

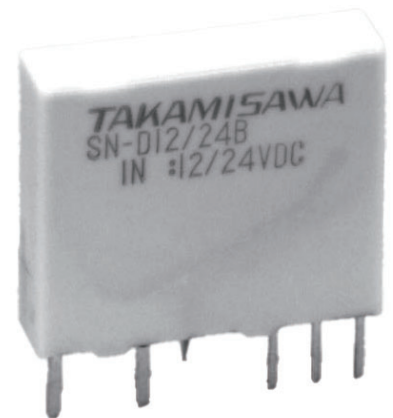
SOLID STATE RELAY (I/O MODULE) MAXIMUM LOAD CURRENT 1A

SN Series

RoHS Compliant

■ 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: 2,500Vrms)
- Long life and maintenance free
- All solid state I/O module
- Compatible with NY relay size and terminals arrangement (only output module type)
- RoHS compliant since date code: 6703 (except 204-207)
The piece-parts used in this relay contains lead but it is excluded from controlled substances.



■ APPLICATIONS

PLC etc.

■ PART NUMBERS

● Input Module

[Example] SN - A 100 B E

(a) (b) (c) (d) (e)

| | | | | |
|-----|------------------------------|---------------------|-----------|------------------------------------|
| (a) | Relay type | | SN series | |
| (b) | Input voltage | | A | : AC type |
| | | | D | : DC type |
| (c) | Nominal voltage (input side) | | 100 | : 100VAC |
| | | | 200 | : 200VAC |
| | | | 12/24 | : 12/24VDC |
| (d) | Output | AC type | Nil | : Without buffer |
| | | | B | : With buffer |
| | | DC type | B | : With buffer |
| (e) | Enclosure | AC type with buffer | Nil | : Plastic sealed (only for 100VAC) |
| | | | F | : Flux free |
| | | DC type with buffer | Nil | : Plastic sealed |

● Output Module

[Example] SN - 12 D 01 HZ - C R - S

(a) (b) (c) (d) (e) (f) (g) (h)

| | | | | |
|-----|---|---------|-----------|------------------------|
| (a) | Relay type | | SN series | |
| (b) | Nominal voltage (input side) | | 3 | : 3VDC (only AC type) |
| | | | 5 | : 5VDC |
| | | | 12 | : 12VDC |
| | | | 24 | : 24VDC |
| (c) | Load voltage | | A | : AC type |
| | | | D | : DC type |
| (d) | Load current | | 01 | : 1A |
| (e) | Kind of inverse connection protecting element | AC type | Nil | : With varistor |
| | | | NV | : Without varistor |
| | | DC type | Nil | : Diode |
| | | | HZ | : Zener diode |
| (g) | Output polarity (DC type) | | Nil | : Standard polarity |
| | | | R | : Reverse polarity |
| (h) | Mounting | | Nil | : PCB mounting type |
| | | | S | : Socket mounting type |

■ SPECIFICATIONS

● AC Input Module (SN-A()B type)

| Item | | Specifications | | | |
|-------------|---|---|----------------------------|------------------------------|----------------------------|
| | | 100VAC Type | | 200VAC Type | |
| | | Without Buffer | With Buffer | Without Buffer | With Buffer |
| | | Plastic Sealed | Flux Free | Plastic Sealed | Flux Free |
| Input side | Input voltage range | 80 to 132VACrms | | 160 to 265VACrms | |
| | Rating input current | Approx. 8.4mA _{rms} | Approx. 7mA _{rms} | Approx. 7.8mA _{rms} | Approx. 7mA _{rms} |
| | Power frequency range | 47 to 63Hz | | | |
| | Must operate voltage | Max. 70VACrms | Max. 80VACrms | Max. 150VACrms | Max. 160VACrms |
| | Must release voltage | Min. 25VACrms | Min. 30VACrms | Min. 60VACrms | Min. 60VACrms |
| | Must release current | Min. 2mA _{rms} | | | |
| Output side | DC supply voltage (V _{DD}) | - | 4 to 6VDC | - | 4 to 6VDC |
| | Max. output current (V _{DD} =5V) | Max. 0.5mA | ±4mA | Max. 0.5mA | ±4mA |
| | Output logic | - | Negative logic | - | Negative logic |
| Temperature | Storage temperature range | -40°C to +100°C (no frost) | | | |
| | Operating temperature range | -30°C to +85°C (no frost) | | | |
| Time | Max. operate time | Max. 20ms | Max. 25ms | Max. 20ms | Max. 25ms |
| | Max. release time | Max. 20ms | Max. 30ms | Max. 20ms | Max. 30ms |
| Buffer | | Absence | Presense | Absence | Presense |
| Insulation | Insulation resistance | Min. 1,000 MΩ (at 500VDC, for input-output) | | | |
| | Dielectric strength | 2,500V _{rms} , 1 minute (for input-output) | | | |
| Others | Case color | Yellow | Ivory | Yellow | Ivory |
| | Weight (approx.) | 3.2g | 3.2g | 3.2g | 2g |
| | Dimensions | 5.0×20.0×17.0 mm | | | |

