

OCM128128A 图形点阵液晶显示模块 使用说明书

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Golden Palm Electronics Co.,Ltd.

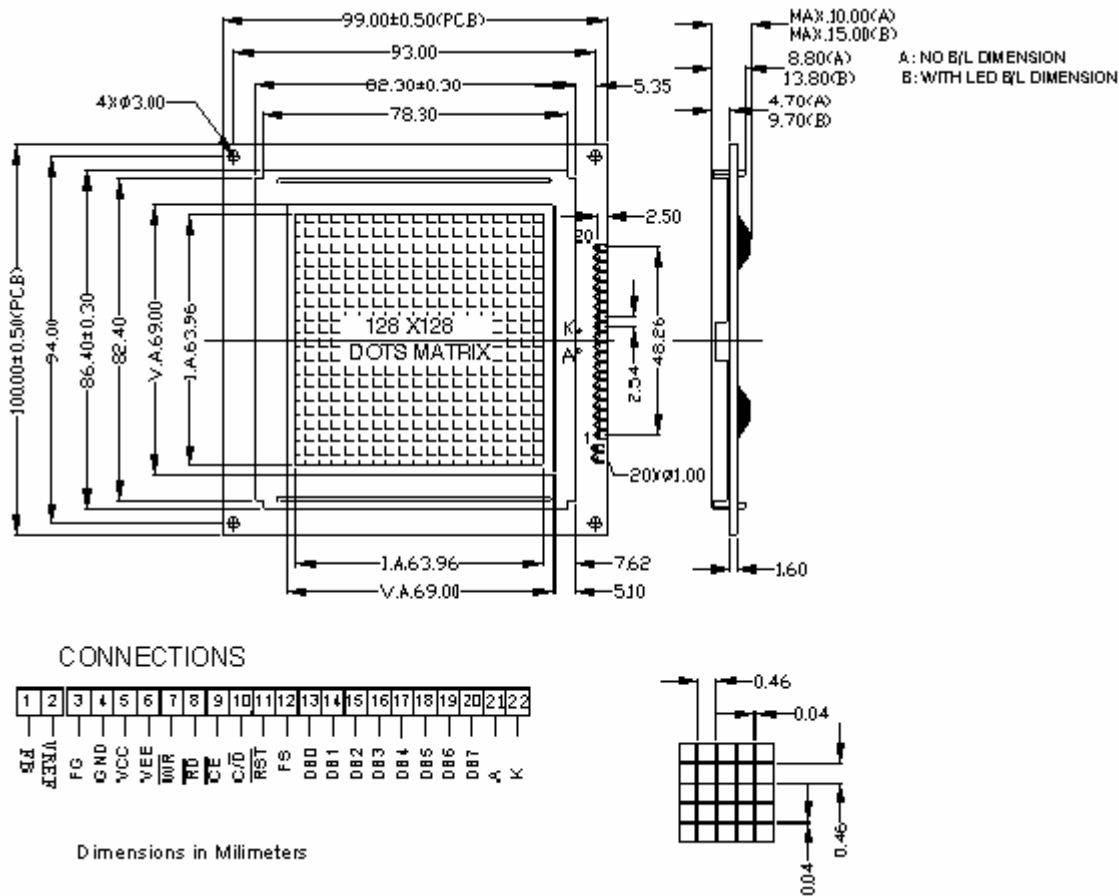
Introduction to OCM128128A LCM

OCM128128A is a dot matrix LCD module, It can display 128*128 dots size LCD panel. It can be used in text, graphic and combination text-and-graphic modes, and includes various attribute functions. The device has an 8-bit parallel data bus and control lines for reading or writing through an MPU interface. It can be directly connected to a TMPZ-80. It has 128-word character generator ROM which can control an external display RAM. Allocation of text, graphics and external character generator RAM can be made easily and the display window can be moved freely within the allocated memory range.

