Frequency Synthesizer KSN-768A-1C19+

50Ω 768 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: DK801

Product Overview

The KSN-768A-1C19+ is a Frequency Synthesizer, designed to operate 768MHz for WiMAX application. The KSN-768A-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: • Phase noise: -110 dBc/Hz typ. @ 10 kHz offset • Comparison spurious: -90 dBc typ. • Reference spurious: -90 dBc typ.	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of KSN-768A-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-768A-1C19+ to be used in compact designs.

Surface Mount

Frequency Synthesizer

KSN-768A-1C19+

50Ω 768 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"

CASE STYLE: DK801

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

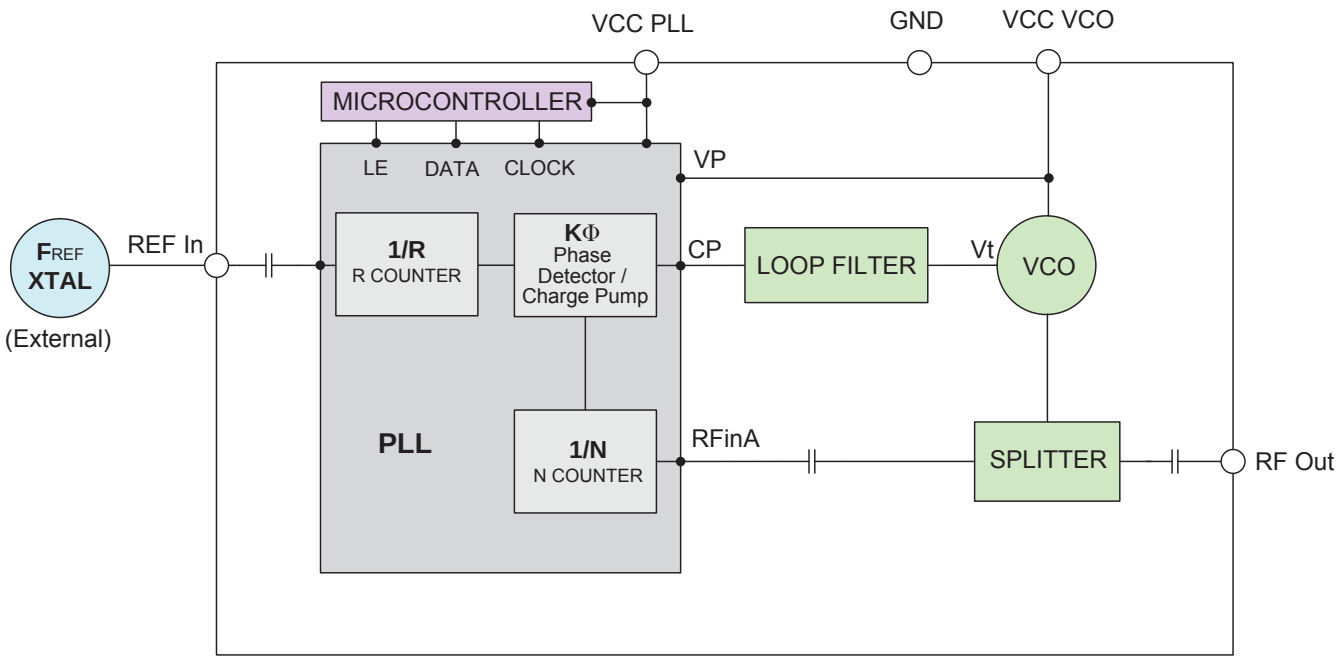
Applications

- WiMAX

General Description

The KSN-768A-1C19+ is a Frequency Synthesizer, designed to operate 768MHz for WiMAX application. The KSN-768A-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-768A-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



Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

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

Parameters		Test Conditions	Min.	Typ.	Max.	Units
Frequency Range (fixed)		-	768	-	768	MHz
Step size		-	-	4000	-	kHz
Settling Time (Power on to lock)		Within ± 1 kHz	-	10	-	mSec
Output Power		-	0	+3	+6	dBm
SSB Phase Noise		@ 100 Hz offset	-	-96		dBc/Hz
		@ 1 kHz offset	-	-100	-95	
		@ 10 kHz offset	-	-110	-102	
		@ 100 kHz offset	-	-133	-122	
		@ 1 MHz offset	-	-155	-138	
Integrated SSB Phase Noise		@ 100 Hz to 1 MHz	-	-	-52	dBc
Reference Spurious Suppression		Ref. Freq. 52 MHz	-	-90	-80	dBc
Comparison Spurious Suppression		Step Size 4000 kHz	-	-90	-80	
Non - Harmonic Spurious Suppression		-	-	-90	-85	
Harmonic Suppression		-	-	-25	-15	dBc
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	40	mA
PLL Supply Current		-	-	10	20	
Reference Input (External)	Frequency	52 (square wave)	-	52	-	MHz
	Amplitude	1	-	1	-	V_{P-P}
	Input impedance	-	-	100	-	KΩ
	Phase Noise @ 1 kHz offset	-	-	-140	-	dBc/Hz
RF Output port Impedance		-	-	50	-	Ω
Digital Lock Detect	Locked	-	2.45	-	3.15	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	-0.3V,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

