

Frequency Synthesizer

KSN-864A-1C19+

50Ω 864 MHz (fixed)

The Big Deal

- Low phase noise and spurious
- Fixed frequency without external programming
- Integrated microcontroller
- Robust design and construction
- Small size 0.80" x 0.58" x 0.15"



CASE STYLE: DK1042

Product Overview

The KSN-864A-1C19+ is a Frequency Synthesizer, designed to operate 864MHz for wire-line broadband access application. The KSN-864A-1C19+ 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: -108 dBc/Hz typ. @ 10 kHz offset• Comparison spurious: -93 dBc typ.• Reference spurious: -87 dBc typ. | Low phase noise and spurious improve system EVM (Error Vector Magnitude). |
| Robust design and construction | To enhance the robustness of KSN-864A-1C19+, 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-864A-1C19+ to be used in compact designs. |



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50Ω 864 MHz (fixed)

Features

- Fixed frequency without external programming
- Integrated microcontroller
- High reliability over temperature changes
- Robust design and construction
- Low operating voltage (VCC VCO=+5V, VCC PLL=+3V)
- Small size 0.80" x 0.58" x 0.15"

Applications

- Wire-line broadband access



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

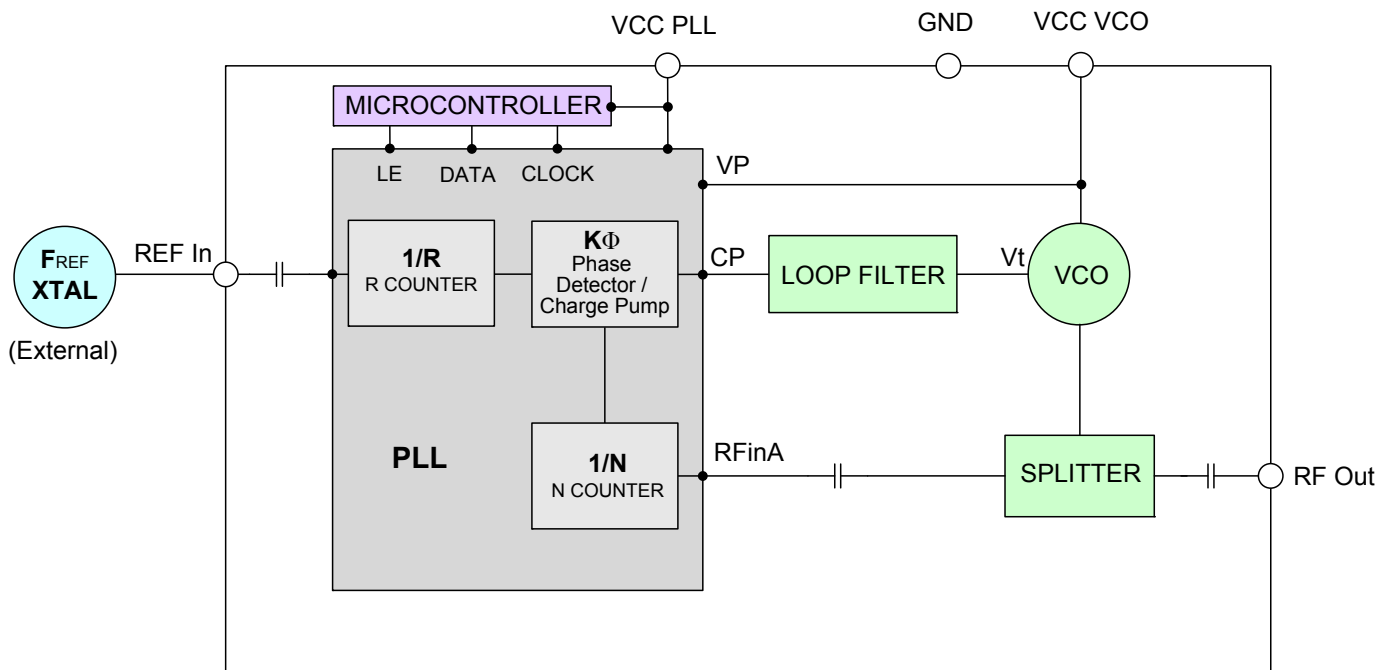
+ RoHS compliant in accordance with EU Directive (2002/95/EC)

The +Suffix has been added in order to identify RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications.

