50Ω **1915 to 1935 MHz**

The Big Deal

- Low phase noise and spurious
- Robust design and construction
- Small size 0.80" x 0.58" x 0.15"



CASE STYLE: DK1042

Product Overview

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 0.80" x 0.58" x 0.15") to shield against unwanted signals and noise.

Key Features

Feature	Advantages				
Low phase noise and spurious: • Phase Noise: -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 operationaby the customer.				
Small size, 0.80" x 0.58" x 0.15"	The small size enables the KSN-1935A+ to be used in compact designs.				



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED OR OF COMPLIANT P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

nline see

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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 away minicircuits.com/MCLStore/terms ;sp.

Surface Mount Frequency Synthesizer

50Ω 1915 to 1935 MHz

Features

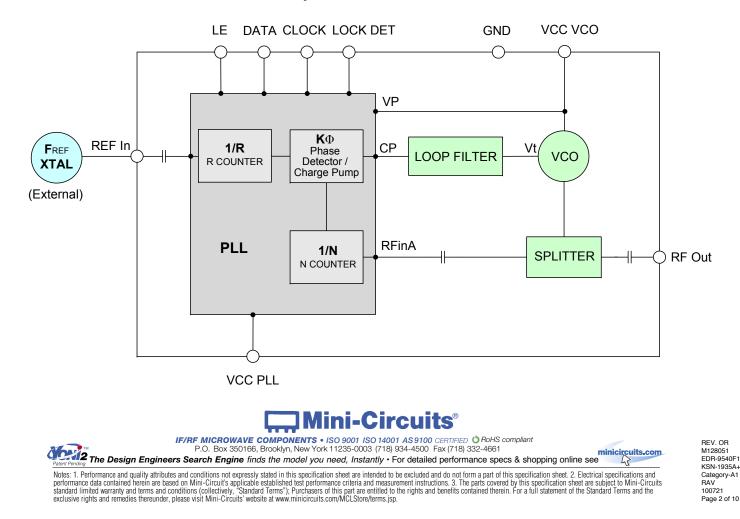
- Integrated VCO + PLL
- Low phase noise and spurious
- Robust design and construction
- Low operating voltage (VCC VCO=+5V, VCC PLL=+3.3V)
- Small size

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 $0.80" \times 0.58" \times 0.15"$) 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

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.





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

Parameters		Test Conditions	Min.	Тур.	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		
		@ 100 Hz offset	-	-62	-			
		@ 1 kHz offset	-	-78	-68			
SSB Phase Noise		@ 10 kHz offset	-	-107	-102	dBc/Hz		
		@ 100 kHz offset	-	-130	-126			
		@ 1 MHz offset	-	-150	-146			
Integrated SSB Phase Noise		@ 100Hz to 1MHz	-	-32	-	dBc		
Reference Spurious Suppres	sion	Ref. Freq. 20 MHz	-	-110	-90			
Comparison Spurious Suppre	ession	Step Size 125 kHz	-	-85	-75	dPo		
Non - Harmonic Spurious Su	opression	-	-	-90	-	- dBc -		
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	V		
VCO Supply Current		-	-	48	55	m۸		
PLL Supply Current		-	-	8	14	– mA		
	Frequency	20 (square wave)	-	20	-	MHz		
Reference Input	Amplitude	1.0	-	1.0	-	V _{P-P}		
(External)	Input impedance	-	-	100	-	KΩ		
	Phase Noise @ 1 kHz offset	-	-	-135	-	dBc/Hz		
RF Output port Impedance		-	-	50	-	Ω		
Input Logic Loval	Input high voltage	-	2.80	-	-	V		
Input Logic Level	Input low voltage	-	-	-	0.60	V		
Digital Look Datast	Locked	-	2.75	-	3.85	V		
Digital Lock Detect	Unlocked	-	-	-	0.40	V		
Frequency Synthesizer PLL	-	ADF4118						
PLL Programming		-	3-wire serial 3.3V CMOS					
	F_Register	-	(MSB) 0000	0000000000	10010010 (L	SB)		
Register Map @ 1935 MHz	N_Register	-	(MSB) 1000	(MSB) 100001111000111100001 (LSB)				
	R_Register	-	(MSB) 1000	(MSB) 10000000001010000000 (LSB)				

Absolute Maximum Ratings

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



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

g online see

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuit's applicable established test performance are entitled to the rights and terms and conditions (collectively). Standard Terms') perchasers 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp.



Typical Performance Data

FREQUENCY	PO	POWER OUTPUT			VCO CURRENT			PLL CURENT		
(MHz)		(dBm)		(mA)			(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		HARMONICS (dBc)					
(MHz)		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								
(1112)	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)	PH	ASE NOIS	E (dBc/Hz -45°C) @OFFSE	TS	FREQUENCY (MHz)	PH	ASE NOIS	E (dBc/Hz +85°C) @OFFSE	TS
(1112)	100Hz	1kHz	10kHz	100kHz	1MHz	(WITZ)	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



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED O RoHS compliant P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuit's 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp.

