

Frequency Synthesizer

KSN-1050A-119+

50Ω 970 to 1050 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-1050A-119+ is a Frequency Synthesizer, designed to operate from 970 to 1050 MHz for W-CDMA base station application. The KSN-1050A-119+ 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: -94 dBc/Hz typ. @ 10 kHz offset• Comparison Spurious: -83 dBc typ.• Reference Spurious: -103 dBc typ.	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of KSN-1050A-119+, 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-1050A-119+ to be used in compact designs.



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50Ω 970 to 1050 MHz

Features

- Integrated VCO + PLL
- Low phase noise and spurious
- Robust design and construction
- Low operating voltage (VCC VCO=+5V, VCC PLL=+5V)
- Small size 0.80" x 0.58" x 0.15"



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.

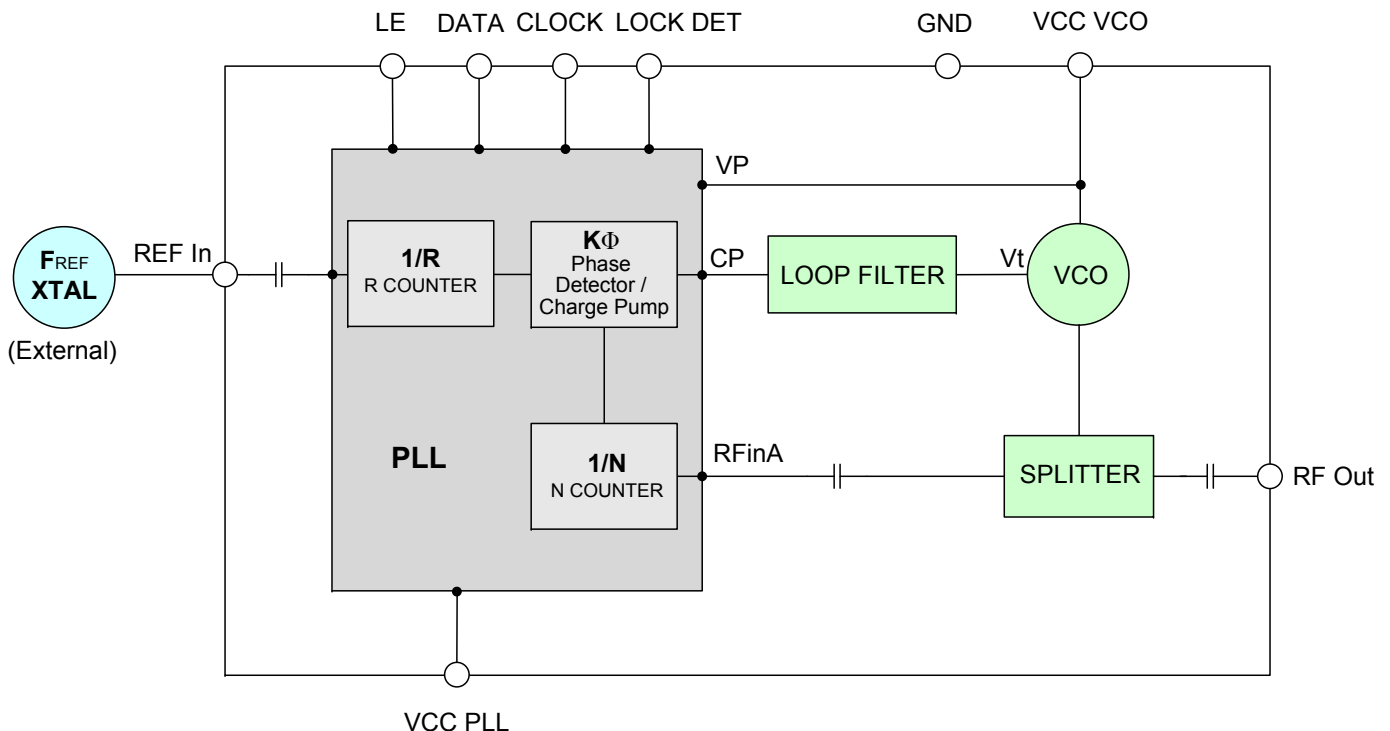
Applications

- W-CDMA base station

General Description

The KSN-1050A-119+ is a Frequency Synthesizer, designed to operate from 970 to 1050 MHz for W-CDMA base station application. The KSN-1050A-119+ 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-1050A-119+, 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		-	970	-	1050	MHz
Step Size		-	-	100	-	kHz
Settling Time		Within ± 1 kHz	-	2	-	mSec
Output Power		-	-2.5	0	+3.5	dBm
SSB Phase Noise		@ 100 Hz offset	-	-81	-	dBc/Hz
		@ 1 kHz offset	-	-81	-75	
		@ 10 kHz offset	-	-94	-89	
		@ 100 kHz offset	-	-126	-118	
		@ 1 MHz offset	-	-146	-139	
Integrated SSB Phase Noise		@ 50 Hz to 5 MHz	-	-41	-	dBc
Reference Spurious Suppression		Ref. Freq. 10 MHz	-	-103	-85	dBc
Comparison Spurious Suppression		Step Size 100 kHz	-	-83	-67	
Non - Harmonic Spurious Suppression		-	-	-90	-	
Harmonic Suppression		-	-	-36	-29	
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		-	-	24	30	mA
PLL Supply Current		-	-	8	15	
Reference Input (External)	Frequency	10 (square wave)	-	10	-	MHz
	Amplitude	1.0	0.8	1.0	1.2	V _{P-P}
	Input impedance	-	-	100	-	KΩ
	Phase Noise @ 1 kHz offset	-	-	-145	-	dBc/Hz
RF Output port Impedance		-	-	50	-	Ω
Input Logic Level	Input high voltage	-	4.20	-	-	V
