Engineering Development Model

Frequency Synthesizer KSN-EDR8066

Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability.
At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.

Please click "Back", and then click "Contact Us" for Applications support.

CASE STYLE : DK801

ELECTRICAL SPECIFICATIONS 50Ω, over -45°C to +85°C					
Parameter		**Min.**	**Typ.**	**Max.**	**Units**
Frequency		409		415	MHz
Step size			20		kHz
Settling Time	**Within ±1kHz**		5		msec
Output Power		-4	0	+4	dBm
Phase Noise					
	at 100 Hz offset		-78		dBc/Hz
	at 1 kHz offset		-79		dBc/Hz
	at 10 KHz offset		-111	-106	dBc/Hz
	at 100 KHz offset		-140	-134	dBc/Hz
	at 1000 kHz offset		-159		dBc/Hz
Integrated SSB Phase Noise			-44		dBc
Reference Spurious Suppression			-102		dBc
Comparison Spurious Suppression			-112		dBc
Non-Harm. Spurious Suppression			-90		dBc
Harmonic Suppression			-19		dBc
Supply voltage	**VCO**		5		V
	PLL		5		V
Supply current	**VCO**		19	27	mA
	PLL		13	21	mA
Reference In (External)	**Frequency**		10		MHz
	Amplitude		1		Vp-p
	Impedance		100		kΩ
	Ph. N @ 1kHz		-145		dBc/Hz
Input Logic Levels	**Logic high**	4		5	V
	Logic Low			1	
Digital Lock Detect	**Locked**	4.6		5	V
	Unlocked			0.4	
Frequency Synthesizer PLL		ADF4118			

ABSOLUTE MAXIMUM RATINGS	
Operating Temperature	-45°C to 85°C
Storage Temperature	-55°C to 100°C
VCO Supply Voltage	6V
PLL Supply Voltage	6V
Reference Frequency voltage	5.8Vp-p
Data, Clock & LE levels	5.3V

Power On sequence: Vcc VCO followed by Vcc PLL
Power Off sequence: Vcc PLL followed by Vcc VCO

PIN CONNECTIONS			
RF OUT	7	**CLOCK**	10
VCC VCO	5	**DATA**	11
VCC PLL	1	**LATCH ENABLE**	12
REF IN	3	**GROUND**	2,4,6,8,13,14
LOCK DETECT	9		

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Frequency Synthesizer KSN-EDR8066

Typical Performance Data

FREQ. (MHz)	POWER OUTPUT (dBm)			HARMONICS (dBc)						VCO CURRENT (mA)			PLL CURRENT (mA)		
				F2			F3								
	-45 °C	+25ºC	+85 °C	-45 °C	+25ºC	+85 °C	-45 °C	+25ºC	+85 °C	-45 °C	+25ºC	+85 °C	-45 °C	+25ºC	+85 °C
404.0	-0.29	-0.10	-0.15	-16.61	-17.27	-18.49	-41.79	-40.51	-40.51	17.56	18.44	18.68	11.95	13.14	14.02
405.6	-0.31	-0.11	-0.17	-16.86	-17.77	-18.82	-41.22	-40.45	-40.45	17.56	18.44	18.71	11.96	13.15	14.03
407.2	-0.32	-0.12	-0.18	-17.02	-18.19	-19.03	-40.59	-40.21	-40.21	17.57	18.46	18.73	11.96	13.15	14.03
408.8	-0.33	-0.13	-0.19	-17.04	-18.48	-19.11	-39.88	-39.87	-39.87	17.57	18.47	18.75	11.96	13.16	14.03
409.0	-0.33	-0.13	-0.19	-17.05	-18.51	-19.11	-39.86	-39.71	-39.71	17.57	18.47	18.75	11.96	13.16	14.04
410.4	-0.34	-0.14	-0.20	-17.01	-18.65	-19.14	-39.33	-39.28	-39.28	17.57	18.48	18.77	11.96	13.16	14.03
412.0	-0.36	-0.15	-0.21	-16.97	-18.70	-19.10	-39.06	-38.67	-38.67	17.57	18.49	18.79	11.97	13.16	14.04
413.6	-0.38	-0.16	-0.23	-16.99	-18.71	-19.15	-39.12	-38.12	-38.12	17.57	18.51	18.81	11.97	13.16	14.04
415.0	-0.39	-0.18	-0.24	-17.14	-18.67	-19.30	-39.22	-37.94	-37.94	17.57	18.52	18.83	11.97	13.16	14.04
415.2	-0.40	-0.18	-0.25	-17.16	-18.67	-19.33	-39.24	-37.92	-37.92	17.57	18.52	18.83	11.97	13.16	14.04
416.8	-0.42	-0.20	-0.27	-17.53	-18.72	-19.67	-39.26	-37.95	-37.95	17.57	18.53	18.85	11.97	13.16	14.04
418.4	-0.44	-0.22	-0.29	-18.04	-18.92	-20.17	-39.11	-38.18	-38.18	17.58	18.55	18.87	11.97	13.16	14.04
420.0	-0.47	-0.24	-0.32	-18.64	-19.28	-20.77	-38.65	-38.42	-38.42	17.58	18.56	18.89	11.97	13.16	14.04

