850	—	cd/m^2	NOTE (6)
THE UNIFORMITY OF MODULE(9 POINTS)		—			70	—	—	%	NOTE (7)

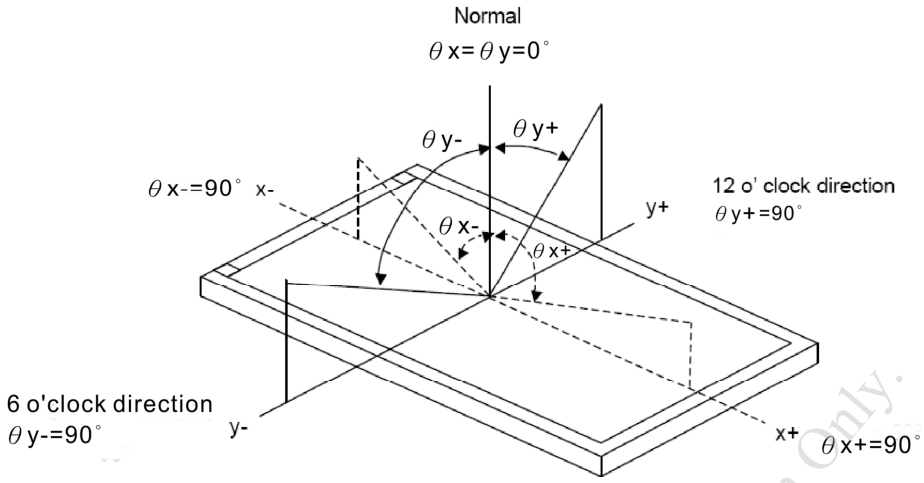
NOTE (1) : TEST CONDITION :

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.

THE MEASUREMENT CRITERIA AND CONDITION FOR EITHER BM-5A OR CA-210 OR EQUIVALENT LUMINANCE METER IS BASED ON THE EQUIPMENT'S MANUAL.



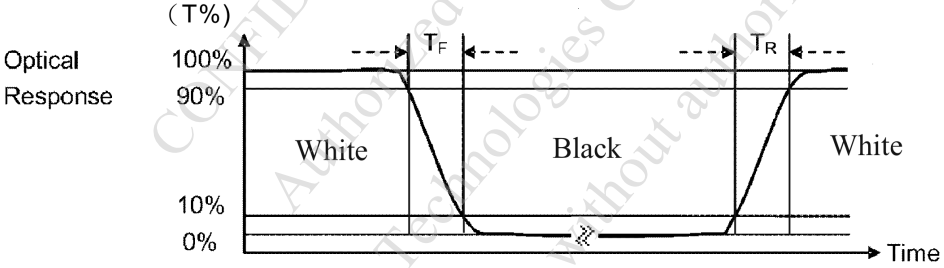
NOTE (2)：DEFINITION OF VIEWING ANGLE :



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

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

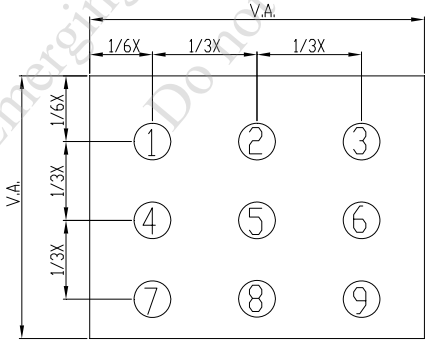
NOTE (4)：DEFINITION OF RESPONSE TIME : T_R AND T_F
THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.



