

# 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]       $\frac{SN}{(a)}$     —     $\frac{A}{(b)}$      $\frac{100 BF}{(c)}$

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

## ● 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 | AC type                                                             | Nil : with varistor<br>NV: without varistor |
|     |                                                | DC type                                                             | Nil : Diode<br>HZ: Zener diode              |
| (f) | Zero Cross function (AC type)                  | F : without zero cross function<br>C : with zero cross function     |                                             |
| (g) | Output Polarity (DC type)                      | Nil : Standard polarity<br>R : Reverse polarity                     |                                             |
| (h) | 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 (max.) | 80 Vrms                                       | 160 Vrms        | 9.6 VDC                  |                           |                       |
|                                       | Must Release Voltage (max.) | 30 Vrms                                       | 60 Vrms         | 5.0 VDC                  |                           |                       |
|                                       | Must Release Current (min.) | 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 (max.)           |                             | 25 ms                                         |                 | 10 ms                    |                           |                       |
| Maximum Release Time (max.)           |                             | 30 ms                                         |                 | 10 ms                    |                           |                       |
| Insulation Resistance (initial value) |                             | Minimum 1,000 M Ω (at 500 VDC)                |                 |                          |                           | for input-output      |
| Dielectric Strength                   |                             | 2,500 Vrms 1 minute                           |                 |                          |                           |                       |
| Operating Temperature Range           |                             | −30°C to + 85°C                               |                 |                          |                           | no                    |
| Storage Temperature Range             |                             | −40°C to +100°C                               |                 |                          |                           | frost                 |
| Case Color                            |                             | Yellow                                        |                 | White                    |                           |                       |
| Weight                                |                             | Approximately 2.0 g                           |                 | Approximately 3.3 g      |                           |                       |

• OUTPUT MODULE Standard Type

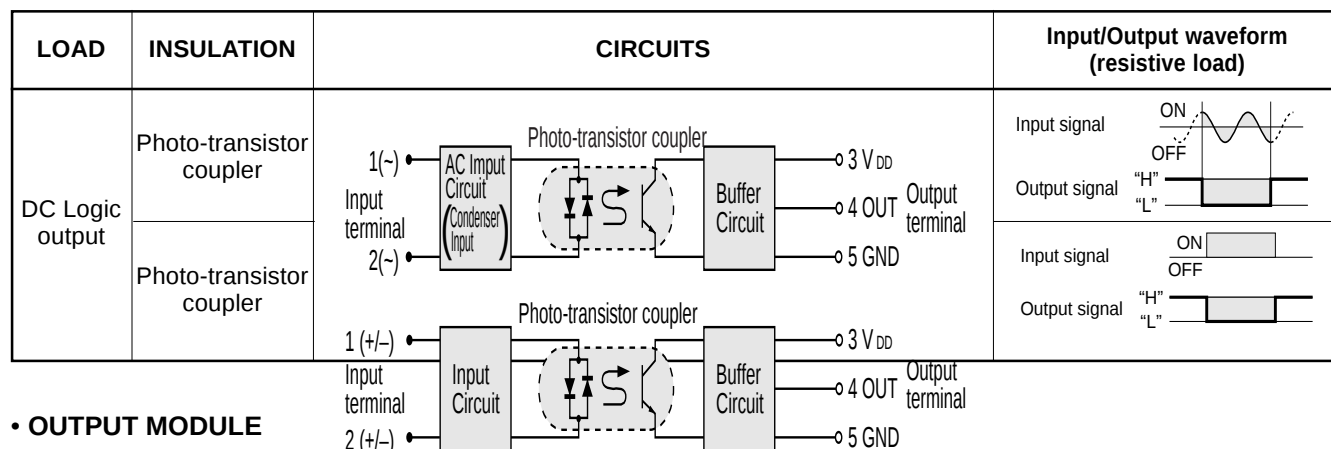
| Item<br>Remarks             |                                |             | AC Output module                                               |                       | DC Output module    |                         |
|-----------------------------|--------------------------------|-------------|----------------------------------------------------------------|-----------------------|---------------------|-------------------------|
|                             |                                |             | with zero<br>cross                                             | without zero<br>cross |                     |                         |
| INPUT<br>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           |             | max.80% of nominal voltage                                     |                       |                     |                         |
|                             | Must Release Voltage           |             | Minimum 1 VDC (minimum 0.5 V*)                                 |                       |                     | *3 VDC type             |
|                             | Input Impedance<br>(±10%)      | 3 VDC Type  | 130 Ω                                                          | 180 Ω                 | —                   |                         |
|                             |                                | 5 VDC Type  | 330 Ω                                                          | 470 Ω                 | 390 Ω               |                         |
|                             |                                | 12 VDC Type | 1,0k Ω                                                         | 1,5k Ω                | 1,2k Ω              |                         |
|                             |                                | 24 VDC Type | 2,2k Ω                                                         | 3,0k Ω                | 2.4k Ω              |                         |
| OUTPUT<br>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                |                         |
|                             | Switching 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 max. load current    |
| Maximum Operate Time (max.) |                                |             | 1 ms                                                           | 1/2 cycle<br>±1 ms    | 1 ms                |                         |
| Maximum Release Time        |                                |             | 1/2 cycle + 1ms                                                |                       | 1 ms                |                         |
| Insulation Resistance       |                                |             | Minimum 1,000 M Ω (at 500 VDC)                                 |                       |                     | for input-output        |
| Dielectric Strength         |                                |             | 2,500 Vrms 1 minute                                            |                       |                     |                         |
| Operating Temperature Range |                                |             | −30°C to + 85°C                                                |                       |                     | no                      |
| Storage Temperature Range   |                                |             | −40°C to +100°C                                                |                       |                     | frost                   |
| Case Color                  |                                |             | Black                                                          |                       | Red                 |                         |
| Weight                      |                                |             | Approximately 3.5 g                                            |                       | Approximately 2.9 g |                         |