FREQ. (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS														
	-45 °C					+25ºC					+85 °C				
	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz
404.0	-76.99	-75.47	-110.36	-135.60	-155.58	-80.47	-76.65	-110.71	-137.95	-157.79	-83.17	-76.26	-110.13	-137.45	-158.45
405.6	-79.09	-75.73	-110.35	-135.67	-155.81	-82.01	-77.62	-110.80	-138.06	-160.01	-78.37	-77.30	-110.23	-137.40	-158.42
407.2	-78.36	-75.86	-110.56	-135.84	-156.10	-79.82	-79.77	-111.11	-138.66	-159.82	-78.02	-77.89	-109.96	-137.87	-158.38
408.8	-77.38	-75.90	-110.83	-135.81	-156.54	-79.38	-78.71	-111.45	-139.19	-159.21	-75.62	-77.73	-110.29	-138.07	-159.24
409.0	-77.27	-76.76	-110.95	-136.09	-149.83	-80.64	-78.25	-110.99	-139.56	-151.86	-78.80	-78.66	-110.37	-138.08	-153.96
410.4	-80.18	-76.69	-110.73	-136.14	-156.30	-81.03	-79.14	-111.03	-139.50	-160.10	-75.50	-77.95	-110.48	-138.12	-159.05
412.0	-74.83	-78.54	-111.18	-136.47	-157.05	-77.94	-78.22	-111.67	-139.91	-159.77	-75.67	-77.72	-109.96	-137.69	-159.42
413.6	-74.59	-78.10	-111.28	-136.72	-157.84	-78.13	-79.60	-111.57	-140.14	-159.97	-74.88	-77.71	-110.21	-137.85	-158.11
415.0	-76.78	-79.62	-111.36	-137.00	-157.00	-76.17	-80.64	-111.79	-140.01	-160.21	-74.29	-77.95	-110.34	-137.85	-159.56
415.2	-76.93	-78.93	-111.23	-136.87	-157.78	-75.80	-79.46	-111.57	-139.94	-162.11	-75.26	-78.11	-110.46	-137.69	-159.02
416.8	-76.90	-77.95	-111.91	-137.41	-158.04	-77.23	-78.63	-111.45	-140.36	-160.99	-77.38	-78.46	-110.48	-137.96	-158.76
418.4	-77.01	-76.14	-111.94	-137.64	-158.19	-76.25	-79.94	-111.70	-140.22	-159.72	-75.88	-77.73	-110.80	-137.94	-159.23
420.0	-78.66	-79.40	-111.99	-138.48	-158.82	-77.27	-78.61	-111.57	-140.40	-160.47	-79.81	-78.93	-111.08	-138.06	-159.85

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Frequency Synthesizer KSN-EDR8066

Typical Performance Data

COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 409 MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @Fcarrier 412 MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @Fcarrier 415 MHz± (n*Fcomparison) (dBc) NOTE 1		
n	-45 °C	+25ºC	+85 °C	-45 °C	+25ºC	+85 °C	-45 °C	+25ºC	+85 °C
-5	-107.32	-109.65	-108.85	-109.55	-109.53	-109.33	-108.05	-108.99	-108.60
-4	-106.92	-105.95	-107.02	-106.58	-106.84	-106.88	-107.05	-106.76	-105.59
-3	-103.65	-103.69	-104.11	-103.93	-103.67	-100.93	-103.63	-104.12	-103.54
-2	-99.17	-102.12	-98.31	-97.81	-100.40	-100.60	-101.17	-100.63	-95.82
-1	-92.16	-92.02	-87.36	-92.04	-92.54	-86.16	-92.54	-94.29	-83.83
0 note 2	-	-	-	-	-	-	-	-	-
+1	-92.86	-94.58	-87.15	-93.25	-92.53	-85.30	-92.95	-93.78	-84.30
+2	-100.89	-97.91	-99.43	-99.82	-100.68	-96.99	-100.94	-100.49	-96.58
+3	-103.65	-102.93	-105.29	-104.59	-104.97	-101.32	-104.65	-103.50	-103.09
+4	-107.18	-106.48	-107.80	-107.32	-107.84	-107.59	-106.68	-107.56	-106.84
+5	-108.42	-109.15	-107.87	-107.75	-109.55	-107.40	-108.68	-109.67	-107.22

Note 1: Comparison frequency 20 kHz
Note 2: All spurs are referenced to carrier signal (n=0).