General Description

The KSN-864A-1C19+ is a Frequency Synthesizer, designed to operate 864MHz for wire-line broadband access application. The KSN-864A-1C19+ 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-864A-1C19+, each internal component is secured to the substrate with chip bonder, thereby eliminating the risk of tombstoning during subsequent solder reflow operations by the customer.

Simplified Schematic



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Electrical Specifications (over operating temperature -40°C to $+85^{\circ}\text{C}$)

| Parameters | Test Conditions | Min. | Typ. | Max. | Units |
|-------------------------------------|----------------------------|----------------|-------|-------|------------------|
| Frequency Range (fixed) | - | 864 | - | 864 | MHz |
| Step size | - | - | 500 | - | kHz |
| Settling Time (Power on to lock) | Within ± 1 kHz | - | 30 | - | mSec |
| Output Power | - | 0 | +3 | +6 | dBm |
| SSB Phase Noise | @ 100 Hz offset | - | -91 | - | dBc/Hz |
| | @ 1 kHz offset | - | -93 | -87 | |
| | @ 10 kHz offset | - | -108 | -104 | |
| | @ 100 kHz offset | - | -133 | -128 | |
| | @ 1 MHz offset | - | -153 | -148 | |
| Integrated SSB Phase Noise | @ 1 kHz to 10 kHz | - | -57 | -50 | dBc |
| | @ 10 kHz to 3 MHz | - | -70 | -61 | |
| Reference Spurious Suppression | Ref. Freq. 27 MHz | - | -87 | -71 | dBc |
| Comparison Spurious Suppression | Step Size 500 kHz | - | -93 | -72 | |
| Non - Harmonic Spurious Suppression | - | - | -90 | - | |
| Harmonic Suppression | - | - | -23 | -18 | |
| 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 | - | - | 31 | 37 | mA |
| PLL Supply Current | - | - | 9 | 16 | |
| Reference Input (External) | Frequency | 27 (sine wave) | - | 27 | MHz |
| | Amplitude | 1 | - | 1 | V _{P-P} |
| | Input impedance | - | - | 100 | K Ω |
| | Phase Noise @ 1 kHz offset | - | - | -145 | dBc/Hz |
| RF Output port Impedance | - | - | 50 | - | Ω |
| Digital Lock Detect | Locked | - | 2.45 | - | V |
| | Unlocked | - | - | 0.40 | V |

Absolute Maximum Ratings

| Parameters | Ratings |
|--|---|
| VCO Supply Voltage | 5.8V |
| PLL Supply Voltage | 3.6V |
| 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 $+85^{\circ}\text{C}$ |
| Storage Temperature | -55°C to $+100^{\circ}\text{C}$ |

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 CURRENT (mA) | | |
|-----------------|--------------------|-------|-------|------------------|-------|-------|------------------|-------|-------|
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| | 864 | 3.01 | 3.13 | 3.33 | 30.51 | 30.97 | 31.72 | 7.92 | 8.58 |

| FREQUENCY (MHz) | HARMONICS (dBc) | | | | | |
|-----------------|-----------------|--------|--------|--------|--------|--------|
| | F2 | | | F3 | | |
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| 864 | -23.24 | -23.57 | -24.25 | -30.72 | -30.64 | -31.11 |

| FREQUENCY (MHz) | @TEMP. | PHASE NOISE (dBc/Hz) | | | | |
|-----------------|--------|----------------------|--------|---------|---------|---------|
| | | @OFFSETS | | | | |
| | | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
| 864 | -45°C | -95.85 | -92.22 | -108.12 | -133.26 | -153.2 |
| | +25°C | -90.39 | -94.12 | -107.72 | -132.93 | -153.04 |
| | +85°C | -93.23 | -89.55 | -107.53 | -131.68 | -151.83 |

| COMPARISON SPURIOUS ORDER | COMPARISON SPURIOUS @Fcarrier 864MHz+(n*Fcomparison) (dBc) note 1 | | |
|---------------------------|---|---------|---------|
| | -45°C | +25°C | +85°C |
| n | | | |
| -5 | -101.39 | -112.21 | -103.38 |
| -4 | -100.06 | -108.67 | -101.44 |
| -3 | -99.52 | -105.18 | -99.09 |
| -2 | -98.29 | -98.93 | -95.73 |
| -1 | -88.17 | -91.06 | -89.08 |
| 0 ^{note 2} | - | - | - |
| +1 | -90.15 | -91.06 | -89.51 |
| +2 | -99.04 | -97.86 | -96.12 |
| +3 | -99.91 | -101.36 | -99.05 |
| +4 | -100.54 | -103.76 | -101.31 |
| +5 | -102.56 | -104.87 | -102.46 |

