EXAMINED BY : C. H. Chu	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-0009802
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APPROVED BY: Yung Chang Hu		TOTAL PAGE : 22
		VERSION : 4

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

E T E M B 0 5 7 0 2 7 X D R A L

(RoHS)

FOR MESSRS :

_____

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CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

RECORDS OF REVISION

DOC . FIRST ISSUE

FEB.20, 2025

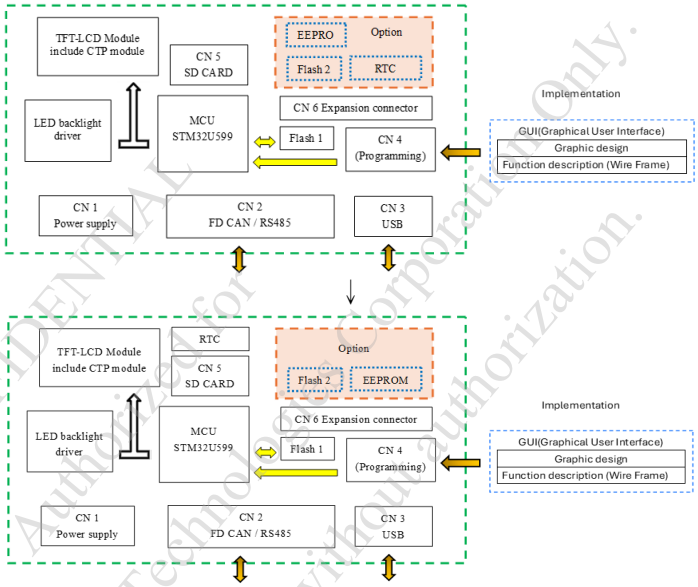
DATE	REVISED PAGE NO.	SUMMARY
MAR.19, 2025	13	13.2 DURABILITY ITEM: STEEL BALL DROP TEST — CONDITION: WEIGHT：67g, HEIGHT OF FALL：30 cm → ITEM: STEEL BALL DROP TEST — CONDITION: WEIGHT：500g, HEIGHT OF FALL：40 cm (IK7)
NOV.21, 2025	12	11.5 CN6 EXPANSION CONNECTOR INTERFACE REVISING THE ENTIER PAGE
DEC.31, 2025	9	10.1 BLOCK DIAGRAM 

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TABLE OF CONTENTS

NO.	ITEM	PAGE
1.	GENERAL SPECIFICATIONS	1
2.	MECHANICAL SPECIFICATIONS	1 , 2
3.	ABSOLUTE MAXIMUM RATINGS	3
4.	ELECTRICAL CHARACTERISTICS	4
5.	TIMING CHARACTERISTICS	4
6.	MCU CHARACTERISTICS	4
7.	OPTICAL CHARACTERISTICS	5 , 6
8.	OUTLINE DIMENSIONS	7
9.	DETAIL DRAWING OF DOT MATRIX	8
10.	BLOCK DIAGRAM	9 , 10
11.	INTERFACE SIGNALS	11 , 12
12.	POWER SUPPLY	13
13.	CAPACITIVE TOUCH PANEL SPECIFICATION	13
14.	INSPECTION CRITERIA	14 ~ 19
15.	RELIABILITY TEST	20
16.	CAUTION	21 , 22

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1. GENERAL SPECIFICATIONS

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

STM32U599

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

MICROCHIP/mXT640UD

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 EMBEDDED SYSTEM MECHANICAL SPECIFICATIONS

(1) DISPLAY SIZE	----------	5.7 inch
(2) NUMBER OF DOTS	----------	640(BGR)W * 480H DOTS
(3) MODULE SIZE	----------	147.6W * 118.8H *18.7(MAX.)D mm
(4) VIEWING AREA	----------	116W * 87.2H mm
(5) ACTIVE AREA	----------	115.2W * 86.4H mm
(6) DOT SIZE	----------	0.06W * 0.18H mm
(7) PIXEL SIZE	----------	0.18W * 0.18H mm
(8) LCD TYPE	----------	TFT , TRANSMISSIVE , NORMALLY BLACK ANTI-GLARE
(9) COLOR	----------	16.7M
(10) VIEWING DIRECTION	----------	SUPER WIDE VIEW
(11) BACKLIGHT	----------	LED , COLOR : WHITE
(12) INTERFACE MODE	----------	FD CAN , RS485 , USB(TYPE C)
(13) WEIGHT	----------	275g

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2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS

(1) TOUCH PANEL SIZE ---------- 5.7 inch

(2) OUTER DIMENSION ---------- 147.6W * 118.8H mm

(3) EFFECTIVE AREA ---------- 116W * 87.2H mm

(4) ACTIVE AREA ---------- 117.2W * 88.4H mm

(5) INPUT TYPE ---------- MULTI TOUCH *

(6) NUMBER OF TOUCH SENSOR ---------- 24*18 SENSORS

*NOTE: ACCORDING TO IMPLEMENTATION DESIGN

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3. ABSOLUTE MAXIMUM RATINGS

3.1 EMBEDDED SYSTEM ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER VOLTAGE	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.

