

Surface Mount Hyperabrupt Wide-Band Tuning Varactors

MA4ST079 thru
MA4ST083 Series V4

Features

- Low Cost
- Very High Capacitance Ratio from 1 to 8 Volts
- Surface Mount Package
- High Quality Factor
- Useful for Battery Applications
- SPC Monitored Ion Implantation for Excellent C-V Repeatability
- Singles and Common Cathode Pairs
- Available in Tape and Reel
- Lead-Free (RoHs Compliant) equivalents available with 260°C reflow compatibility

Description

The MA4ST079 through MA4ST083 series of silicon hyperabrupt junction tuning varactors is produced with ion implantation and advanced epitaxial growth techniques. These diodes have thermal oxide passivation, and feature very high capacitance ratio and quality factor. They are well suited for use from the sub-HF through UHF frequency range. 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 100% matte Sn plating on our RoHs compliant equivalent devices.

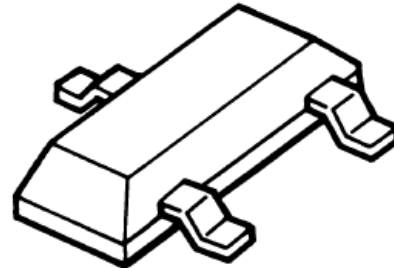
Applications

The MA4ST079 through MA4ST083 series of hyperabrupt junction tuning varactors is suggested for usage where a large frequency change is required with only a small change in tuning voltage. This series is appropriate for usage in wide band voltage controlled oscillators and voltage controlled filters which require the largest rate of change of capacitance with voltage. The large change in capacitance from 1 to 8 volts makes them very attractive for battery operated or other systems with limited available

| Part Number | RoHs Compliant Part Number ¹ |
|-------------|---|
| MA4ST079 | MAVR-000079-XXXXXX |
| MA4ST080 | MAVR-000080-XXXXXX |
| MA4ST081 | MAVR-000081-XXXXXX |
| MA4ST082 | MAVR-000082-XXXXXX |
| MA4ST083 | MAVR-000083-XXXXXX |

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

SOT-23

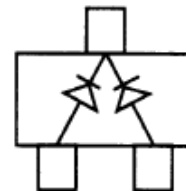


Absolute Maximum Ratings @ T_A=+25 °C (Unless Otherwise Noted)¹

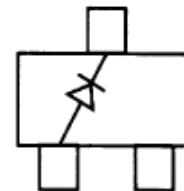
| Parameter | Absolute Maximum |
|-----------------------|-------------------|
| Reverse Voltage | 12 V |
| Forward Current | 50 mA |
| Power Dissipation | 50mW @25°C |
| Operating Temperature | -65 °C to +125 °C |
| Storage Temperature | -65 °C to +125 °C |

1. Operation of this device above any one of these parameters may cause permanent damage.

Configurations



(COMMON CATHODE PAIR)



(SINGLE)

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Electrical Specifications @ T_A = +25 °C

