

# Frequency Synthesizer

KSN-585A-119+

50Ω 565 to 585 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: DK801

## Product Overview

The KSN-585A-119+ is a Frequency Synthesizer, designed to operate from 565 to 585 MHz for CDMA cellular base station application. The KSN-585A-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"><li>• Phase Noise: -110 dBc/Hz typ. @ 10 kHz offset</li><li>• Comparison Spurious: -87 dBc typ.</li><li>• Reference Spurious: -103 dBc typ.</li></ul>	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction.	To enhance the robustness of KSN-585A-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-585A-119+ to be used in compact designs.



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50Ω 565 to 585 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"

### Applications

- CDMA cellular base station

### General Description

The KSN-585A-119+ is a Frequency Synthesizer, designed to operate from 565 to 585 MHz for CDMA cellular base station application. The KSN-585A-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-585A-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.



CASE STYLE: DK801  
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



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REV. OR  
M126018  
EDR-8106/3F1  
KSN-585A-119+  
Category-A1  
RAV  
100314  
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**Electrical Specifications** (over operating temperature -40°C to +85°C)

Parameters		Test Conditions	Min.	Typ.	Max.	Units	
Frequency Range		-	565	-	585	MHz	
Step Size		-	-	25	-	kHz	
Settling Time		Within ± 1 kHz	-	10	-	mSec	
Output Power		-	-4	-1	+2	dBm	
SSB Phase Noise		@ 100 Hz offset	-	-72	-	dBc/Hz	
		@ 1 kHz offset	-	-78	-73		
		@ 10 kHz offset	-	-110	-105		
		@ 100 kHz offset	-	-130	-125		
		@ 1 MHz offset	-	-150	-146		
Reference Spurious Suppression		Ref. Freq. 10 MHz	-	-103	-86	dBc	
Comparison Spurious Suppression		Step Size 25 kHz	-	-87	-60		
Non - Harmonic Spurious Suppression		-	-	-90	-		
Harmonic Suppression		-	-	-30	-25		
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		-	-	32	40	mA	
PLL Supply Current		-	-	7	14		
Reference Input (External)		Frequency	10 (square wave)	-	10	-	MHz
		Amplitude	1	-	1	-	V <sub>P-P</sub>
		Input impedance	-	-	100	-	KΩ
		Phase Noise @ 1 kHz offset	-	-	-125	-	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	-	5.25	V
		Unlocked	-	-	-	0.40	V
Frequency Synthesizer PLL		-	ADF4118				
PLL Programming		-	3-wire serial 5V CMOS				
Register Map @ 585 MHz		F_Register	-	(MSB) X0XXX00000X0010010010 (LSB)			
		N_Register	-	(MSB) 100010110110110100001 (LSB)			
		R_Register	-	(MSB) 1XXXX000001100100000 (LSB)			

**Absolute Maximum Ratings**

Parameters	Ratings
VCO Supply Voltage	6.1V
PLL Supply Voltage	6.1V
VCO Supply Voltage to PLL Supply Voltage	-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



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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
	565	-0.73	-0.34	-0.22	30.45	32.39	34.19	6.12	7.86
567	-0.75	-0.36	-0.24	30.46	32.41	34.21	6.12	7.87	9.27
571	-0.78	-0.39	-0.25	30.50	32.46	34.27	6.12	7.87	9.27
575	-0.81	-0.40	-0.26	30.53	32.50	34.31	6.13	7.88	9.28
579	-0.82	-0.42	-0.27	30.56	32.55	34.37	6.13	7.88	9.28
583	-0.84	-0.43	-0.27	30.60	32.60	34.43	6.13	7.88	9.28
585	-0.85	-0.43	-0.26	30.63	32.63	34.45	6.13	7.88	9.28

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
565	-29.33	-30.26	-30.94	-47.13	-47.40	-48.16
567	-29.37	-30.33	-31.00	-46.88	-47.19	-47.91
571	-29.60	-30.49	-31.13	-47.02	-47.21	-47.80
575	-29.97	-30.84	-31.48	-47.88	-47.94	-48.52
579	-30.26	-31.17	-31.73	-48.18	-48.22	-48.81
583	-30.45	-31.32	-31.89	-48.09	-48.11	-48.66
585	-30.50	-31.39	-31.93	-48.04	-48.13	-48.64