REFERENCE SPURIOUS ORDER	REFFERENCE SPURIOUS @Fcarrier 409 MHz± (n*Freffence) (dBc) NOTE 3			REFFERENCE SPURIOUS @Fcarrier 412 MHz± (n*Freffence) (dBc) NOTE 3			REFFERENCE SPURIOUS @Fcarrier 415 MHz± (n*Freffence) (dBc) NOTE 3		
n	-45 °C	+25ºC	+85 °C	-45 °C	+25ºC	+85 °C	-45 °C	+25ºC	+85 °C
-5	-116.66	-118.74	-120.27	-115.07	-114.41	-116.81	-111.75	-114.71	-115.37
-4	-120.33	-117.75	-115.70	-119.31	-116.99	-114.04	-109.36	-113.80	-113.64
-3	-122.24	-118.86	-119.55	-123.21	-118.69	-120.46	-112.64	-114.86	-116.50
-2	-111.55	-107.66	-108.50	-113.73	-107.23	-108.18	-108.61	-107.93	-108.41
-1	-103.62	-101.85	-103.09	-103.67	-101.73	-103.02	-102.43	-101.69	-102.89
0 note 4	-	-	-	-	-	-	-	-	-
+1	-104.71	-102.89	-104.19	-104.41	-102.86	-104.16	-101.65	-100.84	-102.33
+2	-113.17	-108.16	-109.22	-114.03	-108.64	-109.92	-108.28	-106.06	-107.29
+3	-125.31	-123.59	-122.78	-124.57	-123.92	-123.49	-112.00	-113.03	-115.69
+4	-118.58	-115.57	-113.98	-116.53	-115.38	-114.25	-110.56	-110.41	-110.40
+5	-126.59	-126.79	-126.25	-126.73	-124.17	-124.66	-114.00	-116.09	-117.47

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

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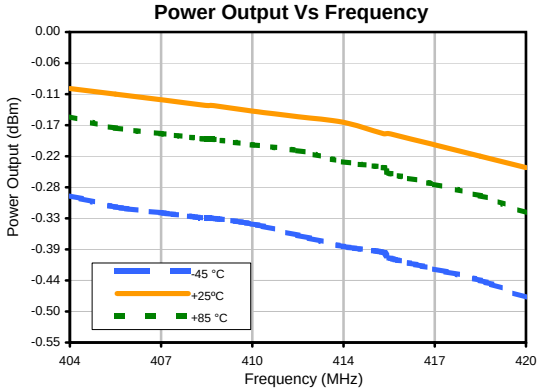
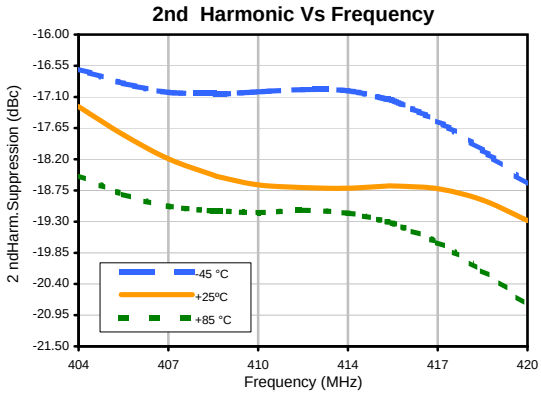
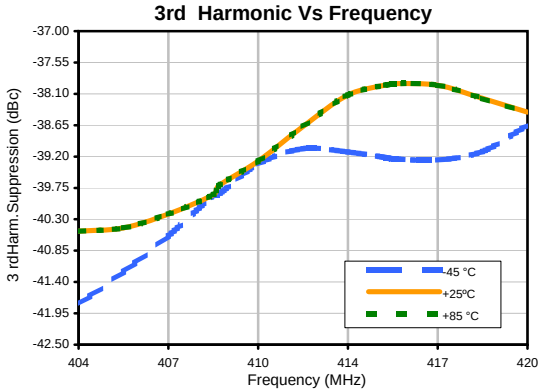
Frequency Synthesizer KSN-EDR8066

Typical Performance Data







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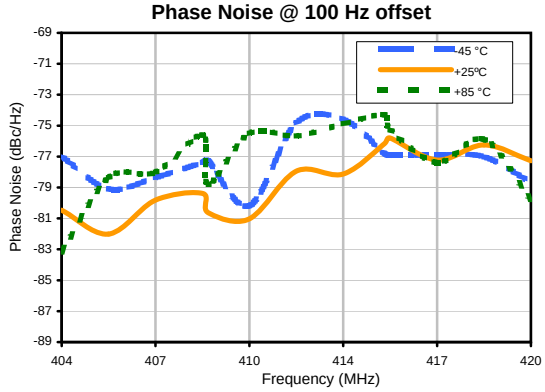
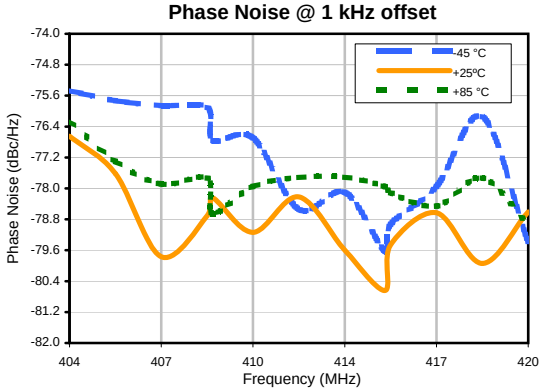
Typical Performance Data