	Input low voltage	-	-	-	0.95	V
Digital Lock Detect	Locked	-	4.35	-	5.65	V
	Unlocked	-	-	-	0.40	V
Frequency Synthesizer PLL		-	ADF4118			
PLL Programming		-	3-wire serial 5V CMOS			
Register Map @ 1050 MHz	F_Register	-	(MSB) 10010010 (LSB)			
	N_Register	-	(MSB) 100001010010000010001 (LSB)			
	R_Register	-	(MSB) 100000000000110010000 (LSB)			

Absolute Maximum Ratings

Parameters	Ratings
VCO Supply Voltage	6.3V
PLL Supply Voltage	6.3V
VCO Supply Voltage to PLL Supply Voltage	N.A.
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



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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
	970	0.03	0.00	-0.03	23.46	24.46	25.28	6.77	8.19
980	-0.01	-0.02	-0.03	23.49	24.49	25.32	6.80	8.19	9.52
990	-0.03	-0.04	-0.03	23.52	24.51	25.36	6.81	8.21	9.52
1000	-0.04	-0.03	-0.02	23.54	24.54	25.39	6.82	8.22	9.54
1010	-0.04	-0.02	-0.02	23.55	24.56	25.41	6.83	8.23	9.54
1020	-0.07	-0.04	-0.04	23.58	24.57	25.43	6.84	8.24	9.56
1030	-0.12	-0.08	-0.10	23.59	24.59	25.45	6.85	8.24	9.57
1040	-0.17	-0.15	-0.16	23.61	24.61	25.47	6.82	8.23	9.55
1050	-0.27	-0.23	-0.24	23.63	24.62	25.49	6.83	8.23	9.56

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
970	-33.87	-36.66	-40.60	-47.91	-50.89	-53.08
980	-33.98	-36.28	-39.75	-48.48	-50.54	-51.65
990	-34.48	-36.61	-39.76	-48.65	-51.51	-52.79
1000	-35.19	-37.42	-40.06	-47.40	-50.69	-51.66
1010	-35.13	-37.09	-39.63	-47.17	-49.84	-51.45
1020	-35.44	-37.30	-39.70	-46.79	-48.37	-50.78
1030	-36.04	-37.61	-39.88	-45.54	-48.59	-49.98
1040	-36.35	-38.26	-39.96	-44.16	-47.24	-47.03
1050	-36.25	-37.85	-39.94	-43.18	-46.46	-47.22



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FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	+25°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
970	-84.42	-82.31	-94.49	-125.67	-146.68
980	-86.62	-80.81	-94.94	-126.21	-147.08
990	-83.71	-82.36	-94.21	-126.40	-147.39
1000	-84.14	-83.64	-93.26	-125.98	-147.13
1010	-83.38	-81.96	-94.27	-125.50	-146.51
1020	-81.90	-80.90	-94.80	-126.41	-146.39
1030	-85.71	-81.04	-93.73	-126.28	-147.20
1040	-83.28	-82.61	-93.88	-126.20	-146.29
1050	-84.98	-80.77	-93.65	-126.26	-146.88

