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TFT | CHARACTER | UWVD | FSC | SEGMENT | CUSTOM | REPLACEMENT

TFT Display Module

Part Number

E35GG-I-CW350-N

Overview:

- 3.5-inch TFT (76.84 x 63.84mm)
- Resolution 640x480 Pixels
- 24-bit RGB Interface
- Operating Temp: -20C to 70C
- All Viewing Angle

- Transmissive, IPS
- No Touch Panel
- 350 Nits
- TFT IC: NV3052C
- RoHS Compliant

Description

This is a color active matrix TFT (Thin Film Transistor) LCD (Liquid Crystal Display) that uses amorphous silicon TFT as a switching device. This model is composed of a transmissive type TFT LCD Panel, driver circuit, and a backlight unit. The resolution of this 3.5" TFT LCD contains 640(RGB)x480 pixels and can display up to 16.7M colors.
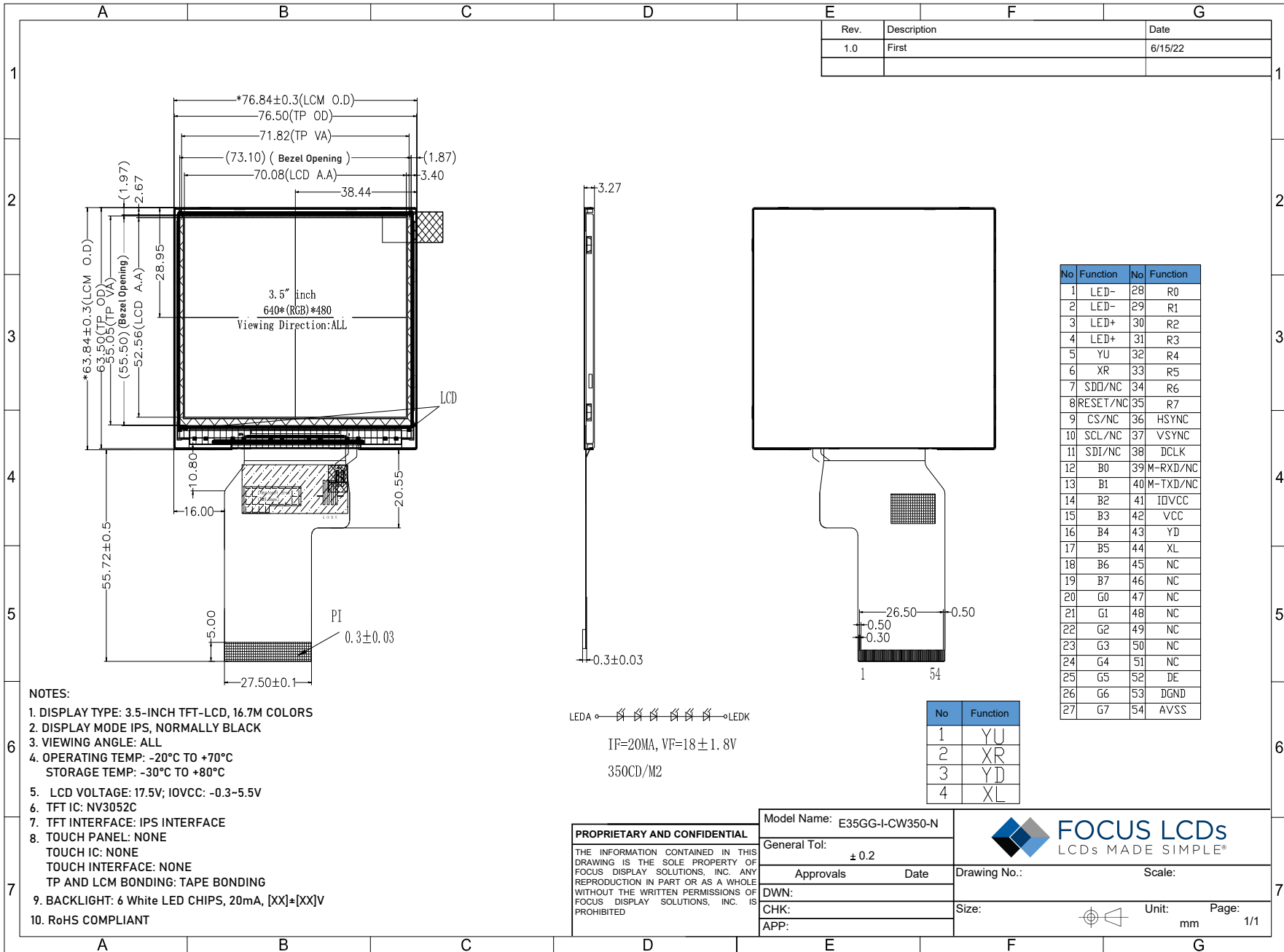
TFT Features

