

Frequency Synthesizer

KSN-490A-1C19+

50Ω 490 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-490A-1C19+ is a Frequency Synthesizer, designed to operate 490MHz for test equipment application. The KSN-490A-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: -106 dBc/Hz typ. @ 10 kHz offset • Comparison spurious: -80 dBc typ. • Reference spurious: -80 dBc typ. 	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of KSN-490A-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-490A-1C19+ to be used in compact designs.

Notes

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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=+5V)
- Small size 0.80" x 0.58" x 0.15"

Applications

- Test equipment



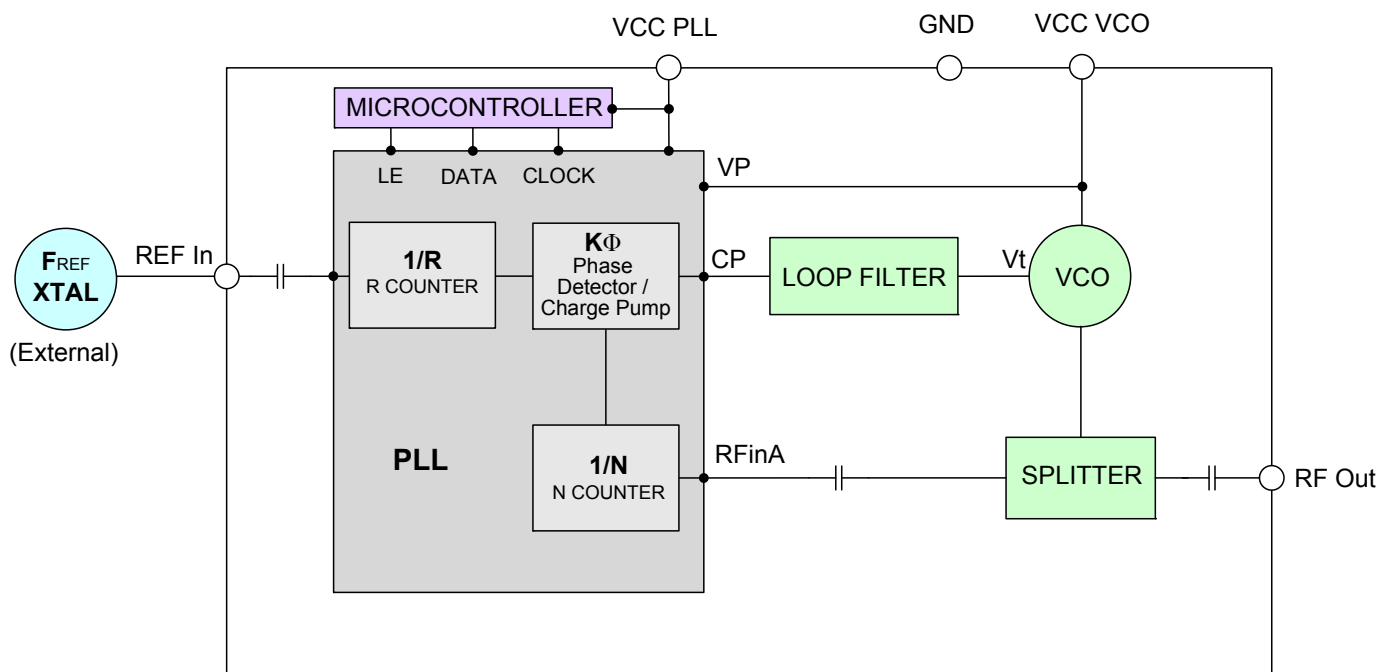
CASE STYLE: DK1042

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

General Description

The KSN-490A-1C19+ is a Frequency Synthesizer, designed to operate 490MHz for test equipment application. The KSN-490A-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-490A-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)	-	490	-	490	MHz
Comparison frequency	-	-	5	-	MHz
Settling time (Power on to lock)	Within ± 1 kHz	-	0.7	-	mSec
Output Power	-	-3.0	+0.5	+3.5	dBm
SSB Phase Noise	@ 100 Hz offset	-	-91	-	dBc/Hz
	@ 1 kHz offset	-	-105	-99	
	@ 10 kHz offset	-	-106	-101	
	@ 100 kHz offset	-	-136	-130	
	@ 1 MHz offset	-	-157	-150	
Reference Spurious Suppression	Ref. Freq. 10 MHz	-	-80	-60	dBc
Comparison Spurious Suppression	Comp. frequency 5 MHz	-	-80	-60	
Non - Harmonic Spurious Suppression	-	-	-90	-	
Harmonic Suppression	-	-	-30	-20	dBc
VCO Supply Voltage	+5.00	+4.75	+5.00	+5.25	V
PLL Supply Voltage	+5.00	+4.75	+5.00	+5.25	
VCO Supply Current	-	-	41	48	mA
PLL Supply Current	-	-	10	18	
