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Thin-Film-Transistor LCD Module
Model: XTPQ24SN11-01

Acceptance

Approved and Checked by

Approved by	Checked by		Made by

Revise Records

Product Specification

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1. General Description and Features

FXTPQ24SN11-01 is a TM (Transmissive) type color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT-LCD module, a driver circuit and a back-light unit. The resolution of a 2.4" contains 240RGBx320 dots and can display up to 262K colors. The following table described the features of FXTPQ24SN11-01.

LCD Module

Item	Specification	Unit
Screen Size	2.4inches	Diagonal
Display Resolution	240RGB(H)x320(V)	Dot
Vision Area	36.72(H) x48.96 (V)	mm
Outline Dimension	42.7(W) x 60.2(H) x 2.4 (D)	mm
Display Mode	Normally white/Transmissive	--
Pixel Arrangement	RGB-Vertical Stripe	--
Display Color	262K	--
Viewing Direction	6 o'clock	--
Gray viewing Direction	12 o'clock	--
Drive IC	ST7789V	--

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2.Mechanical Information

Item	Min.	Typ.	Max.	Unit	Note	
Module Size	Horizontal (H)	--	42.7	--	mm	--
	Vertical (V)	--	60.2	--	mm	(1)
	Thickness (T)	--	2.4	--	mm	(2)
Weight	--	N/A	--	g	--	

Note (1) Not include FPC.

Refer to the Outline Dimension for further information.

(2) Back-light unit are included.

3.Electrical Specifications

3.1 Absolute Max. Ratings

3.1.1 Absolute Ratings of Environment

If the operating condition exceeds the following absolute maximum ratings, the TFT LCD module may be damaged permanently.

(Ta=25±2°C, V_{SS}=GND=0)

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T _{STG}	-30	80	°C	(1)
Operating temperature	T _{OPR}	-20	70	°C	(1,2,3)

Note (1) 95 % RH Max. (40 °C ≥ Ta). Maximum wet-bulb temperature at 39 °C or less. (Ta > 40 °C)
No condensation.

Note (2) In case of below 0°, the response time of liquid crystal (LC) becomes slower and the color of panel becomes darker than normal one. Level of retardation depends on temperature, because of LC's character

Note (3) Only operation is guaranteed at operating temperature. Contrast, response time, another display quality are evaluated at +25°C.

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3.2 Electrical Absolute Rating

3.2.1 TFT-LCD Module

(Voltage Referenced to VSS)

Item	Symbol	Value		Unit	Condition
		Min.	Max.		
Digital Power Supply Voltage	VDD	VSS-0.3	4.6	V	--

3.2.2 Back-Light Unit

(Ta=25±2°C)

Item	Symbol	Min.	Max.	Unit	Note
Forward current(1led)	I _f	--	25	mA	(1)
Reverse voltage	V _R	--	5.0	V	(1)

Note (1) Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is loaded. Functional operation should be restricted to the conditions described under normal operating conditions.

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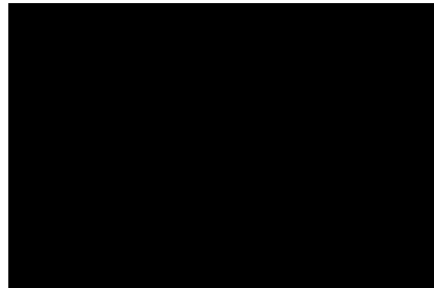
4 Electrical Characteristics

4.1 TFT-LCD Module (DC Characteristics)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Digital Power Supply Voltage	V _{DDI}	1.65	3.0	3.3	V	
Input High Threshold Voltage	V _{IH}	0.7 VDD	-	VDD	V	
Input Low Threshold Voltage	V _{IL}	0	-	0.3 VDD	V	
Power Supply Current	I _{CC}	-	6	20	mA	(1)
Power Consumption	P _L	-	-	-	mW	(1)

Note (1) The specified power consumption is under the conditions at VDD=3.3V , F_V=60Hz, whereas a Power dissipation check pattern below is displayed.

