

# Frequency Synthesizer

KSN-1885A-319+

50Ω 1869.76 to 1885.76 MHz

## The Big Deal

- Fractional N synthesizer
- 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-1885A-319+ is a Frequency Synthesizer, designed to operate from 1869.76 to 1885.76 MHz for TD-SCDMA application. The KSN-1885A-319+ 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: -100 dBc/Hz typ. @ 10 kHz offset</li><li>• Step Size Spurious: -104 dBc typ.</li><li>• Comparison Spurious: -102 dBc typ.</li><li>• Reference Spurious: -86 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-1885A-319+, 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-1885A-319+ to be used in compact designs.   |



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 [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).

# Frequency Synthesizer

KSN-1885A-319+

50Ω 1869.76 to 1885.76 MHz

## Features

- Fractional N synthesizer
- Integrated VCO + PLL
- Low phase noise and spurious
- Robust design and construction
- Low operating voltage (VCC VCO=+5V, VCC PLL=+3V)
- Small size 0.80" x 0.58" x 0.15"

## Applications

- TD-SCDMA

## General Description

The KSN-1885A-319+ is a Frequency Synthesizer, designed to operate from 1869.76 to 1885.76 MHz for TD-SCDMA application. The KSN-1885A-319+ 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-1885A-319+, 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.

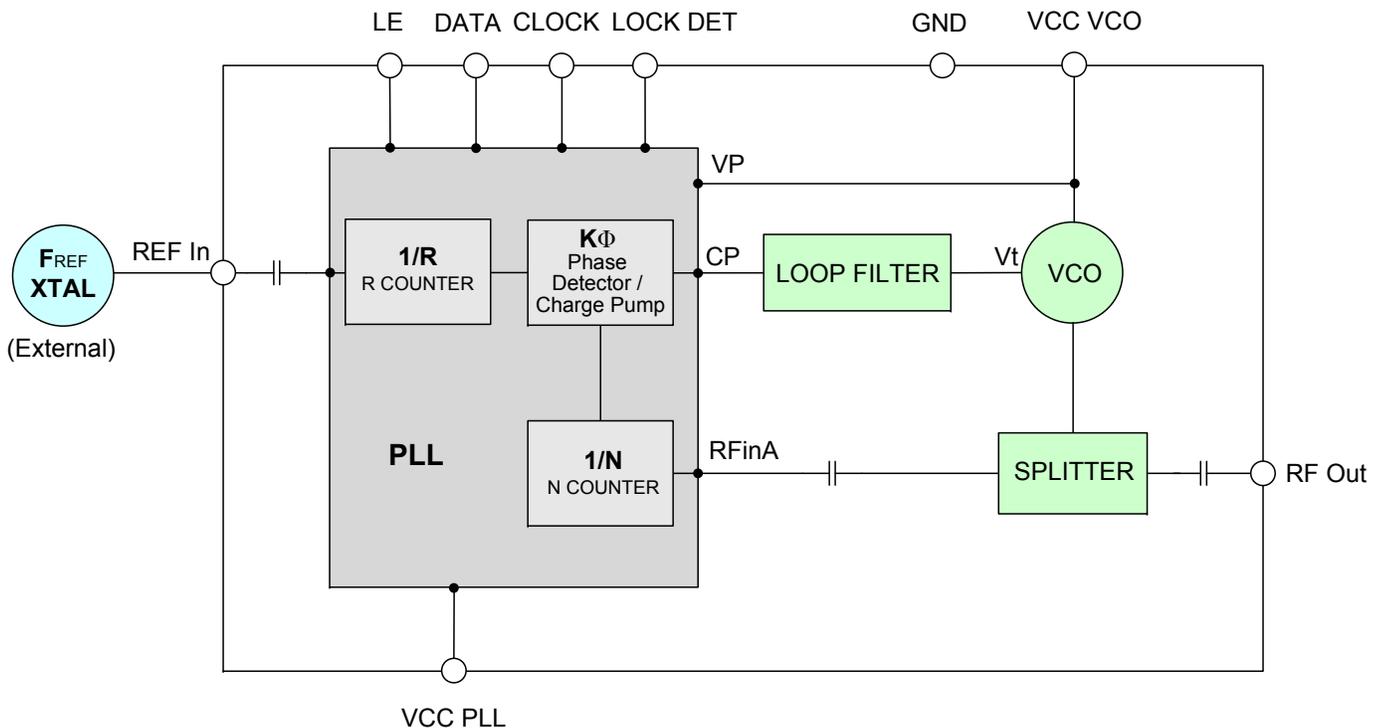


CASE STYLE: DK1042  
PRICE: \$29.95 ea. QTY (1-9)

+ 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.