Reference Input (External)	Frequency	10 (square wave)	-	10	MHz
	Amplitude	1.0	0.8	1.0	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	-	4.20	-	V
	Unlocked	-	-	-	0.40

Absolute Maximum Ratings

Parameters	Ratings
VCO Supply Voltage	5.9V
PLL Supply Voltage	5.9V
VCO Supply Voltage to PLL Power Supply	-0.3V to +5.5V
Reference Frequency Voltage	-0.3Vmin, +4.9Vmax
Data, Clock, LE Levels	N.A.
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
	490	0.68	0.38	-0.24	38.56	41.56	43.21	8.22	9.93

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
490	-37.69	-40.10	-42.90	-31.88	-29.90	-26.38

FREQUENCY	@TEMP.	PHASE NOISE (dBc/Hz)				
		@OFFSETS				
		100Hz	1kHz	10kHz	100kHz	1MHz
490	-45°C	-97.70	-104.75	-106.01	-136.81	-157.39
	+25°C	-94.33	-105.36	-105.93	-136.41	-157.24
	+85°C	-98.22	-103.06	-105.20	-133.98	-154.91

COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @ Fcarrier 490MHz+(n*Freference) (dBc) note 1		
	-45°C	+25°C	+85°C
n			
-5	-84.38	-82.84	-81.75
-4	-92.40	-82.99	-79.71
-3	-91.14	-81.67	-80.48
-2	-86.35	-81.56	-80.23
-1	-79.65	-78.03	-78.71
0 ^{note 2}	-	-	-
+1	-74.59	-80.63	-77.57
+2	-75.67	-80.21	-78.11
+3	-80.49	-80.97	-79.97
+4	-85.02	-81.07	-79.25
+5	-81.89	-82.62	-81.16

REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @ Fcarrier 490MHz+(n*Freference) (dBc) note 3		
	-45°C	+25°C	+85°C
n			
-5	-86.76	-82.21	-80.83
-4	-97.54	-83.38	-80.71
-3	-84.47	-83.63	-81.91
-2	-92.40	-82.99	-79.71
-1	-86.35	-81.56	-80.23
0 ^{note 4}	-	-	-
+1	-75.67	-80.21	-78.11
+2	-85.02	-81.07	-79.25
+3	-83.92	-85.04	-81.23
+4	-85.94	-81.15	-80.92
+5	-83.71	-80.95	-79.80

Note 1: Comparison frequency 5 MHz

Note 2: All spurs are referenced to carrier signal (n=0).

Note 3: Reference frequency 10 MHz

Note 4: All spurs are referenced to carrier signal (n=0).

