



Low-Voltage / High Q Si Hyperabrupt Varactors



Features

- Surface Mount Packages (SOT-23, SOT-323, SOD-323)
- High Q at Low Voltages
- High Capacitance Ratio 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

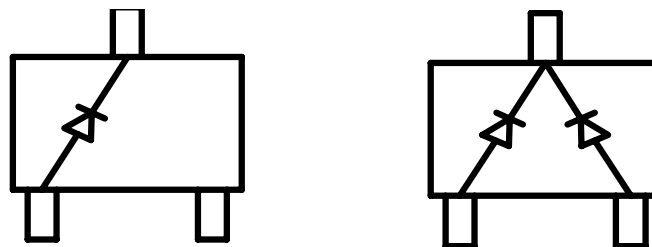
M/A-COM's MA4ST200 series is a ion-implanted, hyperabrupt junction, silicon tuning varactors in SOT-23, SOT-323, and SOD-323 surface mount packages. This series of varactors is designed for high Q and low voltage operation. Each varactor type has a Q greater than 400 at -2 V.

Applications

The MA4ST200 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 for use in the wireless communications up to the 2.4 GHz band. Applications include VCOs and voltage tuned filters.

Configurations

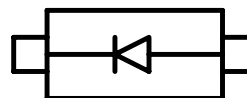
TOP VIEW (SOT-23, SOT-323)



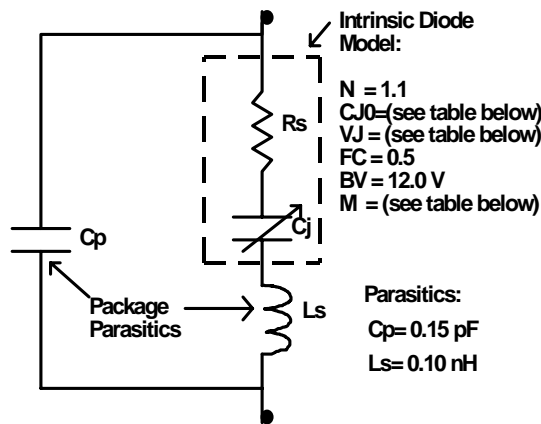
Single

Double

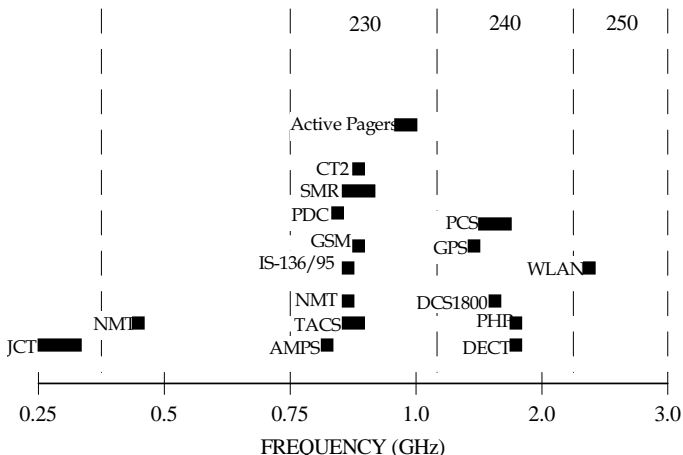
TOP VIEW (SOD-323)



Spice Model



TYPICAL DEVICE SELECTION by FREQUENCY



Part No.	CJO (pF)	VJ (V)	M
MA4ST230	12.0	4.085	2.228
MA4ST250	8.16	4.930	2.520
MA4ST250	6.19	4.774	2.458



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

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

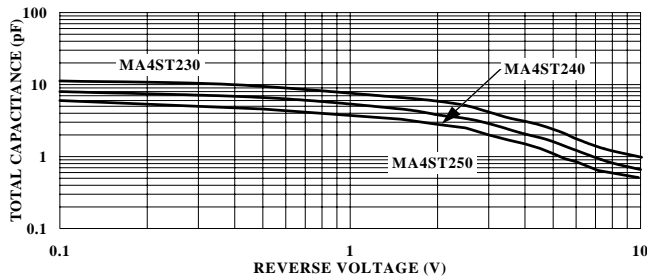
Part Number	C_T (pF) f = 1 MHz, $V_R = 2.0\text{V}$			C_T (pF) f = 1 MHz, $V_R = 4.0\text{V}$ Max.	Capacitance Ratio $C_{T-0.5}/C_{T-4.0}$ Typ.	Q Factor f = 50 MHz, $V_R = 2.0\text{V}$ Min.
	Min.	Nom.	Max.			
MA4ST230	4.5	5.0	6.0	3.1	3.5	400
MA4ST240	3.0	3.5	4.2	2.3	3.5	450
MA4ST250	2.3	2.7	3.5	1.8	3.5	450