## 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                     | -                          | 1869.76               | -                                  | 1885.76 | MHz              |
| Step Size                           | -                          | -                     | 320                                | -       | kHz              |
| Comparison Frequency                | -                          | -                     | 11.52                              | -       | MHz              |
| Settling Time                       | Within ± 1 kHz             | -                     | 3                                  | -       | mSec             |
| Output Power                        | -                          | +4.0                  | +6.5                               | +8.0    | dBm              |
| SSB Phase Noise                     | @ 100 Hz offset            | -                     | -83                                | -       | dBc/Hz           |
|                                     | @ 1 kHz offset             | -                     | -90                                | -85     |                  |
|                                     | @ 10 kHz offset            | -                     | -100                               | -96     |                  |
|                                     | @ 100 kHz offset           | -                     | -128                               | -122    |                  |
|                                     | @ 1 MHz offset             | -                     | -148                               | -143    |                  |
| Step Size Spurious Suppression      | Step Size 320 kHz          | -                     | -104                               | -73     | dBc              |
| 0.5 Step Size Spurious Suppression  | 0.5 Step Size 160 kHz      | -                     | -91                                | -70     |                  |
| Reference Spurious Suppression      | Ref. Freq. 92.16 MHz       | -                     | -86                                | -70     |                  |
| Comparison Spurious Suppression     | Comp Freq. 11.52 MHz       | -                     | -102                               | -75     |                  |
| Non - Harmonic Spurious Suppression | -                          | -                     | -90                                | -       |                  |
| Harmonic Suppression                | -                          | -                     | -25                                | -17     |                  |
| VCO Supply Voltage                  | +5.00                      | 4.75                  | +5.00                              | 5.25    | V                |
| PLL Supply Voltage                  | +3.00                      | 2.85                  | +3.00                              | 3.15    |                  |
| VCO Supply Current                  | -                          | -                     | 68                                 | 75      | mA               |
| PLL Supply Current                  | -                          | -                     | 14                                 | 22      |                  |
| Reference Input<br>(External)       | Frequency                  | 92.16 (square wave)   | -                                  | 92.16   | 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         | -                     | 2.45                               | -       | V                |
|                                     | Input low voltage          | -                     | -                                  | 0.50    | V                |
| Digital Lock Detect                 | Locked                     | -                     | 2.30                               | -       | V                |
|                                     | Unlocked                   | -                     | -                                  | 0.40    | V                |
| Frequency Synthesizer PLL           | -                          | ADF4153               |                                    |         |                  |
| PLL Programming                     | -                          | 3-wire serial 3V CMOS |                                    |         |                  |
| Register Map @ 1885.76MHz           | R0_Register                | -                     | (MSB) 1010001100000001100100 (LSB) |         |                  |
|                                     | R1_Register                | -                     | (MSB) 101100000000010010001 (LSB)  |         |                  |
|                                     | R2_Register                | -                     | (MSB) 1111100010 (LSB)             |         |                  |
|                                     | R3_Register                | -                     | (MSB) 1111000111 (LSB)             |         |                  |

**Absolute Maximum Ratings**

| Parameters                               | Ratings             |
|--|---------------------|
| VCO Supply Voltage                       | 5.4V                |
| PLL Supply Voltage                       | 4.0V                |
| VCO Supply Voltage to PLL Supply Voltage | -0.3V to +5.8V      |
| Reference Frequency Voltage              | -0.3Vmin, +3.05Vmax |
| Data, Clock, LE Levels                   | -0.3Vmin, +3.05Vmax |
| 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 |
|                    | 1869.76               | 6.49  | 6.75  | 6.73                | 66.48 | 68.86 | 70.39              | 13.25 | 14.60 |
| 1870.40            | 6.53                  | 6.75  | 6.72  | 66.84               | 68.86 | 70.39 | 13.27              | 14.64 | 16.77 |
| 1873.92            | 6.52                  | 6.73  | 6.71  | 66.87               | 68.88 | 70.40 | 13.26              | 14.61 | 16.77 |
| 1877.44            | 6.48                  | 6.73  | 6.70  | 66.52               | 68.88 | 70.41 | 13.07              | 14.42 | 16.58 |
| 1880.96            | 6.48                  | 6.73  | 6.70  | 66.53               | 68.90 | 70.41 | 13.25              | 14.61 | 16.78 |
| 1884.48            | 6.49                  | 6.73  | 6.69  | 66.53               | 68.91 | 70.41 | 13.30              | 14.66 | 16.84 |
| 1885.76            | 6.49                  | 6.73  | 6.69  | 66.54               | 68.90 | 70.42 | 13.26              | 14.61 | 16.80 |

| FREQUENCY<br>(MHz) | HARMONICS (dBc) |        |        |        |        |        |
|--------------------|-----------------|--------|--------|--------|--------|--------|
|                    | F2              |        |        | F3     |        |        |
|                    | -45°C           | +25°C  | +85°C  | -45°C  | +25°C  | +85°C  |
| 1869.76            | -28.80          | -32.37 | -36.06 | -21.16 | -24.54 | -27.32 |
| 1870.40            | -28.80          | -32.38 | -36.21 | -21.17 | -24.46 | -27.43 |
| 1873.92            | -28.81          | -32.40 | -36.12 | -21.16 | -24.61 | -27.44 |
| 1877.44            | -28.92          | -32.51 | -36.04 | -21.30 | -24.78 | -27.68 |
| 1880.96            | -29.05          | -32.55 | -36.02 | -21.55 | -25.03 | -28.07 |
| 1884.48            | -29.08          | -32.51 | -35.99 | -21.73 | -25.33 | -28.32 |
| 1885.76            | -29.08          | -32.46 | -35.90 | -21.74 | -25.31 | -28.37 |

| FREQUENCY<br>(MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS |        |         |         |         |
|--------------------|--------------------------------|--------|---------|---------|---------|
|                    | +25°C                          |        |         |         |         |
|                    | 100Hz                          | 1kHz   | 10kHz   | 100kHz  | 1MHz    |
| 1869.76            | -84.28                         | -91.40 | -100.48 | -127.61 | -147.88 |
| 1870.40            | -86.48                         | -89.86 | -100.24 | -127.71 | -147.95 |
| 1873.92            | -87.16                         | -90.80 | -100.55 | -127.61 | -148.11 |
| 1877.44            | -85.11                         | -90.17 | -100.73 | -127.65 | -148.11 |
| 1880.96            | -84.47                         | -90.48 | -100.31 | -127.59 | -147.87 |
| 1884.48            | -84.22                         | -90.65 | -100.56 | -127.70 | -147.94 |
| 1885.76            | -86.69                         | -90.74 | -100.27 | -127.60 | -147.93 |

| FREQUENCY<br>(MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS |        |         |         |         |
|--------------------|--------------------------------|--------|---------|---------|---------|
|                    | -45°C                          |        |         |         |         |
|                    | 100Hz                          | 1kHz   | 10kHz   | 100kHz  | 1MHz    |
| 1869.76            | -83.23                         | -90.16 | -99.91  | -129.23 | -149.84 |
| 1870.40            | -81.99                         | -91.35 | -101.09 | -129.01 | -149.09 |
| 1873.92            | -81.22                         | -89.68 | -100.61 | -128.89 | -149.50 |
| 1877.44            | -81.27                         | -89.51 | -100.45 | -129.43 | -149.90 |
| 1880.96            | -81.47                         | -89.85 | -99.93  | -129.04 | -149.62 |
| 1884.48            | -82.14                         | -90.63 | -100.59 | -129.15 | -149.78 |
| 1885.76            | -81.04                         | -90.17 | -99.83  | -129.17 | -149.75 |

