

Frequency Synthesizer

KSN-1740A-119+

50Ω 1643 to 1740 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-1740A-119+ is a Frequency Synthesizer, designed to operate from 1643 to 1740 MHz for W-CDMA application. The KSN-1740A-119+ 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: -105 dBc/Hz typ. @ 10 kHz offset• Comparison Spurious: -92 dBc typ.• Reference Spurious: -103 dBc typ. | Low phase noise and spurious improve system EVM (Error Vector Magnitude). |
| Robust design and construction | To enhance the robustness of KSN-1740A-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, 0.80" x 0.58" x 0.15" | The small size enables the KSN-1740A-119+ to be used in compact designs. |



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50Ω 1643 to 1740 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-1740A-119+ is a Frequency Synthesizer, designed to operate from 1643 to 1740 MHz for W-CDMA application. The KSN-1740A-119+ 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-1740A-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: 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 | - | 1643 | - | 1740 | MHz |
| Step Size | - | - | 200 | - | kHz |
| Settling Time | Within ± 1 kHz | - | 35 | - | mSec |
| Output Power | - | +1.0 | +3.5 | +6.0 | dBm |
| SSB Phase Noise | @ 100 Hz offset | - | -63 | - | dBc/Hz |
| | @ 1 kHz offset | - | -78 | -72 | |
| | @ 10 kHz offset | - | -105 | -99 | |
| | @ 100 kHz offset | - | -126 | -121 | |
| | @ 1 MHz offset | - | -146 | -140 | |
| Reference Spurious Suppression | Ref. Freq. 26 MHz | - | -103 | -80 | dBc |
| Comparison Spurious Suppression | Step Size 200 kHz | - | -92 | -75 | |
| Non - Harmonic Spurious Suppression | - | - | -90 | - | |
| Harmonic Suppression | - | - | -31 | -22 | |
| 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 | - | - | 47 | 53 | mA |
| PLL Supply Current | - | - | 8 | 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 | - | - | -135 | dBc/Hz |
| RF Output port Impedance | - | - | 50 | - | Ω |
| Input Logic Level | Input high voltage | - | 2.80 | - | V |
| | Input low voltage | - | - | 0.60 | V |
| Digital Lock Detect | Locked | - | 2.75 | - | V |
| | Unlocked | - | - | 0.40 | V |
| Frequency Synthesizer PLL | - | ADF4118 | | | |
| PLL Programming | - | 3-wire serial 3.3V CMOS | | | |
| Register Map @ 1740 MHz | F_Register | - | (MSB) X0XXX00000X0010010010 (LSB) | | |
| | N_Register | - | (MSB) 100001000011111110001 (LSB) | | |
| | R_Register | - | (MSB) 0XXXX0000001000001000 (LSB) | | |

Absolute Maximum Ratings

| Parameters | Ratings |
|------------------------------------------|----------------------------|
| VCO Supply Voltage | 6V |
| PLL Supply Voltage | 6V |
| VCO Supply Voltage to PLL Supply Voltage | -0.3V to +5.5V |
| Reference Frequency Voltage | -0.3Vmin, VCC PLL +0.3Vmax |
| Data, Clock, LE Levels | -0.3Vmin, VCC PLL +0.3Vmax |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -55°C to +100°C |

Permanent damage may occur if any of these limits are exceeded



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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 |
| | 1643 | 3.02 | 3.46 | 3.36 | 45.08 | 46.48 | 47.39 | 5.87 | 7.48 |
| 1648 | 2.97 | 3.38 | 3.28 | 45.08 | 46.51 | 47.42 | 5.86 | 7.48 | 8.84 |
| 1662 | 2.92 | 3.26 | 3.13 | 45.10 | 46.55 | 47.47 | 5.87 | 7.50 | 8.85 |
| 1676 | 3.13 | 3.42 | 3.26 | 45.09 | 46.60 | 47.54 | 5.89 | 7.51 | 8.87 |
| 1690 | 3.26 | 3.55 | 3.40 | 45.13 | 46.66 | 47.60 | 5.86 | 7.48 | 8.84 |
| 1704 | 3.40 | 3.67 | 3.53 | 45.15 | 46.69 | 47.66 | 5.87 | 7.50 | 8.85 |
| 1718 | 3.49 | 3.78 | 3.66 | 45.17 | 46.75 | 47.73 | 5.88 | 7.51 | 8.87 |
| 1732 | 3.41 | 3.76 | 3.69 | 45.22 | 46.83 | 47.79 | 5.90 | 7.52 | 8.88 |
| 1740 | 3.27 | 3.65 | 3.58 | 45.24 | 46.86 | 47.83 | 5.90 | 7.54 | 8.90 |

