

Low Tuning Voltage/Low Rs Silicon Hyperabrupt Varactor Diode

MA4ST1200 Series
 V4

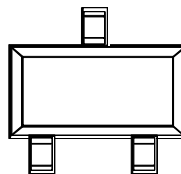
Features

- 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
- Lead-Free (RoHs Compliant) equivalents available with 260°C reflow compatibility

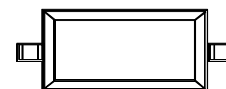
Description

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 SC-79, and SOD-323 along with a Common Cathode version offered in the SC-70, 3 Lead. These diodes are offered with standard Sn/Pb plating , as well as with 100% matte Sn plating on our RohS compliant equivalent devices.

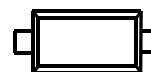
SC-70 (3 lead)



SOD-323



SC-79



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

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.
2. Please refer to application note M538 for surface mounting instructions

Part Number	RoHs Compliant Part Number	Configuration	Package	Package Cp (pF)	Package Ls (nH)
	MAVR-001230-12790T	Single	SC-79	0.10	0.6
	MAVR-001240-12790T	Single	SC-79	0.10	0.6
MA4ST1230-1141T	MA4ST1231-1141T	Single	SOD-323	0.11	1.2
MA4ST1240-1141T	MA4ST1241-1141T	Single	SOD-323	0.11	1.2
MA4ST1230CK-1146T	MA4ST1231CK-1146T	Common Cathode	SC-70 (3L)	0.12	1.3
MA4ST1240CK-1146T	MA4ST1241CK-1146T	Common Cathode	SC-70 (3L)	0.12	1.3

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

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

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

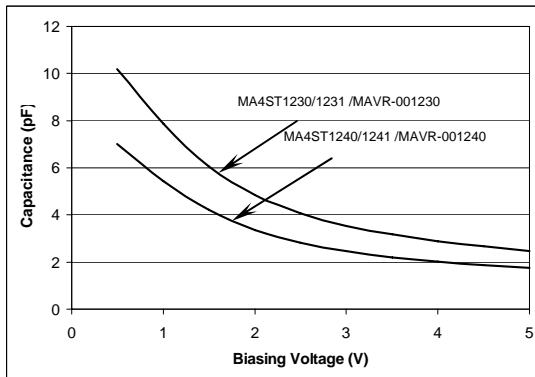
Part Number Base	RoHS Compliant Part Number Base ¹	Ct (pF) ²					Capacitance Ratio	Rs ³ (Ohm)	
		$V_R = 0.5\text{V}$	$V_R = 2.0\text{V}$				$C_{t0.5}/C_{t4.0}$	$V_R = 2.0\text{ V}$	
		Typ.	Min.	Nom.	Max.	Typ.	Typ.	Typ.	Max.
MA4ST1230	MA4ST1231 MAVR-001230-xxxxx	10.1	4.2	4.7	5.2	2.75	3.67	0.40	0.70
MA4ST1240	MA4ST1241 MAVR-001240-xxxxx	7.1	3.0	3.4	3.8	2.05	3.46	0.40	0.70

