

DATA SHEET

# SMPA1345-040LF: Very Low Capacitance, Plastic-Packaged Silicon PIN Diode

## Automotive Applications

- Wi-Fi/Bluetooth® module notch filter
- Infotainment
- Navigation
- Telematics
- Garage door openers
- Wireless control systems



## Features

- AEC-Q101 qualified
- Level-3 PPAP available upon request
- IMDS material declaration available
- Very low insertion loss: 0.4 dB
- Capacitance: 0.15 pF
- Package rated MSL1, 260 °C per JEDEC J-STD-020



Skyworks Green™ products are compliant with all applicable legislation and are halogen-free. For additional information, refer to *Skyworks Definition of Green™*, document number SQ04-0074.

## Description

The SMPA1345-040LF plastic-packaged, surface-mountable PIN diode is designed for high-volume low-noise block (LNB), wireless local area network (WLAN), and switch applications from 10 MHz to 6 GHz. The short carrier lifetime of 100 ns (typical), combined with the thin I-region width of 10 μm (nominal) results in a fast speed RF switching PIN diode.

The RF performance of the SMPA1345-040LF is assured by virtue of the very low capacitance (0.15 pF) and low resistance (1.5 Ω at 10 mA).

Table 1 describes the packaging and marking of the SMPA1345-040LF.

**Table 1. SMPA1345-040LF Packaging and Marking**


Single
SOD-882 Green™
<b>SMPA1345-040LF</b> Marking: U
$L_S = 0.45 \text{ nH}$

## Electrical and Mechanical Specifications

The absolute maximum ratings of the SMPA1345-040LF are provided in Table 2. Electrical specifications are provided in Table 3.

Typical performance characteristics of the SMPA1345-040LF are illustrated in Figures 1 through 6.

**Table 2. SMPA1345-040LF Absolute Maximum Ratings<sup>1</sup>**

Parameter	Symbol	Minimum	Maximum	Units
Reverse voltage	$V_R$		50	V
Power dissipation @ 25 °C lead temperature	$P_D$		250	mW
Storage temperature	$T_{STG}$	-65	+150	°C
Operating temperature	$T_A$	-65	+150	°C
Electrostatic discharge: Human Body Model (HBM), Class 1B	ESD		1000	V

<sup>1</sup> Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

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

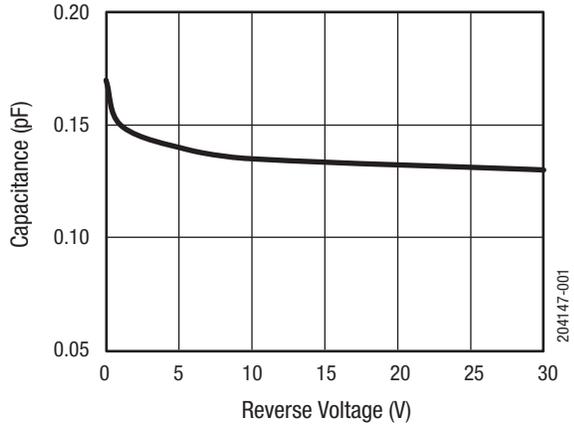
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**Table 3. SMPA1345-040LF Electrical Specifications<sup>1</sup>**  
( $T_A = +25\text{ °C}$ , Unless Otherwise Noted)

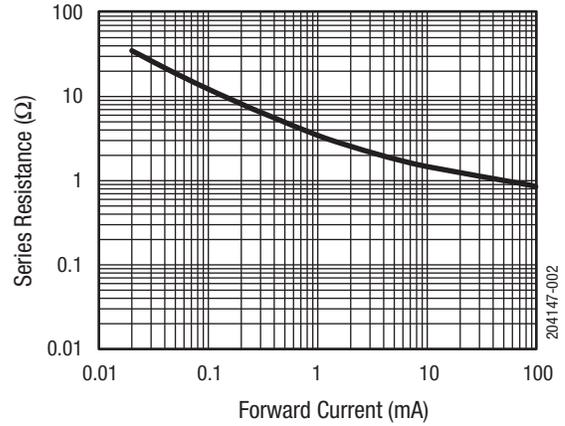
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Reverse current	$I_R$	$V_R = 50\text{ V}$			10	$\mu\text{A}$
Capacitance	$C_T$	F = 1 MHz:		0.19		pF
		V = 1 V V = 5 V		0.18	0.20	pF
Resistance	$R_S$	F = 100 MHz:		3.5		$\Omega$
		I = 1 mA I = 10 mA		1.5	2.0	$\Omega$
Forward voltage	$V_F$	$I_F = 10\text{ mA}$		0.89		V
Carrier lifetime	$\tau_I$	$I_F = 10\text{ mA}$		100		ns
I region width				10		$\mu\text{m}$

<sup>1</sup> Performance is guaranteed only under the conditions listed in this table.

