

**DATA SHEET**

# SMV1245-079LF: Hyperabrupt Junction Tuning Varactor

## Applications

- Wideband RF and microwave VCOs

## Features

- High tuning ratio
- Low series resistance
- Designed for high volume, low-cost applications
- SC-79 package (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 SMV1245-079LF surface mount varactor diode is designed for very low series resistance applications such as RF and microwave VCOs.

The SMV1245-079LF packaging and marking information is shown in Table 1. The absolute maximum ratings of the SMV1245-079LF are provided in Table 2. Electrical specifications are specified in Table 3. Figure 1 shows the typical performance of capacitance versus reverse voltage. The SPICE model for the SMV1245-079LF is shown in Figure 2 and the associated model parameters are provided in Table 4. The relationship between voltage and capacitance for the SMV1245-079LF is shown in Table 5.

**Table 1. Packaging and Marking**


Single
SC-79 Green™
<b>SMV1245-079LF</b> Marking: Cathode
Ls = 0.7 nH



The Pb-free symbol or "LF" in the part number denotes a lead-free, RoHS-compliant package unless otherwise noted as Green™. Tin/lead (Sn/Pb) packaging is not recommended for new designs.

**Table 2. SMV1245-079LF Absolute Maximum Ratings (Note 1)**

Parameter	Symbol	Minimum	Maximum	Units
Power dissipation	P <sub>DIS</sub>		250	mW
Forward current	I <sub>F</sub>		20	mA
Operating temperature	T <sub>OP</sub>	-55	+125	°C
Storage temperature	T <sub>STG</sub>	-55	+150	°C
Electrostatic discharge: Human Body Model (HBM), Class 0	ESD		<250	V

**Note 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.

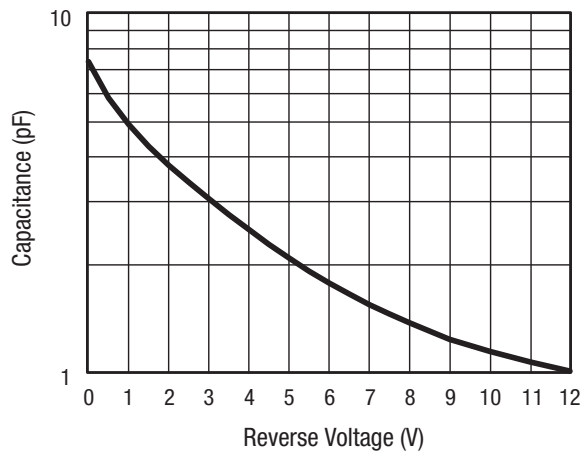
**CAUTION:** Although these devices are designed to be as robust as possible, electrostatic discharge (ESD) can damage them. These devices must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.

**Table 3. SMV1245-079LF Electrical Specifications (Note 1)**  
(T<sub>OP</sub> = 25 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Reverse leakage current	I <sub>R</sub>	V <sub>R</sub> = 20.8 V			50	nA
Reverse breakdown voltage	V <sub>BR</sub>	I <sub>R</sub> = 10 μA	26			V
Capacitance	C <sub>T</sub>	V <sub>R</sub> = 1 V, f = 1 MHz	4.4	4.9	5.4	pF
Capacitance ratio	C <sub>TR</sub>	C <sub>T</sub> (1 V)/C <sub>T</sub> (3 V)	1.47		1.76	–
		C <sub>T</sub> (1 V)/C <sub>T</sub> (9 V)	3.50		4.20	–
Series resistance	R <sub>S</sub>	V <sub>R</sub> = 1 V, f = 500 MHz		1.6	2.0	Ω

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

### Typical Performance Characteristics



**Figure 1. Capacitance vs Reverse Voltage @ 25 °C**

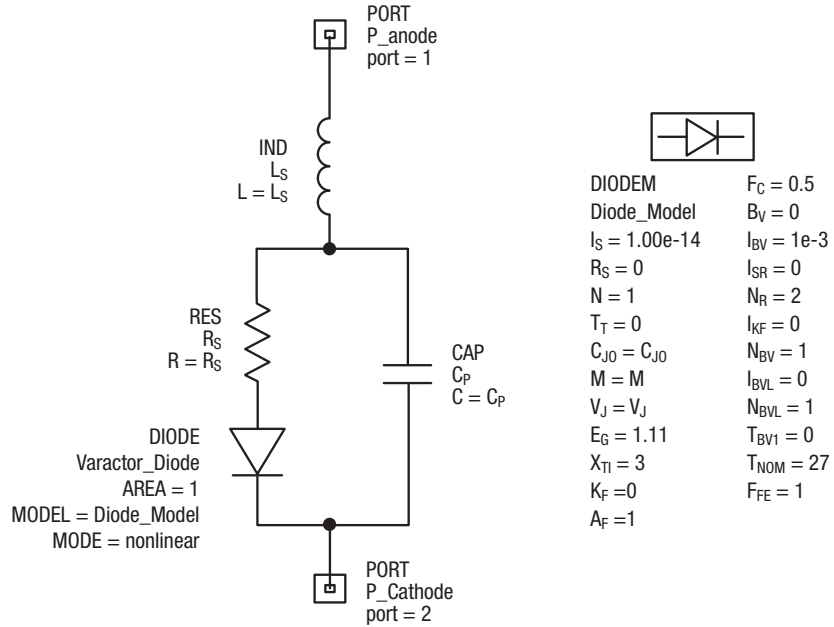


Figure 2. SPICE Model

Table 4. SPICE Model Parameters

Part Number	C <sub>J0</sub> (pF)	V <sub>J</sub> (V)	M	C <sub>p</sub> (pF)	R <sub>s</sub> (Ω)	L <sub>s</sub> (nH)
SMV1245-079LF	6.9	3.5	1.7	0.47	2	0.7

**Table 5. Capacitance vs Reverse Voltage**

Voltage (V <sub>R</sub> ) (V)	Typical Capacitance (C <sub>T</sub> ) (pF)	Voltage (V <sub>R</sub> ) (V)	Typical Capacitance (C <sub>T</sub> ) (pF)
0	7.37	6.5	1.66
0.5	5.84	7.0	1.55
1.0	4.93	7.5	1.46
1.5	4.28	8.0	1.38
2.0	3.79	8.5	1.32
2.5	3.40	9.0	1.26
3.0	3.06	9.5	1.20
3.5	2.76	10.0	1.16
4.0	2.51	10.5	1.12
4.5	2.28	11.0	1.08
5.0	2.09	11.5	1.05
5.5	1.92	12.0	1.02
6.0	1.78		

**Package and Handling Information**

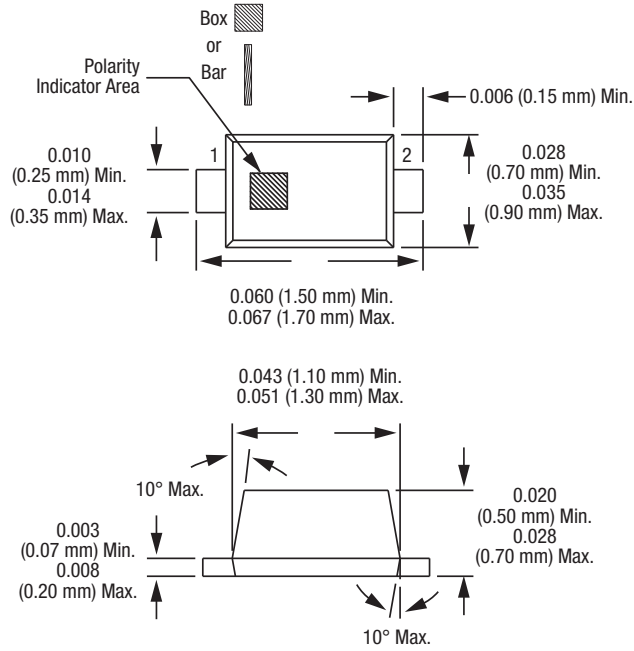
Package dimensions for the SMV1245-079LF are shown in Figure 3, and tape and reel dimensions are provided in Figure 4.

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 SMV1245-079LF 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.

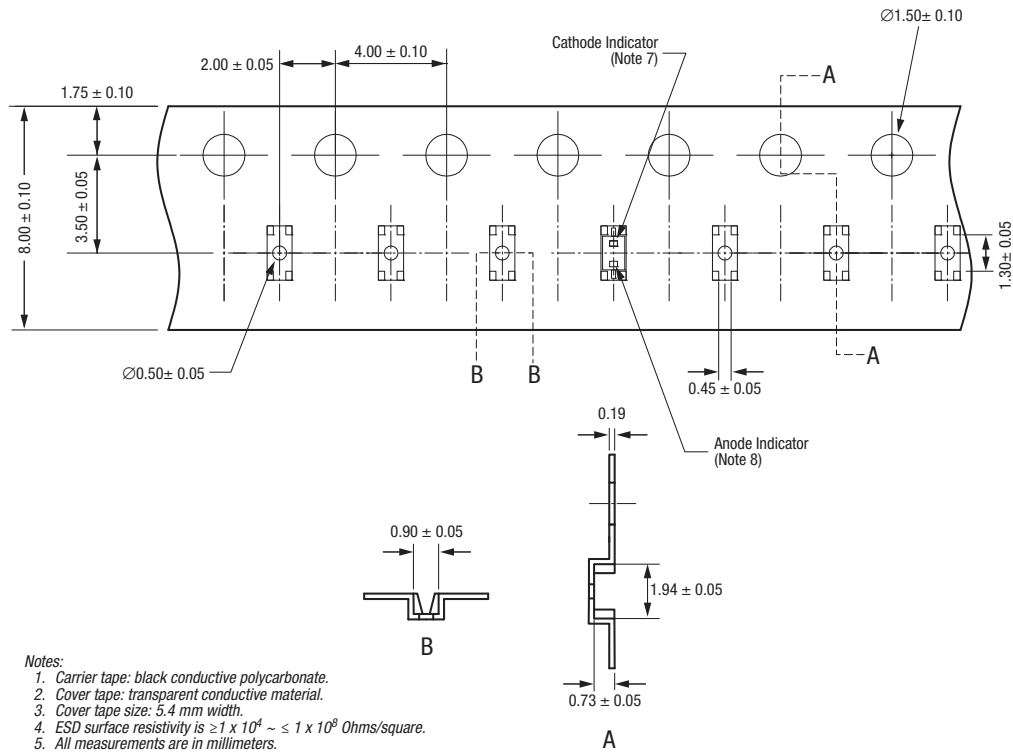
Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format.



Dimensions are in inches (millimeters shown in parentheses)

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Figure 3. SMV1245-079LF SC-79 Package Dimensions



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 measurements are in millimeters.
6. Standard reel size is 7 inches. Standard reel quantity is 3000 pcs.
7. Cathode indicator for all devices except for the SMS7630-079LF.
8. Anode indicator for the SMS7630-079LF only.

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Figure 4. SC-79 Tape and Reel Dimensions