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4. ELECTRICAL CHARACTERISTICS

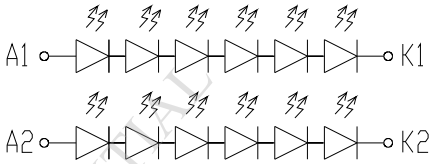
4.1 EMBEDDED SYSTEM ELECTRICAL CHARACTERISTICS

Ta = 25 °C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VP_IN	—	7	12	36	V	VGND=0
POWER SUPPLY CURRENT	I_{VP_IN}	VP_IN=7V	—	545	650	mA	—
	I_{VP_IN}	VP_IN=12V	—	320	384	mA	—
	I_{VP_IN}	VP_IN=36V	—	110	132	mA	—
LED LIFE TIME	—	—	(30K)	—	—	HRS	NOTE (4) NOTE (5)

NOTE (1)：VIL/VIH/VOL/VOH REFER TO STM32U599 DATA SHEET

NOTE (2)：INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT



NOTE (3)：MAXIMUM ALLOWED CURRENT IN LEDS VS. TEMPERATURE ARE AUTOMATICALLY ADJUSTED BY SYSTEM CONTROLLER.

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

NOTE (5)：DEFINITIONS OF FAILURE
LCD LUMINANCE BECOMES HALF OF THE INITIAL VALUE.

5. TIMING CHARACTERISTICS

REFER TO STM32U599 DATA SHEET

6. MCU CHARACTERISTICS

ITEM	MEMORY SIZE		REMARK
	INTERNAL	EXTERNAL	
SRAM	2.5MB	—	
FLASH	2 MB	32 MB	

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7. OPTICAL CHARACTERISTICS

7.1 OPTICAL CHARACTERISTICS(NOTE 1)

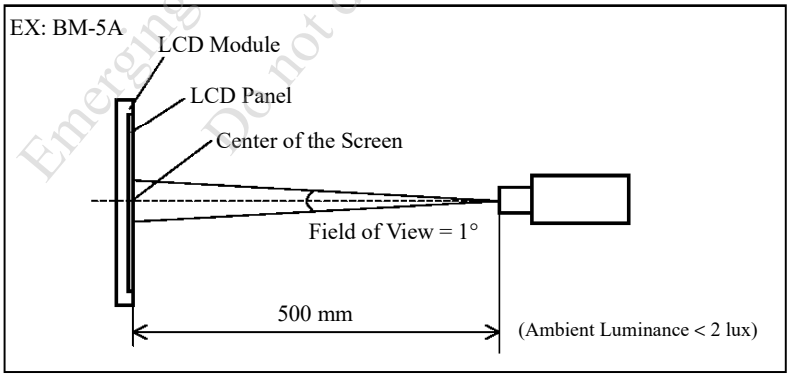
Ta = 25 ± 2 °C

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°		700	1000	—	—	NOTE (3)
RESPONSE TIME		T_R (rise) + T_F (fall)	θx=0° , θy=0°		—	25	35	ms	NOTE (4)
COLOR CHROMATICITY (CENTER)	WHITE	Wx	θx=0° , θy=0° VDD-VSS=3.3V VBL+-VSS=12V (NTSC : 75%)		0.26	0.31	0.36	—	NOTE (5)
		Wy			0.32	0.37	0.42		
	RED	Rx			0.60	0.65	0.70	—	
		Ry			0.28	0.33	0.38		
	GREEN	Gx			0.26	0.31	0.36	—	
		Gy			0.60	0.65	0.70		
	BLUE	Bx			0.09	0.14	0.19	—	
		By			0.05	0.10	0.15		
THE BRIGHTNESS OF MODULE (CENTER)		B			680	850	—	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.

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



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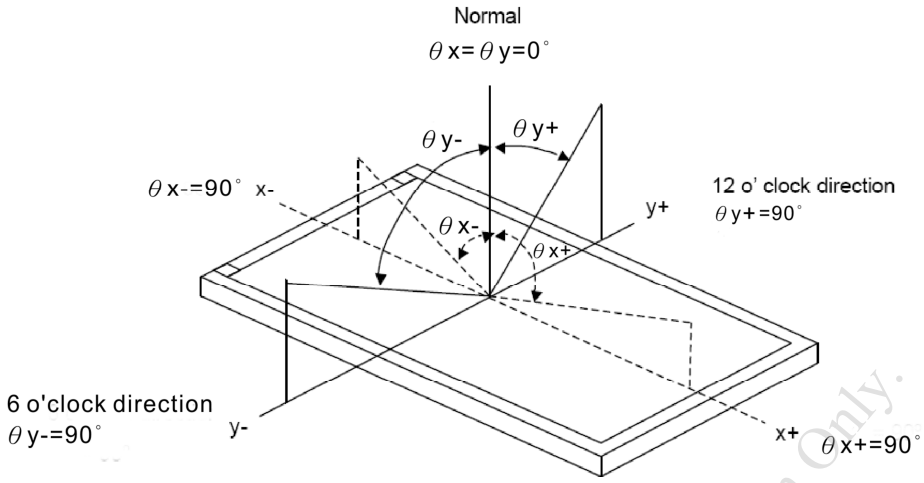
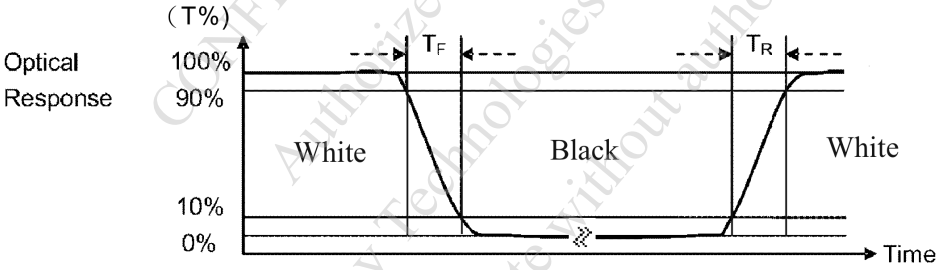
NOTE (2)：DEFINITION OF VIEWING ANGLE :



