PICKERING SERIES 109

Micro-SIL® reed relays

Including coaxial types

*for stacking on 0.15 x 0.6 inches pitch giving **SUPERB PACKING DENSITY***

pickering

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The mu-metal packaged Series 109 and 109RF and the plastic packaged Series 109P and Series 109PH, are magnetically screened single-in-line reed relays that stack on 0.15 inches x 0.6 inches pitch. The adjacent column gives further details of the device types available.

These relays require little more than half the board area of the more usual 0.2 x 0.8 inch devices, this allows around 80 percent more relays onto your board. These are the ideal choice for high density applications such as A.T.E. switching matrices or where very little board area is available.

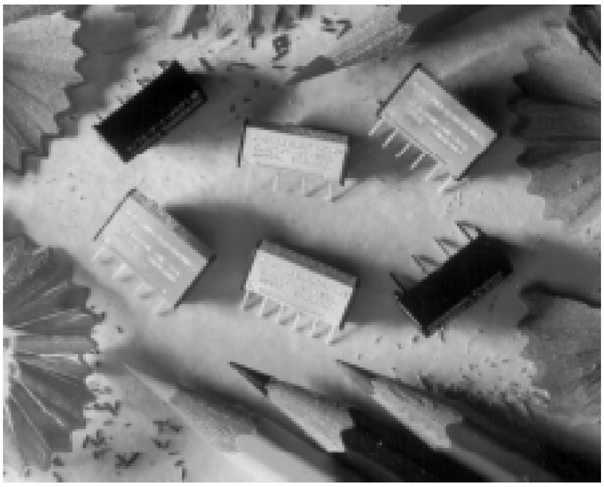
Mu-metal, due to its high permeability and low magnetic remanance is used to provide magnetic screening. This eliminates problems that would otherwise occur due to magnetic interaction. Interaction is usually measured as a percentage increase in the voltage required to operate a relay when two additional relays, stacked one each side, are themselves operated. An unscreened device mounted on this pitch would have an interaction figure of around 40 percent. Relays of this size without magnetic screening would therefore be totally unsuitable for applications where dense packing is required. Pickering Series 109 and 109RF have a typical interaction figure of 1 percent. Series 109P and 109PH have a typical figure of 3 percent.

Two types of Form A (energize to make) switches are available, a general purpose switch (switch no.1) and a vacuum sputtered ruthenium switch (switch no.2) which is ideal for low level or "cold" switching applications.
5 volt coils normally have a resistance of 500 ohms and 12 volt coils are 1000 ohms. A sensitive single pole 5 volt device with a 1000 ohms coil is also available. Internal back E.M.F. clamping diodes are an option for all types. The small size of these relays often makes it possible to increase the functionality of existing designs without increasing the size of printed circuit boards.

Configurations available

- 1 Form A
  (energise to make)
- 2 Form A
  (energise to make)
- 1 Form B
  (energise to break)
- 1 Form A Coaxial
  50 Ohms impedance
  (energise to make)
- 1 Form A Coaxial
  75 Ohms impedance
  (energise to make)

- Insulation resistance greater than 10^{12} ohms.
- 5 and 12 Volt coils are standard, with or without internal diode.



Top (Left to right): 109P, 109-1-A, 109-2-A
Bottom: 109-1-B, 109RF Coaxial, 109PH

Description of Device Types

See reverse side of data sheet for dimensional details.

Series 109 — 1 Form A, 2 Form A, 1 Form B.

Similar in construction to the Pickering Series 107 and Series 108. These patented devices are encapsulated in mu-metal cans using very high resistivity resins.

Series 109RF — Coaxial 1 Form A.

Coaxial relays in mu-metal cans. They are available with a characteristic impedance of either 50 or 75 ohms. For R.F. up to 2GHz, telecoms, video or high speed digital switching up to 500 Mbits/sec. Contact technical sales office for further data.

Series 109P — 1 Form A.

The electrical specification and dimensions are identical to the 1 Form A Series 109. They are encapsulated using the same resins within a plastic package which features an internal mu-metal magnetic screen.

