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LCDs MADE SIMPLE®

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TFT | OLED | CHARACTER | GRAPHIC | UWVD | SEGMENT | CUSTOM

TFT Display Module

Part Number

E18GB-CW600-N

Overview:

- 1.77-inch TFT (33.83x43.42mm)
- 128x160 Pixels
- 8/9/16/18-Bit MCU, 3/4-SPI Interface
- Operating Temp -20C to 70C
- Storage Temp -30C to 80C
- 12:00 Viewing Angle
- Normally White /Transmissive
- No Touch Panel
- 600NITS
- TFT IC: ILI9163V
- 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 TFT-LCD Panel, driver circuit, and backlight unit.

The resolution of the 1.77 inch TFT-LCD contains 128x160 pixels and can display up to 262K colors.

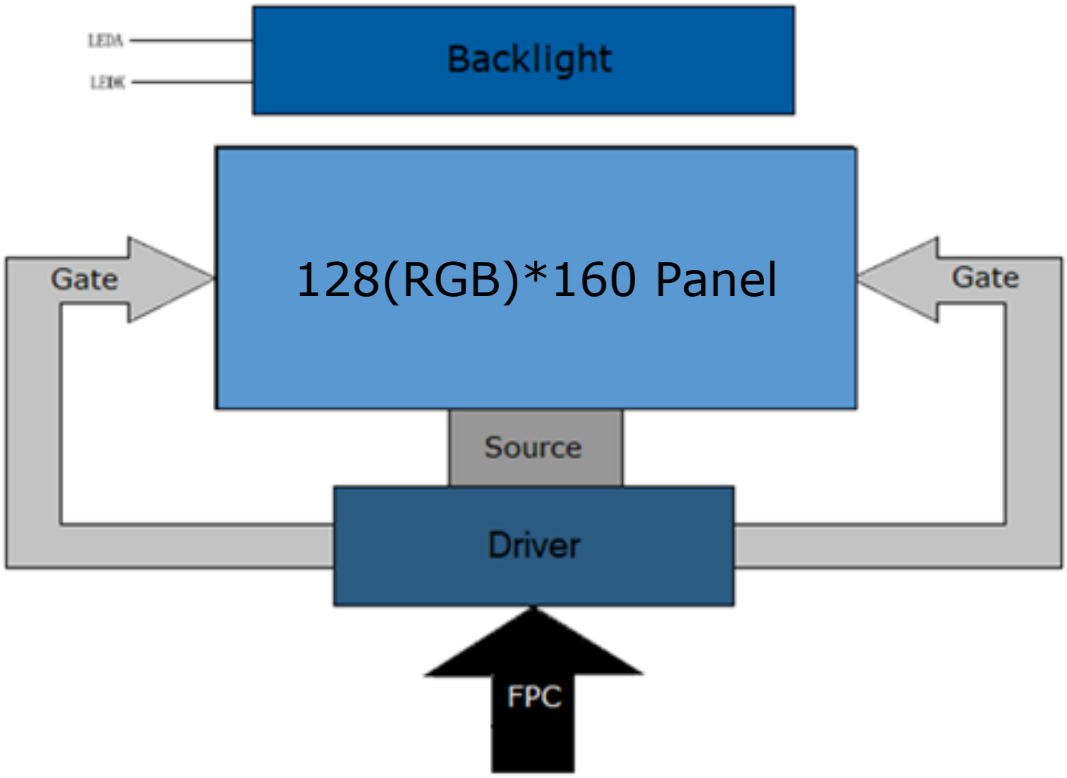
Features:
Input Voltage: 3.3V
TFT Interface: 24-Bit RGB

General Information Items	Specification	Unit	Note
	Main Panel		
TFT Display Area (AA)	28.03 (H) x 35.04(V) (1.77 inch)	mm	--
Display Colors	262K	colors	--
Number of Pixels	128(RGB)*160	dots	--
TFT Pixel Arrangement	RGB Vertical Stripe	--	--
Viewing Angle	12:00	o'clock	--
TFT Controller IC	ILI9163V	--	--
Display Mode	Transmissive/Normally White	--	--
Operating Temperature	-20 to +70	°C	--
Storage Temperature	-30 to +80	°C	--

