

## Surface Mount

# Voltage Controlled Oscillator

# SOS-704PV-119+

## 5V Tuning for PLL IC's 677 to 707 MHz

## Features

- linear tuning characteristics
- low phase noise
- low pushing
- low pulling
- small size 0.3" x 0.3"
- aqueous washable



CASE STYLE: FZ802

## Applications

- wireless communications
- wireless microphones

**+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<br>dBc/Hz SSB at offset frequencies,kHz<br><br>Typ. |      |      |      | TUNING            |                       |               |                                 |      | NON HARMONIC SPURIOUS (dBc) | HARMONICS (dBc) |      | PULLING<br>pk-pk @12 dB <sub>r</sub> (MHz) | PUSHING (MHz/V) | DC OPERATING POWER<br><br>V <sub>cc</sub> 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. |
| SOS-704PV-119+ | 677         | 707  | 0                  | -89                                                             | -113 | -133 | -152 | 0.5               | 4.5                   | 12-16         | 94                              | 30   | -90                         | -13             | -    | 0.3                                        | 0.3             | 5                                                              | 20   |

## Pin Connections

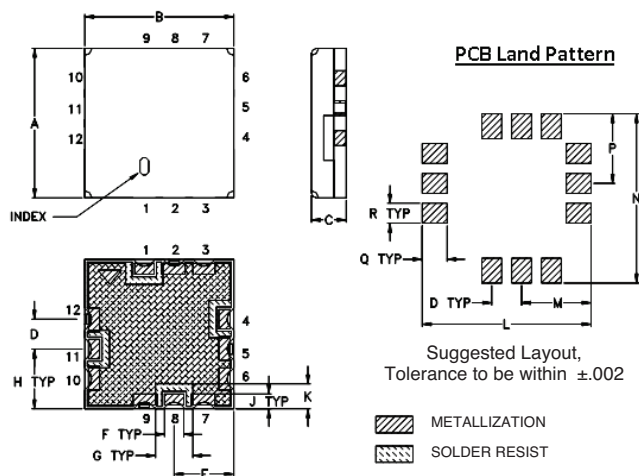
|        |                     |
|--------|---------------------|
| RF OUT | 8                   |
| VCC    | 11                  |
| V-TUNE | 1                   |
| GROUND | 2,3,4,5,6,7,9,10,12 |

### Maximum Ratings

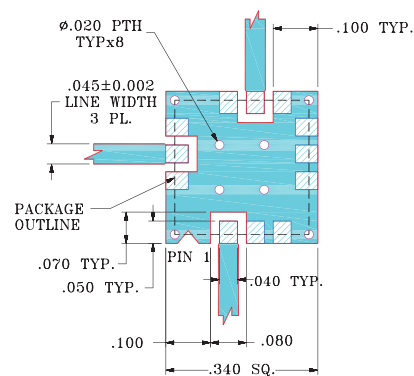
|                                      |                |
|--------------------------------------|----------------|
| Operating Temperature                | -55°C to 85°C  |
| Storage Temperature                  | -55°C to 100°C |
| Absolute Max. Supply Voltage (Vcc)   | 7V             |
| Absolute Max. Tuning Voltage (Vtune) | 7V             |
| All specifications                   | 50 ohm system  |

Permanent damage may occur if any of these limits are exceeded.

## Outline Drawing



**Demo Board MCL P/N: TB-271**  
**Suggested PCB Layout (PL-143)**



### Outline Dimensions (inch mm)

| A    | B    | C    | D    | E    | F    | G    | H    | J    | K    | L    | M    | N    | P    | Q    | R    | wt.   |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| .300 | .300 | .070 | .060 | .120 | .039 | .075 | .120 | .030 | .050 | .340 | .140 | .340 | .140 | .050 | .040 | grams |
| 7.62 | 7.62 | 1.78 | 1.52 | 3.05 | 0.99 | 1.91 | 3.05 | 0.76 | 1.27 | 8.64 | 3.56 | 8.64 | 3.56 | 1.27 | 1.02 | 25    |

NOTE:

1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .025"±.002"; COPPER: 1/2 OZ. EACH SIDE.  
FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

 DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER) DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 *The Design Engineers Search Engine*  Provides ACTUAL Data Instantly at [minicircuits.com](http://minicircuits.com)

For detailed performance specs  
& shopping online see web site

REV. A  
M137599  
EDR-7896/3F1  
ROS-704PV-119+  
RAV  
120723  
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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/MCStore/terms\\_iso](http://www.minicircuits.com/MCStore/terms_iso).

