

# Frequency Synthesizer

KSN-2009N-219+

50Ω 1949 to 2009 MHz

## The Big Deal

- Low phase noise and spurious
- Robust design and construction
- Small size 0.80" x 0.58" x 0.15"



CASE STYLE: DK1042

## Product Overview

The KSN-2009N-219+ is a Frequency Synthesizer, designed to operate from 1949 to 2009 MHz for W-CDMA application. The KSN-2009N-219+ is packaged in a metal case (size of 0.80" x 0.58" x 0.15") to shield against unwanted signals and noise.

## Key Features

| Feature   | Advantages   |
|---|--|
| Low phase noise and spurious: <ul style="list-style-type: none"><li>• Phase Noise: -104 dBc/Hz typ. @ 10 kHz offset</li><li>• Comparison Spurious: -94 dBc typ.</li><li>• Reference Spurious: -100 dBc typ.</li></ul> | Low phase noise and spurious improve system EVM (Error Vector Magnitude).  |
| Robust design and construction  | To enhance the robustness of KSN-2009N-219+, 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, 0.80" x 0.58" x 0.15"   | The small size enables the KSN-2009N-219+ 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](http://www.minicircuits.com/MCLStore/terms.jsp).

50Ω 1949 to 2009 MHz



CASE STYLE: DK1042  
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.

### Features

- Integrated VCO + PLL
- Low phase noise and spurious
- Robust Design and Construction
- Low operating voltage (VCC VCO=+5V, VCC PLL=+3.3V)
- Small size 0.80" x 0.58" x 0.15"

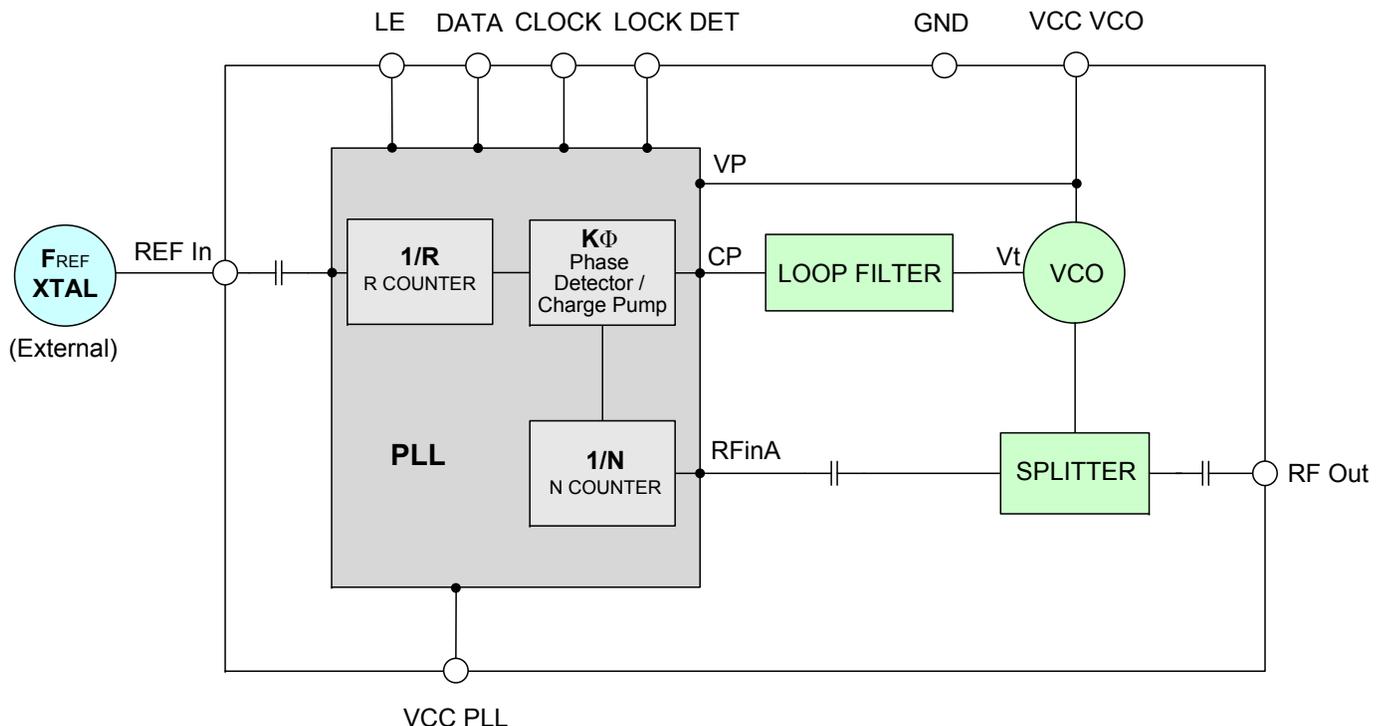
### Applications

- W-CDMA

### General Description

The KSN-2009N-219+ is a Frequency Synthesizer, designed to operate from 1949 to 2009 MHz for W-CDMA application. The KSN-2009N-219+ is packaged in a metal case (size of 0.80" x 0.58" x 0.15") to shield against unwanted signals and noise. To enhance the robustness of KSN-2009N-219+, 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.

### 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



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).

