

# Frequency Synthesizer

KSN-1932A-119+

50Ω 1832 to 1932 MHz

## The Big Deal

- Fractional N synthesizer
- Low phase noise and spurious
- Robust design and construction
- Small size 0.800" x 0.584" x 0.240"



CASE STYLE: DK1182

## Product Overview

The KSN-1932A-119+ is a Frequency Synthesizer, designed to operate from 1832 to 1932 MHz for WiMAX application. The KSN-1932A-119+ is packaged in a metal case (size of 0.800" x 0.584" x 0.240") 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: -108 dBc/Hz typ. @10 kHz offset</li><li>• Step Size Spurious: -87 dBc typ.</li><li>• Comparison Spurious: -92 dBc typ.</li><li>• Reference Spurious: -90 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-1932A-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, 0.800" x 0.584" x 0.240"                                                                                                                                                                                                                           | The small size enables the KSN-1932A-119+ to be used in compact designs.                                                                                                                                                   |



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50Ω 1832 to 1932 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 0.800" x 0.584" x 0.240"

## Applications

- WiMAX

## General Description

The KSN-1932A-119+ is a Frequency Synthesizer, designed to operate from 1832 to 1932 MHz for WiMAX application. The KSN-1932A-119+ is packaged in a metal case (size of 0.800" x 0.584" x 0.240) to shield against unwanted signals and noise. To enhance the robustness of KSN-1932A-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.



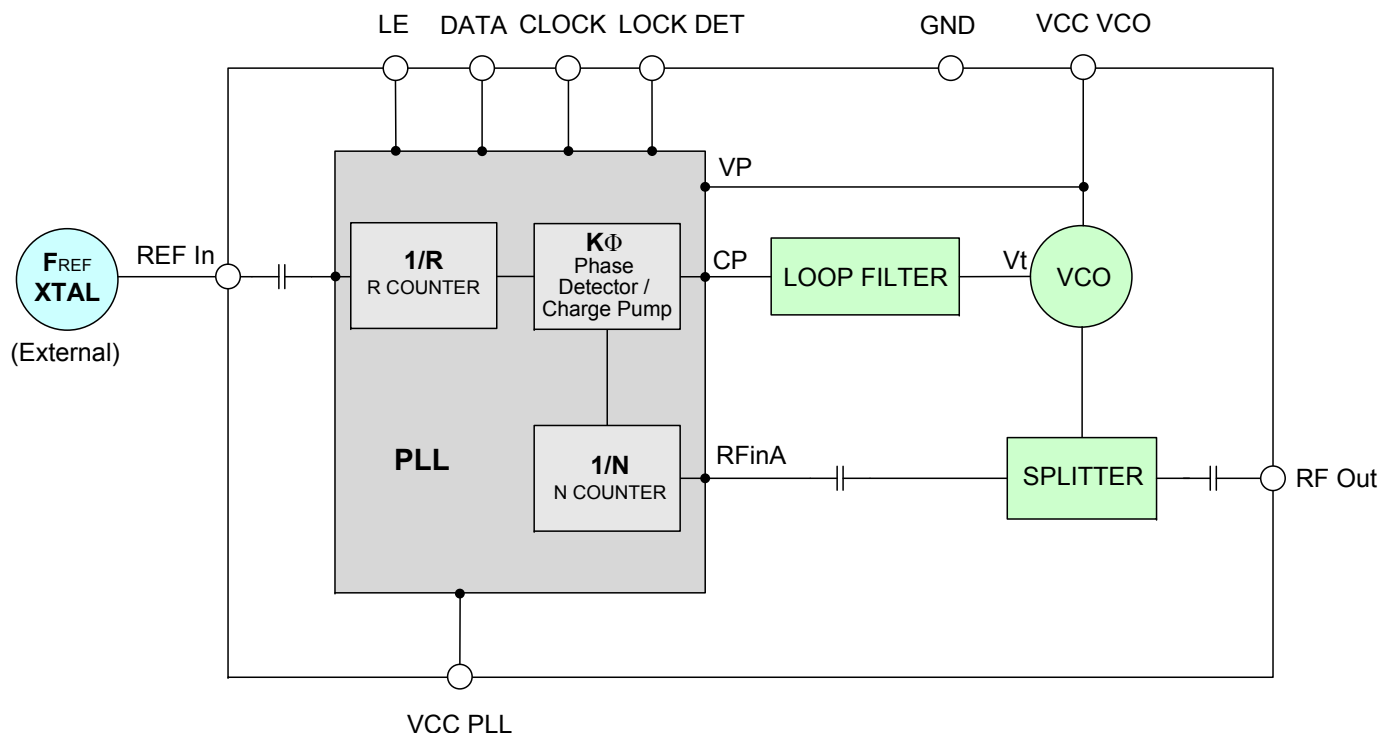
CASE STYLE: DK1182

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



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REV. OR  
M127257  
EDR-8361/1F1  
KSN-1932A-119+  
Category-A3  
RAV  
100818  
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**Electrical Specifications** (over operating temperature -40°C to +85°C)

