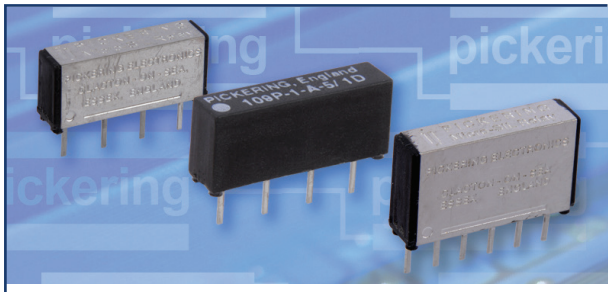
Micro-SIL® SIL/SIP Reed Relays

Including coaxial types
Up to 20 Watts switching

Products highlighted are available from Rapid Electronics www.rapidonline.com



Features

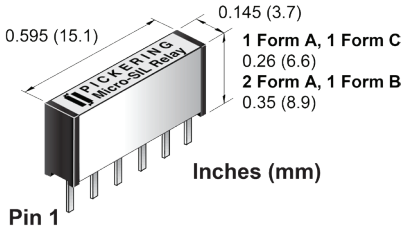
- *SoftCenter*® construction (see adjacent diagram)
- Highest quality instrumentation grade switches
- 1 Form A and 2 Form A (energise to make)
- 1 Form B (energise to break)
- 1 Form C (changeover)
- 1 Form A Coaxial 50 Ohms impedance (energise to make)
- 1 Form A Coaxial 75 Ohms impedance (energise to make)
- Insulation resistance greater than 10^{12} Ω
- 3, 5 and 12 Volt coils with or without internal diode

The mu-metal packaged Series 109 and 109RF, and the plastic packaged Series 109P, 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 remanence 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.



Device Types

Series 109 1 Form A, 2 Form A, 1 Form B, 1 Form C

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.

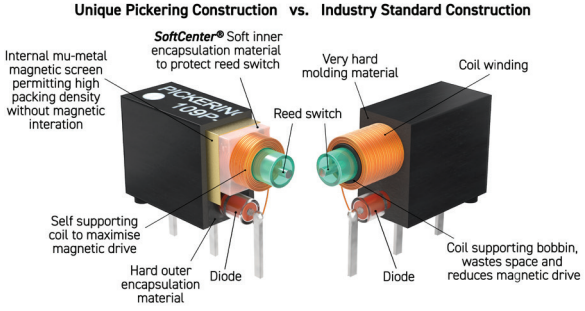
Series 109RF Coaxial 1 Form A

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.

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 mumetal magnetic screen.

Typical Pickering *SoftCenter*® Construction



Highlighted parts are available from Rapid Electronics Ltd

Series 109 switch ratings - The contact ratings for each switch type are shown below:

Switch No	Switch form	Power rating	Max. switch current	Max. carry current	Max. switching volts	Life expectancy ops typical (see Note[1] below)	Operate time inc bounce (max)	Release time	Special features
1	A	15 W (5L Version) 20 W (Other)	1.0 A	1.2 A	200	10^9	0.5 ms	0.2 ms	General purpose
2	A or B	10 W	0.5 A	1.2 A	200	10^9	0.5 ms	0.2 ms	Low level
3	C	3 W	0.1 A	0.1 A	30	10^7	0.75 ms	0.5 ms	Change over

Switch no.2 is particularly good for switching low currents and/or voltages. It is the ideal switch for A.T.E. systems where cold switching techniques are often used. Where higher power levels are involved, switch no.1 is more suitable.