• OUTPUT MODULE High Speed Switching Type

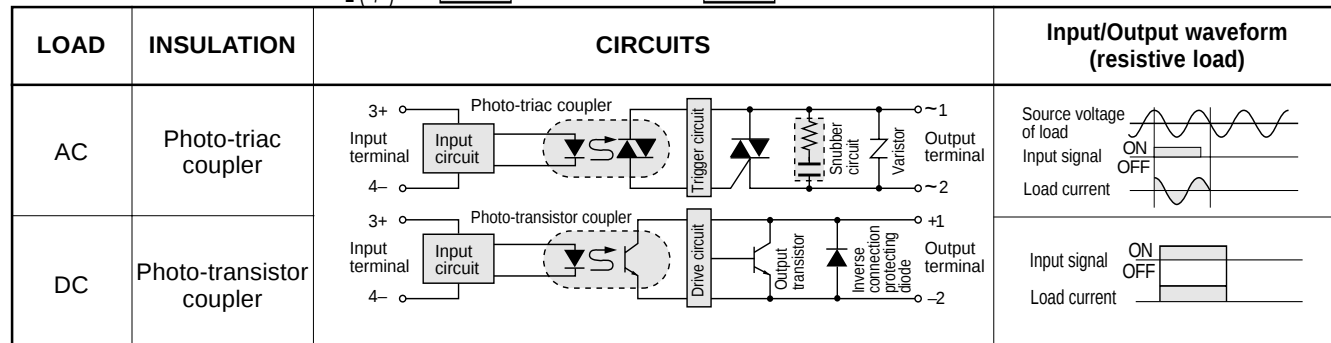
| Item                        |                                | AC Output module                      | Remarks                 |
|-----------------------------|--------------------------------|---------------------------------------|-------------------------|
| INPUT side                  | Nominal 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                            | 330 $\Omega$ ±10%       |
|                             |                                | 12 VDC Type                           | 1,0 k $\Omega$ ±10%     |
|                             |                                | 24 VDC Type                           | 2,0 k $\Omega$ ±10%     |
| OUTPUT side                 | Load Voltage                   | DC3 to 30V                            |                         |
|                             | Maximum Load Current           | 1.0 A                                 | see CHARACTERISTIC DATA |
|                             | Minimum Load Current           | 1 mA                                  |                         |
|                             | Switching Current              | 3 A (10 ms)                           |                         |
|                             | Max. Off-State Leakage Current | 0.1 mA (at 30 VDC)                    |                         |
|                             | Max. On-State Voltage Drop     | 1.2 V                                 | at max. load current    |
| Maximum Operate Time        |                                | max. 5 $\mu$ s                        | at DC 5 V 0.1A          |
| Maximum Release Time        |                                | max. 25 $\mu$ s                       |                         |
| Insulation Resistance       |                                | Minimum 1,000 M $\Omega$ (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 2.9 g                   |                         |

## ■ BLOCK DIAGRAM

### • INPUT MODULE



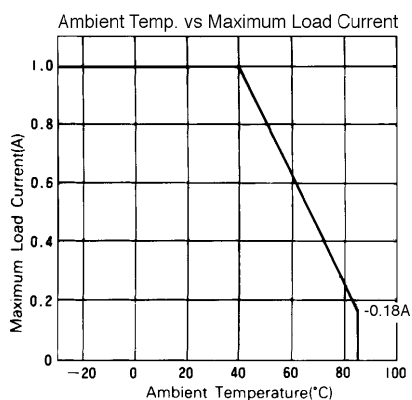
### • OUTPUT MODULE



\* AC type without varistor / DC type with zenor diode available.