Mechanical Information

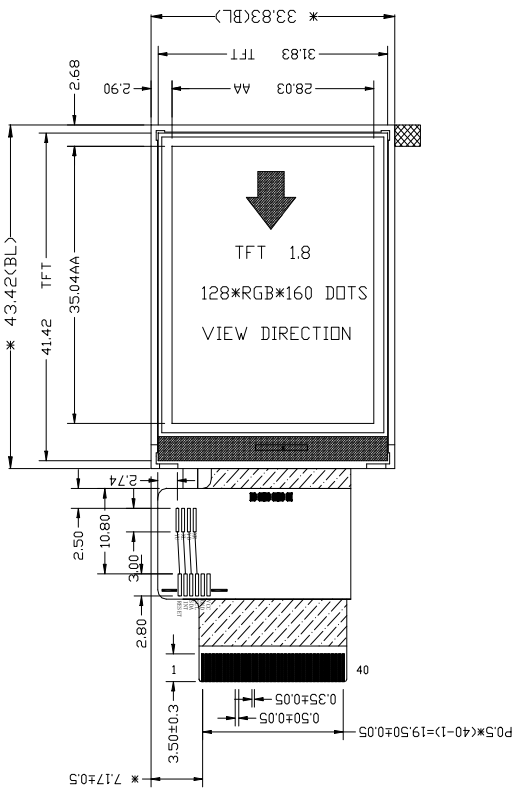
Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	--	33.83	--	mm	--
	Vertical (V)	--	43.42	--	mm	--
	Depth (D)	--	2.6	--	mm	--
Weight		--	TBD	--	g	--

Block Diagram

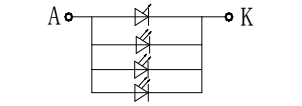


1. Outline Dimensions

Rev.	Description	Date
1.0	First	7/21/2022



Pin	Name
1	NC
2	NC
3	NC
4	NC
5	GND
6	IOVCC(1.8/2.8V)
7	VCI(2.8V)
8	TE
9	CS/SPI CS
10	DC/SPI SCL
11	WR(R/W)/SPI DC
12	RD/E
13	GND
14	P68
15	RESET
16	GND
17	DB0
18	DB1
19	DB2
20	DB3
21	DB4
22	DB5
23	DB6
24	DB7
25	DB8
26	DB9
27	DB10
28	DB11
29	DB12
30	DB13
31	DB14
32	DB15
33	DB16
34	DB17
35	A
36	K
37	SPI4W
38	IM0
39	IM1
40	IM2



NOTES:
1.) 262K/65K TFT
2.) Driver IC: ILI9163V
3.) Operating Voltage: 2.8V-3.3V
4.) Operating Temp -20C to 70C
5.) Storage Temp: -30C to 80C
6.) Interface: 8080/6800 8-Bit, 9-Bit, 16-Bit, 18-Bit Parallel,
3-SPI/4-SPI 7.) Backlight: White (4 Chips)
VF=2.7-3.7V(Typical)
8.) RoHS/REACH Compliant
9.) 600 NITS Brightness / 12:00 Viewing Angle

Model Name: E18GB-CW600-N		FOCUS LCDs LCDs MADE SIMPLE®	
General Tol: ±0.3			
Approvals	Date	Drawing No.:	Scale:
DWN:			
CHK:		Size:	Unit: mm / Page: 1/1
APP:			

2. Input Terminal Pin Assignment

2.1 TFT Pin Assignment

Recommended Connector: FH12S-40S-0.5SH(55)