Notes

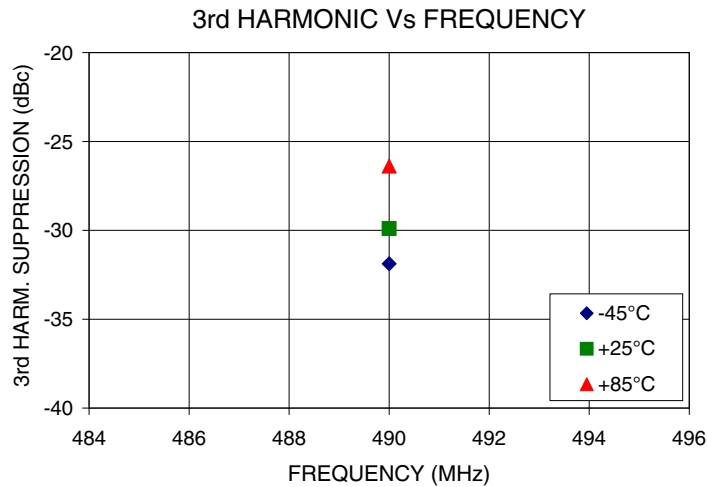
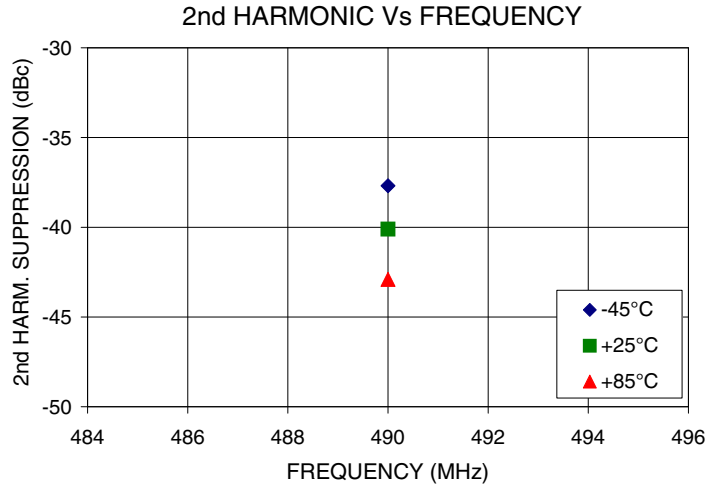
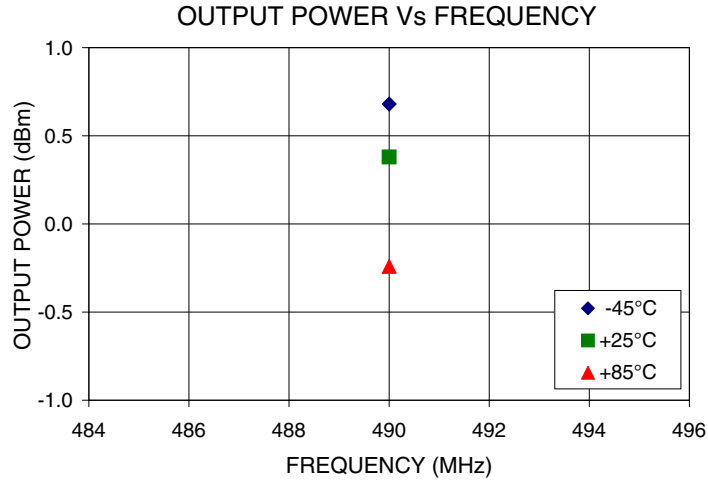
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Typical Performance Curves