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

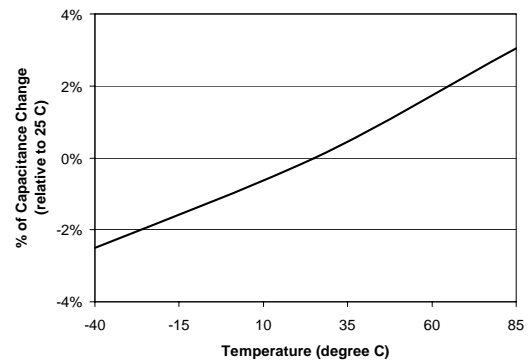
² Capacitance @ 1 MHz

³ Series Resistance @ 100 MHz

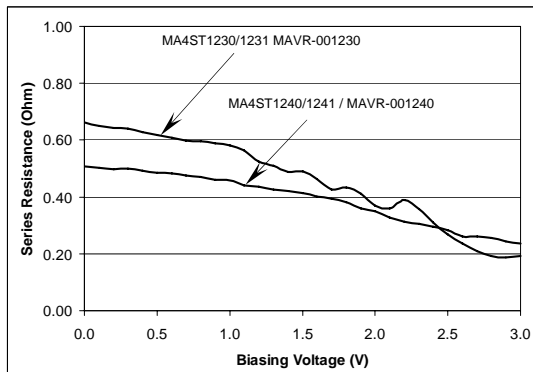
Typical Capacitance vs. Biasing Voltage



Typical Capacitance Change vs. Temperature



Typical Rs vs Biasing Voltage³



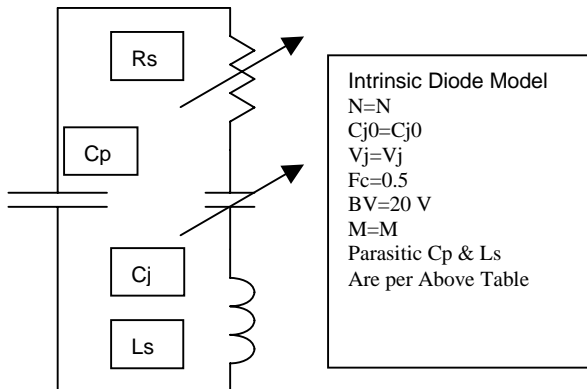
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Typical Capacitance Values

V_R (V)	MA4ST1230	MA4ST1240
	C_t (pF)	C_t (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	C_{j0} (pF)	V_j (V)	M
MA4ST1230	1.1	12.7	3.136	2.6
MA4ST1240	1.1	8.65	3.170	2.6

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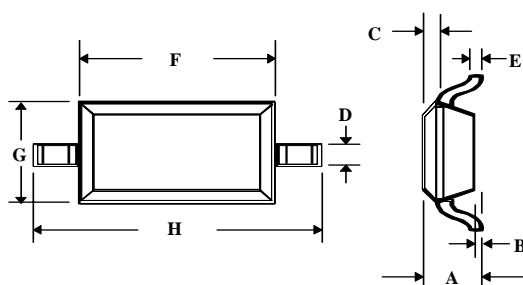
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Case Styles

SOD-323

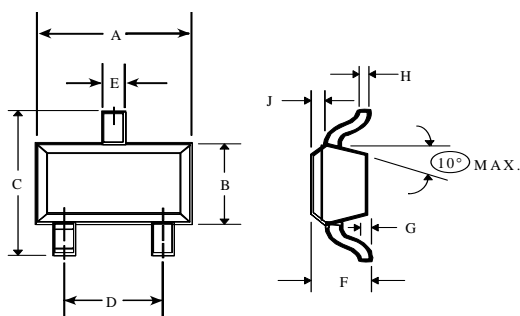
Case Style 1141



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

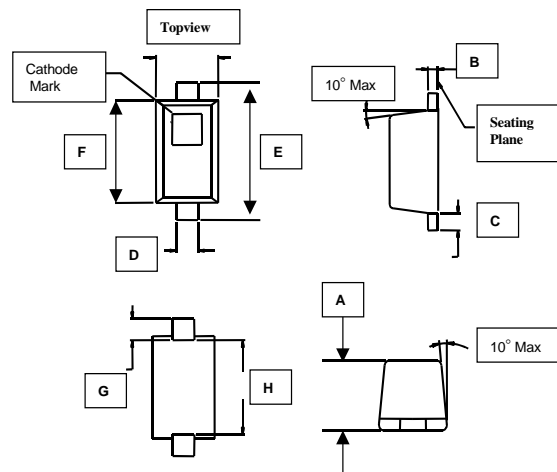
Case Style 1146



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

SC-79

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 typical	0.043	0.94	1.09

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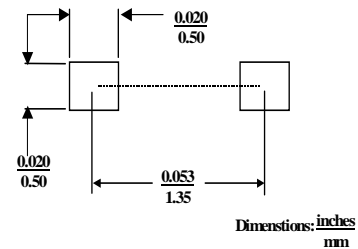
Mounting Information

The illustration indicates the recommended mounting pad configuration for the SC-79, SOT-323 and SOD-323 packages. 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.

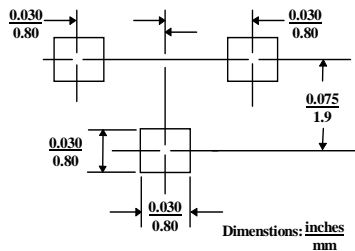
Permanent attachment is performed by a reflow soldering procedure during which the tab temperature does not exceed +275 °C and the body temperature does not exceed +250 °C, for standard models and +260 °C for the RoHS compliant devices.

Please refer to Application Note M538 for surface mounting instructions.

SC-79



SOT-323



SOD-323

