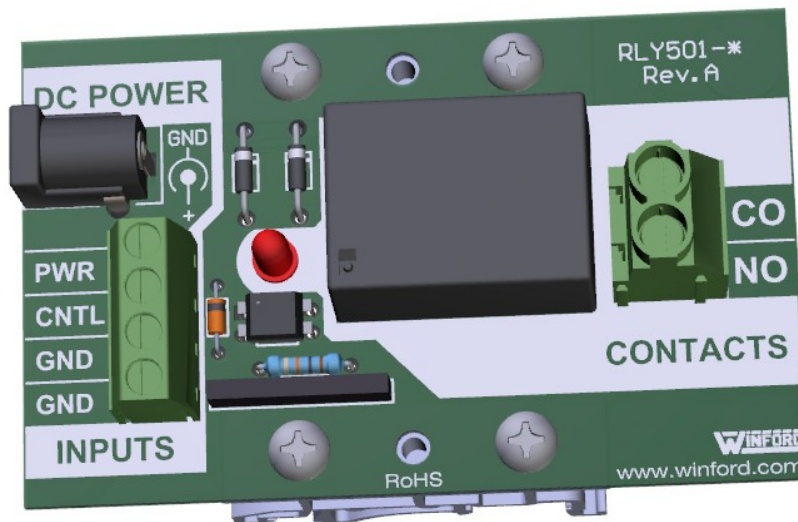


## RLY501 Datasheet

### Overview

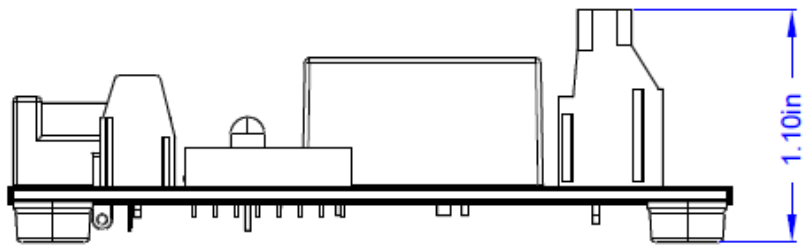
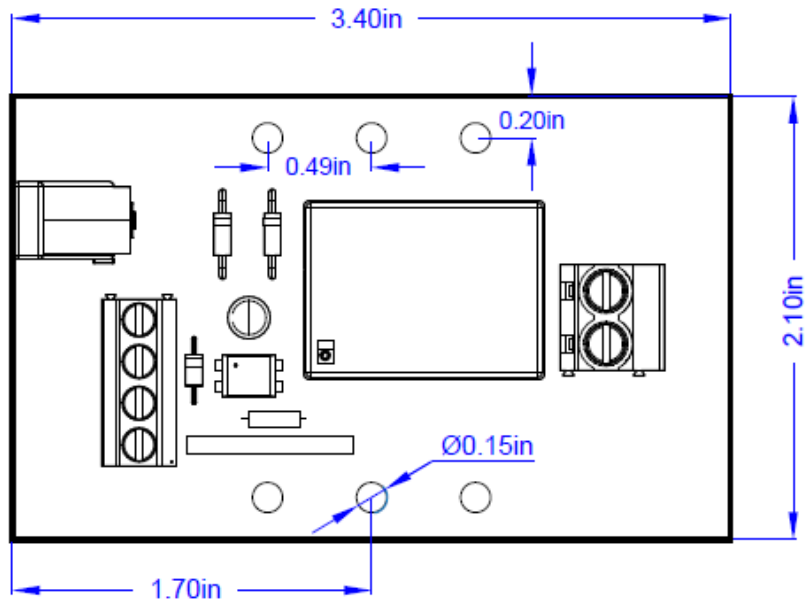
The RLY501 provides a single normally-open SPST high-current relay with convenient screw terminal connections for the input power, input control, and relay contacts. The board includes active driver circuitry allowing relatively low-current input signals (such as 5V TTL) to be used. An LED provides visual indication of the status of the relay. Additionally, a DC power jack is included as an alternative connection point for input power.