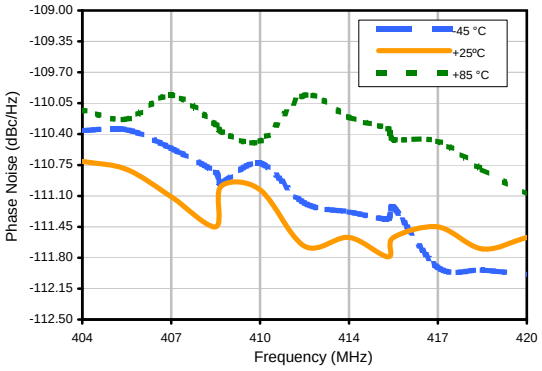
Phase Noise @ 100 Hz offset



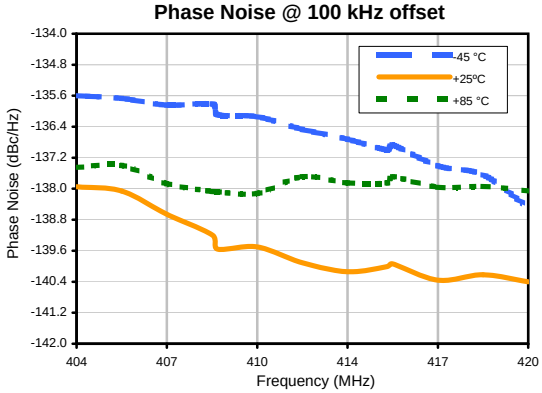
Phase Noise @ 1 kHz offset



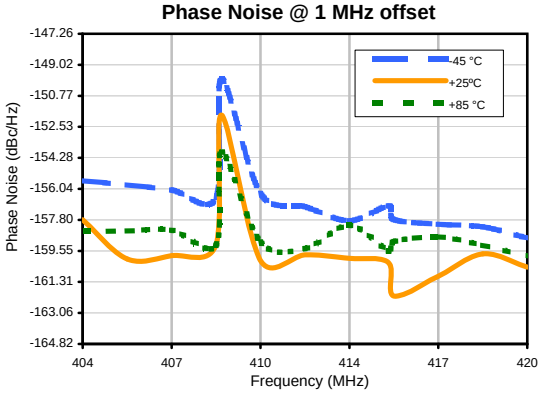
Phase Noise @ 10 kHz offset



Phase Noise @ 100 kHz offset



Phase Noise @ 1 MHz offset



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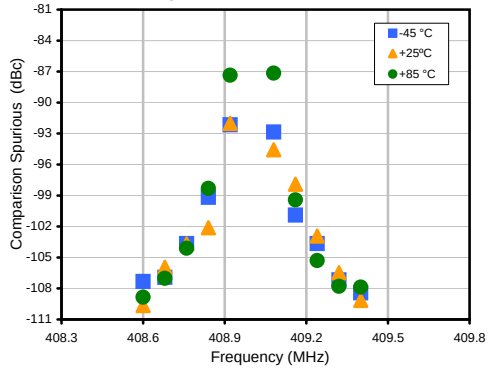
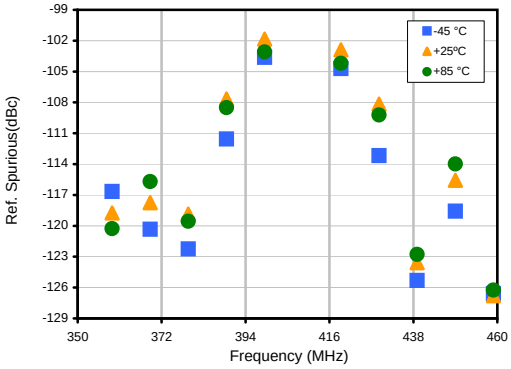
Typical Performance Data

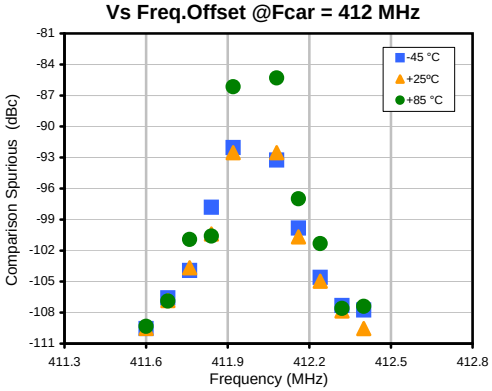
Comparison Spurious
Vs Freq.Offset @Fcar = 409 MHz



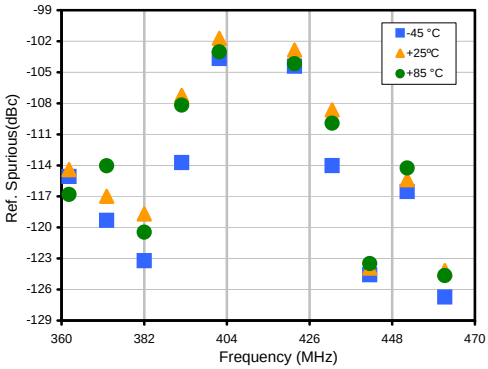
Reference Spurious
Vs Freq.Offset @Fcar = 409 MHz



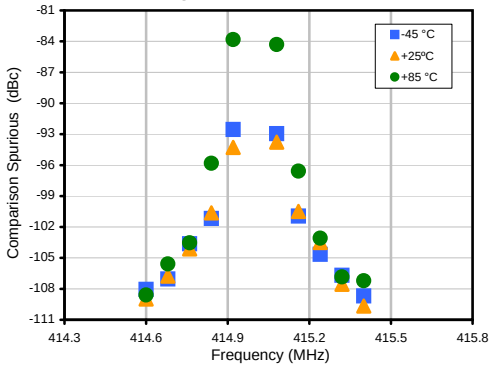
Comparison Spurious
Vs Freq.Offset @Fcar = 412 MHz



