

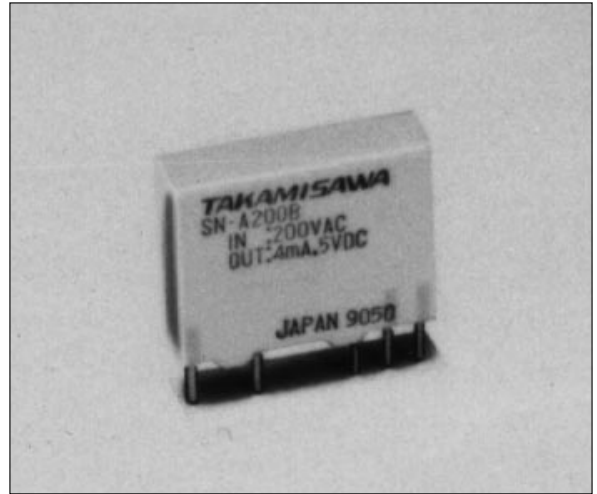
# SOLID STATE RELAY (I/O Module)

## MAXIMUM LOAD CURRENT 1 A

### SN SERIES

#### ■ FEATURES

- I/O modules for interface between CPU and external input devices or loads
- Ultra slim and light weight, SIL terminals type I/O modules for high density mounting
  - Size: 5 (W) × 20 (L) × 17 (H) mm
  - Weight: approximately 3.0 to 3.5 g
- High isolation by employing photo-coupled devices (between input and output: 2,500 V rms)
- Long life and maintenance free
- All solid state I/O module
- Compatible with NY relay size and terminals arrangement (only output module type)



#### ■ ORDERING INFORMATION

- INPUT MODULE

[Example]      SN    -    A    100    BF  
                   (a)        (b)    (c)    (d)

|     |                 |   |
|-----|-----------------|---|
| (a) | Series Name     | SN : SN Series  |
| (b) | Input Voltage   | A : AC type<br>D : DC type                              |
| (c) | Nominal Voltage | 100 : 100 VAC<br>200 : 200 VAC<br>12/24 : 12/24 VDC     |
| (d) | Buffer          | BF : Buffer type (AC type)<br>B : Buffer type (DC type) |

# SN SERIES

## ● OUTPUT MODULE

[Example]  $\frac{SN}{(a)} - \frac{12}{(b)} \frac{D}{(c)} \frac{01}{(d)} \frac{HZ}{(e)} - \frac{C}{(f)} \frac{R}{(g)} \frac{T}{(h)}$

|     |   |   |
|-----|---|---|
| (a) | Series Name   | SN : SN Series  |
| (b) | Nominal Voltage (Input side)                                  | 3 : 3 VDC (only AC type)<br>5 : 5 VDC<br>12 : 12 VDC<br>24 : 24 VDC |
| (c) | Load Voltage  | A : AC type<br>D : DC type  |
| (d) | Load Current  | 01 : 1 A  |
| (e) | Kinds of Inverse Connection Protecting Element (only DC Type) | Nil : Diode<br>HZ : Zener diode                                     |
| (f) | Terminal Classification                                       | Nil : PC board mounting type<br>C : Socket mounting type            |
| (g) | Output Polarity (DC type)                                     | Nil : Standard polarity<br>R : Reverse polarity                     |
| (g) | Switching Speed (DC type)                                     | Nil : Standard<br>T : High speed type                               |

