

Coaxial

# Voltage Controlled Oscillator

ZX95-988+

5V Tuning for PLL IC's 941 to 988 MHz

## Features

- linear tuning characteristics
- low phase noise
- low pushing
- low pulling
- protected by US patent 6,790,049

## Applications

- r & d
- lab
- instrumentation
- wireless communications
- cellular infrastructure



CASE STYLE: GB956

| Connectors | Model       | Price       | Qty.  |
|------------|-------------|-------------|-------|
| SMA        | ZX95-988-S+ | \$44.95 ea. | (1-9) |

### +RoHS Compliant

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

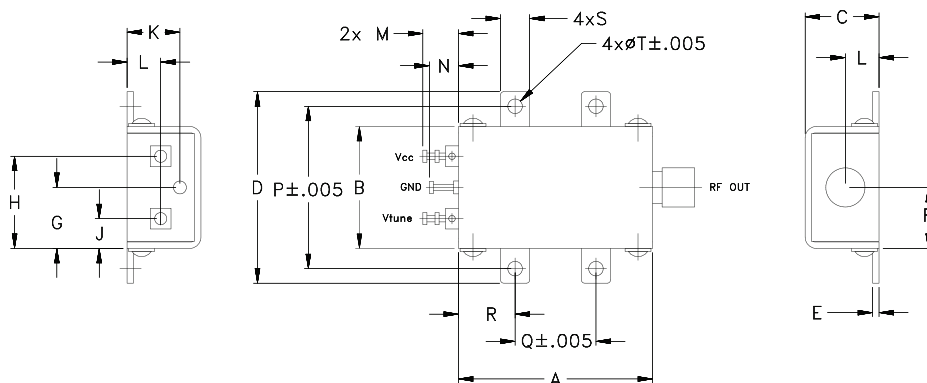
## Electrical Specifications

| MODEL NO. | FREQ. (MHz) |      | POWER OUTPUT (dBm) | PHASE NOISE dBc/Hz SSB at offset frequencies,kHz<br><br>Typ. |      |      |      | TUNING            |                       |               |                                 |      | NON HARMONIC SPURIOUS (dBc) | HARMONICS (dBc) |      | PULLING pk-pk @ 12 dBr (MHz) | PUSHING (MHz/V) | DC OPERATING POWER<br><br>Vcc Current (volts) (mA) |    |
|-----------|-------------|------|--------------------|--------------------------------------------------------------|------|------|------|-------------------|-----------------------|---------------|---------------------------------|------|-----------------------------|-----------------|------|------------------------------|-----------------|----------------------------------------------------|----|
|           |             |      |                    |                                                              |      |      |      | VOLTAGE RANGE (V) | SENSI- TIVITY (MHz/V) | PORT CAP (pF) | 3 dB MODULATION BANDWIDTH (MHz) |      |                             |                 |      |                              |                 |                                                    |    |
|           | Min.        | Max. | Typ.               | 1                                                            | 10   | 100  | 1000 | Min.              | Max.                  | Typ.          | Typ.                            | Typ. | Typ.                        | Typ.            | Max. | Typ.                         | Typ.            | Max.                                               |    |
| ZX95-988+ | 941         | 988  | +0.5               | -85                                                          | -111 | -132 | -152 | 0.5               | 4.5                   | 23-29         | 44                              | 40   | -90                         | -21             | -13  | 0.8                          | 0.2             | 5                                                  | 20 |

## Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -55°C to 85°C  |
| Storage Temperature                                             | -55°C to 100°C |
| Absolute Max. Supply Voltage (Vcc)                              | 7V             |
| Absolute Max. Tuning Voltage (Vtune)                            | 7V             |
| All specifications                                              | 50 ohm system  |
| Permanent damage may occur if any of these limits are exceeded. |                |

