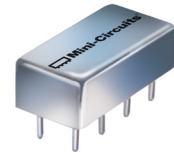


Plug-In

## Voltage Controlled Oscillator

POS-1400A+

Linear Tuning 975 to 1400 MHz



CASE STYLE: A06

## Features

- wide frequency range, 975 to 1400 MHz
- linear tuning characteristics
- low phase noise, -135 dBc/Hz at 1 MHz offset
- hermetically sealed
- protected by US patent 6,549,084

## Applications

- GPS
- agile communication systems
- test instrument-signal generators
- wideband frequency synthesizers

**+RoHS Compliant**

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

## Electrical Specifications

| FREQUENCY (MHz) |      | POWER OUTPUT (dBm) | TUNING VOLTAGE (V) |      | PHASE NOISE (dBc/Hz)<br>SSB at offset frequencies:<br>Typ. |        |         |       | PULLING pk-pk @ 12 dB (MHz) | PUSHING (MHz/V) | TUNING SENSITIVITY (MHz/V) | HARMONICS* (dBc) |      | 3 dB MODULATION BANDWIDTH (MHz) | DC OPERATING POWER      |                   |
|-----------------|------|--------------------|--------------------|------|------------------------------------------------------------|--------|---------|-------|-----------------------------|-----------------|----------------------------|------------------|------|---------------------------------|-------------------------|-------------------|
| Min.            | Max. | Typ.               | Min.               | Max. | 1 kHz                                                      | 10 kHz | 100 kHz | 1 MHz | Typ.                        | Typ.            | Typ.                       | Typ.             | Max. | Typ.                            | V <sub>CC</sub> (volts) | Current (mA) Max. |
| 975             | 1400 | +13                | 1                  | 20   | -65                                                        | -95    | -115    | -135  | 14                          | 2.0             | 25-30                      | -16              | —    | 4.0                             | 8                       | 30                |

\* specified to 4th harmonic

## Pin Connections

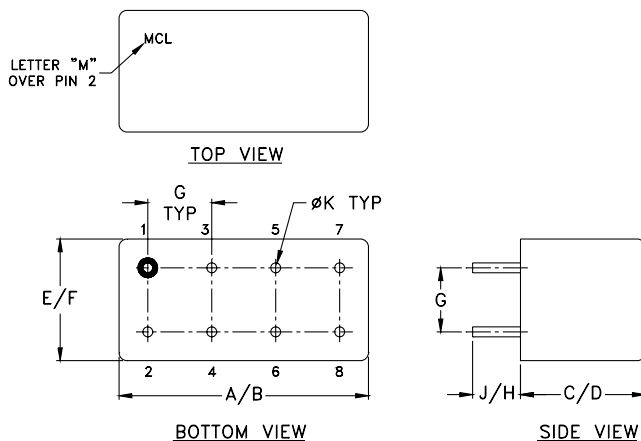
|             |           |
|-------------|-----------|
| RF OUT      | 2         |
| VCC         | 1         |
| V-TUNE      | 8         |
| GROUND      | 3,4,5,6,7 |
| CASE GROUND | 3,4,5,6,7 |

## Maximum Ratings

|                                                   |                |
|---------------------------------------------------|----------------|
| Operating Temperature                             | -55°C to 85°C  |
| Storage Temperature                               | -55°C to 100°C |
| Absolute Max. Supply Voltage (V <sub>CC</sub> )   | +10V           |
| Absolute Max. Tuning Voltage (V <sub>tune</sub> ) | +25V           |

all specifications: 50 ohm system  
Permanent damage may occur if any of these limits are exceeded.

## Outline Drawing



## Outline Dimensions (inch)

| A      | B     | C     | D     | E     | F     | G    | H    | J     | K      | wt    |
|--------|-------|-------|-------|-------|-------|------|------|-------|--------|-------|
| .770   | .800  | .285  | .310  | .370  | .400  | .200 | .20  | .14   | .031   | grams |
| 19.558 | 20.32 | 7.239 | 7.874 | 9.398 | 10.16 | 5.08 | 5.08 | 3.556 | 0.7874 | 5.2   |

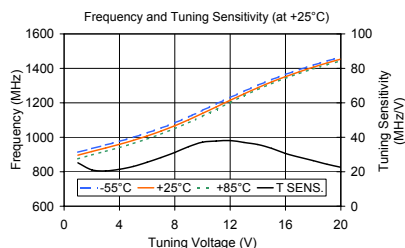
## Notes

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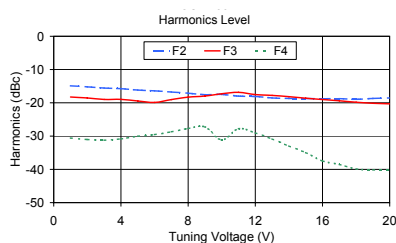
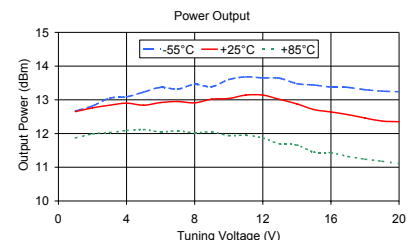


