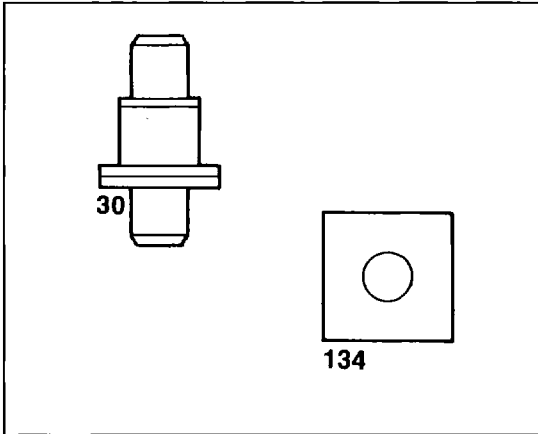


MA4ST550 Series

High Q Silicon Hyperabrupt Tuning Varactors



Description

The MA4ST550 family of high Q Silicon Hyperabrupt Tuning Varactors is available in a series of low parasitic capacitance microwave packages or in chip form. The MA4ST550 series of diodes is available in a RETMA series with junction capacitances of approximately 0.8 pF to 8.2 pF at -4 volts. All junctions are made with an ion implantation process which assures repeatable C-V characteristics from lot to lot. These devices have capacitance change ratios as high as 7:1.

Features

- HIGH Q
- USABLE CAPACITANCE CHANGE OF 7:1
- LOW REVERSE LEAKAGE FOR GOOD POST TUNING DRIFT CHARACTERISTICS
- REPRODUCIBLE C-V CURVES

Applications

The MA4ST550 series is appropriate for use in VCOs with frequencies within the range of ~ 1 -14 GHz where a large capacitance change is required. These devices are ideally suited for VCOs in missile seekers, telecommunication systems and electronic warfare systems with critical post tuning drift specifications.

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

Breakdown Voltage = 22 volts minimum at 10 microamps

Reverse Current = 50 nAmps maximum @ 20 volts and 25°C

Model Number	Case ¹ Style	Total Capacitance ^{2,3} @ -4V (pF) Min./Max.	Total Capacitance ^{2,3} @ -20V (pF) Min./Max.	Minimum Q ⁴ @ -4 Volts 50 MHz
MA4ST551	30	.72-.88	0.30-0.38	650
MA4ST552	30	.90-1.10	0.34-0.42	650
MA4ST553	30	1.08-1.32	0.38-0.48	600
MA4ST554	30	1.35-1.65	0.43-0.58	600
MA4ST555	30	1.62-1.98	0.51-0.68	550
MA4ST556	30	1.98-2.42	0.58-0.78	550
MA4ST557	30	2.43-2.97	0.68-0.88	500
MA4ST558	30	2.97-3.63	0.82-1.02	500
MA4ST559	30	3.51-4.29	0.93-1.18	450
MA4ST560	30	4.23-5.16	1.13-1.43	450
MA4ST561	30	5.04-6.16	1.33-1.63	450
MA4ST562	30	6.12-7.48	1.58-1.98	400
MA4ST563	30	7.38-9.02	1.88-2.38	400

NOTES

1. The standard case style is 30. Other packages and chips shown at the bottom of this page are available upon request. When ordering, specify the desired case style by adding the case designation as a suffix to the model number, i.e. MA4ST552-134 is a 15 X 15 mil chip diode.
2. Capacitance is measured at 1 MHz using a shielded test holder. The normal tolerance at -4 volts is $\pm 10\%$. Closer tolerances are available upon request for an additional charge. By adding the suffix A to the model number, a tolerance of $\pm 5\%$ can be obtained.

3. The total capacitance values shown are for devices housed in case style 30. Other case styles will result in different values due to different case parasitics. Case parasitics (C_p and L_s) are given for available case styles along with the outline drawings in this bulletin. The C_p values are listed along with the outline drawings in this bulletin. The C_p values listed typically have tolerances of $\pm .02$ pF.
4. Diode Q is measured by the DeLoach technique at -4 volts and extrapolated to 50 MHz.

MAXIMUM RATINGS

- Reverse Voltage Same as Breakdown Voltage
- Operating Temperature -65°C to $+150^\circ\text{C}$
- Storage Temperature -65°C to $+150^\circ\text{C}$
- Temperature Coefficient 400 ppm/ $^\circ\text{C}$ at -4 volts

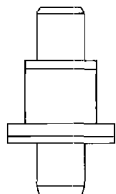
ENVIRONMENTAL PERFORMANCE

All tuning varactors in the MA4ST550 series are capable of meeting the performance tests dictated by the methods and procedures of the latest revisions of MIL-S-19500, MIL-STD-202 and MIL-STD-750 which specify mechanical, electrical, thermal and other environmental tests common to semiconductor products.

