

## Features

- Surface Mount Packages (SOT-23, SC70 3LD, SOD-323, SC-79)
- 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
- RoHS\* Compliant

## Applications

- Wireless Communications

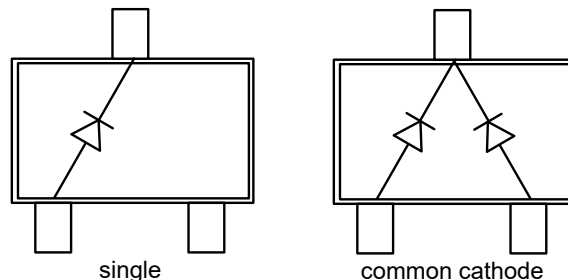
## Description

The MAVR-000200 series are ion-implanted, hyperabrupt junction, silicon tuning varactors in SOT-23, SC70 3LD, SOD-323 and SC-79 surface mount packages. This series of varactors is designed for high Q and low voltage operation. Each varactor type has a typical  $Q > 400 @ -2 \text{ V}$ . These diodes are offered with 100% matte Sn plating.

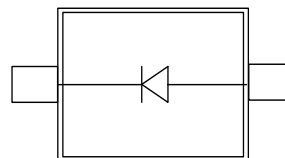
The MAVR-000200 series tuning varactors are ideally suited for wide band tuning and low phase noise applications where the supply voltage is limited to 5 volts or less. These varactors have been specifically designed for use in wireless communications up to the 2.4 GHz band. Applications include VCOs and voltage tuned filters.

## Configurations

### Top View (SOT-23, SC70 3LD)



### Top View (SOD-323, SC-79)



## Part Number Designations

Ordering Part #	Package Style	Diode Configuration	Diode Marking
MAVR-000240-0287AT	SOT-23	Single	V5L
MAVR-000240-11410T	SOD-323	Single	5L
MAVR-000240-1146FT	SC-70	Common Cathode	5M
MAVR-000250-0287AT	SOT-23	Single	V5N
MAVR-000250-0287FT	SOT-23	Common Cathode	V5P
MAVR-000250-11410T	SOD-323	Single	5N
MAVR-000250-1146FT	SC-70	Common Cathode	5P
MAVR-000250-12790T	SC-79	Single	No Marking

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\* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

## 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

Base Part #	Total Capacitance (pF)			Capacitance Ratio	Q Factor	
	f = 1 MHz, $V_R = 2 \text{ V}$			f = 1 MHz, $V_R = 4 \text{ V}$	f = 50 MHz, $V_R = 2 \text{ V}$	
	Min.	Nom.	Max.	$C_{T0.5} / C_{T4.0}$	Typ.	
MAVR-000240-x	3.0	3.5	4.2	2.3	3.5	450
MAVR-000250-x	2.3	2.7	3.5	1.8	3.5	450

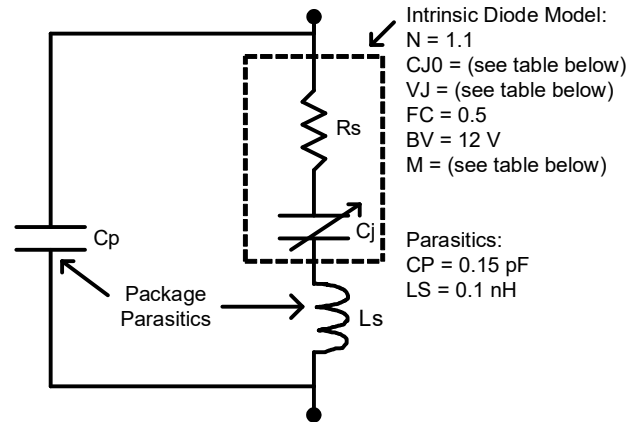
## Absolute Maximum Ratings<sup>1,2</sup>

@  $T_A = +25^\circ\text{C}$  (Unless Otherwise Noted)

Parameter	Absolute Maximum
Reverse Voltage	12 V
Forward Current	50 mA
Total Power Dissipation	250 mW
Operating & Storage Temperature	$-55^\circ\text{C}$ to $+125^\circ\text{C}$

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- MACOM does not recommend sustained operation near these survivability limits.