■ SPECIFICATIONS

● DC Input Module (SN-D()B type)

| Item | | Specifications |
|-------------|-------------------------------------|--|
| | | 12/24VDC, with Buffer, Plastic Sealed |
| Input | Input voltage range | 9.6 to 28.8VDC |
| | Rating input current | Approx. 5mA (at 12VDC) / Approx. 10mA (at 24VDC) |
| | Must operate voltage | Max. 9.6VDC |
| | Must release voltage | Min. 5.0VDC |
| | Must release current | Min. 1.5mA |
| Output | DC supply voltage (V_{DD}) | 4 to 6VDC |
| | Max. output current ($V_{DD}=5V$) | $\pm 0.4mA$ |
| | Output logic | Negative logic |
| Temperature | Storage temperature range | -40°C to +100°C (no frost) |
| | Operating temperature range | -30°C to +85°C (no frost) |
| Time | Operate time | 10ms max. |
| | Release time | 10ms max. |
| Buffer | | Presense |
| Insulation | Insulation resistance (initial) | 1,000M Ω (at 500VDC, for input-output) |
| | Dielectric strength | 2,500Vrms, 1 minute (for input-output) |
| Others | Case color | White |
| | Weight | Approx. 3.3g |
| | Dimensions | 5.0×20.0×17.0 mm |

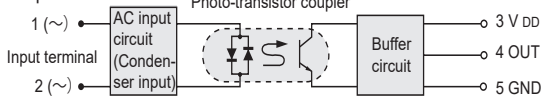
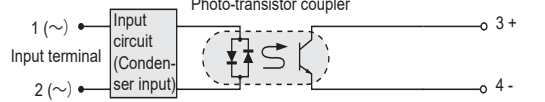
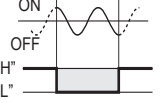
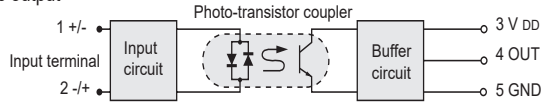
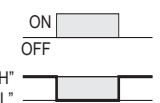
■ SPECIFICATIONS

● Output Module

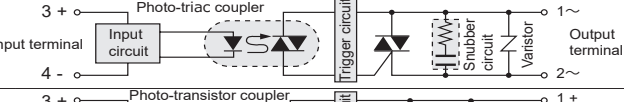
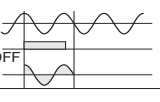
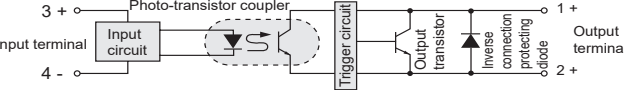
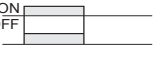
| Item | | | Specifications | | |
|-------------|---|------------|--|----------------------|--------------------------|
| | | | AC Output Module | | DC Output Module |
| | | | Without Zero Cross | With Zero Cross | |
| Input | Nominal voltage | | 3, 5, 12, 24VDC | | 5, 12, 24VDC |
| | Operate voltage range | | ±20% of nominal voltage | | |
| | Must operate voltage | | Max. 80% of nominal voltage | | |
| | Must release voltage | | Min.0.5VDC (3, 5VDC type) | Min. 1VDC | |
| | | | Min.1VDC (12, 24VDC type) | | |
| | Input impedance | 3VDC type | 130Ω±10% | 180Ω±10% | - |
| | | 5VDC type | 330Ω±10% | 470Ω±10% | 390Ω±10% |
| | | 12VDC type | 1,000Ω±10% | 1,500Ω±10% | 1,200Ω±10% |
| | | 24VDC type | 2,200Ω±10% | 3,000Ω±10% | 2,500Ω±10% |
| Output | Load voltage range | | 24 to 265VACrms | | 3 to 30VDC |
| | Maximum load current (Please refer to characteristic data) | | 1.0Arms | | 1.0A |
| | Minimum load current | | 10mArms | | 1mA |
| | Switching current | | 50A (60Hz, 1 cycle) | | 3A (10ms) |
| | OFF-state leakage current | | Max. 1.5mArms (100VACrms, at 60Hz) Max. 3.0mArms (200VACrms, at 60Hz) | | Max. 0.1mA (at 30VDC) |
| | ON-state voltage drop (at max. load current) | | Max. 1.2Vrms | | Max.1.2V |
| | Storage temperature range | | -40°C to +100°C (no frost) | | |
| Temperature | Operate temperature range | | -30°C to +85°C (no frost) | | |
| | Operate time | | Max. 1ms | Max. 1/2 cycle + 1ms | Max. 1ms |
| Time | Release time | | Max. 1/2 cycle + 1ms | | Max. 1ms |
| | Color | | Black | | Red |
| Others | Weight | | Approx.3.5g | | Approx. 2.9g |
| | Dimensions | | 5.0×20.0×17.0 mm (except protrusion) | | |

