

# NON-CATALOG

## 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"><li>• Phase noise: -108 dBc/Hz typ. @ 10 kHz offset</li><li>• Comparison spurious: -93 dBc typ.</li><li>• Reference spurious: -87 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-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

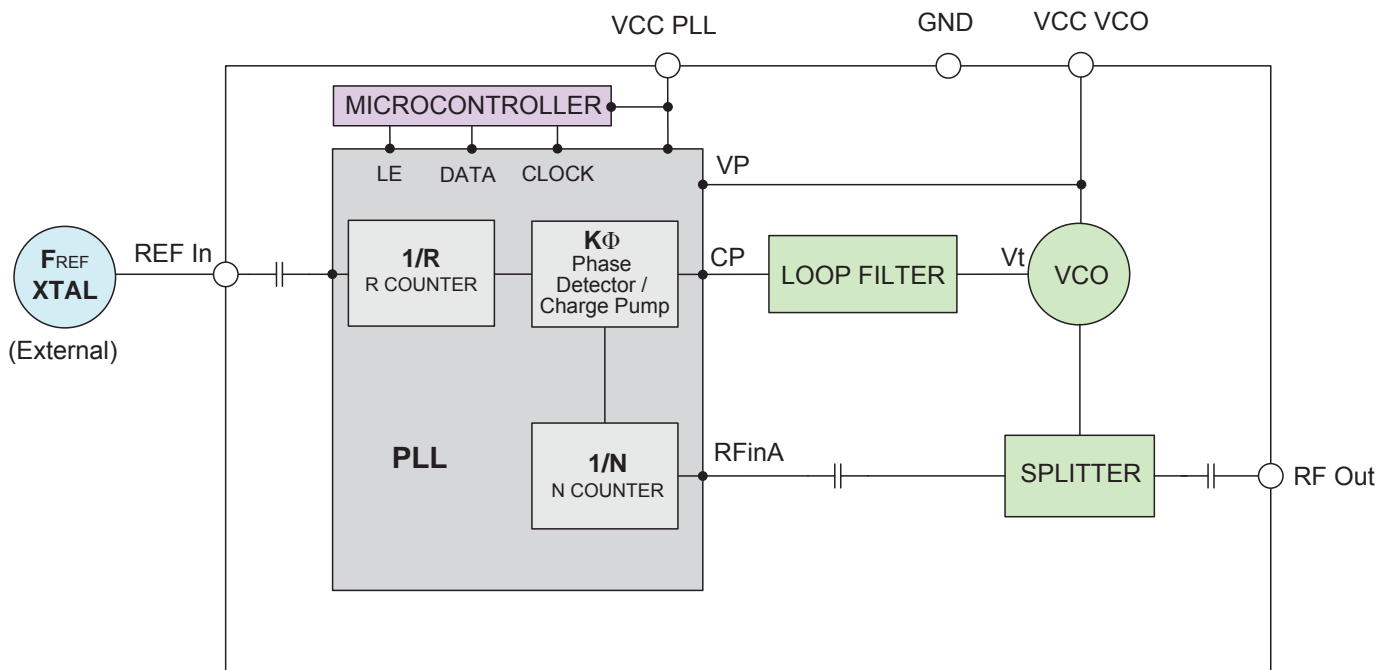
+ RoHS compliant in accordance with EU Directive (2002/95/EC)

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°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 $\pm 1$ 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 <sub>P-P</sub>
	Input impedance	-	-	100	K $\Omega$
	Phase Noise @ 1 kHz offset	-	-	-145	dBc/Hz
RF Output port Impedance	-	-	50	-	$\Omega$
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°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
	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 <sup>note 2</sup>	-	-	-
+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

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

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 <sup>note 4</sup>	-	-	-
+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

