

DATA SHEET

# SMS3924-040LF: 0402 Surface Mount Medium Barrier Schottky Diode

## Applications

- Sensitive detector circuits
- Sampling circuits
- Mixer circuits

## Features

- Low barrier height
- Industry-standard 0402 footprint
- Packages rated MSL1, 260 °C per JEDEC J-STD-020



**NEW**



Skyworks Green™ products are RoHS (Restriction of Hazardous Substances)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, are halogen free according to IEC-61249-2-21, and contain <1,000 ppm antimony trioxide in polymeric materials.

## Description

The SMS3924-040LF is a plastic packaged, surface mountable medium barrier Schottky diode designed for sensitive detector applications up to 10 GHz. The low capacitance of this diode (1 pF) combined with its low total resistance (10 Ω typical at 5 mA) make the SMS3924-040LF particularly well suited for sensitive detector circuits and medium-drive mixer circuits.

The SMS3924-040LF is also available in a variety of plastic packages and configurations that include an SOT-23 (the SMS3924-005LF), a small footprint SC-79 (SMS3924-079LF), a miniature SC-70 (SMS3924-075LF), and as an unconnected pair in an SOT-143 (SMS3924-015LF).

**Table 1. SMS3924-040LF Absolute Maximum Ratings**

Parameter	Symbol	Minimum	Maximum	Units
Reverse voltage	V <sub>R</sub>		70	V
Forward current	I <sub>F</sub>		50	mA
Dissipated power @ 25 °C	P <sub>d</sub>		350	mW
Solder interface temperature	T <sub>S</sub>	-40	+85	°C
Storage temperature	T <sub>STG</sub>	-65	+150	°C
Junction temperature	T <sub>J</sub>		+175	°C

**Note:** 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.

**CAUTION:** 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. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times. The SMS3924-040LF is rated as a Human Body Model (HBM) ESD Class 1B device.

**Table 2. SMS3924-040LF Electrical Specifications (Note 1)**

(T<sub>s</sub> = +25 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Breakdown voltage	V <sub>B</sub>	I <sub>R</sub> = 10 μA	70			V
Total capacitance	C <sub>T</sub>	V <sub>R</sub> = 0 V, f = 1 MHz	1.60		2.25	pF
Total resistance	R <sub>T</sub>	I <sub>F</sub> = 10 mA		7		Ω
Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 1 mA	490		550	mV
Series inductance	L <sub>S</sub>			0.45		nH

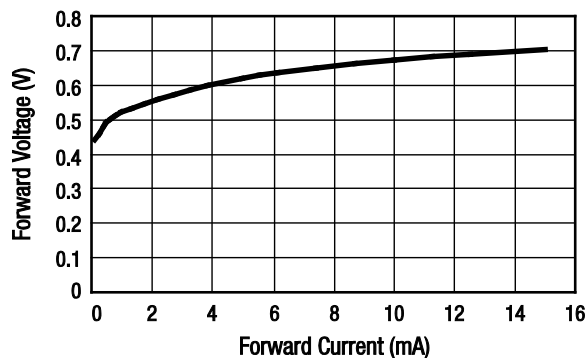
**Note 1:** Performance is guaranteed only under the conditions listed in this Table.

### Electrical and Mechanical Specifications

The absolute maximum ratings of the SMS3924-040LF are provided in Table 1. Electrical specifications are provided in Table 2.

A graph of forward voltage versus forward current is shown in Figure 1.

The SPICE model for the SMS3924-040LF is shown in Figure 2 and the associated model parameters are provided in Table 3.



