

## Surface Mount Hyperabrupt Varactors

Rev. V2

### Features

- Surface Mount Packages
- High Quality Factor
- Capacitance Ratio to 9.5:1
- Tape and Reel Packaging Available
- SPC Monitored Ion Implantation for Excellent
- C-V Repeatability
- Singles and Common Cathode Pairs
- Lead-Free (RoHS Compliant)

### Description

M/A-COM's MAVR-000400 series are ion-implanted, hyperabrupt junction, silicon tuning varactors in the SOT-23 surface mount package. These thermal oxide passivated diodes feature high capacitance ratio and quality factor. They are well suited for octave bandwidth tuning in the HF to UHF frequency bands. The standard capacitance tolerance is  $\pm 10\%$ , with tighter tolerances available. Capacitance matching at one or more bias voltages is also available. These diodes are supplied with 100% matte Sn plating.

### Applications

The MAVR-000400 series tuning varactors are useful for octave bandwidth tuning applications in the HF through UHF ranges. Applications include VCOs and voltage tuned filters in radios, cable TV tuners and test instruments where low cost and excellent lot-to-lot repeatability are critical. Linear tuning performance is available from 3 to 8 volts.

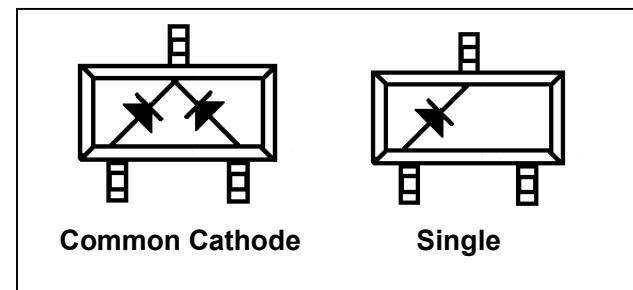
### Absolute Maximum Ratings <sup>1,2</sup>

@  $T_A=+25^\circ\text{C}$  (Unless Otherwise Noted)

Parameter	Absolute Maximum
Reverse Voltage	22V
Forward Current	50 mA
Total Power Dissipation	250 mW
Operating Temperature	-55 °C to +125 °C
Storage Temperature	-55 °C to +125 °C

1. Operation of this device above any one of these parameters may cause permanent damage.
2. Please refer to application note M538 for surface mounting instructions

### Configurations



### RoHS Compliant Parts <sup>3</sup>

RoHS Compliant Part Number	Configuration
MAVR-000401-0287AT	Single
MAVR-000403-0287AT	Single
MAVR-000404-0287AT	Single
MAVR-000405-0287AT	Single
MAVR-000407-0287AT	Single
MAVR-000409-0287AT	Single
MAVR-000401-0287FT	Common Cathode
MAVR-000403-0287FT	Common Cathode
MAVR-000404-0287FT	Common Cathode
MAVR-000405-0287FT	Common Cathode
MAVR-000407-0287FT	Common Cathode
MAVR-000409-0287FT	Common Cathode

3. Suffix refers to package style, configuration and packaging requirements. Other packages and configurations may be available upon request.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300

<sup>1</sup> ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results,

## Surface Mount Hyperabrupt Varactors

Rev. V2

### Electrical Specifications @ $T_A = +25^\circ C$

*Breakdown Voltage @  $I_R = 10\mu A$ ,  $V_b = 22 V$  Minimum*

*Reverse Leakage Current @  $V_R = 20V$ ,  $I_R = 100 nA$  Maximum*

RoHS Compliant Part No. Base <sup>1</sup>	$C_T^2$ (pF)			Capacitance Ratio	Q Factor
	$f = 1 \text{ MHz}, V_R = 4.0 \text{ V}$				
	Min.	Nom.	Max.	CT2.0/CT20	$f = 50 \text{ MHz}$ $V_R = 4.0 \text{ V}$
					Min.
MAVR-000401-0287AT	9.0	10.0	11.0	6	250
MAVR-000403-0287AT	13.5	15.0	16.5	7	250
MAVR-000404-0287AT	16.2	18.0	19.8	7	175
MAVR-000405-0287AT	19.8	22.0	24.2	7.5	175
MAVR-000407-0287AT	29.7	33.0	36.3	9	150
MAVR-000409-0287AT	42.3	47.0	51.7	9.5	150
MAVR-000401-0287FT	9.0	10.0	11.0	6	250
MAVR-000403-0287FT	13.5	15.0	16.5	7	250
MAVR-000404-0287FT	16.2	18.0	19.8	7	175
MAVR-000405-0287FT	19.8	22.0	24.2	7.5	175
MAVR-000407-0287FT	29.7	33.0	36.3	9	150
MAVR-000409-0287FT	42.3	47.0	51.7	9.5	150