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	+25°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
565	-74.30	-81.38	-110.42	-130.96	-150.52
567	-72.19	-76.71	-110.19	-129.70	-150.44
571	-73.24	-80.79	-110.53	-129.59	-150.70
575	-73.17	-78.16	-110.68	-130.76	-150.76
579	-71.15	-79.69	-110.48	-130.21	-150.70
583	-71.23	-78.83	-110.87	-131.12	-150.59
585	-71.46	-77.85	-110.41	-130.45	-150.69

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	-45°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
565	-73.68	-80.16	-111.05	-130.96	-151.34
567	-73.95	-77.79	-110.88	-132.62	-151.39
571	-73.20	-79.39	-111.17	-132.73	-151.52
575	-73.84	-78.79	-111.29	-132.74	-151.62
579	-73.56	-80.36	-111.09	-132.69	-151.55
583	-74.25	-78.86	-110.90	-130.57	-151.66
585	-75.14	-78.51	-111.09	-131.83	-151.64

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	+85°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
565	-74.38	-77.48	-108.75	-129.17	-149.44
567	-75.90	-78.15	-109.01	-129.10	-149.44
571	-76.68	-79.76	-109.18	-128.93	-149.69
575	-70.39	-77.11	-108.96	-128.96	-149.77
579	-74.18	-80.69	-109.21	-130.56	-149.72
583	-71.17	-79.04	-109.15	-130.61	-149.70
585	-70.93	-76.56	-108.93	-130.69	-149.92



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COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @ Fcarrier 565MHz+(n*Fcomparison) (dBc) note 1			COMPARISON SPURIOUS @ Fcarrier 575MHz+(n*Fcomparison) (dBc) note 1			COMPARISON SPURIOUS @ Fcarrier 585MHz+(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	-108.06	-109.22	-107.18	-102.52	-103.10	-107.71	-109.74	-110.50	-106.83
-4	-106.83	-107.56	-102.99	-101.78	-100.57	-102.77	-107.85	-109.10	-101.54	
-3	-101.50	-104.37	-96.60	-99.89	-97.57	-98.62	-104.01	-106.23	-97.25	
-2	-96.34	-98.08	-90.52	-97.40	-93.33	-91.34	-99.15	-98.63	-88.51	
-1	-92.44	-87.93	-77.23	-92.42	-86.13	-78.62	-89.32	-86.86	-76.72	
0 <sup>note 2</sup>	-	-	-	-	-	-	-	-	-	
+1	-83.74	-88.54	-78.47	-81.29	-87.73	-78.78	-85.62	-88.87	-77.86	
+2	-94.38	-98.71	-90.53	-89.82	-94.06	-92.14	-93.70	-99.34	-90.19	
+3	-100.92	-103.87	-98.18	-93.98	-97.90	-99.25	-101.39	-103.90	-97.32	
+4	-100.74	-104.60	-105.13	-96.72	-99.72	-103.92	-103.26	-107.98	-103.34	
+5	-103.90	-107.49	-110.14	-98.76	-102.18	-109.82	-107.54	-109.52	-108.96	

Note 1: Comparison frequency 25 kHz  
 Note 2: All spurs are referenced to carrier signal (n=0).

REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @ Fcarrier 565MHz+(n*Freference) (dBc) note 3			REFERENCE SPURIOUS @ Fcarrier 575MHz+(n*Freference) (dBc) note 3			REFERENCE SPURIOUS @ Fcarrier 585MHz+(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	-117.41	-120.82	-126.06	-120.49	-128.62	-127.27	-127.56	-127.73	-123.36
-4	-111.19	-112.81	-111.50	-111.33	-108.87	-109.81	-109.56	-108.71	-108.54	
-3	-120.10	-124.40	-124.53	-124.30	-126.68	-125.71	-127.20	-123.96	-121.65	
-2	-107.23	-107.59	-107.12	-107.34	-105.69	-105.99	-106.92	-105.62	-106.10	
-1	-102.56	-104.21	-104.20	-103.60	-103.27	-103.54	-103.91	-102.27	-102.54	
0 <sup>note 4</sup>	-	-	-	-	-	-	-	-	-	
+1	-103.61	-105.31	-105.32	-103.76	-104.46	-105.15	-101.86	-104.60	-105.63	
+2	-119.28	-118.43	-116.50	-123.88	-114.15	-112.19	-119.57	-113.34	-112.82	
+3	-120.06	-126.37	-123.73	-119.80	-120.84	-121.87	-118.29	-121.41	-122.01	
+4	-123.99	-121.68	-119.84	-127.83	-120.49	-117.22	-123.65	-119.52	-116.22	
+5	-122.20	-127.37	-126.06	-118.95	-122.50	-126.48	-120.99	-124.77	-126.82	