| Parameters                          |                            | Test Conditions        | Min.                                  | Typ. | Max. | Units            |
|-------------------------------------|----------------------------|------------------------|---------------------------------------|------|------|------------------|
| Frequency Range                     |                            | -                      | 1832                                  | -    | 1932 | MHz              |
| Step Size                           |                            | -                      | -                                     | 125  | -    | kHz              |
| Comparison Frequency                |                            | -                      | -                                     | 13   | -    | MHz              |
| Settling Time                       |                            | Within $\pm 1$ kHz     | -                                     | 25   | -    | mSec             |
| Output Power                        |                            | -                      | 0                                     | +3   | +6   | dBm              |
| SSB Phase Noise                     | @ 100 Hz offset            |                        | -                                     | -80  | -    | dBc/Hz           |
|                                     | @ 1 kHz offset             |                        | -                                     | -87  | -78  |                  |
|                                     | @ 10 kHz offset            |                        | -                                     | -108 | -100 |                  |
|                                     | @ 100 kHz offset           |                        | -                                     | -130 | -125 |                  |
|                                     | @ 1 MHz offset             |                        | -                                     | -150 | -145 |                  |
| Integrated SSB Phase Noise          |                            | @ 100 Hz to 5MHz       | -                                     | -48  | -    | dBc              |
| Step Size Spurious Suppression      |                            | Step Size 125 kHz      | -                                     | -87  | -70  | dBc              |
| 0.5 Step Size Spurious Suppression  |                            | 0.5 Step Size 62.5 kHz | -                                     | -85  | -70  |                  |
| Reference Spurious Suppression      |                            | Ref. Freq. 52 MHz      | -                                     | -90  | -80  |                  |
| Comparison Spurious Suppression     |                            | Comp. Freq. 13 MHz     | -                                     | -92  | -80  |                  |
| Non - Harmonic Spurious Suppression |                            | -                      | -                                     | -90  | -    |                  |
| Harmonic Suppression                |                            | -                      | -                                     | -28  | -20  | V                |
| VCO Supply Voltage                  |                            | 5.00                   | 4.75                                  | 5.00 | 5.25 |                  |
| PLL Supply Voltage                  |                            | 3.00                   | 2.85                                  | 3.00 | 3.15 |                  |
| VCO Supply Current                  |                            | -                      | -                                     | 43   | 51   | mA               |
| PLL Supply Current                  |                            | -                      | -                                     | 15   | 22   |                  |
| Reference Input<br>(External)       | Frequency                  | 52 (square wave)       | -                                     | 52   | -    | MHz              |
|                                     | Amplitude                  | 1                      | -                                     | 1    | -    | V <sub>P-P</sub> |
|                                     | Input impedance            | -                      | -                                     | 100  | -    | K $\Omega$       |
|                                     | Phase Noise @ 1 kHz offset | -                      | -                                     | -130 | -    | dBc/Hz           |
| RF Output port Impedance            |                            | -                      | -                                     | 50   | -    | $\Omega$         |
| Input Logic Level                   | Input high voltage         | -                      | 2.55                                  | -    | -    | V                |
|                                     | Input low voltage          | -                      | -                                     | -    | 0.55 | V                |
| Digital Lock Detect                 | Locked                     | -                      | 2.45                                  | -    | 3.15 | V                |
|                                     | Unlocked                   | -                      | -                                     | -    | 0.40 | V                |
| Frequency Synthesizer PLL           |                            | -                      | ADF4153                               |      |      |                  |
| PLL Programming                     |                            | -                      | 3-wire serial 3V CMOS                 |      |      |                  |
| Register Map @ 1932 MHz             | R0_Register                | -                      | (MSB) 001001010000000100000000 (LSB)  |      |      |                  |
|                                     | R1_Register                | -                      | (MSB) 000101010000000110100001 (LSB)  |      |      |                  |
|                                     | R2_Register                | -                      | (MSB) 0000000000000001001100010 (LSB) |      |      |                  |
|                                     | R3_Register                | -                      | (MSB) 0000000000000001111000111 (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



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## 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 |
| 1832.00            | 2.53                  | 2.94  | 2.95  | 40.53               | 43.04 | 44.51 | 12.68              | 14.64 | 16.76 |
| 1844.00            | 2.46                  | 2.99  | 3.01  | 40.58               | 43.07 | 44.50 | 12.73              | 14.73 | 16.81 |
| 1856.00            | 2.65                  | 2.96  | 3.02  | 40.57               | 43.03 | 44.44 | 12.82              | 14.82 | 16.90 |
| 1868.00            | 2.78                  | 3.14  | 3.14  | 40.54               | 42.99 | 44.39 | 12.82              | 14.84 | 16.91 |
| 1880.00            | 2.80                  | 3.17  | 3.23  | 40.54               | 42.95 | 44.33 | 12.88              | 14.90 | 16.96 |
| 1892.00            | 2.81                  | 3.19  | 3.28  | 40.52               | 42.90 | 44.26 | 12.82              | 14.85 | 16.90 |
| 1904.00            | 2.85                  | 3.22  | 3.26  | 40.46               | 42.81 | 44.16 | 12.92              | 14.96 | 17.00 |
| 1916.00            | 2.83                  | 3.12  | 3.21  | 40.37               | 42.69 | 44.03 | 12.94              | 14.98 | 17.03 |
| 1928.00            | 2.90                  | 3.14  | 3.17  | 40.23               | 42.53 | 43.89 | 12.88              | 14.91 | 16.96 |
| 1932.00            | 2.93                  | 3.13  | 3.15  | 40.18               | 42.47 | 43.83 | 12.83              | 14.87 | 16.91 |

| FREQUENCY<br>(MHz) | HARMONICS (dBc) |        |        |        |        |        |
|--------------------|-----------------|--------|--------|--------|--------|--------|
|                    | F2              |        |        | F3     |        |        |
|                    | -45°C           | +25°C  | +85°C  | -45°C  | +25°C  | +85°C  |
| 1832.00            | -38.64          | -39.68 | -38.81 | -27.86 | -27.68 | -28.63 |
| 1844.00            | -37.62          | -39.28 | -38.79 | -27.49 | -27.42 | -28.58 |
| 1856.00            | -36.70          | -38.19 | -37.46 | -27.74 | -26.89 | -27.86 |
| 1868.00            | -35.95          | -38.42 | -38.07 | -28.12 | -28.23 | -29.17 |
| 1880.00            | -35.63          | -38.34 | -39.42 | -26.79 | -27.33 | -28.29 |
| 1892.00            | -36.31          | -38.69 | -38.90 | -27.78 | -27.76 | -28.46 |
| 1904.00            | -35.52          | -38.66 | -39.33 | -28.03 | -28.35 | -28.99 |
| 1916.00            | -33.51          | -37.04 | -38.99 | -27.56 | -27.64 | -28.15 |
| 1928.00            | -33.63          | -36.63 | -40.75 | -27.32 | -26.99 | -27.44 |
| 1932.00            | -33.61          | -36.67 | -40.99 | -27.60 | -27.42 | -27.78 |



