

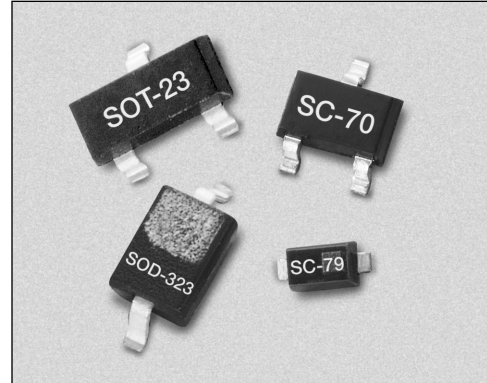
# Abrupt Junction Tuning Varactors



## SMV1405–SMV1419

### Features

- High Q
- Low Series Resistance for Low Phase Noise
- Multiple Packages SOT-23, SOD-323, SC-70 and SC-79
- Designed for High Volume Commercial Applications
- SPICE Models are Available







### Description

The SMV1405–SMV1419 series of 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. The devices are characterized for capacitance over temperature. SPICE models are provided.

### Absolute Maximum Ratings

Characteristic	Value
Reverse Voltage ( $V_R$ )	30 V
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

			
Single	Single	Common Cathode	Common Cathode
SC-79	SOT-23	SOT-23	SC-70
♦ SMV1405-079	♦ SMV1405-001		♦ SMV1405-074
	♦ SMV1408-001		
	♦ SMV1411-001		
	♦ SMV1413-001		
	♦ SMV1417-001	♦ SMV1417-004	
	♦ SMV1419-001		
$L_S = 0.7 \text{ nH}$	$L_S = 1.5 \text{ nH}$	$L_S = 1.5 \text{ nH}$	$L_S = 1.4 \text{ nH}$

♦ Available through distribution.

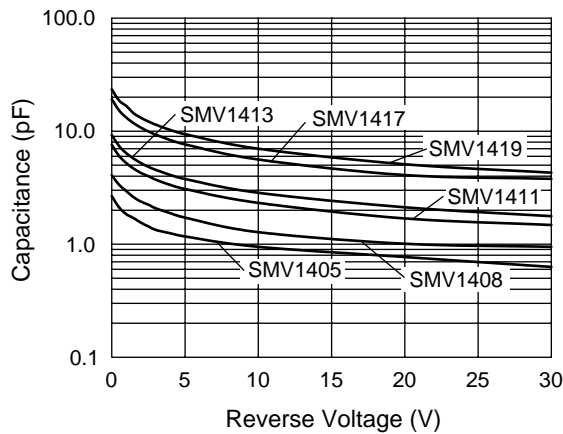
For other packages or configurations, please contact the factory.

## Electrical Specifications at 25°C

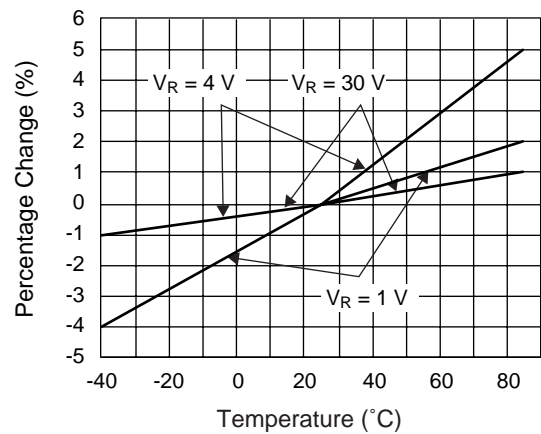
Part Number	$C_T$ @ 0.5 V (pF)	$C_T$ @ 1 V (pF)	$C_T$ @ 4 V (pF)		$\frac{C_T @ 0 V}{C_T @ 30 V}$ (Ratio)	$R_S$ @ 4 V 500 MHz ( $\Omega$ )	$Q$ @ 4 V 50 MHz
	Typ.	Typ.	Min.	Max.	Min.	Max.	Typ.
SMV1405	2.1	1.8	1.21	1.45	4.1	0.80	3200
SMV1408	3.4	2.9	1.75	2.11	4.1	0.60	2900
SMV1411	6.0	5.2	3.10	3.76	4.2	0.40	2500
SMV1413	7.4	6.4	3.64	4.42	4.2	0.35	2400
SMV1417	15.3	13.2	7.51	9.15	4.3	0.22	1800
SMV1419	18.7	16.6	9.13	11.13	4.4	0.20	1600

Reverse Voltage  $V_R$  ( $I_R = 10 \mu A$ ): 30 V  
 Reverse Current  $I_R$  ( $V_R = 24 V$ ): 20 nA