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
768	3.53	3.82	3.85	30.85	32.11	33.20	8.13	9.25	10.70

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
768	-24.82	-24.82	-25.14	-22.31	-24.36	-27.28

FREQUENCY (MHZ)	@TEMP.	PHASE NOISE (dBc/Hz) @OFFSETS				
		100Hz	1kHz	10kHz	100kHz	1MHz
768	-45°C	-97.09	-101.46	-111.36	-135.20	-155.96
	+25°C	-96.15	-101.58	-110.63	-134.34	-155.32
	+85°C	-93.77	-100.70	-109.89	-133.06	-153.85

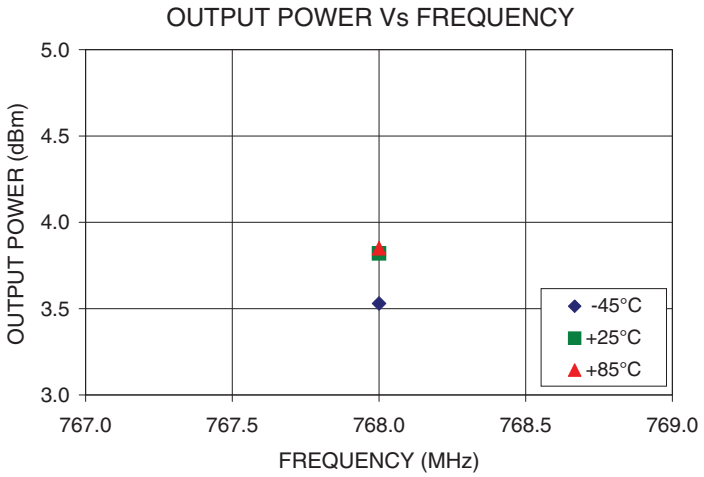
COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 768MHz+(n*Fcomparison) (dBc) NOTE 1		
n	-45°C	+25°C	+85°C
-5	-94.63	-93.46	-93.06
-4	-94.21	-92.98	-93.02
-3	-93.78	-93.22	-92.22
-2	-92.01	-93.73	-90.73
-1	-90.41	-92.94	-87.20
0 note 2	-	-	-
+1	-92.93	-95.56	-93.12
+2	-94.64	-95.75	-99.06
+3	-95.33	-95.65	-100.18
+4	-97.23	-95.93	-99.43
+5	-97.28	-95.91	-99.32

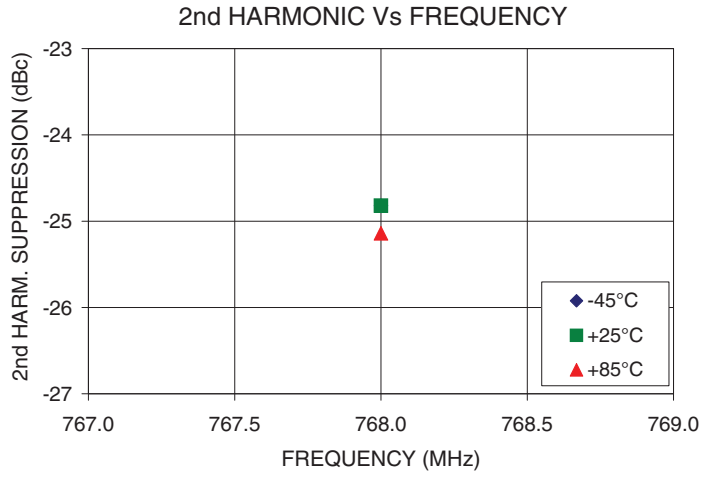
Note 1: Comparison frequency 4000 kHz
Note 2: All spurs are referenced to carrier signal (n=0).