Black Pattern / 0 Gray



Active Area

4.2 Backlight Unit

The back-light system is an edge-lighting type with four white LEDs (Light Emitting Diode).

(Ta=25±2°C)

Item	Symbol	Value			Unit	Condition
		Min.	Typ.	Max.		
LED Voltage	V _F	2.8	-	3.4	V	
LED Current	I _F	-	60	--	mA	
Power Consumption	P _{BL}	-	--	-	mW	

Note (1) Where I_F = 60mA, V_F = 2.8-3.4V, P_{BL} = V_F × I_F

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5 Input Terminal Pin Assignment

PIN.NO	SYMBOL	I/O/P	FUNCTI	MEMARK																																																
1	GND	P	POWER GROUND																																																	
2	VCI	P	POWER SUPPLY																																																	
3	VCI	P	POWER SUPPLY																																																	
4	IM2	P	-The MCU interface mode select. <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr style="background-color: #008000; color: white;"> <th style="width: 5%;">IM3</th> <th style="width: 5%;">IM2</th> <th style="width: 5%;">IM1</th> <th style="width: 5%;">IM0</th> <th style="width: 25%;">MPU Interface Mode</th> <th style="width: 15%;">Data pin</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td>80-8bit parallel I/F</td> <td>DB[7:0]</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td>80-16bit parallel I/F</td> <td>DB[15:0]</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td>80-9bit parallel I/F</td> <td>DB[8:0]</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td>80-18bit parallel I/F</td> <td>DB[17:0],</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td>3-line 9bit serial I/F</td> <td>SDA: in/out</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td>2 data lane serial I/F</td> <td>SDA: in/out WRX: in</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td>4-line 8bit serial I/F</td> <td>SDA: in/out</td> </tr> </tbody> </table>	IM3	IM2	IM1	IM0	MPU Interface Mode	Data pin	0	0	0	0	80-8bit parallel I/F	DB[7:0]	0	0	0	1	80-16bit parallel I/F	DB[15:0]	0	0	1	0	80-9bit parallel I/F	DB[8:0]	0	0	1	1	80-18bit parallel I/F	DB[17:0],	0	1	0	1	3-line 9bit serial I/F	SDA: in/out	0	1	0	1	2 data lane serial I/F	SDA: in/out WRX: in	0	1	1	0	4-line 8bit serial I/F	SDA: in/out	
IM3	IM2	IM1		IM0	MPU Interface Mode	Data pin																																														
0	0	0		0	80-8bit parallel I/F	DB[7:0]																																														
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0	1	1	0	4-line 8bit serial I/F	SDA: in/out																																															
5	IM1	P																																																		
6	IMO	P																																																		
7	RESET	I	-This signal will reset the device and it must be applied to properly initialize the chip. -Signal is active low																																																	
8	CS	I	-This signal will reset the device and it must be applied to properly initialize the chip. -Signal is active low																																																	
9	DC(SPI-SCL)	I	-Display data/command selection pin in parallel interface. -This pin is used to be serial interface clock DCX='1': display data or parameter. DCX='0': command data. -If not used, please fix this pin at VDDI or DGND																																																	
10	WR(SPI-RS /SDA2)	I	-Write enable in MCU parallel interface. - Display data/command selection pin in 4-line serial interface. - Second Data lane in 2 data lane serial interface. -If not used, please fix this pin at VDDI or DGND.																																																	
11	RD	I	-Read enable in 8080 MCU parallel interface. -If not used, please fix this pin at VDDI or DGND																																																	
12	VSYNC	I	-Vertical (Frame) synchronizing input signal for RGB interface operation.																																																	

