

DATA SHEET

Silicon Tuning Varactor Diodes in Hermetic Surface Mount Package

Features

- Silicon abrupt and hyperabrupt tuning varactors available
- Hermetic ceramic package, 1.83 x 1.43 x 1.0 mm
- Very low parasitic impedance
- Low thermal impedance
- Usable as high as 10 GHz
- Operating temperature range -55 °C to 150 °C
- ESD Class 1A, human body model
- Low inductance 0.48 nH
- Available lead (Pb)-free, RoHS-compliant, and Green MSL-1 @ 260 °C per JEDEC J-STD-020



Description

The family of proven silicon tuning varactor diodes is packaged in a hermetic, ceramic package. This package offers excellent, very low parasitic inductance and capacitance for wide bandwidth, high frequency operation. It has low thermal impedance and meets fine and gross leak requirements for excellent reliability. Its small form factor, 1.83 x 1.43 x 1.0 mm, compares favorably to that of the smallest plastic packages.

This package meets Skyworks definition of Green: it is lead (Pb)-free, fully complies with current RoHS requirements and contains no halogens and no antimony (Sb).

SMV1405-108 is an abrupt junction device, with high Q and moderately large tuning bandwidth.

SMV1206-108 and SMV2019-108 are hyperabrupt junction varactors, which offer large tuning bandwidths by virtue of their repeatable capacitance versus voltage characteristics.

The diodes available in this package can operate over the temperature range of -55 °C to 150 °C.

NEW



Skyworks Green™ products are lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, and are free from antimony trioxide and brominated flame retardants.

Electrical Specifications

T = 25 °C, unless otherwise noted

Part Number	Minimum Reverse Breakdown Voltage $I_R = 10 \mu A (V)$	Maximum Reverse Leakage Current @ $V_R = 24 V (nA)$	Total Capacitance @ $V_R = 4 V$ $f = 1 MHz$ (pF)		Minimum Total Capacitance Ratio C_{T0}/C_{T30}	Maximum Series Resistance @ $V_R = 4 V$ $f = 500 MHz$ (Ω)	Typical Quality Factor @ $V_R = 4 V$ $f = 50 MHz$	ESD Rating, Human Body Model
			Min.	Max.				
SMV1405-108	30	20	1.25	1.56	3.8	0.8	3200	1A

Part Number	Minimum Reverse Breakdown Voltage $I_R = 10 \mu A (V)$	Maximum Reverse Leakage Current @ $V_R = 16 V (nA)$	Total Capacitance @ $V_R = 3 V$ $f = 1 MHz$ (pF)		Total Capacitance @ $V_R = 20 V$ $f = 1 MHz$ (pF)		Minimum Total Capacitance Ratio C_{T3}/C_{T20}	Minimum Quality Factor @ $V_R = 3 V$ $f = 50 MHz$	ESD Rating, Human Body Model
			Min.	Max.	Min.	Max.			
SMV1206-108	20	50	10.6	12.6	2.15	2.6	4.45	400	1A

Part Number	Minimum Reverse Breakdown Voltage $I_R = 10 \mu A (V)$	Maximum Reverse Leakage Current @ $V_R = 17.6 V (nA)$	Total Capacitance @ $V_R = 4 V$ $f = 1 MHz$ (pF)		Total Capacitance @ $V_R = 20 V$ $f = 1 MHz$ (pF)		Minimum Quality Factor @ $V_R = 4 V$ $f = 50 MHz$	ESD Rating, Human Body Model
			Min.	Max.	Min.	Max.		
SMV2019-108	22	50	0.86	1.10	0.28	0.42	500	1A

Absolute Maximum Ratings

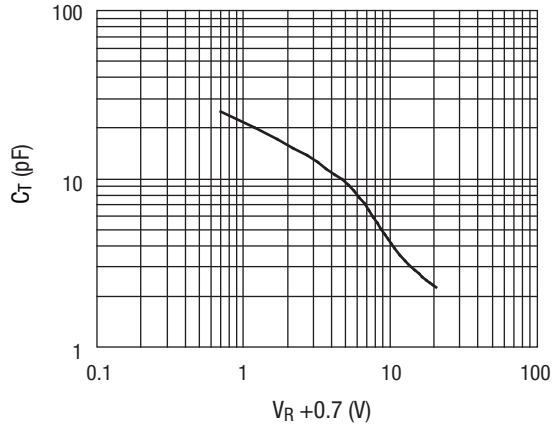
Characteristic	Value
Reverse voltage	Minimum Reverse Breakdown Voltage
Forward current	150 mA
Dissipated power at 25 °C	250 mW
Operating temperature	-55 °C to +150 °C
Storage temperature	-65 °C to +200 °C

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, ESD (Electrostatic Discharge) 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.

