MA4ST1200 Series

Low Tuning Voltage / Low Rs Silicon Hyperabrupt Varactor Diode

Rev. V10

Features

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

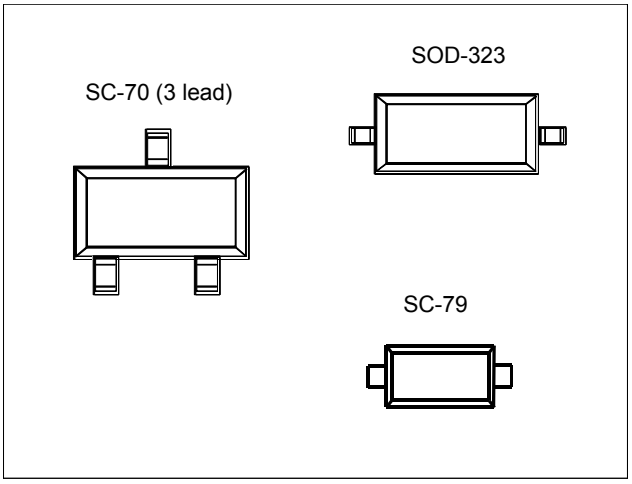
Description

The 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 (3L). These diodes are offered with 100% matte Sn plating.

Package Styles



Ordering Information

Part No.	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
MA4ST1231-1141T	Single	SOD-323	0.11	1.2
MA4ST1241-1141T	Single	SOD-323	0.11	1.2
MA4ST1241CK-1146T	Common Cathode	SC-70 (3L)	0.12	1.3

* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

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Electrical Specifications @ T_A = +25°C

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

RoHS Compliant Part No.	C_T (pF)					Capacitance Ratio	R_S (Ohm)	
	V_R = 0.5 V	V_R = 2.0 V			V_R = 4.0 V	C_T0.5 / C_T4.0	V_R = 2.0 V	
	Typ.	Min.	Nom.	Max.	Typ.	Typ.	Typ.	Max.
MA4ST1231 MAVR-001230	10.1	4.2	4.7	5.6	2.75	3.67	0.40	0.70
MA4ST1241 MAVR-001240	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. guaranteed by design.

Absolute Maximum Ratings[4,5]

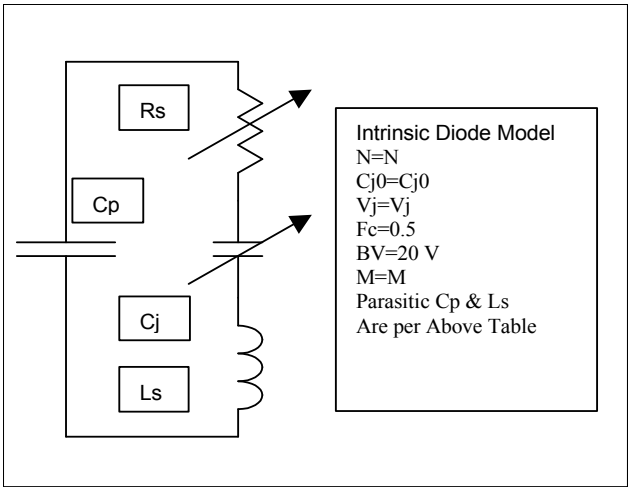
Parameter	Absolute Maximum
Reverse Voltage	12 V
Forward Current	50 mA
Operating Temperature	-55°C to +125°C
Storage Temperature	-55 C to +125°C

4. Operation of this device above any one of these parameters may cause permanent damage.
5. Please refer to application note M538 for surface mounting instructions.

Typical Capacitance Values

V_R (V)	C_T (pF)	
	MA4ST1231	MA4ST1241
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

