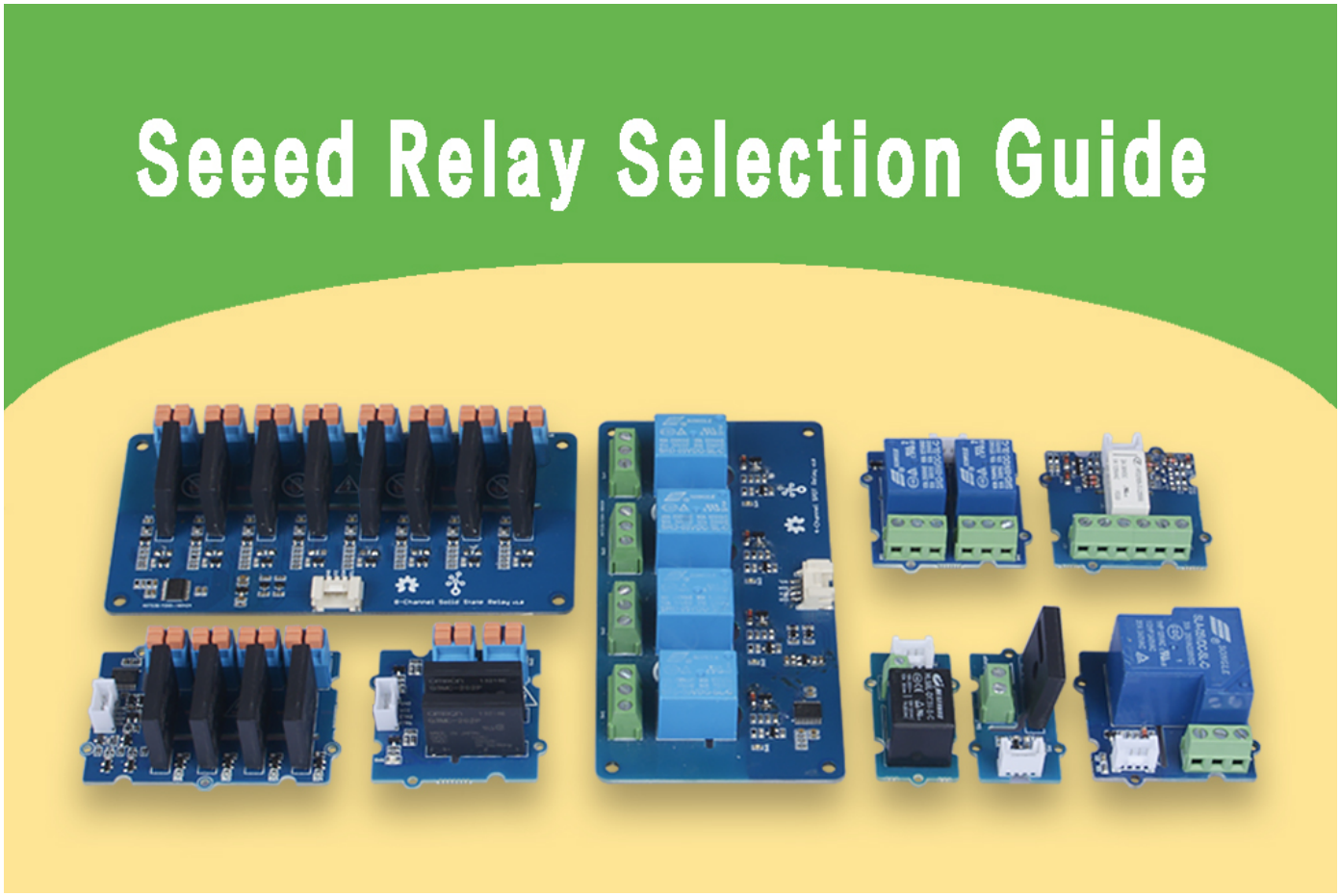
Seeed Relay Selection Guide



We have released various types of relays on our website. You may find it difficult to make a choice. We feel you pain, let's talk about what's the difference between all those relays, and what's the advantage or disadvantage among them.

For all the relay in our bazaar, please click bazaar relay tag to check.

Before the start, let's check the following table, perhaps, all you need is just a table.