| FREQUENCY<br>(MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS |        |        |         |         |
|--------------------|--------------------------------|--------|--------|---------|---------|
|                    | +85°C                          |        |        |         |         |
|                    | 100Hz                          | 1kHz   | 10kHz  | 100kHz  | 1MHz    |
| 1869.76            | -87.34                         | -89.01 | -99.64 | -125.90 | -146.06 |
| 1870.40            | -88.83                         | -91.95 | -99.32 | -125.84 | -146.11 |
| 1873.92            | -91.69                         | -90.72 | -99.47 | -125.67 | -146.15 |
| 1877.44            | -85.76                         | -89.37 | -99.36 | -125.75 | -145.99 |
| 1880.96            | -88.10                         | -91.16 | -99.18 | -125.84 | -146.00 |
| 1884.48            | -87.08                         | -89.30 | -99.70 | -125.67 | -146.04 |
| 1885.76            | -88.65                         | -88.71 | -99.53 | -125.63 | -145.92 |



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).

| COMPARISON SPURIOUS ORDER | COMPARISON SPURIOUS @Fcarrier 1869.76MHz+(n*Fcomparison) (dBc) note 1 |         |         | COMPARISON SPURIOUS @Fcarrier 1877.76MHz+(n*Fcomparison) (dBc) note 1 |         |         | COMPARISON SPURIOUS @Fcarrier 1885.76MHz+(n*Fcomparison) (dBc) note 1 |         |         |
|---------------------------|---|---------|---------|---|---------|---------|---|---------|---------|
|                           | -45°C   | +25°C   | +85°C   | -45°C   | +25°C   | +85°C   | -45°C   | +25°C   | +85°C   |
| n                         |   |         |         |   |         |         |   |         |         |
| -5                        | -103.07   | -102.19 | -105.02 | -98.27  | -107.78 | -104.92 | -102.92   | -100.82 | -105.96 |
| -4                        | -104.85   | -100.71 | -105.59 | -98.60  | -102.21 | -107.93 | -103.87   | -101.13 | -115.08 |
| -3                        | -115.03   | -103.19 | -109.26 | -86.15  | -93.78  | -97.08  | -107.56   | -102.82 | -117.42 |
| -2                        | -116.07   | -109.83 | -110.91 | -101.13   | -106.65 | -103.32 | -108.64   | -113.56 | -106.54 |
| -1                        | -109.76   | -114.03 | -104.75 | -101.89   | -108.13 | -103.88 | -116.75   | -110.71 | -101.14 |
| 0 note 2                  | -   | -       | -       | -   | -       | -       | -   | -       | -       |
| +1                        | -106.46   | -98.25  | -103.85 | -100.69   | -97.10  | -121.37 | -102.55   | -96.11  | -104.49 |
| +2                        | -110.11   | -101.85 | -104.42 | -106.70   | -99.12  | -112.36 | -104.15   | -100.88 | -110.08 |
| +3                        | -109.51   | -105.69 | -110.05 | -98.66  | -102.58 | -115.78 | -106.25   | -105.49 | -108.26 |
| +4                        | -109.00   | -106.18 | -110.05 | -118.10   | -102.44 | -110.03 | -106.34   | -105.42 | -105.16 |
| +5                        | -107.81   | -104.67 | -108.77 | -89.64  | -95.67  | -96.84  | -106.46   | -103.28 | -103.72 |

Note 1: Comparison frequency 11.52 MHz  
 Note 2: All spurs are referenced to carrier signal (n=0).

| REFERENCE SPURIOUS ORDER | REFERENCE SPURIOUS @Fcarrier 1869.76MHz+(n*Freference) (dBc) note 3 |         |         | REFERENCE SPURIOUS @Fcarrier 1877.76MHz+(n*Freference) (dBc) note 3 |         |         | REFERENCE SPURIOUS @Fcarrier 1885.76MHz+(n*Freference) (dBc) note 3 |         |         |
|--------------------------|---|---------|---------|---|---------|---------|---|---------|---------|
|                          | -45°C   | +25°C   | +85°C   | -45°C   | +25°C   | +85°C   | -45°C   | +25°C   | +85°C   |
| n                        |   |         |         |   |         |         |   |         |         |
| -5                       | -99.59  | -91.91  | -91.91  | -98.31  | -90.86  | -91.23  | -102.37   | -91.47  | -93.24  |
| -4                       | -90.37  | -107.24 | -106.83 | -88.45  | -101.58 | -101.55 | -91.50  | -114.56 | -107.00 |
| -3                       | -93.74  | -90.59  | -90.33  | -100.59   | -92.09  | -89.28  | -95.11  | -91.76  | -90.12  |
| -2                       | -113.33   | -95.30  | -102.40 | -102.39   | -92.92  | -103.16 | -110.37   | -94.66  | -98.02  |
| -1                       | -79.04  | -81.73  | -84.51  | -81.93  | -88.77  | -89.93  | -90.31  | -93.59  | -92.57  |
| 0 note 4                 | -   | -       | -       | -   | -       | -       | -   | -       | -       |
| +1                       | -86.29  | -83.27  | -81.32  | -77.66  | -79.34  | -80.89  | -77.74  | -80.45  | -80.87  |
| +2                       | -88.73  | -91.37  | -91.89  | -89.79  | -89.32  | -90.62  | -88.41  | -90.99  | -90.42  |
| +3                       | -87.58  | -92.47  | -104.04 | -88.91  | -93.98  | -101.64 | -88.39  | -94.49  | -104.54 |
| +4                       | -104.54   | -99.15  | -109.59 | -115.09   | -101.71 | -108.24 | -103.73   | -99.39  | -105.36 |
| +5                       | -93.89  | -96.03  | -101.17 | -95.08  | -99.15  | -101.96 | -96.65  | -97.00  | -103.30 |