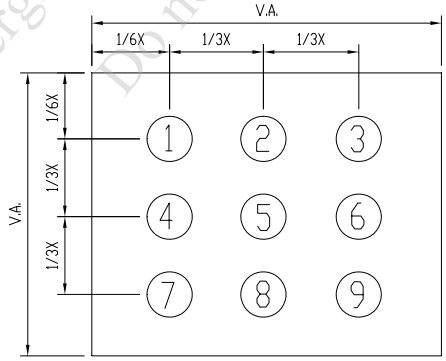
NOTE (3)：DEFINITION OF CONTRAST RATIO (CR) :
MEASURED AT THE CENTER POINT OF MODULE

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

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

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

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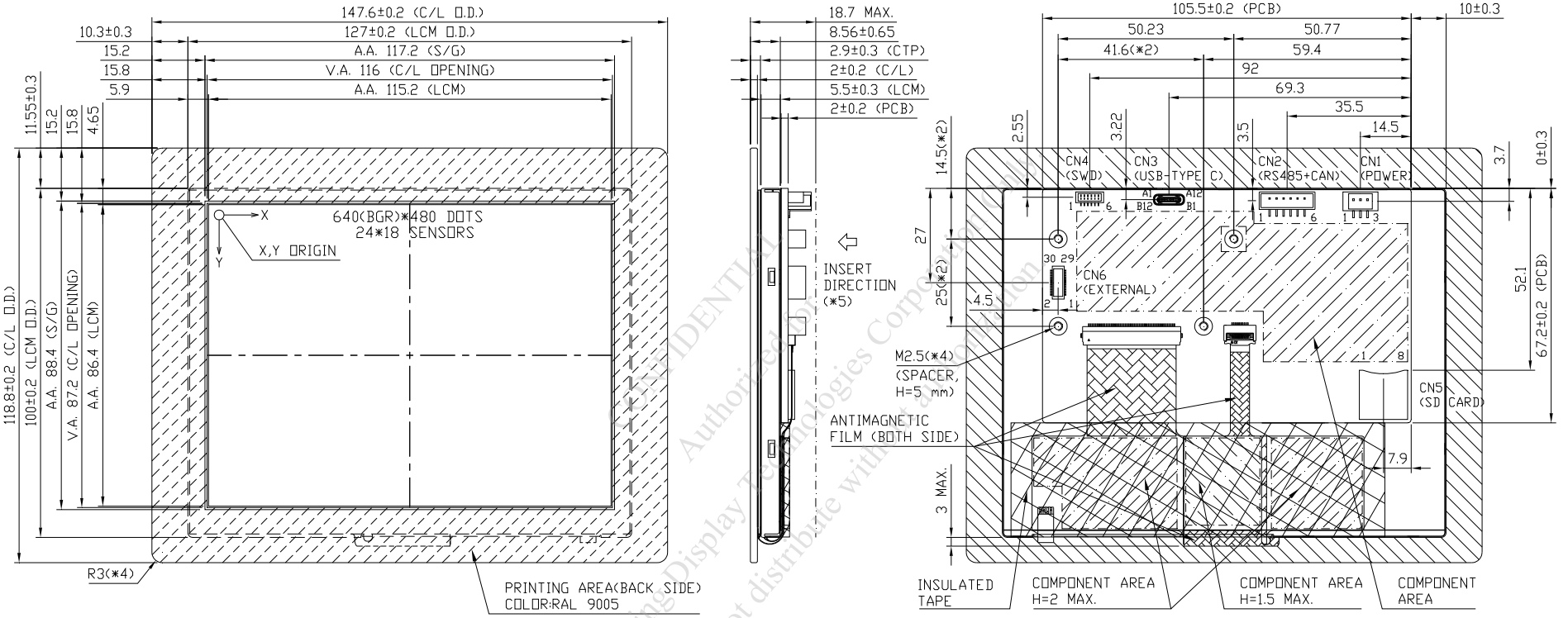
8. OUTLINE DIMENSIONS



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(SWD) : TOPWISE A1002WV-S-6P-LCP OR EQUIVALENT.
6.CN5(SD CARD) : DM3CS-SF (HIROSE) OR EQUIVALENT.
7.CN6(EXTERNAL) : JST 30P5.0-JMCS-GAN-A-TF OR EQUIVALENT