## Outline Drawing



## Outline Dimensions (inch mm)

| A     | B     | C     | D     | E    | F    | G    | H     | J    | K    | L    | M    | N    | P     | Q     | R    | S    | T    | wt.   |
|-------|-------|-------|-------|------|------|------|-------|------|------|------|------|------|-------|-------|------|------|------|-------|
| 1.20  | .75   | .46   | 1.18  | .04  | .38  | .38  | .57   | .18  | .33  | .21  | .22  | .18  | 1.00  | .50   | .35  | .18  | .106 | grams |
| 30.48 | 19.05 | 11.68 | 29.97 | 1.02 | 9.65 | 9.65 | 14.48 | 4.57 | 8.38 | 5.33 | 5.59 | 4.57 | 25.40 | 12.70 | 8.89 | 4.57 | 2.69 | 35.0  |



For detailed performance specs & shopping online see web site

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**Notes:** 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp).

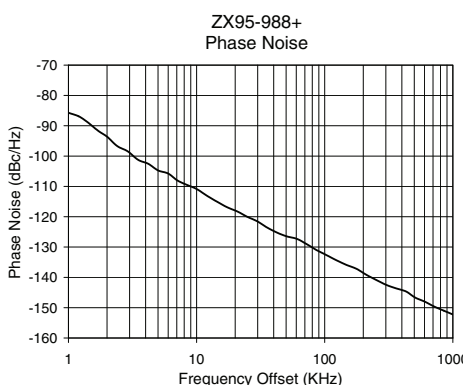
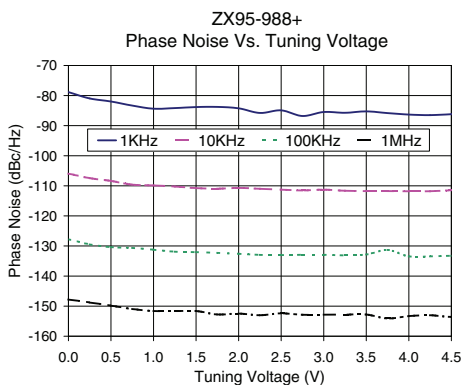
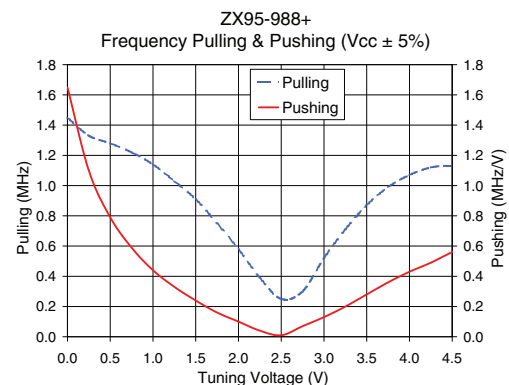
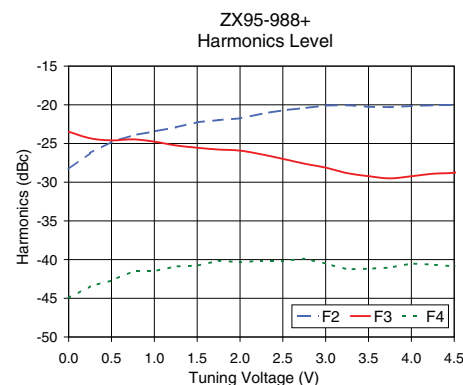
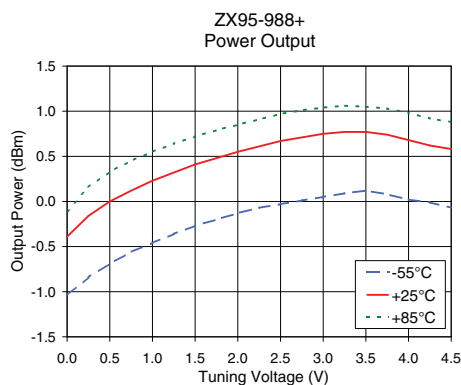
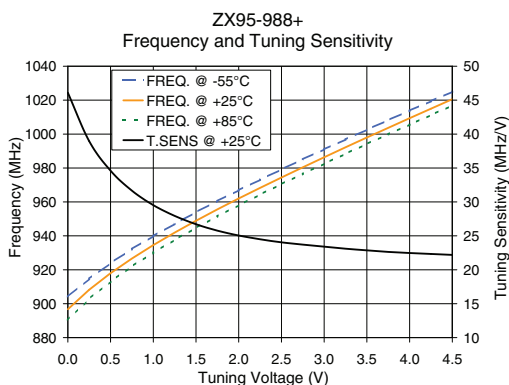
REV. OR  
M121306  
EDR-9498F2  
ZX95-988+  
RAV  
120902  
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# Performance Data & Curves\*

