

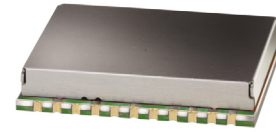
Frequency Synthesizer

DSN-2700A-219+

50Ω 1740 to 2692 MHz

The Big Deal

- Fractional N synthesizer
- Low phase noise and spurious



CASE STYLE: KL1294

Product Overview

The DSN-2700A-219+ is a Frequency Synthesizer, designed to operate from 1740 to 2692 MHz for GPON, ADSL & Cable TV applications. The DSN-2700A-219+ is packaged in a metal case (size of 1.250" x 1.000" x 0.232") to shield against unwanted signals and noise.

Key Features

Feature	Advantages
Low phase noise and spurious: <ul style="list-style-type: none">• Phase Noise: -96 dBc/Hz typ. @ 10 kHz offset• Step Size Spurious: -97 dBc typ.• Comparison Spurious: -90 dBc typ.• Reference Spurious: -90 dBc typ.	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of DSN-2700A-219+, 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.



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Frequency Synthesizer

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50Ω 1740 to 2692 MHz

Features

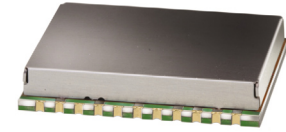
- Fractional N synthesizer
- Integrated VCO + PLL
- Low phase noise and spurious
- Robust design and construction
- Operating voltage (VCC VCO=+10V, VCC PLL=+22V)

Applications

- GPON
- ADSL
- Cable TV

General Description

The DSN-2700A-219+ is a Frequency Synthesizer, designed to operate from 1740 to 2692 MHz for GPON, ADSL & Cable TV applications. The DSN-2700A-219+ is packaged in a metal case (size of 1.250" x 1.000" x 0.232") to shield against unwanted signals and noise. To enhance the robustness of DSN-2700A-219+, 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.

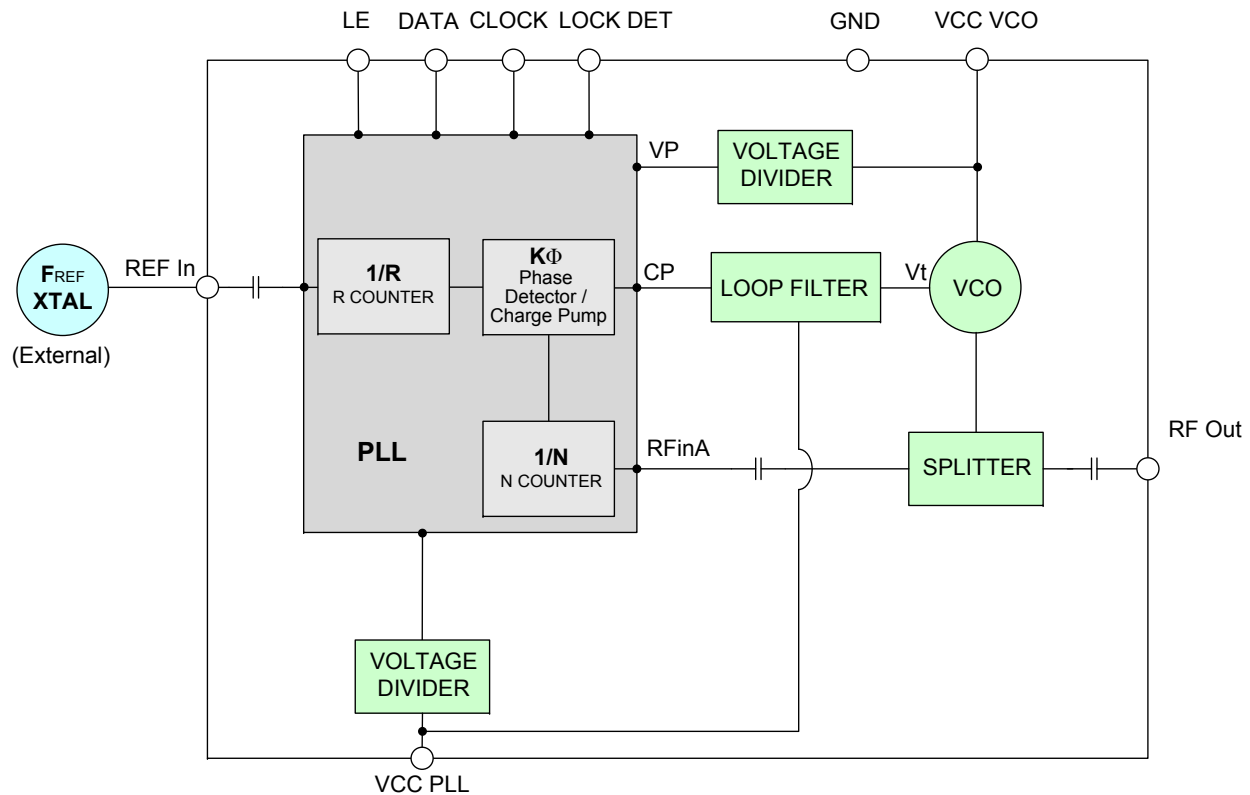


CASE STYLE: KL1294
PRICE: \$45.95 ea. QTY (1-9)