Notes

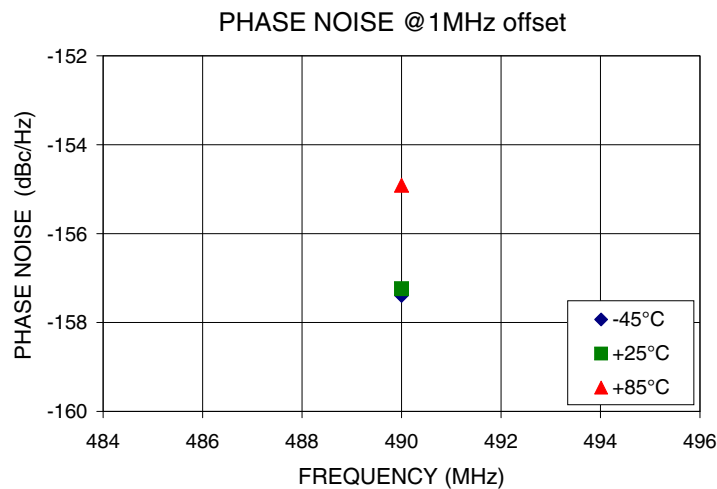
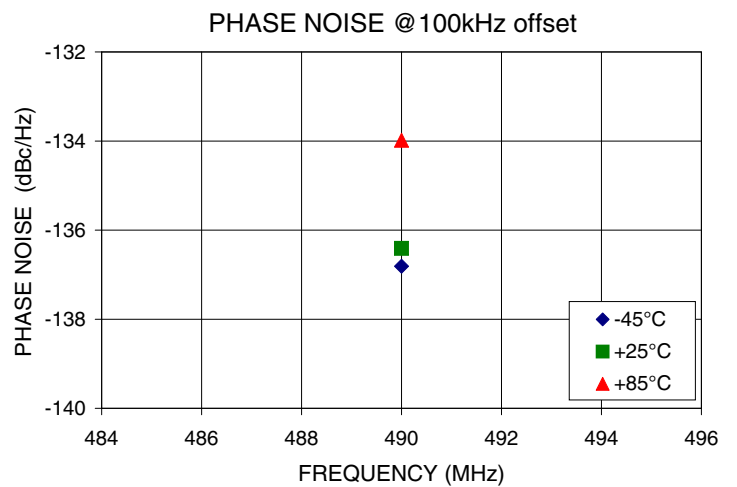
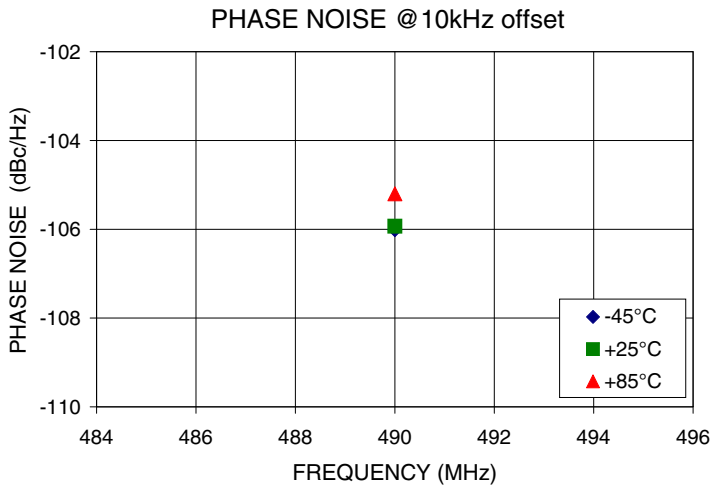
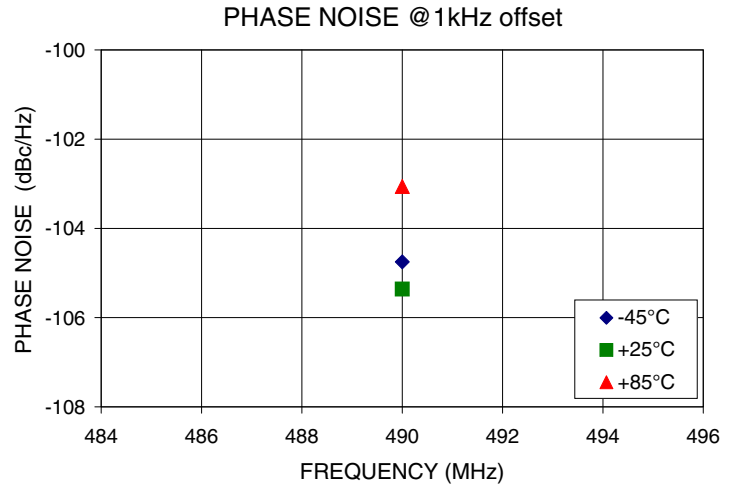
