

**DATA SHEET**

# SMV1281-011LF: Hyperabrupt Junction Tuning Varactors

## Applications

- Wideband VCOs
- High-volume, low-cost systems

## Features


- High tuning ratio
- Packages rated MSL1, 260 °C per JEDEC J-STD-020
- For RoHS and other product compliance information, see the Skyworks Certificate of Conformance.



## Description

The SMV1281-011LF surface mount hyperabrupt junction varactor diodes are designed for very high capacitance tuning ratios with a low series resistance, which makes these devices especially attractive for wideband voltage controlled oscillator (VCO) applications. Table 1 describes the package and marking of the SMV1281-011LF varactor.

Table 1. Packaging and Marking


Single
SOD-323
<b>SMV1281-011LF</b> Marking: HP
$L_s = 1.5 \text{ nH}$

### Electrical Specifications

The absolute maximum ratings of the SMV1281-011LF varactors are provided in Table 2. Electrical specifications are provided in Table 3. Typical capacitance values are listed in Table 4. Typical capacitance vs reverse voltage performance for the SMV1281 varactors is illustrated in Figure 1.

The SPICE model is shown in Figure 2 and the associated model parameters are provided in Table 5.

Package dimensions are shown in Figures 3 and 5, and tape and reel drawings are provided in Figures 4 and 6.

### 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 SMV1281-011LF is rated to Moisture Sensitivity Level 1 (MSL1) at 260 °C. They 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. Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Reverse voltage	V <sub>R</sub>		24	V
Forward current	I <sub>F</sub>		20	mA
Power dissipation	P <sub>DIS</sub>		250	mW
Operating temperature	T <sub>OP</sub>	-55	+125	°C
Storage temperature	T <sub>STG</sub>	-55	+150	°C
Electrostatic discharge:	ESD			
Charged Device Model (CDM), Class 4			2000	V
ESD Human Body Model (HBM), Class 3A			4000	V
Man-Machine (MM) Model, Class C			400	V

**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.

**ESD Handling:** Industry-standard ESD handling precautions must be adhered to at all times to prevent damage to this device.

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

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Reverse current	I <sub>R</sub>	V <sub>R</sub> = 20 V			20	nA
Capacitance	C <sub>T</sub>	V <sub>R</sub> = 1 V	7.8	8.6	9.5	pF
		V <sub>R</sub> = 20 V	0.6	0.7	0.8	pF
Capacitance ratio	C <sub>TR</sub>	V <sub>R</sub> = 1 V/20 V		12		–
Resistance	R <sub>S</sub>	f = 500 MHz, V <sub>R</sub> = 1 V		1.7		Ω
Breakdown voltage	V <sub>BR</sub>	I <sub>R</sub> = 10 μA	24			V

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

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Table 4. Capacitance vs Reverse Voltage

V <sub>R</sub> (V)	C <sub>T</sub> (pF)
0	13.30
1	8.60
2	6.30
3	4.80
4	3.60
5	2.70
6	2.00
7	1.60
8	1.40
9	1.20
10	1.10
11	1.00
12	0.94
13	0.89
14	0.85
15	0.81
16	0.78
17	0.75
18	0.73
19	0.71
20	0.69

Typical Performance Characteristics

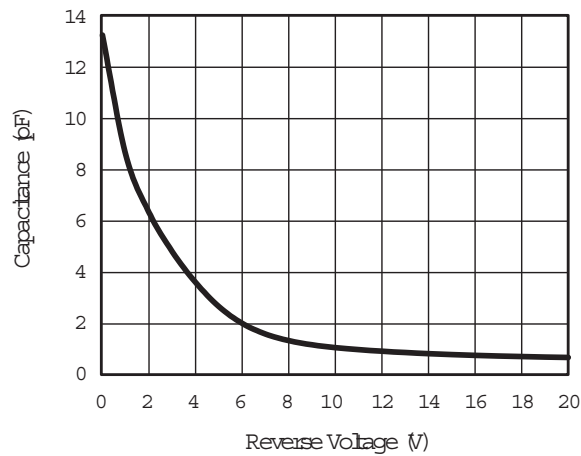


Figure 1. Capacitance vs Reverse Voltage

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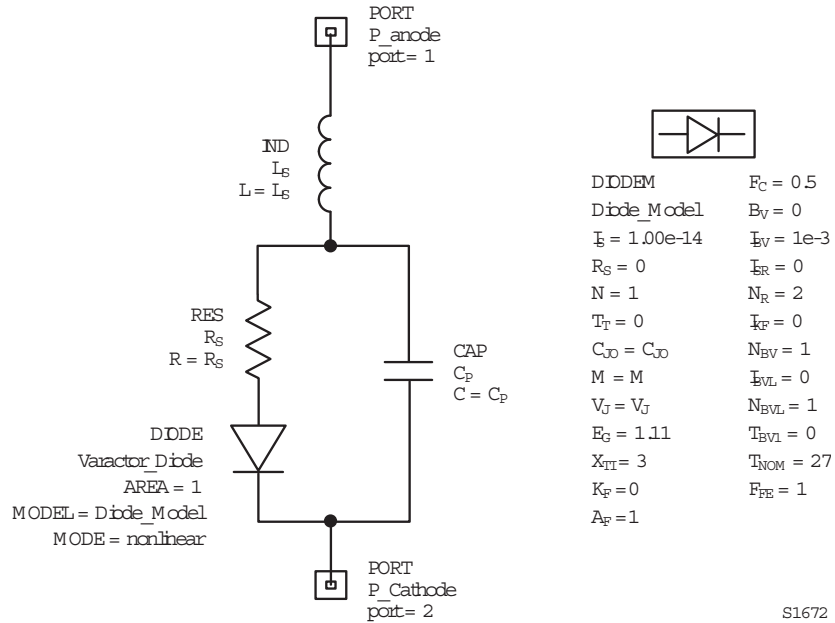
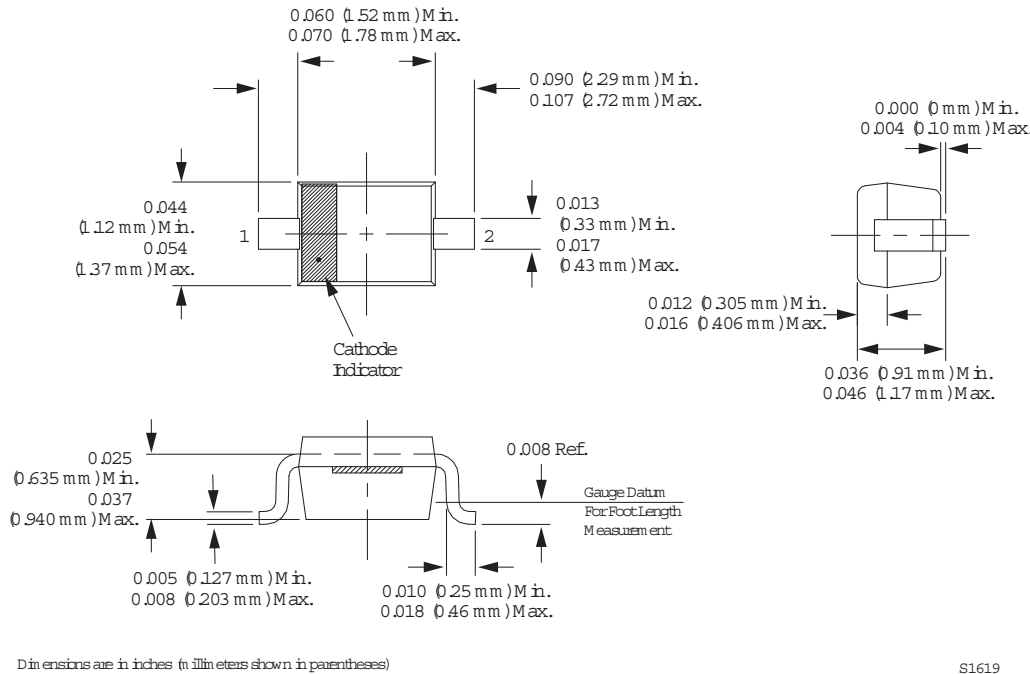


Figure 2. SPICE Model

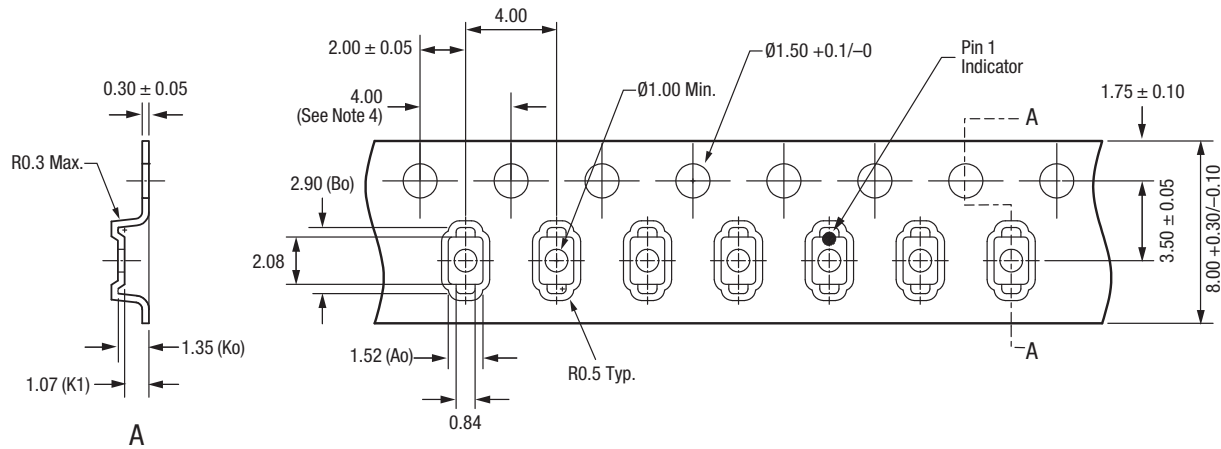
Table 5. SPICE Model Parameters

Part Number	CJO (pF)	VJ (V)	M	CP (pF)	Rs (Ω)	Ls (nH)
SMV1281-011LF	13	14	6	0.62	1.7	1.2

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**Figure 5. 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. Tape and Reel Information**

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