DATA SHEET

SMP1321 Series: Low Capacitance, Plastic Packaged PIN Diodes

Features

- Designed for high-performance wireless switch applications
- 0.25 pF capacitance specified
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020
- Available in tape and reel packaging

Description

The SMP1321 series of plastic packaged, surface mountable PIN diodes is 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 Ω maximum at 10 mA) makes 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. The SMP1321-508 has been specifically designed for WLAN 802.11 a, b, and g applications.

NEW Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.

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

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.*

							
Single	Common Anode	Common Cathode	Series Pair	Low Inductance	Single	Single	Anti-Parallel
SOT-23	SOT-23	SOT-23	SOT-23	SOT-23	SOD-323	SC-79	LGA
SMP1321-001 Marking: PM1	**SMP1321-003** Marking: PM9	**SMP1321-004** Marking: PM3	♦**SMP1321-005** Marking: PM2	**SMP1321-007** Marking: PMB	**SMP1321-011** Marking: PM	**SMP1321-079**	**SMP1321-508 Lead (Pb)-Free** Marking: H
SMP1321-001LF Marking: RM1	**SMP1321-003LF** Marking: RM9	**SMP1321-004LF** Marking: RM3	♦**SMP1321-005LF** Marking: RM2	**SMP1321-007LF** Marking: RMB	**SMP1321-011LF** Marking: RM	**SMP1321-079LF**	
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	L_S = 0.6 nH
	SC-70		SC-70	SC-70			
	SMP1321-073 Marking: PM9		**SMP1321-074** Marking: PM2	**SMP1321-075** Marking: PMB			
	SMP1321-073LF Marking: RM9		**SMP1321-074LF** Marking: RM3	**SMP1321-075LF** Marking: RM2			
	L_S= 1.4 nH		L_S= 1.4 nH	L_S= 1.4 nH			

LF denotes lead (Pb)-free, RoHS-compliant packaging option as an alternative to our standard tin/lead (Sn/Pb) packaging.

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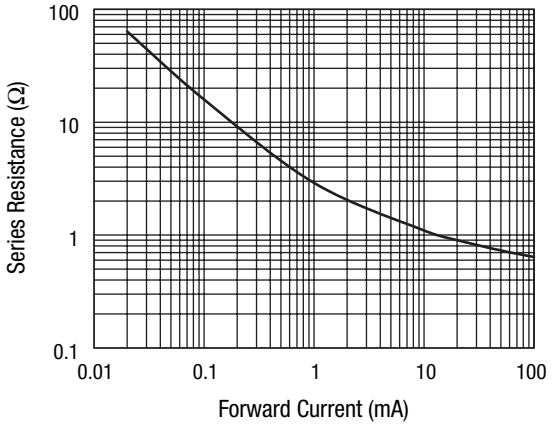
Electrical Specifications at 25 °C

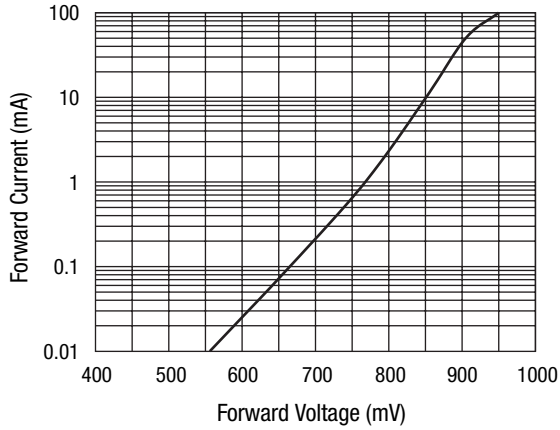
Parameter	Condition	Typ.	Max.	Unit
Reverse current (I_R)	V_R = 100 V		10	µA
Capacitance (C_T)(1)	F = 1 MHz, V = 30 V		0.25	pF
Resistance (R_S)	F = 100 MHz, I = 1 mA	3		Ω
Resistance (R_S)	F = 100 MHz, I = 10 mA		2	Ω
Forward voltage (V_F)	I_F = 10 mA	0.85		V
Carrier lifetime (TI)	I_F = 10 mA	0.4		µs
I region width		15		µm

