Surface-Mounted Varactor and Multiplier Devices and Capacitors

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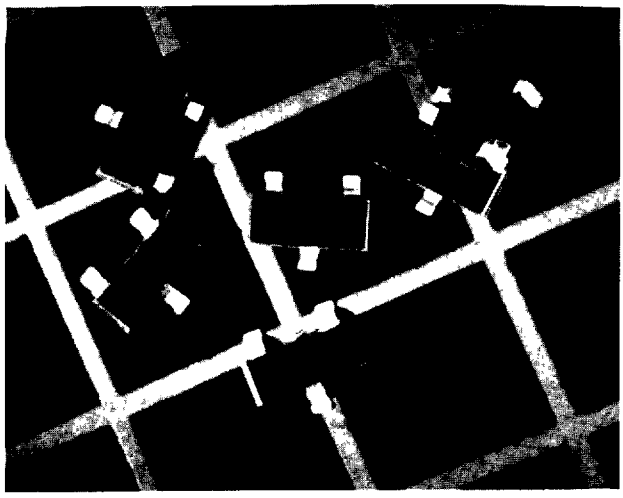

Features

- Small Outline, Low Parasitics
- High Reliability
- Wide Range of Capacitances and Tuning Ratios
- Excellent Thermal Stability
- Fully 100% Tested; Tape and Reel Packing Available

Description

The traditional quality of Alpha varactor devices is available for volume production operations in the form of low cost SOT-23 and other surface-mounted packages. These packages include many of our existing diodes, which feature the same high technology that goes into our high-reliability military devices.

Backed by Alpha's extensive experience and its reputation for producing quality RF devices, these packages assure the highest levels of repeatability and specification conformance. Furthermore, they afford a price/performance advantage that combines the essential ingredient of proven design with the latest in fully automated production equipment.

This particular combination, coupled with immediate availability, makes this line of Alpha surface-mounted varactor products ideal for mass production commercial applications including mobile radios, cellular telephones, DBS, and test equipment.

Many of Alpha's more popular varactor diodes available as surface-mounted devices are outlined in this data sheet. Low profile SOT packages are also available for PC boards and thin-film circuitry. See Alpha outlines 436-043, 436-046, 436-013, and 436-019. If you do not find the particular device you are looking for, please call Alpha to discuss your specific applications.

Applications

The high Q abrupt and hyperabrupt tuning diodes available in SOT configuration are ideal for use in oscillators, filters and phase modulators. The surface mounted hyperabrupt varactor products (SMV1200 Series) offer high tuning ratios (up to 15:1) and are available in a wide range of capacitance specifications (from 4pF to 100 pF measured at 2 volts). Varactor devices for linear frequency tuning application are also available (SMV1204-99), and they represent an ideal choice in applications where the available voltage range is limited and a large change in frequency or phase is desired.

Surface-mounted abrupt tuning diodes (SMV1400 Series) offer a high Q which make them suitable for frequency applications up to 5 GHz. Also, the high breakdown voltage versions of these devices (V_B up to 60 volts) can be used effectively for wide tuning range applications.

Alpha's surface-mounted multiplier varactors (SMV1411 Series) offer fast transition time (as low as 70 ps measured with I_F=10mA, V_R=10 volts, and from 20% to 80% recovery), and are suitable in harmonic generators, upconverters, and comb generators.

Absolute Maximum Ratings

Parameter	Symbol	Value	Units
Reverse Voltage	V_R	Same as V_B	Volts
Forward Current	I_F	200	mAdc
Power Dissipation (T_A=25°C)	P_D	250	mW
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C

Hyperabrupt Tuning Varactors

Outline 434-043[7]

Electrical Characteristics									
Type Number	C_T @ V_1 (pF) Min.-Max.	(Volts)	C_T @ V_2 (pF) Min.-Max.	(Volts)	Tuning[2] Ratio	Q[3] Typ.	V_B[4] Min.	I_R[5] μA Max.	Upper Frequency Limit (MHz)
SMV1200-02	10.5-12.5	@ 3	4.0-5.7	@ 8	1.8	200	10	1.0	800
SMV1200-04	10.5-12.5	@ 3	2.0-2.3	@20	4.6	300	22	0.1	800
SMV1200-05	25.0-31.0	@ 3	10.0-13.5	@ 8	1.8	150	10	1.0	800
SMV1200-07	25.0-31.0	@ 3	4.5-5.1	@20	4.6	200	22	0.1	800
SMV1201-16	45.0-85.0	@ 2	4.0-7.0	@10	10.0	10	12	1.0	100
SMV1201-20	90.0-150.0	@ 2	8.0-13.0	@10	10.0	5	12	1.0	50
SMV1202-02	18.0-22.0	@ 4	7.0-10.5	@ 8	1.7	150	10	1.0	500
SMV1202-03	18.0-22.0	@ 4	3.1-3.9	@20	4.6	300	22	0.1	500
SMV1202-07	45.0-65.0	@ 4	16.0-25.0	@ 8	1.8	150	10	1.0	500
SMV1202-08	45.0-55.0	@ 4	7.3-9.2	@20	4.9	300	22	0.1	500
SMV1202-11	100.0-125.0	@ 4	35.0-60.0	@ 8	1.8	150	10	1.0	500
SMV1202-12	100.0-125.0	@ 4	15.0-20.0	@20	5.0	300	22	0.1	500
SMV1203-01	8.0-12.0	@ 3	1.8-2.8	@25	4.0	300	30	0.1	800
SMV1203-05	26.0-32.0	@ 3	4.0-6.4	@25	5.0	300	30	0.1	800
SMV1204-04	2.3-3.2	@ 4	0.5-0.8	@20	2.5	400	22	0.1	2000
SMV1204-05	4.3-5.3	@ 4	0.8-1.2	@20	4.0	400	22	0.1	2000
SMV1204-99	14.5-18.0	@ 0	1.2-1.6	@ 8	9.0	600[6]	22	0.1	2000

Notes:

1. Total capacitance is measured at the indicated voltage at a frequency of 1 MHz.
2. Tuning ratio is defined as the minimum ratio of the capacitance values, i.e. $C_T(V_1)/C_T(V_2)$.
3. The Q is the figure of merit for the diode. It is specified at a frequency of 50 MHz and at a bias voltage, V_1, as indicated for each type number.
4. V_B is the breakdown voltage measured at a reverse current of 10 microamps.
5. I_R is the reverse leakage current measured at 80% of the beakdown voltage.
6. Q is measured at 4 volts bias on diode types SMV1204-99.
7. Dual diodes are available in 434-013 outline.