■ BLOCKING DIAGRAM

● Input Module

| Load | Insulation Method | Insulation Circuits | Input/Output Waveform (Resistive load) |
|------|--------------------------|--|--|
| AC | Photo-transistor coupler | <p>DC logic output</p>  <p>DC transistor output</p>  | <p>Input signal</p>  <p>Output signal</p> <p>"H"</p> <p>"L"</p> |
| | | <p>DC logic output</p>  | <p>Input signal</p>  <p>Output signal</p> <p>"H"</p> <p>"L"</p> |

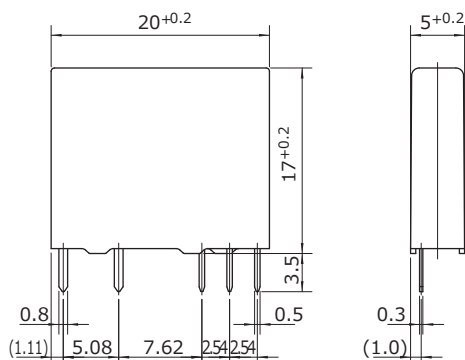
● Output Module

| Load | Insulation Method | Insulation Circuits | Input/Output Waveform (Resistive load) |
|------|--------------------------|--|--|
| AC | Photo-triac coupler |  | <p>Source voltage of load</p>  <p>Input signal</p> <p>Load current</p> <p>OFF</p> |
| DC | Photo-transistor coupler |  | <p>Input signal</p>  <p>Load current</p> <p>ON</p> <p>OFF</p> |

■ DIMENSIONS

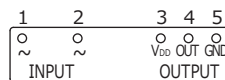
● Dimensions

SN-A()BF (AC input module, with buffer)



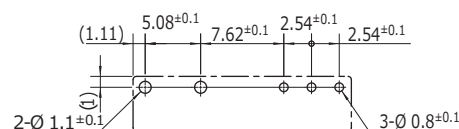
● Schematics

(BOTTOM VIEW)

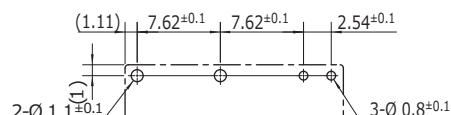
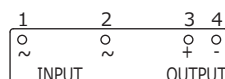
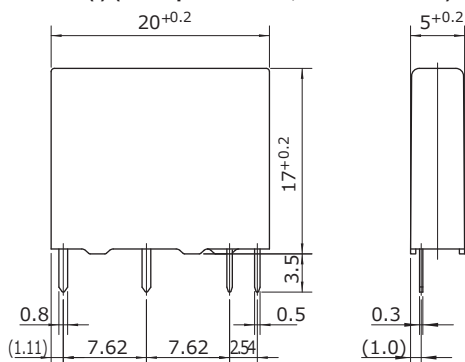