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



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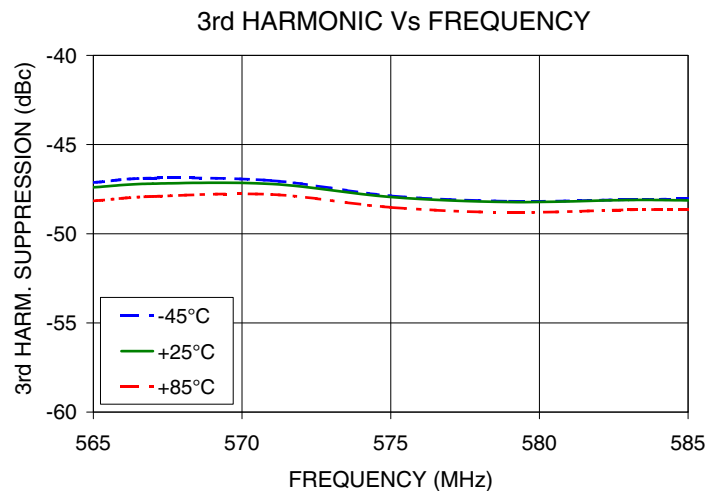
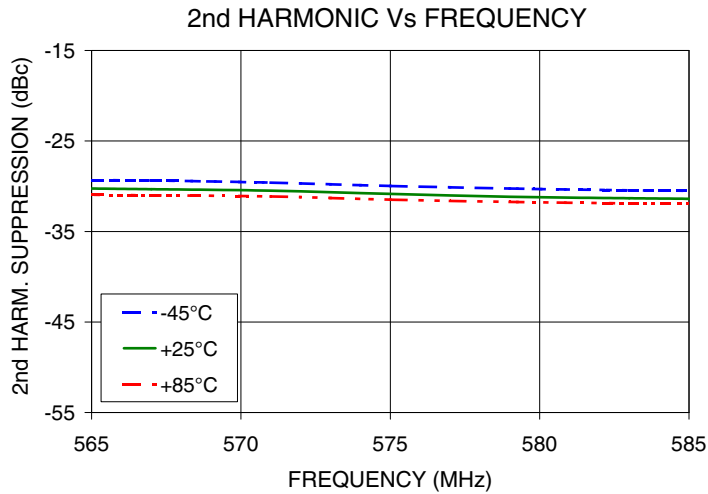
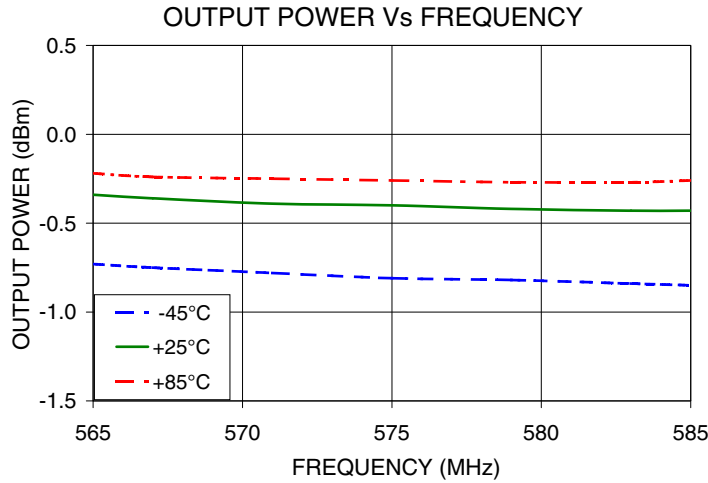