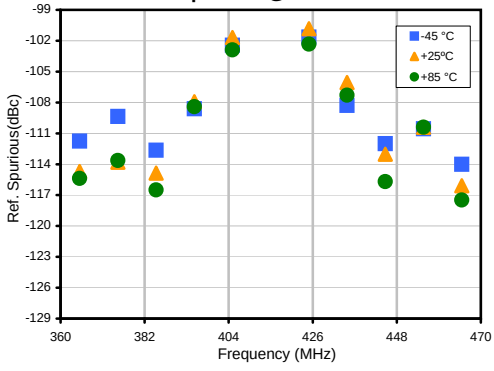
Reference Spurious
Vs Freq.Offset @Fcar = 412 MHz



Comparison Spurious
Vs Freq.Offset @Fcar = 415 MHz



Reference Spurious
Vs Freq.Offset @Fcar = 415 MHz



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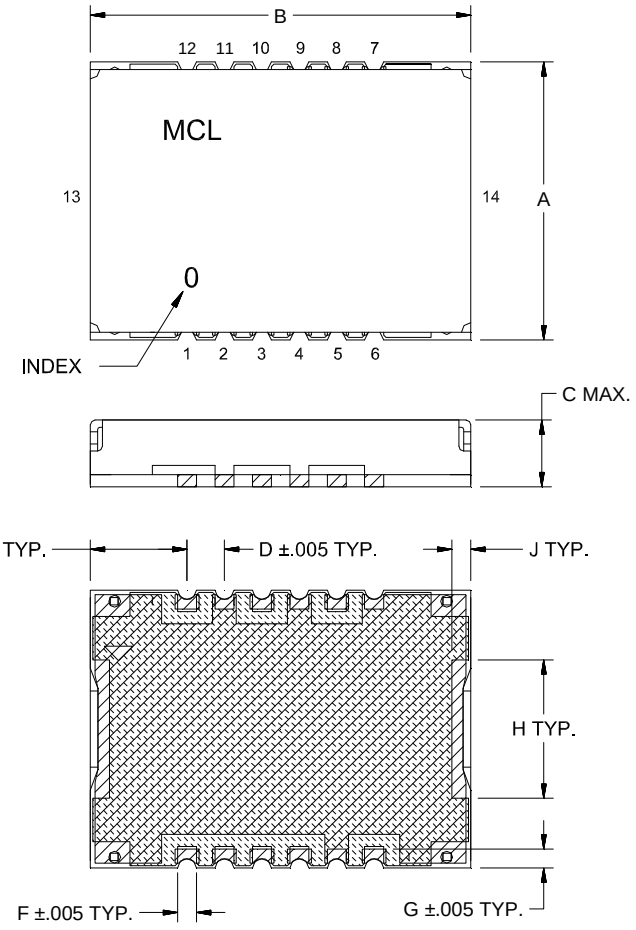
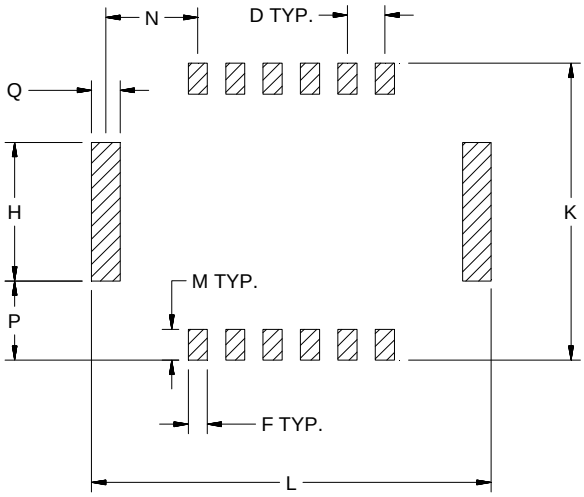
Case Style DK

DK801

Outline Dimensions



Suggested PCB Land Pattern



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:

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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P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
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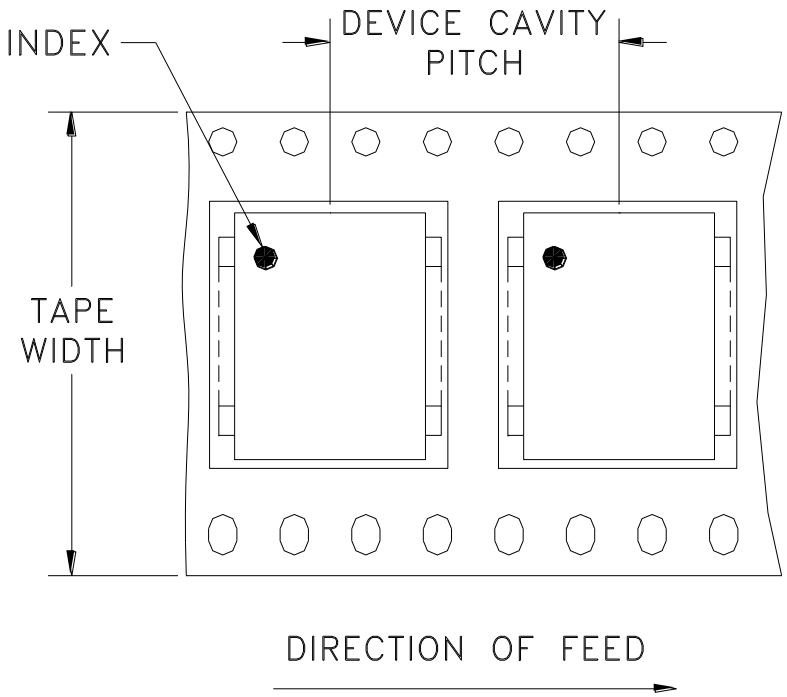
Tape & Reel Packaging TR-F28