## Spice Model



Base Part #	$C_{J0}$ (pF)	$V_J$ (V)	M
MAVR-000240	8.16	4.930	2.520
MAVR-000250	6.19	4.774	2.458

## Handling Procedures

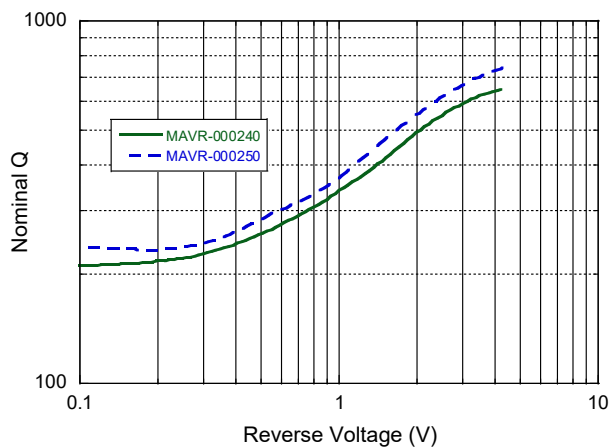
Please observe the following precautions to avoid damage:

## Static Sensitivity

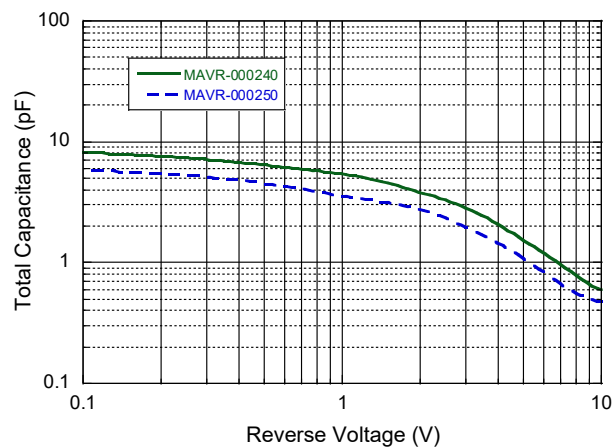
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

## Typical Performance Curves

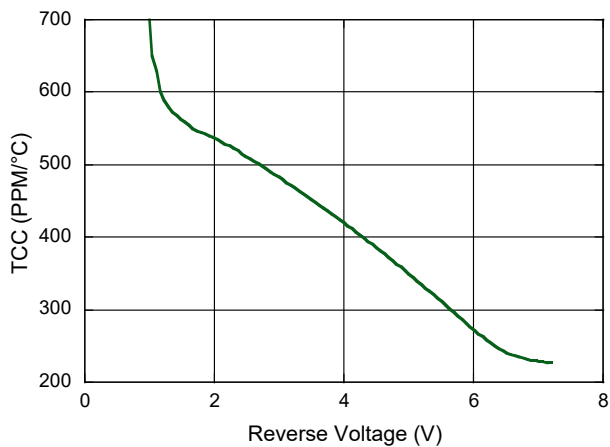
**Nominal Q vs. Reverse Voltage @ 50 MHz**



