

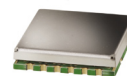
Frequency Synthesizer

SSN-3132A-119+

50Ω 2932 to 3132 MHz

The Big Deal

- Fractional N synthesizer
- Low phase noise and spurious
- Very small size 0.60" x 0.60" x 0.138"



CASE STYLE: KJ1367

Product Overview

The SSN-3132A-119+ is a Frequency Synthesizer, designed to operate from 2932 to 3132 MHz for WiMAX application. The SSN-3132A-119+ is packaged in a metal case (size of 0.60" x 0.60" x 0.138") to shield against unwanted signals and noise.

Key Features

| Feature | Advantages |
|--|--|
| Low phase noise and spurious: <ul style="list-style-type: none">• Phase Noise: -95 dBc/Hz typ. @ 10 kHz offset• Step Size Spurious: -94 dBc typ.• Comparison Spurious: -83 dBc typ.• Reference Spurious: -83 dBc typ. | Low phase noise and spurious improve system EVM (Error Vector Magnitude). |
| Robust design and construction | To enhance the robustness of SSN-3132A-119+, each internal component is secured to the substrate with chip bonder, thereby eliminating the risk of tombstoning during subsequent solder reflow operations by the customer. |
| Small size, 0.60" x 0.60" x 0.138" | The small size enables the SSN-3132A-119+ to be used in compact designs. |



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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.

50Ω 2932 to 3132 MHz

Features

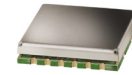
- Fractional N synthesizer
- Integrated VCO + PLL
- Low phase noise and spurious
- Robust design and construction
- Low operating voltage (VCC VCO=+4.85V, VCC PLL=+3.2V)
- Small size 0.60" x 0.60" x 0.138"

Applications

- WiMAX

General Description

The SSN-3132A-119+ is a Frequency Synthesizer, designed to operate from 2932 to 3132 MHz for WiMAX application. The SSN-3132A-119+ is packaged in a metal case (size of 0.60" x 0.60" x 0.138") to shield against unwanted signals and noise. To enhance the robustness of SSN-3132A-119+, each internal component is secured to the substrate with chip bonder, thereby eliminating the risk of tombstoning during subsequent solder reflow operations by the customer.



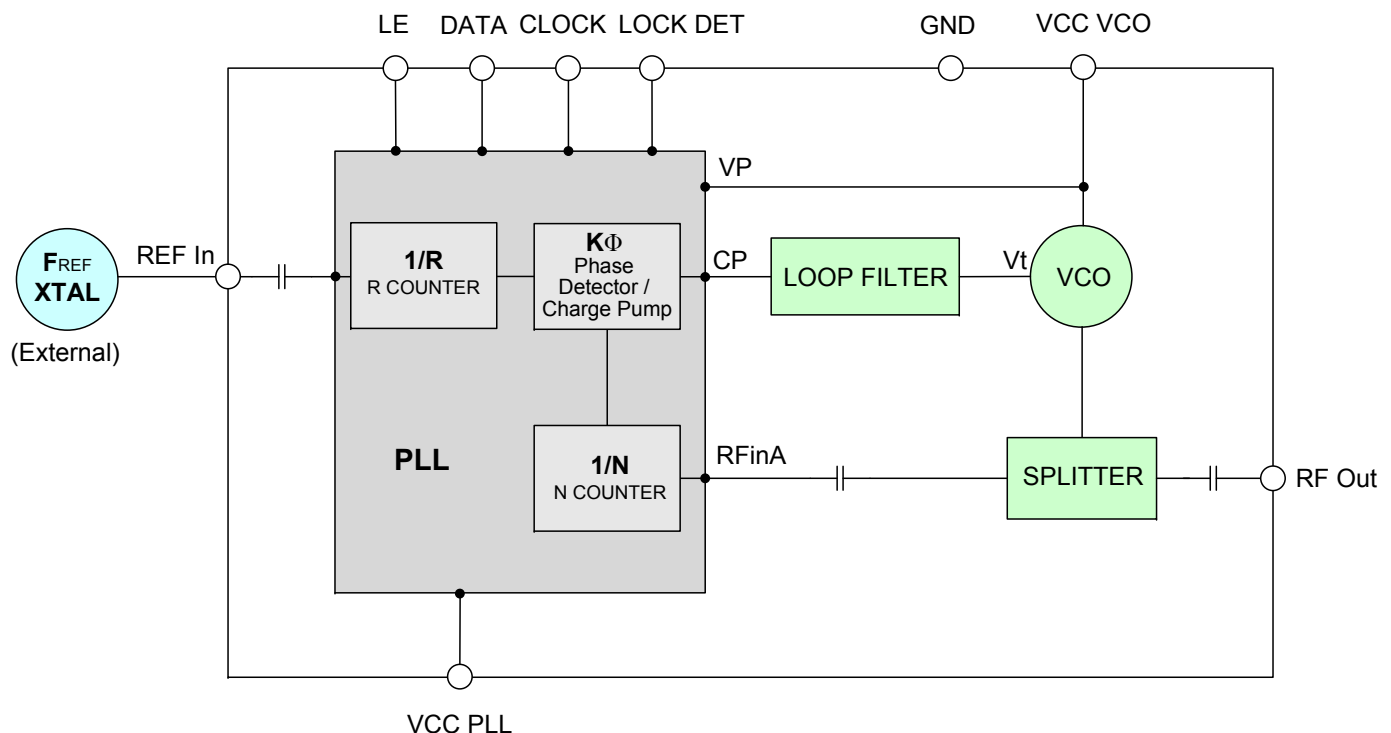
CASE STYLE: KJ1367

PRICE: \$29.95 ea. QTY (1-9)

+ RoHS compliant in accordance with EU Directive (2002/95/EC)

The +Suffix has been added in order to identify RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications.

Simplified Schematic



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

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.

REV. OR
M127257
EDR-8968/8MPF1
SSN-3132A-119+
Category-A1
RAV
100623
Page 2 of 13

Electrical Specifications (over operating temperature -40°C to +85°C)

| Parameters | Test Conditions | Min. | Typ. | Max. | Units |
|-------------------------------------|----------------------------|-------------------------|-----------------------------------|-------|------------------|
| Frequency Range | - | 2932 | - | 3132 | MHz |
| Step Size | - | - | 250 | - | kHz |
| Comparison Frequency | - | - | 26 | - | MHz |
| Settling Time | Within ± 1 kHz | - | 9 | - | mSec |
| Output Power | - | 0 | +2.5 | +6.0 | dBm |
| SSB Phase Noise | @ 100 Hz offset | - | -74 | - | dBc/Hz |
| | @ 1 kHz offset | - | -88 | -83 | |
| | @ 10 kHz offset | - | -95 | -90 | |
| | @ 100 kHz offset | - | -119 | -113 | |
| | @ 1 MHz offset | - | -140 | -134 | |
| Integrated SSB Phase Noise | @ 1kHz to 10MHz | - | -50 | - | dBc |
| Step Size Spurious Suppression | Step Size 250 kHz | - | -94 | -70 | dBc |
| 0.5 Step Size Spurious Suppression | 0.5 Step Size 125 kHz | - | -84 | -60 | |
| Reference Spurious Suppression | Ref. Freq. 52 MHz | - | -83 | -74 | |
| Comparison Spurious Suppression | Comp. Freq. 26 MHz | - | -83 | -75 | |
| Non - Harmonic Spurious Suppression | - | - | -90 | - | |
| Harmonic Suppression | - | - | -27 | -17 | V |
| VCO Supply Voltage | +4.85 | +4.75 | +4.85 | +5.25 | |
| PLL Supply Voltage | +3.20 | +3.10 | +3.20 | +3.30 | mA |
| VCO Supply Current | - | - | 44 | 51 | |
| PLL Supply Current | - | - | 16 | 24 | |
| Reference Input (External) | Frequency | 52 (square wave) | - | 52 | MHz |
| | Amplitude | 1 | - | 1 | V _{P-P} |
| | Input impedance | - | - | 100 | K Ω |
| | Phase Noise @ 1 kHz offset | - | - | -130 | dBc/Hz |
| RF Output port Impedance | - | - | 50 | - | Ω |
| Input Logic Level | Input high voltage | - | 2.65 | - | V |
| | Input low voltage | - | - | 0.60 | V |
| Digital Lock Detect | Locked | - | 2.70 | - | V |
| | Unlocked | - | - | 0.40 | V |
| Frequency Synthesizer PLL | - | ADF4153 | | | |
| PLL Programming | - | 3-wire serial 3.2V CMOS | | | |
| Register Map @ 3132 MHz | R0_Register | - | (MSB) 11110000000011000000 (LSB) | | |
| | R1_Register | - | (MSB) 101001000000110100001 (LSB) | | |
| | R2_Register | - | (MSB) 1111100010 (LSB) | | |
| | R3_Register | - | (MSB) 1111000111 (LSB) | | |

Absolute Maximum Ratings

| Parameters | Ratings |
|--|----------------------------|
| VCO Supply Voltage | 5.8V |
| PLL Supply Voltage | 4.0V |
| VCO Supply Voltage to PLL Supply Voltage | -0.3V to +5.8V |
| Reference Frequency Voltage | -0.3Vmin, VCC PLL +0.3Vmax |
| Data, Clock, LE Levels | -0.3Vmin, VCC PLL +0.3Vmax |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -55°C to +100°C |

Permanent damage may occur if any of these limits are exceeded



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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.jsp.

Typical Performance Data

| FREQUENCY (MHz) | POWER OUTPUT (dBm) | | | VCO CURRENT (mA) | | | PLL CURENT (mA) | | |
|--------------------|-----------------------|-------|-------|---------------------|-------|-------|--------------------|-------|-------|
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| | | | | | | | | | |
| 2932 | 2.85 | 2.75 | 2.79 | 42.17 | 43.78 | 45.22 | 14.74 | 15.83 | 18.08 |
| 2944 | 2.62 | 2.59 | 2.62 | 42.20 | 43.80 | 45.24 | 14.69 | 15.78 | 18.04 |
| 2966 | 2.25 | 2.39 | 2.23 | 42.25 | 43.87 | 45.29 | 14.44 | 15.52 | 17.76 |
| 2988 | 2.48 | 2.45 | 2.27 | 42.34 | 43.93 | 45.36 | 14.50 | 15.59 | 17.84 |
| 3010 | 2.71 | 2.73 | 2.57 | 42.40 | 43.99 | 45.42 | 14.74 | 15.85 | 18.10 |
| 3032 | 2.65 | 2.68 | 2.58 | 42.43 | 44.02 | 45.45 | 14.86 | 15.97 | 18.24 |
| 3054 | 2.50 | 2.46 | 2.51 | 42.45 | 44.05 | 45.47 | 14.96 | 16.08 | 18.35 |
| 3076 | 2.15 | 2.32 | 2.21 | 42.50 | 44.10 | 45.51 | 14.75 | 15.86 | 18.12 |
| 3098 | 2.03 | 2.23 | 2.00 | 42.57 | 44.16 | 45.57 | 14.56 | 15.66 | 17.90 |
| 3120 | 2.64 | 2.52 | 2.28 | 42.64 | 44.21 | 45.61 | 12.71 | 13.71 | 15.90 |
| 3132 | 2.78 | 2.68 | 2.60 | 42.66 | 44.23 | 45.64 | 14.96 | 16.07 | 18.34 |

| FREQUENCY (MHz) | HARMONICS (dBc) | | | | | |
|--------------------|-----------------|--------|--------|--------|--------|--------|
| | F2 | | | F3 | | |
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| 2932 | -25.45 | -26.52 | -29.28 | -37.06 | -35.69 | -40.56 |
| 2944 | -26.50 | -27.59 | -29.00 | -36.67 | -37.51 | -43.79 |
| 2966 | -25.33 | -26.75 | -27.29 | -39.61 | -36.90 | -42.67 |
| 2988 | -23.58 | -24.18 | -28.90 | -38.46 | -38.80 | -44.96 |
| 3010 | -26.88 | -27.25 | -27.30 | -39.96 | -41.57 | -53.34 |
| 3032 | -22.77 | -25.80 | -26.84 | -42.64 | -45.76 | -58.30 |
| 3054 | -25.91 | -25.23 | -29.23 | -48.69 | -51.57 | -55.03 |
| 3076 | -25.33 | -24.61 | -27.24 | -45.11 | -50.41 | -46.65 |
| 3098 | -23.54 | -24.99 | -24.34 | -46.86 | -48.51 | -43.34 |
| 3120 | -23.96 | -28.23 | -30.18 | -47.59 | -48.29 | -42.60 |
| 3132 | -24.05 | -25.40 | -25.61 | -43.68 | -47.77 | -42.04 |