Due to the relay design and contact material, this board is well-suited for controlling AC motors up to 1 HP. In addition to their given continuous-carrying current rating, the relays are able to handle high inrush currents such as those associated with motors during startup. Furthermore, the contact material (silver tin oxide) makes these relays a good choice for controlling either AC or DC loads.

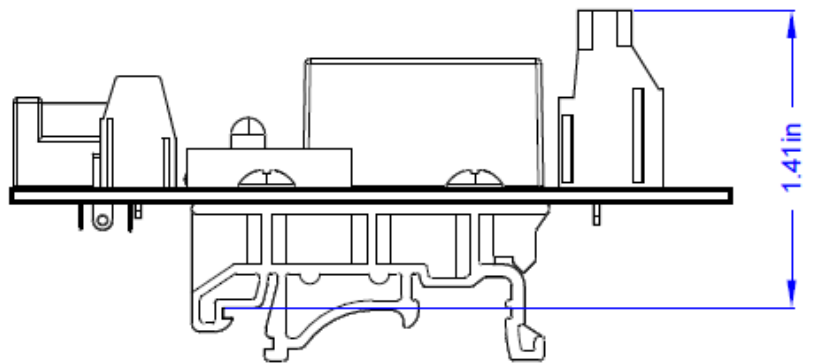


DIN Mounting Option Shown

## Dimensions (typical shown)



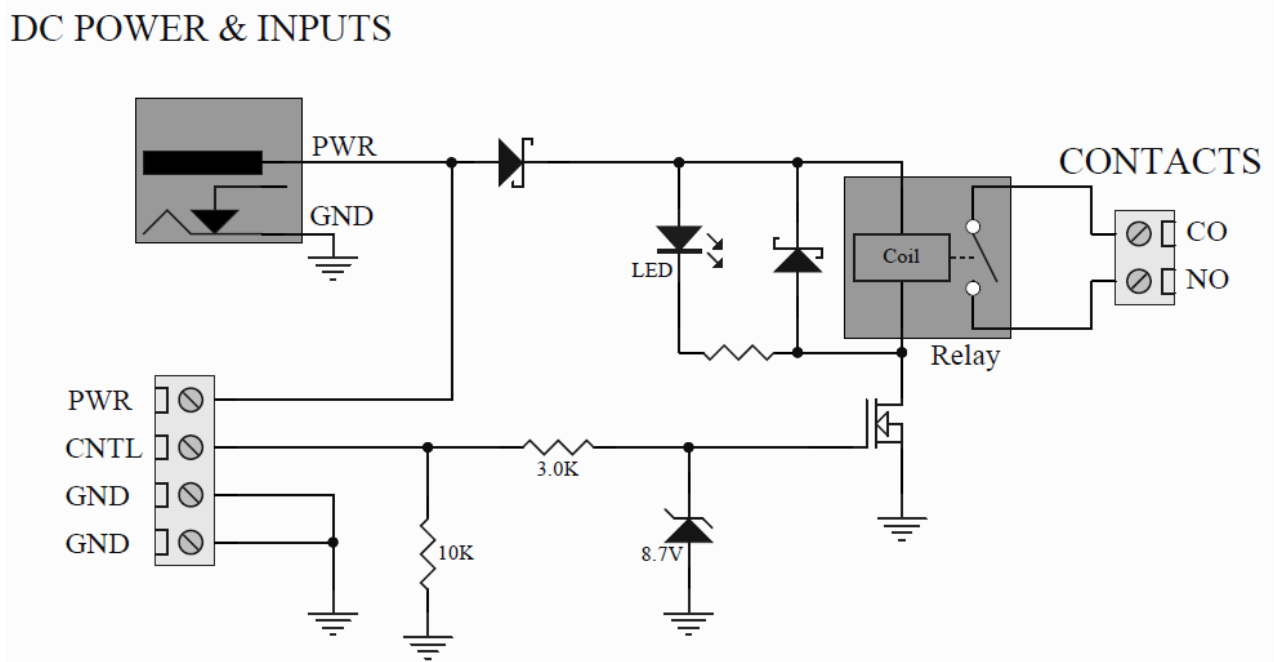
**Rubber Feet Option**



**DIN Mounting Option**

## Simplified Schematic and Signal Descriptions

### DC POWER & INPUTS

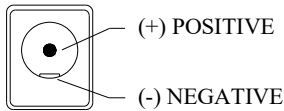


Signal	Description
PWR	DC power input. Provides power for relay coil. 5V, 12V, or 24V. <i>(Signal present at DC power jack and terminal block)</i>
CNTL	Logic-level control signal. When at logic high, activates MOSFET to energize relay coil and close the contacts.
GND	Ground / signal reference. <i>(Signal present at DC power jack and two positions on the terminal block)</i>

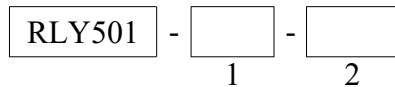
Signal	Description
CO	Relay Contact (moving)
NO	Relay Contact (stationary)

## DC Power Jack

The DC power jack accepts connectors with a 2.1mm inside diameter and 5.5mm outside diameter. The jack requires a center-positive supply.



## Part Number Ordering Information



### 1. Relay Coil Voltage (DC)

- 5V
- 12V
- 24V

### 2. Mounting Option

- **FT** Rubber Feet on bottom side of PCB
- **DIN** DIN Rail Mounting Clips

## RLY501 Stocked Part Numbers

The following part numbers represent standard options and are stocked:

