

Frequency Synthesizer

KSN-1935A+

50Ω 1915 to 1935 MHz

The Big Deal

- Low phase noise and spurious
- Robust design and construction
- Small size 0.800" x 0.584" x 0.154"



CASE STYLE: DK1042

Product Overview

The KSN-1935A+ is a Frequency Synthesizer, designed to operate from 1915 to 1935 MHz for Cable TV applications. The KSN-1935A+ is packaged in a metal case (size of 0.800" x 0.584" x 0.154") to shield against unwanted signals and noise.

Key Features

Feature	Advantages
Low phase noise and spurious: <ul style="list-style-type: none">• Phase Noise: -107 dBc/Hz typ. @ 10 kHz offset• Comparison Spurious: -85 dBc typ.• Reference Spurious: -110 dBc typ.	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of KSN-1935A+, 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, 0.800" x 0.584" x 0.154"	The small size enables the KSN-1935A+ to be used in compact designs.



For detailed performance specs
& shopping online see web site

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IF/RF MICROWAVE COMPONENTS

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50Ω 1915 to 1935 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 0.800" x 0.584" x 0.154"

Applications

- Cable TV

General Description

The KSN-1935A+ is a Frequency Synthesizer, designed to operate from 1915 to 1935 MHz for Cable TV application. The KSN-1935A+ is packaged in a metal case (size of 0.800" x 0.584" x 0.154") to shield against unwanted signals and noise. To enhance the robustness of KSN-1935A+, 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.



