Short form
RELAYS

On our Relays
Hardly any sector of the working or living space can exist without modern relay technology today. Panasonic Industry meets the various needs with a broad range of innovative and economical relays series.

After more than 40 years of experience at the forefront of relay innovation and development, Panasonic Industry today offers a portfolio of more than 2,000 electromechanical relay versions in the field of miniaturized relays - from ultra-miniature SMD signal relays to robust, compact industrial high power types.

With our new short form we’ll invite you to gain a quick and comprehensive overview on our new relay portfolio: our endurance runners, our innovations – and for sure the ones that suit your project.

About Panasonic Industry
As established part of the global Panasonic Corporation with long-grown and European relationships we strive for continuous innovation and share the company’s overarching purpose: Shaping the future for the better.

To take your ideas to the next level, we at Panasonic Industry research, develop and produce technologies and components for a vast range of industries. From full-custom batch-size 1 factory automation devices to next-gen electronic and electromechanical components manufactured in billions of units, our clear focus on innovation, performance and reliability sets the bar high in multiple market sectors – and trends.
Service & Support

Albeit the standard relay datasheet covers more than 80% of all applications, the paper can only cover a certain scope of values and parameters, mostly concerning worst case scenarios, for example in terms of temperature. When it comes to specific requests like switching 8A with a 6A relay, our laboratories in Germany are able to support you. Our engineers do not only perform lifetime tests but provide you with an in-depth view at the application parameters. In almost every case, there is a relay that fits your project, even if the datasheet wouldn't reveal it in the first place.

Application support is then followed by the analysis part: Continuous tests during production will ensure a high and constant quality level. When it comes to lifetime or customer related investigations, latest technology shows results about the condition, wear-out or remaining lifetime of relays. Finally, we encourage our customers to address our support in case of questions and claims. Resorting to many decades of experience, the reason of a relay fault is mostly found not the in the relay itself, but in the context of improper component decision or external factors like overcurrent, mechanical stress or hazardous materials.

Does this relay suit my idea? And if not - which one does?

Is it possible to switch 8A with a slim 6A relay?
Industrial Relays

- Proven, reliable, innovative and energy-efficient switching solutions

We find ourselves already in the midst of the next industrial revolution, which is not only a question of visions and ideas - but also of next-gen reliable and efficient components making a true difference in daily operations.

Get a glimpse on what Panasonic Industry has to offer in its latest portfolio of industrial relays – from circuit board connection types to plug-in or screw terminals, from low-level load switching to double-digit ampere values. Discover the variety of industrial switching.

Load switching capability ranges from low-level signals to double-digit ampere values.

Various connection types such as circuit boards, plug-in or screw terminals offer a large variety of options that are tailored to your application.
With a compact size and switching capability up to 2A, signal relays are used in a wide field of communication and security applications as well as in lighting, measurement or automation equipment.

Galvanic separation between control and load circuit and ruggedness against high inrush or voltage peaks (overload) makes them an ideal choice for any kind of application.

Even battery-driven or energy harvesting applications can benefit from the modern latching technology all signal relays offer. Power is only needed for few hundred milliseconds during on- or off-switching, in between the relays needs no energy to keep the state.
<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
</table>
| **AGN** | Compact slim body  
  » 1,500V FCC  
  » 2,500V Telcordia  
  » Twin crossbar contacts ensures high contact reliability  
  » High sensitivity 100mW type available | DC 1.5, 3, 4.5, 6, 9, 12V  
  Single side stable  
  140mW  
  230mW  
  Sensitive / 1 coil latching type  
  100mW  
  120mW | THT  
  SMD  |
| **AGQ** | Space saving flat body  
  » 1,500V FCC  
  » 2,500V Telcordia  
  » The use of twin crossbar contacts ensures high contact reliability  
  » Power type for 3.5A inrush current available | DC 1.5, 3, 4.5, 6, 9, 12V  
  Single side stable  
  140mW  
  230mW  
  Sensitive / 1 coil latching type  
  100mW  
  120mW | THT  
  SMD  |
| **TX** | 1,500V FCC  
  » 2,500V Telcordia  
  » 3 types of surface-mount terminals available | DC 1.5, 3, 4.5, 6, 9, 12V  
  Single side stable: 140mW  
  270mW  
  2 coil latching: 100mW  
  200mW  
  TX-TH high inrush type  
  Single side stable: 140mW  
  270mW  
  1 coil latching: 100mW  
  2 coil latching: 140mW  
  TX-D high insualtion type  
  Single side stable: 200mW  
  230mW  
  1 coil latching: 150mW  
  170mW  
  TX-S sensitive type  
  Single side stable: 50mW  
  70mW  
  1 coil latching: 35mW  
  50mW  
  2 coil latching: 70mW  
  150mW | THT  
  SMD  |
## Industrial Relays

### Series Features Coil Mounting (bottom view)

**TQ**

**SMD**

- Ultra low profile 5.8 mm
- Surge withstand 2,500V
- 3 types of surface-mount terminals available

<table>
<thead>
<tr>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 1.5, 3, 4.5, 5, 6, 9, 12V</td>
<td>SMD</td>
</tr>
<tr>
<td>140mW</td>
<td>200mW</td>
</tr>
<tr>
<td>Single side stable: 140mW</td>
<td>200mW</td>
</tr>
<tr>
<td>1 coil latching: 70mW</td>
<td>100mW</td>
</tr>
<tr>
<td>2 coil latching: 140mW</td>
<td>200mW</td>
</tr>
</tbody>
</table>

**TQ**

**THT**

- 1,500V FCC
- Low thermal electromotive force approx. 5 μV

<table>
<thead>
<tr>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 3, 4.5, 5, 6, 9, 12V</td>
<td>THT</td>
</tr>
<tr>
<td>140mW</td>
<td>200mW</td>
</tr>
<tr>
<td>Single side stable: 140mW</td>
<td>200mW</td>
</tr>
<tr>
<td>1 coil latching: 100mW</td>
<td>150mW</td>
</tr>
<tr>
<td>2 coil latching: 140mW</td>
<td>300mW</td>
</tr>
</tbody>
</table>

**DS1**

- 1,500V FCC

<table>
<thead>
<tr>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 1.5, 3, 5, 6, 9, 12, 24, 48V</td>
<td>THT</td>
</tr>
<tr>
<td>DC 3, 4.5, 5, 6, 9, 12V</td>
<td>SMD</td>
</tr>
<tr>
<td>120mW</td>
<td>200mW</td>
</tr>
<tr>
<td>Single side stable: 200mW</td>
<td>–</td>
</tr>
<tr>
<td>1 coil latching: 90mW</td>
<td>–</td>
</tr>
<tr>
<td>2 coil latching: 120mW</td>
<td>–</td>
</tr>
</tbody>
</table>

**HY**

- Non polarized type
- Gold clad twin contacts for superior contact reliability

<table>
<thead>
<tr>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 1.5, 3, 4.5, 6, 9, 12, 24V</td>
<td>THT</td>
</tr>
<tr>
<td>200mW</td>
<td>150mW</td>
</tr>
<tr>
<td>High sensitivity type 150mW</td>
<td>–</td>
</tr>
</tbody>
</table>