## ■ SPECIFICATIONS

### • INPUT MODULE (SN-( ) B Type)

| Item                        |                        | AC Input module                               |                 | DC Input module          |                           | Remarks               |
|-----------------------------|------------------------|---|-----------------|--------------------------|---------------------------|-----------------------|
|                             |                        | 100 VAC Type                                  | 200 VAC Type    | 12/24 VDC Type           |                           |                       |
| INPUT side                  | Input Voltage Range    | 80 to 132 Vrms                                | 160 to 265 Vrms | 9.6 to 28.8 VDC          |                           |                       |
|                             | Rating Input Current   | Approx. 7 mArms                               |                 | Approx. 5 mA (at 12 VDC) | Approx. 10 mA (at 24 VDC) |                       |
|                             | Power Frequency Range  | 47 to 63 Hz                                   |                 | —                        | —                         |                       |
|                             | Must Operate Voltage   | 80 Vrms                                       | 160 Vrms        | 9.6 VDC                  |                           |                       |
|                             | Must Release Voltage   | 30 Vrms                                       | 60 Vrms         | 5.0 VDC                  |                           |                       |
|                             | Must Release Current   | 2 mArms                                       |                 | 1.5 mA                   |                           |                       |
| OUTPUT side                 | DC Supply Voltage      | 4 to 6 VDC                                    |                 |                          |                           | V <sub>DD</sub>       |
|                             | Maximum Output Current | ±4 mA   |                 | ±0.4 mA                  |                           | V <sub>DD</sub> = 5 V |
|                             | Output Logic           | Operate with negative true logic (active low) |                 |                          |                           |                       |
| Maximum Operate Time        |                        | 25 ms   |                 | 10 ms                    |                           |                       |
| Maximum Release Time        |                        | 30 ms   |                 | 10 ms                    |                           |                       |
| Insulation Resistance       |                        | Minimum 1,000 MΩ (at 500 VDC)                 |                 |                          |                           | for input-output      |
| Dielectric Strength         |                        | 2,500 Vrms 1 minute                           |                 |                          |                           |                       |
| Operating Temperature Range |                        | -30°C to + 85°C                               |                 |                          |                           |                       |
| Storage Temperature Range   |                        | -40°C to +100°C                               |                 |                          |                           |                       |
| Case Color                  |                        | Yellow  |                 | White                    |                           |                       |
| Weight                      |                        | Approximately 3.3 g                           |                 |                          |                           |                       |

# SN SERIES

• OUTPUT MODULE Standard Type

| Item                        |                                | AC Output module   | DC Output module    | Remarks                 |  |
|-----------------------------|--------------------------------|--|---------------------|-------------------------|--|
| INPUT side                  | Nominal Voltage (DC)           | 3 V, 5 V, 12 V, 24 V   | 5 V, 12 V, 24 V     |                         |  |
|                             | Operate Voltage Range          | ±20% of nominal voltage  |                     |                         |  |
|                             | Must Operate Voltage           | 80% of nominal voltage   |                     |                         |  |
|                             | Must Release Voltage           | Minimum 1 V (minimum 0.5 V*)                                   |                     | *3 VDC type             |  |
|                             | Input Impedance                | 3 VDC Type   | 180Ω ±10%           | —                       |  |
|                             |                                | 5 VDC Type   | 390Ω ±10%           |                         |  |
|                             |                                | 12 VDC Type  | 1,200Ω ±10%         |                         |  |
|                             |                                | 24 VDC Type  | 2,700Ω ±10%         | 2,400Ω ±10%             |  |
| OUTPUT side                 | Load Voltage Range             | 24 to 265 Vrms   | 3 to 30 VDC         |                         |  |
|                             | Maximum Load Current           | 1.0 Arms   | 1.0 A               | see CHARACTERISTIC DATA |  |
|                             | Minimum Load Current           | 10 mArms   | 1 mA                |                         |  |
|                             | 1 Cycle Surge Current          | 50 A (60 Hz)   | 3 A (10 ms)         |                         |  |
|                             | Max. Off-State Leakage Current | 1.5 mArms (at 100 Vrms 60 Hz)<br>3.0 mArms (at 200 Vrms 60 Hz) | 0.1 mA (at 30 VDC)  |                         |  |
|                             | Max. On-State Voltage Drop     | 1.2 Vrms   | 1.2 V               | at maximum load current |  |
| Maximum Operate Time        |                                | 1 ms   |                     |                         |  |
| Maximum Release Time        |                                | 1/2 cycle + 1ms  | 1 ms                |                         |  |
| Insulation Resistance       |                                | Minimum 1,000 MΩ (at 500 VDC)                                  |                     | for input-output        |  |
| Dielectric Strength         |                                | 2,500 Vrms 1 minute  |                     |                         |  |
| Operating Temperature Range |                                | -30°C to + 85°C  |                     |                         |  |
| Storage Temperature Range   |                                | -40°C to +100°C  |                     |                         |  |
| Case Color                  |                                | Black  | Red                 |                         |  |
| Weight                      |                                | Approximately 3.5 g  | Approximately 3.0 g |                         |  |