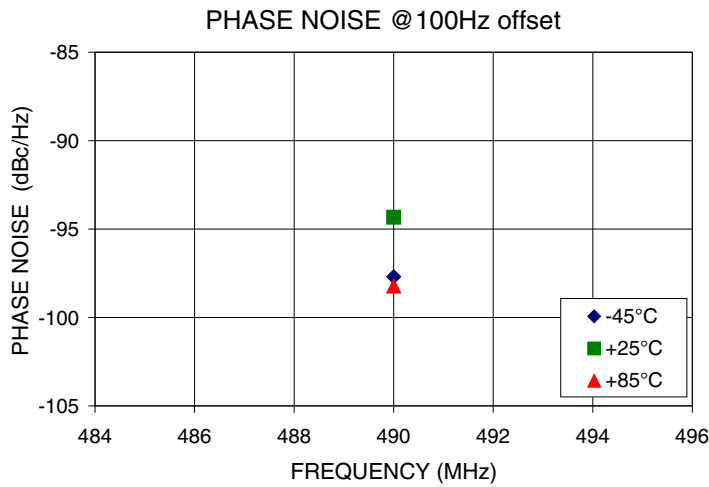
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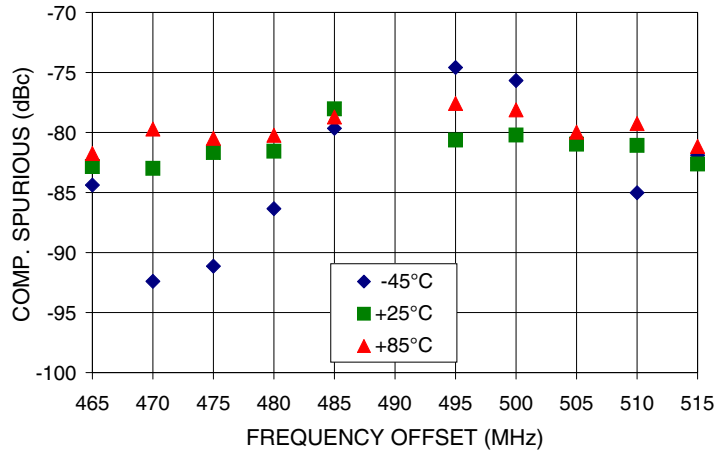