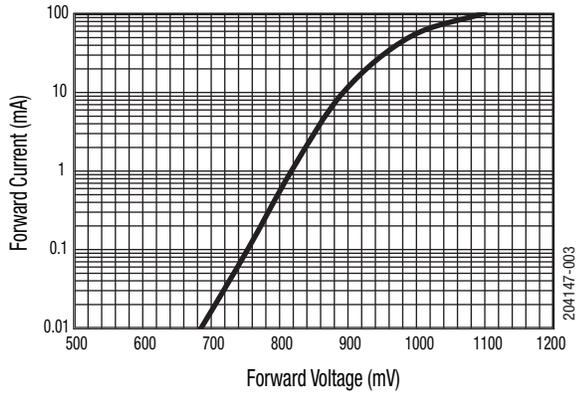
## Typical Performance Characteristics



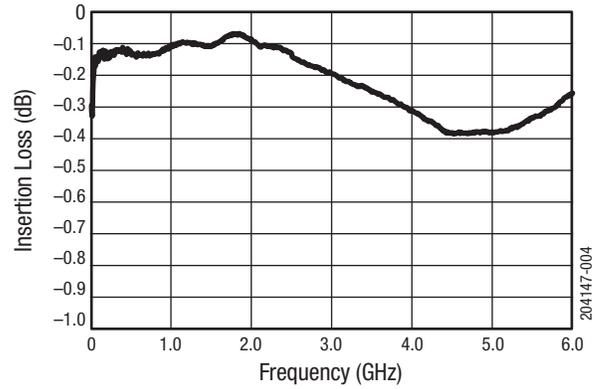
**Figure 1. Total Capacitance vs Reverse Voltage**



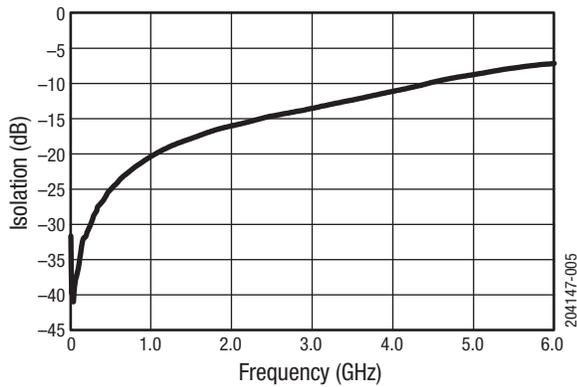
**Figure 2. Series Resistance vs Current @ 100 MHz**



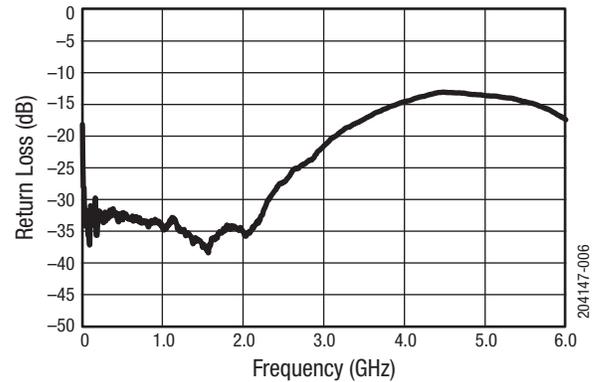
**Figure 3. Forward Current vs Forward Voltage**