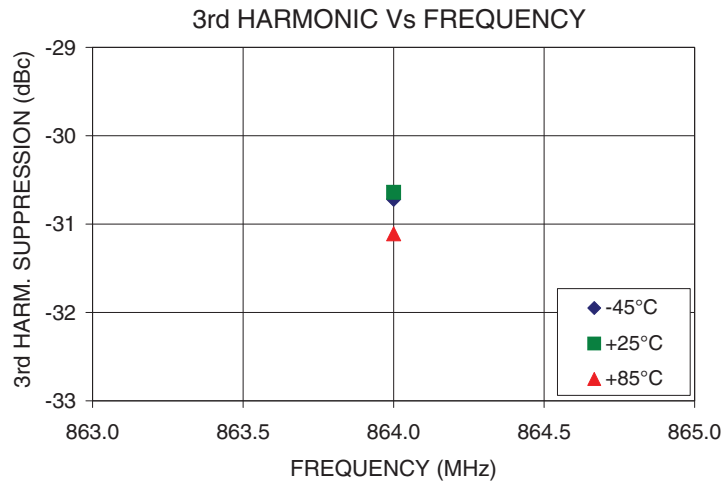
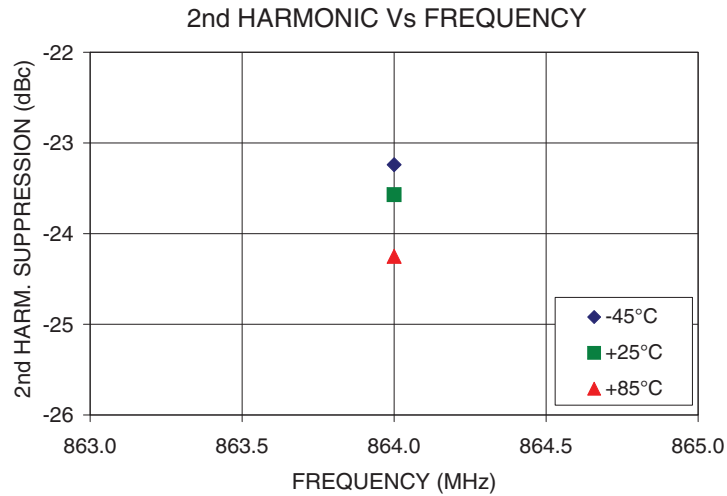
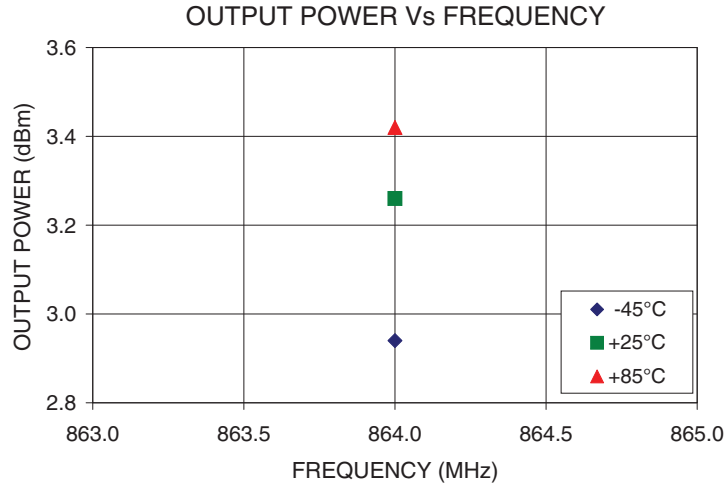
Note 3: Reference frequency 27 MHz  
 Note 4: All spurs are referenced to carrier signal (n=0).



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### Typical Performance Curves



