SHENZHEN XINGYUHE LTD., CO.

# SPECIFICATIONS

CUSTOMER :

PRODUCT : LCD Module

SAMPLE CODE : JGG12864A01

VER : 00

| Customer Approved | Confirmed | Designer |
|---|---|---|
| | | |

## TABLE OF CONTENTS

# 1.GENERAL DESCRIPTION

The JGG12864A01 is a 128X64 DOTS MATRIX LCD module which is fabricated by low power COMS technology. It has an FSTN panel composed of 128 segments and 64 commons. The LCM can be easily accessed by microcontroller via serial data interface.

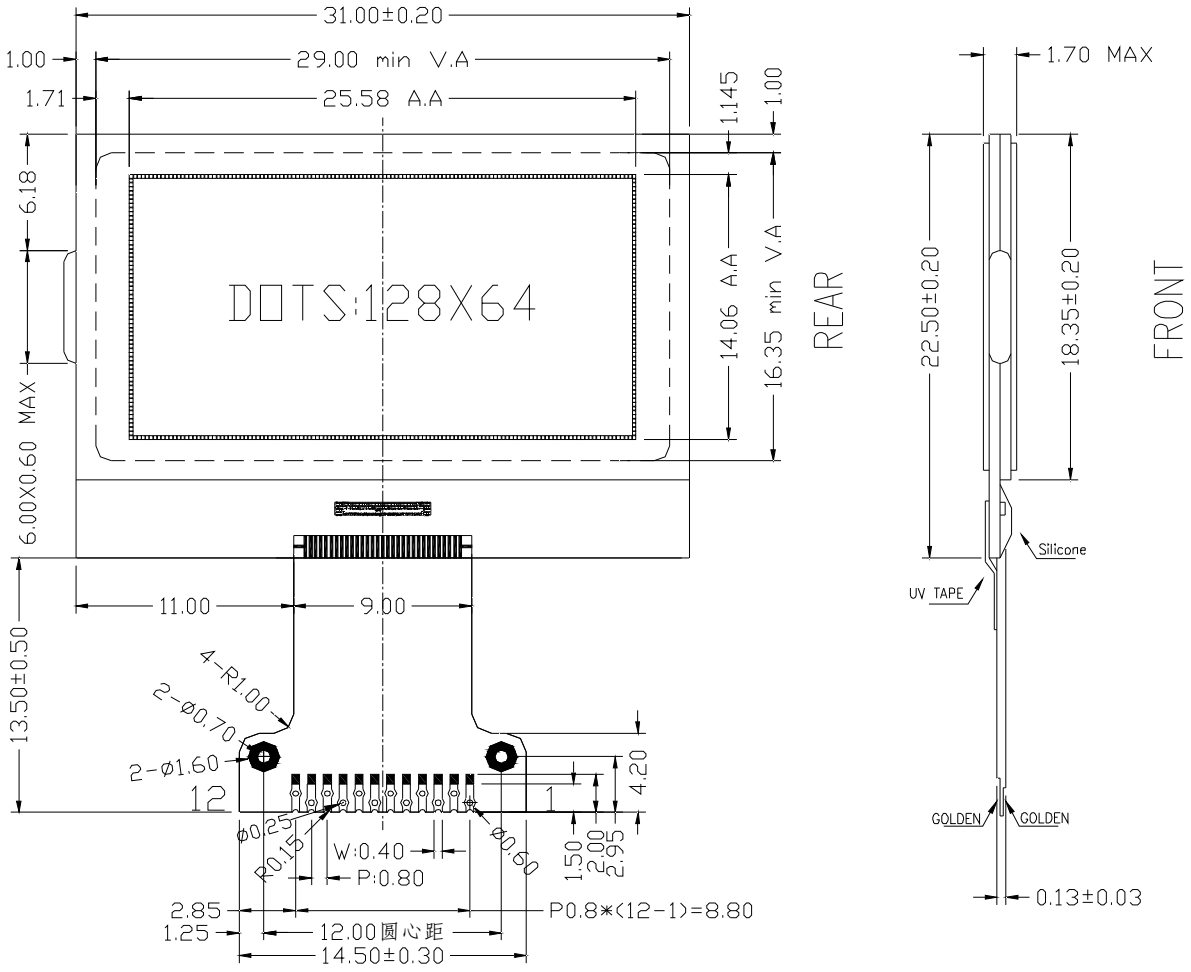
# 2.FEATURES

| | |
|---|---|
| Display Model | TRANSMISSIVE and POSITIVE type |
| | FSTN Mode LCD |
| Display Format | 128X64 DOTS MATRIX |
| Input Data | Serial data input from MPU |
| Multiplexing Ration | 1/64Duty , 1/9Bias |
| Viewing Direction | 6 O'clock |
| DRIVER | ST7567 |

# 3.MECHANICAL SPECIFICATION

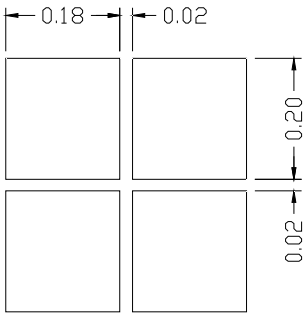
| Item | Specifications | Unit |
|---|---|---|
| Module Size(W*H*T) | 31.0X（22.5+13.5）X1.7 MAX | mm |
| Viewing Area (W*H) | 29.0X16.35 | mm |
| Dot Pitch (W*H) | 0. 20X0.22 | mm |
| Dot Size (W*H) | 0.18X0.20 | mm |
| Active Area (W*H) | 25.58X14.06 | mm |
| Number of Dots | 128X64 | --- |

# 4.MECHANICAL DIMENSION




| PIN NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SYMBOL | CSB | RST | A0 | SCL | SDA | VDD | VSS | V0 | XV0 | VG | NC | NC |