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| FREQUENCY<br>(MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS |        |         |         |         |
|--------------------|--------------------------------|--------|---------|---------|---------|
|                    | +25°C                          |        |         |         |         |
|                    | 100Hz                          | 1kHz   | 10kHz   | 100kHz  | 1MHz    |
| 1832.00            | -84.44                         | -89.89 | -110.02 | -133.28 | -151.42 |
| 1844.00            | -85.15                         | -90.77 | -109.86 | -133.05 | -152.76 |
| 1856.00            | -84.65                         | -89.61 | -109.73 | -132.81 | -152.58 |
| 1868.00            | -81.11                         | -89.06 | -109.60 | -132.83 | -153.60 |
| 1880.00            | -80.86                         | -87.99 | -108.24 | -132.47 | -153.14 |
| 1892.00            | -84.04                         | -87.01 | -108.06 | -132.55 | -152.50 |
| 1904.00            | -81.35                         | -89.77 | -107.82 | -132.07 | -152.40 |
| 1916.00            | -83.77                         | -89.32 | -107.50 | -131.71 | -152.23 |
| 1928.00            | -80.86                         | -88.06 | -107.31 | -130.52 | -150.12 |
| 1932.00            | -82.25                         | -87.53 | -107.18 | -130.33 | -150.10 |

| FREQUENCY<br>(MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS |        |         |         |         |
|--------------------|--------------------------------|--------|---------|---------|---------|
|                    | -45°C                          |        |         |         |         |
|                    | 100Hz                          | 1kHz   | 10kHz   | 100kHz  | 1MHz    |
| 1832.00            | -84.97                         | -92.64 | -109.64 | -133.29 | -153.30 |
| 1844.00            | -84.08                         | -90.48 | -109.12 | -133.24 | -153.30 |
| 1856.00            | -86.29                         | -90.55 | -108.55 | -132.87 | -153.20 |
| 1868.00            | -81.88                         | -91.46 | -108.61 | -132.63 | -152.26 |
| 1880.00            | -84.70                         | -90.89 | -108.86 | -133.15 | -153.62 |
| 1892.00            | -85.25                         | -90.71 | -108.06 | -133.17 | -152.23 |
| 1904.00            | -83.73                         | -90.07 | -108.38 | -133.26 | -153.58 |
| 1916.00            | -85.24                         | -89.56 | -108.68 | -132.87 | -153.50 |
| 1928.00            | -84.23                         | -88.42 | -107.84 | -131.86 | -152.07 |
| 1932.00            | -84.03                         | -88.32 | -106.77 | -131.09 | -151.66 |

| FREQUENCY<br>(MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS |        |         |         |         |
|--------------------|--------------------------------|--------|---------|---------|---------|
|                    | +85°C                          |        |         |         |         |
|                    | 100Hz                          | 1kHz   | 10kHz   | 100kHz  | 1MHz    |
| 1832.00            | -86.06                         | -88.60 | -109.73 | -132.32 | -150.90 |
| 1844.00            | -86.47                         | -88.13 | -109.49 | -131.88 | -152.58 |
| 1856.00            | -87.35                         | -88.31 | -109.11 | -131.78 | -152.19 |
| 1868.00            | -85.82                         | -88.19 | -108.48 | -131.07 | -151.69 |
| 1880.00            | -88.22                         | -87.65 | -108.37 | -131.38 | -151.96 |
| 1892.00            | -86.29                         | -86.81 | -107.47 | -131.19 | -151.31 |
| 1904.00            | -88.60                         | -86.51 | -107.64 | -130.85 | -151.27 |
| 1916.00            | -87.35                         | -86.05 | -106.62 | -130.33 | -150.68 |
| 1928.00            | -82.50                         | -84.99 | -106.66 | -129.51 | -149.75 |
| 1932.00            | -83.51                         | -83.45 | -106.46 | -129.24 | -149.41 |



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| COMPARISON<br>SPURIOUS<br>ORDER | COMPARISON SPURIOUS<br>@ Fcarrier<br>1832MHz+(n*Fcomparison)<br>(dBc) note 1 |         |         | COMPARISON SPURIOUS<br>@ Fcarrier<br>1882MHz+(n*Fcomparison)<br>(dBc) note 1 |        |         | COMPARISON SPURIOUS<br>@ Fcarrier<br>1932MHz+(n*Fcomparison)<br>(dBc) note 1 |         |         |
|---------------------------------|------------------------------------------------------------------------------|---------|---------|------------------------------------------------------------------------------|--------|---------|------------------------------------------------------------------------------|---------|---------|
|                                 | -45°C                                                                        | +25°C   | +85°C   | -45°C                                                                        | +25°C  | +85°C   | -45°C                                                                        | +25°C   | +85°C   |
| -5                              | -94.91                                                                       | -95.98  | -107.30 | -99.70                                                                       | 112.93 | -107.84 | -101.51                                                                      | -115.01 | -106.45 |
| -4                              | -103.10                                                                      | -105.16 | -102.90 | -101.66                                                                      | 99.70  | -99.64  | -98.14                                                                       | -99.07  | -104.95 |
| -3                              | -113.39                                                                      | -99.52  | -98.25  | -102.07                                                                      | 95.17  | -97.68  | -98.27                                                                       | -101.35 | -106.11 |
| -2                              | -100.12                                                                      | -100.40 | -95.78  | -95.98                                                                       | 92.36  | -97.72  | -98.99                                                                       | -94.50  | -107.14 |
| -1                              | -96.48                                                                       | -102.37 | -96.71  | -93.93                                                                       | 92.72  | -99.47  | -99.67                                                                       | -92.15  | -103.61 |
| 0 note 2                        | -                                                                            | -       | -       | -                                                                            | -      | -       | -                                                                            | -       | -       |
| +1                              | -98.93                                                                       | -99.68  | -100.69 | -98.81                                                                       | 94.28  | -100.91 | -103.25                                                                      | -96.24  | -104.88 |
| +2                              | -99.02                                                                       | -112.73 | -98.00  | -106.20                                                                      | 96.03  | -97.56  | -102.88                                                                      | -95.45  | -109.77 |
| +3                              | -97.01                                                                       | -113.36 | -98.15  | -100.98                                                                      | 101.80 | -94.63  | -96.07                                                                       | -101.15 | -102.97 |
| +4                              | -97.09                                                                       | -98.32  | -93.66  | -91.33                                                                       | 102.38 | -92.88  | -94.46                                                                       | -98.61  | -93.16  |
| +5                              | -106.72                                                                      | -99.64  | -101.23 | -94.98                                                                       | 106.75 | -102.56 | -96.25                                                                       | -97.82  | -96.90  |