| FREQUENCY (MHz) | HARMONICS (dBc) | | | | | |
|--------------------|-----------------|--------|--------|--------|--------|--------|
| | F2 | | | F3 | | |
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| 1643 | -33.35 | -30.33 | -29.34 | -29.24 | -31.85 | -34.35 |
| 1648 | -34.65 | -31.08 | -29.94 | -28.59 | -31.54 | -34.15 |
| 1662 | -37.76 | -33.62 | -32.29 | -27.84 | -30.35 | -32.94 |
| 1676 | -36.11 | -33.28 | -32.75 | -29.10 | -31.31 | -33.69 |
| 1690 | -37.24 | -33.46 | -33.33 | -27.36 | -30.25 | -32.94 |
| 1704 | -40.95 | -36.30 | -36.54 | -29.17 | -31.72 | -34.10 |
| 1718 | -42.58 | -38.78 | -39.43 | -28.92 | -31.93 | -34.26 |
| 1732 | -42.24 | -41.07 | -42.93 | -27.37 | -29.33 | -31.47 |
| 1740 | -40.99 | -41.17 | -44.63 | -28.07 | -29.89 | -31.91 |



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| FREQUENCY (MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS | | | | |
|--------------------|--------------------------------|--------|---------|---------|---------|
| | +25°C | | | | |
| | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
| 1643 | -63.84 | -79.86 | -105.47 | -126.13 | -146.08 |
| 1648 | -63.66 | -81.61 | -105.63 | -126.21 | -146.30 |
| 1662 | -64.35 | -79.24 | -105.37 | -126.23 | -146.03 |
| 1676 | -65.79 | -78.47 | -105.47 | -126.23 | -145.17 |
| 1690 | -62.57 | -78.04 | -105.48 | -126.36 | -146.15 |
| 1704 | -61.41 | -79.90 | -105.40 | -126.24 | -144.69 |
| 1718 | -61.75 | -75.85 | -105.25 | -126.24 | -146.02 |
| 1732 | -61.64 | -77.85 | -105.35 | -126.31 | -146.20 |
| 1740 | -60.86 | -80.08 | -105.18 | -126.30 | -145.50 |

| FREQUENCY (MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS | | | | |
|--------------------|--------------------------------|--------|---------|---------|---------|
| | -45°C | | | | |
| | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
| 1643 | -64.25 | -77.97 | -106.27 | -127.46 | -147.35 |
| 1648 | -64.53 | -77.25 | -106.35 | -127.47 | -147.46 |
| 1662 | -63.07 | -80.06 | -106.32 | -127.37 | -147.37 |
| 1676 | -65.08 | -78.75 | -106.10 | -127.27 | -146.96 |
| 1690 | -65.26 | -79.82 | -106.19 | -127.32 | -147.43 |
| 1704 | -63.13 | -78.41 | -105.87 | -127.27 | -145.10 |
| 1718 | -62.10 | -81.52 | -105.94 | -127.23 | -147.31 |
| 1732 | -62.84 | -79.13 | -105.83 | -127.28 | -145.14 |
| 1740 | -63.04 | -77.74 | -105.82 | -127.21 | -143.59 |

| FREQUENCY (MHz) | PHASE NOISE (dBc/Hz) @ OFFSETS | | | | |
|--------------------|--------------------------------|--------|---------|---------|---------|
| | +85°C | | | | |
| | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
| 1643 | -65.39 | -80.63 | -104.21 | -124.84 | -144.63 |
| 1648 | -64.97 | -81.53 | -104.30 | -124.83 | -144.85 |
| 1662 | -67.24 | -77.82 | -104.18 | -124.90 | -144.29 |
| 1676 | -65.68 | -78.23 | -104.31 | -124.95 | -144.76 |
| 1690 | -63.26 | -77.15 | -104.20 | -125.08 | -145.02 |
| 1704 | -63.24 | -79.31 | -104.23 | -125.05 | -144.62 |
| 1718 | -63.30 | -75.24 | -104.26 | -125.16 | -144.63 |
| 1732 | -63.13 | -77.09 | -104.33 | -125.14 | -144.37 |
| 1740 | -62.54 | -79.06 | -104.27 | -125.12 | -144.89 |