| REFERENCE SPURIOUS ORDER | REFERENCE PURIOUS @Fcarrier 864MHz+(n*Freferance) (dBc) note 3 | | |
|--------------------------|--|---------|---------|
| | -45°C | +25°C | +85°C |
| n | | | |
| -5 | -102.07 | -105.50 | -104.40 |
| -4 | -95.47 | -96.62 | -102.56 |
| -3 | -102.40 | -107.34 | -104.89 |
| -2 | -96.34 | -98.66 | -115.20 |
| -1 | -89.88 | -87.63 | -87.11 |
| 0 ^{note 4} | - | - | - |
| +1 | -90.84 | -87.76 | -88.62 |
| +2 | -95.02 | -101.62 | -103.63 |
| +3 | -115.70 | -111.14 | -111.33 |
| +4 | -93.63 | -97.27 | -94.79 |
| +5 | -115.26 | -113.37 | -110.54 |

Note 1: Comparison frequency 500 kHz
 Note 2: All spurs are referenced to carrier signal (n=0).

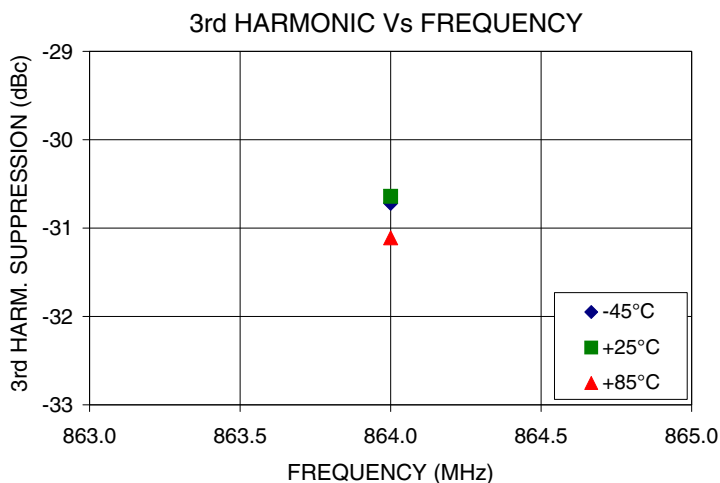
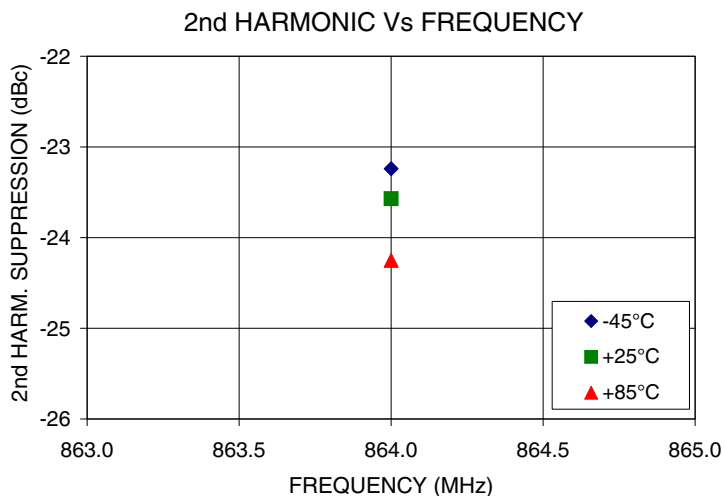
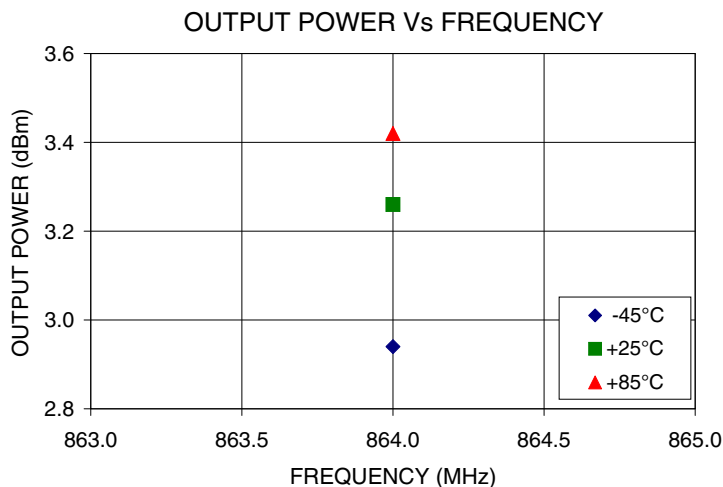
Note 3: Reference frequency 27 MHz
 Note 4: All spurs are referenced to carrier signal (n=0).