Note 3: Reference frequency 92.16 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 [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).

| STEP SIZE<br>SPURIOUS<br>ORDER | 0.5 STEP SIZE & STEP SIZE<br>SPURIOUS @Fcarrier<br>1869.76MHz+(n*Fstep size)<br>(dBc) note 5 |         |         | 0.5 STEP SIZE & STEP SIZE<br>SPURIOUS @Fcarrier<br>1877.76MHz+(n*Fstep size)<br>(dBc) note 5 |         |         | 0.5 STEP SIZE & STEP SIZE<br>SPURIOUS @Fcarrier<br>1885.76MHz+(n*Fstep size)<br>(dBc) note 5 |         |         |
|--------------------------------|--|---------|---------|--|---------|---------|--|---------|---------|
|                                | n  | -45°C   | +25°C   | +85°C  | -45°C   | +25°C   | +85°C  | -45°C   | +25°C   |
| -5.0                           | -120.58  | -115.27 | -115.86 | -118.09  | -114.93 | -117.31 | -116.70  | -118.84 | -119.02 |
| -4.5                           | -114.52  | -117.68 | -117.60 | -116.58  | -117.36 | -117.50 | -117.28  | -113.81 | -115.67 |
| -4.0                           | -118.33  | -117.32 | -118.03 | -117.98  | -119.64 | -118.41 | -117.57  | -113.72 | -115.61 |
| -3.5                           | -119.16  | -113.61 | -114.08 | -114.21  | -117.93 | -116.88 | -116.76  | -118.14 | -114.14 |
| -3.0                           | -113.35  | -114.46 | -114.64 | -114.55  | -114.45 | -115.86 | -116.19  | -117.18 | -116.27 |
| -2.5                           | -116.13  | -112.54 | -114.35 | -112.23  | -116.76 | -113.36 | -114.05  | -107.21 | -113.54 |
| -2.0                           | -113.16  | -115.29 | -112.00 | -114.53  | -114.47 | -112.89 | -113.16  | -111.90 | -108.26 |
| -1.5                           | -108.65  | -107.18 | -108.74 | -106.99  | -106.55 | -106.73 | -105.79  | -113.39 | -107.97 |
| -1.0                           | -101.92  | -105.37 | -103.42 | -106.46  | -106.57 | -104.45 | -106.01  | -104.90 | -103.67 |
| -0.5                           | -91.72   | -89.52  | -91.67  | -91.96   | -89.23  | -94.66  | -88.31   | -89.45  | -92.02  |
| 0 note 6                       | -  | -       | -       | -  | -       | -       | -  | -       | -       |
| +0.5                           | -88.56   | -90.23  | -92.02  | -89.86   | -92.03  | -92.59  | -93.93   | -94.12  | -92.06  |
| +1.0                           | -105.61  | -100.11 | -104.43 | -106.27  | -104.23 | -100.58 | -103.35  | -105.69 | -105.50 |
| +1.5                           | -109.15  | -108.57 | -104.28 | -108.37  | -112.66 | -111.28 | -107.90  | -109.24 | -110.82 |
| +2.0                           | -114.46  | -115.21 | -109.38 | -108.55  | -113.34 | -111.76 | -113.07  | -114.57 | -108.99 |
| +2.5                           | -117.08  | -115.01 | -115.88 | -111.73  | -111.45 | -114.63 | -112.69  | -113.43 | -114.25 |
| +3.0                           | -114.52  | -116.40 | -117.09 | -117.41  | -113.62 | -116.22 | -112.03  | -116.13 | -115.46 |
| +3.5                           | -119.08  | -113.04 | -118.75 | -117.33  | -116.97 | -119.19 | -117.89  | -116.88 | -116.15 |
| +4.0                           | -115.06  | -119.28 | -113.79 | -117.48  | -114.96 | -115.29 | -115.35  | -117.43 | -119.63 |
| +4.5                           | -114.28  | -117.71 | -117.98 | -116.48  | -117.27 | -116.60 | -116.83  | -114.72 | -119.83 |
| +5.0                           | -120.81  | -114.31 | -117.47 | -118.34  | -119.12 | -116.70 | -119.89  | -120.30 | -119.11 |