+ 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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Electrical Specifications (over operating temperature 0°C to +55°C)

Parameters	Test Conditions	Min.	Typ.	Max.	Units	
Frequency Range	-	1740	-	2692	MHz	
Step Size	-	-	2000	-	KHz	
Comparison Frequency	-	-	20	-	MHz	
Settling Time	Within ± 1 kHz	-	5	-	mSec	
Output Power	-	-4.0	-0.5	+3.0	dBm	
SSB Phase Noise	@ 100 Hz offset	-	-80	-	dBc/Hz	
	@ 1 kHz offset	-	-94	-86		
	@ 10 kHz offset	-	-96	-90		
	@ 100 kHz offset	-	-115	-109		
	@ 1 MHz offset	-	-140	-134		
Integrated SSB Phase Noise	@12 kHz to 6MHz	-	-50	-	dBc	
Step Size Spurious Suppression	Step Size 2000 kHz	-	-97	-80	dBc	
0.5 Step Size Spurious Suppression	0.5 Step Size 1000 kHz	-	-97	-80		
Reference & Comparison Spurious Suppression	Ref. & Comp. Freq. 20 MHz	-	-90	-70		
Non - Harmonic Spurious Suppression	-	-	-90	-		
Harmonic Suppression	-	-	-39	-23		
VCO Supply Voltage	+10	+9.75	+10.00	+10.25	V	
PLL Supply Voltage	+22	+21.75	+22.00	+22.25		
VCO Supply Current	-	-	49	58	mA	
PLL Supply Current	-	-	23	32		
Reference Input (External)	Frequency	20 (square wave)	-	20	MHz	
	Amplitude	1	-	1	V _{PP}	
	Input impedance	-	-	100	KΩ	
	Phase Noise @ 1 kHz offset	-	-	-145	-	dBc/Hz
RF Output port Impedance	-	-	50	-	Ω	
Input Logic Level	Input high voltage	-	2.65	-	V	
	Input low voltage	-	-	0.65	V	
Digital Lock Detect	Locked	-	2.20	-	3.05	V
	Unlocked	-	-	-	0.40	V
Frequency Synthesizer PLL	-	ADF4153				
PLL Programming	-	3-wire serial 3.3V CMOS				
Register Map @ 2692 MHz	R0_Register	-	(MSB) 00100001100000000011000 (LSB)			
	R1_Register *	-	(MSB) 00000P000100000000101001 (LSB)			
	R2_Register *	-	(MSB) 0XYZW0100010 (LSB)			
	R3_Register	-	(MSB) 001111000111 (LSB)			

*** Refer to Charge Pump Settings**

FREQ. LOCK [MHz]	Charge Pump Settings				
	P	X	Y	Z	W
1740 - 1850	0	0	0	1	1
1852 - 2000	0	0	0	1	1
2002 - 2400	1	1	1	1	0
2402 - 2500	1	0	0	1	1
2502 - 2600	1	0	1	0	0
2602 - 2650	1	0	1	0	1
2652 - 2670	1	0	1	1	0
2672 - 2692	1	0	1	1	1

Absolute Maximum Ratings

Parameters	Ratings
VCO Supply Voltage	11V
PLL Supply Voltage	23V
VCO Supply Voltage to PLL Supply Voltage	N.A.
Reference Frequency Voltage	0Vmin, +3.6Vmax
Data, Clock, LE Levels	0Vmin, +3.6Vmax
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)		
	-5°C	+25°C	+60°C	-5°C	+25°C	+60°C	-5°C	+25°C	+60°C
1740	0.83	0.66	0.46	49.09	49.70	50.14	22.61	23.74	24.83
1818	0.69	0.52	0.32	49.14	49.73	50.18	22.84	23.97	25.06
1916	0.27	0.10	-0.11	49.17	49.76	50.20	23.28	24.44	25.57
2014	-0.14	-0.28	-0.52	49.22	49.82	50.26	23.47	24.63	25.78
2112	-0.56	-0.69	-0.91	49.25	49.86	50.29	23.70	24.86	25.83
2210	-1.02	-1.12	-1.36	49.30	49.90	50.36	23.57	24.73	25.89
2308	-1.55	-1.57	-1.86	49.34	49.97	50.43	23.65	24.81	25.97
2406	-1.73	-1.65	-1.87	49.38	50.02	50.48	23.54	24.70	25.86
2504	-1.65	-1.57	-1.61	49.53	50.19	50.68	23.16	24.31	25.48
2602	-1.30	-1.29	-1.30	49.67	50.36	50.87	23.13	24.27	25.45
2692	-0.80	-0.78	-0.79	49.86	50.59	51.12	23.76	24.91	26.10