# SN SERIES

• OUTPUT MODULE High Speed Switching Type

| Item                        |                                | AC Output module              | Remarks                 |
|-----------------------------|--------------------------------|-------------------------------|-------------------------|
| INPUT side                  | Nominal Voltage (DC)           | 5 V, 12 V, 24 V               |                         |
|                             | Operate Voltage Range          | ±20% of nominal voltage       |                         |
|                             | Must Operate Voltage           | 80% of nominal voltage        |                         |
|                             | Must Release Voltage           | Minimum 1 V                   |                         |
| Input Impedance             | 5 VDC Type                     | 330Ω ±10%                     |                         |
|                             | 12 VDC Type                    | 1,0 kΩ ±10%                   |                         |
|                             | 24 VDC Type                    | 2,2 kΩ ±10%                   |                         |
| OUTPUT side                 | Load Voltage                   | DC3 ~ 30V                     |                         |
|                             | Maximum Load Current           | 1.0 A                         | see CHARACTERISTIC DATA |
|                             | Minimum Load Current           | 1 mA                          |                         |
|                             | Inrush Current                 | 3 A (10 ms)                   |                         |
|                             | Max. Off-State Leakage Current | 0.1 mA (at 300 DC)            |                         |
|                             | Max. On-State Voltage Drop     | 1.2 V                         | at maximum load current |
| Maximum Operate Time        |                                | 5 μs                          | at DC 5 V 0.1A          |
| Maximum Release Time        |                                | 25 μs                         |                         |
| Insulation Resistance       |                                | Minimum 1,000 MΩ (at 500 VDC) | for input-output        |
| Dielectric Strength         |                                | 2,500 V rms 1 minute          |                         |
| Operating Temperature Range |                                | -40°C to + 100°C              |                         |
| Storage Temperature Range   |                                | -30°C to + 85°C               |                         |
| Case Color                  |                                | Red                           |                         |
| Weight                      |                                | Approximately 3.0 g           |                         |

## ■ BLOCK DIAGRAM

### • INPUT MODULE

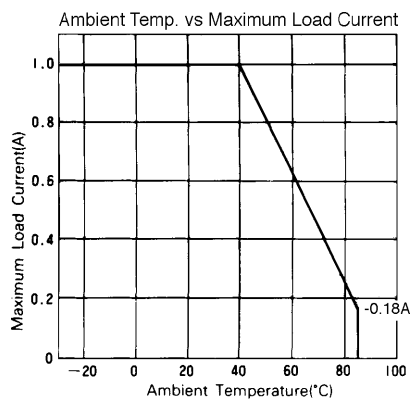
| LOAD            | INSULATION               | CIRCUITS | Input/Output waveform (resistive load)   |
|-----------------|--------------------------|----------|--|
| DC Logic output | Photo-transistor coupler |          | Input signal: ON (sine wave), OFF (zero)<br>Output signal: "H" (high), "L" (low) |
|                 | Photo-transistor coupler |          | Input signal: ON (high), OFF (low)<br>Output signal: "H" (high), "L" (low)       |

### • OUTPUT MODULE

| LOAD | INSULATION               | CIRCUITS | Input/Output waveform (resistive load)   |
|------|--------------------------|----------|--|
| AC   | Photo-triac coupler      |          | Source voltage of load: sine wave<br>Input signal: ON (high), OFF (low)<br>Load current: sine wave |
| DC   | Photo-transistor coupler |          | Input signal: ON (high), OFF (low)<br>Load current: pulse  |

## ■ CHARACTERISTIC DATA

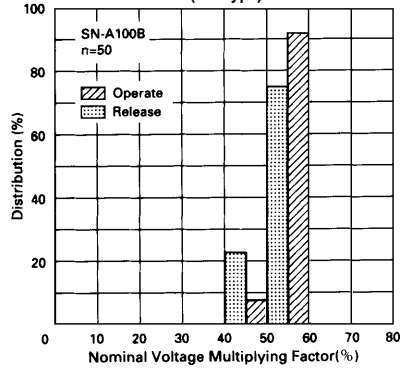
### • OUTPUT MODULE



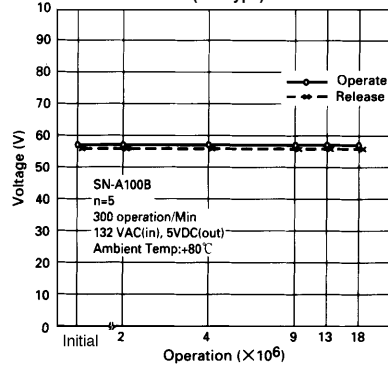
## ■ REFERENCE DATA

### ● INPUT MODULE

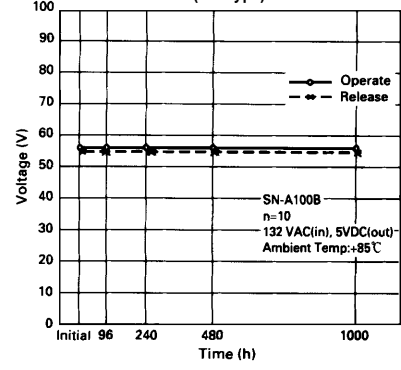
Distribution of Operate & Release Voltage  
(AC Type)