Note 5: Step size 320 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

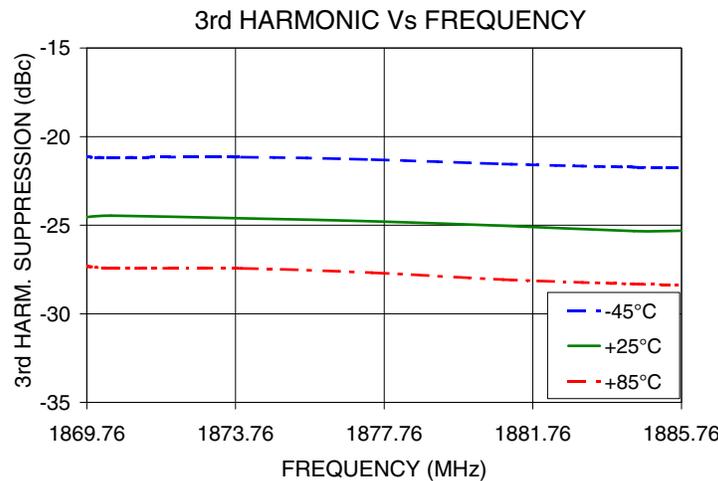
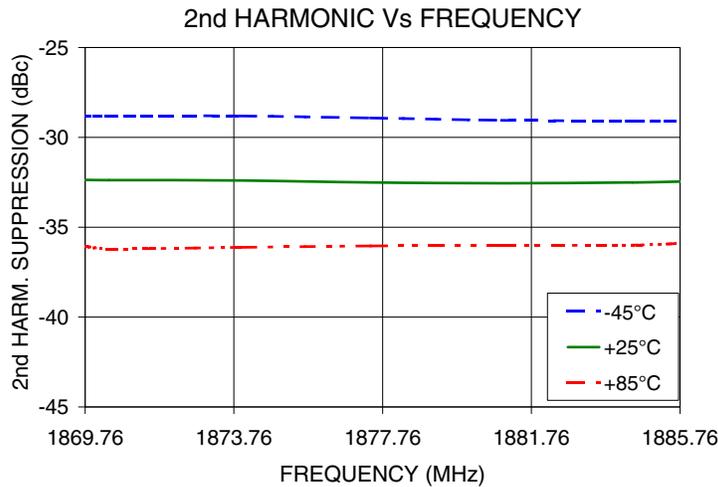
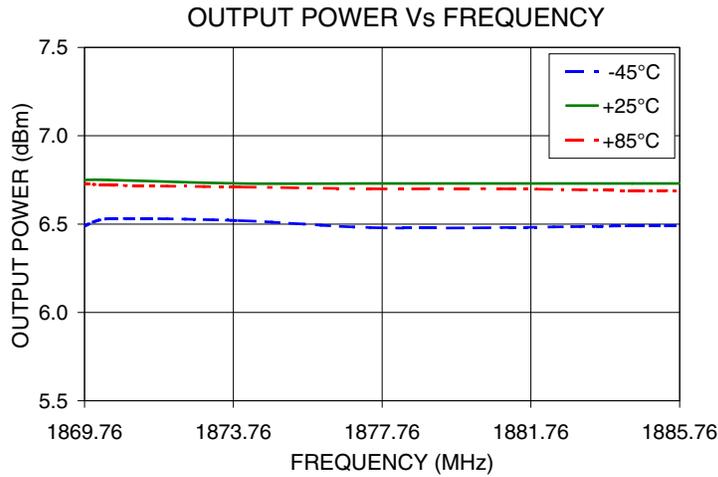


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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

Typical Performance Curves



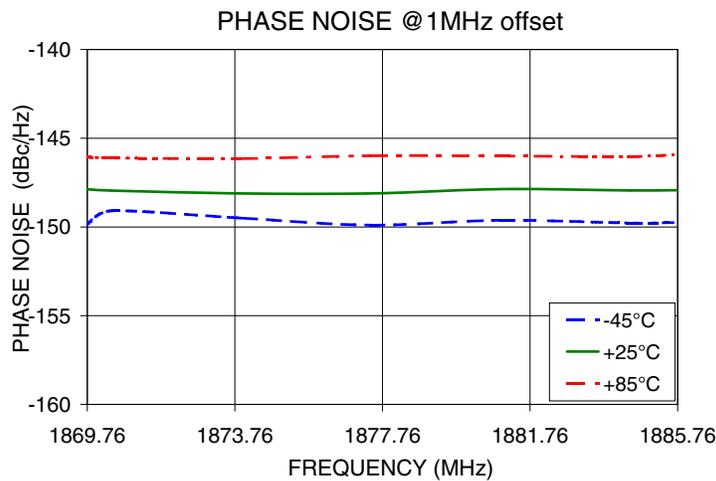
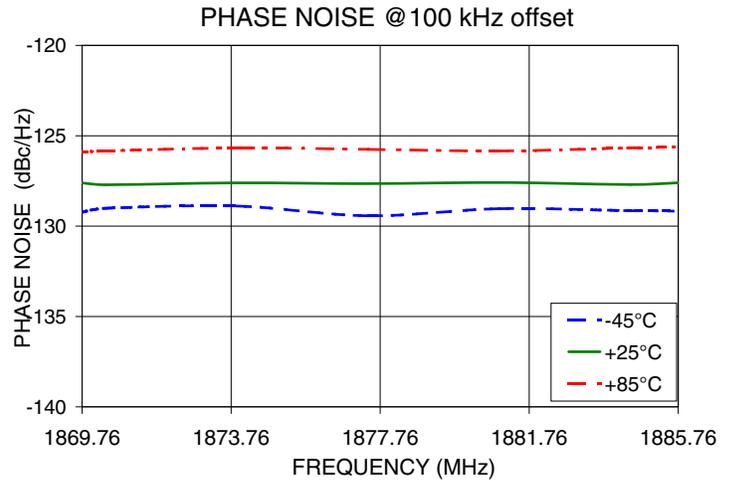
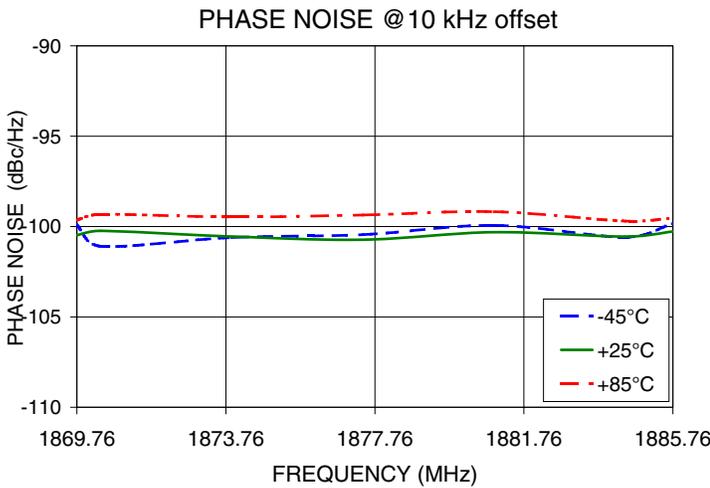
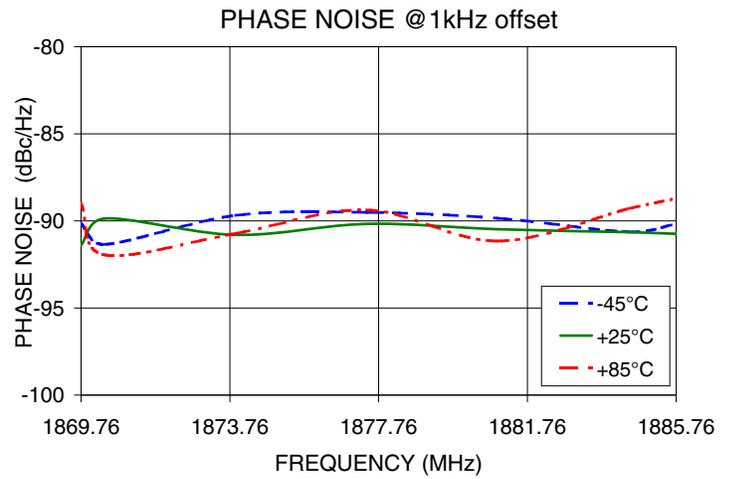
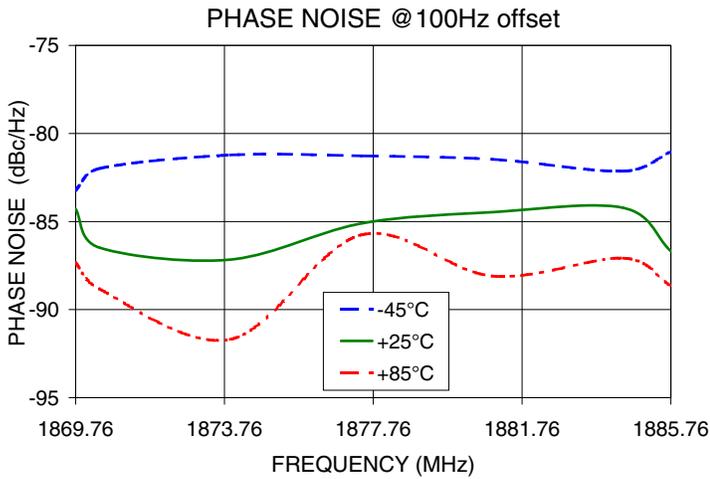
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant  
 P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