● PC board mounting hole layout

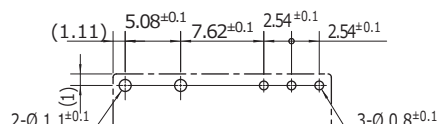
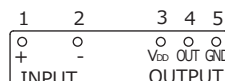
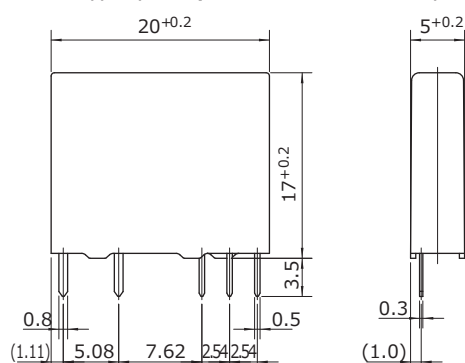
(BOTTOM VIEW)



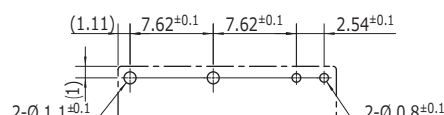
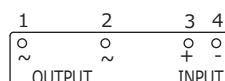
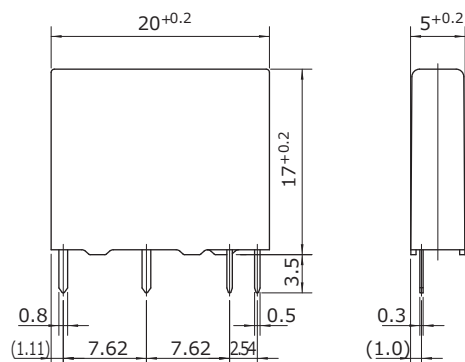
SN-A() (AC input module, without buffer)



SN-D()B (DC input module, with buffer)



SN-()A (AC output module, PCB mounting mounting type)



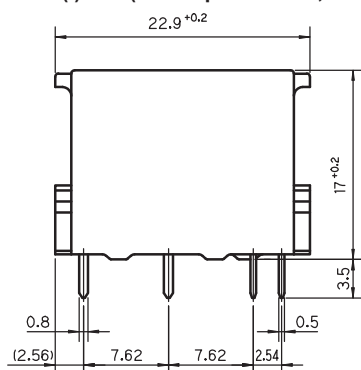
Dimensions of the terminals do not include thickness of pre-soldering.

() : Reference
Unit: mm

■ DIMENSIONS

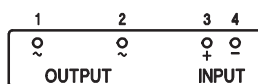
● Dimensions

SN-()A-S (AC output module, socket mounting type)



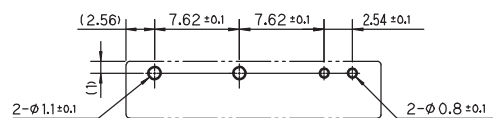
● Schematics

(BOTTOM VIEW)

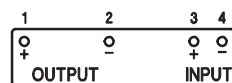
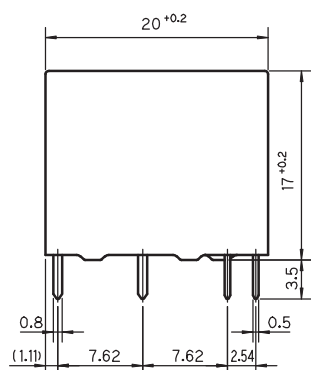


● PC board mounting hole layout

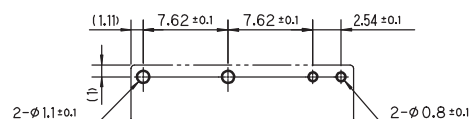
(BOTTOM VIEW)



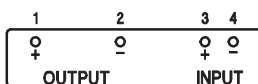
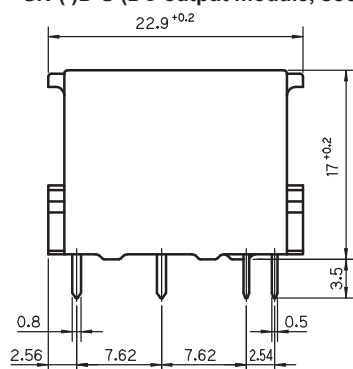
SN-()D (DC output module, PCB mounting type)



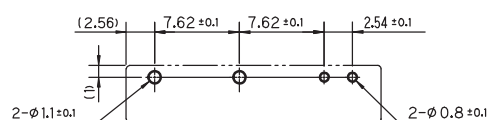
Reverse polarity type available.