## Typical Performance Data



Capacitance vs. Reverse Voltage

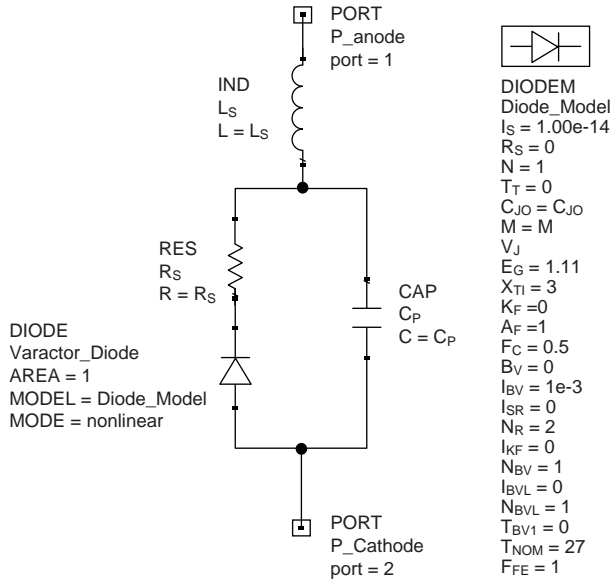


Relative Capacitance Change vs. Temperature

## Typical Capacitance Values

$V_R$ (V)	SMV1405	SMV1408	SMV1411	SMV1413	SMV1417	SMV1419
	$C_T$ (pF)	$C_T$ (pF)	$C_T$ (pF)	$C_T$ (pF)	$C_T$ (pF)	$C_T$ (pF)
0.0	2.67	4.08	7.58	9.24	19.20	23.44
0.5	2.12	3.36	6.05	7.39	15.30	18.72
1.0	1.84	2.94	5.21	6.37	13.16	16.64
1.5	1.70	2.60	4.66	5.71	11.76	14.38
2.0	1.55	2.38	4.27	5.22	10.74	13.14
2.5	1.44	2.24	4.00	4.85	9.95	12.18
3.0	1.34	2.08	3.72	4.55	9.32	11.42
4.0	1.25	1.88	3.35	4.10	8.35	10.26
5.0	1.17	1.72	3.08	3.77	7.64	9.40
10.0	0.95	1.28	2.32	2.85	5.62	7.00
20.0	0.77	1.01	1.69	2.12	4.09	5.10
30.0	0.63	0.95	1.48	1.77	3.79	4.30

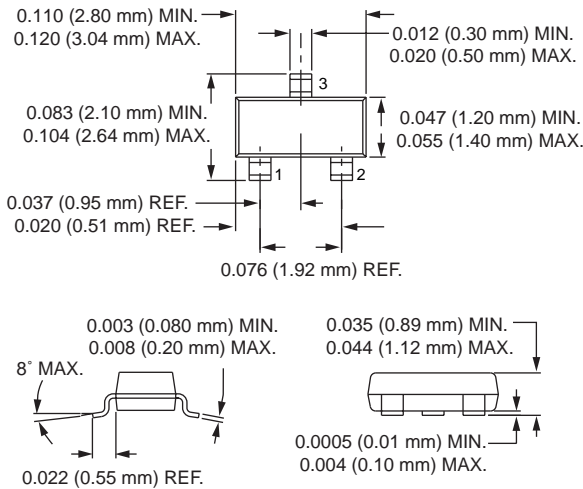
SPICE Model



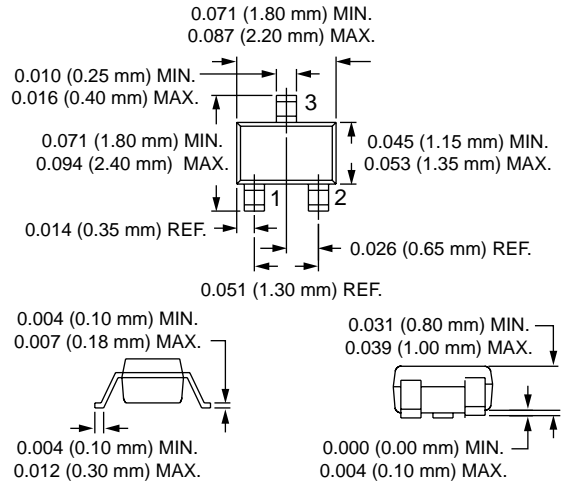
Part Number	C <sub>JO</sub> (pF)	V <sub>J</sub> (V)	M	C <sub>P</sub> (pF)	R <sub>S</sub> (Ω)
SMV1405	2.92	0.68	0.41	0.05	0.80
SMV1408	3.70	0.80	0.48	0.13	0.60
SMV1411	7.57	0.80	0.45	0.13	0.40
SMV1413	9.20	0.79	0.45	0.13	0.35
SMV1417	19.20	0.84	0.48	0.13	0.22
SMV1419	23.40	0.87	0.54	0.13	0.20

1. Values extracted from measured performance.
2. For package inductance (L<sub>S</sub>) refer to package type.
3. For more details refer to the “Varactor SPICE Models for RF VCO Applications” Application Note.

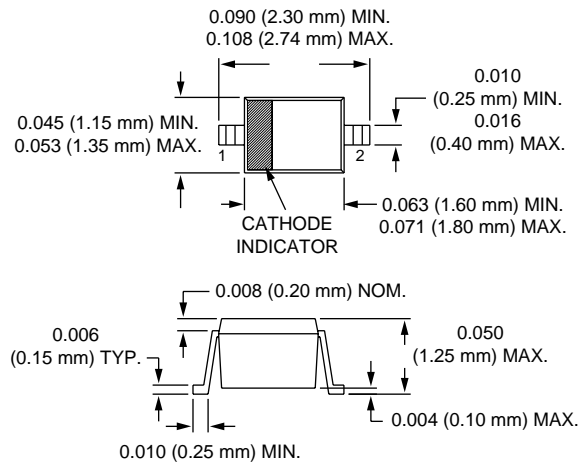
SOT-23



SC-70



SOD-323



SC-79