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

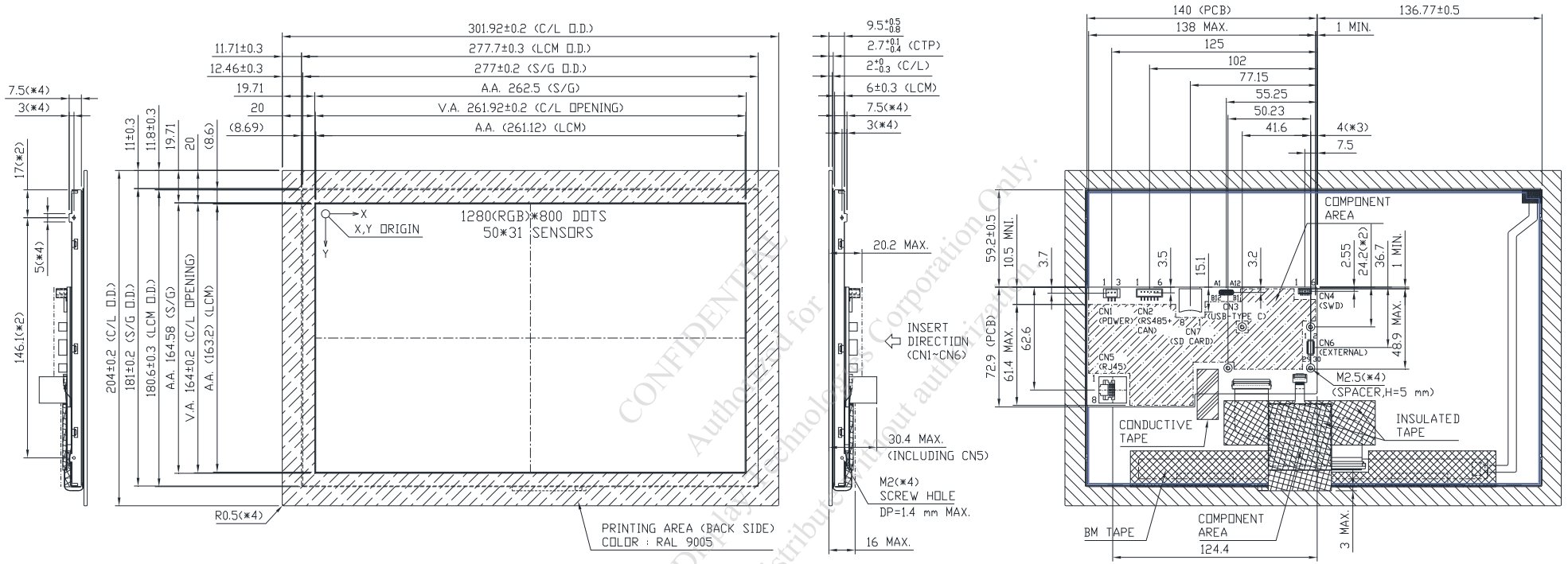


UNIT：mm

(b)THE BRIGHTNESS UNIFORMITY CALCULATING METHOD

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

8. OUTLINE DIMENSIONS

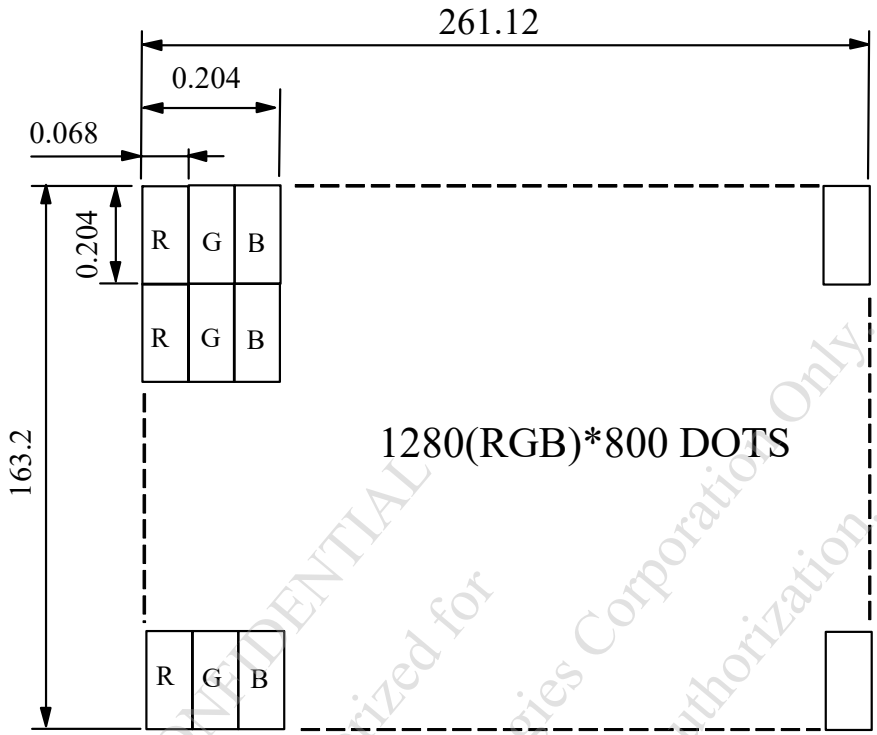


UNIT : mm
SCALE : NTS

THIRD ANGLE PROJECTION

NOT SPECIFIED TOLERANCE IS±0.5mm
NOTE :
1.C/L GLASS : SODA LIME, CHAMFERED EDGES.
2.CN1(POWER) : TOPWISE A2001WV-S-3P-LCP OR EQUIVALENT.
3.CN2(RS485+CAN) : JST B6B-PH-SM4-TB OR EQUIVALENT.
4.CN3(USB-TYPE C) : HRS CX80B2-24P OR EQUIVALENT.
5.CN4(SWO) : TOPWISE A1002WV-S-6P-LCP OR EQUIVALENT.
6.CN5(RJ45) : WURTH 74984104401 OR EQUIVALENT.
7.CN6(EXTERNALl) : JST 30P5.0-JMCS-GAN-A-TF OR EQUIVALENT.
