Applications

- General purpose, switching

Features

- Low capacitance
- Low resistance
- Fast switching
- Low distortion attenuation
- ADS models available

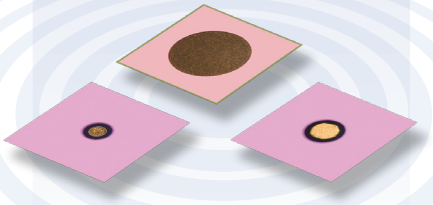
Silicon PIN Diode Chips

Skyworks broad product portfolio includes PIN diodes as packaged and bondable silicon chips, in addition to beam-lead, and plastic surface mount packaged devices for switch and attenuator applications.

Skyworks series of silicon PIN diode chips offer excellent performance in chip-and-wire hybrid circuit switches and attenuators. These devices are available in a wide variety of I layer thicknesses, capacitances and resistances which make them suitable for such diverse applications as very fast switches and low distortion attenuators.

Applications

PIN diodes are three layer diodes, comprised of a heavily doped anode (the "P" layer) and a heavily doped cathode (the "N" layer) separated by a virtually undoped intrinsic layer (the "I" layer). Under forward bias, charge carriers from the P and the N layers are forced into the I layer, which reduces its RF impedance. When a reverse bias voltage is applied across the PIN diodes, all free charge carriers are removed from the I layer, thereby causing its RF impedance to increase. This variable RF impedance versus DC or low frequency bias signal allows the diode to be used in RF switching circuits, in which the PIN diode is either heavily forward-biased or reverse biased, or in RF attenuation circuits, in which case the PIN diode is utilized as a continuously-variable RF resistance by controlling the magnitude of the DC bias current through the diode.



Electrical Specifications at 25 °C

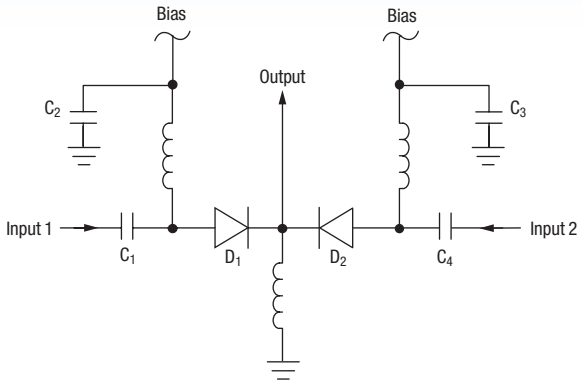
Part Number	Capacitance V_R = 50 V, 1 MHz (pF) Max.	Capacitance V_R = 0 V, 1 MHz (pF) Typ.	R_S I = 10 mA, 500 MHz (Ω) Max.	T_L I = 10 mA (ns) Typ.	Voltage Rating[1] (V)	I Region Thickness (µm) Nom.	Thermal Resistance (°C/W) Max.	Contact Diameter (Mils) Nom.	Outline Drawing
Switching Applications									
APD0505-000	0.05	0.1	2	20	50	5	100	1.5	150-806
APD0510-000	0.1	0.2	1.5	40	50	5	80	2.5	150-801
APD0520-000	0.2	0.25	1	50	50	5	80	3.5	150-801
APD0805-000	0.05	0.1	2	100	100	8	80	2	150-801
APD0810-000	0.1	0.15	1.5	160	100	8	60	3	150-801
APD1510-000	0.1	0.2	2	300	200	15	60	3	150-813
APD1520-000	0.2	0.25	1.2	900	200	15	30	4	150-802
Attenuator Applications									
APD2220-000	0.2	0.35	4	700	100	50	80	7.5	149-815

1. Reverse current is specified at 10 µA maximum at the voltage rating. This voltage should not be exceeded.

Switching

The circuit below shows a pair of PIN diodes used to form a single pole, double throw switch. In this switch, a positive control current typically of the order of 10 mA is applied to one of the bias inputs to place that side of the switch into its low insertion loss state, while a negative bias voltage is applied to the other bias input, forcing the diode on that side of the switch into its maximum RF impedance state to produce high isolation on that side of the switch.

Many other switching circuit variations exist. Please refer to "Design with PIN Diodes," available at www.skyworksinc.com for more information.