Note 1: Comparison frequency 13 MHz

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

| REFERENCE<br>SPURIOUS<br>ORDER | REFERENCE SPURIOUS<br>@ Fcarrier<br>1832MHz+(n*Freference)<br>(dBc) note 3 |         |         | REFERENCE SPURIOUS<br>@ Fcarrier<br>1882MHz+(n*Freference)<br>(dBc) note 3 |         |         | REFERENCE SPURIOUS<br>@ Fcarrier<br>1932MHz+(n*Freference)<br>(dBc) note 3 |         |         |
|--------------------------------|----------------------------------------------------------------------------|---------|---------|----------------------------------------------------------------------------|---------|---------|----------------------------------------------------------------------------|---------|---------|
|                                | -45°C                                                                      | +25°C   | +85°C   | -45°C                                                                      | +25°C   | +85°C   | -45°C                                                                      | +25°C   | +85°C   |
| -5                             | -94.82                                                                     | -105.09 | -102.08 | -101.67                                                                    | -100.42 | -93.46  | -96.55                                                                     | -99.34  | -103.05 |
| -4                             | -102.20                                                                    | -97.34  | -100.86 | -92.70                                                                     | -100.93 | -98.33  | -91.66                                                                     | -92.95  | -95.76  |
| -3                             | -94.38                                                                     | -101.44 | -100.63 | -95.31                                                                     | -92.24  | -91.21  | -90.70                                                                     | -98.95  | -102.48 |
| -2                             | -93.77                                                                     | -98.34  | -98.41  | -104.07                                                                    | -95.89  | -96.09  | -99.11                                                                     | -95.44  | -103.03 |
| -1                             | -98.34                                                                     | -104.63 | -99.45  | -101.81                                                                    | -100.50 | -99.60  | -96.43                                                                     | -99.60  | -103.36 |
| 0 note 4                       | -                                                                          | -       | -       | -                                                                          | -       | -       | -                                                                          | -       | -       |
| +1                             | -101.18                                                                    | -98.85  | -93.33  | -89.96                                                                     | -101.87 | -91.14  | -100.52                                                                    | -98.46  | -93.43  |
| +2                             | -108.10                                                                    | -97.76  | -97.18  | -101.76                                                                    | -98.82  | -109.69 | -101.68                                                                    | -95.57  | -98.34  |
| +3                             | -92.91                                                                     | -95.69  | -101.93 | -92.68                                                                     | -91.70  | -99.02  | -96.60                                                                     | -103.67 | -104.06 |
| +4                             | -103.48                                                                    | -99.84  | -100.94 | -99.98                                                                     | -104.14 | -109.77 | -98.79                                                                     | -105.10 | -103.57 |
| +5                             | -108.83                                                                    | -114.85 | -102.73 | -107.48                                                                    | -107.02 | -104.35 | -96.67                                                                     | -102.53 | -104.56 |

Note 3: Reference frequency 52 MHz

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



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| STEP SIZE<br>SPURIOUS<br>ORDER | 0.5 STEP SIZE & STEP SIZE<br>SPURIOUS @Fcarrier<br>1832MHz+(n*Fstep size)<br>(dBc) note 5 |         |         | 0.5 STEP SIZE & STEP SIZE<br>SPURIOUS @Fcarrier<br>1882MHz+(n*Fstep size)<br>(dBc) note 5 |         |         | 0.5 STEP SIZE & STEP SIZE<br>SPURIOUS @Fcarrier<br>1932MHz+(n*Fstep size)<br>(dBc) note 5 |         |         |
|--------------------------------|-------------------------------------------------------------------------------------------|---------|---------|-------------------------------------------------------------------------------------------|---------|---------|-------------------------------------------------------------------------------------------|---------|---------|
|                                | -45°C                                                                                     | +25°C   | +85°C   | -45°C                                                                                     | +25°C   | +85°C   | -45°C                                                                                     | +25°C   | +85°C   |
| -5.0                           | -112.64                                                                                   | -110.56 | -108.09 | -108.27                                                                                   | -110.99 | -111.95 | -112.59                                                                                   | -110.47 | -113.61 |
| -4.5                           | -108.08                                                                                   | -108.16 | -112.49 | -109.86                                                                                   | -112.44 | -108.50 | -109.74                                                                                   | -110.80 | -111.64 |
| -4.0                           | -111.46                                                                                   | -108.14 | -105.08 | -110.06                                                                                   | -109.02 | -109.57 | -107.47                                                                                   | -111.03 | -107.12 |
| -3.5                           | -109.44                                                                                   | -105.47 | -109.71 | -108.68                                                                                   | -108.59 | -108.02 | -107.10                                                                                   | -107.13 | -110.14 |
| -3.0                           | -106.13                                                                                   | -104.03 | -107.36 | -103.27                                                                                   | -104.98 | -107.68 | -107.06                                                                                   | -104.72 | -107.96 |
| -2.5                           | -101.54                                                                                   | -103.61 | -102.07 | -104.84                                                                                   | -103.60 | -100.25 | -100.66                                                                                   | -102.65 | -101.52 |
| -2.0                           | -96.92                                                                                    | -99.83  | -100.49 | -100.07                                                                                   | -100.30 | -99.58  | -98.58                                                                                    | -100.03 | -95.72  |
| -1.5                           | -94.26                                                                                    | -95.39  | -95.76  | -95.22                                                                                    | -95.48  | -92.99  | -95.11                                                                                    | -93.41  | -95.77  |
| -1.0                           | -87.55                                                                                    | -88.29  | -89.85  | -86.71                                                                                    | -89.38  | -89.41  | -86.10                                                                                    | -88.75  | -88.02  |
| -0.5                           | -86.05                                                                                    | -86.32  | -85.97  | -86.94                                                                                    | -86.09  | -86.06  | -86.43                                                                                    | -86.51  | -85.94  |
| 0 <sup>note 6</sup>            | -                                                                                         | -       | -       | -                                                                                         | -       | -       | -                                                                                         | -       | -       |
| +0.5                           | -86.36                                                                                    | -86.90  | -86.11  | -86.84                                                                                    | -85.94  | -86.69  | -85.18                                                                                    | -87.49  | -85.97  |
| +1.0                           | -86.37                                                                                    | -87.81  | -88.88  | -85.27                                                                                    | -89.04  | -86.81  | -87.85                                                                                    | -86.73  | -89.61  |
| +1.5                           | -94.26                                                                                    | -96.41  | -93.34  | -94.99                                                                                    | -94.63  | -96.02  | -93.86                                                                                    | -95.04  | -94.53  |
| +2.0                           | -99.59                                                                                    | -101.23 | -99.84  | -99.43                                                                                    | -101.70 | -98.07  | -100.84                                                                                   | -99.84  | -97.50  |
| +2.5                           | -100.78                                                                                   | -103.49 | -96.56  | -101.28                                                                                   | -102.62 | -103.62 | -102.17                                                                                   | -101.44 | -104.25 |
| +3.0                           | -103.00                                                                                   | -107.65 | -106.72 | -105.60                                                                                   | -109.58 | -106.78 | -105.05                                                                                   | -107.43 | -107.18 |
| +3.5                           | -110.13                                                                                   | -110.13 | -103.65 | -105.82                                                                                   | -108.96 | -109.22 | -107.95                                                                                   | -108.51 | -109.53 |
| +4.0                           | -111.34                                                                                   | -111.32 | -109.32 | -109.00                                                                                   | -110.74 | -110.91 | -111.31                                                                                   | -105.95 | -111.21 |
| +4.5                           | -112.40                                                                                   | -106.32 | -112.16 | -109.68                                                                                   | -110.88 | -112.20 | -108.11                                                                                   | -112.45 | -108.61 |
| +5.0                           | -111.11                                                                                   | -113.93 | -110.79 | -107.47                                                                                   | -110.03 | -109.29 | -112.63                                                                                   | -111.30 | -111.60 |