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13	HSYNC	I	-Horizontal (Line) synchronizing input signal for RGB interface operation. - If not used, please fix to VDDI or DGND	
14	ENABLE	I	-Data enable signal for RGB interface operation. -If not used, please fix this pin at VDDI or DGND.	
15	DOTCLK	I	-Dot clock signal for RGB interface operation. -If not used, please fix this pin at VDDI or DGND	
16	SDA_1	I/O	-When IM3: Low, SPI interface input/output pin. -When IM3: High, SPI interface input pin. -The data is latched on the rising edge of the SCL signal. -If not used, please fix this pin at VDDI or DGND	
17-34	DB0-DB17	I/O	-DB[17:0] are used as MCU parallel interface data bus. 8-bit I/F: when IM3:0, DB[7:0] are used; when IM3:1, DB[17:10] are used. 9-bit I/F: when IM3:0, DB[8:0] are used; when IM3:1, DB[17:9] are used. 16-bit I/F: when IM3:0, DB[15:0] are used; when IM3:1, DB[17:10] and DB[8:1] are used. 18-bit I/F: DB[17:0] are used. -DB[17:0] are used as RGB interface data bus. 6-bit RGB I/F: DB[5:0] are used. 16-bit RGB I/F: DB[17:13], DB[11:1] are used. 18-bit RGB I/F: DB[17:0] are used. -If not used, please fix this pin at VDDI or DGND	
35	SDO	O	-SPI interface output pin. -The data is output on the falling edge of the SCL signal. -If not used, let this pin open	
36	LEDA	P	POWER FOR BACKLIGHT(ANODE)	
37	LEDK1	P	POWER FOR BACKLIGHT(CATHODE)	
38	LEDK2	P	POWER FOR BACKLIGHT(CATHODE)	
39	LEDK3	P	POWER FOR BACKLIGHT(CATHODE)	
40	LEDK4	P	POWER FOR BACKLIGHT(CATHODE)	
41	XR	-		
42	YU	-		
43	XL	-		
44	YD	-		

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45	GND	P	POWER GROUND	
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6 Optical Characteristics

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note (1).

Measuring equipment: BM-5A, BM-7,

Item	Symbol	Condition	Min	Type	Max	Unit	Note	
Brightness	B		--	200	--	cd/m ²		
Response time	T _r +T _f	θ=0° T=25°C	--	30	60	ms	.	
Contrast ratio	CR		--	250	--	--		
Color Gamut	NTSC %	--	--	56	--	%		
Luminance Uniformity	ΔL		--	80		%		
Color Chromaticity (CIE 1931)	White	W _x	θ=0° Normal Viewing Angle	0.275	0.302	0.325	--	BM-7A
		W _y		0.285	0.315	0.345		
Viewing Angle	Hor.	θ _R	--	60	70	--	Degree	
		θ _L		60	70	--		
	Ver.	θ _U		60	70	--		
		θ _D		50	60	--		

a. Test equipment setup

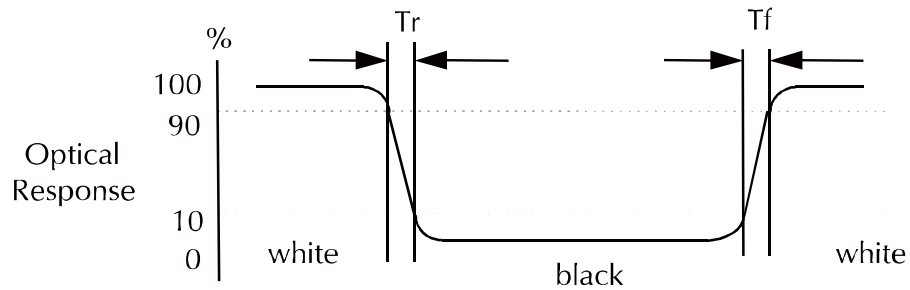
After stabilizing and leaving the panel alone shall be warmed up for the stable operation of LCM, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7(fast) with a viewing angle of 2° at a distance of 50cm and normal direction.

b. Definition of response time: Tr and Tf

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".