Name	Thumbnail	Operate voltage	Input current	Rated load	Contact resistance	Insulation resistance	Operate time	Release time	Input interface	Type
Grove - Relay		3.3V-5V	100mA	5A@250VAC 5A@30VDC	50mΩ @6VDC 1A	100MΩ	10ms Max.	5ms Max.	Digital	Electromechanical
Grove - SPDT Relay(30A)		5V	185mA	30A@250VAC 30A@30VDC	100mΩ Max.	100MΩ Min.@500VDC	15ms Max.	10ms Max.	Digital	Electromechanical
Grove - 2-Channel SPDT Relay		5V	90mA	10A@250VAC 10A@30VDC	100mΩ Max.	100MΩ Min.@500VDC	10ms Max.	5ms Max.	Digital	Electromechanical
Grove - 4-Channel SPDT Relay		5V	90mA	10A@250VAC 10A@30VDC	100mΩ Max.	100MΩ Min.@500VDC	10ms Max.	5ms Max.	I2C	Electromechanical
Grove - Solid State Relay		3V-5V	16mA Min. 20mA Typ. 50mA Max.	4A@220VAC		1000MΩ	10ms	10ms	Digital	Solid State

Name	Thumbnail	Operate voltage	Input current	Rated load	Contact resistance	Insulation resistance	Operate time	Release time	Input interface	Type
Grove - Solid State Relay V2		4V-6V		2A@100VAC to 240VAC		1000MΩ Min.@500VDC	1/2 of load power source cycle +1 ms max	1/2 of load power source cycle + 1 ms max	Digital	Solid State
Grove - 2-Channel Solid State Relay		4V-6V		2A@100VAC to 240VAC		1000MΩ Min.@500VDC	1/2 of load power source cycle +1 ms max	1/2 of load power source cycle + 1 ms max	Digital	Solid State
Grove - 4-Channel Solid State Relay		4V-6V		2A@100VAC to 240VAC		1000MΩ Min.@500VDC	1/2 of load power source cycle +1 ms max	1/2 of load power source cycle + 1 ms max	I2C	Solid State
Grove - 8-Channel Solid State Relay		4V-6V		2A@100VAC to 240VAC		1000MΩ Min.@500VDC	1/2 of load power source cycle +1 ms max	1/2 of load power source cycle + 1 ms max	I2C	Solid State
Grove - 2-Coil Latching Relay		5V		1A@125VAV 3A@30VDC	50mΩ Max.	1000MΩ@500VDC	4.5ms Max.	3.5ms Max.	Digital	Electromechanical
Grove - Dry-Reed Relay		5V		0.1A@100VAC 0.5A@24VDC	150mΩ Max.	100MΩ @500VDC 1000MΩ @100VDC	1ms Max.	0.5ms Max.	Digital	Reed Relays

Table 1.*Seeed Relay Parameter*

Glossary

A relay is an electrically operated switch, the relay opens when the two contacts are disconnected, and the relay turns on when the two contacts touch.

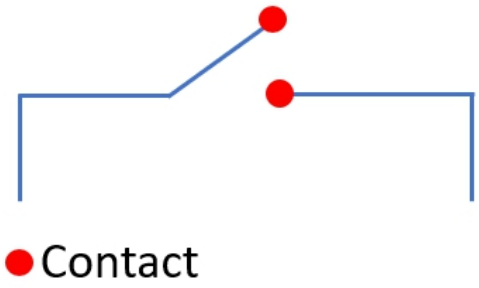


Figure 1. *Relay Contacts*

Each contact connects to an input or output terminal. The input terminal is called **Pole**, and the output terminal is called **Throw**. According to the number of terminals, the relay is divided into several types. which is **SPST**,**SPDT**,**DPDT**, and so on.

SPST(Single Pole Single Throw):
SPST is the simplest relay, you can consider it as a button. This 'button' is normally open, when the trigger signal comes, the pole contact will connect to the throw contact, we call it close. It is great for applications that need only an on or off state. A typical representative of SPST is our Grove - Relay

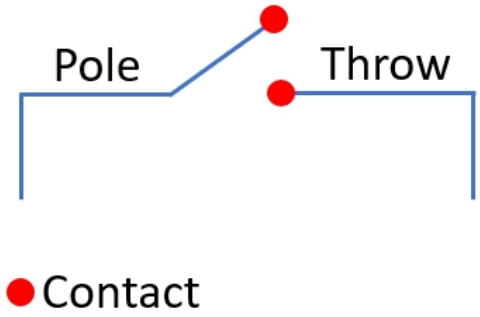


Figure 2. *SPST Relay*

SPDT(Single Pole Double Throw):

SPDT relay is ofen called A/B swicth, as you can see in the figure 3, there are two throws, this kind of relay is great for selecting between two options.

