

DATA SHEET

# SMV1129-079LF: Hyperabrupt Junction Tuning Varactor

## Applications

- Low phase noise VCOs
- High-Q tuning elements in wireless system LOs

## Features

- High-Q
- Low series resistance for low phase noise
- Package is 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 SMV1129-079LF silicon hyperabrupt junction varactor is designed for use in low phase noise voltage controlled oscillators (VCOs) that require low series resistance tuning diodes. The low series resistance of the varactor makes it appropriate for use within tunable high-Q resonant circuits in wireless system local oscillators (LOs) to frequencies beyond 2.5 GHz.

Table 1 describes the package and marking of the SMV1129-079LF varactor.

**Table 1. Packaging and Marking**


Single
SC-79 Green™
<b>SMV1129-079LF</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.

### Electrical and Mechanical Specifications

The absolute maximum ratings of the SMV1129-079LF are provided in Table 2. Electrical specifications are provided in Table 3. Figure 1 shows the typical performance of capacitance versus reverse voltage for the SMV1129-079LF, and Table 4 summarizes the capacitance for reverse voltages between 0 and 12 V.

The SPICE model for the SMV1129-079LF is shown in Figure 2 and the associated model parameters are provided in Table 5.

Package dimensions are shown in Figure 3. Tape and reel dimensions are shown in Figure 4.

### 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 SMV1129-079LF 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.

**Table 2. SMV1129-079LF Absolute Maximum Ratings (Note 1)**

Parameter	Symbol	Minimum	Typical	Maximum	Units
Reverse voltage ( $I_R = 10 \mu A$ )	$V_R$			12	V
Reverse current ( $V_R = 10 V$ )	$I_R$			20	nA
Power dissipation	$P_{DIS}$			250	mW
Forward current	$I_F$			20	mA
Operating temperature	$T_{OP}$	-55		+125	°C
Storage temperature	$T_{STG}$	-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.

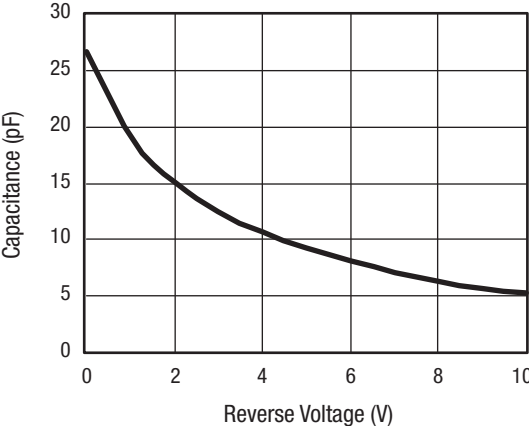
**CAUTION:** Although this device is designed to be as robust as possible, electrostatic discharge (ESD) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without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

**Table 3. SMV1129-079LF Electrical Specifications (Note 1)**  
( $T_{OP} = 25 \text{ }^\circ\text{C}$ , Unless Otherwise Noted)

Part Number	$C_T @ 1 V$ (pF)			$\frac{C_T @ 1 V}{C_T @ 3 V}$ Ratio (pF)		$\frac{C_T @ 1 V}{C_T @ 6 V}$ Ratio (pF)		$R_s @ 1 V,$ 500 MHz ( $\Omega$ )
	Minimum	Typical	Maximum	Minimum	Typical	Minimum	Typical	Maximum
SMV1129-079LF	17.5	19.0	20.5	1.40	1.53	2.0	2.5	0.4

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

**Typical Performance Characteristics**



**Figure 1. Capacitance vs Reverse Voltage**

**Table 4. Capacitance vs Reverse Voltage**

V <sub>R</sub> (V)	SMV1129-079LF
	C <sub>T</sub> (pF)
0	27.5
1	18.9
2	15.0
3	12.5
4	10.7
5	9.3
6	8.1
7	7.1
8	6.3
9	5.7
10	5.2
11	4.9
12	4.7

