Pickering Series 119

High Voltage Micro-SIL Single-in-Line SIL/SIP Reed Relays
Up to 3kV Stand-off

Features

- **SoftCenter®** construction (see adjacent diagram)
- Highest quality instrumentation grade switches
- Small size
- Internal mu-metal magnetic screen
- One or two switches in a single package
- 1 Form A or 2 Form A (energize to make) or 1 Form B (energize to break) configurations
- 3, 5 and 12 Volt coils are standard, with or without internal diode
- 100% tested for dynamic contact resistance
- Ideal for Cable Testers, Mixed signal testers or other applications where High Voltage capability is required.

The Pickering Series 119 is a new range of very small Single-in-Line Reed Relays intended for voltages very much higher than standard small SIL relays. The vacuumed, sputtered ruthenium reed switches have a superb low level performance also, which makes them an ideal choice where a wide range of signals are involved.

The range is based on the long established Series 109P style of plastic package with an internal mu-metal magnetic screen which allows high packing density and are made using Pickering’s **SoftCenter®** construction.

Six versions are available, all with either 3, 5 or 12 volt operating coils. The 1 Form A, 1.5kV version has a package and pin configuration compatible with the standard 109P type, i.e. 4 pins on 0.15 inches (3.8mm) pitch. The other types have package lengths and pin configurations appropriate for their voltage ratings and the user will need to arrange suitable clearance distances around the parts.

Form A types can be mounted side by side, but a 1cm space should be left between the Form B type and other relays, as the magnetic field from the internal biasing magnet could slightly affect the sensitivity of the relay alongside.

**Application Note:**

For stand-off voltages at the upper range of the specification; increases in the contact resistance at low signal levels may be observed. This is a characteristic of the switch. For new applications or for further information please contact our Technical department. Additional information is available on our website.

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**Switch Ratings - Dry switches**

- **1 Form A (energize to make)**
  - Minimum Stand-off 1.5kV, switching up to 1kV.
  - Minimum Stand-off 2kV, switching up to 1kV.
  - Minimum Stand-off 3kV, switching up to 1kV.

- **1 Form B (energize to break)**
  - Minimum Stand-off 1.5kV, switching up to 1kV.
  - Minimum Stand-off 2kV, switching up to 1kV.

- **2 Form A (energize to make)**
  - Minimum Stand-off 1.5kV, switching up to 1kV.

**Typical Pickering **SoftCenter®** Construction**

Unique Pickering Construction vs. Industry Standard Construction

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For FREE evaluation samples go to: pickeringrelay.com/samples
Series 119 switch ratings - The contact ratings for each switch type are shown below:

<table>
<thead>
<tr>
<th>Switch No</th>
<th>Switch form</th>
<th>Power rating</th>
<th>Max. switching current</th>
<th>Max. switching volts (see Note7)</th>
<th>Min. stand-off volts</th>
<th>Life expectancy ovs typical (see Note7 below)</th>
<th>Min. switching current</th>
<th>Min. switching time</th>
<th>Special features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A or B</td>
<td>10 W</td>
<td>3.75 V</td>
<td>1.25 A</td>
<td>0.5 ms</td>
<td>2.5 pF</td>
<td>1000</td>
<td>0.2 ms</td>
<td>High voltage</td>
</tr>
<tr>
<td>2</td>
<td>A or B</td>
<td>10 W</td>
<td>3.75 V</td>
<td>1.25 A</td>
<td>0.5 ms</td>
<td>2.5 pF</td>
<td>1000</td>
<td>0.2 ms</td>
<td>High voltage</td>
</tr>
<tr>
<td>3</td>
<td>A</td>
<td>10 W</td>
<td>3.75 V</td>
<td>1.25 A</td>
<td>0.5 ms</td>
<td>2.5 pF</td>
<td>3000</td>
<td>0.2 ms</td>
<td>High voltage</td>
</tr>
</tbody>
</table>

Operating voltages

- **Coil voltage - nominal**: 3 V
- **Must operate voltage - maximum at 25°C**: 2.25 V
- **Must operate voltage - minimum at 25°C**: 0.75 V
- **Release time**: 0.2 ms

Coil data and type numbers

<table>
<thead>
<tr>
<th>Device type</th>
<th>Type Number</th>
<th>Coils (V)</th>
<th>Coils (Ω)</th>
<th>Max. contact resistance (initial)</th>
<th>Insulation resistance (minimum)</th>
<th>Capacitance (typical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Form A (energize to make)</td>
<td>119-1-A-3/1D</td>
<td>125 D</td>
<td>750 D</td>
<td>0.17 Ω</td>
<td>100 Ω</td>
<td>100 pF</td>
</tr>
<tr>
<td>1 Form A (energize to make)</td>
<td>119-1-A-3/2D</td>
<td>125 D</td>
<td>750 D</td>
<td>0.17 Ω</td>
<td>100 Ω</td>
<td>100 pF</td>
</tr>
<tr>
<td>1 Form A (energize to make)</td>
<td>119-1-A-3/1D</td>
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</tr>
</tbody>
</table>

When an internal diode is required, the suffix D is added to the part number as shown in the table.