1. The suffix defines package style, configuration and packaging information. Contact representative for complete part identification.
2. Capacitance specification is per diode

Specifications are subject to change without prior notification

2

**ADVANCED:** Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results,

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300

and/or prototype measurements. Commitment to develop is not guaranteed.

• **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

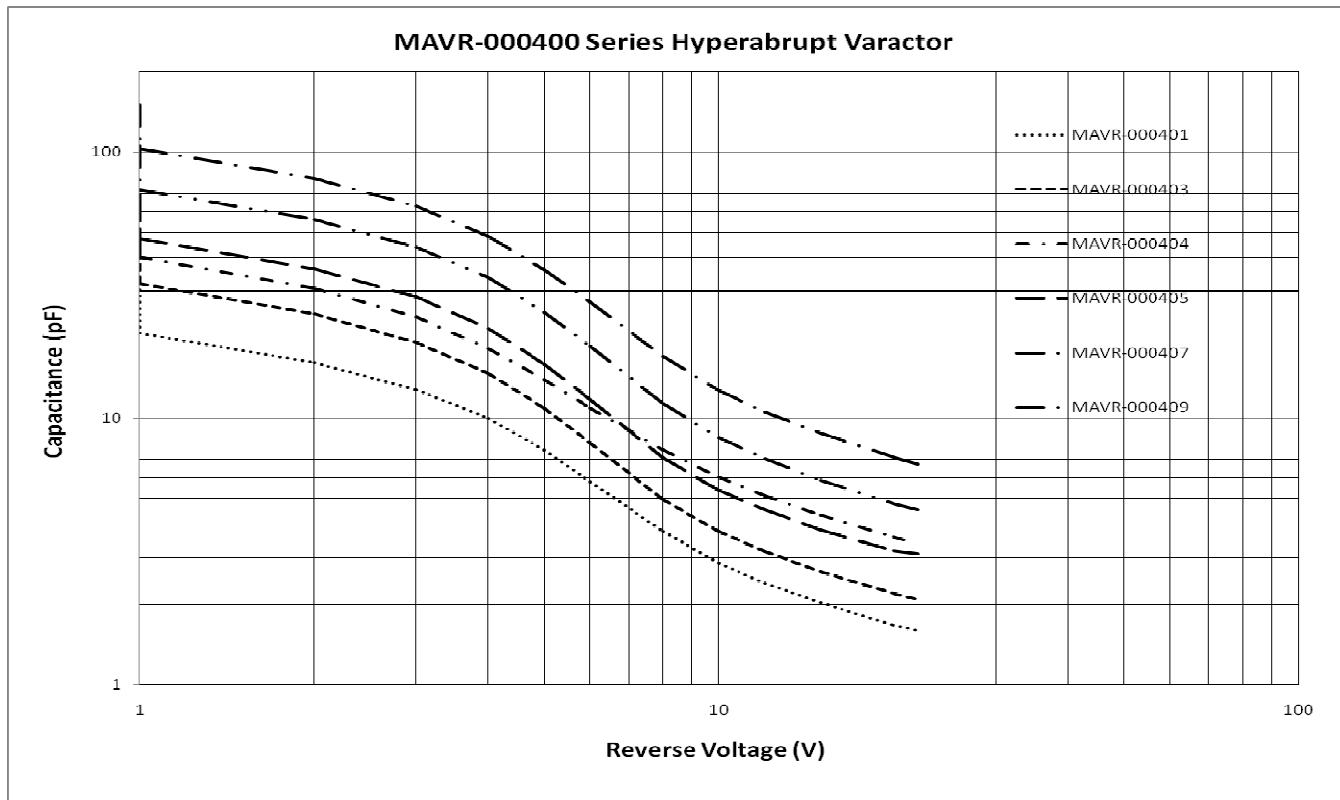
# MAVR-000400 Series



## Surface Mount Hyperabrupt Varactors

Rev. V2

### Typical Performance Curves



Bias (V)	MAVR-000401	MAVR-000403	MAVR-000404	MAVR-000405	MAVR-000407	MAVR-000409
0	30.37	47.05	59.64	69.45	105.60	150.59
1	20.86	32.12	40.43	47.47	72.34	103.10
2	16.19	24.72	30.89	36.55	55.93	79.70
3	12.83	19.33	24.00	28.57	44.02	62.79
4	9.99	14.74	18.35	21.73	33.85	48.45
5	7.59	10.90	13.95	15.95	25.13	36.27
6	5.80	8.08	10.94	11.73	18.64	27.26
8	3.76	4.96	7.61	7.11	11.37	17.11
10	2.86	3.76	6.00	5.37	8.45	12.73
12	2.41	3.17	5.12	4.53	7.05	10.58
15	2.03	2.66	4.33	3.81	5.87	8.79
20	1.68	2.21	3.60	3.18	4.81	7.17
22	1.60	2.09	3.39	3.11	4.53	6.75

Specifications are subject to change without prior notification

3

**ADVANCED:** Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results,

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300

