Frequency Synthesizer KSN-1620A-119+

50Ω 1520 to 1620 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-1620A-119+ is a Frequency Synthesizer, designed to operate from 1520 to 1620 MHz for WCDMA base station applications. The KSN-1620A-119+ 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: -95 dBc/Hz typ. @ 10 kHz offset • Comparison Spurious: -85 dBc typ. • Reference Spurious: -100 dBc typ.	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of KSN-1620A-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, 0.800" x 0.584" x 0.154"	The small size enables the KSN-1620A-119+ to be used in compact designs.

Surface Mount

Frequency Synthesizer

KSN-1620A-119+

50Ω 1520 to 1620 MHz

CASE STYLE: DK1042

+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Features

- Integrated VCO + PLL
- Low phase noise and spurious
- Robust design and construction
- Low operating voltage (VCC VCO=+5V, VCC PLL=+5V)
- Small size 0.800" x 0.584" x 0.154"

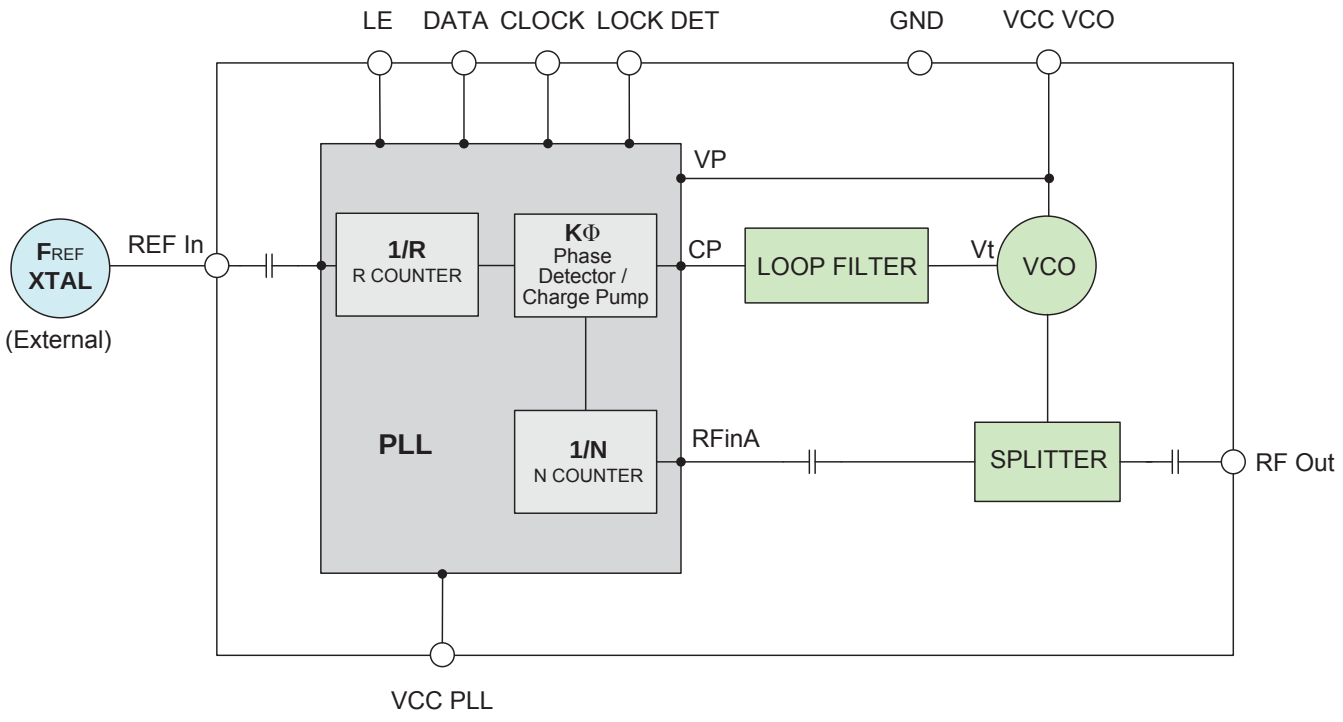
Applications

- WCDMA base station

General Description

The KSN-1620A-119+ is a Frequency Synthesizer, designed to operate from 1520 to 1620 MHz for WCDMA base station application. The KSN-1620A-119+ 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-1620A-119+, each internal component is secured to the substrate with chip bonder, thereby eliminating the risk of tomb-stoning during subsequent solder reflow operations by the customer.

Simplified Schematic



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

Parameters		Test Conditions	Min.	Typ.	Max.	Units
Frequency Range		-	1520	-	1620	MHz
Step Size		-	-	100	-	kHz
Settling Time		Within ± 50 Hz	-	5	10	mSec
Output Power		-	-1.0	+2.5	+4.5	dBm
SSB Phase Noise		@ 100 Hz offset	-	-80	-	dBc/Hz
		@ 1 kHz offset	-	-77	-72	
		@ 10 kHz offset	-	-95	-87	
		@ 100 kHz offset	-	-124	-112	
		@ 1 MHz offset	-	-147	-141	
Integrated SSB Phase Noise		@ 50 Hz to 5 MHz	-	-38	-	dBc
Reference Spurious Suppression		Ref. Freq. 10 MHz	-	-100	-85	
Comparison Spurious Suppression		Step Size 100 kHz	-	-85	-60	
Non - Harmonic Spurious Suppression		-	-	-90	-	
Harmonic Suppression		-	-	-56	-40	
VCO Supply Voltage		+5.00	+4.85	+5.00	+5.15	V
PLL Supply Voltage		+5.00	+4.85	+5.00	+5.15	
VCO Supply Current		-	-	25	31	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	-	-	-140	-	dBc/Hz
RF Output port Impedance		-	-	50	-	Ω
Input Logic Level	Input high voltage	-	4.15	-	-	V
	Input low voltage	-	-	-	0.95	
Digital Lock Detect	Locked	-	4.45	-	5.15	
	Unlocked	-	-	-	0.40	
Frequency Synthesizer PLL		-	ADF4118			
PLL Programming		-	3-wire serial 5V 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 @ 1620 MHz	*CP Gain*	*13-Bit B Counter*								*5-Bit A Counter*			*Control Bits*
		1	0000111111010								01000			01
	R_Register	*Lock Detect Precision*	*Test Mode Bits*		*14-BIT Reference Counter, R*									*Control Bits*
		1	0000		00000001100100									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	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

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
1520.0	2.69	2.75	2.60	24.03	24.99	25.52	6.69	8.22	9.57
1530.0	2.70	2.74	2.60	24.03	24.98	25.52	6.73	8.25	9.61
1540.0	2.67	2.72	2.58	24.02	24.97	25.51	6.72	8.24	9.61
1550.0	2.63	2.66	2.54	24.02	24.98	25.52	6.72	8.25	9.62
1560.0	2.57	2.62	2.51	24.02	24.98	25.53	6.74	8.26	9.62
1570.0	2.53	2.60	2.48	24.02	25.00	25.55	6.74	8.27	9.63
1580.0	2.50	2.59	2.48	24.03	25.00	25.56	6.75	8.27	9.64
1590.0	2.53	2.60	2.49	24.02	25.01	25.57	6.74	8.28	9.65
1600.0	2.55	2.60	2.50	24.00	25.00	25.56	6.74	8.29	9.66
1610.0	2.55	2.59	2.49	23.99	24.99	25.56	6.76	8.30	9.67
1620.0	2.52	2.56	2.48	23.97	24.98	25.55	6.76	8.29	9.66

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
1520.0	-51.36	-54.74	-58.47	-59.35	-61.70	-62.16
1530.0	-52.08	-54.93	-58.57	-60.18	-61.10	-61.92
1540.0	-50.64	-54.22	-57.91	-60.21	-60.15	-60.83
1550.0	-49.97	-53.18	-56.55	-59.39	-59.67	-59.74
1560.0	-50.43	-52.97	-56.44	-57.33	-58.78	-58.97
1570.0	-51.48	-54.03	-57.15	-56.41	-57.27	-58.41
1580.0	-52.78	-55.16	-58.80	-55.99	-56.96	-58.58
1590.0	-52.92	-56.05	-59.30	-56.14	-56.94	-58.33
1600.0	-52.50	-54.49	-58.07	-55.87	-55.81	-57.45
1610.0	-50.77	-53.11	-56.40	-54.63	-55.08	-56.25
1620.0	-50.31	-51.96	-55.08	-54.05	-54.82	-55.57

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @OFFSETS +25°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1520.0	-80.50	-77.32	-95.67	-125.47	-146.64
1530.0	-79.02	-77.02	-95.52	-123.39	-146.77
1540.0	-79.26	-77.38	-95.37	-126.45	-146.76
1550.0	-80.30	-78.02	-94.47	-125.76	-146.86
1560.0	-80.60	-78.31	-93.99	-124.93	-146.92
1570.0	-79.76	-78.08	-94.13	-123.87	-146.96
1580.0	-80.28	-78.37	-94.44	-123.36	-146.98
1590.0	-81.11	-78.65	-94.73	-123.20	-146.99
1600.0	-80.74	-77.26	-94.41	-124.50	-146.87
1610.0	-80.59	-77.05	-94.23	-125.20	-146.76
1620.0	-80.73	-78.29	-94.22	-125.16	-146.66

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @OFFSETS -45°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1520.0	-78.03	-76.19	-94.64	-126.04	-147.85
1530.0	-76.74	-77.12	-94.76	-123.45	-147.94
1540.0	-77.91	-76.11	-94.70	-125.54	-147.89
1550.0	-78.14	-75.64	-94.34	-126.69	-147.94
1560.0	-76.97	-76.00	-93.54	-126.45	-148.14
1570.0	-77.11	-76.39	-92.85	-125.34	-148.22
1580.0	-77.82	-76.78	-92.21	-123.86	-148.26
1590.0	-77.71	-77.84	-92.61	-123.90	-147.97
1600.0	-77.56	-78.22	-92.82	-123.36	-147.75
1610.0	-77.35	-77.01	-92.60	-121.49	-147.69
1620.0	-78.52	-76.37	-92.51	-125.12	-147.47

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @OFFSETS +85°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1520.0	-79.20	-76.61	-94.12	-123.41	-145.70
1530.0	-79.06	-76.47	-93.63	-123.26	-145.58
1540.0	-79.09	-76.89	-93.29	-122.69	-145.48
1550.0	-80.42	-77.16	-92.49	-121.58	-145.62
1560.0	-80.23	-76.94	-92.20	-121.49	-145.73
1570.0	-79.04	-76.39	-92.24	-122.09	-145.84
1580.0	-78.63	-76.34	-92.83	-122.29	-145.87
1590.0	-78.15	-76.43	-93.03	-122.48	-145.85
1600.0	-77.58	-76.73	-92.63	-122.65	-145.75
1610.0	-77.22	-76.41	-92.69	-121.26	-145.57
1620.0	-79.03	-75.83	-92.53	-118.96	-145.32

