M/A-COM

Low - Voltage / Wide Band Si Hyperabrupt Varactors

Features

- Surface Mount Packages
- (SOT-23, SOT-323, 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

Description

The MA4ST300 series are ion-implanted, hyperabrupt junction, silicon tuning varactors in SOT-23, SOT-323, 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.

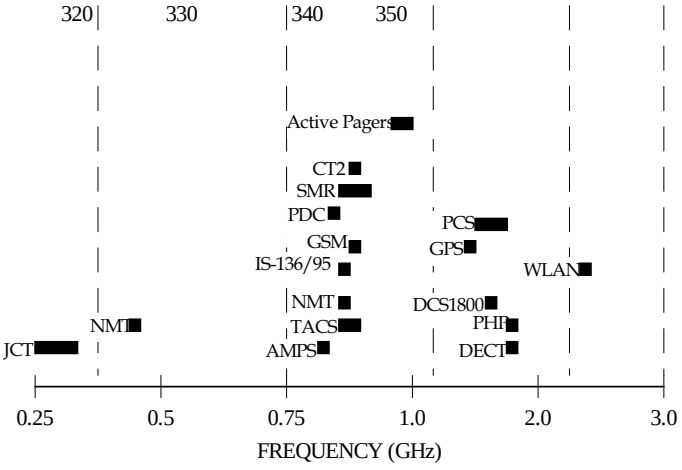
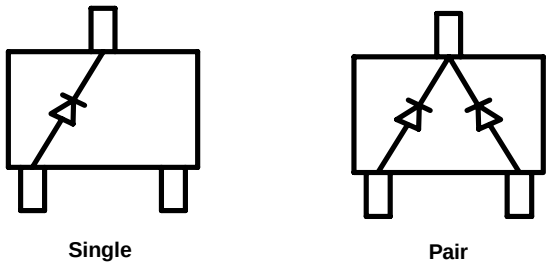


Fig. 1 Typical Device Selection by Frequency

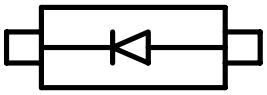
Configurations

TOP VIEW (SOT-23, SOT-323)

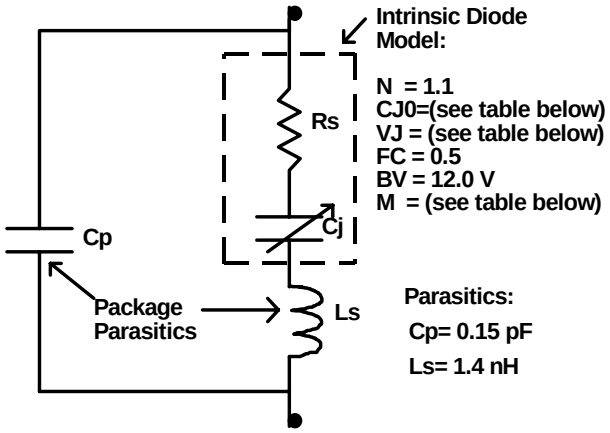


Single **Pair**

TOP VIEW (SOD-323)



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

V4.00

Electrical Specifications @ T_A = +25°C

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

Part No.	C_T (pF) f=1 MHz, V_R=0.5V			C_T (pF) f=1 MHz, V_R=3.0V	Capacitance Ratio $C_{T0.5}/C_{T3.0}$	Q Factor f=50 MHz, V_R= 2.0V
	Min.	Nom.	Max.	Max.	Typ.	Min.
MA4ST320	48.0	58.0	63.0	19.0	3.2	300
MA4ST330	22.0	26.0	30.0	9.0	3.2	350
MA4ST340	15.0	18.5	21.0	6.5	3.2	350
MA4ST350	9.5	11.8	13.5	4.5	3.2	400

Absolute Maximum Rating[1]

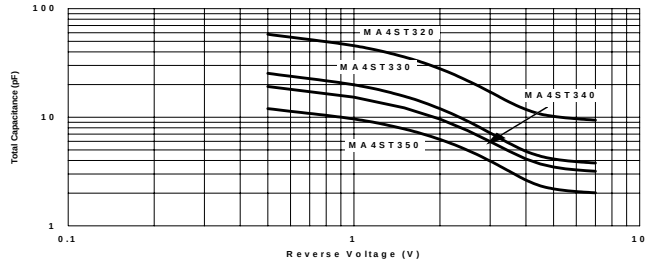
Parameter	Ratings
Device Current	100 Ma
Power Dissipation[2, 3]	650 mW
RF Input Power	+13 dBm
Junction Temperature	200°C
Storage Temperature	-65°C to +200°C
Thermal Resistance: θ_{jc}=140°C/W	