Note 5: Step size 125 kHz

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



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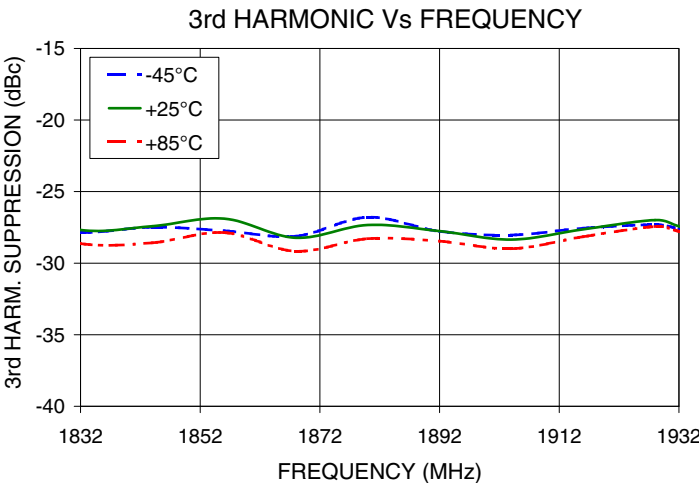
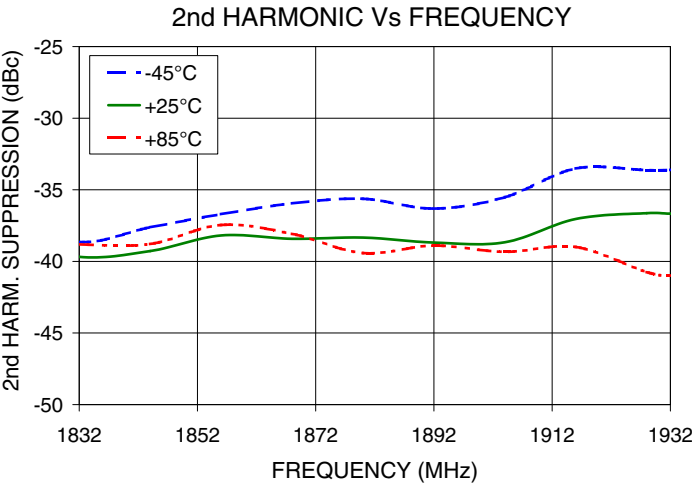
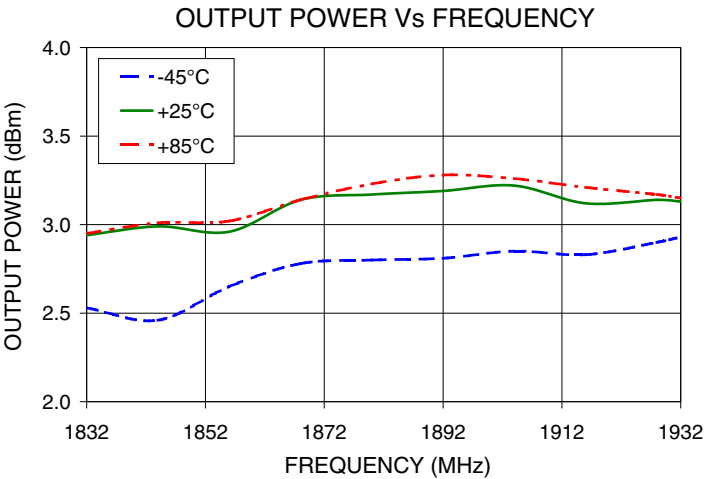


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Typical Performance Curves



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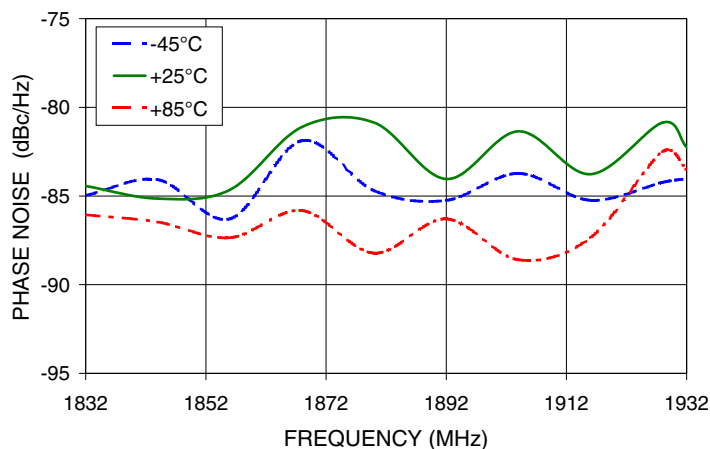


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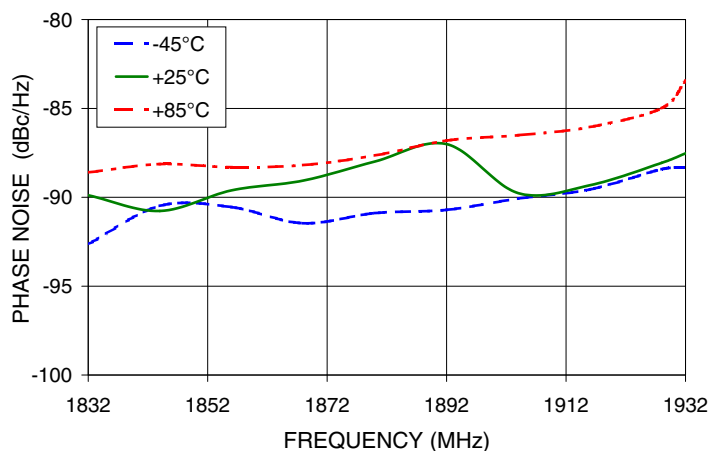