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	-45°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
970	-82.06	-80.36	-94.50	-125.19	-148.05
980	-83.34	-82.15	-94.13	-126.98	-148.61
990	-81.63	-81.63	-94.20	-127.34	-149.22
1000	-81.57	-80.44	-94.19	-127.40	-147.20
1010	-82.92	-83.31	-93.22	-127.28	-148.87
1020	-83.83	-80.75	-95.01	-127.55	-148.89
1030	-81.97	-80.90	-94.13	-127.35	-149.08
1040	-81.16	-81.28	-93.99	-127.27	-147.44
1050	-83.16	-81.47	-94.47	-127.25	-145.67

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	+85°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
970	-81.46	-80.87	-94.29	-123.26	-143.20
980	-80.93	-79.91	-94.60	-123.78	-142.50
990	-82.99	-82.44	-93.51	-124.09	-142.99
1000	-82.38	-80.67	-93.10	-124.17	-144.12
1010	-81.51	-81.68	-93.97	-124.43	-144.93
1020	-81.61	-80.38	-93.55	-124.57	-144.83
1030	-81.71	-81.89	-93.84	-124.51	-144.52
1040	-82.44	-82.09	-93.25	-124.41	-145.25
1050	-85.11	-80.97	-93.33	-124.38	-145.16



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COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @ Fcarrier 970MHz+(n*Fference) (dBc) note 1			COMPARISON SPURIOUS @ Fcarrier 1010MHz+(n*Fference) (dBc) note 1			COMPARISON SPURIOUS @ Fcarrier 1050MHz+(n*Fference) (dBc) note 1			
	n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
	-5	-106.67	-104.22	-97.73	-97.21	-104.79	-95.13	-96.59	-95.73	-101.22
-4	-107.41	-106.08	-94.36	-96.65	-103.50	-91.38	-95.03	-92.36	-104.31	
-3	-103.51	-101.28	-94.63	-92.24	-102.07	-89.14	-89.90	-88.76	-98.20	
-2	-95.00	-96.65	-90.56	-89.84	-95.43	-84.24	-86.64	-85.79	-92.48	
-1	-88.35	-85.57	-81.33	-83.70	-84.96	-78.22	-79.80	-81.38	-82.43	
0 note 2	-	-	-	-	-	-	-	-	-	
+1	-86.53	-87.12	-82.76	-81.10	-84.96	-78.79	-82.84	-83.46	-82.83	
+2	-95.28	-96.08	-88.72	-87.09	-94.43	-84.50	-90.28	-88.51	-93.90	
+3	-101.88	-99.70	-93.69	-90.76	-104.26	-89.67	-91.18	-87.96	-101.65	
+4	-107.58	-105.35	-96.50	-93.79	-103.21	-91.00	-94.27	-94.17	-103.41	
+5	-111.85	-103.02	-97.82	-95.75	-100.10	-95.04	-97.20	-94.56	-103.03	

Note 1: Comparison frequency 100 kHz
 Note 2: All spurs are referenced to carrier signal (n=0).

REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @ Fcarrier 970MHz+(n*Fference) (dBc) note 3			REFERENCE SPURIOUS @ Fcarrier 1010MHz+(n*Fference) (dBc) note 3			REFERENCE SPURIOUS @ Fcarrier 1050MHz+(n*Fference) (dBc) note 3			
	n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
	-5	-125.32	-108.38	-112.03	-109.11	-110.81	-109.81	-121.51	-107.01	-111.73
-4	-102.94	-110.11	-114.42	-107.45	-118.18	-123.47	-103.87	-110.56	-115.80	
-3	-116.07	-110.77	-112.90	-118.88	-112.05	-109.49	-114.85	-110.00	-110.93	
-2	-103.97	-112.26	-113.25	-109.08	-113.92	-118.93	-101.78	-108.95	-113.42	
-1	-108.65	-107.04	-104.69	-110.29	-103.69	-110.59	-110.13	-107.25	-110.91	
0 note 4	-	-	-	-	-	-	-	-	-	
+1	-106.35	-107.17	-103.05	-104.55	-103.13	-108.04	-105.81	-110.77	-112.40	
+2	-109.33	-110.68	-109.10	-105.29	-111.86	-110.12	-109.11	-109.98	-108.38	
+3	-112.93	-110.46	-116.62	-112.42	-108.99	-107.92	-114.60	-111.42	-112.65	
+4	-104.86	-108.58	-113.55	-107.21	-119.35	-112.41	-104.99	-108.85	-111.67	
+5	-115.59	-110.19	-109.07	-111.63	-114.70	-110.85	-111.17	-108.70	-113.34	

Note 3: Reference frequency 10 MHz
 Note 4: All spurs are referenced to carrier signal (n=0).