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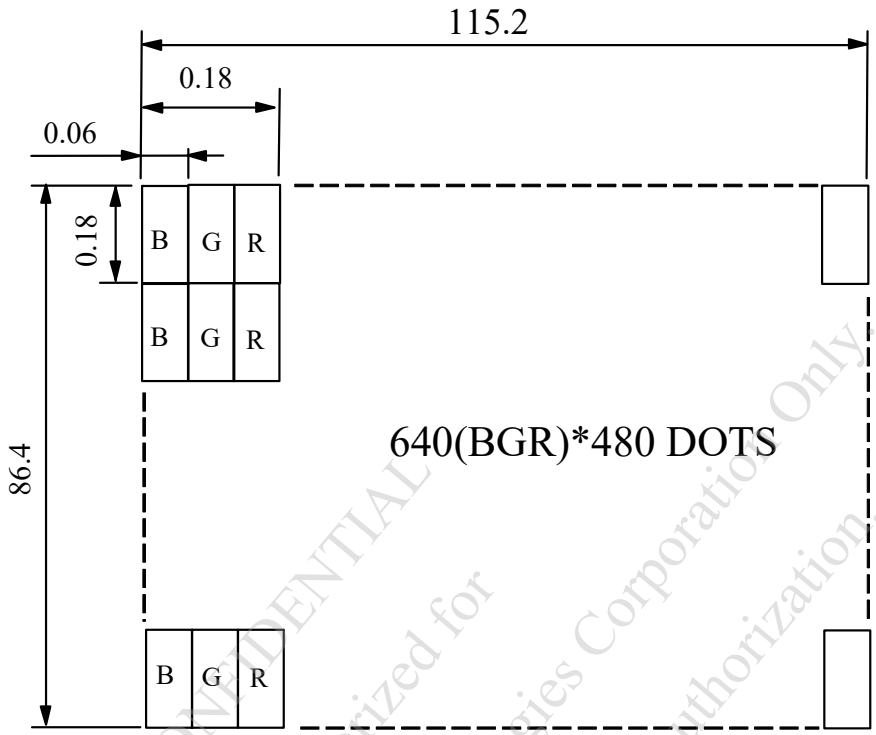
9. DETAIL DRAWING OF DOT MATRIX



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

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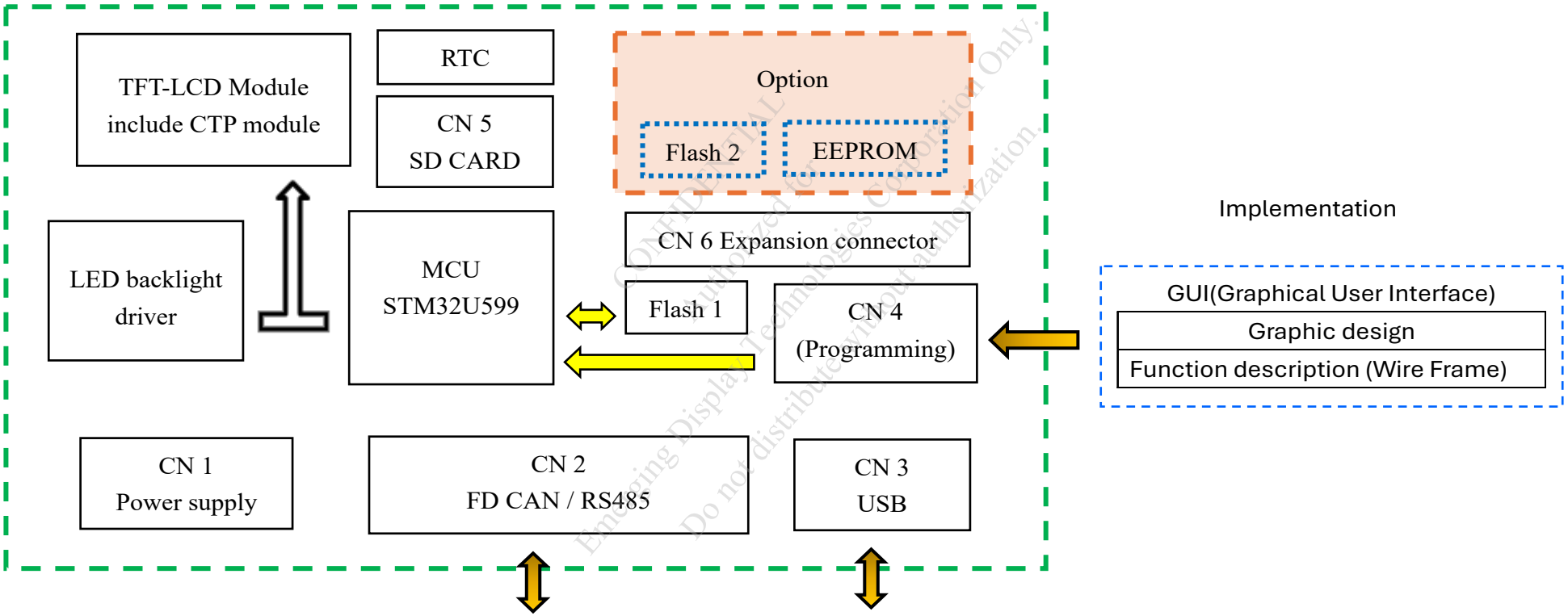
10. BLOCK DIAGRAM

10.1 BLOCK DIAGRAM



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10.2 IMPLEMENTATION TURN-KEY SOLUTION

BUSINESS MODEL	IMPLEMENTATION	GRAPHIC DESIGN
MODEL 1	EDT	EDT
MODEL 2	EDT	CUSTOMER / THIRD PARTY
MODEL 3	CUSTOMER / THIRD PARTY	CUSTOMER / THIRD PARTY

NOTE：THE MODEL 3 WILL REQUIRE THE SOFTWARE IMPLEMENTATION BY CUSTOMER OR A THIRD PARTY. CUSTOMER OR THIRD PARTY WILL NEED TO PROVIDE A BIN OR HEX FILE TO EDT DURING INITIAL DESIGN/DEVELOPMENT STAGE OF PROJECT, AND COULD REFERENCE TouchGFX FOR THIS DEVELOPMENT.