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).



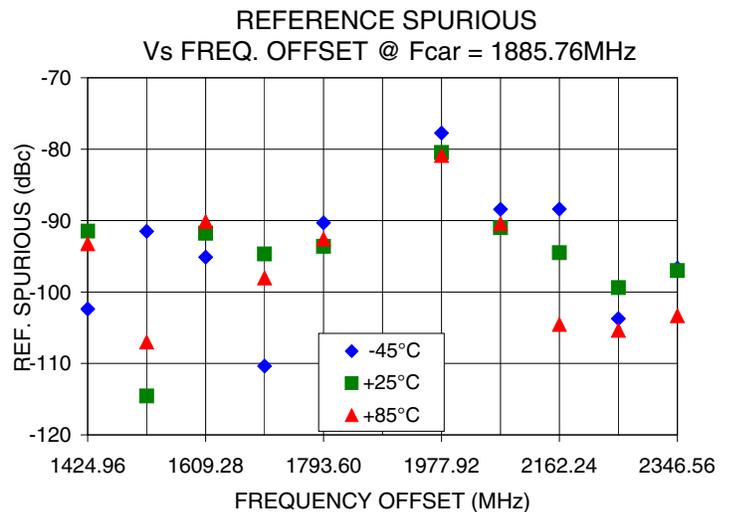
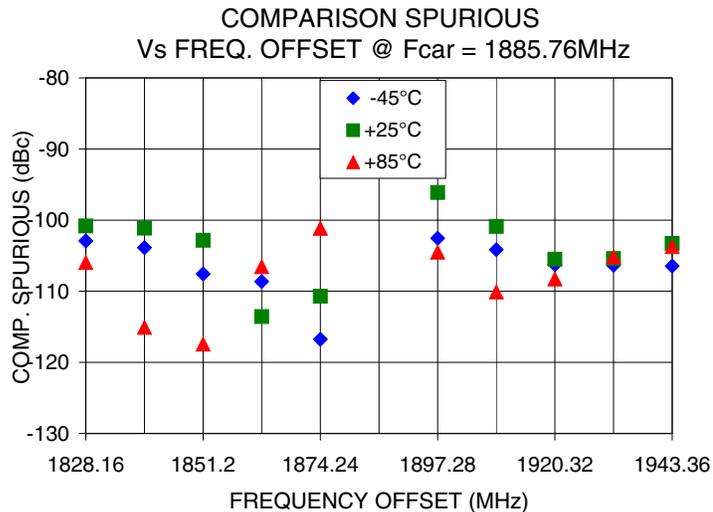
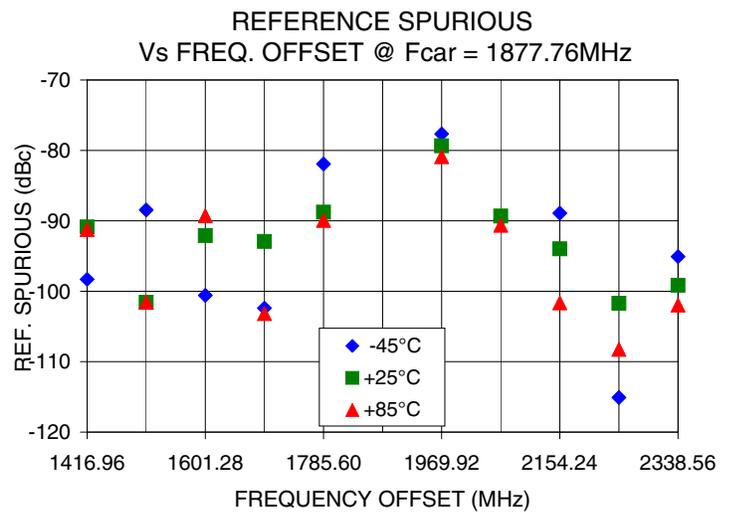
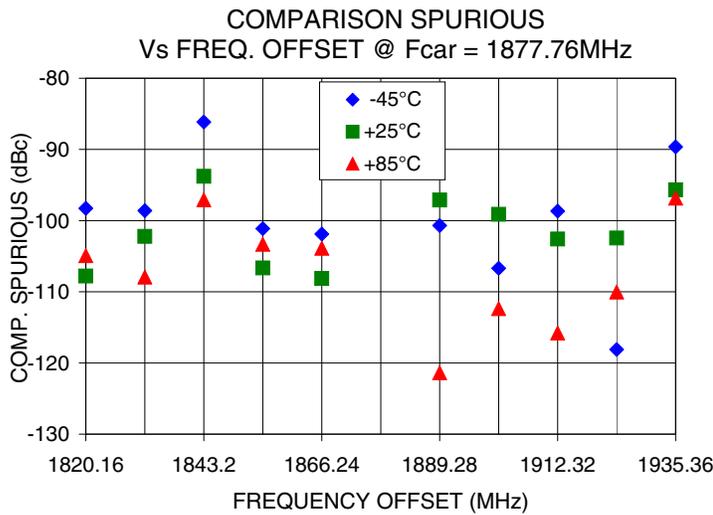
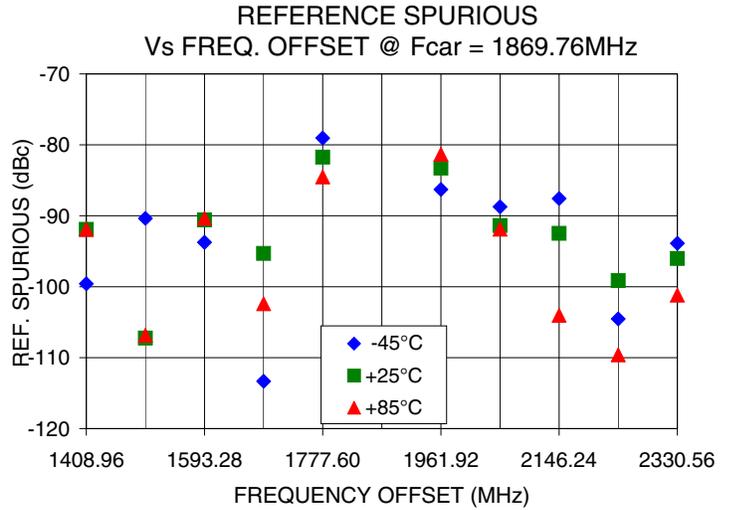
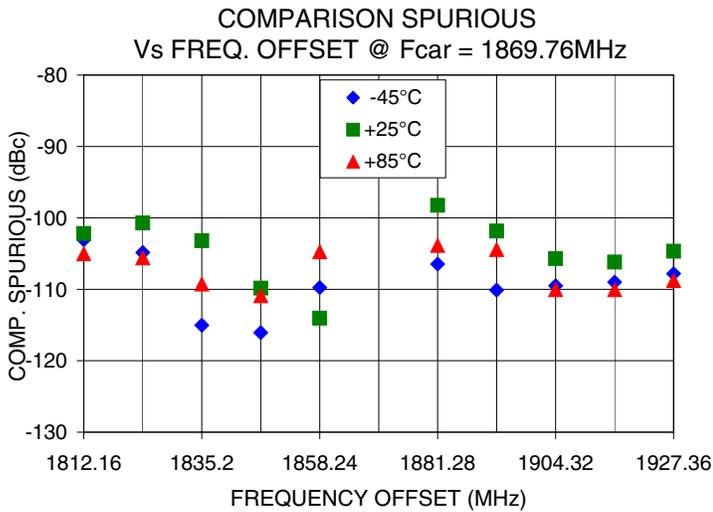
