1 Description

Molded SIP relays are the industry standard when high reliability and consistent performance are desired in a compact package. The 9104 Series adds high voltage switching and high voltage standoff capability to a SIP relay package, switching up to 1kV and with a breakdown voltage of 4kV.

In accordance with our commitment to quality, this relay is tested 100%, even at high voltage across all pin combinations. This makes it the ideal relay with the highest reliability requirements for the most stringent applications.

Device Packages



2 Features

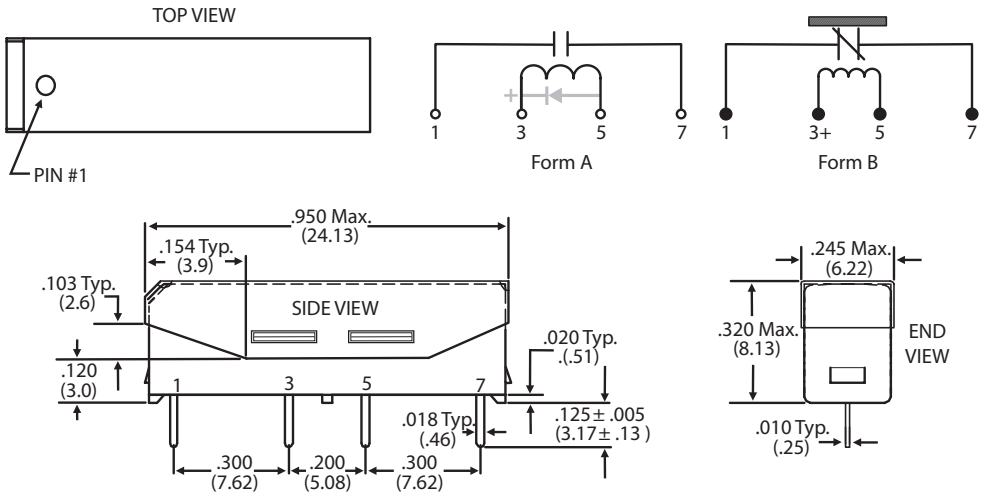
- Form A and B contacts available
- High voltage switching up to 1000 V
- High dielectric strength (up to 4000 V)
- High Insulation Resistance – $10^{11}\Omega$ minimum
- High reliability, hermetically sealed contacts for long life
- High speed switching compared to electromechanical relays
- Molded thermoset body on integral lead frame design
- Optional Coil Suppression Diode – protects coil drive circuits
- Magnetic Shield – reduces interaction
- UL File #E67117 (Form A Only) - Contact factory for details
- RoHS compliant

3 Applications

- Automated Test Equipment (ATE)
- Instrumentation
- Medical Equipment
- Battery Management
- Process Control
- Solar Systems

4 Dimensions

In Inches (Millimeters)



Note: The Form B version does not have a magnetic shield.

5 Ordering Information

Part Number **9104-XX-XX**

Model Number
9104

Coil Voltage
05=5 volts 12=12 volts

General Options
0=No Diode
1=Diode[2]
2=Form B (12 V, 4000 V Only)

Dielectric Strength (Min) / Contacts Shield to Coil
1=2000/3000
3=3000/3000
4=4000/4000

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6 Parameters - Model Number 9104

Parameters	Test Conditions	Units	4 Pin SIP			
Relay Configuration			**9104-XX-1X Form A**	**9104-XX-3X Form A**	**9104-XX-4X Form A**	**9104-12-42 Form B**
Coil Specs.						
Nom. Coil Voltage		VDC	5.0 12.0	5.0 12.0	5.0 12.0	12.0
Max. Coil Voltage		VDC	6.5 15.0	6.5 15.0	6.5 15.0	15.0
Coil Resistance	+/- 10%, 25°C	Ω	175 500	175 500	140 500	500
Operate Voltage	Must Operate By	VDC - Max.	3.75 9.0	3.75 9.0	3.75 9.0	9.0
Release Voltage	Must Release By	VDC - Min.	0.5 1.0	0.5 1.0	0.5 1.0	0.4
Contact Ratings						
Switching Voltage[3]	Max DC/Peak AC Resist.	Volts	1000			1000
Switching Current	Max DC/Peak AC Resist.	Amps	0.5			0.5
Carry Current	Max DC/Peak AC Resist.	Amps	1.3			1.3
Contact Rating	Max DC/Peak AC Resist.	Watts	10			10
Life Expectancy - Typical[1]	Signal Level 1.0V, 10mA	x 10^6 Ops.	300			50
Static Contact Resistance (Max. Init.)	50mV, 10mA	Ω	0.150			0.150
Dynamic Contact Resistance (Max. Init.)	0.5V, 50mA at 100Hz, 1.5msec.	Ω	0.200			0.200
Relay Specifications						
Insulation Resistance (Min.)	Between all Isolated Pins at 100V, 25°C, 40%RH	Ω	10^{11}			
Capacitance - Typical Across Open Contacts	No Shield	pF	1.0			
Open Contact to Coil	No Shield	pF	-			
Dielectric Strength (Min.)	Between Contacts Contacts/Shield to Coil	VDC/peak AC VDC/peak AC	2000 3000	3000 3000	4000 4000	4000 4000
Operate Time - Including Bounce - Typical	At Nominal Coil Voltage, 30Hz, Square Wave	msec.	0.75	0.75	0.75	1.0
Release Time - Typical		msec.	0.5	0.5	0.5	1.0