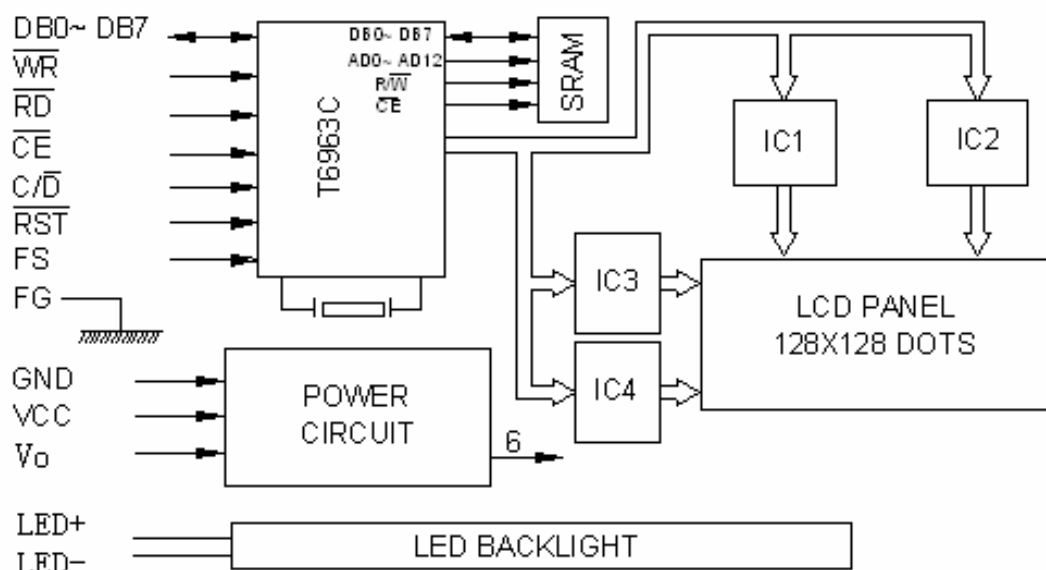
Features

- Display format: 128*128 dots matrix
- STN yellow-green mode
- Easy interface with 8-bit MPU
- Low power consumption
- Viewing angle: 6 O'clock
- Multiplex level: 1/128 duty, 1/13 bias
- LCD driving voltage (top): 15~17V
- LCD driver IC
LCD control LSI : T6963C
Row driver : KS0086
Column driver : KS0086
- Character font (pin-selectable)
Horizontal dots : 6, 8
Vertical dots : 8 (fixed)
- A 128-word character generator ROM (code 0101) T6963C-0101 is built in as standard
- External display memory: 8KB
The address in display memory of the text area, graphic area and external character generator area are determined by software.
- Read or Write operations from the CPU do not disturb the display
- The attribute functions can only be used in Text mode. They cannot be used in Graphic or Combination Character mode

Figure 1. External Dimensions



OCM128128A 引脚如上所示，1 脚（FB）与 2 脚（VREF）之间接一电位器（约 40K），调整对比度，6 脚悬空。

Figure 2. Application Diagram**Output Voltage Control**

The output voltage is set using a single external resistor and the internal current-output DAC (Figure 1). The full-scale output voltage is set by selecting the feed-back resistor, RFB. The output voltage is controlled from 33% to 100% of the full-scale output by an internal 64-step DAC/counter.

On power-up or after a reset, the counter sets the DAC output to mid-range. Each rising edge of ADJ increments the DAC output. When incremented beyond full scale, the counter rolls over and sets the DAC to the minimum value. In this way, a single pulse applied to ADJ increases the DAC set point by one step, and 63 pulses decrease the set point by one step.

Table 1 is the logic table for the CTRL and ADJ inputs, which control the internal DAC and counter. Figures 3-7 show various timing specifications and different ways of incrementing and resetting the DAC, and of placing it in the low-power standby mode. As long as the timing specifications for ADJ and CTRL are observed, any sequence of operations can be implemented.

Table 1. Input Truth Table

ADJ	CTRL	RESULT
Low	Low	Shut down
High	Low	Reset counter to mod-range. The device is not shut down.
X	High	On
	High	Increment the counter

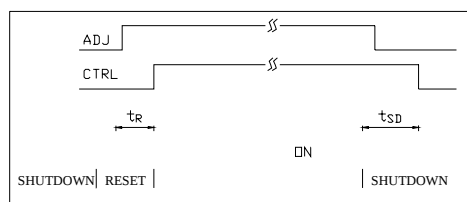


Figure 3. Shutdown-Reset-On-Shutdown Sequence of Operation.
The device is not shut down during reset.

