

DATA SHEET

SMV1245 Series: Hyperabrupt Junction Tuning Varactors

Applications

- Wideband RF and microwave VCOs

Features

- High tuning ratio
- Low series resistance
- Designed for high volume, low-cost applications
- SC-79 and SOD-323 packages
(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 series surface-mount varactor diodes are designed for very low series resistance applications such as RF and microwave VCOs.

The SMV1245 series packaging and marking information is shown in Table 1. The absolute maximum ratings of the SMV1245 series 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 series is shown in Figure 2 and the associated model parameters are provided in Table 4. The relationship between voltage and capacitance for the SMV1245 series is shown in Table 5.

Table 1. Packaging and Marking

Single	Single
SOD-323 Green™	SC-79 Green™
SMV1245-011LF Marking: HL	SMV1245-079LF Marking: Cathode and 45
$L_s = 1.5 \text{ nH}$	$L_s = 0.7 \text{ nH}$



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 Series Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Minimum	Maximum	Units
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.

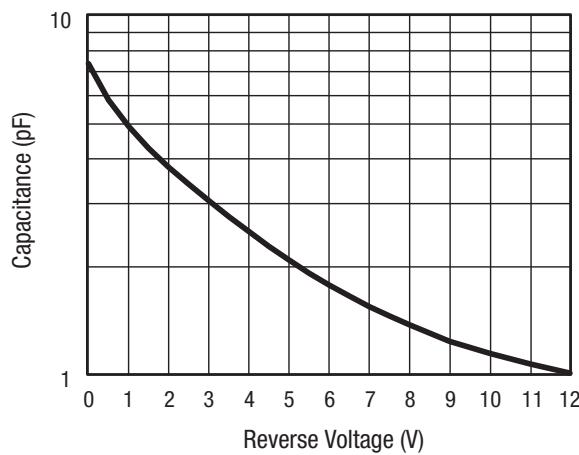
CAUTION: Although these devices are designed to be as robust as possible, electrostatic discharge (ESD) can damage them. These devices must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without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

Table 3. SMV1245 Series Electrical Specifications (Note 1)
($T_{OP} = 25$ °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Reverse leakage current	I_R	$V_R = 20.8$ V			50	nA
Reverse breakdown voltage	V_{BR}	$I_R = 10$ μ A	26			V
Capacitance	C_T	$V_R = 1$ V, $f = 1$ MHz	4.4	4.9	5.4	pF
Capacitance ratio	C_{TR}	$C_T(1\text{ V})/C_T(3\text{ V})$ $C_T(1\text{ V})/C_T(9\text{ V})$	1.47 3.50		1.76 4.20	— —
Series resistance	R_s	$V_R = 1$ 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**

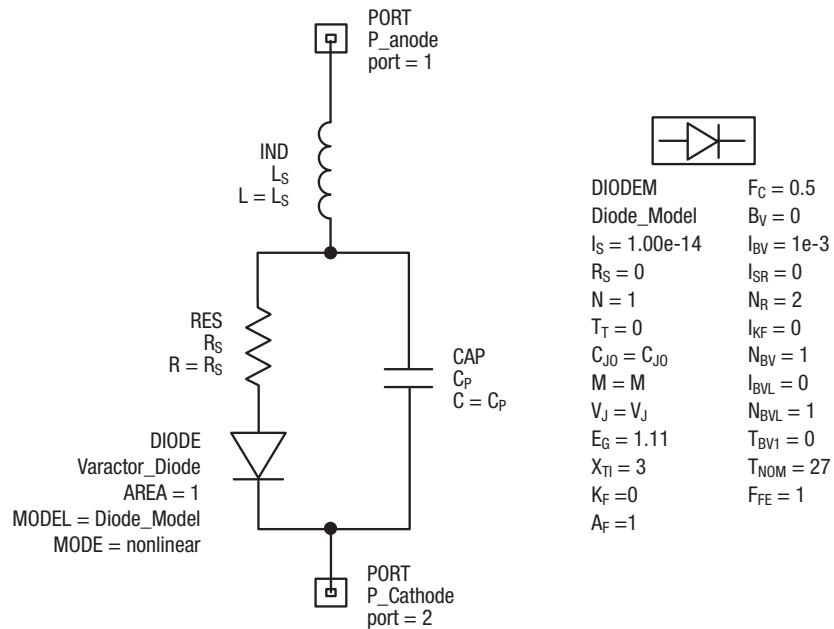


Figure 2. SPICE Model

Table 4. SPICE Model Parameters

Part Number	C_{JO} (pF)	V_J (V)	M	C_p (pF)	R_s (Ω)	L_s (nH)
SMV1245-079LF	6.9	3.5	1.7	0.47	2	0.7
SMV1245-011LF	6.9	3.5	1.7	0.47	2	1.5

