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ISO 9001
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G240128D1-FTW-DW65

Product Description

- 240x128 Graphic LCD
- FSTN Positive
- 144.00x104.00mm Module
- 6800 Parallel Interface
- Side EL Backlight

- Transflective
- Wide Temp Range
- 5.0V
- LCD IC: HD61830A0
- RoHS Compliant

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Revision History

Date	Rev. No	Page	Summary
07/08/2025	1.0	All	First issue

Graphic LCD Features

Resolution: 240x128 Dots
Interface(s): 6800 Parallel
RoHS Compliant.

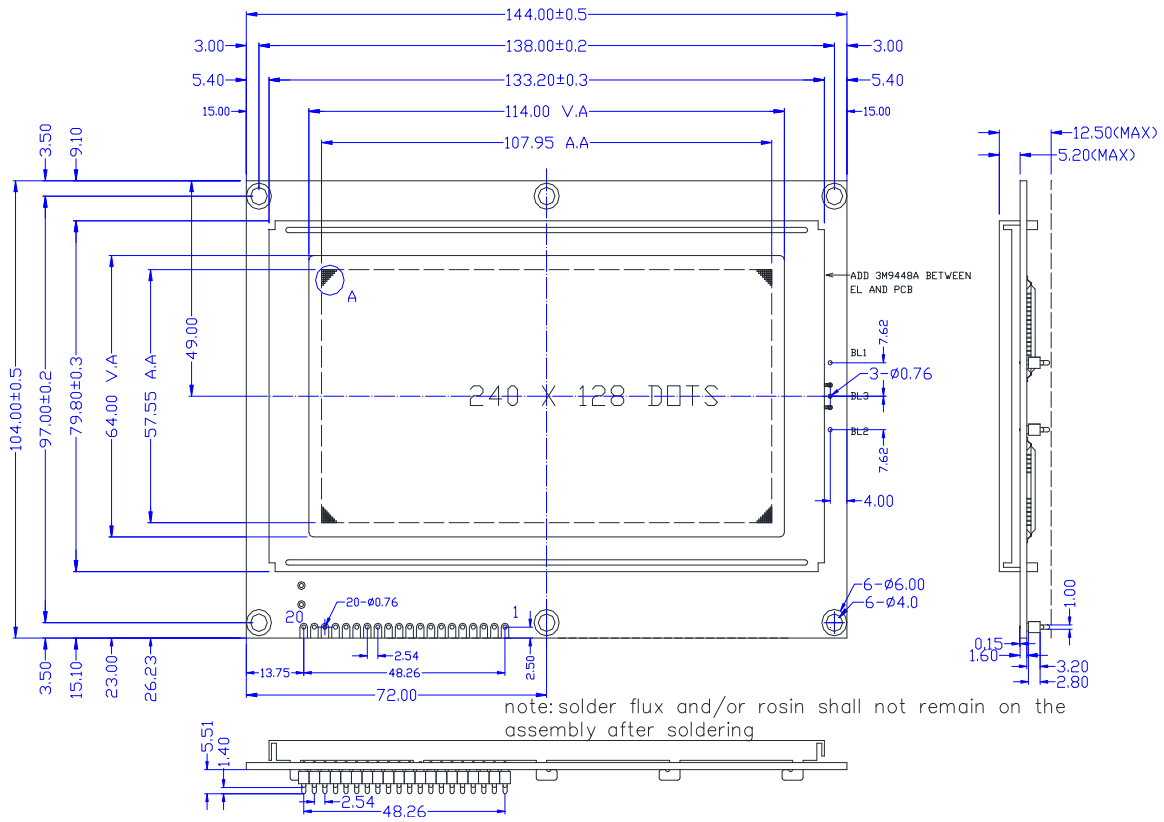
General Information Items	Specification	Unit	Note
	Main Panel		
Viewing Area (VA)	114.0 (H) x 64.0 (V)	mm	--
LCD Type	FSTN Positive	--	--
Viewing Angle	6:00	O'Clock	--
Polarizer	Transflective	--	--
Backlight Type	Side EL Backlight	--	--
Backlight Color	White	--	--
LCD IC	HD61830A0	--	--
Drive Mode	1/128 Duty, 1/12 Bias	--	--
Operating Temperature	-20 to +70	°C	--
Storage Temperature	-30 to +80	°C	--

Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	--	144.00	--	mm	--
	Vertical (V)	--	104.00	--	mm	--
	Depth (D)	--	13.00	--	mm	--
Weight		--	149	--	g	Approximate

1. Outline Dimensions

Rev.	Description	Date
1.0	First	06/12/2024



Interface:

NO	PIN
1	VSS
2	VDD
3	VR
4	RS
5	R/W
6	E
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	/CE
16	/RES
17	VOUT
18	NC
19	RTH1
20	RTH2
BL1	EL1
BL2	EL2
BL3	NC

NOTES:
1. DISPLAY TYPE: 240x128 FSTN GRAPHIC LCD
2. POLARIZER: TRANSFLECTIVE, POSITIVE MODE
3. VIEWING ANGLE: 6:00
4. OPERATING TEMPERATURE: -20°C TO +70°C
   STORAGE TEMPERATURE: -30°C TO +80°C
5. DRIVE METHOD: 1/128 DUTY, 1/12 BIAS,
   VDD 5.0V, VLCD 17.5V
6. LCD IC: HD61830A0
7. BACKLIGHT: EL WHITE, 21mA, 100V

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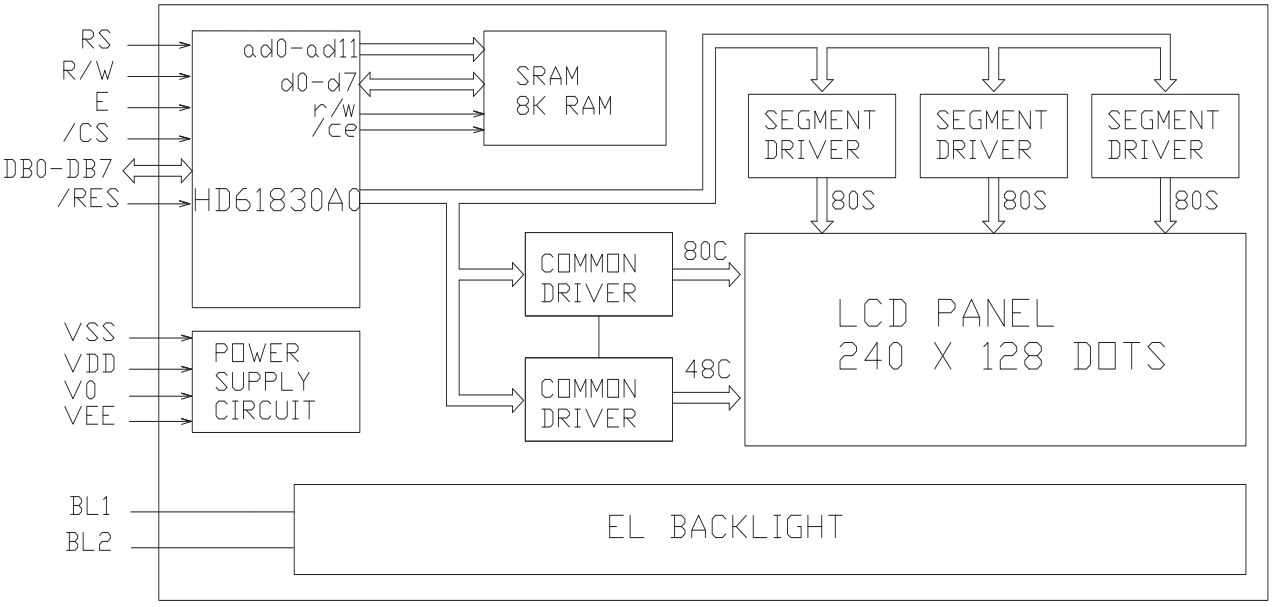
Model Name: G240128D1-FTW-DW65		FOCUS LCDs LCDs MADE SIMPLE®	
General Tol: ±0.3			
Approvals	Date	Drawing No.:	Scale:
DWN:			
CHK:		Size:	Unit: mm / Page: 1/1
APP:			