# ZX95-988+

| V<br>TUNE | TUNE<br>SENS<br>(MHz/V) | FREQUENCY<br>(MHz) |        |        | POWER OUTPUT<br>(dBm) |       |       | Icc<br>(mA) | HARMONICS (dBc) |       |       | FREQ.<br>PUSH<br>(MHz/V) | FREQ.<br>PULL<br>(MHz) | PHASE NOISE (dBc/Hz)<br>at offsets |        |        |        | FREQ<br>OFFSET<br>(KHz) | PHASE<br>NOISE at<br>965 MHz<br>(dBc/Hz) |
|-----------|-------------------------|--------------------|--------|--------|-----------------------|-------|-------|-------------|-----------------|-------|-------|--------------------------|------------------------|------------------------------------|--------|--------|--------|-------------------------|------------------------------------------|
|           |                         | -55°C              | +25°C  | +85°C  | -55°C                 | +25°C | +85°C |             | F2              | F3    | F4    |                          |                        | 1kHz                               | 10kHz  | 100kHz | 1MHz   |                         |                                          |
| 0.00      | 46.10                   | 904.1              | 896.7  | 890.4  | -1.04                 | -0.39 | -0.11 | 13.24       | -28.3           | -23.5 | -45.0 | 1.65                     | 1.45                   | -78.9                              | -105.9 | -127.8 | -147.8 | 1.0                     | -85.70                                   |
| 0.25      | 38.95                   | 914.7              | 908.2  | 902.8  | -0.84                 | -0.16 | 0.16  | 13.33       | -26.2           | -24.3 | -43.5 | 1.10                     | 1.33                   | -81.0                              | -107.4 | -129.5 | -148.8 | 2.0                     | -93.59                                   |
| 0.50      | 34.60                   | 923.9              | 918.0  | 913.0  | -0.69                 | 0.00  | 0.33  | 13.40       | -24.8           | -24.6 | -42.7 | 0.79                     | 1.28                   | -82.0                              | -108.4 | -130.4 | -149.8 | 3.5                     | -101.25                                  |
| 0.75      | 31.66                   | 932.2              | 926.6  | 922.0  | -0.56                 | 0.12  | 0.45  | 13.46       | -24.0           | -24.5 | -41.5 | 0.59                     | 1.22                   | -83.3                              | -109.6 | -130.7 | -151.0 | 6.0                     | -105.75                                  |
| 1.00      | 29.52                   | 939.9              | 934.5  | 930.1  | -0.46                 | 0.23  | 0.55  | 13.51       | -23.4           | -24.8 | -41.5 | 0.44                     | 1.14                   | -84.4                              | -109.9 | -131.2 | -151.6 | 8.5                     | -109.59                                  |
| 1.25      | 27.94                   | 947.1              | 941.9  | 937.7  | -0.36                 | 0.32  | 0.64  | 13.57       | -22.9           | -25.2 | -40.9 | 0.33                     | 1.03                   | -84.2                              | -110.2 | -131.9 | -151.7 | 10.0                    | -110.86                                  |
| 1.50      | 26.71                   | 953.9              | 948.9  | 944.8  | -0.27                 | 0.41  | 0.72  | 13.61       | -22.3           | -25.6 | -40.8 | 0.24                     | 0.91                   | -83.8                              | -110.8 | -132.1 | -151.6 | 20.8                    | -118.28                                  |
| 1.75      | 25.77                   | 960.5              | 955.6  | 951.5  | -0.20                 | 0.48  | 0.79  | 13.65       | -22.0           | -25.8 | -40.1 | 0.16                     | 0.75                   | -83.8                              | -111.0 | -132.3 | -152.8 | 35.5                    | -123.55                                  |
