

Surface Mount Hyperabrupt Varactors

MA4ST400 Series
V1

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) Equivalents Available with 260 °C Reflow Compatibility

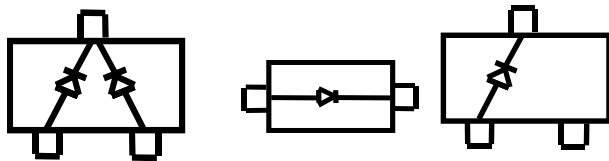
Description

M/A-COM's MA4ST400 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 octavebandwidth 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 offered with standard Sn/Pb plating, as well as with 100% matte Sn plating on our RoHS compliant devices.

Applications

The MA4ST400 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.

Configurations



Common Cathode

Single

Absolute Maximum Ratings @ $T_A=+25\text{ }^\circ\text{C}$ (Unless Otherwise Noted)¹

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

RoHS Compliant Parts

Part Number	RoHS Compliant Base Part Number
MA4ST401	MAVR-000401-XXXXXX
MA4ST402	MAVR-000402-XXXXXX
MA4ST403	MAVR-000403-XXXXXX
MA4ST404	MAVR-000404-XXXXXX
MA4ST405	MAVR-000405-XXXXXX
MA4ST406	MAVR-000406-XXXXXX
MA4ST407	MAVR-000407-XXXXXX
MA4ST408	MAVR-000408-XXXXXX
MA4ST409	MAVR-000409-XXXXXX

¹Suffix refers to package style, configuration and packaging requirements. Contact representative for complete part number information.

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Electrical Specifications @ $T_A = +25\text{ }^\circ\text{C}$

Breakdown Voltage @ $I_R = 10\mu\text{A}$, $V_b = 22\text{ V}$ Minimum

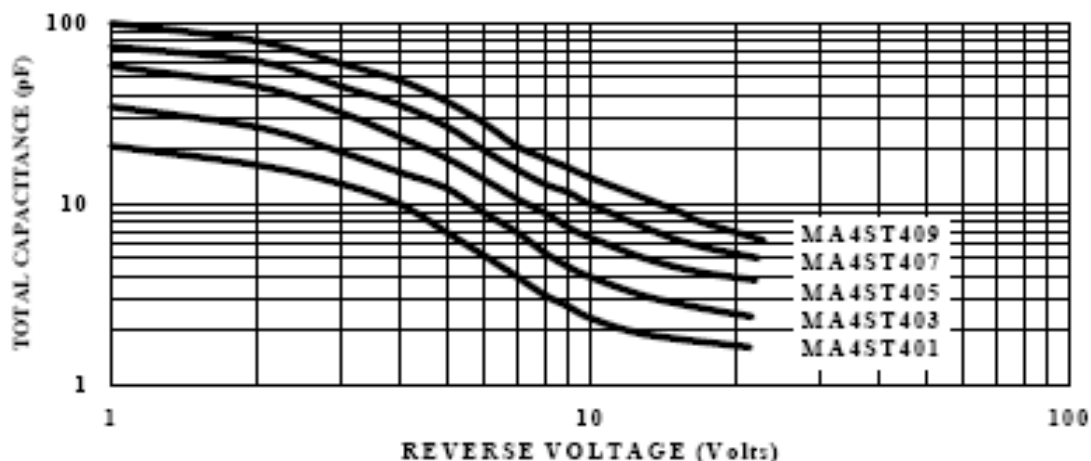
Reverse Leakage Current @ $V_R = 20\text{V}$, $I_R = 100\text{ nA}$ Maximum

Part Number Base	RoHs Compliant Part Number Base ¹	C_T^2			Capacitance Ratio	Q Factor
		(pF)				
		f=1 MHz, $V_R=4.0\text{V}$			CT2.0/CT20	f=50 MHz,
		Min.	Nom.	Max.	Typ.	Min.
MA4ST401	MAVR-000401-XXXXXX	9.0	10.0	11.0	6	250
MA4ST402	MAVR-000402-XXXXXX	10.8	12.0	13.2	6.5	250
MA4ST403	MAVR-000403-XXXXXX	13.5	15.0	16.5	7	250
MA4ST404	MAVR-000404-XXXXXX	16.2	18.0	19.8	7	175
MA4ST405	MAVR-000405-XXXXXX	19.8	22.0	24.2	7.5	175
MA4ST406	MAVR-000406-XXXXXX	24.3	27.0	29.7	8	150
MA4ST407	MAVR-000407-XXXXXX	29.7	33.0	36.3	9	150
MA4ST408	MAVR-000408-XXXXXX	35.1	39.0	42.9	9.5	150
MA4ST409	MAVR-000409-XXXXXX	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.

Typical Performance Curves

TOTAL CAPACITANCE (pF) vs REVERSE VOLTAGE



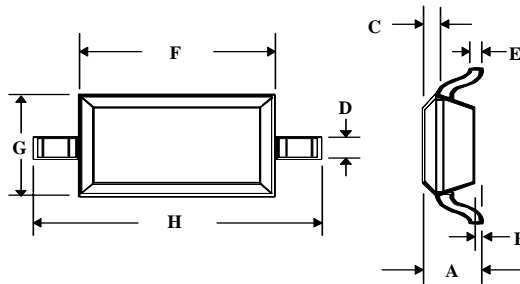
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Case Styles

SOD-323

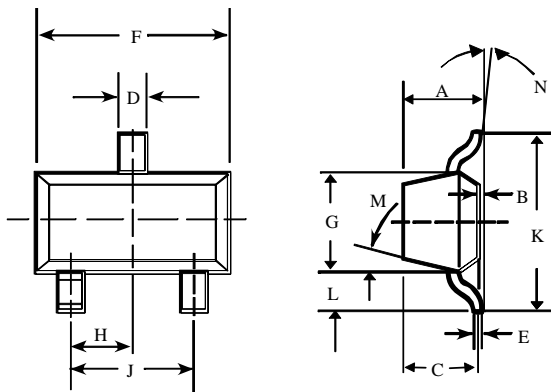
Case Style 1141



DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	—	0.043	—	1.1
B	—	0.004	—	0.1
C	—	0.008	—	0.2
D	0.010	0.016	0.25	0.4
E	0.003	0.006	0.08	0.15
F	0.063	0.075	1.6	1.9
G	0.045	0.057	1.15	1.45
H	0.091	0.106	2.3	2.7

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. ¹			
N	2° ... 30°			

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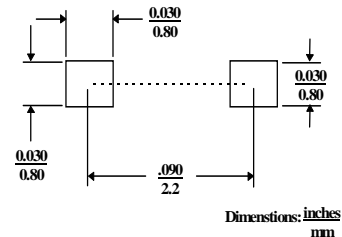
Mounting Information

The illustration indicates the recommended mounting pad configuration for the SOT-23 and SOD-323 packages. Solder paste containing flux should be screened onto the pads to a thickness of 0.005- 0.007 inches. The plastic package is placed in position, firmly adhering to the solder paste.

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 +250 °C, for standard models and +260 °C for the RoHS compliant devices.

Please refer to Application Note M538 for surface mounting instructions.

SOD-323



SOT-23

