MA4ST300 Series

Low-Voltage / Wide Band Si Hyperabrupt Varactors

Rev. V7

Features

- Surface Mount Packages (SC70 3LD, SC79, SOD-323)
- High Capacitance Ratio at Low Voltages
- High Q at Low Voltages
- SPC Process for Superior C-V Repeatability
- Available as Single and Common Cathode Pairs
- Tape and Reel Packaging
- Designed for Commercial Wireless Applications
- Also offering RoHS Compliant Equivalent Parts

Description

The MA4ST300 series are ion-implanted, hyperabrupt junction, silicon tuning varactors in SC79, SC70 3LD, and SOD-323 surface mount packages. This series of varactors is designed for high capacitance ratio and low voltage operation. Each varactor type has a better than 3:1 capacitance ratio between 0.5V and 3.0V.

Applications

The MA4ST300 series tuning varactors are useful for wide band tuning and low phase noise applications where the supply voltage is limited to 5 volts or less. These varactors have been specifically designed to cover wireless application bands up to the 2.4 GHz WLAN band. Applications include VCOs and voltage tuned filters.

RoHS Compliant Parts

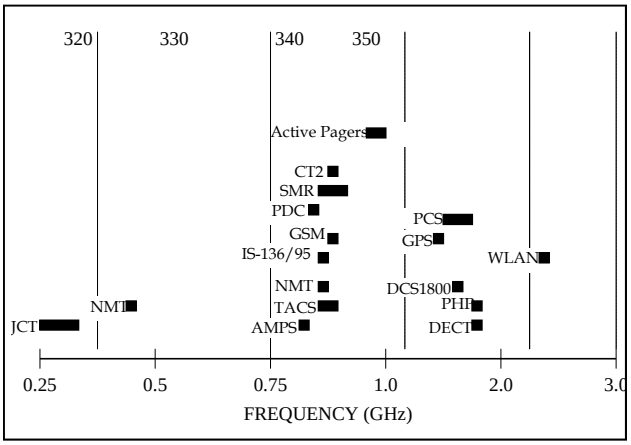
Part Number	RoHs Compliant Part Number
MA4ST320	MAVR-000320
MA4ST330	MAVR-000330
MA4ST340	MAVR-000340
MA4ST350	MAVR-000350

Absolute Maximum Ratings [1,2] @ T_A=+25 °C (Unless Otherwise Noted)

Parameter	Absolute Maximum
Reverse Voltage	12 V
Forward Current	50 mA
Total Power Dissipation	250 mW
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

Typical Device Selection by Frequency



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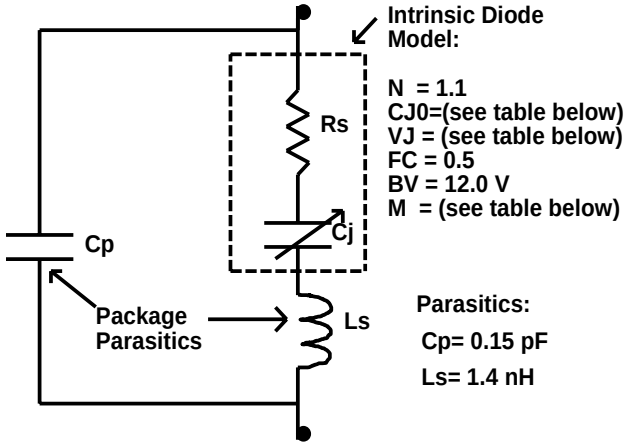
Electrical Specifications @ T_A = +25 °C

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

Part Number Base [1]	RoHS Compliant Part Number Base [1]	C_T [2] (pF) f = 1 MHz, V_R = 0.5 V			C_T [2] (pF) f = 1 MHz V_R = 3.0 V	Capacitance Ratio $C_{T0.5}/C_{T3.0}$	Q Factor f = 50 MHz V_R = 2.0 V
		Min.	Nom.	Max.	Max.	Typ.	Min.
MA4ST320	MAVR-000320-XXXXXX	48.0	58.0	63.0	19.0	3.2	300
MA4ST330	MAVR-000330-XXXXXX	22.0	26.0	30.0	9.0	3.2	350
MA4ST340	MAVR-000340-XXXXXX	15.0	18.5	21.0	6.5	3.2	350
MA4ST350	MAVR-000350-XXXXXX	9.5	11.8	13.5	4.5	3.2	400

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

Spice Model



Part No.	CJ0 (pF)	VJ (V)	M
MA4ST320	77.4	11.71	6.51
MA4ST330	33.9	8.91	5.15
MA4ST340	25.3	14.25	7.41
MA4ST350	15.7	14.55	7.26