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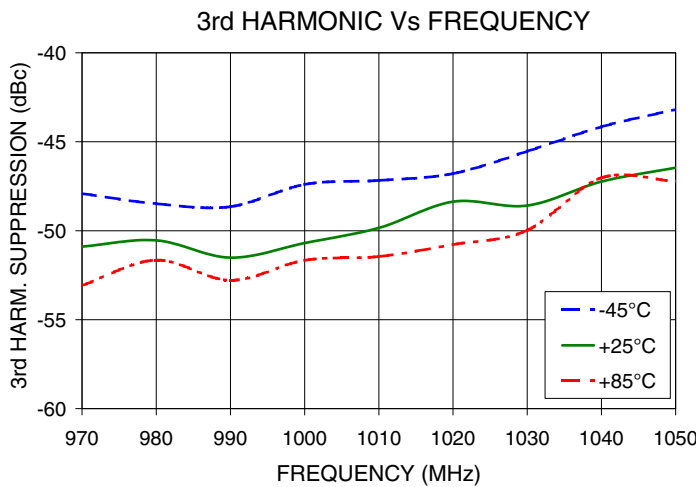
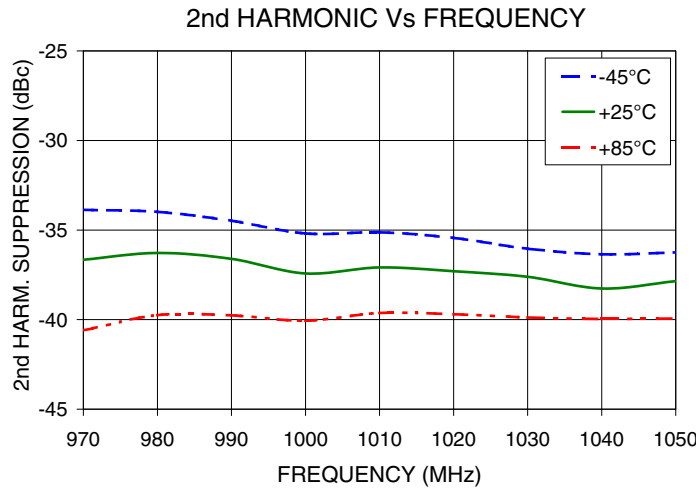
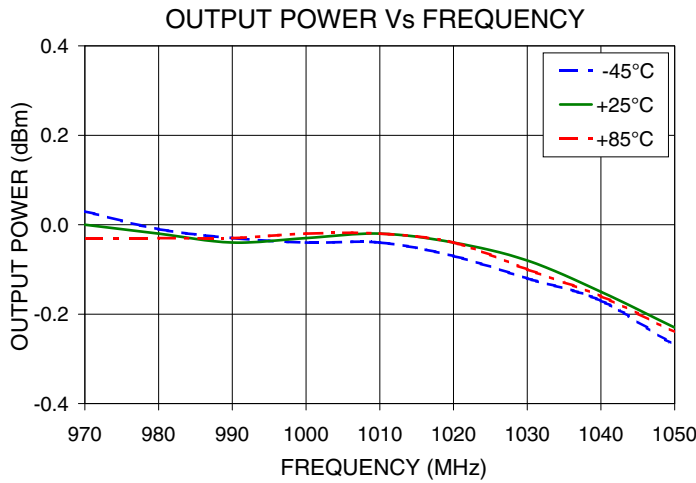