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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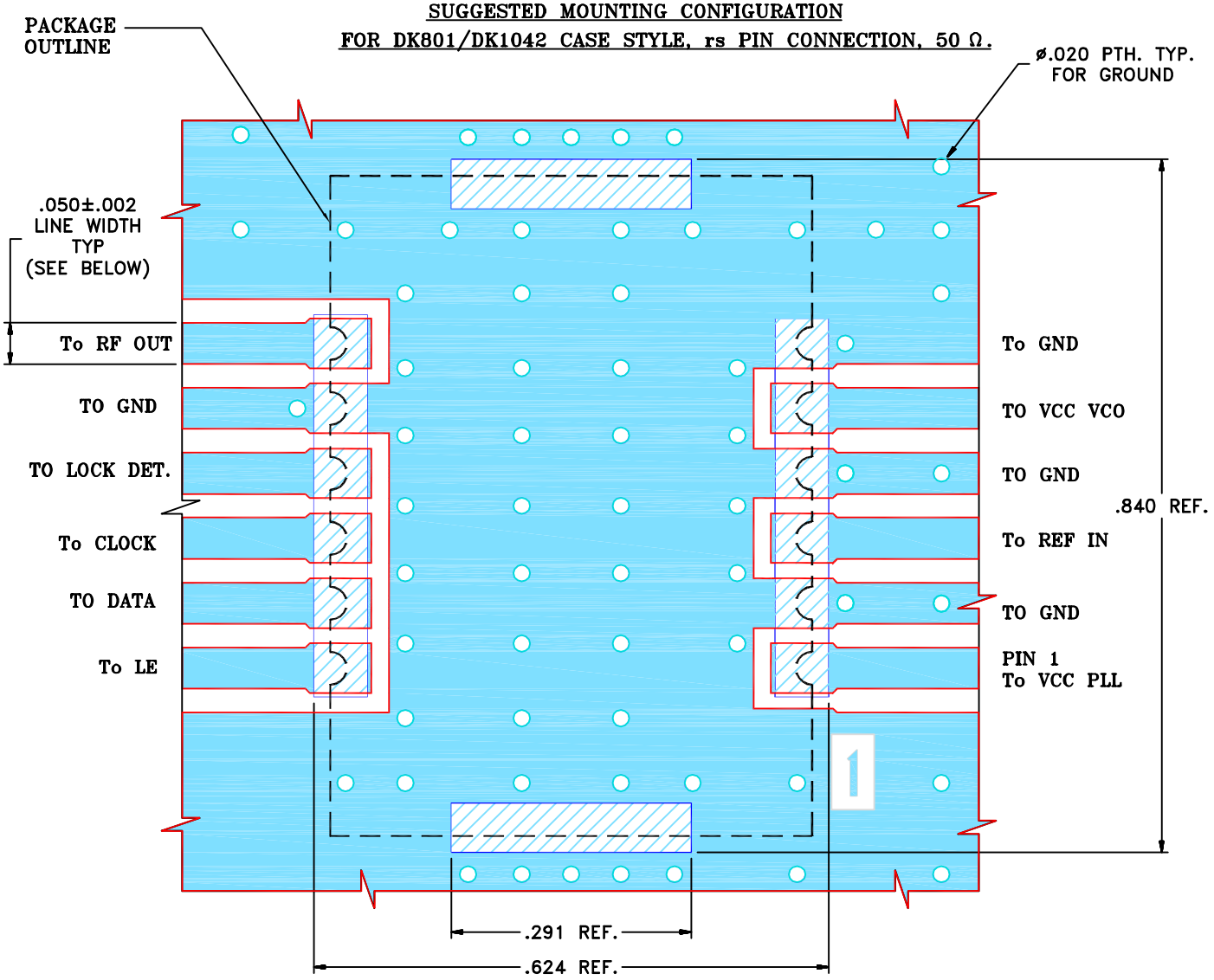
THIRD ANGLE PROJECTION