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	+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			ier @Fcarrier reference) 1925MHz+(n*Freference)			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	+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

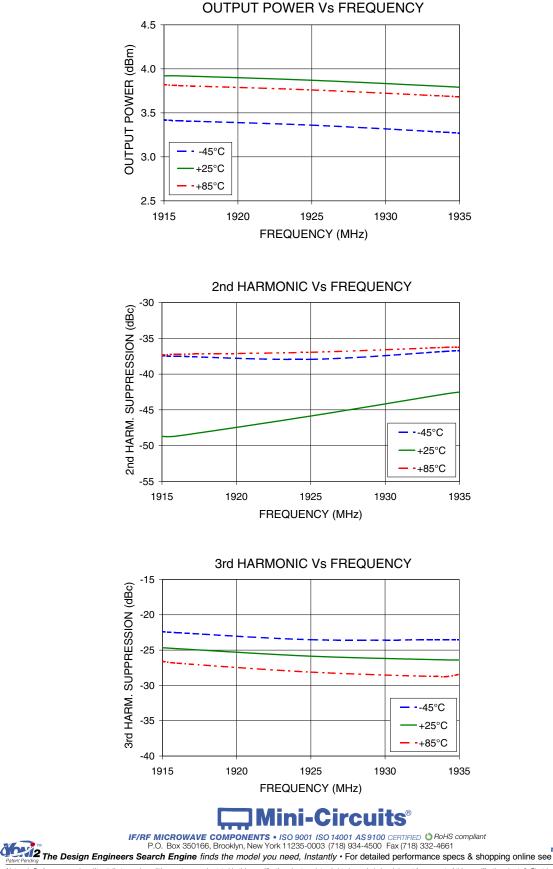
Note 4: All spurs are referenced to carrier signal (n=0).



e minicircuits.com

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuit's applicable established test performance there are entitled to the rights and terms and conditions, for a full statement of the Standard limit are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms's performance trans is a subject to Mini-Circuit's exclusive rights and remedies thereunder, please visit Mini-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp.

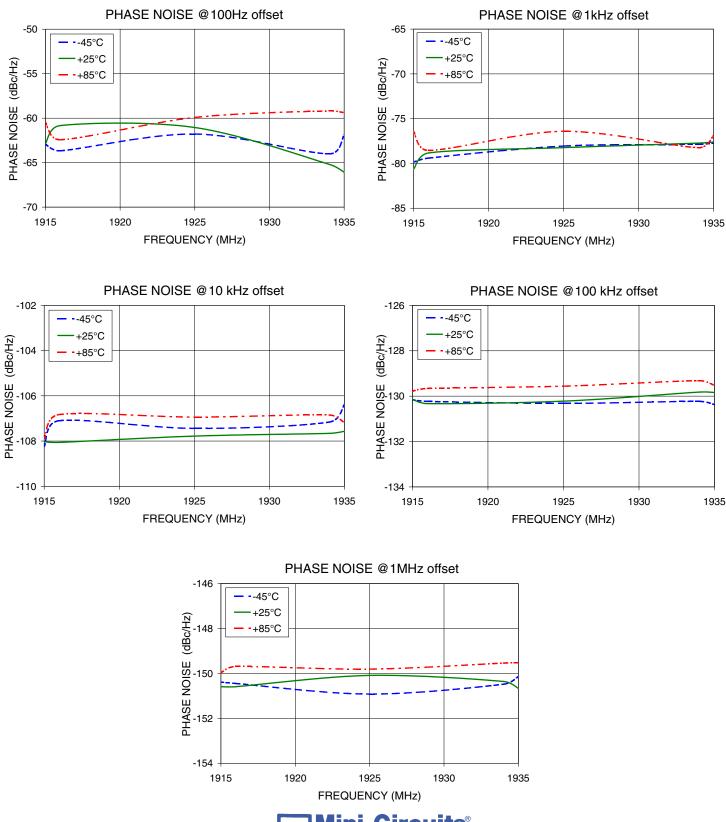
Typical Performance Curves



minicircuits.com 43

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuit's applicable established test performance or thera are entitled to the rights and benefits contained therein. For a full statement of the 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp.

KSN-1935A+



ts

IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED O RoHS compliant P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 The Design Engineers Search Engine finds the model you need, Instantify • For detailed performance specs & shopping online see minicircuits.com

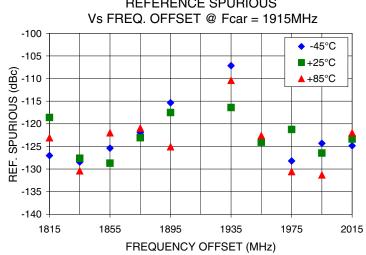
Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuit's estandard 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jp.