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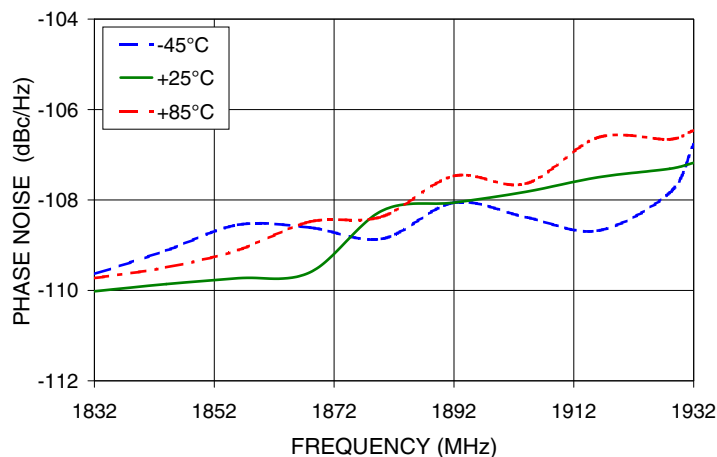
PHASE NOISE @ 100Hz offset



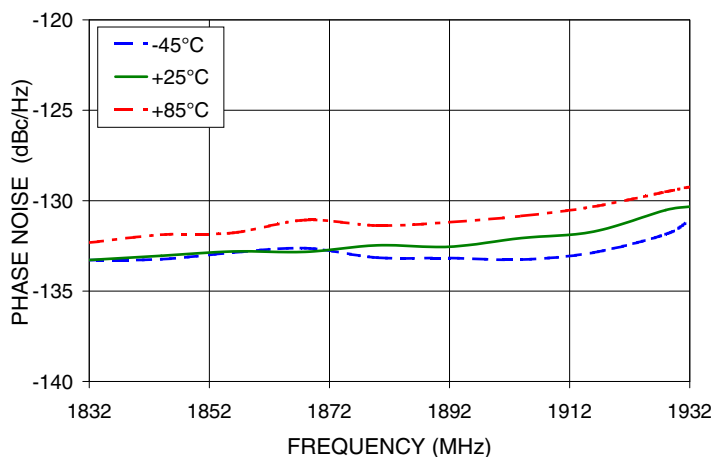
PHASE NOISE @ 1kHz offset



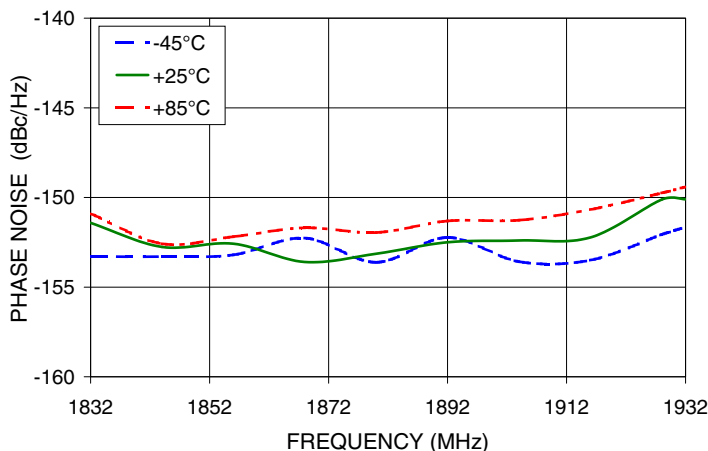
PHASE NOISE @ 10kHz offset



PHASE NOISE @ 100kHz offset



PHASE NOISE @ 1MHz offset



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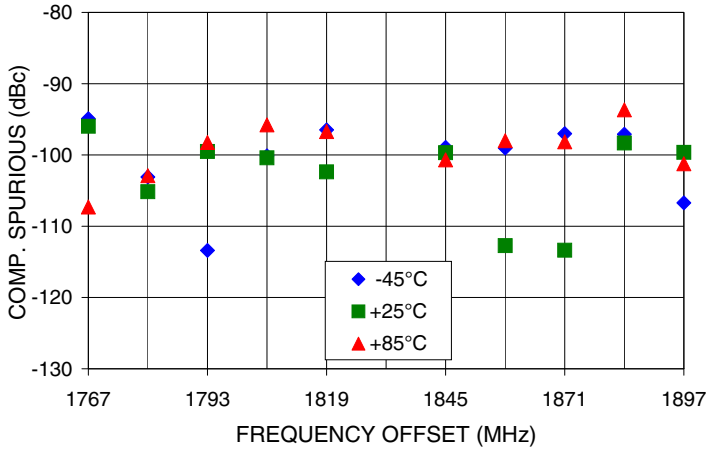


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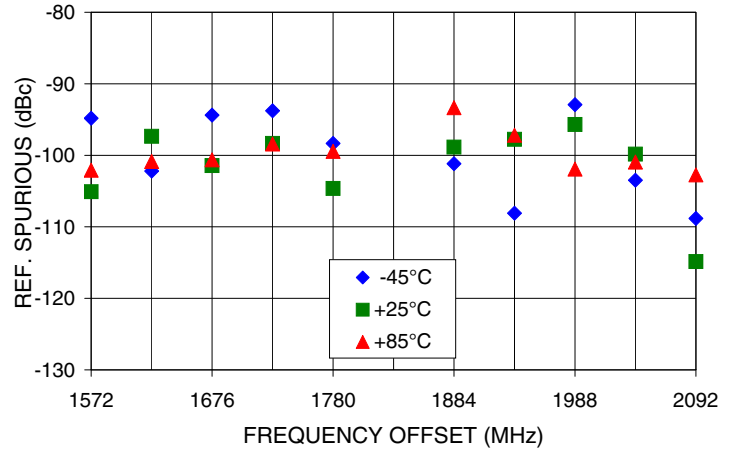