1. The SMP1321-007 maximum capacitance is 0.4 pF.

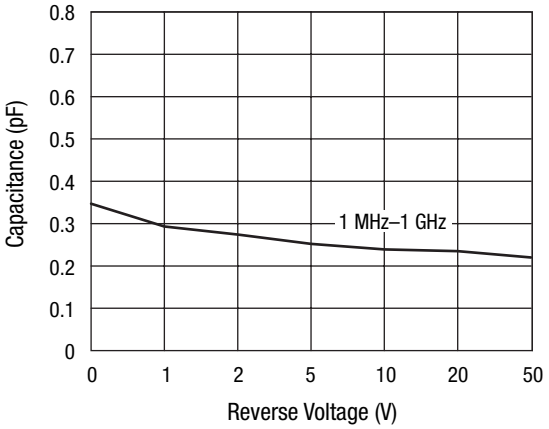
Typical Performance Data



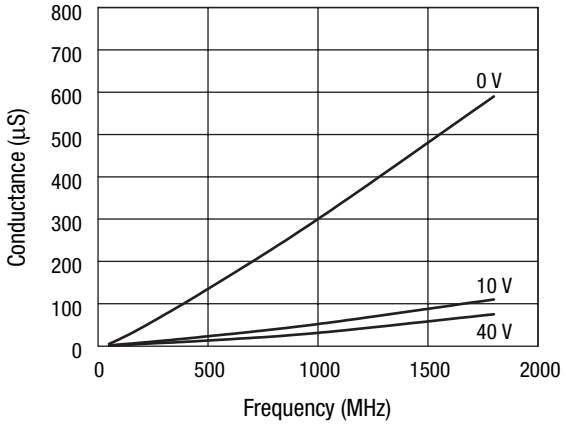
Series Resistance vs. Current @ 100 MHz



DC Characteristic



Capacitance vs. Reverse Voltage



Conductance vs. Frequency and Reverse Voltage

Resistance vs. Temperature @ 500 MHz

I_F (mA)	R -55 °C (Ω)	R -15 °C (Ω)	R 25 °C (Ω)	R 65 °C (Ω)	R 100 °C (Ω)
0.02	47.4	50	56.3	61.5	65.1
0.1	12	12.6	13.9	15.4	16.4
0.3	5.2	5.4	5.8	6.4	6.9
0.5	3.6	3.8	4.1	4.5	4.8
1	2.4	2.5	2.6	2.8	3.1
10	1.03	1.04	1.04	1.07	1.15
20	0.871	0.888	0.873	0.889	0.956
100	0.669	0.659	0.642	0.645	0.695

Recommended Solder Reflow Profiles

Refer to the *"Recommended Solder Reflow Profile"* Application Note.

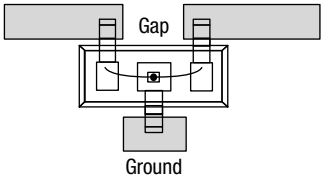
Tape and Reel Information

Refer to the *"Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation"* Application Note.

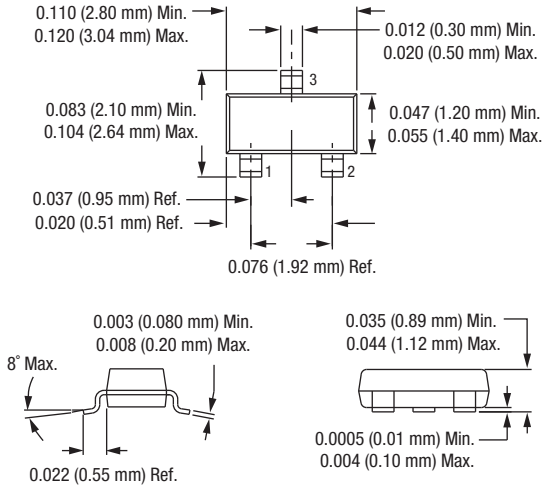
SMP1321-007

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.

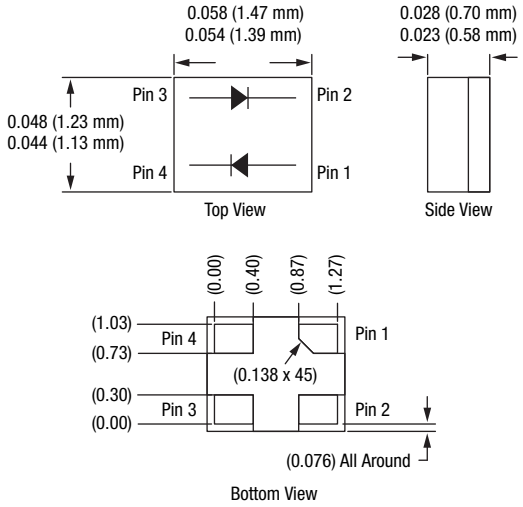
To achieve the effective 0.4 nH, the SOT-23 package must be inserted in the microstrip circuit board with a gap in the trace, as shown in the figure. Because of the polarity of the diode junction, this low inductance feature is realizable only with the cathode connected to ground.



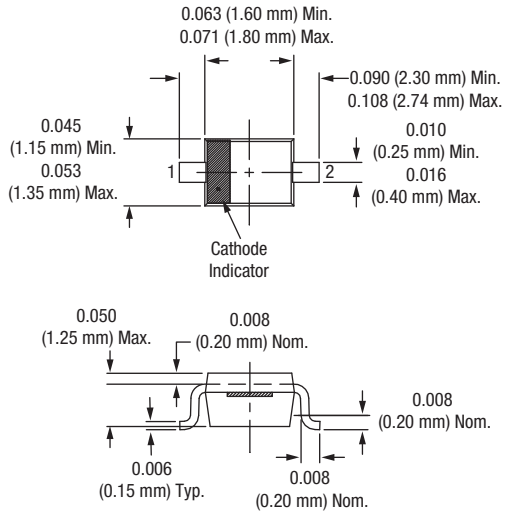
SOT-23



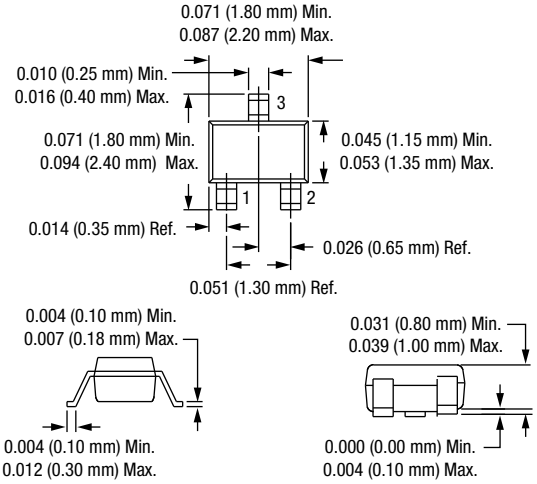
LGA



SOD-323



SC-70



SC-79