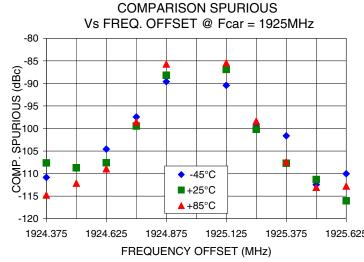
43

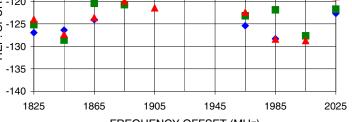
COMPARISON SPURIOUS REFERENCE SPURIOUS Vs FREQ. OFFSET @ Fcar = 1915MHz Vs FREQ. OFFSET @ Fcar = 1915MHz -80 -100 -45°C -85 -105 (gp) -90 -90 -95 -95 -100 -105 +25°C (dBc) -110 ▲ +85°C SPURIOUS -115 -120 -125 COMP REF. -45°C 110 -130 +25°C 115 -135 ▲ +85°C -120 -140 1914.375 1914.625 1914.875 1915.125 1915.375 1915.625 1815 1855 1895 1935 1975 2015 FREQUENCY OFFSET (MHz) FREQUENCY OFFSET (MHz) REFERENCE SPURIOUS COMPARISON SPURIOUS Vs FREQ. OFFSET @ Fcar = 1925MHz Vs FREQ. OFFSET @ Fcar = 1925MHz -100 -80 ◆ -45°C -85 -105 +25°C (dBc) ▲ +85°C -110 SPURIOUS -115 -120 -125 REF. -130 -45°C +25°C -135 +85°C -140 -120 1825 1865 1905 1945 1985 2025 1924.375 1924.625 1924.875 1925.125 1925.375 1925.625 FREQUENCY OFFSET (MHz) FREQUENCY OFFSET (MHz) **COMPARISON SPURIOUS** REFERENCE SPURIOUS Vs FREQ. OFFSET @ Fcar = 1935MHz Vs FREQ. OFFSET @ Fcar = 1935MHz -80 -100 -85 -105 (ogp) -90 -90 SNOIH-100 -105 (dBc) -110 URIOUS (-115 -120 SP -125 COMP. ЩШ. 110 -45°C -45°C -130 ■+25°C +25°C -115 -135 ▲ +85°C ▲ +85°C -120 -140 1934.375 1934.625 1934.875 1935.125 1935.375 1935.625 1835 1875 1955 1995 2035 1915 FREQUENCY OFFSET (MHz) FREQUENCY OFFSET (MHz) uits® C IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED O RoHS compliant P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 minicircuits.com 43

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuit's 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jp.

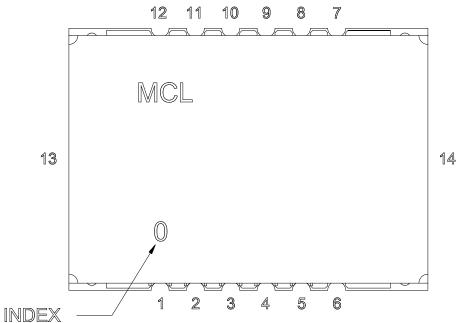
KSN-1935A+







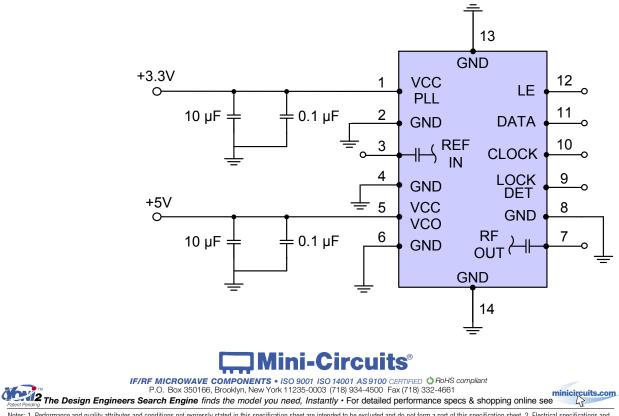
Pin Configuration



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.



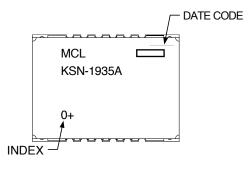
KSN-1935A+

Pin Connection

Page 9 of 10

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuit's applicable established test performance criteria and measurement instructions. 4. The parts covered by this specification sheet are subject to Mini-Circuit's estandard 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-Circuit's 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: DK1042

Tape & Reel: TR-F28

Suggested Layout for PCB Design: PL-249

Evaluation Board: TB-567-1+

Environment Ratings: ENV03T2



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED ORIGINAL P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuit's explicable established test performance are entitled to the rights 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp.