

Frequency Synthesizer

KSN-2310A-419+

50Ω 2250 to 2300 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-2310A-419+ is a Frequency Synthesizer, designed to operate from 2250 to 2300 MHz for W-CDMA application. The KSN-2310A-419+ 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">• Phase Noise: -106 dBc/Hz typ. @ 10 kHz offset• Comparison Spurious: -97 dBc typ.• Reference Spurious: -100 dBc typ. | Low phase noise and spurious improve system EVM (Error Vector Magnitude). |
| Robust design and construction | To enhance the robustness of KSN-2310A-419+, 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-2310A-419+ to be used in compact designs. |



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50Ω 2250 to 2300 MHz

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-2310A-419+ is a Frequency Synthesizer, designed to operate from 2250 to 2300 MHz for W-CDMA application. The KSN-2310A-419+ 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-2310A-419+, 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.



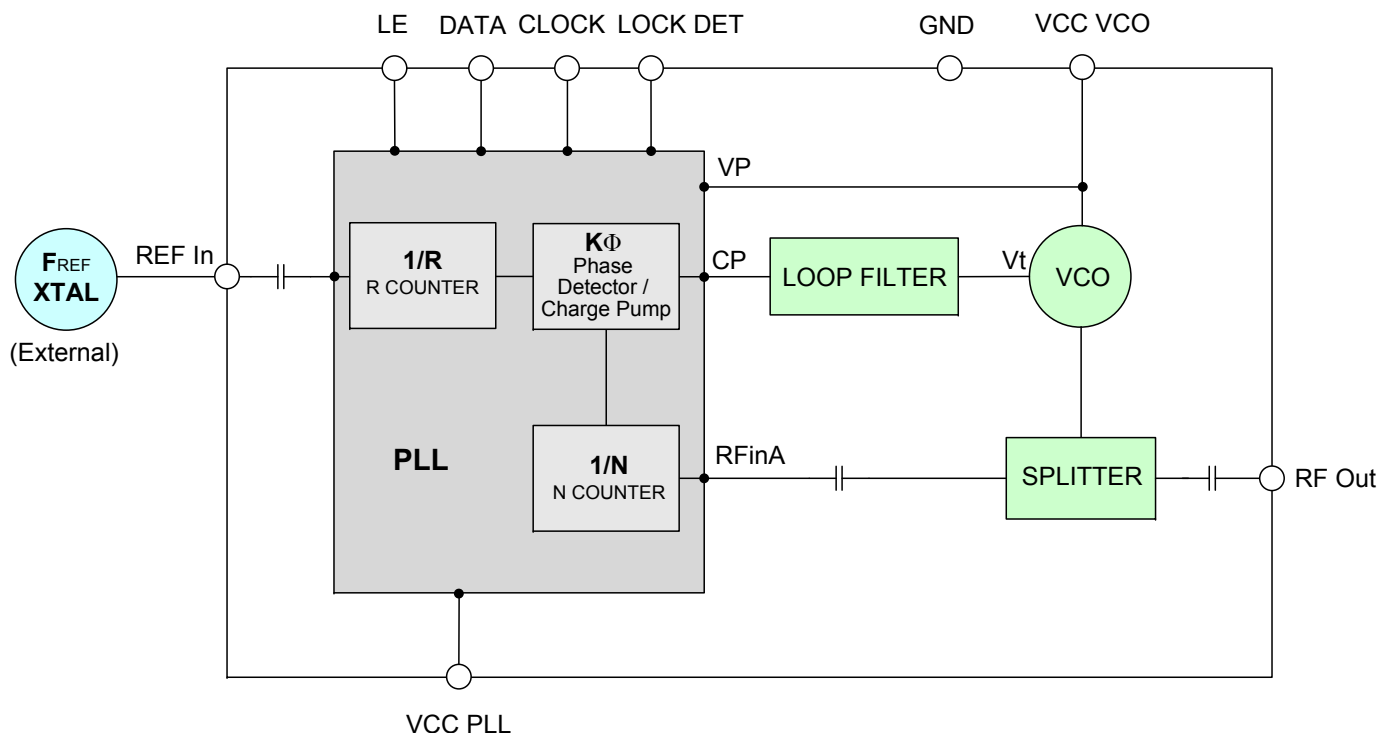
CASE STYLE: DK1042

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



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

| Parameters | Test Conditions | Min. | Typ. | Max. | Units |
|-------------------------------------|----------------------------|-------------------------|-----------------------------------|------|------------------|
| Frequency Range | - | 2250 | - | 2300 | MHz |
| Step Size | - | - | 200 | - | kHz |
| Settling Time | Within ± 500 Hz | - | 25 | - | mSec |
| Output Power | - | +1 | +3 | +5 | dBm |
| SSB Phase Noise | @ 100 Hz offset | - | -64 | - | dBc/Hz |
| | @ 1 kHz offset | - | -80 | -71 | |
| | @ 10 kHz offset | - | -106 | -101 | |
| | @ 100 kHz offset | - | -127 | -122 | |
| | @ 1 MHz offset | - | -147 | -134 | |
| Reference Spurious Suppression | Ref. Freq. 26 MHz | - | -100 | -75 | dBc |
| Comparison Spurious Suppression | Step Size 200 kHz | - | -97 | -75 | |
| Non - Harmonic Spurious Suppression | - | - | -90 | - | |
| Harmonic Suppression | - | - | -44 | -30 | |
| VCO Supply Voltage | 5.00 | 4.75 | 5.00 | 5.25 | |
| PLL Supply Voltage | 3.30 | 3.15 | 3.30 | 3.45 | |
| VCO Supply Current | - | - | 31 | 37 | mA |
| PLL Supply Current | - | - | 7 | 14 | |
| Reference Input (External) | Frequency | 26 (square wave) | - | 26 | MHz |
| | Amplitude | 1 | - | 1 | V _{P-P} |
| | Input impedance | - | - | 100 | KΩ |
| | Phase Noise @ 1 kHz offset | - | - | -130 | dBc/Hz |
| RF Output port Impedance | - | - | 50 | - | Ω |
| Input Logic Level | Input high voltage | - | 2.7 | - | V |
| | Input low voltage | - | - | 0.6 | V |
| Digital Lock Detect | Locked | - | 2.6 | 3.4 | V |
