DATA SHEET

SMV1493–SMV1494: Abrupt Junction Tuning Varactors

Features

- High Q
- Low series resistance for low phase noise
- Multiple packages: SOD-323 and SC-79
- Designed for high volume commercial applications
- SPICE models are available

Description

The SMV1493 and SMV1494 silicon abrupt junction varactor diodes are designed for use in VCOs requiring tight capacitance tolerances. The low resistance of these varactors makes them appropriate for high Q resonators in wireless system VCOs to frequencies beyond 2.5 GHz.

Absolute Maximum Ratings

Characteristic	Value
Forward current (I_F)	20 mA
Power dissipation (P_D)	250 mW
Storage temperature (T_{ST})	-55 °C to +150 °C
Operating temperature (T_{OP})	-55 °C to +125 °C
ESD human body model	Class 0

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

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 must be employed at all times.*

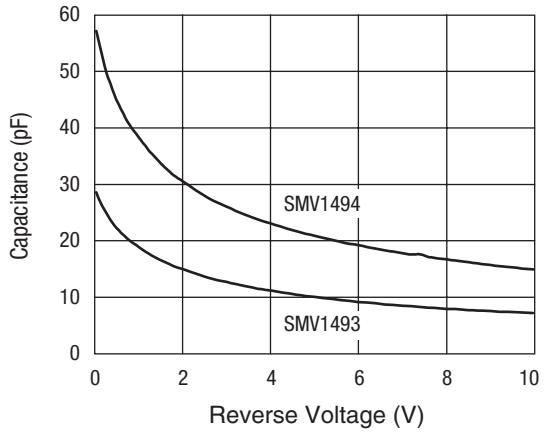
Electrical Specifications at 25 °C

Part Number	C_T @ 1 V (pF)		C_T @ 4 V (pF)		R_S @ 1 V 500 MHz (Ω)
	Min.	Max.	Min.	Max.	Max.
SMV1493	17.4	20.0	10.0	12.1	0.50
SMV1494	36.3	41.7	20.7	25.3	0.45

Reverse Voltage V_R (I_R = 10 µA): 12 V
Reverse Current I_R (V_R = 10 V): 20 nA

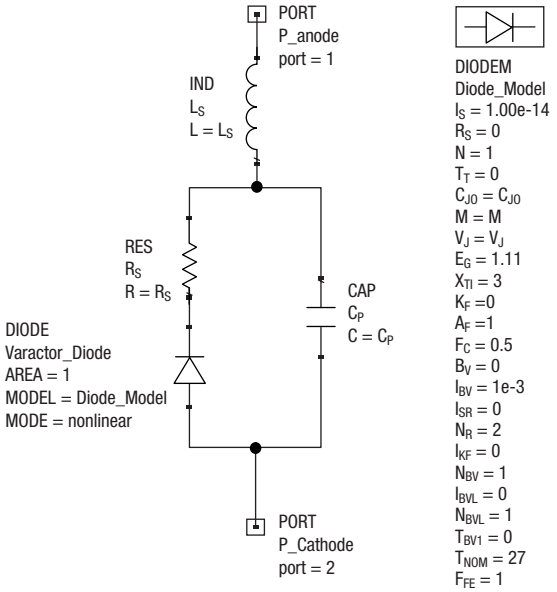
Single	Single
Marking: CF	Marking: Cathode
SOD-323	SC-79
SMV1493-011	**SMV1493-079**
	SMV1494-079
L_S = 1.5 nH	L_S = 0.7 nH