DISPLAY TYPE: FSTN/POSITIVE
POLARIZER: TRANSMISSIVE
VIEWING DIRECTION: 6:00-CLOCK
DRIVE METHOD: 1/64DUTY,1/9BIAS
LCD OPERATING VOLTAGE: 8.5v
LCM OPERATING VOLTAGE: 3.0v
OPERATING TEMP: -10 TO 60 Deg.C
STORAGE TEMP: -20 TO 70 Deg.C
CONNECTOR: COG
UNSIGNED TOLERANCE: ±0.20



# 5. PIN DESCRIPTIONS

| PIN | SYMBOL | I/O | FUCTION |
|---|---|---|---|
| 1 | CSB | I/O | The chip select singal |
| 2 | REST | I/O | When /RES is set to “L” the seting are intialized |
| 3 | A0 | I/O | This is connect to the least significant bit of the normal MPU address bus, and it determines whether the data bits are data or command. |
| 4 | SCL | I/O | The serial clock input |
| 5 | SI | I/O | Serial data input |
| 6 | VDD | – | Power supply |
| 7 | VSS | – | Ground |
| 8 | V0 | – | V0 is the LCD driving voltage for common circuits at negative frame. |
| 9 | XV0 | – | XV0 is the LCD driving voltage for common circuits at positive frame. |
| 10 | VG | – | VG is the LCD driving voltage for segment circuits. |
| 11 | NC | – | – |
| 12 | | | |

# 6. MAXIMUM RATINGS

| Item | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| Supply Voltage | VDD | -0.3 | 3.6 | V |
| | Vout | -0.3 | 15.0 | V |
| Input Voltage | Vin | VSS-0.3 | VDD+0.3 | V |
| Operating temperature | Topr | -10 | 60 | ℃ |
| Storage temperature | Tstr | -20 | 70 | ℃ |