| | Unlocked | - | - | 0.4 | V |
| Frequency Synthesizer PLL | - | ADF4118 | | | |
| PLL Programming | - | 3-wire serial 3.3V CMOS | | | |
| Register Map @ 2300 MHz | F_Register | - | (MSB) X0XXX00000X0010010010 (LSB) | | |
| | N_Register | - | (MSB) 100001011010011101101 (LSB) | | |
| | R_Register | - | (MSB) 1XXXX0000001000001000 (LSB) | | |

Absolute Maximum Ratings

| Parameters | Ratings |
|--|----------------------|
| VCO Supply Voltage | 5.6V |
| PLL Supply Voltage | 5.6V |
| VCO Supply Voltage to PLL Supply Voltage | -0.3V to +5.5V |
| Reference Frequency Voltage | -0.3V min, +3.3V max |
| Data, Clock, LE Levels | -0.3V min, +3.3V max |
| 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 (MHz) | POWER OUTPUT (dBm) | | | VCO CURRENT (mA) | | | PLL CURENT (mA) | | |
|--------------------|-----------------------|-------|-------|---------------------|-------|-------|--------------------|-------|-------|
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| | 2250 | 3.43 | 3.19 | 2.73 | 29.77 | 31.04 | 31.90 | 6.07 | 7.48 |
| 2256 | 3.44 | 3.22 | 2.75 | 29.76 | 31.03 | 31.90 | 6.09 | 7.48 | 8.85 |
| 2262 | 3.44 | 3.21 | 2.74 | 29.74 | 31.02 | 31.89 | 6.08 | 7.49 | 8.86 |
| 2268 | 3.41 | 3.19 | 2.72 | 29.72 | 31.01 | 31.89 | 6.07 | 7.49 | 8.85 |
| 2274 | 3.38 | 3.16 | 2.69 | 29.69 | 31.00 | 31.88 | 6.09 | 7.48 | 8.84 |
| 2280 | 3.35 | 3.13 | 2.66 | 29.68 | 30.99 | 31.88 | 6.09 | 7.49 | 8.85 |
| 2286 | 3.32 | 3.11 | 2.64 | 29.67 | 30.98 | 31.88 | 6.10 | 7.50 | 8.86 |
| 2292 | 3.28 | 3.08 | 2.61 | 29.66 | 30.96 | 31.87 | 6.11 | 7.50 | 8.87 |
| 2298 | 3.25 | 3.04 | 2.56 | 29.65 | 30.94 | 31.85 | 6.09 | 7.51 | 8.88 |
| 2300 | 3.18 | 2.98 | 2.50 | 29.63 | 30.91 | 31.83 | 6.10 | 7.49 | 8.86 |
| 2310 | 3.12 | 2.91 | 2.43 | 29.55 | 30.89 | 31.82 | 6.12 | 7.52 | 8.88 |

| FREQUENCY (MHz) | HARMONICS (dBc) | | | | | |
|--------------------|-----------------|--------|--------|--------|--------|--------|
| | F2 | | | F3 | | |
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| 2250 | -63.37 | -71.03 | -57.07 | -46.09 | -46.31 | -58.36 |
| 2256 | -60.87 | -71.20 | -57.94 | -44.31 | -44.81 | -53.99 |
| 2262 | -60.16 | -67.91 | -59.72 | -42.48 | -43.40 | -50.35 |
| 2268 | -61.15 | -65.75 | -61.37 | -41.29 | -42.92 | -48.33 |
| 2274 | -62.80 | -65.48 | -63.13 | -42.40 | -43.25 | -47.89 |
| 2280 | -62.78 | -65.61 | -67.00 | -41.05 | -43.01 | -48.05 |
| 2286 | -61.72 | -68.63 | -64.81 | -41.00 | -43.38 | -48.04 |
| 2292 | -60.19 | -69.39 | -60.62 | -42.55 | -43.86 | -49.83 |
| 2298 | -59.86 | -67.27 | -56.29 | -43.11 | -44.08 | -53.06 |
| 2300 | -62.02 | -64.98 | -55.16 | -41.68 | -43.00 | -54.23 |
| 2310 | -64.49 | -64.89 | -55.10 | -39.93 | -41.95 | -51.84 |



