

Frequency Synthesizer

KSN-2170A-219+

50Ω 2110 to 2170 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-2170A-219+ is a Frequency Synthesizer, designed to operate from 2110 to 2170 MHz for UMTS application. The KSN-2170A-219+ 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: -101 dBc/Hz typ. @ 10 kHz offset • Comparison Spurious: -89 dBc typ. • Reference Spurious: -97 dBc typ.	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of KSN-2170A-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.
Small size, 0.80" x 0.58" x 0.15"	The small size enables the KSN-2170A-219+ to be used in compact designs.

Notes

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www.minicircuits.com P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

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: DK801

+RoHS Compliant

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

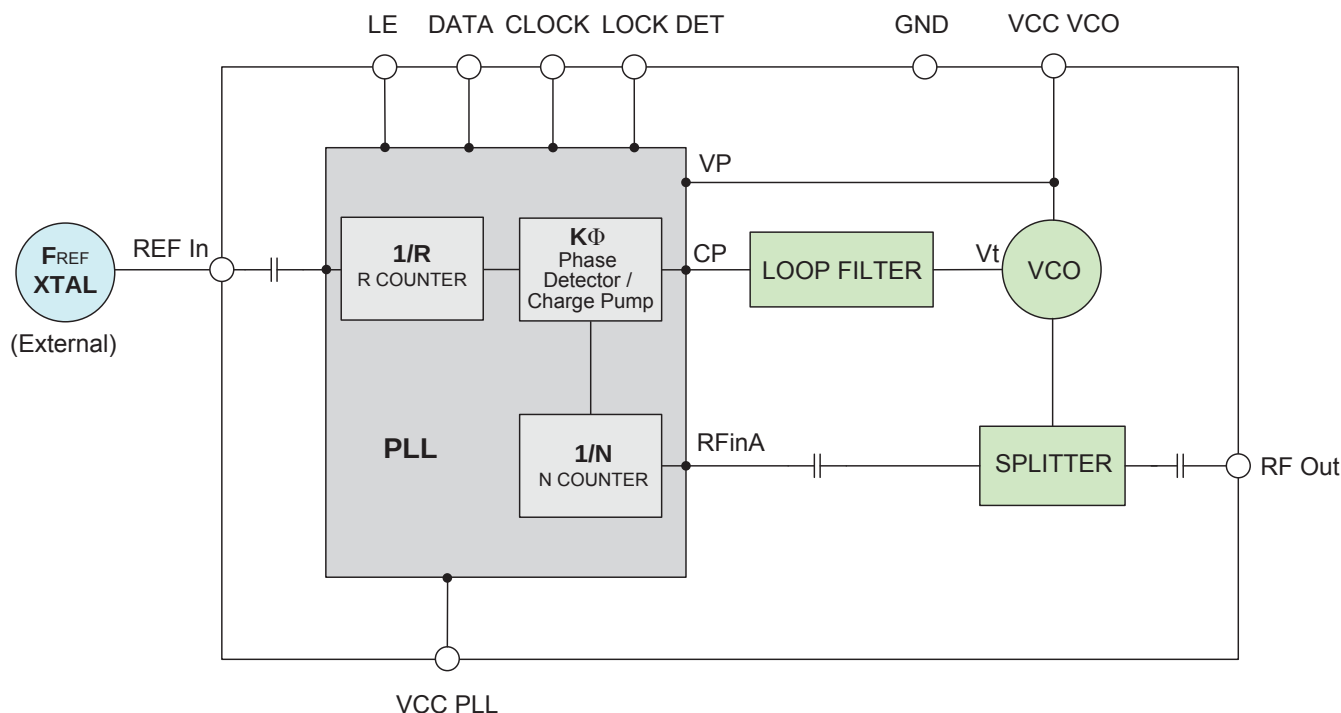
Applications

- UMTS

General Description

The KSN-2170A-219+ is a Frequency Synthesizer, designed to operate from 2110 to 2170 MHz for UMTS application. The KSN-2170A-219+ 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-2170A-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.

Simplified Schematic



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Electrical Specifications (over operating temperature -35°C to +85°C)

Parameters		Test Conditions	Min.	Typ.	Max.	Units
Frequency Range		-	2110	-	2170	MHz
Step Size		-	-	40	-	kHz
Settling Time		Within ± 1 kHz	-	8	-	mSec
Output Power		-	0	+2.5	+5.0	dBm
SSB Phase Noise	@ 100 Hz offset	-	-	-68	-	dBc/Hz
	@ 1 kHz offset	-	-	-73	-68	
	@ 10 kHz offset	-	-	-101	-96	
	@ 100 kHz offset	-	-	-125	-121	
	@ 1 MHz offset	-	-	-145	-140	
Reference Spurious Suppression		Ref. Freq. 15.84 MHz	-	-97	-73	dBc
Comparison Spurious Suppression		Step Size 40 kHz	-	-89	-60	
Non - Harmonic Spurious Suppression		-	-	-90	-	
Harmonic Suppression		-	-	-39	-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		-	-	27	35	mA
PLL Supply Current		-	-	23	30	
Reference Input (External)	Frequency	15.84 (square wave)	-	15.84	-	MHz
	Amplitude	1	-	1	-	V _{P-P}
	Input impedance	-	-	100	-	K Ω
	Phase Noise @ 1 kHz offset	-	-	-135	-	dBc/Hz
RF Output port Impedance		-	-	50	-	Ω
Input Logic Level	Input high voltage	-	2.85	-	-	V
	Input low voltage	-	-	-	0.60	V
Digital Lock Detect	Locked	-	2.80	-	3.55	V
	Unlocked	-	-	-	0.60	V
Frequency Synthesizer PLL		-	ADF4106			
PLL Programming		-	3-wire serial 3.3V CMOS			
Register Map @ 2170 MHz	F_Register	-	(MSB) 100111111000000010010011 (LSB)			
	N_Register	-	(MSB) 000001101001111100101001 (LSB)			
	R_Register	-	(MSB) 000100000000011000110000 (LSB)			

Absolute Maximum Ratings

Parameters	Ratings
VCO Supply Voltage	5.8V
PLL Supply Voltage	5.3V
VCO Supply Voltage to PLL Supply Voltage	-0.3V to +5.8V
Reference Frequency Voltage	-0.3Vmin, +3.5Vmax
Data, Clock, LE Levels	-0.3Vmin, +3.5Vmax
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			VCO CURRENT			PLL CURENT		
	(dBm)			(mA)			(mA)		
	-40°C	+25°C	+85°C	-40°C	+25°C	+85°C	-40°C	+25°C	+85°C
2110	2.72	2.58	2.17	26.19	27.48	28.41	22.26	23.67	24.96
2120	2.71	2.57	2.15	26.13	27.43	28.37	22.27	23.68	24.97
2130	2.71	2.56	2.13	26.07	27.38	28.34	22.27	23.68	24.98
2140	2.74	2.58	2.14	26.00	27.32	28.30	22.27	23.69	24.99
2150	2.81	2.65	2.19	25.95	27.27	28.26	22.28	23.69	24.99
2160	2.80	2.65	2.17	25.90	27.23	28.23	22.28	23.69	24.99
2170	2.77	2.62	2.14	25.85	27.19	28.20	22.28	23.69	24.99

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-40°C	+25°C	+85°C	-40°C	+25°C	+85°C
2110	-51.50	-57.50	-47.07	-36.71	-38.14	-41.62
2120	-52.99	-56.90	-46.96	-35.59	-35.83	-40.10
2130	-56.20	-52.42	-46.54	-35.22	-36.66	-40.82
2140	-57.82	-51.01	-46.13	-33.11	-35.18	-40.45
2150	-54.57	-51.04	-46.46	-34.61	-37.21	-41.20
2160	-51.21	-53.34	-47.75	-35.01	-38.27	-42.80
2170	-50.26	-57.75	-49.23	-35.73	-39.62	-43.62

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	+25°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
2110	-67.92	-74.99	-101.09	-125.68	-145.94
2120	-67.74	-74.28	-100.93	-125.77	-144.67
2130	-74.87	-74.52	-100.99	-125.58	-145.74
2140	-66.70	-74.87	-101.02	-125.34	-145.56
2150	-63.84	-73.42	-101.05	-125.03	-145.36
2160	-66.49	-72.62	-100.73	-124.82	-145.19
2170	-74.88	-72.69	-100.91	-124.74	-145.34

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	-40°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
2110	-72.41	-73.40	-101.56	-125.69	-146.15
2120	-73.01	-72.94	-101.10	-125.73	-145.78
2130	-70.08	-74.77	-101.07	-125.68	-146.08
2140	-70.54	-73.18	-100.70	-125.38	-145.65
2150	-73.70	-74.35	-100.20	-125.30	-145.55
2160	-72.31	-74.46	-100.32	-125.17	-145.57
2170	-74.00	-72.55	-100.32	-125.11	-145.45

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS				
	+85°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
2110	-73.24	-74.80	-100.85	-125.07	-145.16
2120	-75.15	-75.06	-101.23	-124.76	-144.51
2130	-68.17	-74.38	-100.64	-124.73	-145.07
2140	-73.68	-74.06	-100.26	-124.58	-144.70
2150	-78.09	-73.65	-100.57	-124.36	-144.48
2160	-71.83	-75.71	-100.11	-124.16	-144.44
2170	-71.56	-73.63	-100.52	-124.25	-144.62

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COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 2110MHz+(n*Fcomparison) (dBc) note 1			COMPARISON SPURIOUS @Fcarrier 2140MHz+(n*Fcomparison) (dBc) note 1			COMPARISON SPURIOUS @Fcarrier 2170MHz+(n*Fcomparison) (dBc) note 1		
	n	-40°C	+25°C	+85°C	-40°C	+25°C	+85°C	-40°C	+25°C
-5	-111.98	-101.50	-103.14	-97.21	-105.94	-109.99	-100.07	-103.64	-107.48
-4	-106.91	-103.55	-95.98	-99.54	-95.62	-96.80	-96.65	-100.64	-106.36
-3	-100.88	-99.32	-100.32	-103.95	-98.04	-99.05	-104.64	-106.53	-103.92
-2	-96.99	-97.12	-97.82	-101.63	-94.20	-93.33	-83.24	-80.77	-84.35
-1	-88.45	-88.15	-87.12	-88.56	-87.51	-83.21	-86.89	-89.50	-79.51
0 ^{note 2}	-	-	-	-	-	-	-	-	-
+1	-88.22	-88.52	-81.85	-88.69	-91.24	-83.35	-88.45	-89.87	-79.67
+2	-95.98	-97.24	-95.11	-101.28	-95.56	-92.05	-82.92	-81.24	-82.76
+3	-100.13	-100.51	-101.16	-103.32	-96.42	-98.03	-105.46	-108.91	-104.34
+4	-103.38	-104.65	-93.38	-97.72	-96.62	-92.66	-99.78	-101.33	-108.76
+5	-106.96	-101.36	-100.45	-99.02	-102.54	-106.88	-102.00	-106.01	-108.98

Note 1: Comparison frequency 40 kHz

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

REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @Fcarrier 2110MHz+(n*Freference) (dBc) note 3			REFERENCE SPURIOUS @Fcarrier 2140MHz+(n*Freference) (dBc) note 3			REFERENCE SPURIOUS @Fcarrier 2170MHz+(n*Freference) (dBc) note 3		
	n	-40°C	+25°C	+85°C	-40°C	+25°C	+85°C	-40°C	+25°C
-5	-131.76	-131.25	-127.08	-122.43	-128.52	-130.08	-131.55	-130.47	-128.11
-4	-121.21	-123.09	-121.94	-122.53	-126.14	-122.60	-115.91	-118.75	-118.98
-3	-124.05	-130.61	-130.54	-125.04	-131.11	-130.06	-120.38	-127.63	-129.28
-2	-120.26	-124.00	-120.29	-109.08	-109.99	-114.58	-119.67	-118.00	-121.71
-1	-100.56	-100.51	-98.57	-101.90	-98.21	-92.15	-94.80	-94.82	-115.55
0 ^{note 4}	-	-	-	-	-	-	-	-	-
+1	-93.78	-93.70	-91.93	-92.15	-91.11	-94.45	-110.83	-107.13	-102.39
+2	-117.40	-120.24	-126.62	-119.58	-120.36	-121.21	-112.52	-109.80	-116.98
+3	-112.60	-117.36	-121.38	-114.96	-120.56	-122.73	-116.11	-123.09	-127.14
+4	-112.69	-114.06	-113.70	-112.20	-114.17	-116.34	-116.95	-116.45	-114.78
+5	-120.00	-123.64	-122.75	-115.32	-122.42	-125.39	-126.71	-131.30	-127.36