**Figure 1. Forward Voltage vs Forward Current (T<sub>s</sub> = 25 °C)**

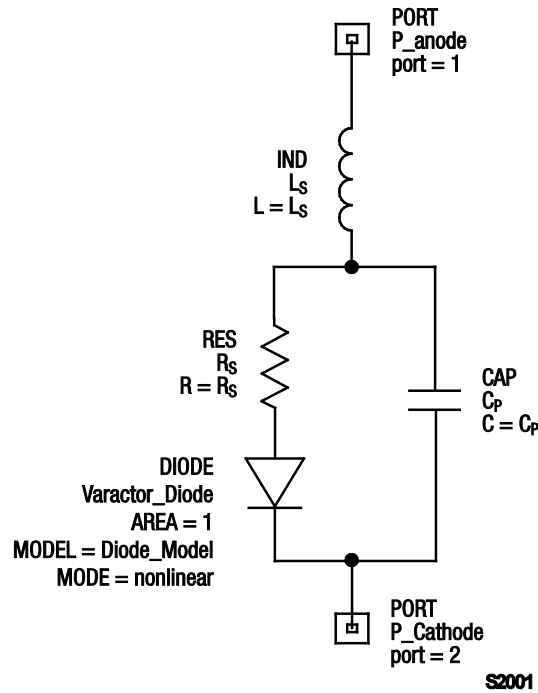


Figure 2. SMS3924-040LF SPICE Model

Table 3. SPICE Model Parameters

Parameter	Units	Value
Is	A	2E-11
Rs	$\Omega$	11
N	–	1.08
T <sub>T</sub>	sec	8E-11
C <sub>JO</sub>	pF	1.5
M	–	0.40
E <sub>G</sub>	eV	0.69
X <sub>T1</sub>	–	2
F <sub>c</sub>	–	0.5
B <sub>v</sub>	V	100
I <sub>bv</sub>	A	1E-5
V <sub>J</sub>	V	0.84
C <sub>P</sub>	pF	0.07
L <sub>S</sub>	nH	0.45

### Package Dimensions

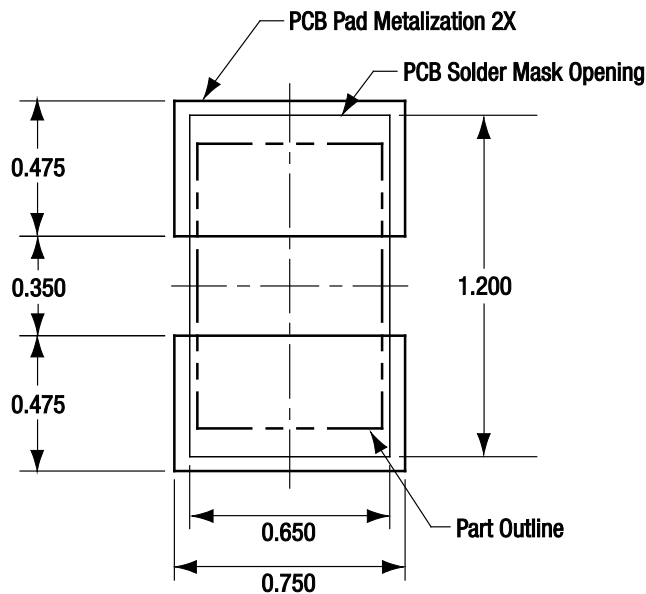
The PCB layout footprint for the SMS3924-040LF is provided in Figure 3. Typical case markings are shown in Figure 4. Package dimensions for the SMS3924-040LF are provided in Figure 5. Tape and reel dimensions are provided in Figure 6.

The SMS3924-040LF 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.

### 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.



All measurements in millimeters

S1997

Figure 3. SMS3924-040LF PCB Layout Footprint

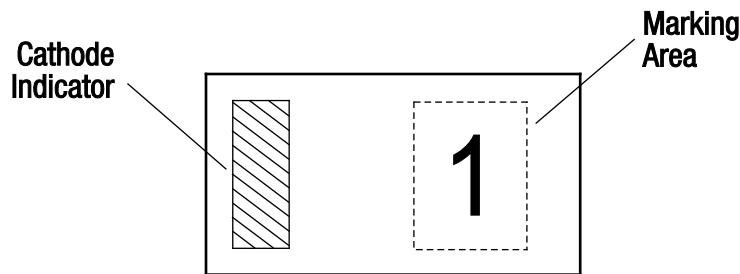


Figure 4. Typical Case Markings (Top View)

