

**DESCRIPTION**

These families of hyperabrupt junction RF varactor diodes feature computer controlled grown junction epitaxy which provides extraordinary consistency and the highest Q available in a 22 Volt hyperabrupt varactor. These series give the designer a full capacitance range of 10 to 500 pF at 3 or 4 volts of bias, depending on product series. They allow octave tuning of LC tanks through 500 MHz. With a reduced 1.5 to 1 frequency ratio, straight-line-frequency tuning over a 3 to 8 volt tuning range is possible. Ultrahigh Q and excellent large signal handling capabilities, along with a 2 to 1 capacitance ratio, is obtained by tuning from 9 to 20 volts of reverse bias. Linear, wide deviation tuning of VCXO/TCXO'S and frequency modulators also results when these diodes are tuned over a 3 to 8 volt bias range.

Closely matched sets of all HF-VHF diodes are available along with "A" suffix versions having  $\pm 5\%$  capacitance tolerance at 3 or 4 volts of reverse bias depending on series selected.

**APPLICATIONS**

These families of hyperabrupt varactors are ideal for wide bandwidth VCOs. They also provide excellent performance in frequency modulators, voltage variable filters, analog phase shifters, TCXOs and VCXOs.

**KEY FEATURES**

- Available as packaged devices or as chips for hybrid applications
- Octave Tuning Range
- Ultrahigh Q
- Available with 5% Tolerance  $C_T$

**APPLICATIONS/BENEFITS**

- Values cover the entire HF / VHF / UHF spectrum;
- Highest Q / lowest VCO phase noise
- Tough MIL-Spec SiO<sub>2</sub> passivation
- Dozens of package outlines available

**ABSOLUTE MAXIMUM RATINGS AT 25° C  
(UNLESS OTHERWISE SPECIFIED)**

| Rating                  | Symbol    | Value       | Unit |
|-------------------------|-----------|-------------|------|
| Maximum Working Voltage | $V_R$     | 22          | V    |
| Storage Temperature     | $T_{STG}$ | -65 to +150 | °C   |
| Operating Temperature   | $T_{OP}$  | -55 to +150 | °C   |

**IMPORTANT:** For the most current data, consult our website: [www.MICROSEMI.com](http://www.MICROSEMI.com)  
 Specifications are subject to change. Consult factory for the latest information.



These devices are ESD sensitive and must be handled using ESD precautions.

<sup>1</sup> Unless otherwise specified, these products are supplied with Gold terminations suitable for RoHS compliant assembly.

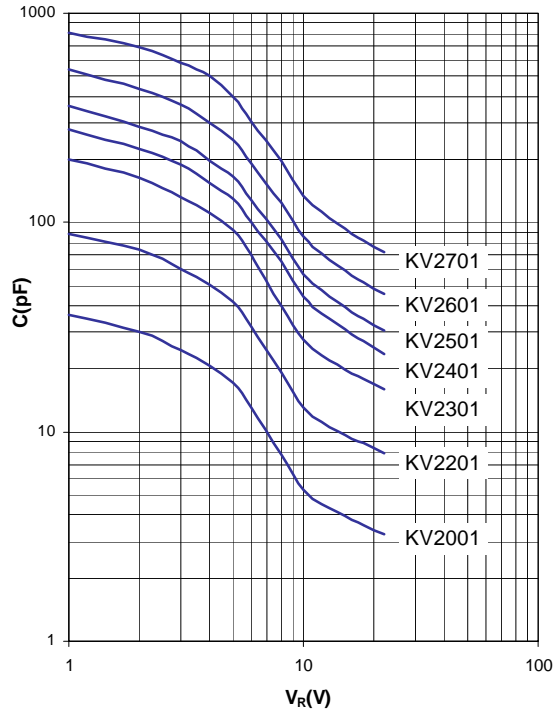
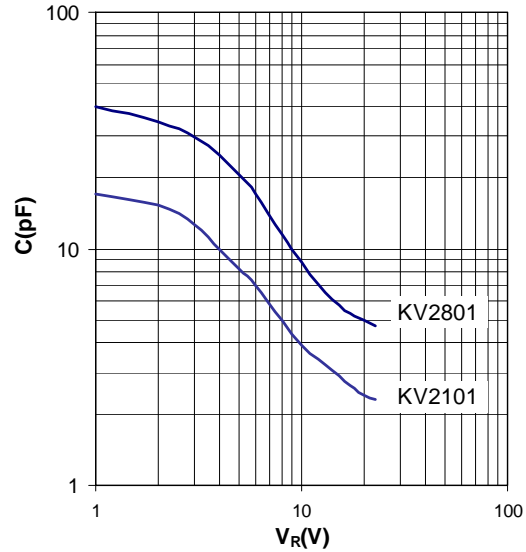
**HF / VHF – HYPERABRUPT VARACTORS**
**ELECTRICAL PARAMETERS @ 25°C (unless otherwise specified)**

