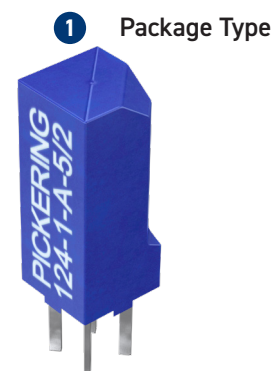


- The industry's smallest through-hole reed relay currently available
- Stacking on **4 mm x 4 mm** pitch allowing the highest packing density currently available
- **3 or 5 V** coils
- **10 W, 0.5 A** switching
- **1 Form A** (SPST) normally open (NO) energize to make
- Very fast operate and release 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
- Sputtered ruthenium instrumentation grade switch
- Insulation resistance $>10^{12} \Omega$
- **Additional build options are available**
- **Many benefits compared to industry standard relays (see last page)**



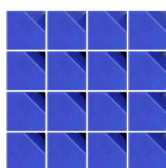
The Series 124 reed relay range is part of Pickering's new ultra-high density 4mm^2 product line, which take up the minimum board area of only $4\text{mm} \times 4\text{mm}$, allowing the highest packing density currently available.

The range features a sputtered ruthenium instrumentation grade switch rated at 10 Watts, 0.5 Amps. These are the same reed switches as used in the long established Pickering Series 111, 111P and 117 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.

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 2 mm 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 4 mm pitch.

Examples of Packing Density

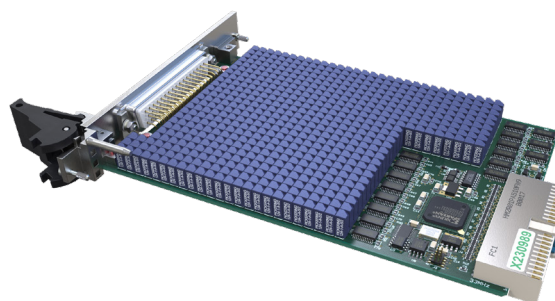


Pickering
Electronics'
Series 124



Industry standard
reed relay of the
same electrical
specification

The above actual size graphic shows sixteen Series 124 Relays packed into an area of $1.6\text{cm} \times 1.6\text{cm}$. In comparison, only four of the industry standard reed relays can be fitted into the same area.



A total of 606 Series 124 relays on a Pickering Interfaces ultra-high-density PXI module illustrates the packing density of these extremely small Reed Relays.

Switch Ratings - Dry Switches

1 Form A (energize to make)
10 W at 170 V

The reed switch in the Series 124 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 124 switch ratings - contact ratings for each switch type

Switch No	Switch form	Power rating	Max. switch current	Max. carry current	Max. switching volts	Life expectancy ops typical (see Note ¹)	Operate time inc bounce (max)	Release time	Special features
2	A	10 W	0.5A	0.5A	170	10 ⁸	0.2 ms	0.1 ms	All applications

Note¹: 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 10⁸ ops. At the maximum load (resistive), typical life is 1 x 10⁶ 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.

Operating Voltages

Coil voltage - nominal	Must operate voltage - maximum at 25°C	Must release voltage - minimum at 25°C
3 V	2.25 V	0.3 V
5 V	3.75 V	0.5 V

Environmental Specification/Mechanical Characteristics

In the table below, the upper temperature limit can be extended to +125 °C if the coil drive voltage is increased to accommodate the resistance/temperature coefficient of the copper coil winding. This is approximately 0.4% per °C. This means that at 125 °C the coil drive voltage will need to be increased by approximately 40 x 0.4 = 16% to maintain the required magnetic drive level. Please contact sales@pickeringrelay.com for assistance.

Operating Temperature Range	-20 °C to +85 °C
Storage Temperature Range	-35 °C to +100 °C
Shock Resistance	50 g
Vibration Resistance (10 - 2000 Hz)	20 g
Soldering Temperature (max) (10 s max)	270 °C
Washability (Proper drying process is recommended)	Fully Sealed

Dry Relay: Series 124 Coil data and type numbers

Device Type	Type Number	Coil (V)	Coil resistance	Max. contact resistance (initial)	Insulation resistance (minimum at 25 °C) (see Note ⁴)		Capacitance (typical) (see Note ^{2, 3})	
					Switch to coil @1kV DC	Across switch	Closed switch to coil	Across open switch
1 Form A, Switch No. 2 Package Type 1	124-1-A-3/2	3	75 Ω	0.18 Ω	10 ¹² Ω	10 ¹² Ω	1.6 pF	0.25 pF
	124-1-A-5/2	5	200 Ω					

Note²: 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.