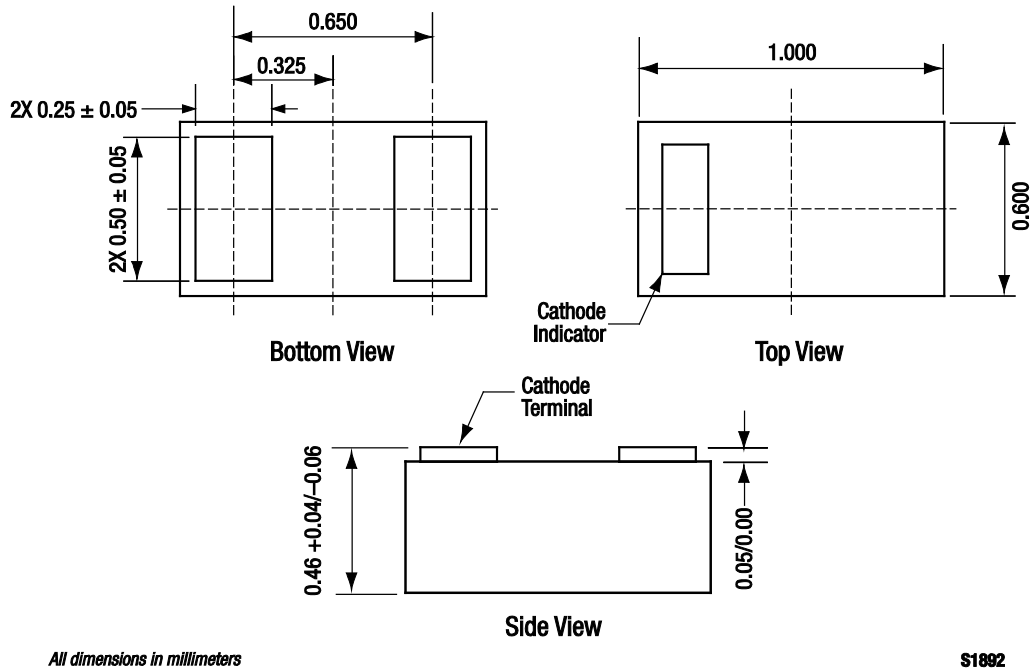


Figure 5. SMS3924-040LF Package Dimensions

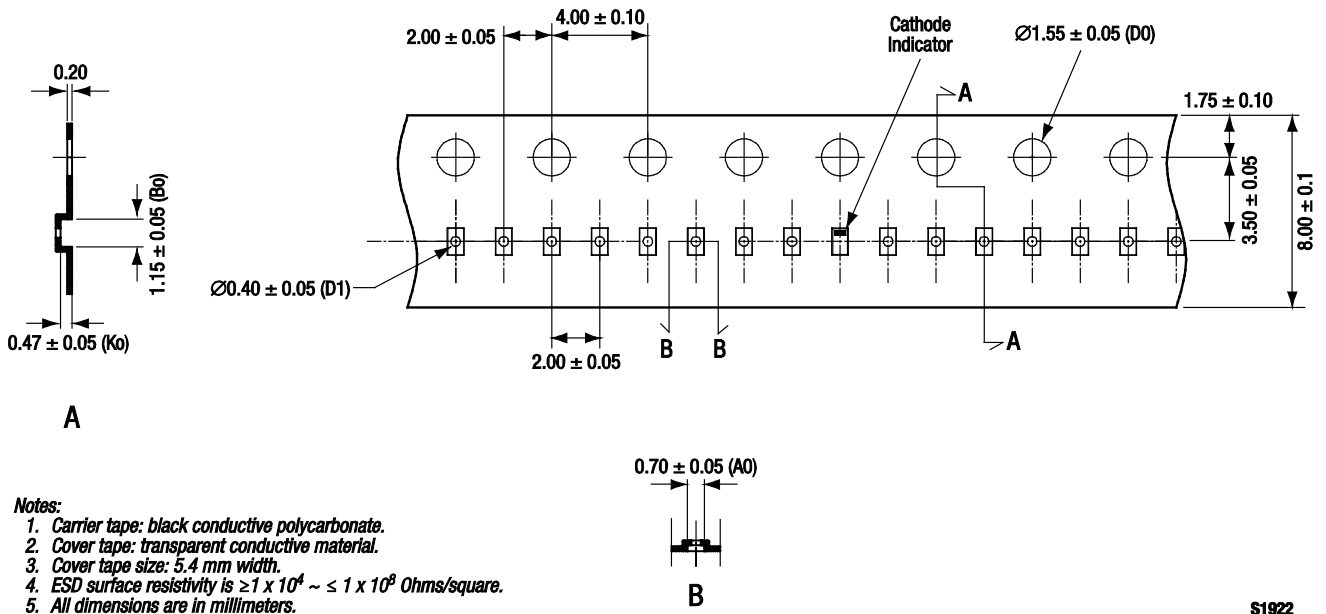


Figure 6. SMS3924-040LF Tape and Reel Dimensions

## Ordering Information

Model Name	Manufacturing Part Number
SMS3924-040LF Surface Mount Medium Barrier Schottky Diode	SMS3924-040LF

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