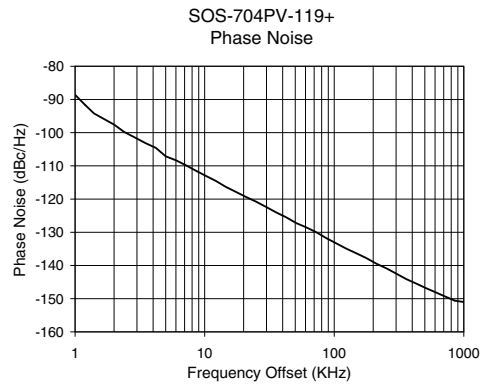
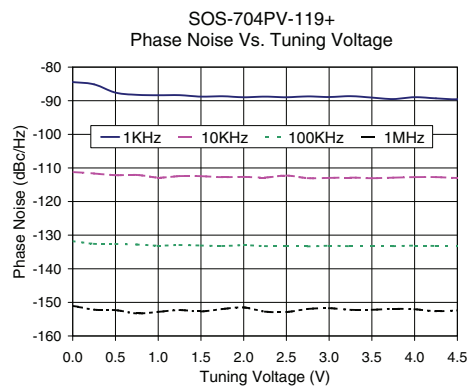
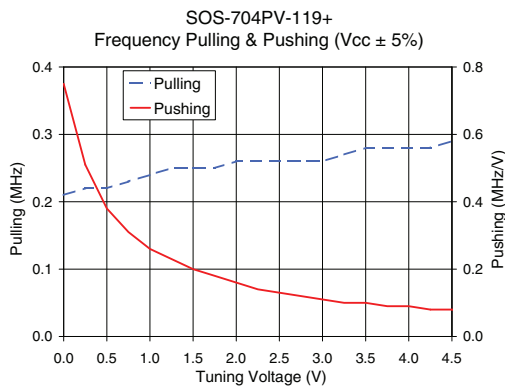
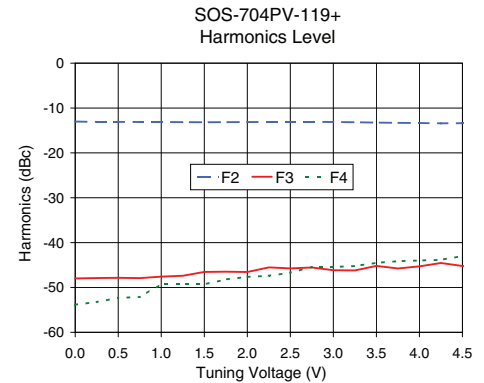
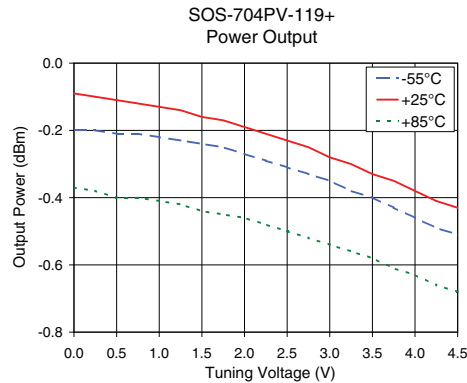
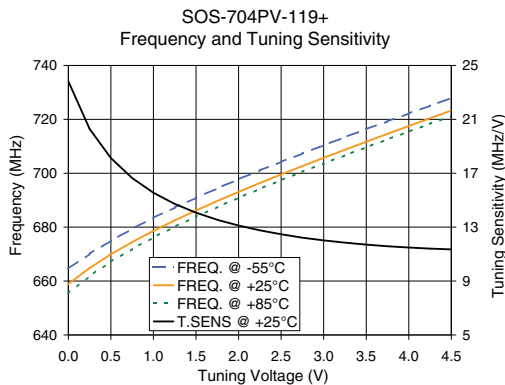
# NON-CATALOG

