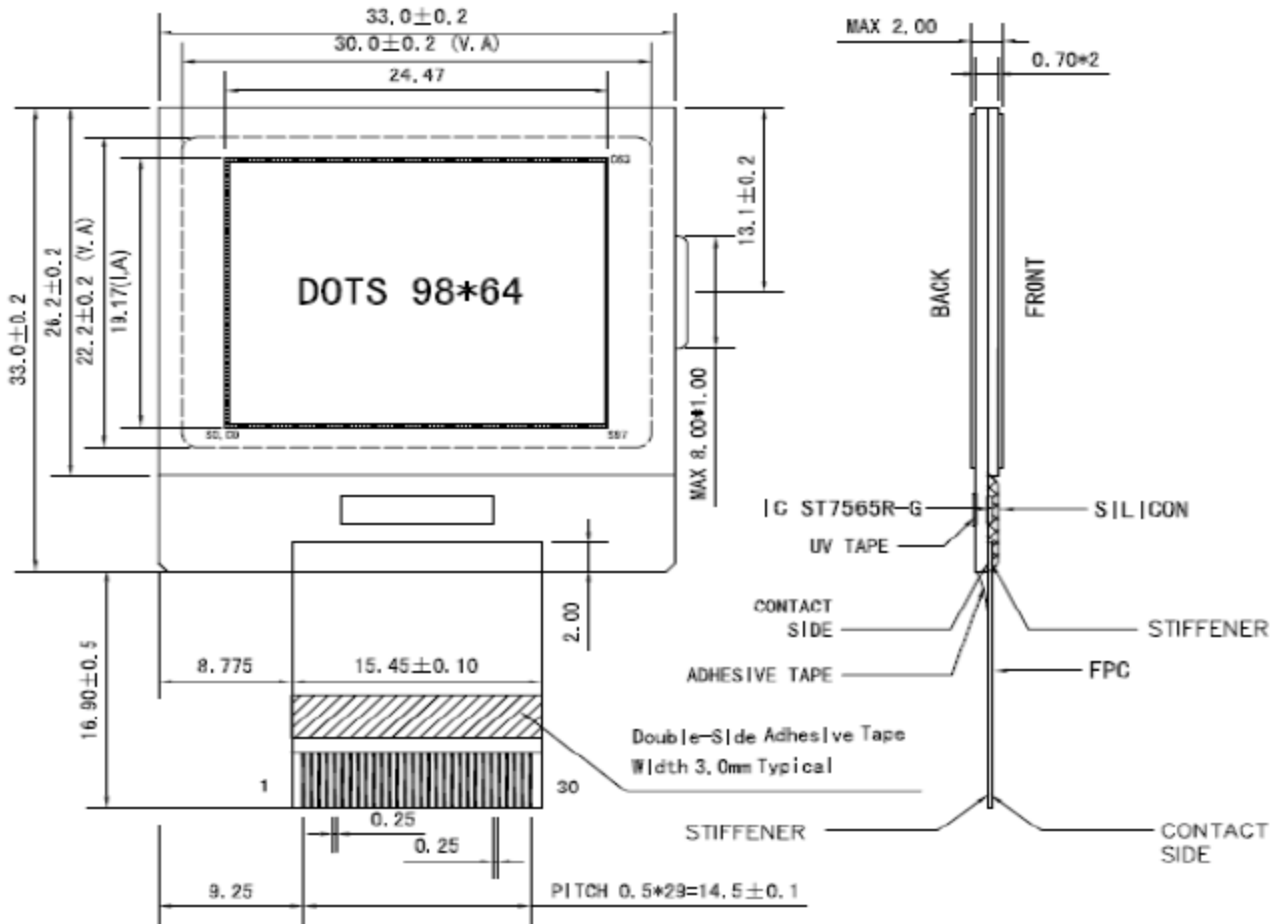


FOCUS DISPLAY SOLUTIONS

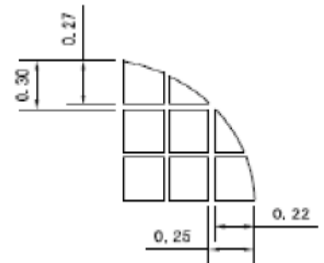
WWW.FOCUSLCD.COM

FDS98X64(33x33)XGG



Feature:

1. 98x64 dots graphic LCD Module
2. Built-In controller (ST7565R or equivalent)
3. 1.8~3.3V power supply
4. FSTN; 1/64 duty



