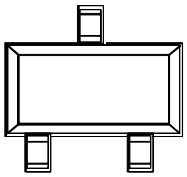
Low Voltage/Low Rs Silicon Hyperabrupt Varactor Diode

MA4ST1300 Series
V3

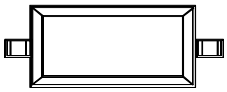
Features

- 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) (other packages & configurations available)
- SPC Process for Superior C vs V Repeatability
- Lead-Free (RoHs Compliant) equivalents available with 260°C reflow compatibility.

SC-70 (3 lead)



SOD-323



SC-79



Description and Applications

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. These diodes are offered with standard Sn/Pb plating , as well as 100% matte Sn plating on our RoHs compliant equivalent devices.

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-001320-12790T	Single	SC-79	0.10	0.6
	MAVR-001330-12790T	Single	SC-79	0.10	0.6
	MAVR-001340-12790T	Single	SC-79	0.10	0.6
	MAVR-001350-12790T	Single	SC-79	0.10	0.6
MA4ST1320-1141T	MAVR-001320-11410T	Single	SOD-323	0.11	1.2
MA4ST1330-1141T	MAVR-001330-11410T	Single	SOD-323	0.11	1.2
MA4ST1340-1141T	MAVR-001340-11410T	Single	SOD-323	0.11	1.2
MA4ST1350-1141T	MAVR-001350-11410T	Single	SOD-323	0.11	1.2
MA4ST1320CK-1146T	MAVR-001320-1146FT	Common Cathode	SC-70 (3L)	0.12	1.3
MA4ST1330CK-1146T	MAVR-001330-1146FT	Common Cathode	SC-70 (3L)	0.12	1.3
MA4ST1340CK-1146T	MAVR-001340-1146FT	Common Cathode	SC-70 (3L)	0.12	1.3
MA4ST1350CK-1146T	MAVR-001350-1146FT	Common Cathode	SC-70 (3L)	0.12	1.3

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Low Voltage/Low Rs Silicon Hyperabrupt Varactor Diode

MA4ST1300 Series
V3

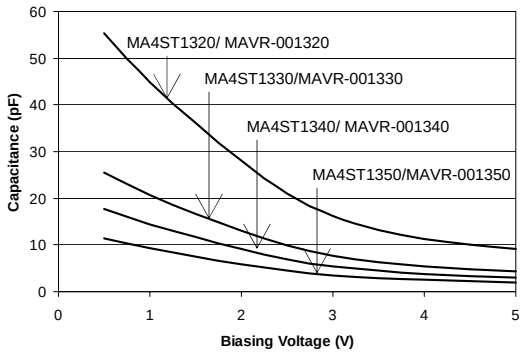
Electrical Specifications @ T_A = +25 °C

Breakdown Voltage @ I_R = 10μA, V_b = 12 V Minimum
Reverse Leakage Current @ V_R =10V, I_R = 100 nA Maximum

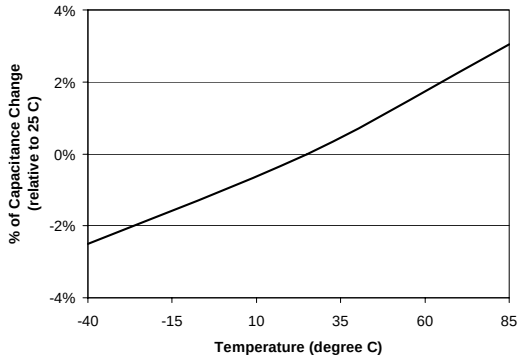
Part Number Base	RoHs Compliant Part Number Base[1]	Ct (pF)[2]				Capacitance Ratio	Rs[3] (Ohm)	
		V_R = 0.5V			V_R = 4.0V	$Ct_{0.5}/Ct_{3.0}$	V_R = 2.0 V	
		Min.	Nom.	Max.	Typ.	Typ.	Typ.	Max.
MA4ST1320	MAVR-001320-XXXXXX	48.0	55.0	63.0	17.0	3.37	0.32	0.5
MA4ST1330	MAVR-001330-XXXXXX	22.0	25.0	30.0	7.8	3.31	0.45	0.7
MA4ST1340	MAVR-001340-XXXXXX	15.0	18.0	21.0	5.2	3.4	0.57	0.85
MA4ST1350	MAVR-001350-XXXXXX	9.5	11.0	13.5	3.6	3.2	0.78	1.0