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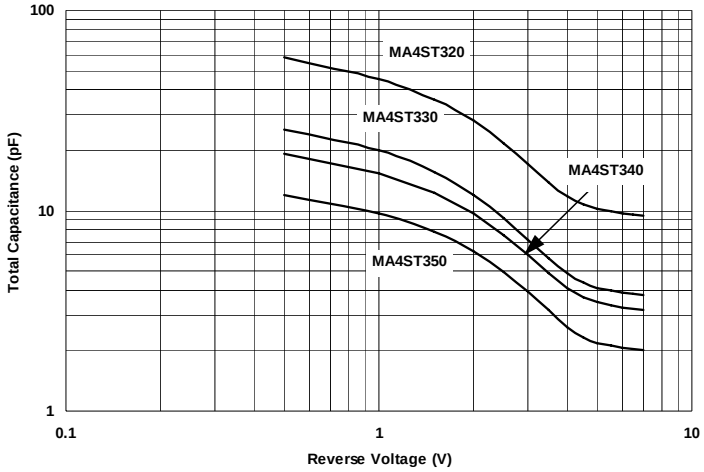
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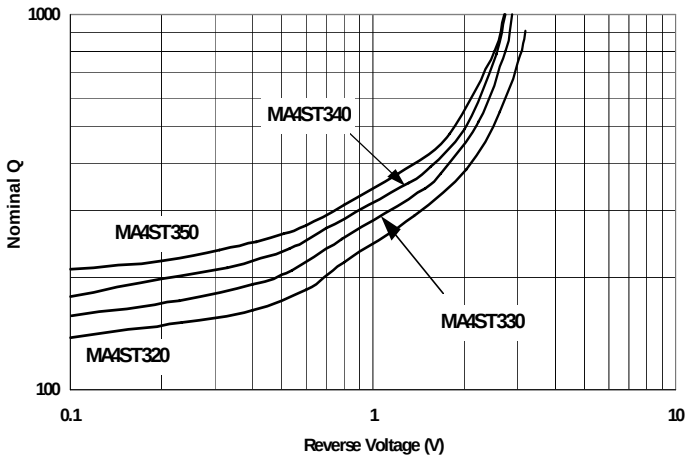
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Typical Performance Curves

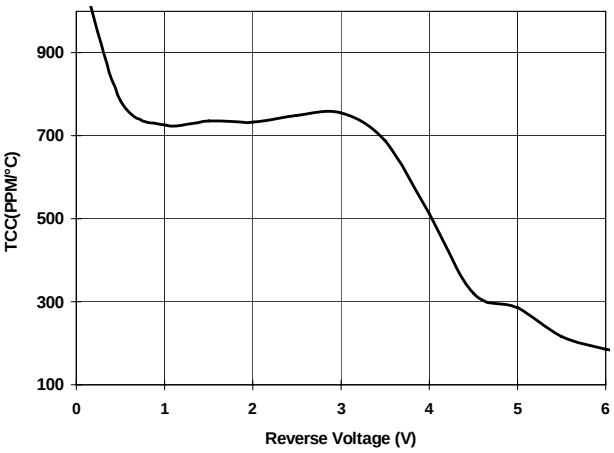
Total Capacitance vs. Reverse Voltage at 1 MHz



Nominal Q at 50 MHz vs. Reverse Voltage



Nominal Change in Capacitance with temperature



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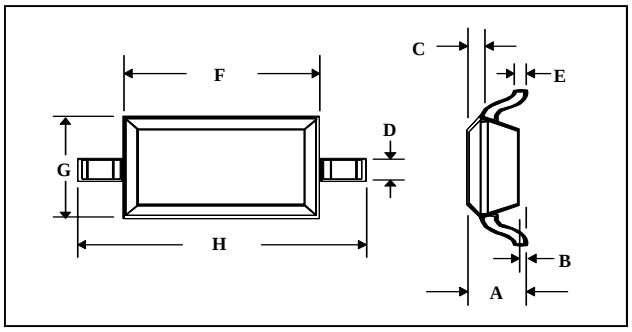
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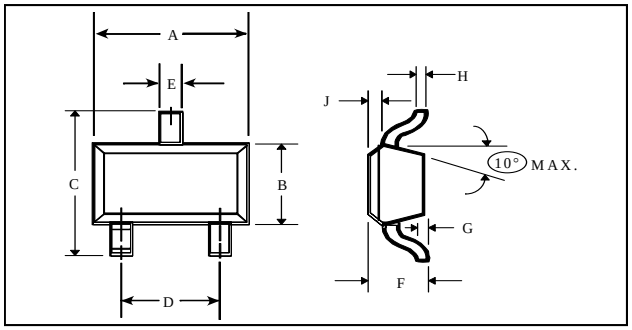
Case Styles