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Typical Performance Curves



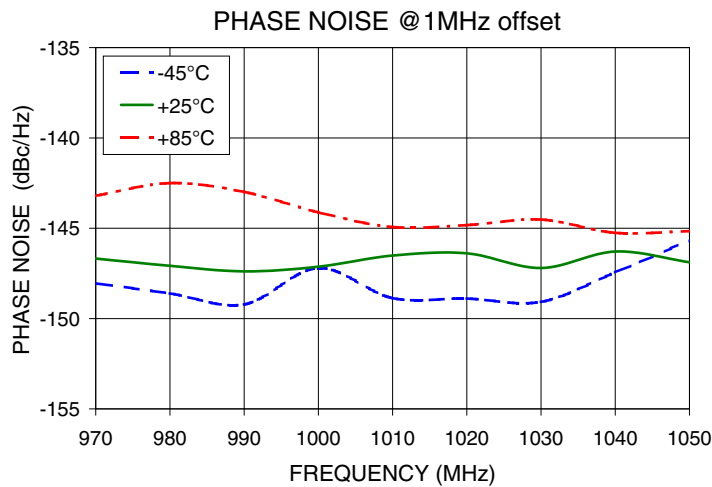
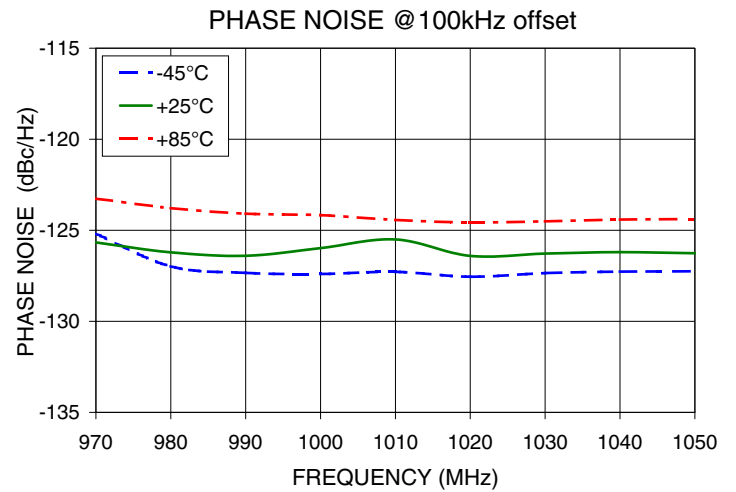
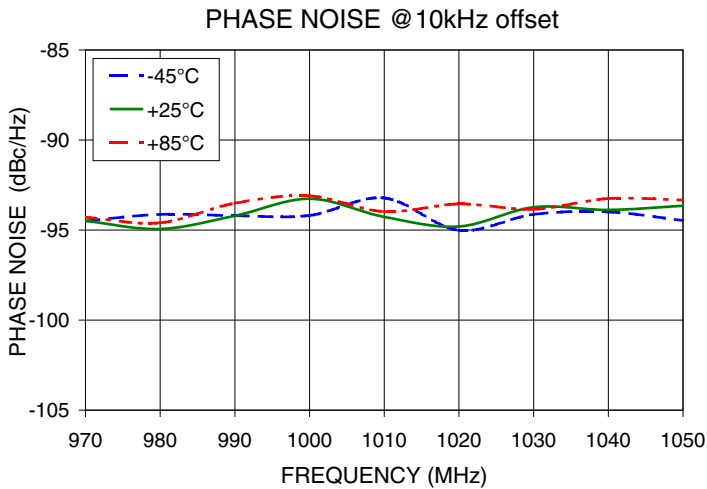
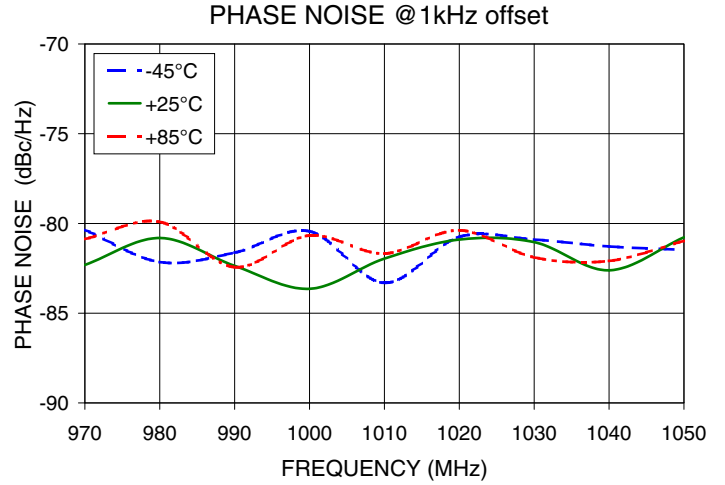