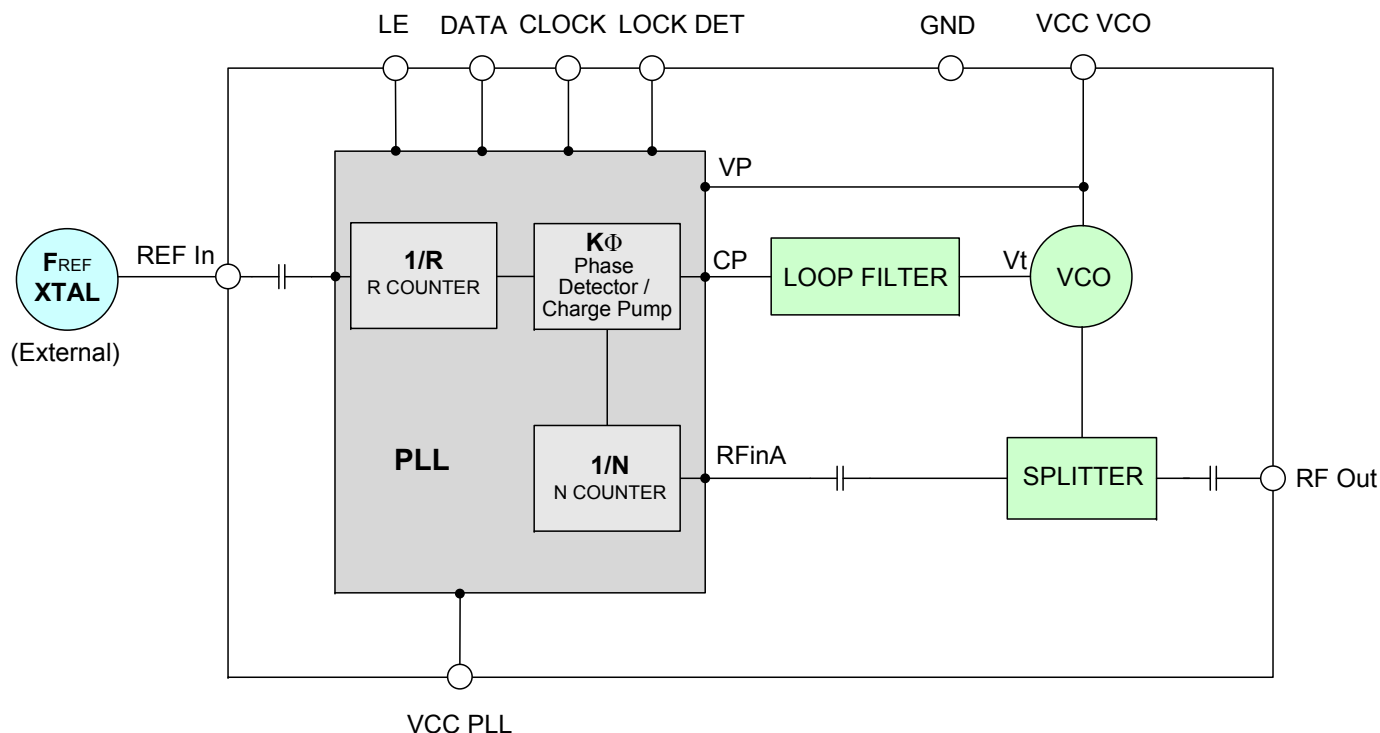
CASE STYLE: DK1042

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



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

Parameters						Test Conditions				Min.	Typ.	Max.	Units	
Frequency Range						-				1915	-	1935	MHz	
Step Size						-				-	125	-	kHz	
Settling Time						Within ± 1 kHz				-	20	-	mSec	
Output Power						-				+0.5	+3.5	+6.5	dBm	
SSB Phase Noise						@ 100 Hz offset				-	-62	-	dBc/Hz	
						@ 1 kHz offset				-	-78	-68		
						@ 10 kHz offset				-	-107	-102		
						@ 100 kHz offset				-	-130	-126		
						@ 1 MHz offset				-	-150	-146		
Integrated SSB Phase Noise						@ 100Hz to 1MHz				-	-32	-	dBc	
Reference Spurious Suppression						Ref. Freq. 20 MHz				-	-110	-90	dBc	
Comparison Spurious Suppression						Step Size 125 kHz				-	-85	-75		
Non - Harmonic Spurious Suppression						-				-	-90	-		
Harmonic Suppression						-				-	-25	-18		
VCO Supply Voltage						+5.00				+4.75	+5.00	+5.25	V	
PLL Supply Voltage						+3.30				+3.15	+3.30	+3.45		
VCO Supply Current						-				-	48	55	mA	
PLL Supply Current						-				-	8	14		
Reference Input (External)		Frequency				20 (square wave)				-	20	-	MHz	
		Amplitude				1.0				-	1.0	-	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	-	3.45	V	
		Unlocked				-				-	-	0.40	V	
Frequency Synthesizer PLL						-				ADF4118				
PLL Programming						-				3-wire serial 3.3V CMOS				
Register Map ^{NOTE 1}	F_Register ^{NOTE 2}	Reserved	Power-Down 2	Reserved	Timer Counter Control	Fastlock Mode	Reserved	Fastlock Enable	CP 3-State	PD Polarity	Muxout Control	Power-Down 1	Counter Reset	Control Bits
		0	0	000	0000	0	0	0	0	1	001	0	0	10
	N_Register @ 1935 MHz	CP Gain	13-Bit B Counter								5-Bit A Counter			Control Bits
		1	0000111100011								11000			01
	R_Register	Lock Detect Precision	Test Mode Bits			14-BIT Reference Counter, R								Control Bits
1		0000			00000010100000								00	

Note 1: Registers Load Sequence: Initialization Register, F Register, R Register, N Register.**Note 2:** For the Initialization Register use Register F with Control Bits 11.**Absolute Maximum Ratings**

Parameters	Ratings
VCO Supply Voltage NOTE 3	6V
PLL Supply Voltage NOTE 3	6V
VCO Power Supply to PLL Power Supply NOTE 3	-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

Note 3: Power on/off Sequence:
Power on: VCO Supply Voltage,
followed by PLL Supply Voltage.
Power off: PLL Supply Voltage,
followed by VCO Supply Voltage.

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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
1915	3.42	3.92	3.82	44.83	47.55	48.87	5.65	7.57	9.03
1916	3.41	3.92	3.81	44.83	47.55	48.87	5.64	7.56	9.02
1925	3.36	3.87	3.76	44.79	47.48	48.81	5.65	7.57	9.03
1934	3.28	3.80	3.69	44.74	47.40	48.74	5.66	7.57	9.04
1935	3.27	3.79	3.68	44.74	47.39	48.73	5.66	7.58	9.05

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
1915	-37.45	-48.72	-37.34	-22.41	-24.66	-26.60
1916	-37.50	-48.67	-37.22	-22.53	-24.80	-26.86
1925	-37.94	-45.86	-36.95	-23.53	-25.86	-28.12
1934	-36.83	-42.79	-36.27	-23.52	-26.38	-28.75
1935	-36.71	-42.51	-36.24	-23.51	-26.40	-28.41