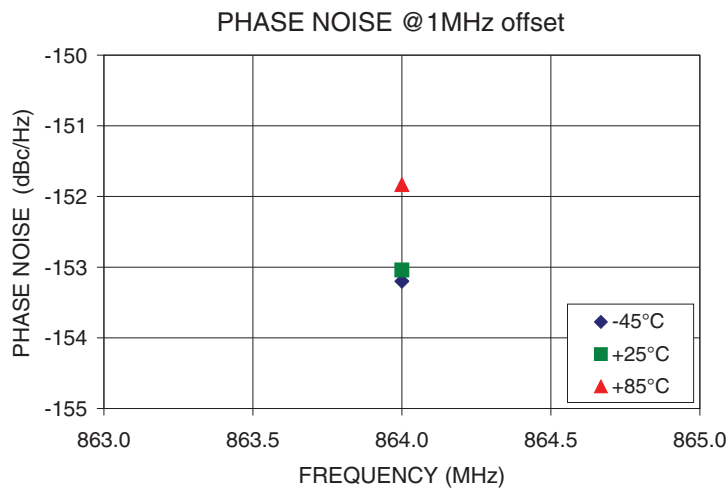
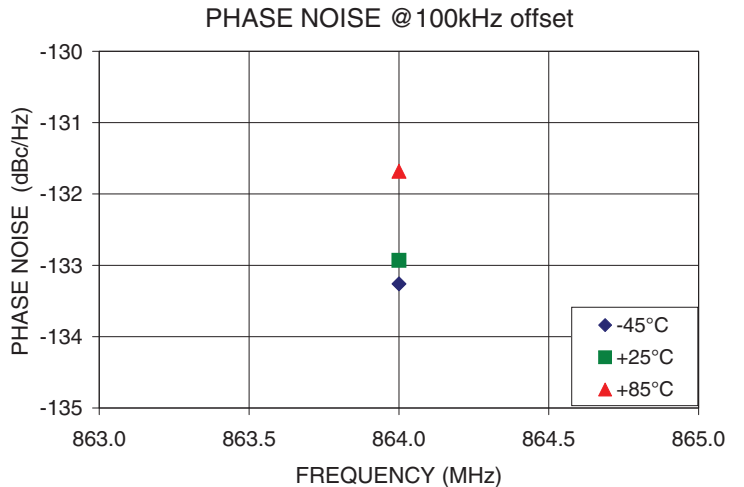
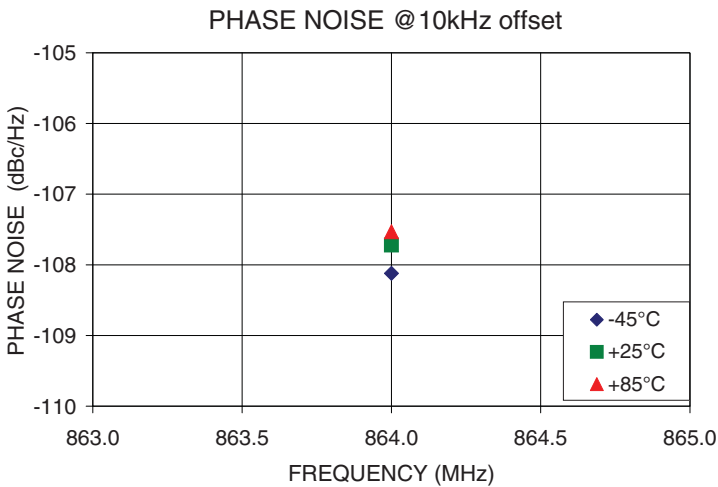
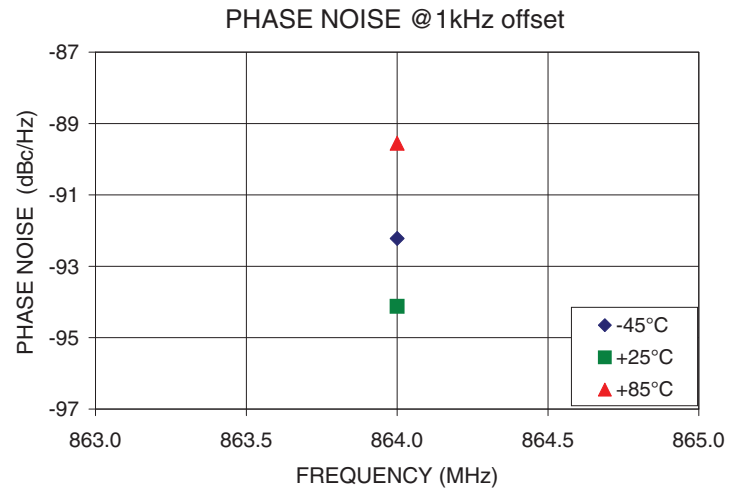
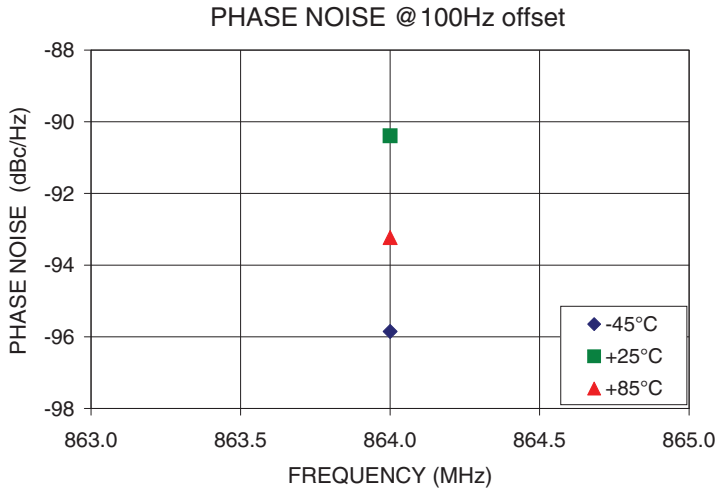