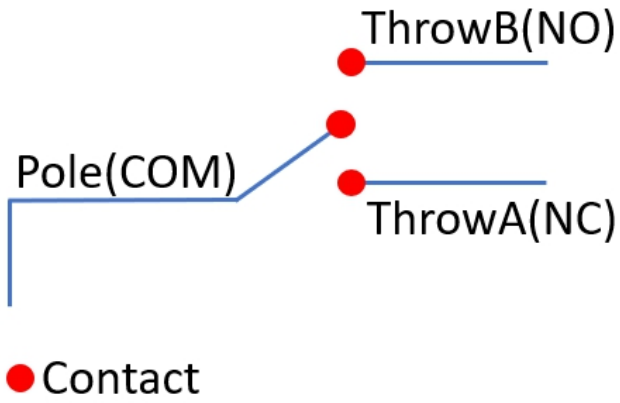


Figure 3. *SPDT Relay*

You may find that these two throws are called **NC** and **NO** respectively, and the pole is called **COM**. NC means normally connected, NO means normally open. Which means if there is no trigger signal, the NC terminal will be connected to the COM terminal, once the trigger signal comes, the NC terminal will be disconnected and the NO terminal will be connected to the COM termianl. For instance, you can refer to our Grove - 2-Channel SPDT Relay.

4 GND: connect this module to the system GND
3 VCC: you can use 5V for this module
2 SIG2: contral signal of swith2, high-NO2/low-NC2
1 SIG1: contral signal of swith1, high-NO1/low-NC1

5 NC1: one throw, connected to COM1 by default
6 COM1: controlled by SIG1, connected to NC1 or NO1
7 NO1: the other throw of swicth1
8 NC2: one throw, connected to COM2 by default
9 COM2: controlled by SIG2, connected to NC2 or NO2
0 NO2: the other throw of swicth2

Figure 4. *Grove - 2-Channel SPDT Relay*

We only have SPST and SPDT relays in our website now, if you want to check other types of relays please refer to the relay page by NATIONAL INSTRUMENTS.

Latching Relay

Latching Relay is a relay that is set (ON) or reset (OFF) by the input of a pulse voltage. Even after the input voltage is interrupted, this relay maintains its set or reset condition until it receives the next inverting input. It is also called a keep relay. Conversely, a non-latching relay maintains its state only while being actuated, most of relays in our website is non-latching relay except the Grove - 2-Coil Latching Relay.

Types of Relays

Although there are more than a dozen relays in our website, in general, there are only three types: **Electromechanical Relay**, **Solid State Relay** and **Reed Relay**. You can see the classification information in the last column of **Table 1.**

Electromechanical Relay

Principle

Most relays in our bazaar are Electromechanical Relay. Normally a Electromechanical Relay is consisted of coils, armatures and contacts.