| MODEL NUMBER | C <sub>T</sub> (pF)<br>f = 1 MHz<br>Min / Typ / Max |                     |                      | Capacitance Ratio<br>Typ | Quality Factor <sup>1</sup><br>Min/Typ | I <sub>R</sub><br>Typ/Max    |
|--------------|---|---------------------|----------------------|--------------------------|--|------------------------------|
|              | V <sub>R</sub> = 4V                                 | V <sub>R</sub> = 8V | V <sub>R</sub> = 20V | C(-4V) / C(-20V)         | Q @ -4V<br>f = 50MHz                   | V <sub>R</sub> = 20V<br>(nA) |
| KV2001       | 18 / 20 / 22  | 7.5 / 8.5 / 10.5    | 3.1 / 3.5 / 3.9      | 5.8                      | 160 / 220                              | 15 / 100                     |
| KV2201       | 45 / 50 / 55  | 18 / 20 / 25        | 7.3 / 8.0 / 9.2      | 6.3                      | 125 / 165                              | 20 / 100                     |
| KV2301       | 100 / 110 / 120                                     | 39 / 45 / 55        | 15 / 17 / 19         | 6.6                      | 80 / 110                               | 30 / 100                     |
| KV2401       | 140 / 155 / 170                                     | 55 / 65 / 80        | 22.5 / 25 / 28       | 6.2                      | 70 / 90                                | 50 / 500                     |
| KV2501       | 180 / 200 / 220                                     | 70 / 85 / 105       | 29 / 32 / 36         | 6.3                      | 60 / 80                                | 70 / 500                     |
| KV2601       | 270 / 300 / 330                                     | 110 / 125 / 155     | 42.5 / 48 / 53.5     | 6.4                      | 40 / 50                                | 100 / 1000                   |
| KV2701       | 450 / 500 / 550                                     | 175 / 195 / 225     | 66 / 75 / 83         | 6.8                      | 30 / 40                                | 150 / 1000                   |

**UHF – HYPERABRUPT VARACTORS**
**ELECTRICAL PARAMETERS @ 25°C (unless otherwise specified)**

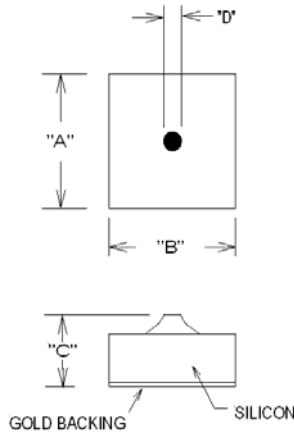
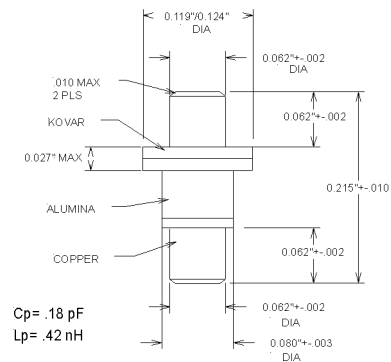
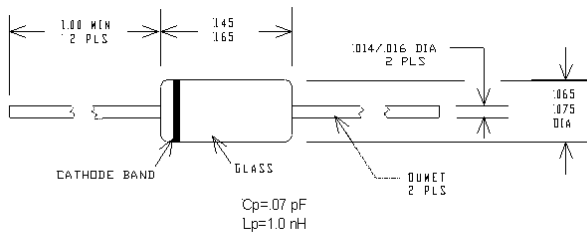
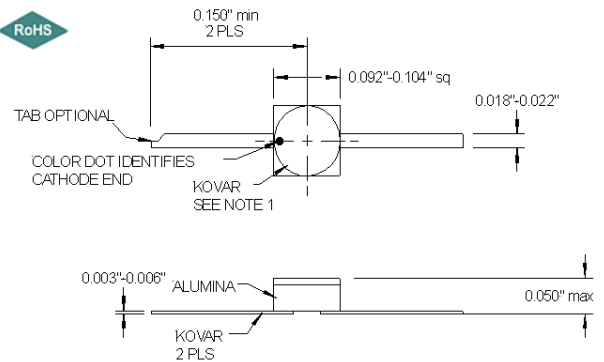
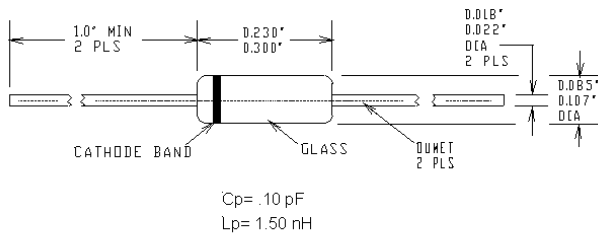
| MODEL NUMBER | C <sub>T</sub> (pF)<br>f = 1 MHz<br>Min / Typ / Max |                     |                      | CAPACITANCE RATIO<br>Typ | QUALITY FACTOR <sup>1</sup><br>Min/Typ | I <sub>R</sub><br>Typ/Max    |
|--------------|---|---------------------|----------------------|--------------------------|--|------------------------------|
|              | V <sub>R</sub> = 3V                                 | V <sub>R</sub> = 8V | V <sub>R</sub> = 20V | C(-3V) / C(-20V)         | Q @ -3V<br>f = 50MHz                   | V <sub>R</sub> = 20V<br>(nA) |
| KV2101       | 10.5 / 11.5 / 12.5                                  | 4.3 / 5.0 / 5.7     | 2.0 / 2.15 / 2.3     | 5.4                      | 300 / 350                              | 10 / 100                     |
| KV2801       | 25 / 28 / 31  | 10 / 12 / 13.5      | 4.5 / 4.8 / 5.1      | 5.9                      | 200 / 250                              | 20 / 100                     |

1. Q is determined at V<sub>R</sub> = 4V, f = 50 MHz by  $Q = 1/(2\pi f R_s C_j)$

**C-V (HF-VHF HYPERABRUPT)**
**C-V (UHF HYPERABRUPT)**
**KV2001-KV2701 C-V Curves**

**KV2801 / KV2101 C-V Curves**


**TYPICAL PACKAGE STYLES**

Microsemi offers a variety of package styles to meet specific application requirements. Some limitations apply. Consult factory for details.

**PACKAGE STYLE 00**

**PACKAGE STYE 30**

**PACKAGE STYLE 15**

**PACKAGE STYLE 17**

**PACKAGE STYLE 11**

**NOTES**

The standard 11 and 15 package styles are not RoHS compliant. Consult Factory for RoHS complaint options.