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**Power**

**Safety**

**High Capacity**

**High Frequency**

**Semiconductor**

**Automotive**

**Plug-in**

**High Voltage**
Power relays - the backbone of applications in countless contexts.
There are clear trends towards high power handling directly on the PCB – and towards polarized relay technology for low or (for the latching types) even zero energy consumption.
<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Breakdown voltage</th>
<th>Surge voltage</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSP</td>
<td>Miniature high sensitive power relay</td>
<td>DC 3, 5, 6, 9, 12, 24V</td>
<td>1,000Vrms</td>
<td>5,000V</td>
<td>THT Grid 2.54mm</td>
</tr>
<tr>
<td></td>
<td>High breakdown voltage</td>
<td>Single side stable &amp; 2 coil latching: 300mW</td>
<td>2,000Vrms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creepage &amp; clearance distance min. 3.5mm</td>
<td>1 coil latching: 150mW</td>
<td>3,000Vrms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Open contacts</td>
<td></td>
<td></td>
<td></td>
<td>PCB</td>
</tr>
<tr>
<td></td>
<td>Contact sets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contacts to coil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DK</td>
<td>Creepage &amp; clearance distance min. 8mm: DK2A-L1/L2 min. 6.8mm DK1A1B-L1/L2 min. 6.8mm</td>
<td>DC 3, 5, 6, 9, 12, 24V</td>
<td>1,000Vrms</td>
<td>10,000V</td>
<td>THT Grid 2.54mm</td>
</tr>
<tr>
<td></td>
<td>Single side stable &amp; 2 coil latching: 200mW</td>
<td>4,000Vrms</td>
<td>4,000Vrms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creepage &amp; clearance distance min. 8mm: DK2A-L1/L2 min. 6.8mm DK1A1B-L1/L2 min. 6.8mm</td>
<td>1 coil latching: 100mW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contact sets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contacts to coil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>Conforms to VDE0631</td>
<td>DC 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V</td>
<td>1,000Vrms</td>
<td>12,000V</td>
<td>THT Grid 2.54mm</td>
</tr>
<tr>
<td></td>
<td>Low coil power</td>
<td>Single side stable &amp; 2 coil latching: 200mW</td>
<td>4,000Vrms</td>
<td>5,000Vrms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High switching capacity:</td>
<td>1 coil latching: 100mW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16A = 25,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10A = 100,000 switching cycles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creepage &amp; clearance distance min. 8mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DW/</td>
<td>15.8mm low profile type available</td>
<td>DC 3, 5, 6, 9, 12, 24V</td>
<td>1,000Vrms</td>
<td>12,000V</td>
<td>THT PCB 3.50/7.50</td>
</tr>
<tr>
<td>DW-HL</td>
<td>HL inrush type available (TV-8 UL/C-UL)</td>
<td>1 coil latching: 200mW</td>
<td>5,000Vrms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IEC60335-1* compliant, PTI325V (VDE approved) type available</td>
<td>2 coil latching: 400mW</td>
<td></td>
<td></td>
<td>PCB 3.50/7.50</td>
</tr>
<tr>
<td></td>
<td>Creepage &amp; clearance distance min. 6mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PCB 3.50/7.50</td>
</tr>
</tbody>
</table>

**Industrial Relays** | **Power Relays**
### Industrial Relays | Power Relays

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Breakdown voltage</th>
<th>Surge voltage</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
</table>
| DJ-H   | Manual Lever Type  
> Creepage and clearance distance min. 8mm  
> High inrush current capacity ~ 500A  
> EN 60669 compliant | DC 5, 6, 9, 12, 24V  
1 coil latching: 1,000mW  
2 coil latching: 2,000mW | 1,500Vrms – 4,000Vrms | 12,000V | THT |
| DJ     | Optional available with manual testbutton  
> Creepage and clearance distance min. 8mm  
> Tungsten pre contact available | DC 5, 6, 12, 24, 48V  
Single side stable & 2 coil latching: 250mW  
1 coil latching: 150mW | 1,000Vrms – 4,000Vrms | 10,000V | THT |
| DZ-S   | IEC62055-31 UC3 compliant  
( short current 3,000 A)  
> High switching capacity 90 A 250 VAC (resistive load)  
> Twin contacts for low temperature rise | DC 5, 12, 24V  
1 coil latching: 1500mW  
2 coil latching: 3,000mW | 2,000Vrms – 4,000Vrms | 12,000V | Terminal mounting |
| ST     | High inrush capability, TV rating  
> Frictionless pivoted rotating armature  
> Socket available  
> Not for new applications  
> Creepage and clearance distance more than 3mm, approx. 4mm | DC 3, 5, 6, 9, 12, 24, 48V  
Single side stable & 2 coil latching: 240mW  
1 coil latching: 130mW | 1,200Vrms, 2,000Vrms, 3,750Vrms | 6,000V | THT |

**Series Features**
- Coil Breakdown voltage
- Surge voltage
- Mounting (bottom view)
## Industrial Relays | Power Relays

### Series Features

- **Coil**
  - Breakdown voltage
  - Surge voltage
  - Mounting (bottom view)

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Breakdown voltage</th>
<th>Surge voltage</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>5-layer contact for wide switching capacity range: 100µA...4A</td>
<td>DC 3, 5, 6, 12, 24, 48V</td>
<td>750Vrms</td>
<td>THT</td>
<td>PCB Grid 2.54mm</td>
</tr>
<tr>
<td></td>
<td>High vibration and shock resistance</td>
<td>Single side stable &amp; 2 coil latching: 200mW (48V: 271mW)</td>
<td>1,000Vms</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Low thermal electromotive force (approx. 3µV)</td>
<td>1 coil latching: 100mW (48V: 144mW)</td>
<td>1,500Vms</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Sockets available</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
</tbody>
</table>

- **Contacts**
  - Open contacts: 4 contacts
  - Contact sets: 1 contact
  - Contacts to coil: 2 contacts

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Breakdown voltage</th>
<th>Surge voltage</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>Polarized power relay with rotating armature</td>
<td>DC 3, 5, 6, 12, 24, 48V</td>
<td>1,500Vrms</td>
<td>THT</td>
<td>PCB Grid 2.54mm</td>
</tr>
<tr>
<td></td>
<td>High sensitivity</td>
<td>300mW</td>
<td>3,000Vms</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>High vibration and shock resistance</td>
<td></td>
<td>3,000Vms</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Socket available</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
</tbody>
</table>

- **Contacts**
  - Open contacts: 2 contacts
  - Contact sets: 1 contact
  - Contacts to coil: 2 contacts

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Breakdown voltage</th>
<th>Surge voltage</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>Ideal for compressor and inverter loads</td>
<td>DC 5, 6, 9, 12, 18, 24V</td>
<td>1,000Vrms</td>
<td>THT</td>
<td>PCB Grid 2.54mm</td>
</tr>
<tr>
<td></td>
<td>High insulation resistance</td>
<td>900mW</td>
<td>5,000Vms</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Inrush current: 102A/200V AC</td>
<td></td>
<td>10,000V</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>224A/100V AC</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>High surge withstand voltage</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Creepage and clearance distance</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>min. 8mm</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
</tbody>
</table>

- **Contacts**
  - Open contacts: 1 contact
  - Contact sets: 1 contact
  - Contacts to coil: 1 contact