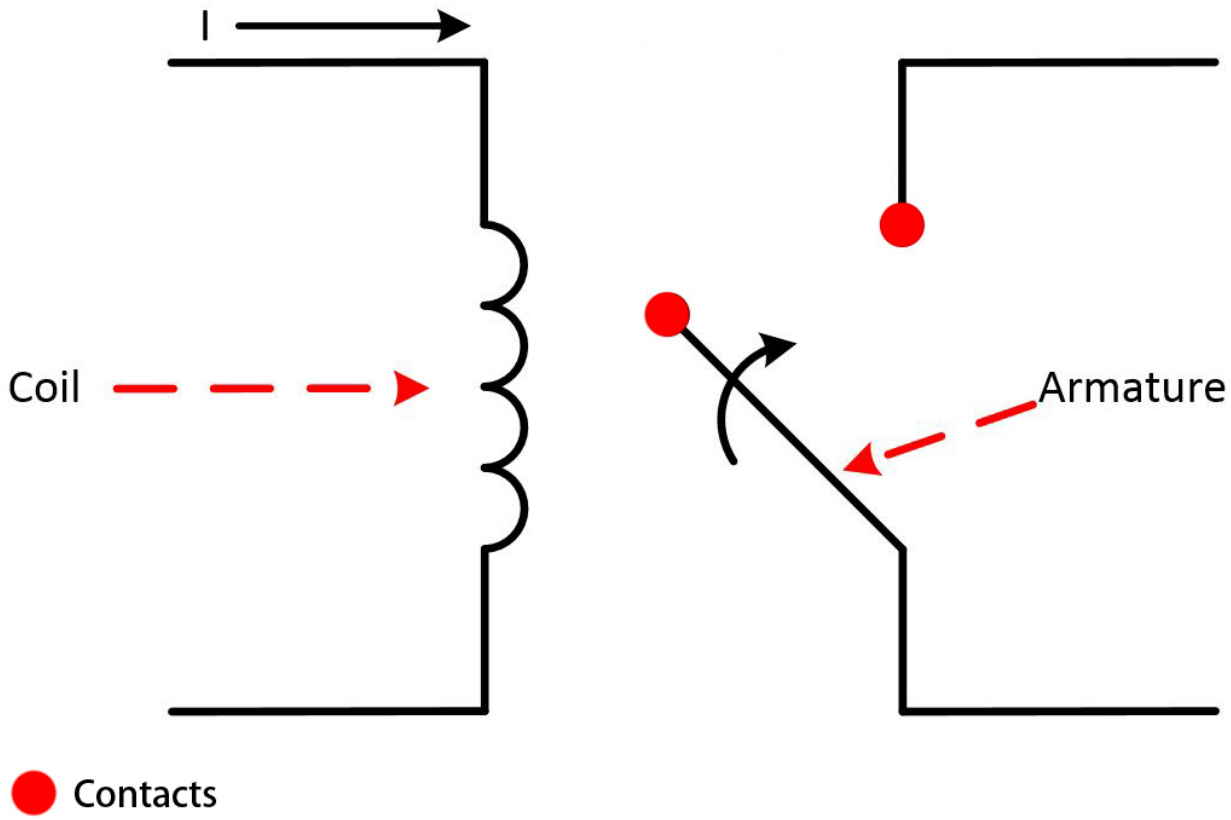


Figure 5. *Electromechanical Relay*

When the coil is energized, the induced magnetic field moves the armature, which opens or closes the contact.

Advantage and Disadvantage

Advantage:

- Able to withstand large inrush currents
- High mechanical structure reliability, not susceptible to external electromagnetic environment
- Cheap and cost-effective
- Relatively speaking, it can carry high voltage, high current load

Disadvantage:

- Electromechanical relays are slower than other types of relays, typical switch and settle in 5 to 15 ms
- Larger package sizes, not suitable for size sensitive occasions
- In general, Electromechanical relays have a shorter life than other types of relays due to mechanical wear

Solid State Relays

Principle

Solid State Relays is also known as SSR, which is an electronic switching device that switches on or off when a small external voltage is applied across its control terminals. Solid state relays typically use semiconductor devices to switch the conduction and disconnection of high voltage loads. Normally a Solid State Relay is consisted of a LED driver and a photosensitive MOSFET. When the trigger signal comes the LED light up to actuate the photosensitive MOSFET, then the high voltage circuit will be turned on.