## Performance Data &amp; Curves

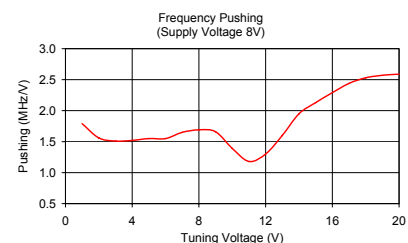
## POS-1400A+



| V<br>TUNE | TUNING<br>SENS.<br>(MHz/V) | FREQUENCY (MHz) |         |         | POWER OUTPUT (dBm) |       |       |
|-----------|----------------------------|-----------------|---------|---------|--------------------|-------|-------|
|           |                            | -55°C           | +25°C   | +85°C   | -55°C              | +25°C | +85°C |
| 1.00      | 25.17                      | 913.50          | 896.12  | 875.39  | 12.67              | 12.65 | 11.87 |
| 2.00      | 21.10                      | 934.51          | 917.21  | 897.43  | 12.82              | 12.76 | 11.99 |
| 3.00      | 20.48                      | 955.50          | 937.69  | 918.48  | 13.05              | 12.84 | 12.03 |
| 4.00      | 21.46                      | 976.98          | 959.15  | 940.40  | 13.09              | 12.90 | 12.09 |
| 5.00      | 23.09                      | 1000.48         | 982.24  | 964.03  | 13.23              | 12.84 | 12.12 |
| 6.00      | 25.51                      | 1025.74         | 1007.75 | 989.88  | 13.37              | 12.92 | 12.05 |
| 7.00      | 28.23                      | 1053.56         | 1035.98 | 1018.53 | 13.32              | 12.95 | 12.08 |
| 8.00      | 31.18                      | 1084.54         | 1067.16 | 1050.13 | 13.46              | 12.91 | 12.02 |
| 9.00      | 34.57                      | 1118.95         | 1101.73 | 1084.97 | 13.39              | 13.02 | 12.05 |
| 10.00     | 37.18                      | 1156.59         | 1138.91 | 1122.47 | 13.60              | 13.04 | 11.94 |
| 11.00     | 37.83                      | 1194.46         | 1176.74 | 1161.44 | 13.68              | 13.14 | 11.95 |
| 12.00     | 38.10                      | 1231.23         | 1214.84 | 1201.40 | 13.65              | 13.14 | 11.87 |
| 13.00     | 36.98                      | 1267.48         | 1251.82 | 1240.25 | 13.64              | 13.01 | 11.69 |
| 14.00     | 35.82                      | 1302.37         | 1287.64 | 1276.83 | 13.48              | 12.88 | 11.66 |
| 15.00     | 33.57                      | 1335.12         | 1321.20 | 1310.80 | 13.44              | 12.71 | 11.45 |
| 16.00     | 30.63                      | 1365.12         | 1351.84 | 1341.78 | 13.38              | 12.64 | 11.43 |
| 17.00     | 28.42                      | 1393.09         | 1380.26 | 1370.33 | 13.37              | 12.56 | 11.32 |
| 18.00     | 26.47                      | 1419.09         | 1406.73 | 1396.93 | 13.30              | 12.46 | 11.24 |
| 19.00     | 24.37                      | 1443.09         | 1431.10 | 1421.00 | 13.26              | 12.37 | 11.18 |
| 20.00     | 22.61                      | 1465.48         | 1453.71 | 1444.30 | 13.24              | 12.35 | 11.11 |