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Breakdown voltage</th>
<th>Surge voltage</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF-G</td>
<td>Ideal solar inverters</td>
<td>DC 9, 12, 18, 24V</td>
<td>2,500Vrms</td>
<td>THT</td>
<td>PCB Grid 2.54mm</td>
</tr>
<tr>
<td></td>
<td>Contact gap: 1.5 mm / 1.8 mm</td>
<td>1,400mW</td>
<td>4,000Vms</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Compliant with IEC62109 and VDE0126</td>
<td></td>
<td>6,000V</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Inrush current: 102A/200V AC</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>224A/100V AC</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Creepage distance contact-coil: min. 9.5mm</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Clearance distance contact-coil: min. 6.5mm</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

- **Contacts**
  - Open contacts: 1 contact
  - Contact sets: 1 contact
  - Contacts to coil: 1 contact

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Breakdown voltage</th>
<th>Surge voltage</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ideal for solar inverters</td>
<td>DC 9, 12, 18, 24V</td>
<td>2,500Vrms</td>
<td>THT</td>
<td>PCB Grid 2.54mm</td>
</tr>
<tr>
<td></td>
<td>Contact gap: 1.5 mm / 1.8 mm</td>
<td>1,400mW</td>
<td>4,000Vms</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Compliant with IEC62109 and VDE0126</td>
<td></td>
<td>6,000V</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Inrush current: 102A/200V AC</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>224A/100V AC</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Creepage distance contact-coil: min. 9.5mm</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Clearance distance contact-coil: min. 6.5mm</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
## Series Features

**LZ / LZ-N**
- Low profile relay (15.7mm)
- EN60335-1 GWT compliant
- Ambient temperature up to 105°C
- Creepage and clearance distance min. 10mm

**Dimensions:** 28.8 x 12.5 x 15.7 mm

- **Coil:** DC 5, 9, 12, 18, 24V (LZ 48V)
- **Breakdown voltage:** 400mW
- **Surge voltage:** 1,000Vrms to 5,000Vrms
- **Mounting:** THT, PCB
- **Data:** UL, VDE

**LQ**
- Low power consumption
- F-coil type for 105°C ambient temperature available
- Creepage and clearance distance: 1a: min. 4.55 mm, 1c: min. 3.53 mm

**Dimensions:** 20 x 10 x 16 mm

- **Coil:** DC 5, 6, 9, 12, 18, 24V
- **Breakdown voltage:** 200mW (1a), 400mW (1c)
- **Surge voltage:** 1,000Vrms (1a), 750Vrms (1c)
- **Mounting:** THT, PCB
- **Data:** UL, VDE

**JW**
- Class B coil insulation types available
- Creepage and clearance distance min. 8mm between contacts and coil (for 2 changeover contacts min. 7.5mm)
- Universal terminal footprint

**Dimensions:** 28.6 x 12.8 x 20 mm

- **Coil:** DC 5, 6, 9, 12, 18, 24, 48V
- **Breakdown voltage:** 530mW
- **Surge voltage:** 1,000Vrms (2a, 2c), 3,000Vrms (2a, 2c), 5,000Vrms (2a, 2c)
- **Mounting:** THT, PCB
- **Data:** UL, VDE, TÜV, CSA, SEV, SEMKO

**LD-P**
- Slim type: width 7mm
- Creepage and clearance distance min. 6mm
- EN60995 (GWIT2-11, GWIT2-12, GWIT2-13) data available

**Dimensions:** 20.3 x 7 x 15 mm

- **Coil:** DC 5, 6, 9, 12, 18, 24V
- **Breakdown voltage:** 200mW
- **Surge voltage:** 750Vrms to 4,000Vrms
- **Mounting:** THT, PCB
- **Data:** UL, VDE, CQC, SEV, TÜV, UL, VDE

---

**Power Relays**

- Short form RELAYS
- Power
- Plug-in
- Automotive
- Semiconductor
- High Frequency
- Safety
- High Capacity
- Industrial Relays

---

**Components**

- Plug-in Automotive Semiconductor High Frequency Safety
- High Voltage Power
- High Capacity Signal
## Series Features

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
</tr>
</thead>
</table>
| PA-N   | - High density mounting  
          - Low operating power  
          - Complies with IEC61010 reinforced insulation standards  
          - Insulation distance: 5.29mm clearance, 5.35mm creepage  
          - Complies with Standard for Hazardous Location (ANSI/ISA 12.12.01) |
| PF     | - Slim size permits high density mounting  
          - Slim relay for grid applications  
          - Insulation construction conforms to VDE0700  
          - Gold flash or gold-clad contacts available  
          - Clearance distance min. 6.0mm  
          - Creepage distance min. 8mm  
          - Bent pin type available  
          - EN60335-1, clause 30 (GWT) approved |

### Breakdown voltage

<table>
<thead>
<tr>
<th>Coil</th>
<th>DC 3, 4.5, 5, 6, 9, 12, 18, 24V</th>
<th>110mW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Breakdown voltage</td>
<td>Surge</td>
</tr>
<tr>
<td></td>
<td>1,000Vrms - 3,000Vrms 6,000V</td>
<td></td>
</tr>
</tbody>
</table>

### Mounting (bottom view)

- **PA-N**
  - PCB 30 x 5 x 12.5mm  
  - 1A 10mA 110V DC 250V AC  
  - UL / C-UL TÜV  
  - 110V DC 250V AC 5A  
  - THT  

- **PF**
  - PCB 28 x 5 x 15mm  
  - 1A 10mA 110V DC 250V AC  
  - CSA UL / C-UL VDE  
  - 250V AC 300V DC 6A  
  - THT  

---

**Industrial Relays**

**Power Relays**

**Short form RELAYS**

**Plug-in Automotive**

**Semiconductor**

**High Voltage**

**High Frequency**

**Safety**

**High Capacity**

**Power**

---
High Capacity Relays

Our energy grid is changing. Decentralized power generation like wind engines or solar panels on each building require new ways to handle and distribute the current that keeps our modern life running.

In addition, e-mobility solutions bring high power applications to each and everyone. To miniaturize this technology - and to make it affordable, HE relays are designed to bring the high power handling on the PCB – without wiring, with improved reliability and low power losses.

“Extremely low power dissipation at the contacts is achieved by reducing the contact resistance down to 0.4mΩ.”
## Industrial Relays | High Capacity Relays

### HE-S

**Series**: HE-S  
**Features**:  
- High-capacity and long life  
- 170mW coil holding power for energy saving  
- Contact gap: 3.2mm  
- Safety: Mirror contact mechanisms according to IEC 60947-4-1  

**Coil**: DC 6, 9, 12, 24, 48V  
**Breakdown voltage**:  
- 1,880mW  
- 2,000Vrms  
- 5,000Vrms (between coil and Form A contacts)  
- 10,000V  

**Mounting (bottom view)**: THT  
**Recommended PC board pattern (Bottom view)**:  

### HE-Y5/HE-PV

**Series**: HE-Y5/HE-PV  
**Features**:  
- Compliant with European photovoltaic standard VDE0126  
- Compliant with EN61810-1 2.5kW surge breakdown voltage (between contacts)  
- Contact gap 2.5mm  
- Only 310mW holding power  

**Coil**: DC 6, 9, 12, 24V  
**Breakdown voltage**:  
- 1,920mW  
- 2,000Vrms  
- 5,000Vrms  
- 10,000V  

**Mounting (bottom view)**: THT  
**Top mounting**:  

### HE-Y6

**Series**: HE-Y6  
**Features**:  
- Compliant with European photovoltaic standard VDE0126  
- Compliant with EN61810-1 2.5kW surge breakdown voltage (between contacts)  
- Contact gap 3.0mm  
- Only 310mW holding power  