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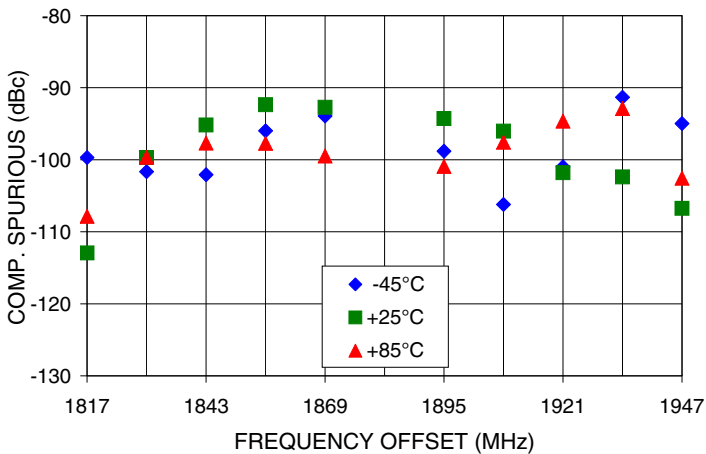
COMPARISON SPURIOUS  
Vs FREQ. OFFSET @ Fcar = 1832MHz



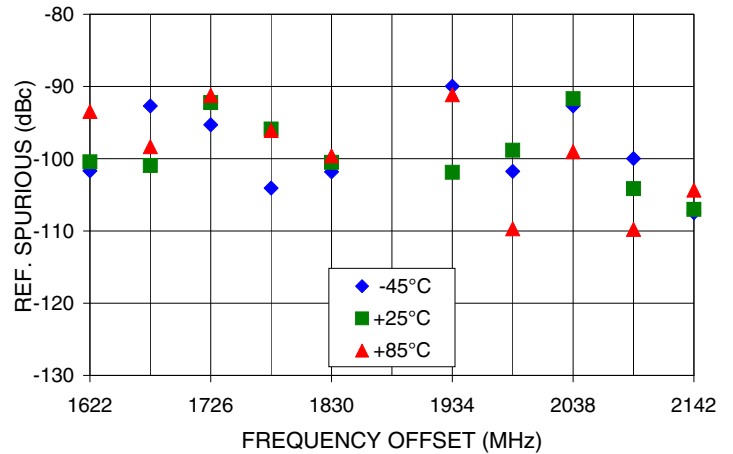
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Vs FREQ. OFFSET @ Fcar = 1832MHz



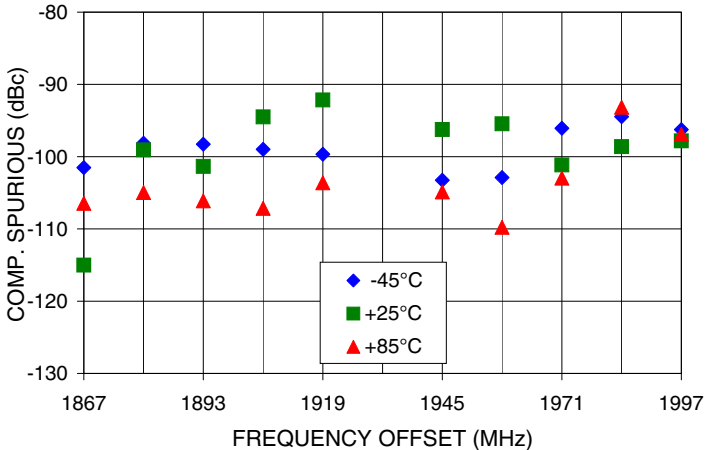
COMPARISON SPURIOUS  
Vs FREQ. OFFSET @ Fcar = 1882MHz



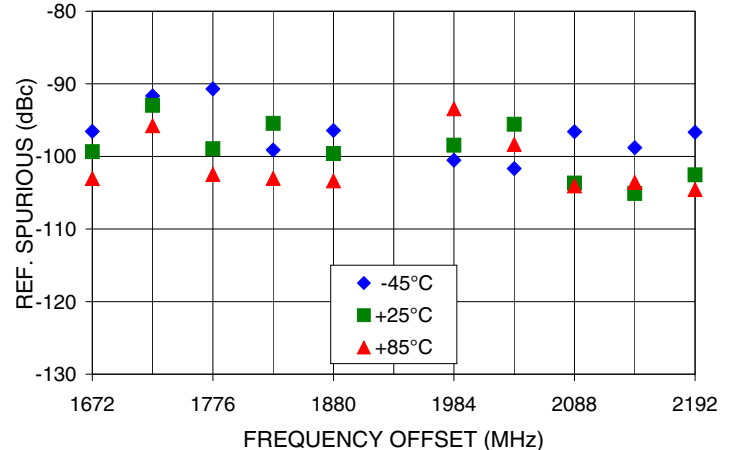
REFERENCE SPURIOUS  
Vs FREQ. OFFSET @ Fcar = 1882MHz



COMPARISON SPURIOUS  
Vs FREQ. OFFSET @ Fcar = 1932MHz



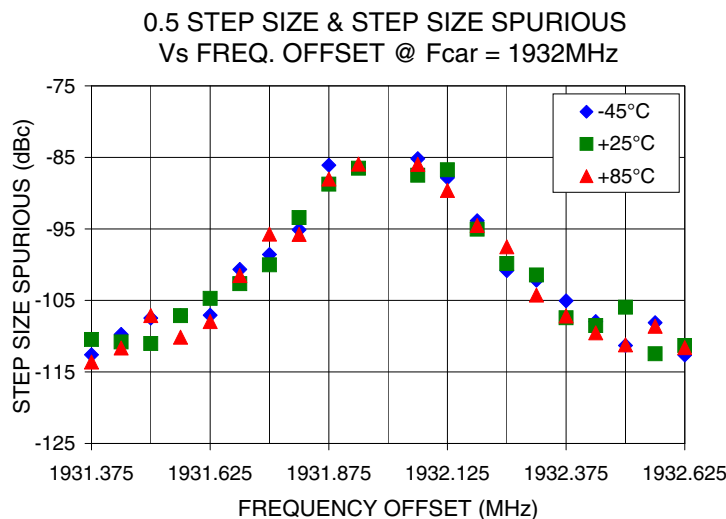
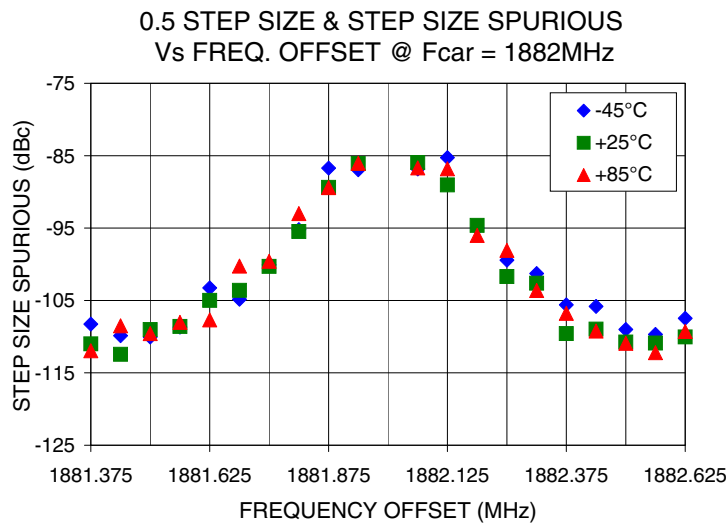
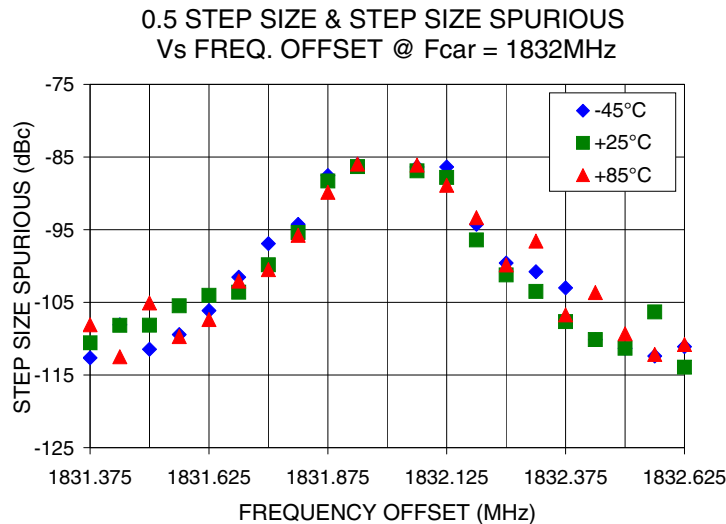
REFERENCE SPURIOUS  
Vs FREQ. OFFSET @ Fcar = 1932MHz