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

| Parameters                          | Test Conditions            | Min.                    | Typ.                              | Max. | Units  |                  |
|-------------------------------------|----------------------------|-------------------------|-----------------------------------|------|--------|------------------|
| Frequency Range                     | -                          | 1949                    | -                                 | 2009 | MHz    |                  |
| Step Size                           | -                          | -                       | 200                               | -    | kHz    |                  |
| Settling Time                       | Within ± 1 kHz             | -                       | 25                                | -    | mSec   |                  |
| Output Power                        | -                          | 0                       | +3                                | +6   | dBm    |                  |
| SSB Phase Noise                     | @ 100 Hz offset            | -                       | -70                               | -    | dBc/Hz |                  |
|                                     | @ 1 kHz offset             | -                       | -73                               | -68  |        |                  |
|                                     | @ 10 kHz offset            | -                       | -104                              | -98  |        |                  |
|                                     | @ 100 kHz offset           | -                       | -126                              | -120 |        |                  |
|                                     | @ 1 MHz offset             | -                       | -146                              | -138 |        |                  |
| Integrated SSB Phase Noise          | @ 100 Hz -1 MHz offset     | -                       | -36                               | -    | dBc    |                  |
| Reference Spurious Suppression      | Ref. Freq. 26 MHz          | -                       | -100                              | -80  | dBc    |                  |
| Comparison Spurious Suppression     | Step Size 200 kHz          | -                       | -94                               | -80  |        |                  |
| Non - Harmonic Spurious Suppression | -                          | -                       | -90                               | -    |        |                  |
| Harmonic Suppression                | -                          | -                       | -25                               | -17  |        |                  |
| VCO Supply Voltage                  | +5.00                      | 4.75                    | +5.00                             | 5.25 |        | V                |
| PLL Supply Voltage                  | +3.30                      | 3.15                    | +3.30                             | 3.45 |        |                  |
| VCO Supply Current                  | -                          | -                       | 47                                | 55   | mA     |                  |
| PLL Supply Current                  | -                          | -                       | 6                                 | 17   |        |                  |
| Reference Input (External)          | Frequency                  | 26 (square wave)        | -                                 | 26   | -      | MHz              |
|                                     | Amplitude                  | 1                       | -                                 | 1    | -      | V <sub>P-P</sub> |
|                                     | Input impedance            | -                       | -                                 | 100  | -      | KΩ               |
|                                     | Phase Noise @ 1 kHz offset | -                       | -                                 | -130 | -      | dBc/Hz           |
| RF Output port Impedance            | -                          | -                       | 50                                | -    | Ω      |                  |
| Input Logic Level                   | Input high voltage         | -                       | 2.80                              | -    | -      | V                |
|                                     | Input low voltage          | -                       | -                                 | -    | 0.60   | V                |
| Digital Lock Detect                 | Locked                     | -                       | 2.75                              | -    | 3.45   | V                |
|                                     | Unlocked                   | -                       | -                                 | -    | 0.40   | V                |
| Frequency Synthesizer PLL           | -                          | ADF4118                 |                                   |      |        |                  |
| PLL Programming                     | -                          | 3-wire serial 3.3V CMOS |                                   |      |        |                  |
| Register Map @ 2009 MHz             | F_Register                 | -                       | (MSB) X0XXX00000X0010010010 (LSB) |      |        |                  |
|                                     | N_Register                 | -                       | (MSB) 100001001110011110101 (LSB) |      |        |                  |
|                                     | R_Register                 | -                       | (MSB) 1XXXX0000001000001000 (LSB) |      |        |                  |

**Absolute Maximum Ratings**

| Parameters                               | Ratings                    |
|--|----------------------------|
| VCO Supply Voltage                       | 6V                         |
| PLL Supply Voltage                       | 6V                         |
| VCO Supply Voltage to PLL Supply Voltage | -0.3V to +5.5V             |
| 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 [minicircuits.com](http://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](http://www.minicircuits.com/MCLStore/terms.jsp).

Typical Performance Data

| FREQUENCY<br>(MHz) | POWER OUTPUT<br>(dBm) |       |       | VCO CURRENT<br>(mA) |       |       | PLL CURENT<br>(mA) |       |       |
|--------------------|-----------------------|-------|-------|---------------------|-------|-------|--------------------|-------|-------|
|                    | -45°C                 | +25°C | +85°C | -45°C               | +25°C | +85°C | -45°C              | +25°C | +85°C |
|                    | 1949                  | 3.14  | 3.30  | 3.31                | 45.24 | 47.39 | 48.77              | 5.31  | 6.83  |
| 1955               | 3.18                  | 3.33  | 3.35  | 45.29               | 47.43 | 48.79 | 5.30               | 6.82  | 8.14  |
| 1961               | 3.22                  | 3.37  | 3.38  | 45.32               | 47.46 | 48.81 | 5.30               | 6.82  | 8.14  |
| 1967               | 3.26                  | 3.41  | 3.42  | 45.36               | 47.49 | 48.83 | 5.31               | 6.82  | 8.14  |
| 1973               | 3.30                  | 3.45  | 3.46  | 45.40               | 47.52 | 48.85 | 5.31               | 6.82  | 8.14  |
| 1979               | 3.33                  | 3.49  | 3.50  | 45.44               | 47.55 | 48.87 | 5.32               | 6.83  | 8.15  |
| 1985               | 3.37                  | 3.53  | 3.54  | 45.48               | 47.58 | 48.88 | 5.33               | 6.84  | 8.16  |
| 1991               | 3.40                  | 3.56  | 3.58  | 45.51               | 47.60 | 48.89 | 5.34               | 6.85  | 8.17  |
| 1997               | 3.37                  | 3.54  | 3.57  | 45.54               | 47.62 | 48.90 | 5.34               | 6.85  | 8.17  |
| 2003               | 3.35                  | 3.53  | 3.56  | 45.57               | 47.64 | 48.91 | 5.33               | 6.85  | 8.17  |
| 2009               | 3.32                  | 3.50  | 3.54  | 45.59               | 47.65 | 48.93 | 5.34               | 6.85  | 8.18  |