2. Input Terminal Pin Assignment

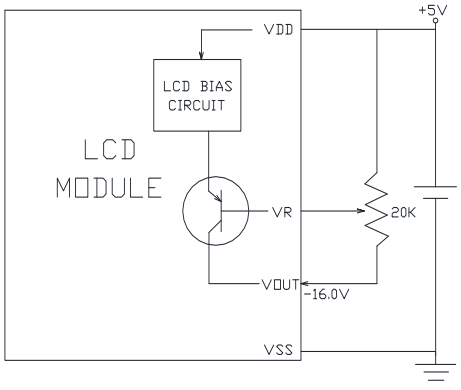
NO.	Symbol	Description	I/O
1	VSS	Power supply (GND).	P
2	VDD	Power supply for logic (+5.0V).	P
3	VR	LCD contrast adjust.	P
4	RS	Command/Data select signal. RS = 1: Command RS = 0: Data	I
5	R/W	Read/Write signal. R/W = 1: MPU → HD61830 R/W = 0: MPU ← HD61830	I
6	E	Enable signal.	I
7-14	DB0-DB7	Data bus lines.	I/O
15	/CE	Chip select signal.	I
16	/RES	Reset signal (low effective).	I
17	VOUT	LCD module negative input.	P
18	NC	No connection.	--
19	RTH1	Pin 1 of 10k resistor.	I
20	RTH2	Pin 2 of 10k resistor.	I
BL1	EL1	Power supply for EL backlight (+5.0V).	P
BL2	EL2	Power supply for EL backlight (0V).	P
BL3	NC	No connection.	--

3. Circuit Block Diagram

3.1 Electrical Block Diagram



3.2 Power Supply



4. LCD Optical Characteristics

Item		Symbol	Condition	Min	Typ.	Max	Unit
Contrast Ratio		CR	--	--	12	--	--
Response Time	On	T_{on}	--	--	160	240	ms
	Off	T_{off}		--	100	150	ms
Viewing Angle $C_r \geq 2$, 25°C	Hor.	Θ_L	Φ=270°, 9H	-40	--	55	degree
		Θ_R	Φ=90°, 3H	-40	--	55	
	Ver.	Θ_T	Φ=180°, 12H	--	--	80	
		Θ_B	Φ=0°, 6H	--	--	80	
Frame Frequency		Ff	25°C	--	70	--	Hz

5. Electrical Characteristics

5.1 Absolute Maximum Rating

Characteristics	Symbol	Min	Max	Unit
Supply Voltage	VDD-VSS	-0.3	7.0	V
	VDD-VR	0.0	26.0	V
Input Voltage	Vi	-0.3	VDD+0.3	V
Operating Temperature	T_{OP}	-20	+70	°C
Storage Temperature	T_{ST}	-30	+80	°C

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

Characteristics		Symbol	Condition	Min	Typ.	Max	Unit
LCD Driving Voltage		VDD-VR	--	--	17.5	--	V
Supply Voltage For Logic		VDD-VSS	VDD=5V	4.5	5.0	5.5	V
Input Voltage	H Level	V_{IH}	--	2.2	--	VDD	V
	L Level	V_{IL}	--	0.0	--	0.6	V
Supply Current For Logic		I_{CC}		--	15.5	37.0	mA
Supply Current For LCD		I_O		0.15	0.22	0.27	mA