PIN.NO	SYMBOL	I/O/P	FUNCTION	REMARK
1	XL	-	Not Connected	
2	YU	-	Not Connected	
3	XR	-	Not Connected	
4	YD	-	Not Connected	
5	GND	P	POWER GROUND	
6	IOVCC(1.8/2.8V)	P	Power Supply for interface logic circuits (1.65-3.3V)	
7	VCI(2.8V)	P	Power Supply for Analog Circuit Connect to external power supply (VCI=2.5~4.0V)	
8	TE	O	Tearing effect output pin to sync MCU to frame wiring, activated by s/w command. If not used, leave open.	
9	CS/SPI CS	I	Chip select input pin (Low = Enable) This pin can be permanently fixed to "low" in MCU interface mode only.	
10	DC/SPI SDL	I	Display Data / Command selection pin in Parallel and SCL in 3-pin SPI interface D/CX=1: Display Data and D/CX=0: Command Data. If not used, connect to GND	
11	WR(R/W) SPI DC	I	Write enable in parallel interface WRX for 8080 MCU R/WX for 6800 MCU D/CX for 4-wire SPI If not used, connect to VDDI or GND	
12	RD/E	I	Read enable in 8080 parallel interface and Read/Write operation enable pin in 6800 parallel interface For 8080 interface, if not used, connect to VDDI For 6800 interface, if not used, connect to VDDI or GND	
13	GND	P	POWER GROUND	
14	P68	I	8080/6800 MCU Interface mode selection P68=1: select 6800 MCU parallel interface P68=0: select 8080 MCU parallel interface If not used, set to GND	
15	RESET	I	Chip reset pin (low active) Will reset the device if signal is 'low' and must be applied to properly initialize the chip	
16	GND	P	POWER GROUND	
17-34	DB0-DB17	I/O	When RCM1=0 (MCU I/F), D[17:0] are used to MCU interface data bus and D0 is also the serial input/output signal in SPI Interface mode. In serial interface, D[17:1] should be connected to GND When RCM1=1 (RGB I/F), D[17:0] are used to RGB interface data bus.	
35	A	P	Backlight Power (Anode)	
36	K	P	Backlight Power (Cathode)	
37	SPI4W	I	SPI interface selection pin SPI4W=0: 3 Wire SPI (Default) SPI4W=1: 4 Wire SPI This pin is internal pull low.	
38	IM0	I	MCU parallel interface type selection IM1 IM0 Parallel interface 0 0 MCU 8-bit Parallel 0 1 MCU 16-bit Parallel 1 0 MCU 9-bit Parallel 1 1 MCU 18-bit Parallel	
39	IM1			
40	IM2	I	MCU Parallel Interface bus and Serial Interface Select IM2=1; Parallel Interface IM2=0; Serial Interface	

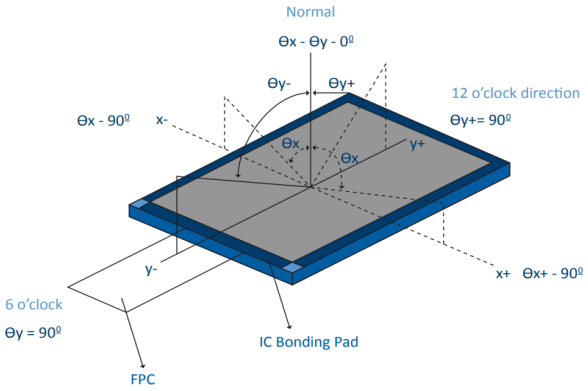
3. LCD Optical Characteristics

3.1 Optical Specifications

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	Θ=0 Normal viewing angle	200	300	--		(1)(2)
Response time	Rising+ Falling	TR+TF		--	30	60	msec	
Cross Talk		ct		--	--	2%	%	(1)
Color Filter Chromacicity	White	WX		--	0.308	--		(1)
		WY		--	0.327	--		
	Red	RX		--	0.610	--		
		RY		--	0.329	--		
	Green	GX		--	0.299	--		
		GY		--	0.567	--		
	Blue	BX		--	0.143	--		
		BY		--	0.111	--		
Viewing angle	Hor.	ΘL	CR>10	40	45	--	Degrees	
		ΘR		40	45	--		
	Ver.	ΘU		40	45	--		
		ΘD		15	20	--		
Option View Direction		12:00						

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.