8.( ) : REFERENCE DIMENSION
9.POLARIZER VISIBLE IN THE VIEWING AREA OF COVER LENS IS ACCEPTABLE.
10.CN7(SD CARD) : HIROSE DM3CS-SF OR EQUIVALENT.

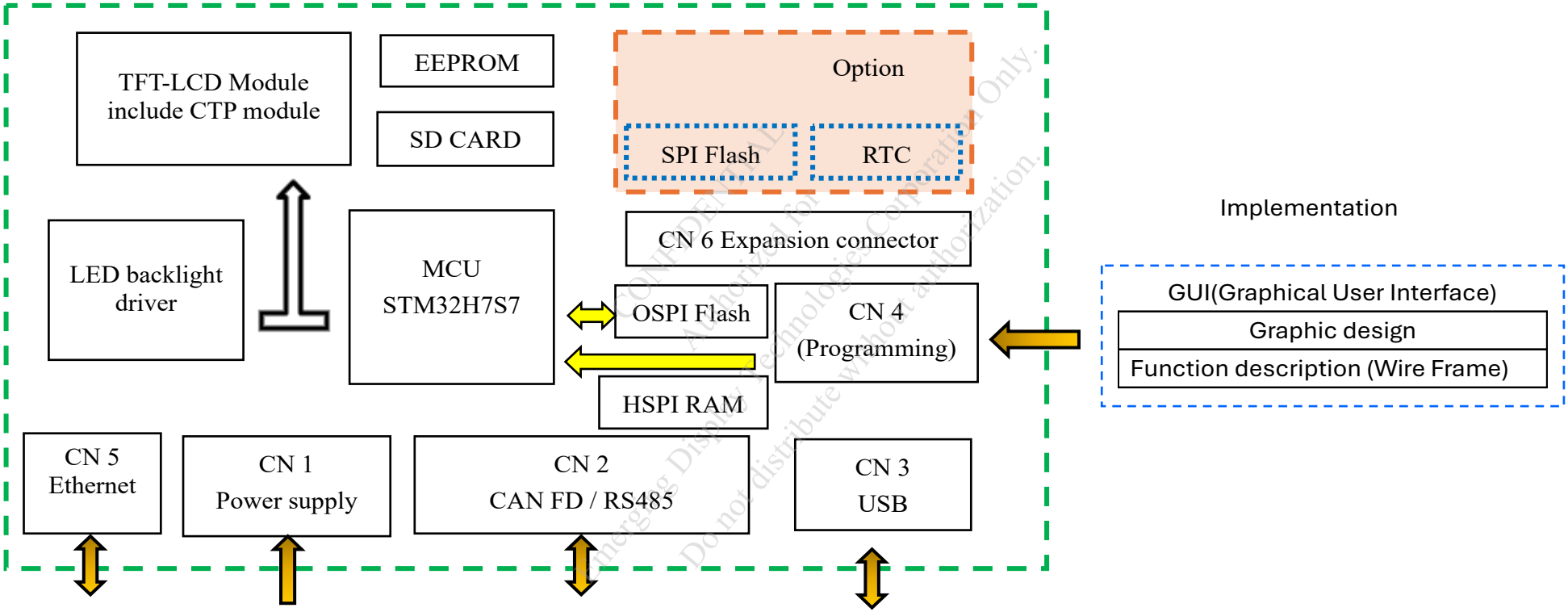
9. DETAIL DRAWING OF DOT MATRIX



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

10. BLOCK DIAGRAM

10.1 BLOCK DIAGRAM



11. INTERFACE SIGNALS

11.1 CN1 POWER SUPPLY INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	VP_IN	POWER SUPPLY
2	VP_EN	POWER SUPPLY ENABLE (INTERNAL PULL HIGH)
3	VSS	GROUND

11.2 CN2 CAN FD &RS485 INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	VSS	GROUND
2	RS485A	RS485-A
3	RS485B	RS485-B
4	VSS	GROUND
5	CANL	LOW LEVEL CAN BUS SIGNAL
6	CANH	HIGH LEVEL CAN BUS SIGNAL