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Typical Performance Curves



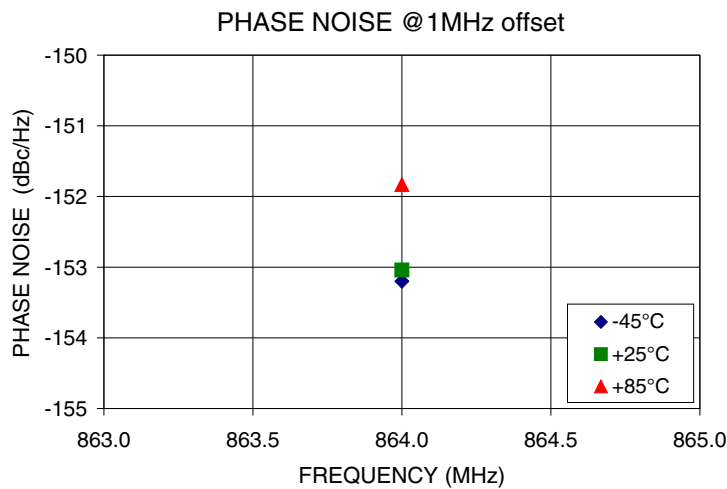
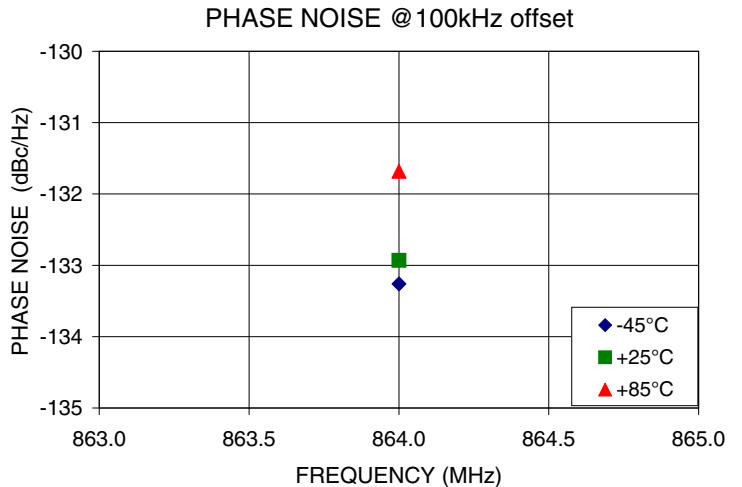
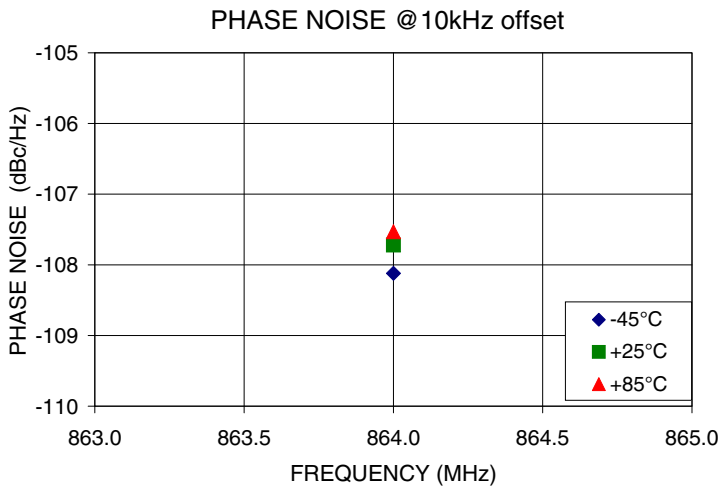
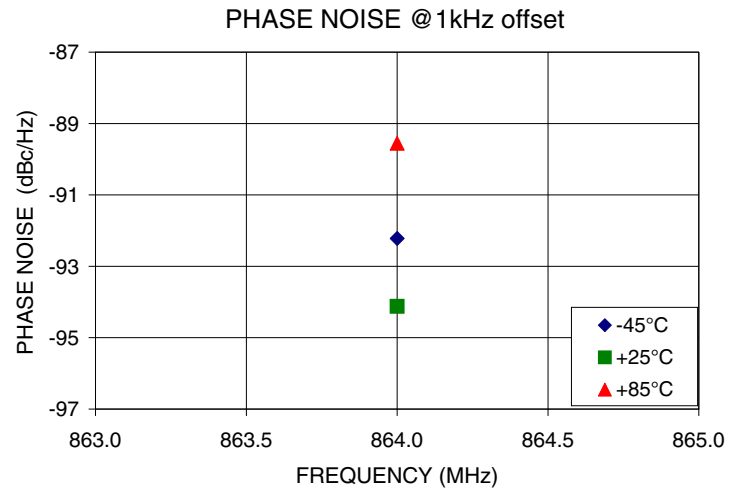