and/or prototype measurements. Commitment to develop is not guaranteed.

• **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

## Surface Mount Hyperabrupt Varactors

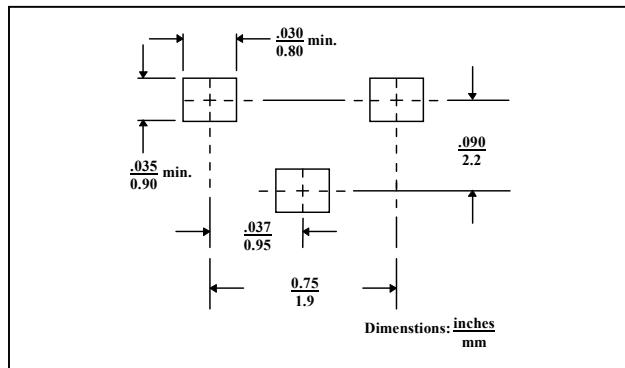
Rev. V2

### Mounting Information

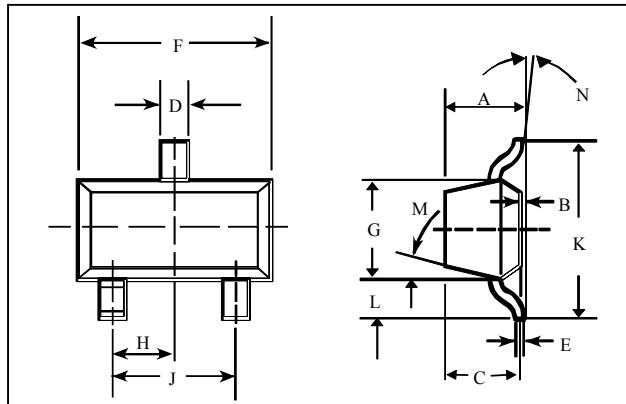
The illustration indicates the recommended mounting pad configuration for the SOT-23 package. Permanent attachment is performed by a reflow soldering procedure during which the tab temperature does not exceed +275 °C and the body temperature does not exceed +260 °C, using RoHS compliant solders

Please refer to Application Note M538 for surface mounting instructions.

### SOT-23



### SOT-23 (Case Style 287)



### SOT-23 (Case Style 287)

DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	—	0.048	—	1.22
B	—	0.008	—	0.20
C	—	0.040	—	1.00
D	0.013	0.020	0.35	0.50
E	0.003	0.006	0.08	0.15
F	0.110	0.119	2.80	3.00
G	0.047	0.056	1.20	1.40
H	0.037 typical		0.95 typical	
J	0.075 typical		1.90 typical	
K	—	0.103	—	2.60
L	—	0.024	—	0.60
DIM.	GRADIENT			
M	10° max.			
N	2° . . . 30°			

Specifications are subject to change without prior notification

4

**ADVANCED:** Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results,

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300