Environmental specification

- **Standard operating temperature range**: -20 to +85°C
- **Note**: There can be a temperature dependence if an internal diode is fitted or for all Form B types, the correct coil polarity must be observed, as shown by the + symbol on the schematics.
- **Vibration**: Maximum 20 G
- **Shock**: Maximum 50 G

Note3 Switching Voltage

This high voltage rating is for RESISTIVE loads only. At these high voltages, even stray capacitance can generate very high current pulses, which can damage the contact plating causing welding of the reed switch. If there is capacitance in circuit, provision should be made to limit the surge, to within the current and power ratings of the relay.

Note4 Life expectancy

The life of a reed relay depends upon the switch load and end of life criteria. For example, for an ‘end of life’ contact resistance specification of 1 Ω, switching load (10 V at 10 mA resistive) or when ‘cold’ switching, typical life is approx. 1 x 10⁶ ops. At the maximum load (resistive), typical life is 1 x 10⁷ ops. In the event of abusive conditions, e.g., high currents due to capacitive inrushes, this figure reduces considerably. Pickering will be pleased to perform life testing with any particular load condition.

Note5 Capacitance across open switch

This is measured with all other component leads connected to the guard terminal of the measuring bridge.

Note6 Contact Resistance

As part of our continuous product evaluation program Pickering have identified a characteristic with our Series 119. For stand-off voltages at the upper range of the specification increases in the contact resistance at low signal levels may be observed. This characteristic has always been present and if an application has used these parts and not been affected we do not believe any action needs to be taken.

For new applications or for further information please contact our Technical Department.

Help

If you need any technical advice or other help, for example, any special tests that you would like carried out, please do not hesitate to contact our Technical Sales Department. We will always be pleased to discuss Pickering relays with you. email: techsales@pickeringrelay.com

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- **UK Headquarters**: email: sales@pickeringrelay.com | Tel. +44 1255 428141
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  For a full list of agents and representatives visit: pickeringrelay.com/agents

Pin Configuration and Dimensional Data

Dimensions in inches (Millimeters in brackets)

- **1.5kV**
  - 1 Form A: 0.26 (6.6) 0.125 (3.3)
  - 1 Form B: 0.35 (8.9) 0.125 (3.3)

- **2kV**
  - 1 Form A: 0.26 (6.6) 0.125 (3.3)
  - 1 Form B: 0.35 (8.9) 0.125 (3.3)

- **3kV**
  - 1 Form A: 0.26 (6.6) 0.125 (3.3)
  - 1 Form B: 0.35 (8.9) 0.125 (3.3)

Order Code

- **Series**: 119 - 1 - A - 5 / 1 D
- **Number of reeds**: [Select from table adjacent]
- **Switch form**: [Select from table adjacent]
- **Coil voltage**: [Select from table adjacent]
- **Switch number**: [Select from table adjacent]
- **Diode if fitted**: [Select from table adjacent]

Please ask us for a FREE evaluation sample.
Pickering Electronics continue to lead the high-end reed relay market through innovative product design, high performance components and exceptional quality control.

Part of the privately-owned Pickering Group, company operations employ around 200 staff across quality accredited factories in the UK and Czech Republic, supplying demanding Aerospace, Infrastructure, Test & Measurement and ATE applications worldwide.

**Reliability through quality** – 50 Year reputation for exceptional product life longevity derived from continuous staged manufacturing inspection, strenuous full range thermal cycling and 100% testing for all operating parameters.

**Reliability through design** – Environmentally compliant designs and unique Softcenter® technology combine to create an optimised assembly that minimises internal lifetime stresses, extending working life and contact stability.

**Switching Performance** – Compared with common bobbin based products, our formerless coil constructions maximise magnetic efficiency resulting in faster switching speeds, optimal switching action and several orders of extended lifetime at operational extremes.

**Cost & Size Performance** – Industry leading mu-metal magnetically screened packages deliver ultra-high PCB packing densities, saving significant cost and space.

**Designers toolkit** – Free samples, worldwide tech support and an unrivalled range of specialist and custom devices, Pickering engineers work alongside customers to deliver problem solving solutions for complex and challenging applications.


**Distribution** – An established global network of group sales offices supported by local agents and distributors, Pickering operate an established logistical supply chain worldwide.

**The Pickering Group** – Employing around 400 staff across 8 sites in the UK and CZ, Pickering Electronics are a key technology partner for Pickering Interfaces and Pickering Connect, supporting the design and manufacture of high performance modular signal switching and simulation systems.