| FREQUENCY<br>(MHz) | HARMONICS (dBc) |        |        |        |        |        |
|--------------------|-----------------|--------|--------|--------|--------|--------|
|                    | F2              |        |        | F3     |        |        |
|                    | -45°C           | +25°C  | +85°C  | -45°C  | +25°C  | +85°C  |
| 1949               | -37.18          | -34.92 | -33.55 | -25.22 | -28.26 | -29.56 |
| 1955               | -37.42          | -34.94 | -33.59 | -25.75 | -27.67 | -30.18 |
| 1961               | -37.42          | -35.08 | -33.32 | -25.47 | -27.13 | -30.10 |
| 1967               | -37.42          | -35.22 | -33.06 | -25.18 | -26.59 | -30.03 |
| 1973               | -37.06          | -35.31 | -32.85 | -24.94 | -26.14 | -29.94 |
| 1979               | -37.06          | -35.15 | -32.90 | -24.93 | -26.12 | -29.75 |
| 1985               | -37.06          | -34.99 | -32.95 | -24.92 | -26.10 | -29.56 |
| 1991               | -38.02          | -34.90 | -33.02 | -24.80 | -26.07 | -29.29 |
| 1997               | -38.02          | -35.19 | -33.22 | -24.13 | -26.02 | -28.64 |
| 2003               | -38.02          | -35.48 | -33.42 | -23.46 | -25.96 | -27.98 |
| 2009               | -38.73          | -35.70 | -33.59 | -22.87 | -25.96 | -27.36 |



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](http://www.minicircuits.com/MCLStore/terms.jsp).

| FREQUENCY<br>(MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS |        |         |         |         |
|--------------------|--------------------------------|--------|---------|---------|---------|
|                    | +25°C                          |        |         |         |         |
|                    | 100Hz                          | 1kHz   | 10kHz   | 100kHz  | 1MHz    |
| 1949               | -72.23                         | -74.53 | -105.13 | -126.51 | -146.03 |
| 1955               | -72.77                         | -72.25 | -104.98 | -126.63 | -146.43 |
| 1961               | -71.89                         | -72.13 | -104.84 | -126.59 | -146.55 |
| 1967               | -71.01                         | -72.02 | -104.70 | -126.55 | -146.67 |
| 1973               | -70.15                         | -72.07 | -104.61 | -126.51 | -146.76 |
| 1979               | -69.39                         | -72.96 | -104.71 | -126.51 | -146.67 |
| 1985               | -68.63                         | -73.86 | -104.82 | -126.52 | -146.58 |
| 1991               | -68.01                         | -74.49 | -104.89 | -126.51 | -146.48 |
| 1997               | -68.10                         | -73.85 | -104.79 | -126.42 | -146.39 |
| 2003               | -68.18                         | -73.21 | -104.69 | -126.34 | -146.29 |
| 2009               | -66.51                         | -75.13 | -104.53 | -126.26 | -146.51 |

| FREQUENCY<br>(MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS |        |         |         |         |
|--------------------|--------------------------------|--------|---------|---------|---------|
|                    | -45°C                          |        |         |         |         |
|                    | 100Hz                          | 1kHz   | 10kHz   | 100kHz  | 1MHz    |
| 1949               | -71.54                         | -75.83 | -105.42 | -127.41 | -147.71 |
| 1955               | -70.40                         | -74.82 | -105.44 | -127.35 | -147.46 |
| 1961               | -70.77                         | -74.43 | -105.55 | -127.39 | -147.55 |
| 1967               | -71.14                         | -74.05 | -105.67 | -127.43 | -147.64 |
| 1973               | -71.44                         | -73.78 | -105.73 | -127.47 | -147.71 |
| 1979               | -71.39                         | -74.06 | -105.55 | -127.46 | -147.67 |
| 1985               | -71.33                         | -74.34 | -105.36 | -127.45 | -147.63 |
| 1991               | -71.20                         | -74.53 | -105.20 | -127.43 | -147.58 |
| 1997               | -70.65                         | -74.27 | -105.16 | -127.38 | -147.52 |
| 2003               | -70.10                         | -74.01 | -105.12 | -127.33 | -147.46 |
| 2009               | -68.58                         | -74.14 | -105.22 | -127.32 | -147.33 |

| FREQUENCY<br>(MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS |        |         |         |         |
|--------------------|--------------------------------|--------|---------|---------|---------|
|                    | +85°C                          |        |         |         |         |
|                    | 100Hz                          | 1kHz   | 10kHz   | 100kHz  | 1MHz    |
| 1949               | -69.94                         | -71.59 | -103.92 | -125.55 | -145.77 |
| 1955               | -71.68                         | -71.59 | -103.77 | -125.43 | -144.94 |
| 1961               | -71.20                         | -72.13 | -103.83 | -125.40 | -145.21 |
| 1967               | -70.72                         | -72.67 | -103.88 | -125.36 | -145.48 |
| 1973               | -70.23                         | -73.08 | -103.89 | -125.32 | -145.69 |
| 1979               | -69.66                         | -72.86 | -103.64 | -125.28 | -145.63 |
| 1985               | -69.10                         | -72.63 | -103.39 | -125.23 | -145.56 |
| 1991               | -68.55                         | -72.40 | -103.18 | -125.18 | -145.51 |
| 1997               | -68.04                         | -72.13 | -103.20 | -125.10 | -145.48 |
| 2003               | -67.54                         | -71.86 | -103.21 | -125.03 | -145.45 |
| 2009               | -66.49                         | -71.49 | -103.02 | -125.00 | -144.87 |