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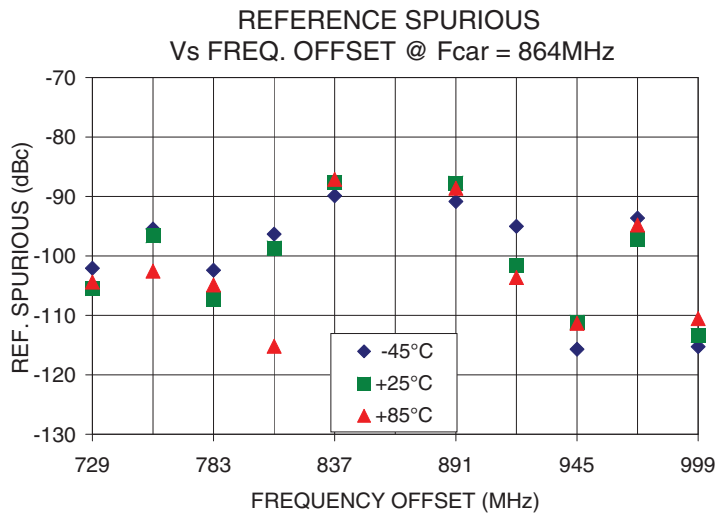
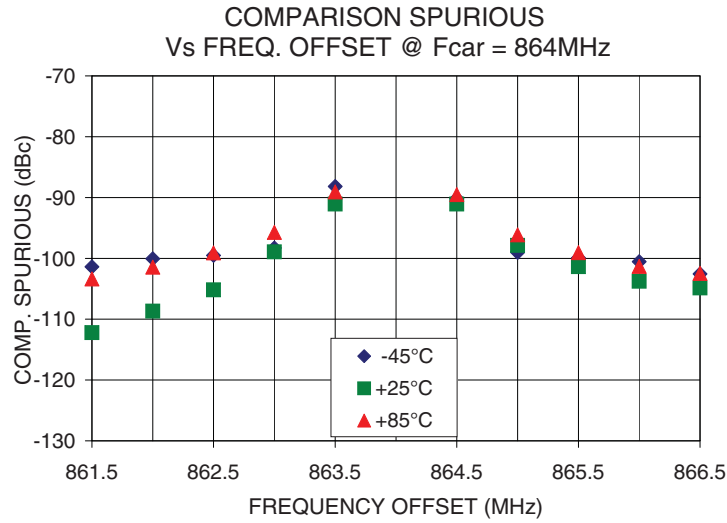
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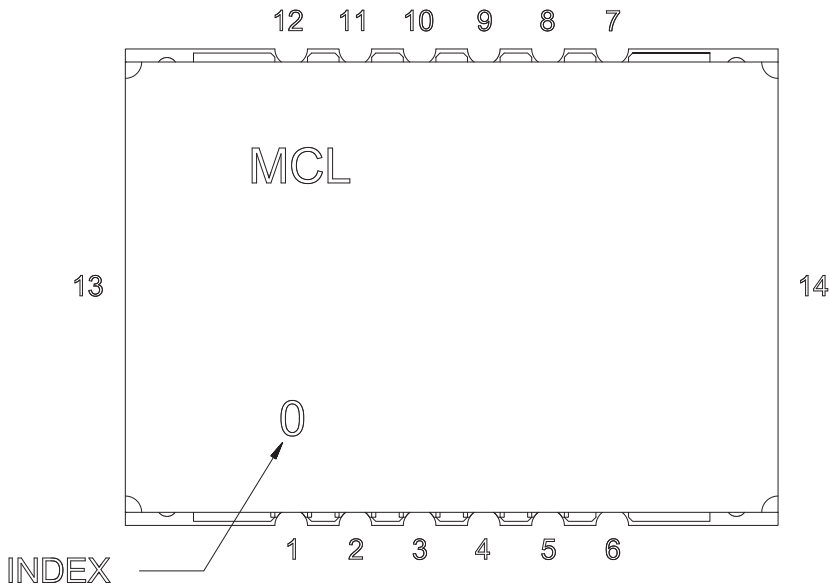