Note³: Capacitance across open switch

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

Note⁴: Insulation resistance

Insulation resistance will reduce at higher temperatures. For more information on temperature effects [click here](#), or [contact Pickering](#) for more in depth guidance.

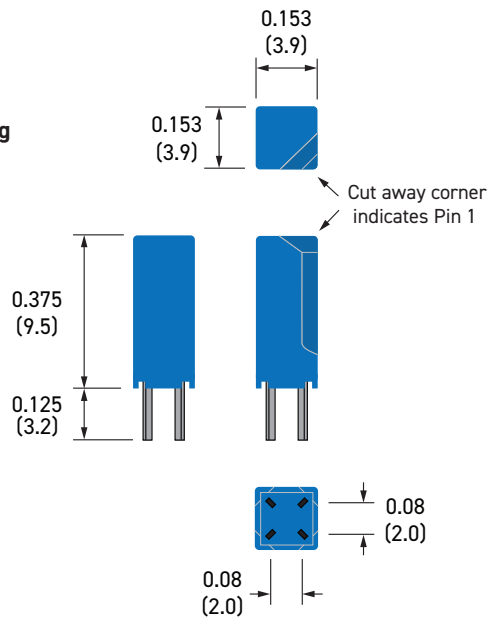
The technical information shown in this data sheet could contain inaccuracies or typographical errors. This information may be periodically changed or updated and these changes will be included in future versions of this data sheet.

For different values, latest specifications and product details, please contact your local Pickering sales office.

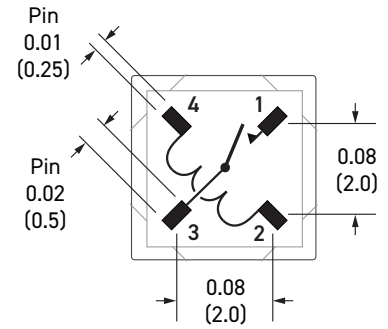
For **FREE** evaluation samples go to: pickeringrelay.com/samples

Pin Configuration, Weights and Dimensional Data (dimensions in inches, millimeters in brackets)

Package Type **1**
Weight: Typical 0.28 g



1 Form A



Connection details - viewed from underside

Similar Relays Comparison

If the Series 124 is unsuitable for your application, Pickering also manufactures two other series of reed relays with similar characteristics, but in different package sizes.

Series Name		124-1-A	122-1-A	120-1-A	
Physical Outline					
Depth	mm (inches)	3.9 (0.153)	3.9 (0.153)	3.9 (0.153)	
Width		3.9 (0.153)	3.9 (0.153)	3.9 (0.153)	
Height		9.5 (0.375)	12.5 (0.492)	15.5 (0.61)	
Package Volume (mm ³)		145	191	236	
Typical Weights (g)		0.28	0.37	0.49	
Contact Configuration		1-A (SPST)	1-A (SPST)	1-A (SPST)	
Reed Switch Type		Dry	Dry	Dry	Dry
Switching Voltage (V)		170	200	200	200
Switching Current (A)		0.5	0.5	1.0	0.5
Carry Current (A)		0.5	0.5	1.2	1.2
Switch Power (W)		10	10	20/15	10

Reed Relay Selection Tool

Because Pickering offer the largest range of high-quality reed relays, sometimes it can be difficult to find the right reed relay you require. That is why we created the Reed Relay Selector, this tool will help you narrow down our offering to get you the correct reed relay for your application. To try the tool today go to: pickeringrelay.com/reed-relay-selector-tool

Standard Build Options

The Series 124 Reed Relays are available with a number of standard build options to tailor them to your specific application. These options are detailed in the table below. If you decide to go ahead and specify one, or more, of these options you will be allocated a unique part number suffix.

Mechanical Build Options	Electrical Build Options
Special pin configurations or pin lengths	Different coil resistance
Special print with customer's own part number or logo	Operate or de-operate time
	Pulse capability
	Enhanced specifications
	Non-standard coil voltages and resistance figures
	Special Life testing under customer's specific load conditions
	Specific environmental requirements
	Controlled thermal EMF possibility

Customization

If your specific requirements are not met by standard relay, or any of the standard build options, please speak to us to discuss producing a customized reed relay to service your specific application: pickeringrelay.com/contact

3D Models

Interactive 3D models of the complete range of Pickering relay products in STEP, IGS and SLDPRP formats can be downloaded from the website: pickeringrelay.com/3d-models

Part Number Description: 124 - 1 - A - 5 / 2 - xxx

Series _____
 Number of reeds _____
 Switch form _____
 Coil voltage _____
 Switch number (only Type 2 available) _____
 Unique suffix (if standard build option selected) _____

Help

If you need any technical advice or other help, 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