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| COMPARISON SPURIOUS ORDER | COMPARISON SPURIOUS @Fcarrier 1643MHz+(n*Fcomparison) (dBc) note 1 | | | COMPARISON SPURIOUS @Fcarrier 1691MHz+(n*Fcomparison) (dBc) note 1 | | | COMPARISON SPURIOUS @Fcarrier 1740MHz+(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 | -116.14 | -114.50 | -117.07 | -101.39 | -100.94 | -100.08 | -102.73 | -110.10 | -112.99 |
| -4 | -113.21 | -110.94 | -115.11 | -113.93 | -114.57 | -111.56 | -101.45 | -107.83 | -108.65 | |
| -3 | -112.47 | -112.37 | -114.02 | -110.28 | -108.11 | -104.27 | -101.52 | -104.39 | -106.23 | |
| -2 | -104.31 | -106.10 | -105.92 | -105.15 | -107.05 | -101.80 | -96.31 | -99.72 | -101.91 | |
| -1 | -91.02 | -93.13 | -96.49 | -91.25 | -96.29 | -96.32 | -86.43 | -90.42 | -95.95 | |
| 0 note 2 | - | - | - | - | - | - | - | - | - | |
| +1 | -88.94 | -95.04 | -93.37 | -92.99 | -92.84 | -96.00 | -86.65 | -93.29 | -93.44 | |
| +2 | -103.80 | -106.54 | -107.69 | -106.96 | -106.08 | -104.65 | -96.31 | -100.69 | -102.15 | |
| +3 | -112.47 | -109.75 | -112.31 | -110.47 | -111.23 | -106.85 | -99.08 | -103.34 | -108.80 | |
| +4 | -117.13 | -114.20 | -113.41 | -116.80 | -113.16 | -112.72 | -101.47 | -109.61 | -108.67 | |
| +5 | -118.23 | -113.87 | -112.45 | -102.80 | -101.44 | -100.43 | -105.25 | -110.99 | -115.56 | |

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

| REFERENCE SPURIOUS ORDER | REFERENCE SPURIOUS @Fcarrier 1643MHz+(n*Frefernce) (dBc) note 3 | | | REFERENCE SPURIOUS @Fcarrier 1691MHz+(n*Frefernce) (dBc) note 3 | | | REFERENCE SPURIOUS @Fcarrier 1740MHz+(n*Frefernce) (dBc) note 3 | | | |
|--------------------------|-----------------------------------------------------------------------|---------|---------|-----------------------------------------------------------------------|---------|---------|-----------------------------------------------------------------------|---------|---------|---------|
| | n | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| | -5 | -129.03 | -134.38 | -130.71 | -134.72 | -130.93 | -130.76 | -131.30 | -129.10 | -134.49 |
| -4 | -130.97 | -128.38 | -130.18 | -126.97 | -125.20 | -123.95 | -115.46 | -115.49 | -117.08 | |
| -3 | -127.09 | -124.71 | -126.08 | -127.42 | -124.49 | -125.44 | -126.36 | -128.36 | -130.44 | |
| -2 | -124.53 | -121.79 | -120.15 | -126.75 | -120.02 | -117.64 | -123.21 | -123.51 | -124.32 | |
| -1 | -106.19 | -106.45 | -105.05 | -109.45 | -106.28 | -105.96 | -104.74 | -102.91 | -105.46 | |
| 0 note 4 | - | - | - | - | - | - | - | - | - | |
| +1 | -106.21 | -103.58 | -104.06 | -103.59 | -100.67 | -102.75 | -102.45 | -100.77 | -103.41 | |
| +2 | -121.47 | -118.03 | -120.53 | -123.09 | -117.08 | -119.02 | -120.65 | -121.98 | -125.14 | |
| +3 | -126.71 | -126.67 | -127.77 | -127.86 | -125.33 | -125.20 | -125.86 | -129.06 | -130.11 | |
| +4 | -129.24 | -129.29 | -128.88 | -122.50 | -122.94 | -123.50 | -115.54 | -115.78 | -117.04 | |
| +5 | -130.54 | -132.01 | -126.88 | -127.29 | -128.49 | -128.31 | -129.59 | -129.16 | -131.95 | |