Absolute Maximum Rating

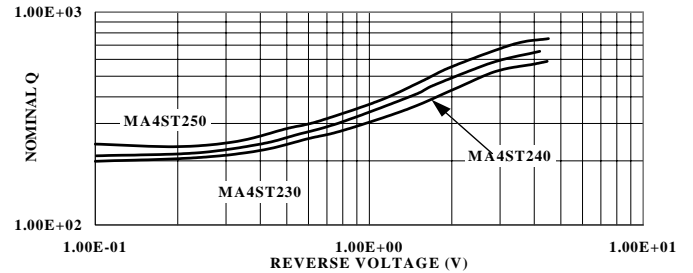
Parameter	Absolute Maximum
Reverse Voltage	12 Volts
Forward Current	50 mA
Total Power Dissipation	250 mW
Junction Operating Temp.	-55°C to +125°C
Storage Temperature	-55°C to +125°C

Typical Performance Curves

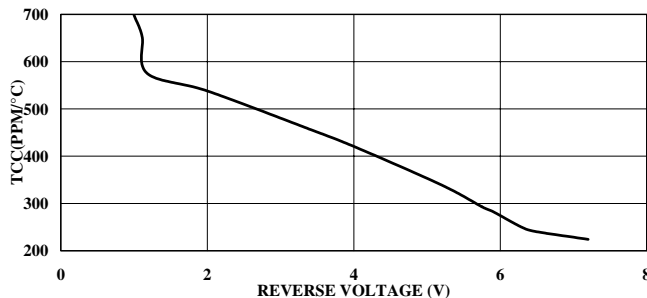
TOTAL CAPACITANCE vs REVERSE VOLTAGE at 1 MHz



NOMINAL Q at 50 MHz vs REVERSE VOLTAGE



NOMINAL CHANGE in CAPACITANCE with TEMPERATURE



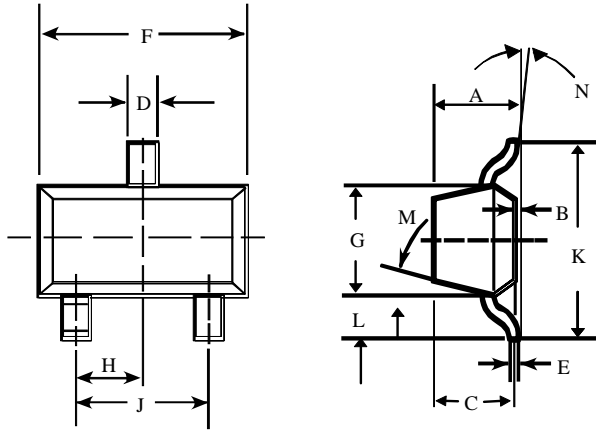
Ordering Information

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, MA4ST230-1141 specifies the MA4ST230 varactor in the SOD-323 package. The model number indicated is for a single varactor. Common cathode pairs are available in SOT-23 package, and are specified by adding "CK" to the end of the model number. For example MA4ST230CK-287 specifies the MA4ST230 varactor in common cathode pairs.



Case Styles

SOT-23
Case Style 287



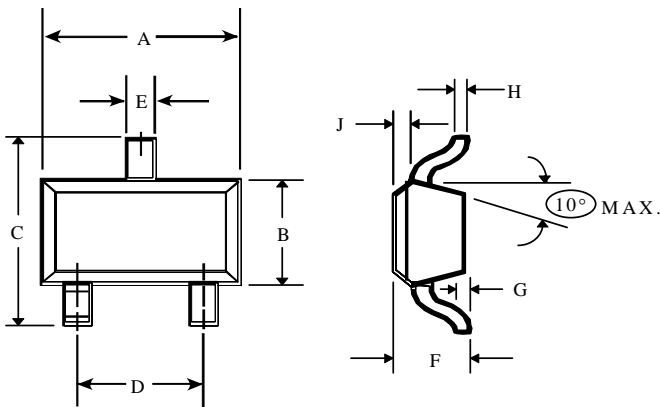
SOT-23 (Case Style 287)

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.

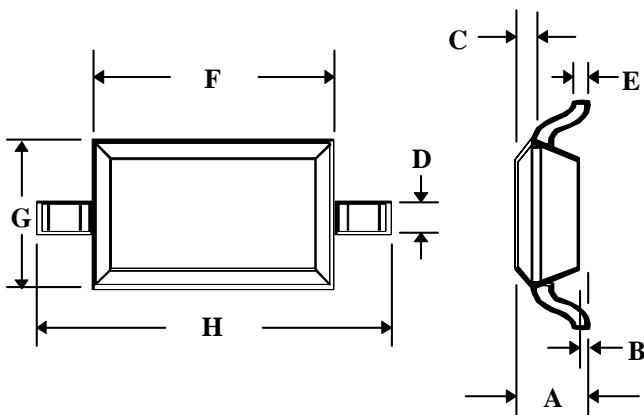
SOT-323
Case Style 1146



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

SOD-323
Case Style 1141



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