SOD-323 (Case Style 1141)



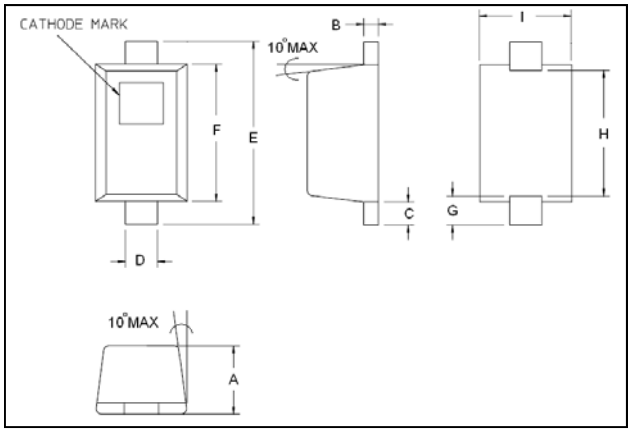
	INCHES		MILLIMETERS	
DIM.	MIN.	MAX.	MIN.	MAX.
A	—	0.043	—	1.1
B	—	0.004	—	0.1
C	—	0.008	—	0.2
D	0.010	0.016	0.25	0.41
E	0.003	0.006	0.07	0.15
F	0.063	0.075	1.6	1.9
G	0.045	0.057	1.14	1.45
H	0.091	0.106	2.3	2.7

SC-70, 3 Lead (Case Style 1146)



	INCHES		MILLIMETERS	
DIM.	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)



	INCHES		MILLIMETERS	
DIM.	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

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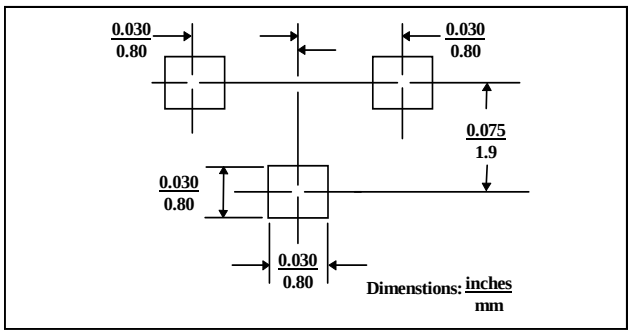
Mounting Information

The illustration indicates the recommended mounting pad configuration for the SC-79, SC70 3LD 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.

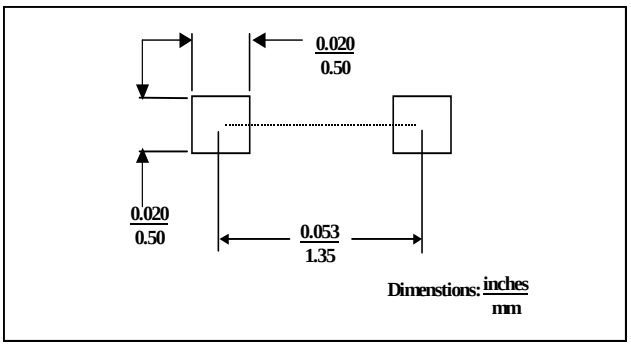
Permanent attachment is performed by a reflow soldering procedure during which the tab temperature does not exceed +275 °C and the body temperature does not exceed +250 °C, for standard models and +260 °C for the RoHS compliant devices.

Please refer to Application Note M538 for surface mounting instructions.

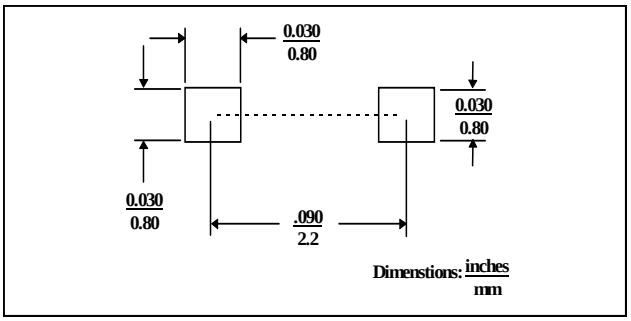
SC-70, 3 Lead (Case Style 1146)



SC-79 (Case Style 1279)



SOD-323 (Case Style 1141)



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