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Typical Performance Curves



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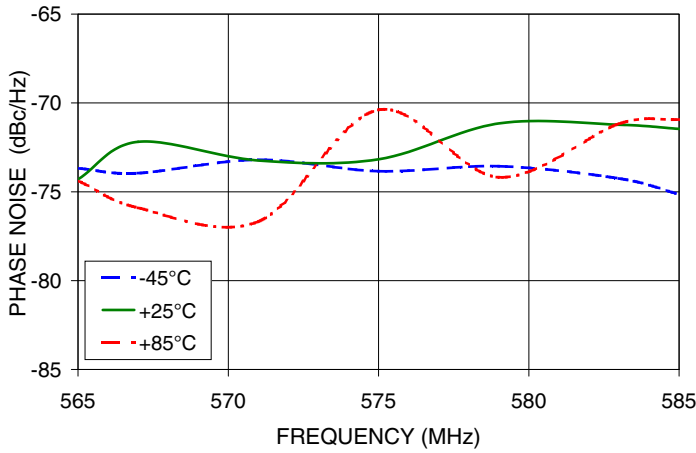


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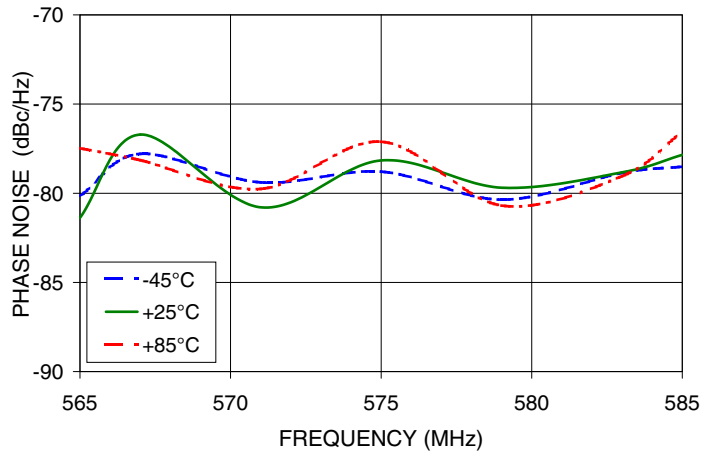


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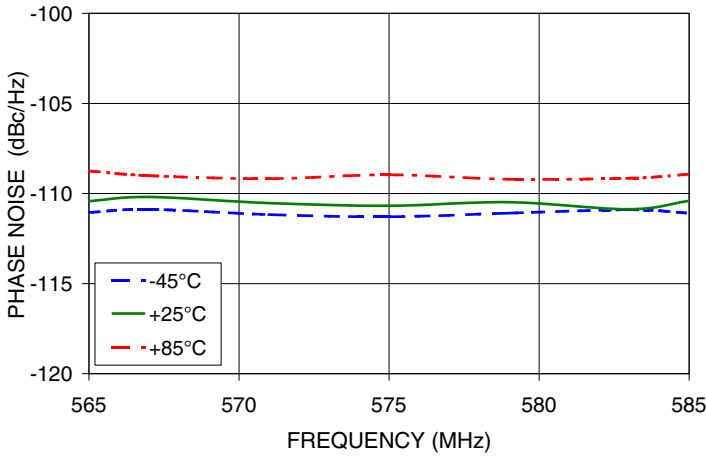
PHASE NOISE @ 100Hz offset