HIGH RELIABILITY

All diodes in the MA4ST550 series may be screened to TX, TXV specifications. For further high reliability information contact the factory.

Case Styles



30



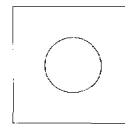
31



94



120



134

Typical Performance Curves

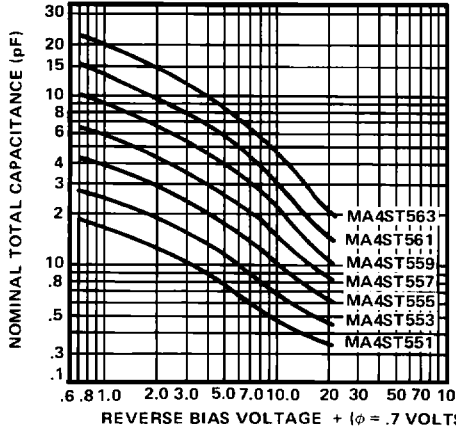


FIGURE 1. Capacitance vs. Reverse Bias Voltage (MA4ST551-563) in ODS-30.

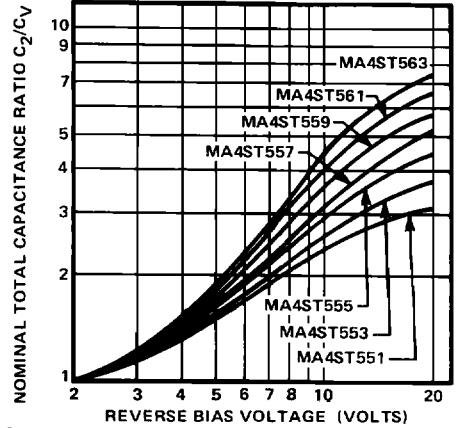


FIGURE 2. Capacitance Ratio C_2/C_y vs. Reverse Bias Voltage (MA4ST551-563) in ODS-30.

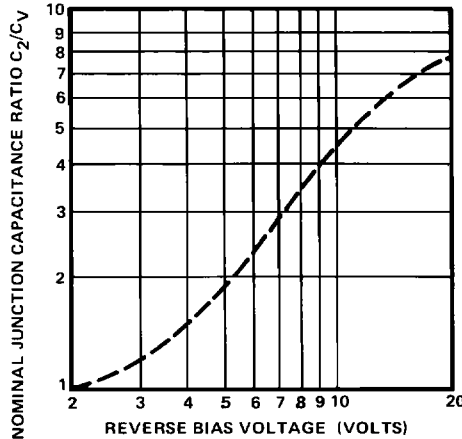


FIGURE 3. Capacitance Ratio C_2/C_y vs. Reverse Bias (MA4ST551-563) Chip Diodes (ODS-134).

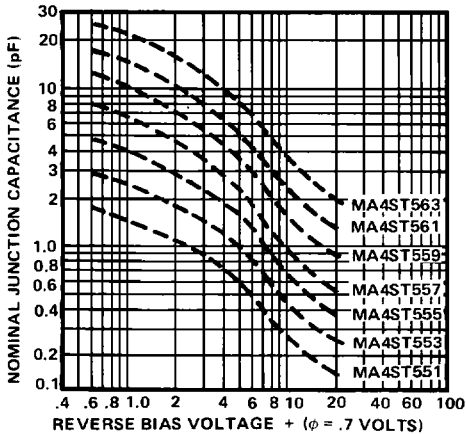


FIGURE 4. Capacitance vs. Reverse Bias Voltage (MA4ST551-563) Chips (ODS-134).

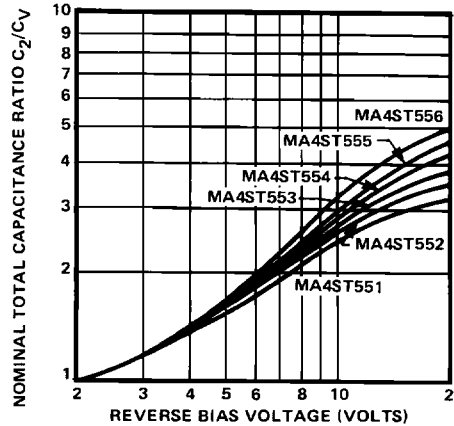


FIGURE 5. Capacitance Ratio C_2/C_y vs. Reverse Bias (MA4ST551-556) in ODS-30.