Note 3: Reference frequency 15.84 MHz

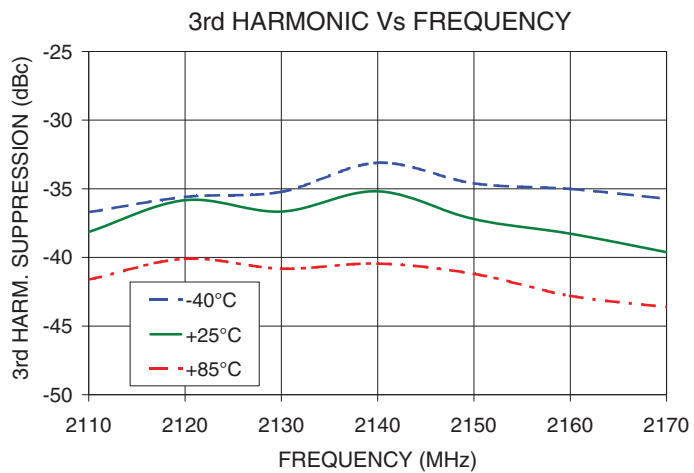
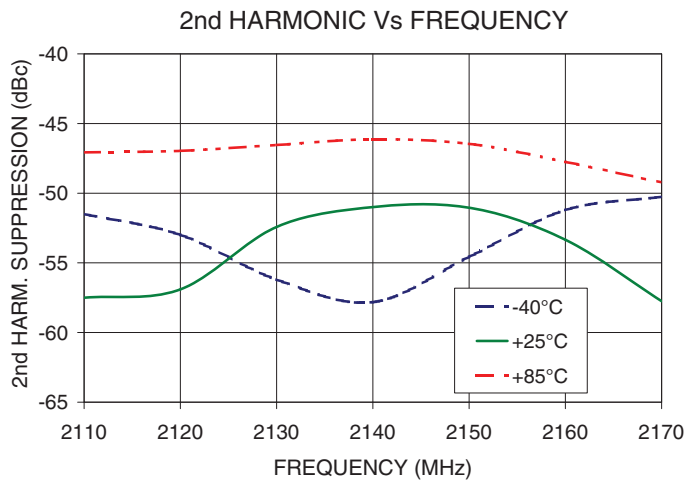
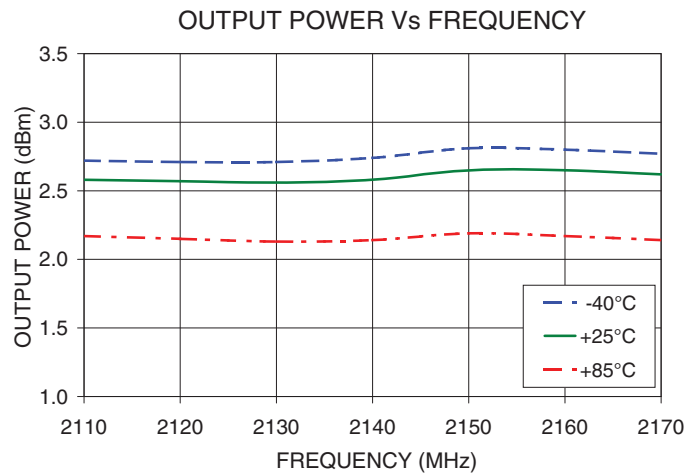
Note 4: All spurs are referenced to carrier signal (n=0).

Notes

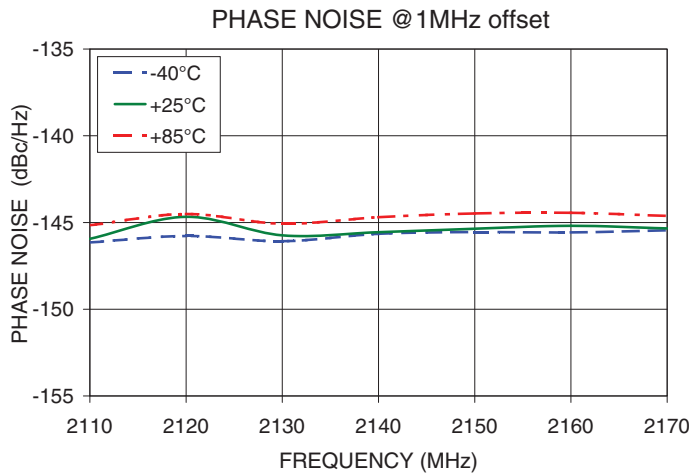
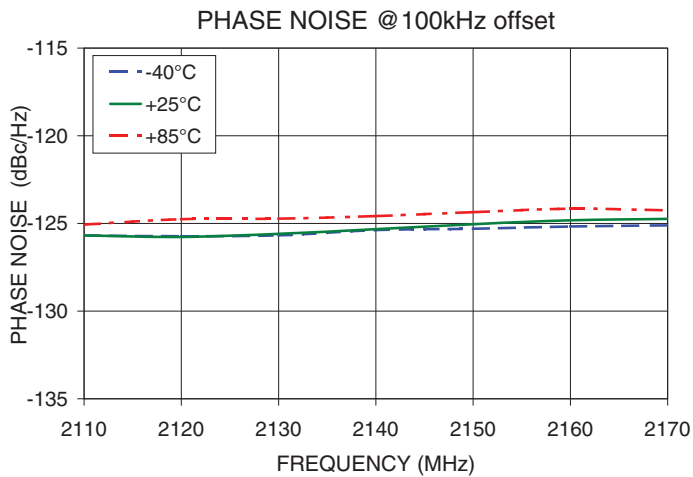
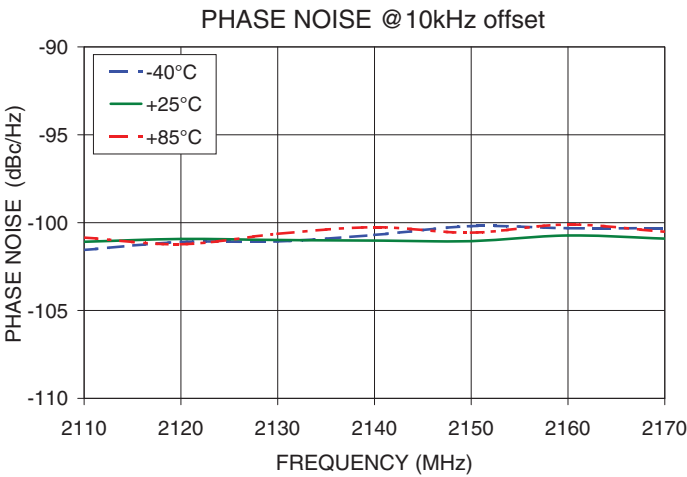
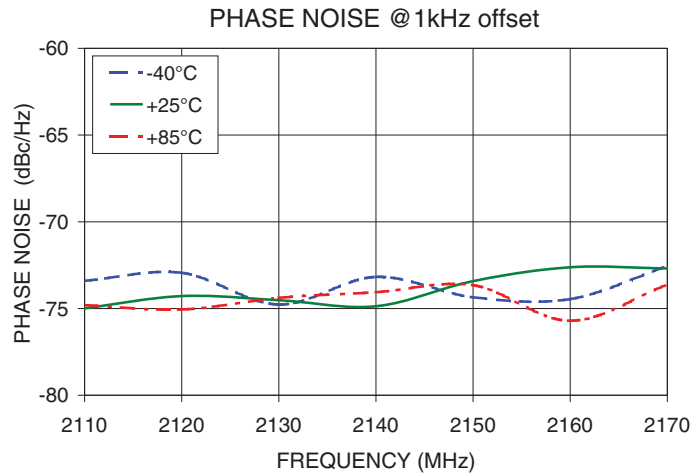
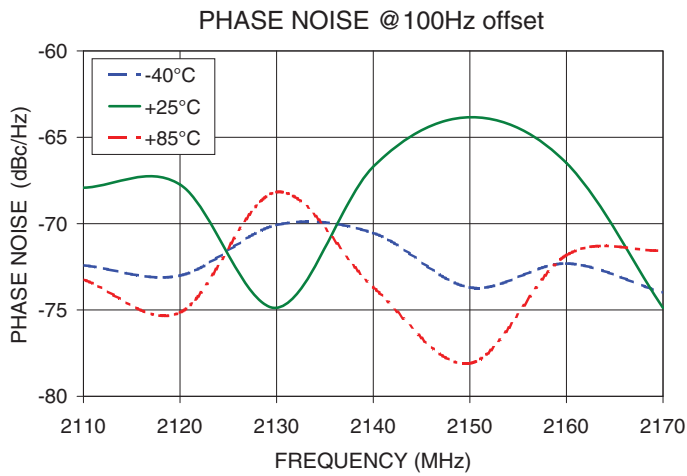
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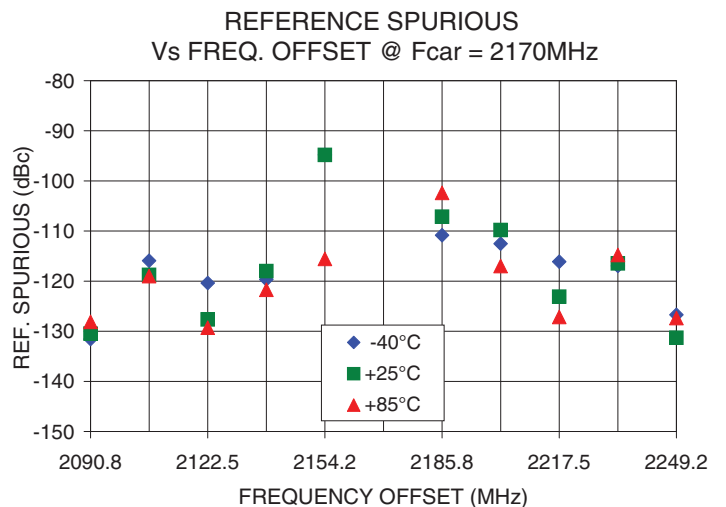
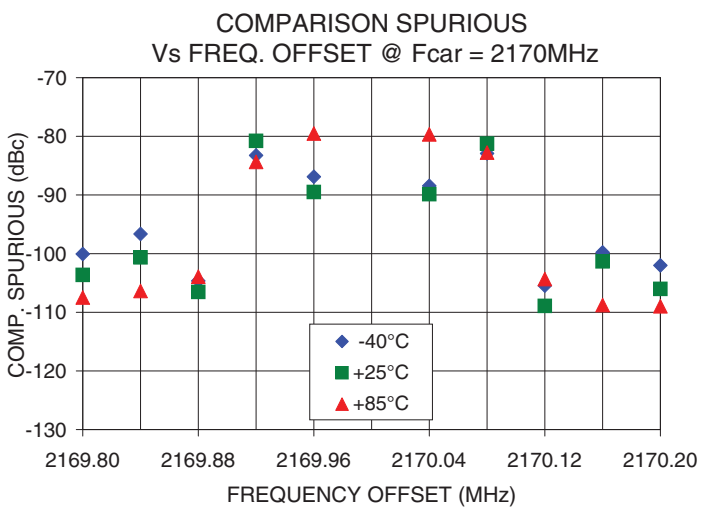
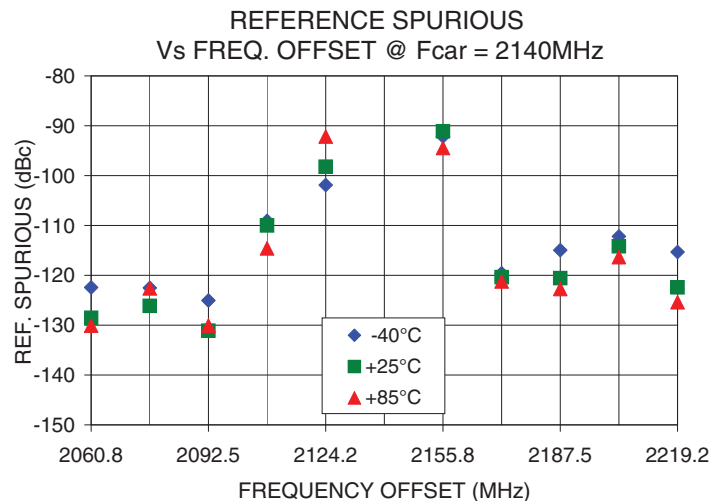
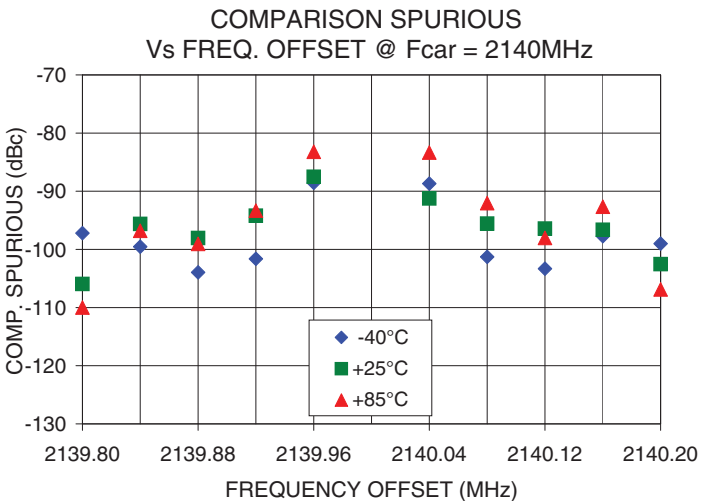
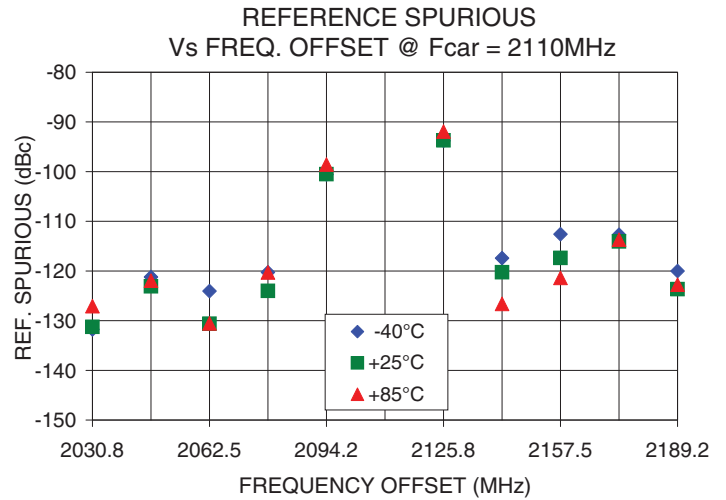
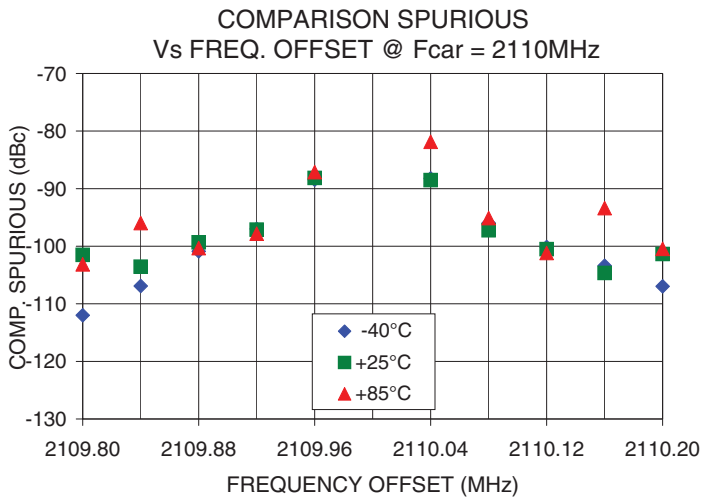
Typical Performance Curves