**Figure 4. Insertion Loss vs Frequency  
( $I_F = 10$  mA)**



**Figure 5. Isolation vs Frequency  
( $V_R = 0$  V)**



**Figure 6. Return Loss vs Frequency  
( $I_F = 10$  mA)**

## Package Dimensions

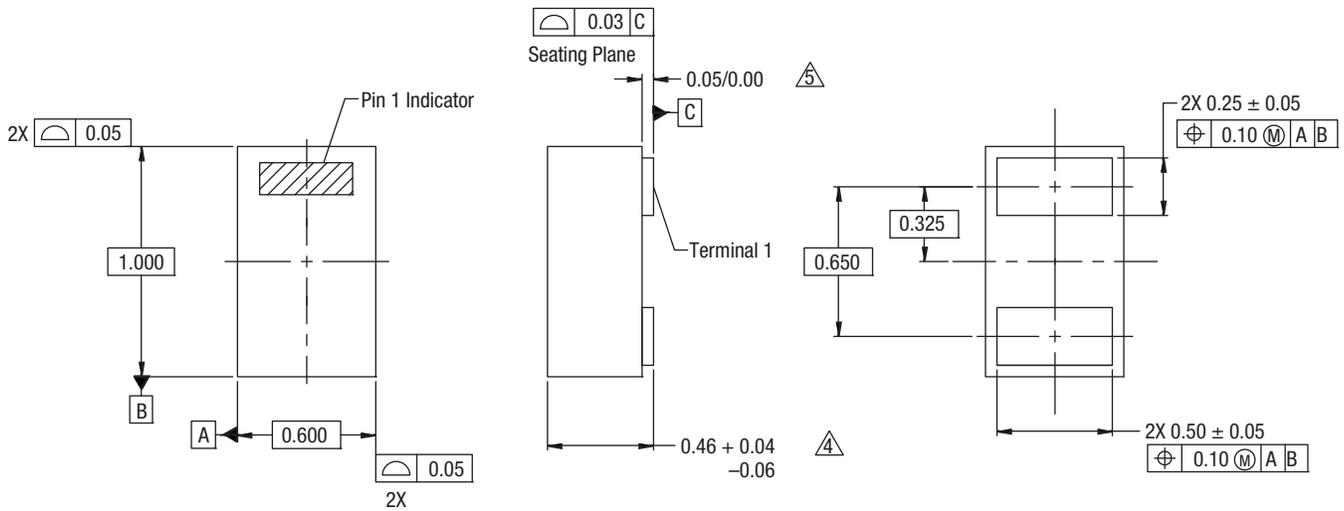
Package dimensions are shown in Figure 7, and tape and reel dimensions are provided in Figure 8.

## Package and Handling Information

Instructions on the shipping container label regarding exposure to moisture after the container seal is broken must be followed. Otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly.

The SMPA1345-040LF is rated to Moisture Sensitivity Level 1 (MSL1) at 260 °C. It can be used for lead or lead-free soldering. For additional information, refer to the Skyworks Application Note, *Solder Reflow Information*, document number 200164.

Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format.

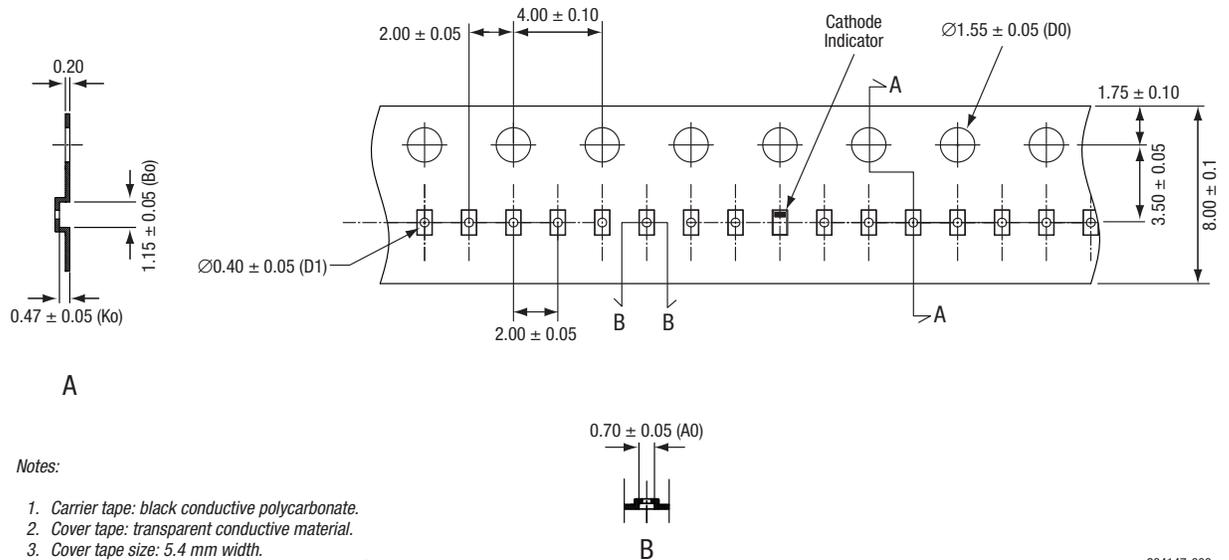


Notes:

1. All measurements are in millimeters.
2. Dimensions and tolerances according to ASME Y14.5M-1994.
3. These packages are used principally for discrete devices.
4. This dimension includes stand-off height and package body thickness, but does not include attached features, e.g., external heatsink or chip capacitors. An integral heatslug is not considered an attached feature.
5. This dimension is primarily terminal plating, but does not include small metal protrusion.

204147-007

Figure 7. SOD-882 Package Dimension Drawing



Notes:

1. Carrier tape: black conductive polycarbonate.
2. Cover tape: transparent conductive material.
3. Cover tape size: 5.4 mm width.
4. ESD surface resistivity is  $\geq 1 \times 10^4 \sim \leq 1 \times 10^8$  Ohms/square.
5. All dimensions are in millimeters.

204147-008

Figure 8. SOD-882 Tape and Reel Drawing

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