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-5°C	+25°C	+60°C	-5°C	+25°C	+60°C
1740	-30.79	-32.03	-33.98	-49.68	-49.61	-51.15
1818	-35.60	-36.70	-37.89	-49.14	-49.13	-50.19
1916	-38.30	-38.81	-40.40	-42.59	-41.99	-43.32
2014	-40.35	-41.70	-43.51	-38.03	-35.83	-38.60
2112	-42.60	-44.43	-45.87	-31.48	-32.20	-31.98
2210	-42.70	-44.00	-45.58	-28.25	-29.31	-29.43
2308	-42.13	-42.08	-44.43	-34.17	-33.00	-34.51
2406	-40.75	-40.87	-42.69	-41.06	-39.27	-41.55
2504	-38.56	-39.51	-39.93	-50.56	-55.40	-58.71
2602	-38.43	-39.00	-38.74	-46.66	-41.46	-42.23
2692	-39.60	-40.03	-39.98	-36.66	-37.24	-38.17



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FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	+25°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1740	-86.58	-98.22	-98.46	-116.69	-140.27
1818	-88.12	-98.51	-98.12	-116.41	-140.42
1916	-85.17	-97.47	-98.04	-115.73	-140.21
2014	-81.28	-94.25	-96.56	-115.32	-140.33
2112	-81.33	-94.32	-96.29	-114.78	-138.97
2210	-80.59	-95.57	-96.00	-114.63	-140.08
2308	-80.71	-92.95	-95.87	-114.70	-138.78
2406	-82.42	-97.35	-96.61	-114.93	-140.40
2504	-80.78	-95.14	-95.88	-114.23	-139.83
2602	-83.08	-95.49	-95.75	-114.62	-139.76
2692	-81.70	-93.51	-95.28	-114.89	-139.88

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	-5°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1740	-86.86	-96.32	-97.74	-117.46	-140.28
1818	-86.50	-95.76	-98.11	-117.28	-139.63
1916	-84.08	-95.27	-97.29	-116.49	-141.15
2014	-83.26	-93.36	-96.09	-116.11	-140.98
2112	-85.14	-93.84	-95.52	-115.32	-139.14
2210	-84.85	-93.80	-95.18	-115.27	-140.89
2308	-82.96	-93.48	-95.29	-115.39	-140.77
2406	-82.84	-93.63	-95.68	-115.30	-138.84
2504	-85.62	-95.03	-95.55	-114.65	-140.19
2602	-84.88	-94.55	-95.02	-115.00	-140.02
2692	-81.50	-94.45	-94.66	-115.14	-138.74

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	+60°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1740	-86.97	-96.62	-98.04	-115.71	-138.60
1818	-86.70	-97.26	-97.19	-115.58	-137.25
1916	-87.66	-95.53	-97.00	-114.86	-138.79
2014	-84.58	-93.53	-95.84	-114.59	-138.89
2112	-84.55	-91.43	-95.45	-114.04	-139.22
2210	-81.92	-92.03	-94.78	-114.05	-138.80
2308	-82.38	-93.04	-94.44	-114.14	-138.31
2406	-83.69	-93.38	-95.75	-114.14	-137.55
2504	-83.95	-94.69	-95.40	-113.55	-139.15
2602	-83.83	-93.06	-94.07	-113.85	-139.09
2692	-82.67	-93.96	-94.32	-114.43	-137.60



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REFERENCE SPURIOUS ORDER	REFERENCE & COMPARISON SPURIOUS @Fcarrier 1742MHz+(n*Freference) (dBc) note 3			REFERENCE & COMPARISON SPURIOUS @Fcarrier 2216MHz+(n*Freference) (dBc) note 3			REFERENCE & COMPARISON SPURIOUS @Fcarrier 2692MHz+(n*Freference) (dBc) note 3		
	n	-5°C	+25°C	+60°C	-5°C	+25°C	+60°C	-5°C	+25°C
-5	-91.83	-91.63	-87.02	-96.38	-95.21	-94.34	-93.33	-93.08	-90.07
-4	-91.45	-88.02	-89.12	-92.16	-105.67	-101.83	-96.49	-101.80	-93.39
-3	-90.09	-86.56	-91.70	-98.38	-94.15	-101.03	-97.03	-99.58	-96.98
-2	-87.19	-88.44	-99.42	-94.84	-104.54	-101.69	-111.65	-102.71	-115.67
-1	-89.14	-98.49	-101.99	-91.56	-94.47	-96.02	-95.92	-101.06	-99.45
0 note 4	-	-	-	-	-	-	-	-	-
+1	-106.92	-102.49	-93.61	-88.68	-96.14	-99.90	-97.54	-102.98	-104.99
+2	-101.14	-99.18	-97.08	-90.42	-106.00	-95.05	-98.83	-97.85	-97.46
+3	-104.18	-97.79	-113.25	-103.95	-101.21	-92.47	-98.58	-96.00	-91.83
+4	-109.22	-98.56	-102.93	-98.50	-98.39	-94.63	-101.94	-106.10	-97.84
+5	-106.60	-103.53	-99.95	-101.75	-97.40	-98.85	-88.82	-88.04	-89.38