**Coil**: DC 6, 9, 12, 24V  
**Breakdown voltage**:  
- 1,920mW  
- 2,000Vrms  
- 5,000Vrms  
- 10,000V  

**Mounting (bottom view)**: THT  
**Top mounting**:  

---

**High Capacity Relays**  
**Short form RELAYS**  
**Plug-in Automotive Semiconductor High Frequency Safety High Voltage Power High Capacity Signal**
<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Breakdown voltage</th>
<th>Surge voltage</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
</table>
| HE-Y7  | - For inverter, battery charger, battery storage  
- Contact gap 3.6mm  
- Only 400mW holding power  
- Very low contact resistance  
- Creepage & clearance distance min. 10.55mm | DC 6, 9, 12, 24V  
2,500mW | 2,000Vrms  
- 5,000Vrms | 10,000V | THT  
Top mounting |
| HE-V   | - Max. 1,000V DC, 20A cutoff  
- Coil holding power 210mW  
- Protective construction: Flux-resistant type  
- Contact gap: min. 3.0mm  
- Clearance distance min. 8mm  
- Creepage distance min. 9.6mm | DC 6, 9, 12, 15, 24V  
1,920mW | 2,000Vrms  
4,000Vrms  
5,000Vrms | 10,000V | THT  
PCB |
| HE-R   | - Compliant IEC 62965  
- 1b mirror contact structure  
- Contact gap 3.6mm  
- Only 490mW holding power  
- Creepage / clearance >8.0mm  
- Low operation noise 61dB | DC 6, 9, 12, 24V  
4,000mW | 2,000Vrms  
- 5,000Vrms | 10,000V | THT |
## Industrial Relays | High Capacity Relays

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Breakdown voltage</th>
<th>Surge voltage</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
</table>
| EP     | - Max. cut-off current 2,500A/300VDC (300A type)  
        - Max. 1,000VDC contact voltage  
        - Low operating noise  
        - High contact reliability  
        - DC type with sealed capsule |  |  |  |  |

### EP Series

1. **10A**
   - **Coil:** DC 24, 48V
   - **Power:** 1.24W
   - **Breakdown voltage:** 2,500Vrms
   - **Mounting hole:** 2-4.2 dia. ±0.1

2. **20A**
   - **Coil:** DC 12, 100V
   - **Power:** 3.9W
   - **Breakdown voltage:** 2,500Vrms
   - **Mounting hole:** 2-6 dia. ±0.2

3. **80A**
   - **Coil:** DC 12, 100V
   - **Power:** 4.2W
   - **Breakdown voltage:** 2,500Vrms
   - **Mounting hole:** 3-6 dia.

4. **200A**
   - **Coil:** DC 12, 100V
   - **Power:** 6.0W
   - **Breakdown voltage:** 2,500Vrms
   - **Mounting hole:** 3-6 dia.

5. **300A**
   - **Coil:** DC 12, 100V
   - **Power:** 40W
   - **Breakdown voltage:** 2,500Vrms
   - **Mounting hole:** 3-6 dia.
In relays designed according to the standard EN 61810-3, the contacts are interconnected in such a way that in case of failure, e.g. when a load contact for a motor welds, the corresponding forcibly guided contacts are blocked. Redundancy in the circuit can, for example, allow a motor to be shut off whereby the blocked contact prevents the motor from being turned on again because the release circuit is not closed.

What this boils down to is, that relays with forcibly guided contacts are usually power relays with several NO (1a) and NC (1b) contacts (minimum 1a1b) that comply with the relay standards EN 61810-1 and EN 61810-3. This technology guarantees defined and hence safe operating conditions in the event of a failure.
### Industrial Relays

#### SFM

- **Series**: SFM
- **Features**:
  - Extremely low height
  - Low holding power (100mW)
  - High shock resistance >20g
  - Reinforced insulation ≥ 5.5mm (V=230V overvoltage category III, 6kV) on NO side
  - Ambient temperature -40 to +85°C
  - Tape & Reel available
- **Coil**:
  - DC 3, 5, 12, 16, 18, 21, 24V
  - 270mW
- **Breakdown voltage**:
  - 1,500Vrms
  - 2,500Vrms for NC side
  - 4,000Vrms for NO side
- **Surge voltage**:
  - 270mW
- **Mounting (bottom view)**:
  - THT

#### SFY

- **Series**: SFY
- **Features**:
  - Gold clad contacts on request
  - Reinforced insulation according to EN 50178, creepage and clearance distance 25.5mm (V=230V overvoltage category III, 6kV)
  - Ambient temperature -40 to +85°C
  - Tested as sealed device according to IEC / EN 60079-15:2010 clause 22.5 (VDE)
- **Coil**:
  - DC 5, 12, 18, 21, 24V
  - 670mW
- **Breakdown voltage**:
  - 1,500Vrms
  - 4,000Vrms
- **Mounting (bottom view)**:
  - THT

#### SFS

- **Series**: SFS
- **Features**:
  - Slim profile reduces mounting area
  - PC board sockets available
  - DIN-rail terminal sockets available
  - RTIi (IP54), RTIi 4pole on request
  - Ambient temperature -40 to +85°C
  - LED indication type available
- **Coil**:
  - DC 12, 18, 21, 24, 48V
  - 360mW (4pole)
  - 500mW (6pole)
- **Breakdown voltage**:
  - 2,500Vrms
  - 4,000Vrms
- **Mounting (bottom view)**:
  - THT
### Series Features Coil

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Breakdown voltage</th>
<th>Surge voltage</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
</table>
| SFN4D  | + EN 61810-3, Type B safety double contact  
+ Reinforced insulation, creepage and clearance distance 5.5mm | DC 5, 9, 12, 16, 18, 21, 24, 36, 48, 60V  
390mW (5 - 24V)  
420mW (36 - 60V) | 2,500Vrms  
4,000Vrms  
5,000Vrms | [THT](#)  
PCB Grid 2.5mm | [Go To Overview](#) |
| SF     | + SF4D: EN 61810-3, Type B safety double contact  
+ SF2D: EN 61810-3, Type A safety double contact  
+ SF3: EN 61810-3, Type A  
+ For applications according to EN 50155  
+ IEC/EN 60335-1 (GWT) available | DC 5, 9, 12, 16, 18, 21, 24, 36, 48, 60V  
500mW | 2,500Vrms  
4,000Vrms  
5,000Vrms | [THT](#)  
RTIII  
3a1b  
2a2b  
4a4b  
TÜV  
UL  
CSA  
8A  
N.O.  
8A  
N.C.  
400V DC  
400V AC | [Go To Overview](#) |
Microwave devices can be classified into relays and coaxial switches which handle high frequency signals above several 100MHz. These devices are frequently used in the field of test and measurement equipment, wireless devices and base stations. Panasonic Industry has a wide range of relays and coaxial switch products for various frequency bands. Features include low insertion loss, high isolation, and low VSWR for impedance matching.