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](http://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](http://www.minicircuits.com/MCLStore/terms.jsp).

| COMPARISON SPURIOUS ORDER | COMPARISON SPURIOUS @Fcarrier 1949MHz+(n*Fcomparison) (dBc) note 1 |         |         | COMPARISON SPURIOUS @Fcarrier 1979MHz+(n*Fcomparison) (dBc) note 1 |         |         | COMPARISON SPURIOUS @Fcarrier 2009MHz+(n*Fcomparison) (dBc) note 1 |         |         |
|---------------------------|--|---------|---------|--|---------|---------|--|---------|---------|
|                           | n  | -45°C   | +25°C   | +85°C  | -45°C   | +25°C   | +85°C  | -45°C   | +25°C   |
| -5                        | -108.15  | -105.16 | -113.47 | -115.54  | -115.25 | -114.47 | -114.70  | -118.11 | -115.55 |
| -4                        | -115.72  | -117.51 | -114.38 | -119.73  | -116.26 | -112.68 | -113.59  | -109.84 | -111.39 |
| -3                        | -111.62  | -112.47 | -107.64 | -115.35  | -115.42 | -112.72 | -113.65  | -110.05 | -112.30 |
| -2                        | -105.60  | -110.19 | -103.62 | -110.30  | -109.16 | -106.07 | -111.18  | -102.27 | -105.91 |
| -1                        | -91.63   | -95.07  | -90.96  | -91.09   | -94.42  | -93.05  | -96.11   | -90.78  | -96.70  |
| 0 note 2                  | -  | -       | -       | -  | -       | -       | -  | -       | -       |
| +1                        | -95.06   | -94.68  | -92.26  | -96.50   | -98.50  | -94.59  | -96.83   | -93.97  | -95.16  |
| +2                        | -107.82  | -106.06 | -103.13 | -108.15  | -110.35 | -107.64 | -110.01  | -106.99 | -107.09 |
| +3                        | -111.32  | -115.82 | -110.37 | -115.03  | -113.72 | -110.48 | -116.28  | -107.63 | -112.88 |
| +4                        | -114.13  | -114.52 | -118.15 | -119.73  | -121.18 | -115.99 | -116.00  | -112.59 | -113.52 |
| +5                        | -107.11  | -104.26 | -109.82 | -119.40  | -119.33 | -119.36 | -113.42  | -117.18 | -115.30 |

Note 1: Comparison frequency 200 kHz

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

| REFERENCE SPURIOUS ORDER | REFERENCE SPURIOUS @Fcarrier 1949MHz+(n*Freference) (dBc) note 3 |         |         | REFERENCE SPURIOUS @Fcarrier 1979MHz+(n*Freference) (dBc) note 3 |         |         | REFERENCE SPURIOUS @Fcarrier 2009MHz+(n*Freference) (dBc) note 3 |         |         |
|--------------------------|--|---------|---------|--|---------|---------|--|---------|---------|
|                          | n  | -45°C   | +25°C   | +85°C  | -45°C   | +25°C   | +85°C  | -45°C   | +25°C   |
| -5                       | -123.58  | -133.23 | -132.29 | -116.96  | -122.12 | -122.64 | -114.51  | -121.04 | -128.43 |
| -4                       | -120.97  | -123.62 | -127.79 | -123.14  | -126.82 | -126.97 | -126.98  | -128.95 | -127.85 |
| -3                       | -129.14  | -129.66 | -127.47 | -132.07  | -131.25 | -133.18 | -133.41  | -130.90 | -132.59 |
| -2                       | -109.03  | -109.47 | -110.25 | -108.51  | -110.02 | -109.76 | -109.11  | -109.52 | -111.07 |
| -1                       | -103.25  | -101.94 | -99.90  | -102.32  | -100.30 | -99.17  | -101.53  | -99.48  | -98.65  |
| 0 note 4                 | -  | -       | -       | -  | -       | -       | -  | -       | -       |
| +1                       | -101.40  | -100.64 | -100.79 | -101.34  | -101.96 | -101.02 | -103.65  | -101.57 | -102.73 |
| +2                       | -106.31  | -108.75 | -108.76 | -107.33  | -108.17 | -109.27 | -108.30  | -108.38 | -109.89 |
| +3                       | -126.26  | -129.67 | -125.61 | -126.03  | -127.57 | -127.75 | -127.76  | -126.95 | -129.88 |
| +4                       | -123.56  | -124.58 | -129.07 | -127.27  | -128.56 | -127.48 | -132.40  | -128.65 | -130.54 |
| +5                       | -121.82  | -124.41 | -127.59 | -115.76  | -119.39 | -121.47 | -114.37  | -120.60 | -127.26 |

Note 3: Reference frequency 26 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