11.3 CN3 USB INTERFACE

PIN NO.	SYMBOL	FUNCTION
A1	GND	GROUND
A2	NC	NO CONNECTION
A3	NC	NO CONNECTION
A4	VBUS	POWER INPUT IS NOT SUPPORT
A5	CC1	CONFIGURATION CHANNEL (NOT USED)
A6	D+	D+
A7	D-	D-
A8	NC	NO CONNECTION
A9	VBUS	POWER INPUT IS NOT SUPPORT
A10	NC	NO CONNECTION
A11	NC	NO CONNECTION
A12	GND	GROUND
B1	GND	GROUND
B2	NC	NO CONNECTION
B3	NC	NO CONNECTION
B4	VBUS	POWER INPUT IS NOT SUPPORT
B5	CC2	CONFIGURATION CHANNEL (NOT USED)
B6	D+	D+
B7	D-	D-
B8	NC	NO CONNECTION
B9	VBUS	POWER INPUT IS NOT SUPPORT
B10	NC	NO CONNECTION
B11	NC	NO CONNECTION
B12	GND	GROUND

11.4 CN4 PROGRAMMING INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	3V3	POWER SUPPLY (3.3V OUTPUT)
2	NC	NO CONNECTION
3	SWDIO	DATA
4	SWCLK	CLOCK
5	NRST	RESET
6	VSS	GROUND

11.5 CN1 RJ45 (10/100 BASE) WITH POE INTERFACE

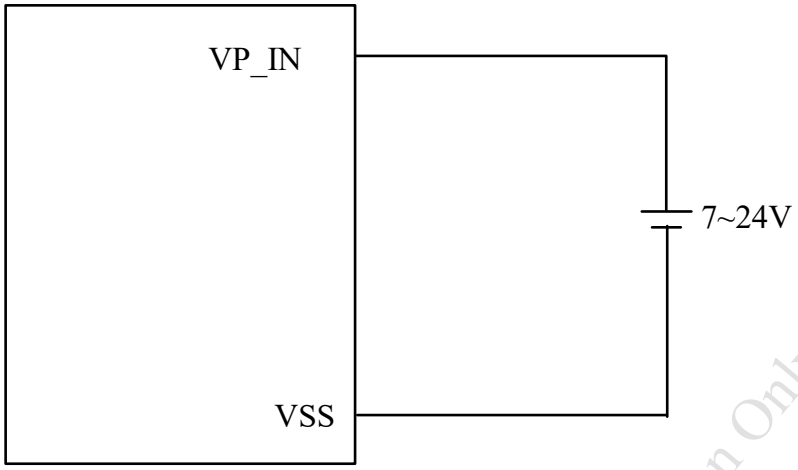
PIN NO.	SYMBOL	FUNCTION
1	TX+	TRANSMIT DATA(+)
2	TX-	TRANSMIT DATA(-)
3	RX+	RECEIVE DATA DATA(+)
4	NC	NO CONNECTION
5	NC	NO CONNECTION
6	RX-	RECEIVE DATA(-)
7	NC	NO CONNECTION
8	NC	NO CONNECTION

11.6 CN6 EXPANSION CONNECTOR INTERFACE

WE HAVE PROVIDED PCB PADS FOR ONE 30 PIN EXPANSION CONNECTOR, CN6. THE IDEA IS TO MAKE IT POSSIBLE TO ADD FUNCTIONALITY IN A QUICK WAY AND EVENTUALLY ADD THIS TO A REDESIGNED PCB BOARD. WE HAVE ADDED THE MOST OBVIOUS ALTERNATE FUNCTIONS IN THE TABLES. YOU CAN CONSULT THE STM32H7S7 DATASHEET FOR MORE DETAILS.

