

VD LCD DISPLAY PUSHBUTTON SWITCH

Clear LCD (Message) and Reliable Pushbutton Switch (Operation) combined.

FEATURES

- Wide view angle available with 33 X 64 dots (2,112dots) FSTN LCD, which can display maximum 12 characters (alphabets) X 4 column and graphics.
- Mono-Color(Red, Green, Orange Yellow, Super Blue, Super Green) , Dual-Color(Red/Green), Multiple-Color (RGB) back lighting LED provided.
- Negative display mode (Characters come out) gives good visibility.
- The switch has cross bar contacts which assures excellent reliability specially for dry circuit.

Applications

- Broadcasting System (Video, Voice, Sound)
- Ticket Publishing System (Ticket Selling Machine)
- Surveillance, Control System(Fire Prevention, Building Maintenance, Traffic)
- Communication System (Telephone Exchange, Rader, Satelite)
- Medical Electronics System (Diagnosis, Data Process)
- Distribution System (Automatic Warehouse, Filing System)
- Factory Automation System (Product Line Surveillance, Robot)
- Financial System (Dealing System, Automated Teller Machine)
- Public Equipment (Educational Instrument)
- Measureing Instrument
- Other equipments.




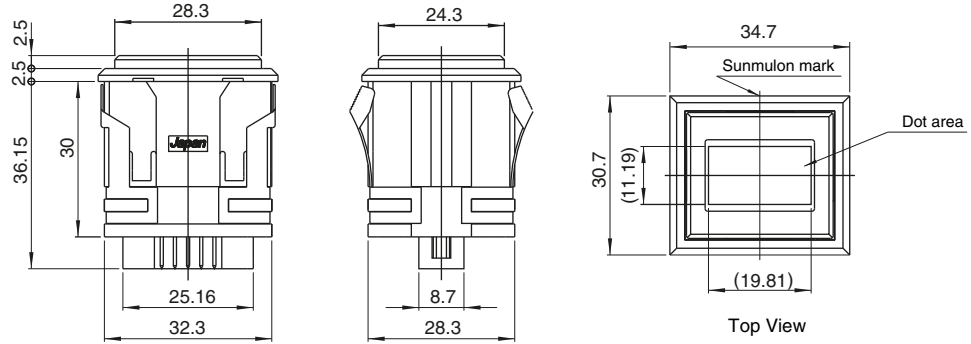

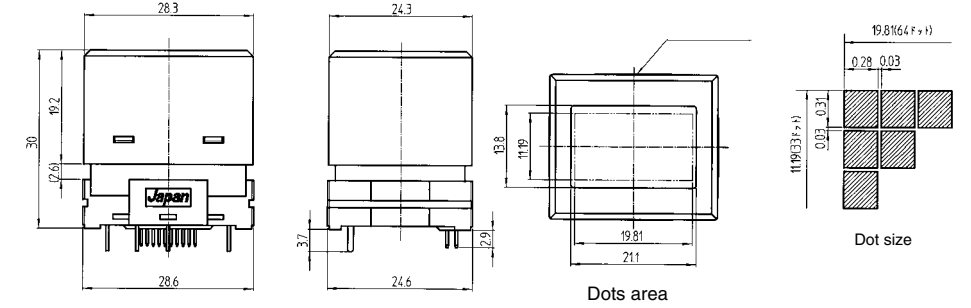
SPECIFICATIONS

| | | | | |
|---------------------|-----------------------|--|---|--|
| Switch | Contact Material | PGS (Platinum, Gold, Silver) Cross Bar Contact | Contact Resistance | Less than 50mΩ(Initial) at DC6V 1A |
| | Contact Rating | AC125V 0.1A, DC30V 0.1A (Resistive Load) | Withstand Shock (miss indicate) | More than 10G |
| | Insulation Resistance | More than 100MΩ at 500V DC | Withstand Vibration (miss indicate) | Double Amplitude 1mm, Vibration 10~55Hz at 2 hours |
| | Dielectric Strength | 600V AC RMS between NC and NO terminal 1500V AC RMS between terminals and ground 50/60Hz for 60sec. At normal ambient temperature and humidity | Mechanical Life | Momentary Action : more then 1,000,000 operations Alternate Action : more than 200,000 operations |