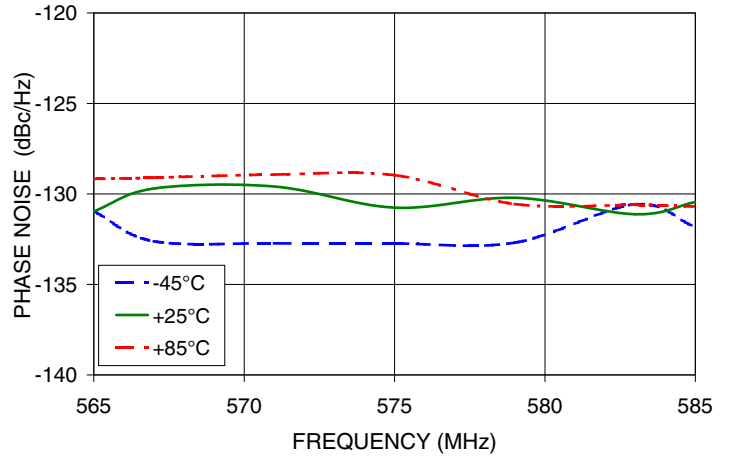
PHASE NOISE @ 1kHz offset



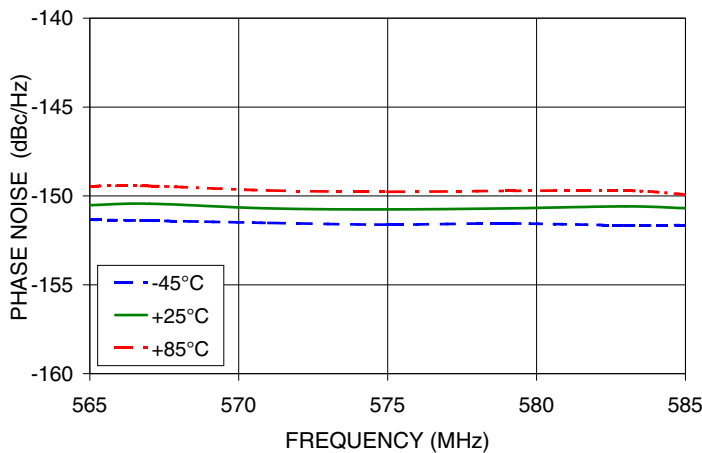
PHASE NOISE @ 10kHz offset



PHASE NOISE @ 100kHz offset



PHASE NOISE @ 1MHz offset



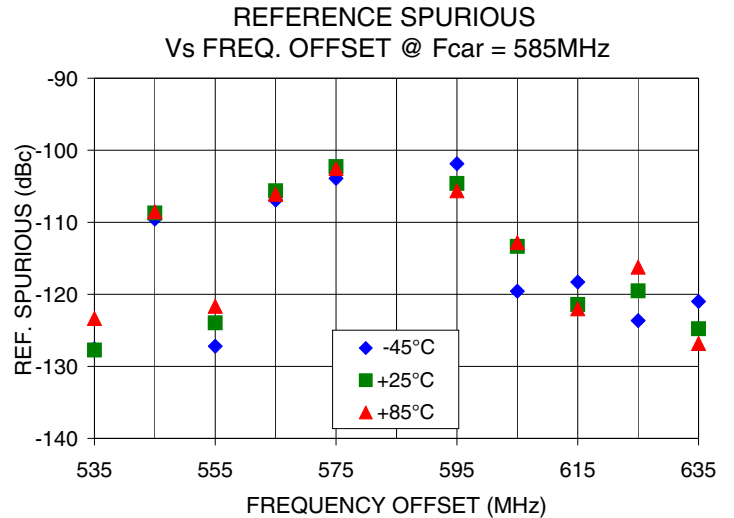
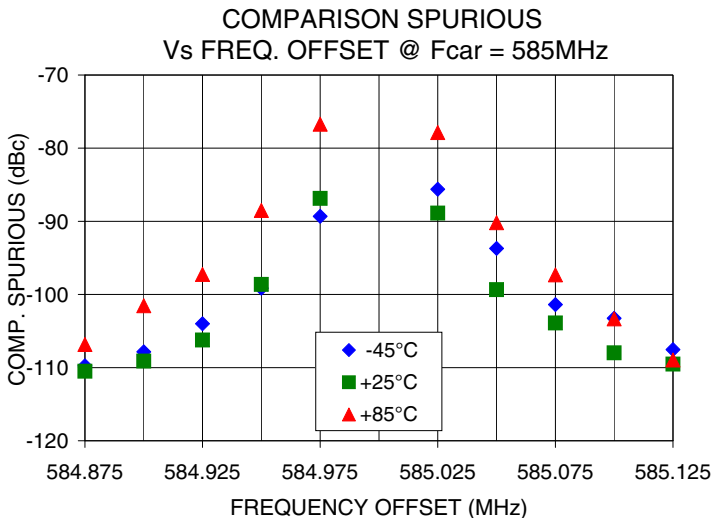