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| FREQUENCY (MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS | | | | |
|--------------------|--------------------------------|--------|---------|---------|---------|
| | +25°C | | | | |
| | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
| 2250 | -63.14 | -79.62 | -105.82 | -126.94 | -147.21 |
| 2256 | -63.18 | -80.06 | -105.74 | -127.02 | -146.89 |
| 2262 | -63.59 | -79.77 | -105.71 | -126.97 | -146.58 |
| 2268 | -63.33 | -79.50 | -105.65 | -126.89 | -146.10 |
| 2274 | -62.65 | -79.40 | -105.60 | -126.83 | -145.72 |
| 2280 | -63.53 | -79.33 | -105.63 | -126.87 | -146.73 |
| 2286 | -62.89 | -79.25 | -105.56 | -126.84 | -146.91 |
| 2292 | -62.42 | -79.22 | -105.46 | -126.75 | -146.83 |
| 2298 | -62.41 | -79.28 | -105.37 | -126.66 | -146.68 |
| 2300 | -62.26 | -79.55 | -105.29 | -126.63 | -146.65 |
| 2310 | -62.69 | -78.62 | -105.10 | -126.44 | -146.29 |

| FREQUENCY (MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS | | | | |
|--------------------|--------------------------------|--------|---------|---------|---------|
| | -45°C | | | | |
| | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
| 2250 | -61.50 | -77.00 | -104.81 | -126.71 | -146.55 |
| 2256 | -60.59 | -77.09 | -104.84 | -126.76 | -143.69 |
| 2262 | -61.32 | -77.07 | -104.86 | -126.78 | -144.19 |
| 2268 | -62.22 | -77.19 | -104.80 | -126.78 | -146.83 |
| 2274 | -63.18 | -76.37 | -104.78 | -126.75 | -146.57 |
| 2280 | -61.84 | -76.76 | -104.83 | -126.75 | -146.46 |
| 2286 | -60.76 | -77.15 | -104.88 | -126.76 | -145.88 |
| 2292 | -60.47 | -77.19 | -104.89 | -126.75 | -144.27 |
| 2298 | -60.62 | -76.77 | -104.72 | -126.61 | -139.93 |
| 2300 | -60.91 | -76.67 | -104.54 | -126.48 | -143.47 |
| 2310 | -61.94 | -77.09 | -104.49 | -126.44 | -145.68 |

| FREQUENCY (MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS | | | | |
|--------------------|--------------------------------|--------|---------|---------|---------|
| | +85°C | | | | |
| | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
| 2250 | -65.35 | -80.15 | -105.50 | -126.40 | -146.05 |
| 2256 | -64.60 | -79.57 | -105.47 | -126.39 | -145.75 |
| 2262 | -64.52 | -79.61 | -105.30 | -126.38 | -145.86 |
| 2268 | -64.27 | -79.69 | -105.22 | -126.39 | -146.06 |
| 2274 | -63.86 | -79.66 | -105.25 | -126.41 | -145.93 |
| 2280 | -64.13 | -79.62 | -105.28 | -126.35 | -143.98 |
| 2286 | -63.06 | -78.90 | -105.25 | -126.32 | -145.09 |
| 2292 | -63.80 | -78.80 | -105.24 | -126.29 | -145.98 |
| 2298 | -65.95 | -79.32 | -105.23 | -126.26 | -145.93 |
| 2300 | -64.79 | -79.26 | -105.13 | -126.15 | -145.36 |
| 2310 | -65.16 | -78.87 | -105.00 | -126.11 | -145.97 |