Low Input Voltage: 3.3V
TFT Interface: IPS

General Information Items	Specification Main Panel	Unit	Note
TFT Display Area (AA)	70.08(H) x52.56 (V) (3.5 inch)	mm	-
Driver Element	TFT active matrix	-	-
Display Colors	16.7M	colors	-
Number of Pixels	640(RGB)x480	dots	-
TFT Pixel Arrangement	RGB vertical stripe	-	-
Pixel Pitch	0.1095(H) x 0.1095(V)	mm	-
Viewing Angle	All	o'clock	-
TFT Controller IC	NV3052C	-	-
TFT Interface	IPS	-	-
Display Mode	Transmissive/ Normally Black	-	-
Operating Temperature	-20C to+70C	°C	-
Storage Temperature	-30C to+80C	°C	-

Mechanical Information

Item		Min	Typ.	Max	Unit	Note
Module Size	Horizontal (H)		76.84		mm	-
	Vertical (V)		63.84		mm	-
	Depth (D)		3.27		mm	-
	Weight		n/a		g	

Rev.	Description	Date
1.0	First	6/15/22

*76.84±0.3(LCM O.D)
76.50(TP OD)
71.82(TP VA)
(73.10) (Bezel Opening)   (1.87)
70.08(LCD A.A)   3.40
38.44

(1.97)
2.67
28.95

*63.84±0.3(LCM O.D)
63.50(TP OD)
55.05(TP VA)
(55.50)(Bezel Opening)
52.56(LCD A.A)

3.5" inch
640*(RGB)*480
Viewing Direction:ALL

LCD

10.80
20.55
16.00
55.72±0.5
5.00
PI
0.3±0.03
27.50±0.1

3.27

0.3±0.03

26.50   0.50
0.50
0.50
0.30
1   54

No	Function	No	Function
1	LED-	28	R0
2	LED-	29	R1
3	LED+	30	R2
4	LED+	31	R3
5	YU	32	R4
6	XR	33	R5
7	SDO/NC	34	R6
8	RESET/NC	35	R7
9	CS/NC	36	HSYNC
10	SCL/NC	37	VSYNC
11	SDI/NC	38	DCLK
12	B0	39	M-RXD/NC
13	B1	40	M-TXD/NC
14	B2	41	IOVCC
15	B3	42	VCC
16	B4	43	YD
17	B5	44	XL
18	B6	45	NC
19	B7	46	NC
20	G0	47	NC
21	G1	48	NC
22	G2	49	NC
23	G3	50	NC
24	G4	51	NC
25	G5	52	DE
26	G6	53	DGND
27	G7	54	AVSS

LEDA ⊶ ⊶ ⊶ ⊶ ⊶ ⊶ ⊶ LEDK

IF=20MA, VF=18±1.8V

350CD/M2

No	Function
1	YU
2	XR
3	YD
4	XL

NOTES:
1. DISPLAY TYPE: 3.5-INCH TFT-LCD, 16.7M COLORS
2. DISPLAY MODE IPS, NORMALLY BLACK
3. VIEWING ANGLE: ALL
4. OPERATING TEMP: –20°C TO +70°C
   STORAGE TEMP: –30°C TO +80°C
5. LCD VOLTAGE: 17.5V; IOVCC: –0.3~5.5V
6. TFT IC: NV3052C
7. TFT INTERFACE: IPS INTERFACE
8. TOUCH PANEL: NONE
   TOUCH IC: NONE
   TOUCH INTERFACE: NONE
   TP AND LCM BONDING: TAPE BONDING
9. BACKLIGHT: 6 White LED CHIPS, 20mA, [XX]±[XX]V
10. RoHS COMPLIANT