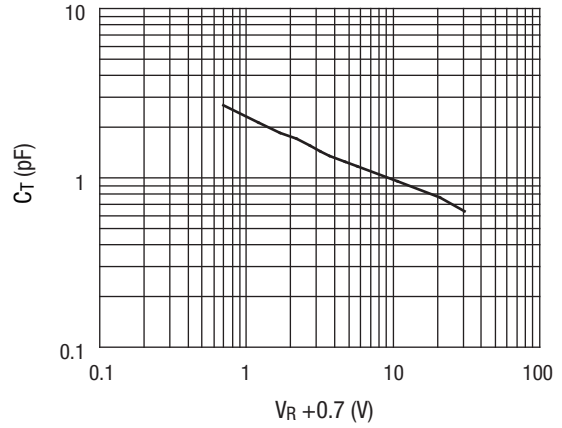
Typical Performance Data

SMV1206



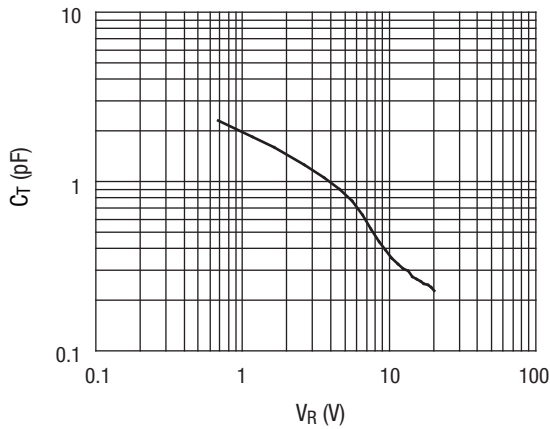
Capacitance vs. Voltage

SMV1405



Capacitance vs. Voltage

SMV2019

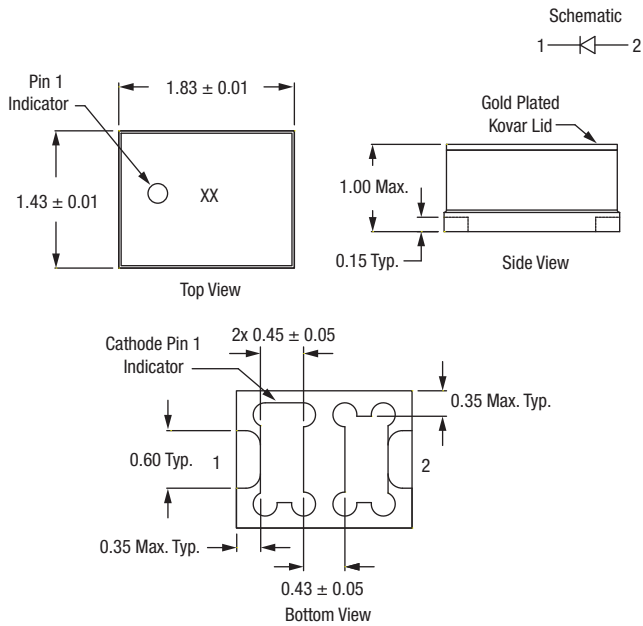


Capacitance vs. Voltage

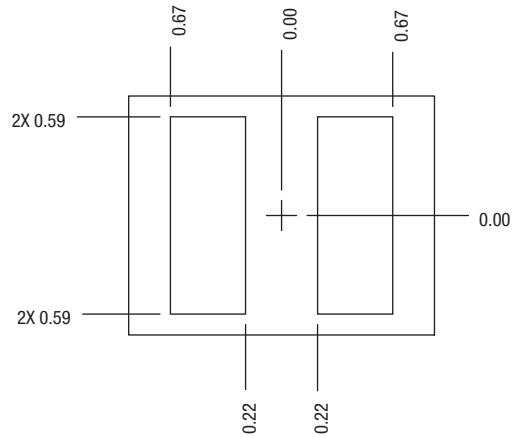
Typical Capacitance Values

V_R (V)	SMV1206 $C_T(V_R)$, pF	SMV1405 $C_T(V_R)$, pF	SMV2019 $C_T(V_R)$, pF
0	25.2	2.67	2.3
0.5	20.1	2.12	1.85
1	17.2	1.84	1.6
2	13.7	1.55	1.26
3	11.5	1.34	1.06
4	9.8	1.25	0.91
5	8.4	1.17	0.78
6	7.1		0.64
7	5.9		0.53
8	5.0		0.45
9	4.4		0.40
10	3.9	0.95	0.36
11	3.5		0.33
12	3.3		0.31
13	3.0		0.30
14	2.9		0.28
15	2.7		0.27
16	2.6		0.265
17	2.5		0.26
18	2.4		0.25
19	2.3		0.24
20	2.3	0.77	0.23
30		0.63	

-108 Package Outline



-108 Land Pattern



XX marking denotes last 2 digits of part numbers.
 Example: SMP1340 is marked 40.

Copyright © 2008, Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc. ("Skyworks") products or services. These materials, including the information contained herein, are provided by Skyworks as a service to its customers and may be used for informational purposes only by the customer. Skyworks assumes no responsibility for errors or omissions in these materials or the information contained herein. Skyworks may change its documentation, products, services, specifications or product descriptions at any time, without notice. Skyworks makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Skyworks assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Skyworks products, information or materials, except as may be provided in Skyworks Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. SKYWORKS DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. SKYWORKS SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Skyworks products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Skyworks products could lead to personal injury, death, physical or environmental damage. Skyworks customers using or selling Skyworks products for use in such applications do so at their own risk and agree to fully indemnify Skyworks for any damages resulting from such improper use or sale.

Customers are responsible for their products and applications using Skyworks products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Skyworks assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Skyworks products outside of stated published specifications or parameters.

Skyworks, the Skyworks symbol, and "Breakthrough Simplicity" are trademarks or registered trademarks of Skyworks Solutions, Inc., in the United States and other countries. Third-party brands and names are for identification purposes only, and are the property of their respective owners. Additional information, including relevant terms and conditions, posted at www.skyworksinc.com, are incorporated by reference.