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS +25°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1915	-62.86	-80.63	-108.03	-130.14	-150.59
1916	-60.83	-78.83	-108.06	-130.33	-150.59
1925	-61.05	-78.23	-107.78	-130.22	-150.09
1934	-65.19	-77.73	-107.66	-129.82	-150.36
1935	-66.08	-77.61	-107.57	-129.84	-150.67

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS -45°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1915	-62.92	-79.84	-108.24	-130.16	-150.39
1916	-63.67	-79.40	-107.10	-130.23	-150.45
1925	-61.78	-78.06	-107.44	-130.32	-150.92
1934	-64.01	-77.87	-107.16	-130.23	-150.48
1935	-61.87	-77.73	-106.39	-130.37	-150.14

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS +85°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1915	-60.48	-76.46	-107.87	-129.78	-149.97
1916	-62.42	-78.55	-106.83	-129.66	-149.69
1925	-59.92	-76.41	-106.94	-129.56	-149.81
1934	-59.18	-78.24	-106.85	-129.32	-149.54
1935	-59.39	-76.89	-107.20	-129.53	-149.52

COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 1915MHz+(n*Fcomparison) (dBc) note 1			COMPARISON SPURIOUS @Fcarrier 1925MHz+(n*Fcomparison) (dBc) note 1			COMPARISON SPURIOUS @Fcarrier 1935MHz+(n*Fcomparison) (dBc) note 1		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-108.69	-114.02	-114.91	-110.85	-107.63	-114.74	-111.22	-113.32	-113.90
-4	-110.74	-112.61	-108.85	-108.83	-108.71	-112.11	-109.36	-111.57	-110.06
-3	-102.95	-106.03	-106.70	-104.57	-107.59	-108.91	-103.59	-105.41	-107.86
-2	-97.42	-99.64	-98.02	-97.44	-99.46	-98.52	-92.49	-100.89	-98.31
-1	-88.58	-88.94	-86.37	-89.61	-88.19	-85.70	-88.42	-88.33	-85.46
0 note 2	-	-	-	-	-	-	-	-	-
+1	-89.16	-89.46	-86.99	-90.44	-86.91	-85.44	-87.99	-86.21	-87.94
+2	-95.75	-102.35	-100.66	-99.07	-100.18	-98.36	-95.90	-99.75	-99.55
+3	-105.65	-105.87	-104.86	-101.63	-107.70	-107.38	-105.43	-108.42	-103.22
+4	-109.35	-110.06	-112.49	-112.47	-111.31	-113.02	-111.47	-108.41	-109.30
+5	-113.93	-112.43	-112.76	-110.03	-116.04	-112.75	-113.06	-110.94	-115.19

