Pickering Series 122

Single Pole $4mm^2$™ Reed Relays

0.5 Amp switching - Very high packing density
Stacking on 4mm x 4mm pitch

Features

- Highest packing density currently available
- 3 or 5 Volt coils
- 10 Watts, 0.5 Amp switching
- 1 Form A (SPST) Normally Open (NO) Energize to make
- Fast operate and release times making these relays ideal for high speed test systems
- Plastic package with internal mu-metal magnetic screen
- Ideal for A.T.E. switching matrices or multiplexers
- Highest quality instrumentation grade switches
- Insulation resistance greater than $10^{12}$ Ω
- 100% tested for dynamic contact resistance for guaranteed performance

The Series 122 reed relay range is part of Pickering’s new ultra-high density $4mm^2$ product line, which take up the minimum board area of only 4mm x 4mm, allowing the highest packing density currently available.

The range features a sputtered ruthenium switch rated at 10 Watts, 0.5 Amps. These are the same reed switches as used in the long established Pickering Series 112, 113 and 116 but are orientated vertically within the package, allowing this high density. If a higher rating is required, please consider our Series 120 which are rated up to 1.0 Amp at 20 Watts but with a higher profile height. If a lower profile height is required, please consider our Series 124 with a height of just 9.5mm whilst rated up to 5 Watts, 0.5 Amps switching.

The small size of the package does not allow an internal diode. Back EMF suppression diodes are included in many relay drivers but if they are not, and depending on your drive methods, these may have to be provided externally.

While socketing relays is not normally recommended due to the risk of affecting contact resistance integrity, it is appreciated that sockets may sometimes be desired for ease of servicing/replacement, in the case of a relay being damaged or reaching the end of its working life.

The device has pins on a 2mm square pitch. There are suitable connectors available from some manufacturers, both SMD and Through Hole, that will allow these relays to be stacked in either a row or in a matrix on a 4mm pitch.

A total of 528 Series 122 relays on an example ultra-high-density PXI module illustrates the packing density of these extremely small Reed Relays.

For FREE evaluation samples go to: pickeringrelay.com/samples
The reed switch in the Series 122 is suitable for low level or ‘cold’ switching. In accordance with Pickering convention, this switch is referred to as type number 2. There is no general purpose switch (type number 1) currently available in this series, but the type 2 is suitable for all applications if it is used within its specified ratings. This means that high inrush currents, particularly caused by capacitive loads must be avoided.

Series 122 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. switch current</th>
<th>Max. carry current</th>
<th>Max. switching volts</th>
<th>Life expectancy</th>
<th>Life expectancy ops typical (see Note 1 below)</th>
<th>Operate time inc bounce (max)</th>
<th>Release time</th>
<th>Special features</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>A</td>
<td>10 W</td>
<td>0.5 A</td>
<td>0.5 A</td>
<td>200</td>
<td>10 V</td>
<td>Must operate voltage - maximum at 25°C</td>
<td>0.2 ms</td>
<td>0.1 ms</td>
<td>All applications</td>
</tr>
</tbody>
</table>

Operating voltages

<table>
<thead>
<tr>
<th>Coil voltage - nominal</th>
<th>Must operate voltage - maximum at 25°C</th>
<th>Must release voltage - minimum at 25°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 V</td>
<td>2.25 V</td>
<td>0.2 ms</td>
</tr>
<tr>
<td>5 V</td>
<td>3.75 V</td>
<td>0.5 V</td>
</tr>
</tbody>
</table>

Coil data and type numbers

<table>
<thead>
<tr>
<th>Device type</th>
<th>Type Number</th>
<th>Coil (V)</th>
<th>Coil resistance</th>
<th>Max. contact resistance (initial)</th>
<th>Insulation resistance (minimum)</th>
<th>Capacitance (typical)</th>
<th>Capacitance (typical) (see Note 2 below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Form A (energize to make)</td>
<td>122-1-A-3/2</td>
<td>3</td>
<td>125 Ω</td>
<td>0.15 Ω</td>
<td>10Ω @ 1 kV DC</td>
<td>10Ω @ 1 kV DC</td>
<td>1.6 pF younger</td>
</tr>
<tr>
<td>2 Form A (energize to break)</td>
<td>122-1-A-5/2</td>
<td>5</td>
<td>350 Ω</td>
<td>0.15 Ω</td>
<td>10Ω @ 1 kV DC</td>
<td>10Ω @ 1 kV DC</td>
<td>1.6 pF younger</td>
</tr>
</tbody>
</table>

Environmental specification

Standard operating temperature range: -20 to +65 °C.

Note 1: 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 low loads (10 V at 10 mA resistive) or when ‘cold’ switching, typical life is approx 2.5 x 10^6 ops. At the maximum load (resistive), typical life is 1 x 10^6 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.

Note 2: Switch to coil capacitance

Due to the asymmetrical internal construction of the relay, the capacitance to the coil from one switch connection is approximately half the capacitance of the other switch connection, pin 1 is lower. In some applications this feature may be used to advantage for example, in a multiplexer where it is desirable to minimize the capacitance of the common connection to maximize bandwidth.

Note 3: Capacitance across open switch

The capacitance across the open switch was measured with other connections guarded.

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Pickering Electronics’ Industry standard reed relay

The above full scale graphic illustrates sixteen new Series 122 Relays packed into an area of 1.6cm x 1.8cm, in comparison, only four of the industry standard reed relays can be fitted into the same area.

3D Models: Interactive models of Pickering relay products can be downloaded here: pickeringrelay.com/3d-models

Internal Mu-metal Magnetic Screen

The Series 122 relays are fitted with an internal mu-metal magnetic screen which permits side-by-side stacking on a 4mm pitch.

Order Code

<table>
<thead>
<tr>
<th>Series</th>
<th>Number of reeds</th>
<th>Switch form</th>
<th>Coil voltage</th>
<th>Switch number</th>
</tr>
</thead>
<tbody>
<tr>
<td>122</td>
<td>1 - A - 5 / 2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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.

Why Pickering Electronics?
Because Quality Matters