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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 FD CAN & 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	NON CONNECTION
A3	NC	NON CONNECTION
A4	VBUS	POWER SUPPLY
A5	CC1	INTERNAL PULL DOWN RESISTER 5.1K Ohm
A6	D+	D+
A7	D-	D-
A8	NC	NON CONNECTION
A9	VBUS	POWER SUPPLY
A10	NC	NON CONNECTION
A11	NC	NON CONNECTION
A12	GND	GROUND
B1	GND	GROUND
B2	NC	NON CONNECTION
B3	NC	NON CONNECTION
B4	VBUS	POWER SUPPLY
B5	CC2	INTERNAL PULL DOWN RESISTER 5.1K Ohm
B6	D+	D+
B7	D-	D-
B8	NC	NON CONNECTION
B9	VBUS	POWER SUPPLY
B10	NC	NON CONNECTION
B11	NC	NON CONNECTION
B12	GND	GROUND

11.4 CN4 PROGRAMMING INTERFACE

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

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11.5 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 STM32U599 DATASHEET FOR MORE DETAILS.

PIN NO.	SYMBOL	MCU PIN/ PORT	ALTERNATE FUNCTION			
			GPIO	ADC/DAC	UART	TIMER
1	5V OUT	—	—			
2	GND	—	—			
3	3V OUT	—	—			
4	GND	—	—			
5	EX_I2C3 SCL	PG_7	GPIO		LPUART1_TX	
6	EX_I2C4 SCL	PB_6	GPIO		USART1_TX	
7	EX_I2C3 SDA	PG_8	GPIO		LPUART1_RX	
8	EX_I2C4 SDA	PB_7	GPIO		USART1_RX	
9	EX_I2C3 INT	PG_6	GPIO		LPUART1_RTS , LPUART1_DE	
10	EX_I2C4 INT	PE_4	GPIO			TIM3_CH2
11	EX_I2C3 RST	PG_5	GPIO		LPUART1_CTS	
12	EX_I2C4 RST	PE_1	GPIO			TIM17_CH1
13	EX_SPI3_SCK	PG_9	GPIO	DAC1_EXIT9	USART1_TX	
14	EX_SPI2 NSS	PI_0	GPIO			TIM5_CH4
15	EX_SPI3_MISO	PG_10	GPIO		USART1_RX	
16	EX_SPI2 SCK	PI_1	GPIO			
17	EX_SPI3_MOSI	PG_11	GPIO		USART1_CTS	TIM15_CH2
18	EX_SPI2 MISO	PI_2	GPIO			TIM8_CH4
19	EX_SPI3_NSS	PG_12	GPIO		USART1_RTS	
20	EX_SPI2 MOSI	PI_3	GPIO			
21	EX_USART6 TX	PJ_3	GPIO			
22	EX_USART3 TX	PC_4	GPIO	ADC_IN13 , ADC2_IN13, ADC4_IN22		
23	EX_USART6 RX	PJ_4	GPIO			
24	EX_USART3 RX	PC_5	GPIO	ADC1_IN14 , ADC2_IN14 , TAMPIN4		
25	EX_USART6 RTS	PJ_5	GPIO		UART6_DE	
26	EX_ADC4_IN7	PG_0	GPIO			
27	EX_USART6 CTS	PJ_7	GPIO			
28	EX_DAC_OUT1	PA_4	GPIO	ADC1_IN9		
29	EX_GPIO1	PJ_2	GPIO			
30	EX_GPIO2	PJ_6	GPIO			

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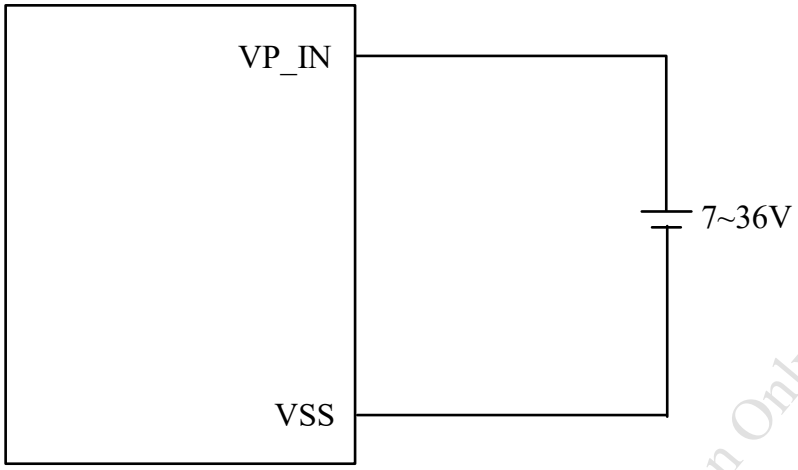
12. POWER SUPPLY