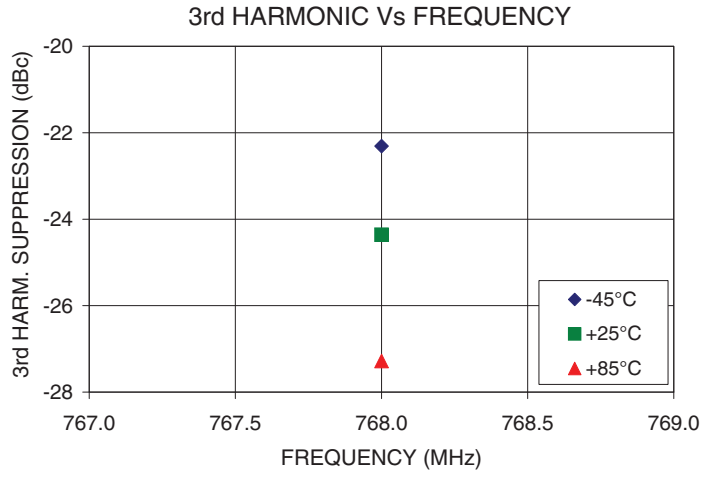
REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @Fcarrier 768MHz+(n*Freference) (dBc) NOTE 3		
n	-45°C	+25°C	+85°C
-5	-105.23	-99.22	-91.04
-4	-103.10	-102.50	-90.50
-3	-96.81	-92.46	-92.08
-2	-95.27	-92.87	-91.81
-1	-93.78	-93.33	-94.95
0 note 4	-	-	-
+1	-97.29	-99.67	-97.64
+2	-103.23	-99.42	-102.04
+3	-107.56	-102.56	-103.74
+4	-107.81	-99.08	-103.21
+5	-107.26	-99.79	-104.07

Note 3: Reference frequency 52 MHz
Note 4: All spurs are referenced to carrier signal (n=0).

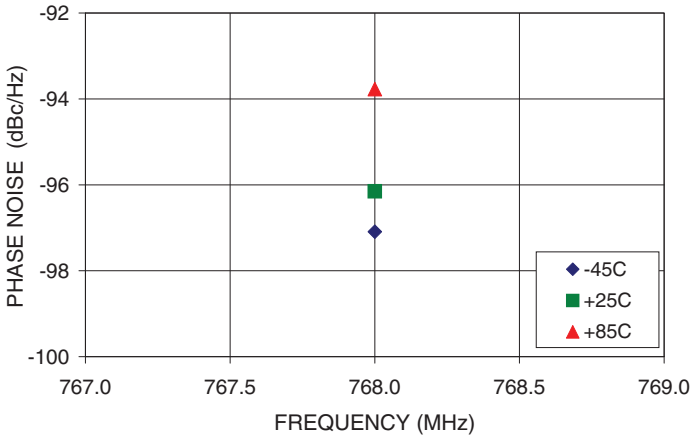
Typical Performance Curves



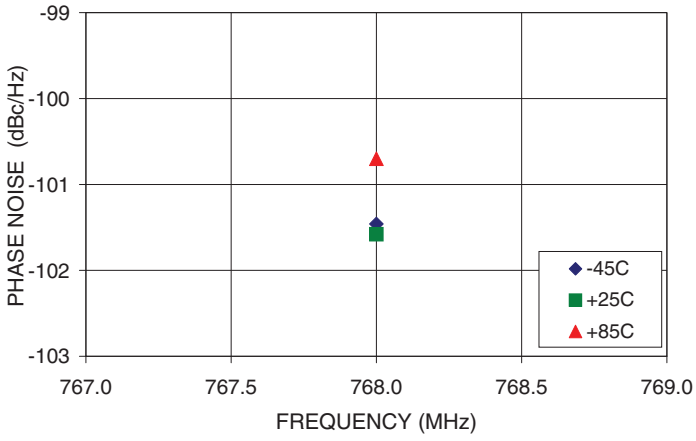




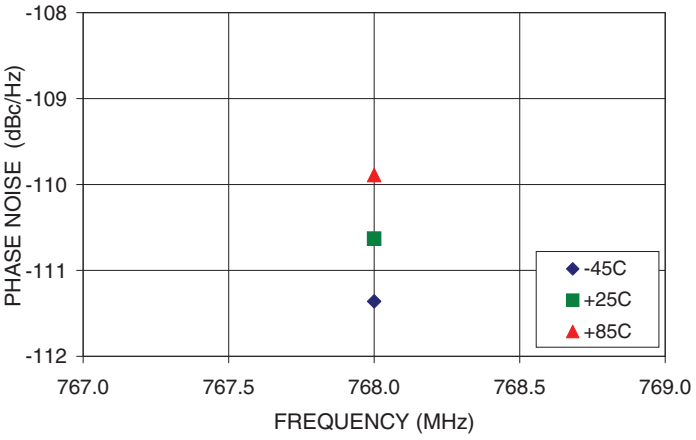
PHASE NOISE @100Hz offset



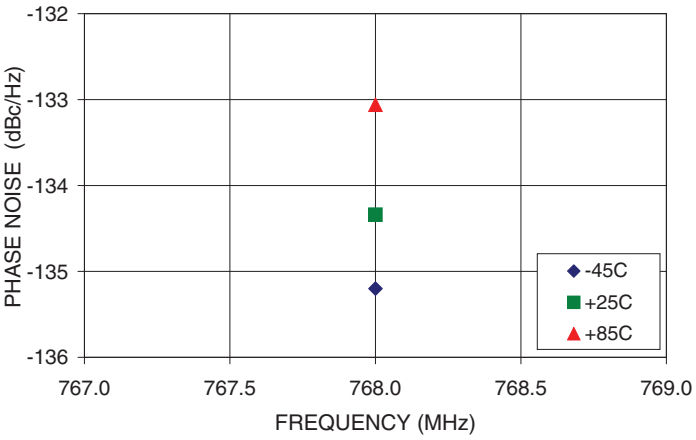
PHASE NOISE @1kHz offset



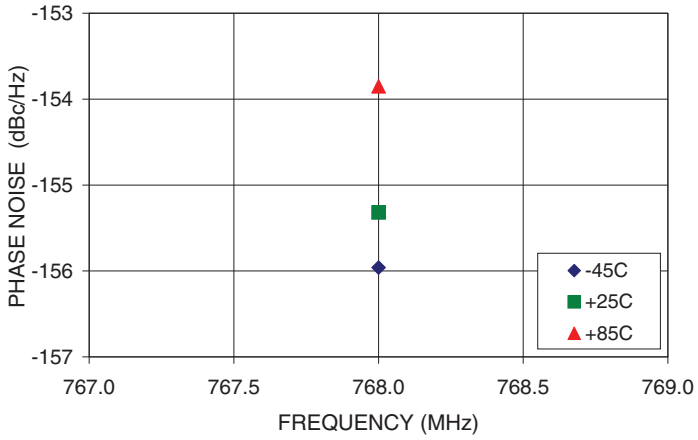
PHASE NOISE @10kHz offset



PHASE NOISE @100kHz offset

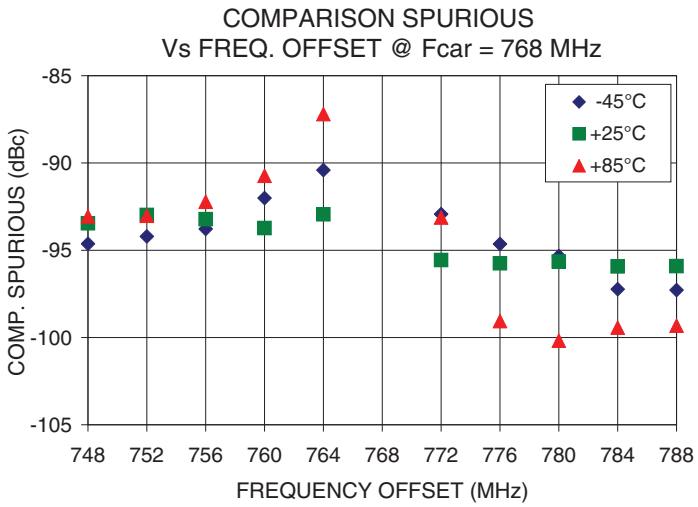


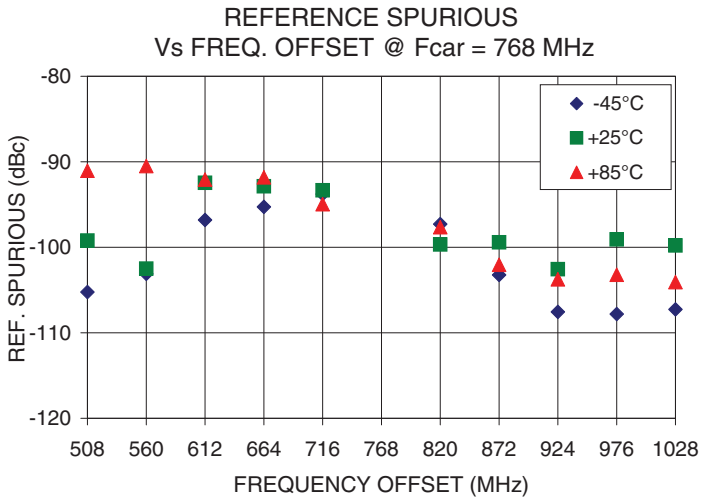
PHASE NOISE @1MHz offset



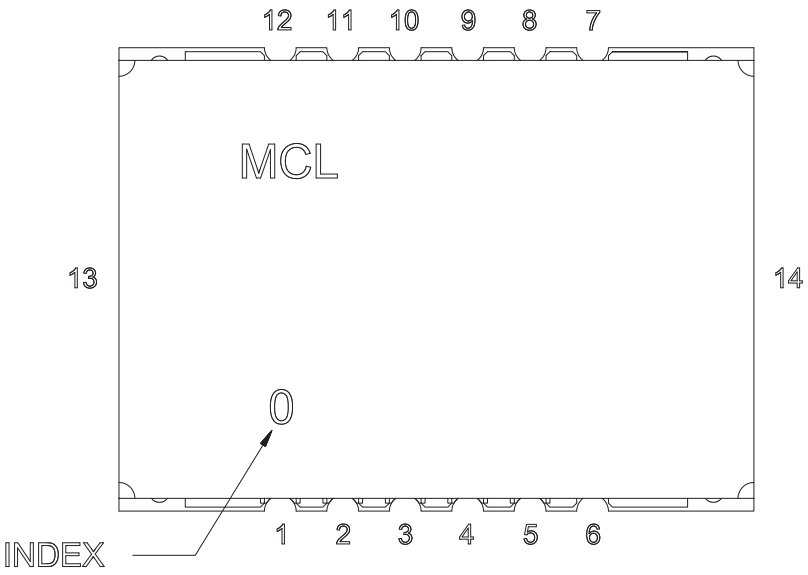
Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp





Pin Configuration

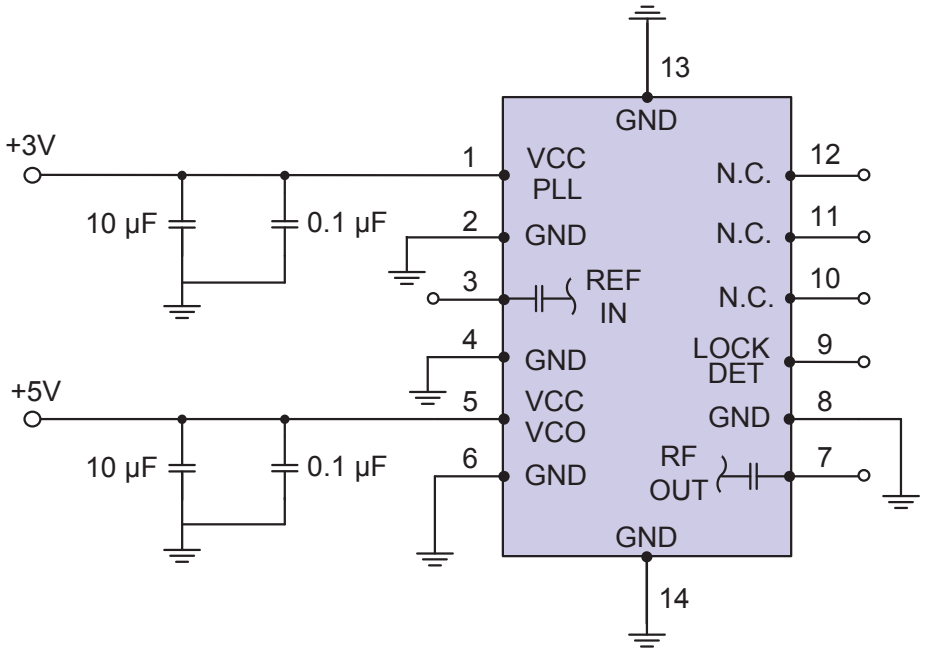


Pin Connection

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

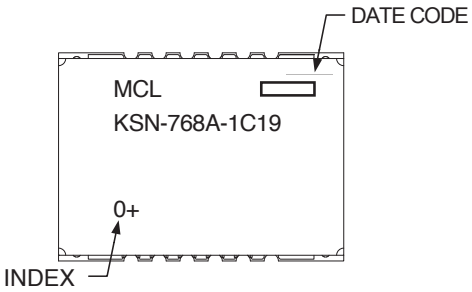
Recommended Application Circuit

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



Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

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: DK801

Tape & Reel: TR-F28

Suggested Layout for PCB Design: PL-249

Evaluation Board: TB-567-2+F

Environment Ratings: ENV03T2