

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™
SMPA1345-040LF 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 Ratings¹

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

¹ 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.

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.*

Table 3. SMPA1345-040LF Electrical Specifications¹
($T_A = +25\text{ °C}$, Unless Otherwise Noted)

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

¹ Performance is guaranteed only under the conditions listed in this table.

Typical Performance Characteristics

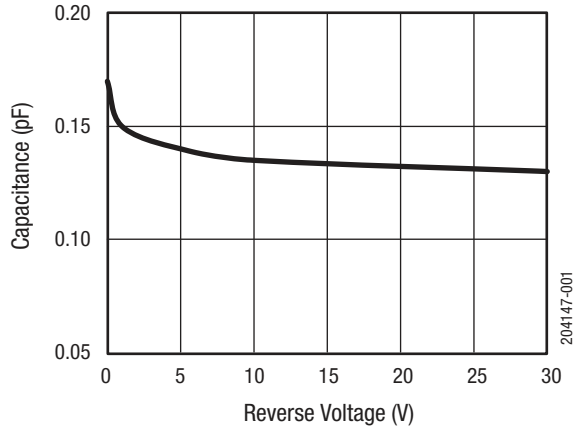


Figure 1. Total Capacitance vs Reverse Voltage

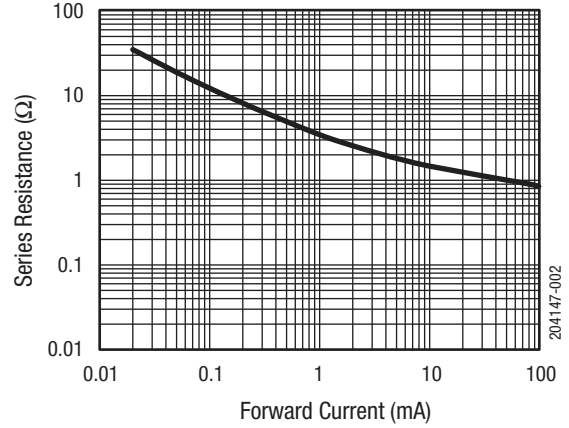


Figure 2. Series Resistance vs Current @ 100 MHz

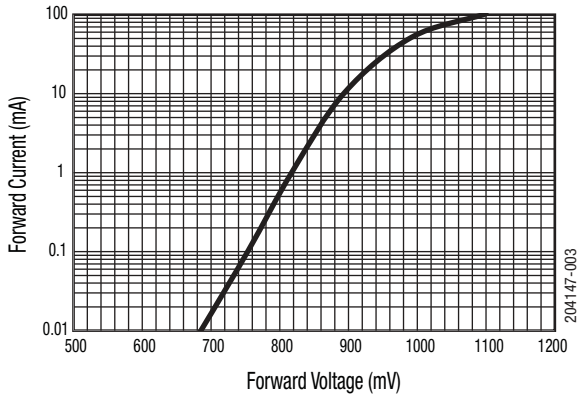


Figure 3. Forward Current vs Forward Voltage

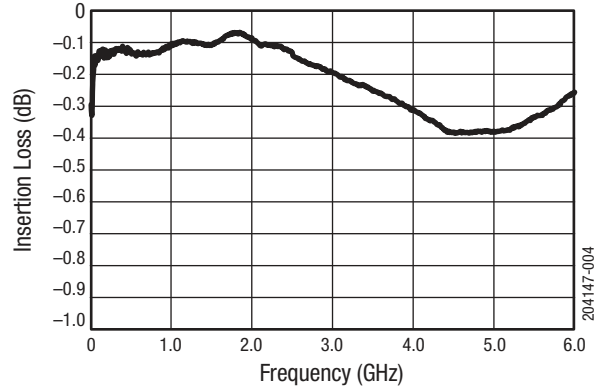


Figure 4. Insertion Loss vs Frequency
($I_F = 10 \text{ mA}$)