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



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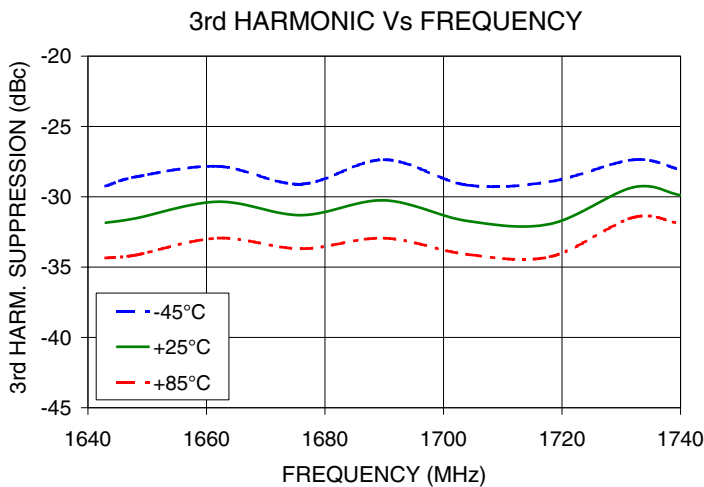
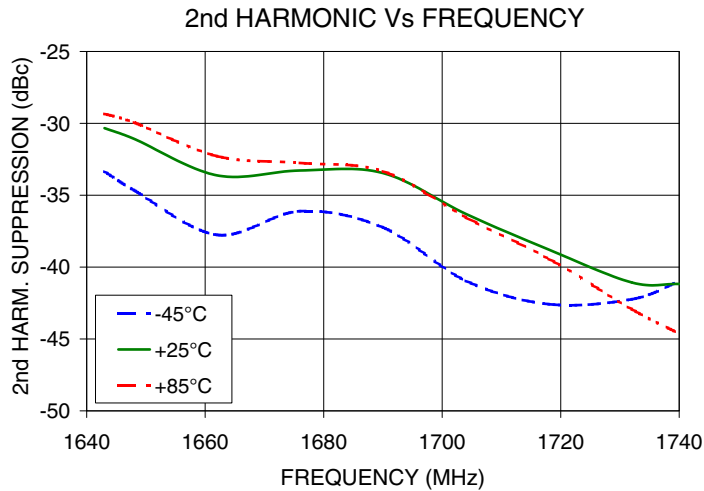
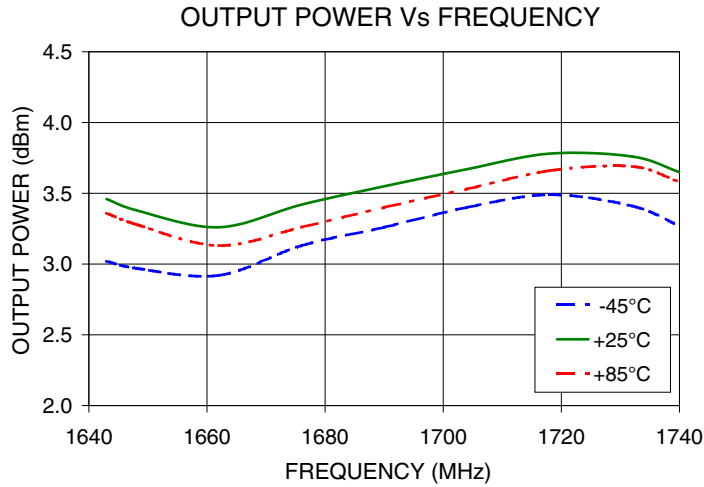


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Typical Performance Curves



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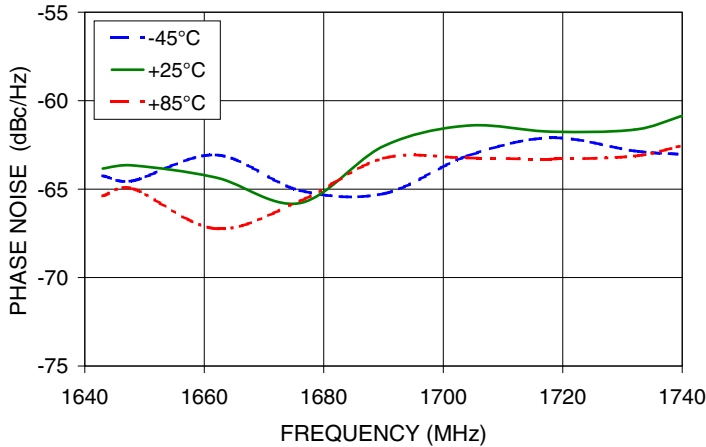