Note 1: Comparison frequency 125 kHz

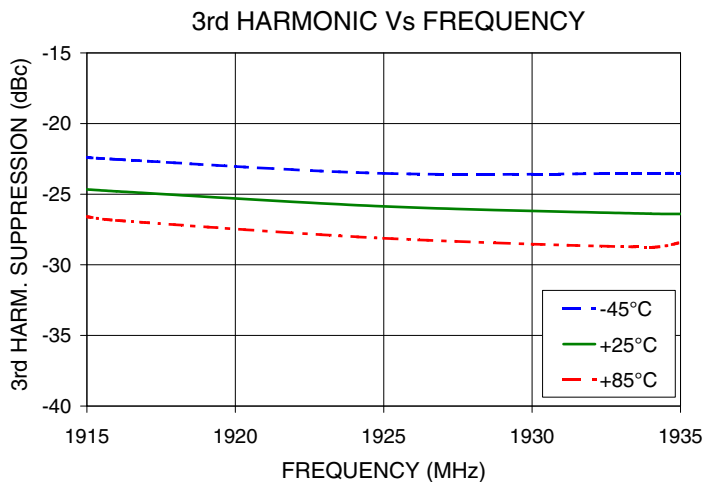
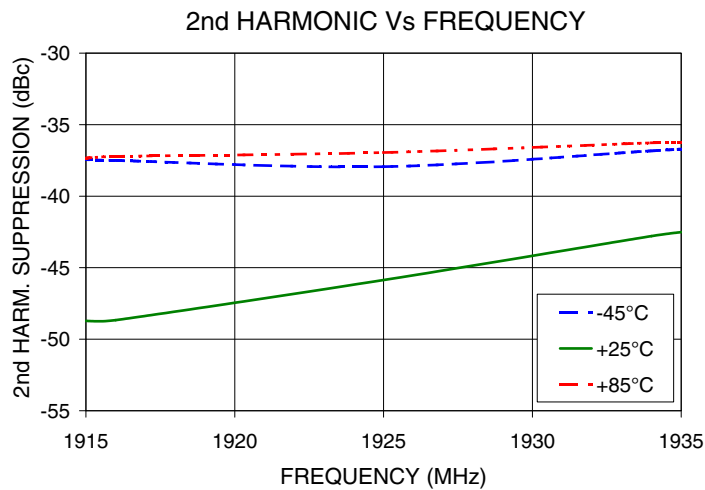
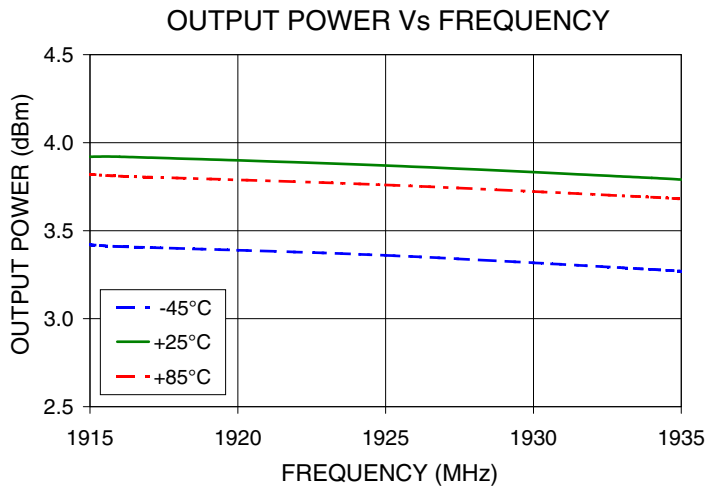
Note 2: All spurs are referenced to carrier signal (n=0).

REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @Fcarrier 1915MHz+(n*Freference) (dBc) note 3			REFERENCE SPURIOUS @Fcarrier 1925MHz+(n*Freference) (dBc) note 3			REFERENCE SPURIOUS @Fcarrier 1935MHz+(n*Freference) (dBc) note 3		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-127.03	-118.61	-123.07	-126.96	-125.18	-123.96	-121.18	-122.56	-123.46
-4	-128.45	-127.61	-130.40	-126.39	-128.62	-127.31	-127.78	-123.55	-129.30
-3	-125.40	-128.69	-121.98	-124.05	-120.44	-123.58	-123.36	-126.23	-126.89
-2	-121.95	-123.07	-120.92	-118.65	-120.73	-119.91	-120.21	-122.44	-120.22
-1	-115.36	-117.51	-125.06	-115.83	-118.40	-121.43	-113.67	-118.45	-120.57
0 note 4	-	-	-	-	-	-	-	-	-
+1	-107.16	-116.41	-110.39	-108.87	-118.79	-111.42	-107.66	-114.22	-111.26
+2	-123.76	-124.07	-122.60	-125.41	-123.21	-122.41	-121.67	-119.32	-120.86
+3	-128.22	-121.25	-130.56	-128.32	-121.88	-128.37	-126.88	-123.83	-128.29
+4	-124.32	-126.47	-131.29	-127.68	-127.66	-128.71	-123.75	-126.37	-126.62
+5	-124.85	-123.36	-121.98	-122.68	-121.72	-118.91	-121.78	-123.19	-120.46