Note 1: Reference frequency = Comparison frequency = 20 MHz

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

STEP SIZE SPURIOUS ORDER	0.5 STEP SIZE & STEP SIZE SPURIOUS @Fcarrier 1742MHz+(n*Fstep size) (dBc) note 5			0.5 STEP SIZE & STEP SIZE SPURIOUS @Fcarrier 2216MHz+(n*Fstep size) (dBc) note 5			0.5 STEP SIZE & STEP SIZE SPURIOUS @Fcarrier 2692MHz+(n*Fstep size) (dBc) note 5		
	n	-5°C	+25°C	+60°C	-5°C	+25°C	+60°C	-5°C	+25°C
-5.0	-111.69	-110.04	-107.90	-109.53	-113.23	-105.20	-115.00	-115.55	-121.89
-4.5	-107.06	-105.01	-111.37	-100.29	-102.06	-96.14	-116.49	-111.80	-115.57
-4.0	-108.97	-109.72	-124.29	-103.84	-107.88	-100.53	-99.05	-99.77	-102.94
-3.5	-104.49	-103.19	-107.10	-107.09	-105.24	-105.69	-117.88	-121.11	-120.21
-3.0	-107.20	-110.53	-109.89	-106.36	-110.88	-106.27	-120.82	-115.93	-121.88
-2.5	-108.50	-109.36	-104.55	-108.82	-112.50	-104.32	-113.31	-111.71	-115.11
-2.0	-96.63	-100.22	-99.98	-93.47	-92.01	-95.41	-108.02	-110.39	-112.82
-1.5	-106.73	-106.71	-107.60	-104.96	-112.73	-105.83	-108.93	-117.58	-113.12
-1.0	-101.50	-90.11	-89.53	-110.36	-116.30	-108.13	-107.39	-111.37	-108.71
-0.5	-102.09	-91.65	-102.14	-96.03	-95.13	-100.24	-98.94	-94.19	-98.17
0 note 6	-	-	-	-	-	-	-	-	-
+0.5	-98.17	-93.61	-101.77	-99.06	-93.95	-96.88	-99.75	-93.37	-97.47
+1.0	-101.21	-91.39	-89.22	-111.98	-106.16	-108.70	-110.13	-110.76	-107.34
+1.5	-105.94	-115.07	-113.18	-104.19	-110.47	-102.92	-109.39	-116.08	-109.54
+2.0	-103.33	-108.11	-105.55	-91.52	-92.08	-94.42	-108.17	-109.15	-112.11
+2.5	-108.09	-112.02	-109.74	-109.56	-109.26	-103.12	-116.50	-117.34	-115.14
+3.0	-109.68	-114.34	-110.25	-110.01	-110.33	-113.88	-116.47	-117.53	-119.48
+3.5	-105.59	-116.95	-108.96	-103.28	-102.13	-100.75	-113.01	-119.73	-120.45
+4.0	-109.83	-120.06	-107.92	-105.62	-102.27	-103.64	-94.98	-98.83	-99.56
+4.5	-101.92	-116.11	-106.53	-102.46	-102.91	-105.04	-116.57	-121.84	-112.37
+5.0	-116.10	-116.84	-118.94	-108.78	-111.19	-105.17	-112.61	-113.75	-115.99