<table>
<thead>
<tr>
<th>High Frequency Relays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microwave devices can be classified into relays and coaxial switches which handle high frequency signals above several 100MHz. These devices are frequently used in the field of test and measurement equipment, wireless devices and base stations. Panasonic Industry has a wide range of relays and coaxial switch products for various frequency bands. Features include low insertion loss, high isolation, and low VSWR for impedance matching.</td>
</tr>
</tbody>
</table>
## Industrial Relays | High Frequency Relays

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
</table>
| ARD    | » Long life  
       » Stable contact resistance  
       » High sensitive coaxial switch | DC 4.5, 5, 12, 24V  
       Fail-safe (with or without indicator)  
       Latching (with or without indicator)  
       Latching with TTL driver (with self cut-off function, with or without indicator) | SMA (SMD) |
| ARJ    | » Shielded HF relay  
       » HF characteristics at 5GHz:  
         Isolation min. 35dB  
         Isolation min. 30dB between contact sets  
       » Insertion loss max. 0.5dB  
       » V.S.W.R. max. 1.25 | DC 3, 4.5, 12, 24V  
       Single side stable: 200mW  
       2 coil latching: 150mW | THT (SMD) |
| ARN    | » 150W carrying power at 2GHz  
       » HF characteristics at 2GHz:  
         Isolation min. 55dB  
         Insertion loss max. 0.12dB  
       » V.S.W.R. max. 1.15 | DC 4.5, 12, 24V  
       Single side stable: 300mW  
       2 coil latching: 400mW | SMD |

---

**Series Features Coil Mounting (bottom view)**
ARD  
34 x 13.2 x 40mm  
32 x 32 x 40mm  
80 x 80 x 40.5mm  
» Long life  
» Stable contact resistance  
» High sensitive coaxial switch  
» Shielded HF relay  
» HF characteristics at 5GHz:  
  Isolation min. 35dB  
  Isolation min. 30dB between contact sets  
» Insertion loss max. 0.5dB  
» V.S.W.R. max. 1.25

**Coil**
DC 4.5, 5, 12, 24V  
Fail-safe (with or without indicator)  
Latching (with or without indicator)  
Latching with TTL driver (with self cut-off function, with or without indicator)

**Mounting (bottom view)**
SMA (SMD)  
THT (SMD)  
SMD
### ARS Series

<table>
<thead>
<tr>
<th>Features</th>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>» A or Y layout</td>
<td>DC 3, 4.5, 9, 12, 24V</td>
<td>THT, SMT</td>
</tr>
<tr>
<td>» 10W at 3GHz contact carrying power</td>
<td></td>
<td></td>
</tr>
<tr>
<td>» Silent Type available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>» HF characteristics @ 3GHz (50Ω PCB type):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>» Isolation min. 35dB</td>
<td></td>
<td>50Ω PCB type</td>
</tr>
<tr>
<td>» Insertion loss max. 0.35dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>» V.S.W.R. max. 1.4</td>
<td></td>
<td>2.54, 6.35, 50</td>
</tr>
</tbody>
</table>

### ARA Series

<table>
<thead>
<tr>
<th>Features</th>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>» SMD</td>
<td>DC 1.5, 3, 4, 5, 6, 9, 12, 24, 48V</td>
<td>THT, SMT</td>
</tr>
<tr>
<td>» Single side stable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>» HF characteristics at 1GHz:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>» Isolation min. 30dB</td>
<td></td>
<td>2.54, 2.00</td>
</tr>
<tr>
<td>» Insertion loss max. 0.3dB</td>
<td></td>
<td>0.3, 2.00, 14.0</td>
</tr>
<tr>
<td>» V.S.W.R. max. 1.2</td>
<td></td>
<td>earth</td>
</tr>
</tbody>
</table>

**Notes:**
- RTIII: 1 coil latching, 2 coil latching
- 14 x 8.6 x 7mm
- 14 x 8.6 x 8mm
- A or Y layout
- 10W at 3GHz contact carrying power
- Silent Type available
- HF characteristics @ 3GHz (50Ω PCB type):
  - Isolation min. 35dB
  - Insertion loss max. 0.35dB
  - V.S.W.R. max. 1.4
- DC 3, 4.5, 9, 12, 24V
- Single side stable / 1 coil latching: 200mW
- 2 coil latching: 400mW
- 50Ω PCB type
- 2.54, 6.35, 50
- 50Ω SMT type
- 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
- 140mW (1.5 - 12V)
- 200mW (24V)
- 300mW (48V, only single side stable)
- 1 coil latching: 70mW (1.5 - 12V)
- 100mW (24V)
Semiconductor
Relays

- **Maximum service life - many application purposes**

Panasonic Industry offers a wide range of PhotoMOS® relays for use in telecommunication, measurement, security devices and industrial control.

The power MOSFET’s output acts as a pure ohmic resistance thus distinguishing the PhotoMOS® from an optocoupler or triac solution, since no saturation voltage or offset voltage is required.

PhotoMOS® relays with a MOSFET output enjoy an almost unlimited lifetime if used according to the specifications. Moreover, they are extremely reliable, unaffected by vibration, and their On-resistance remains stable throughout their entire lifetime. In addition to our broad product line-up for the industrial market, automotive-qualified types are also available.
PhotoMOS®

Overview

- **Slim & Power**
  - Power High Capacity type
  - Power DC only type
  - Power AC/DC dual use type

- **Flat & Power**
  - PD type

- **Low on-resistance**
  - HF DC only type
  - HF AC/DC dual use type
  - HE type

- **Low on-resistance & Economical**
  - GU type
  - GE type
  - HS type

- **Low on-resistance & Low output capacitance**
  - RF type

- **Low current consumption & Guaranteed performance at high temperature**
  - CC type

- **Automotive | EV Isolation Monitoring**
  - AU type

Legend:
- **PD**: Power DIP
- **HF**: High Functioned
- **HE**: High functioned and Economical
- **RF**: Radio Frequency
- **GU**: General Use
- **GE**: General use and Economical
- **HS**: High Sensitivity
- **CC**: Capacitor Coupled
- **AU**: Automotive
Semiconductor Relays | PhotoMOS®

Product key & Packages

Channel configuration
- S: 4 channels
- Y: 1 channel
- W: 2 channels
- V: 3 channels
- Z: 1 channel

Output configuration
- 1: Form A (AC/DC)
- 2: Form A (DC)
- 4: Form A (AC/DC)
- 6: Form A & Form B (AC/DC)

Load voltage
- 0: 150V
- 1: 250V
- 2: 600V
- 3: 600V
- 4: 200V
- 5: 1000V

Driving method
- N: Current-sensitive
- F: Small size type voltage-sensitive

Feature
- D: Power type
- E: Economical

I/O isolation voltage
- A: Normal open
- B: Normal closed

Type
- 0: HF type Low on-resistance
- 1: GU type Low on-resistance & Economical
- 2: RF type Low on-resistance & Economical
- 3: HS type High sensitivity
- 4: HE type Low on-resistance & Economical
- 5: HE type Low on-resistance & Economical
- 6: KH type Low on-resistance & Economical
- 7: PD type Low and power
- 8: PD type Power

Current limit function
- K: With short circuit protection
- L: With current limiting

Package
- A: DIP (surface mount terminal)
- B: SSOP (SIL4pin)
- C: SOP (SOP6pin)
- D: CC type

Packing style
- X: Tape and reel (BOS/SOP)
- Y: Tape and reel (BOS/SOP)
- Z: Tape and reel (BOS/SOP)

Valid only for combinations of products listed in the catalog (see “TYPES” in this catalog). Please inquire regarding combinations with products not listed in this catalog.
### Series Features Output