PIN NO.	SYMBOL	ALTERNATE FUNCTIONS				
		MCU I/O PORT	GPIO	ADC/DAC	UART	TIMER
1	+5V OUT	—	—			
2	GND	—	—			
3	+3.3V OUT	—	—			
4	GND	—	—			
5	USART1_TX	PF_13	GPIO	ADC2_INP2		
6	I2C2_SCL	PF_1	GPIO			
7	USART1_RX	PF_12	GPIO	ADC1_INN2 ADC1_INP6		
8	I2C2_SDA	PF_0	GPIO			
9	GPIO_3	PF_6	GPIO			TIM16_CH1
10	I2C2_INT	PF_7	GPIO			TIM17_CH1
11	GPIO_2	PF_5	GPIO			
12	I2C2_RST	PF_8	GPIO			TIM13_CH1 TIM16_CH1N
13	SPI4_MISO	PE_5	GPIO			TIM15_CH1
14	SPI2_NSS	PB_9	GPIO			TIM4_CH4 TIM17_CH1
15	SPI4_NSS	PE_4	GPIO			TIM15_CH1N
16	SPI2_SCK	PD_3	GPIO			TIM1_CH3N
17	SPI4_SCK	PE_2	GPIO			TIM1_CH2N
18	SPI2_MISO	PC_2	GPIO	ADC1_INN11 ADC1_INP12 ADC2_INN11 ADC2_INP12		TIM1_CH1
19	SPI4_MOSI	PE_6	GPIO			TM15_CH2
20	SPI2_MOSI	PC_3	GPIO	ADC1_INN12 ADC1_INP13 ADC2_INN12 ADC2_INP13		TIM1_CH2
21	UART8_TX	PE_1	GPIO			
22	USART2_TX	PD_5	GPIO			TIM1_CH4N
23	UART8_RX	PE_0	GPIO			
24	USART2_RX	PD_6	GPIO			
25	UART8_RTS	PD_15	GPIO			TIM4_CH4
26	ADC2_INP10	PC_0	GPIO	ADC1_INP10 ADC2_INP10		
27	UART8_CTS	PD_14	GPIO			TIM4_CH3
28	TIM15_CH2	PA_3	GPIO	ADC1_INP15 ADC2_INP15		TIM1_CH3 TIM2_CH4 TIM5_CH4
29	GPIO_0	PD_13	GPIO			TIM4_CH2
30	GPIO_1	PD_12	GPIO			TIM4_CH1

12. POWER SUPPLY



13. CAPACITIVE TOUCH PANEL SPECIFICATION

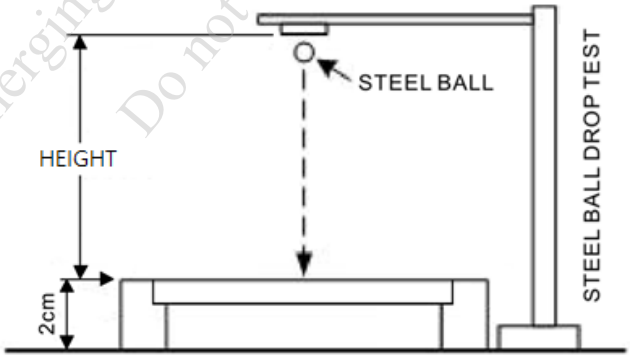
13.1 HARDNESS

ITEM	DESCRIPTION
SURFACE HARDNESS	7H (MIN)

13.2 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：500g HEIGHT OF FALL：20 cm (IK6)	VISUAL INSPECTION	SIGN OF FRACTURE OR DAMAGE IS NOT ACCEPTABLE 3 TIMES/ 1 POINTS, 25°C(CENTER TEST)



14. INSPECTION CRITERIA

14.1 APPLICATION

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

14.2 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°

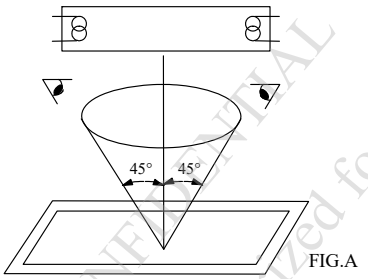


FIG.A

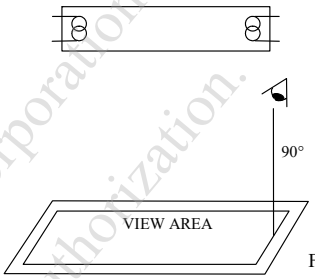


FIG.B

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.

14.2.2 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

14.2.3 INSPECTION LOT

QUANTITY PER DELIVERY LOT FOR EACH MODEL

14.2.4 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

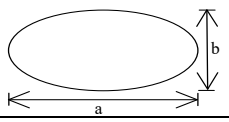
MINOR DEFECT：AQL 1.0

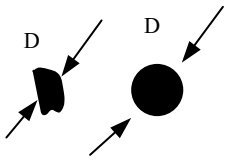
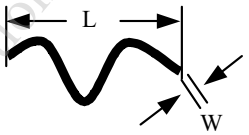
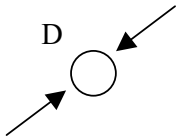
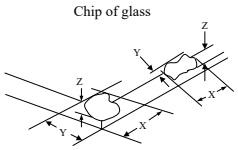
14.3 INSPECTION STANDARDS