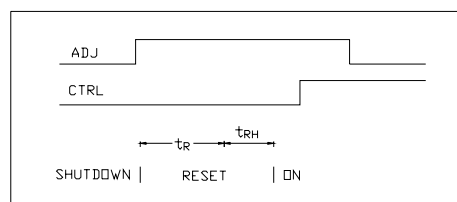


Figure 6. Reset Sequence with Shutdown

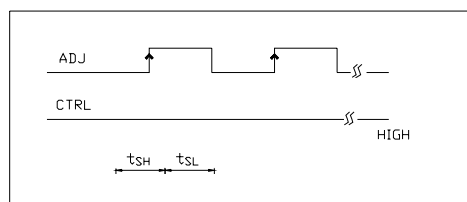


Figure 4. Count-Up Operation

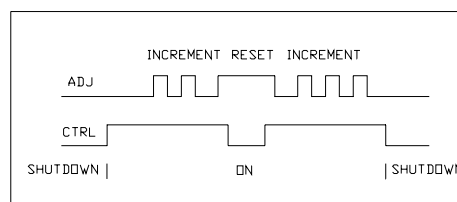


Figure 7. Control Sequence Example(see Output Voltage Control section)

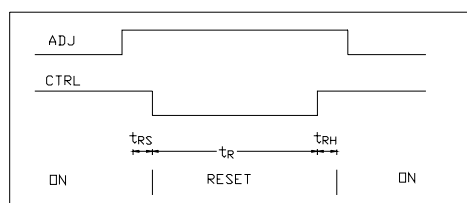


Figure 5. Reset Sequence without Shutdown.
The device is not shut down during reset.

In figure 3, the MAX749 is reset when it is taken out of shutdown, which sets the output at mid-scale. Figure 5 illustrates a reset without shutting the device down.

Figure 7 provides an example of a sequence of operations: Starting from shutdown, the device is turned on, incremented, reset to mid-scale without being shut down, incremented again, and finally shut down.

Shutdown Mode

When CTRL and ADJ are both low, the MAX749 is shut down (Table 1): The internal reference and biasing circuitry turn off, the output voltage drops to zero, and the supply current drops to 15 μ A. The MAX749 retains its DAC setting, simplifying software control.

Reset Mode

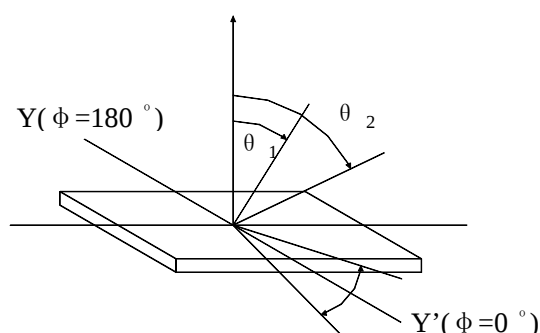
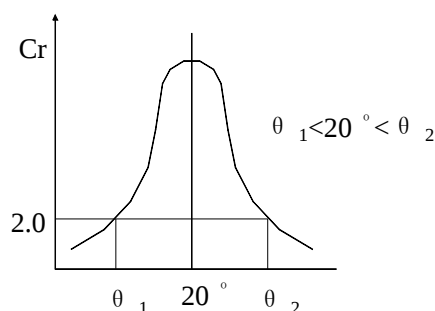
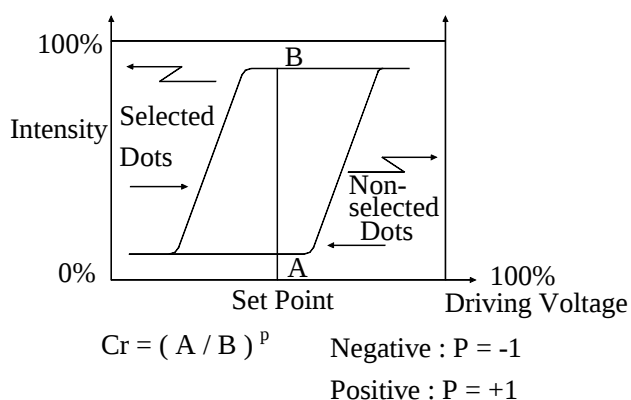
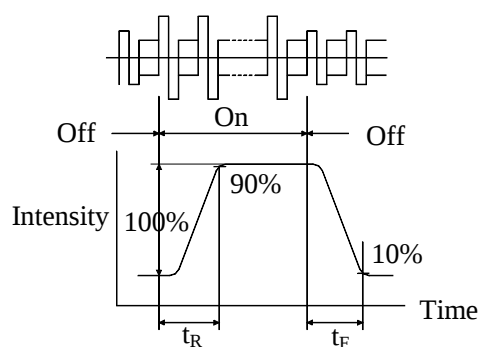
If ADJ is high when CTRL is low, the DAC set point is reset to mid-scale and the MAX749 is not shut down. Mid-scale is 32 steps from the minimum, 31 steps from the maximum.

