

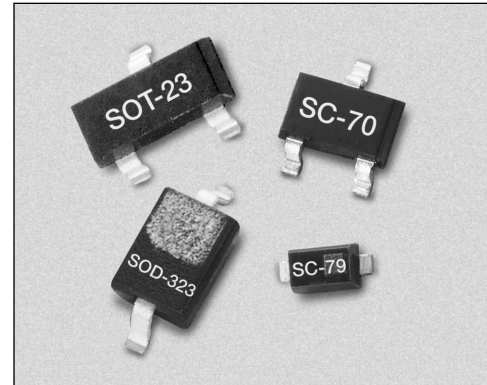
# Low Capacitance Plastic Packaged PIN Diodes



## SMP1321 Series

### Features

- Designed for High Performance Wireless Switch Applications
- 0.25 pF Capacitance Specified
- Multiple Package Configurations
- Available in Tape and Reel Packaging



### Description

The SMP1321 series of plastic packaged, surface mountable PIN diodes are designed for high volume switch applications from 10 MHz to beyond 2 GHz. The low capacitance of these diodes (0.25 pF) combined with its low resistance (2.0  $\Omega$  maximum at 10 mA) make the SMP1321 series particularly suited to high isolation series connected PIN diode switches in battery operated circuits. Available in a selection of plastic packages and in a variety of configurations including a low inductance (0.4 nH) SOT-23 (SMP1321-007), the small footprint SC-79 and the miniature SC-70.

### Absolute Maximum Ratings

Characteristic	Value
Reverse Voltage ( $V_R$ )	100 V
Power Dissipation @ 25°C Lead Temperature ( $P_D$ )	250 mW
Storage Temperature ( $T_{ST}$ )	-65°C to +150°C
Operating Temperature ( $T_{OP}$ )	-65°C to +150°C
ESD Human Body Model	Class 1B

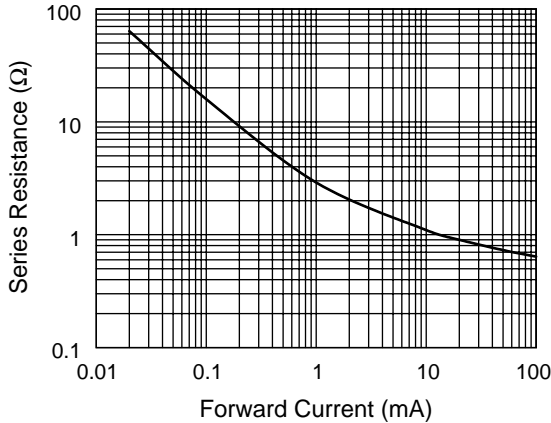
Diagram	Diagram	Diagram	Diagram	Diagram	Diagram	Diagram
Single	Common Anode	Common Cathode	Series Pair	Low Inductance	Single	Single
Marking: PM1	Marking: PM9	Marking: PM3	Marking: PM2	Marking: PMB		
SOT-23	SOT-23	SOT-23	SOT-23	SOT-23	SOD-323	SC-79
† SMP1321-001	† SMP1321-003	† SMP1321-004	† SMP1321-005	† SMP1321-007	† SMP1321-011	† SMP1321-079
$L_S = 1.5$ nH	$L_S = 1.5$ nH	$L_S = 1.5$ nH	$L_S = 1.5$ nH	$L_S = 0.4$ nH	$L_S = 1.5$ nH	$L_S = 0.7$ nH
	SC-70	SC-70	SC-70			
	† SMP1321-073	† SMP1321-074	† SMP1321-075			
	$L_S = 1.4$ nH	$L_S = 1.4$ nH	$L_S = 1.4$ nH			

† Available through distribution.

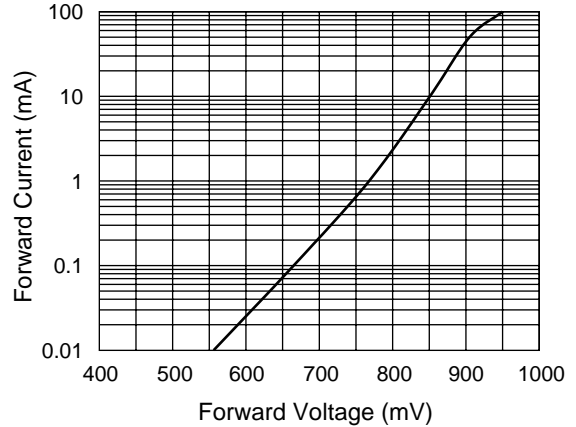
### Electrical Specifications at 25°C

Parameter	Condition	Typ.	Max.	Unit
Reverse Current ( $I_R$ )	$V_R = 100$ V		10	$\mu$ A
Capacitance ( $C_T$ )	$F = 1$ MHz, $V = 30$ V		0.25	pF
Resistance ( $R_S$ )	$F = 100$ MHz, $I = 1$ mA	3.0		$\Omega$
Resistance ( $R_S$ )	$F = 100$ MHz, $I = 10$ mA		2.0	$\Omega$
Forward Voltage ( $V_F$ )	$I_F = 10$ mA	0.85		V
Carrier Lifetime (TI)	$I_F = 10$ mA	0.4		$\mu$ S
I Region Width		15		$\mu$ m

