

# MA4ST300 Series



## Low-Voltage / Wide Band Si Hyperabrupt Varactors

Rev. V6

### 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

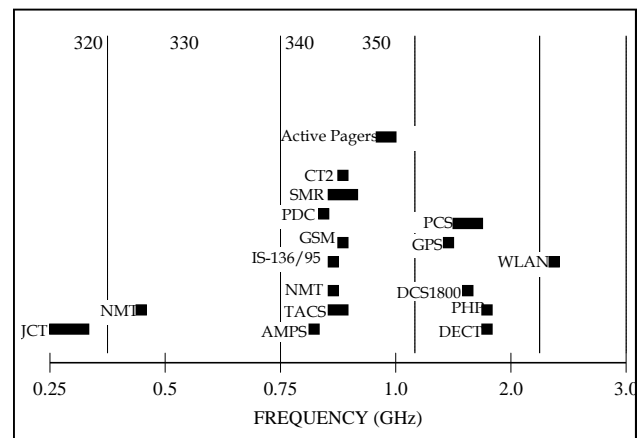
### Absolute Maximum Ratings <sup>1,2</sup>

@ T<sub>A</sub>=+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



<sup>1</sup> Specifications are subject to change without prior notification

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

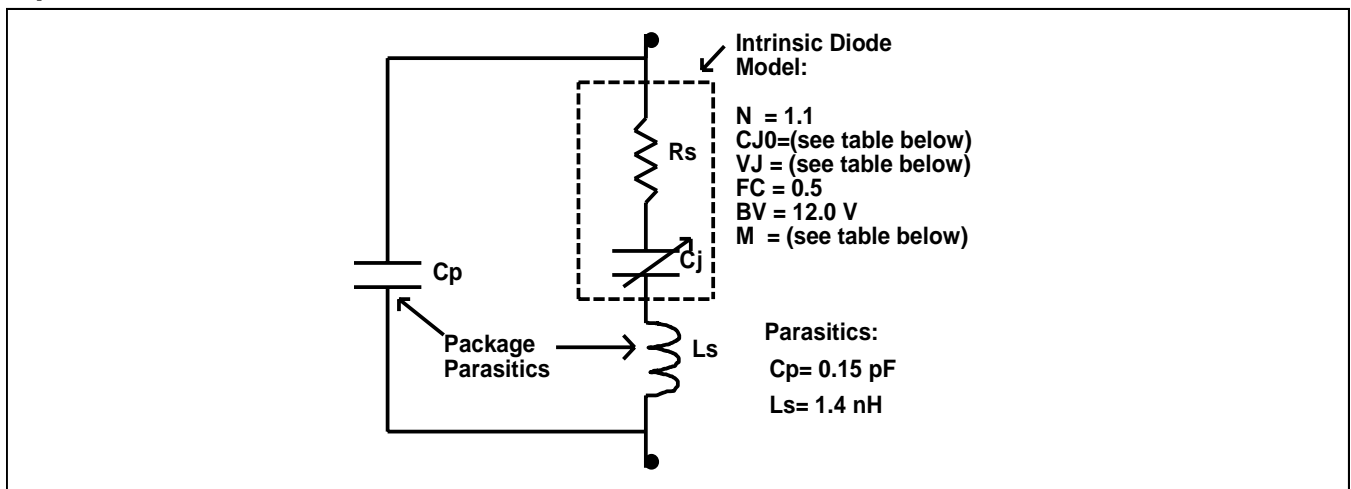
**Breakdown Voltage @  $I_R = 10\mu\text{A}$ ,  $V_b = 12\text{ V}$  Minimum**

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

Part Number Base <sup>1</sup>	RoHS Compliant Part Number Base <sup>1</sup>	$C_T^2$				Capacitance Ratio	Q Factor
		(pF)		(pF)			
		f = 1 MHz, $V_R = 0.5\text{ V}$			f = 1 MHz $V_R = 3.0\text{ V}$	$C_{T0.5}/C_{T3.0}$	f = 50 MHz $V_R = 2.0\text{ V}$
		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

