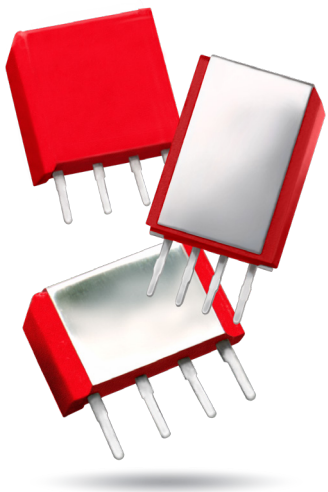
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1 Description

The 9011, 9012 & 9117 are compact versions of Coto's standard 9000 SIPs, with the 9011 and 9117 using 65% less board space and the 9012 using 47% less board space (LxW). These miniature SIP relays are ideal for use in ATE applications and other high reliability test, measurement and telecommunications applications where high board density and long life are key requirements.

Device Packages



2 Features

- 9012 is a 10W SIP relay (.400" x .150" x .400")
- 9011 is a 3W SIP relay (.400" x .150" x .265")
- 9117 is the smallest 3W SIP relay (.270" x .150" x .385")
- Magnetic shielding to reduce interaction
- Optional coil suppression diode – protects coil drive circuits
- UL File #E67117 - Contact factory for details
- High insulation resistance $10^{12}\Omega$ minimum
- High reliability, hermetically sealed contacts for long life
- High speed switching as compared to electromechanical relays
- Molded thermoset body on integral lead frame design
- RoHS compliant

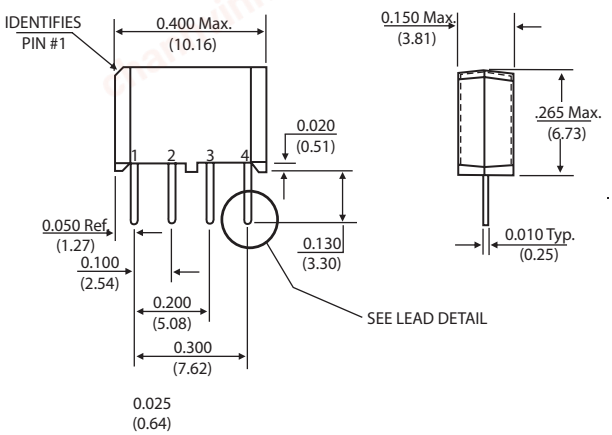
3 Applications

- Automated Test Equipment (ATE)
- Instrumentation
- Telecommunications

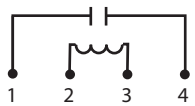
4 Dimensions

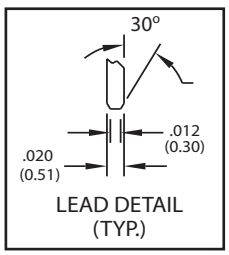
In Inches (Millimeters)

Model 9011



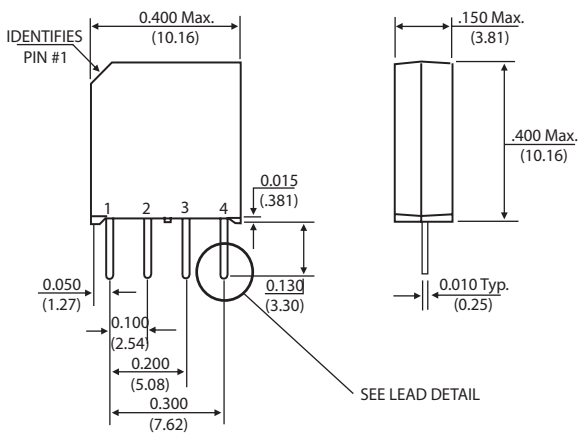
Schematic (9011 & 9012)



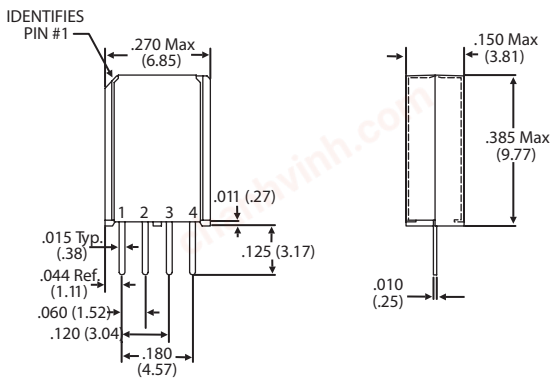


Lead Detail only applicable for models 9011 & 9012

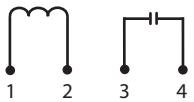
Model 9012



Model 9117



Schematic (9117)



Ordering Information

Part Number 90XX-XX-1X

Model Number
9011 9012 9117

Coil Voltage
05=5 volts
12=12 volts (N/A on 9117)

Magnetic Shield
1=Mag Shield (External 9011, 9117; Internal 9012)

General Options
0=No Diode
1=Diode[2]

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5 Parameters - Model Number 9011, 9012 and 9117

Parameters	Test Conditions	Units	9011[2,3]	9012[2,3]	9117[2,3]
Relay Configuration			**4 Pin SIP**	**4 PIN SIP**	**Narrow Fit**
Coil Specs.					
Nom. Coil Voltage		VDC	5.0 12.0	5.0 12.0	5.0
Max. Coil Voltage		VDC	6.5 15.0	6.5 15.0	6.0
Coil Resistance	+/- 10%, 25°C	Ω	500 750	500 750	400
Operate Voltage	Must Operate By	VDC - Max.	3.75 9.0	3.75 9.0	3.75
Release Voltage	Must Release By	VDC - Min.	0.4 1.0	0.4 1.0	0.5
Contact Ratings					
Switching Voltage	Max DC/Peak AC Resist.	Volts	100	200	100
Switching Current	Max DC/Peak AC Resist.	Amps	0.25	0.5	0.25
Carry Current	Max DC/Peak AC Resist.	Amps	0.5	1.0	0.5
Contact Rating	Max DC/Peak AC Resist.	Watts	3	10	3
Life Expectancy - Typical[1]	Signal Level 1.0V, 10mA	x 10^6 Ops.	250	1000	250
Static Contact Resistance (Max. Init.)	50mV, 10mA	Ω	0.150	0.120	0.120
Dynamic Contact Resistance (Max. Init.)	0.5V, 50mA at 100Hz, 1.5msec.	Ω	0.200	0.200	0.200
Relay Specifications					
Insulation Resistance (Min.)	Between all Isolated Pins at 100V, 25°C, 40% RH	Ω	10^{12}	10^{12}	10^{12}
Capacitance - Typical	Across Open Contacts Open Contact to Coil	pF	0.7 1.4	0.7 1.4	0.14 N/A
Dielectric Strength (Min.)	Between Contacts Contacts/Shield to Coil	VDC/peak AC VDC/peak AC	200 1500	200 1500	150 1500
Operate Time - Including Bounce - Typical	At Nominal Coil Voltage, 30Hz, Square Wave	msec.	0.35	0.35	0.2
Release Time - Max.		msec.	0.1	0.1	0.1

General Notes:

[1] Consult factory for life expectancy at other switching loads. Resistance >0.50Ω defines end of life or failure to open.

[2] Optional diode available. For models 9011 & 9012, the diode is connected to pin #2(+) and pin #3(-). For model 9117, the diode is connecte to pin #1(+) and pin #2(-). Correct coil polarity must be observed.

[3] Relays have magnetic shields; models 9011 & 9117 are external. Model 9012 is internal.

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.

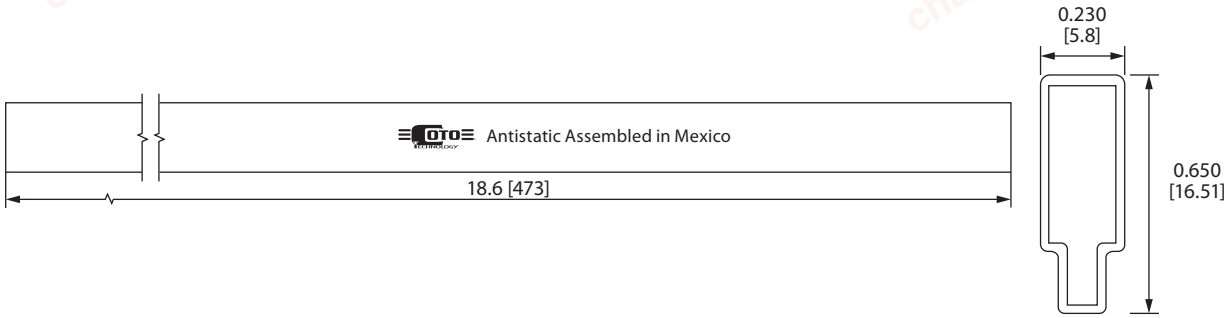
Vibration: 20 G's to 2000 Hz; *Shock:* 50 G's

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6 Package Information

Plastic Tube Dimensions (9011, 9012 & 9117)

- 39 relays per tube when ordered as 9011-XX-XX & 9012-XX-XX
- 58 relays per tube when ordered as 9117-XX-XX



7 Relay Processing Notes

7.1 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.

7.2 Cleaning

9011, 9012 & 9117 relays are 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.

7.3 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.

7.4 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 following QR code:

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