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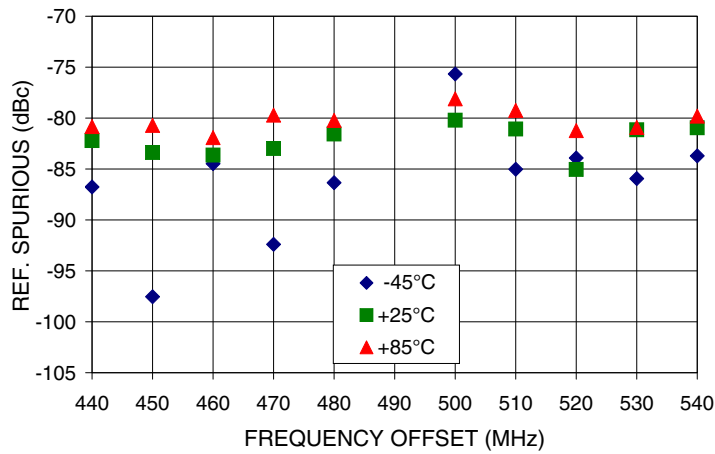
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COMPARISON SPURIOUS
Vs FREQ. OFFSET @ F_{car} = 490MHz



REFERENCE SPURIOUS
Vs FREQ. OFFSET @ F_{car} = 490MHz



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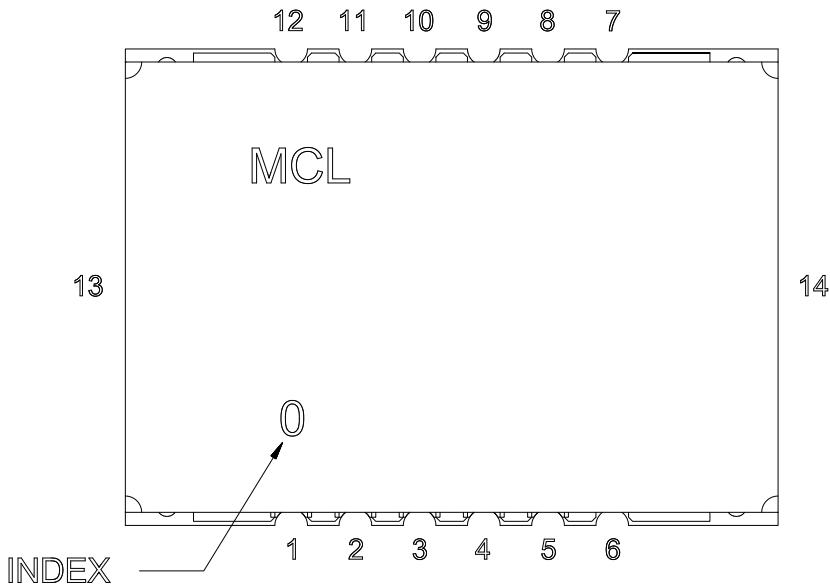


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Pin Configuration

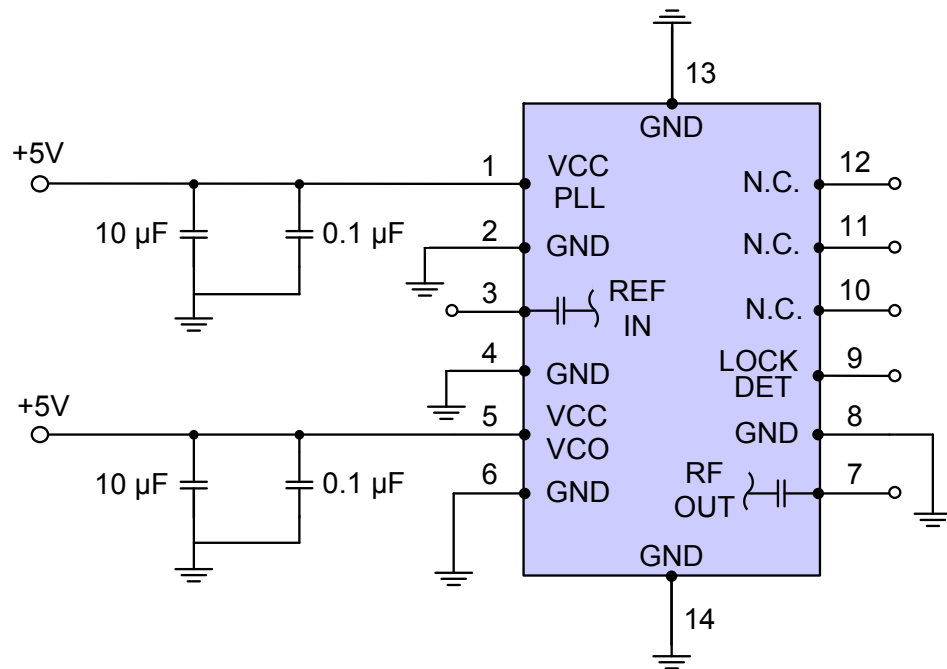


Pin Connection

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.

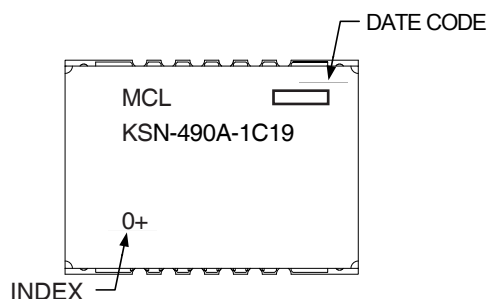


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Device Marking



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+F

Environment Ratings: ENV03T2

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