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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.jsp.

| FREQUENCY (MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS | | | | |
|--------------------|--------------------------------|--------|--------|---------|---------|
| | +25°C | | | | |
| | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
| 2932 | -78.59 | -88.09 | -95.53 | -118.24 | -139.32 |
| 2944 | -77.70 | -90.62 | -95.84 | -118.30 | -139.40 |
| 2966 | -77.97 | -88.64 | -95.82 | -118.70 | -139.81 |
| 2988 | -78.21 | -88.97 | -95.64 | -118.90 | -139.87 |
| 3010 | -80.68 | -87.99 | -95.25 | -119.16 | -140.14 |
| 3032 | -78.45 | -88.41 | -95.26 | -119.20 | -140.14 |
| 3054 | -77.87 | -87.52 | -94.91 | -118.99 | -139.68 |
| 3076 | -78.01 | -86.88 | -95.31 | -118.98 | -139.67 |
| 3098 | -77.98 | -89.12 | -95.04 | -118.96 | -139.77 |
| 3120 | -76.86 | -88.70 | -95.51 | -118.69 | -139.87 |
| 3132 | -77.34 | -90.38 | -94.77 | -118.67 | -139.79 |

| FREQUENCY (MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS | | | | |
|--------------------|--------------------------------|--------|--------|---------|---------|
| | -45°C | | | | |
| | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
| 2932 | -80.08 | -89.83 | -97.48 | -118.80 | -140.28 |
| 2944 | -78.70 | -88.02 | -97.39 | -119.02 | -140.47 |
| 2966 | -76.97 | -89.61 | -97.02 | -119.16 | -140.73 |
| 2988 | -76.02 | -90.04 | -97.05 | -119.59 | -141.03 |
| 3010 | -77.60 | -89.37 | -96.26 | -119.90 | -141.23 |
| 3032 | -78.20 | -88.62 | -96.99 | -119.77 | -141.13 |
| 3054 | -76.05 | -87.75 | -96.50 | -119.66 | -140.88 |
| 3076 | -75.94 | -89.47 | -95.52 | -119.88 | -141.12 |
| 3098 | -76.63 | -89.15 | -95.95 | -119.85 | -141.21 |
| 3120 | -80.70 | -88.41 | -96.18 | -119.86 | -141.62 |
| 3132 | -78.69 | -87.43 | -96.15 | -119.85 | -141.13 |

| FREQUENCY (MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS | | | | |
|--------------------|--------------------------------|--------|--------|---------|---------|
| | +85°C | | | | |
| | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
| 2932 | -81.24 | -90.08 | -95.60 | -117.30 | -138.31 |
| 2944 | -81.00 | -89.78 | -95.69 | -117.40 | -138.26 |
| 2966 | -77.86 | -89.05 | -95.53 | -117.63 | -138.41 |
| 2988 | -81.08 | -88.67 | -95.17 | -117.78 | -138.70 |
| 3010 | -76.59 | -89.65 | -94.89 | -117.80 | -138.80 |
| 3032 | -77.75 | -87.98 | -95.28 | -117.69 | -138.51 |
| 3054 | -83.61 | -89.16 | -94.73 | -117.60 | -138.48 |
| 3076 | -78.29 | -89.55 | -94.20 | -117.42 | -138.38 |
| 3098 | -79.24 | -89.10 | -94.49 | -117.31 | -138.29 |
| 3120 | -79.63 | -88.39 | -93.78 | -117.25 | -138.06 |
| 3132 | -78.68 | -89.46 | -93.21 | -117.22 | -138.10 |



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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.jsp.

| COMPARISON SPURIOUS ORDER | COMPARISON SPURIOUS @ Fcarrier 2932MHz+(n*Fcomparison) (dBc) note 1 | | | COMPARISON SPURIOUS @ Fcarrier 3032MHz+(n*Fcomparison) (dBc) note 1 | | | COMPARISON SPURIOUS @ Fcarrier 3132MHz+(n*Fcomparison) (dBc) note 1 | | |
|---------------------------------|--|--------|--------|--|--------|--------|--|--------|--------|
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| -5 | -82.34 | -83.86 | -85.22 | -83.66 | -84.86 | -86.32 | -83.79 | -84.76 | -86.07 |
| -4 | -83.03 | -82.47 | -82.65 | -84.67 | -84.36 | -84.90 | -84.42 | -84.45 | -86.23 |
| -3 | -86.68 | -89.13 | -87.83 | -88.72 | -89.78 | -87.96 | -89.82 | -88.11 | -88.57 |
| -2 | -88.37 | -86.62 | -87.37 | -89.27 | -88.57 | -87.26 | -88.73 | -90.43 | -89.30 |
| -1 | -90.97 | -88.15 | -91.88 | -88.44 | -87.79 | -91.18 | -88.46 | -87.20 | -84.64 |
| 0 note 2 | - | - | - | - | - | - | - | - | - |
| +1 | -91.28 | -88.86 | -91.20 | -90.24 | -90.64 | -93.60 | -89.31 | -88.57 | -86.51 |
| +2 | -88.06 | -88.16 | -88.29 | -90.56 | -89.69 | -88.33 | -95.24 | -94.13 | -91.15 |
| +3 | -87.90 | -88.85 | -87.68 | -88.02 | -88.75 | -88.81 | -89.09 | -87.78 | -88.70 |
| +4 | -82.48 | -82.53 | -83.22 | -83.75 | -83.82 | -84.38 | -84.42 | -84.63 | -85.21 |
| +5 | -83.11 | -84.96 | -86.31 | -83.70 | -85.22 | -86.47 | -83.61 | -84.75 | -86.27 |

Note 1: Comparison frequency 26 MHz

Note 2: All spurs are referenced to carrier signal (n=0).

| REFERENCE SPURIOUS ORDER | REFERENCE SPURIOUS @ Fcarrier 2932MHz+(n*Freference) (dBc) note 3 | | | REFERENCE SPURIOUS @ Fcarrier 3032MHz+(n*Freference) (dBc) note 3 | | | REFERENCE SPURIOUS @ Fcarrier 3132MHz+(n*Freference) (dBc) note 3 | | |
|--------------------------------|--|---------|---------|--|---------|---------|--|---------|---------|
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| -5 | -98.13 | -102.48 | -101.21 | -98.23 | -102.07 | -112.10 | -99.99 | -101.70 | -105.05 |
| -4 | -93.90 | -91.25 | -93.34 | -97.84 | -96.05 | -97.70 | -99.72 | -99.91 | -98.79 |
| -3 | -84.80 | -84.55 | -86.36 | -87.01 | -87.71 | -88.14 | -88.32 | -89.21 | -88.90 |
| -2 | -83.01 | -82.53 | -82.67 | -84.60 | -84.28 | -85.00 | -84.32 | -84.52 | -86.22 |
| -1 | -88.44 | -86.66 | -87.30 | -89.24 | -88.53 | -87.51 | -88.68 | -90.45 | -89.21 |
| 0 note 4 | - | - | - | - | - | - | - | - | - |
| +1 | -88.04 | -88.25 | -88.30 | -90.33 | -89.64 | -88.48 | -95.27 | -93.91 | -91.04 |
| +2 | -82.44 | -82.55 | -83.20 | -83.67 | -83.76 | -84.41 | -84.31 | -84.61 | -85.25 |
| +3 | -85.22 | -85.63 | -86.85 | -88.12 | -87.73 | -87.90 | -89.07 | -89.34 | -89.18 |
| +4 | -94.88 | -94.72 | -95.04 | -100.52 | -98.28 | -97.71 | -102.04 | -101.37 | -98.53 |
| +5 | -108.57 | -125.31 | -107.83 | -102.62 | -107.58 | -109.29 | -102.04 | -105.90 | -107.96 |

Note 3: Reference frequency 52 MHz

Note 4: All spurs are referenced to carrier signal (n=0).



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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.

| STEP SIZE SPURIOUS ORDER | 0.5 STEP SIZE & STEP SIZE SPURIOUS @Fcarrier 2932MHz+(n*Fstep size) (dBc) note 5 | | | 0.5 STEP SIZE & STEP SIZE SPURIOUS @Fcarrier 3032MHz+(n*Fstep size) (dBc) note 5 | | | 0.5 STEP SIZE & STEP SIZE SPURIOUS @Fcarrier 3132MHz+(n*Fstep size) (dBc) note 5 | | |
|--------------------------------|---|---------|---------|---|---------|---------|---|---------|---------|
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| -5.0 | -114.54 | -107.64 | -117.28 | -113.24 | -108.76 | -117.85 | -114.84 | -110.85 | -115.82 |
| -4.5 | -113.45 | -116.41 | -109.64 | -114.54 | -115.33 | -118.44 | -117.02 | -119.32 | -113.45 |
| -4.0 | -112.95 | -113.33 | -112.95 | -112.58 | -116.86 | -115.43 | -107.90 | -108.90 | -108.85 |
| -3.5 | -108.68 | -111.10 | -114.25 | -112.69 | -115.31 | -111.17 | -115.64 | -114.83 | -116.57 |
| -3.0 | -113.18 | -105.57 | -109.62 | -115.06 | -112.22 | -113.90 | -114.94 | -112.18 | -111.55 |
| -2.5 | -106.55 | -106.14 | -105.82 | -111.52 | -104.89 | -110.85 | -112.45 | -112.21 | -113.20 |
| -2.0 | -102.58 | -104.28 | -109.84 | -107.76 | -108.04 | -111.24 | -107.04 | -107.91 | -105.90 |
| -1.5 | -96.69 | -102.67 | -104.07 | -107.66 | -98.84 | -105.33 | -103.32 | -98.76 | -103.36 |
| -1.0 | -94.22 | -95.76 | -97.93 | -96.13 | -101.58 | -96.14 | -97.04 | -100.30 | -95.51 |
| -0.5 | -81.90 | -84.93 | -86.18 | -84.87 | -84.28 | -82.02 | -86.13 | -83.53 | -86.67 |
| 0 note 6 | - | - | - | - | - | - | - | - | - |
| +0.5 | -80.95 | -84.83 | -84.82 | -87.56 | -84.49 | -81.29 | -84.19 | -86.23 | -85.17 |
| +1.0 | -92.94 | -97.89 | -94.98 | -95.68 | -95.11 | -96.08 | -97.64 | -96.48 | -99.00 |
| +1.5 | -96.25 | -104.54 | -106.50 | -103.69 | -102.07 | -106.58 | -106.08 | -102.12 | -100.26 |
| +2.0 | -102.96 | -105.84 | -109.21 | -107.12 | -105.97 | -107.70 | -106.64 | -107.31 | -107.90 |
| +2.5 | -102.43 | -101.67 | -107.28 | -110.29 | -103.00 | -109.57 | -111.07 | -115.02 | -113.54 |
| +3.0 | -111.47 | -105.76 | -111.86 | -115.42 | -113.50 | -112.14 | -112.65 | -111.24 | -111.90 |
| +3.5 | -110.36 | -110.63 | -112.33 | -116.61 | -113.18 | -116.71 | -114.52 | -112.76 | -111.33 |
| +4.0 | -117.38 | -116.41 | -117.76 | -114.32 | -117.35 | -114.52 | -109.15 | -108.70 | -108.50 |
| +4.5 | -114.30 | -114.59 | -113.60 | -115.48 | -116.16 | -113.71 | -118.09 | -112.96 | -119.16 |
| +5.0 | -115.48 | -109.82 | -113.34 | -120.04 | -114.97 | -112.64 | -110.16 | -112.81 | -108.40 |

Note 5: Step size 250 kHz

Note 6: All spurs are referenced to carrier signal (n=0).



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

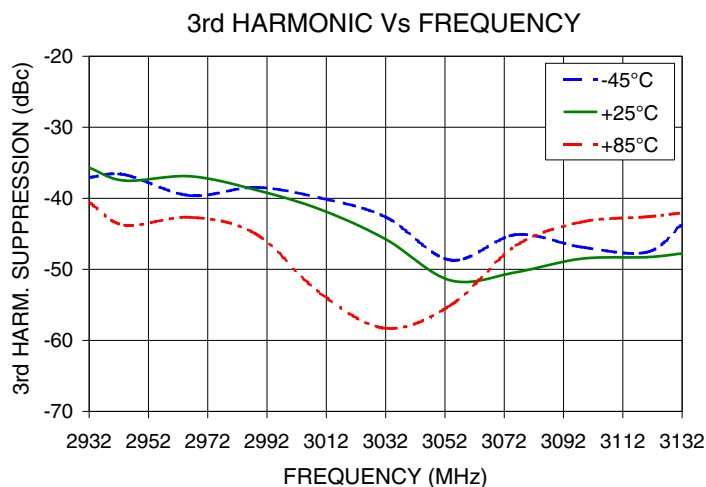
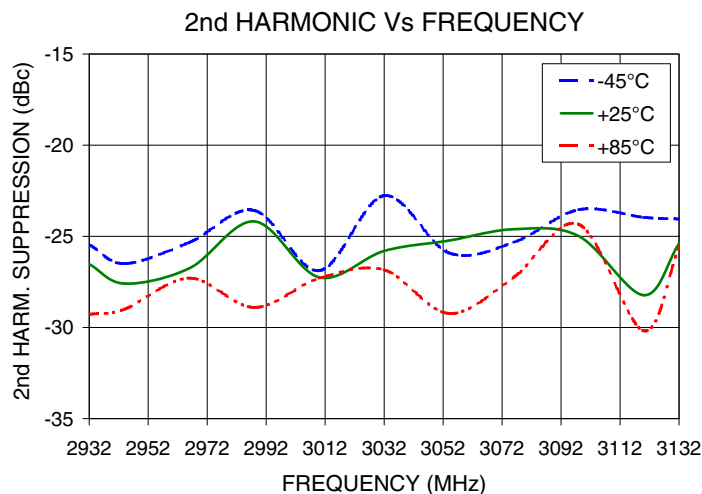
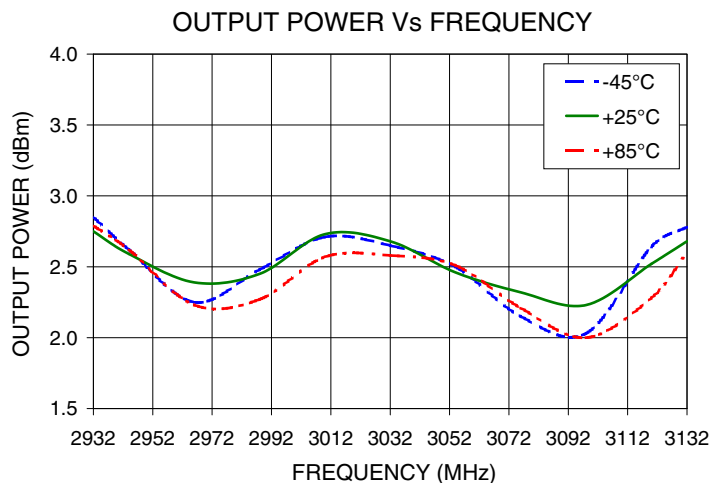


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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.

Typical Performance Curves



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

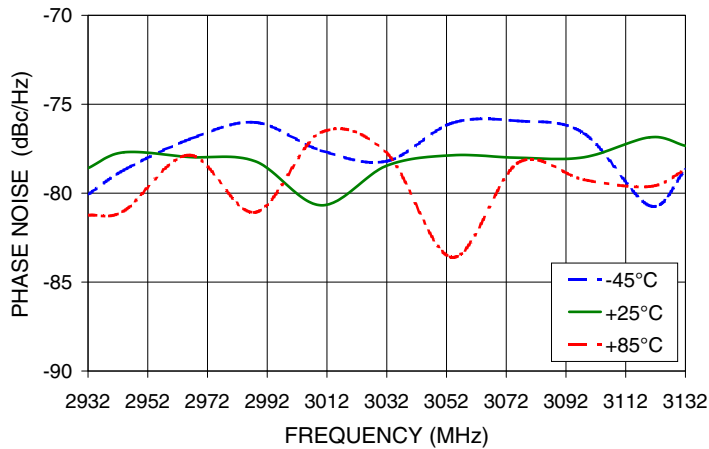


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

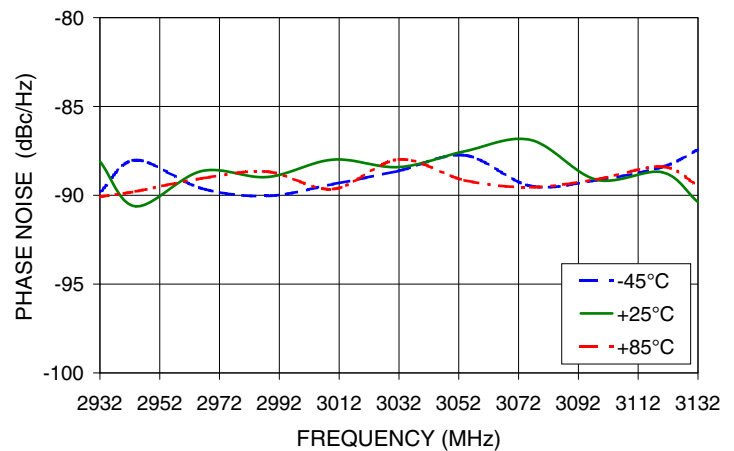


Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established 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.jsp.

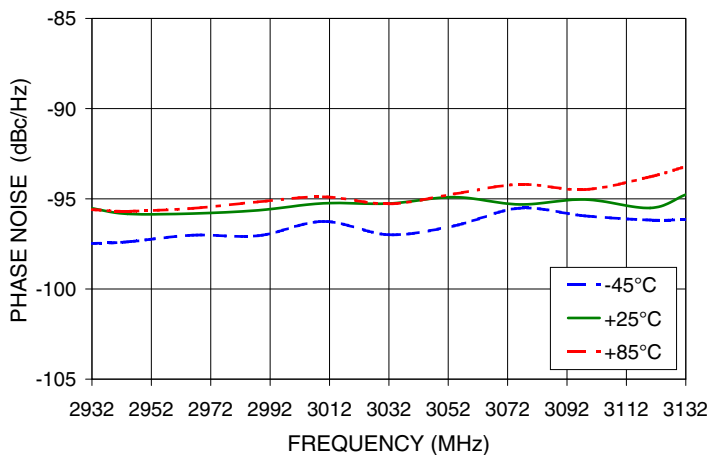
PHASE NOISE @100Hz offset



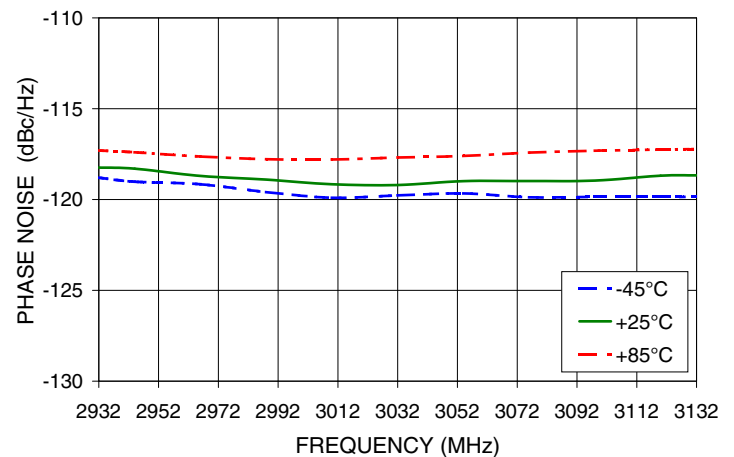
PHASE NOISE @1kHz offset



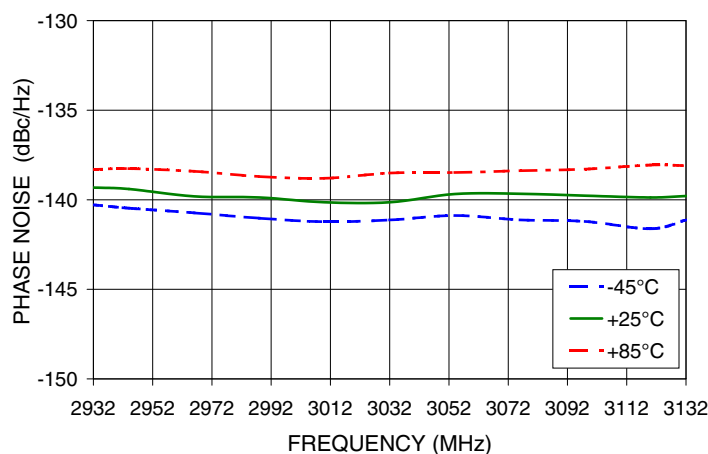
PHASE NOISE @10kHz offset



PHASE NOISE @100kHz offset



PHASE NOISE @1MHz offset



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

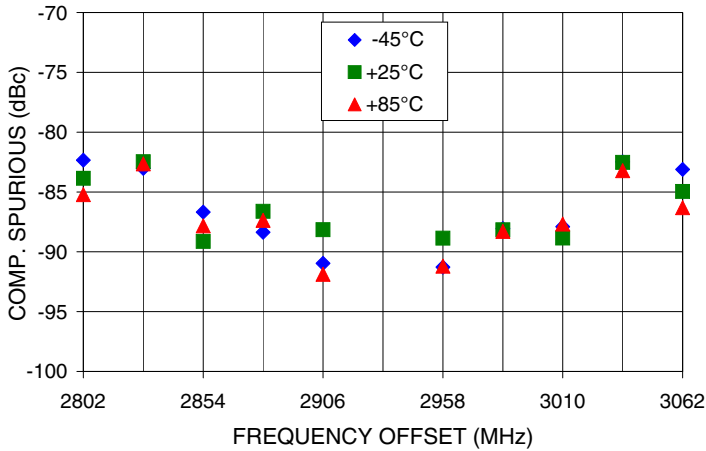


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

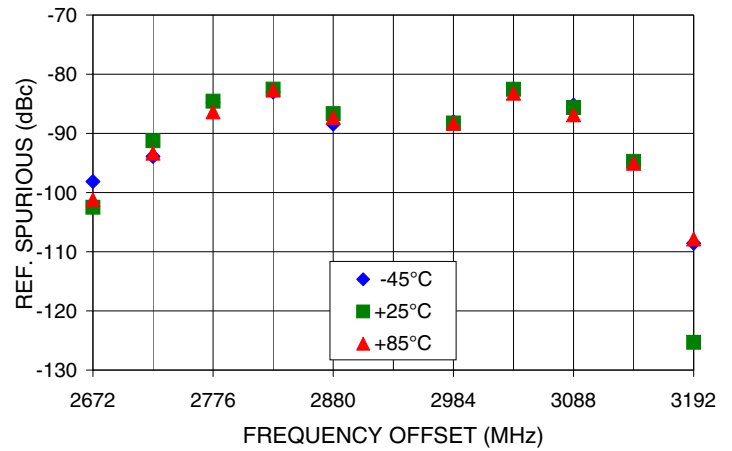


Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established 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.jsp.

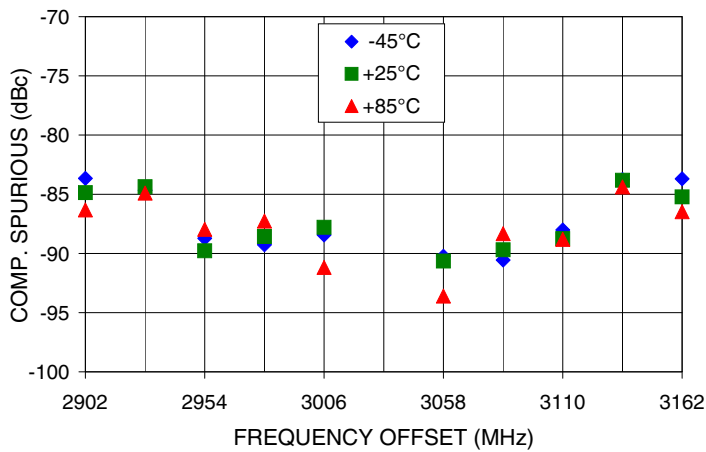
COMPARISON SPURIOUS
Vs FREQ. OFFSET @ Fcar = 2932MHz