## Performance Data & Curves\*

## SOS-704PV-119+

| 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>692 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      | 23.83                   | 664.6              | 658.9 | 655.4 | -0.20                 | -0.09 | -0.37 | 15.28       | -13.0           | -48.0 | -53.8 | 0.75                     | 0.21                   | -84.4                              | -111.2 | -131.8 | -151.0 | 1.0                     | -88.62                                   |
| 0.25      | 20.29                   | 670.1              | 664.9 | 661.9 | -0.20                 | -0.10 | -0.38 | 15.29       | -13.1           | -47.9 | -53.3 | 0.51                     | 0.22                   | -85.1                              | -111.7 | -132.6 | -152.2 | 2.0                     | -97.56                                   |
| 0.50      | 18.13                   | 675.0              | 669.9 | 667.2 | -0.21                 | -0.11 | -0.40 | 15.30       | -13.1           | -47.9 | -52.3 | 0.38                     | 0.22                   | -87.6                              | -112.2 | -132.6 | -152.3 | 3.5                     | -103.16                                  |
| 0.75      | 16.64                   | 679.4              | 674.5 | 671.9 | -0.21                 | -0.12 | -0.40 | 15.31       | -13.1           | -47.9 | -52.1 | 0.31                     | 0.23                   | -88.2                              | -112.1 | -132.8 | -153.3 | 6.0                     | -108.33                                  |
| 1.00      | 15.55                   | 683.4              | 678.6 | 676.2 | -0.22                 | -0.13 | -0.41 | 15.32       | -13.1           | -47.6 | -49.2 | 0.26                     | 0.24                   | -88.4                              | -112.9 | -133.1 | -152.8 | 8.5                     | -111.40                                  |
| 1.25      | 14.72                   | 687.3              | 682.5 | 680.1 | -0.23                 | -0.14 | -0.42 | 15.33       | -13.2           | -47.4 | -49.2 | 0.23                     | 0.25                   | -88.4                              | -112.4 | -132.9 | -152.3 | 10.0                    | -112.84                                  |
| 1.50      | 14.08                   | 690.9              | 686.2 | 683.9 | -0.24                 | -0.16 | -0.44 | 15.33       | -13.2           | -46.5 | -49.3 | 0.20                     | 0.25                   | -88.8                              | -112.5 | -133.1 | -152.7 | 20.8                    | -119.36                                  |
| 1.75      | 13.55                   | 694.4              | 689.7 | 687.5 | -0.25                 | -0.17 | -0.45 | 15.34       | -13.2           | -46.5 | -48.2 | 0.18                     | 0.25                   | -88.7                              | -112.8 | -133.2 | -152.0 | 35.5                    | -123.99                                  |
| 2.00      | 13.12                   | 697.8              | 693.1 | 690.9 | -0.27                 | -0.19 | -0.46 | 15.34       | -13.1           | -46.6 | -47.6 | 0.16                     | 0.26                   | -89.0                              | -112.7 | -133.0 | -151.5 | 60.7                    | -128.51                                  |
| 2.25      | 12.76                   | 701.0              | 696.4 | 694.2 | -0.29                 | -0.21 | -0.48 | 15.35       | -13.1           | -45.5 | -47.4 | 0.14                     | 0.26                   | -88.8                              | -112.9 | -133.3 | -152.8 | 86.7                    | -131.76                                  |
| 2.50      | 12.47                   | 704.2              | 699.6 | 697.4 | -0.31                 | -0.23 | -0.50 | 15.35       | -13.1           | -45.8 | -46.7 | 0.13                     | 0.26                   | -89.0                              | -112.3 | -133.3 | -152.9 | 100.0                   | -133.03                                  |
| 2.75      | 12.22                   | 707.3              | 702.7 | 700.6 | -0.33                 | -0.25 | -0.52 | 15.36       | -13.1           | -45.6 | -45.4 | 0.12                     | 0.26                   | -88.7                              | -113.0 | -133.4 | -152.0 | 177.0                   | -137.77                                  |
| 3.00      | 12.02                   | 710.4              | 705.7 | 703.6 | -0.35                 | -0.28 | -0.54 | 15.36       | -13.1           | -46.2 | -45.4 | 0.11                     | 0.26                   | -88.9                              | -113.0 | -133.2 | -151.7 | 211.6                   | -139.46                                  |
| 3.25      | 11.85                   | 713.4              | 708.7 | 706.7 | -0.38                 | -0.30 | -0.56 | 15.37       | -13.2           | -46.2 | -45.2 | 0.10                     | 0.27                   | -88.7                              | -112.9 | -133.3 | -152.2 | 302.4                   | -142.49                                  |
| 3.50      | 11.70                   | 716.3              | 711.7 | 709.6 | -0.40                 | -0.33 | -0.58 | 15.38       | -13.3           | -45.2 | -44.5 | 0.10                     | 0.28                   | -89.1                              | -113.1 | -133.3 | -152.2 | 361.5                   | -144.14                                  |
| 3.75      | 11.58                   | 719.3              | 714.6 | 712.6 | -0.43                 | -0.35 | -0.61 | 15.37       | -13.3           | -45.8 | -44.2 | 0.09                     | 0.28                   | -89.5                              | -112.9 | -133.3 | -151.9 | 507.5                   | -146.79                                  |
| 4.00      | 11.49                   | 722.2              | 717.5 | 715.5 | -0.46                 | -0.38 | -0.63 | 15.38       | -13.3           | -45.3 | -44.0 | 0.09                     | 0.28                   | -88.9                              | -112.7 | -133.1 | -151.1 | 606.7                   | -148.10                                  |
| 4.25      | 11.41                   | 725.1              | 720.4 | 718.3 | -0.49                 | -0.41 | -0.66 | 15.39       | -13.4           | -44.5 | -43.8 | 0.08                     | 0.28                   | -89.3                              | -112.7 | -133.2 | -152.6 | 851.6                   | -150.58                                  |
| 4.50      | 11.35                   | 727.9              | 723.2 | 721.2 | -0.51                 | -0.43 | -0.68 | 15.39       | -13.4           | -45.2 | -43.0 | 0.08                     | 0.29                   | -89.6                              | -113.0 | -133.3 | -152.4 | 1000.0                  | -151.02                                  |