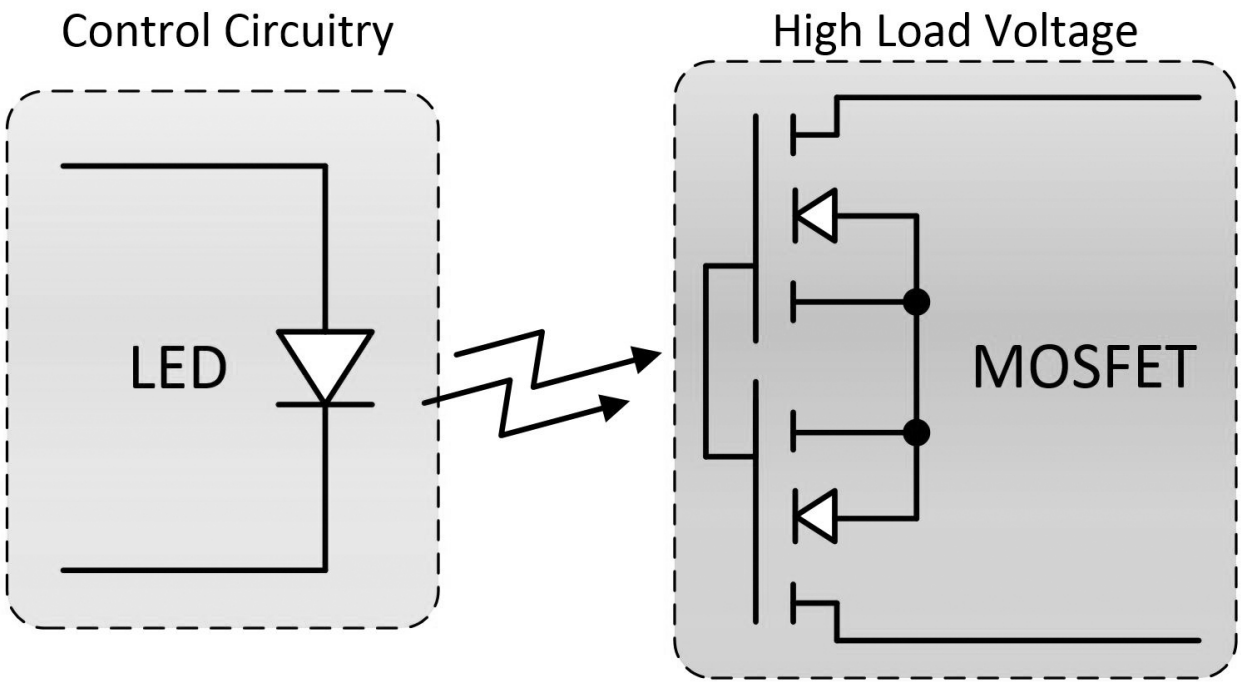


Figure 6. *Solid State Relay*

Advantage and Disadvantage

Advantage:

- Fast switching speed, the switching time is dependent on the time required to power the LED on and off—approximately 1 ms and 0.5 ms. For instand the G3MC202p serial SSR we use is 1/2 of load power source cycle +1 ms.
- Totally silent operation, almost no noise
- No physical contacts means no sparking, allows it to be used in explosive environments, where it is critical that no spark is generated during switching.
- Increased lifetime, even if it is activated many times, as there are no moving parts to wear and no contacts to pit or build up carbon
- Compact, thin-profile SSR of monoblock construction with an all-in-one lead frame incorporates a PCB, terminals and heat sink, which is much smaller than mechanical relays, and can integrate more channels
- Not susceptible to physical shock

Disadvantage:

- Contact resistance is relatively large, usually above 100 ohms, which will generat more heat, so it need to be used with fan heat.
- High cost and low cost performance
- Only works for AC laod

!!!Tips Please note that some kind of solid state relays support DC load, but all the solid state relays currently sold by seeed do not support DC load.

Reed Relays

Principle

Reed relays are switches that use electromagnets to control one or more reed switch. The contacts are of magnetic material and the electromagic acts directly on them without requiring an armature to move them. Sealed in a long, narrow glass tube, Fill the glass tube with inert gas so that the contacts are protected from corrosion.

