

**Low Tuning Voltage/Low Rs Silicon Hyperabrupt Varactor Diode**

**MA4ST1200 Series  
V2**

**Features**

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

**Description and Applications**

M/A-COM's MA4ST1200 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 SOD-323 along with a common cathode version offered in the SC-70, 3 Lead.

**Ordering Information**

Part Number	Configuration	Package
MA4ST12XX-1141T	Single	SOD-323
MA4ST12XX-1146T	Common Cathode	SC-70 ( 3 L )

**Absolute Maximum Ratings @ 25 °C  
(Unless Otherwise Noted)<sup>1</sup>**

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

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

**Technical Parasitic Information**

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

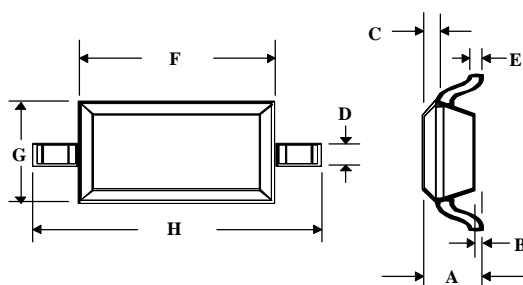
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**Case Styles**

**SOD-323**

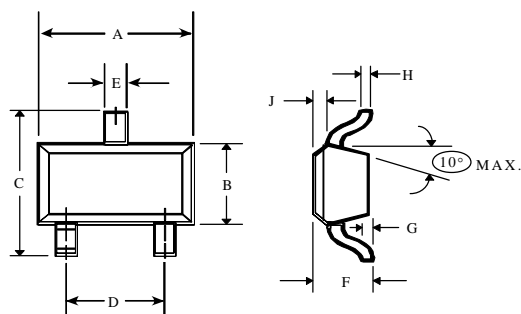
**Case Style 1141**



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

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

*Breakdown Voltage @  $I_R = 10\text{mA}$ ,  $V_b = 12\text{ V}$  Minimum*

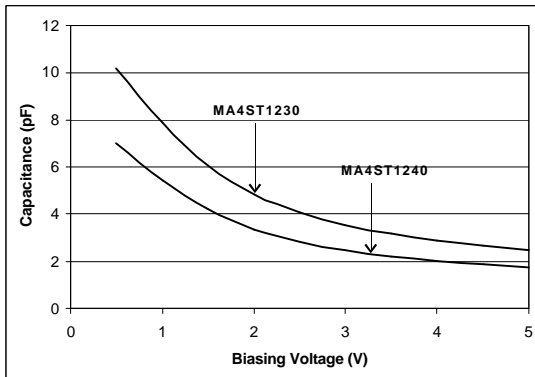
*Reverse Leakage Current @  $V_R = 10\text{V}$ ,  $I_R = 100\text{ nA}$  Maximum*

Part Number	Ct* (pF)				Capacitance Ratio	Rs** (Ohm)		
	$V_R = 0.5\text{ V}$	$V_R = 2.0\text{ V}$		$V_R = 4.0\text{ V}$		$V_R = 2.0\text{ V}$		
	Typ.	Min.	Nom.	Max.	Typ.	Typ.	Max.	
MA4ST1230	10.1	4.2	4.7	5.2	2.75	3.67	0.4	0.7
MA4ST1240	7.1	3.0	3.4	3.8	2.05	3.46	0.4	0.7

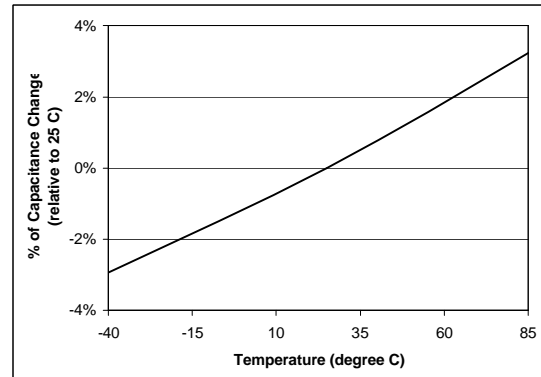
\* Capacitance @ 1 MHz

\*\* Series Resistance @ 100 MHz

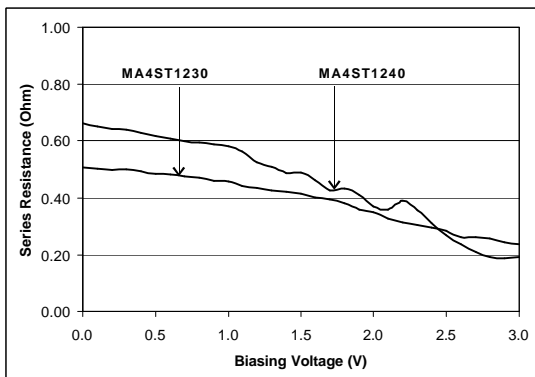
**Typical Capacitance vs. Biasing Voltage**



**Typical Capacitance Change vs. Temperature**



**Typical Rs vs Biasing Voltage\***



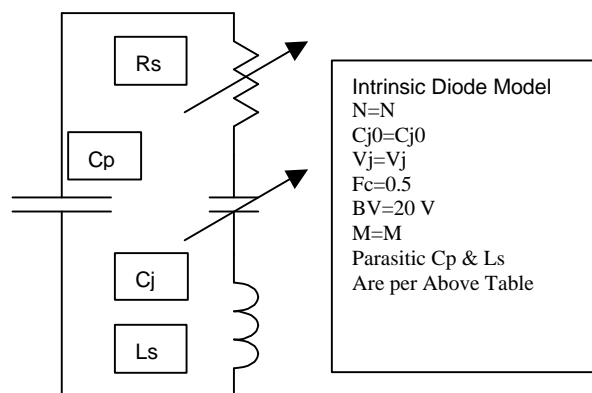
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**Typical Capacitance Values**

$V_R$ (V)	MA4ST1230	MA4ST1240
	Ct (pF)	Ct (pF)
0.5	10.170	7.016
1.0	7.839	5.424
1.5	6.062	4.213
2.0	4.840	3.370
2.5	4.053	2.829
3.0	3.527	2.466
3.5	3.155	2.208
4.0	2.877	2.016
4.5	2.661	1.865
5.0	2.488	1.746

**Spice Model**



Part Number	N	CJO (pF)	Vj (V)	M
MA4ST1230	1.1	12.7	3.136	2.6
MA4ST1240	1.1	8.65	3.170	2.6