DATA SHEET

SMV1283-011LF: Hyperabrupt Junction Tuning Varactor

Applications

- Wideband VCOs

Features

- High tuning ratio
- Small footprint SOD-323 (1.60 x 1.15 mm) package (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 SMV1283-011LF is a surface mount varactor diode designed for very high capacitance tuning ratios with low series resistance. The varactor is well suited for wideband Voltage Controlled Oscillator (VCO) applications.

The SOD-323 packaging option is defined in Table 1. The absolute maximum ratings of the SMV1283-011LF varactor are provided in Table 2. Electrical specifications are specified in Table 3. Figure 1 shows the typical performance of capacitance versus voltage. The SPICE model for the SMV1283-011LF is shown in Figure 2 and the associated model parameters are provided in Table 4. The relationship between voltage and capacitance for the SMV1283-011LF is shown in Table 5.

Table 1. Packaging and Marking


Single
SOD-323 Green™
SMV1283-011LF Marking: HQ
L_S = 1.7 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. SMV1283-011LF Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Reverse voltage	V_R		28	V
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

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 SMV1283-011LF varactor is a Class 0 Human Body Model (HBM) ESD device.*

Table 3. SMV1283-011LF 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 = 26 V			20	nA
Reverse breakdown voltage	V_{BR}	I_R = 10 µA	28			V
Capacitance	C_T	f = 1 MHz				
		V_R = 1 V	8.50	9.10	9.70	pF
		V_R = 26 V	0.50	0.62	0.75	pF
Capacitance ratio	C_{TR}	C_T @ 1 V/C_T @ 26 V	14.0	14.7		–
Series resistance	R_S	V_R = 1 V, f = 500 MHz		2.4		Ω

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

Typical Performance Characteristics

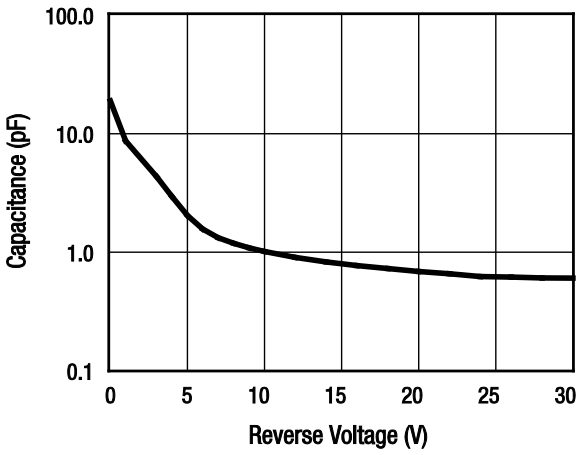

Figure 1. Capacitance vs Reverse Voltage

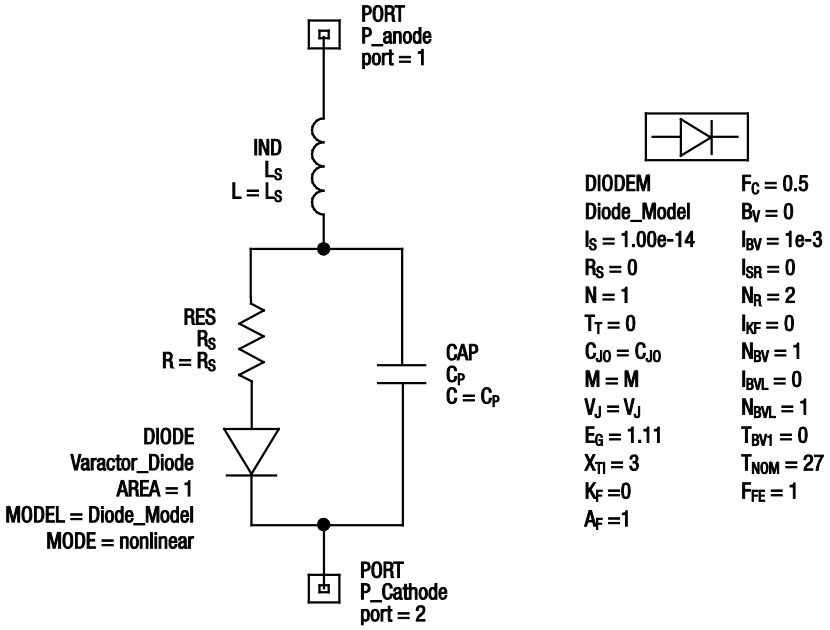

Figure 2. SPICE Model

Table 4. SPICE Model Parameters

Part Number	C_{JO} (pF)	V_J (V)	M	C_P (pF)	R_S (Ω)	L_S (nH)
SMV1283-011LF	19	3	2.6	0.58	2.4	1.7

Table 5. Capacitance vs Reverse Voltage

Voltage (V_R) (V)	Typical Capacitance (C_T) (pF)
0	18.8820
1	8.7000
2	6.1400
3	4.3300
4	2.9500
5	2.0400
6	1.5680
7	1.3250
8	1.1880
9	1.0870
10	1.0123
12	0.9040
14	0.8295
16	0.7720
18	0.7280
20	0.6880
22	0.6580
24	0.6230
26	0.6160
28	0.6060
30	0.6040

Package and Handling Information

Package dimensions for the SOD-323 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 SMV1283-011LF 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.