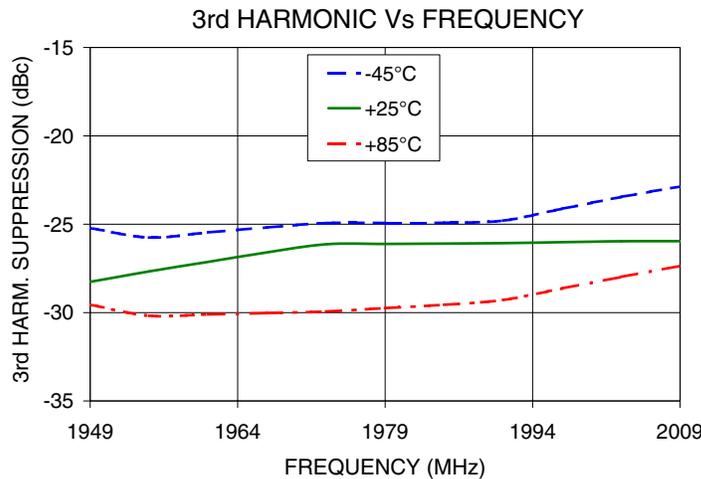
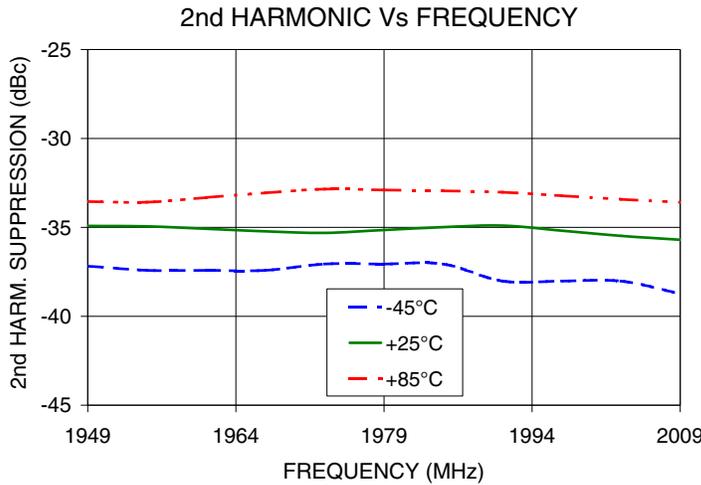
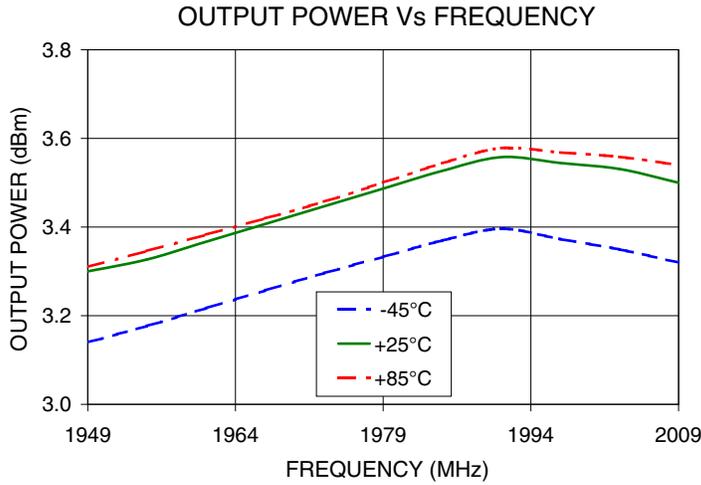


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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](http://www.minicircuits.com/MCLStore/terms.jsp).

