M/A-COM

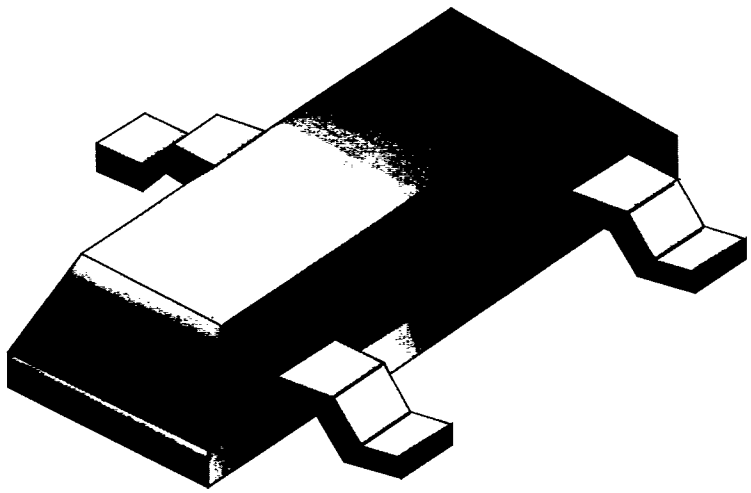
Wide-Band Tuning Varactors

SOT-23 Silicon Hyperabrupt Wide-Band Tuning Varactors

MA4ST079 – MA4ST083 Series

Features

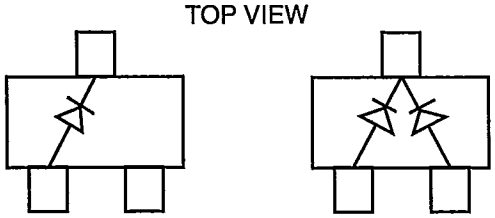
- Low Cost
- Very High Capacitance Ratio from 1 to 8 Volts
- Surface Mount Package
- High Quality Factor
- Useful for Battery Applications
- SPC Monitored Ion Implantation for Excellent C-V Repeatability
- Singles and Common Cathode Pairs
- Available in Tape and Reel



Case Style 287
SOT-23

Configurations

TOP VIEW



(SINGLE) (COMMON CATHODE PAIR)

Description

The MA4ST079 - 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 +/-10%, with tighter tolerances available. Capacitance matching at one or more bias voltages is also available.

Applications

The MA4ST079 - 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 control voltage.

The MA4ST079 - MA4ST083 family can be used in VCOs and VTFs from approximately 100 KHz through the UHF frequency band.

Bulletin No. 4615

SOT-23 Silicon Hyperabrupt Wide-Band Tuning Varactors

Absolute Maximum Ratings

Reverse Voltage	12 Volts
Junction Temperature	–65°C to +125°C
Storage Temperature	–65°C to +125°C
Forward Current	50 mA
Power Dissipation	50 mW @ 25 °C

Ordering Information

The part numbers shown are for single diodes. When ordering diodes in common cathode pairs add suffix "CK." For example, MA4ST079CK specifies model number MA4ST079 as a common cathode pair.

Specifications @ T_A = 25°C

Breakdown Voltage @ I_R = 10 μA, V_B = 12 Volts Minimum
Reverse Leakage Current @ V_R = 10 Volts, I_R = 100 nA Maximum
Temperature Coefficient of Capacitance @ V_R = 8 Volts, TCC = 400 ppm/°C Maximum