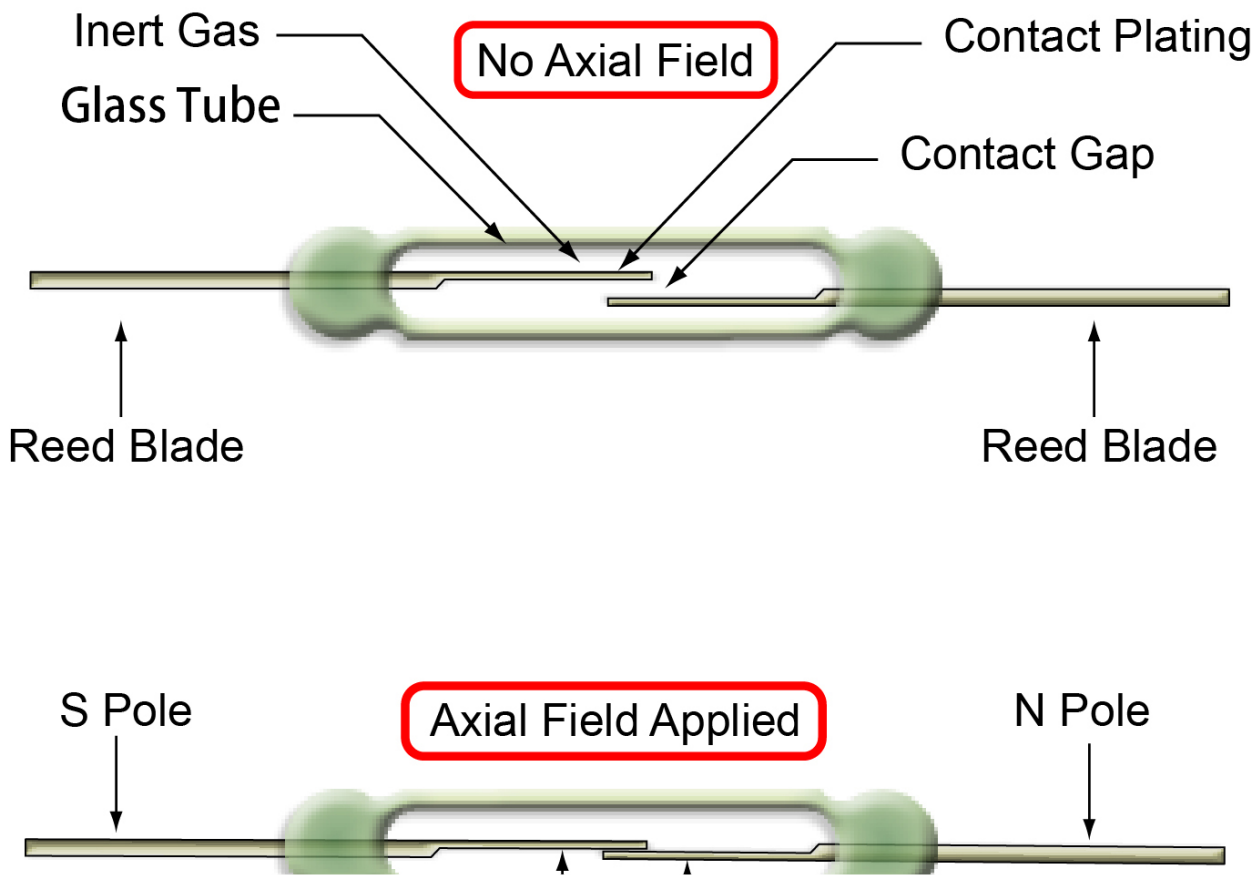


Figure 7. *Reed Relay*

As shown in Figure 7, there is no axial magnetic field generated when there is no trigger signal excitation, the reed blade will be disconnected because of the rigidity. When the signal is triggered, a transverse magnetic field will be generated and the reed will be magnetized. One contact turns N pole and the other turns S pole, they will be connected.

Advantage and Disadvantage

Advantage:

- Low power consumption, small size
- Because it is sealed in an inert gas, very little affected by environmental factors such as temperature and humidity , high environmental adaptability
- Switching speed is fast, about 10 times higher than electromechanical relay

Disadvantage:

- Low load voltage and low current
- Susceptible to inductive loads

!!!Note If you need to use reed relay with an inductive load (such as a motor), you need to add a protection circuit between the relay and the load.

Special Function Relays

In addition to the typical relays described above, we have several special-function relays in our website.

1.Relay Shield v3.0

We also provide a relay shield for arduino, this shield integrates four mechanical relays, can carry 8A, 30V load.