Typical Performance Data



Capacitance vs. Reverse Voltage

SPICE Model



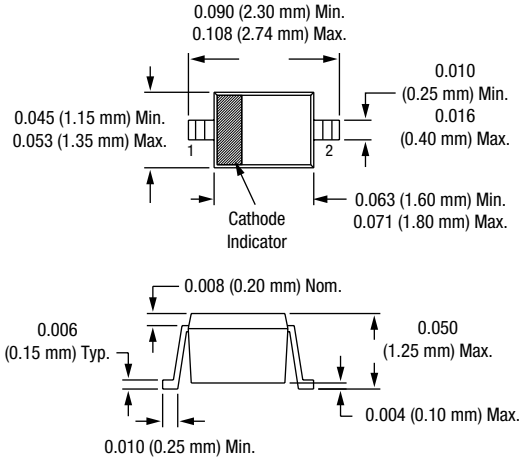
Part Number	C_{J0} (pF)	V_J (V)	M	C_P (pF)	R_S (Ω)
SMV1493	29	0.63	0.47	0	0.50
SMV1494	58	0.63	0.47	0	0.45

1. Values extracted from measured performance.
2. For package inductance (L_S) refer to package type.
3. For more details refer to the "Varactor SPICE Models for RF VCO Applications" Application Note.

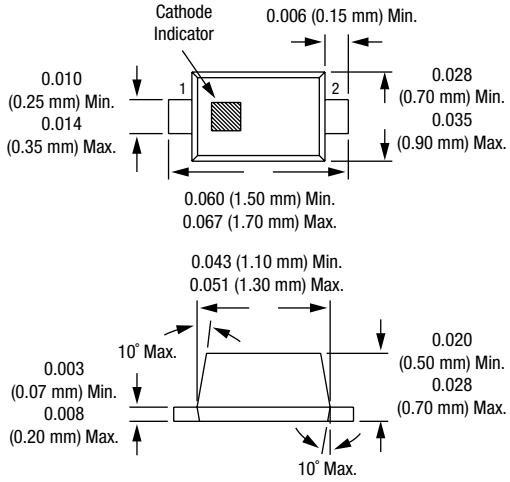
Capacitance vs. Reverse Voltage

	SMV1493	SMV1494
V_R (V)	C_T (pF)	C_T (pF)
0.0	28.7	57.8
0.2	25.6	51.5
0.4	23.3	46.9
0.6	21.5	43.4
0.8	20.1	40.5
1.0	19.0	38.4
1.2	17.9	36.3
1.4	17.0	34.6
1.6	16.2	33.0
1.8	15.5	31.6
2.0	15.0	30.6
2.2	14.4	29.5
2.4	13.9	28.5
2.6	13.5	27.6
2.8	13.1	26.7
3.0	12.7	26.1
3.2	12.4	25.3
3.4	12.0	24.7
3.6	11.7	24.1
3.8	11.4	23.5
4.0	11.2	23.1
4.2	10.9	22.6
4.4	10.7	22.1
4.6	10.5	21.7
4.8	10.3	21.3
5.0	10.1	20.9
6.0	9.2	19.2
7.0	8.5	17.9
8.0	8.0	16.7
9.0	7.6	15.7
10.0	7.1	14.7

SOD-323


0.090 (2.30 mm) Min.
0.108 (2.74 mm) Max.
0.010
(0.25 mm) Min.
0.045 (1.15 mm) Min.
0.053 (1.35 mm) Max.
0.016
(0.40 mm) Max.
1
2
Cathode
Indicator
0.063 (1.60 mm) Min.
0.071 (1.80 mm) Max.
0.008 (0.20 mm) Nom.
0.006
(0.15 mm) Typ.
0.050
(1.25 mm) Max.
0.004 (0.10 mm) Max.
0.010 (0.25 mm) Min.

SC-79


Cathode
Indicator
0.006 (0.15 mm) Min.
0.010
(0.25 mm) Min.
0.014
(0.35 mm) Max.
1
2
0.028
(0.70 mm) Min.
0.035
(0.90 mm) Max.
0.060 (1.50 mm) Min.
0.067 (1.70 mm) Max.
0.043 (1.10 mm) Min.
0.051 (1.30 mm) Max.
10° Max.
0.020
(0.50 mm) Min.
0.003
(0.07 mm) Min.
0.028
(0.70 mm) Max.
0.008
(0.20 mm) Max.
10° Max.

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