13. CAPACITIVE TOUCH PANEL SPECIFICATION

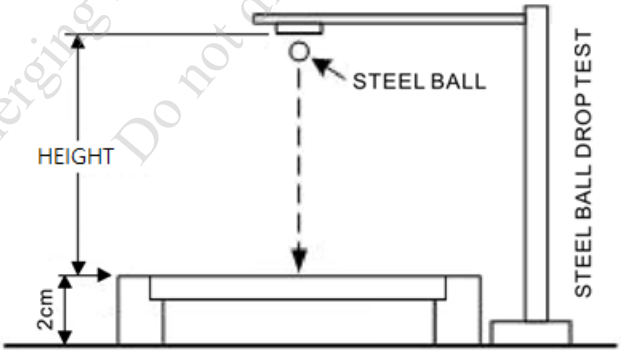
13.1 HARDNESS

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：40 cm (IK7)	VISUAL INSPECTION	SIGN OF FRACTURE OR DAMAGE IS NOT ACCEPTABLE 3 TIMES/ 1 POINTS, 25°C(CENTER TEST)



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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°

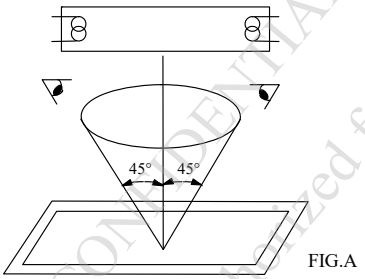

FIG.A

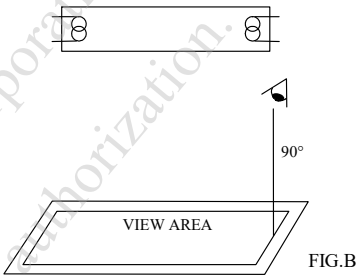

FIG.B

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		20±5°C
AMBIENT HUMIDITY		55±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

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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.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 • 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	

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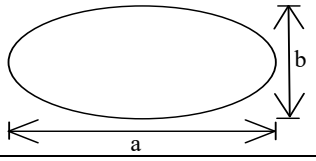
14.3.2 MODULE DEFECTS CLASSIFICATION

<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 colspan="2">ITEM</th><th>ACCEPTABLE COUNT</th></tr>
<tr><td rowspan="3">BRIGHT DOT</td><td>RANDOM</td><td>N = 3</td></tr>
<tr><td>2 DOTS ADJACENT (PAIR)</td><td>N = 0</td></tr>
<tr><td>3 DOTS ADJACENT OR MORE</td><td>N = 0</td></tr>
<tr><td rowspan="3">DARK DOT</td><td>RANDOM</td><td>N ≤ 5</td></tr>
<tr><td>2 DOTS ADJACENT (PAIR)</td><td>N = 0</td></tr>
<tr><td>3 DOTS ADJACENT OR MORE</td><td>N = 0</td></tr>
<tr><td colspan="2">TOTAL BRIGHT AND DARK DOT</td><td>N ≤ 6</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 OF POLARIZER /DIRT/CF FAIL /SURFACE STAINS</td><td>
<table>
<tr><th></th><th>AVERAGE DIAMETER (mm)：D</th><th>NUMBER OF PIECES PERMITTED</th></tr>
<tr><td rowspan="3">BUBBLE ON THE POLARIZER</td><td>D ≤ 0.25</td><td>IGNORE</td></tr>
<tr><td>0.25 < D ≤ 0.5</td><td>N ≤ 5</td></tr>
<tr><td>0.5 < D</td><td>NONE</td></tr>
<tr><td rowspan="3">SURFACE STAINS</td><td>D ≤ 0.1</td><td>IGNORE</td></tr>
<tr><td>0.1 < D ≤ 0.5</td><td>N ≤ 4</td></tr>
<tr><td>0.5 < D</td><td>NONE</td></tr>
<tr><td rowspan="3">CF FAIL / SPOT</td><td>D ≤ 0.1</td><td>IGNORE</td></tr>
<tr><td>0.1 < D ≤ 0.5</td><td>N ≤ 4</td></tr>
<tr><td>0.5 < D</td><td>NONE</td></tr>
</table>
NOTE : (1)POLARIZER BUBBLE IS DEFINED AS THE BUBBLE APPEARS ON ACTIVE DISPLAY AREA. THE DEFECT OF POLARIZER BUBBLE SHALL BE IGNORED IF THE POLARIZER BUBBLE APPEARS ON THE OUTSIDE OF ACTIVE DISPLAY AREA.
(2)THE EXTRANEOUS SUBSTANCE IS DEFINED AS IT CAN BE OBSERVED WHEN THE MODULE IS POWER ON.
(3)THE DEFINITION OF AVERAGE DIAMETER, D IS DEFINED AS FOLLOWING.
AVERAGE DIAMETER (D)=(a+b)/2
 