Contact Us

UK Headquarters - email: sales@pickeringrelay.com | Tel. +44 1255 428141

USA - email: ussales@pickeringrelay.com | Tel. +1 781 897 1710

Germany - email: desales@pickeringtest.com | Tel. +49 89 125 953 160

France - email: frsales@pickeringtest.com | Tel. +33 9 72 58 77 00

Nordic - email: ndsales@pickeringtest.com | Tel. +46 340 69 06 69

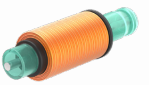
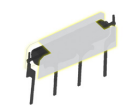
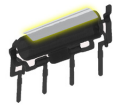
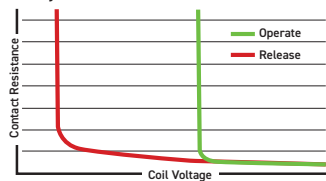
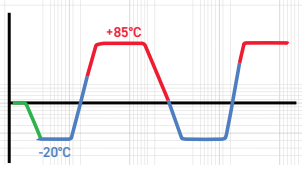
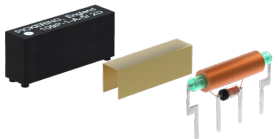
Czech Republic: czsales@pickeringtest.com | Tel. +420 558-987-613

China - email: chinasales@pickeringtest.com | Tel. +86 4008 799 765

For a full list of agents, distributors and representatives visit: pickeringrelay.com/agents



10 Key Benefits of Pickering Reed Relays

Key Benefit	Pickering Reed Relays	Typical Industry Reed Relays	
1 Instrumentation Grade Reed Switches	Instrumentation Grade Reed Switches with vacuum sputtered Ruthenium plating to ensure stable, long life up to 5x10E9 operations.	Often low grade Reed Switches with electroplated Rhodium plating resulting in higher, less stable contact resistance.	
2 Formerless Coil Construction	Formerless coil construction increases the coil winding volume, maximizing magnetic efficiency, allowing the use of less sensitive reed switches resulting in optimal switching action and extended lifetime at operational extremes.	Use of bobbins decreases the coil winding volume, resulting in having less magnetic drive and a need to use more sensitive reed switches which are inherently less stable with greatly reduced restoring forces.	  Pickering former-less coil Typical industry coil wound on bobbin
3 Magnetic Screening	Mu-metal magnetic screening (either external or internal), enables ultra-high PCB side-by-side packing densities with minimal magnetic interaction, saving significant cost and space. Pickering Mu-Metal magnetic screen - interaction approx. 5%	Lower cost reed relays have minimal or no magnetic screening, resulting in magnetic interaction issues causing changes in operating and release voltages, timing and contact resistance, causing switches to not operate at their nominal voltages. Typical industry screen - interaction approx. 30%	  X-Ray of Pickering mu-metal magnetic screen X-Ray of typical industry mu-metal magnetic screen
4 SoftCenter™ Technology	SoftCenter™ technology, provides maximum cushioned protection of the reed switch, minimising internal lifetime stresses and extending the working life and contact stability.	Transfer moulded reed relays (produced using high temperature/pressure), result in significant stresses to the glass reed switch which can cause the switch blades to deflect or misalign leading to changes in the operating characteristics, contact resistance stability and operating lifetime.	  Pickering soft center protection of the reed switch Typical industry thermo-setting hard moulded protection of the reed switch
5 100% Dynamic Testing	100% testing for all operating parameters including dynamic contact wave-shape analysis with full data scrutiny to maintain consistency.	Simple dc testing or just batch testing which may result in non-operational devices being supplied.	Dynamic Contact Resistance Test 
6 100% Inspection at Every Stage of Manufacturing	Inspection at every stage of manufacturing maintaining high levels of quality.	Often limited batch inspection.	
7 100% Thermal Cycling	Stress testing of the manufacturing processes, from -20°C to +85°C to -20°C, repeated 3 times.	Rarely included resulting in field failures.	
8 Flexible Manufacturing Process	Flexible manufacturing processes allow quick-turn manufacturing of small batches.	Mass production: Usually large batch sizes and with no quick-turn manufacturing.	
9 Custom Reed Relays	Our reed relays can be customized easily, e.g. special pin configurations, enhanced specifications, non-standard coil or resistance figures, special life testing, low capacitance, and more.	Limited ability to customize.	
10 Product Longevity	Pickering are committed to product longevity; our reed relays are manufactured and supported for more than 25 years from introduction, typically much longer.	Most other manufacturers discontinue parts when they reach a low sales threshold; costing purchasing and R&D a great deal of unnecessary time and money to redesign and maintain supply.	

For more information go to: pickeringrelay.com/10-key-benefits