\*at 25°C unless mentioned otherwise



# Voltage Controlled Oscillator

SOS-704PV-119+

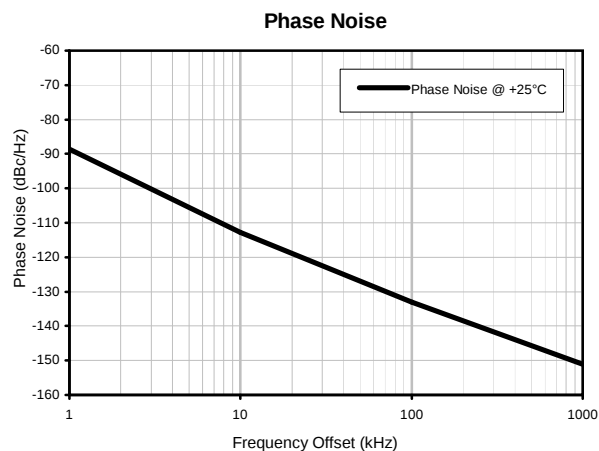
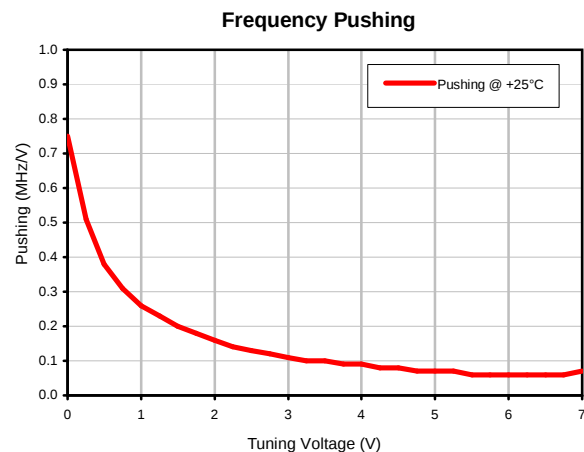
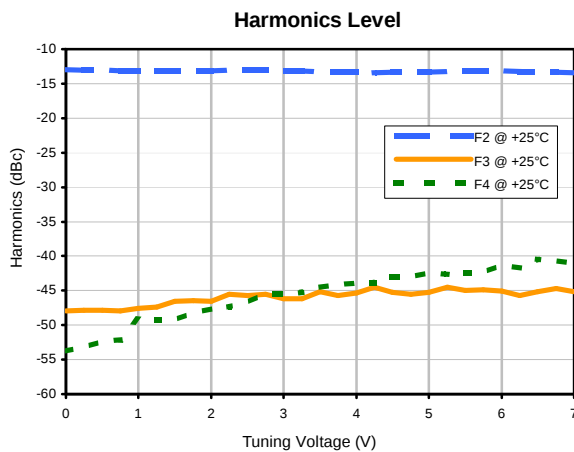
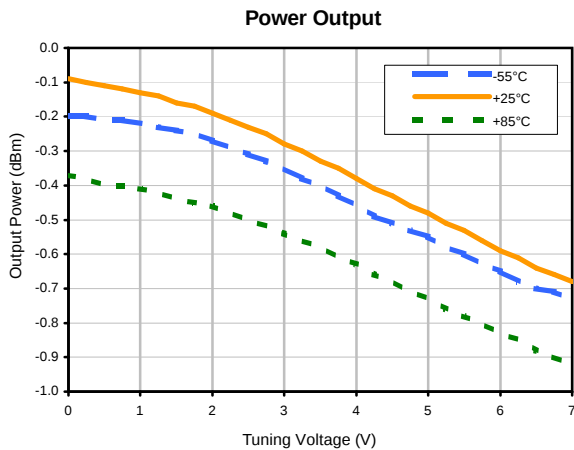
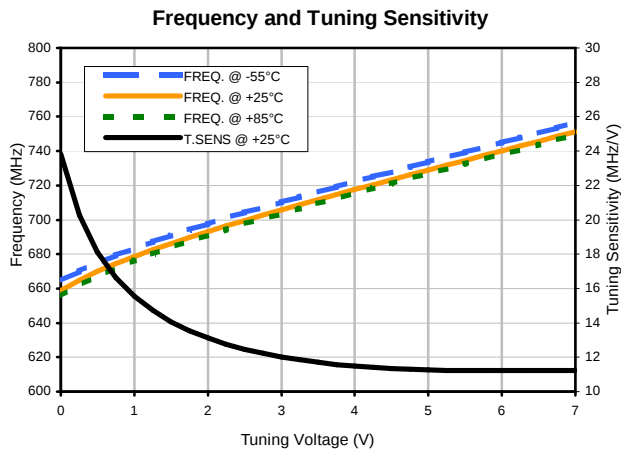
## Typical Performance Data

| V<br>TUNE | TUNE<br>SENS<br>(MHz/V) | FREQUENCY<br>(MHz) |       |       | POWER OUTPUT<br>(dBm) |       |       | HARMONICS (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    |                          |                         |                            |
| 0.00      | 23.83                   | 664.6              | 658.9 | 655.4 | -0.20                 | -0.09 | -0.37 | -13.0           | -48.0 | -53.8 | 0.75                     | 1                       | -88.62                     |
| 0.25      | 20.29                   | 670.1              | 664.9 | 661.9 | -0.20                 | -0.10 | -0.38 | -13.1           | -47.9 | -53.3 | 0.51                     | 10                      | -112.84                    |
| 0.50      | 18.13                   | 675.0              | 669.9 | 667.2 | -0.21                 | -0.11 | -0.40 | -13.1           | -47.9 | -52.3 | 0.38                     | 100                     | -133.03                    |
| 0.75      | 16.64                   | 679.4              | 674.5 | 671.9 | -0.21                 | -0.12 | -0.40 | -13.1           | -47.9 | -52.1 | 0.31                     | 1000                    | -151.02                    |
| 1.00      | 15.55                   | 683.4              | 678.6 | 676.2 | -0.22                 | -0.13 | -0.41 | -13.1           | -47.6 | -49.2 | 0.26                     |                         |                            |
| 1.25      | 14.72                   | 687.3              | 682.5 | 680.1 | -0.23                 | -0.14 | -0.42 | -13.2           | -47.4 | -49.2 | 0.23                     |                         |                            |
| 1.50      | 14.08                   | 690.9              | 686.2 | 683.9 | -0.24                 | -0.16 | -0.44 | -13.2           | -46.5 | -49.3 | 0.20                     |                         |                            |
| 1.75      | 13.55                   | 694.4              | 689.7 | 687.5 | -0.25                 | -0.17 | -0.45 | -13.2           | -46.5 | -48.2 | 0.18                     |                         |                            |
| 2.00      | 13.12                   | 697.8              | 693.1 | 690.9 | -0.27                 | -0.19 | -0.46 | -13.1           | -46.6 | -47.6 | 0.16                     |                         |                            |
| 2.25      | 12.76                   | 701.0              | 696.4 | 694.2 | -0.29                 | -0.21 | -0.48 | -13.1           | -45.5 | -47.4 | 0.14                     |                         |                            |
| 2.50      | 12.47                   | 704.2              | 699.6 | 697.4 | -0.31                 | -0.23 | -0.50 | -13.1           | -45.8 | -46.7 | 0.13                     |                         |                            |
| 2.75      | 12.22                   | 707.3              | 702.7 | 700.6 | -0.33                 | -0.25 | -0.52 | -13.1           | -45.6 | -45.4 | 0.12                     |                         |                            |
| 3.00      | 12.02                   | 710.4              | 705.7 | 703.6 | -0.35                 | -0.28 | -0.54 | -13.1           | -46.2 | -45.4 | 0.11                     |                         |                            |
| 3.25      | 11.85                   | 713.4              | 708.7 | 706.7 | -0.38                 | -0.30 | -0.56 | -13.2           | -46.2 | -45.2 | 0.10                     |                         |                            |
| 3.50      | 11.70                   | 716.3              | 711.7 | 709.6 | -0.40                 | -0.33 | -0.58 | -13.3           | -45.2 | -44.5 | 0.10                     |                         |                            |
| 3.75      | 11.58                   | 719.3              | 714.6 | 712.6 | -0.43                 | -0.35 | -0.61 | -13.3           | -45.8 | -44.2 | 0.09                     |                         |                            |
| 4.00      | 11.49                   | 722.2              | 717.5 | 715.5 | -0.46                 | -0.38 | -0.63 | -13.3           | -45.3 | -44.0 | 0.09                     |                         |                            |
| 4.25      | 11.41                   | 725.1              | 720.4 | 718.3 | -0.49                 | -0.41 | -0.66 | -13.4           | -44.5 | -43.8 | 0.08                     |                         |                            |
| 4.50      | 11.35                   | 727.9              | 723.2 | 721.2 | -0.51                 | -0.43 | -0.68 | -13.4           | -45.2 | -43.0 | 0.08                     |                         |                            |
| 4.75      | 11.30                   | 730.8              | 726.1 | 724.0 | -0.53                 | -0.46 | -0.71 | -13.4           | -45.6 | -43.1 | 0.07                     |                         |                            |
| 5.00      | 11.27                   | 733.6              | 728.9 | 726.9 | -0.55                 | -0.48 | -0.73 | -13.3           | -45.3 | -42.4 | 0.07                     |                         |                            |
| 5.25      | 11.24                   | 736.5              | 731.7 | 729.7 | -0.58                 | -0.51 | -0.76 | -13.3           | -44.5 | -42.7 | 0.07                     |                         |                            |
| 5.50      | 11.23                   | 739.3              | 734.5 | 732.5 | -0.60                 | -0.53 | -0.78 | -13.2           | -45.0 | -42.4 | 0.06                     |                         |                            |
| 5.75      | 11.22                   | 742.1              | 737.3 | 735.3 | -0.63                 | -0.56 | -0.80 | -13.2           | -44.9 | -42.4 | 0.06                     |                         |                            |
| 6.00      | 11.22                   | 744.9              | 740.1 | 738.1 | -0.65                 | -0.59 | -0.83 | -13.2           | -45.1 | -41.3 | 0.06                     |                         |                            |
| 6.25      | 11.23                   | 747.8              | 743.0 | 740.9 | -0.68                 | -0.61 | -0.85 | -13.2           | -45.7 | -41.7 | 0.06                     |                         |                            |
| 6.50      | 11.23                   | 750.6              | 745.8 | 743.7 | -0.70                 | -0.64 | -0.88 | -13.3           | -45.2 | -40.5 | 0.06                     |                         |                            |
| 6.75      | 11.23                   | 753.4              | 748.6 | 746.5 | -0.71                 | -0.66 | -0.90 | -13.3           | -44.7 | -40.7 | 0.06                     |                         |                            |
| 7.00      | 11.23                   | 756.2              | 751.4 | 749.3 | -0.73                 | -0.68 | -0.92 | -13.4           | -45.1 | -40.9 | 0.07                     |                         |                            |