| Electrical Life | | | More than 100,000 operations at max. rated load | |
| LCD | Display Type | FSTN (Fine Super Twisted Nematic) (Duty : 1/33, Bias : 1/5) | Dots Area | 11.19mm×19.81mm |
| | Dots number | Column 33×Row 64 (2,112 dots) | Indication Data | Non-synchronous Latch Type |
| | Dot size | 0.28mm×0.31mm | Indication Mode | Graphic Character |
| | Indication Characters | Figures/Alphabets Maximum 12×4 column (5×7 dots) | Display Mode | Negative Type All transparent type (with LED backlight) |
| Ambient Temperature | | -15°C to +50°C | | |
| Ambient Humidity | | 80% RH (max.) | | |
| Storage Temperature | | -25°C to +65°C | | |

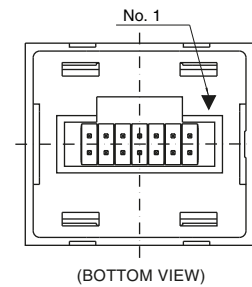
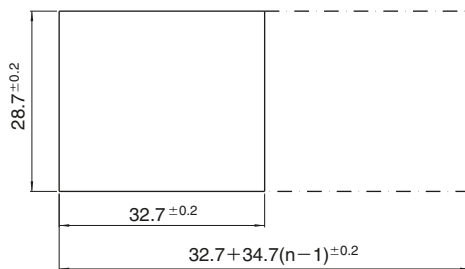
OPERATING CHARACTERISTICS

| | | | |
|------------------------|------|---------------------|-----|
| Operating Force (max.) | 3.5N | Total Travel (max.) | 3mm |
|------------------------|------|---------------------|-----|

DIMENSIONS

| | | |
|--|---|---|
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Panel Mounting</p> |  |  |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">PCB Mounting</p> |  |  |

Panel cut dimension / Terminal Layout (Panel Mounting Type)



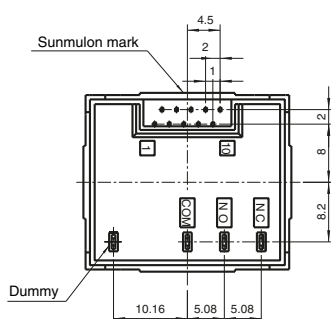
RECOMMENDED CONNECTER
OMRON : XG4M-1430-U

* Connectors are not appended, please procure above connector or prepare equivalent.

TERMINAL SHAPE / PCB HOLE DIMENSION (PCB Type)

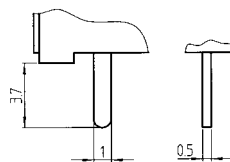
● TERMINAL SHAPE

● PCB Hole Dimension

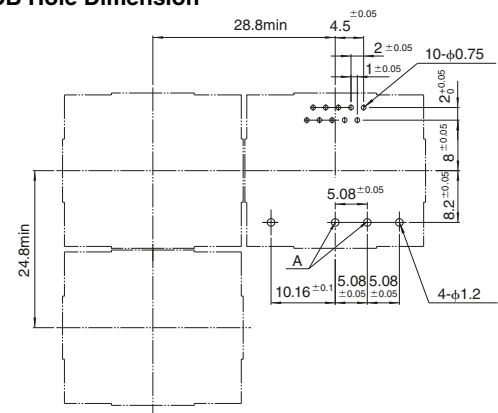
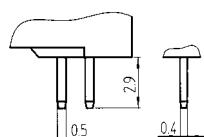


COM and NO terminals are excepted for Indicator type.
(BOTTOM VIEW)

Switch Terminal



Connector Terminal



* Hole A not needed for Indicator type.