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| COMPARISON SPURIOUS ORDER | COMPARISON SPURIOUS @Fcarrier 2250MHz+(n*Fcomparison) (dBc) note 1 | | | COMPARISON SPURIOUS @Fcarrier 2280MHz+(n*Fcomparison) (dBc) note 1 | | | COMPARISON SPURIOUS @Fcarrier 2310MHz+(n*Fcomparison) (dBc) note 1 | | | |
|---------------------------|--|---------|---------|--|---------|---------|--|---------|---------|---------|
| | n | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| | -5 | -108.54 | -113.06 | -112.53 | -106.76 | -108.75 | -113.08 | -110.77 | -111.43 | -112.53 |
| -4 | -107.08 | -110.98 | -112.47 | -107.74 | -107.09 | -112.11 | -106.04 | -107.80 | -111.82 | |
| -3 | -105.01 | -108.11 | -107.81 | -104.08 | -105.31 | -110.38 | -102.35 | -105.85 | -112.50 | |
| -2 | -101.70 | -105.37 | -104.38 | -99.72 | -101.01 | -112.80 | -96.13 | -101.06 | -105.03 | |
| -1 | -94.64 | -101.67 | -101.47 | -93.84 | -94.59 | -99.52 | -85.96 | -88.76 | -89.23 | |
| 0 note 2 | - | - | - | - | - | - | - | - | - | |
| +1 | -101.04 | -111.95 | -102.93 | -97.40 | -95.54 | -97.82 | -88.48 | -90.42 | -90.84 | |
| +2 | -101.23 | -110.77 | -107.86 | -100.84 | -100.13 | -112.54 | -97.35 | -102.85 | -107.85 | |
| +3 | -103.77 | -113.07 | -110.15 | -103.50 | -108.18 | -111.14 | -106.09 | -110.06 | -108.62 | |
| +4 | -105.97 | -113.84 | -113.65 | -108.89 | -108.40 | -111.68 | -111.50 | -110.21 | -108.39 | |
| +5 | -105.52 | -112.03 | -113.41 | -106.45 | -108.90 | -113.35 | -109.27 | -111.98 | -110.03 | |

Note 1: Comparison frequency 200 kHz
 Note 2: All spurs are referenced to carrier signal (n=0).

| REFERENCE SPURIOUS ORDER | REFERENCE SPURIOUS @Fcarrier 2250MHz+(n*Freference) (dBc) note 3 | | | REFERENCE SPURIOUS @Fcarrier 2280MHz+(n*Freference) (dBc) note 3 | | | REFERENCE SPURIOUS @Fcarrier 2310MHz+(n*Freference) (dBc) note 3 | | | |
|--------------------------|--|---------|---------|--|---------|---------|--|---------|---------|---------|
| | n | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| | -5 | -108.55 | -117.33 | -113.05 | -112.46 | -111.29 | -113.91 | -112.10 | -111.22 | -113.88 |
| -4 | -125.65 | -128.39 | -125.54 | -117.67 | -117.17 | -117.93 | -113.09 | -114.05 | -112.34 | |
| -3 | -120.44 | -124.73 | -124.43 | -124.22 | -128.68 | -123.47 | -121.10 | -127.94 | -119.76 | |
| -2 | -110.62 | -111.52 | -112.24 | -114.58 | -118.64 | -117.14 | -112.04 | -113.13 | -111.55 | |
| -1 | -116.99 | -106.39 | -106.33 | -102.94 | -102.56 | -100.61 | -97.75 | -95.49 | -93.25 | |
| 0 note 4 | - | - | - | - | - | - | - | - | - | |
| +1 | -102.46 | -99.73 | -101.01 | -105.88 | -104.17 | -102.90 | -93.69 | -92.32 | -91.11 | |
| +2 | -113.41 | -111.45 | -112.17 | -108.74 | -109.03 | -108.48 | -107.78 | -107.13 | -105.79 | |
| +3 | -106.34 | -104.44 | -106.55 | -107.60 | -106.62 | -107.04 | -106.96 | -107.42 | -106.78 | |
| +4 | -108.44 | -109.17 | -109.50 | -112.62 | -111.89 | -109.10 | -106.89 | -106.95 | -106.39 | |
| +5 | -102.16 | -104.88 | -106.42 | -109.03 | -110.24 | -109.42 | -108.92 | -109.50 | -109.43 | |

Note 3: Reference frequency 26 MHz
 Note 4: All spurs are referenced to carrier signal (n=0).