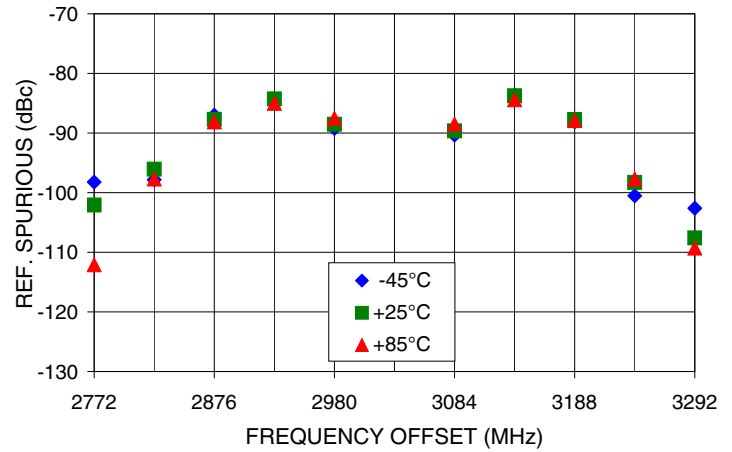
REFERENCE SPURIOUS
Vs FREQ. OFFSET @ Fcar = 2932MHz



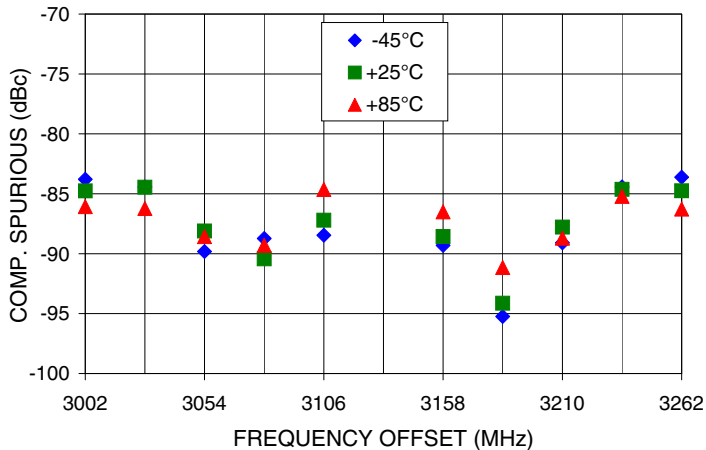
COMPARISON SPURIOUS
Vs FREQ. OFFSET @ Fcar = 3032MHz



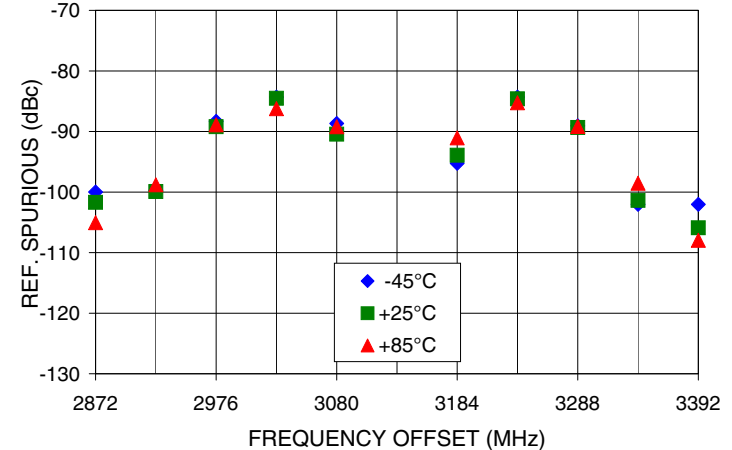
REFERENCE SPURIOUS
Vs FREQ. OFFSET @ Fcar = 3032MHz



COMPARISON SPURIOUS
Vs FREQ. OFFSET @ Fcar = 3132MHz



REFERENCE SPURIOUS
Vs FREQ. OFFSET @ Fcar = 3132MHz

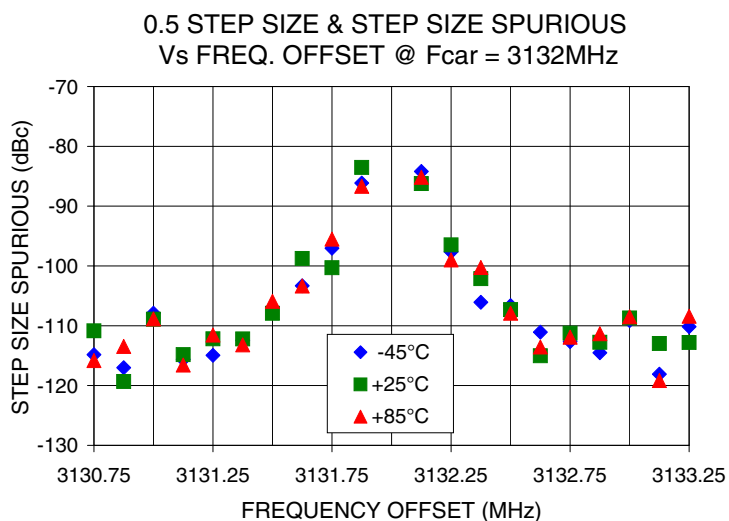
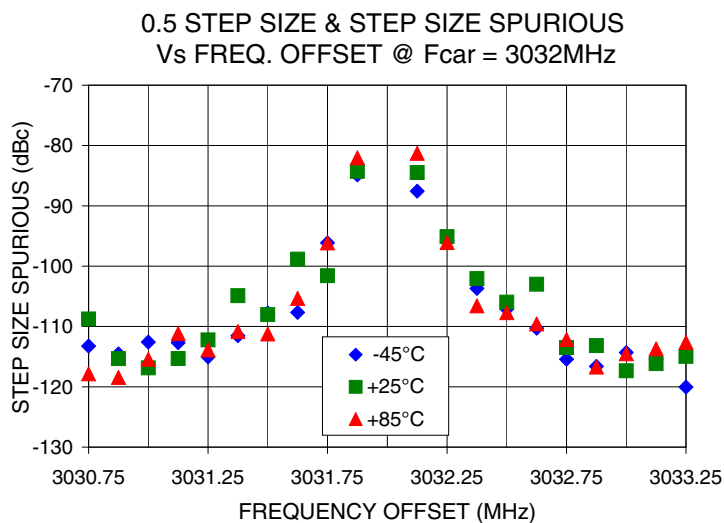
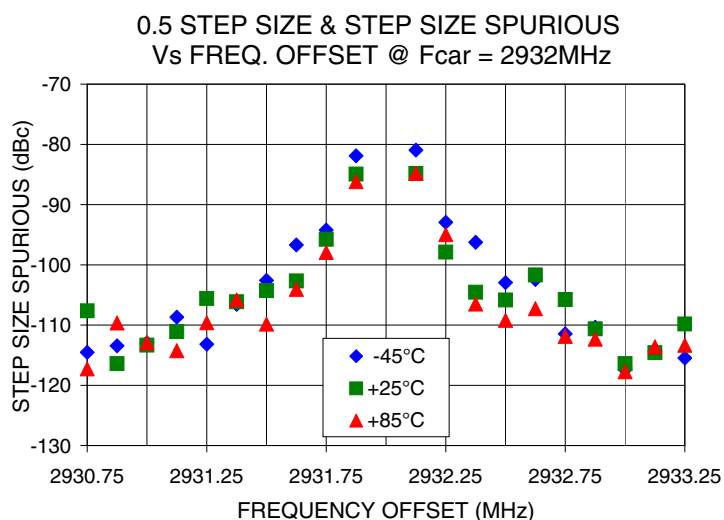


IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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.



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

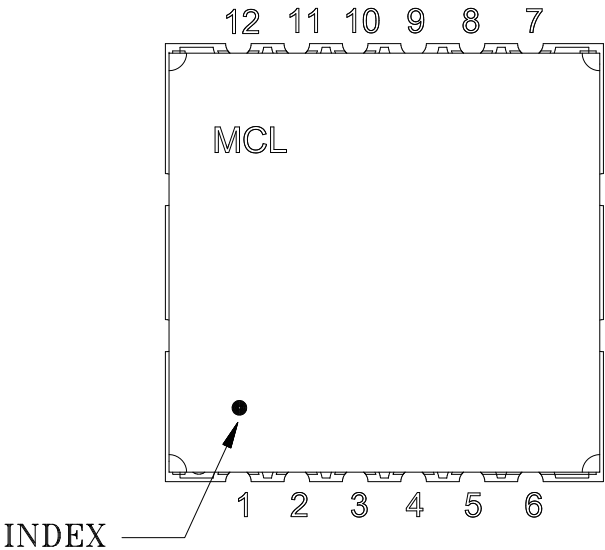


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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.jsp.

Pin Configuration

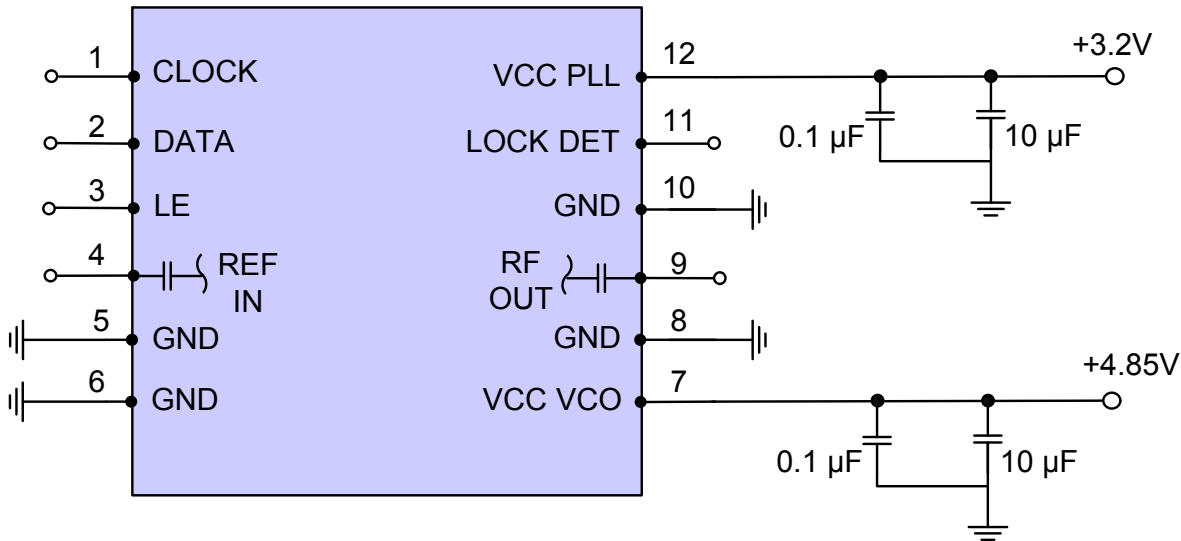


Pin Connection

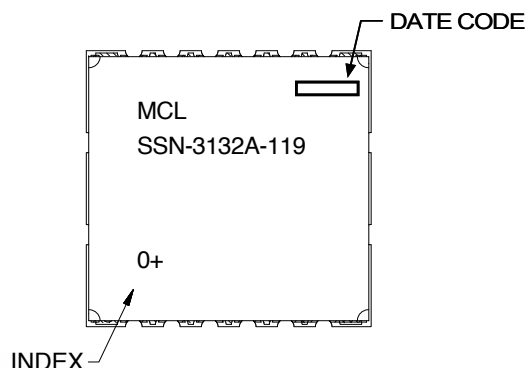
| Pin Number | Function |
|------------|----------|
| 1 | CLOCK |
| 2 | DATA |
| 3 | ENABLED |
| 4 | REF IN |
| 5 | GND |
| 6 | GND |
| 7 | VCC VCO |
| 8 | GND |
| 9 | RF OUT |
| 10 | GND |
| 11 | LOCK DET |
| 12 | VCC PLL |

Recommended Application Circuit

Note: REF IN and RF OUT ports are internally AC coupled.



Device Marking

**Additional Detailed Technical Information**

Additional information is available on our web site. To access this information enter the model number on our web site home page.

Case Style: KJ1367

Tape & Reel: TR-F95

Suggested Layout for PCB Design: PL-317

Evaluation Board: TB-552+

Environment Ratings: ENV03T2



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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.