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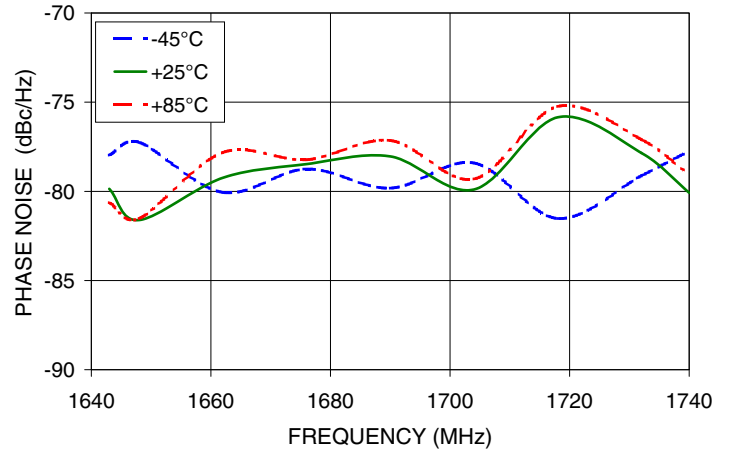


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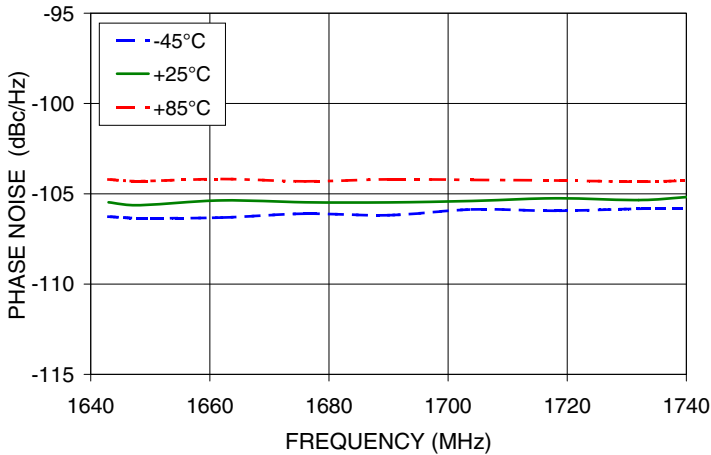
PHASE NOISE @100 Hz offset



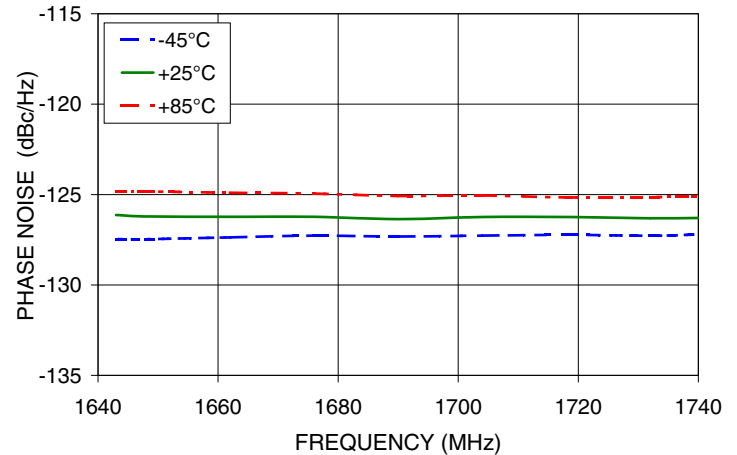
PHASE NOISE @1 kHz offset



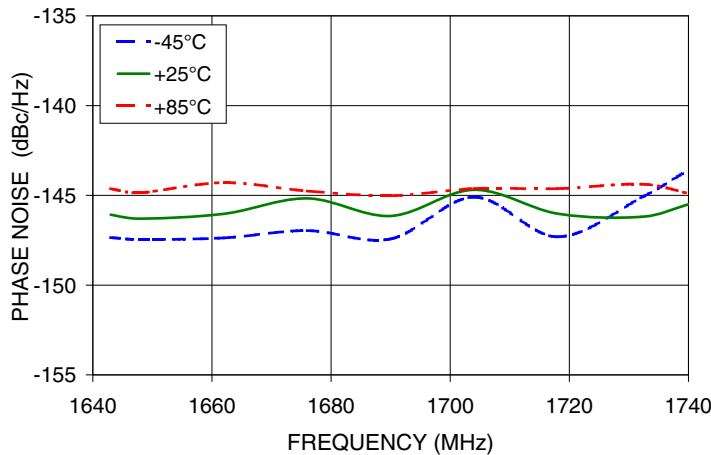
PHASE NOISE @10 kHz offset



PHASE NOISE @100 kHz offset



PHASE NOISE @1 MHz offset



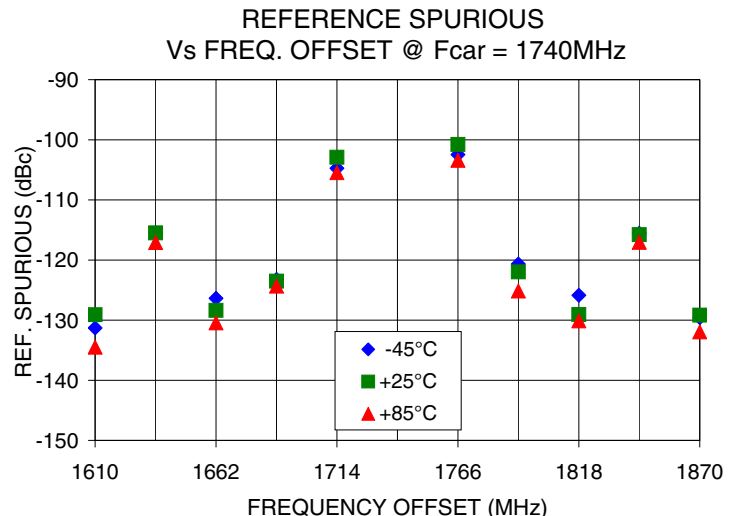
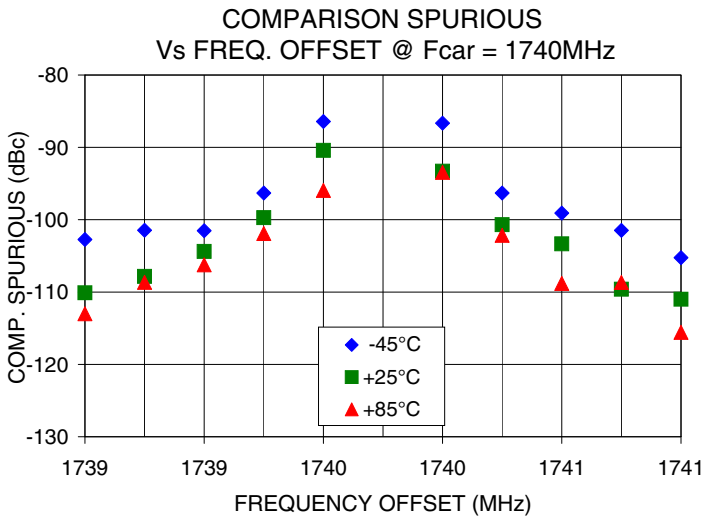
