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 seeed relay quick selection diagram.

![Seeed Relay Selection Guide](image)

Figure 1. Seeed relay quick selection diagram, you can click the diagram to view the original file.
For more detail, please refer to the following table, perhaps, all you need is just a table.

Table 1. Seeed Relay Parameter

<table>
<thead>
<tr>
<th>Name</th>
<th>Thumbnail</th>
<th>Operate voltage</th>
<th>Input current</th>
<th>Rated load</th>
<th>Contact resistance</th>
<th>Insulation resistance</th>
<th>Operate time</th>
<th>Release time</th>
<th>Input interface</th>
<th>Type</th>
<th>Click to buy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grove - Relay</td>
<td></td>
<td>3.3V-5V</td>
<td>100mA</td>
<td>5A@250VAC</td>
<td>5A@30VDC</td>
<td>50mΩ @6VDC 1A</td>
<td>100mΩ</td>
<td>10ms Max.</td>
<td>5ms Max.</td>
<td>Digital</td>
<td>Electromechanical</td>
</tr>
<tr>
<td>Grove - SPDT Relay(30A)</td>
<td></td>
<td>5V</td>
<td>185mA</td>
<td>30A@250VAC 30A@30VDC</td>
<td>100mΩ Max.</td>
<td>100mΩ Min.@500VDC</td>
<td>15ms Max.</td>
<td>10ms Max.</td>
<td>Digital</td>
<td>Electromechanical</td>
<td>Buy Now</td>
</tr>
<tr>
<td>Grove - 2-Channel SPDT Relay</td>
<td></td>
<td>5V</td>
<td>90mA</td>
<td>10A@250VAC 10A@30VDC</td>
<td>100mΩ Max.</td>
<td>100mΩ Min.@500VDC</td>
<td>10ms Max.</td>
<td>5ms Max.</td>
<td>Digital</td>
<td>Electromechanical</td>
<td>Buy Now</td>
</tr>
<tr>
<td>Grove - 4-Channel SPDT Relay</td>
<td></td>
<td>5V</td>
<td>90mA</td>
<td>10A@250VAC 10A@30VDC</td>
<td>100mΩ Max.</td>
<td>100mΩ Min.@500VDC</td>
<td>10ms Max.</td>
<td>5ms Max.</td>
<td>I2C</td>
<td>Electromechanical</td>
<td>Buy Now</td>
</tr>
<tr>
<td>Grove - Solid State Relay</td>
<td></td>
<td>3V-5V</td>
<td>16mA Min. 20mA Typ. 50mA Max.</td>
<td>4A@220VAC</td>
<td>1000MΩ</td>
<td>10ms 10ms</td>
<td>Digital</td>
<td>Solid State</td>
<td>Buy Now</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grove - Solid State Relay V2</td>
<td></td>
<td>4V-6V</td>
<td>2A@100VAC to 240VAC</td>
<td>1000MΩ Min.@500VDC</td>
<td>1/2 of load power source cycle + 1 ms max</td>
<td>1/2 of load power source cycle + 1 ms max</td>
<td>Digital</td>
<td>Solid State</td>
<td>Buy Now</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grove - 2-Channel Solid State Relay</td>
<td></td>
<td>4V-6V</td>
<td>2A@100VAC to 240VAC</td>
<td>1000MΩ Min.@500VDC</td>
<td>1/2 of load power source cycle + 1 ms max</td>
<td>1/2 of load power source cycle + 1 ms max</td>
<td>Digital</td>
<td>Solid State</td>
<td>Buy Now</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grove - 4-Channel Solid State Relay</td>
<td></td>
<td>4V-6V</td>
<td>2A@100VAC to 240VAC</td>
<td>1000MΩ Min.@500VDC</td>
<td>1/2 of load power source cycle + 1 ms max</td>
<td>1/2 of load power source cycle + 1 ms max</td>
<td>I2C</td>
<td>Solid State</td>
<td>Buy Now</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grove - 8-Channel Solid State Relay</td>
<td></td>
<td>4V-6V</td>
<td>2A@100VAC to 240VAC</td>
<td>1000MΩ Min.@500VDC</td>
<td>1/2 of load power source cycle + 1 ms max</td>
<td>1/2 of load power source cycle + 1 ms max</td>
<td>I2C</td>
<td>Solid State</td>
<td>Buy Now</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grove - 2-Coil Latching Relay</td>
<td></td>
<td>5V</td>
<td>1A@125VAV 3A@30VDC</td>
<td>50mΩ Max.</td>
<td>1000MΩ@500VDC</td>
<td>4.5ms Max.</td>
<td>3.5ms Max.</td>
<td>Digital</td>
<td>Electromechanical</td>
<td>Buy Now</td>
<td></td>
</tr>
<tr>
<td>Grove - Dry-Reed Relay</td>
<td></td>
<td>5V</td>
<td>0.1A@100VAC 0.5A@24VDC</td>
<td>150mΩ Max.</td>
<td>1000MΩ@500VDC @100VDC</td>
<td>1ms Max.</td>
<td>0.5ms Max.</td>
<td>Digital</td>
<td>Reed Relays</td>
<td>Buy Now</td>
<td></td>
</tr>
</tbody>
</table>

You can click the following button to download the zip file of both the diagram and the table.
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.

![Contact](image)

Figure 2. 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

![Pole and Throw](image)

Figure 3. SPST Relay

**SPDT (Single Pole Double Throw):**

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

![Pole, ThrowA, and ThrowB](image)

Figure 4. 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 terminal. For instance, you can refer to our 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.

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.

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 generate more heat, so it need to be used with fan heat.
• High cost and low cost performance
• Only works for AC load

!!!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 electromagnets 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.
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.
2. Heelight Relay

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

3.315MHz Codec-Adaptive Wireless Relay

A wireless relay is a codec-adaptive RF receiver with single channel relay.
Figure 11. Wireless Relay, you can click this figure to check

Resource
- [PDF] Seeed Relay Page PDF Version
- [ZIP] Seeed Relay Module Datasheet
- [ZIP] Seeed Relay Quick Selection Table&Diagram

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