Interface Pin Connections

NO	SYM	I/O	FUNCTION																														
1	P/S	I	<p>This pin configures the interface to be parallel mode or serial mode. P/S = "H": Parallel data input/output. P/S = "L": Serial data input. The following applies depending on the P/S status:</p> <table border="1"> <thead> <tr> <th>P/S</th> <th>Data/Command</th> <th>Data</th> <th>Read/Write</th> <th>4-line SPI Clock</th> </tr> </thead> <tbody> <tr> <td>"H"</td> <td>A0</td> <td>D0 to D7</td> <td>/RD, /WR</td> <td>X</td> </tr> <tr> <td>"L"</td> <td>A0</td> <td>SI (D7)</td> <td>Write only</td> <td>SCL (D6)</td> </tr> </tbody> </table> <p>When P/S = "L", D0 to D5 must be fixed to "H". /RD (E) and /WR (R/W) are fixed to either "H" or "L". The serial access mode does NOT support read operation.</p>	P/S	Data/Command	Data	Read/Write	4-line SPI Clock	"H"	A0	D0 to D7	/RD, /WR	X	"L"	A0	SI (D7)	Write only	SCL (D6)															
P/S	Data/Command	Data	Read/Write	4-line SPI Clock																													
"H"	A0	D0 to D7	/RD, /WR	X																													
"L"	A0	SI (D7)	Write only	SCL (D6)																													
2	C86	I	<p>This is the MPU interface selection pin. C86 = "H": 6800 Series MPU interface C86 = "L": 8080 Series MPU interface</p>																														
3	V _R	I	<p>Output voltage regulator terminal. Provides the voltage between VSS and V0 through a resistive voltage divider. IRS = "L": the V0 voltage regulator internal resistors are not used. IRS = "H": the V0 voltage regulator internal resistors are used.</p>																														
4~8	V0, V1, V2, V3, V4, Vss	Power Supply	<p>This is a multi-level power supply for the liquid crystal drive. The voltage Supply applied is determined by the liquid crystal cell, and is changed through the use of a resistive voltage divided or through changing the impedance using an op. amp. Voltage levels are determined based on Vss, and must maintain the relative magnitudes shown below. $V0 \geq V1 \geq V2 \geq V3 \geq V4 \geq Vss$ When the power supply turns ON, the internal power supply circuits produce the V1 to V4 voltages shown below. The voltage settings are selected using the LCD bias set command.</p> <table border="1"> <thead> <tr> <th></th> <th>1/65 DUTY</th> <th>1/49 DUTY</th> <th>1/33 DUTY</th> <th>1/55 DUTY</th> <th>1/53 DUTY</th> </tr> </thead> <tbody> <tr> <td>V1</td> <td>8/9*V0,6/7*V0</td> <td>7/8*V0,5/6*V0</td> <td>5/6*V0,4/5*V0</td> <td>7/8*V0,5/6*V0</td> <td>7/8*V0,5/6*V0</td> </tr> <tr> <td>V2</td> <td>7/9*V0,5/7*V0</td> <td>6/8*V0,4/6*V0</td> <td>4/6*V0,3/5*V0</td> <td>6/8*V0,4/6*V0</td> <td>6/8*V0,4/6*V0</td> </tr> <tr> <td>V3</td> <td>2/9*V0,2/7*V0</td> <td>2/8*V0,2/6*V0</td> <td>2/6*V0,2/5*V0</td> <td>2/8*V0,2/6*V0</td> <td>2/8*V0,2/6*V0</td> </tr> <tr> <td>V4</td> <td>1/9*V0,1/7*V0</td> <td>1/8*V0,1/6*V0</td> <td>1/6*V0,1/5*V0</td> <td>1/8*V0,1/6*V0</td> <td>1/8*V0,1/6*V0</td> </tr> </tbody> </table>		1/65 DUTY	1/49 DUTY	1/33 DUTY	1/55 DUTY	1/53 DUTY	V1	8/9*V0,6/7*V0	7/8*V0,5/6*V0	5/6*V0,4/5*V0	7/8*V0,5/6*V0	7/8*V0,5/6*V0	V2	7/9*V0,5/7*V0	6/8*V0,4/6*V0	4/6*V0,3/5*V0	6/8*V0,4/6*V0	6/8*V0,4/6*V0	V3	2/9*V0,2/7*V0	2/8*V0,2/6*V0	2/6*V0,2/5*V0	2/8*V0,2/6*V0	2/8*V0,2/6*V0	V4	1/9*V0,1/7*V0	1/8*V0,1/6*V0	1/6*V0,1/5*V0	1/8*V0,1/6*V0	1/8*V0,1/6*V0
	1/65 DUTY	1/49 DUTY	1/33 DUTY	1/55 DUTY	1/53 DUTY																												
V1	8/9*V0,6/7*V0	7/8*V0,5/6*V0	5/6*V0,4/5*V0	7/8*V0,5/6*V0	7/8*V0,5/6*V0																												
V2	7/9*V0,5/7*V0	6/8*V0,4/6*V0	4/6*V0,3/5*V0	6/8*V0,4/6*V0	6/8*V0,4/6*V0																												
V3	2/9*V0,2/7*V0	2/8*V0,2/6*V0	2/6*V0,2/5*V0	2/8*V0,2/6*V0	2/8*V0,2/6*V0																												
V4	1/9*V0,1/7*V0	1/8*V0,1/6*V0	1/6*V0,1/5*V0	1/8*V0,1/6*V0	1/8*V0,1/6*V0																												
9	CAP2-	O	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2P terminal.																														
10	CAP2+	O	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2N terminal.																														
11	CAP1+	O	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1N terminal.																														
12	CAP1-	O	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1P terminal.																														
13	CAP3+	O	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1N terminal.																														
14	NC	--	No Connect																														
15	V _{OUT}	O	DC/DC voltage converter. Connect a capacitor between this terminal and VSS or VDD terminal.																														