PROPRIETARY AND CONFIDENTIAL

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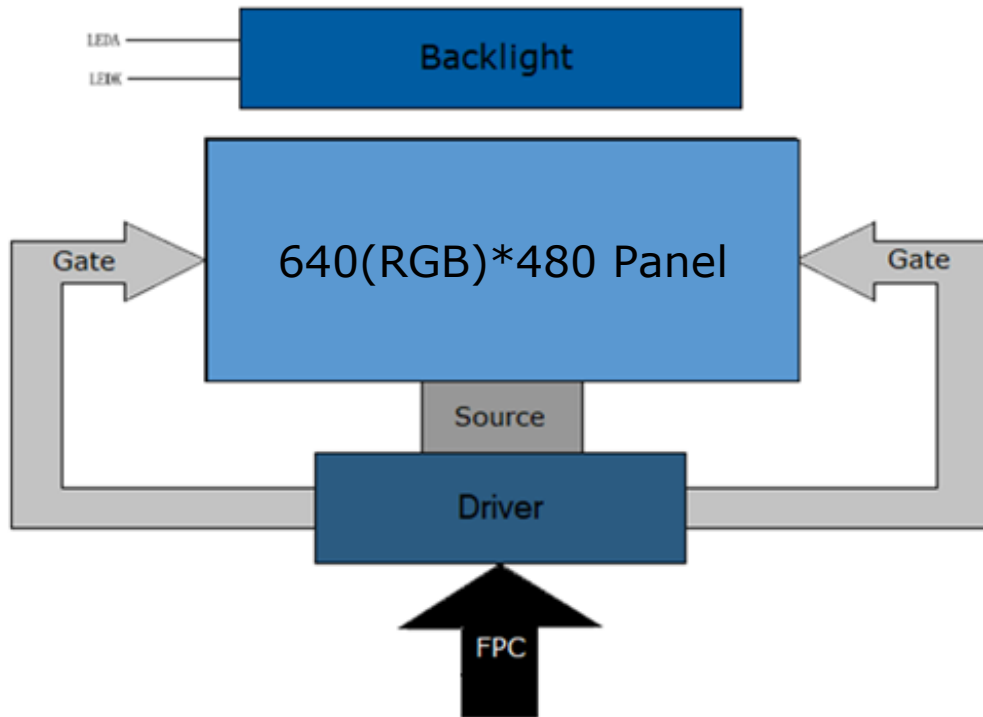
Model Name:	E35GG-I-CW350-N	
General Tol:	± 0.2	
Approvals	Date	
DWN:		
CHK:		
APP:		

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Drawing No.:   Scale:

Size: Unit: mm   Page: 1/1

Notes:
1.)Display Mode:IPS Normally Black
2.)Viewing angle: All
3.)LCD Driver IC: NV3052CGRB
4.)Operating Temp: -20C to +70C
5.)Storage Temp: -30C to +80C
6.)RoHS Compliant

2. Block Diagram

3. Input TFT Terminal Pin Assignment

Recommended Connector: 512965494

NO.	Symbol	Description	I/O
1	LEDK	Cathode pin of the backlight	P
2	LEDK	Cathode pin of the backlight	P
3	LEDA	Anode pin of the backlight	P
4	LEDA	Anode pin of the backlight	P
5	YU(NC)	Touch panel top film terminal, not connected	I
6	XR(NC)	Touch panel right glass terminal, not connected	I
7	SDO	Serial Data Output Pin	I
8	RESET	Reset signal of the device	I
9	CS	Chip select signal	I
10	SCL	Serial clock signal input pin	I
11	SDI	Serial data input pin	I
12-19	B0-B7	8-bit blue data bus for the RGB interface (B0-LSB;B7-MSB)	I
20-27	G0-G7	8-bit green data bus for the RGB interface(G0-LSB;G7-MSB)	I
28-35	R0-R7	8-bit red data bus for the RGB interface (R0-LSB;R7-MSB	I
36	HS	Horizontal sync signal for the RGB interface Negative polarity is the default	I
37	VS	Vertical sync signal for the RGB interface Negative polarity is the default	I
38	PCLK	Dot clock signal for the RGB interface	I
39	NC	Not connected	I
40	NC	Not connected	I
41	IOVCC	Supply voltage	I
42	VCI	Supply voltage	I
43	YD(NC)	Touch panel bottom film terminal, Not connected	I
44	XL(NC)	Touch panel left glass terminal, Not connected	I
45	NC	Not connected	I
46	NC	Not connected	I
47	NC	Not connected	I
48	NC	Not connected	I
49	NC	Not connected	I
50	NC	Not connected	I
51	NC	Not connected	I
52	DE	Data enable signal for the RGB interface	I
53	GND	Ground	I
54	GND	Ground	I