High temperature Switching Test  
(AC Type)

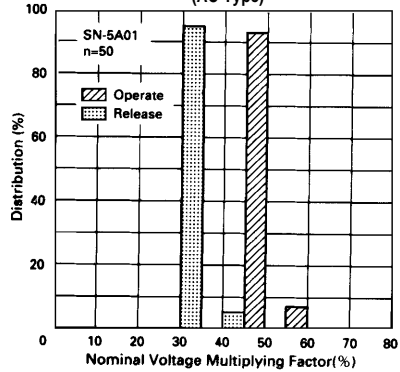


High temperature Continuous Operating Test  
(AC Type)

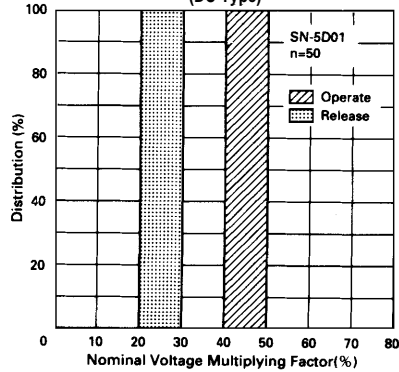


### ● OUTPUT MODULE

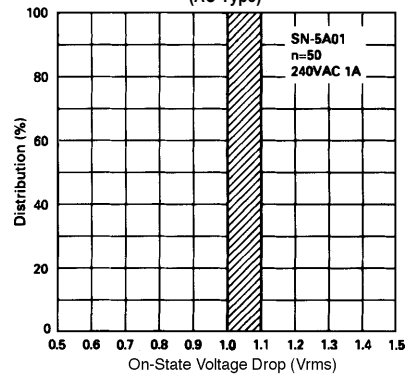
Distribution of Operate & Release Voltage  
(AC Type)



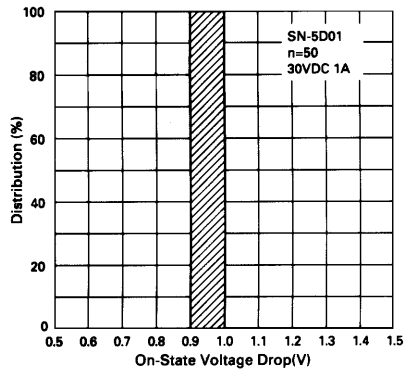
Distribution of Operate & Release Voltage  
(DC Type)



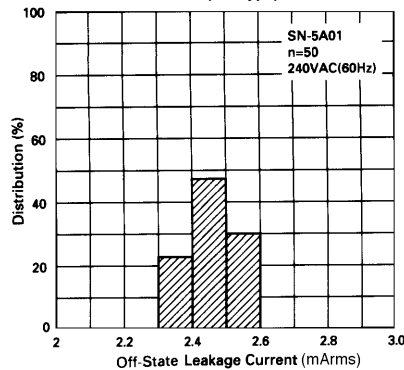
Distribution of On-State Voltage Drop  
(AC Type)



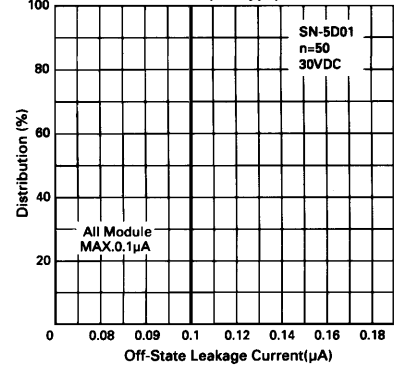
Distribution of On-State Voltage Drop  
(DC Type)



Distribution of On-State Leakage Current  
(AC Type)



Distribution of On-State Leakage Current  
(DC Type)