</td></tr>
</table>

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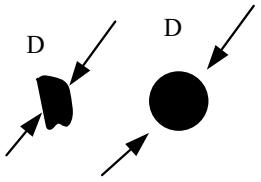
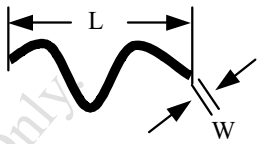
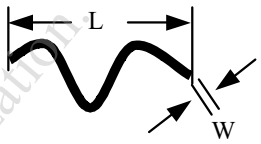
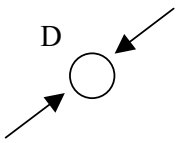
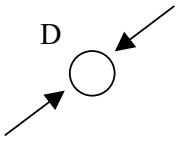
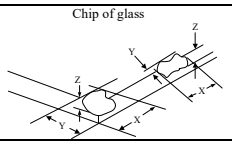
<table>
<tr><th>NO.</th><th>ITEM</th><th>CRITERIA</th></tr>
<tr><td>5</td><td>BLACK/WHITE SPOT CIRCULAR TYPE</td><td>THE FOLLOWING BLACK/WHITE SPOT ARE WITHIN THE VIEWING AREA. AVERAGE DIAMETER：D (mm)
<table>
<tr><th>SIZE D</th><th>PERMISSIBLE NO.</th></tr>
<tr><td>D≤0.2</td><td>IGNORE</td></tr>
<tr><td>0.2<D≤0.3</td><td>5</td></tr>
<tr><td>0.3<D≤0.5</td><td>5</td></tr>
<tr><td>D>0.5</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.

</td></tr>
<tr><td>6</td><td>SCRATCH</td><td>THE FOLLOWING SCRATCH 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≤0.05</td><td>IGNORE</td></tr>
<tr><td>0.05<W≤0.2, L≤8</td><td>3</td></tr>
<tr><td>0.05<W≤0.2, 8<L≤10</td><td>2</td></tr>
<tr><td>W>0.2</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.

</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≤0.05</td><td>IGNORE</td></tr>
<tr><td>0.05<W≤0.2, L≤8</td><td>3</td></tr>
<tr><td>0.05<W≤0.2, 8<L≤10</td><td>2</td></tr>
<tr><td>W>0.2</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≤0.2</td><td>IGNORE</td></tr>
<tr><td>0.2<D≤0.3</td><td>3</td></tr>
<tr><td>0.3<D≤0.5</td><td>2</td></tr>
<tr><td>D>0.5</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.

</td></tr>
<tr><td>9</td><td>PIN HOLE</td><td>AVERAGE DIAMETER：D (mm)
<table>
<tr><th>SIZE D</th><th>PERMISSIBLE NO.</th></tr>
<tr><td>D≤0.1</td><td>IGNORE</td></tr>
<tr><td>0.1<D≤0.2</td><td>3</td></tr>
<tr><td>0.2<D≤0.3</td><td>1</td></tr>
<tr><td>D>0.3</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.
NOTE (2)：REFILL INK IS ACCEPTABLE, BUT LOGO AND ICON PIN HOLE ARE NOT ALLOWED.

</td></tr>
<tr><td>10</td><td>CHIPPING</td><td>
<table>
<tr><td>CORNER</td><td>X ≤ 3 mm , Y ≤ 3mm 、Z ≤ t
(t : THICKNESS)</td></tr>
<tr><td>EDGE</td><td>X ≤ 6mm , Y ≤ 1mm , Z < t
(t : THICKNESS)</td></tr>
</table>

</td></tr>
<tr><td>11</td><td>CRACKED GLASS</td><td>NOT ACCEPTABLE</td></tr>
<tr><td>12</td><td>LINE DEFECT ON DISPLAY</td><td>OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED</td></tr>
<tr><td>13</td><td>MURA ON DISPLAY</td><td>IT'S OK IF MURA IS SLIGHT VISIBLE THROUGH 5% ND FILTER</td></tr>
<tr><td>14</td><td>UNEVEN COLOR SPREAD, COLORATION</td><td>TO BE DETERMINED BASED UPON THE LIMITED SAMPLE.</td></tr>
<tr><td>15</td><td>BEZEL APPEARANCE</td><td>1. BEZEL MAY NOT HAVE RUST, BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION.
2. BEZEL MUST COMPLY WITH JOB SPECIFICATIONS.</td></tr>
</table>