# 7. ELECTRICAL CHARACTERISTICS

| Item | | Symbol | Condition | Min | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Supply Voltage | | Logic | VDD-GND | - | 3.0 | - | V |
| Input cotage | H level | VDD | - | 0.8VDD | - | VDD | V |
| | L level | VIH | | VSS | - | 0.2VDD | |
| LCD Driving Voltage | | VLCD | | - | 8.5 | - | V |

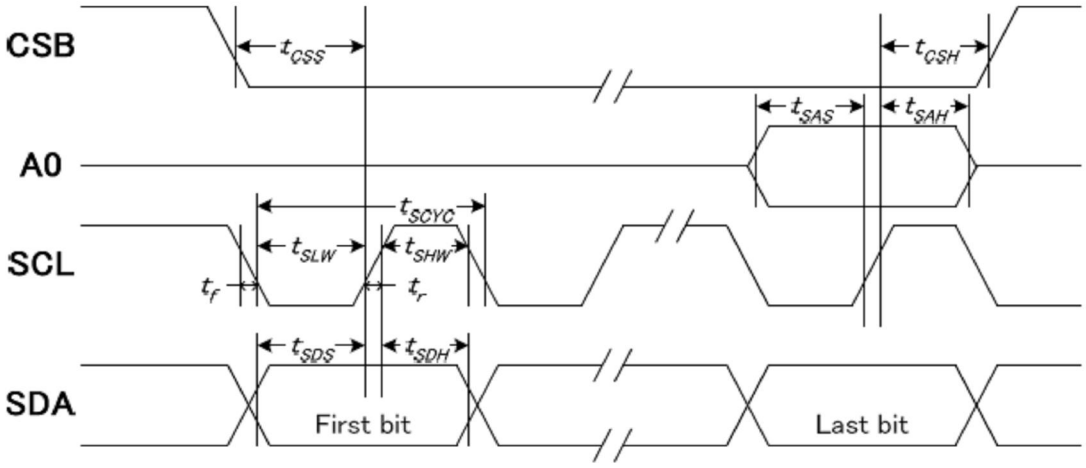
Note1. The value is measure at following condition; follow same condition to test sample and mass product.

(a)VDD=3.0V

(b)1/64Duty ,1/9Bias

# 8. MODULE FUNCTION DESCRIPTION

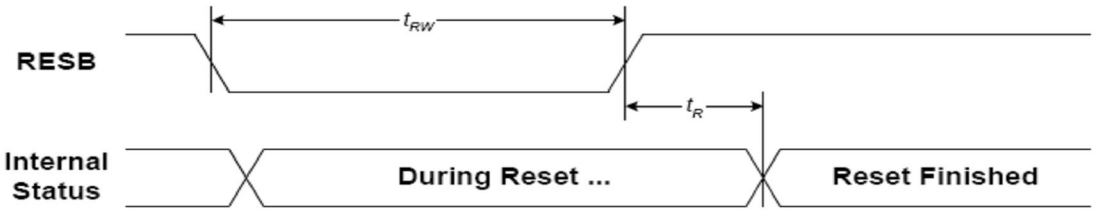
**System Bus Timing for 4-Line Serial Interface**




(VDD = 3.3V , Ta =-30~85°C)

| Item | Signal | Symbol | Condition | Min. | Max. | Unit |
|---|---|---|---|---|---|---|
| Serial clock period | SCLK | tSCYC | | | | ns |
| SCLK "H" pulse width | | tSHW | | | | |
| SCLK "L" pulse width | | tSLW | | | | |
| Address setup time | A0 | tSAS | | | | |
| Address hold time | | tSAH | | | | |
| Data setup time | SDA | tSDS | | | | |
| Data hold time | | tSDH | | | | |
| CSB-SCLK time | CSB | tCSS | | | | |
| CSB-SCLK time | | tCSH | | | | |

Hardware Reset Timing




(VDD = 3.3V , Ta =-30~85°C)

| Item | Symbol | Condition | Min. | Max. | Unit |
|---|---|---|---|---|---|
| Reset time | tR | | | | us |
| Reset "L" pulse width | tRW | | | | |