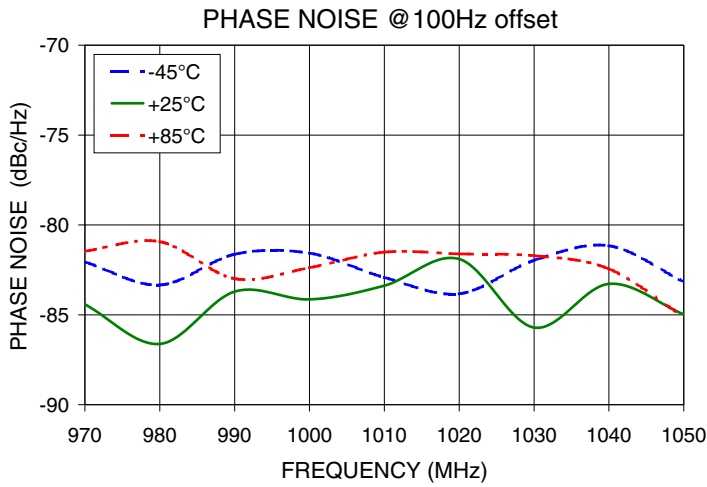
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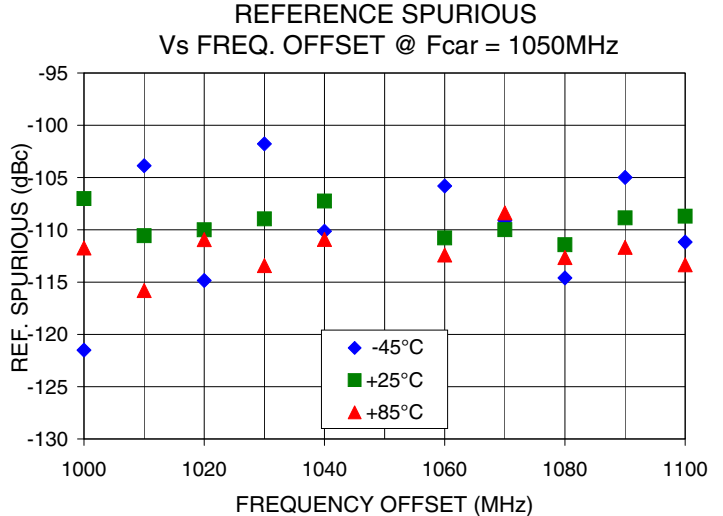
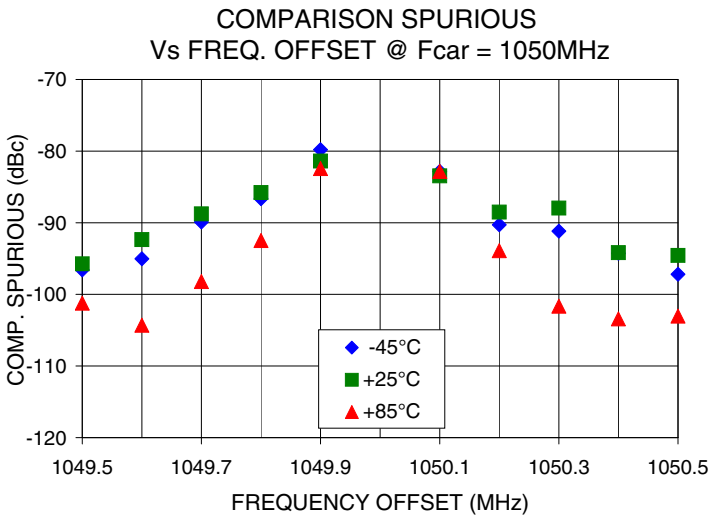
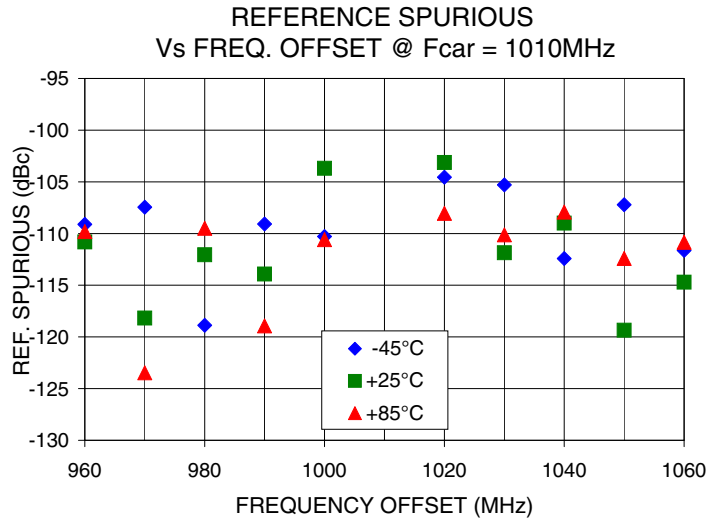