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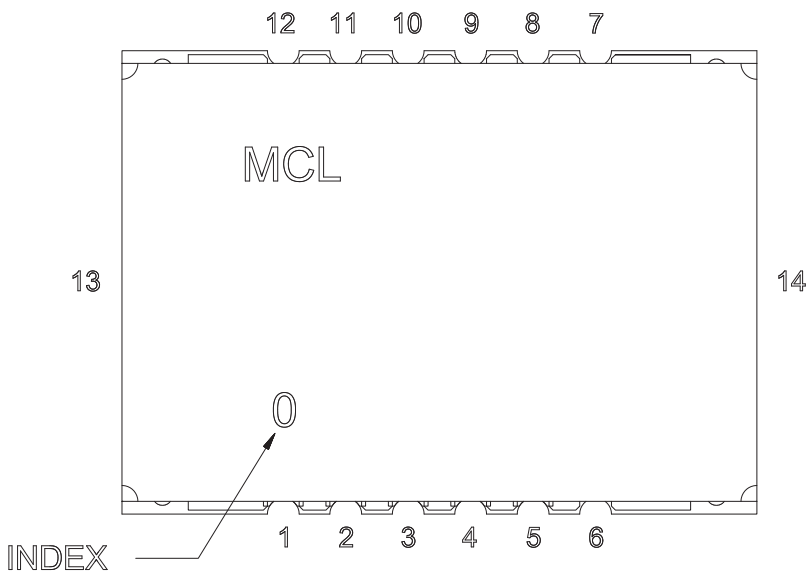


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Pin Configuration

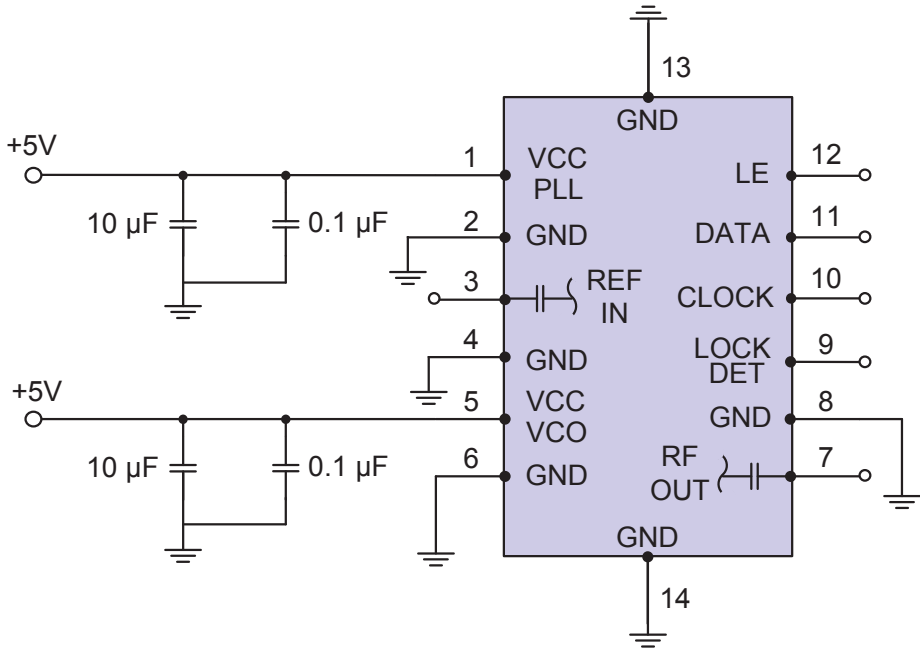


Pin Connection

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

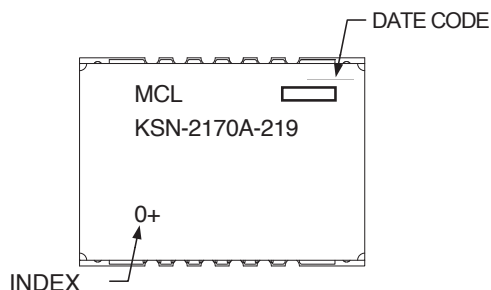
Recommended Application Circuit

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



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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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Frequency Synthesizer

KSN-2170A-219+

Typical Performance Data

FREQ. (MHz)	POWER OUTPUT (dBm)			HARMONICS						VCO CURRENT (mA)			PLL CURENT (mA)		
				(dBc)											
	-40°C	+25°C	+85°C	F2			F3			-40°C	+25°C	+85°C	-40°C	+25°C	+85°C
2110	2.72	2.58	2.17	-51.50	-57.50	-47.07	-36.71	-38.14	-41.62	26.19	27.48	28.41	22.26	23.67	24.96
2120	2.71	2.57	2.15	-52.99	-56.90	-46.96	-35.59	-35.83	-40.10	26.13	27.43	28.37	22.27	23.68	24.97
2130	2.71	2.56	2.13	-56.20	-52.42	-46.54	-35.22	-36.66	-40.82	26.07	27.38	28.34	22.27	23.68	24.98
2140	2.74	2.58	2.14	-57.82	-51.01	-46.13	-33.11	-35.18	-40.45	26.00	27.32	28.30	22.27	23.69	24.99
2150	2.81	2.65	2.19	-54.57	-51.04	-46.46	-34.61	-37.21	-41.20	25.95	27.27	28.26	22.28	23.69	24.99
2160	2.80	2.65	2.17	-51.21	-53.34	-47.75	-35.01	-38.27	-42.80	25.90	27.23	28.23	22.28	23.69	24.99
2170	2.77	2.62	2.14	-50.26	-57.75	-49.23	-35.73	-39.62	-43.62	25.85	27.19	28.20	22.28	23.69	24.99

FREQ. (MHz)	PHASE NOISE (dBc/Hz)														
	@ OFFSETS														
	-40°C					+25°C					+85°C				
	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz
2110	-72.41	-73.40	-101.56	-125.69	-146.15	-67.92	-74.99	-101.09	-125.68	-145.94	-73.24	-74.80	-100.85	-125.07	-145.16
2120	-73.01	-72.94	-101.10	-125.73	-145.78	-67.74	-74.28	-100.93	-125.77	-144.67	-75.15	-75.06	-101.23	-124.76	-144.51
2130	-70.08	-74.77	-101.07	-125.68	-146.08	-74.87	-74.52	-100.99	-125.58	-145.74	-68.17	-74.38	-100.64	-124.73	-145.07
2140	-70.54	-73.18	-100.70	-125.38	-145.65	-66.70	-74.87	-101.02	-125.34	-145.56	-73.68	-74.06	-100.26	-124.58	-144.70
2150	-73.70	-74.35	-100.20	-125.30	-145.55	-63.84	-73.42	-101.05	-125.03	-145.36	-78.09	-73.65	-100.57	-124.36	-144.48
2160	-72.31	-74.46	-100.32	-125.17	-145.57	-66.49	-72.62	-100.73	-124.82	-145.19	-71.83	-75.71	-100.11	-124.16	-144.44
2170	-74.00	-72.55	-100.32	-125.11	-145.45	-74.88	-72.69	-100.91	-124.74	-145.34	-71.56	-73.63	-100.52	-124.25	-144.62

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Frequency Synthesizer

KSN-2170A-219+

Typical Performance Data

COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 2110MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @Fcarrier 2140MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @Fcarrier 2170MHz± (n*Fcomparison) (dBc) NOTE 1		
	-40°C	+25°C	+85°C	-40°C	+25°C	+85°C	-40°C	+25°C	+85°C
-5	-111.98	-101.50	-103.14	-97.21	-105.94	-109.99	-100.07	-103.64	-107.48
-4	-106.91	-103.55	-95.98	-99.54	-95.62	-96.80	-96.65	-100.64	-106.36
-3	-100.88	-99.32	-100.32	-103.95	-98.04	-99.05	-104.64	-106.53	-103.92
-2	-96.99	-97.12	-97.82	-101.63	-94.20	-93.33	-83.24	-80.77	-84.35
-1	-88.45	-88.15	-87.12	-88.56	-87.51	-83.21	-86.89	-89.50	-79.51
0 ^{Note 4}	-	-	-	-	-	-	-	-	-
+1	-88.22	-88.52	-81.85	-88.69	-91.24	-83.35	-88.45	-89.87	-79.67
+2	-95.98	-97.24	-95.11	-101.28	-95.56	-92.05	-82.92	-81.24	-82.76
+3	-100.13	-100.51	-101.16	-103.32	-96.42	-98.03	-105.46	-108.91	-104.34
+4	-103.38	-104.65	-93.38	-97.72	-96.62	-92.66	-99.78	-101.33	-108.76
+5	-106.96	-101.36	-100.45	-99.02	-102.54	-106.88	-102.00	-106.01	-108.98

Note 1: Comparison frequency 40 kHz

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

REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @Fcarrier 2110MHz± (n*Freference) (dBc) NOTE 3			REFERENCE SPURIOUS @Fcarrier 2140MHz± (n*Freference) (dBc) NOTE 3			REFERENCE SPURIOUS @Fcarrier 2170MHz± (n*Freference) (dBc) NOTE 3		
	-40°C	+25°C	+85°C	-40°C	+25°C	+85°C	-40°C	+25°C	+85°C
-5	-131.76	-131.25	-127.08	-122.43	-128.52	-130.08	-131.55	-130.47	-128.11
-4	-121.21	-123.09	-121.94	-122.53	-126.14	-122.60	-115.91	-118.75	-118.98
-3	-124.05	-130.61	-130.54	-125.04	-131.11	-130.06	-120.38	-127.63	-129.28
-2	-120.26	-124.00	-120.29	-109.08	-109.99	-114.58	-119.67	-118.00	-121.71
-1	-100.56	-100.51	-98.57	-101.90	-98.21	-92.15	-94.80	-94.82	-115.55
0 ^{Note 4}	-	-	-	-	-	-	-	-	-
+1	-93.78	-93.70	-91.93	-92.15	-91.11	-94.45	-110.83	-107.13	-102.39
+2	-117.40	-120.24	-126.62	-119.58	-120.36	-121.21	-112.52	-109.80	-116.98
+3	-112.60	-117.36	-121.38	-114.96	-120.56	-122.73	-116.11	-123.09	-127.14
+4	-112.69	-114.06	-113.70	-112.20	-114.17	-116.34	-116.95	-116.45	-114.78
+5	-120.00	-123.64	-122.75	-115.32	-122.42	-125.39	-126.71	-131.30	-127.36

Note 3: Reference frequency 15.84 MHz

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

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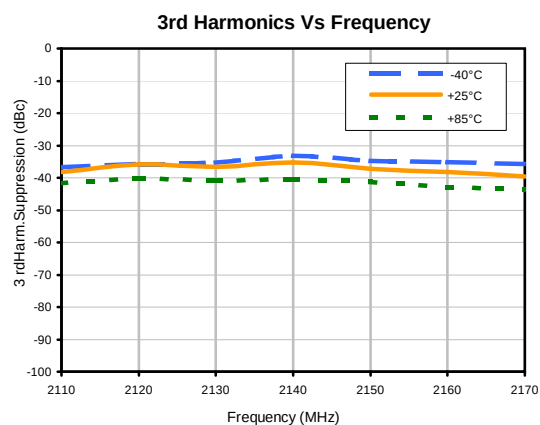
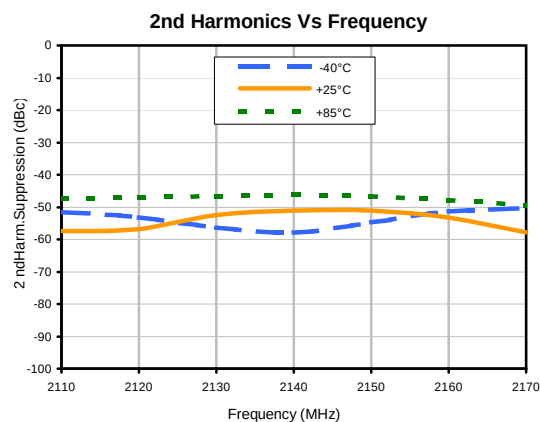
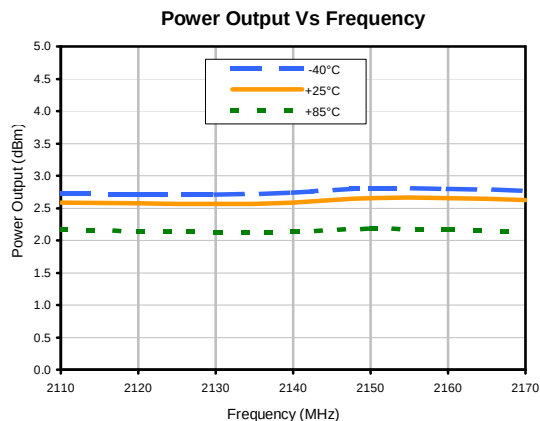
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Typical Performance Data

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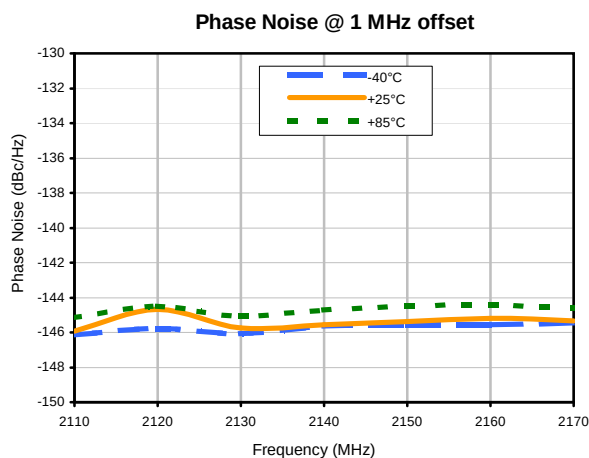
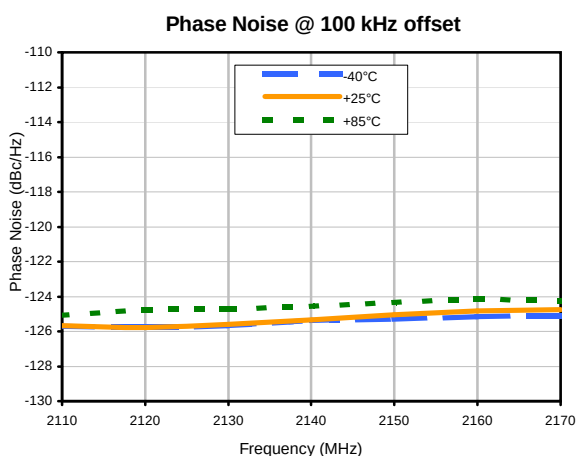
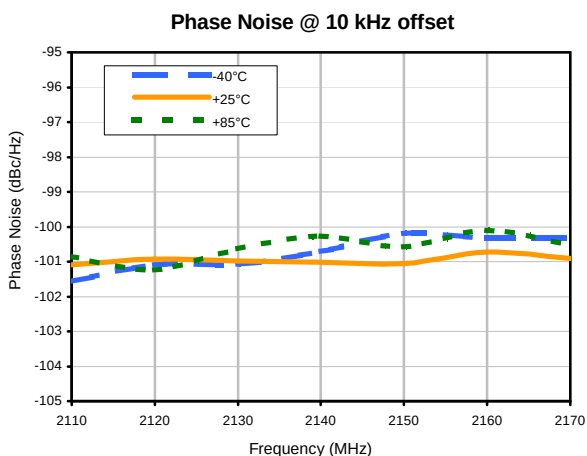
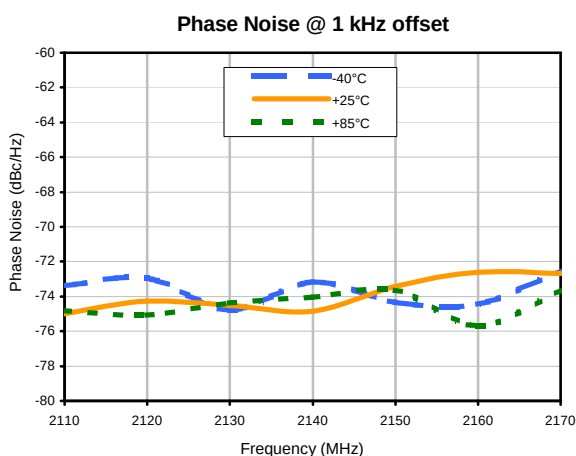
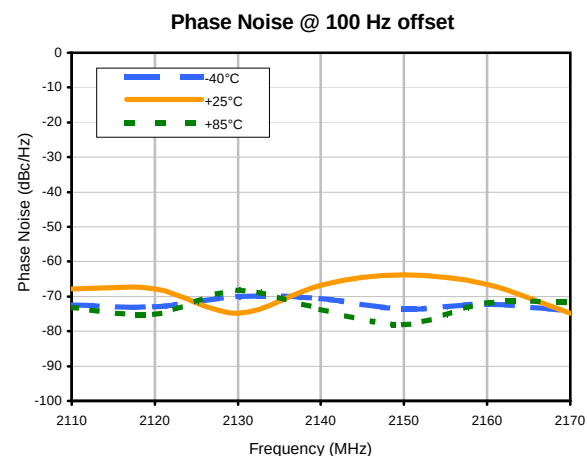
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KSN-2170A-219+

Typical Performance Data



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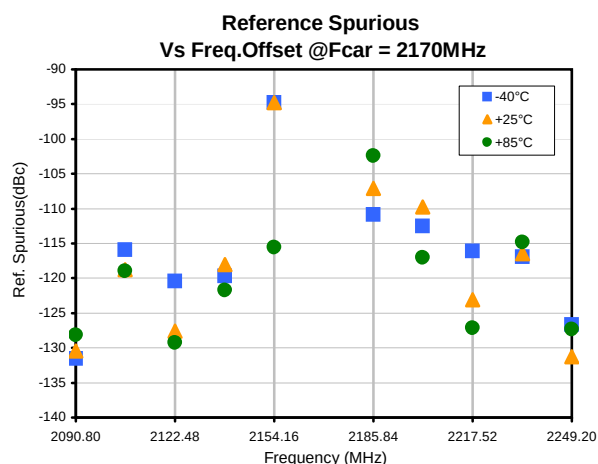
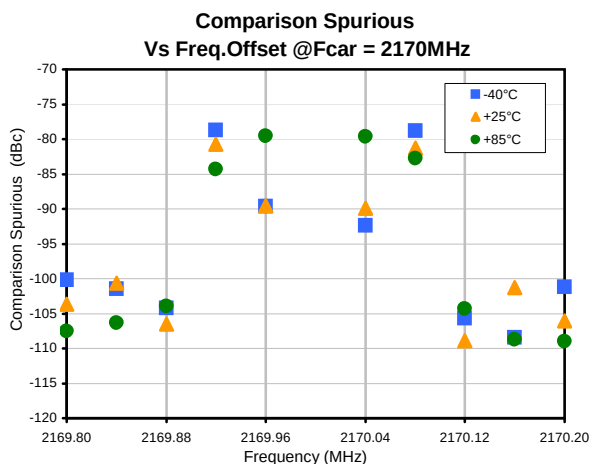
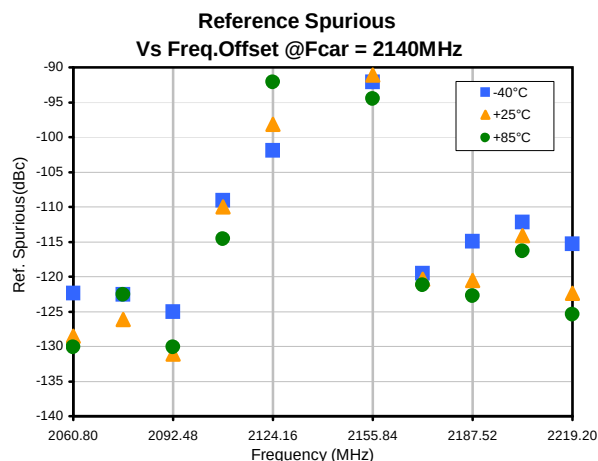
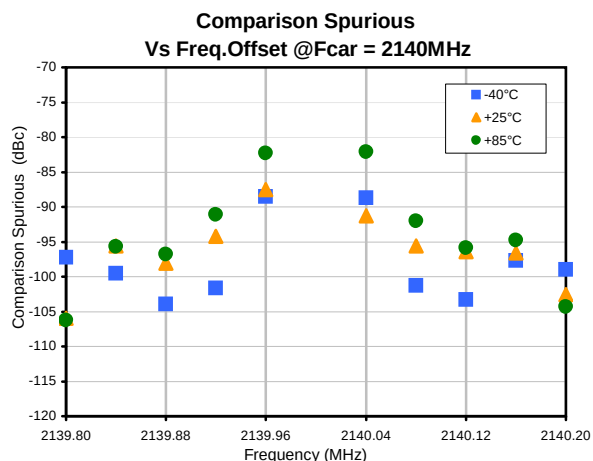
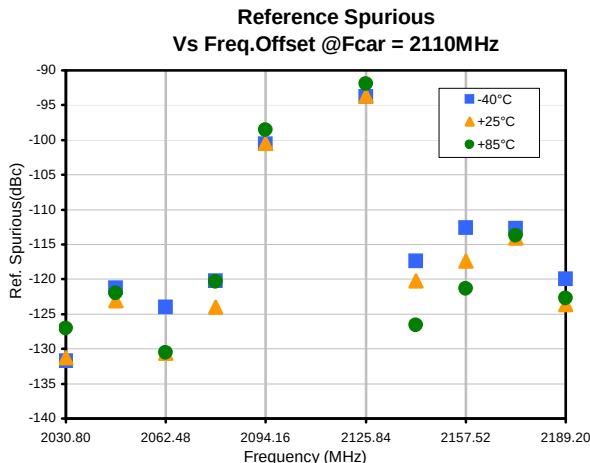
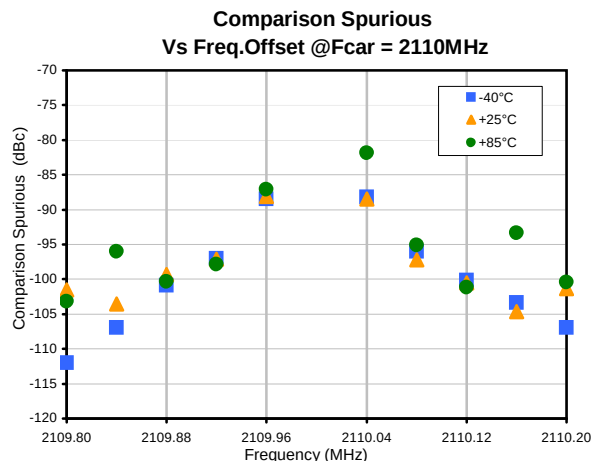
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KSN-2170A-219+

Typical Performance Data



REV. X1

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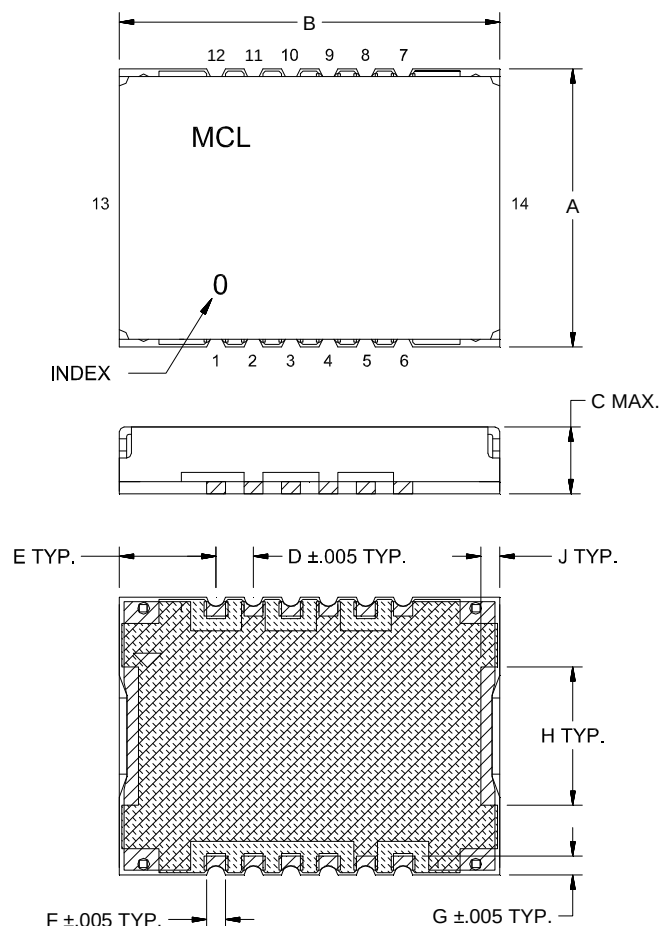
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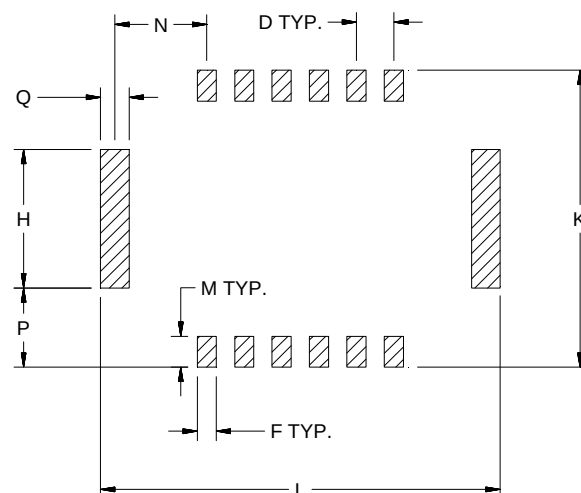
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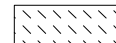


Outline Dimensions



Suggested PCB Land Pattern



 METALLIZATION
 SOLDER RESIST

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	WT. GRAM
DK801	.584 (14.83)	.800 (20.32)	.154 (3.91)	.079 (2.01)	.203 (5.16)	.040 (1.02)	.040 (1.02)	.291 (7.39)	.039 (1.0)	.624 (15.85)	.840 (21.34)	.060 (1.52)	.193 (4.90)	.170 (4.32)	.060 (1.52)	1.6

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

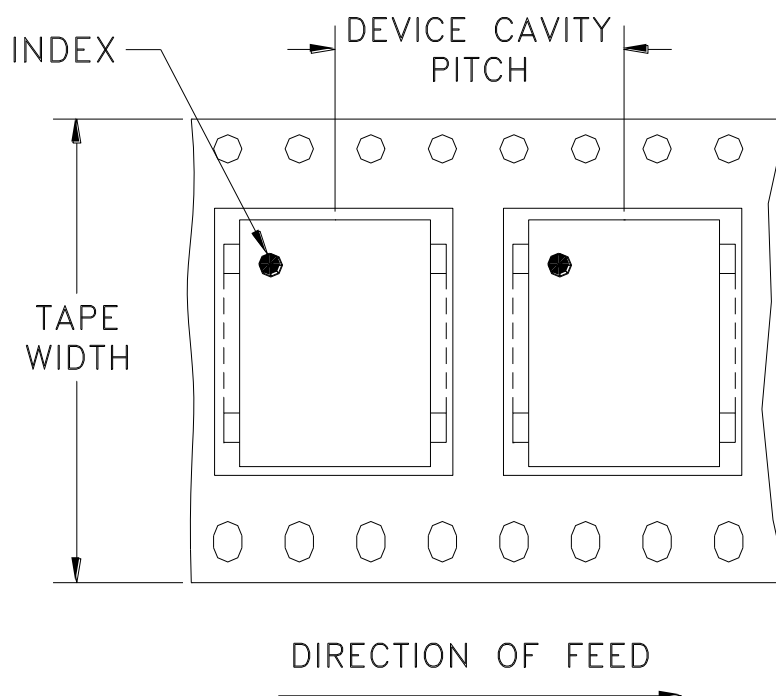
Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- 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.

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	20
			quantity	50
			standards	100
			(see note)	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



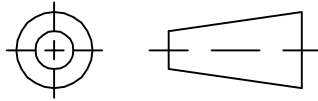
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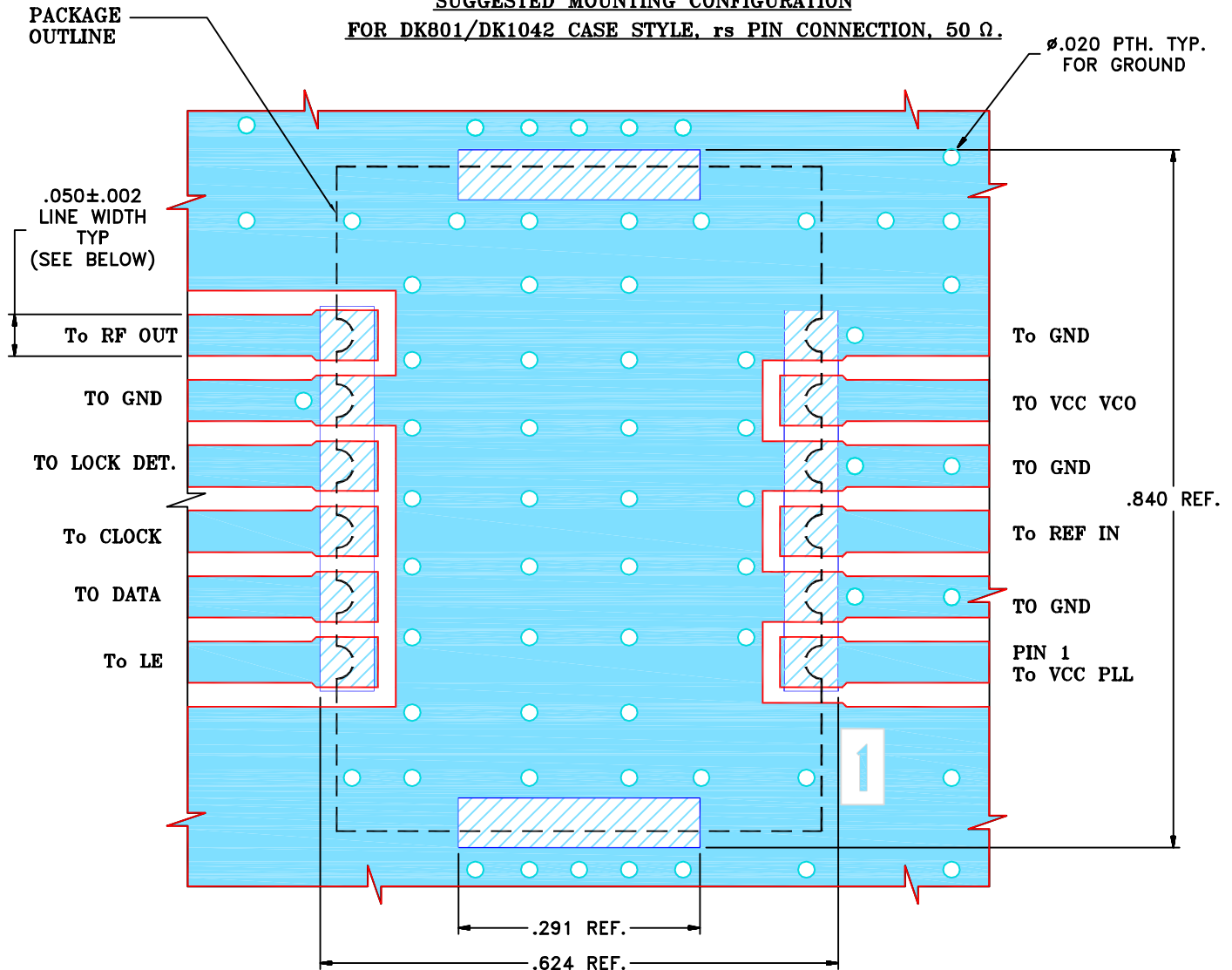
THIRD ANGLE PROJECTION



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 . ϕ .020 PTH. TYP.
FOR GROUND

NOTES:

- 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.
- 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

TOLERANCES ON:

2 PL DECIMALS ±

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±

DRAWN

DK (RAVON)

27 MAR 07

CHECKED

RZ (RAVON)

27 MAR 07

APPROVED

HH (RAVON)

27 MAR 07

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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
A

 CODE IDENT
15542

 DRAWING NO:
98-PL-249

 REV:
B

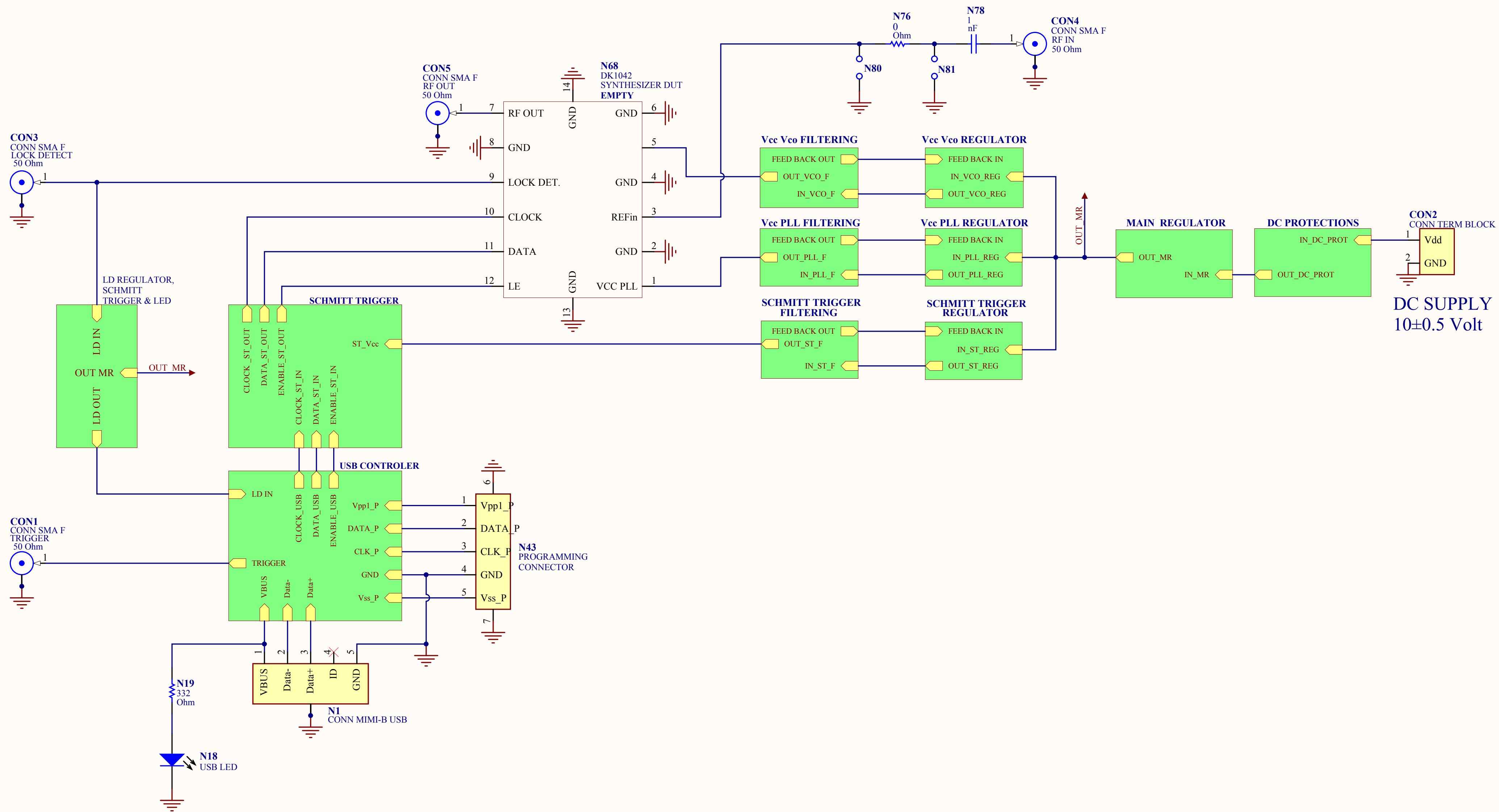
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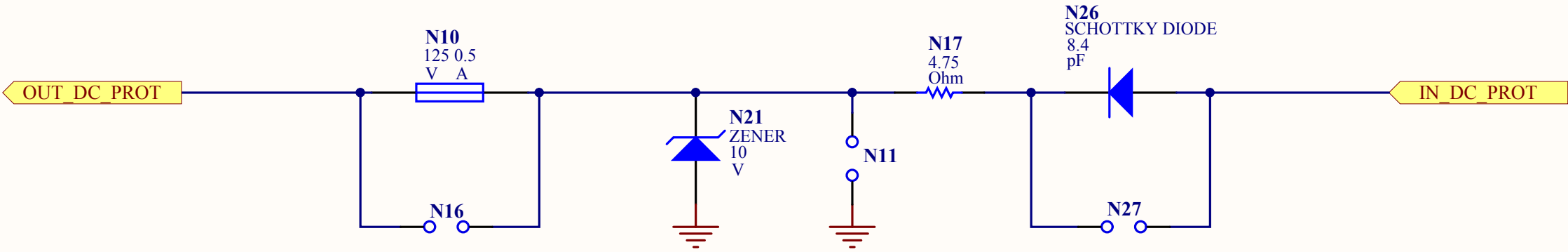
SHEET: 1 OF 1

ELECTRICAL SCHEME-GENERAL

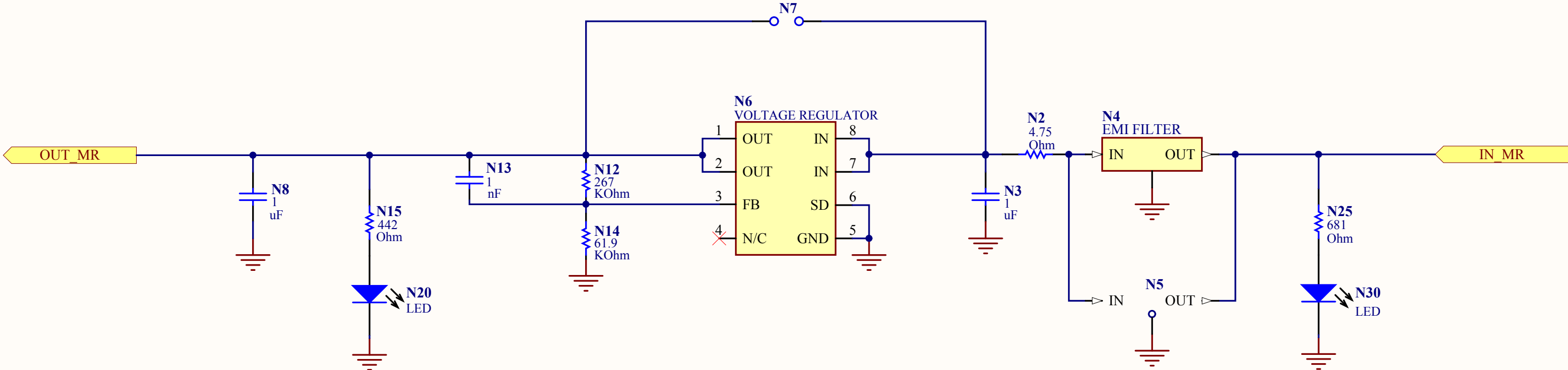
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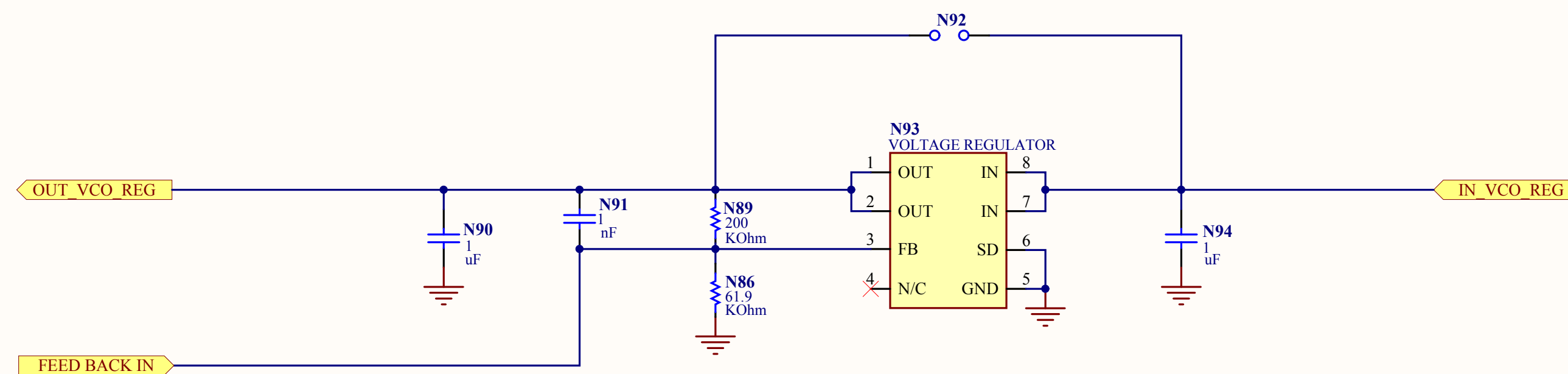
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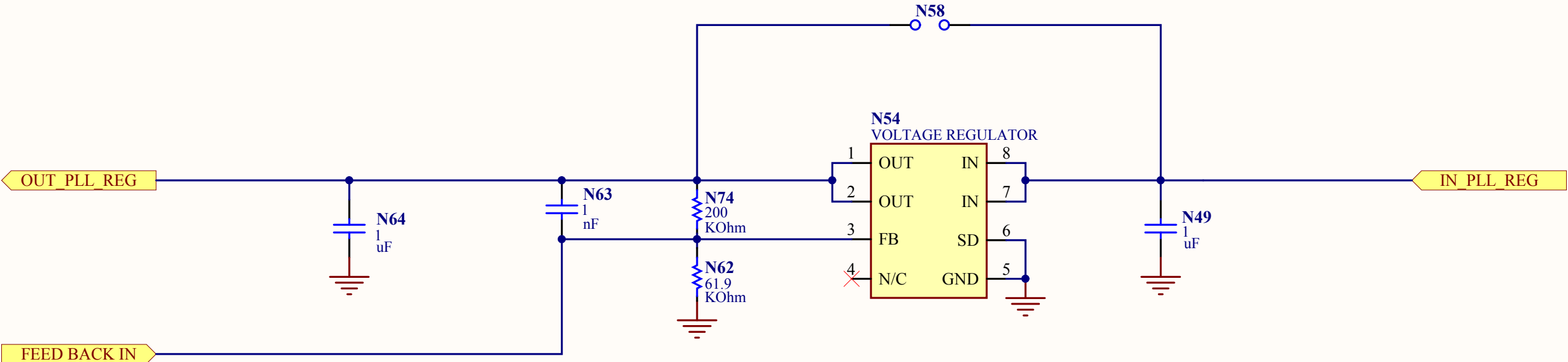
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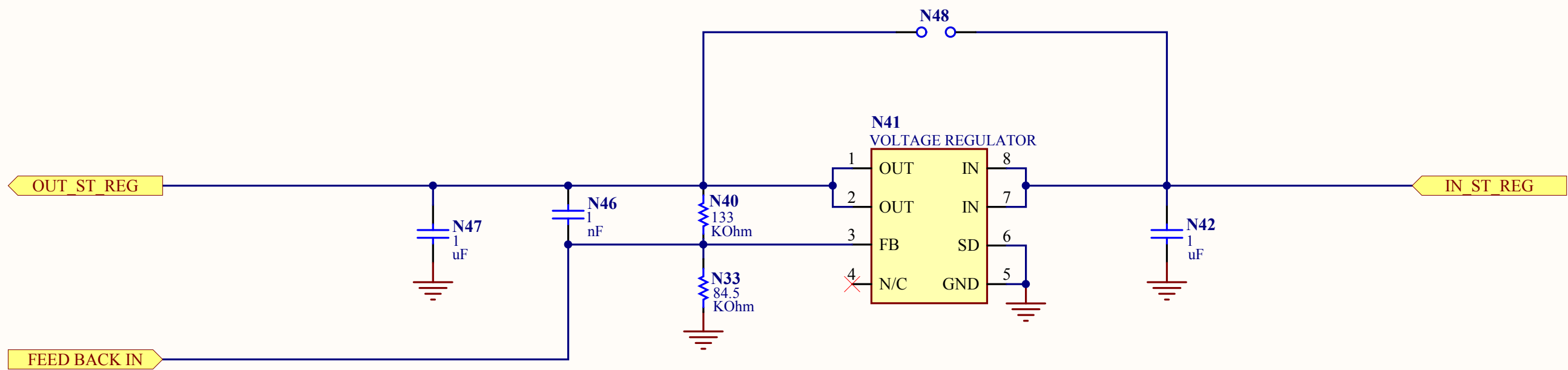
VCC VCO REGULATOR



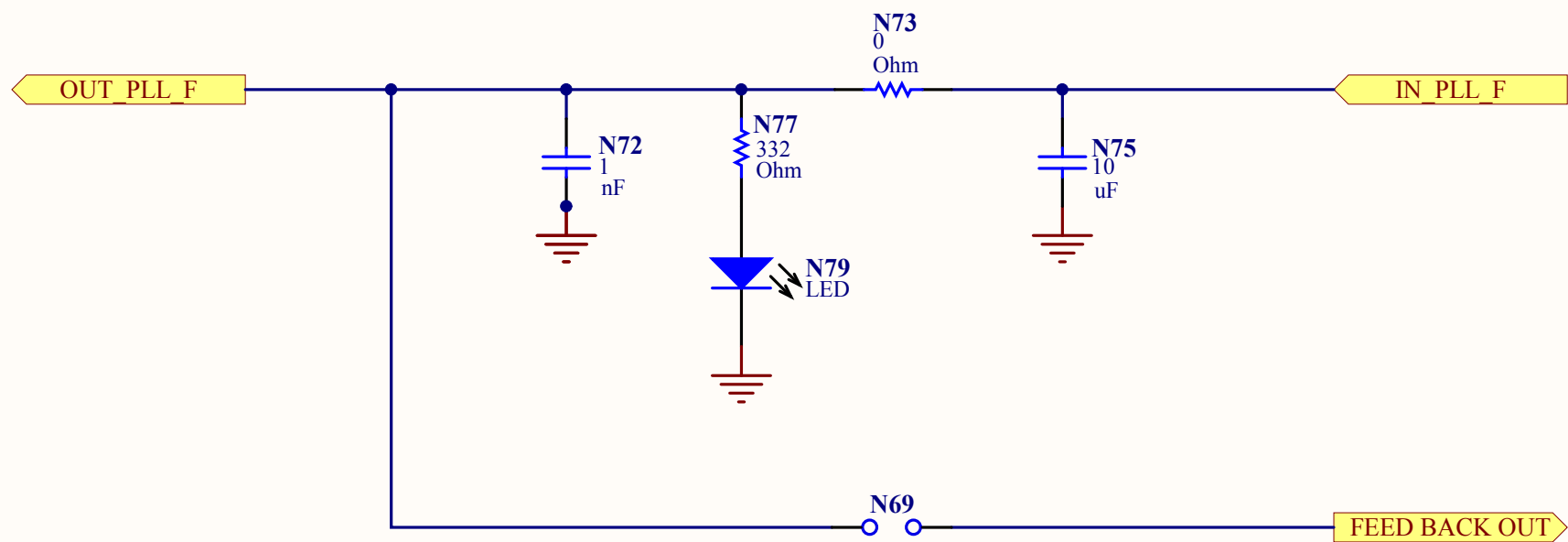
VCC PLL REGULATOR



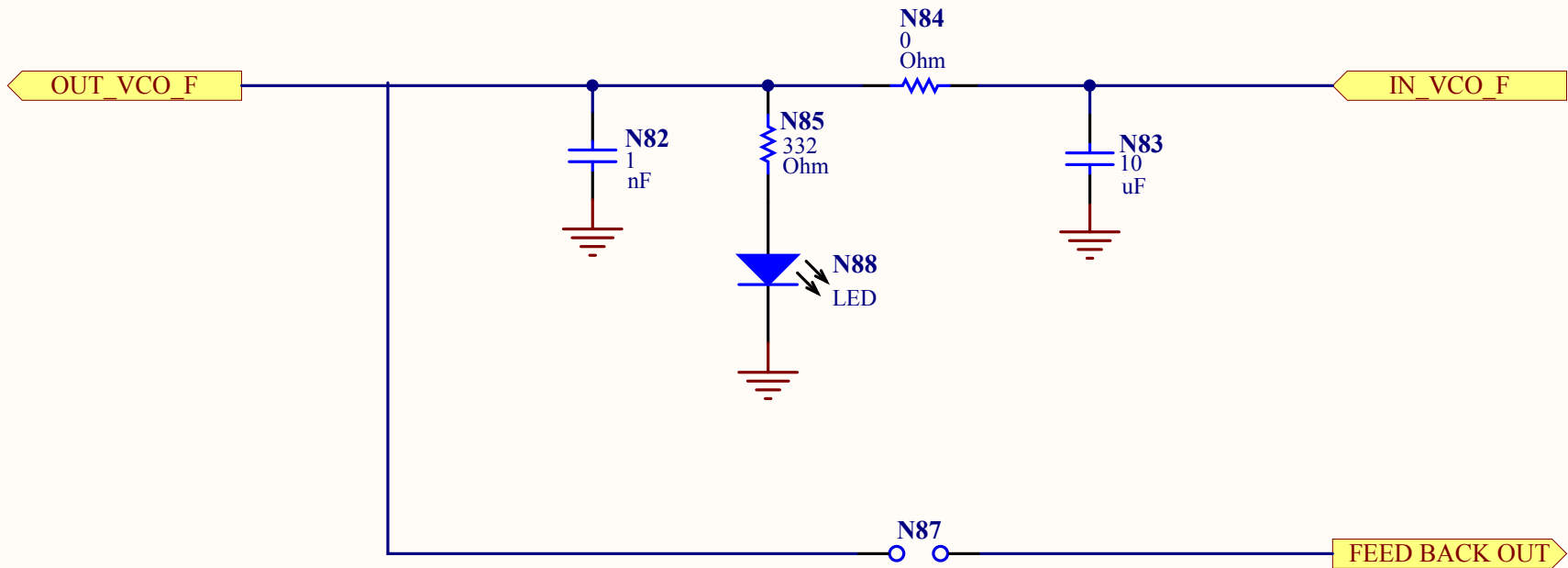
SCHMITT TRIGGER REGULATOR



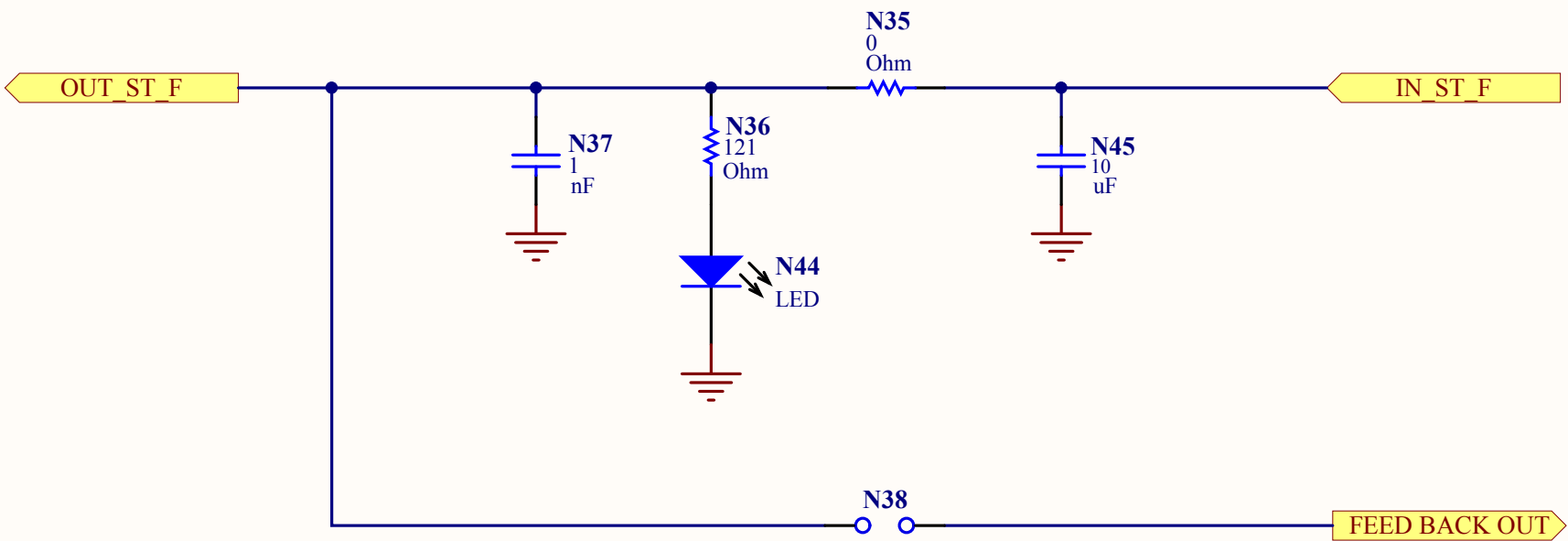
VCC PLL FILTERING



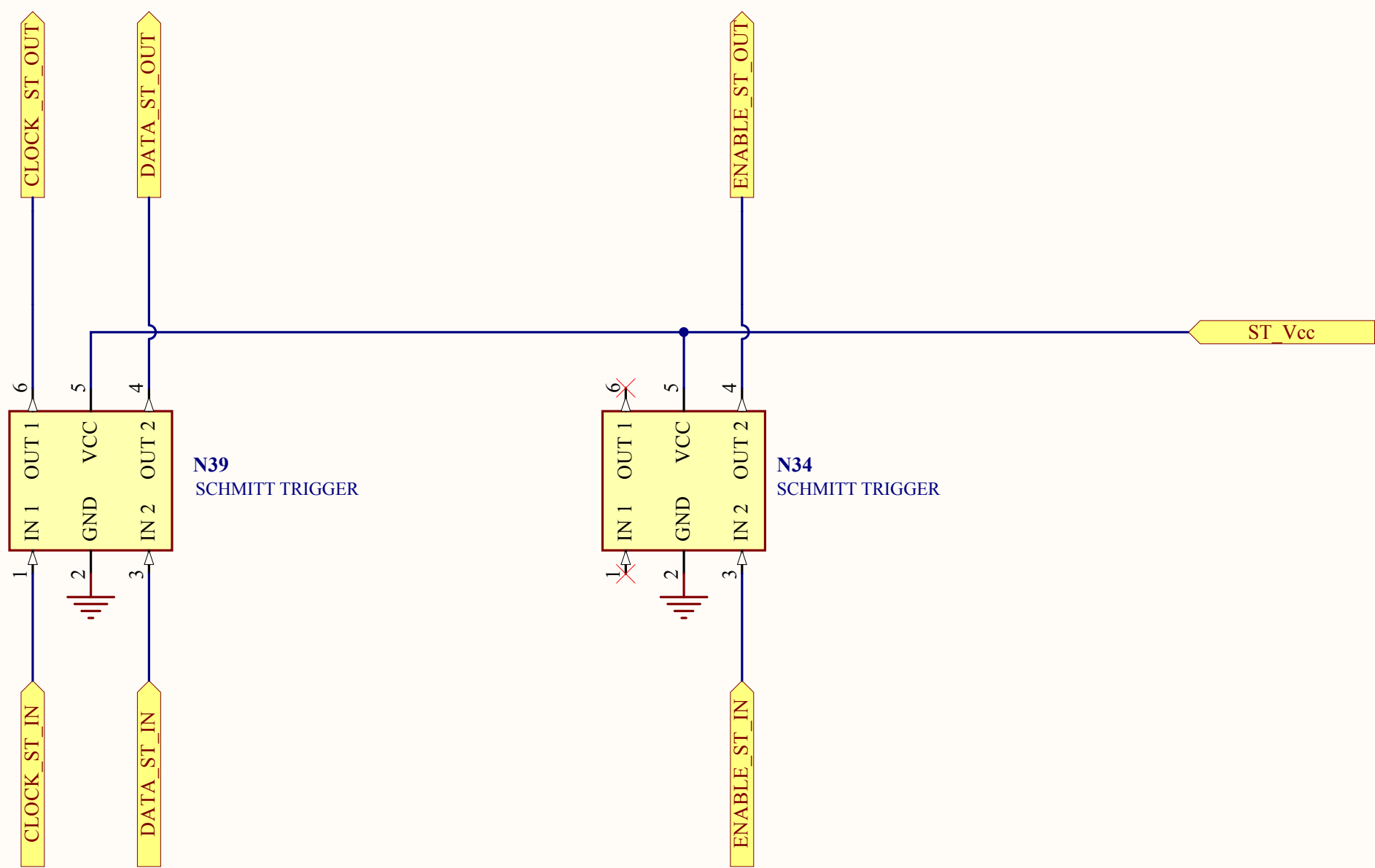
VCC VCO FILTERING



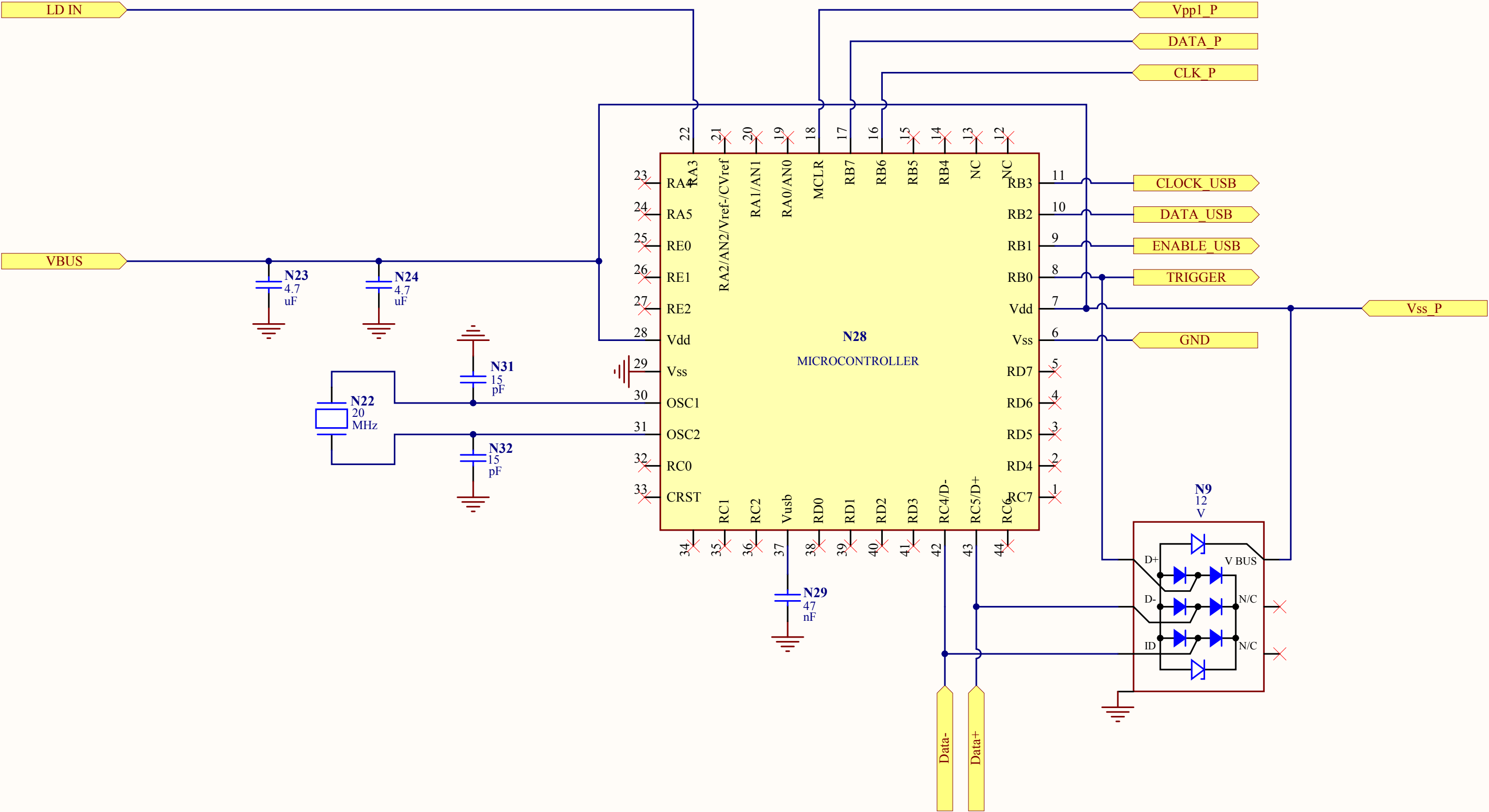