Note 3: Step size 2000 kHz

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

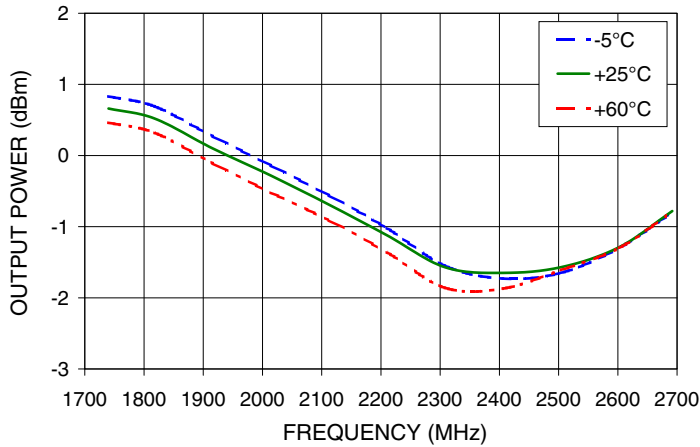


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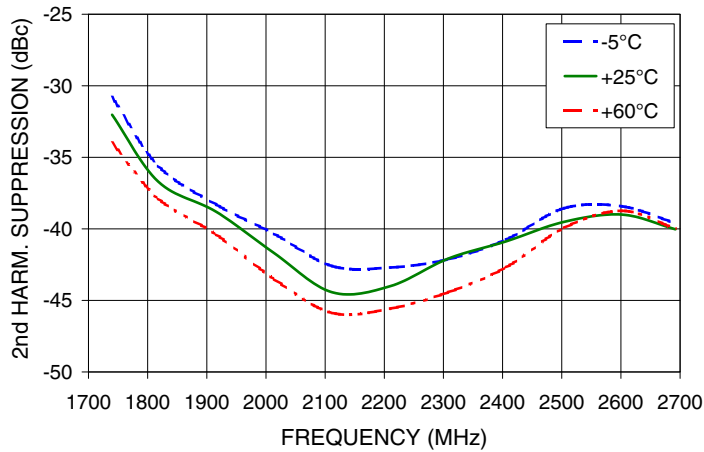
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Typical Performance Curves