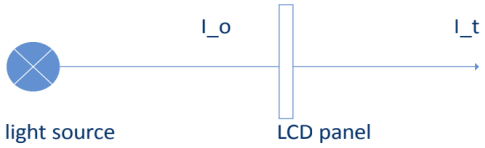


(2) Definition of Contrast Ratio (Cr): measured at the center point of panel. The contrast ratio (Cr) measured on a module, is the ratio between the luminance (Lw) in a full white area (R=G=B=1) and the luminance (Ld) in a dark area (R=G=B=0).

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

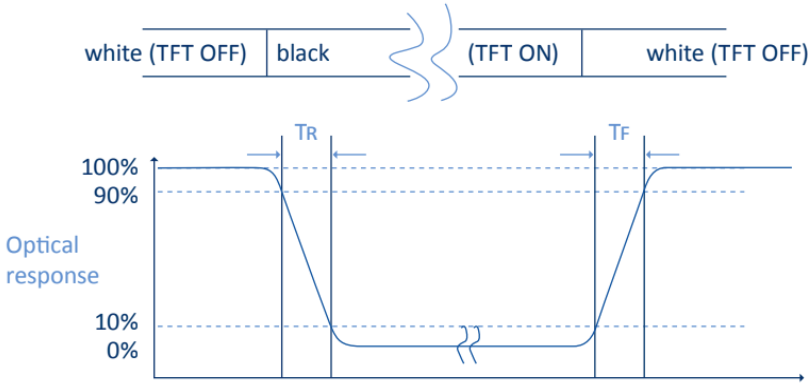
(3) Definition of transmittance (T%): The transmittance of the panel including the polarizers is measured with electrical driving. The equation for transmittance Tr is:

$$Tr = \frac{It}{Io} x\ 100\%$$



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.



(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.

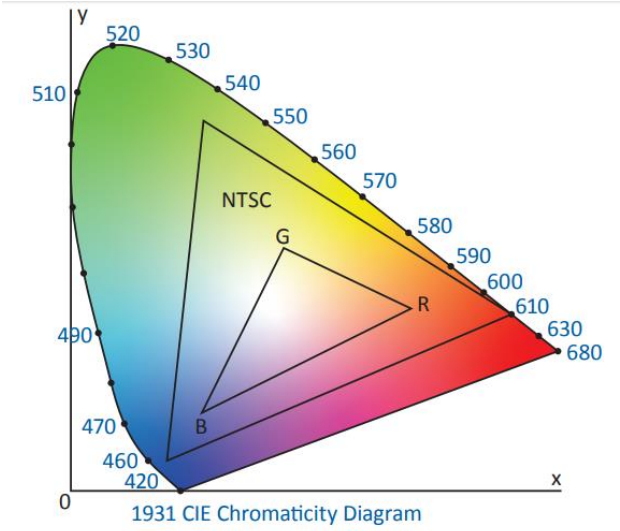
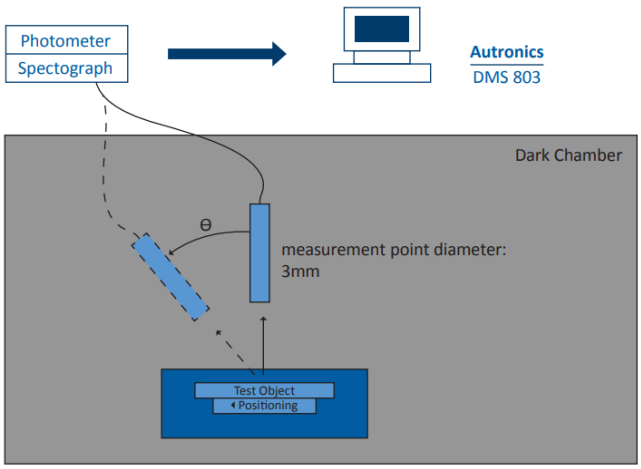