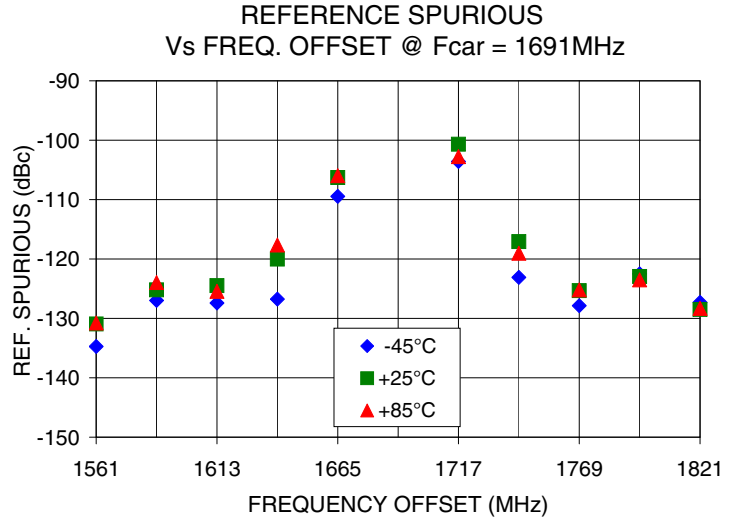
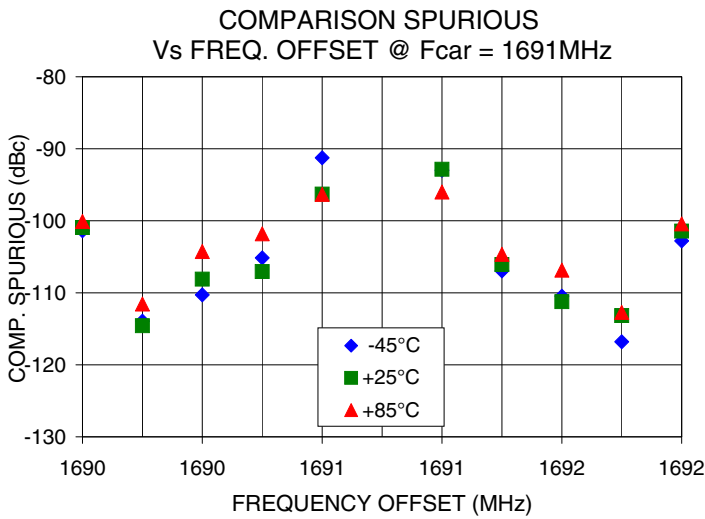
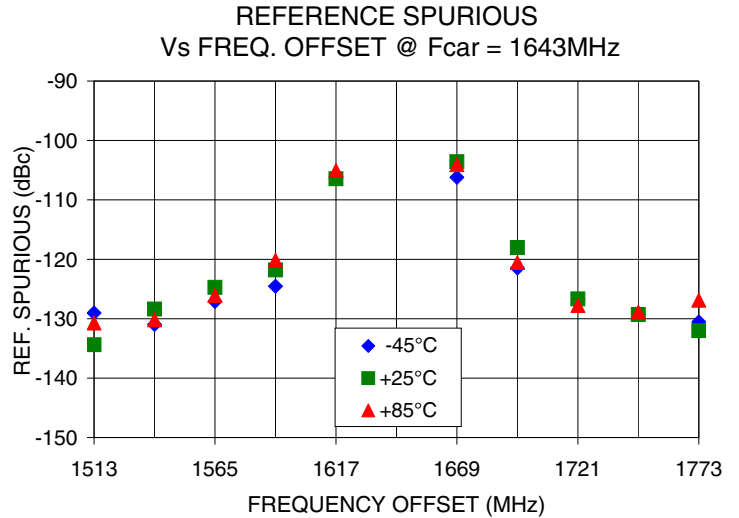
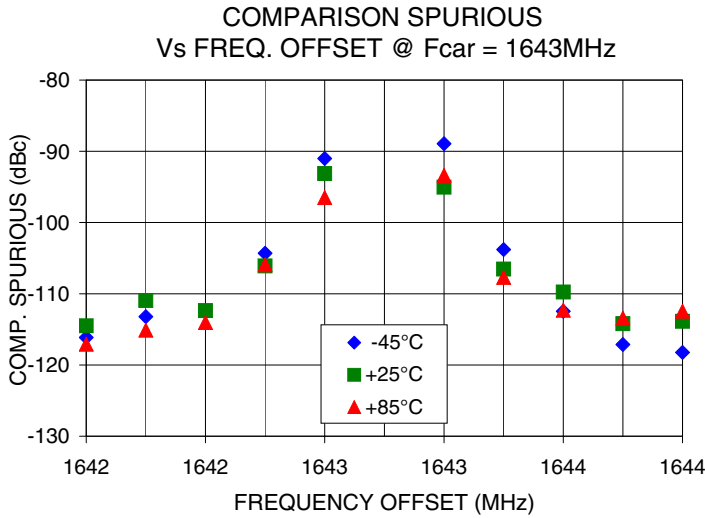
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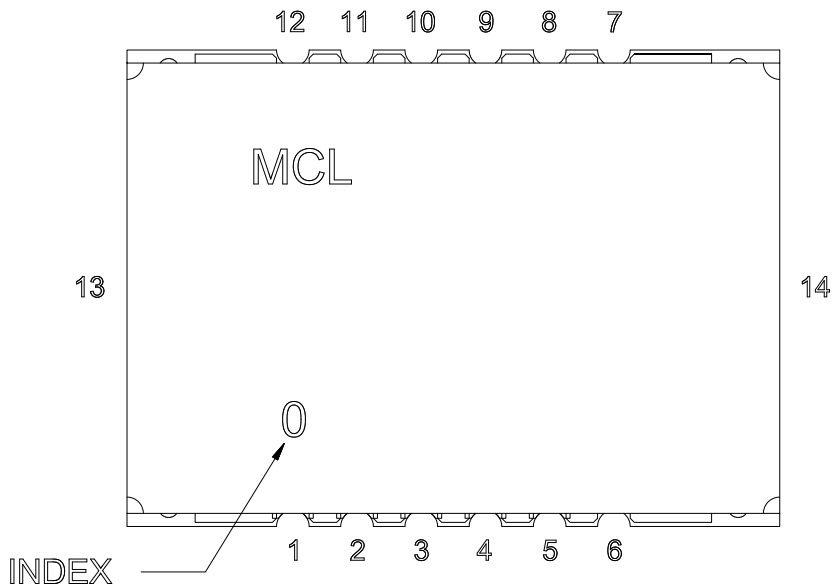