I: Input, O: Output, P: Power

4. LCD Optical Characteristics

4.1 Optical Specifications

Item		Symbol	Condition	Min	Type	Max	Unit	Note
Brightness		B			350	--	cd/m^2	
Response time		T_r	$\theta=0°$	-	25	50	ms	.
		T_f		--			ms	
Contrast ratio		CR	At optimized viewing angle	600	800	--	--	
Luminance Uniformity		$\triangle$ L		70	80		%	
Color Chromaticity (CIE 1931)	White	Wx	$\theta=0$ °Normal Viewing Angle	0.267	0.307	0.337	--	BM-7A
		Wy		0.278	0.318	0.348		
Viewing Angle (12H)	Hor.	θ_R	CR≥10	75	85	--	Degree	
		θ_L		75	85	--		
	Ver.	θ_U		75	85	--		
		θ_D		75	85	--		

Optical Specification Reference Notes:

(1) Definition of Viewing Angle: The viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3,9 o'clock direction and the vertical or 6,12 o'clock direction with respect to the optical axis which is normal to the LCD surface.
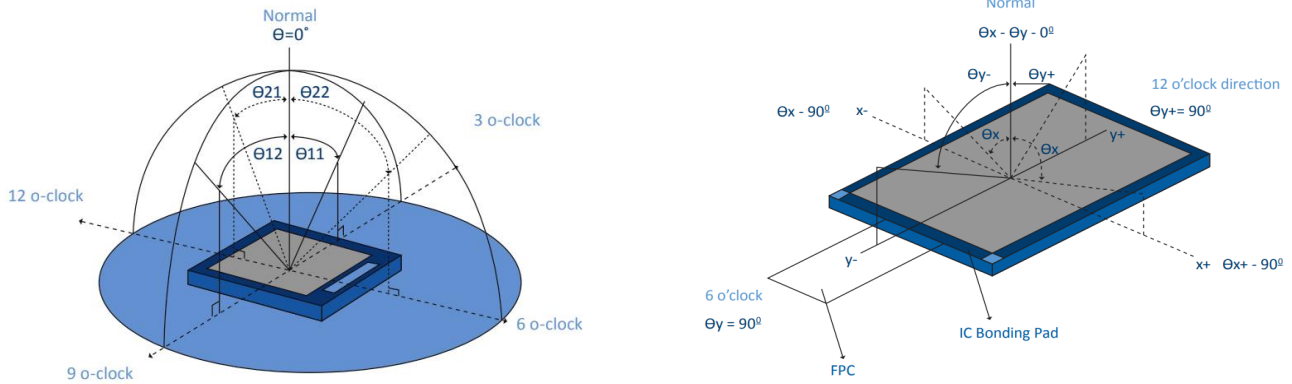

(2) Definition of Contrast Ratio (Cr): measured at the center point of panel. The contrast ratio (Cr) measured on a module, is the ratio between the luminance (Lw) in a full white area (R=G=B=1) and the luminance (Ld) in a dark area (R=G=B=0).

$$Cr = \frac{Lw}{Ld}$$

(3) Definition of transmittance (T%): The transmittance of the panel including the polarizers is measured with electrical driving. The equation for transmittance Tr is:

$$Tr = \frac{It}{Io} \, x \, 100\%$$
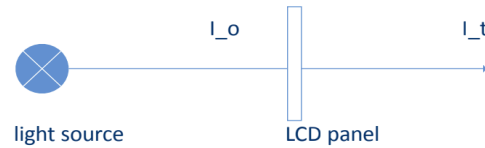
Io = the brightness of the light source.
It = the brightness after panel transmission

(4) Definition of Response Time (Tr, Tf): The rise time 'Tr' is defined as the time for luminance to change from 90%to 10% as a result of a change of the electrical condition. The fall time 'Tf' is defined as the time for luminance to change from 10% to 90% as a result of a change of the electrical condition.