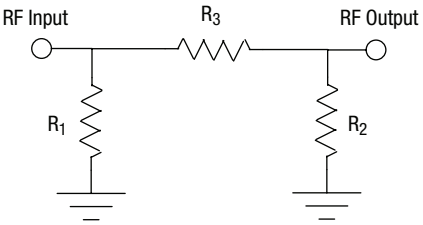
C2, C3 — Chip MIS capacitor
C1, C4 — Chip or beam-lead MIS capacitor
D1, D2 DSG9500 beam-lead PIN diode

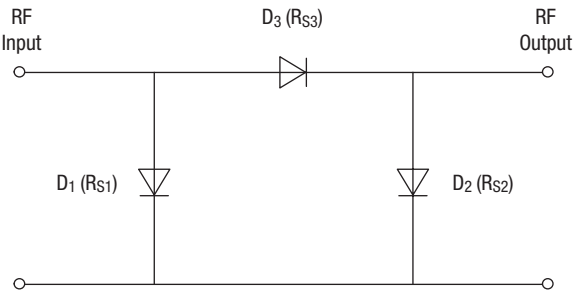
Typical SPDT Switch

Attenuation

A resistive attenuator can be built utilizing one or more PIN diodes. In this type of circuit, the RF resistance of the PIN diode is adjusted to a desired value by varying the magnitude of the DC bias current applied to the diode. This resistance produces attenuation.

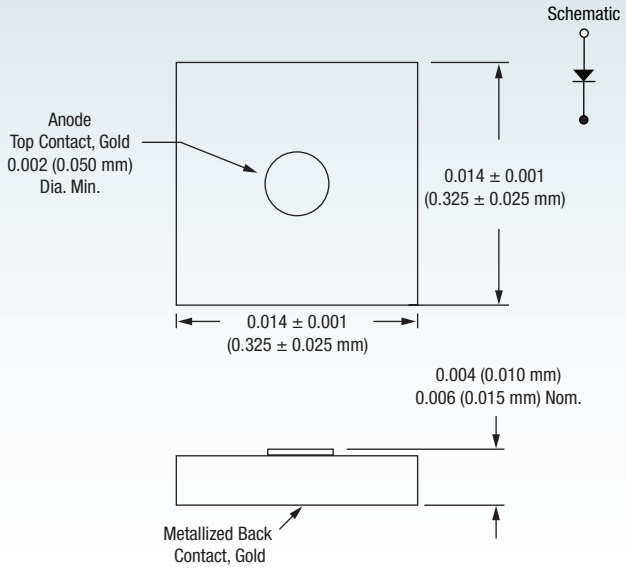
The diagrams below show an attenuator that utilizes three PIN diodes. Many other PIN diode attenuator circuit configurations are possible. Please refer to "Design with PIN Diodes," available at www.skyworksinc.com for more information.