## 2. COMMAND TABLE

| INSTRUCTION | A0 | R/W (RWR) | COMMAND BYTE | | | | | | | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | |
| (1) Display ON/OFF | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | D | D=1, display ON<br>D=0, display OFF |
| (2) Set Start Line | 0 | 0 | 0 | 1 | S5 | S4 | S3 | S2 | S1 | S0 | Set display start line |
| (3) Set Page Address | 0 | 0 | 1 | 0 | 1 | 1 | Y3 | Y2 | Y1 | Y0 | Set page address |
| (4) Set Column Address | 0 | 0 | 0 | 0 | 0 | 1 | X7 | X6 | X5 | X4 | Set column address (MSB) |
| | 0 | 0 | 0 | 0 | 0 | 0 | X3 | X2 | X1 | X0 | Set column address (LSB) |
| (5) Read Status | 0 | 1 | 0 | MX | D | RST | 0 | 0 | 0 | 0 | Read IC Status |
| (6) Write Data | 1 | 0 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Write display data to RAM |
| (7) Read Data | 1 | 1 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Read display data from RAM |
| (8) SEG Direction | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | MX | Set scan direction of SEG<br>MX=1, reverse direction<br>MX=0, normal direction |
| (9) Inverse Display | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | INV | INV =1, inverse display<br>INV =0, normal display |
| (10) All Pixel ON | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | AP | AP=1, set all pixel ON<br>AP=0, normal display |
| (11) Bias Select | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | BS | Select bias setting<br>0=1/9; 1=1/7 (at 1/65 duty) |
| (12) Read-modify-Write | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | Column address increment:<br>Read:+0 , Write:+1 |
| (13) END | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | Exit Read-modify-Write mode |
| (14) RESET | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | Software reset |
| (15) COM Direction | 0 | 0 | 1 | 1 | 0 | 0 | MY | - | - | - | Set output direction of COM<br>MY=1, reverse direction<br>MY=0, normal direction |
| (16) Power Control | 0 | 0 | 0 | 0 | 1 | 0 | 1 | VB | VR | VF | Control built-in power circuit<br>ON/OFF |
| (17) Regulation Ratio | 0 | 0 | 0 | 0 | 1 | 0 | 0 | RR2 | RR1 | RR0 | Select regulation resistor ratio |
| (18) Set EV | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Double command!! Set<br>electronic volume (EV) level |
| | 0 | 0 | 0 | 0 | EV5 | EV4 | EV3 | EV2 | EV1 | EV0 | |
| (19) Set Booster | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | Double command!!<br>Set booster level:<br>00=4X, 01=5X, 10=6X |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | BL1 | BL0 | |
| (20) Power Save | 0 | 0 | Compound Command | | | | | | | | Display OFF + All Pixel ON |
| (21) NOP | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | No operation |
| (22) Test | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - | Do NOT use.<br>Reserved for testing. |