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 ±			

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

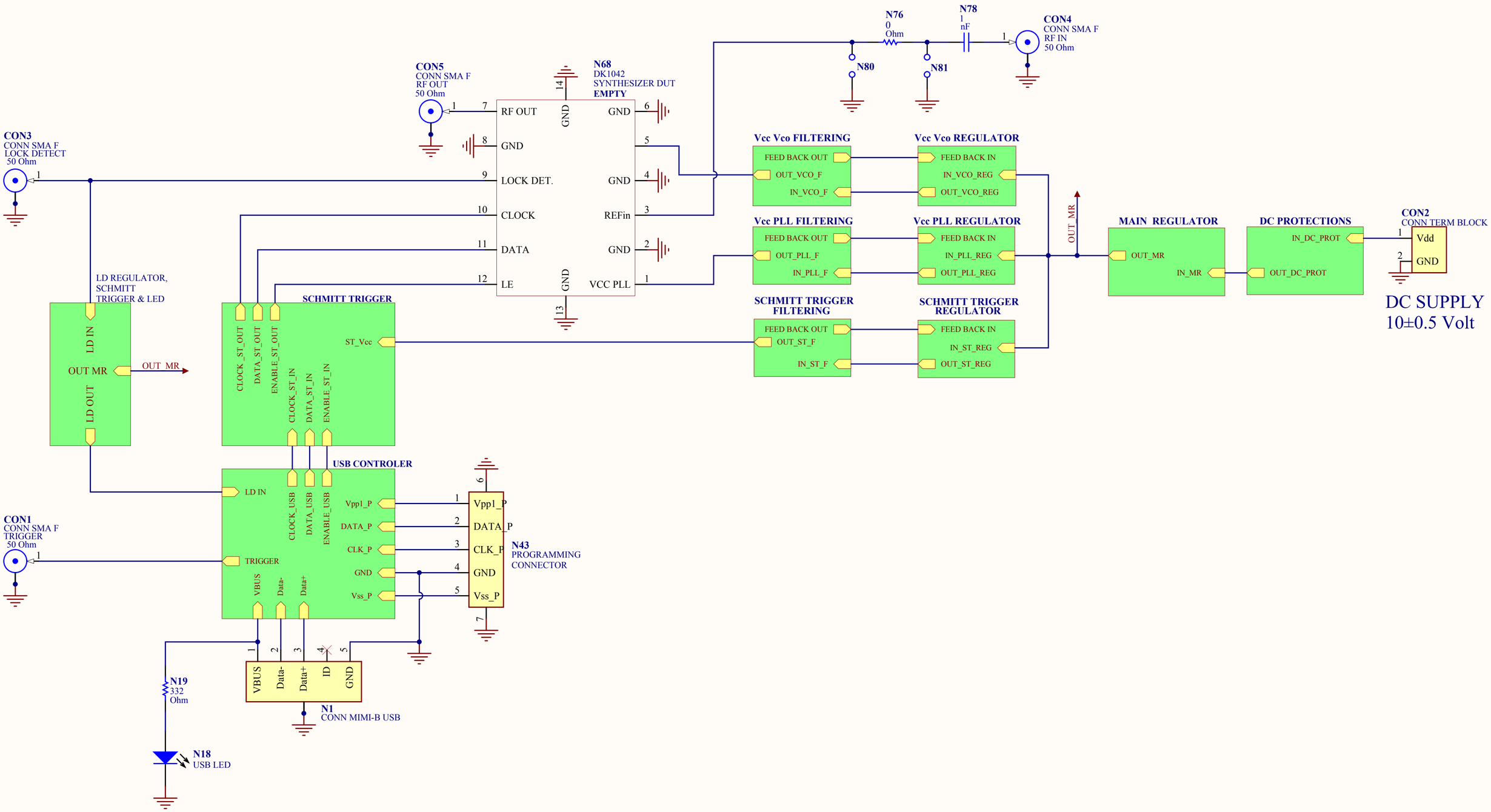
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

SIZE	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)



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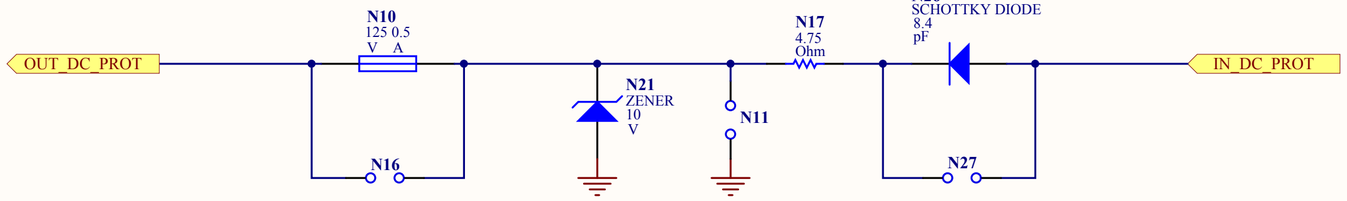
DC PROTECTIONS