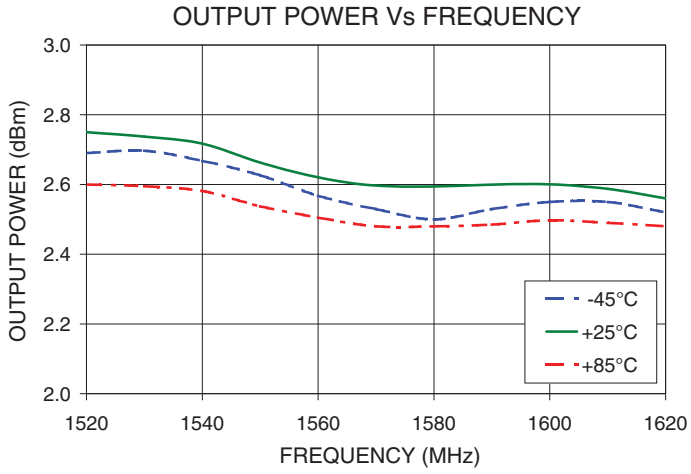
COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 1520MHz+(n*Fcomparison) (dBc) note 1			COMPARISON SPURIOUS @Fcarrier 1570MHz+(n*Fcomparison) (dBc) note 1			COMPARISON SPURIOUS @Fcarrier 1620MHz+(n*Fcomparison) (dBc) note 1		
n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-109.12	-104.61	-100.63	-109.58	-109.16	-103.40	-112.06	-102.21	-100.91
-4	-105.57	-103.23	-100.21	-106.14	-107.23	-101.05	-107.11	-98.56	-100.03
-3	-98.65	-99.96	-96.79	-102.93	-102.20	-100.62	-102.95	-97.92	-95.05
-2	-93.58	-93.30	-90.71	-93.86	-94.46	-94.93	-95.22	-93.28	-90.05
-1	-88.33	-85.93	-82.64	-82.34	-83.21	-83.73	-85.51	-84.99	-82.04
0 note 2	-	-	-	-	-	-	-	-	-
+1	-85.20	-84.74	-76.95	-84.83	-85.29	-83.92	-88.49	-86.07	-83.59
+2	-97.88	-92.88	-90.47	-97.11	-93.79	-93.47	-97.19	-93.93	-92.88
+3	-101.43	-99.84	-96.59	-103.24	-104.03	-97.77	-104.21	-95.84	-97.43
+4	-103.66	-102.12	-99.49	-107.86	-108.83	-101.38	-108.29	-97.54	-102.10
+5	-107.90	-104.40	-104.50	-108.27	-107.28	-103.38	-109.72	-101.01	-103.04

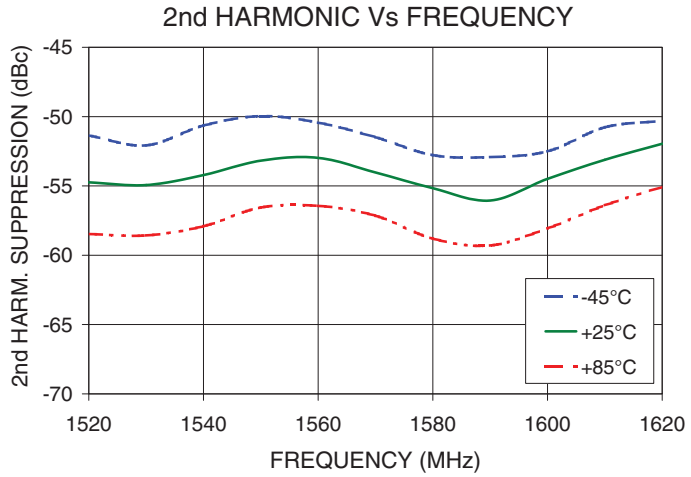
Note 1: Comparison frequency 100 kHz
Note 2: All spurs are referenced to carrier signal (n=0).

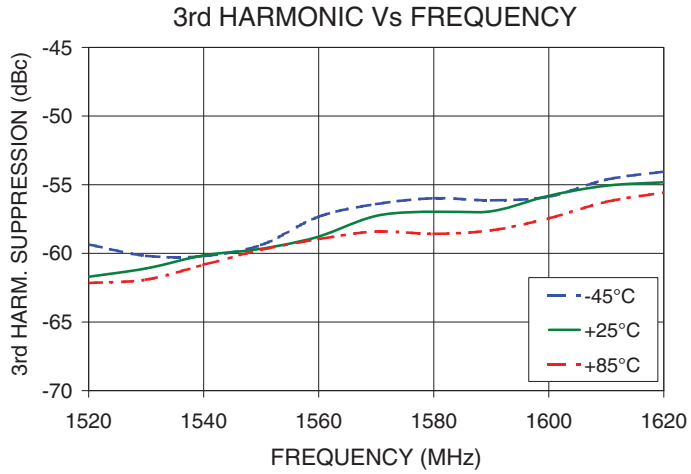
REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @Fcarrier 1520MHz+(n*Freference) (dBc) note 3			REFERENCE SPURIOUS @Fcarrier 1570MHz+(n*Freference) (dBc) note 3			REFERENCE SPURIOUS @Fcarrier 1620MHz+(n*Freference) (dBc) note 3		
n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-130.36	-125.28	-120.00	-128.52	-125.03	-128.55	-122.80	-124.03	-126.57
-4	-111.43	-116.93	-115.26	-117.06	-120.35	-117.39	-119.82	-120.60	-114.22
-3	-120.91	-116.05	-116.45	-113.32	-119.09	-117.76	-118.54	-119.19	-128.61
-2	-108.46	-113.26	-113.68	-114.22	-116.75	-114.50	-114.75	-116.74	-113.44
-1	-112.80	-101.57	-107.16	-109.22	-101.82	-111.06	-101.31	-103.12	-105.01
0 note 4	-	-	-	-	-	-	-	-	-
+1	-103.76	-104.82	-103.40	-101.71	-105.64	-106.67	-100.75	-104.56	-104.85
+2	-111.37	-112.44	-118.24	-119.08	-116.97	-121.23	-116.47	-118.60	-114.95
+3	-117.06	-116.09	-120.57	-113.86	-114.75	-114.57	-114.43	-114.43	-115.68
+4	-114.20	-115.92	-116.05	-123.33	-121.96	-122.09	-121.25	-120.13	-116.58
+5	-113.50	-116.90	-118.63	-116.36	-106.83	-118.19	-117.09	-118.17	-118.85

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

Typical Performance Curves







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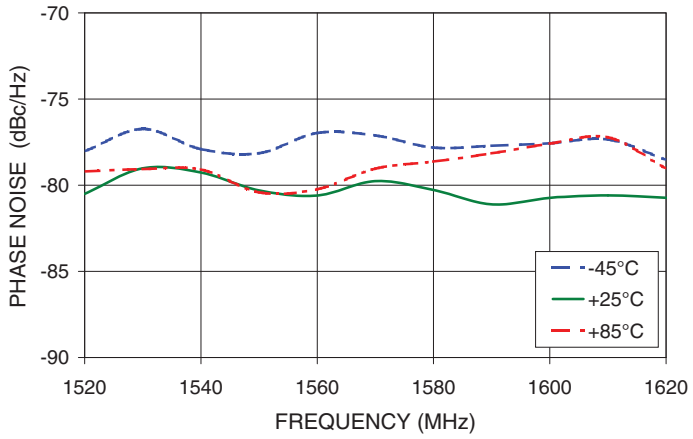
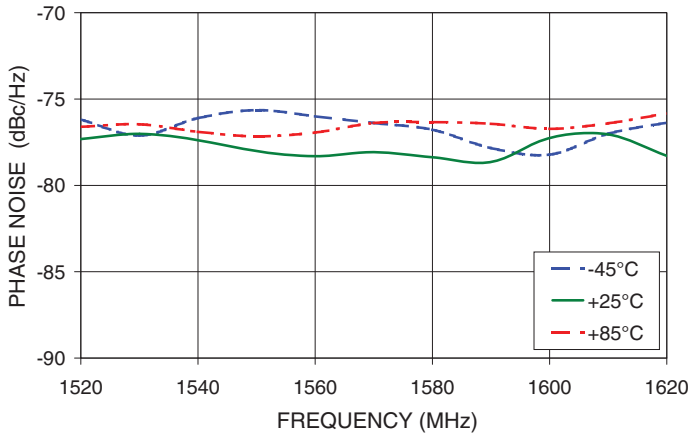
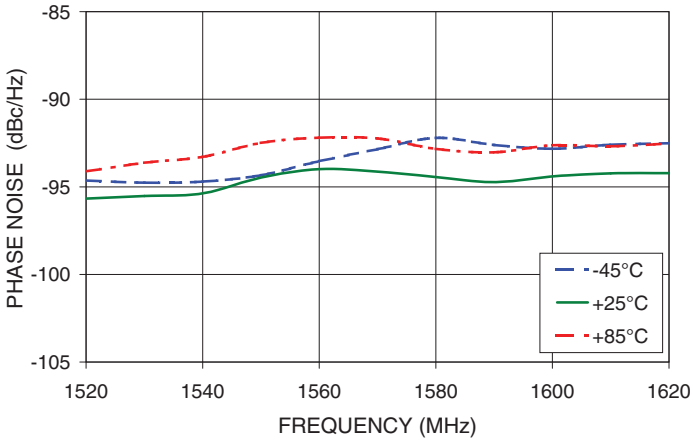
PHASE NOISE @100Hz offset