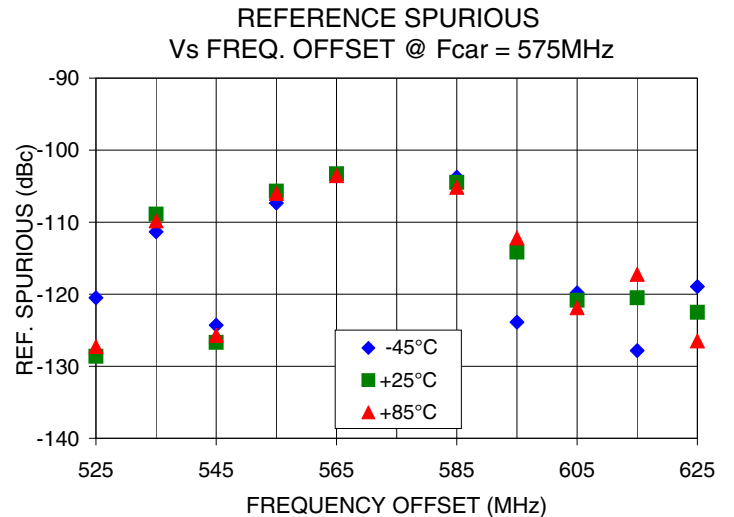
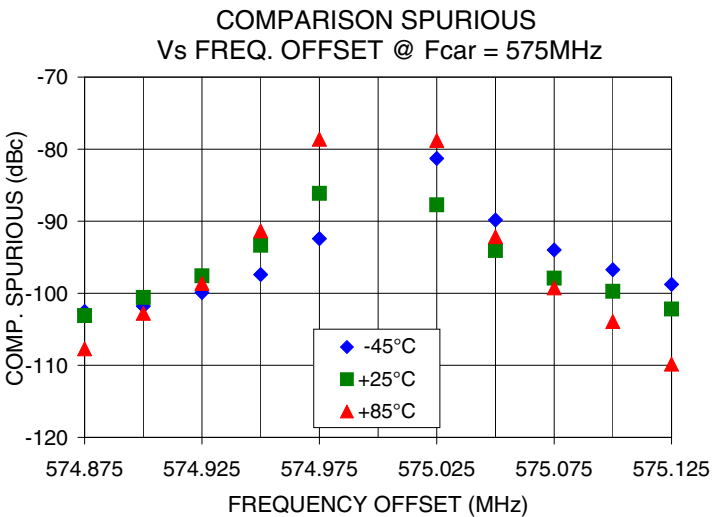
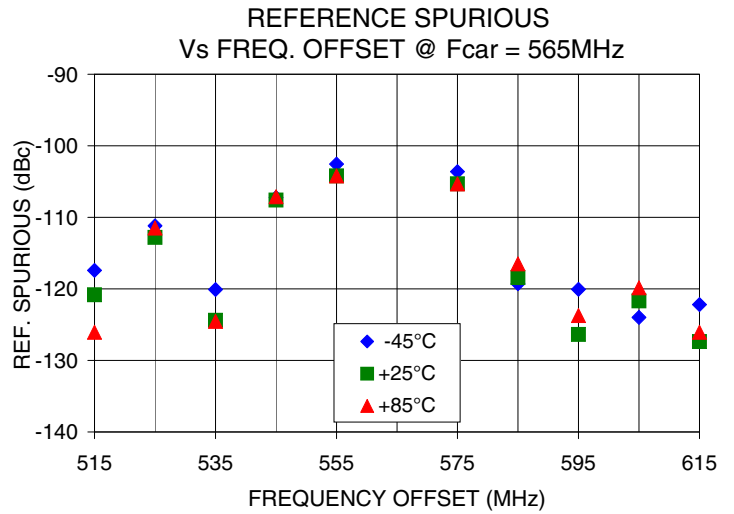
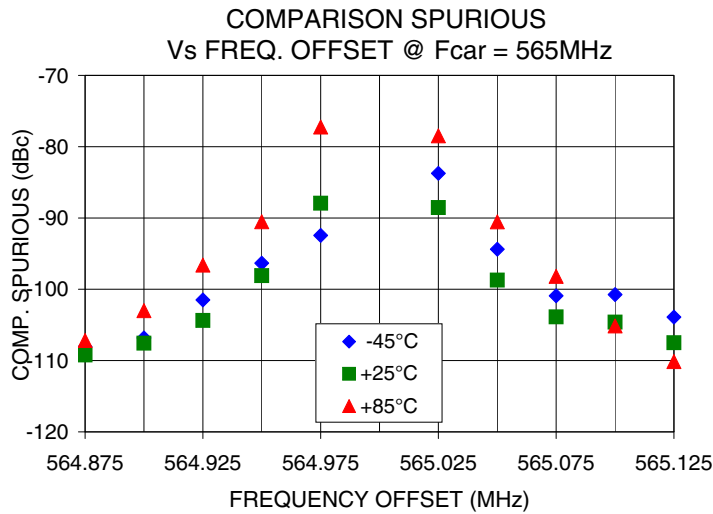
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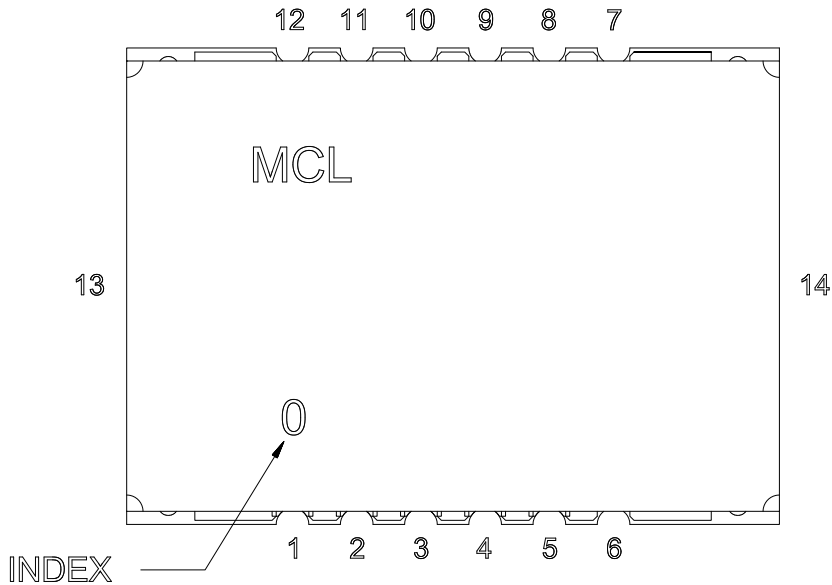