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c. Definition of contrast ratio:

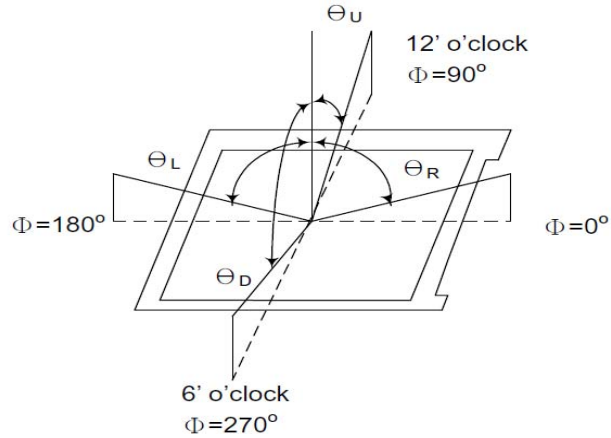
$$\text{Contrast Ratio (CR)} = \frac{\text{Brightness measured when LCD is at "white state"}}{\text{Brightness measured when LCD is at "black state"}}$$

d. Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

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e. View Angle



f. Definition of Luminance of White: Luminance of white at the center points

Light Source of Back-Light Unit	LED Type
---------------------------------	----------

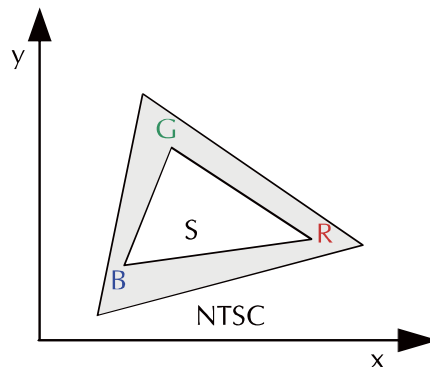
g. Definition of White Uniformity

$$\text{White Uniformity} = \frac{\text{Min. luminance of white among 9-points}}{\text{Max. luminance of white among 9-points}} \times 100\%$$

h. The definition of Color Gamut -Color Chromaticity CIE 1931

Color coordinate of white & red, green, blue at center point.

$$\text{Color Gamut : NTSC(\%)} = (\text{RGB Triangle Area} / \text{NTSC Triangle Area}) \times 100$$