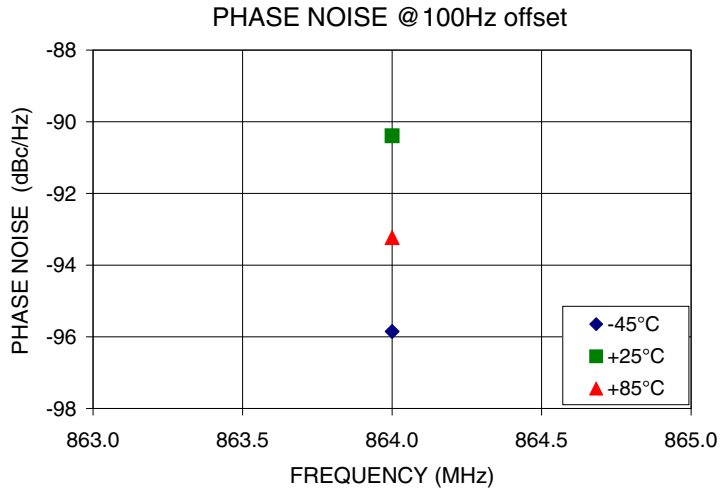
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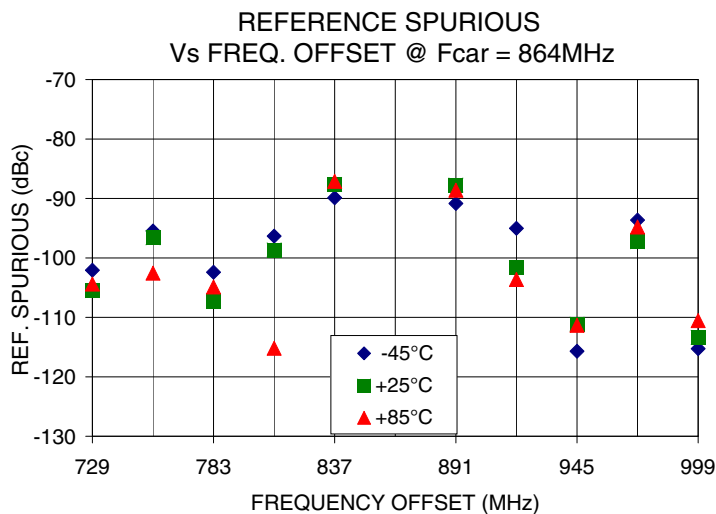
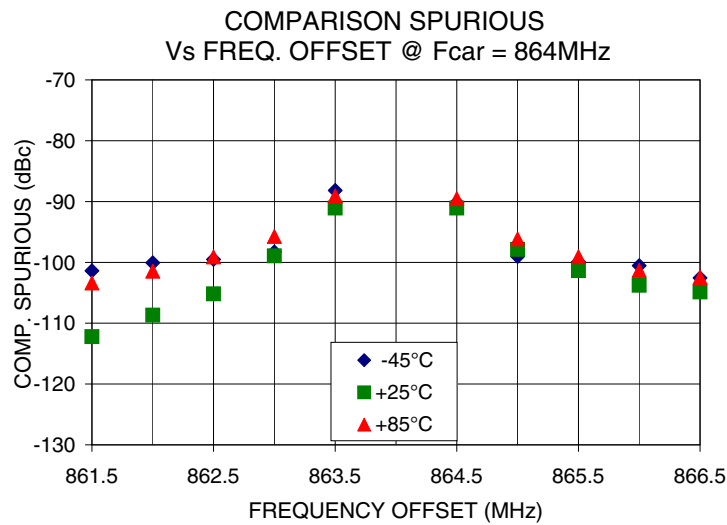
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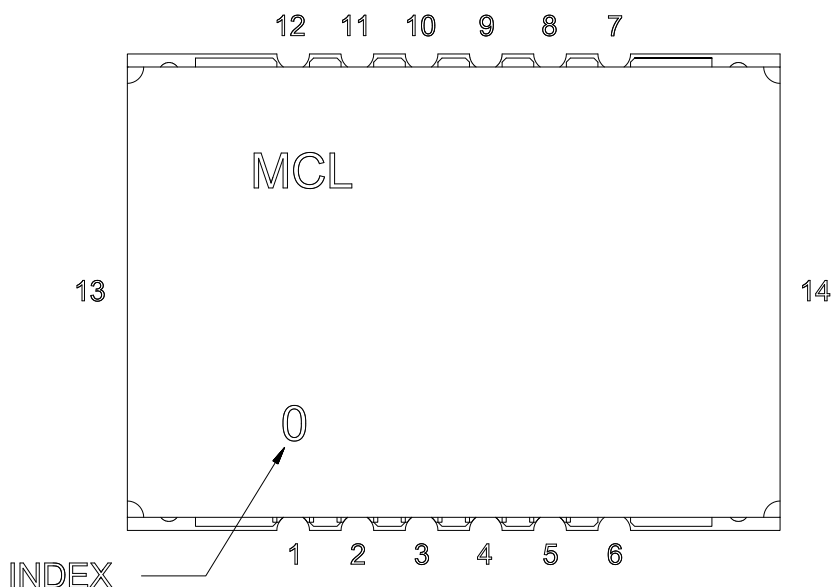