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant  
 P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



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

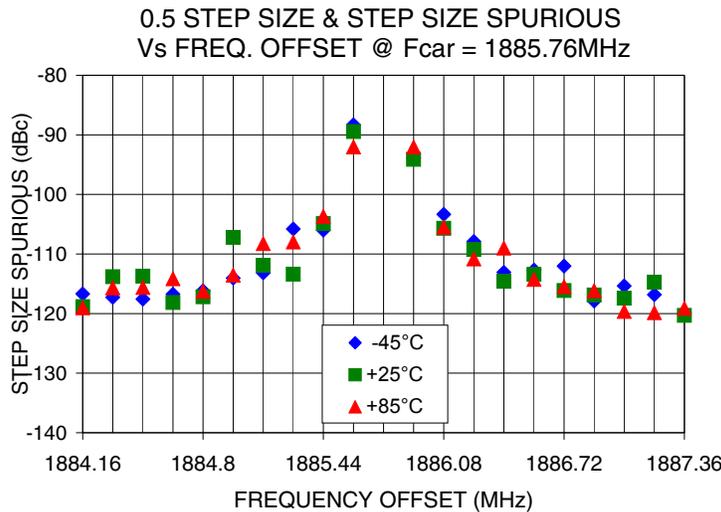
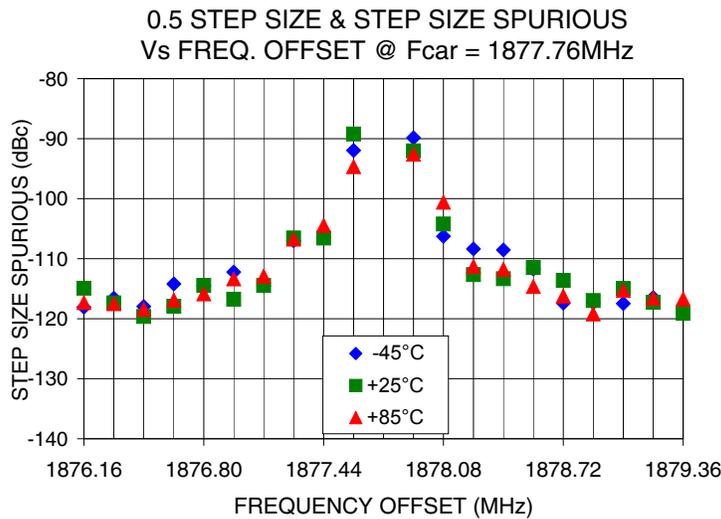
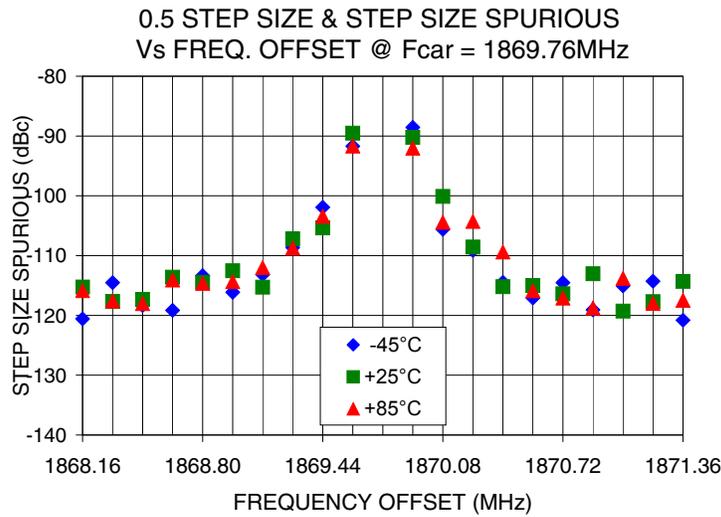
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