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7 Interface Timing

7.1 8080 Series MCU Parallel Interface Characteristics: 18/16/9/8-bit Bus

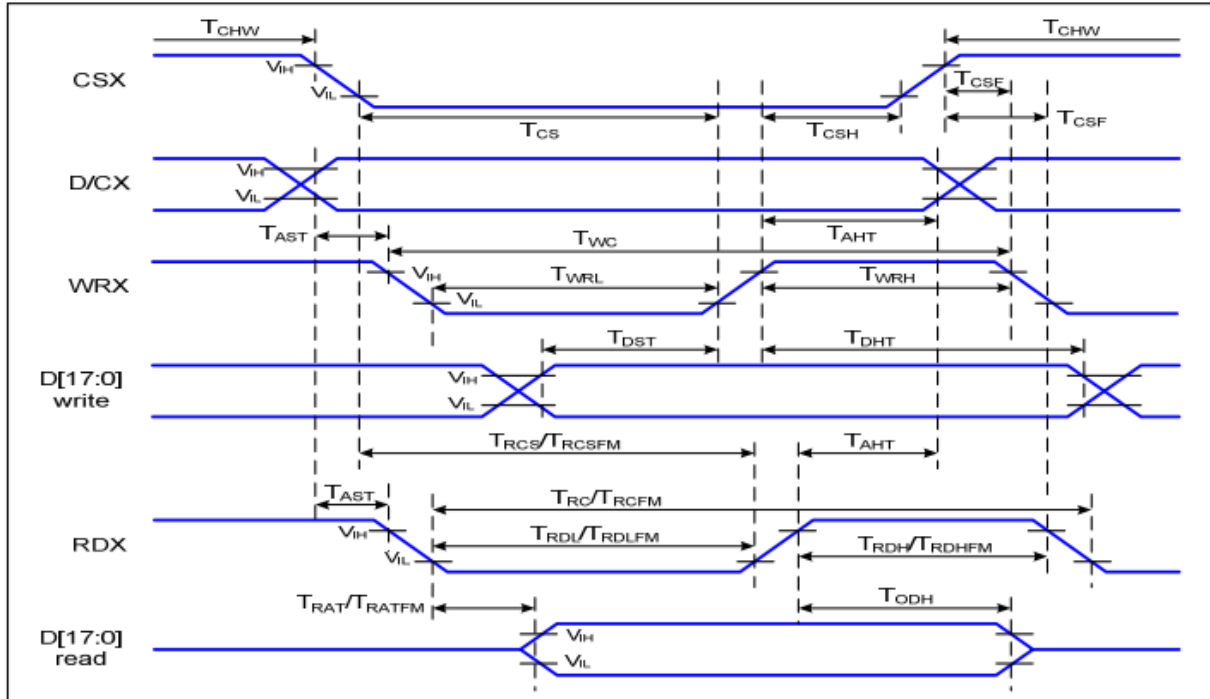


Figure 1 Parallel Interface Timing Characteristics (8080-Series MCU Interface)

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VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=25°C

Signal	Symbol	Parameter	Min	Max	Unit	Description
D/CX	T _{AST}	Address setup time	0		ns	-
	T _{AHT}	Address hold time (Write/Read)	10		ns	
CSX	T _{CHW}	Chip select "H" pulse width	0		ns	-
	T _{CS}	Chip select setup time (Write)	15		ns	
	T _{RCS}	Chip select setup time (Read ID)	45		ns	
	T _{RCSFM}	Chip select setup time (Read FM)	355		ns	
	T _{CSF}	Chip select wait time (Write/Read)	10		ns	
	T _{CSH}	Chip select hold time	10		ns	
WRX	T _{WC}	Write cycle	66		ns	
	T _{WRH}	Control pulse "H" duration	15		ns	
	T _{WRL}	Control pulse "L" duration	15		ns	
RDX (ID)	T _{RC}	Read cycle (ID)	160		ns	When read ID data
	T _{RDH}	Control pulse "H" duration (ID)	90		ns	
	T _{RDL}	Control pulse "L" duration (ID)	45		ns	
RDX (FM)	T _{RCFM}	Read cycle (FM)	450		ns	When read from frame memory
	T _{RDHFM}	Control pulse "H" duration (FM)	90		ns	
	T _{RDLFM}	Control pulse "L" duration (FM)	355		ns	
D[17:0]	T _{DST}	Data setup time	10		ns	For CL=30pF

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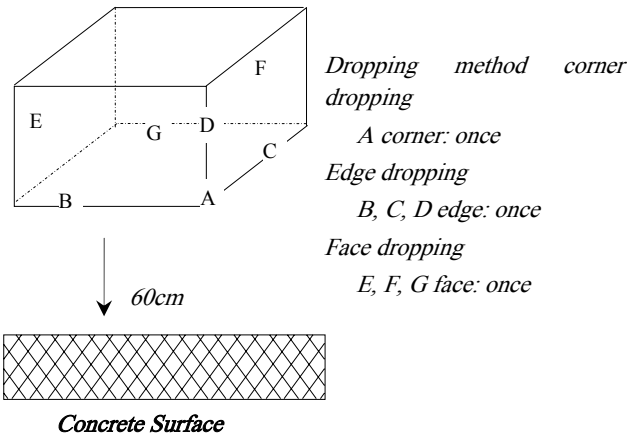
8 Reliability Condition for LCD

No change on display and in operation under the following test condition.

Condition: Unless otherwise specified, tests will be conducted under the following condition.

Temperature: 20±5° C Humidity: 65±5%RH

Tests will be not conducted under functioning state.

No.	Parameter	Condition	Notes
1	High Temperature Operating	70° C±2° C, 240hrs (Operation state)	--
2	Low Temperature Operating	-20° C±2° C, 240hrs (Operation state)	--
3	High Temperature Storage	80° C±2° C, 240hrs	--
4	Low Temperature Storage	-30° C±2° C, 240hrs	--
5	High Temperature and High Humidity Operation Test	60° C±2° C, 90%, 240hrs	--
6	Vibration Test	Total fixed amplitude: 1.5mm Vibration Frequency: 10-55Hz One cycle 60 seconds to 3 direction of X, Y, Z each 15 minutes.	--
7.	Drop Test	<p>To be measured after dropping from 60cm high on the concrete surface in packing state.</p> <div style="text-align: center;">  </div>	--

- Notes:
1. No dew condensation to be observed.
 2. The function test shall be conducted after 4 hours storage at the normal temperature and humidity after removed from the test chamber.
 3. Vibration test will be conducted to the product itself without putting I in a container.