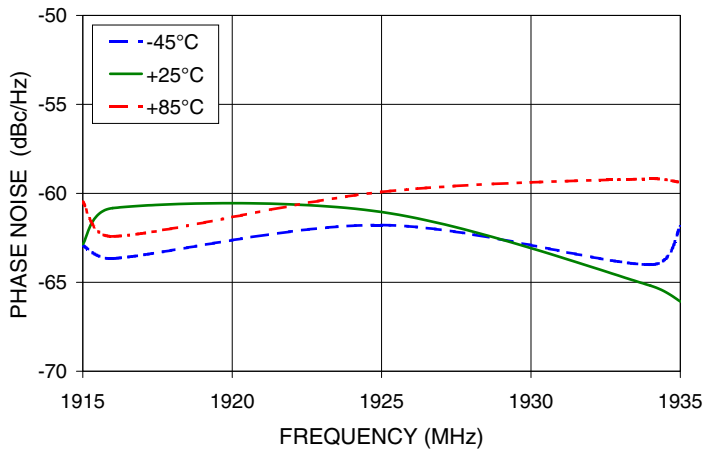
Note 3: Reference frequency 20 MHz

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

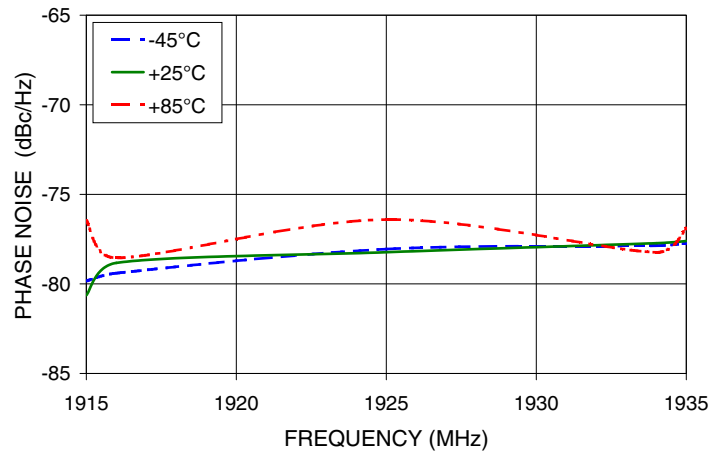
Typical Performance Curves