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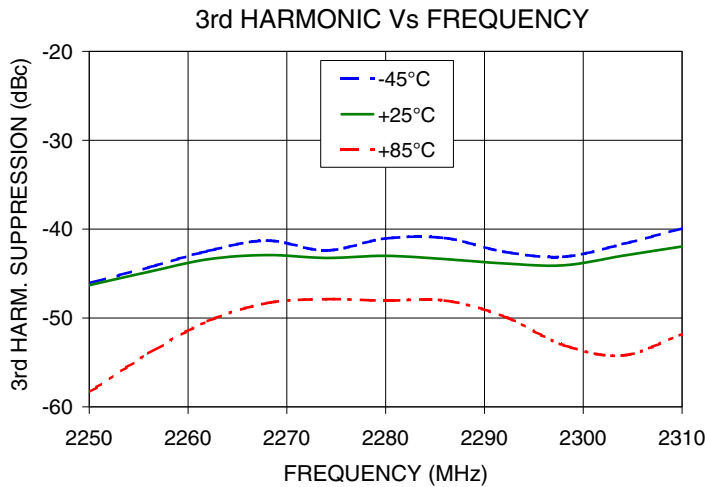
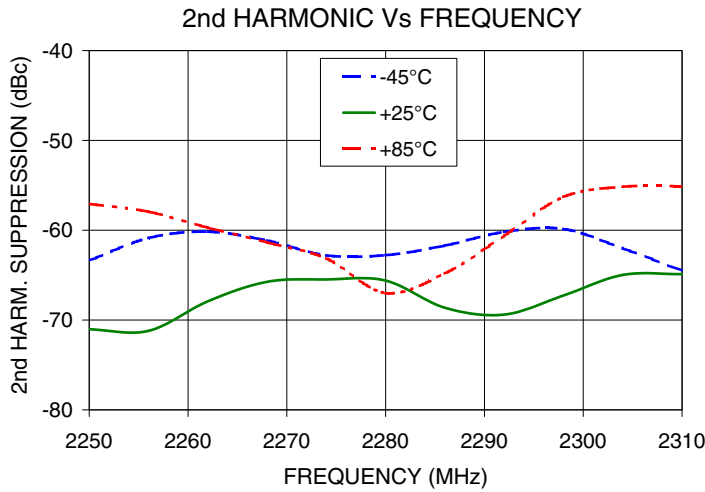
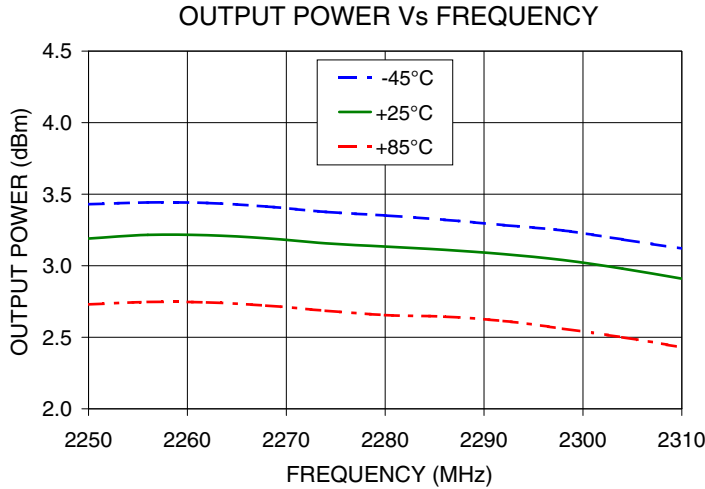