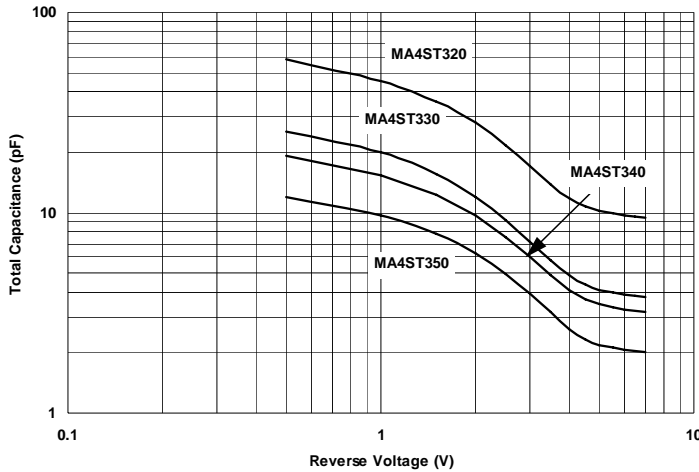


Part No.	CJ0 (pF)	VJ (V)	M
MA4ST320	77.4	11.71	6.51
MA4ST330	33.9	8.91	5.15
MA4ST340	25.3	14.25	7.41
MA4ST350	15.7	14.55	7.26

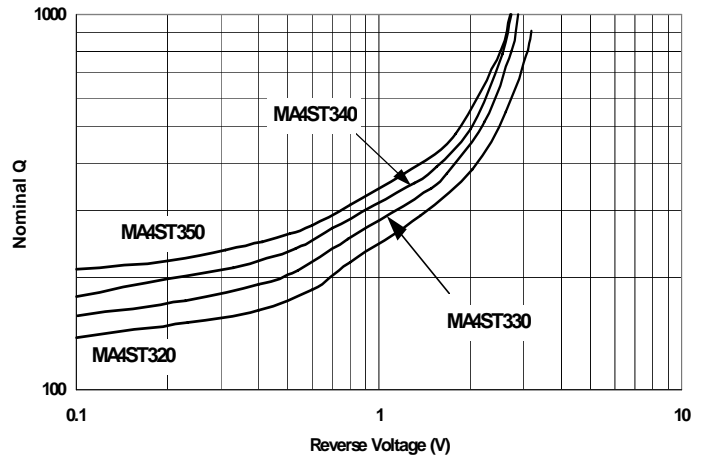
Specifications are subject to change without prior notification

### Typical Performance Curves

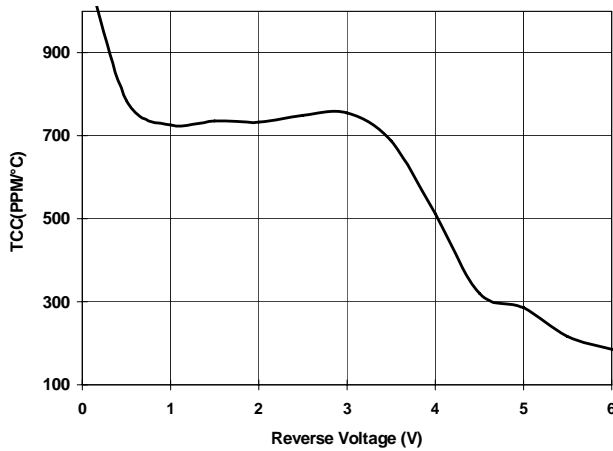
**Total Capacitance vs. Reverse Voltage at 1 MHz**



**Nominal Q at 50 MHz vs. Reverse Voltage**



**Nominal Change in Capacitance with temperature**



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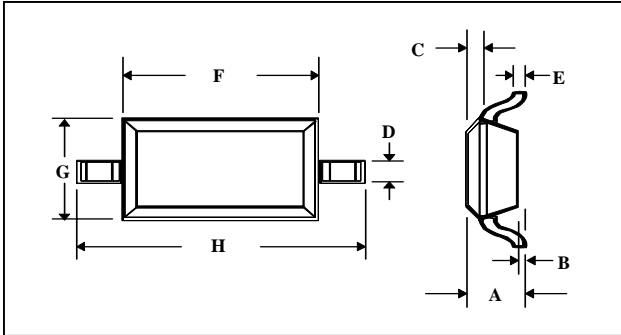


