

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: • 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
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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"



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.

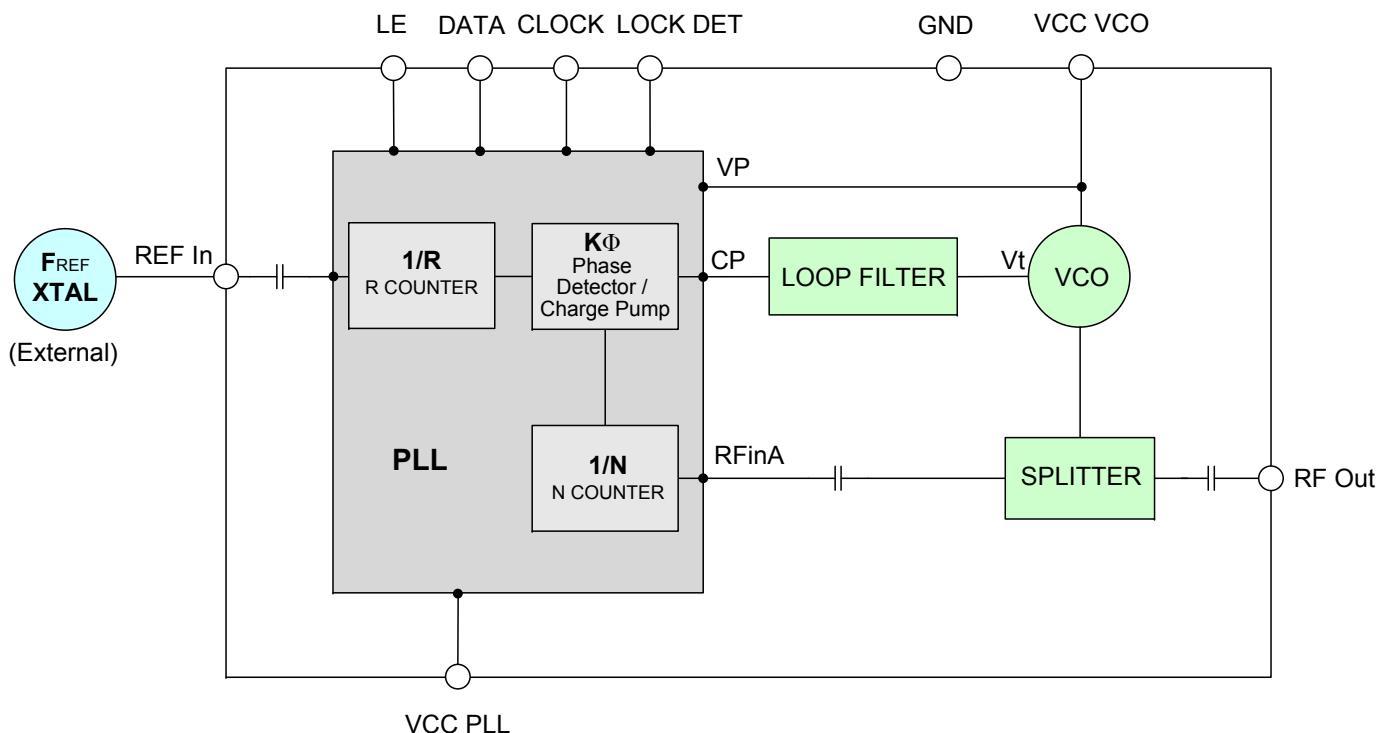
Applications

- 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.

Simplified Schematic



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REV. A
M131853
EDR-9540F1
KSN-1935A+
Category-A1
RAV
110906
Page 2 of 10

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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											
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	-											
Input Logic Level	Input high voltage					2.80	-	-											
	Input low voltage					-	-	0.60											
Digital Lock Detect	Locked					2.75	-	3.45											
	Unlocked					-	-	0.40											
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								
	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		
	3.42	3.92	3.82	44.83	47.55	48.87	5.65	7.57	9.03
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					FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS +85°C				
	100Hz	1kHz	10kHz	100kHz	1MHz		100Hz	1kHz	10kHz	100kHz	1MHz
1915	-62.92	-79.84	-108.24	-130.16	-150.39	1915	-60.48	-76.46	-107.87	-129.78	-149.97
1916	-63.67	-79.40	-107.10	-130.23	-150.45	1916	-62.42	-78.55	-106.83	-129.66	-149.69
1925	-61.78	-78.06	-107.44	-130.32	-150.92	1925	-59.92	-76.41	-106.94	-129.56	-149.81
1934	-64.01	-77.87	-107.16	-130.23	-150.48	1934	-59.18	-78.24	-106.85	-129.32	-149.54
1935	-61.87	-77.73	-106.39	-130.37	-150.14	1935	-59.39	-76.89	-107.20	-129.53	-149.52



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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		
	n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°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		
	n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°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).