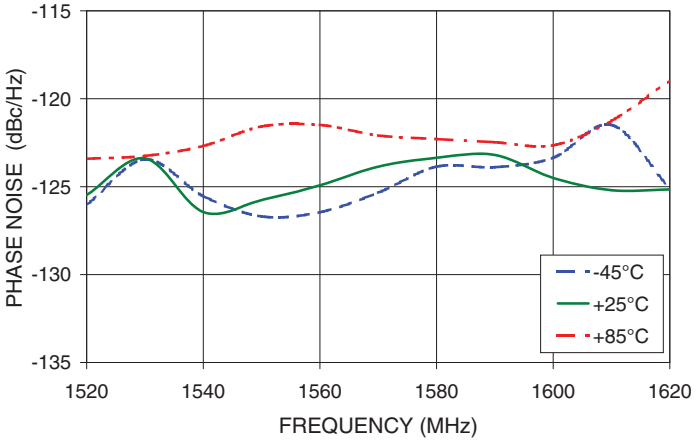
PHASE NOISE @1kHz offset



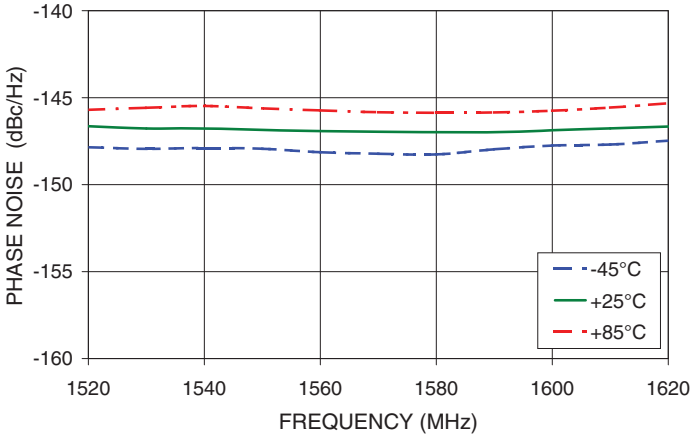
PHASE NOISE @10kHz offset



PHASE NOISE @100kHz offset



PHASE NOISE @1MHz offset



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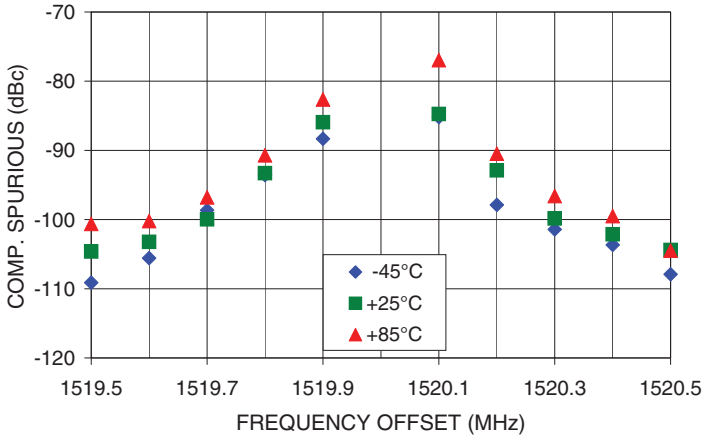
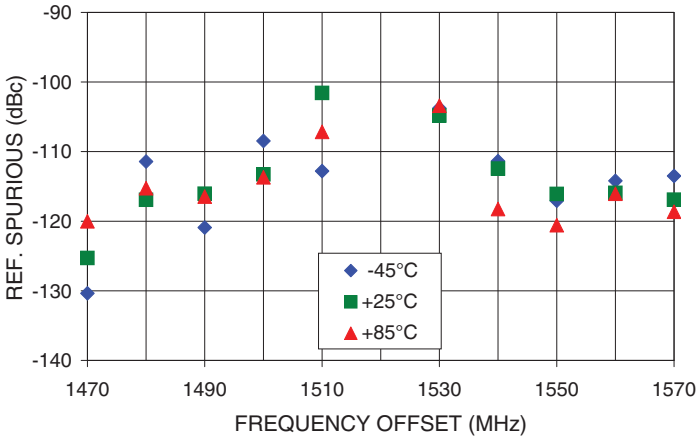
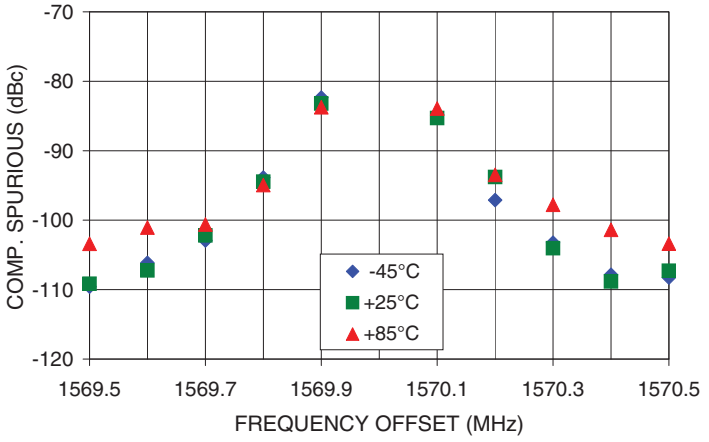
COMPARISON SPURIOUS
Vs FREQ. OFFSET @ Fcar = 1520MHz



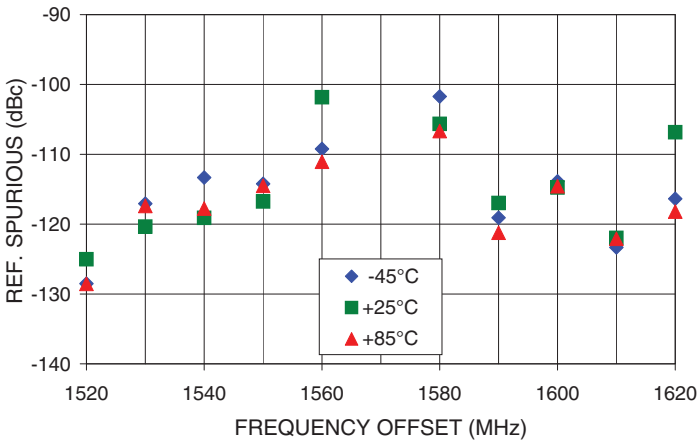
REFERENCE SPURIOUS
Vs FREQ. OFFSET @ Fcar = 1520MHz



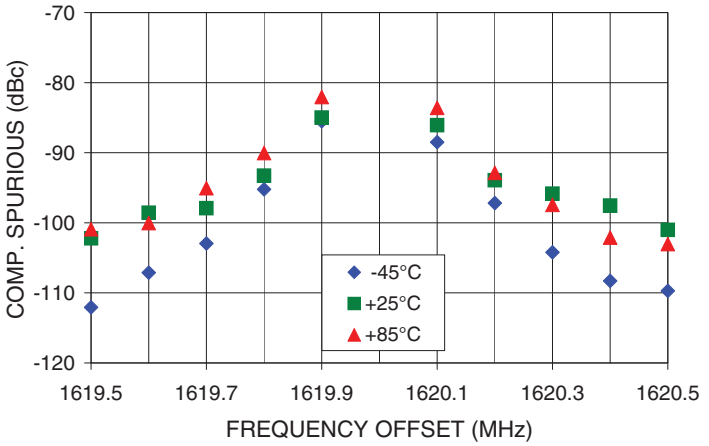
COMPARISON SPURIOUS
Vs FREQ. OFFSET @ Fcar = 1570MHz



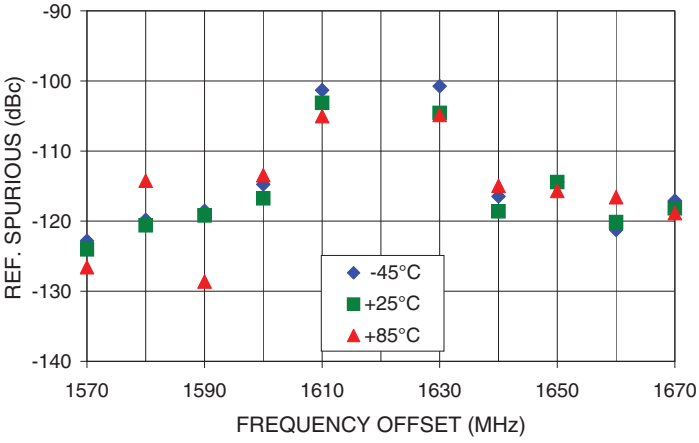
REFERENCE SPURIOUS
Vs FREQ. OFFSET @ Fcar = 1570MHz



COMPARISON SPURIOUS
Vs FREQ. OFFSET @ Fcar = 1620MHz



REFERENCE SPURIOUS
Vs FREQ. OFFSET @ Fcar = 1620MHz



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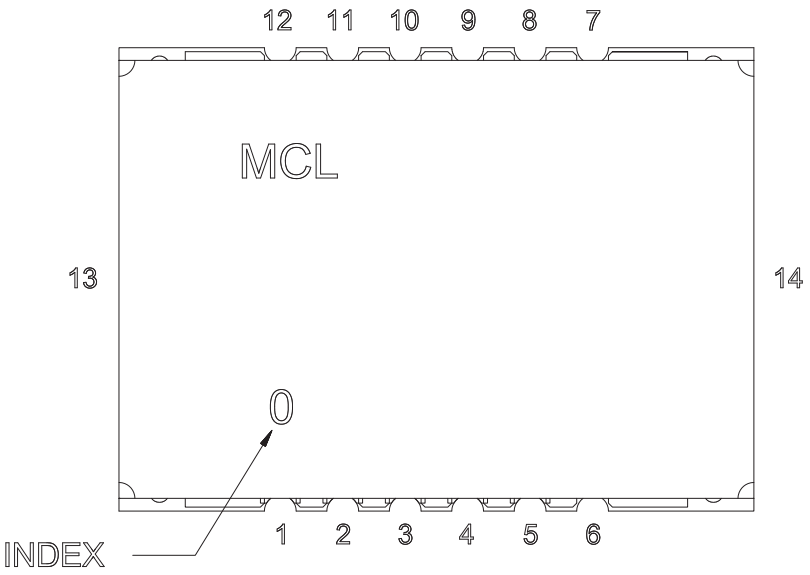
Pin Configuration

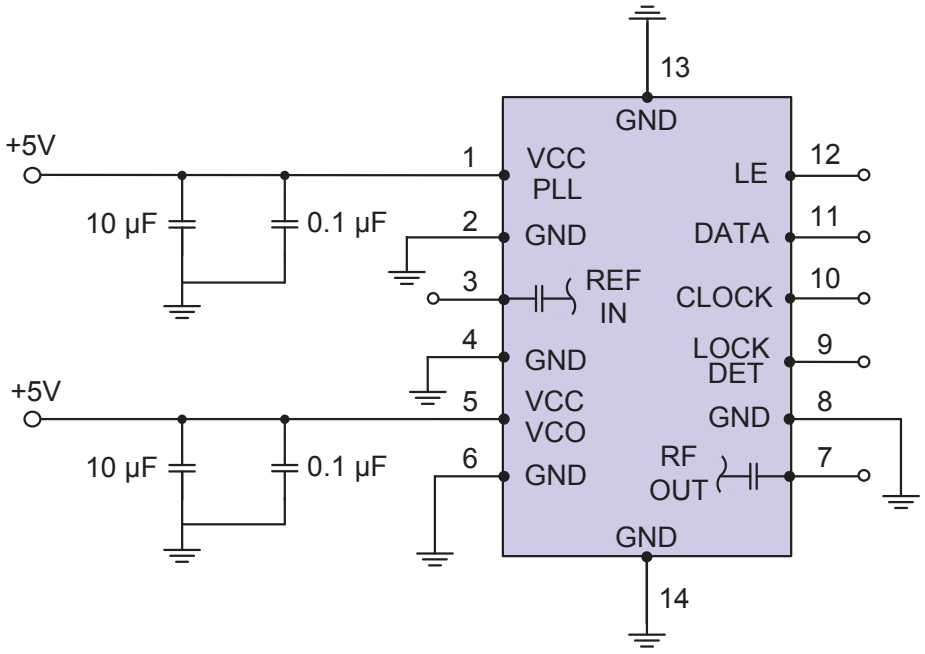


Pin Connection

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

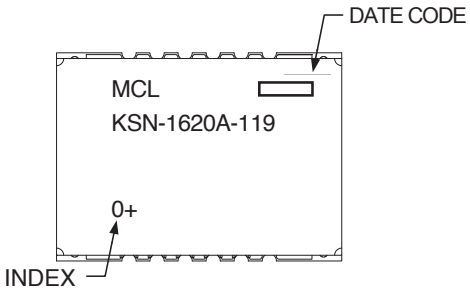
Recommended Application Circuit

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



Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document 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' 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+

Environment Ratings: ENV03T2

Frequency Synthesizer KSN-1620A-119+

Typical Performance Data

FREQ. (MHz)	POWER OUTPUT (dBm)			HARMONICS (dBc)						VCO CURRENT (mA)			PLL CURENT (mA)		
				F2			F3								
	-45ºC	+25ºC	+85ºC	-45ºC	+25ºC	+85ºC	-45ºC	+25ºC	+85ºC	-45ºC	+25ºC	+85ºC	-45ºC	+25ºC	+85ºC
1520.0	2.69	2.75	2.60	-51.36	-54.74	-58.47	-59.35	-61.70	-62.16	24.03	24.99	25.52	6.69	8.22	9.57
1530.0	2.70	2.74	2.60	-52.08	-54.93	-58.57	-60.18	-61.10	-61.92	24.03	24.98	25.52	6.73	8.25	9.61
1540.0	2.67	2.72	2.58	-50.64	-54.22	-57.91	-60.21	-60.15	-60.83	24.02	24.97	25.51	6.72	8.24	9.61
1550.0	2.63	2.66	2.54	-49.97	-53.18	-56.55	-59.39	-59.67	-59.74	24.02	24.98	25.52	6.72	8.25	9.62
1560.0	2.57	2.62	2.51	-50.43	-52.97	-56.44	-57.33	-58.78	-58.97	24.02	24.98	25.53	6.74	8.26	9.62
1570.0	2.53	2.60	2.48	-51.48	-54.03	-57.15	-56.41	-57.27	-58.41	24.02	25.00	25.55	6.74	8.27	9.63
1580.0	2.50	2.59	2.48	-52.78	-55.16	-58.80	-55.99	-56.96	-58.58	24.03	25.00	25.56	6.75	8.27	9.64
1590.0	2.53	2.60	2.49	-52.92	-56.05	-59.30	-56.14	-56.94	-58.33	24.02	25.01	25.57	6.74	8.28	9.65
1600.0	2.55	2.60	2.50	-52.50	-54.49	-58.07	-55.87	-55.81	-57.45	24.00	25.00	25.56	6.74	8.29	9.66
1610.0	2.55	2.59	2.49	-50.77	-53.11	-56.40	-54.63	-55.08	-56.25	23.99	24.99	25.56	6.76	8.30	9.67
1620.0	2.52	2.56	2.48	-50.31	-51.96	-55.08	-54.05	-54.82	-55.57	23.97	24.98	25.55	6.76	8.29	9.66