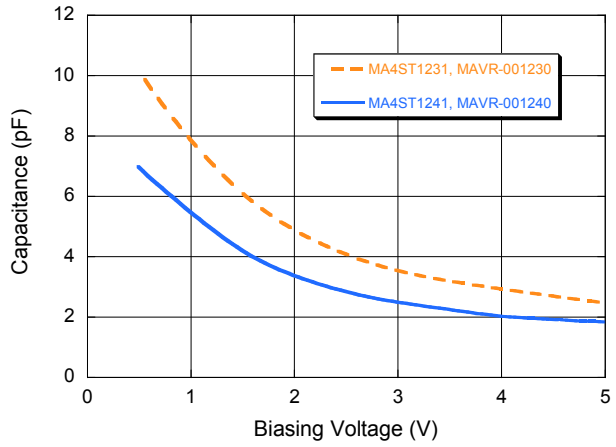
Spice Model



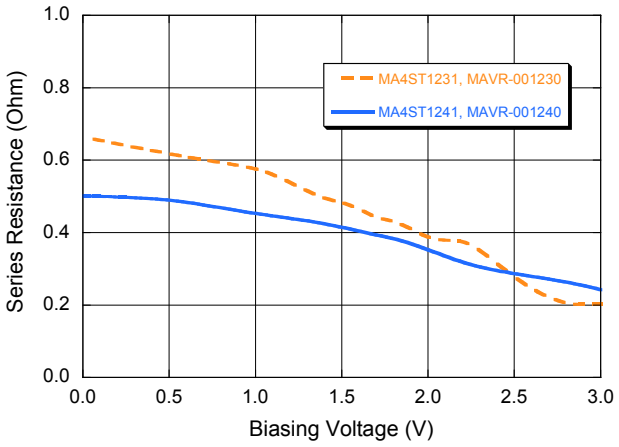
Part Number	N	Cj0 (pF)	Vj (V)	M
MA4ST1231 MAVR-001230	1.1	12.7	3.136	2.6
MA4ST1241 MAVR-001240	1.1	8.65	3.170	2.6

Typical Performance Curves

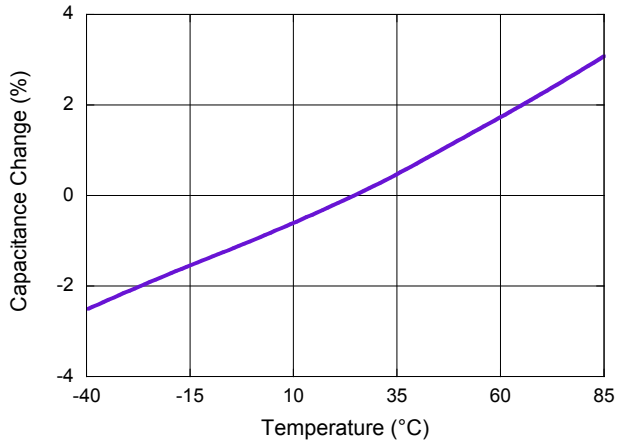
Capacitance vs. Biasing Voltage



Series Resistance vs. Biasing Voltage

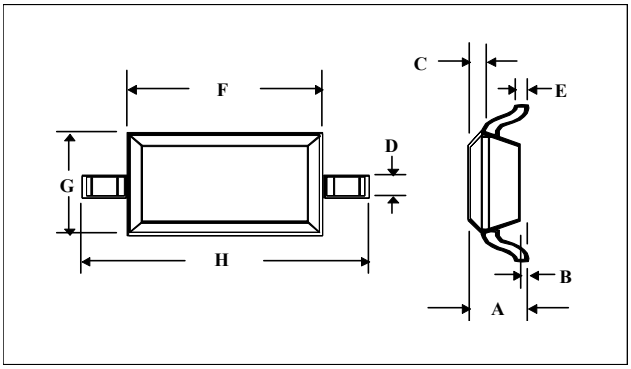


Capacitance Change (relative to +25°C) vs. Temperature



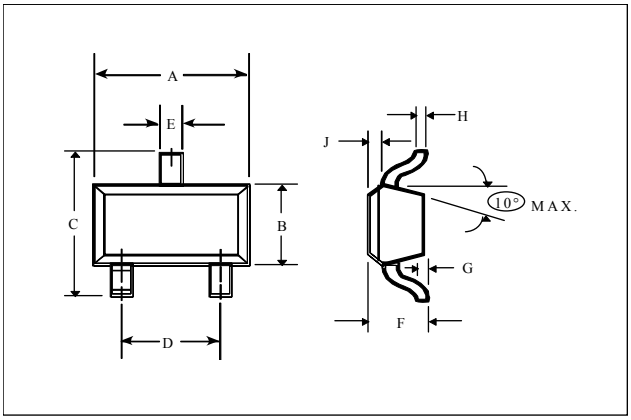
Case Styles

SOD-323 (Case Style 1141)



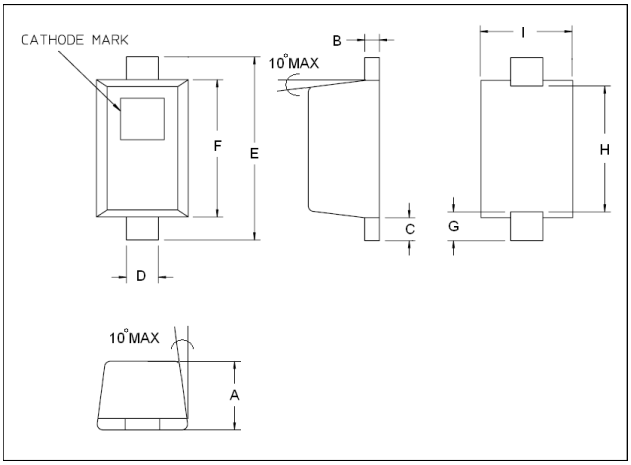
DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	¾	0.043	¾	1.1
B	¾	0.004	¾	0.1
C	¾	0.008	¾	0.2
D	0.010	0.016	0.25	0.41
E	0.003	0.006	0.07	0.15
F	0.063	0.075	1.6	1.9
G	0.045	0.057	1.14	1.45
H	0.091	0.106	2.3	2.7