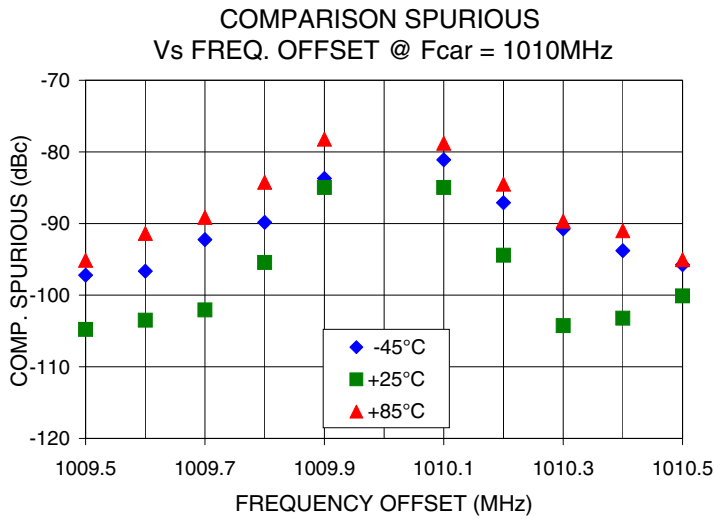
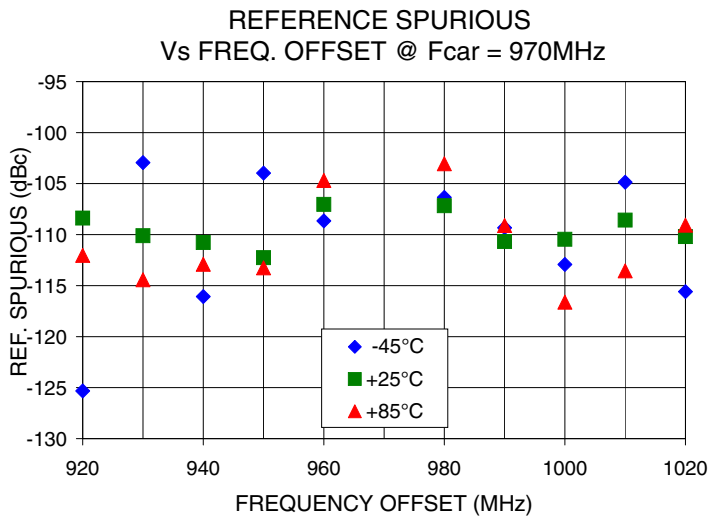
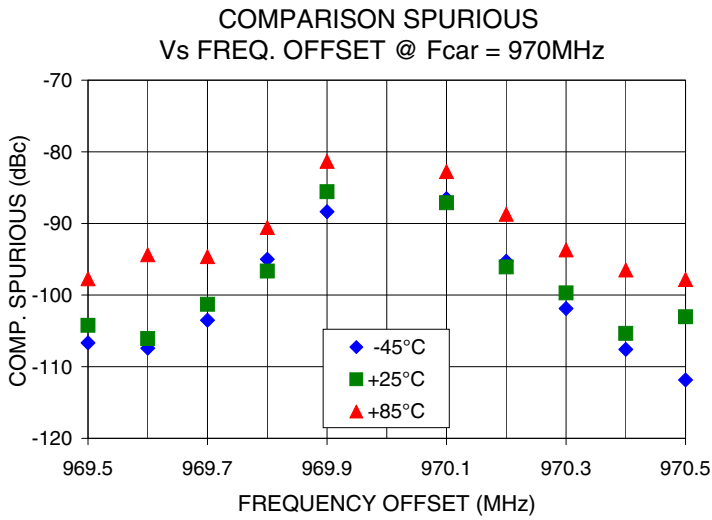
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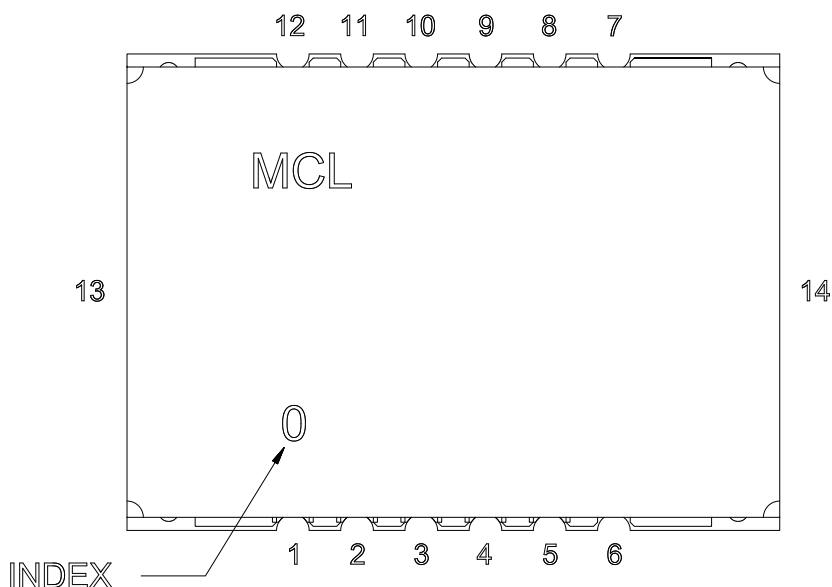