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Pin Configuration

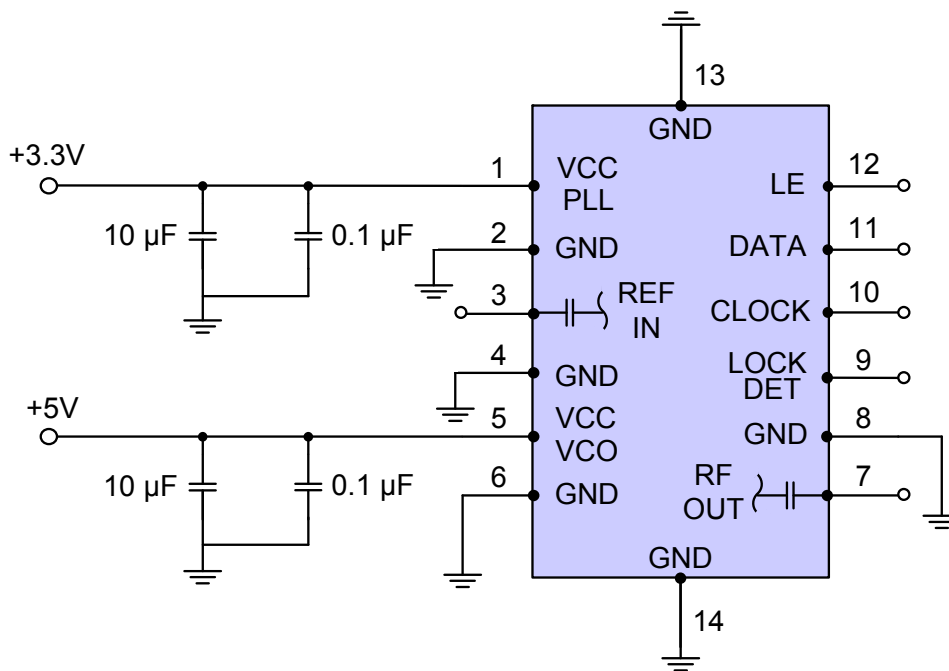


Pin Connection

| 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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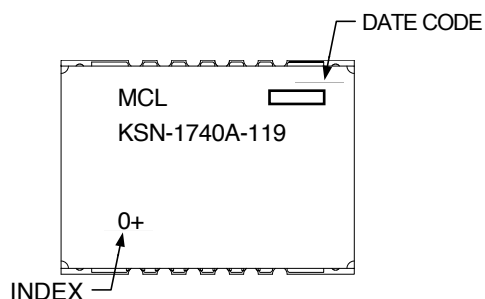


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Device Marking



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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