9 Dimensional outlines

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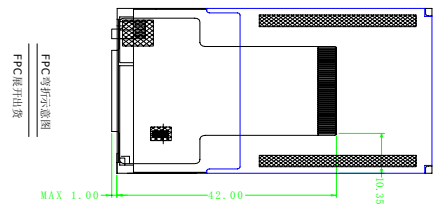
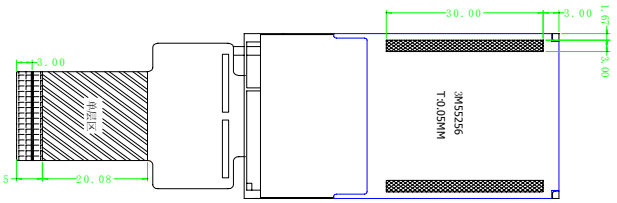
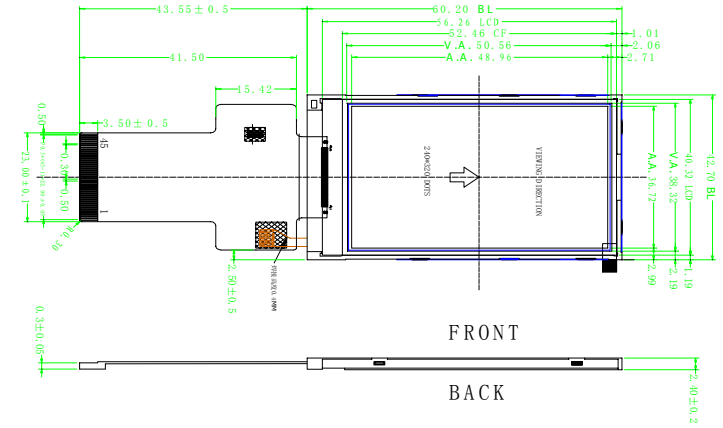
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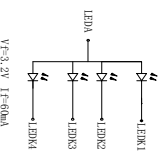
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CUSTOMER APPROVED:



- NOTES:
1. DISPLAY TYPE: 2. FTFT
 2. VIEWING DIRECTION (GRAY INVERSION): 6:00
 3. LCD DRIVE IC: ST7890
 4. POLARIZER MODE: TRANSMISSIVE/POSITIVE
 5. VCI : 3.3V
 6. OPERATING TEMP: -20° C ~ +70° C
 7. STORAGE TEMP: -30° C ~ +80° C
 8. DIMARKER TOLERANCE: ±0.20
 9. Backlight: AHD WHITE 60mA
 10. RECALIBRATIONS ON ENVIRONMENTAL PROTECTION: RAS



NOTE: RGB interface

RGB Interface	RGB Interface
16 BR RGB Interface	DB17-DB13
18 BR RGB Interface	DB11-DB6, DB5-DB1
	DB17-DB0

NOTE: If used RGB mode must select serial interface!

NOTE: MCU interface SET for P/PINS.

Pin	Pin	Pin	Interface Type	DB Pin in use	NOTE
0	0	0	DB17 Pin 0	DB17-DB0	
0	0	0	DB17 Pin 1	DB17-DB0	
0	0	1	DB17 Pin 2	DB17-DB0	
0	1	0	DB17 Pin 3	DB17-DB0	
0	1	1	DB17 Pin 4	DB17-DB0	
0	1	1	DB17 Pin 5	DB17-DB0	
0	1	1	DB17 Pin 6	DB17-DB0	
0	1	1	DB17 Pin 7	DB17-DB0	
0	1	1	DB17 Pin 8	DB17-DB0	
0	1	1	DB17 Pin 9	DB17-DB0	
0	1	1	DB17 Pin 10	DB17-DB0	
0	1	1	DB17 Pin 11	DB17-DB0	
0	1	1	DB17 Pin 12	DB17-DB0	
0	1	1	DB17 Pin 13	DB17-DB0	
0	1	1	DB17 Pin 14	DB17-DB0	
0	1	1	DB17 Pin 15	DB17-DB0	
0	1	1	DB17 Pin 16	DB17-DB0	
0	1	1	DB17 Pin 17	DB17-DB0	
0	1	1	DB17 Pin 18	DB17-DB0	
0	1	1	DB17 Pin 19	DB17-DB0	
0	1	1	DB17 Pin 20	DB17-DB0	

NOTE: 1. If not use P/PIN, to the GND, DVCC or NC.
2. If use RGB mode must select serial interface.