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

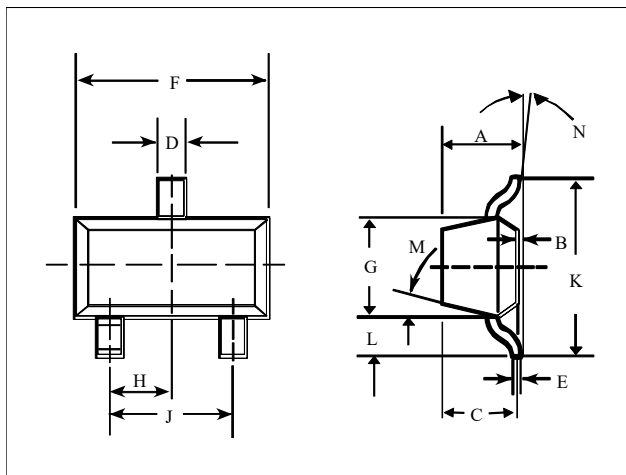


**Nominal Change in Capacitance with Temperature**



## Case Styles

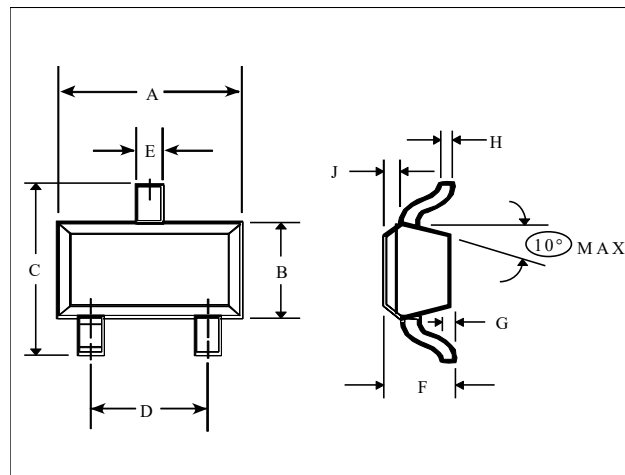
### SOT-23 (Case Style 287)



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. <sup>3</sup>			
N	2° . . . 30°			

3. Applicable on all sides.

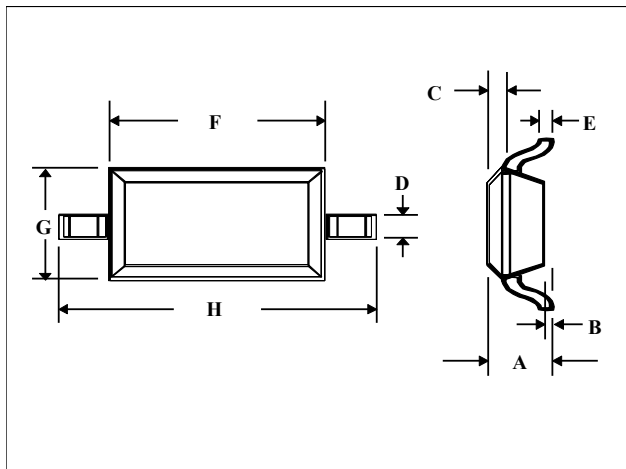
### SC-70, 3 Lead (Case Style 1146)



Dim.	INCHES		MILLIMETERS	
	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

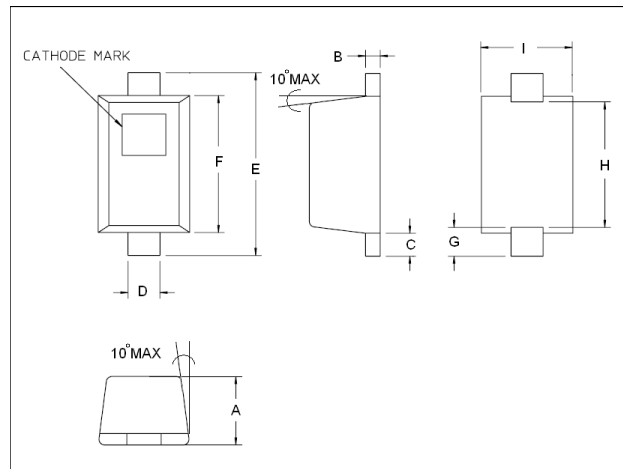
## Case Styles

### 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	0.41
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-79 (Case Style 1279)