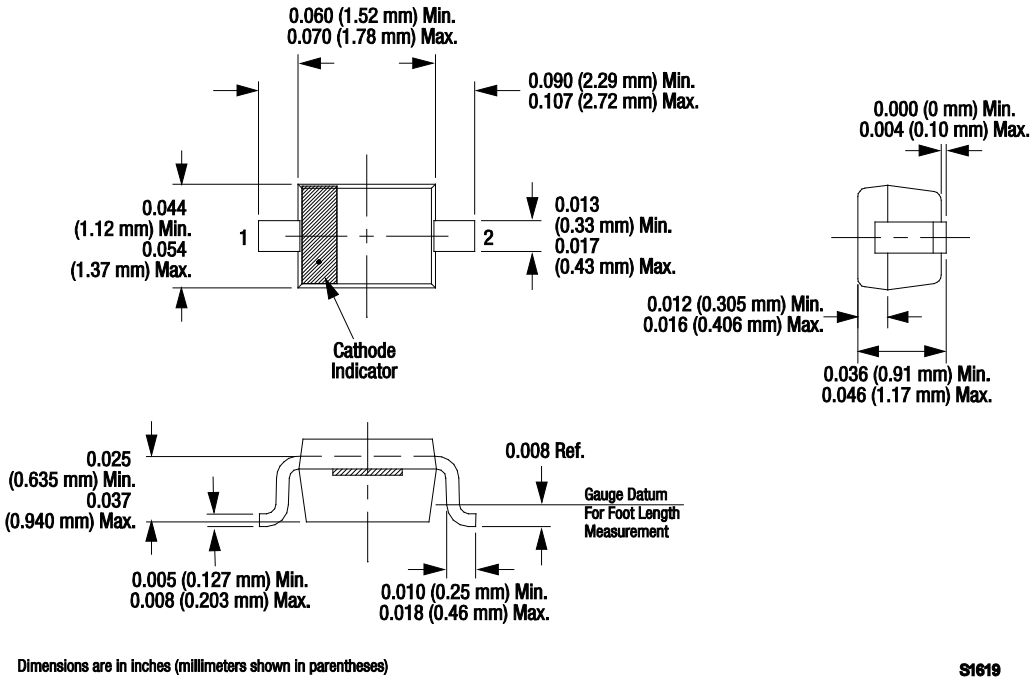

Figure 3. SOD-323 Package Dimensions

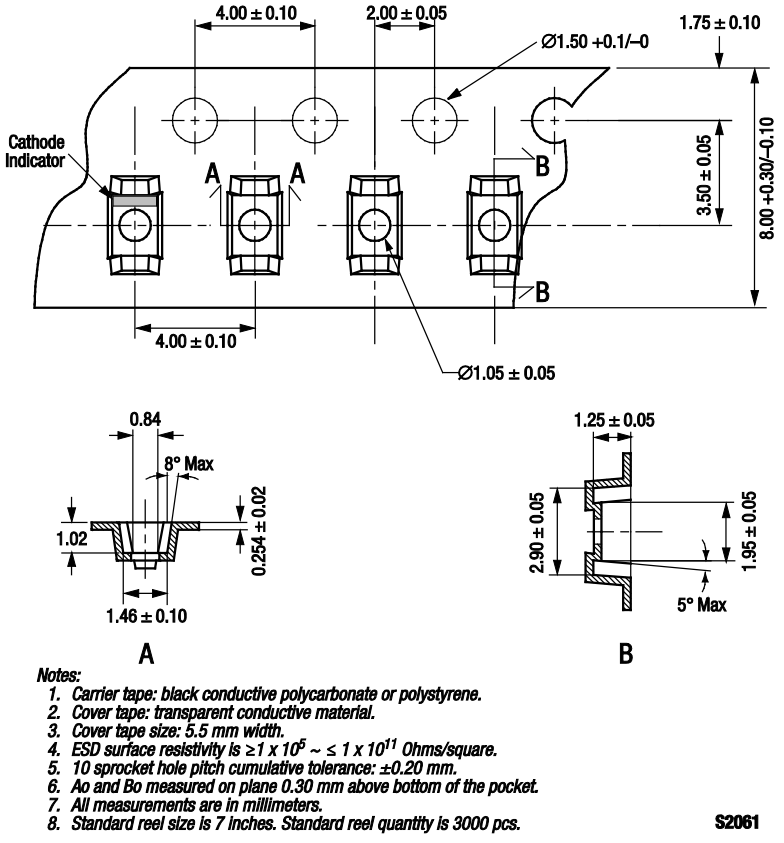

Figure 4. SOD-323 Tape and Reel Dimensions