| V<br>TUNE | HARMONICS (dBc) |        |        | FREQ. PUSHING<br>(MHz/V) |
|-----------|-----------------|--------|--------|--------------------------|
|           | F2              | F3     | F4     |                          |
| 1.00      | -14.87          | -18.25 | -30.58 | 1.79                     |
| 2.00      | -15.19          | -18.54 | -31.01 | 1.56                     |
| 3.00      | -15.55          | -18.98 | -31.23 | 1.51                     |
| 4.00      | -15.73          | -18.96 | -30.82 | 1.52                     |
| 5.00      | -16.15          | -19.45 | -30.03 | 1.55                     |
| 6.00      | -16.39          | -19.88 | -29.54 | 1.55                     |
| 7.00      | -16.75          | -19.02 | -28.71 | 1.65                     |
| 8.00      | -17.09          | -18.30 | -27.70 | 1.69                     |
| 9.00      | -17.55          | -17.96 | -27.23 | 1.66                     |
| 10.00     | -17.45          | -17.26 | -31.17 | 1.39                     |
| 11.00     | -17.98          | -16.85 | -27.76 | 1.18                     |
| 12.00     | -18.08          | -17.51 | -29.03 | 1.30                     |
| 13.00     | -18.52          | -17.77 | -30.84 | 1.60                     |
| 14.00     | -18.68          | -18.15 | -32.96 | 1.95                     |
| 15.00     | -18.69          | -18.61 | -34.95 | 2.13                     |
| 16.00     | -18.75          | -19.01 | -37.46 | 2.29                     |
| 17.00     | -18.73          | -19.38 | -38.52 | 2.44                     |
| 18.00     | -18.94          | -19.83 | -39.87 | 2.53                     |
| 19.00     | -18.67          | -20.14 | -40.15 | 2.57                     |
| 20.00     | -18.53          | -20.30 | -40.17 | 2.59                     |



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# Voltage Controlled Oscillator

POS-1400A+

## Typical Performance Data

| V<br>TUNE | TUNE<br>SENS<br>(MHz/V) | FREQUENCY<br>(MHz) |        |        | POWER OUTPUT<br>(dBm) |       |       | HARMONICS<br>(dBc) |       |       | FREQ.<br>PUSH<br>(MHz/V) | FREQ<br>OFFSET<br>(KHz) | PHASE<br>NOISE<br>(dBc/Hz) |
|-----------|-------------------------|--------------------|--------|--------|-----------------------|-------|-------|--------------------|-------|-------|--------------------------|-------------------------|----------------------------|
|           |                         | -55°C              | +25°C  | +85°C  | -55°C                 | +25°C | +85°C | F2                 | F3    | F4    |                          |                         |                            |
| 1.0       | 25.17                   | 913.5              | 896.1  | 875.4  | 12.67                 | 12.65 | 11.87 | -14.9              | -18.3 | -30.6 | 1.79                     | 1                       | -65                        |
| 2.0       | 21.10                   | 934.5              | 917.2  | 897.4  | 12.82                 | 12.76 | 11.99 | -15.2              | -18.5 | -31.0 | 1.56                     | 10                      | -95                        |
| 3.0       | 20.48                   | 955.5              | 937.7  | 918.5  | 13.05                 | 12.84 | 12.03 | -15.6              | -19.0 | -31.2 | 1.51                     | 100                     | -115                       |
| 4.0       | 21.46                   | 977.0              | 959.2  | 940.4  | 13.09                 | 12.90 | 12.09 | -15.7              | -19.0 | -30.8 | 1.52                     | 1000                    | -135                       |
| 5.0       | 23.09                   | 1000.5             | 982.2  | 964.0  | 13.23                 | 12.84 | 12.12 | -16.2              | -19.5 | -30.0 | 1.55                     |                         |                            |
| 6.0       | 25.51                   | 1025.7             | 1007.8 | 989.9  | 13.37                 | 12.92 | 12.05 | -16.4              | -19.9 | -29.5 | 1.55                     |                         |                            |
| 7.0       | 28.23                   | 1053.6             | 1036.0 | 1018.5 | 13.32                 | 12.95 | 12.08 | -16.8              | -19.0 | -28.7 | 1.65                     |                         |                            |
| 8.0       | 31.18                   | 1084.5             | 1067.2 | 1050.1 | 13.46                 | 12.91 | 12.02 | -17.1              | -18.3 | -27.7 | 1.69                     |                         |                            |
| 9.0       | 34.57                   | 1119.0             | 1101.7 | 1085.0 | 13.39                 | 13.02 | 12.05 | -17.6              | -18.0 | -27.2 | 1.66                     |                         |                            |
| 10.0      | 37.18                   | 1156.6             | 1138.9 | 1122.5 | 13.60                 | 13.04 | 11.94 | -17.5              | -17.3 | -31.2 | 1.39                     |                         |                            |
| 11.0      | 37.83                   | 1194.5             | 1176.7 | 1161.4 | 13.68                 | 13.14 | 11.95 | -18.0              | -16.9 | -27.8 | 1.18                     |                         |                            |
| 12.0      | 38.10                   | 1231.2             | 1214.8 | 1201.4 | 13.65                 | 13.14 | 11.87 | -18.1              | -17.5 | -29.0 | 1.30                     |                         |                            |
| 13.0      | 36.98                   | 1267.5             | 1251.8 | 1240.3 | 13.64                 | 13.01 | 11.69 | -18.5              | -17.8 | -30.8 | 1.60                     |                         |                            |
| 14.0      | 35.82                   | 1302.4             | 1287.6 | 1276.8 | 13.48                 | 12.88 | 11.66 | -18.7              | -18.2 | -33.0 | 1.95                     |                         |                            |
| 15.0      | 33.57                   | 1335.1             | 1321.2 | 1310.8 | 13.44                 | 12.71 | 11.45 | -18.7              | -18.6 | -35.0 | 2.13                     |                         |                            |
| 16.0      | 30.63                   | 1365.1             | 1351.8 | 1341.8 | 13.38                 | 12.64 | 11.43 | -18.8              | -19.0 | -37.5 | 2.29                     |                         |                            |
| 17.0      | 28.42                   | 1393.1             | 1380.3 | 1370.3 | 13.37                 | 12.56 | 11.32 | -18.7              | -19.4 | -38.5 | 2.44                     |                         |                            |
| 18.0      | 26.47                   | 1419.1             | 1406.7 | 1396.9 | 13.30                 | 12.46 | 11.24 | -18.9              | -19.8 | -39.9 | 2.53                     |                         |                            |
| 19.0      | 24.37                   | 1443.1             | 1431.1 | 1421.0 | 13.26                 | 12.37 | 11.18 | -18.7              | -20.1 | -40.2 | 2.57                     |                         |                            |
| 20.0      | 22.61                   | 1465.5             | 1453.7 | 1444.3 | 13.24                 | 12.35 | 11.11 | -18.5              | -20.3 | -40.2 | 2.59                     |                         |                            |