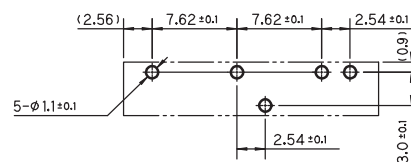
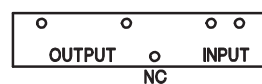
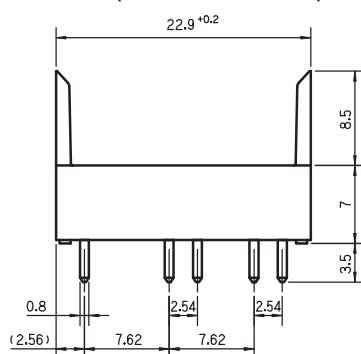
SN-()D-S (DC output module, socket mounting type)



Reverse polarity type available.



●Socket (Part number: JL-5N)



(): Reference
 Unit: mm

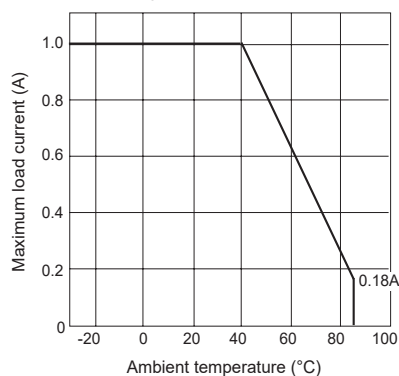
Dimensions of the terminals do not include thickness of pre-soldering.

■ CHARACTERISTIC DATA

(Characteristic data is not guaranteed value but measured values of samples from production line.)

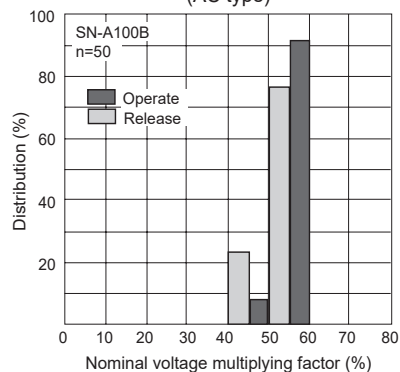
● OUTPUT MODULE

Ambient temperature vs max. load current

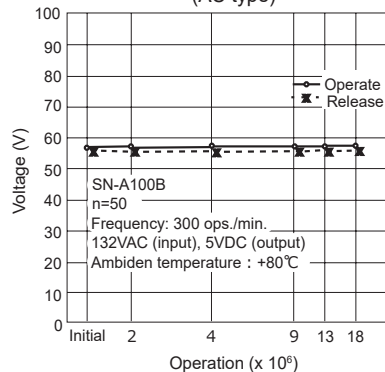


● INPUT MODULE

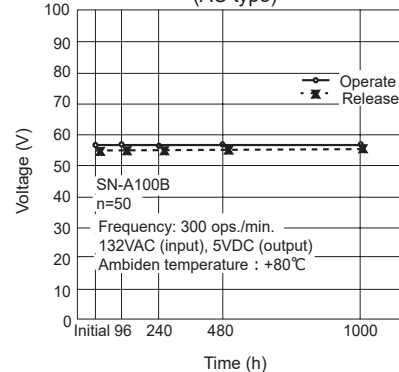
Distribution of Operate & Release voltage (AC type)



High temperature switching test (AC type)

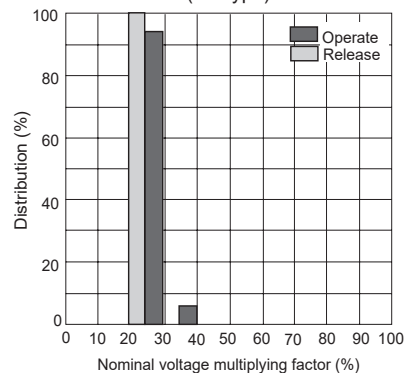


High temperature continuous operating test (AC type)

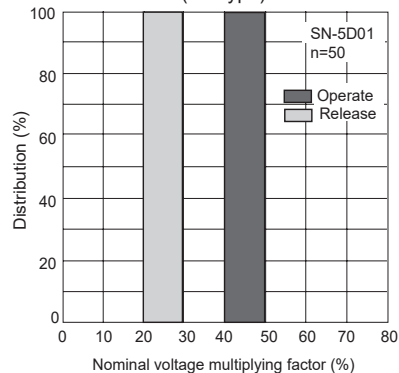


● OUTPUT MODULE

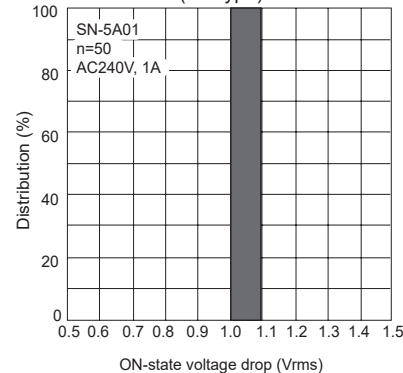
Distribution of operate & release voltage (AC type)



