



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司

SPECIFICATION

MODULE NO.: WO12864K

General Specification

Item	Dimension	Unit
Number of dots	128 x 64	—
Module dimension	89.7 x 49.8 x 6.0	mm
View area	66.8 x 35.5	mm
Active area	63.98 x 31.98	mm
Dot size	0.48 x 0.48	mm
Dot pitch	0.50 x 0.50	mm
Duty	1/65 Duty , 1/9 Bias	
Backlight Type	LED	
IC	ST7565V	

Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_{OP}	-20	—	+70	°C
Storage Temperature	T_{ST}	-30	—	+80	°C
Power Supply Voltage	V_{SS}	-3.6	—	+0.3	V
Power supply voltage (VDD standard)	V5, VOUT	-13.5	—	+0.3	V
Power supply voltage (VDD standard)	V1, V2, V3, V4	V5	—	+0.3	V

Electrical Characteristics

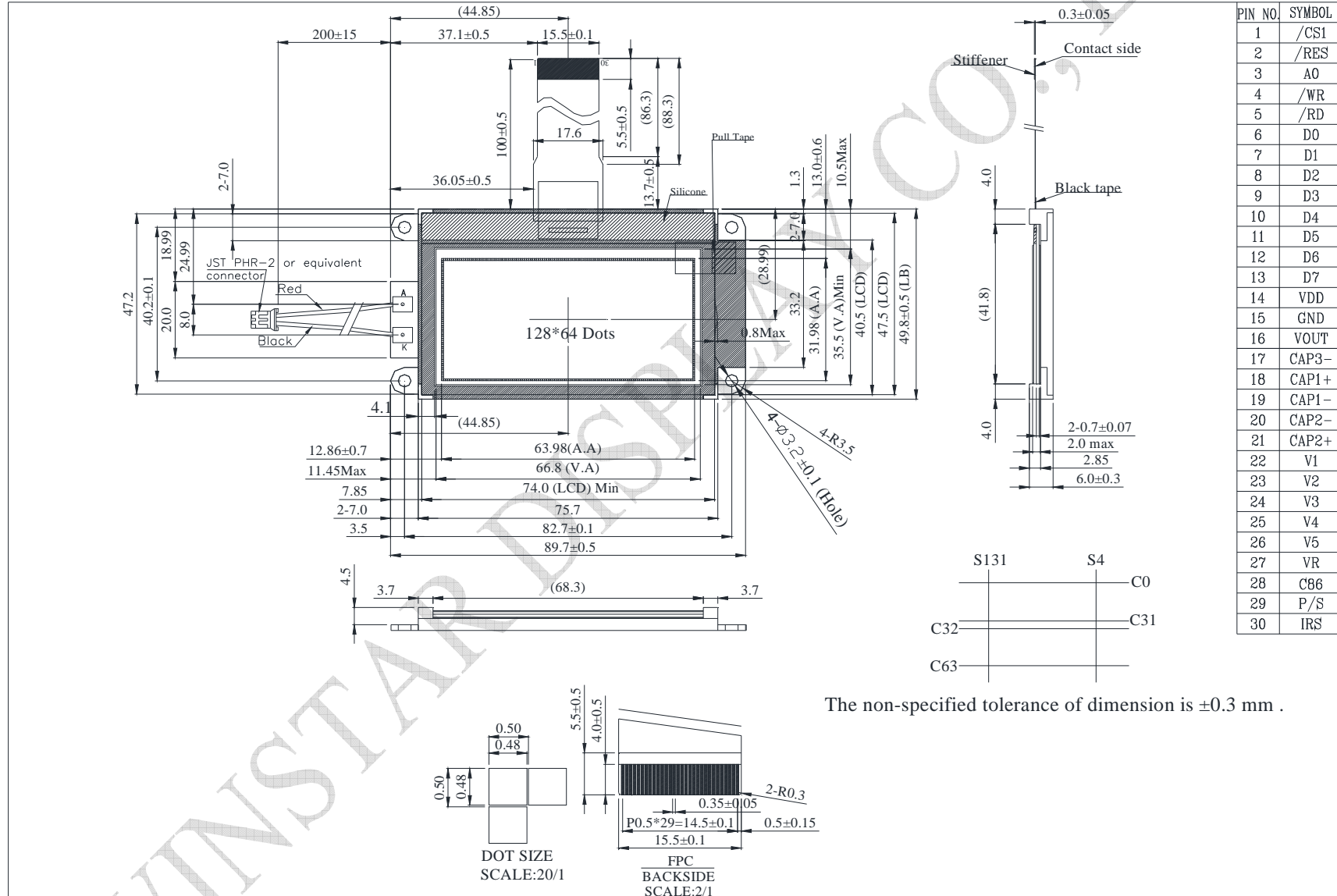
Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	$V_{DD}-V_{SS}$	—	2.8	3.0	3.2	V
Supply Voltage For LCD *Note	V_{OP}	$T_a=-20^{\circ}\text{C}$	—	—	—	V
		$T_a=25^{\circ}\text{C}$	9.3	9.5	9.7	V
		$T_a=70^{\circ}\text{C}$	—	—	—	V
Input High Volt.	V_{IH}	—	$0.8 V_{DD}$	—	V_{DD}	V
Input Low Volt.	V_{IL}	—	V_{SS}	—	$0.2 V_{DD}$	V
Output High Volt.	V_{OH}	—	$0.8 V_{DD}$	—	V_{DD}	V
Output Low Volt.	V_{OL}	—	V_{SS}	—	$0.2 V_{DD}$	V
Supply Current	I_{DD}	$V_{DD}=3.0\text{V}$	—	—	2.0	mA