- RLY501-5V-FT
- RLY501-12V-FT
- RLY501-24V-FT
- RLY501-5V-DIN
- RLY501-12V-DIN
- RLY501-24V-DIN

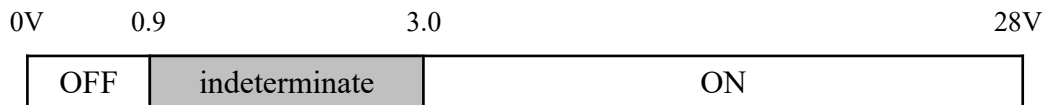
## Electrical Characteristics

Specifications at 25°C

<i>Specification</i>	<i>RLY501-5V</i>	<i>RLY501-12V</i>	<i>RLY501-24V</i>	<i>Unit</i>
DC Power Supply Input Range	4.7 - 5.3	11.3 – 12.7	22 – 25.3	VDC
Nominal supply current - activated relay (coil current + LED current) (Power supply: RLY501-5V=5.0V, RLY501-12V=12.0V, RLY501-24V=24.0V)	170	75	45	mA
Maximum leakage current (power supply current with relay not activated)	0.1			mA
Minimum turn-off threshold for input control signal (see diagram)	0.9			VDC

<i>Specification</i>	<i>RLY501-5V</i>	<i>RLY501-12V</i>	<i>RLY501-24V</i>	<i>Unit</i>
Maximum turn-on threshold for input control signal (see diagram)	3.0			VDC
Maximum allowable input control signal voltage	28			VDC
Input control signal current requirement, typical (per channel)				mA
Input signal @ 3.0V	0.3			
Input signal @ 5.0V	0.5			
Input signal @ 12V	2.3			
Input signal @ 24V	7.5			
Relay contact max switching ratings, Resistive AC Load	20A @ 250 VAC: 250k cycles			
Relay contact max switching ratings, Inductive AC Load	1 HP motor, 125 VAC: 100k cycles			
Relay contact TV inrush current ratings (tungsten load test)	TV-8 @ 240 VAC: 25k cycles			
Relay contact max switching ratings, Resistive DC load	0.3A @ 300 VDC 1.0A @ 70 VDC 10A @ 30 VDC 20A @ 20 VDC			
Relay contact max rated voltage	250 300			VAC VDC
Relay contact minimum recommended load	1A, 12VAC/VDC			
Relay contact material	AgSnO <sub>2</sub>			