NO.	PIN
1	GND
2	VCI
3	VCI
4	IMZ
5	IMZ
6	IMZ
7	RESET
8	CS
9	DCEN(=SCL)
10	WRS(=HS/SMD)
11	RD
12	VSNC
13	HSNC
14	EMBLE
15	DOTCLK
16	SMA_1
17	DB07(B0)
18	DB01(B1)
19	DB02(B2)
20	DB03(B3)
21	DB04(B4)
22	DB05(B5)
23	DB06(B6)
24	DB07(G1)
25	DB08(G2)
26	DB09(G3)
27	DB10(G4)
28	DB11(G5)
29	DB12(R0)
30	DB13(R1)
31	DB14(R2)
32	DB15(R3)
33	DB16(R4)
34	DB17(B5)
35	SIO
36	LEDA
37	LEDK1
38	LEDK2
39	LEDK3
40	LEDK4
41	XR
42	VL
43	XL
44	VD
45	GND

日期 版本

修改内容

DATE	2018.03.10	REV	A
UNIT : mm	Product :	FXTQP24SN11-01	Count Dwg.
SCALE : 1/1	DRAWN :		PAGE : 1/1
SHEET : 1/1	CHECKED :		

ROHS

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10.1 VISUAL & FUNCTION INSPECTION STANDARD

10.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

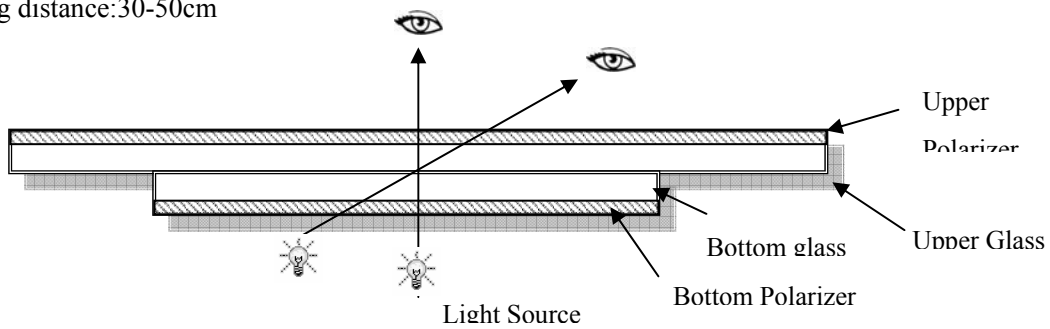
Temperature : 25±5°C

Humidity : 65%±10%RH

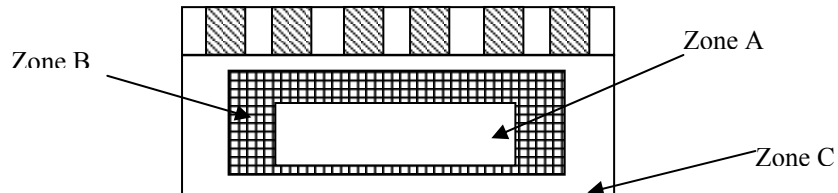
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



10.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer.