## ■ CHARACTERISTIC DATA

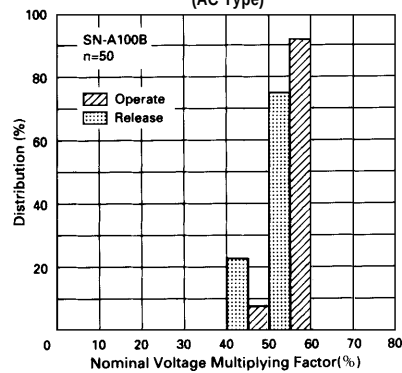
### • OUTPUT MODULE



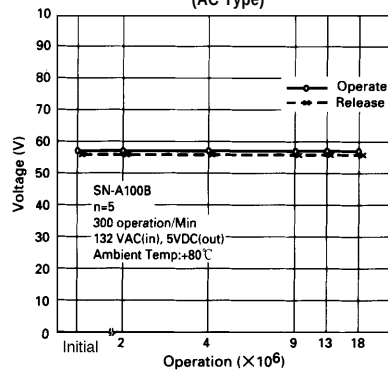
## REFERENCE DATA

### INPUT MODULE

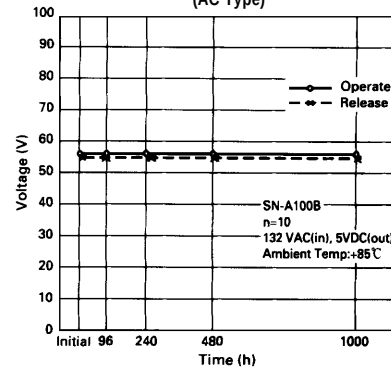
Distribution of Operate & Release Voltage  
(AC Type)



High temperature Switching Test  
(AC Type)

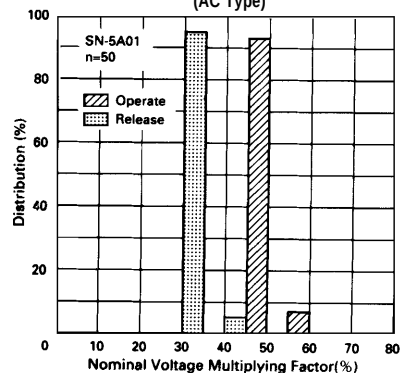


High temperature Continuous Operating Test  
(AC Type)

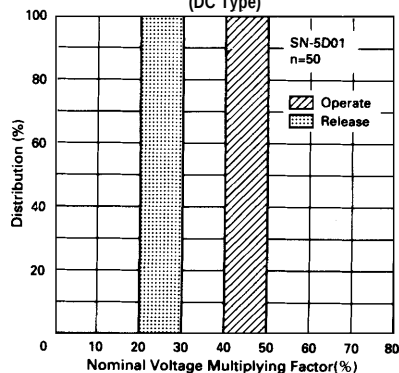


### OUTPUT MODULE

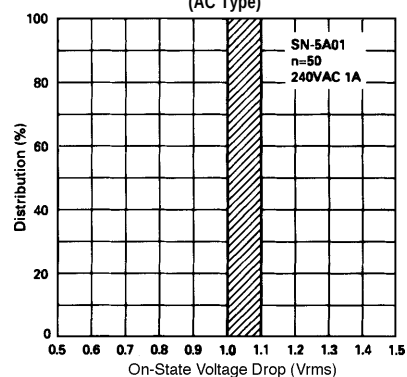
Distribution of Operate & Release Voltage  
(AC Type)



Distribution of Operate & Release Voltage  
(DC Type)



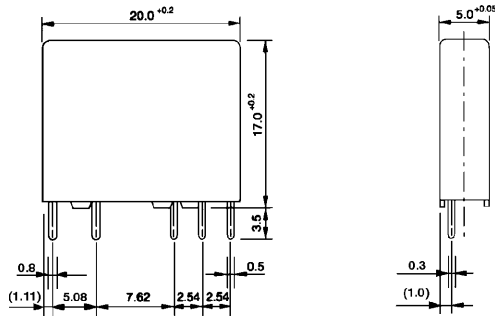
Distribution of On-State Voltage Drop  
(AC Type)