General Notes:

1. Consult factory for life expectancy at other switching loads.
2. Optional diode (available in Form A configuration only) is connected to pin #3 (cathode) and pin #5 (anode). Correct coil polarity must be observed by connecting the positive terminal of the applied voltage to the cathode pin.
3. Switch current limited to 1.0mA @ 1000V.

Environmental Ratings:

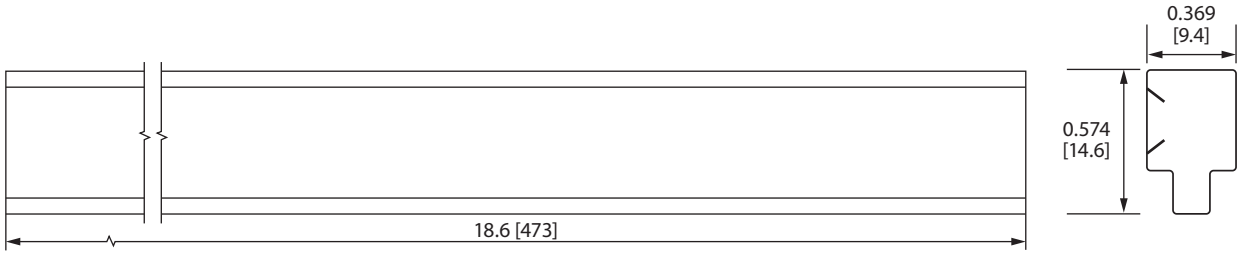
Storage Temp:-35°C to + 100°C; Operating Temp: -20°C to +85°C
All electrical parameters measured at 25°C unless otherwise specified.
Vibration: 20 G's to 2000 Hz; Shock: 50 G's

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7 Package Information

Plastic Tube Dimensions

- 18 relays per tube



8 Relay Processing Notes

8.1 Soldering

Relays can be soldered by hand or by wave solder processing. Coto Technology recommends the maximum wave solder temperature (measured at the relay leads) as 270°C for 10 seconds. Temperature and time in excess of the recommended levels may result in damage to the relay. All our through-hole relays are compatible with either SAC alloy or eutectic soldering process.

8.2 Cleaning

9104 is designed and manufactured to provide an adequate seal from external conditions. However, caution must be taken during the cleaning process not to expose the relays to conditions that will allow moisture to permeate into the package. Caution should be taken with dwell time between reflow and cleaning, high pressure spraying, and time in cleaning solvent/aqueous solutions, as these cleaning process parameters can contribute to moisture permeation. Board level bake out may be required after wash to remove moisture that has been introduced during cleaning operations.

8.3 Relay Storage

Relay parametric specifications are specified at 25°C and 40% RH. Reduced relay performance may result if storage or use environments significantly exceed these conditions. If high insulation resistance is required, Coto Technology recommends that relay storage, processing, and use environments are adequate to achieve the desired results. Relays should be stored in similar environmental conditions as other high-reliability active and passive electronic components. Proper storage of relays is also important to maintain solderability over an extended period of time.

8.4 Handling

Relays should be handled with care. Dropping or mishandling relays may result in damage that can contribute to a direct failure or, even worse, a latent field failure. If relays are dropped, Coto Technology recommends that they should be discarded.

Coto Technology does not recommend use of ultrasonic activated equipment with relays. The use of ultrasonic equipment may change the characteristics of the relay and can contribute to failure.

For more **technical and application information**, please refer to the QR code above.

Download App Note: **"Understanding Reed Relay Power Ratings & How to Extend Switching Capabilities"**, please refer to the QR code above.

Download App Note: **"Optimizing Cable Tester Switching Architecture"**, please refer to the QR code above.

Download App Note: **"Applications of Small Signal Relays in Photovoltaic Inverters"**, please refer to the QR code above.

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