Series 109PH — 1 Form A.

The electrical specification is again identical but the mu-metal screened plastic package is slightly different having an increased stand-off from the printed circuit board. Small feet on each corner of this relay lift the underside of the component 0.05 inches (1.25mm) from the board surface rather than the more usual 0.02 inches (0.5mm). These components are often used in large blocks with little or no clearance between them, for example in an ATE matrix. Flux residues can degrade insulation resistance values, the increased clearance is useful to facilitate easier cleaning after flow soldering. The move away from CFC cleaning solvents makes this feature particularly attractive when using less aggressive solvents or aqueous washing.

Switch ratings

The contact ratings for each switch type are shown below.

Switch No	Power rating	Max. switch current	Max. carry current	Max. switch volts
1	10 Watts	0.5 Amp.	1.2 Amp.	200
2	10 Watts	0.5 Amp.	1.2 Amp.	200

Switch no.1 is intended for general pupose use.
Switch no.2 is intended for switching low levels. It is the ideal switch for A.T.E. systems where cold switching techniques are often used.

Special high sensitivity 5 volt model

Standard 5 volt coils have a resistance of 500 ohms. A special model is available featuring a 1000 ohms, 5 volt coil. This type is identified by a letter "L" in the part number, signifying low coil power, (see table below).

Relay data and type numbers.

Device type	Package style	Type number	Coil volts	Coil resistance (Ohms)	Max. contact resistance (initial)
1 Form A Switch No. 1	1	109-1-A-5/1D 109-1-A-5L/1D 109-1-A-12/1D	5 5 12	500 1000 1000	0.15 Ohms 0.15 Ohms 0.15 Ohms
1 Form A Switch No. 2	1	109-1-A-5/2D 109-1-A-5L/2D 109-1-A-12/2D	5 5 12	500 1000 1000	0.12 Ohms 0.12 Ohms 0.12 Ohms
1 Form B Switch No. 2	2	109-1-B-5/2D	5	750	0.12 Ohms
2 Form A Switch No. 2	3	109-2-A-5/2D 109-2-A-12/2D	5 12	375 750	0.14 Ohms 0.14 Ohms
50 Ohms Coaxial Switch No. 1	4	109RF50-1-A-5/1D 109RF50-1-A-12/1D	5 12	375 600	0.15 Ohms 0.15 Ohms
50 Ohms Coaxial Switch No. 2	4	109RF50-1-A-5/2D 109RF50-1-A-12/2D	5 12	375 600	0.12 Ohms 0.12 Ohms
75 Ohms Coaxial Switch No. 1	4	109RF75-1-A-5/1D 109RF75-1-A-12/1D	5 12	375 600	0.15 Ohms 0.15 Ohms
75 Ohms Coaxial Switch No. 2	4	109RF75-1-A-5/2D 109RF75-1-A-12/2D	5 12	375 600	0.12 Ohms 0.12 Ohms
1 Form A Switch No. 1	5	109P-1-A-5/1D 109P-1-A-5L/1D 109P-1-A-12/1D	5 5 12	500 1000 1000	0.15 Ohms 0.15 Ohms 0.15 Ohms
1 Form A Switch No. 2	5	109P-1-A-5/2D 109P-1-A-5L/2D 109P-1-A-12/2D	5 5 12	500 1000 1000	0.12 Ohms 0.12 Ohms 0.12 Ohms
1 Form A Switch No. 1	6	109PH-1-A-5/1D 109PH-1-A-5L/1D 109PH-1-A-12/1D	5 5 12	500 1000 1000	0.15 Ohms 0.15 Ohms 0.15 Ohms
1 Form A Switch No. 2	6	109PH-1-A-5/2D 109PH-1-A-5L/2D 109PH-1-A-12/2D	5 5 12	500 1000 1000	0.12 Ohms 0.12 Ohms 0.12 Ohms

When an internal diode is required, the suffix D is added to the part number as shown in the table. If a diode is not required, the D suffix should be omitted.