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10.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class II

AQL:

Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

10.1.4 Criteria (Visual)

Number	Items	Criteria(mm)
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1.0 LCD
Crack/Broken

NOTE:

X: Length

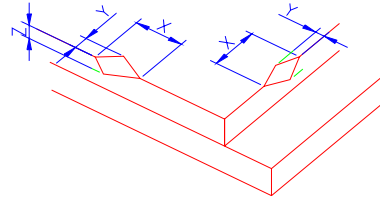
Y: Width

Z: Height

L: Length of ITO,

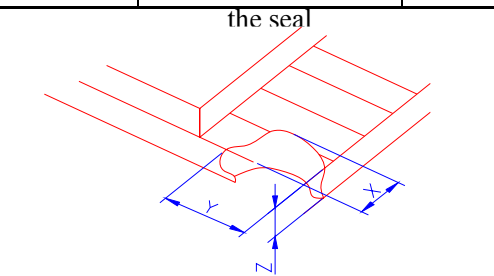
T: Height of LCD

(1) The edge of LCD broken



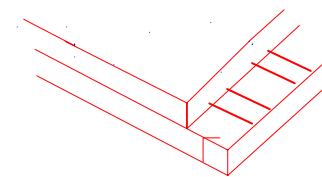
X	Y	Z
$\leq 3.0\text{mm}$	<Inner border line of the seal	$\leq T$

(2) LCD corner broken



X	Y	Z
$\leq 3.0\text{mm}$	$\leq L$	$\leq T$

(3) LCD crack



Crack
Not allowed

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Number	Items	Criteria (mm)
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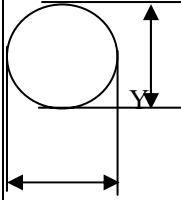
A

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2.0

Spot defect



X

$$\Phi = (X+Y)/2$$

① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.10$	Ignore		
$0.10 < \Phi \leq 0.15$	3(distance $\geq 10\text{mm}$)		
$0.15 < \Phi \leq 0.2$	1		
$0.2 < \Phi$	0		

② Dim spot (LCD/TP/Polarizer dim dot, light leakage, dark spot)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.1$	Ignore		
$0.1 < \Phi \leq 0.2$	2(distance $\geq 10\text{mm}$)		
$0.2 < \Phi \leq 0.3$	1		
$\Phi > 0.3$	0		

③ Polarizer accidented spot

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		
$0.2 < \Phi \leq 0.5$	2(distance $\geq 10\text{mm}$)		
$\Phi > 0.5$	0		

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	Line defect (LCD/TP /Polarizer black/white line, scratch, stain)	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Width(mm)</th> <th rowspan="2">Length(mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.03$</td> <td>Ignore</td> <td colspan="2">Ignore</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$0.03 < W \leq 0.05$</td> <td>$L \leq 3.0$</td> <td colspan="2">$N \leq 2$</td> </tr> <tr> <td>$0.05 < W \leq 0.08$</td> <td>$L \leq 2.0$</td> <td colspan="2">$N \leq 2$</td> </tr> <tr> <td>$0.08 < W$</td> <td colspan="4">Define as spot defect</td> </tr> </tbody> </table>	Width(mm)	Length(mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.03$	Ignore	Ignore		Ignore	$0.03 < W \leq 0.05$	$L \leq 3.0$	$N \leq 2$		$0.05 < W \leq 0.08$	$L \leq 2.0$	$N \leq 2$		$0.08 < W$	Define as spot defect			
Width(mm)	Length(mm)	Acceptable Qty																										
		A	B	C																								
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$0.05 < W \leq 0.08$	$L \leq 2.0$	$N \leq 2$																										
$0.08 < W$	Define as spot defect																											
3.0	Polarizer Bubble	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.2$</td> <td colspan="2">Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td>$0.2 < \Phi < 0.4$</td> <td colspan="2">2(distance ≥ 10mm)</td> </tr> <tr> <td>$0.4 < \Phi < 0.6$</td> <td colspan="2">1</td> </tr> <tr> <td>$0.6 < \Phi$</td> <td colspan="2">0</td> </tr> </tbody> </table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore		Ignore	$0.2 < \Phi < 0.4$	2(distance ≥ 10 mm)		$0.4 < \Phi < 0.6$	1		$0.6 < \Phi$	0							
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$0.4 < \Phi < 0.6$	1																											
$0.6 < \Phi$	0																											
4.0	SMT	According to IPC-A-610C class II standard . Function defect and missing part are major defect ,the others are minor defect.																										