(BOTTOM VIEW)

Tolerance : ±0.4mm

ELECTRICAL & OPTICAL CHARACTERISTICS

| Item | Symbol | Condition | MIN | TYP | MAX | UNIT |
|---------------------------------------|-----------------|-----------------------|--------------------|-----|--------------------|------|
| Supply Voltage | V _{DD} | — | +4.5 | +5 | +5.5 | V |
| High Level Input Voltage | V _{IH} | — | 0.8V _{DD} | — | — | V |
| Low Level Input Voltage | V _{IL} | — | — | — | 0.2V _{DD} | V |
| Driver IC Dynamic Current Consumption | | at no access from MPU | — | — | 130 | μA |
| Viewing Direction | | 6 O'clock | | | | |
| Viewing Angle | θ | T _a 25°C | -50 | — | 60 | deg |
| | φ | T _a 25°C | -50 | — | 50 | deg |
| Contrast Ratio | C.R. | T _a 25°C | — | 25 | — | — |
| Response Time | t _r | T _a 25°C | — | 100 | 200 | mS |
| | t _f | T _a 25°C | — | 150 | 300 | mS |

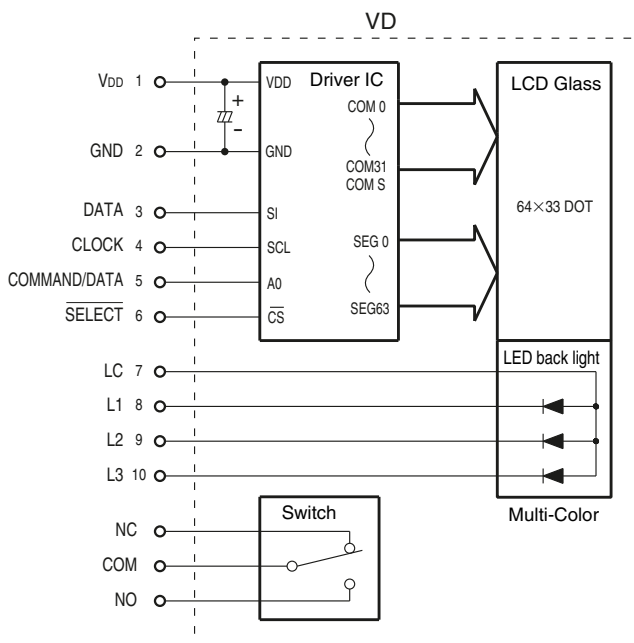
* 1θ : Up & Down Direction

* 2φ : Left & Right Direction

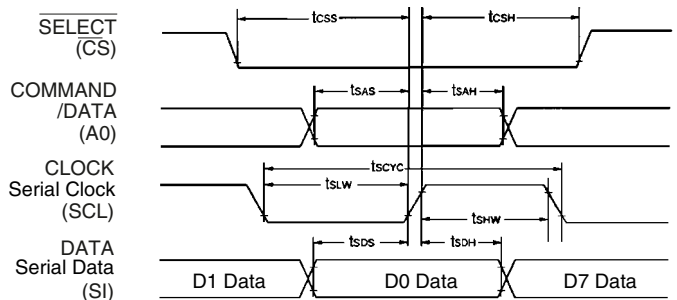