Electro-Optical characteristics**TN Type (Twisted Nematic)**

Item	Symbol	Min.	Typ.	Max.	Unit	Condition	Note
Viewing Angle	$\frac{\theta_2 - \theta_1}{\phi}$	40	-	-	deg.	Cr = 2.0	1,2
Contrast Ratio	Cr	-	4	-	-	$\theta = 20^\circ$ $\phi = 0^\circ$	3
Response Time (rise)	t_R	-	110	-	ms	$\theta = 20^\circ$ $\phi = 0^\circ$	4
Response Time (fall)	t_F	-	110	-	ms	$\theta = 20^\circ$ $\phi = 0^\circ$	4

STN Type (Super Twisted Nematic)

Item	Symbol	Min.	Typ.	Max.	Unit	Condition	Note
Viewing Angle	$\frac{\theta_2 - \theta_1}{\phi}$	70 -90	-	+90	deg.	Cr = 2.0	1,2
Contrast Ratio	Cr	-	4	-	-	$\theta = 20^\circ$ $\phi = 0^\circ$	3
Response Time (rise)	t_R	-	110	-	ms	$\theta = 20^\circ$ $\phi = 0^\circ$	4
Response Time (fall)	t_F	-	110	-	ms	$\theta = 20^\circ$ $\phi = 0^\circ$	4

1. Definition of angle θ & ϕ **2. Definition of viewing angle θ_1 & θ_2** **3. Definition of contrast Cr****4. Definition of optical response**

Interface Pin Connections

Pin No.	Symbol	Description
1	FB	Operating Voltage for LCD (Variable)
2	VREF	
3	FG	Frame ground
4	GND	0V (GND)
5	V _{DD}	Power supply for logic circuit and LCD
6	VEE	Power supply for LCD drive circuit
7	WR	Data write. Write data into T6963C when WR = L
8	RD	Data read. Read data from T6963C when RD = L
9	CE	Chip Enable for T6963C. CE must be L when CPU communicates with T6963C.
10	C/D	WR = L C/D = H : Command Write C/D = L : Data Write RD = L C/D = H : Status Read C/D = L : Data Read
11	RST	When RST = H Normal (T6963C has internal pull-up resistor) When RST = L Initialize T6963C. Text and graphic have address and text and graphic area settings are retained.
12	FS	Pins for selection of font When FS = H, 6*8 dots font When FS = L, 8*8 dots font
13—20	DB0~DB7	Data I/O pins for display memory
21	A	LED back light pin
22	K	

(1) Mechanical Specifications

Item	Dimension	Unit
Module Size(W*H*T)	99.0*100.0*10.0	mm
Module Size with B/L(W*H*L)	99.0*100.0*15.0	mm
Internal Area (W*H)	63.96*63.96	mm
Viewing Area(W*H)	69.00*69.00	mm
Dot Size(W*H)	0.46*0.46	mm
Dot Pitch(W*H)	0.5*0.5	mm
Number Of Dots	128X 128	dots

Wide Temperature Characteristics

Parameter	Symbol	Rating	Unit
Operating temperature	Topr	0 ~ +60	°C
Storage temperature	Tstg	-20 ~ +70	°C

Maximum Absolute Rate

Characteristic	Symbol	Value	Unit
Power Supply Voltage	V_{DD}	-0.3 to +7.0	V
LCD Supply Voltage	V_{LCD}	$V_{DD}-18.0$ to $V_{DD}+0.3$	V
Input Voltage	V_{IN}	-0.3 to $V_{DD}+0.3$	V

*Note: Voltage greater than above may damage to the circuit