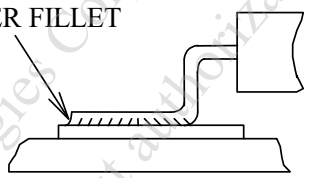
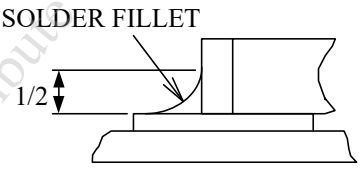
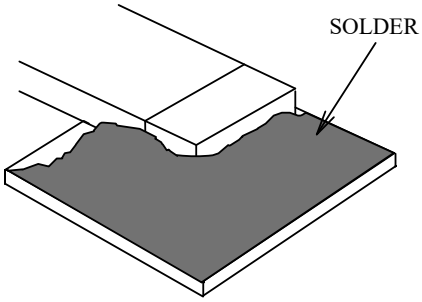
14.3.1 VISUAL DEFECTS CLASSIFICATION

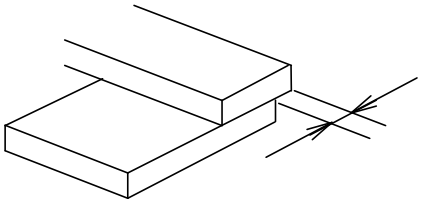
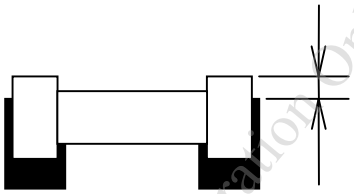
TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS EX: DISCONNECTION, SHORT CIRCUIT ETC	0.65
	2.CTP FUNCTION	• NO FUNCTION • BROKEN LINE • FALSE TOUCH	
	3.BACKLIGHT	• NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION	
	4.DIMENSIONS	• SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS	
MINOR DEFECT	1.DISPLAY ZONE	• BLACK/WHITE SPOT • BUBBLES ON POLARIZER • NEWTON RING • BLACK/WHITE LINE • SCRATCH • CONTAMINATION • UNEVEN 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	

14.3.2 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>ITEMS</th><th></th><th>ACCEPTABLE COUNT</th></tr>
<tr><td rowspan="3">BRIGHT DOT</td><td>RANDOM</td><td>N≤1</td></tr>
<tr><td>2 DOTS ADJACENT</td><td>N≤0</td></tr>
<tr><td>3 DOTS ADJACENT</td><td>N≤0</td></tr>
<tr><td>DISTANCE</td><td>MINIMUM DISTANCE BETWEEN BRIGHT DOTS</td><td>5mm</td></tr>
<tr><td rowspan="3">DARK DOT</td><td>RANDOM</td><td>N≤2</td></tr>
<tr><td>2 DOTS ADJACENT</td><td>N≤0</td></tr>
<tr><td>3 DOTS ADJACENT</td><td>N≤0</td></tr>
<tr><td colspan="2">TOTAL BRIGHT AND DARK DOT</td><td>N≤2</td></tr>
<tr><td>DISTANCE</td><td>MINIMUM DISTANCE BETWEEN DARK DOTS
MINIMUM DISTANCE BETWEEN DARK AND BRIGHT DOT.</td><td>5mm</td></tr>
<tr><td colspan="2">TINY BRIGHT DOT</td><td>VISIBLE THROUGH 5% ND FILTER
D≤0.15mm, IGNORE
0.15mm<D≤0.3mm, N≤0.3mm
DISTANCE≥5mm</td></tr>
<tr><td colspan="2">DISPLAY FAILURE (V-LINE/H-LINE/CROSS LINE ETC.)</td><td>NOT ALLOWABLE</td></tr>
<tr><td>MURA/WAVING/ HOT SPOT</td><td colspan="2">NOT VISIBLE THROUGH 5% ND FILTER</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>BUBBLES ON POLARIZER/ SURFACE STAINS/ DIRT/CF FAIL/SPOT</td><td>
<table>
<tr><th></th><th>AVERAGE DIAMETER (mm)：D</th><th>NUMBER OF PIECES PERMITTED</th></tr>
<tr><td rowspan="3">BUBBLE ON THE POLARIZER</td><td>D ≤ 0.15</td><td>IGNORE</td></tr>
<tr><td>0.15 < D ≤ 0.4</td><td>N ≤ 2</td></tr>
<tr><td>0.4 < 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 ≤ 0.1 , 2<L≤3</td><td>N ≤ 2</td></tr>
<tr><td>0.1 < W</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>
</table>