Dim.	INCHES		MILLIMETERS	
	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	0.0098 nominal		0.250 nominal	
H	0.0433 nominal		1.10 nominal	
I	0.027	.035	0.68	0.89

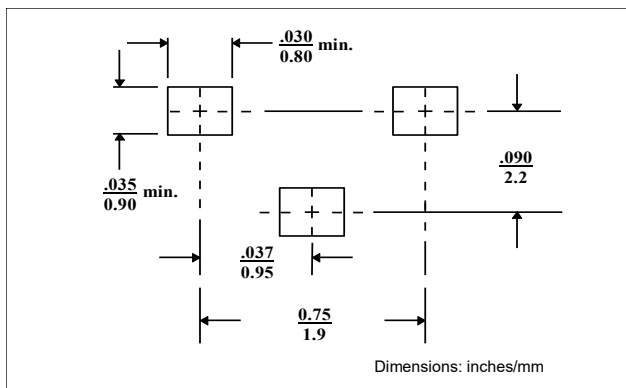
### Mounting Information

The illustration indicates the recommended mounting pad configuration for the SC-79, SC70 3LD, SOT-23 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.

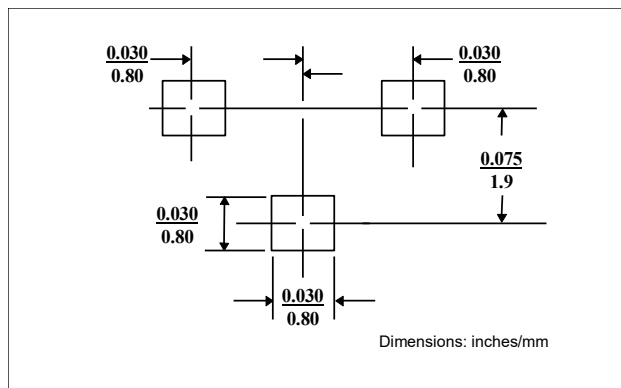
Permanent attachment is performed by a reflow soldering procedure during which the tab temperature does not exceed +275°C and the body temperature does not exceed +260°C.

Please refer to Application Note M538 for surface mounting instructions.

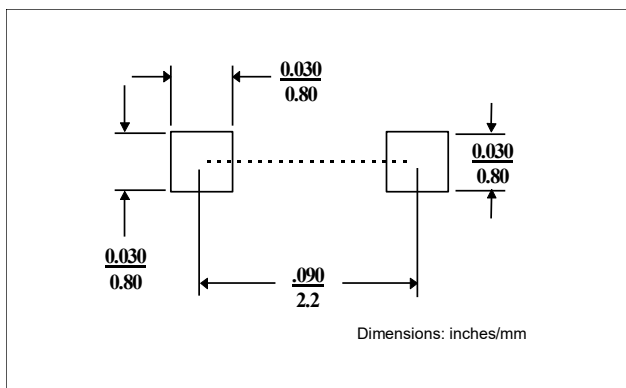
#### SOT-23 (Case Style 287)



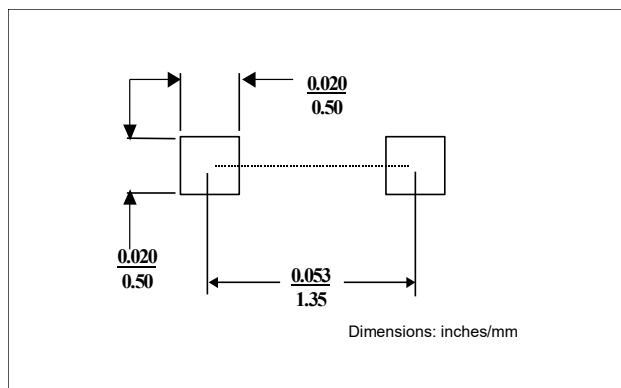
#### SC-70, 3 Lead (Case Style 1146)



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



#### SC-79 (Case Style 1279)



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