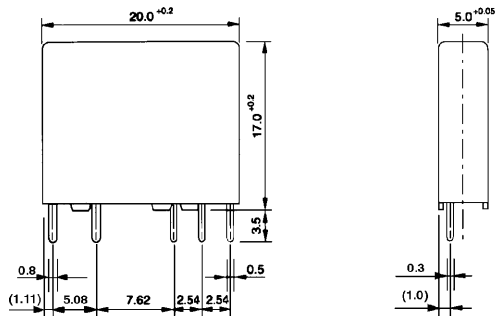
## ■ DIMENSIONS

### ● Dimensions

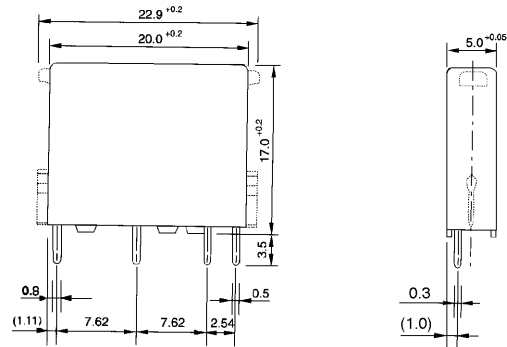
SN-A ( ) type (input module)



SN-D ( ) type (input module)

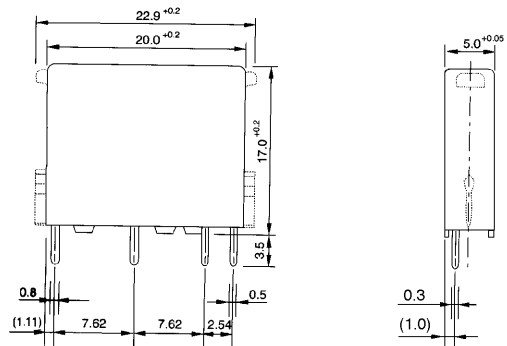


SN-A ( ) type (output module)



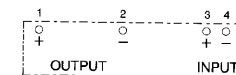
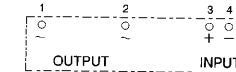
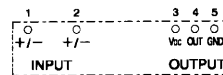
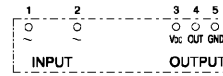
Dotted line : Socket mounting SN-( )A-S type

SN-( ) D, ( )D ( ) R type (output module)



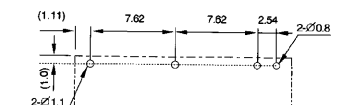
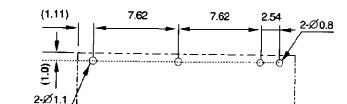
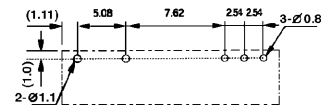
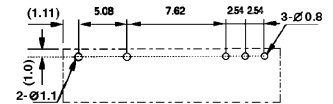
Dotted line : Socket mounting SN-( )D-S type

### ● Schematics (BOTTOM VIEW)



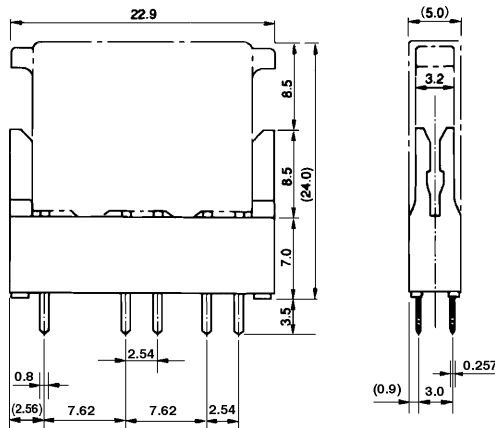
\* Reverse polarity type available

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

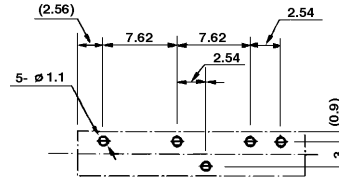


Unit: mm

## ■ Socket Dimensions



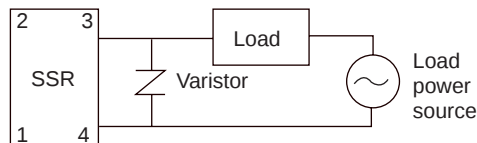
## ■ Socket PC board mounting hole layout (BOTTOM VIEW)



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".
4. When switching inductive load by AC output module without varistor, please connect a varistor as shown in drawing below.
5. AC input module has inside logic IC. Please connect bypass condenser (approx. 0.01 $\mu$ ) at pivotal points between VDD and GND. (Conform to general handling instructions for logic IC.)



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