Distribution of operate & release voltage (DC type)



Distribution of ON-state voltage drop (AC type)



■ PART NUMBER LIST

● Input Module

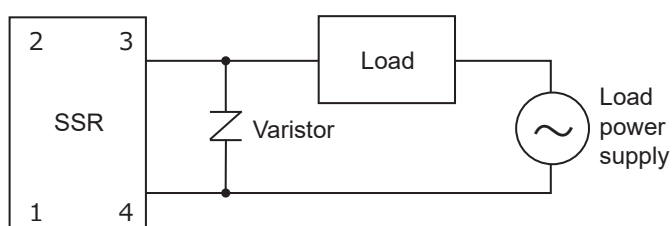
| Part Number | Input Voltage | Output | Enclosure | Note |
|-------------|---------------|----------------|-----------|-------------|
| SN-A() | AC | Without buffer | Washable | - |
| SN-A()B | | With buffer | | 100VAC only |
| SN-A()BF | | Without buffer | Flux free | - |
| SN-D()B | DC | With buffer | Washable | - |

● Output Module

| Part Number | Load Voltage | Load Current | Kinds of Inverse Connectin Protecting Element | Zero Cross Function | Output Polarity | Mounting | Note |
|----------------|--------------|--------------|---|---------------------|-------------------|----------|--|
| SN-()A01F | AC | 1.0A | With varistor | Absence | - | PCB | - |
| SN-()A01C | | | | Presence | | | |
| SN-()A01NVF | | | Without varistor | Absence | | | |
| SN-()A01NVC | | | | Presence | | | |
| SN-()A01F-S | | | With varistor | Absence | | Socket | Socket part number: JL-5N |
| SN-()A01C-S | | | | Presence | | | |
| SN-()A01NVF-S | | | Without varistor | Absence | | | |
| SN-()A01NVC-S | | | | Presence | | | |
| SN-()D01 | DC | 1.0A | Diode | - | Standard polarity | PCB | Input voltage 3VDC is not available |
| SN-()D01R | | | | | Reverse polarity | | |
| SN-()D01HZ | | | Zener diode | - | Standard polarity | | |
| SN-()D01HZR | | | | | Reverse polarity | | |
| SN-()D01-S | | | Diode | - | Standard polarity | Socket | Socket part number: JL-5N Input voltage 3VDC is not available |
| SN-()D01R-S | | | | | Reverse polarity | | |
| SN-()D01HZ-S | | | Zener diode | - | Standard polarity | | |
| SN-()D01HZR-S | | | | | Reverse polarity | | |

■ 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. 0.01μ) at pivotal points between VDD and GND. (Conform to general handling instructions for logic IC.)



CAUTIONS

- All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- Reflow soldering is prohibited.
- Do not use relays in the atmosphere with sulfide gas, chloride gas or nitric oxide. Contact resistance may increase.
- Do not use silicon or silicon-containing product or materials near relays. It may cause contact failure.

GENERAL INFORMATION

1. ROHS Compliance

- All relays produced by FCL Components are compliant with RoHS directive 2011/65/EU, including commission delegated directive 2015/863.

2. Recommended lead free solder condition

- Lead free solder plating on relay terminals is Sn-3.0Ag-0.5Cu, unless otherwise specified. This material has been verified to be compatible with PbSn assembly process.
- Recommended solder for assembly: Sn-3.0Ag-0.5Cu.

Flow Solder Condition:

Pre-Heating: Maximum 120°C within 90 sec.

Soldering: Dip within 5 sec. at 255°C±5°C solder bath

Relay must be cooled by air immediately after soldering

Solder by Soldering Iron:

Soldering Iron: 30-60W

Temperature: Maximum 340-360°C

Duration: Maximum 3 sec.

We highly recommend that you confirm your actual solder conditions

3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays, unless otherwise indicated.

4. Tin Whiskers

- Dipped SnAgCu solder is known as presenting a low risk to tin whisker development. No considerable length whisker was found by our in house test.

Contact

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