INPUT & OUTPUT TERMINAL TABLE

| Terminal No. | | Symbol | Designation | Function |
|--------------|------------|----------------------------|---------------|--|
| PCB Type | Panel Type | | | |
| 1 | 1 | VDD | Plus Voltage | ⊕ Supply Input Terminal(+5V) |
| 2 | 2 | GND | Ground | ⊖ Supply Terminal, All Signal Basic Electrical Potential |
| 3 | 3 | DATA | Data | Serial Data Signal |
| 4 | 4 | CLOCK | Clock | Serial Clogk Signal |
| 5 | 5 | COMMAND/DATA | Mode Exchange | Serial of Display Data Signal |
| 6 | 6 | $\overline{\text{SELECT}}$ | Select | Chip Select Signal |
| 7 | 7 | LC | LED(+) | LED Anode(+) |
| 8 | 8 | L1 | LED 1 | LED1 Cathode(-) |
| 9 | 9 | L2 | LED 2 | LED2 Cathode(-) |
| 10 | 10 | L3 | LED 3 | LED3 Cathode(-) |
| NC | 11 | NC | — | Switch NC |
| NO | 12 | NO | — | Switch NO |
| COM | 13 | COM | — | Switch COM |
| — | 14 | COM | — | Switch COM |

INTERNAL CIRCUIT



TIMING CHARACTERISTICS



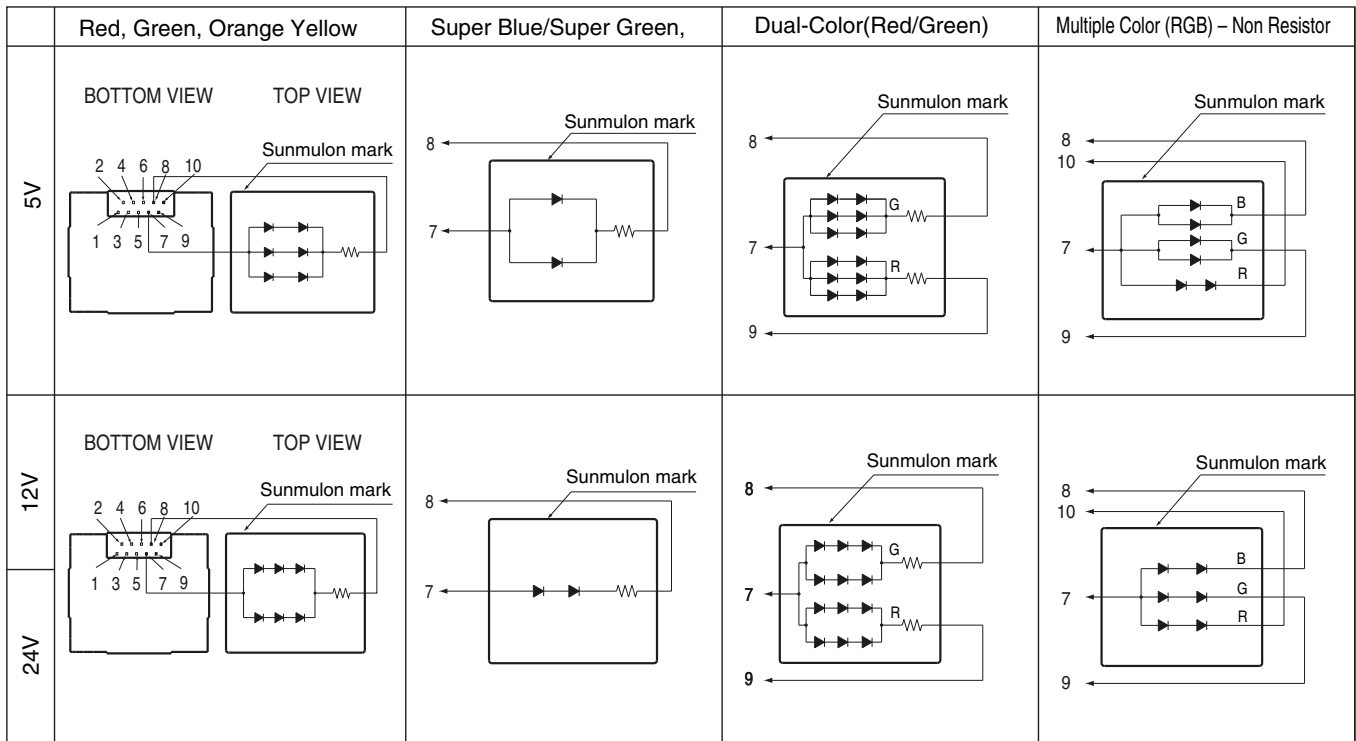
(V_{SS}=0V, V_{DD}=5.0V±10%, T_a=-40~85°C)