Interface Pin Function

Pin No.	Symbol	Description
1	/CS1	This is the chip select signal. When /CS1 = "L", then the chip select becomes active, and data/command I/O is enabled.
2	/RES	I When /RES is set to "L," the settings are initialized. The reset operation is performed by the /RES signal level.
3	A0	This is connect to the least significant bit of the normal MPU address bus, and it determines whether the data bits are data or a command. A0 = "H": Indicates that D0 to D7 are display data. A0 = "L": Indicates that D0 to D7 are control data
4	/WR	<ul style="list-style-type: none"> When connected to an 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. <ul style="list-style-type: none"> When connected to a 6800 Series MPU: This is the read/write control signal input terminal. When R/W = "H": Read. When R/W = "L": Write.
5	/RD	<ul style="list-style-type: none"> When connected to an 8080 MPU, this is active LOW. (E) This pin is connected to the /RD signal of the 8080 MPU, and the ST7565V series data bus is in an output status when this signal is "L". <ul style="list-style-type: none"> When connected to a 6800 Series MPU, this is active HIGH. This is the 6800 Series MPU enable clock input terminal.
6	D0	This is an 8-bit bi-directional data bus that connects to an 8-bit or 16-bit standard MPU data bus. When the serial interface is selected (P/S = "L") : D7 : serial data input (SI) ; D6 : the serial clock input (SCL). D0 to D5 are set to high impedance. When the chip select is not active, D0 to D7 are set to high impedance.
7	D1	
8	D2	
9	D3	
10	D4	
11	D5	
12	D6	
13	D7	
14	VDD	Shared with the MPU power supply terminal Vcc.
15	GND	This is a 0V terminal connected to the system GND.
16	VOUT	DC/DC voltage converter. Connect a capacitor between this terminal and VSS.
17	CAP3-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1+ terminal.

18	CAP1+	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1-terminal.
19	CAP1-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1-terminal.
20	CAP2-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2-terminal.
21	CAP2+	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2-terminal.
22	V1	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 resistive voltage divider or through changing the impedance using an op. amp. Voltage levels are determined based on VDD,
23	V2	
24	V3	
25	V4	
26	V5	
27	VR	Output voltage regulator terminal. Provides the voltage between VDD and V5 through a resistive voltage divider. IRS = "L" : the V5 voltage regulator internal resistors are not used . IRS = "H" : the V5 voltage regulator internal resistors are used .
28	C86	This is the MPU interface switch terminal. C86 = "H": 6800 Series MPU interface. C86 = "L": 8080 MPU interface.
29	P/S	This is the parallel data input/serial data input switch terminal. P/S = "H": Parallel data input. P/S = "L": Serial data input. When P/S = "L", D0 to D5 fixed "H". /RD (E) and /WR (R/W) are fixed to either "H" or "L". With serial data input, It is impossible read data from RAM .
30	IRS	This terminal selects the resistors for the V5 voltage level adjustment. IRS = "H": Use the internal resistors IRS = "L": Do not use the internal resistors. The V5 voltage level is regulated by an external resistive voltage divider attached to the VR terminal

Contour Drawing



PIN NO.	SYMBOL
1	/CS1
2	/RES
3	A0
4	/WR
5	/RD
6	D0
7	D1
8	D2
9	D3
10	D4
11	D5
12	D6
13	D7
14	VDD
15	GND
16	VOUT
17	CAP3-
18	CAP1+
19	CAP1-
20	CAP2-
21	CAP2+
22	V1
23	V2
24	V3
25	V4
26	V5
27	VR
28	C86
29	P/S
30	IRS

The non-specified tolerance of dimension is ±0.3 mm .