

# RI-23 Series Dry Reed Switch



## RI-23 Series

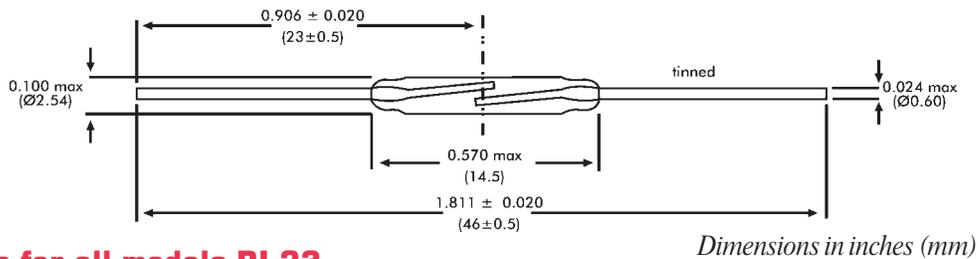
Micro dry-reed switch hermetically sealed in a gas-filled envelope. Single-pole, single-throw (SPST) type, having normally open contacts, and containing two magnetically actuated reeds.

The switch is of the double-ended type and may be actuated by an electromagnet, a permanent magnet or a combination of both.

The device is intended for use in sensors, relays, pulse counters or similar devices.

## RI-23 Series Features

- ◆ General purpose reed switch
- ◆ Contact layers: gold, plated ruthenium
- ◆ Superior glass-to-metal seal and blade alignment
- ◆ Excellent life expectancy and reliability



## General data for all models RI-23

### AT-Customization / Preformed Leads

Besides the standard models, customized products can also be supplied offering the following options:

- Operate and release ranges to customer specification
- Cropped and/or preformed leads

### Coils

All characteristics are measured using the Philips Standard Coil. For definitions of the Philips Standard Coil, refer to "Application Notes" in the *Reed Switch Technical & Application Information* Section of this catalog.

### Life expectancy and reliability

The life expectancy data given below are valid for a coil energized at 1.25 times the published maximum operate value for each type in the RI-23 series.

#### No load conditions (operating frequency: 100Hz)

Life expectancy : min.  $10^8$  operations with a failure rate of less than  $10^{-9}$  with a confidence level of 90%.

End of life criteria:

Contact resistance >  $1\Omega$  after 2 ms

Release time > 2 ms (latching or contact sticking).

#### Loaded conditions (resistive load: 12 V; 4 mA; (15 mA peak); operating frequency: 170 Hz)

Life expectancy: min.  $10^7$  operations with a failure rate of less than  $10^{-8}$  with a confidence level of 90%.

End of life criteria:

Contact resistance >  $2\Omega$  after 4 ms

Release time > 0.7 ms (latching or contact sticking).

Switching different loads involves different life expectancy and reliability data. Further information is available on request.

### Mechanical Data

Contact arrangement is normally open; lead finish is tinned; net mass is approximately 190 mg; and can be mounted in any position.

### Shock

The switches are tested in accordance with "IEC 68-2-27", test Ea (peak acceleration 150 G, half sine wave; duration 11 ms). Such a shock will not cause an open switch (no magnetic field present) to close, nor a switch kept closed by an 80 AT coil to open.

# RI-23 Series Dry Reed Switch

| Model Number                           |                     |            | RI-23AAA        | RI-23AA         | RI-23A          | RI-23B          | RI-23C          |
|--|---------------------|------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Parameters                             | Test Conditions     | Units      |                 |                 |                 |                 |                 |
| <b>Operating Characteristics</b>       |                     |            |                 |                 |                 |                 |                 |
| Operate Range                          |                     | AT         | 8-16            | 14-23           | 18-32           | 28-52           | 46-70           |
| Release Range                          |                     | AT         | 4-14            | 7.5-17.5        | 8-22            | 12-29           | 16-32           |
| Operate Time - including bounce (typ.) | energization 100 AT | ms         | 0.1 (20AT)      | 0.25 (29AT)     | 0.25 (40AT)     | 0.25 (65AT)     | 0.25 (88AT)     |
| Bounce Time (typ.)                     | energization 100 AT | ms         | 0.05 (20AT)     | 0.15 (29AT)     | 0.15 (40AT)     | 0.15 (65AT)     | 0.15 (88AT)     |
| Release Time (max)                     | energization 100 AT | $\mu$ s    | 70 (20AT)       | 30 (29AT)       | 30 (40AT)       | 30 (65AT)       | 30 (88AT)       |
| Resonant Frequency (typ.)              |                     | Hz         | 5500            | 5500            | 5500            | 5500            | 5500            |
| <b>Electrical Characteristics</b>      |                     |            |                 |                 |                 |                 |                 |
| Switched Power (max)                   |                     | W          | 10              | 10              | 10              | 10              | 10              |
| Switched Voltage DC (max)              |                     | V          | 200             | 200             | 200             | 200             | 200             |
| Switched Voltage AC, RMS value (max)   |                     | V          | 140             | 140             | 140             | 140             | 140             |
| Switched Current DC (max)              |                     | mA         | 250             | 500             | 500             | 500             | 500             |
| Switched Current AC, RMS value (max)   |                     | mA         | 250             | 500             | 500             | 500             | 500             |
| Carry Current DC (max)                 |                     | A          | 1               | 1.5             | 2.5             | 2.5             | 2.75            |
| Breakdown Voltage (min)                |                     | V          | 200             | 275             | 325             | 400             | 500             |
| Contact Resistance (initial max)       | (energization)      | m $\Omega$ | 100 (20 AT)     | 100 (25 AT)     | 100 (30AT)      | 100 (40 AT)     | 100 (40 AT)     |
| Contact Resistance (initial typ.)      | (energization)      | m $\Omega$ | 70 (20 AT)      | 70 (25 AT)      | 70 (30 AT)      | 70 (40 AT)      | 70 (40 AT)      |
| Contact Capacitance (max)              | without test coil   | pF         | 0.3             | 0.3             | 0.25            | 0.25            | 0.25            |
| Insulation Resistance (min)            | RH $\leq$ 45%       | M $\Omega$ | 10 <sup>6</sup> |

## Vibration

The switches are tested in accordance with “IEC 68-2-6”, test Fc (acceleration 10G; below cross-over frequency 57 to 62 Hz; amplitude 0.75 mm; frequency range 10 to 2000 Hz, duration 90 minutes). Such a vibration will not cause an open switch (no magnetic field present) to close, nor a switch kept closed by an 80 AT coil to open.

## Mechanical Strength

The robustness of the terminations is tested in accordance with “IEC 68-2-21”, test Ua<sub>1</sub> (load 40 N).

## Operating and Storage Temperature

Operating ambient temperature; min: -55°C; max: +125°C. Storage temperature; min: -55°C; max: +125°C. **Note:** Temperature excursions up to 150°C may be permissible. For more information contact your nearest Coto Technology sales office.

## Soldering

The switch can withstand soldering heat in accordance with “IEC 68-2-20”, test Tb, method 1B:solder bath at 350  $\pm$ 10 °C for 3.5  $\pm$ 0.5 s. Solderability is tested in

accordance with “IEC 68-2-20”, test Ta, method 3: solder globule temperature 235°C; ageing 1b: 4 hours steam.

## Welding

The leads can be welded.

## Mounting

The leads should not be bent closer than 1 mm to the glass-to-metal seals. Stress on the seals should be avoided. Care must be taken to prevent stray magnetic fields from influencing the operating and measuring conditions.