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>40V</th>
<th>60V</th>
<th>100V</th>
<th>200V</th>
<th>350V</th>
<th>400V</th>
<th>600V</th>
</tr>
</thead>
<tbody>
<tr>
<td>GU</td>
<td>Wide product range for most applications&lt;br&gt;Reinforced insulation type available</td>
<td>0.15A</td>
<td>0.30</td>
<td>0.30</td>
<td>1.80</td>
<td>3.20</td>
<td>2.00</td>
<td>7.00</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE</td>
<td>Economic and Reinforced insulation</td>
<td>0.15A</td>
<td>0.30</td>
<td>0.30</td>
<td>1.80</td>
<td>3.20</td>
<td>2.00</td>
<td>7.00</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>HS</td>
<td>Low LED operate current</td>
<td>0.15A</td>
<td>0.30</td>
<td>0.30</td>
<td>1.80</td>
<td>3.20</td>
<td>2.00</td>
<td>7.00</td>
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</tr>
<tr>
<td>RF</td>
<td>Very good RF characteristics&lt;br&gt;Low signal loss</td>
<td>0.15A</td>
<td>0.30</td>
<td>0.30</td>
<td>1.80</td>
<td>3.20</td>
<td>2.00</td>
<td>7.00</td>
</tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td>CC</td>
<td>Capacitor Coupled isolation type&lt;br&gt;Low On resistance, low output capacitance&lt;br&gt;High temperature range up to +105°C</td>
<td>0.15A</td>
<td>0.30</td>
<td>0.30</td>
<td>1.80</td>
<td>3.20</td>
<td>2.00</td>
<td>7.00</td>
</tr>
</tbody>
</table>
## Series Features Output

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AU</strong> Automotive</td>
<td>» Tested in accordance to AEC-Q101</td>
<td>60V 4.5A (0.005)</td>
</tr>
<tr>
<td></td>
<td>» Optimized for Isolation Monitoring &amp; HV measurement</td>
<td>0.85/uni037A</td>
</tr>
<tr>
<td><strong>Power</strong> Slim &amp; Power</td>
<td>» High Current in SIL package</td>
<td>60V DC 3A (0.003)</td>
</tr>
<tr>
<td></td>
<td>» Voltage sensitive types</td>
<td>0.11/uni037A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200V DC 0.7A (0.010)</td>
</tr>
<tr>
<td><strong>PD</strong> Flat &amp; Power</td>
<td>» High Current in Power DIP package</td>
<td>60V DC 0.3A (0.001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.4A</td>
</tr>
<tr>
<td><strong>HF</strong> Low On Resistance</td>
<td>» High Functionality</td>
<td>40V DC 0.7A (0.020)</td>
</tr>
<tr>
<td></td>
<td>» AC and DC types</td>
<td>0.7A</td>
</tr>
<tr>
<td><strong>HE</strong> Low On Resistance &amp; Economical</td>
<td>» High Efficiency</td>
<td>30V 3.5A (0.025)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.025/uni037A</td>
</tr>
</tbody>
</table>

Go To Overview
<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APT</strong></td>
<td>» Phototric Coupler</td>
<td>600VAC 0.1A</td>
</tr>
<tr>
<td></td>
<td>DIP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOP</td>
<td></td>
</tr>
</tbody>
</table>
| **AQH** | » No derating up to +40°C  
|        | » SMD mounting | 600VAC 1.2A |
|        | DIP      |        |
| **AQG** | » Voltage Controlled  
|        | » Integrated Snubber Circuit | 230VAC 2A |
|        | SIL      |        |
| **AQ1** | » Voltage Controlled  
|        | » Heat Sink ready | 230VAC 10A |
|        | SIL      |        |
| **AQJ** | » Plug terminals  
|        | » Integrated Varistor | 230VAC 25A |
|        | Hockey-Puck |        |
| **AQA** | » Wide range input (3 – 30VDC)  
|        | » Screw terminals  
|        | » Status LED  
|        | » Integrated Varistor | 230VAC 40A | 1.00VDC 10A |
|        | Hockey-Puck |        |
Automotive Relays

- All Panasonic Industry Automotive relays comply with ISO / TS 16949.

Panasonic Industry has been contributing to the ever increasing need for innovation in transportation electronics for decades, with highly reliable, long lasting devices for transportation safety, comfort, entertainment and powertrain applications. There is continued effort within the transportation industry to balance societal and economic perspectives with the environment. Panasonic Industry continually supports these efforts with proven quality, a solid manufacturing organization and experienced engineering talent.
Modern automotive electric equipment and control technologies are a key aspect to achieve the safety, comfort and efficiency customers expect from a car nowadays. Discover how our relays and connectors meet the demand for sophisticated and sustainable automotive power and body control applications.

PCB Relays
### Overview

#### Height

<table>
<thead>
<tr>
<th>Capacity</th>
<th>30mm</th>
<th>25mm</th>
<th>15mm</th>
<th>10mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>20A</td>
<td>CJ</td>
<td>CT</td>
<td>TH</td>
<td>CJ</td>
</tr>
<tr>
<td></td>
<td>TE</td>
<td>(1a)</td>
<td>(1c)</td>
<td>(1a)</td>
</tr>
<tr>
<td></td>
<td>TB</td>
<td>(1a, 1c)</td>
<td>TH</td>
<td>(1a, 1c)</td>
</tr>
<tr>
<td>30A</td>
<td>CT-P</td>
<td>CN-M</td>
<td>CN-H</td>
<td>CP-P</td>
</tr>
<tr>
<td></td>
<td>TE</td>
<td>(1a, 1c)</td>
<td>(1a, 1c)</td>
<td>(1a, 1c)</td>
</tr>
<tr>
<td></td>
<td>TB-P</td>
<td>(1a)</td>
<td>(1a, 1c)</td>
<td>(1a, 1c)</td>
</tr>
<tr>
<td>35A</td>
<td>CJ</td>
<td>CT-P</td>
<td>CN-M</td>
<td>CN-H</td>
</tr>
<tr>
<td></td>
<td>TE</td>
<td>(1a)</td>
<td>(1a, 1c)</td>
<td>(1a, 1c)</td>
</tr>
<tr>
<td></td>
<td>TB-P</td>
<td>(1a)</td>
<td>(1a, 1c)</td>
<td>(1a, 1c)</td>
</tr>
<tr>
<td>40A</td>
<td>TL</td>
<td>(2a)</td>
<td>(2a)</td>
<td>(2a)</td>
</tr>
<tr>
<td>70A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Series</td>
<td>Features</td>
<td>Coil</td>
<td>Mounting (bottom view)</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>CT</strong></td>
<td>- Super miniature size &lt;br&gt;- ACT512 layout = layout of 2 x ACT112 &lt;br&gt;- H-bridge type available (twin relay) &lt;br&gt;- Quiet operation &lt;br&gt;- Pin in Paste (with vent hole) available &lt;br&gt;- Twin type as 8 pin or 10 pin version available</td>
<td>12V DC &lt;br&gt;800mW</td>
<td>THT&lt;br&gt;PBC,PiP&lt;br&gt;PiT&lt;br&gt;PiT</td>
<td></td>
</tr>
<tr>
<td><strong>CT Power</strong></td>
<td>- Super miniature size &lt;br&gt;- Footprint same as CT standard type &lt;br&gt;- Suitable for motor loads &lt;br&gt;- H-bridge type available (twin relay) &lt;br&gt;- Pin in Paste (with vent hole) available</td>
<td>12V DC &lt;br&gt;1000mW</td>
<td>THT&lt;br&gt;PBC,PiP&lt;br&gt;PiT&lt;br&gt;PiT</td>
<td></td>
</tr>
<tr>
<td><strong>TB</strong></td>
<td>- Super miniature size &lt;br&gt;- H-bridge type available (twin relay) &lt;br&gt;- Pin in Paste (with vent hole) available &lt;br&gt;- Lamp load type available</td>
<td>12V DC &lt;br&gt;1,440mW &lt;br&gt;(for pick-up max. 5.5V DC) &lt;br&gt;900mW &lt;br&gt;(for pick-up max. 6.5V DC) &lt;br&gt;640mW &lt;br&gt;(for pick-up max. 7.7V DC)</td>
<td>THT&lt;br&gt;PBC,PiP&lt;br&gt;PiT&lt;br&gt;PiT</td>
<td></td>
</tr>
<tr>
<td><strong>TB1P</strong></td>
<td>- Low power consumption &lt;br&gt;- Small board space &lt;br&gt;- Light weight</td>
<td>12V DC &lt;br&gt;480mW</td>
<td>THT&lt;br&gt;PBC,PiP&lt;br&gt;PiT&lt;br&gt;PiT</td>
<td></td>
</tr>
</tbody>
</table>
## Automotive Relays | PCB Relays