Breakdown Voltage @ I_R = 10µA, V_b = 12 V Minimum

Reverse Leakage Current @ V_R = 10V, I_R = 100 nA Maximum

Temperature Coefficient of Capacitance @ V_R = 8 Volts, TCC = 400ppm/°C Typical

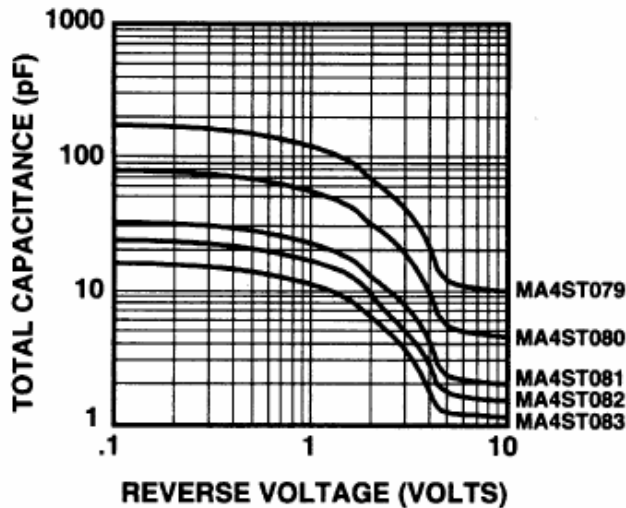
| Part Number Base | RoHs Compliant Part Number Base ¹ | C _t (pF) ² | | | | | Typical Capacitance Ratio | Typical Q |
|---------------------|---|-------------------------------------|---------------------------------|------|---------------------------------|---------------------------------|---------------------------------|--------------|
| | | V _R = 1.0V f=1MHz | V _R = 2.5V f=1MHz | | V _R = 4.0V f=1MHz | V _R = 8.0V f=1MHz | | |
| | | Min. | Min | Max | Max | Max | Typ. | Typ. |
| MA4ST079 | MAVR-000079-XXXXXX | 87.4 | 48.7 | 59.5 | 27.3 | 11.8 | 9.1 | 80 |
| MA4ST080 | MAVR-000080-XXXXXX | 40.0 | 22.3 | 27.3 | 13.1 | 5.5 | 8.9 | 150 |
| MA4ST081 | MAVR-000081-XXXXXX | 16.2 | 9.1 | 11.1 | 5.2 | 2.4 | 8.5 | 300 |
| MA4ST082 | MAVR-000082-XXXXXX | 11.5 | 6.6 | 8.0 | 3.8 | 1.8 | 8.2 | 350 |
| MA4ST083 | MAVR-000083-XXXXXX | 7.9 | 4.5 | 5.5 | 2.6 | 1.3 | 7.8 | 450 |

¹ The prefix defines package style, configuration and packaging information. Contact representative for complete part identification.

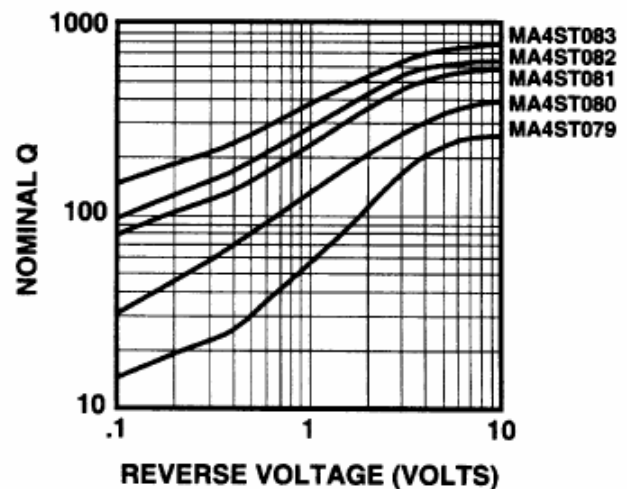
² Capacitance @ 1 MHz

Typical Performance Curves

TOTAL CAPACITANCE vs REVERSE VOLTAGE



NOMINAL Q vs REVERSE VOLTAGE



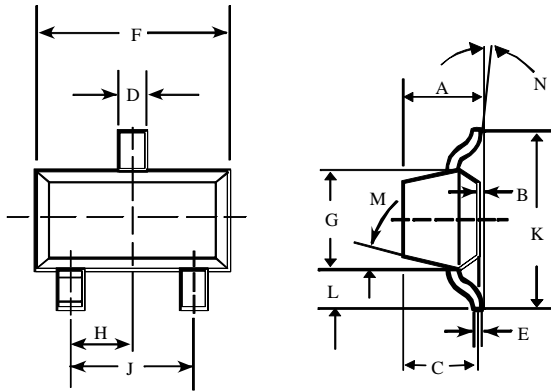
Note : Performance curves also reflect that of the RoHs equivalent part

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Case Styles

**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° | | | |

Mounting Information

The illustration indicates the recommended mounting pad configuration for the SOT-23 package. 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.

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