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Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained 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.jsp.

Pin Configuration

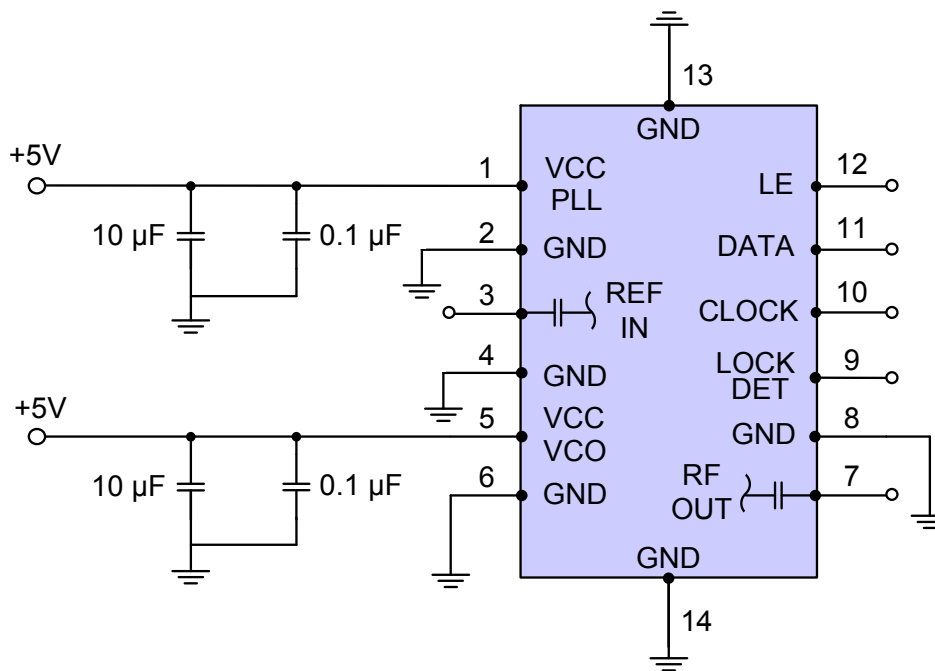


Pin Connection

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	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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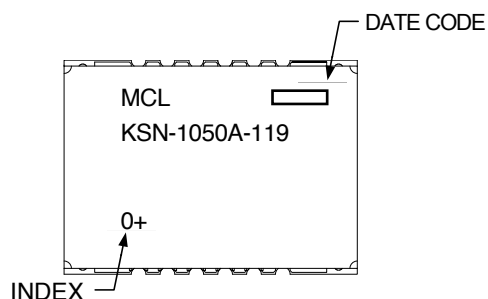


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Device Marking



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+

Environment Ratings: ENV03T2



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