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### Pin Configuration

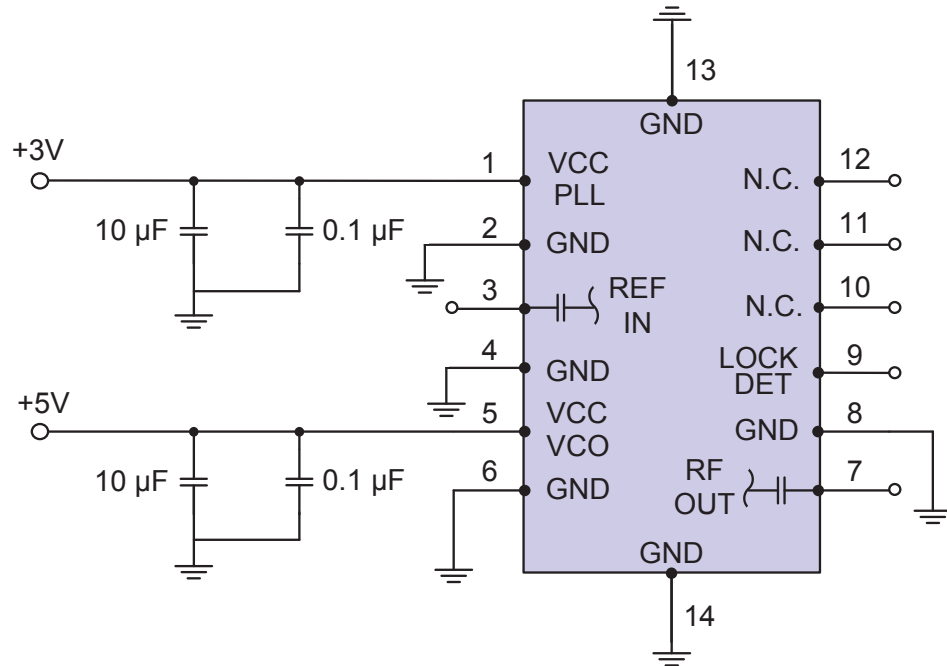


### Pin Connection

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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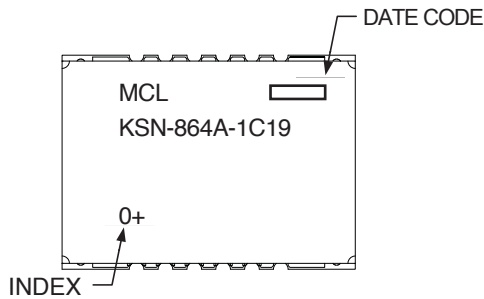
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### Device Marking



### 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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