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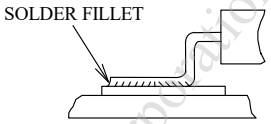
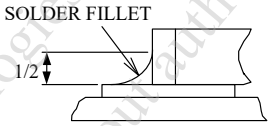
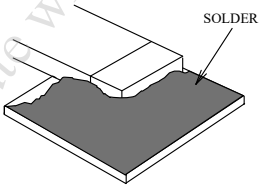
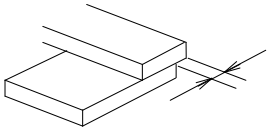
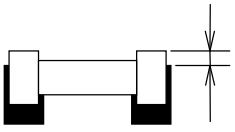
NO.	ITEM	CRITERIA
16	PCB	1. THERE MAY NOT BE MORE THAN 2mm OF SEALANT OUTSIDE THE SEAL AREA ON THE PCB, AND THERE SHOULD BE NO MORE THAN THREE PLACES. 2. NO OXIDATION OR CONTAMINATION PCB TERMINALS. 3. PARTS ON PCB MUST BE THE SAME AS ON THE PRODUCTION CHARACTERISTIC CHART. THERE SHOULD BE NO WRONG PARTS, 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.
17	SOLDERING	1. NO SOLDERING FOUND ON THE SPECIFIED PLACE 2. INSUFFICIENT SOLDER (a)LSI, IC A POOR WETTING OF SOLDER IS BETWEEN LOWER BEND OR "HEEL" OF LEAD AND PAD  (b)CHIP COMPONENT · SOLDER IS LESS THAN 50% OF SIDES AND FRONT FACE WETTING  · SOLDER WETS 3 SIDES OF TERMINAL, BUT LESS THAN 25% OF SIDES AND FRONT SURFACE AREA ARE COVERED  3. PARTS ALIGNMENT (a)LSI, IC LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE  (b)CHIP COMPONENT COMPONENT IS OFF CENTER, AND MORE THAN 50% OF THE LEADS IS OFF THE PAD OUTLINE  4. NO UNMELTED SOLDER PASTE MAY BE PRESENT ON THE PCB. 5. NO COLD SOLDER JOINTS, MISSING SOLDER CONNECTIONS, OXIDATION OR ICICLE. 6. NO RESIDUE OR SOLDER BALLS ON PCB. 7. NO SHORT CIRCUITS IN COMPONENTS ON PCB.

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NO.	ITEM	CRITERIA
18	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.
19	GENERAL APPEARANCE	1. NO OXIDATION, CONTAMINATION, CURVES OR, BENDS ON INTERFACE PIN (OLB) OF TCP. 2. NO CRACKS ON INTERFACE PIN (OLB) OF TCP. 3. NO CONTAMINATION, SOLDER RESIDUE OR SOLDER BALLS ON PRODUCT. 4. THE IC ON THE TCP MAY NOT BE DAMAGED, CIRCUITS. 5. THE UPPERMOST EDGE OF THE PROTECTIVE STRIP ON THE INTERFACE PIN MUST BE PRESENT OR LOOK AS IF IT CAUSE THE INTERFACE PIN TO SEVER. 6. THE RESIDUAL ROSIN OR TIN OIL OF SOLDERING (COMPONENT OR CHIP COMPONENT) IS NOT BURNED INTO BROWN OR BLACK COLOR. 7. SEALANT ON TOP OF THE ITO CIRCUIT HAS NOT HARDENED. 8. PIN TYPE MUST MATCH TYPE IN SPECIFICATION SHEET. 9. LCD PIN LOOSE OR MISSING PINS. 10. PRODUCT PACKAGING MUST BE THE SAME AS SPECIFIED ON PACKAGING SPECIFICATION SHEET. 11. PRODUCT DIMENSION AND STRUCTURE MUST CONFORM TO PRODUCT SPECIFICATION SHEET. 12. THE APPEARANCE OF HEAT SEAL SHOULD NOT ADMIT ANY DIRT AND BREAK.

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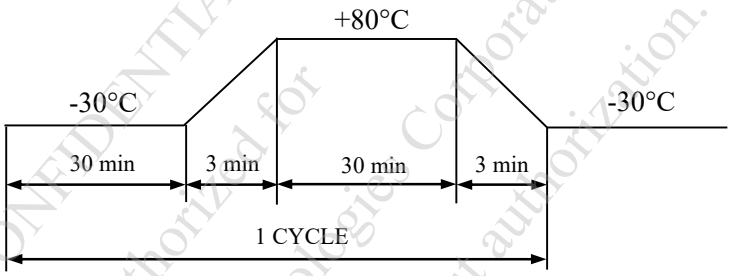
15. RELIABILITY TEST

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	ESD (ELECTROSTATIC DISCHARGE) (NOT OPERATED)	AIR DISCHARGE ± 12KV CONTACT DISCHARGE ± 8KV (ACCORDING TO IEC-61000-4-2)

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

NOTE (2)：TESTING CONDITIONS AND INSPECTION CRITERIA

NO.	ITEM	TEST MODEL	INSPECTION CRITERIA
1	CURRENT CONSUMPTION	REFER TO SPECIFICATION	THE CURRENT CONSUMPTION SHOULD CONFORM TO THE PRODUCT SPECIFICATION.
2	CONTRAST	REFER TO SPECIFICATION	AFTER THE TESTS HAVE BEEN EXECUTED, THE CONTRAST MUST BE LARGER THAN HALF OF ITS INITIAL VALUE PRIOR TO THE TESTS.
3	APPEARANCE	VISUAL INSPECTION	DEFECT FREE

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16. CAUTION

16.1 OPERATION

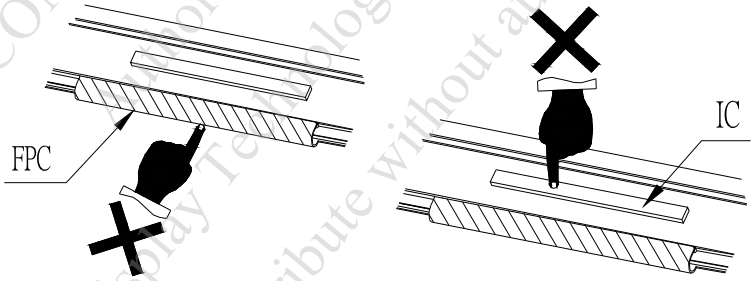
16.1.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .

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.

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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.

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