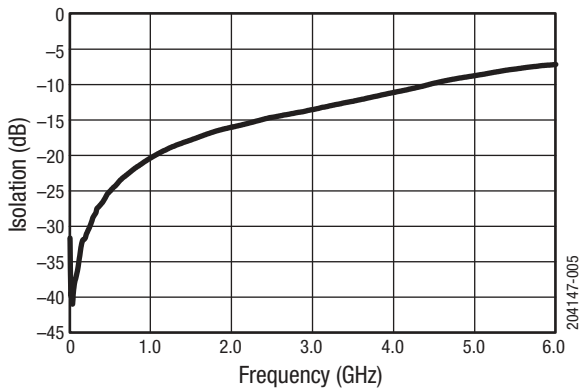


Figure 5. Isolation vs Frequency
($V_R = 0 \text{ V}$)

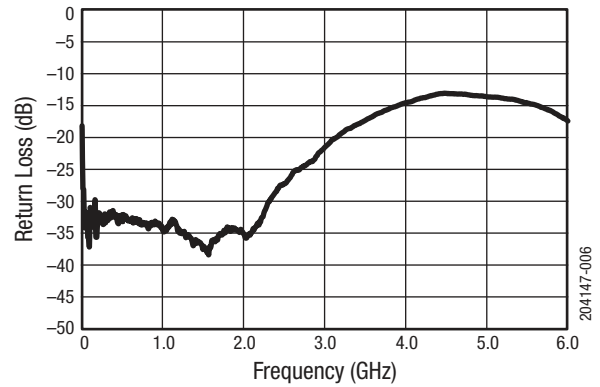


Figure 6. Return Loss vs Frequency
($I_F = 10 \text{ mA}$)

Package Dimensions

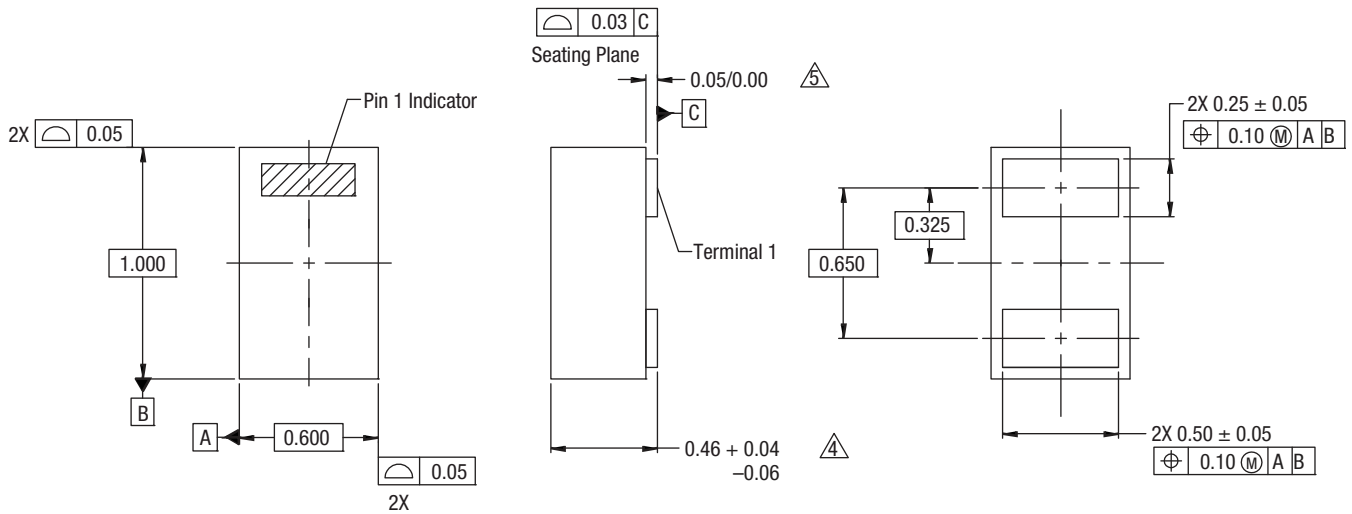
Package dimensions are shown in Figure 7, and tape and reel dimensions are provided in Figure 8.