Ordering Information

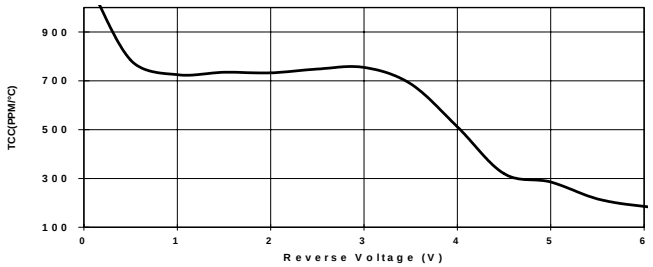
These varactors are available in the three case styles shown. When ordering, specify the desired case style by adding the case designation (287 for SOT-23, 1146 for SOT-323, 1141 for SOD-323) as a suffix to the model number. For example, MA4ST330-1141 specifies the MA4ST330 varactor in the SOD-323 package. The MA4ST320 is available in the SOT-23 and SOD-323 packages only. The model number indicated is for a single varactor. The MA4ST330, 340 and 350 are available in common cathode pairs in the SOT-23 package, and are specified by adding "CK" to the end of the model number. For example MA4ST330CK-287 specifies the MA4ST330 varactor in common cathode pairs.

Typical Performance Curves

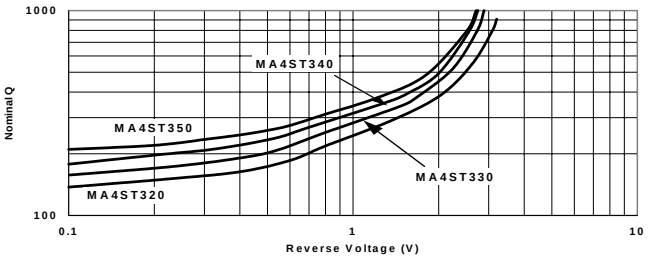
Total Capacitance vs Reverse Voltage at 1 MHz



Nominal Change in Capacitance with Temperature



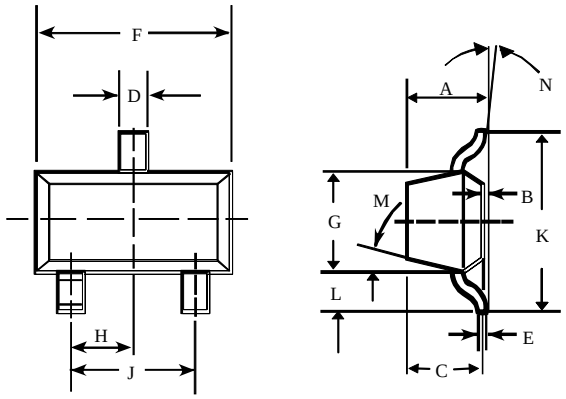
Nominal Q at 50 MHz vs Reverse Voltage



V4.00

Case Styles

SOT-23 (Case Style 287)



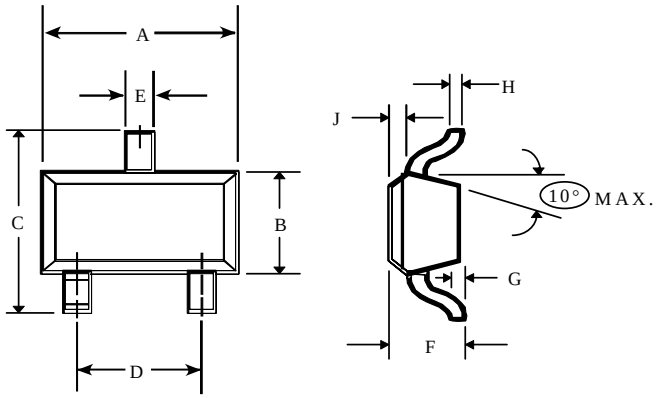
SOT-23 (Case Style 287)

DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	—	0.048	—	1.22
B	—	0.008	—	0.20
C	—	0.040	—	1.00
D	0.013	0.020	0.35	0.50
E	0.003	0.006	0.08	0.15
F	0.110	0.119	2.80	3.00
G	0.047	0.056	1.20	1.40
H	0.037 typical		0.95 typical	
J	0.075 typical		1.90 typical	
K	—	0.103	—	2.60
L	—	0.024	—	0.60

DIM.	GRADIENT
M	10° max. [1]
N	2° . . . 30°

NOTE:
1. Applicable on all sides

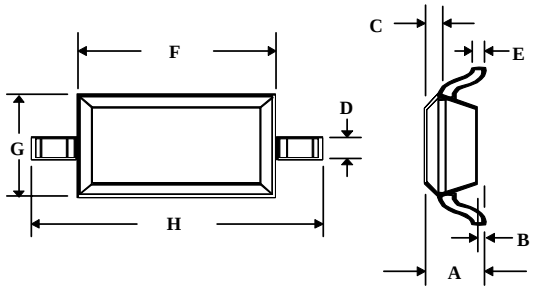
SOT-323 (Case Style 1146)



SOT-323 (Case Style 1146)

DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.063	0.087	1.6	2.2
B	0.045	0.053	1.15	1.35
C	0.079	0.087	2.0	2.2
D	0.047	0.055	1.2	1.4
E	0.008	0.016	0.2	0.4
F	0.031	0.039	0.8	1.0
G	—	0.004	—	0.1
H	0.003	0.006	0.08	0.15
J	0.004	0.010	0.1	0.25

SOT-323 (Case Style 1146)



SOT-323 (Case Style 1146)

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

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