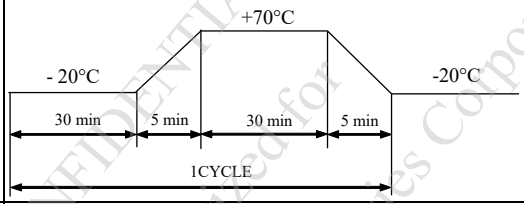
<table>
<tr><th>NO.</th><th>ITEM</th><th>CRITERIA</th><th>REMARK</th></tr>
<tr><td>5</td><td>BLACK/WHITE SPOT CIRCULAR TYPE</td><td>THE FOLLOWING BLACK/WHITE SPOT ARE WITHIN THE VIEWING AREA.
AVERAGE DIAMETER：D (mm)
<table>
<tr><th>SIZE D</th><th>PERMISSIBLE NO.</th></tr>
<tr><td>D≤0.3mm</td><td>IGNORE</td></tr>
<tr><td>0.3mm<D≤0.5mm</td><td>9</td></tr>
<tr><td>D>0.5 mm</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.</td><td> 
</td></tr>
<tr><td>6</td><td>SCRATCH</td><td>THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA.
WIDTH：W (mm) , LENGTH : L (mm)
<table>
<tr><th>SIZE W & L</th><th>PERMISSIBLE NO.</th></tr>
<tr><td>W≤0.07mm</td><td>IGNORE</td></tr>
<tr><td>0.07 mm<W≤0.1mm , L<10mm</td><td>6</td></tr>
<tr><td>W>0.1mm</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.</td><td rowspan="2"> 
</td></tr>
<tr><td>7</td><td>BLACK/WHITE LINE LINEAR TYPE/FOREIGN FIBER</td><td>THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA.
WIDTH：W (mm) , LENGTH : L (mm)
<table>
<tr><th>SIZE W & L</th><th>PERMISSIBLE NO.</th></tr>
<tr><td>W≤0.07mm</td><td>IGNORE</td></tr>
<tr><td>0.07 mm<W≤0.1mm , L<10mm</td><td>6</td></tr>
<tr><td>W>0.1mm</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.</td></tr>
<tr><td>8</td><td>BUBBLE / DENT FOR OPTICAL BONDING</td><td>BUBBLES WITHIN VIEWING AREA.
AVERAGE DIAMETER：D (mm)
<table>
<tr><th>SIZE D</th><th>PERMISSIBLE NO.</th></tr>
<tr><td>D≤0.3mm</td><td>IGNORE</td></tr>
<tr><td>0.3mm<D≤0.5mm</td><td>9</td></tr>
<tr><td>D>0.5 mm</td><td>0</td></tr>
</table></td><td> 
</td></tr>
<tr><td>9</td><td>CHIP DAMAGE ON GLASS</td><td>
<table>
<tr><td>CORNER</td><td>X ≤ 3mm、Y ≤ 3mm、Z ≤ t
(t : thickness)</td></tr>
<tr><td>EDGE</td><td>X≤6 mm、Y≤ 1mm、Z <t
(t : thickness)</td></tr>
</table></td><td> 
</td></tr>
<tr><td>10</td><td>CRACK</td><td colspan="2">NOT ACCEPTABLE</td></tr>
<tr><td>11</td><td>LINE DEFECT ON DISPLAY</td><td colspan="2">OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED</td></tr>
<tr><td>12</td><td>MURA ON DISPLAY</td><td colspan="2">MURA NOT VISIBLE THROUGH 5% ND FILTER</td></tr>
<tr><td>13</td><td>UNEVEN COLOR SPREAD, COLORATION</td><td colspan="2">1. TO BE DETERMINED BASED UPON THE STANDARD SAMPLE.</td></tr>
</table>

NO.	ITEM	CRITERIA
14	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.
15	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.
16	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 

NO.	ITEM	CRITERIA
16	SOLDERING	3. PARTS ALIGNMENT (a)LSI, IC LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE  (b)CHIP COMPONENT COMPONENT IS OFF CENTER, AND MORE THAN 50% OF THE LEADS IS OFF THE PAD OUTLINE  4. NO UNMELTED SOLDER PASTE MAY BE PRESENT ON THE PCB. 5. NO COLD SOLDER JOINTS, MISSING SOLDER CONNECTIONS, OXIDATION OR ICICLE. 6. NO RESIDUE OR SOLDER BALLS ON PCB. 7. NO SHORT CIRCUITS IN COMPONENTS ON PCB.
17	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.
18	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.