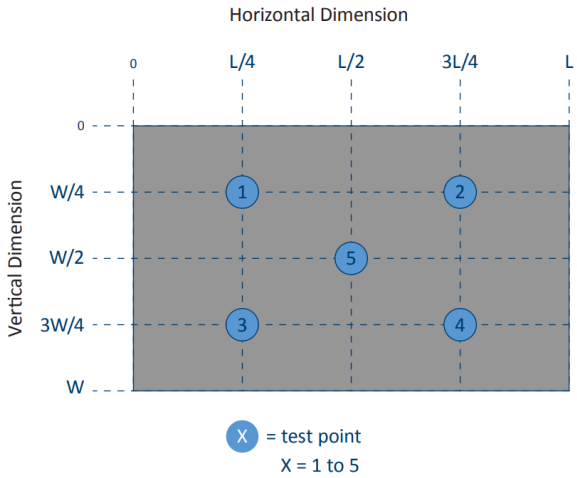
Fig. 1931 CIE chromacity diagram

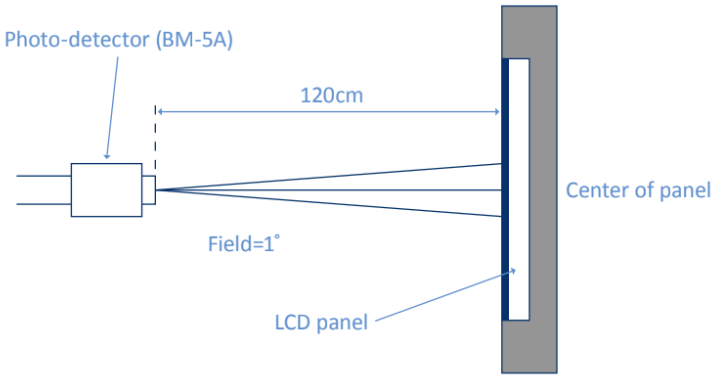
Color gamut: $S = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}} \times 100\%$

(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.







4. TFT Electrical Characteristics

4.1 Absolute Maximum Rating (Ta=25°C,,VSS=0V)

Item	Symbol	Value		Unit	Condition
		Min.	Max.		
Digital Power Supply Voltage	VDD	VSS-0.3	5.0	V	--

4.2 Back-Light Unit Maximum Rating

(Ta=25±2°C)

Item	Symbol	Min.	Max.	Unit	Note
Current(1LED)	I_f	--	30	mA	(1)
voltage	V_R	--	5.0	V	(1)

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. LED Backlight Characteristics

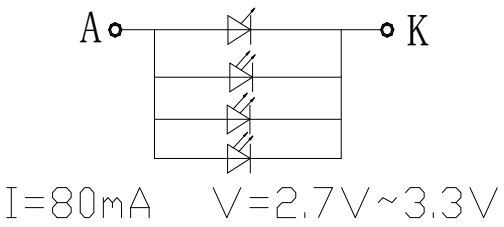
The back-light system is an edge-lighting type with four white LEDs (Light Emitting Diode).

(Ta=25±2°C)

Item	Symbol	Value			Unit	Condition
		Min.	Typ.	Max.		
LED Voltage	VF	2.7	3.0	3.3	V	If=80mA
LED Current	IF	-	80	-	mA	
Power Consumption	PBL	-	-	-	mW	
Brightness through TFT	Lv	600	-	-	nit	If=80mA
Color coordinate(TFT Surface)	X	0.25<x<0.34				
	Y	0.26<Y<0.35				
Uniformity(TFT Surface)		>=80%				

Note (1) PBL = VF × IF

LED CIRCUIT DIAGRAM



6. Timing Characteristics

For more information on the timing characteristics for this module, please see the full specifications for Controller ILI9163V

7. Quality Inspection Standards

For TFT quality inspection standards, please visit the following link:
https://focuslcds.com/tft-quality-inspection-standards/

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.