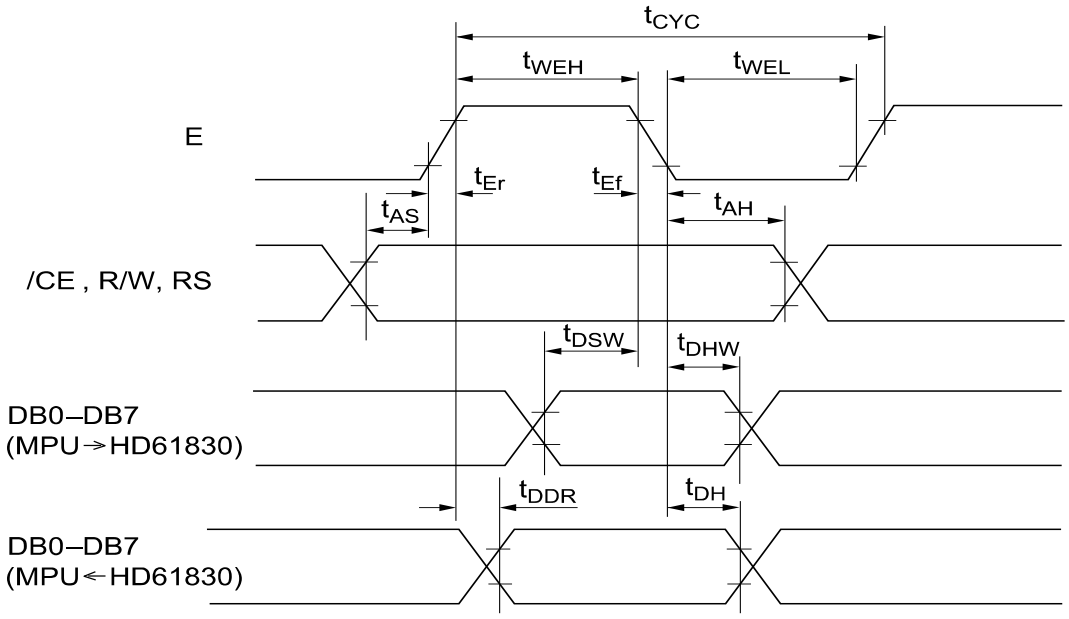
Condition:

1. VDD = 5.0V
2. 1/128 Duty, 1/12 Bias
3. Ta=25°C

6. Module Function

6.1 Timing Characteristics

System Bus Timing for 6800 MCU Interface

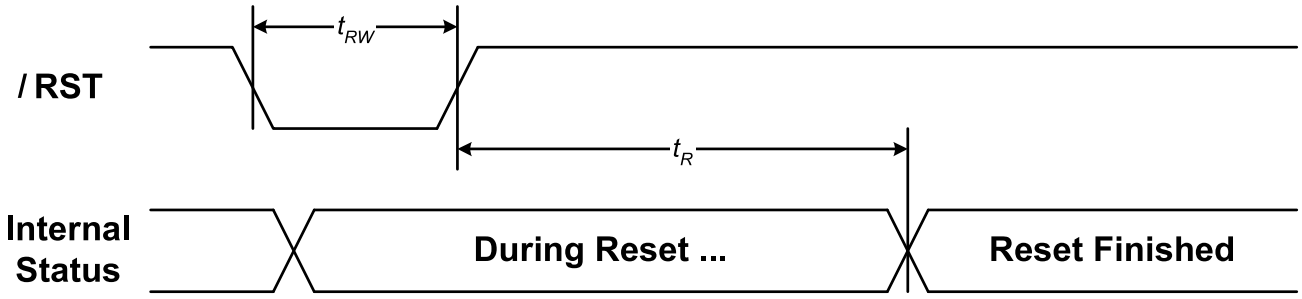


(VDD=5V±5%, GND=0V, Ta=-20~70°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Enable cycle Time	E	t_{CYC}		1000	--	ns
Enable Pulse Width (high)		t_{WEH}		450	--	
Enable Pulse Width (low)		t_{WEL}		450	--	
Enable Rise Time		t_{Er}		--	25	
Enable Fall Time		t_{Ef}		--	25	
Setup Time	/CE, R/W, RS	t_{AS}		140	--	
Address Hold Time		t_{AH}		10	--	
Data Set-up Time	DB0~DB7 (Write)	t_{DSW}		225	--	
Data Hold Time		t_{DHW}		10	--	
Data Delay Time	DB0~DB7 (Read)	t_{DDR}		--	225	
Output Data Hold Time		t_{DH}		20	--	

Note:
*1. Input signal rise time and fall time (tr, tf) is specified at 20ns or less.
*2. Please see the HD61830 sheet for details.

6.2 Reset Timing



(VDD=5V±10%, VSS=0V, Ta=25°C)

Item	Signal	Symbol	Condition	Rating			Units
				Min.	Typ.	Max.	
Reset time		t_R		--	--	100	μs
Reset “L” pulse width	RST	t_{RW}		100	--	--	μs

6.3 LCM Application

For application examples, please see information on pages 22-23 of the data sheet for LCD controller HD61830A0. The data sheet can be found here:
https://focuslcds.com/wp-content/uploads/Drivers/HD61830A0.pdf

7. Cautions and Handling Precautions

7.1 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.

7.2 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 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.