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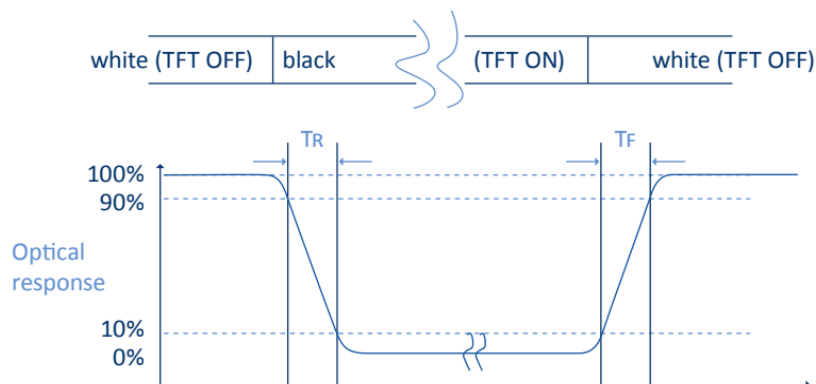
(5) Definition of Color Gamut:

Measuring machine CFT-01. NTSC's Primaries: R(x,y,Y),G(x,y,Y), B(x,y,Y). FPM520 of Westar Display Technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.The color chromaticity shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.


Fig. 1931 CIE chromacity diagram

Color gamut: $S = \dfrac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}} \times 100\%$

(6) Definition of Optical Measurement Setup:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 20 minutes.
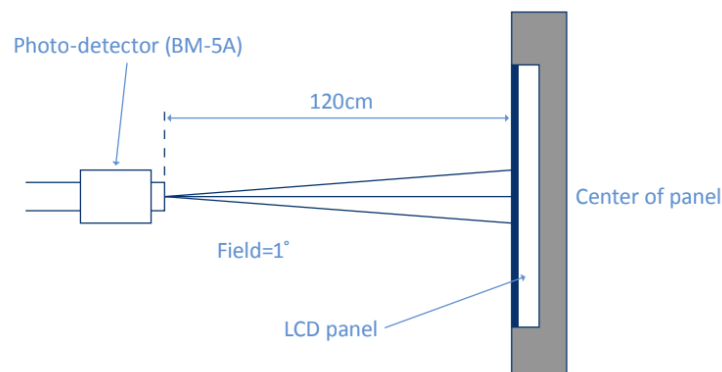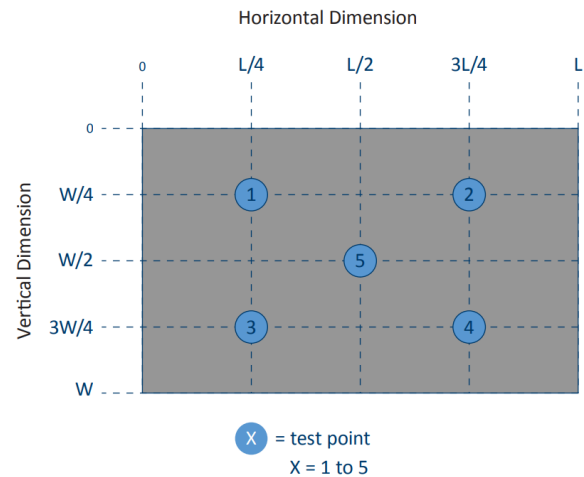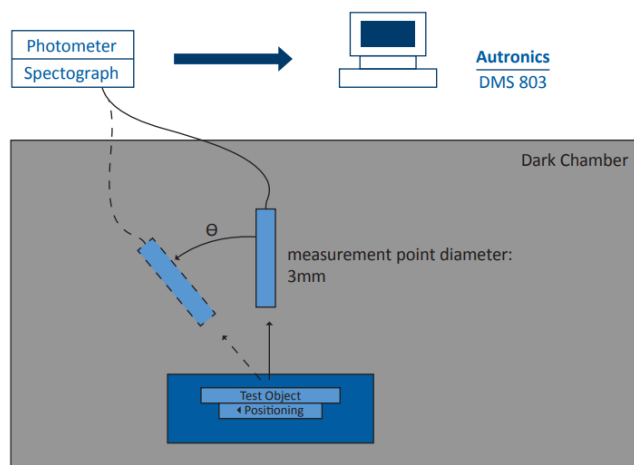
5. TFT Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 ℃, VSS=0V)

Characteristics	Symbol	Min	Max	Unit
Power Supply Voltage 1	IOVCC	-0.3	5.5	V
Power Supply Voltage 2	VSP	-0.3	6.6	V
Power Supply Voltage 3	VSN	-6.6	0.3	V