| 2.00      | 25.05                   | 966.9              | 962.0  | 958.0  | -0.13                 | 0.55  | 0.85  | 13.69       | -21.8           | -25.9 | -40.3 | 0.10                     | 0.58                   | -84.2                              | -110.7 | -132.6 | -152.5 | 60.7                    | -127.31                                  |
| 2.25      | 24.49                   | 973.1              | 968.3  | 964.3  | -0.07                 | 0.61  | 0.91  | 13.71       | -21.2           | -26.4 | -40.2 | 0.04                     | 0.39                   | -85.8                              | -111.0 | -133.0 | -153.0 | 86.7                    | -131.06                                  |
| 2.50      | 24.04                   | 979.2              | 974.4  | 970.5  | -0.03                 | 0.67  | 0.97  | 13.74       | -20.7           | -27.0 | -40.2 | 0.01                     | 0.25                   | -84.9                              | -111.3 | -133.0 | -152.4 | 100.0                   | -132.35                                  |
| 2.75      | 23.71                   | 985.1              | 980.4  | 976.5  | 0.01                  | 0.71  | 1.01  | 13.76       | -20.4           | -27.6 | -39.9 | 0.07                     | 0.30                   | -86.8                              | -111.5 | -132.9 | -152.9 | 148.1                   | -135.92                                  |
| 3.00      | 23.41                   | 991.0              | 986.3  | 982.5  | 0.05                  | 0.75  | 1.04  | 13.77       | -20.1           | -28.1 | -40.5 | 0.13                     | 0.52                   | -85.5                              | -111.3 | -132.9 | -152.9 | 211.6                   | -139.17                                  |
| 3.25      | 23.11                   | 996.8              | 992.2  | 988.3  | 0.09                  | 0.77  | 1.06  | 13.79       | -20.0           | -28.8 | -41.3 | 0.20                     | 0.71                   | -85.7                              | -111.7 | -133.1 | -152.8 | 361.5                   | -143.65                                  |
| 3.50      | 22.86                   | 1002.6             | 998.0  | 994.2  | 0.12                  | 0.77  | 1.05  | 13.81       | -20.3           | -29.2 | -41.2 | 0.28                     | 0.87                   | -85.3                              | -111.8 | -132.8 | -152.8 | 432.2                   | -144.67                                  |
| 3.75      | 22.63                   | 1008.2             | 1003.7 | 999.9  | 0.08                  | 0.74  | 1.03  | 13.82       | -20.3           | -29.5 | -41.0 | 0.36                     | 0.99                   | -85.8                              | -111.7 | -131.3 | -154.1 | 507.5                   | -146.66                                  |
| 4.00      | 22.46                   | 1013.8             | 1009.3 | 1005.6 | 0.02                  | 0.68  | 0.98  | 13.82       | -20.2           | -29.2 | -40.5 | 0.43                     | 1.07                   | -86.3                              | -111.8 | -133.4 | -153.3 | 606.7                   | -148.04                                  |
| 4.25      | 22.33                   | 1019.4             | 1015.0 | 1011.2 | -0.01                 | 0.62  | 0.92  | 13.83       | -20.1           | -28.9 | -40.7 | 0.49                     | 1.12                   | -86.5                              | -111.8 | -133.5 | -153.0 | 851.6                   | -151.02                                  |
| 4.50      | 22.20                   | 1025.0             | 1020.5 | 1016.8 | -0.07                 | 0.58  | 0.88  | 13.84       | -20.0           | -28.8 | -40.9 | 0.56                     | 1.13                   | -86.2                              | -111.5 | -133.3 | -153.6 | 1000.0                  | -152.25                                  |

\*at 25°C unless mentioned otherwise



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