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
12 V	9 V	1.2 V

Coil data and type numbers

Device type	Package Style	Type Number	Coil (V)	Coil resistance	Max. contact resistance (initial)	Insulation resistance (minimum)		Capacitance (typical) (see Note[2] below)	
						Switch to coil	Across switch	Closed switch to coil	Across open switch
1 Form A General Purpose Switch No. 1	1	109-1-A-5/1D 109-1-A-5L/1D 109-1-A-12/1D	5 5 12	500 Ω 1000 Ω 1000 Ω	0.15 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
1 Form A Low Level Switch No. 2	1	109-1-A-3/2D 109-1-A-5/2D 109-1-A-5L/2D 109-1-A-12/2D	3 5 5 12	330 Ω 500 Ω 1000 Ω 1000 Ω	0.12 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
1 Form B Low Level Switch No. 2	2	109-1-B-5/2D	5	750 Ω	0.12 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
1 Form C (change-over) Switch No. 3	5	109-1-C-3/3D 109-1-C-5/3D	3 5	100 Ω 150 Ω	0.25 Ω	10^{12} Ω	10^{11} Ω	See Note[3]	See Note[3]
2 Form A Switch No. 2	3	109-2-A-3/2D 109-2-A-5/2D 109-2-A-12/2D	3 5 12	200 Ω 375 Ω 750 Ω	0.14 Ω	10^{12} Ω	10^{12} Ω	See Note[3]	See Note[3]
50 Ω Coaxial Switch No. 1	4	109RF50-1-A-5/1D 109RF50-1-A-12/1D	5 12	375 Ω 600 Ω	0.15 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
50 Ω Coaxial Switch No. 2	4	109RF50-1-A-3/2D 109RF50-1-A-5/2D 109RF50-1-A-12/2D	3 5 12	200 Ω 375 Ω 600 Ω	0.12 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
75 Ω Coaxial Switch No. 1	4	109RF75-1-A-5/1D 109RF75-1-A-12/1D	5 12	375 Ω 600 Ω	0.15 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
75 Ω Coaxial Switch No. 2	4	109RF75-1-A-5/2D 109RF75-1-A-12/2D	5 12	375 Ω 600 Ω	0.12 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
1 Form A Switch No. 1	6	109P-1-A-5/1D 109P-1-A-5L/1D 109P-1-A-12/1D	5 5 12	500 Ω 1000 Ω 1000 Ω	0.15 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF
1 Form A Switch No. 2	6	109P-1-A-3/2D 109P-1-A-5/2D 109P-1-A-5L/2D 109P-1-A-12/2D	3 5 5 12	250 Ω 500 Ω 1000 Ω 1000 Ω	0.12 Ω	10^{12} Ω	10^{12} Ω	2.5 pF	0.1 pF

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: 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.

Vibration: Maximum 20 G

Shock: Maximum 50 G

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 1 x 10^9 ops. At the maximum load (resistive), typical life is 1 x 10^7 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] Capacitance across open switch

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

Note[3] Capacitance values

The value will depend upon on the mode of connection/guarding of unused terminals. Please contact technical sales for details.

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

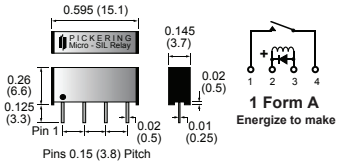
ISO9001 Manufacture of Reed Relays FM 29036

Pin Configuration and Dimensional Data

Dimensions in Inches (Millimeters in brackets)

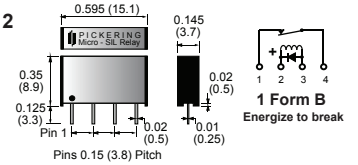
Package Style 1

Mu-metal Package
109-1-A-?



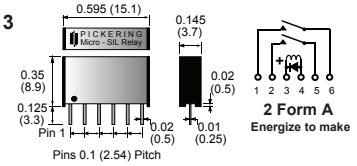
Package Style 2

Mu-metal Package
109-1-B-?



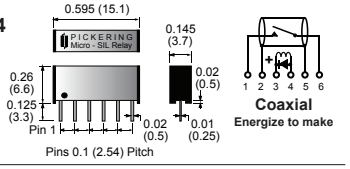
Package Style 3

Mu-metal Package
109-2-A-?



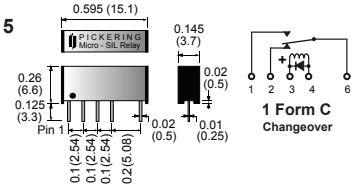
Package Style 4

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



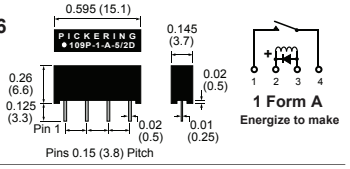
Package Style 5

Mu-metal Package
109-1-C-?



Package Style 6

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



Important: Where the optional 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.

3D Models: Interactive models of the complete range of Pickering relay products can be downloaded from the web site.

Order Code

109 RF 50 - 1 - A - 5 L / 2 D

- Series
- RF (Omit if RF not required)
- RF Impedance 50Ω or 75Ω (Omit if not RF)
- Number of reeds
- Switch form
- Coil voltage
- 'L' - Special 1000Ω, 5V coil
  (Form A Types only. Not RF - Omit 'L' if not required)
- Switch number (1, 2 or 3 See table adjacent)
- Diode if fitted (Omit if not required)

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.

Please ask us for a FREE evaluation sample.