| Item | Signal | Mark | Min. | Max. | Unit |
|------------------------------|--------------|-------------------|------|------|------|
| Serial Clock Cycle | | t _{SCYC} | 500 | | ns |
| Serial Clock "H" pulse width | Serial Clock | t _{SHW} | 150 | | ns |
| Serial Clock "L" pulse width | Serial Clock | t _{SLW} | 150 | | ns |
| Address Set Up Time | A0 | t _{SAS} | 120 | | ns |
| Address Hold Time | A0 | t _{SAH} | 200 | | ns |
| Data Set Up Time | Serial Data | t _{SDS} | 120 | | ns |
| Data Hold Time | Serial Data | t _{SDH} | 120 | | ns |
| Serial Clock Time | CS1 | t _{CSS} | 80 | | ns |
| | | t _{CSH} | 400 | | ns |

*1 Set up time for signal input to be provided less than 15ns.

*2 All of Timing to be provided 20% and 80% of V_{DD}.

CONNECTION ARRANGEMENTS FOR BACK LIGHT LED



BACK LIGHT LED DATA

R=Red G=Green OY=Orange Yellow SB=Super Blue SG=Super Green

● BACK LIGHT LED DATA

| DC Supply Voltage (V) | Current Rating (mA) | | | | | | |
|-----------------------|---------------------|----|----|----|----|------------|----|
| | Mono-Color | | | | | DUAL-COLOR | |
| | R | G | OY | SB | SG | R | G |
| 5V (±5%) | 21 | 36 | 36 | 26 | 26 | 21 | 36 |
| 12V·24V (±5%) | 14 | 26 | 26 | 13 | 13 | 14 | 26 |

● The value of the series resistor can be determined by the formula:

$$R = \frac{V_{cc} - V_F}{I_F}$$

V_{cc} : Supply Voltage
 V_F : Forward Voltage
 I_F : Forward Current

● EXTERNAL RESISTOR

Switches are normally fitted with internal resistors to operate on 5, 12, 24V DC supply. In case of non-resistor type, suitable external current limiting resistors must be installed as shown by the table and formula

| Item | Mono-Color, Dual-Color | | | | | | Mono-Color(Super) | | | | Multi-Color | | | | | |
|--|---|-----|----|--------|-----|----|-------------------|-----|--------|-----|-------------|------|------|--------|-----|-----|
| | 5V | | | 12·24V | | | 5V | | 12·24V | | 5V | | | 12·24V | | |
| | R | G | OY | R | G | OY | SB | SG | SB | SG | R | SB | SG | R | SB | SG |
| Max. operating current I_{FM} (mA) | 75 | 75 | 75 | 50 | 50 | 50 | 40 | 40 | 20 | 20 | 30 | 50 | 50 | 30 | 25 | 25 |
| DC reverse voltage V_R (V) | 8 | 8 | 8 | 12 | 12 | 12 | 5 | 5 | 10 | 10 | 10 | 3 | 3 | 10 | 6 | 6 |
| Forward voltage V_F (V) | 3.6 | 4.4 | 4 | 5.4 | 6.6 | 6 | 2.9 | 3.1 | 5.8 | 6.2 | 3.6 | 3.2 | 3.2 | 3.6 | 6.4 | 6.4 |
| Recommended operating current I_F (mA) | 21 | 36 | 36 | 14 | 26 | 26 | 26 | 26 | 13 | 13 | 10 | 16.6 | 16.6 | 10 | 8.3 | 8.3 |
| Wiring Diagram | Mono-Color (Fig.1) Dual-Color(Fig.2) | | | | | | Fig.1 | | | | Fig.3 | | | | | |