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Pin Configuration

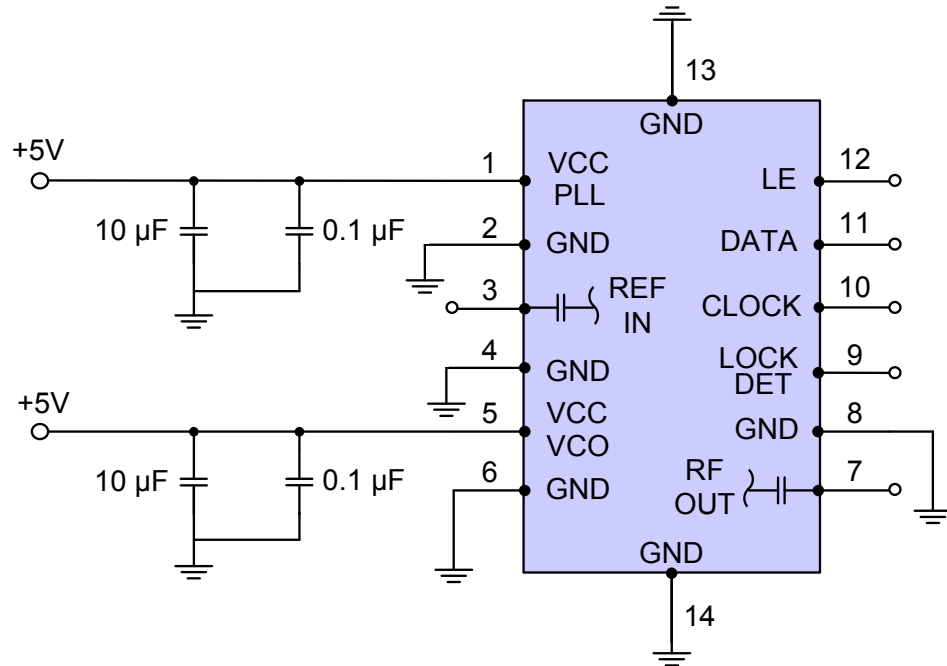


Pin Connection

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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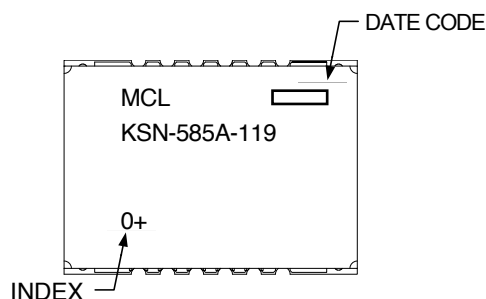


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## Device Marking



### 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:** DK801

**Tape & Reel:** TR-F28

**Suggested Layout for PCB Design:** PL-249

**Evaluation Board:** TB-567+

**Environment Ratings:** ENV03T2



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