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
</table>
| **TL** | » 1 form U contact arrangement (double make)  
» Small board space  
» Light weight | 12V DC  
640mW  
(for pick-up max. 6.5V DC) | ![TL Mounting Diagram]  
14.0 x 9.2 x 14.0mm |
| **TE** | » Ultra small size, smallest in its class  
» High capacity in a compact body  
» H-bridge type available (twin relay)  
» Pin in Paste (with vent hole) available | 12V DC  
1,309mW  
(for pick-up max. 5.5V DC)  
900mW  
(for pick-up max. 6.5V DC)  
655mW  
(for pick-up max. 7.7V DC) | ![TE Mounting Diagram]  
12.0 x 7.2 x 13.5mm |
| **CJ** | » Ultra small size  
» High capacity in a compact body  
» H-bridge type available (twin relay)  
» Pin in Paste (with vent hole) available | 12V DC  
900mW  
High sensitive type 640mW | ![CJ Mounting Diagram]  
7.3 x 12.3 x 13.5mm |
| **CP** | » Very low profile  
» High capacity  
» 24V DC type available on request | 12V DC  
640mW | ![CP Mounting Diagram]  
14.0 x 13.0 x 9.5mm |
<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP POWER</td>
<td>» Very low profile</td>
<td>12V DC</td>
<td>THT</td>
</tr>
<tr>
<td></td>
<td>» Improved heat conduction by additional pin</td>
<td>450mW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>» Pin in Paste (with vent hole) available</td>
<td>640mW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1c</td>
<td>PCB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20A N.O.</td>
<td>16mA N.C.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16V</td>
<td></td>
</tr>
<tr>
<td>CP SMD</td>
<td>» Very low profile</td>
<td>12V DC</td>
<td>SMD</td>
</tr>
<tr>
<td></td>
<td>» High capacity</td>
<td>640mW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1c</td>
<td>SMT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20A N.O.</td>
<td>16mA N.C.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16V</td>
<td></td>
</tr>
<tr>
<td>TJ</td>
<td>» Compact flat type (height: 11.2mm)</td>
<td>12V DC</td>
<td>THT</td>
</tr>
<tr>
<td></td>
<td>» High capacity switching</td>
<td>450mW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>» Thermal resistant type</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1c</td>
<td>PCB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30A N.O.</td>
<td>15mA N.C.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16V</td>
<td></td>
</tr>
<tr>
<td>CQ</td>
<td>» Very quiet operation</td>
<td>12V DC</td>
<td>THT</td>
</tr>
<tr>
<td></td>
<td>» Terminal layout identical to JUM</td>
<td>640mW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1c</td>
<td>PCB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20A N.O.</td>
<td>16mA N.C.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16V</td>
<td></td>
</tr>
<tr>
<td>Series</td>
<td>Features</td>
<td>Coil</td>
<td>Mounting (bottom view)</td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>------</td>
<td>-----------------------</td>
</tr>
</tbody>
</table>
| **TA** | » Very quiet operation  
» Flat type | 12V DC  
640mW  
(for pick-up max. 7.7V DC)  
900mW  
(for pick-up max. 6.5V DC) | THT, PCB |
| 10.8 x 17.0 x 14.0mm | 30A N.O., 15A N.C., 16V | |
| **CN-M** | » Space-saving design  
» SMD type available  
» Pin in Paste (with vent hole) available | 12V DC  
640mW | THT, PCB, SMT |
| 15.5 x 11.0 x 14.4mm | 30A N.O., 25A N.C., 16V | |
| **CN-H** | » Best space savings in its class  
» Substitute for Micro-ISO relay  
» Low operating power type  
» High current-carrying capacity | 12V DC  
450mW  
(for pick-up max. 6.5V DC)  
640mW  
(for pick-up max. 5.5V DC) | THT, PCB |
| 17 x 10.6 x 18.3mm | 30A N.O., 16V | |
| **TG** | » Large switching capacity in small size  
» Substitute for micro ISO relays  
» Low operating power type | 12V DC  
640mW  
(for pick-up max. 6.5V DC)  
450mW  
(for pick-up max. 7.0V DC) | THT, PCB |
| 17.8 x 12.6 x 18mm | 30A N.O., 15A N.C., 16V | |
### TM
- **Flat type**
- **Ideal for smart junction box**
- **High capacity and 35A type**
- **High heat resistant type**

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM</td>
<td>19.2 x 16.8 x 13.6mm</td>
<td>12V DC 450mW (500Ω type) 360mW (400Ω type)</td>
</tr>
</tbody>
</table>

- **1a**
- **1c**

### TT
- **Double make contact 2 Form A (1 Form U)**
- **60 A fuse rating**
- **High heat resistant type available**

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT</td>
<td>17.8 x 13.0 x 16.0mm</td>
<td>12V DC 450mW</td>
</tr>
</tbody>
</table>

- **2a/1s**

### TC
- **Substitute for micro ISO relays**
- **Latching type available**
- **High heat resistant type available**

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC</td>
<td>17.8 x 13.0 x 16.0mm</td>
<td>12V DC 1,300mW (for pick-up max. 6.5V DC) 900mW (for pick-up max. 7.0V DC) 640mW (for pick-up max. 7.5V DC) 1,920mW (2 coil latching type)</td>
</tr>
</tbody>
</table>

- **1a**
- **1c**
- **2a**
### Automotive Relays | PCB Relays

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
</table>
| TH     | » Ultra compact flat type  
        » High switching capacity (up to 25A)  
        » 10 terminals twin type | 12V DC  
900mW  
(for pick-up max. 6.5V DC)  
655mW  
(for pick-up max. 7.7V DC) | SMD  
SMT |

11.0 x 12.0 x 8.8mm  
21.6 x 12.0 x 8.8mm

**Go To Overview**
Panasonic Industry provides high-performing micro and mini ISO plug-in relays suitable for 12V and 24V power supply systems.
# Series Features Coil Mounting (bottom view)