16	V _{SS}	Power Supply	Ground
17	V _{DD}	Power Supply	Power Supply
18	DB7	I/O	<p>This is an 8-bit bi-directional data bus that connects to an 8-bit or 16-bit standard MPU data bus.</p> <p>When the serial interface is selected (P/S = "L") :</p> <p>D7 : serial data input (SI) ; D6 : the serial clock input (SCL). D0 to D5 are set to high impedance.</p>
19	DB6	I/O	
20	DB5	I/O	
21	DB4	I/O	
22	DB3	I/O	
23	DB2	I/O	
24	DB1	I/O	
25	DB0	I/O	
26	/RD (E)	I	<ul style="list-style-type: none"> When connected to 8080 series MPU, this pin is treated as the "/RD" signal of the 8080 MPU and is LOW-active. The data bus is an output status when this signal is "L". When connected to 6800 series MPU, this pin is treated as the "E" signal of the 6800 MPU and is HIGH-active.
27	/WR (R/W)	I	<p>When connected to the 8080 MPU, this is active LOW. (R/W) This terminal connects to the 8080 MPU/WR signal. The signals on the data bus are latched at the rising edge of the /WR signal. When connected to the 6800 series MPU: This is the read/write control.</p>
28	A0	I	<p>Select register -A0 = "H": Indicates that DB0 to DB7 are display data -A0 = "L": Indicates that DB0 to DB7 are control data</p>
29	/RES	I	<p>When /RES is set to "L", the settings are initialized. The reset operation is performed by the /RES signal level.</p>
30	CS1B	I	<p>This is the chip select signal. When CS1B = "L" and CS2 = "H", then the chip select becomes active, and data/command I/O is enabled.</p>

Absolute Maximum Rating

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
POWER SUPPLY	V _{DD}	-0.3	---	+3.6	V
INPUT VOLTAGE	V _{IN}	-0.3	---	V _{DD} +0.3	
DC SUPPLY VOLTAGE	V _{OUT}	-0.3	---	+13.5	
DC SUPPLY VOLTAGE	V _O	-0.3	---	+13.5	
OPERATING TEMP.	T _{OPR}	-10	---	+50	C

Electrical Characteristics

ITEM	SYM	CONDITION	MIN	TYP	MAX	UNIT
POWER SUPPLY VOLTAGE	V _{DD}	---	1.8	3.0	3.3	V
CURRENT CONSUMPTION	I _{DD}	T _a = 25°C	---	1.0	---	mA

Mechanical Data

ITEM	STANDARD	UNIT
MODULE DIMENSION	33 X 33	mm
VIEWING AREA	30.0 X 22.2	mm
DOT SIZE	0.22 X 0.27	mm
DOT PITCH	0.25 X 0.3	mm