

Low Voltage/Low Rs Silicon Hyperabrupt Varactor Diode

V 2.00

MA4ST1300 Series

Features

- Low Series Resistance at Low Tuning Voltages
- High Capacitance Ratio at Low Tuning Voltages
- Surface Mount Plastic Packages : SC-79, SOD-323, SC-70 (3L)
- SPC Process for Superior C vs V Repeatability

Description

M/A-COM's MA4ST1300 series is a highly repeatable, UHCVD/ion-implanted, hyperabrupt silicon tuning varactor in a cost effective surface mount package. This series of varactors is designed for high capacitance ratio, and high Q for low battery voltage operation. It is efficient for wide band tuning and low phase noise application where the supply voltage is limited to 5 volts or less. The Varactors are offered as Singles in SC-79, and SOD-323 along with a Common Cathode version offered in the SC-70, 3 Lead.

Ordering Information

Part Number	Configuration	Package
MA4ST13XX-1279T	Single	SC-79
MA4ST13XX-1141T	Single	SOD-323
MA4ST13XX-1146T	Common Cathode	SC-70 (3L)

Absolute Maximum Ratings

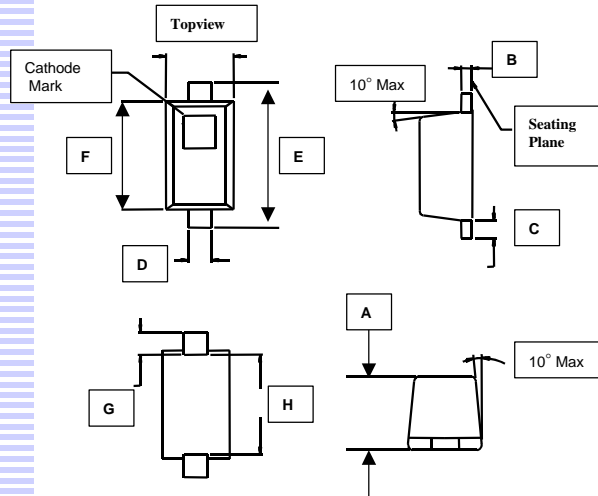
@T_A = +25 °C

Parameter	Absolute Maximum
Reverse Voltage	12 V
Forward Current	50 mA
Operating Temperature	-55 °C to +125 °C
Storage Temperature	-55 °C to +125 °C

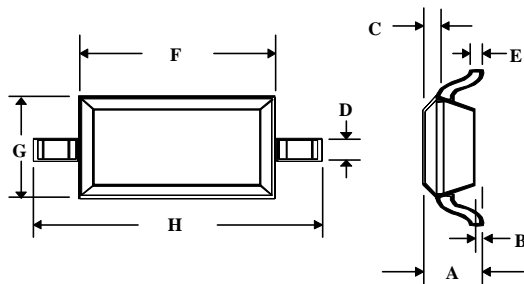
Technical Parasitic Information

Package Type	Package Cp (pF)	Package Ls (nH)
SC-79	0.10	0.6
SOD-323	0.11	1.2
SC-70, 3 Lead	0.12	1.3

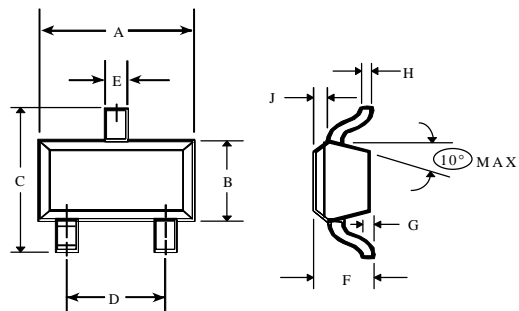
Case Styles

SC-79 (SOD-523)
Case Style 1279

DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.020	0.028	0.50	0.71
B	0.003	0.008	0.08	0.20
C	0.006	0.010	0.15	0.25
D	0.010	0.014	0.25	0.36
E	0.059	0.067	0.08	0.15
F	0.043	0.051	1.50	1.30
G	0.011	0.012	0.28	0.30
H	0.037	0.043	0.94	1.09

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

SC-70, 3 Lead
Case Style 1146

DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.071	0.094	1.80	2.40
D	0.047	0.057	1.19	1.45
E	0.010	0.016	0.25	0.41
F	0.031	0.039	0.80	1.00
G	0.000	0.004	0.00	0.10
H	0.004	0.007	0.10	0.18
J	0.004	0.010	0.10	0.25