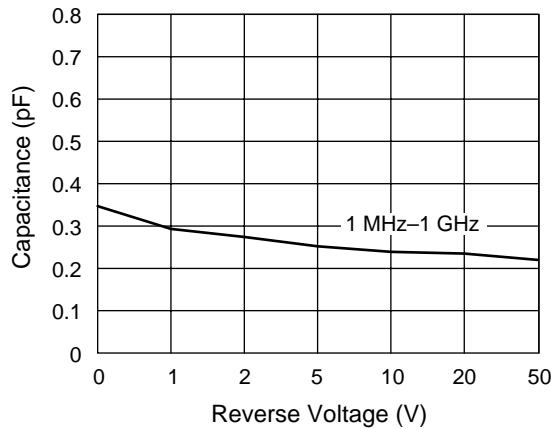
Typical Performance Data



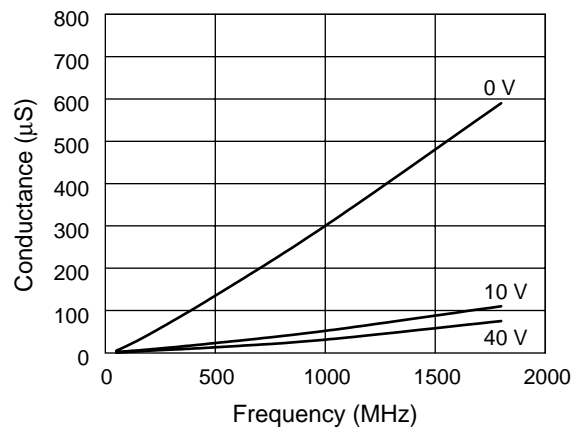
Series Resistance vs. Current @ 100 MHz



DC Characteristic



Capacitance vs. Reverse Voltage



Conductance vs. Frequency and Reverse Voltage

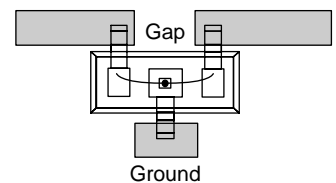
Resistance vs. Temperature @ 500 MHz

I <sub>F</sub> (mA)	R -55°C (Ω)	R -15°C (Ω)	R +25°C (Ω)	R +65°C (Ω)	R +100°C (Ω)
0.02	47.400	50.000	56.300	61.500	65.100
0.10	12.000	12.600	13.900	15.400	16.400
0.30	5.200	5.400	5.800	6.400	6.900
0.50	3.600	3.800	4.100	4.500	4.800
1.00	2.400	2.500	2.600	2.800	3.100
10.00	1.030	1.040	1.040	1.070	1.150
20.00	0.871	0.888	0.873	0.889	0.956
100.00	0.669	0.659	0.642	0.645	0.695

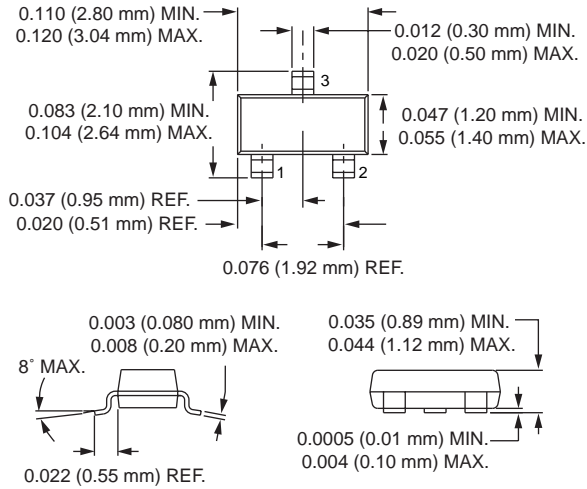
SMP1321-007

In the -007 configuration of the SOT-23 package, the package inductance is effectively reduced to 0.4 nH, in comparison to the 1.5 nH value of the standard configuration. This lower inductance will be particularly beneficial when the diodes are used as shunt connected switches at frequencies higher than 500 MHz, where inductance is the primary limitation on maximum switch isolation.

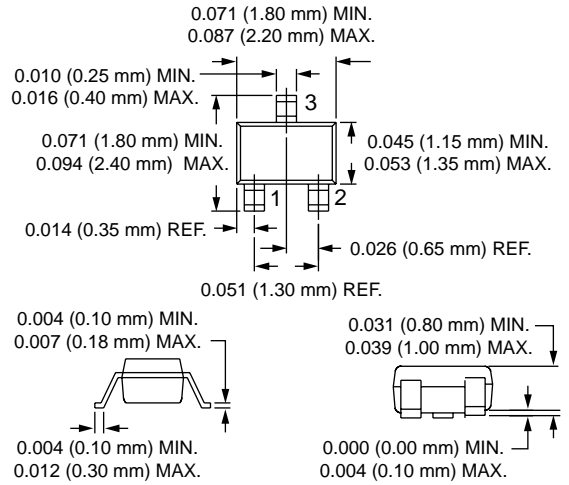
To achieve the effective 0.4 nH, the SOT-23 package must be inserted in the microstrip circuit board with a gap in the trace, as shown in the figure. Because of the polarity of the diode junction, this low inductance feature is only realizable with the cathode connected to ground.



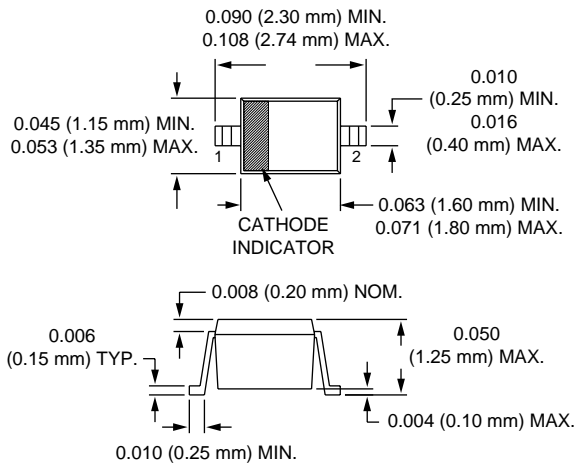
SOT-23



SC-70



SOD-323



SC-79