15. RELIABILITY TEST

15.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE

NO.	ITEM	DESCRIPTION
1	HIGH TEMPERATURE TEST (OPERATION)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +70°C FOR 240 HRS
2	LOW TEMPERATURE TEST (OPERATION)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -20°C FOR 240 HRS
3	HIGH TEMPERATURE TEST (STORAGE)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +80°C FOR 240 HRS
4	LOW TEMPERATURE TEST (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 TEST (NOT OPERATED)	THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION: 
7	VIBRATION (NOT OPERATED)	11.76 m/s^2(1.2G), 10~100 Hz XYZ DIRECTIONS, 1 HR EACH
8	SHOCK (NOT OPERATED)	490.0 m/s^2(50G), 10 ms XYZ DIRECTIONS, 1 TIME EACH
9	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)：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)：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

16. CAUTION

16.1 OPERATION

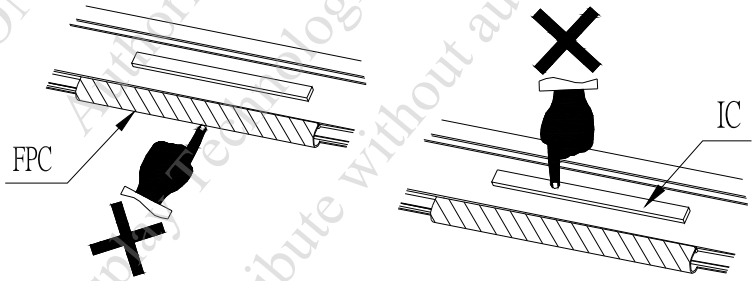
16.1.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .

16.1.2 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.

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

16.1.4 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.

16.1.5 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!



16.2 STORAGE

16.2.1 STORE THE MODULE IN A DARK ROOM OR KEEP IN ORIGINAL PACKAGE WHERE MUST KEEP AT 25±10℃ AND 65%RH OR LESS.

16.2.2 DO NOT STORE THE MODULE IN SURROUNDINGS CONTAINING ORGANIC SOLVENT OR CORROSIVE GAS.

16.2.3 STORE THE MODULE IN AN ANTI-ELECTROSTATIC CONTAINER OR BAG.

16.3 NOTICE

16.3.1 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.

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

16.3.3 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.

16.3.4 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.

16.3.5 DON’T GIVE EXTERNAL SHOCK.

16.3.6 DON’T APPLY EXCESSIVE FORCE ON THE SURFACE.

16.3.7 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.

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

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

16.3.10 STORE WITHOUT ANY PHYSICAL LOAD.

16.3.11 REWIRING: NO MORE THAN 3 TIMES.

17. CERTIFICATION

17.1 CE CERTIFICATION

TYPE OF TEST: EMC DIRECTIVE 2014/30/EU FOR CE MARKING
TECHNICAL STANDARD :
EMISSION :

TEST STANDARD	TEST ITEM
EN IEC 61000-6-3:2021	RADIATED EMISSION

IMMUNITY:
EN IEC61000-6-1:2019

TEST STANDARD	TEST ITEM
IEC 61000-4-2:2008	ELECTROSTATIC DISCHARGE
IEC 61000-4-3:2010	RADIATED SUSCEPTIBILITY
IEC 61000-4-4:2012	ELECTRICAL FAST TRANSIENT
IEC 61000-4-5:2017	SURGE
IEC 61000-4-6:2013	CONDUCTED SUSCEPTIBIITY
IEC 61000-4-8:2009	MAGNETIC FIELD

17.2 FCC CERTIFICATION

TYPE OF TEST: FCC PART 15 SUBPART B
TECHNICAL STANDARD :
EMISSION :
FCC PART 15 SUBPART B CLASS B
ANSI C63.4:2014

TEST STANDARD	TEST ITEM
FCC PART 15 SUBPART B CLASS B ANSI C63.4	CONDUCTED EMISSION
	RADIATED EMMISSION (BELOW 1GHz)
	RADIATED EMMISSION (ABOVE 1GHz)

CE/FCC MARKING IS TYPICALLY REQUIRED ONLY FOR COMPLETE END PRODUCTS.
EDT SMART EMBEDDED MODULES ARE SEMI-FINISHED GOODS INTENDED FOR INTEGRATION INTO FINISHED PRODUCTS.
THEREFORE, THE CE/FCC MARKING ON EDT SMART EMBEDDED MODULES IS PROVIDED FOR REFERENCE ONLY.