Typical Performance Curves



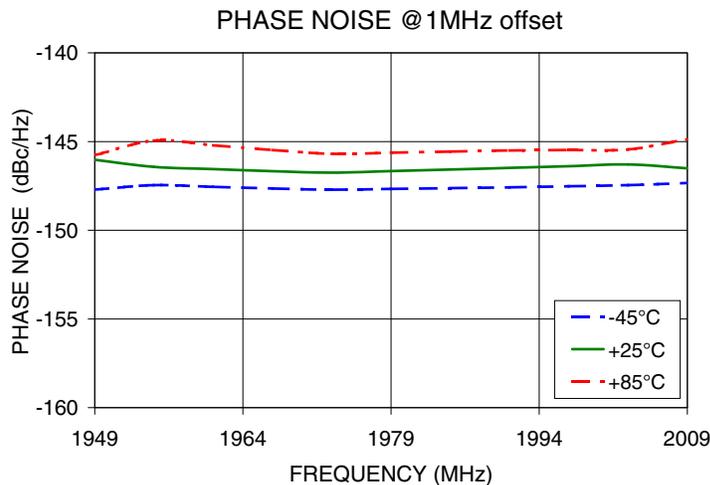
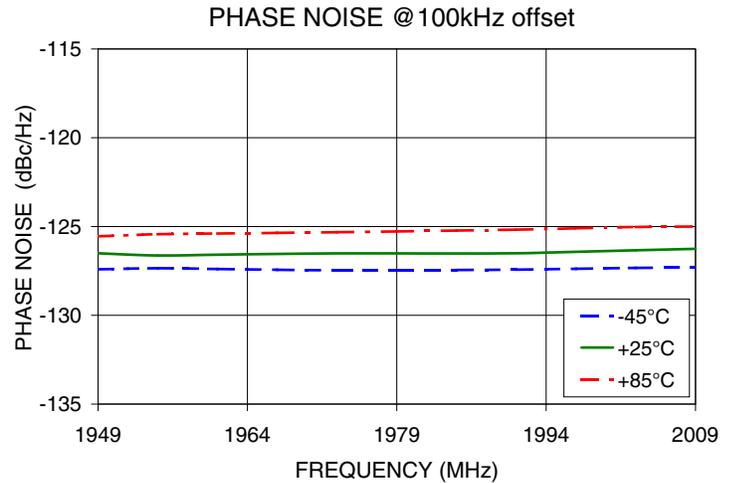
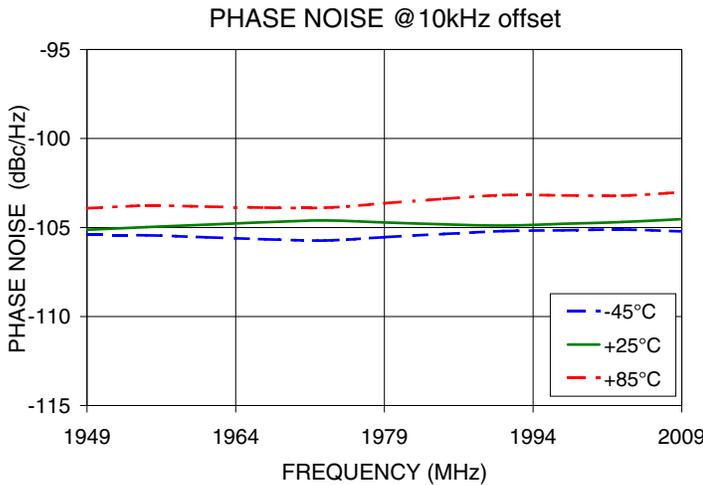
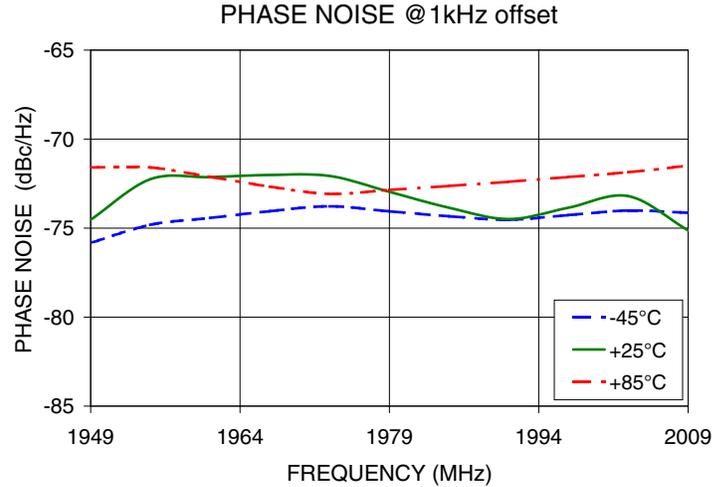
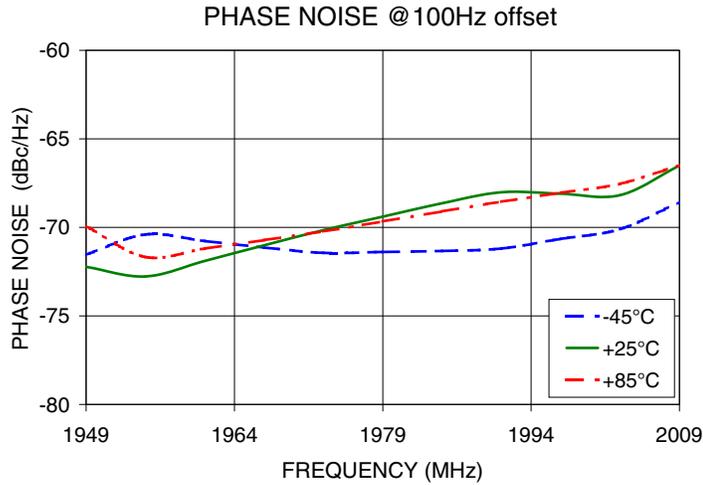
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant  
 P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp).