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Typical Performance Curves



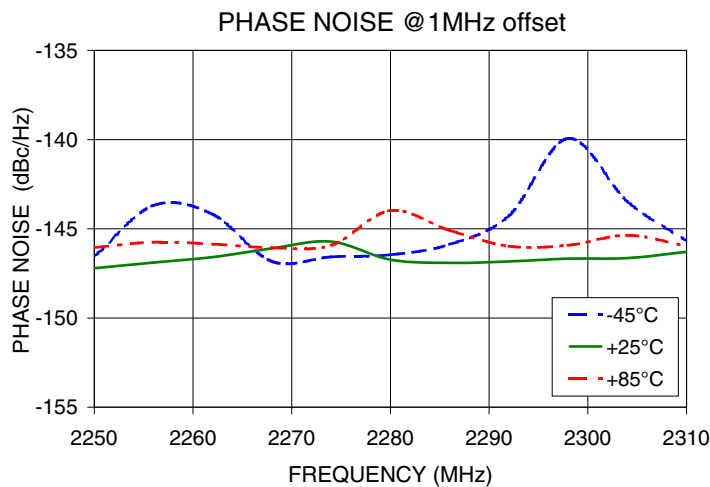
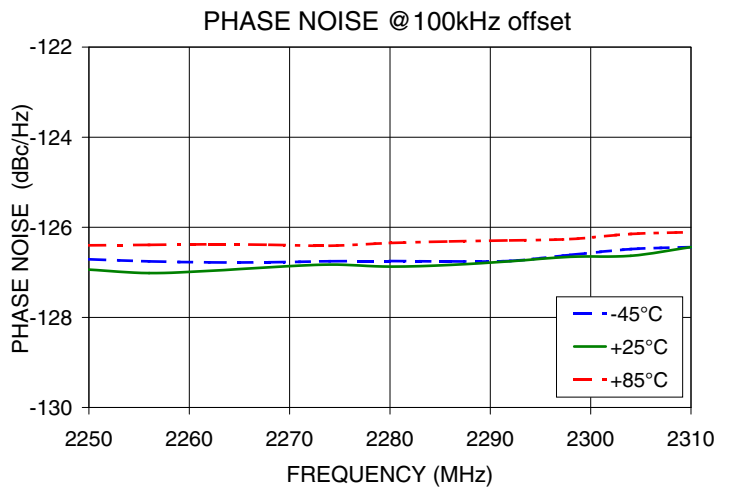
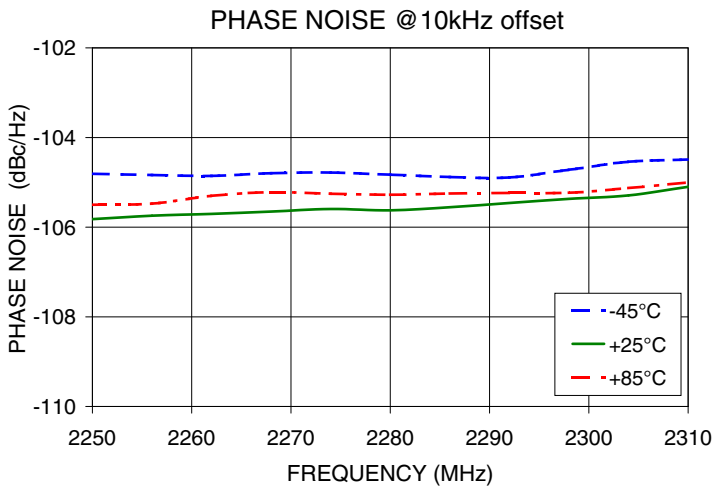
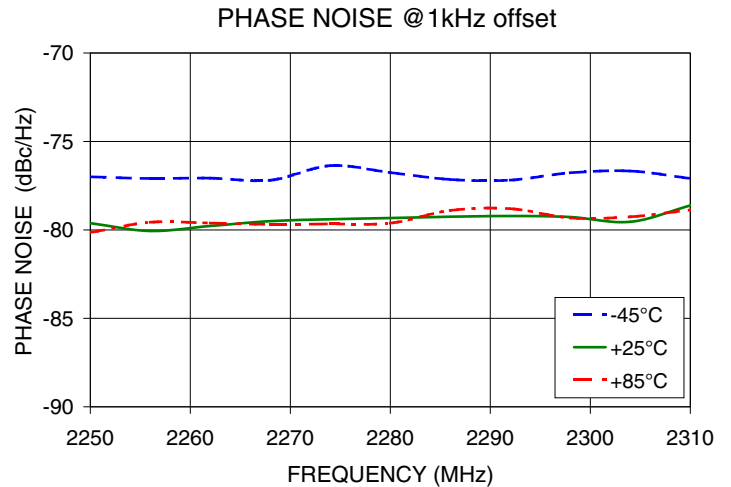
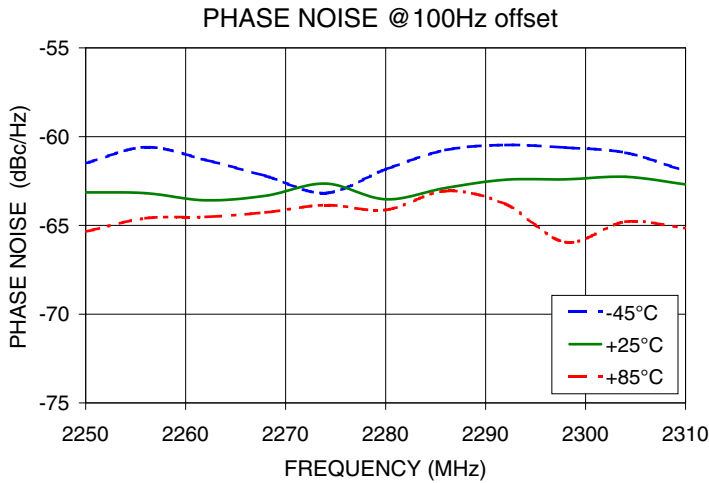
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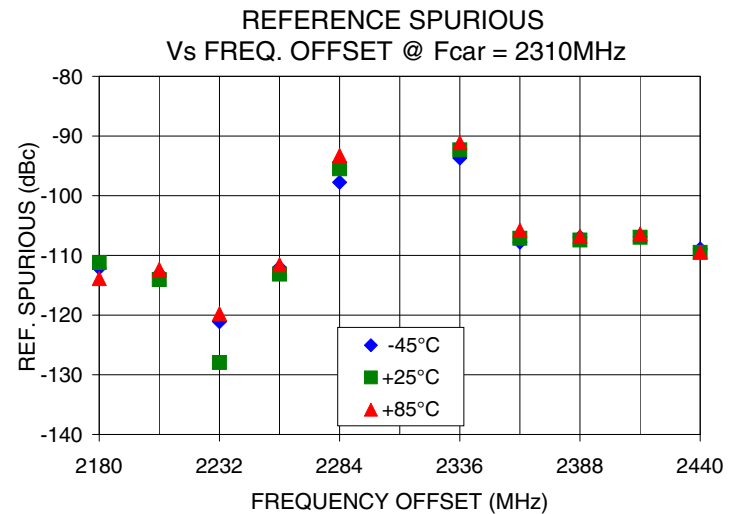