[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

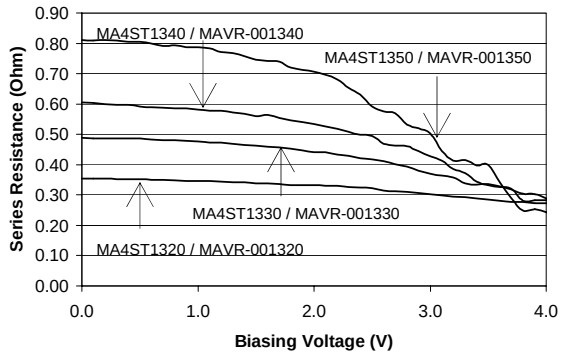
Typical Capacitance vs. Biasing Voltage



Typical Capacitance Change vs. Temperature



Series Resistance vs Biasing Voltage*



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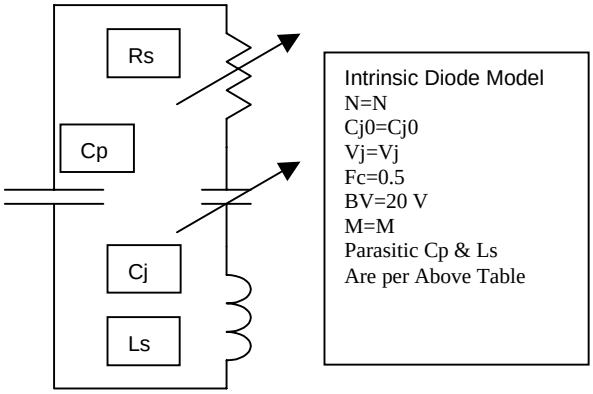
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Typical Capacitance Values

V_R (V)	MA4ST1320 MAVR-001320	MA4ST1330 MAVR-001330	MA4ST1340 MAVR-001340	MA4ST1350 MAVR-001350
	Ct (pF)	Ct (pF)	Ct (pF)	Ct (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 MAVR-001320	1.1	71.5	20.35	13.21
MA4ST1330 MAVR-001330	1.1	32.8	20.91	13.72
MA4ST1340 MAVR-001340	1.1	22.7	22.32	14.72
MA4ST1350 MAVR-001350	1.1	14.3	25.52	15.87

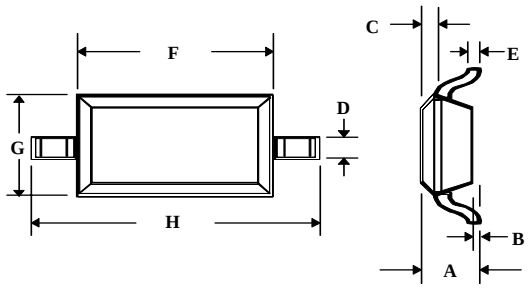
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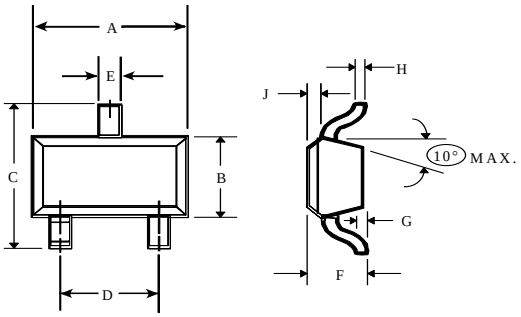
Case Styles

SOD-323
Case Style 1141



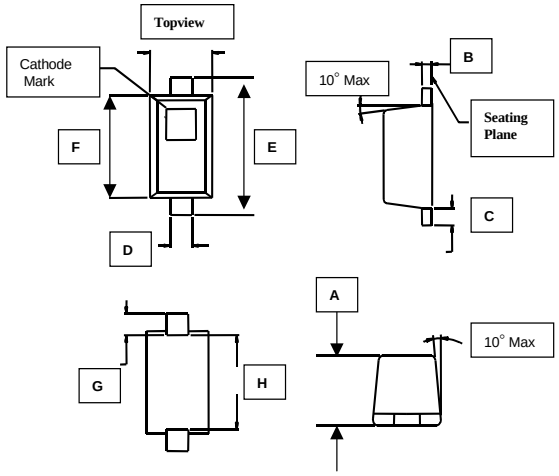
	INCHES		MILLIMETERS	
DIM.	MIN.	MAX.	MIN.	MAX.
A	—	0.043	—	1.1
B	—	0.004	—	0.1
C	—	0.008	—	0.2
D	0.010	0.016	0.25	0.4
E	0.003	0.006	0.08	0.15
F	0.063	0.075	1.6	1.9
G	0.045	0.057	1.15	1.45
H	0.091	0.106	2.3	2.7

SC-70, 3 Lead
Case Style 1146



	INCHES		MILLIMETERS	
DIM.	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



	INCHES		MILLIMETERS	
DIM.	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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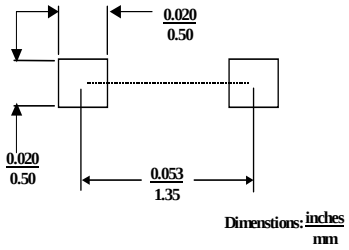
Mounting Information

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.

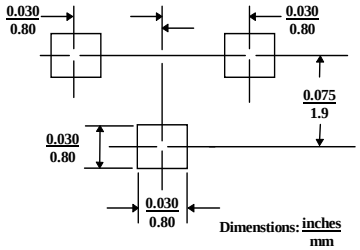
Permanent attachment is performed by a reflow soldering procedure during which the tab temperature does not exceed +275 °C and the body temperature does not exceed +250 °C, for standard models and +260 °C for the RoHS compliant devices.

Please refer to Application Note M538 for surface mounting instructions.

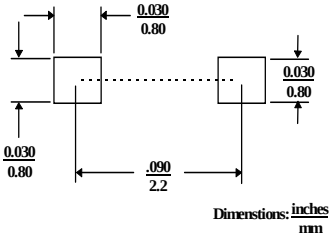
SC-79



SOT-323



SOD-323



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