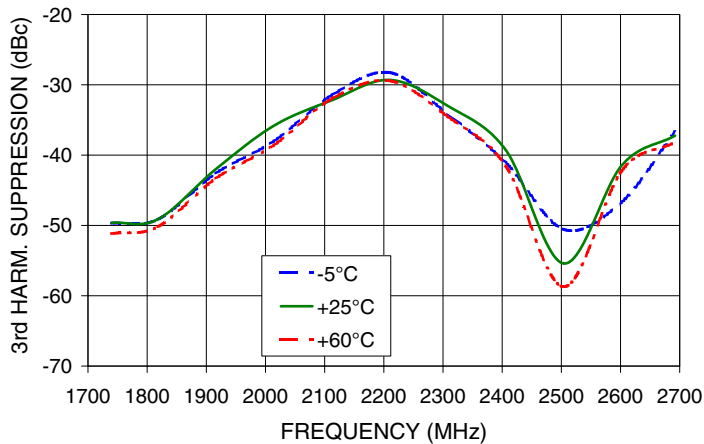
OUTPUT POWER Vs FREQUENCY



2nd HARMONIC Vs FREQUENCY



3rd HARMONIC Vs FREQUENCY



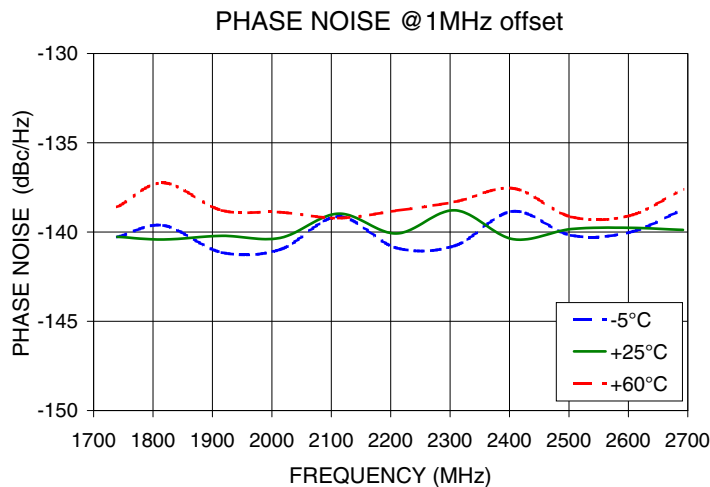
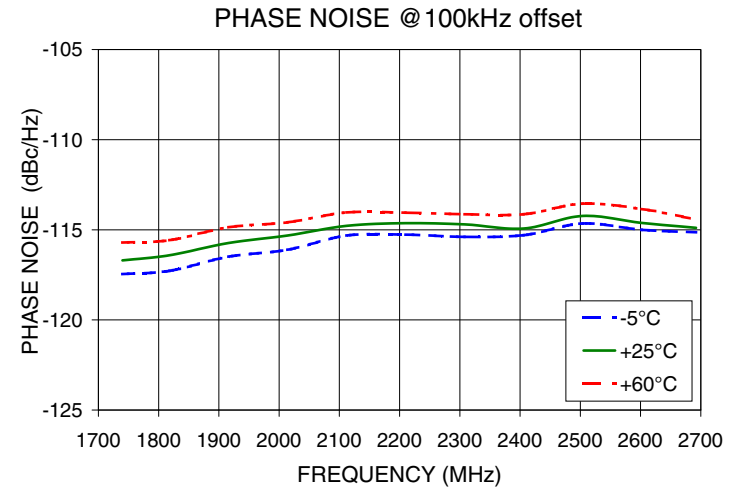
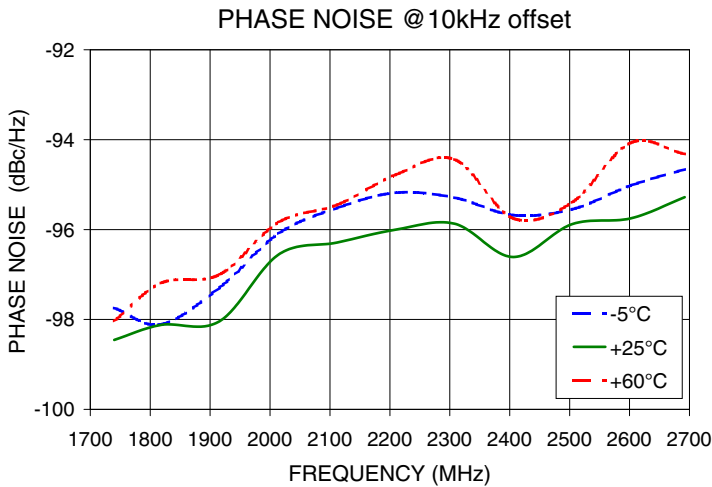
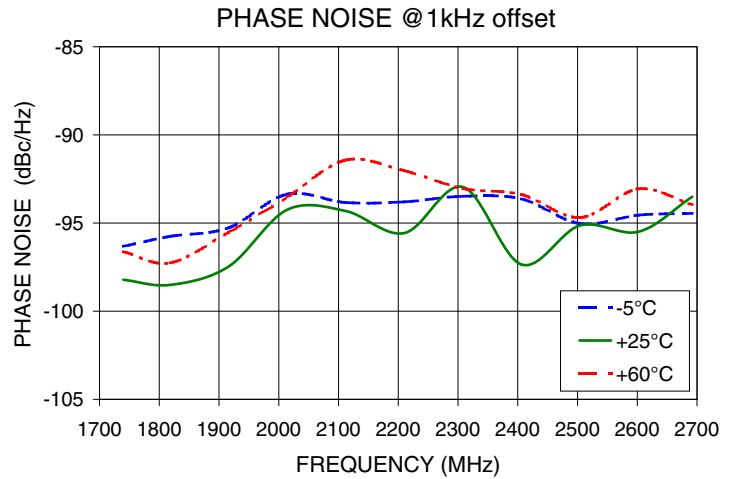
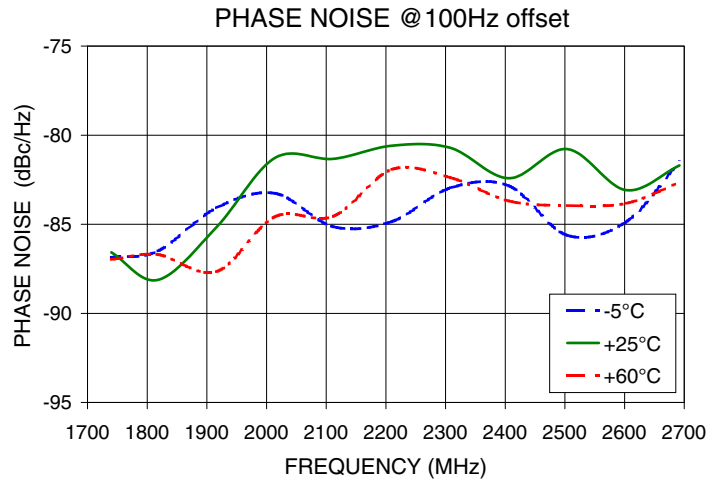
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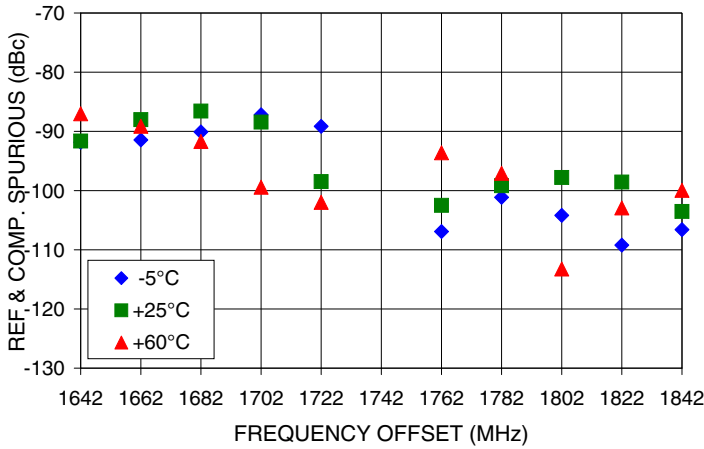