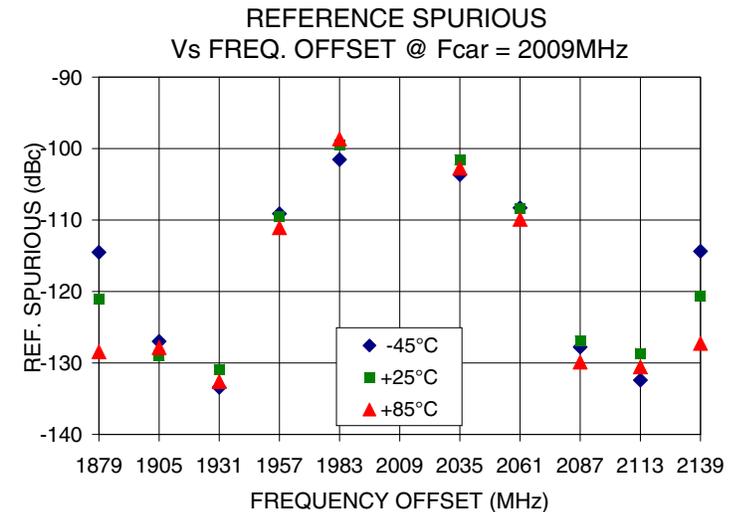
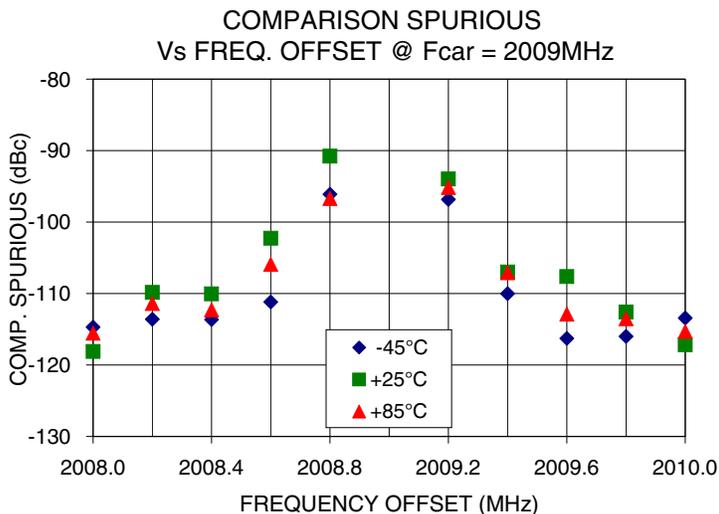
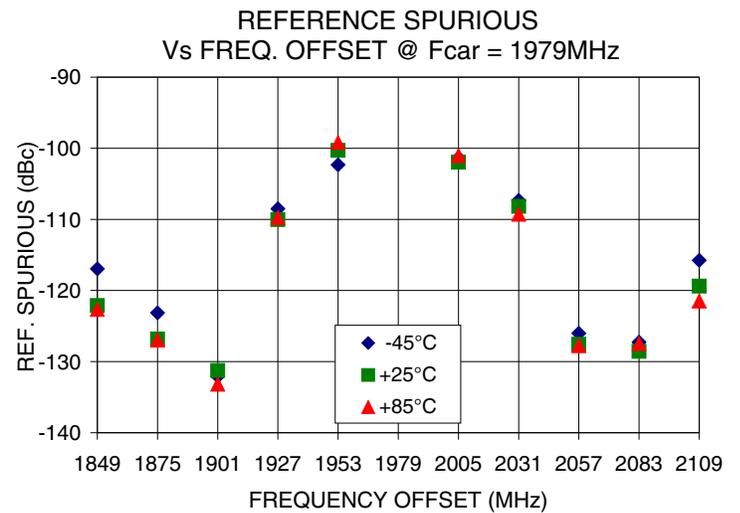
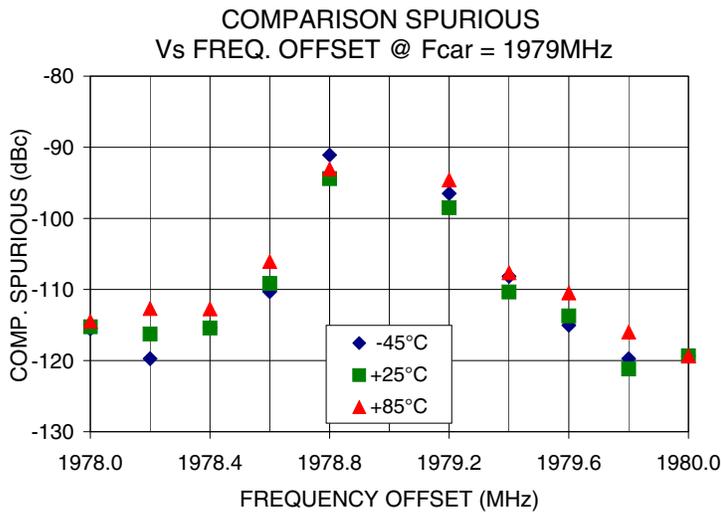
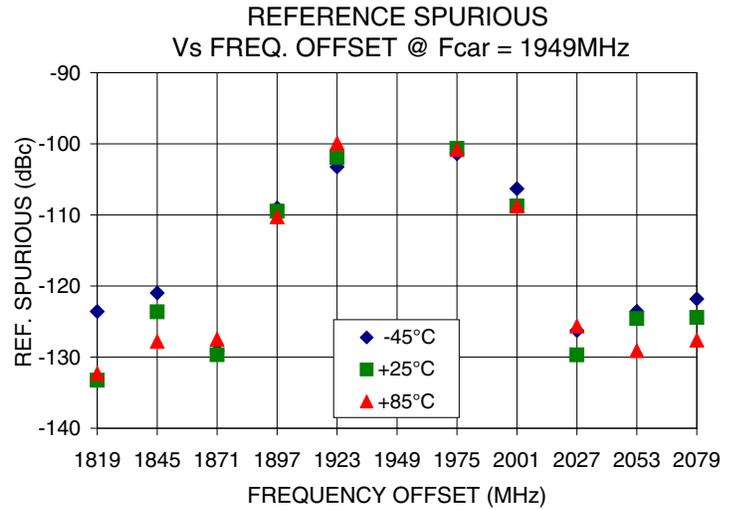
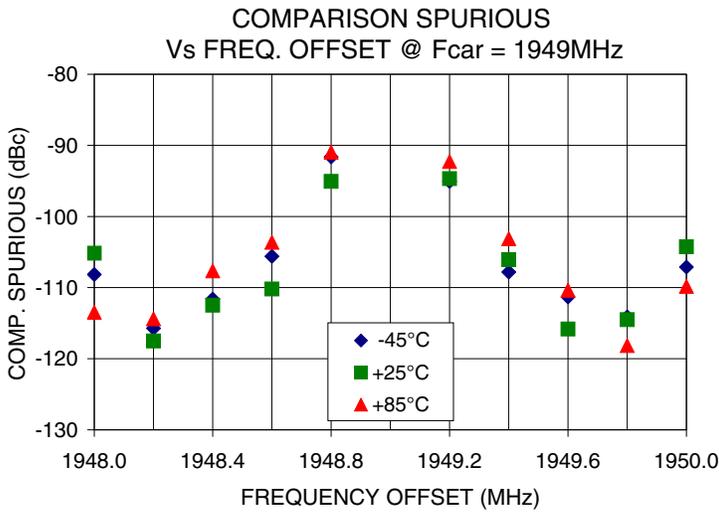
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant  
 P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