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).



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

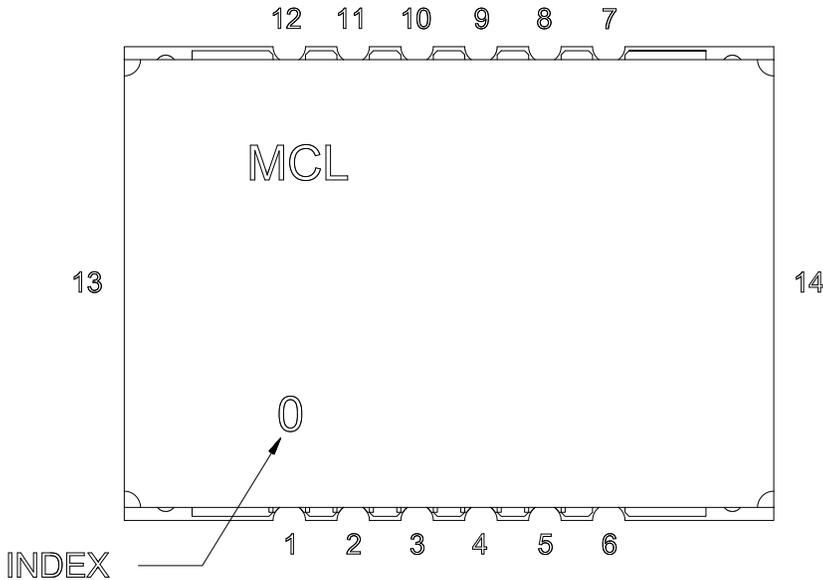


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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

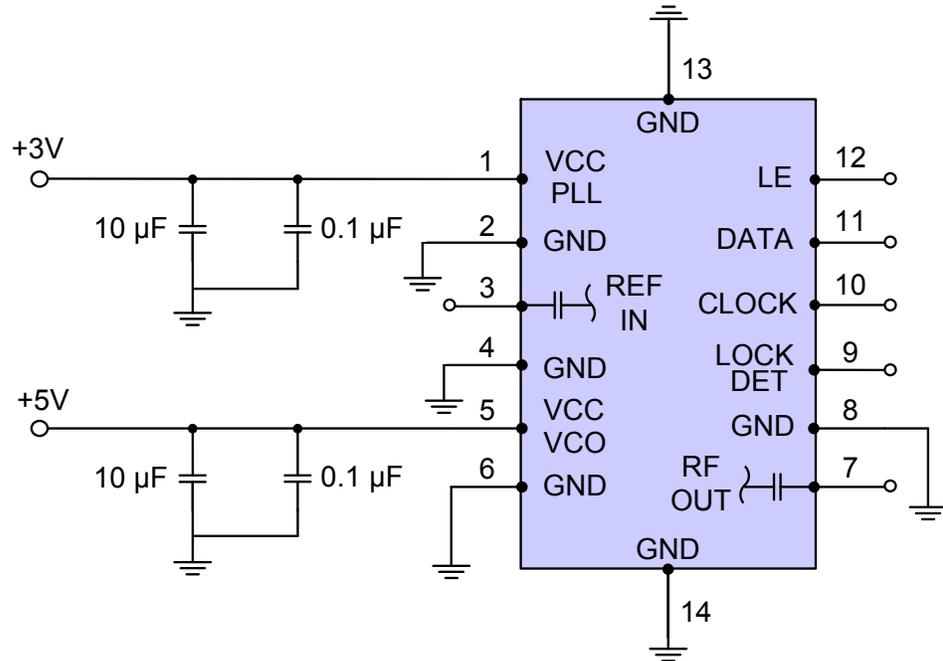


Pin Connection

| 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

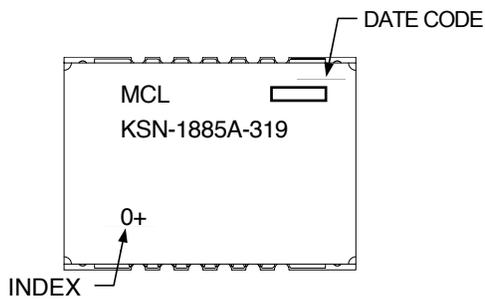


The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



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-567-2+

**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).