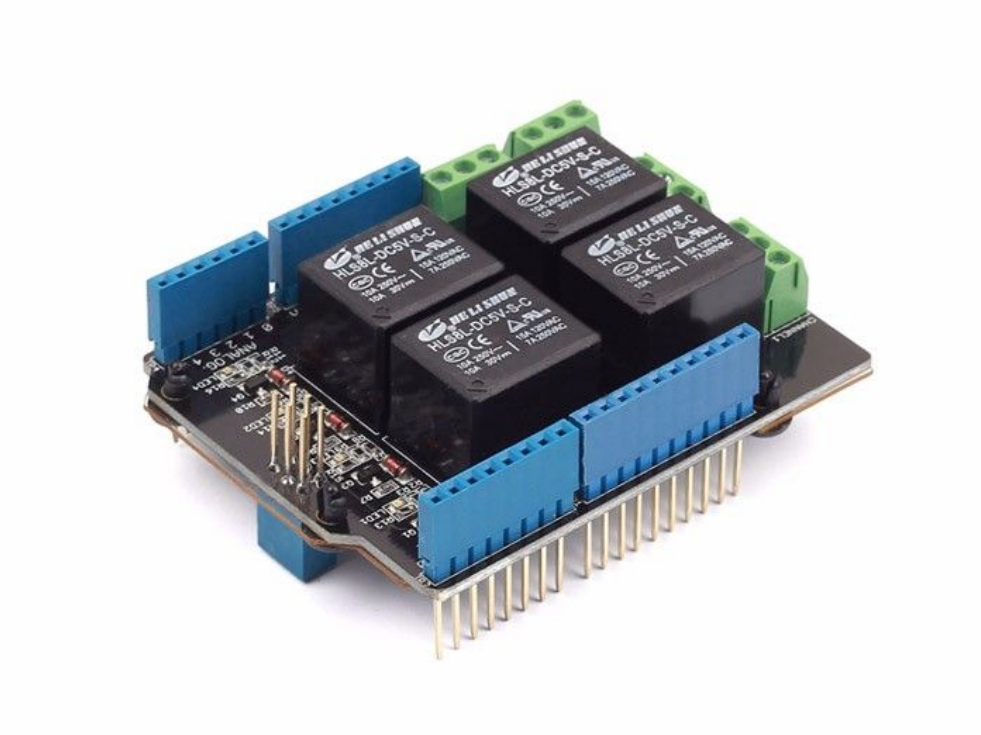


Figure 8. *Relay Shield, you can click this figure to check*

2.Heelight Relay

You can control the relay through a sound command, isn't it interesting!?

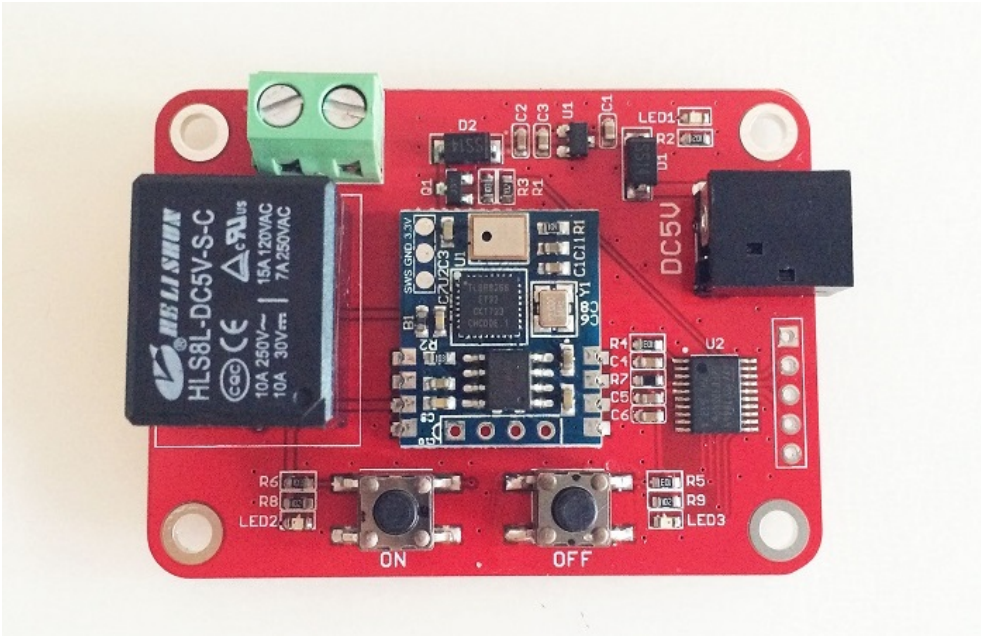


Figure 9. *Heelight Relay, you can click this figure to check this magic relay*

3.315MHz Codec-Adaptive Wireless Relay

A wireless relay is a codec-adaptive RF receiver with single channel relay.

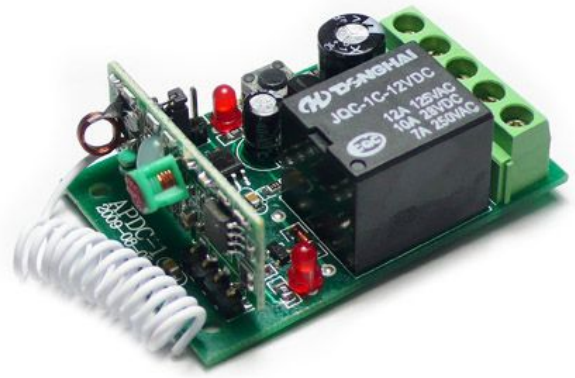


Figure 10. *Wireless Relay, you can click this figure to check*

Resource

- **[PDF]** Seeed Relay Page PDF Version
- **[ZIP]** Seeed Relay Module Datasheet

Tech Support

Please do not hesitate to contact techsupport@seeed.cc if you have any technical issue. Or submit the issue into our forum.