SCHMITT TRIGGER FILTERING



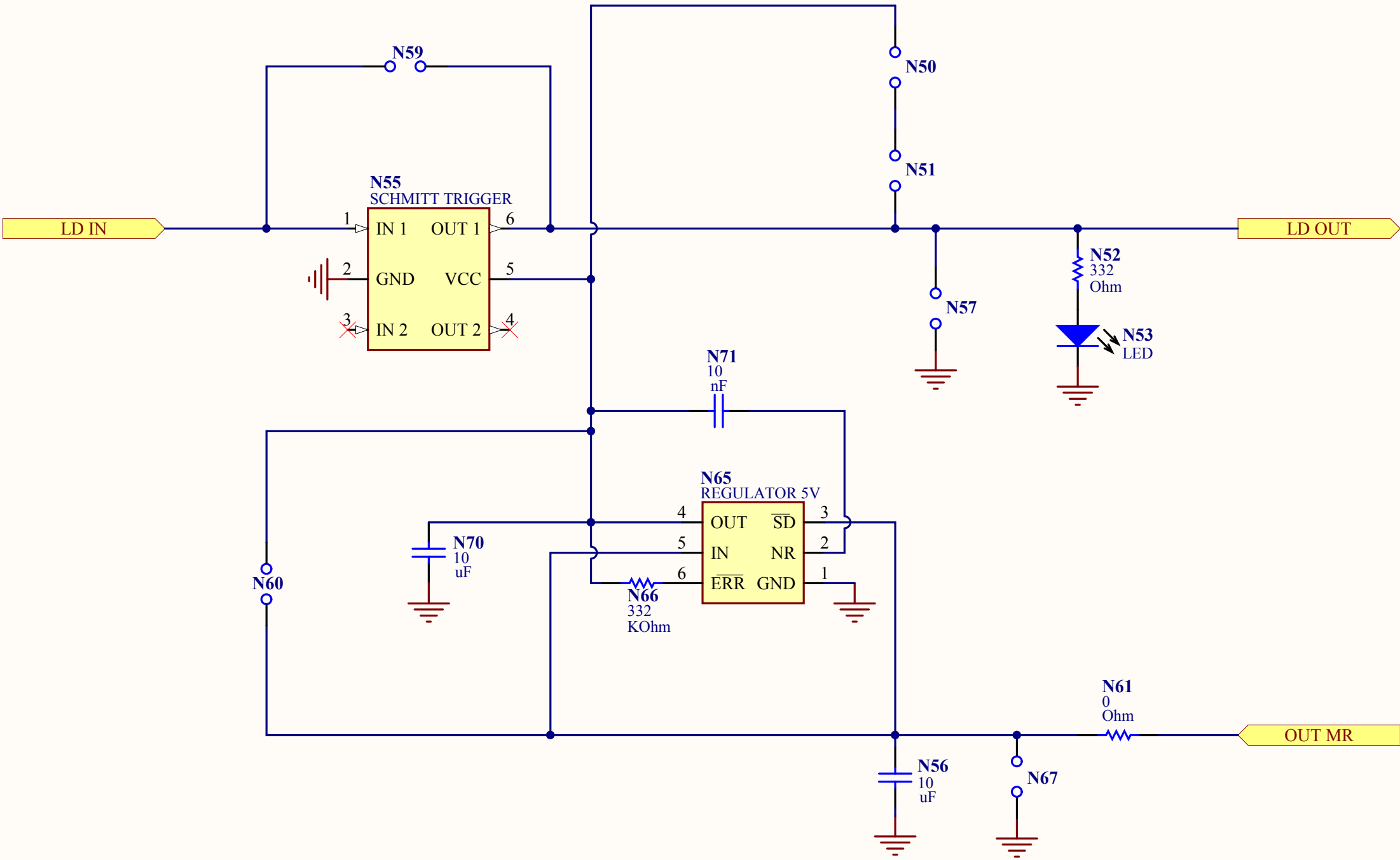
SCHMITT TRIGGER



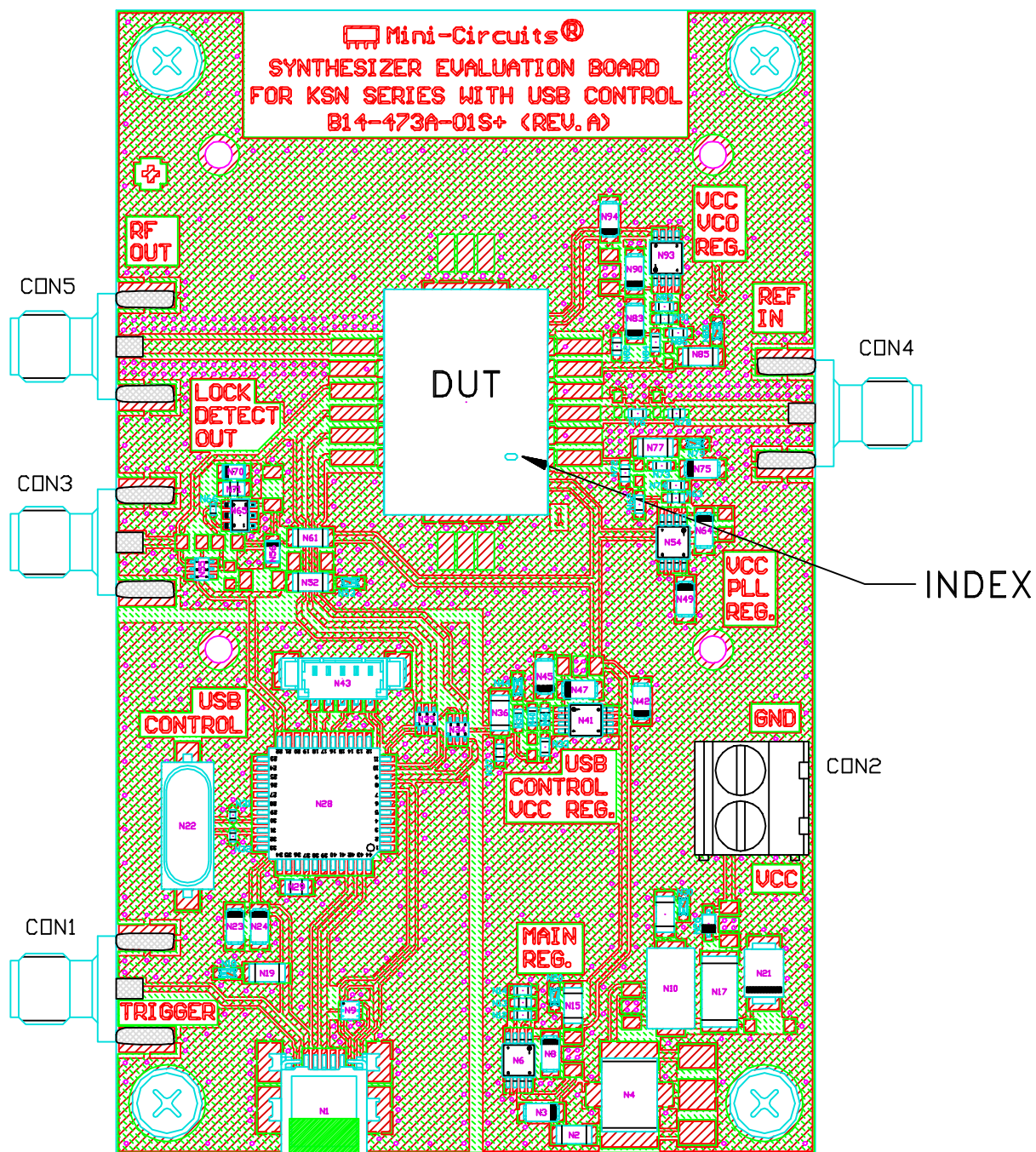
USB CONTROLER



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.



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