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Pin Configuration

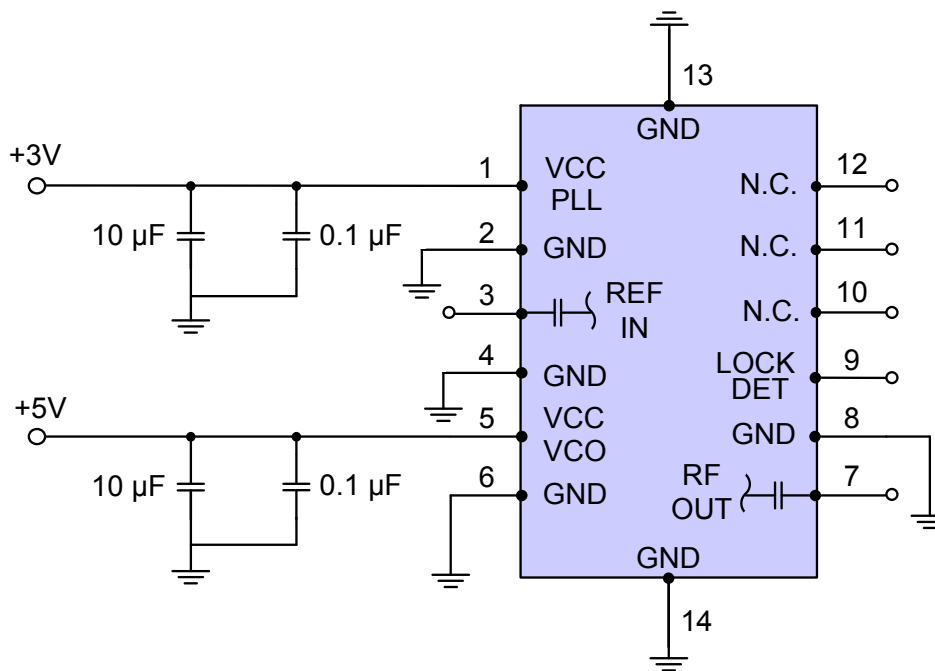


Pin Connection

| 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 | NOT CONNECTED |
| 11 | NOT CONNECTED |
| 12 | NOT CONNECTED |
| 13 | GND |
| 14 | GND |

Recommended Application Circuit

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



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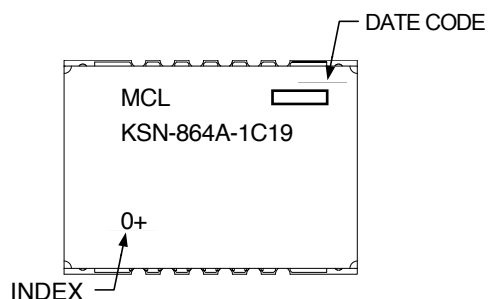


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Device Marking



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-567-2+F

Environment Ratings: ENV03T2



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