FREQ. (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS														
	-45ºC					+25ºC					+85ºC				
	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz
1520.0	-78.03	-76.19	-94.64	-126.04	-147.85	-80.50	-77.32	-95.67	-125.47	-146.64	-79.20	-76.61	-94.12	-123.41	-145.70
1530.0	-76.74	-77.12	-94.76	-123.45	-147.94	-79.02	-77.02	-95.52	-123.39	-146.77	-79.06	-76.47	-93.63	-123.26	-145.58
1540.0	-77.91	-76.11	-94.70	-125.54	-147.89	-79.26	-77.38	-95.37	-126.45	-146.76	-79.09	-76.89	-93.29	-122.69	-145.48
1550.0	-78.14	-75.64	-94.34	-126.69	-147.94	-80.30	-78.02	-94.47	-125.76	-146.86	-80.42	-77.16	-92.49	-121.58	-145.62
1560.0	-76.97	-76.00	-93.54	-126.45	-148.14	-80.60	-78.31	-93.99	-124.93	-146.92	-80.23	-76.94	-92.20	-121.49	-145.73
1570.0	-77.11	-76.39	-92.85	-125.34	-148.22	-79.76	-78.08	-94.13	-123.87	-146.96	-79.04	-76.39	-92.24	-122.09	-145.84
1580.0	-77.82	-76.78	-92.21	-123.86	-148.26	-80.28	-78.37	-94.44	-123.36	-146.98	-78.63	-76.34	-92.83	-122.29	-145.87
1590.0	-77.71	-77.84	-92.61	-123.90	-147.97	-81.11	-78.65	-94.73	-123.20	-146.99	-78.15	-76.43	-93.03	-122.48	-145.85
1600.0	-77.56	-78.22	-92.82	-123.36	-147.75	-80.74	-77.26	-94.41	-124.50	-146.87	-77.58	-76.73	-92.63	-122.65	-145.75
1610.0	-77.35	-77.01	-92.60	-121.49	-147.69	-80.59	-77.05	-94.23	-125.20	-146.76	-77.22	-76.41	-92.69	-121.26	-145.57
1620.0	-78.52	-76.37	-92.51	-125.12	-147.47	-80.73	-78.29	-94.22	-125.16	-146.66	-79.03	-75.83	-92.53	-118.96	-145.32

Frequency Synthesizer KSN-1620A-119+

Typical Performance Data

COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 1520MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @Fcarrier 1570MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @Fcarrier 1620MHz± (n*Fcomparison) (dBc) NOTE 1		
n	-45ºC	+25ºC	+85ºC	-45ºC	+25ºC	+85ºC	-45ºC	+25ºC	+85ºC
-5	-109.12	-104.61	-100.63	-109.58	-109.16	-103.40	-112.06	-102.21	-100.91
-4	-105.57	-103.23	-100.21	-106.14	-107.23	-101.05	-107.11	-98.56	-100.03
-3	-98.65	-99.96	-96.79	-102.93	-102.20	-100.62	-102.95	-97.92	-95.05
-2	-93.58	-93.30	-90.71	-93.86	-94.46	-94.93	-95.22	-93.28	-90.05
-1	-88.33	-85.93	-82.64	-82.34	-83.21	-83.73	-85.51	-84.99	-82.04
0 note 2	-	-	-	-	-	-	-	-	-
+1	-85.20	-84.74	-76.95	-84.83	-85.29	-83.92	-88.49	-86.07	-83.59
+2	-97.88	-92.88	-90.47	-97.11	-93.79	-93.47	-97.19	-93.93	-92.88
+3	-101.43	-99.84	-96.59	-103.24	-104.03	-97.77	-104.21	-95.84	-97.43
+4	-103.66	-102.12	-99.49	-107.86	-108.83	-101.38	-108.29	-97.54	-102.10
+5	-107.90	-104.40	-104.50	-108.27	-107.28	-103.38	-109.72	-101.01	-103.04

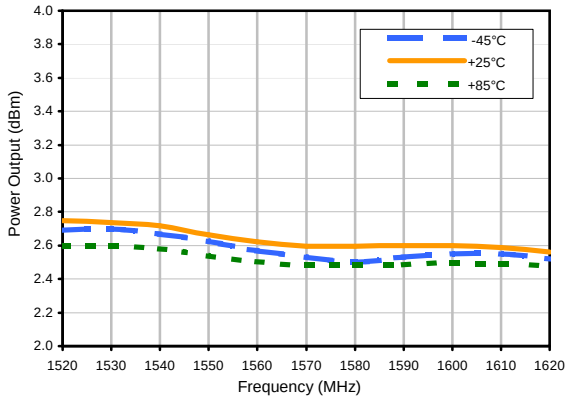
Note 1: Comparison frequency 100 kHz
Note 2: All spurs are referenced to carrier signal (n=0).

REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @Fcarrier 1520MHz± (n*Freference) (dBc) NOTE 3			REFERENCE SPURIOUS @Fcarrier 1570MHz± (n*Freference) (dBc) NOTE 3			REFERENCE SPURIOUS @Fcarrier 1620MHz± (n*Freference) (dBc) NOTE 3		
n	-45ºC	+25ºC	+85ºC	-45ºC	+25ºC	+85ºC	-45ºC	+25ºC	+85ºC
-5	-130.36	-125.28	-120.00	-128.52	-125.03	-128.55	-122.80	-124.03	-126.57
-4	-111.43	-116.93	-115.26	-117.06	-120.35	-117.39	-119.82	-120.60	-114.22
-3	-120.91	-116.05	-116.45	-113.32	-119.09	-117.76	-118.54	-119.19	-128.61
-2	-108.46	-113.26	-113.68	-114.22	-116.75	-114.50	-114.75	-116.74	-113.44
-1	-112.80	-101.57	-107.16	-109.22	-101.82	-111.06	-101.31	-103.12	-105.01
0 note 4	-	-	-	-	-	-	-	-	-
+1	-103.76	-104.82	-103.40	-101.71	-105.64	-106.67	-100.75	-104.56	-104.85
+2	-111.37	-112.44	-118.24	-119.08	-116.97	-121.23	-116.47	-118.60	-114.95
+3	-117.06	-116.09	-120.57	-113.86	-114.75	-114.57	-114.43	-114.43	-115.68
+4	-114.20	-115.92	-116.05	-123.33	-121.96	-122.09	-121.25	-120.13	-116.58
+5	-113.50	-116.90	-118.63	-116.36	-106.83	-118.19	-117.09	-118.17	-118.85

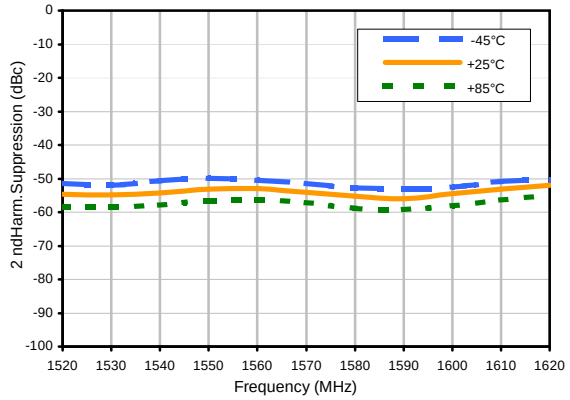
Note 3: Reference frequency 10 MHz
Note 4: All spurs are referenced to carrier signal (n=0).

Typical Performance Data

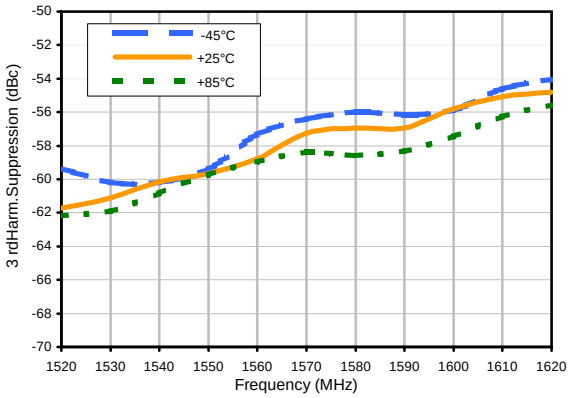
Power Output Vs Frequency



2nd Harmonics Vs Frequency

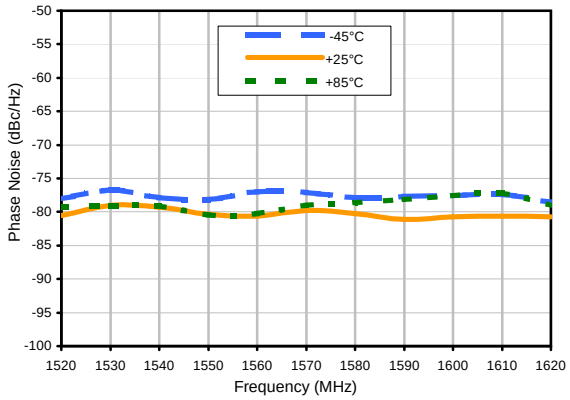


3rd Harmonics Vs Frequency

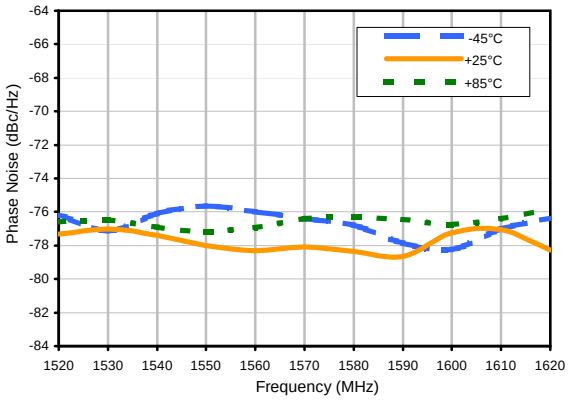


Typical Performance Data

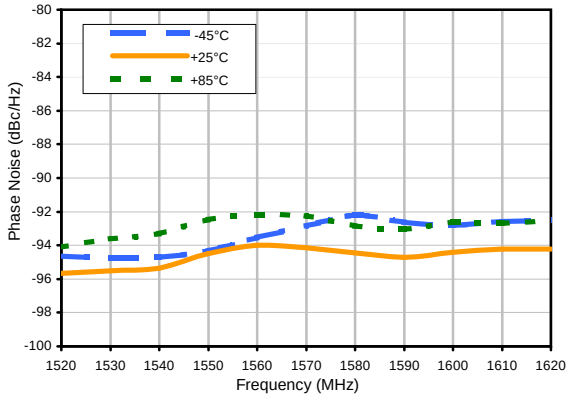
Phase Noise @ 100 Hz offset



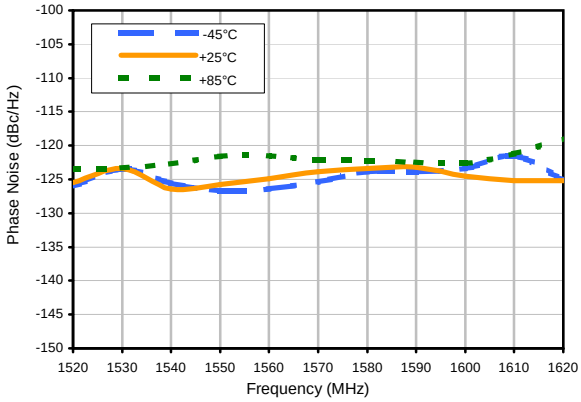
Phase Noise @ 1 kHz offset



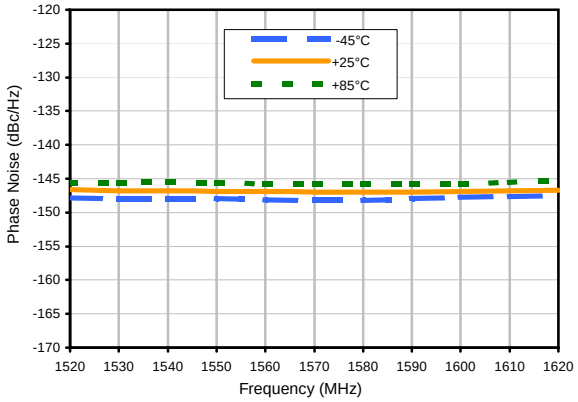
Phase Noise @ 10 kHz offset



Phase Noise @ 100 kHz offset

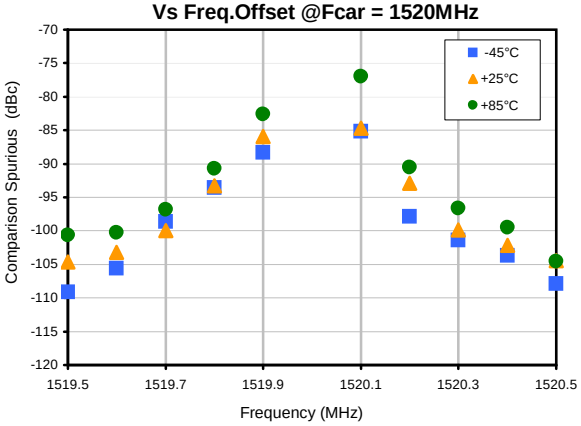


Phase Noise @ 1 MHz offset

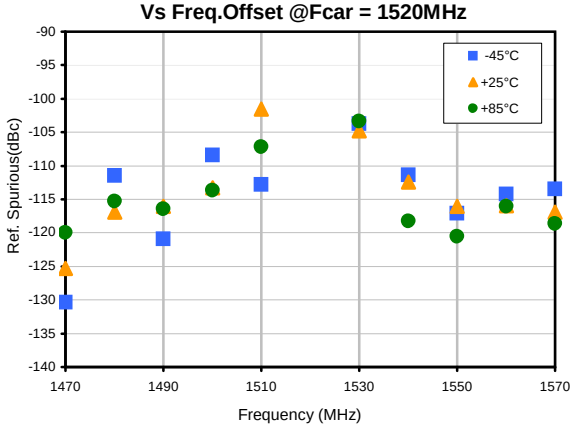


Typical Performance Data

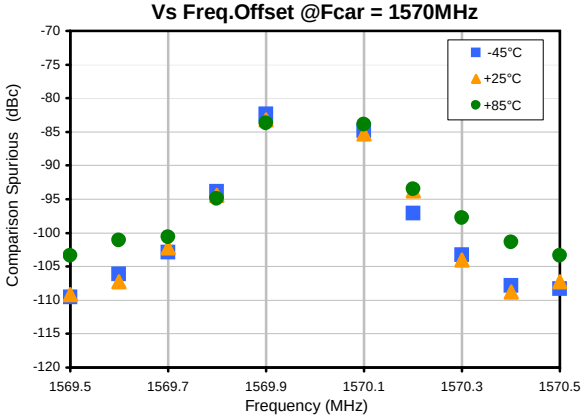
Comparison Spurious
Vs Freq.Offset @Fcar = 1520MHz



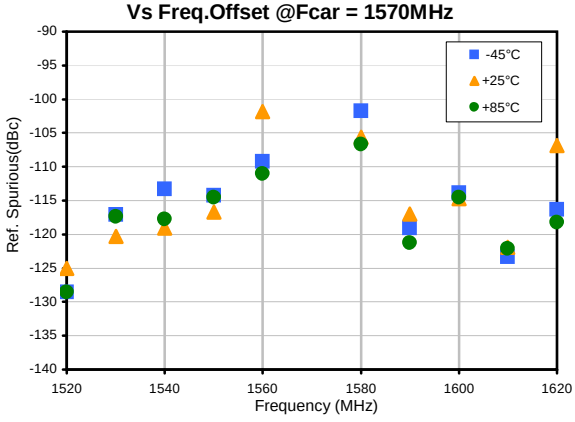
Reference Spurious
Vs Freq.Offset @Fcar = 1520MHz



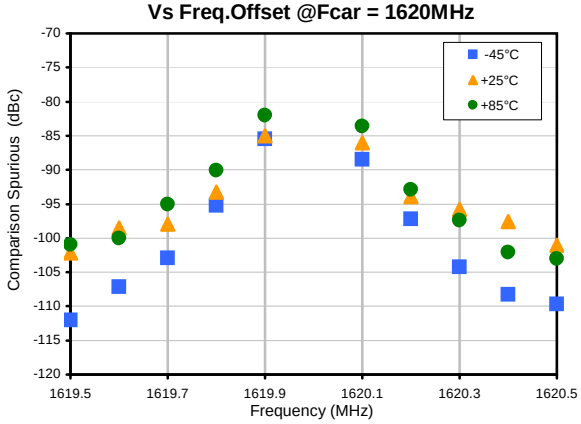
Comparison Spurious
Vs Freq.Offset @Fcar = 1570MHz



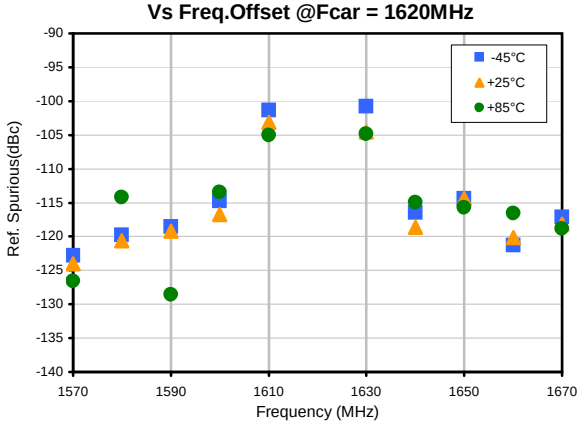
Reference Spurious
Vs Freq.Offset @Fcar = 1570MHz



Comparison Spurious
Vs Freq.Offset @Fcar = 1620MHz



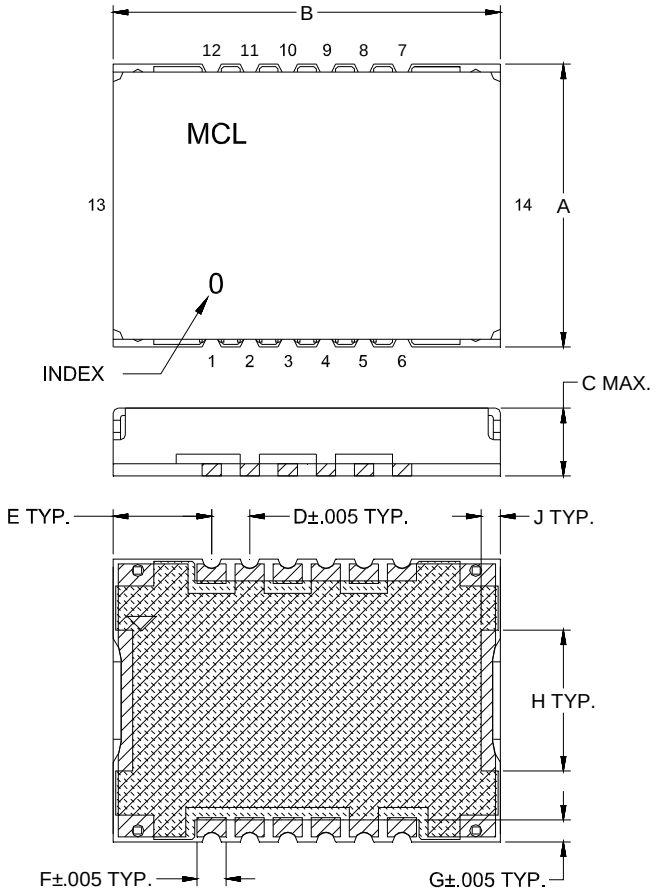
Reference Spurious
Vs Freq.Offset @Fcar = 1620MHz



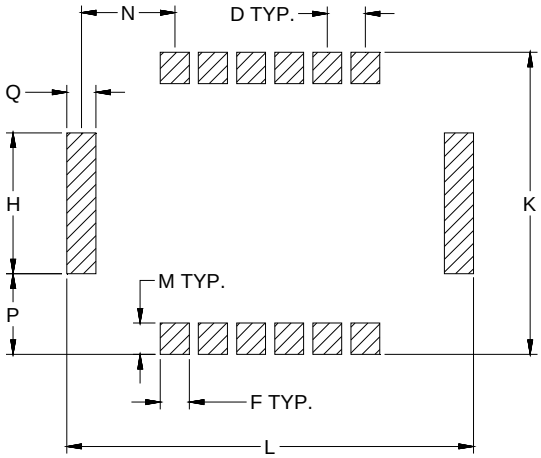
Case Style DK

DK1042

Outline Dimensions



Suggested PCB Land Pattern



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	WT. GRAM
DK1042	.584 (14.83)	.800 (20.32)	.154 (3.91)	.079 (2.01)	.203 (5.16)	.060 (1.52)	.045 (1.14)	.291 (7.39)	.039 (1.0)	.624 (15.85)	.840 (21.34)	.065 (1.65)	.193 (4.90)	.170 (4.32)	.060 (1.52)	1.6

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:

   For RoHS Case Styles: 2-5 µ inch (.05-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.

Mini-Circuits®
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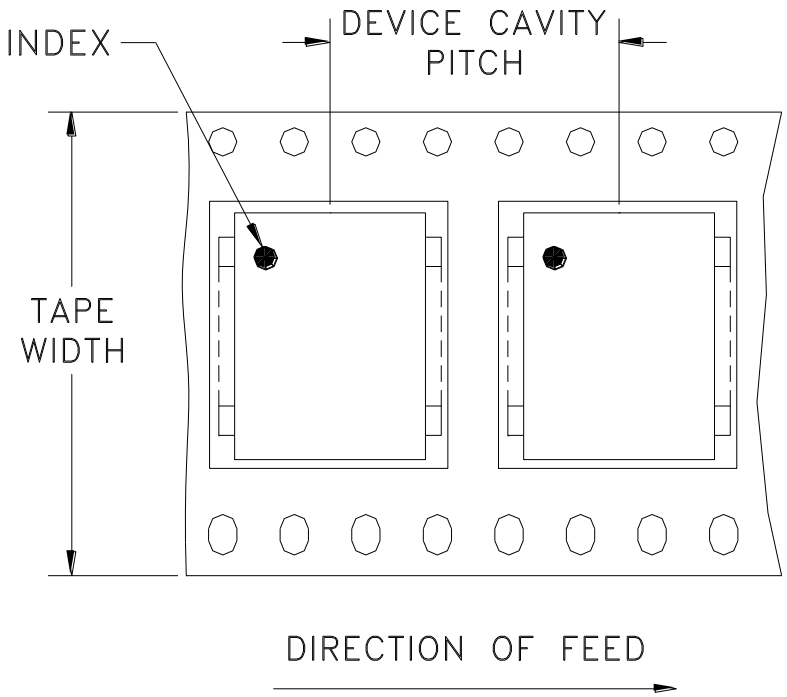
Mini-Circuits ISO 9001 & ISO 14001 Certified

Tape & Reel Packaging TR-F28

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
32	20	13	Small quantity standards (see note)	20
				50
				100
				200
			Standard	500

Note: Please consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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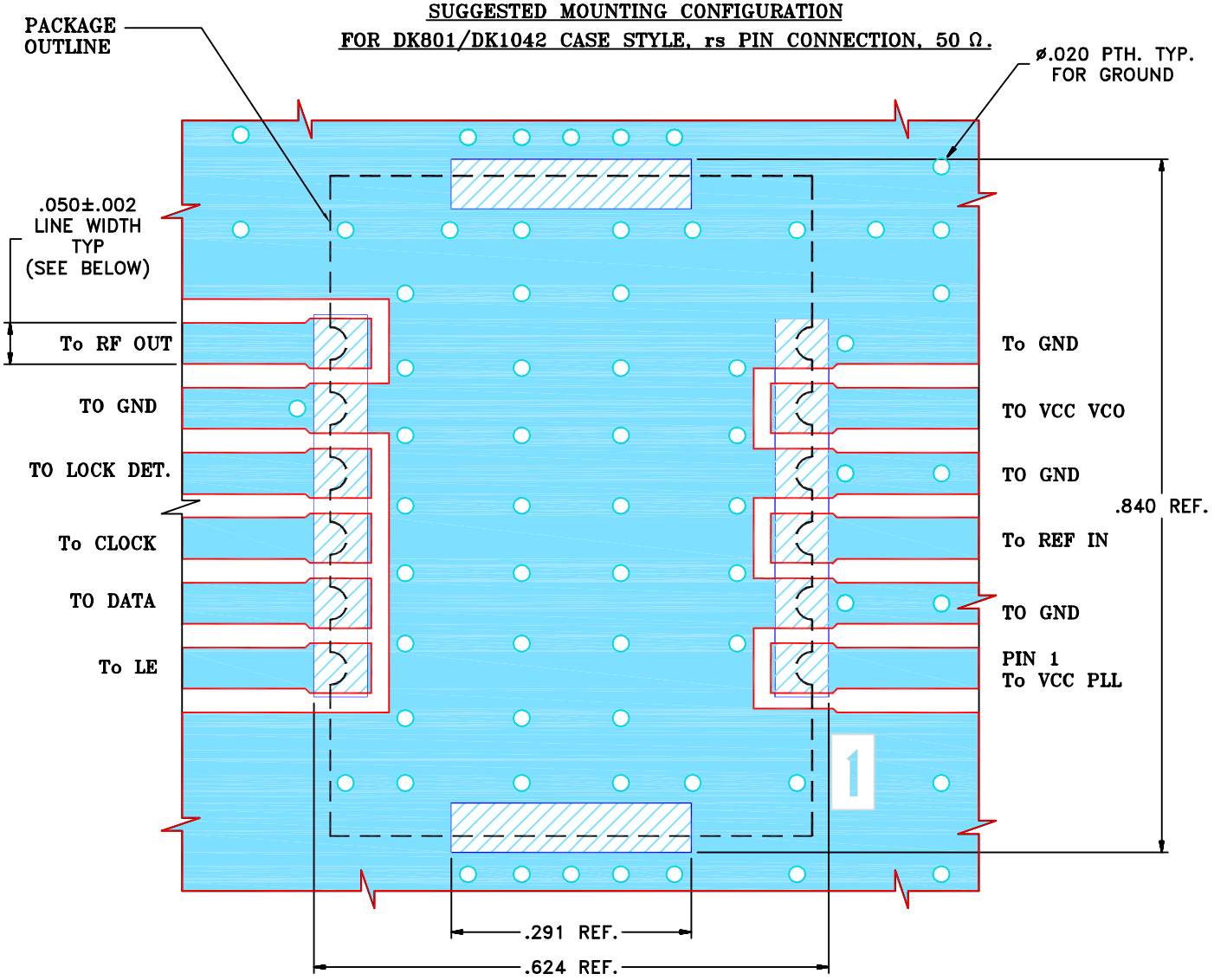
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M108069	NEW RELEASE	11/06	DK	HH
A	M110535	MODIFY GROUND PADS	03/07	DK	HH
B	M126537	DELETE CHIP COMP. & TABLE OF VALUES	03/10	DK	HH
B	R78979	DELETE CHIP COMP. & TABLE OF VALUES	03/10	DK	HH

SUGGESTED MOUNTING CONFIGURATION
FOR DK801/DK1042 CASE STYLE, rs PIN CONNECTION, 50 Ω.



NOTES:

1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS. .025"±.002". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	DK (RAVON)	27 MAR 07
TOLERANCES ON:	CHECKED	RZ (RAVON)	27 MAR 07
2 PL DECIMALS ±	APPROVED	HH (RAVON)	27 MAR 07
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

ASHEETA1.DWG REV:A DATE:01/12/95

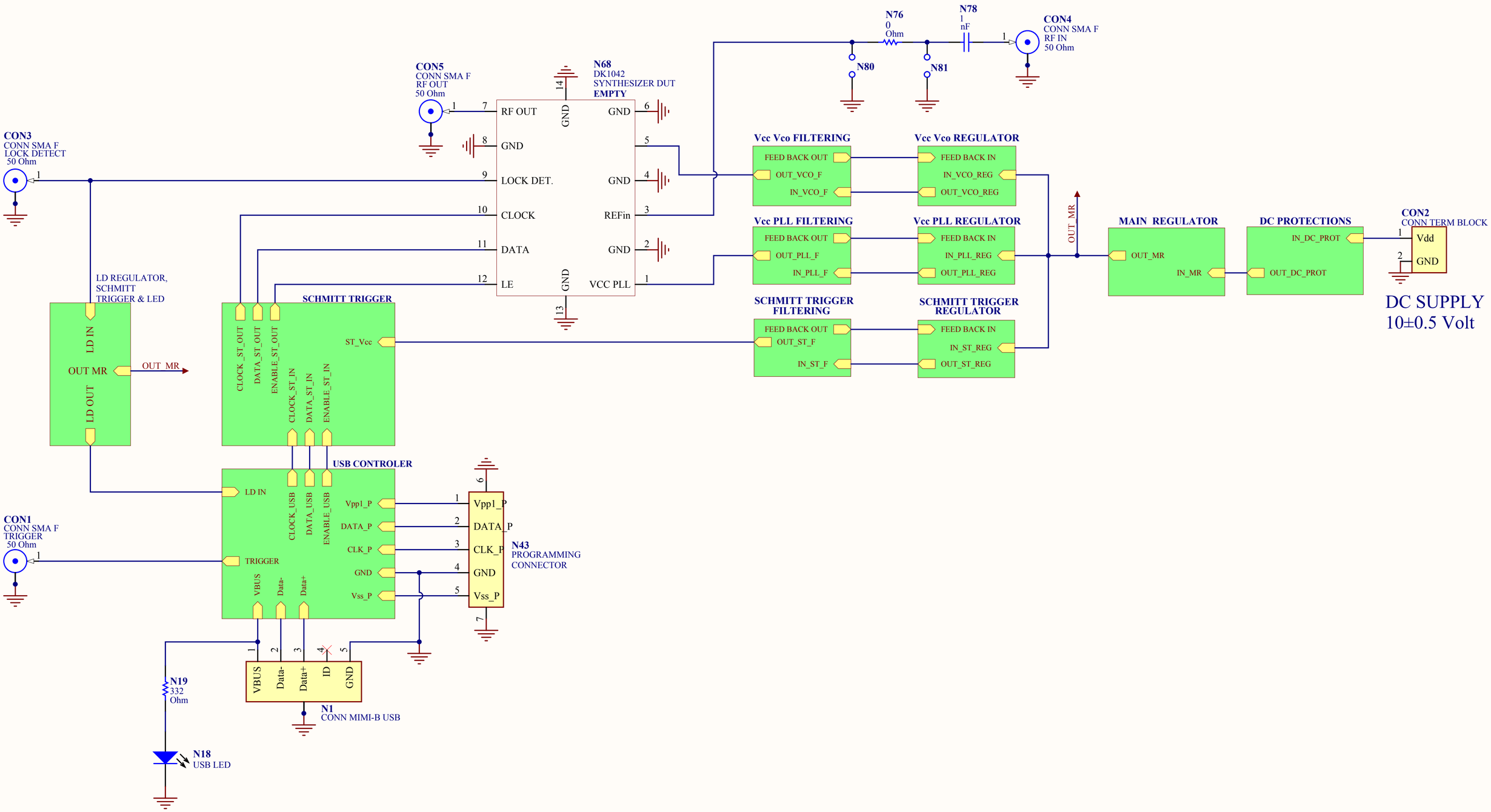
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, rs ,DK801/DK1042, KSN
TB-567+ (50 Ω)

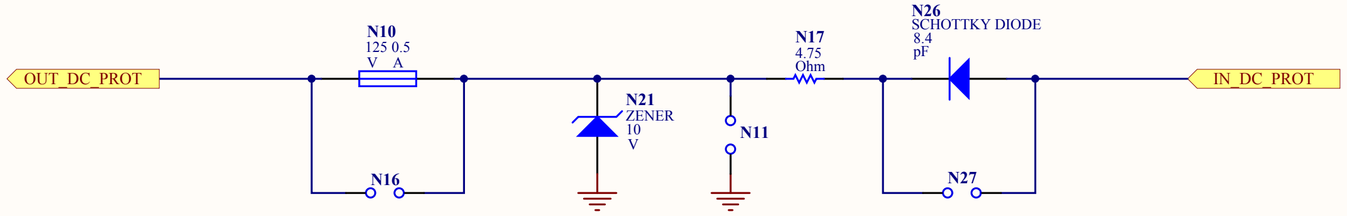
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-249	B

FILE:	SCALE:	SHEET:
98PL249	5:1	1 OF 1

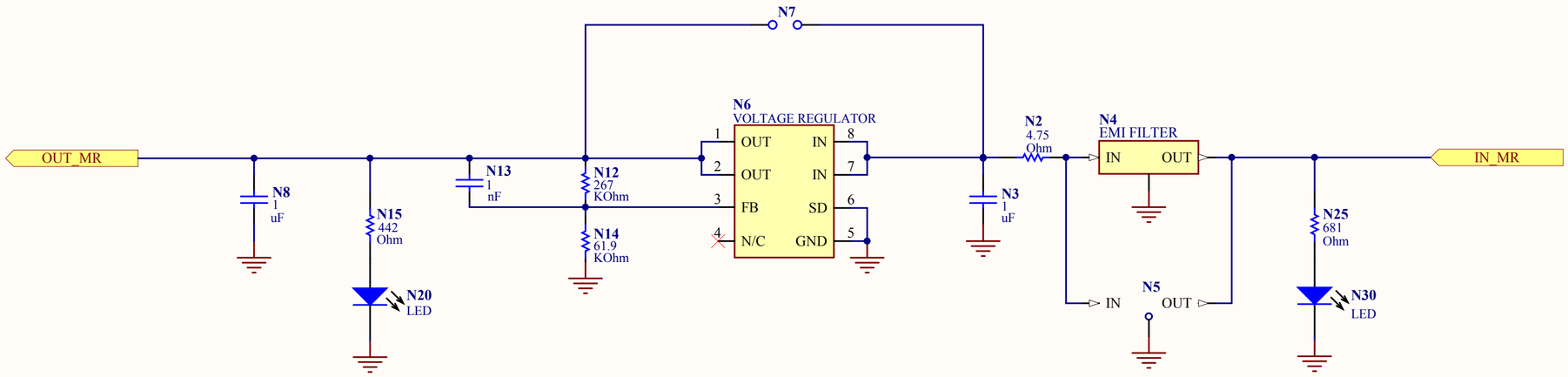
ELECTRICAL SCHEME-GENERAL
(TB for KSN)



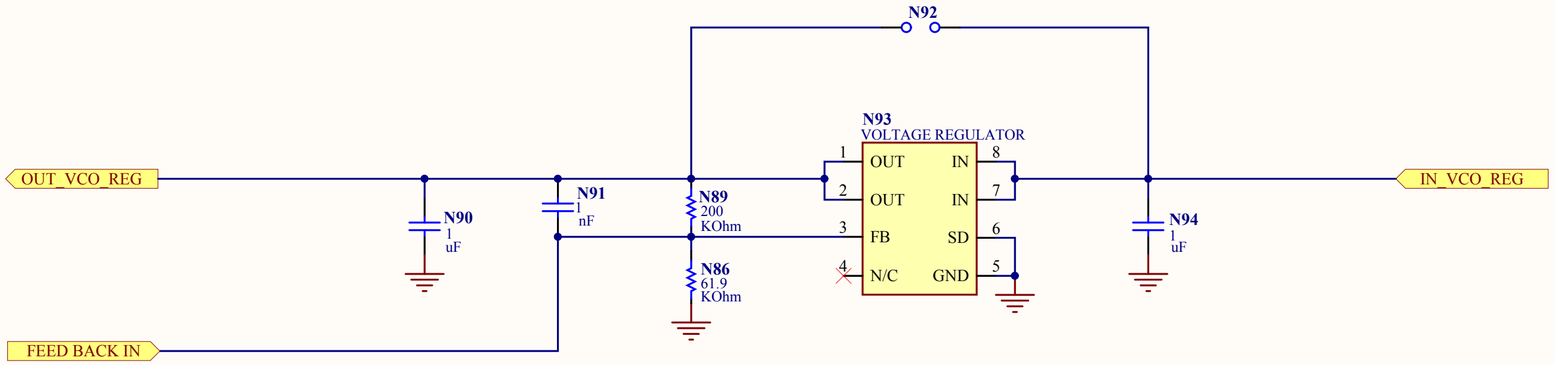
DC PROTECTIONS



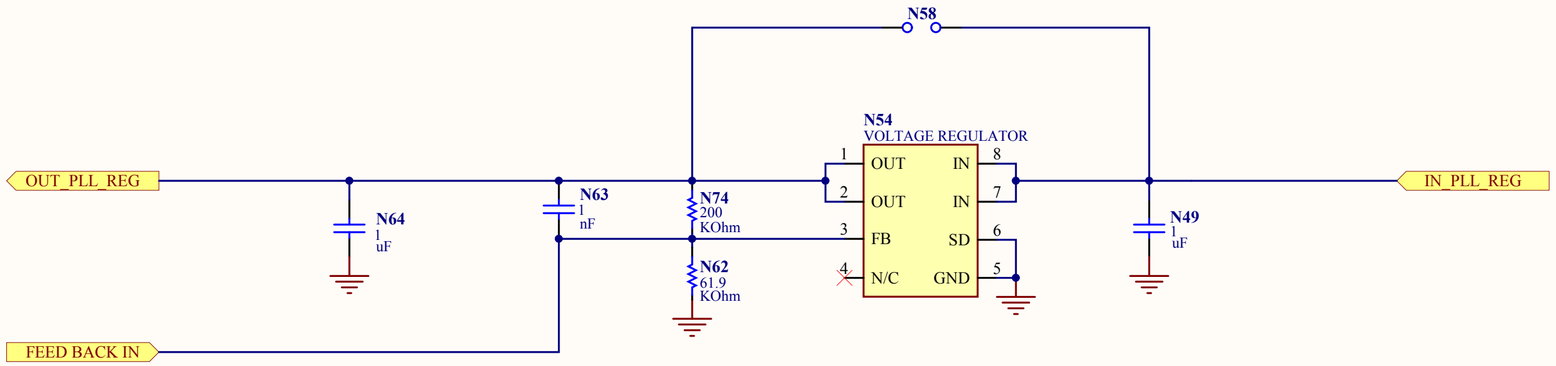
MAIN REGULATOR



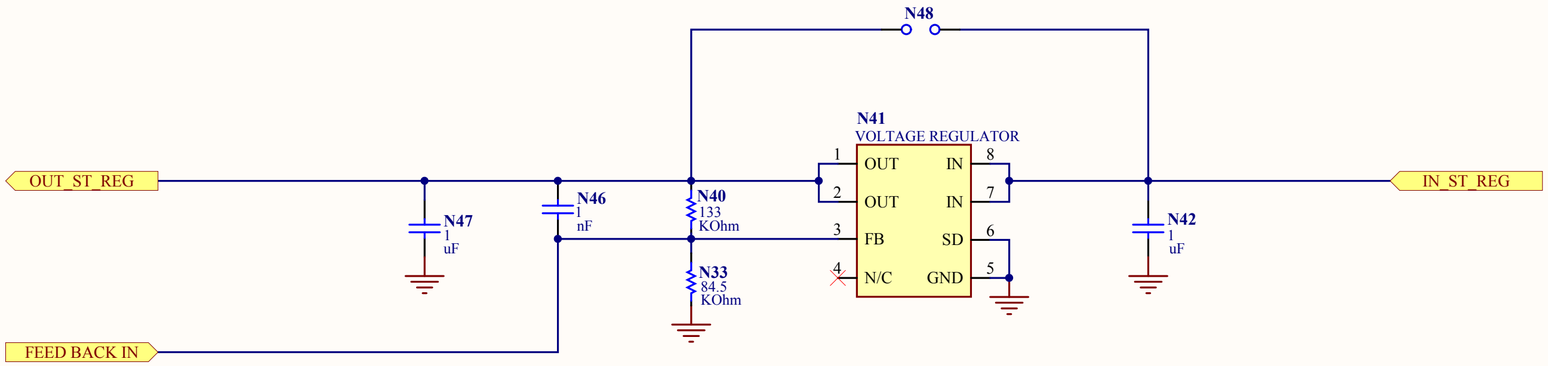
VCC VCO REGULATOR



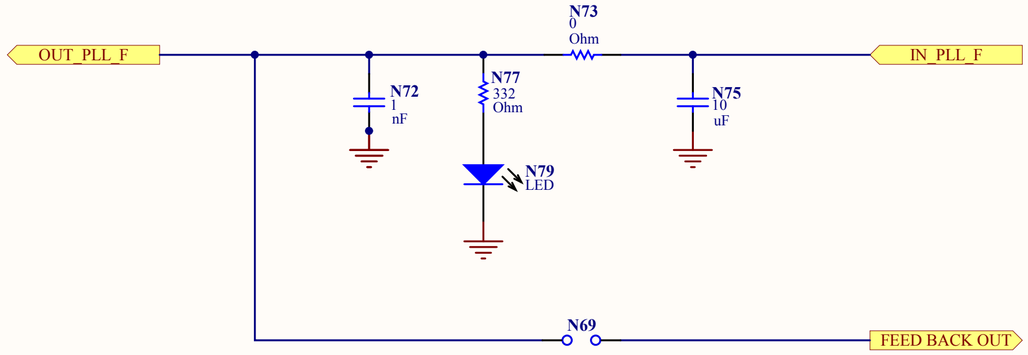
VCC PLL REGULATOR



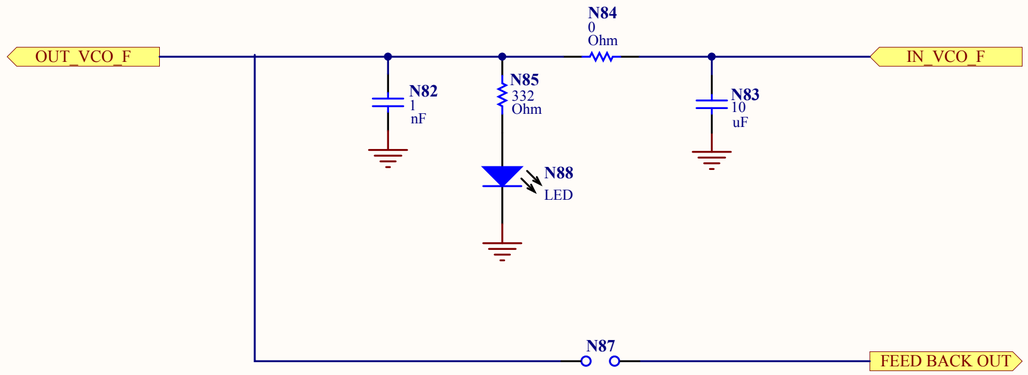
SCHMITT TRIGGER REGULATOR



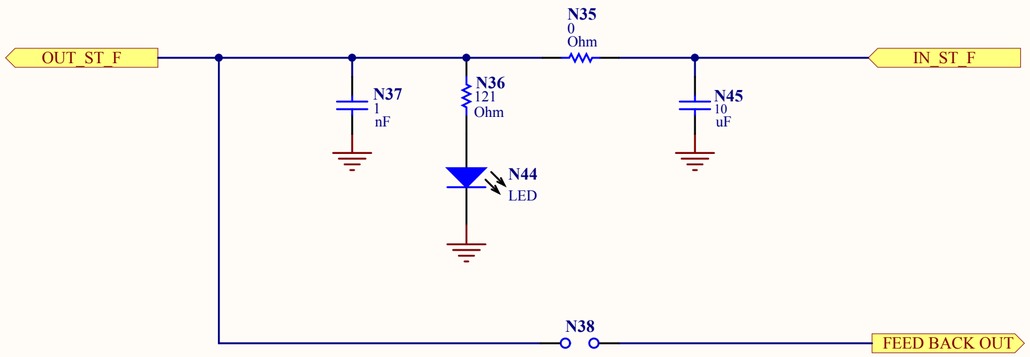
VCC PLL FILTERING



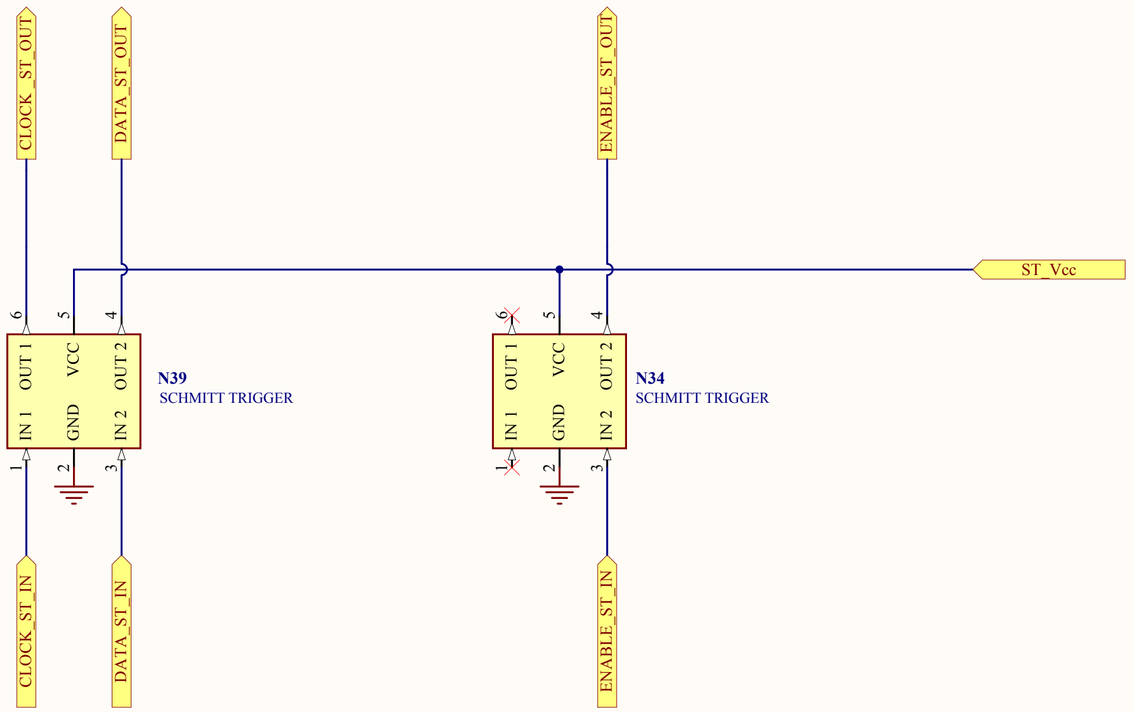
VCC VCO FILTERING



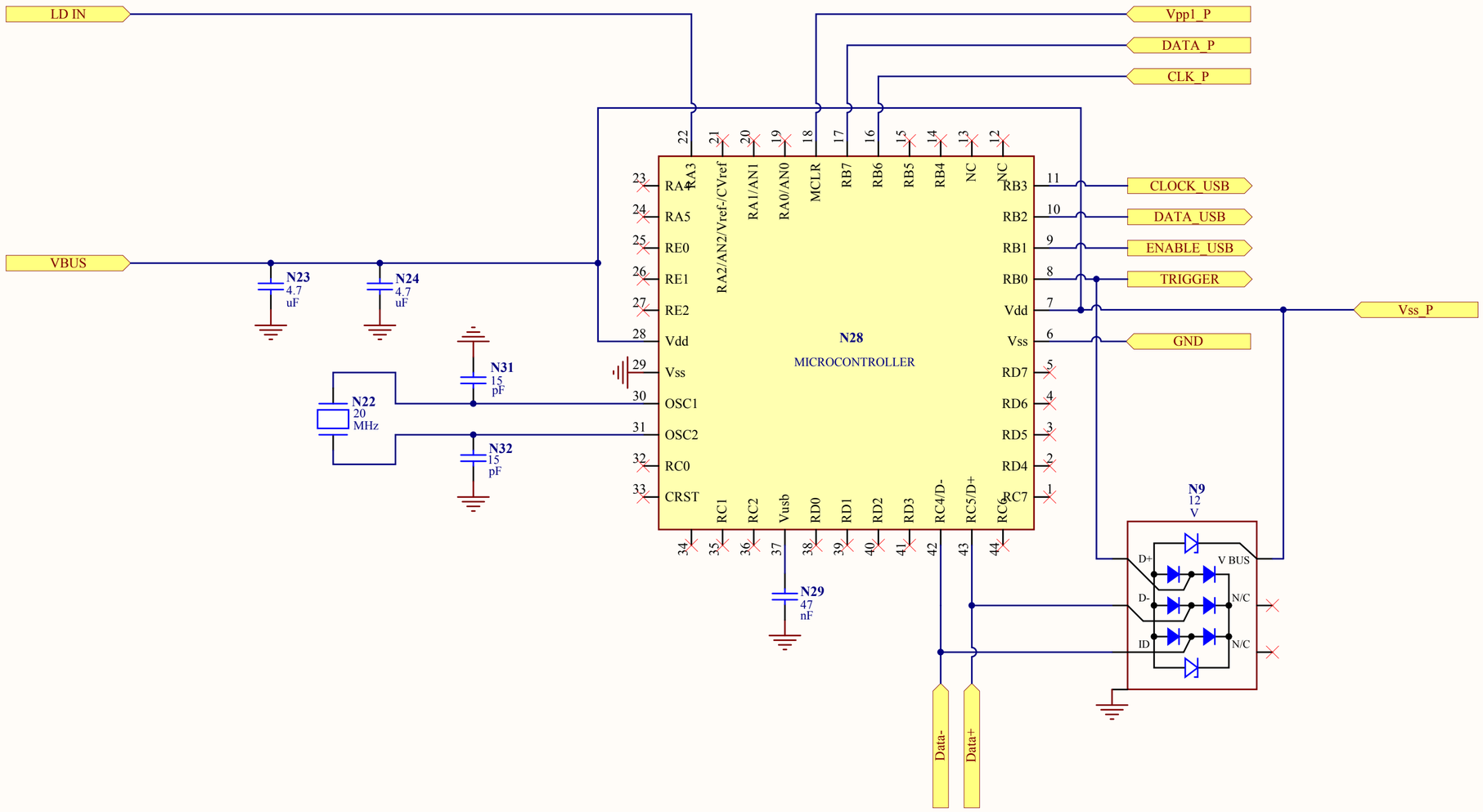
SCHMITT TRIGGER FILTERING



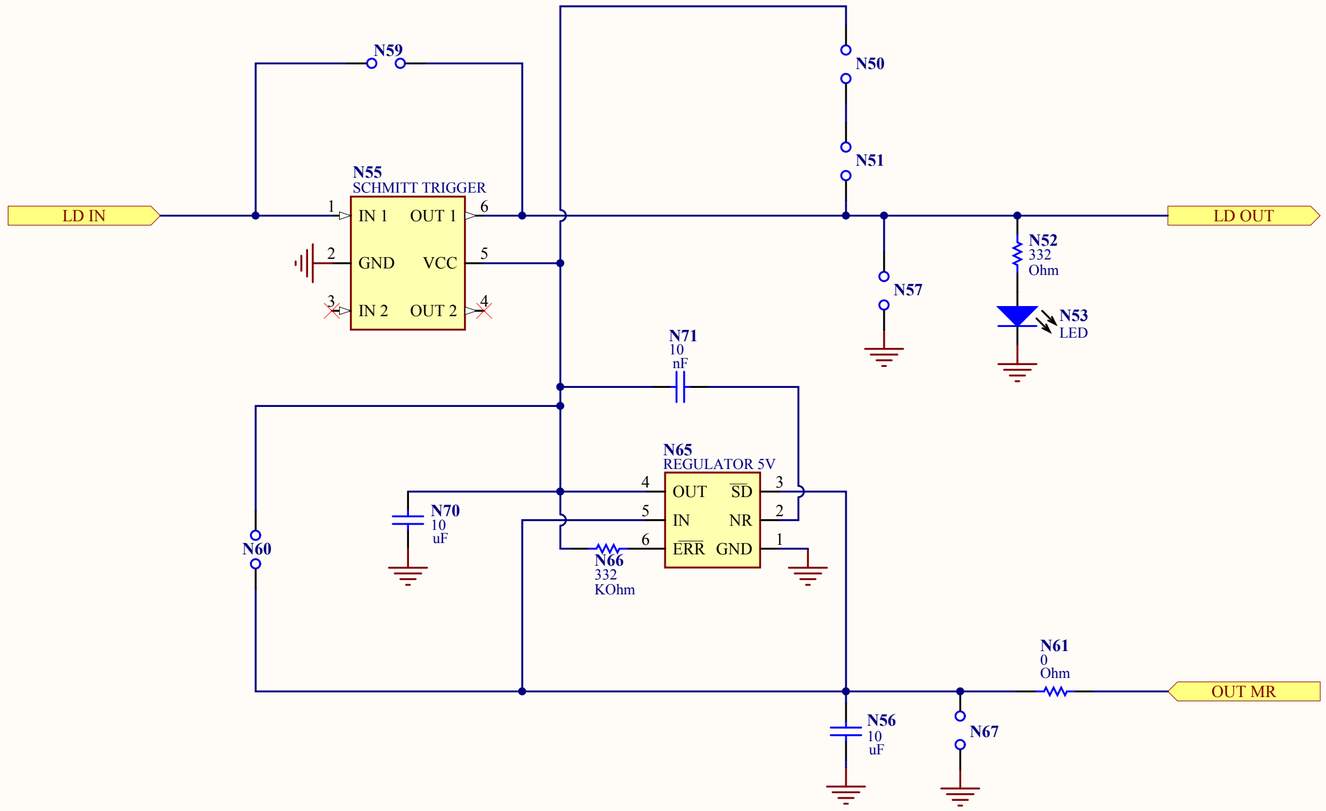
SCHMITT TRIGGER



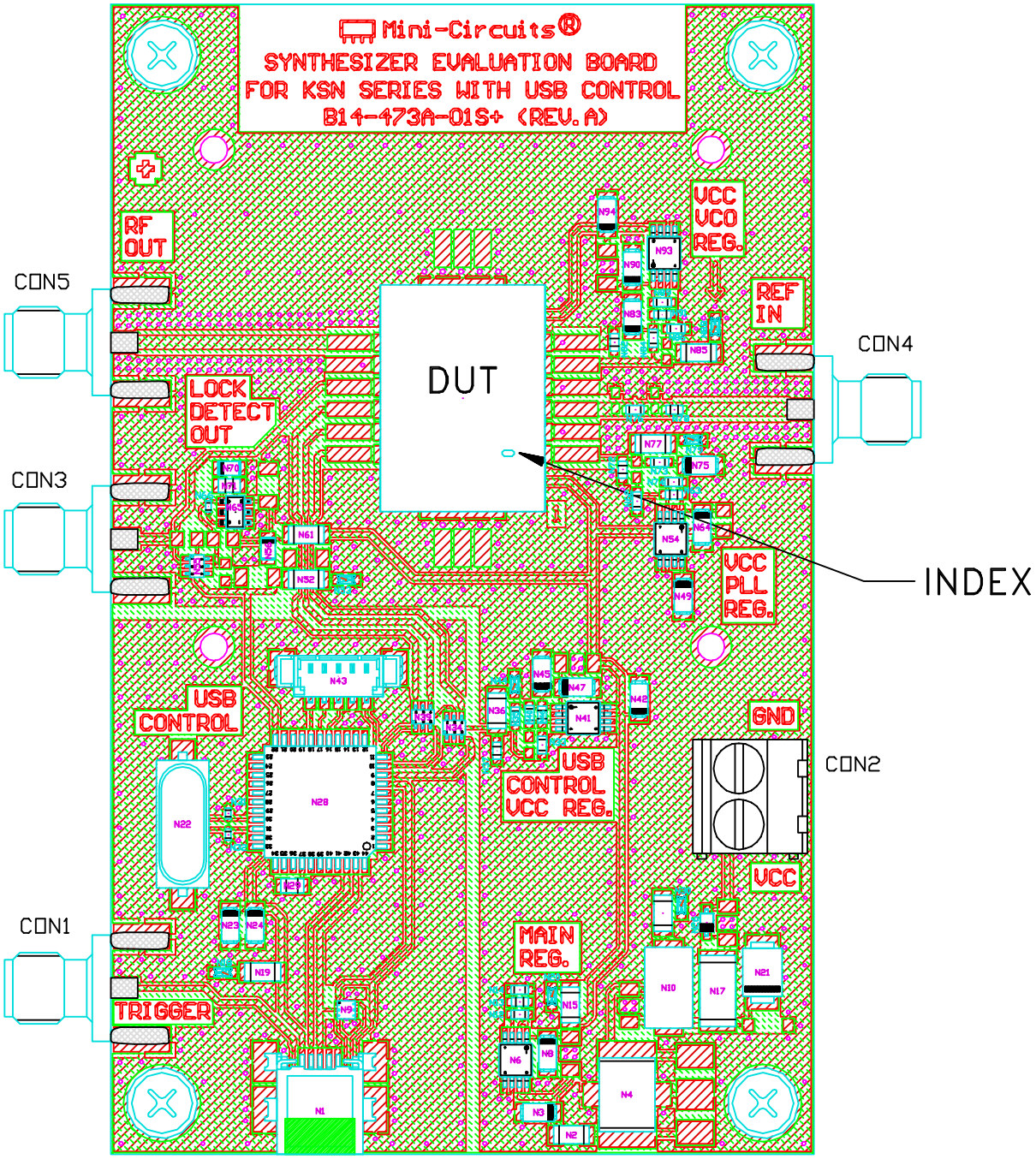
USB CONTROLER



LD REGULATOR SCHMITT TRIGGER AND LED



Evaluation Board and Circuit



TB-567+

NOTES:

1. SMA F JACK CONNECTORS.
2. PCB MATERIAL: FR4 OR EQUIVALENT, DIALECTRIC CONSTANT=4.7, DIALECTRIC THICKNESS=.059 INCH.

Mini-Circuits

Environmental Specifications ENV65T2

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215