Table 5. Capacitance vs Reverse Voltage

Voltage (V _R) (V)	Typical Capacitance (C _T) (pF)	Voltage (V _R) (V)	Typical Capacitance (C _T) (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		

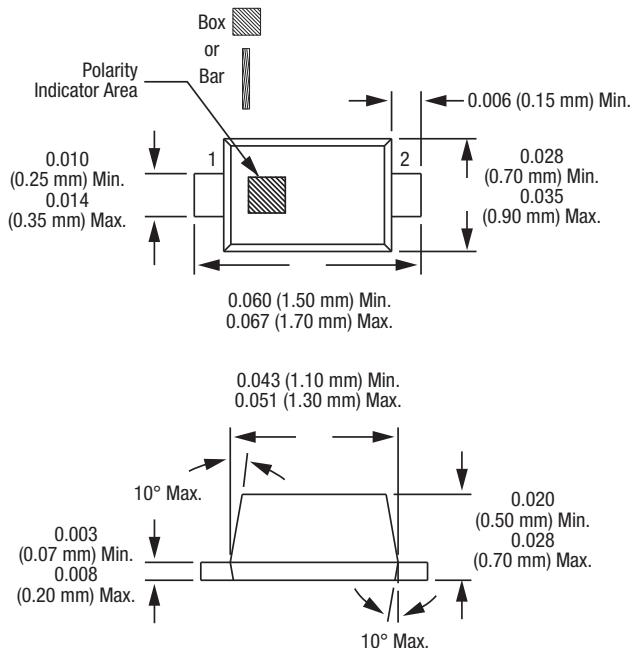
Package and Handling Information

Package dimensions for the SMV1245 SC-79 package are shown in Figure 3, and tape and reel dimensions are provided in Figure 4. Package dimensions for the SMV1245 SOD-323 package are shown in Figure 5, and tape and reel dimensions are provided in Figure 6.

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 series 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.

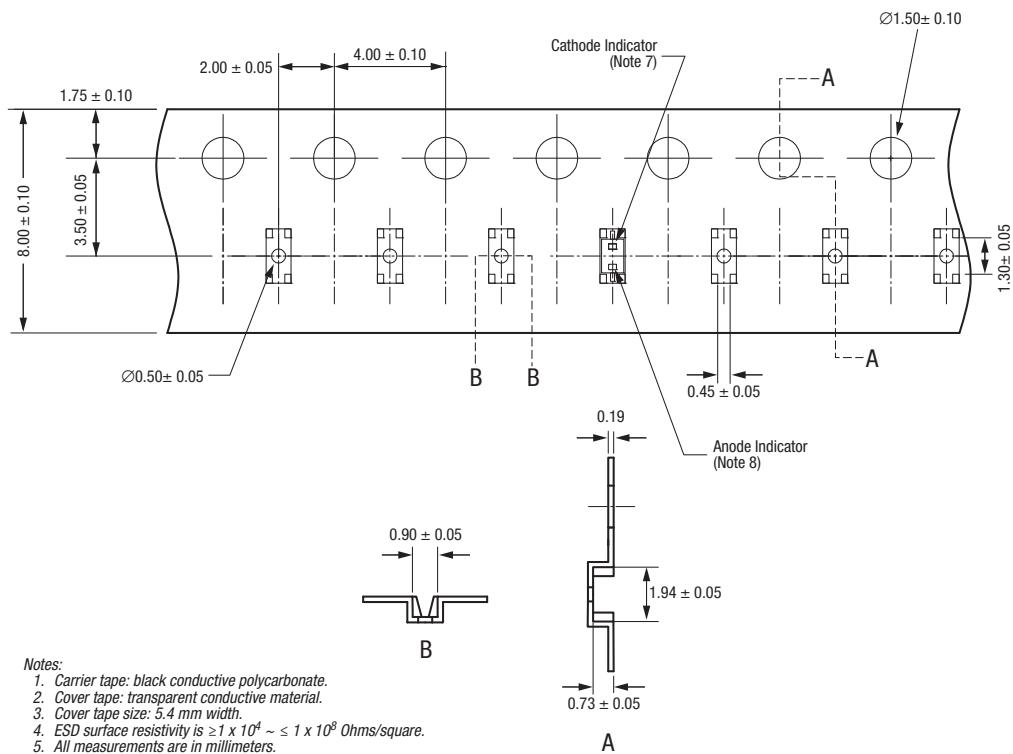
Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format.