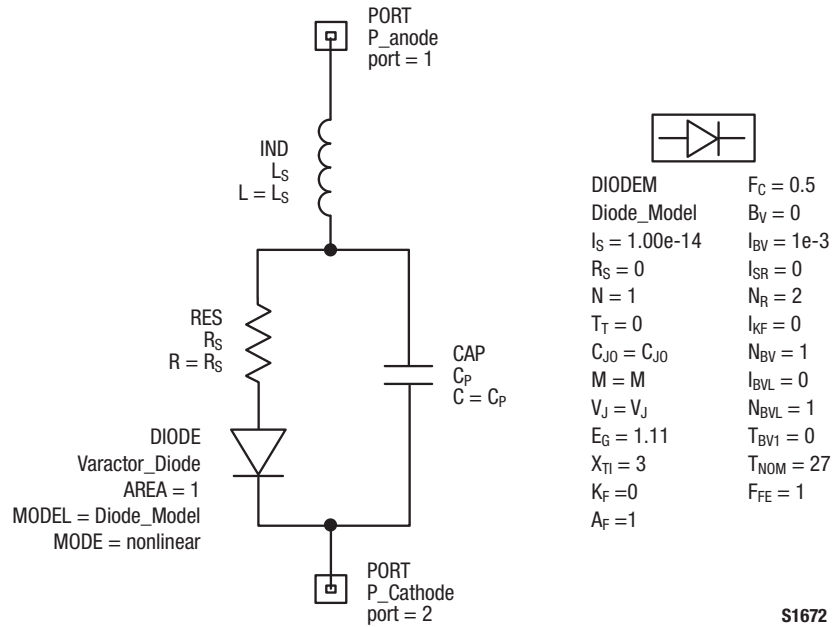
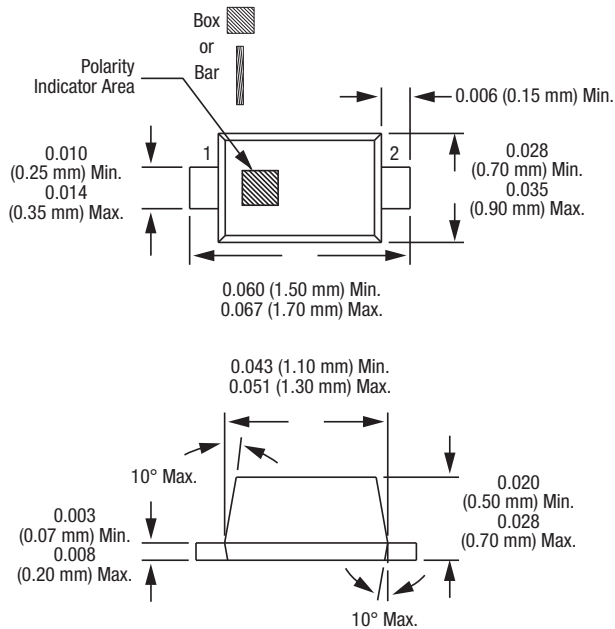


Figure 2. SPICE Model

Table 5. SPICE Model Parameters

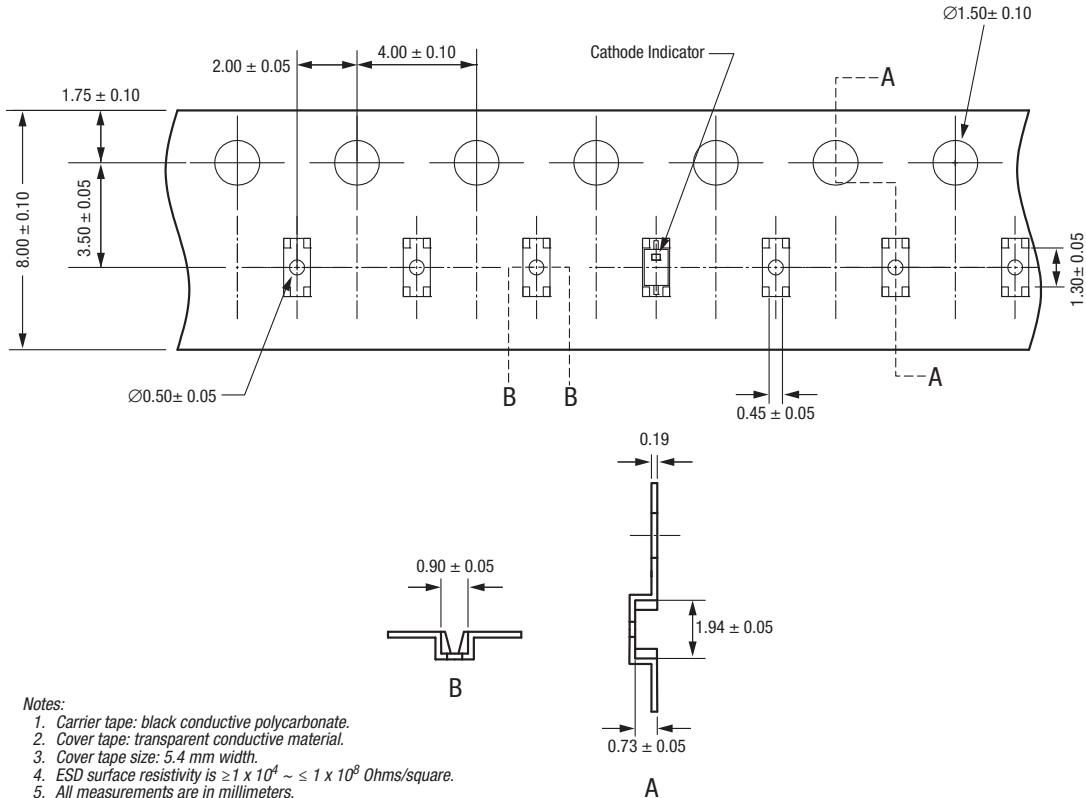
Part Number	CJO (pF)	VJ (V)	M	CP (pF)	RS (Ω)
SMV1129-079LF	27.30	2.38	0.98	0	0.4

Note: Values extracted from measured performance.



Dimensions are in inches (millimeters shown in parentheses) S1652

Figure 3. 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  $\geq 1 \times 10^4 \sim \leq 1 \times 10^9$  Ohms/square.
  5. All measurements are in millimeters.
  6. Standard reel size is 7 inches. Standard reel quantity is 3000 pcs.

S2188

Figure 4. SC-79 Tape and Reel Dimensions

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