## CA
- Rubber bracket / screw mounting
- Direct plug-in

<table>
<thead>
<tr>
<th>Features</th>
<th>Coil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>20A N.O.</td>
</tr>
<tr>
<td>Type S</td>
<td>30A N.O.</td>
</tr>
</tbody>
</table>

- 12V DC
- 1,800mW

## CM
- Small substitute for Mini-ISO relay
- Micro-ISO terminal type

<table>
<thead>
<tr>
<th>Features</th>
<th>Coil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>20A N.O.</td>
</tr>
<tr>
<td>Type S</td>
<td>30A N.O.</td>
</tr>
</tbody>
</table>

- 24V DC
- 1,800mW

## CV-N
- Low profile
- Low temperature rise
- Low sound pressure level
- RTIII (IP67) available

<table>
<thead>
<tr>
<th>Features</th>
<th>Coil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>20A N.O.</td>
</tr>
<tr>
<td>Type S</td>
<td>30A N.O.</td>
</tr>
</tbody>
</table>

- 24V DC
- 1,800mW

## CB
- 40A switching current at 85°C
- Mini-ISO type terminals
- High shock resistance
- High thermal resistance

<table>
<thead>
<tr>
<th>Features</th>
<th>Coil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>40A N.O.</td>
</tr>
<tr>
<td>H Type</td>
<td>70A N.O.</td>
</tr>
<tr>
<td>24V Type</td>
<td>40A N.O.</td>
</tr>
</tbody>
</table>

- 12V DC
- 1,400mW
- 24V DC
- 1,800mW

## Mounting (bottom view)

- Plug-In
- Sealed with epoxy resin
- Standard
- PCB (24V, Plug-in)
- Including resistor type also available

---

**Automotive Relays | Plug-in Relays**

- Short form RELAYS
- Plug-in Automotive Semiconductor High Frequency Safety High Voltage Power High Capacity Signal

---

**Plug-in**

- PCB (standard type)
## Automotive Relays | Plug-in Relays

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Mounting (bottom view)</th>
</tr>
</thead>
</table>
| CW     | » Ideal relay for high output, 3-phase motors (Electric Power Steering)  
         » High cut-off current capability  
         » High current carrying capability | 12V DC  
         1400mW | Welding |
| CN-L   | » Continuous carrying current of 150A@85°C, 80A@125°C  
         » Max. ambient temperature 125°C  
         » Can be installed to engine compartment (IP54)  
         » Version without fasten lug available  
         » Overcurrent (> 2000A) trip function  
         » No additional fuse needed | 12V DC  
         30W | Plug-in/Screw |

### CW

- **Size:** 32 x 18 x 26 mm
- **Ideal relay for high output, 3-phase motors (Electric Power Steering)**
- **High cut-off current capability**
- **High current carrying capability**

### CN-L

- **Size:** 91.5 x 38.5 x 85.3 mm
- **Continuous carrying current of 150A@85°C, 80A@125°C**
- **Max. ambient temperature 125°C**
- **Can be installed to engine compartment (IP54)**
- **Version without fasten lug available**
- **Overcurrent (> 2000A) trip function**
- **No additional fuse needed**

**Contact Information**

- **Contact:** Sales Team
- **Phone:** +1-555-555-5555
- **Email:** sales@samplecompany.com

**Additional Resources**

- **Website:** www.samplecompany.com
- **Brochure:** Download brochure for more information.
With increasing concern for the environment, the market for eco-friendly vehicles is expanding. To contribute to a greener world and environmental compliance regulations, we provide a broad range of solutions for hybrid to full-electric vehicles. We aim at contributing to the electrification and safety of cars by offering EV relays (DC contactors) achieving high-capacity DC cutoff & space saving and Automotive relays capable of large current/voltage cutoff. Charging the next generation of mobility.
### Series Features Coil Mounting

#### EV-A
- **Dimensions:** 82.6 x 73.0 x 23.0mm
- **Characteristics:**
  - One of the smallest and lightest in 250 A class
  - 8,000 A short circuit tolerance
  - High cut-off capacity 1,800A at 500V DC without contact polarity
  - Vertical and horizontal type available
- **Coil:** 12V DC, 6000mW
- **Mounting:** Screw terminal

#### EV-G, EV-H
- **Dimensions:**
  - 1: 65.8 x 40.7 x 37.9mm
  - 2: 78 x 40 x 48.1mm
- **Characteristics:**
  - High short-circuit capacity type
  - AEVH (100A) available with lead wire
- **Coil:** 12V DC, 5200mW

#### EV-S
- **Dimensions:**
  - 1a: 76 x 36 x 72.3mm
  - 1b: 77 x 67.8 x 37.7mm
- **Characteristics:**
  - DC type with sealed capsule, mainly for hybrid vehicles
  - Very quiet operation
  - Small size and light weight
  - Blow-out magnets allow small arcing space
  - Safety construction
  - High contact reliability
  - Standard type for horizontal mounting available
- **Coil:** 12V DC, 4500mW

---

### Short form RELAYS

- **Plug-in Automotive Semiconductor High Frequency Safety High Voltage Power High Capacity Signal**

---

**Automotive Relays | High Voltage DC Relays**
## Series Features Coil Mounting

### EV

- **Features**
  - Sealed capsule for xEV
  - Compact size
  - Blow-out magnets allow small arcing space
  - Safety construction
  - High contact reliability

- **Dimensions**
  - Series 1: 66.8 x 49.7 x 37.9 mm
  - Series 2: 78 x 40 x 48.1 mm
  - Series 3: 82.8 x 40 x 79 mm

- **Coil**
  - 12V DC
  - 24V DC

- **Mounting**
  - Screw terminal
  - Faston terminal

### EBN

- **Features**
  - Low height for mounting within battery packs
  - Max. 1,500 A 60 V DC switching off possible

- **Dimensions**
  - 82.6 x 75.0 x 25.0 mm

- **Coil**
  - 12V DC
  - 2000 mW

- **Mounting**
  - Plug-in

### ECN

- **Features**
  - Small pre-charging relay
  - Easy connect plug-in terminal

- **Dimensions**
  - 29.0 x 25.0 x 28.9 mm

- **Coil**
  - 12V DC
  - 1400 mW

---

**High Voltage DC Relays**

**Series**

<table>
<thead>
<tr>
<th>EV</th>
<th>Features</th>
<th>Coil</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sealed capsule for xEV, compact size, blow-out magnets allow small arcing space, safety construction, high contact reliability</td>
<td>12V DC, 24V DC</td>
<td>Screw terminal, Faston terminal</td>
</tr>
<tr>
<td></td>
<td>66.8 x 49.7 x 37.9 mm, 78 x 40 x 48.1 mm, 82.8 x 40 x 79 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EBN**

- Low height for mounting within battery packs
- Max. 1,500 A 60 V DC switching off possible
- 82.6 x 75.0 x 25.0 mm
- 12V DC, 2000 mW
- Plug-in

**ECN**

- Small pre-charging relay
- Easy connect plug-in terminal
- 29.0 x 25.0 x 28.9 mm
- 12V DC, 1400 mW

## Series Features Coil Mounting

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Coil</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV switch</td>
<td>» High performance with capsule contact technology</td>
<td>No coil, manual switch</td>
<td></td>
</tr>
<tr>
<td></td>
<td>» High carrying current performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>» Safety function</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>59.9 x 34.6 x 114.3mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1a 80A 400V