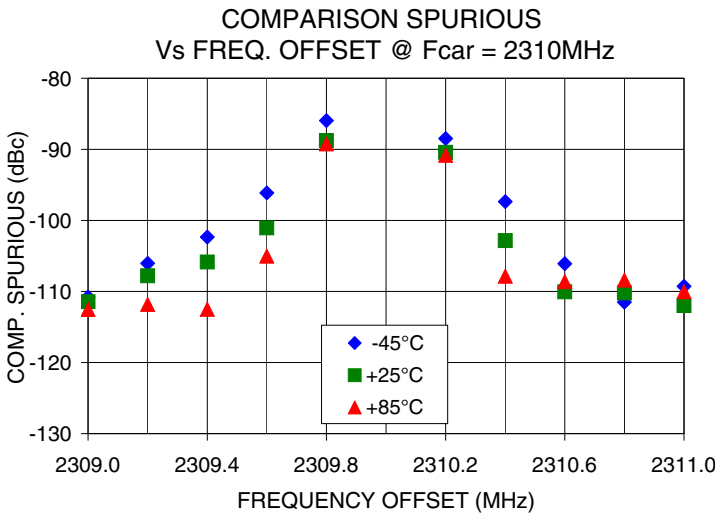
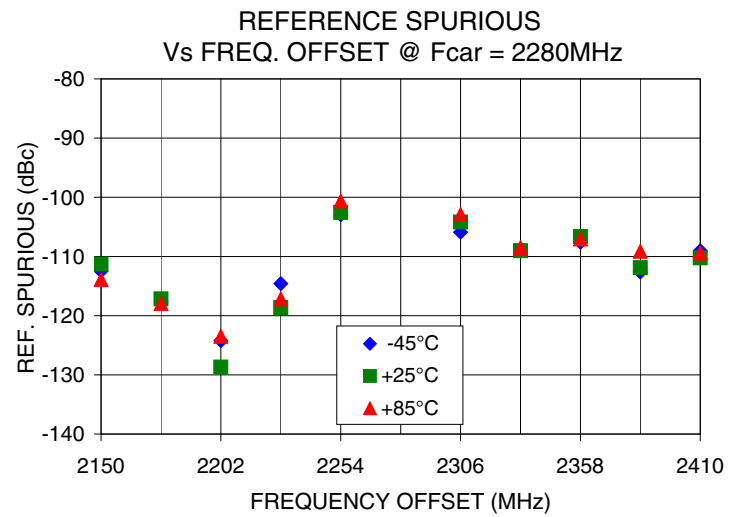
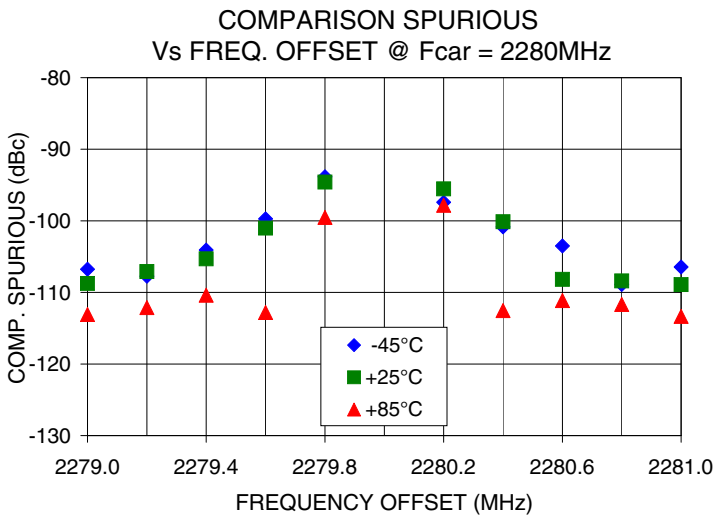
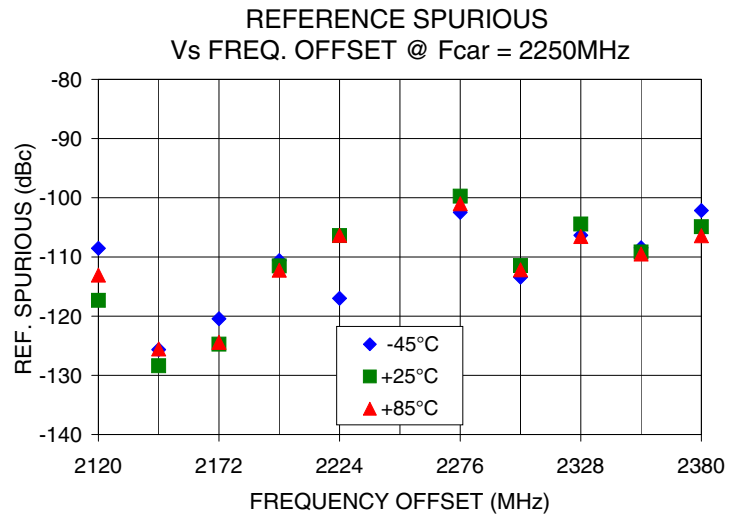
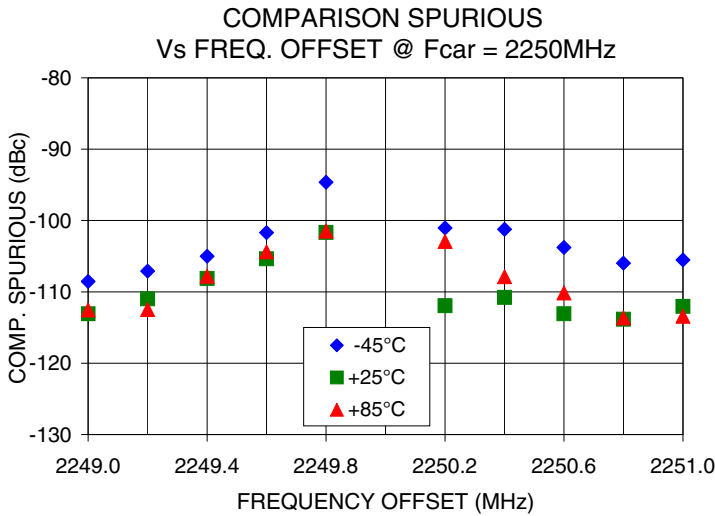
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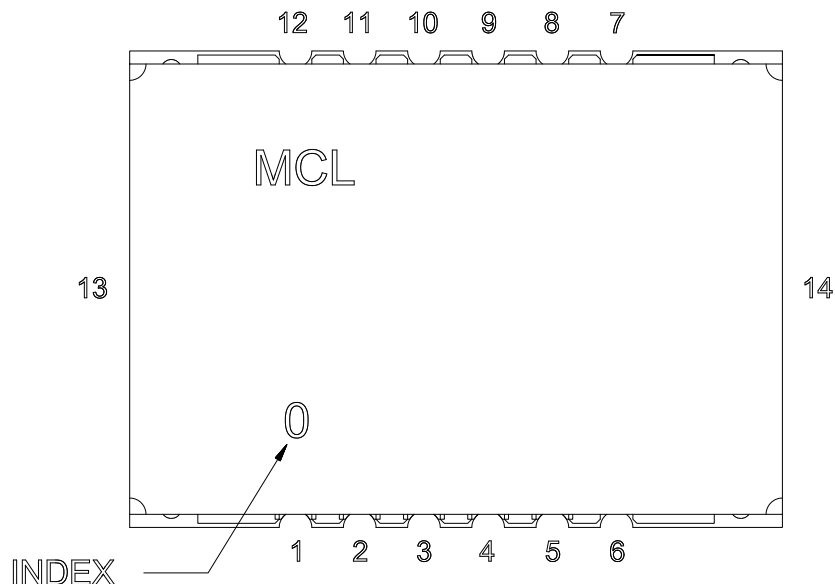