NOTE: If the absolute maximum rating of the above parameters is exceeded, even momentarily, the quality of the product may be degraded. Absolute maximum ratings specify the values which the product may be physically damaged if exceeded. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Item	Symbol	Value			Unit	Condition
		Min.	Typ.	Max.		
LED Voltage	VF	-	17.5	-	V	
LED Current	IF	-	20	-	mA	
LED Life		-	20000	-	Hours	
Power Consumption	P$_{BL}$	-	-	-	mW	

5.3   LED Backlight Characteristics

Item	Symbol	Min	Typ.	Max	Unit	Note
Forward Current	IF	--	20	--	mA	
Forward Voltage	VF	--	17.5	--	V	
LCM Luminance	LV	--	350	--	cd/m2	Note 3
LED lifetime	Hr	--	20000	--	hour	Note1 & 2
Uniformity	AVg	70	80	--	%	Note 3

The back-light system is edge-lighting type with 6 white LEDs.

Note 1: LED lifetime (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 °C, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note 2: The "LED lifetime" is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IL=20mA. The LED lifetime could be decreased if operating IL is larger than 20mA. The constant current driving method is suggested.
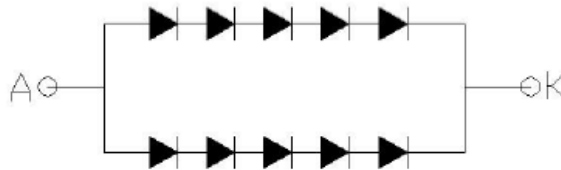
Backlight LED Circuit

Note 3: Luminance Uniformity of these 9 points is defined as below:
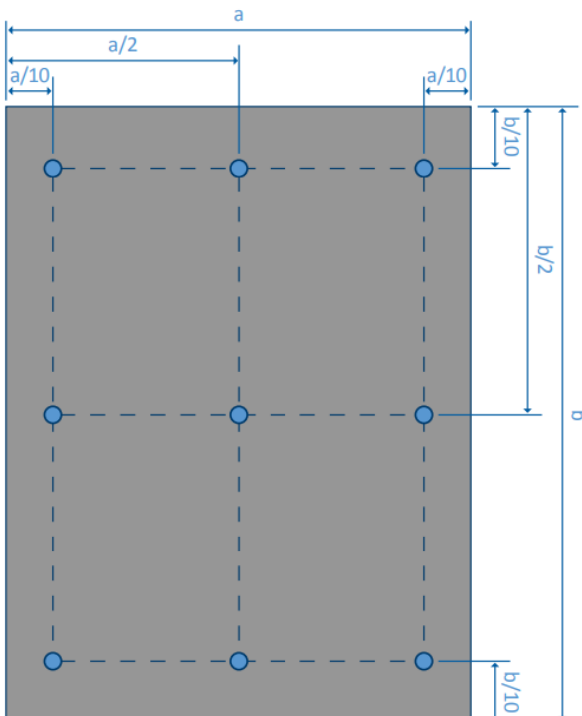
$$Luminance = \frac{(Total\ Luminance\ of\ 9\ points)}{9}$$

$$Uniformity = \frac{minimum\ luminance\ in\ 9\ points(1\text{-}9)}{maximum\ luminance\ in\ 9\ points(1\text{-}9)}$$

6. Controller Information

For more detailed information on the driver for this module, please refer to NV3052C Specifications

7. Quality Inspection Information

For more detailed information about quality inspection for this module, please visit:
https://focuslcds.com/content/LCD%20Quality%20Inspection%20Standards.pdf

8. Cautions and Handling Precautions

8.1 Handling and Operating the Module

1. When the module is assembled, it should be attached to the system firmly. Do not warp or twist the module during assembly work.
2. Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
3. Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
4. Do not allow drops of water or chemicals to remain on the display surface. If you have the droplets for a long time, staining and discoloration may occur.
5. If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
6. The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
7. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
8. Protect the module from static; it may cause damage to the CMOS ICs.
9. Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
10. Do not disassemble the module.
11. Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
12. Pins of I/F connector shall not be touched directly with bare hands.
13. Do not connect, disconnect the module in the "Power ON" condition.
14. Power supply should always be turned on/off by the item Power On Sequence & Power Off Sequence.

8.2 Storage and Transportation

1. Do not leave the panel in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%
2. Do not store the TFT-LCD module in direct sunlight.
3. The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.
4. It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module. In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.
5. This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.