Current Reduced Factor(Over 25°C working Temperature) : 0.33mA/°C (DC)

: 1.6mA/°C (PULSE)

Pulse Lighting

Pulse Width $P_w = 100\mu S$ Duty Ratio $D_r = 10^{-1}$ $I_{FM}=100mA$

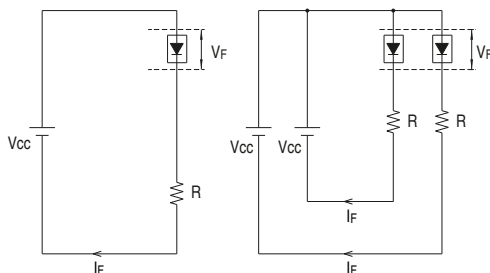
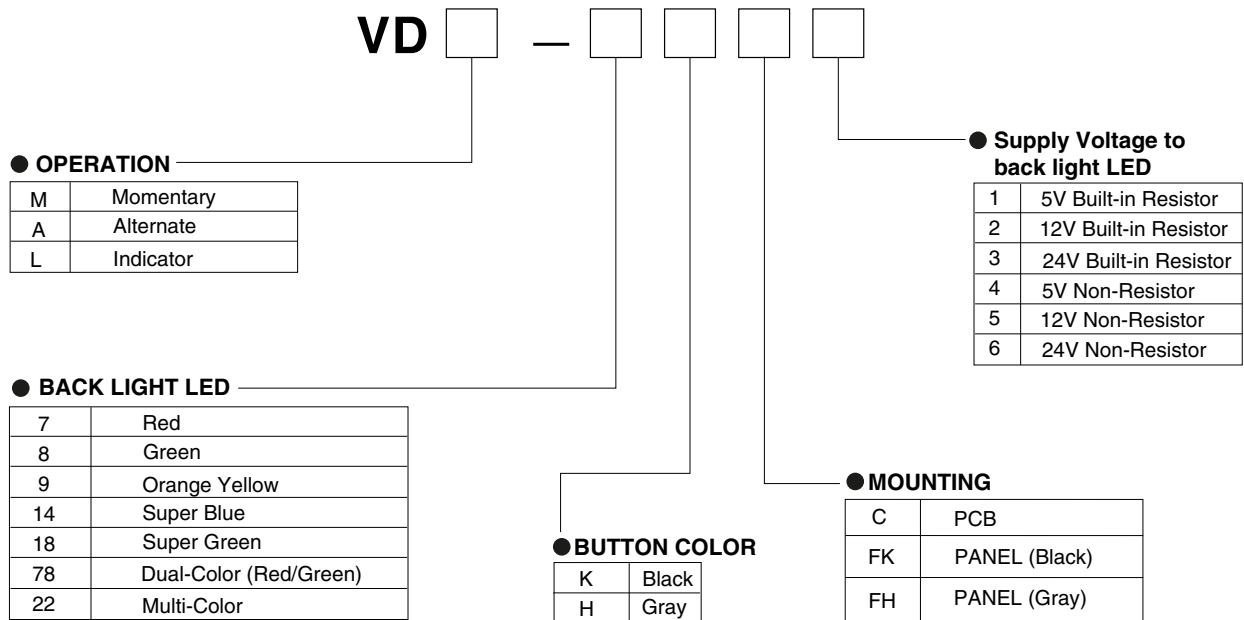


Fig. 1

Fig. 2

Fig. 3

ORDERING CODE



● **NOTES**

- 1) Regarding Dual-Color simultaneous illumination, please select 6 non resistor type and apply external resistor accordingly.
- 2) Regarding all Multi-Color type, please select non resistor type and apply external resistor accordingly.
- 3) Only 12V, 24V Built-in Resistor type and 12V,24V Multi-Color type can be controlled by VDC-2000.

CONTROL BOARD

● **VDC-2004 (Control Board)**



Regarding details of VDC-2004,VD BUILDER-II, please inquire us.