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.

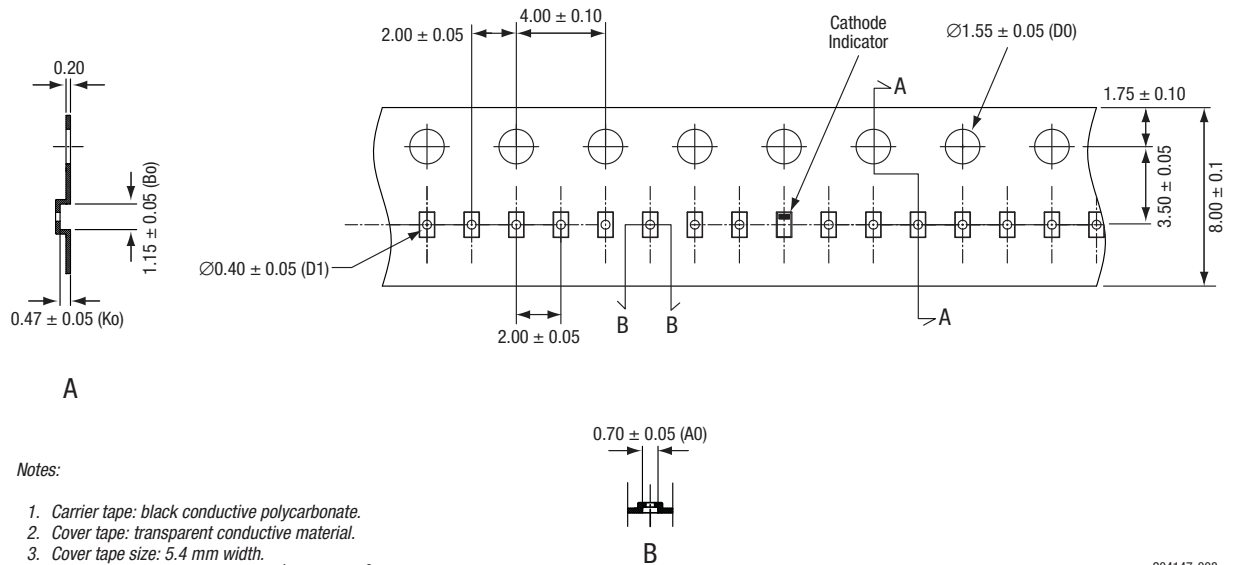


Notes:

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

DATA SHEET • SMPA1345-040LF: VERY LOW CAPACITANCE, PLASTIC-PACKAGED SILICON PIN DIODE

Copyright © 2016, 2018 Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc. ("Skyworks") products or services. These materials, including the information contained herein, are provided by Skyworks as a service to its customers and may be used for informational purposes only by the customer. Skyworks assumes no responsibility for errors or omissions in these materials or the information contained herein. Skyworks may change its documentation, products, services, specifications or product descriptions at any time, without notice. Skyworks makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Skyworks assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Skyworks products, information or materials, except as may be provided in Skyworks Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. SKYWORKS DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. SKYWORKS SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Skyworks products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Skyworks products could lead to personal injury, death, physical or environmental damage. Skyworks customers using or selling Skyworks products for use in such applications do so at their own risk and agree to fully indemnify Skyworks for any damages resulting from such improper use or sale.

Customers are responsible for their products and applications using Skyworks products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Skyworks assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Skyworks products outside of stated published specifications or parameters.

Skyworks and the Skyworks symbol are trademarks or registered trademarks of Skyworks Solutions, Inc. or its subsidiaries in the United States and other countries. Third-party brands and names are for identification purposes only, and are the property of their respective owners. Additional information, including relevant terms and conditions, posted at www.skyworksinc.com, are incorporated by reference.