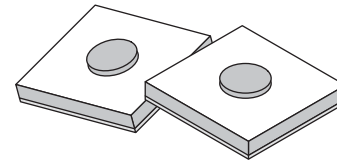


DATA SHEET

APD Series: Silicon PIN Diode Chips

Features

- Established Skyworks PIN diode process
- For switch and attenuator applications
- Low capacitance designs to 0.05 pF
- Voltage ratings to 100 V
- Chip size smaller than 15 mils square
- Available Green MSL-1 @ 250 °C per JEDEC J-STD-020



Description

Skyworks APD Series of silicon PIN diode chips is designed for use as switch and attenuator devices in high-performance hybrid microwave integrated circuits. These PIN diode designs are useful over a wide range of frequencies from below 100 MHz to beyond 30 GHz. These devices utilize Skyworks well-established silicon technology resulting in high resistivity and tightly controlled I region width PIN diodes. APD0505-00 through APD0810-000 are primarily designed for fast speed through moderate speed switch applications. They have low resistance and capacitance at zero bias and reverse bias. The thick I region APD2220-000 is primarily designed for low-distortion attenuator applications.



Skyworks Green products are lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, and are free from antimony trioxide and brominated flame retardants.



Absolute Maximum Ratings

Characteristic	Value
Power dissipation	$P_{diss} = \frac{175 - T_{amb}}{\theta} \text{ W}$
Operating temperature	-65 °C to +175 °C
Storage temperature	-65 °C to +200 °C

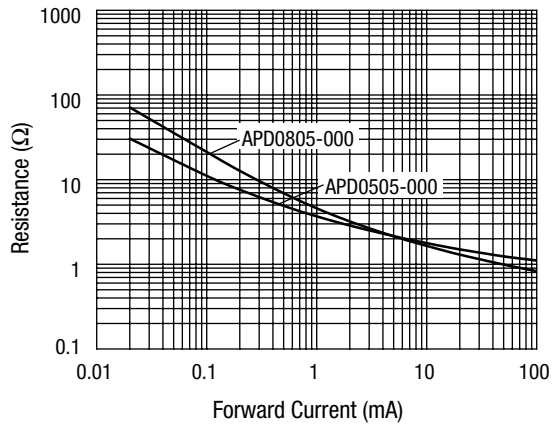
Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

CAUTION: Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.

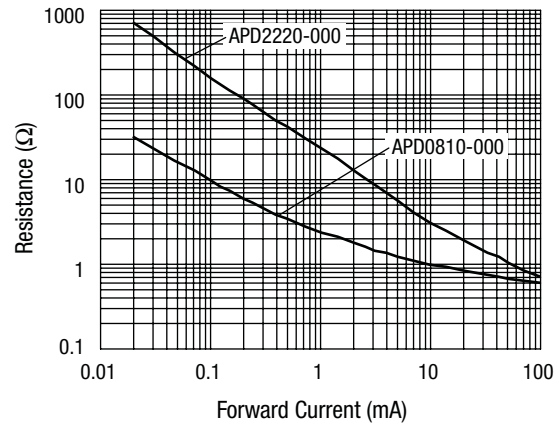
Electrical Specifications at 25 °C

Part Number	Capacitance $V_R = 50\text{ V}$, 1 MHz (pF)	Capacitance $V_R = 0\text{ V}$, 1 MHz (pF)	R_S $I = 10\text{ mA}$, 500 MHz (Ω)	TL $I = 10\text{ mA}$ (ns)	Voltage Rating $I_R = 10\ \mu\text{A}$ (V)	I Region (μm)	Thermal Resistance ($^{\circ}\text{C/W}$)	Contact Diameter (Mils)	Outline Drawing
	Max.	Typ.	Max.	Typ.	Min.	Nom.	Max.	Nom.	
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
Attenuator Applications									
APD2220-000	0.2	0.2	4	700	100	50	80	7.5	149-815

Typical Performance Data



Resistance vs. Forward Current @ 1 GHz



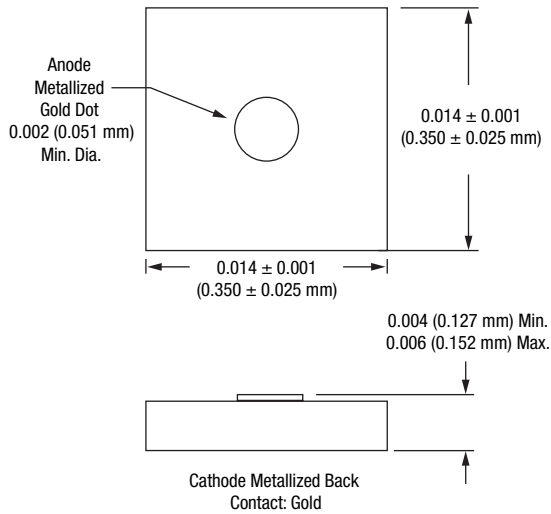
Resistance vs. Forward Current @ 1 GHz

SPICE Model Parameters

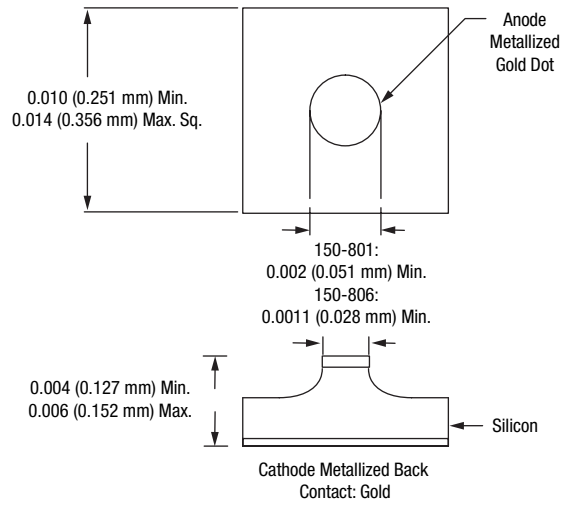
Description	Symbol	APD0505-000	APD0510-000	APD0805-000	APD0810-000	APD2220-000	Unit
Saturation current	I_S	6.40E-14	5.50E-17	1.20E-11	1.50E-12	2.00E-09	A
Series resistance	R_S	0.25	0.5	1	0.3	0.2	Ω
Emission coefficient	N	1.4	1.02	1.7	1.48	1.9	
Reverse breakdown	B_V	50	50	100	100	200	V
Current at B_V	I_{BV}	10E-06	10E-06	10E-06	10E-06	10E-06	A
Zero bias capacitance	C_{J0}	0.12E-12	0.18E-12	0.13E-12	0.16E-12	0.2E-12	F
Junction potential	V_J	1	1	1	1	1	V
Grading coefficient	M	0.5	0.5	0.5	0.5	0.5	
Transit time	TT	20E-9	40E-9	50E-9	160E-9	300E-9	s

Outline Drawings

149-815



150 Series



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