Order code

The following example indicates data required to process your order:-

109 - 1 - A - 5 / 2 D

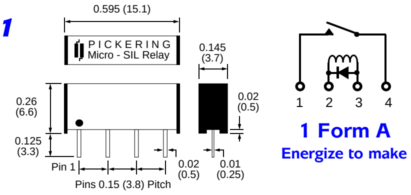
Series
Number of reeds
Switch form
Coil voltage (+L for low coil power version)
Switch number
Diode if fitted (Omit if not required.)

Pin configuration and dimensional data

Dimensions in Inches (Millimetres in brackets). Drawings are actual size.

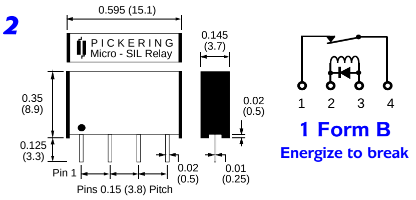
Package Style 1

Mu-metal Package
109-1-A-?



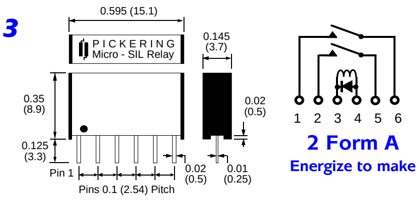
Package Style 2

Mu-metal Package
109-1-B-?



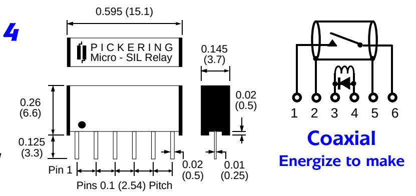
Package Style 3

Mu-metal Package
109-2-A-?



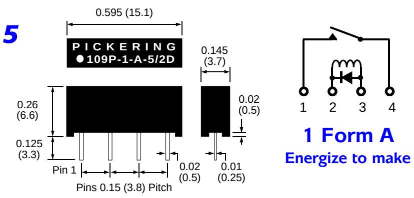
Package Style 4

Mu-metal Package
109RF50-1-A-?
109RF75-1-A-?
For performance data of coaxial versions, please contact Pickering technical department



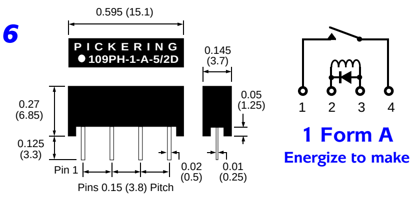
Package Style 5

Standard
Plastic Package
(Internal Mu-metal Screen)
109P-1-A-?



Package Style 6

High Stand-off
Plastic Package
(Internal Mu-metal Screen)
109PH-1-A-?

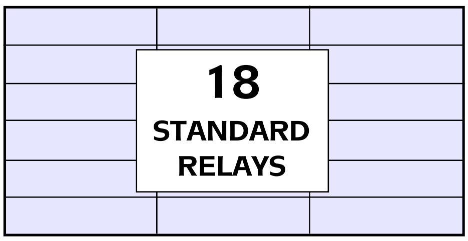


Alternative pin configurations

Alternative pin configurations are available, for example, 1 Form A relays with pins on 0.1 inches (2.54mm) pitch to enable insertion into standard SIL sockets. Please contact our technical sales office for further information.

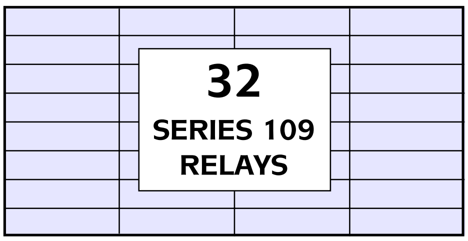
EXAMPLE OF PACKING DENSITY

The following actual size example illustrates the relative packing densities of standard 0.2 x 0.8 inch SIL relays compared with Pickering Series 109 reed relays when packed into an area of 1.2 x 2.4 inches. **Important: Unscreened relays are unsuitable for dense packing in this way.**



Using standard
0.2 x 0.8 inch relays
in this PCB area you can
fit 18 Relays

Using Pickering
Series 109 relays
in this PCB area you can
fit 32 Relays



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