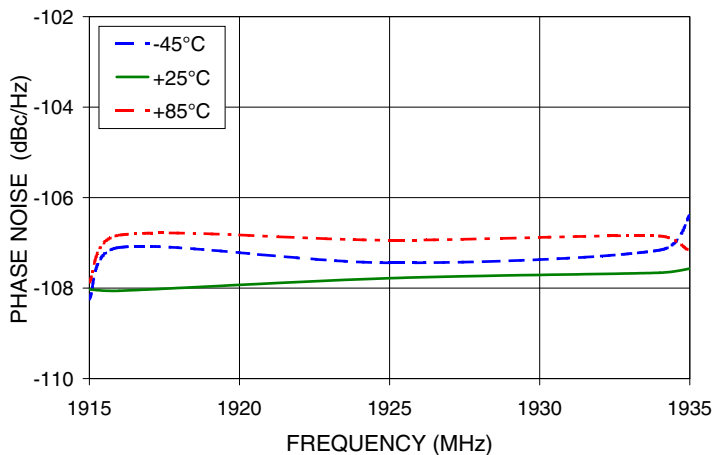
PHASE NOISE @ 100Hz offset



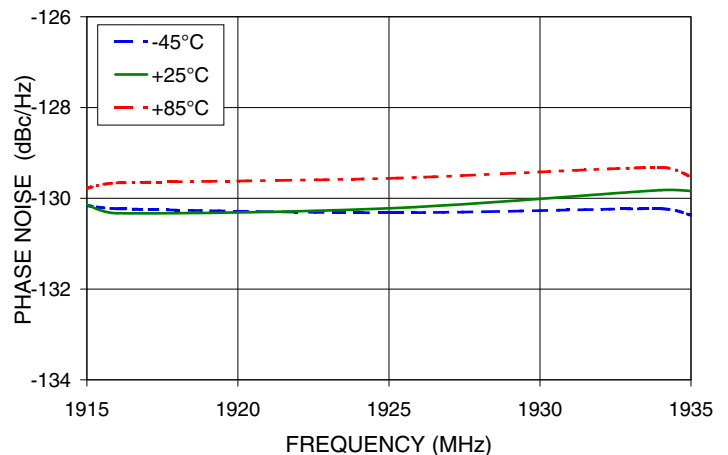
PHASE NOISE @ 1kHz offset



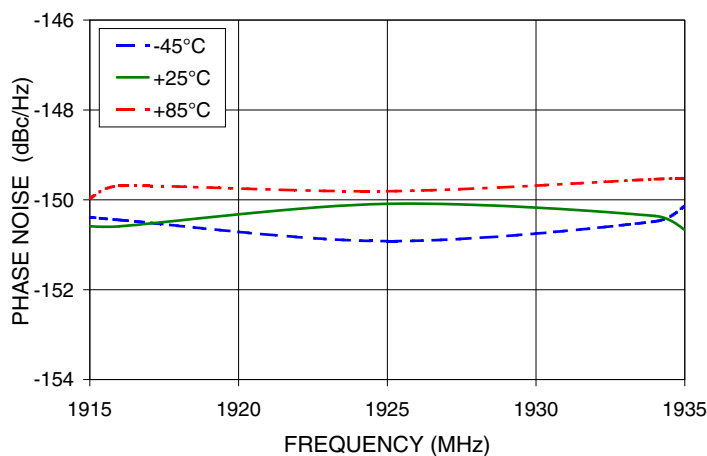
PHASE NOISE @ 10 kHz offset

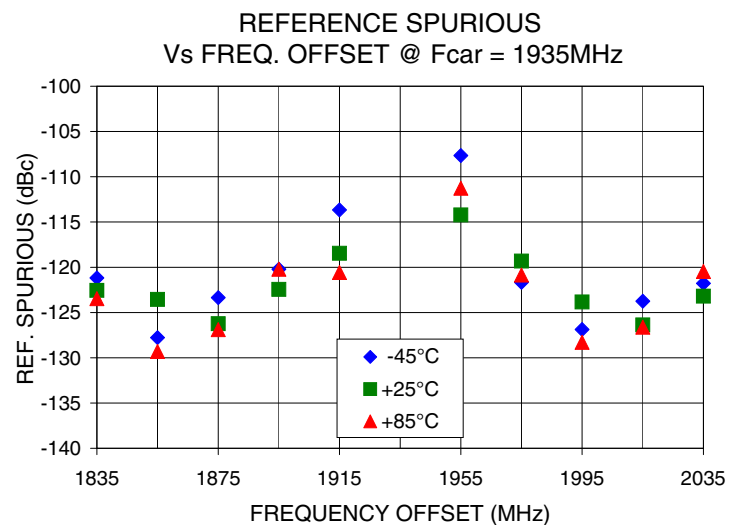