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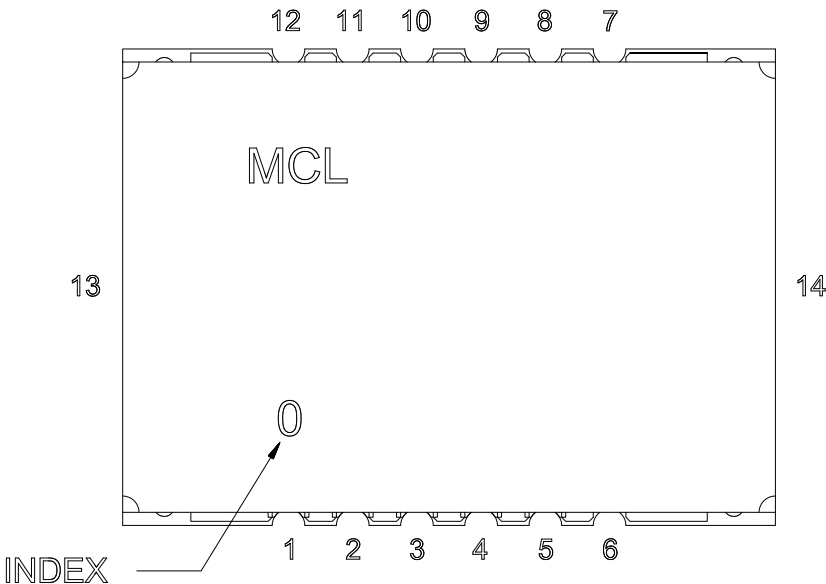


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Pin Configuration

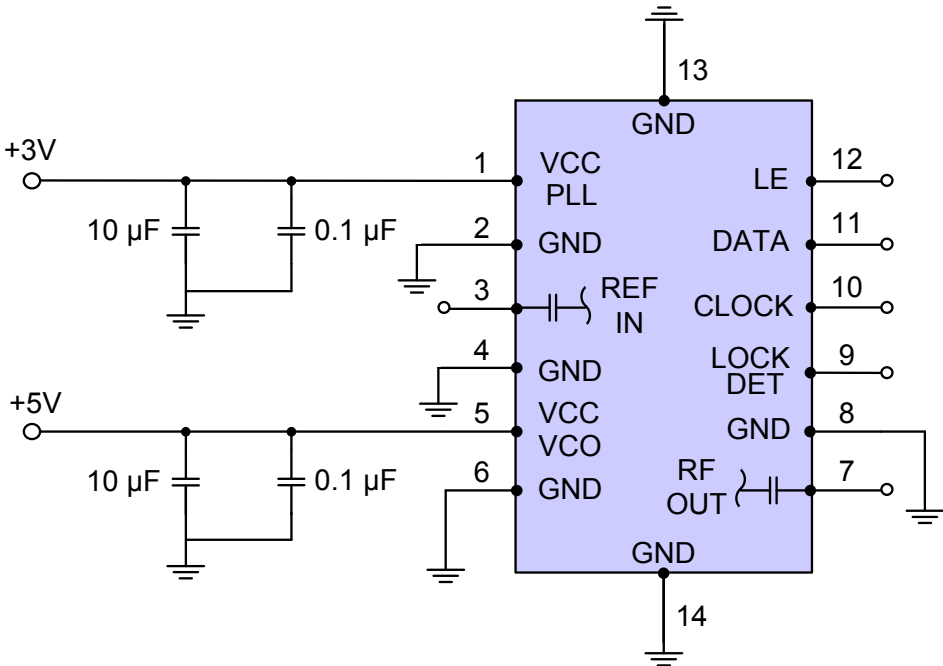


Pin Connection

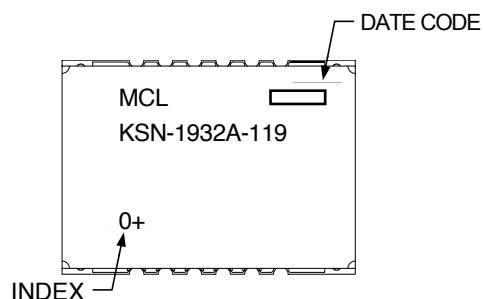
| Pin Number | Function |
|------------|----------|
| 1          | VCC PLL  |
| 2          | GND      |
| 3          | REF IN   |
| 4          | GND      |
| 5          | VCC VCO  |
| 6          | GND      |
| 7          | RF OUT   |
| 8          | GND      |
| 9          | LOCK DET |
| 10         |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

Recommended Application Circuit

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



## 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:** DK1182

**Tape & Reel:** TR-F28

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

**Evaluation Board:** TB-567-2+

**Environment Ratings:** ENV03T2



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