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/MCLStore/terms.jsp](http://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

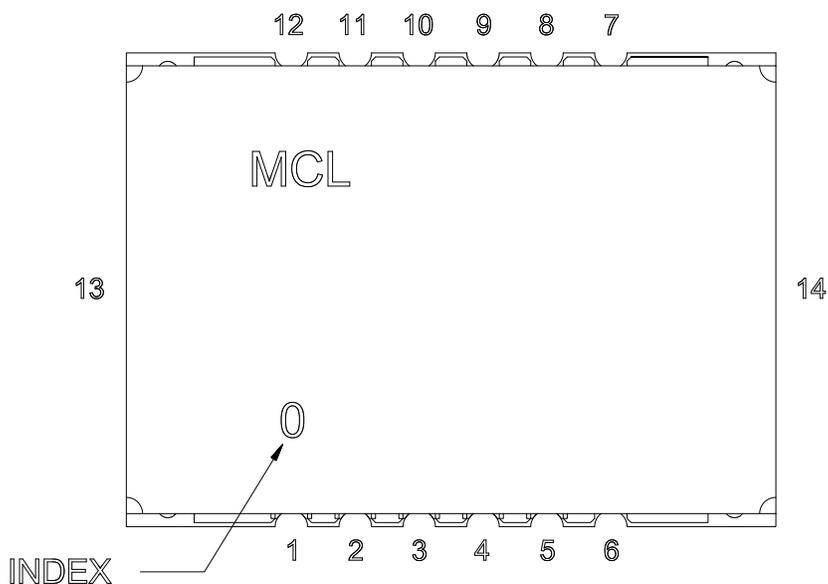


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp).

Pin Configuration

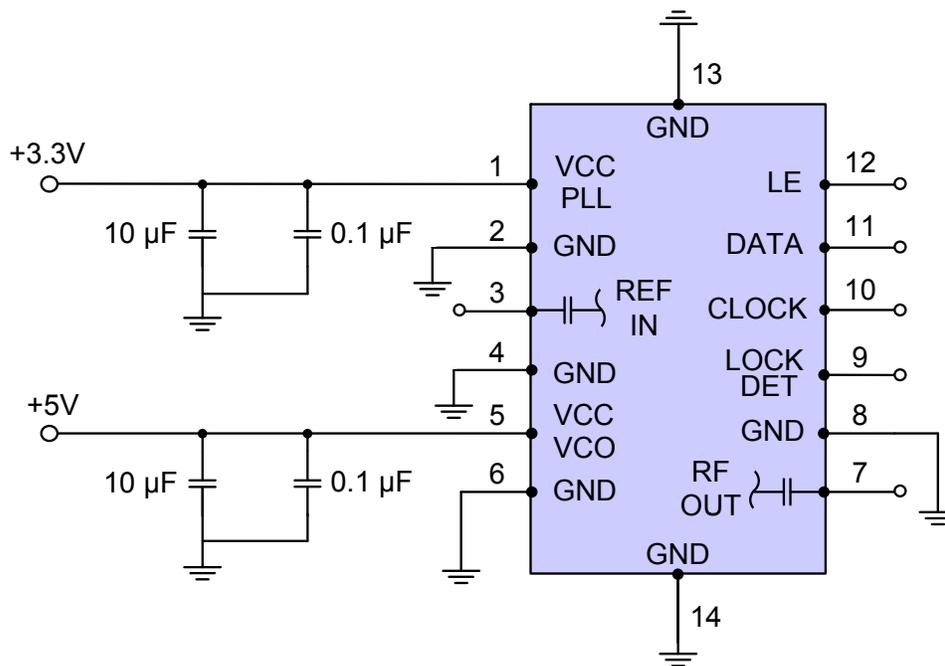


Pin Connection

| Pin Number | Function |
|------------|----------|
| 1          | VCC PLL  |
| 2          | GND      |
| 3          | REF IN   |
| 4          | GND      |
| 5          | VCC VCO  |
| 6          | GND      |
| 7          | RF OUT   |
| 8          | GND      |
| 9          | LOCK DET |
| 10         | CLOCK    |
| 11         | DATA     |
| 12         | LE       |
| 13         | GND      |
| 14         | GND      |

Recommended Application Circuit

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



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

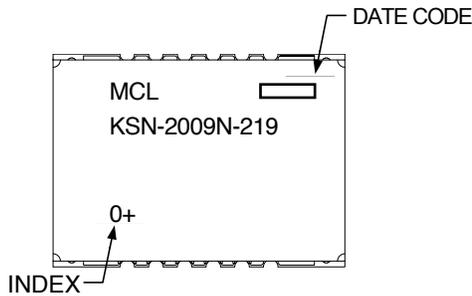


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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](http://www.minicircuits.com/MCLStore/terms.jsp).

## 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:** DK1042

**Tape & Reel:** TR-F28

**Suggested Layout for PCB Design:** PL-249

**Evaluation Board:** TB-567-1+

**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](http://www.minicircuits.com/MCLStore/terms.jsp).