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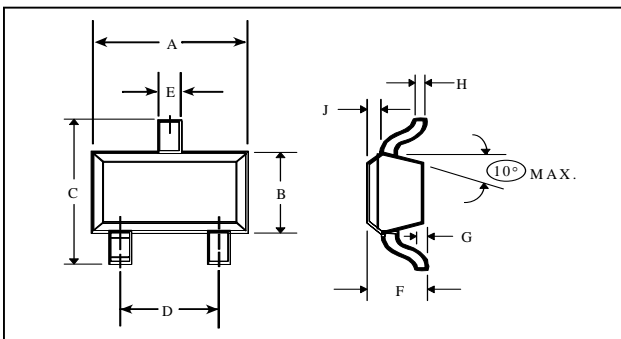
### Case Styles

#### SOD-323 (Case Style 1141)



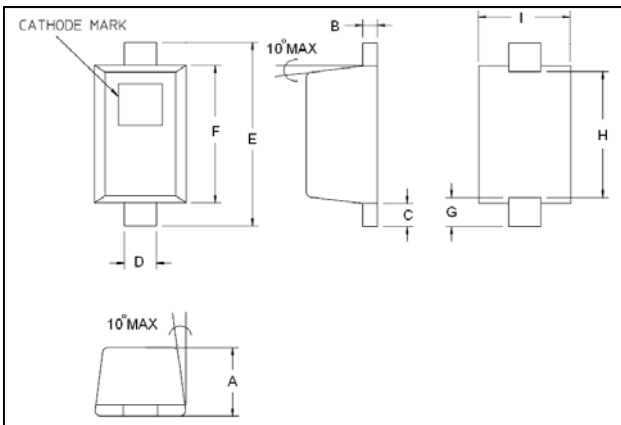
DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	—	0.043	—	1.1
B	—	0.004	—	0.1
C	—	0.008	—	0.2
D	0.010	0.016	0.25	0.4
E	0.003	0.006	0.08	0.15
F	0.063	0.075	1.6	1.9
G	0.045	0.057	1.15	1.45
H	0.091	0.106	2.3	2.7

#### 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
I	.028	.035	0.71	0.89

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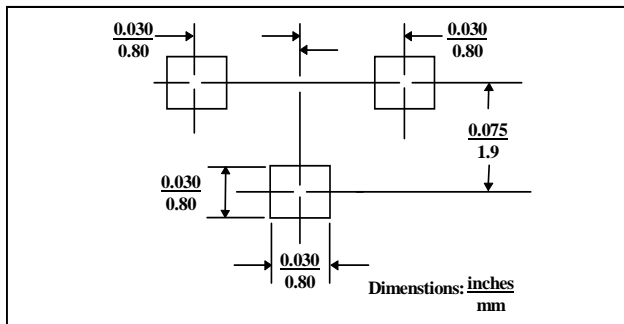
### Mounting Information

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.

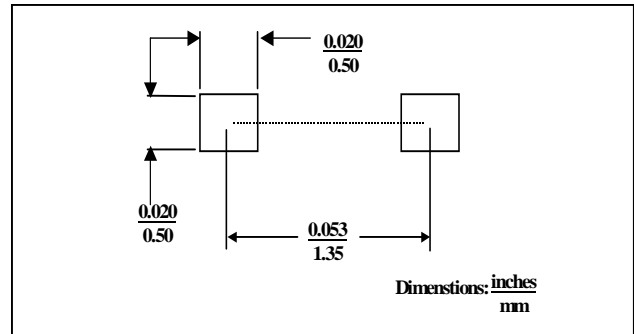
Permanent attachment is performed by a reflow soldering procedure during which the tab temperature does not exceed +275 °C and the body temperature does not exceed +250 °C, for standard models and +260 °C for the RoHS compliant devices.

Please refer to Application Note M538 for surface mounting instructions.

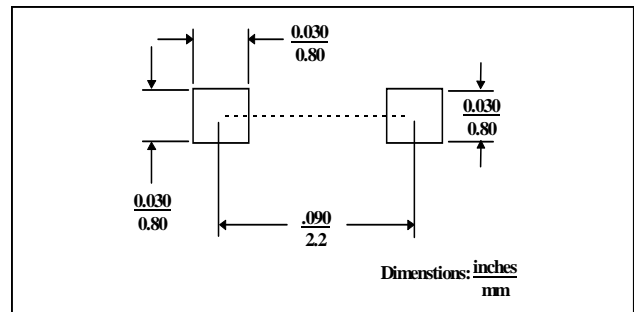
### SC-70, 3 Lead (Case Style 1146)



### SC-79 (Case Style 1279)



### SOD-323 (Case Style 1141)



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