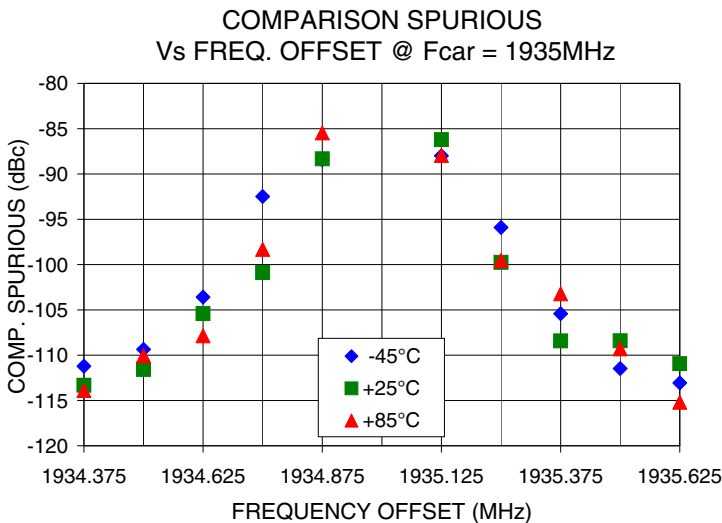
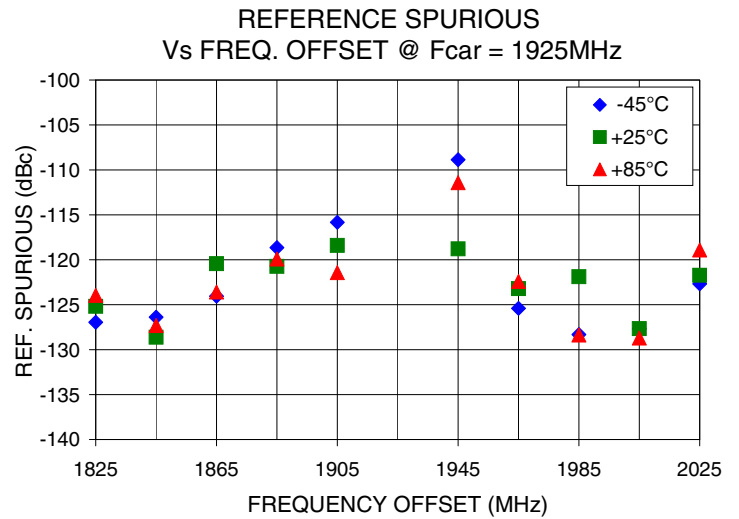
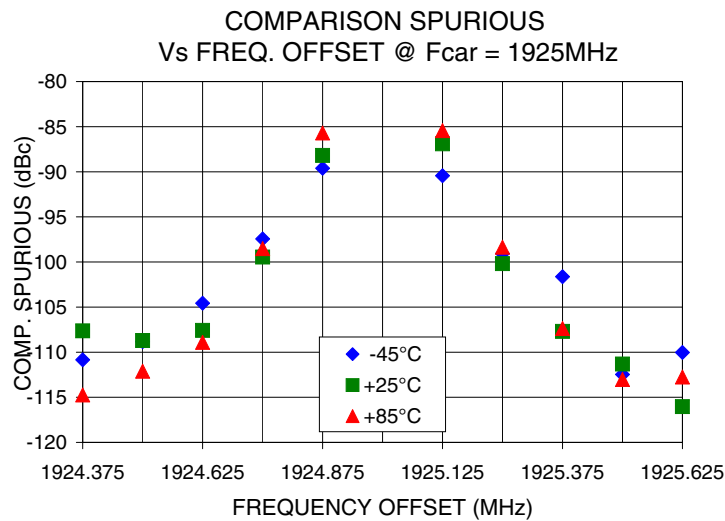
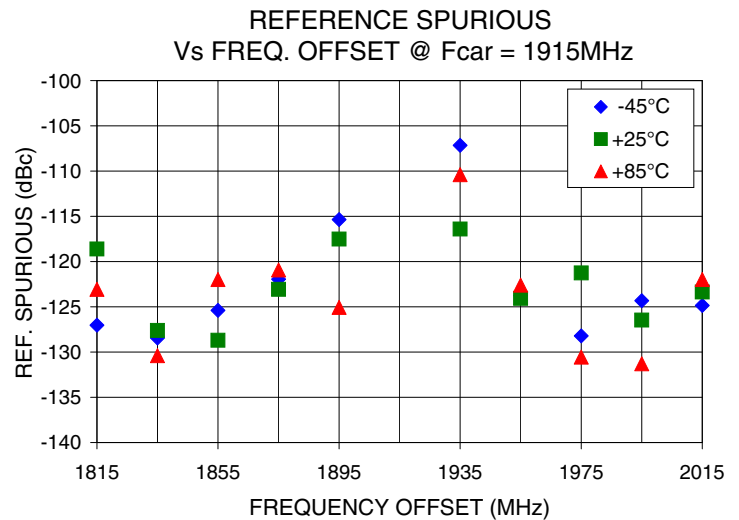
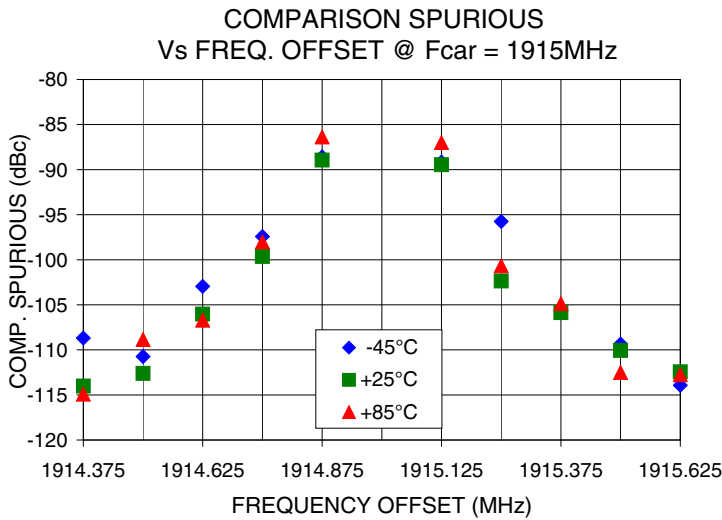