REV. X1

POS-1400A+

070205

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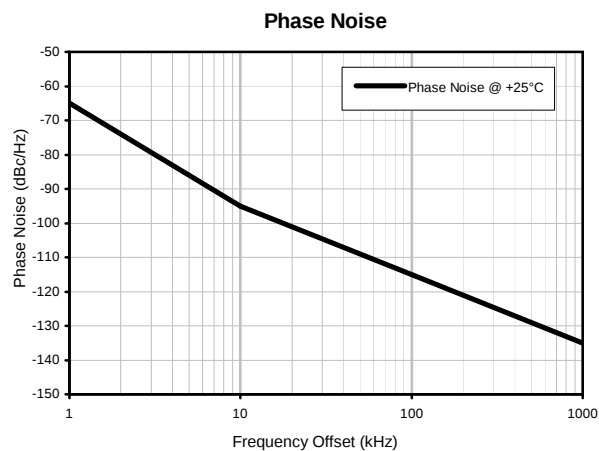
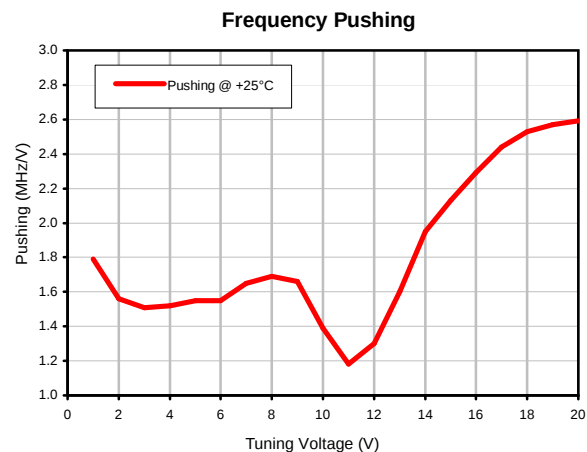
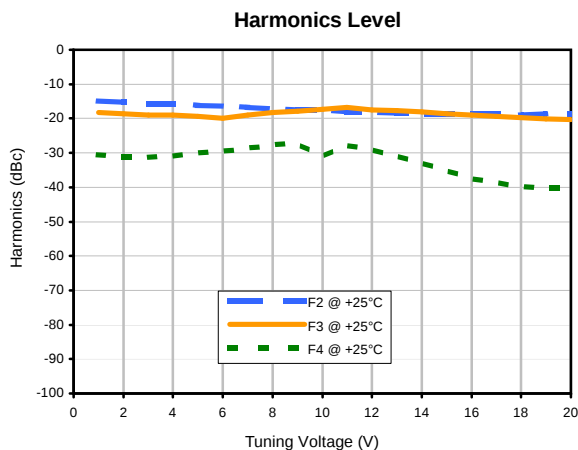
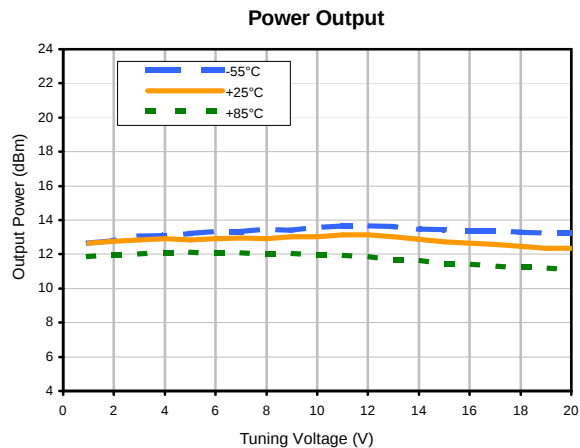
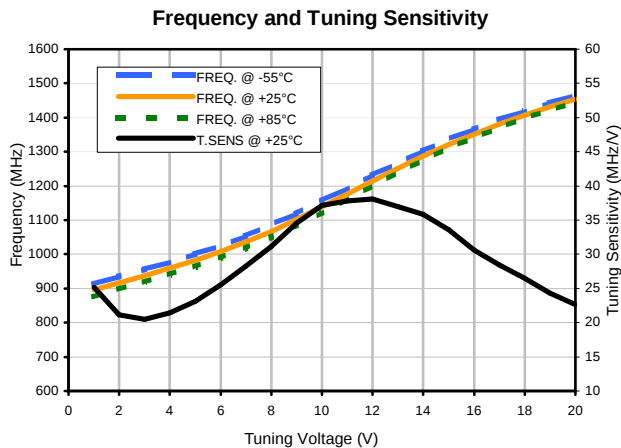
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# Voltage Controlled Oscillator