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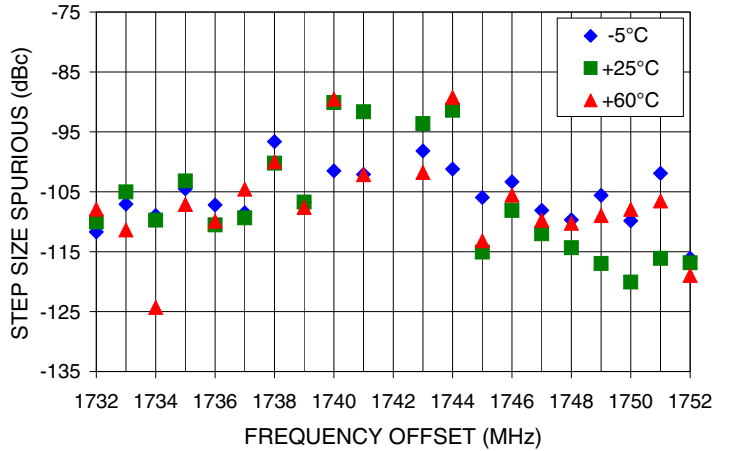


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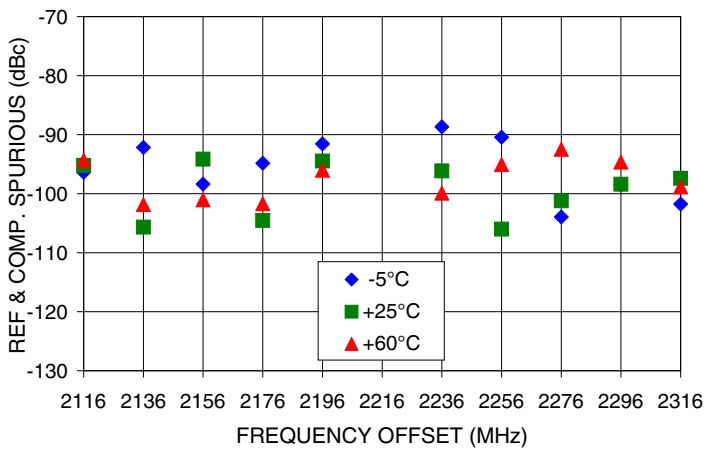
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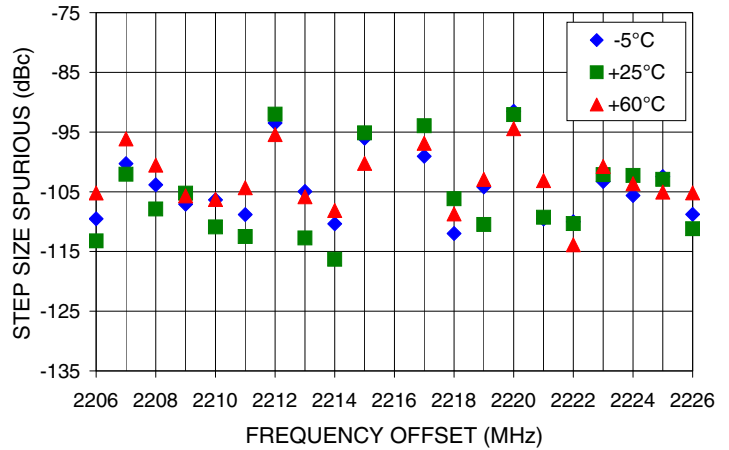
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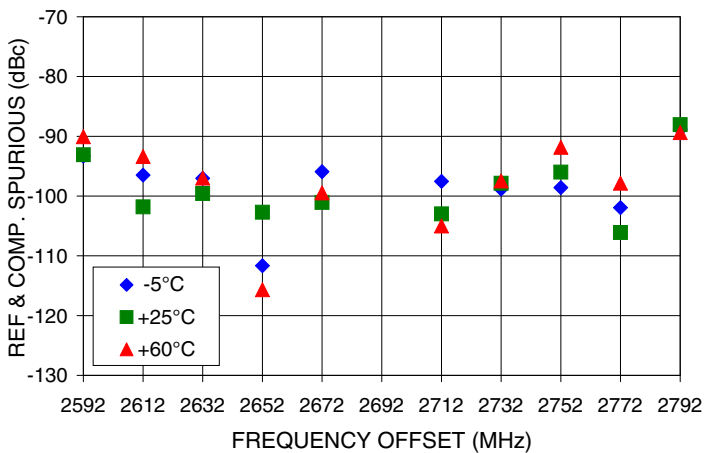
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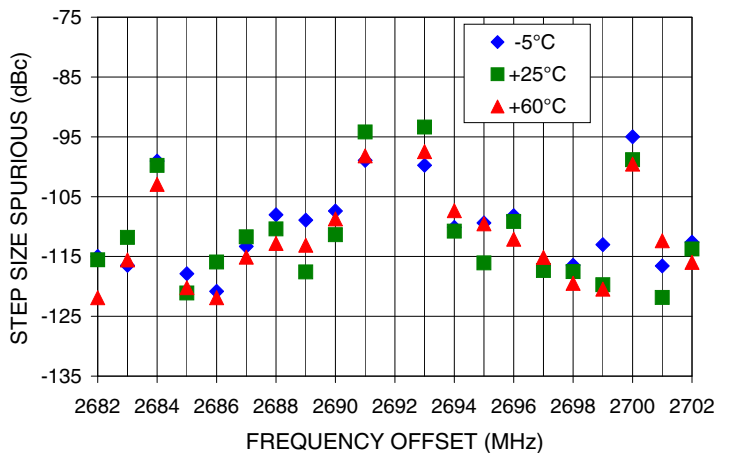
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Vs FREQ. OFFSET @ Fcar = 2216MHz