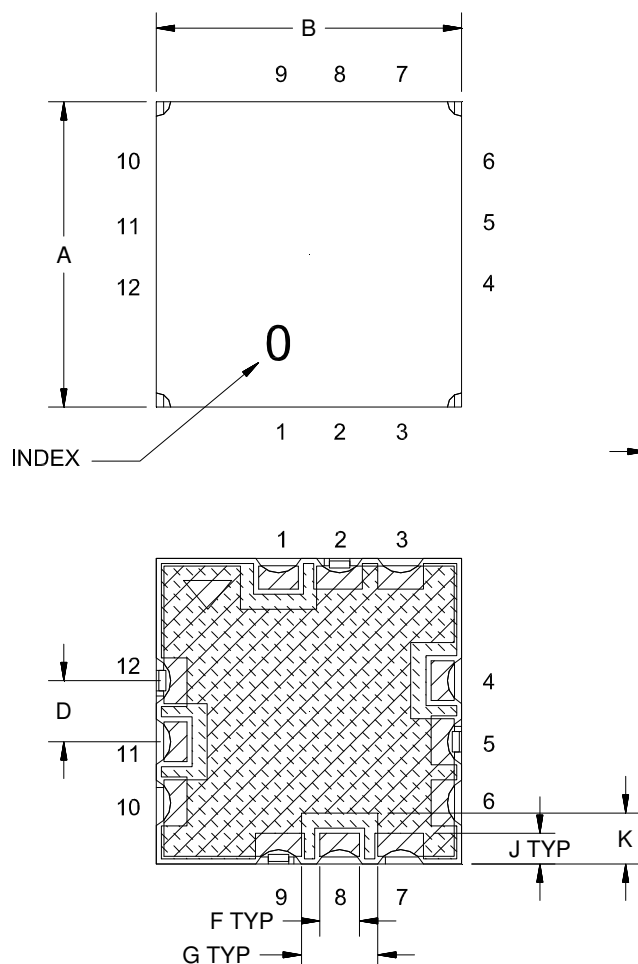
# Voltage Controlled Oscillator

SOS-704PV-119+

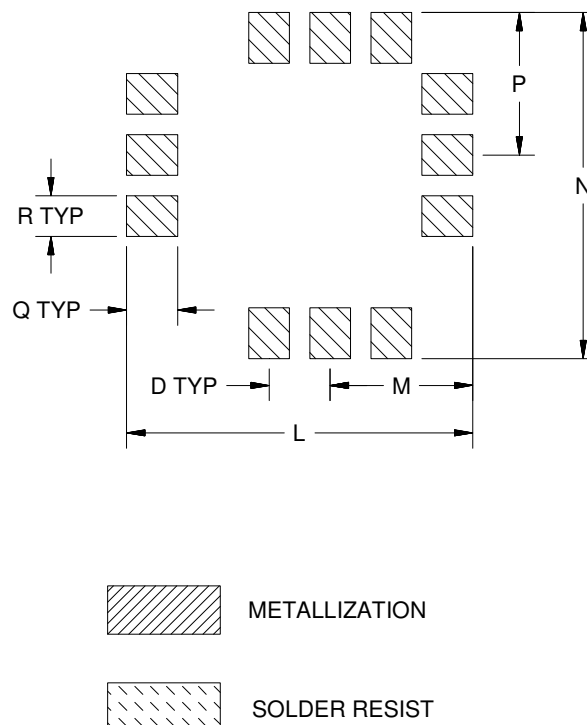
## Typical Performance Data



### Outline Dimensions



### PCB Land Pattern



| CASE # | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| FZ802  | .300<br>(7.62) | .300<br>(7.62) | .070<br>(1.78) | .060<br>(1.52) | .120<br>(3.05) | .039<br>(0.99) | .075<br>(1.91) | .120<br>(3.05) | .030<br>(0.76) | .050<br>(1.27) |

| CASE # | L              | M              | N              | P              | Q              | R              | WT. GRAM |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------|
| FZ802  | .340<br>(8.64) | .140<br>(3.56) | .340<br>(8.64) | .140<br>(3.56) | .050<br>(1.27) | .040<br>(1.02) | .25      |

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

### Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:

For RoHS Case Styles: 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate.



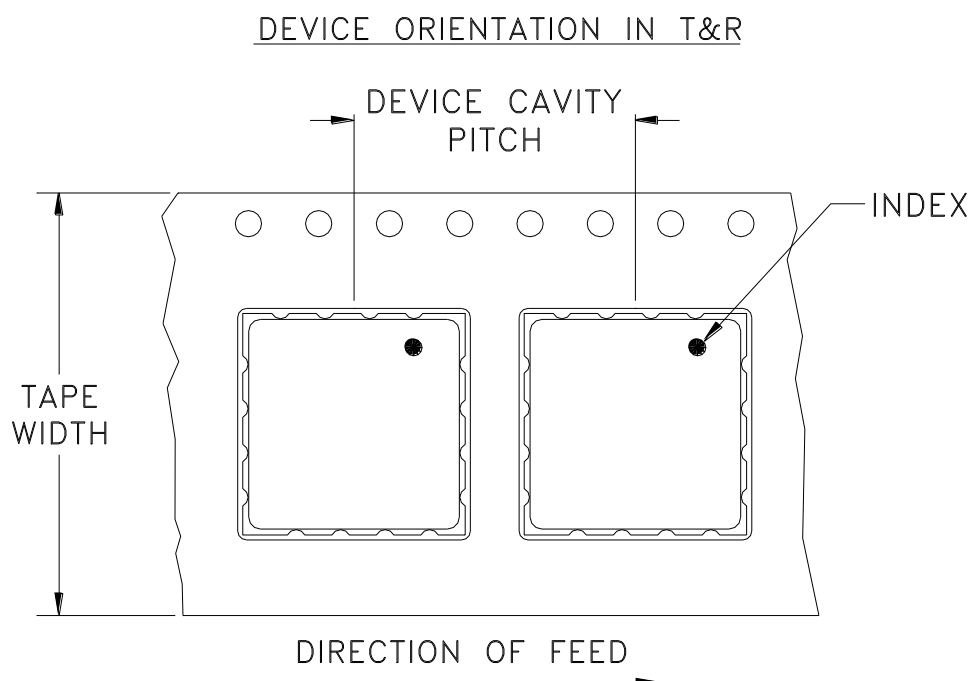
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# Tape & Reel Packaging TR-F78



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel<br>see note |
|-------------------|----------------------------|----------------------|------------------------------|
| 16                | 12                         | 7                    | 10                           |
|                   |                            |                      | 20                           |
|                   |                            |                      | 50                           |
|                   |                            |                      | 100                          |
|                   |                            |                      | 200                          |
|                   |                            | 13                   | 500, 1000                    |

Note: Please consult individual model data sheet to determine device per reel availability.