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Pin Configuration

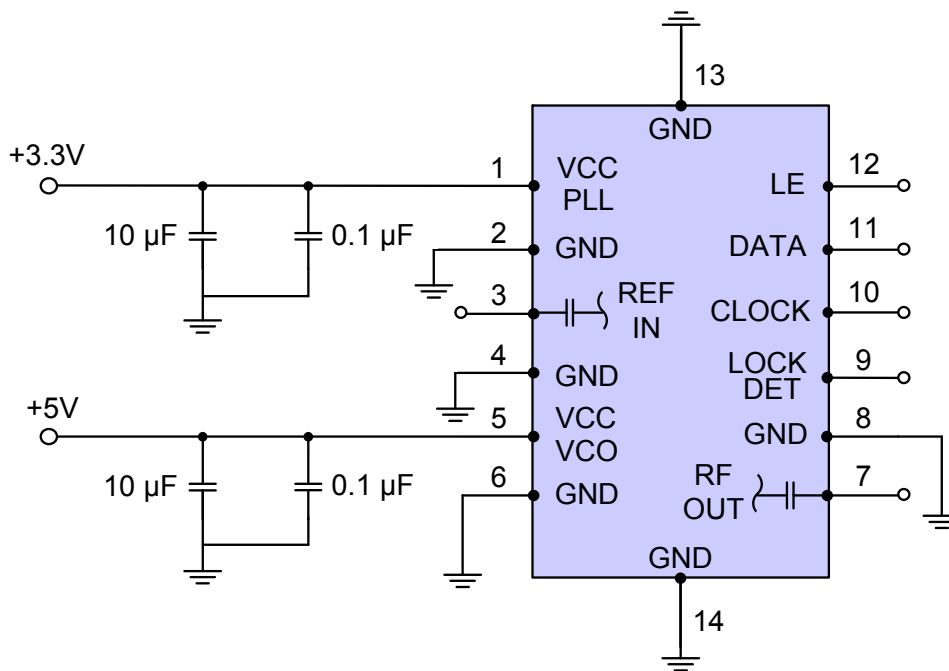


Pin Connection

| 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.



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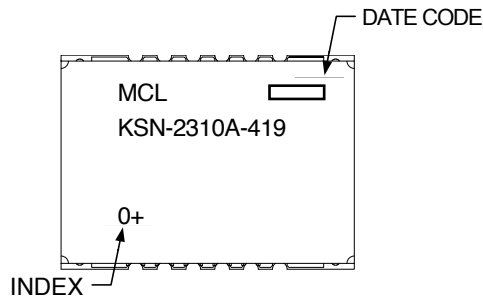


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Device Marking



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



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