REFERENCE & COMPARISON SPURIOUS
Vs FREQ. OFFSET @ Fcar = 2692MHz



0.5 STEP SIZE & STEP SIZE SPURIOUS
Vs FREQ. OFFSET @ Fcar = 2692MHz



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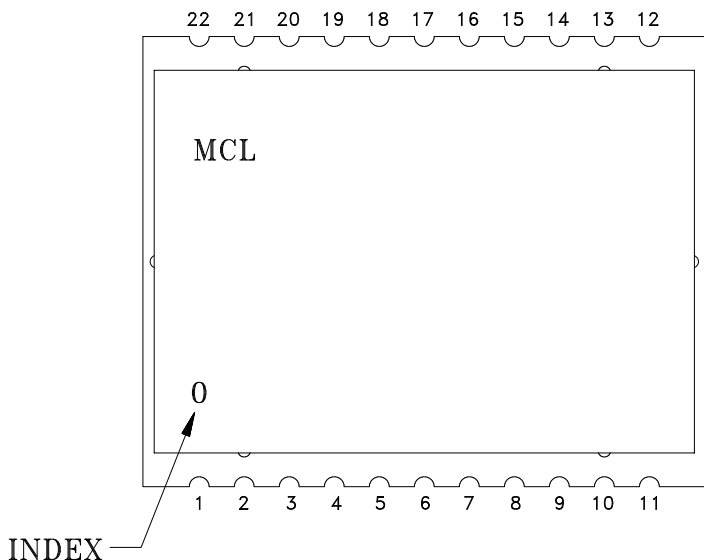


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Pin Configuration

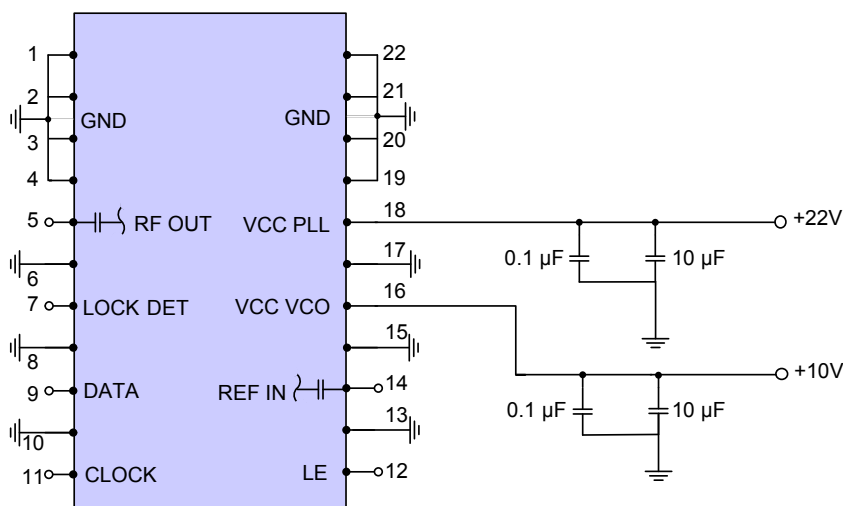


Pin Connection

Pin Number	Function	Pin Number	Function
1	GND	12	LE
2	GND	13	GND
3	GND	14	REF IN
4	GND	15	GND
5	RF OUT	16	VCC VCO
6	GND	17	GND
7	LOCK DET	18	VCC PLL
8	GND	19	GND
9	DATA	20	GND
10	GND	21	GND
11	CLOCK	22	GND

Recommended Application Circuit

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



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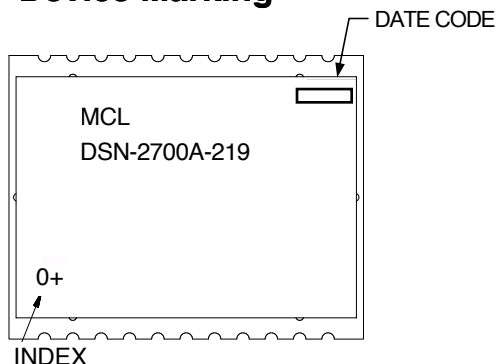


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Device Marking



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: KL1294

Tape & Reel: TR-F97

Suggested Layout for PCB Design: PL-318

Evaluation Board: TB-553+

Environment Ratings: ENV03T2



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