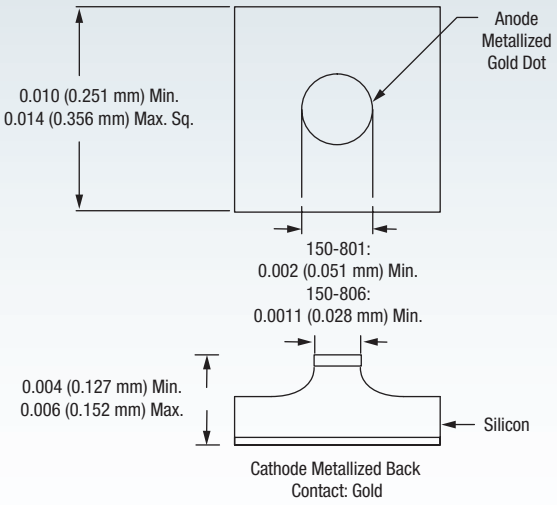


Outline Drawings

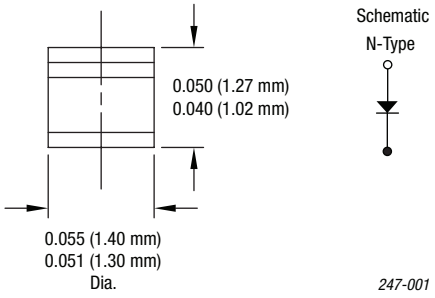
149-815



150 Series



-203



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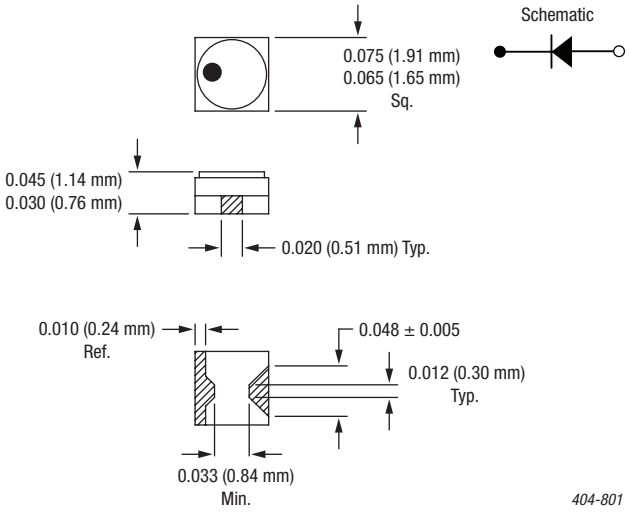

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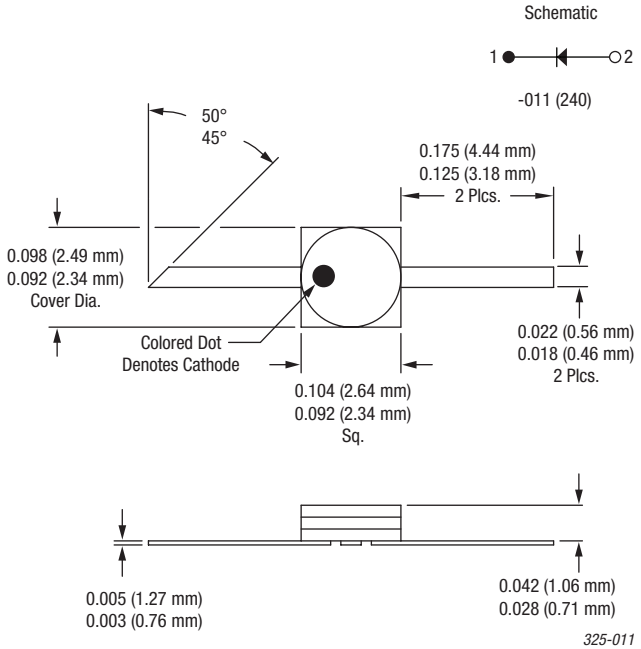

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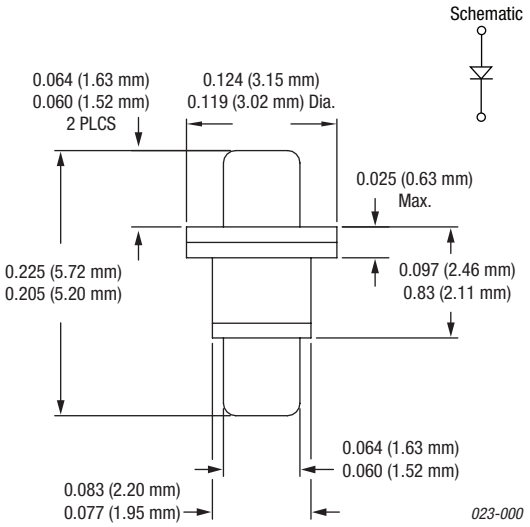

Application Notes

For additional information, please refer to the following Application Notes.

Design With PIN Diodes

Diode Chips, Beam-Lead Diodes, Capacitors: Bonding Methods and Packaging

PIN Diode Basics

Through our Green Initiative,™ we are committed to manufacturing products that comply with global government directives and industry requirements.

Skyworks is continuously innovating RF, analog and mixed-signal ICs. For the latest product introductions and information about Skyworks, visit our Web site at **www.skyworksinc.com**

For additional information on our broad overall product portfolio, please contact your local sales office or email us at **sales@skyworksinc.com.**

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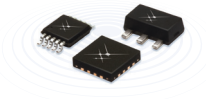

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