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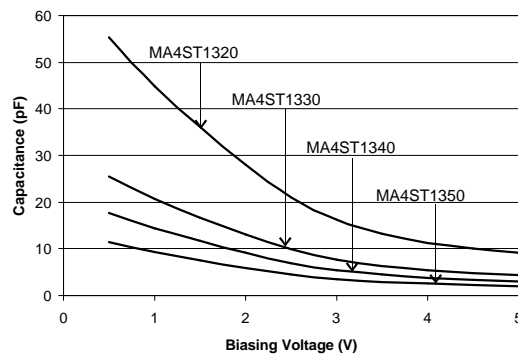
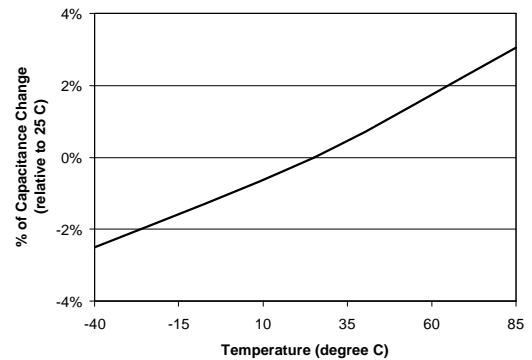
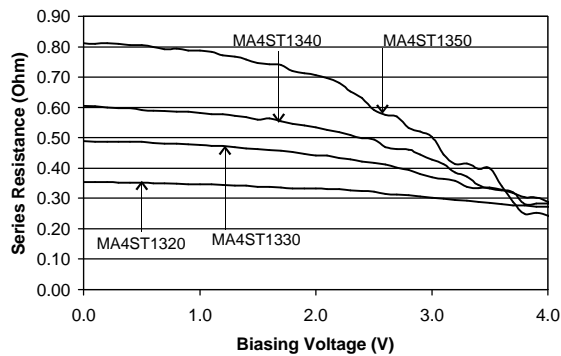
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Electrical Characteristics @ $T_A = +25^\circ\text{C}$ **Breakdown Voltage @ $I_R = 10\text{mA}$, $V_b = 12\text{ V}$ Minimum****Reverse Leakage Current @ $V_R = 10\text{V}$, $I_R = 100\text{ nA}$ Maximum**

Part Number	Ct* (pF)				Capacitance Ratio	Rs** (Ohm)	
	$V_R = 0.5\text{V}$			$V_R = 4.0\text{ V}$	$C_{t0.5}/C_{t3.0}$	$V_R = 2.0\text{ V}$	
	Min.	Nom.	Max.	Typ.	Typ.	Typ.	Max.
MA4ST1320	48.0	55.0	63.0	17.0	3.37	0.32	0.5
MA4ST1330	22.0	25.0	30.0	7.8	3.31	0.45	0.7
MA4ST1340	15.0	18.0	21.0	5.2	3.4	0.57	0.85
MA4ST1350	9.5	11.0	13.5	3.6	3.2	0.78	1.0

* Capacitance @ 1 MHz

** Series Resistance @ 100 MHz

Typical Capacitance vs. Biasing Voltage**Typical Capacitance Change vs. Temperature****Series Resistance vs. Biasing Voltage***

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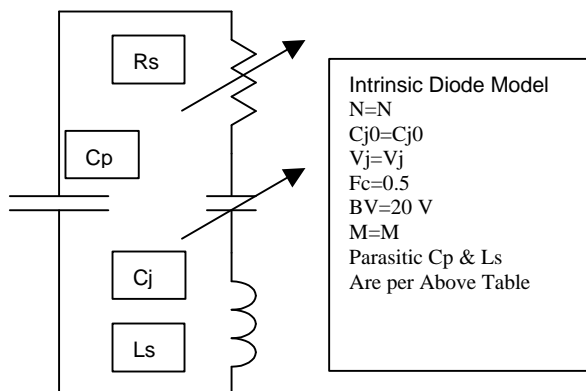
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Typical Capacitance Values

V_R (V)	MA4ST1320	MA4ST1330	MA4ST1340	MA4ST1350
	C_t (pF)	C_t (pF)	C_t (pF)	C_t (pF)
0.5	55.45	25.4	17.7	11.4
1.0	45.0	20.7	14.4	9.3
1.5	36.3	16.8	11.7	7.6
2.0	28.3	13.2	9.2	5.9
2.5	21.2	10.1	7.0	4.5
3.0	16.4	7.9	5.4	3.4
3.5	13.3	6.4	4.4	2.9
4.0	11.4	5.5	3.8	2.5
4.5	10.0	4.8	3.3	2.2
5.0	9.1	4.4	3.0	2.0

Spice Model



Part Number	N	CJO (pF)	Vj (V)	M
MA4ST1320	1.1	71.5	20.35	13.21
MA4ST1330	1.1	32.8	20.91	13.72
MA4ST1340	1.1	22.7	22.32	14.72
MA4ST1350	1.1	14.3	25.52	15.87