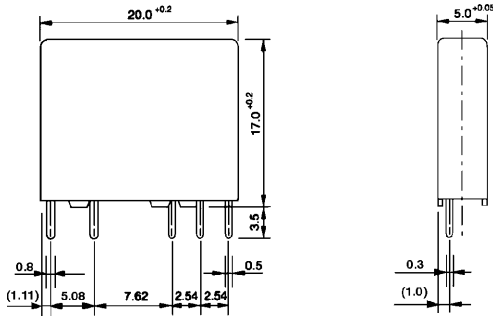


# SN SERIES

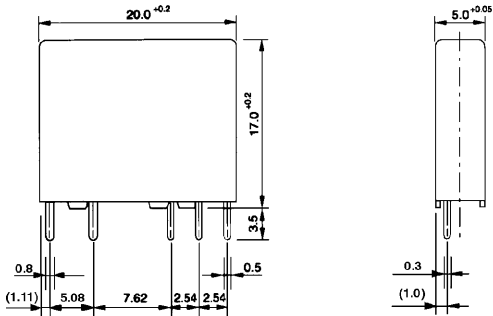
## ■ DIMENSIONS

### ● Dimensions

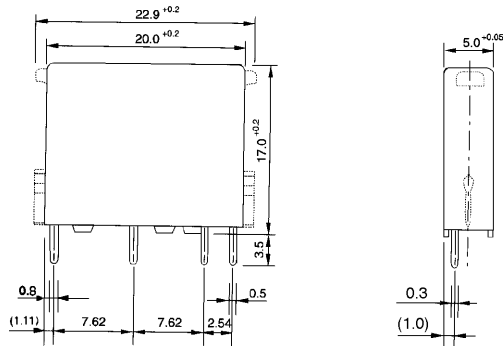
SN-A ( ) type (input module)



SN-D ( ) type (input module)

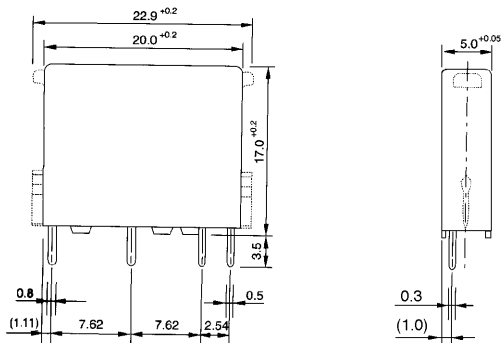


SN-A ( ) type (output module)



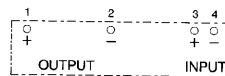
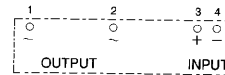
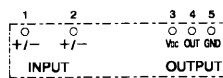
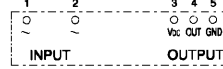
Dotted line : Socket mounting SN-( )A-S type

SN-D ( ) type (output module)

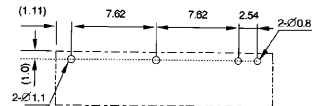
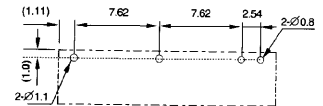
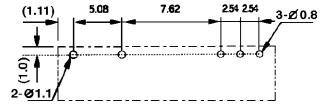
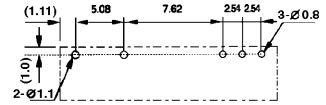


Dotted line : Socket mounting SN-( )D-S type

### ● Schematics (BOTTOM VIEW)

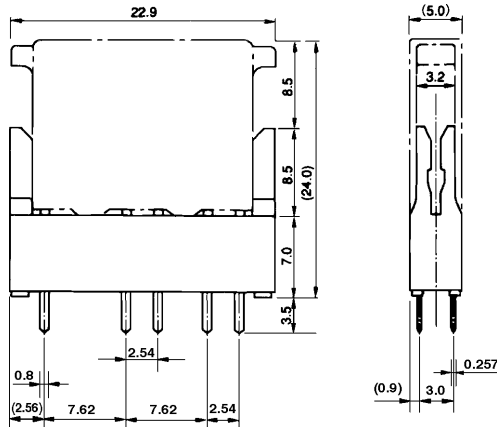


### ● PC board mounting hole layout (BOTTOM VIEW)

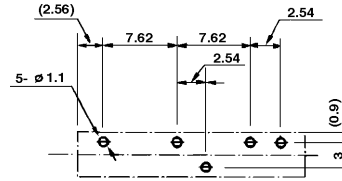


Unit: mm

## ■ Socket Dimensions



## ■ Socket PC board mounting hole layout (BOTTOM VIEW)



Unit: mm

## ■ NOTES

1. Polarity of terminals is pre-determined. Please design your circuit accordingly.
2. Socket ordering code: JL-5N
3. Standard IC socket is not recommended. Please use socket "JL-5N".

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