## Input Control Signal Thresholds Diagram



## Operating Conditions

Ambient Temperature Range, full load	-25°C to 65°C
Relative Humidity Range - not freezing or condensing	5% to 85% RH

## Screw Terminal Wire Sizes

- Input control signals and Power: 12-28 AWG
- Relay contacts: 10-24 AWG

## Component Part Numbers

- Relay: TE Connectivity T9GS1L14-vv (vv=voltage)

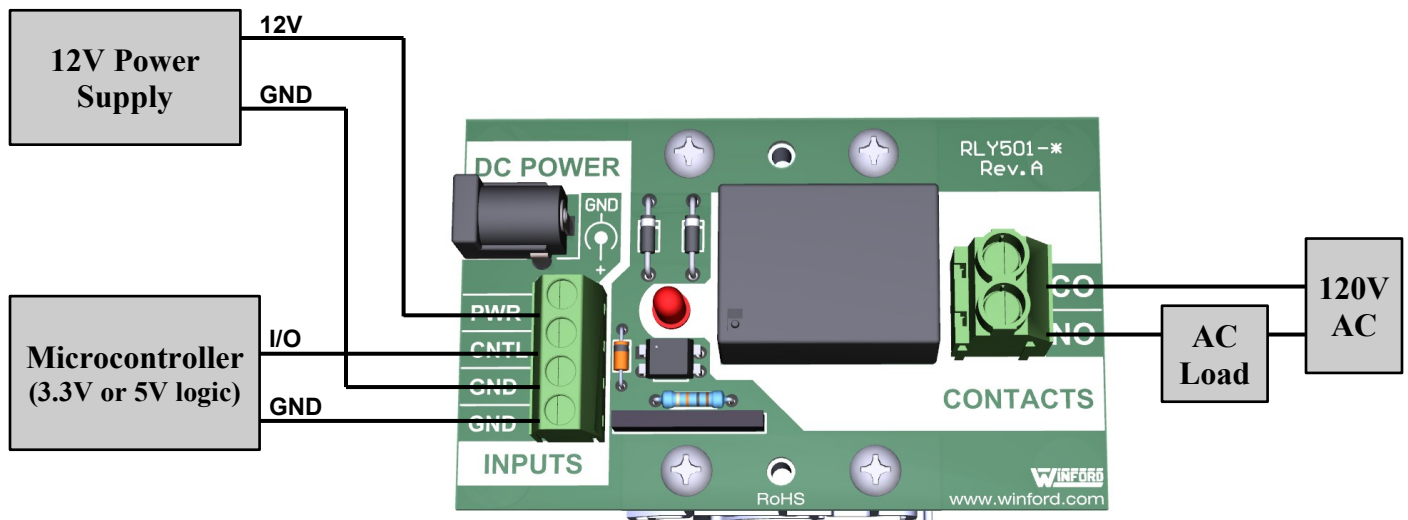
## Note About Inductive Loads

It is of primary importance to ensure that the relay used in a given application is rated for the given load type (e.g., resistive, inductive) as well as the load current. This device (RLY501) is rated for resistive loads and AC motor loads (up to 1 HP), and has a capacitive-load TV-8 high inrush current rating, as indicated in the electrical characteristics section of this document.

If the relay board is used to switch an inductive load, such as a solenoid coil or motor or a larger relay, it may be helpful to reference Winford Application Note “Relays and Motor Loads.”

## Application

A typical application is shown in the figure below for a system in which a 12V rail is available to provide power for the RLY501. In this case, the 12V variant of the RLY501 is used. A microcontroller provides the control signal used to activate / de-activate the relay.



When the microcontroller sends out a logic high on its I/O pin, the relay contacts close and apply 120V AC to the AC load. The AC load may be a motor, heater, compressor, etc. A microcontroller I/O pin will typically provide either a 5V or 3.3V logic-level control signal, but the RLY501 allows the control signal to go significantly higher than that. (See electrical characteristics for more information.)

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