Dimensions are in inches (millimeters shown in parentheses)

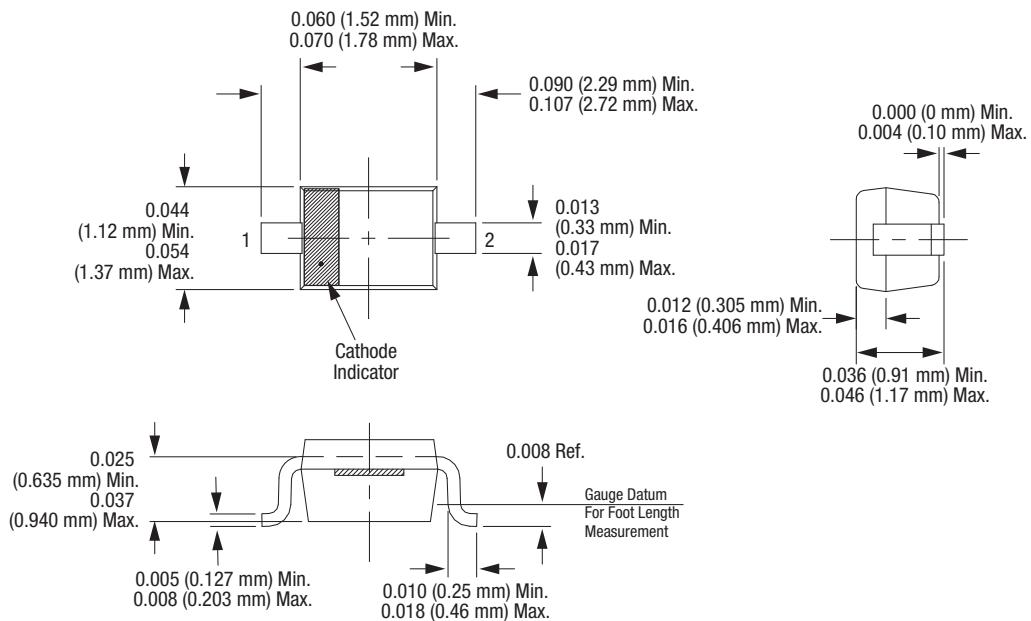
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Figure 3. SMV1245 Series SC-79 Package Dimensions



S2188

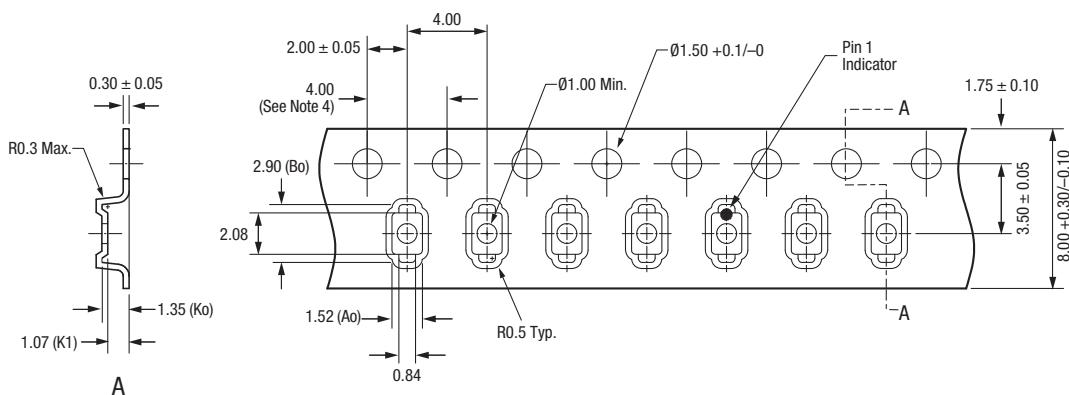
Figure 4. SC-79 Tape and Reel Dimensions



Dimensions are in inches (millimeters shown in parentheses)

S1619

Figure 5. SMV1245 Series SOD-323 Package Dimensions



Notes:

1. Carrier tape: black conductive polystyrene.
2. Cover tape: transparent conductive PSA.
3. Cover tape size: 5.4 mm width.
4. 10 sprocket hole pitch cumulative tolerance: ± 0.20 mm.
5. All measurements are in millimeters.

S2910

Figure 6. SOD-323 Tape and Reel Dimensions

Ordering Information

Model Name	Manufacturing Part Number
SMV1245-079LF: Hyperabrupt Junction Tuning Varactor	SMV1245-079LF
SMV1245-011LF: Hyperabrupt Junction Tuning Varactor	SMV1245-011LF

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