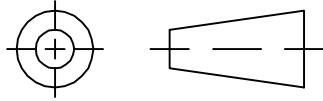
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



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Mini-Circuits ISO 9001 & ISO 14001 Certified

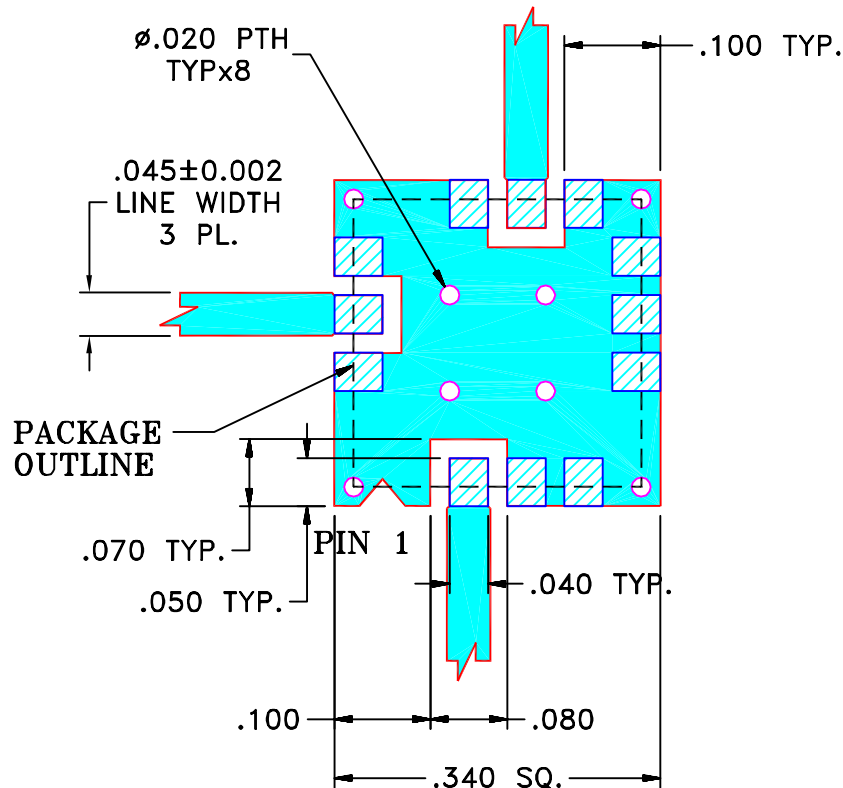
## THIRD ANGLE PROJECTION



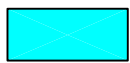
## REVISIONS

| REV | ECN No. | DESCRIPTION              | DATE     | DR | AUTH |
|-----|---------|--------------------------|----------|----|------|
| OR  | M89039  | NEW RELEASE (FROM RAVON) | 01/04    | DK | HH   |
| OR  | R54816  | NEW RELEASE (FROM RAVON) | 01/04    | DK | HH   |
| A   | M102713 | ADDED "...WITH SMOBC"    | 01/12/06 | GF | IL   |

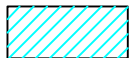
**SUGGESTED MOUNTING CONFIGURATION  
FOR FZ802/FZ990 CASE STYLE, pl PIN CONNECTION.**

**NOTE:**

1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS  $.025" \pm .002"$ ; COPPER: 1/2 OZ. EACH SIDE.  
FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

DRAWN

DK (RAV)

19/01/04

TOLERANCES ON:

CHECKED

RZ (RAV)

19/01/04

2 PL DECIMALS  $\pm$ 

APPROVED

HH (RAV)

19/01/04

3 PL DECIMALS  $\pm$  .005ANGLES  $\pm$ FRACTIONS  $\pm$ 

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ASHEETA1.DWG REV:A DATE:01/12/95



**Mini-Circuits®** 13 Neptune Avenue  
Brooklyn NY 11235

PL, pl, FZ802/FZ990, SOS, TB-271

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-143

REV:

A

FILE: 98PL143

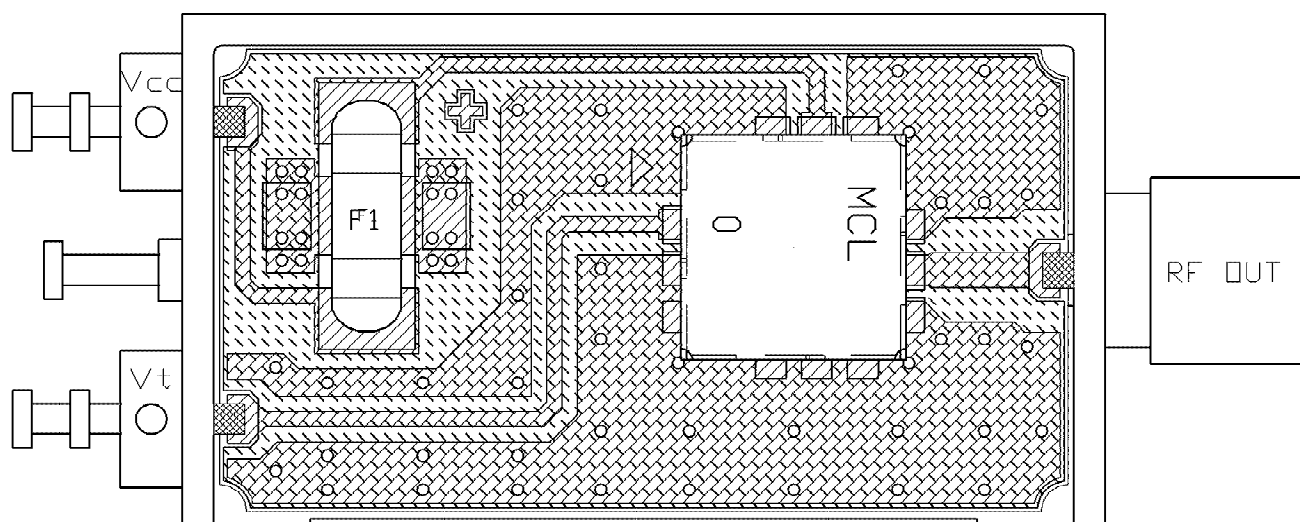
SCALE:

5:1

SHEET:

1 OF 1

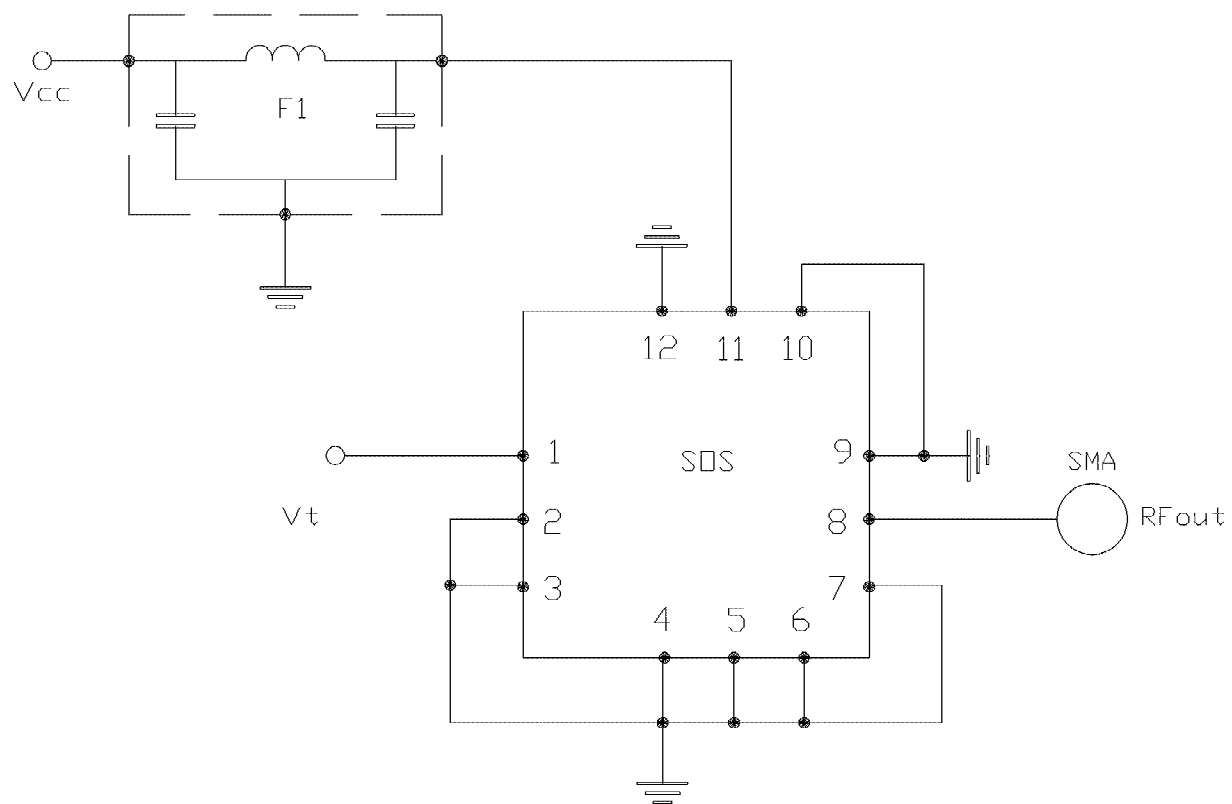
# Evaluation Board and Circuit



TB-271

## NOTES:

1. SMA FEMALE CONNECTORS.
2. PCB MATERIAL: RO4350B OR EQUIVALENT, DIALECTRIC CONSTANT=3.48, DIALECTRIC THICKNESS=.020 INCH.



Schematic Diagram



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 85°C<br>Ambient Environment                                                                                                                             | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Humidity                       | 90 to 95% RH, 240 hours, 50°C                                                                                                                                   | MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-202, Method 107, Condition A-3, except +100°C                                                |
| Solder Reflow Heat             | Sn-Pb Eutectic Process: 225°C peak<br>Pb-Free Process, 245°C peak                                                                                               | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1                                                        |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, Para 4.2.5, Test S, 95% Coverage                                                          |
| Vibration (High Frequency)     | 20g peak, 20-2000 Hz, 4 times in each of three axes (total 12)                                                                                                  | MIL-STD-883, Method 2007.3, Condition A                                                              |
| Mechanical Shock               | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes                                                                                               | MIL-STD-202, Method 213, Condition A                                                                 |
| 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                                                                              |