

Axial Lead Abrupt Tuning Varactors

MA45300 Series

V 2.00

Features

- High Q
- Low Leakage
- Low Post Tuning Drift
- Frequency Range Through X-band
- Can Be Screened to TX, TXV Specifications

Description

The MA45300 series of silicon abrupt junction tuning varactors has been designed to obtain the highest Q possible. All diodes in this series have a high density silicon dioxide passivation which results in low leakage currents, low phase noise and low post tuning drift. These diodes are available in axial lead glass packages.

Applications

This series of silicon abrupt tuning varactors is designed for applications through S-band. Silicon abrupt junction tuning varactors are useful for transistor VCOs and tunable filters, phase shifters or pre-selectors.

Environmental Performance

All tuning varactors in the MA45300 series are capable of meeting the performance tests dictated by the methods and procedures of the latest revisions of MIL-S-19500 MIL-STD-202 and MIL-STD-750 which specifies mechanical, electrical, thermal and other environmental tests common to semiconductor products.

High Reliability Parts

All diodes in the MA45300 series may be screened to TX or TX-V specifications.

Maximum Ratings

Reverse Voltage	30 V
Operating Temperature	-65°C to +150°C
Storage Temperature	-65°C to +150°C
Temperature Coefficient	300ppm/°C at -4 Volts
Power Dissipation (Derate linearly to zero at 150°C)	200mW

Case Style 54



Specifications @ T_A = +25°C

30 Volt Axial Lead Silicon Tuning Varactors

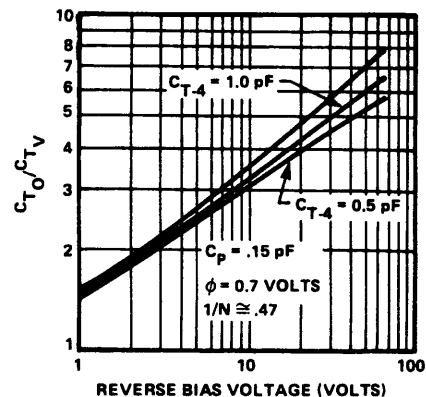
Model ¹ Number	Total ² Capacitance (pF)	Minimum Capacitance Ratio C _{T0} /C _{TVb}	Typical ³ "Q" (@ -4 Volts)
MA45330	4.7	4.5	1800
MA45331	5.6	4.5	1700
MA45334	10	4.6	1300
MA45336	15	4.6	1200
MA45337	18	4.6	1100
MA45338	22	4.6	1000

Notes:

1. All silicon abrupt junction varactors in this series are available as standard products in the axial lead glass package, case style 54. See appendix for complete dimensions.
2. Standard capacitance tolerances are ± 10%. A tighter tolerance (± 5%) may be obtained by adding the suffix "A" to the diode model number.
3. Diode Q is calculated at -4 volts and 50 MHz using values of R_S measured at 500 MHz and values of junction capacitance measured at 1 MHz.

Typical Performance Curves

TYPICAL CAPACITANCE CHANGE RATIO FOR SILICON TUNING VARACTORS



Specifications Subject to Change Without Notice.

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Abrupt Tuning Varactors

MA45200 Series

V 2.00

Features

- High Q
- Low Leakage
- Available in Chip Form
- Available in Ceramic Packages
- Low Post Tuning Drift
- Frequency Range VHF – Ku-Band
- Can be Screened to TX, TX-V Specifications

Description

The MA45200 series of silicon abrupt junction tuning varactors has been designed to obtain the highest Q possible. Each diode in this series has a high density silicon dioxide passivation which results in exceptionally low leakage currents and low post tuning drift. These silicon abrupt junction tuning varactors, which have a high Q, exhibit large capacitance changes with bias voltages. The capacitance change is approximately equal to the square root of the voltage. The MA45200 series diodes are available in a number of ceramic packages as well as in chip form.

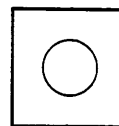
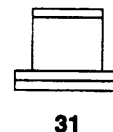
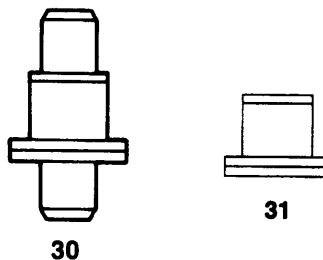
Applications

The MA45200 series of silicon tuning diodes are useful for frequency tuning applications through Ku band, including electronic tuning of transistor, Gunn and IMPATT oscillators.

High Reliability Parts

All diodes in the MA45200 series may be screened to TX, TX-V specification.

Case Styles



Maximum Ratings

Reverse Voltage	Same as rated breakdown V_B
Operating Temperature	-65°C to + 150°C
Storage Temperature	-65°C to + 200°C
Temperature Coefficient	+300 ppm/°C @ 4 Volts
Power Dissipation	$C_j \leq 1.0 \text{ pF @ } 100 \text{ mW}$ $C_j \geq 1.0 \text{ pF @ } 200 \text{ mW}$
Storage Temperature (derate linearly to zero at 150°C)	-35°C to + 200°C

Environmental Performance

All tuning varactors in the MA45200 series are capable of meeting the performance tests dictated by the methods and procedures of the latest revisions of MIL-S-19500, MIL-STD-202 and MIL-STD-750 which specify mechanical, electrical, thermal and other environmental tests common to semiconductor products.