SC-70, 3 Lead (Case Style 1146)



DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.071	0.087	1.80	2.21
B	0.045	0.053	1.14	1.35
C	0.071	0.094	1.80	2.39
D	0.047	0.057	1.19	1.45
E	0.010	0.016	0.25	0.41
F	0.031	0.039	0.79	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	.0197	.0276	0.50	0.70
B	0.003	0.008	0.07	0.20
C	0.006	0.010	0.15	0.25
D	0.010	0.014	0.25	0.35
E	0.059	0.067	1.50	1.70
F	0.043	0.051	1.09	1.30
G	.0098 nominal		0.250 nominal	
H	.0433 nominal		1.10 nominal	
I	.027	.035	0.68	0.89

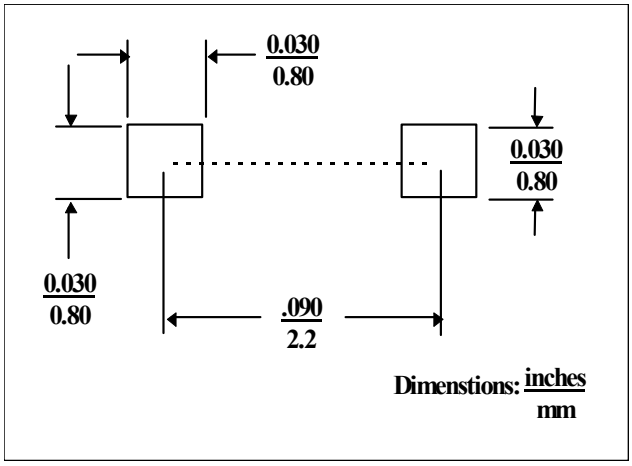
Mounting Information

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.

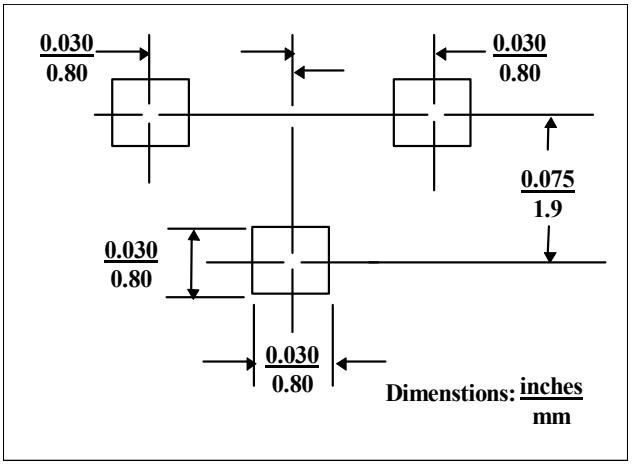
Permanent attachment is performed by a reflow soldering procedure during which the tab temperature does not exceed +275°C and the body temperature does not exceed +250°C, for standard models and +260°C for the RoHS compliant devices.

Please refer to Application Note M538 for surface mounting instructions.

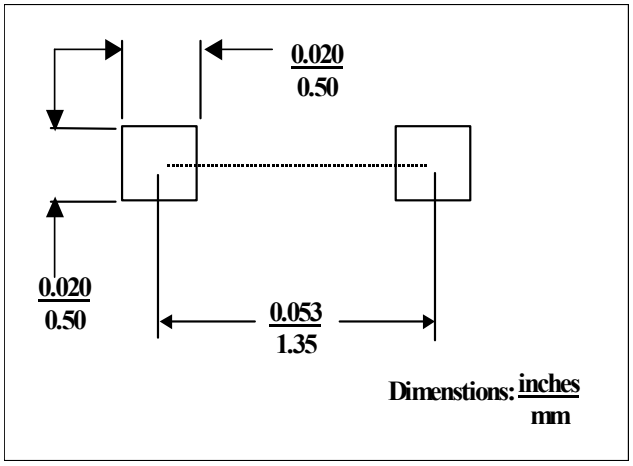
SOD-323 (Case Style 1141)



SC-70, 3 Lead (Case Style 1146)



SC-79 (Case Style 1279)



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