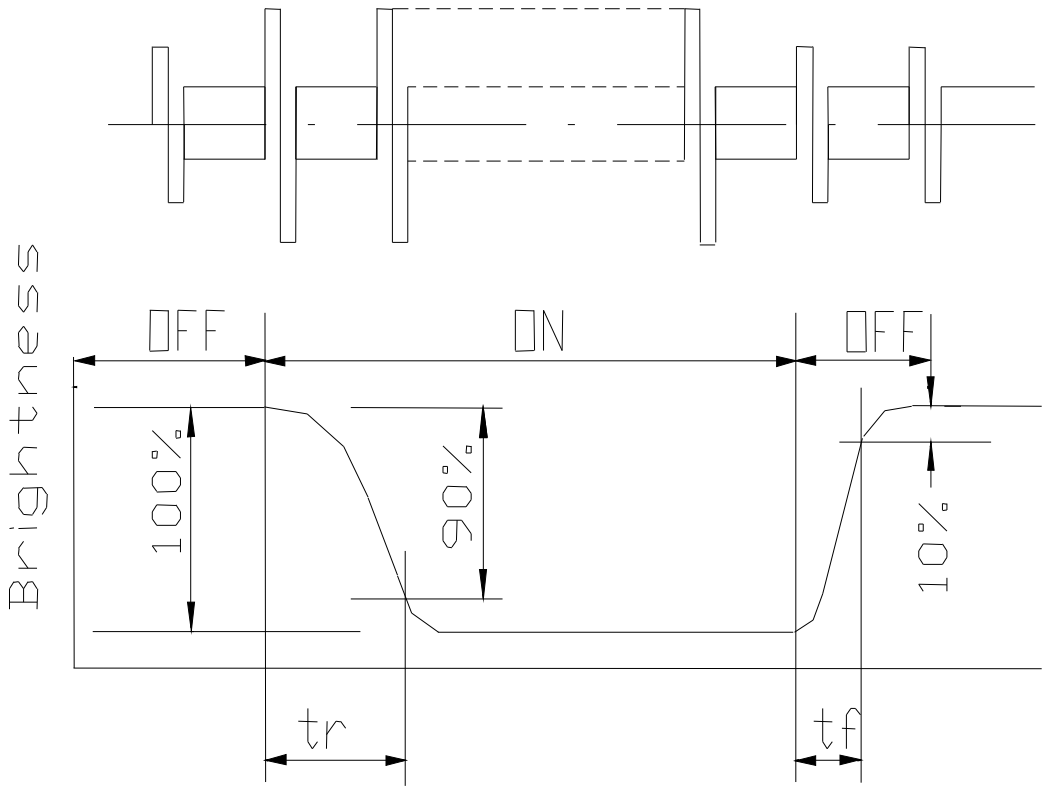
Note: Symbol "-" means this bit can be "H" or "L".

# 9. Electro-Optical Characteristics

## (1).FSTN Type

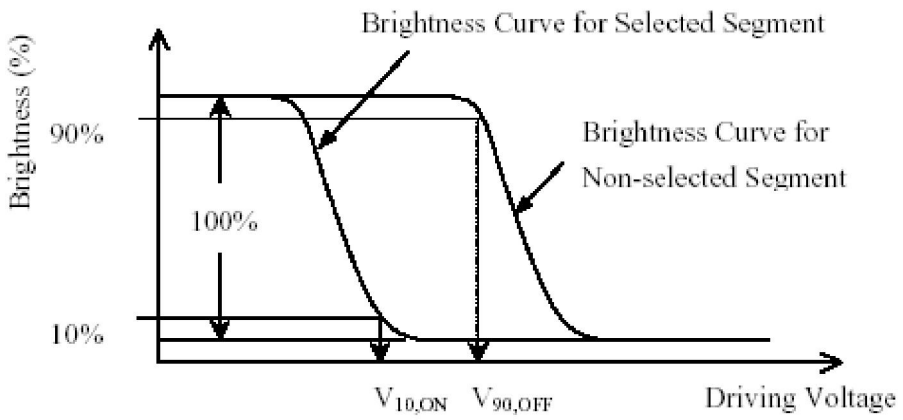
| Item | Symbol | Condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Contrast | K | θ=0° Φ=0° | 5 ： 1 | — | — | deg. |
| Viewing Angle | θ | K=5 Φ=0° | $\theta_2-\theta_1$=30 | — | — | deg. |
| | | K=5 θ=10° | Φ=±30 | — | — | deg. |
| Response time | $T_{on}$ | 25℃ | — | — | 250 | ms |
| | $T_{off}$ | 25℃ | — | — | 250 | ms |

## (2). Definition of Optical Response Time




## (3). Definition of Driving Voltage (Vlcd)

$Vlcd=(V_{10,ON}+V_{90,OFF})/2$




## (4). Definition of Viewing Angle θ and Φ