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Specifications @ T_A = +25°C

264V

Model ¹ Number	Minimum ^{5,6} V _B (Volts)	Total ^{2,7} Capacitance (pF)	Minimum ^{2,3,7} Capacitance Ratio C _{T0} /C _{TVB}	Typical ⁴ Q at 50 MHz	Suggested Frequency Range (GHz)
MA45225	30	0.5	2.7	5500	10-12
MA45226	30	0.6	2.9	5500	9-11
MA45227	30	0.8	2.9	5000	8-10
MA45228	30	1.0	3.0	4800	7-9
MA45229	30	1.2	3.2	4800	6-8
MA45230	30	1.5	3.3	4500	6-8
MA45231	30	1.8	3.5	4000	5-7
MA45232	30	2.2	3.6	4000	5-7
MA45233	30	2.7	3.7	4000	4-6
MA45234	30	3.3	3.7	3500	4-6
MA45236	30	4.7	3.8	3000	2-4
MA45239	30	8.2	3.9	2700	1-2
MA45240	30	10.0	4.0	2500	1-2
MA45241	30	12.0	4.0	2200	.5-1.0

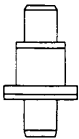
Notes:

- Case style 30 is the standard enclosure for this series. On special order, these devices are also available in other case styles including 31, 94, 96, 108, and in chip form (132). To order the MA45200 series in chip form or other case styles, add the designated available case number as a suffix to the model number, i.e., MA5229-132 is a chip or MA45229-96 is in the 96 case style.
- Total capacitance is measured at 1 MHz.
- The total capacitance ratio will vary with different packages due to differences in package parasitic capacitance.
- Diode Q at -4 volts is determined at 1 GHz and extrapolated to 50 MHz by:

$$Q_{-4} = \frac{1}{2 \times f C_j} R_s$$

- Reverse leakage current is 20 nanoamperes maximum at 24 volts.
- Reverse leakage is 10 microamperes maximum at breakdown voltage.
- The total capacitance and capacitance ratios shown are for diodes housed in case style 30. Other cases and chip styles will result in slightly different values.

Case Styles (See appendix for complete dimensions)



30



31



94



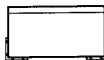
96



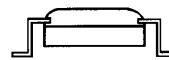
108



132



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Specifications Subject to Change Without Notice.

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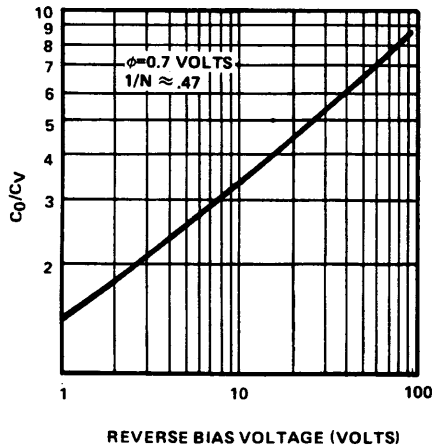
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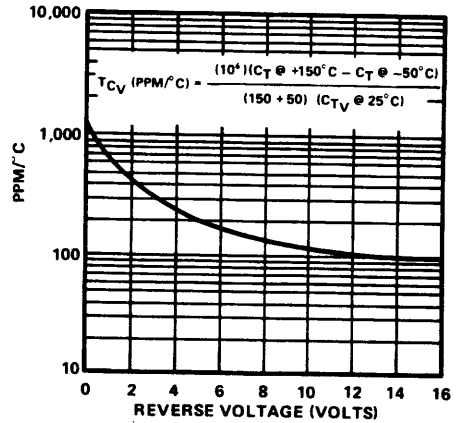
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Typical Performance Curves

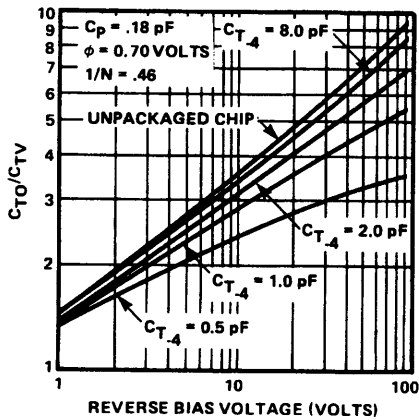
TYPICAL CAPACITANCE CHANGE RATIOS FOR SILICON TUNING VARACTOR CHIPS



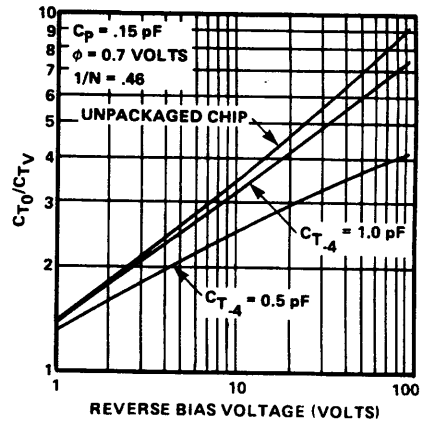
TYPICAL TEMPERATURE COEFFICIENT OF SILICON VARACTORS



TYPICAL CAPACITANCE CHANGE RATIOS FOR SILICON TUNING VARACTORS IN CASE STYLES 30, 31 & 108



TYPICAL CAPACITANCE CHANGE RATIOS FOR SILICON TUNING VARACTORS IN CASE STYLES 94 AND 96



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