Model Number	Minimum Total Capacitance (pF)	Total Capacitance (pF)		Maximum Total Capacitance (pF)	Maximum Total Capacitance (pF)	Typical Total Capacitance Ratio C_{T1}/C_{T8}	Minimum Q
	f=1 MHz V_R=1 Volt	f=1 MHz V_R=2.5 Volts min.	max.	f=1 MHz V_R=4 Volts	f=1 MHz V_R=8 Volts	f=1 MHz V_R=1/ V_R=8	f=50 MHz V_R=4 Volts
MA4ST079	87.4	48.7	59.5	27.3	11.8	9.1	80
MA4ST080	40.0	22.3	27.3	13.1	5.5	8.9	150
MA4ST081	16.2	9.1	11.1	5.2	2.4	8.5	300
MA4ST082	11.5	6.6	8.0	3.8	1.8	8.2	350
MA4ST083	7.9	4.5	5.5	2.6	1.3	7.8	450

Case Style

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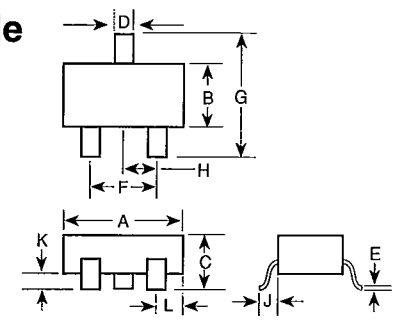

Package Capacitance = 0.15 pF typ.
Package Inductance = 2 nH typ.

DIM.	INCHES MIN.	INCHES MAX.	MILLIMETERS MIN.	MILLIMETERS MAX.
A	0.110	0.120	2.80	3.05
B	0.047	0.055	1.20	1.40
C	0.034	0.047	0.86	1.20
D	0.014	0.017	0.35	0.43
E	0.003	0.005	0.08	0.13
F	0.070	0.081	1.78	2.06
G	0.083	0.098	2.11	2.49
H	0.035	0.043	0.89	1.09
J	0.018	0.024	0.46	0.61
K	0.005	0.009	0.13	0.23
L	0.018	0.022	0.46	0.56

Typical Performance Curves

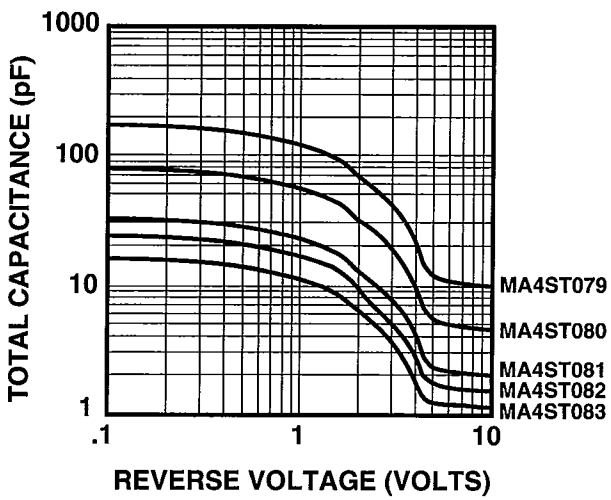

Figure 1. Total Capacitance vs. Reverse Voltage

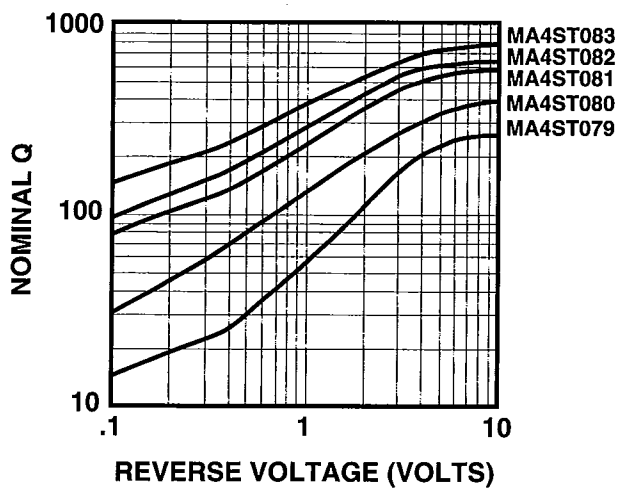

Figure 2. Nominal Q vs. Reverse Voltage