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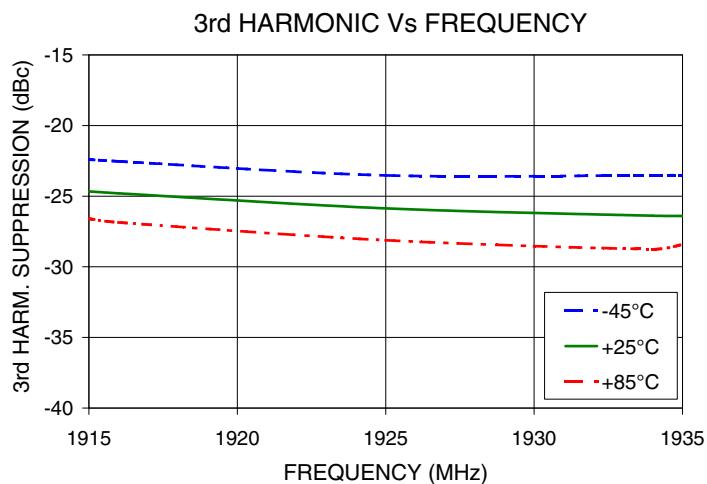
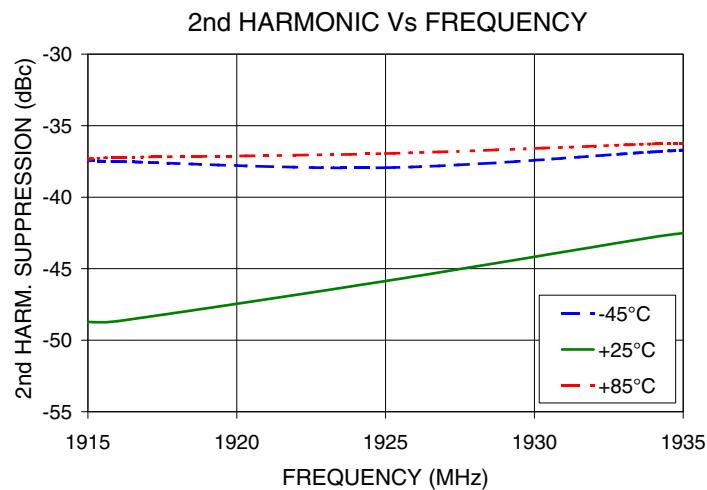
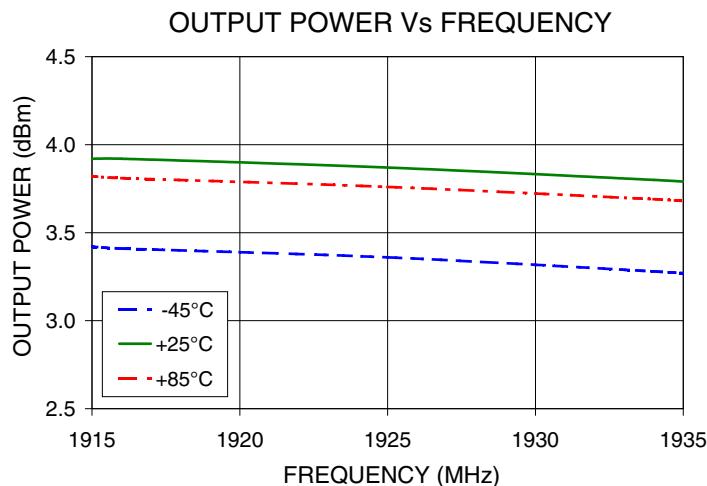
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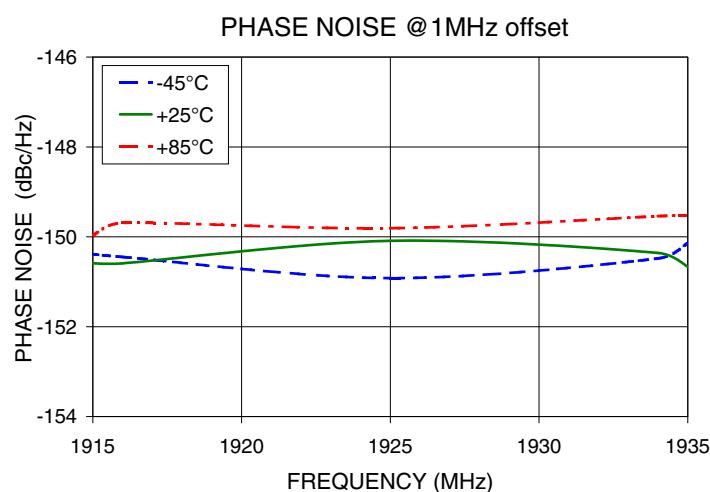
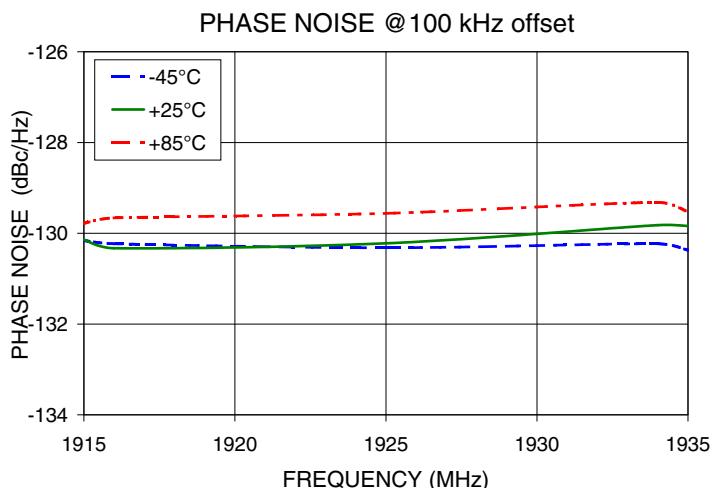
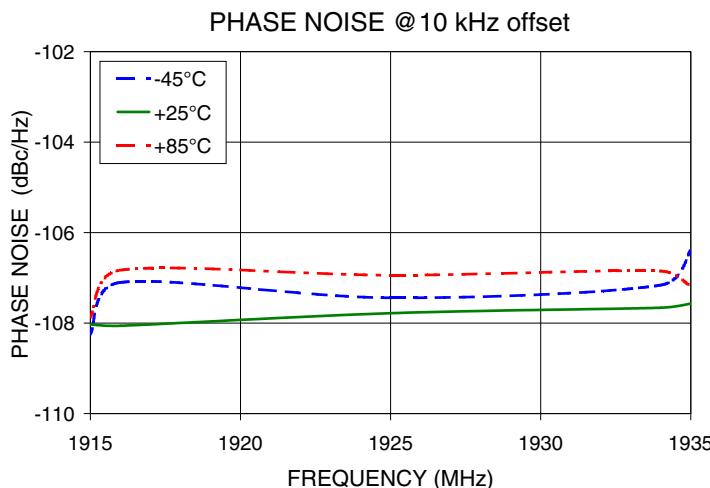
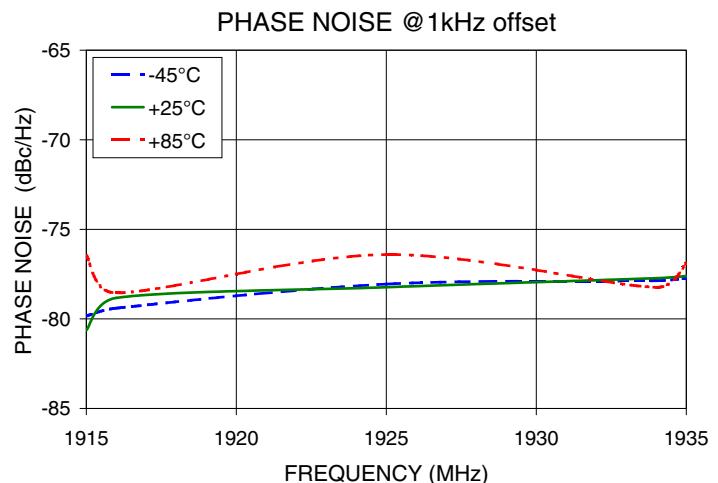
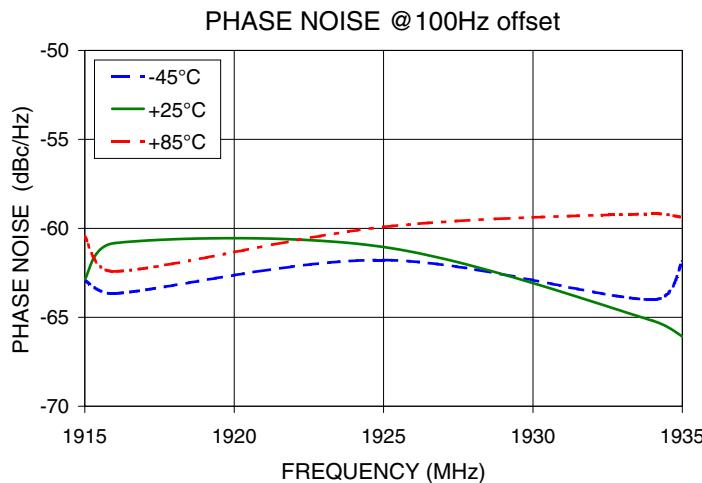
Typical Performance Curves



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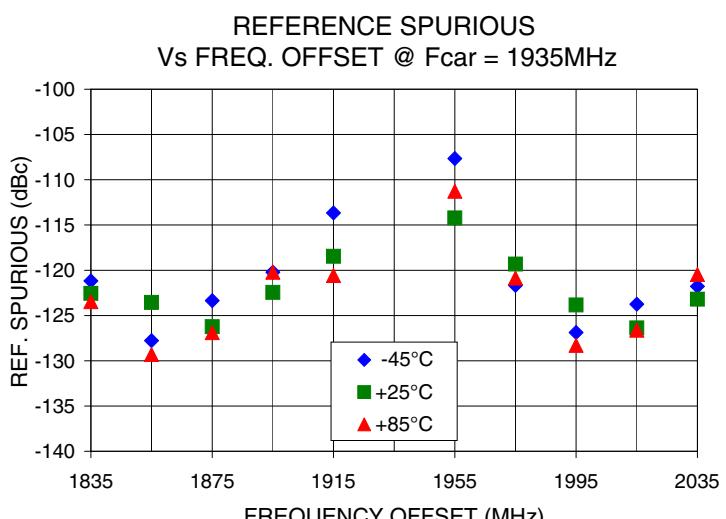
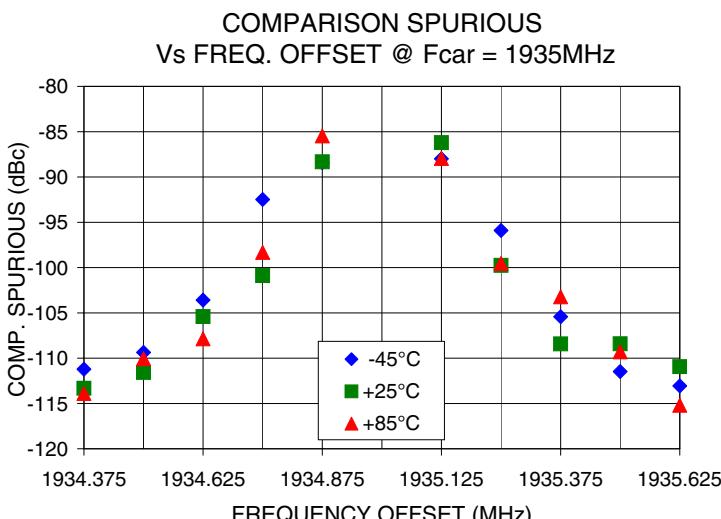
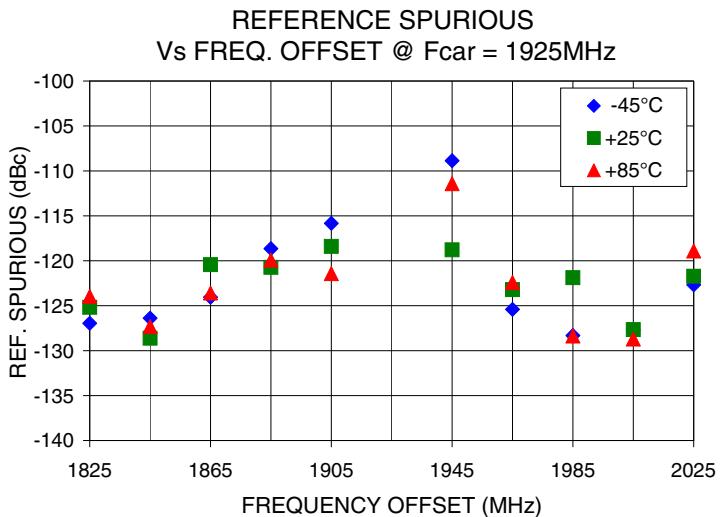
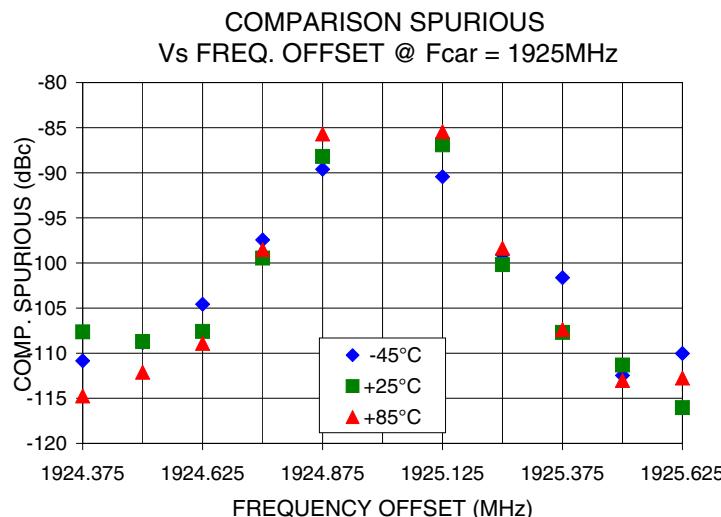
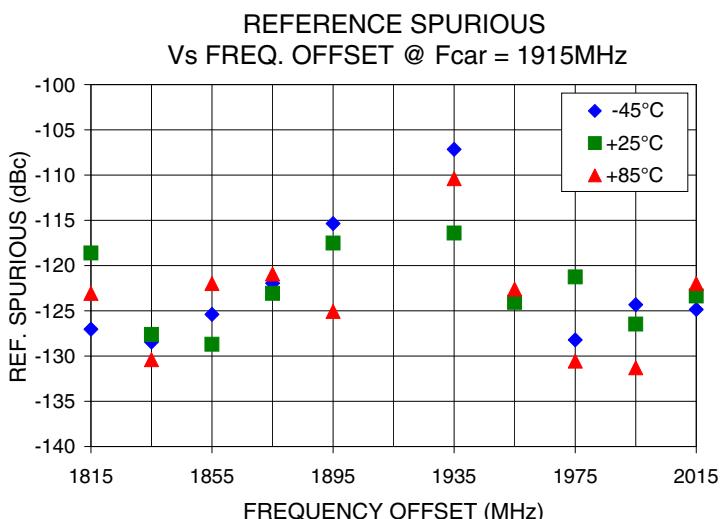
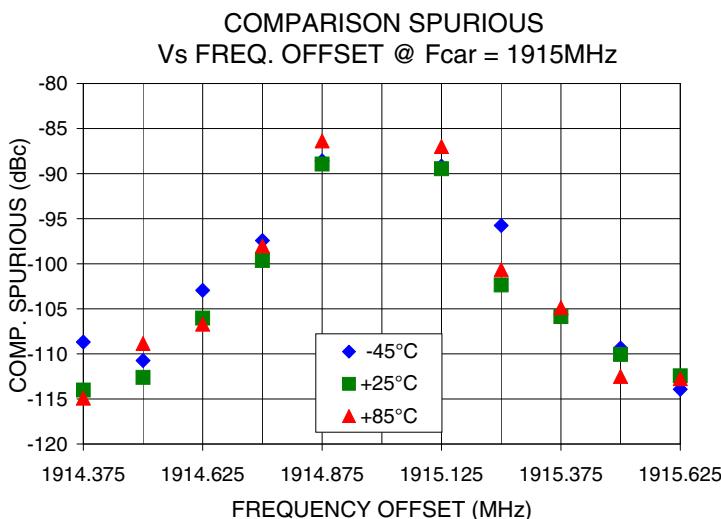
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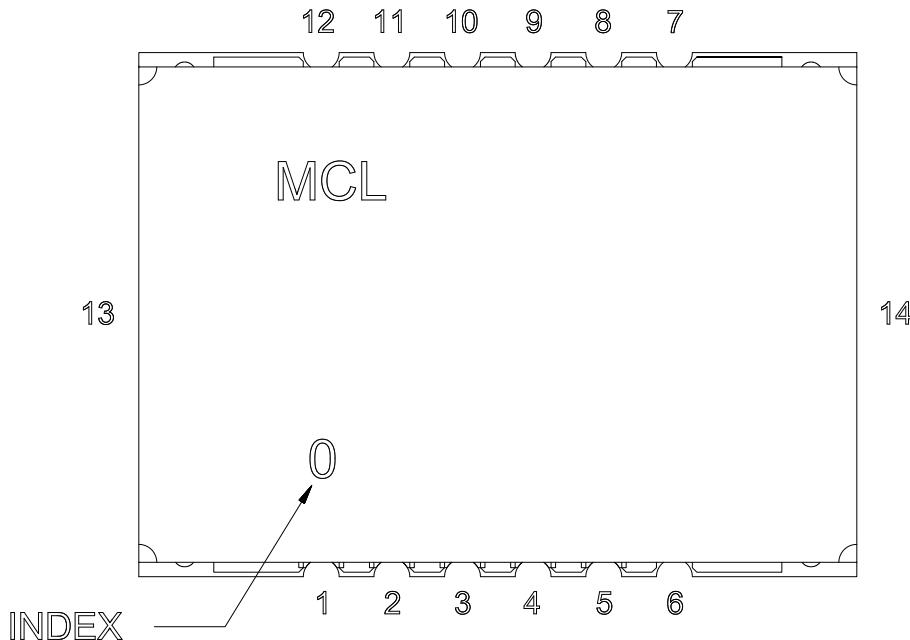
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Pin Configuration

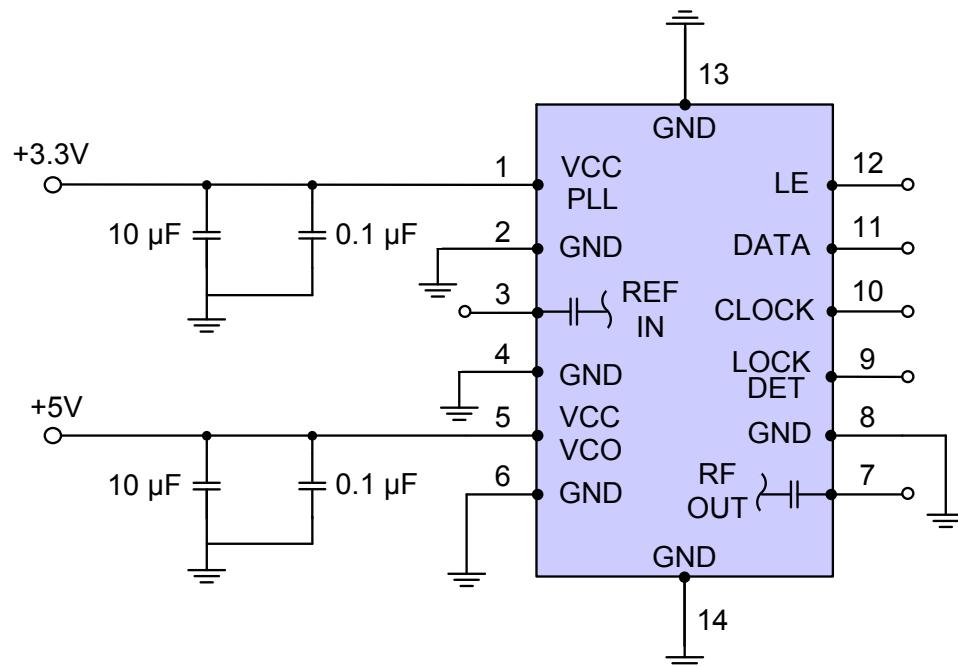


Pin Connection

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	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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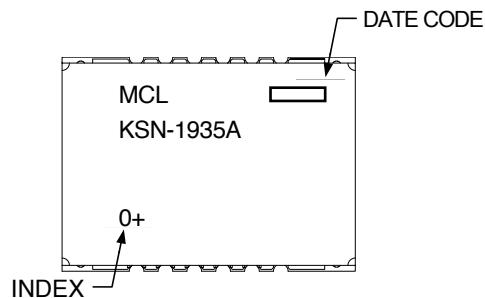
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Device Marking



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



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