POS-1400A+

## Typical Performance Data



REV. X1  
POS-1400A+  
070205  
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A01  
A04  
A05  
A06

## Outline Dimensions



| CASE# | A               | B               | C              | D               | E              | F               | G              | H             | J             | K             | WT,<br>GRAM |
|-------|-----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|---------------|---------------|---------------|-------------|
| A01   | .770<br>(19.56) | .800<br>(20.32) | .385<br>(9.78) | .400<br>(10.16) | .370<br>(9.40) | .400<br>(10.16) | .200<br>(5.08) | .20<br>(5.08) | .14<br>(3.56) | .031<br>(.79) | 5.2         |
| A04   |                 |                 | .200<br>(5.08) | .210<br>(5.33)  |                |                 |                |               |               |               | 3.7         |
| A05   |                 |                 | .240<br>(6.10) | .250<br>(6.35)  |                |                 |                |               |               |               | 3.7         |
| A06   |                 |                 | .285<br>(7.24) | .310<br>(7.87)  |                |                 |                |               |               |               | 5.2         |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .03$ ; 3 Pl.  $\pm .015$

### Notes:

- Header material: C.R.S.  
Pin material: #52 alloy.  
Cover material: Cupro-Nickel.
- Pin finish: Electro Tin-Silver.
- Insulated spacer available. Request P/N B14-045-01.
- Tolerance on pin diameter  $\pm .005$  inch.
- Glass meniscus 0.015 inch max.
- Blue bead indicates Pin 1. Pin numbers do not appear on unit, for reference only.



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Mini-Circuits ISO 9001 & ISO 14001 Certified



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification                  | Test/Inspection Condition                                                                                                                                       | Reference/Spec                                                                                       |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Operating Temperature          | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-202, Method 107, Condition A-3, except +100°C                                                |
| Vibration (High Frequency)     | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)                                                                             | MIL-STD-202, Method 204, Condition D                                                                 |
| Mechanical Shock               | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes                                                                                               | MIL-STD-202, Method 213, Condition A                                                                 |
| Moisture Resistance            | 10 cycles, 24 hours per cycle                                                                                                                                   | MIL-STD-202, Method 106, Condition A, except 50°C and end point electrical test done within 12 hours |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, 95% Coverage                                                                              |
| Resistance to Solder Heat      | 260°C for 10 seconds                                                                                                                                            | MIL-STD-202, Method 210, Condition B                                                                 |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                                                                              |
| Terminal Strength              | 4 1/2 Pound Pull                                                                                                                                                | MIL-STD-202, Method 211, Condition A                                                                 |



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification       | Test/Inspection Condition | Reference/Spec                       |
|---------------------|---------------------------|--------------------------------------|
| Gross Leak          | 125°C Bubble Test         | MIL-STD-202, Method 112, Condition D |
| Barometric Pressure | 100,000 Feet              | MIL-STD-202, Method 105, Condition D |