Low Tuning Voltage / Low Rs Silicon Hyperabrupt Varactor Diode

Rev. V10

масом

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

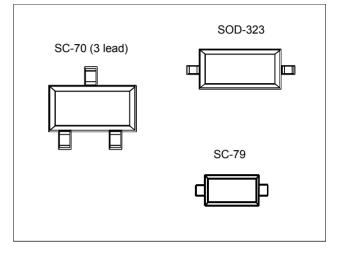
Description

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



Orderina	Information
e au mg	

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.

M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. Visit www.macom.com for additional data sheets and product information.

¹



Low Tuning Voltage / Low Rs Silicon Hyperabrupt Varactor Diode

Electrical Specifications @ T_A = +25°C

Breakdown Voltage @ $I_R = 10 \ \mu A$, $V_b = 12 \ V$ Minimum Reverse Leakage Current @ $V_R = 10 \ V$, $I_R = 100 \ nA$ Maximum

		С _т (рF)				Capacitance Ratio	R _s (O)hm)
RoHS Compliant Part No.	V _R = 0.5 V	V _R = 2.0 V		V _R = 4.0 V	C _T 0.5 / C _T 4.0	V _R = 2	2.0 V	
	Тур.	Min.	Nom.	Max.	Тур.	Тур.	Тур.	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

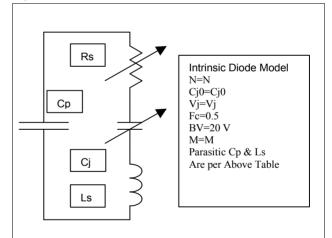
4. Operation of this device above any one of these parameters may cause permanent damage.

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

Typical Capacitance Values

V _R (V)	С _т (pF)				
V R (V)	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	Ν	Cj0 (pF)	Vj (V)	М
MA4ST1231 MAVR-001230	1.1	12.7	3.136	2.6
MA4ST1241 MAVR-001240	1.1	8.65	3.170	2.6

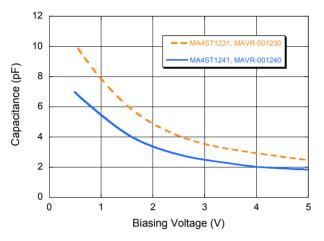
2

M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. Visit www.macom.com for additional data sheets and product information.

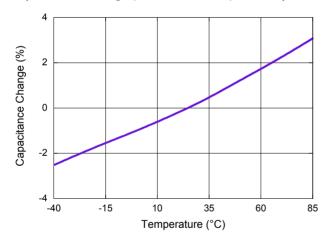
Low Tuning Voltage / Low Rs Silicon Hyperabrupt Varactor Diode

Typical Performance Curves

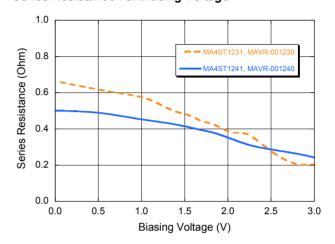
Capacitance vs. Biasing Voltage



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



Series Resistance vs. Biasing Voltage



M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. Visit www.macom.com for additional data sheets and product information.

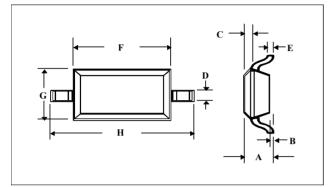
3

МЛСОМ

Low Tuning Voltage / Low Rs Silicon Hyperabrupt Varactor Diode

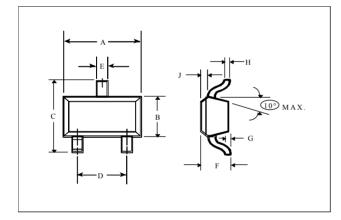
Case Styles

SOD-323 (Case Style 1141)



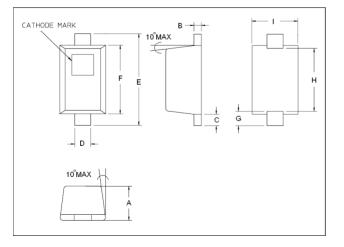
DIM.	INC	HES	MILLIMETERS		
DIN.	MIN.	MAX.	MIN.	MAX.	
Α	3⁄4	0.043	3/4	1.1	
В	3⁄4	0.004	3/4	0.1	
С	3⁄4	0.008	3/4	0.2	
D	0.010	0.016	0.25	0.41	
E	0.003	0.006	0.07	0.15	
F	0.063	0.075	1.6	1.9	
G	0.045	0.057	1.14	1.45	
Н	0.091	0.106	2.3	2.7	

SC-70, 3 Lead (Case Style 1146)



DIM.	INC	HES	MILLIMETERS		
DIW.	MIN.	MAX.	MIN.	MAX.	
Α	0.071	0.087	1.80	2.21	
В	0.045	0.053	1.14	1.35	
С	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	
Н	0.004	0.007	0.10	0.18	
J	0.004	0.010	0.10	0.25	

SC-79 (Case Style 1279)



DIM.	INC	HES	MILLIMETERS		
Dilvi.	MIN.	MAX.	MIN.	MAX.	
А	.0197	.0276	0.50	0.70	
В	0.003	0.008	0.07	0.20	
С	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 r	nominal	
Н	.0433 nominal		1.10 n	ominal	
I	.027	.035	0.68	0.89	

4

M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. Visit www.macom.com for additional data sheets and product information.

ΜΛΟΜ

Low Tuning Voltage / Low Rs Silicon Hyperabrupt Varactor Diode

Mounting Information

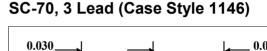
SOD-323 (Case Style 1141)

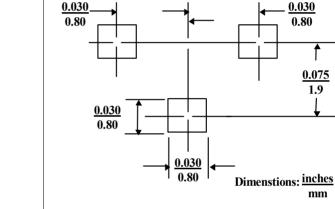
The illustration indicates the recommended mounting pad configuration for the SC-79, SOT-323 and SOD-323 packages. Solder paste containing flux should be screened onto the pads to a thickness of 0.005- 0.007 inches. The plastic package is placed in position, firmly adhering to the solder paste.

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.

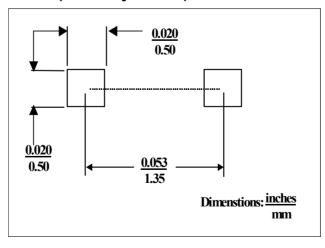
Please refer to Application Note M538 for surface mounting instructions.

0.030 0.80 0.030 0.80 0.030 .090 0.80 2.2 Dimenstions: inches mm





SC-79 (Case Style 1279)



M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. Visit www.macom.com for additional data sheets and product information.



MACOM

Low Tuning Voltage / Low Rs Silicon Hyperabrupt Varactor Diode

Rev. V10

M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppels or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.

⁶

M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. Visit www.macom.com for additional data sheets and product information.