PHASE NOISE @ 100 kHz offset

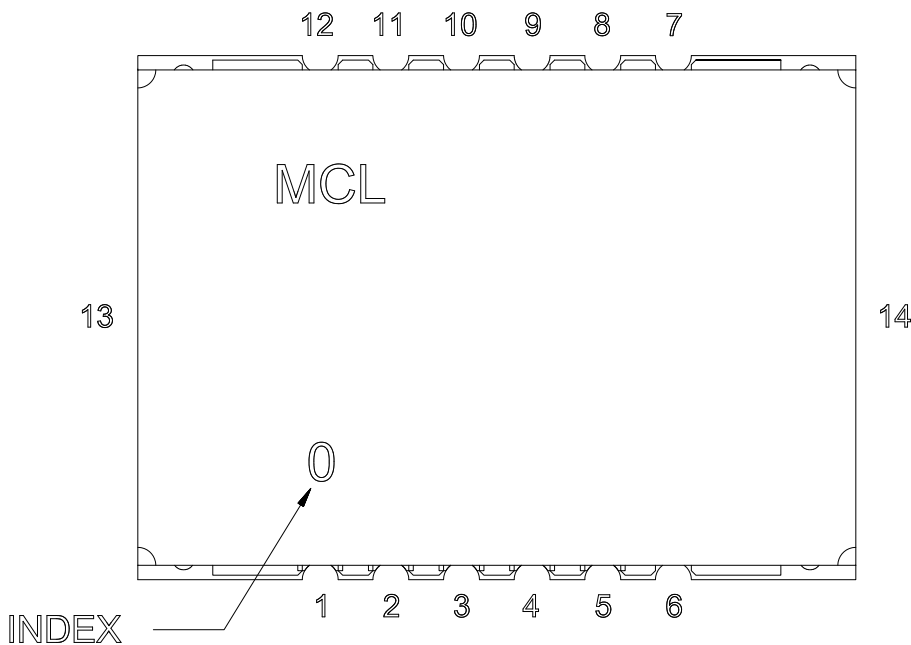


PHASE NOISE @ 1MHz offset





Pin Configuration

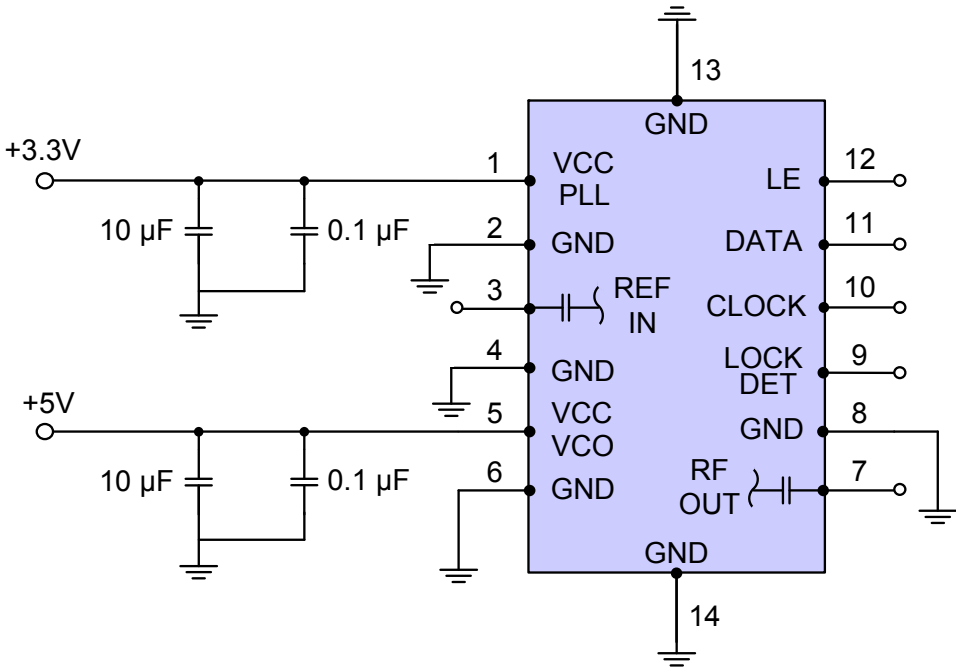


Pin Connection

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

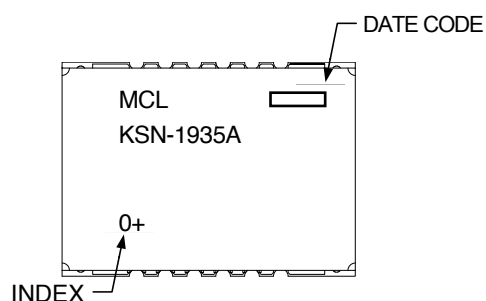
Recommended Application Circuit

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



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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