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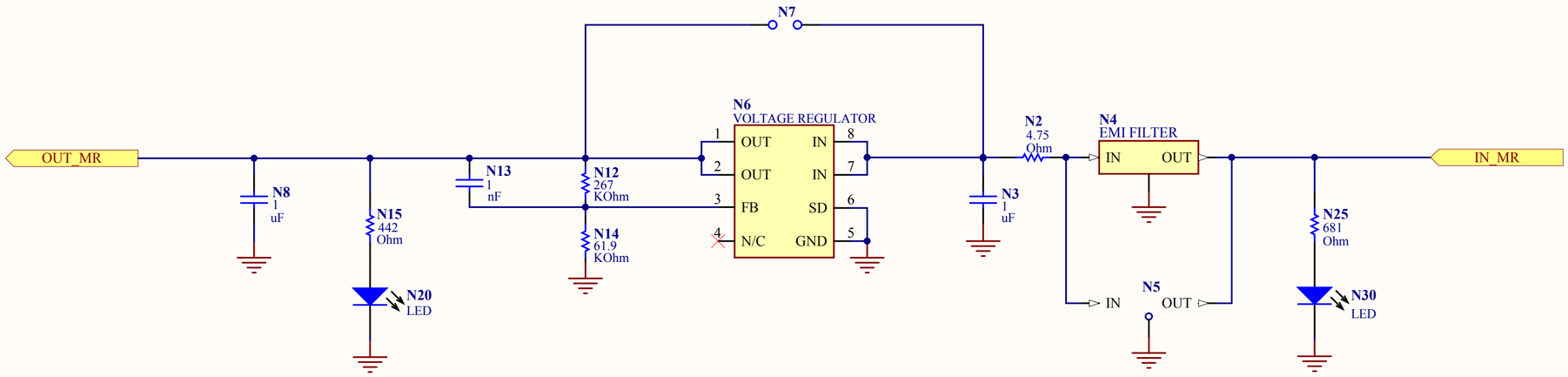
MAIN REGULATOR



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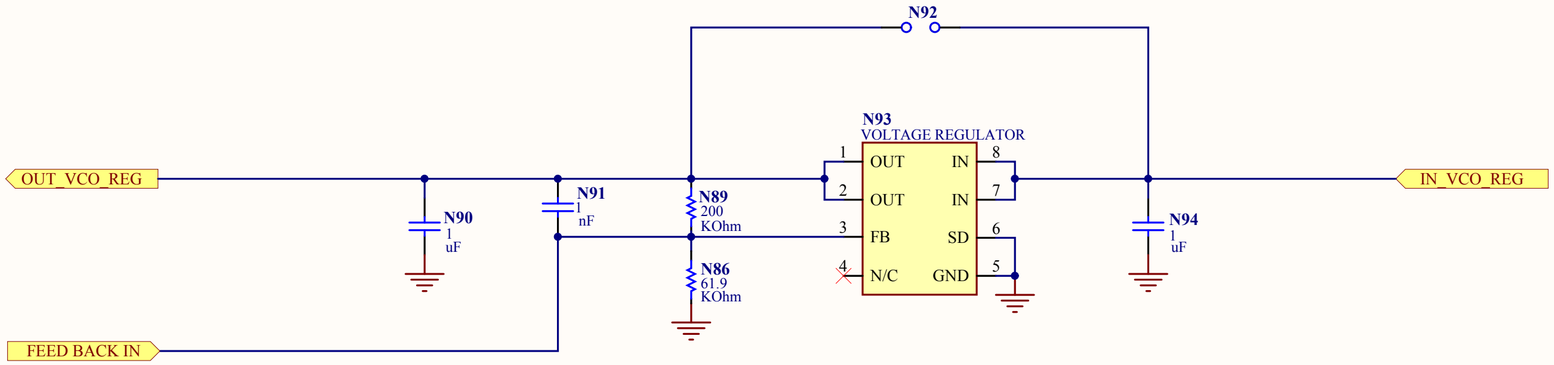
VCC VCO REGULATOR



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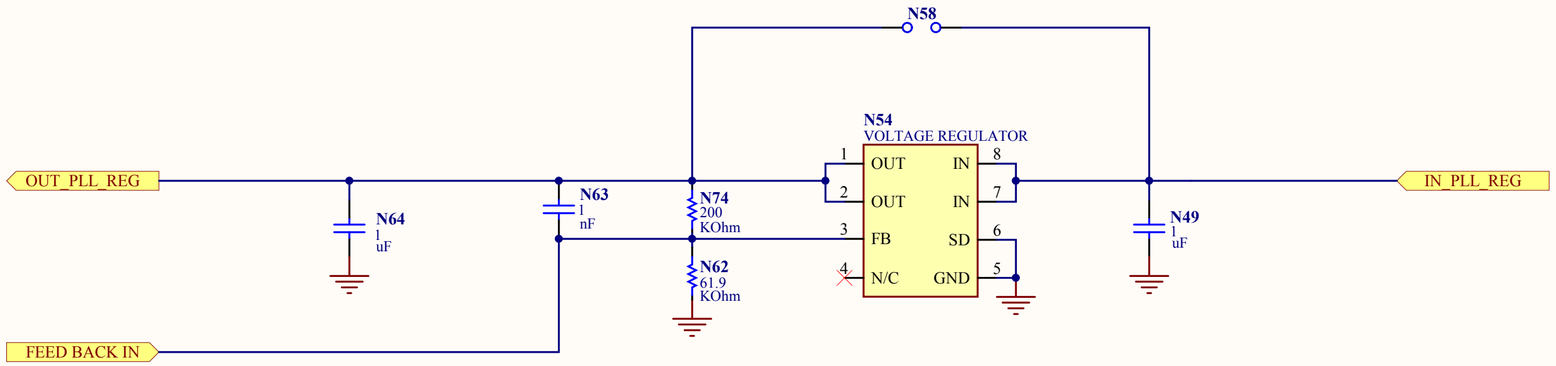
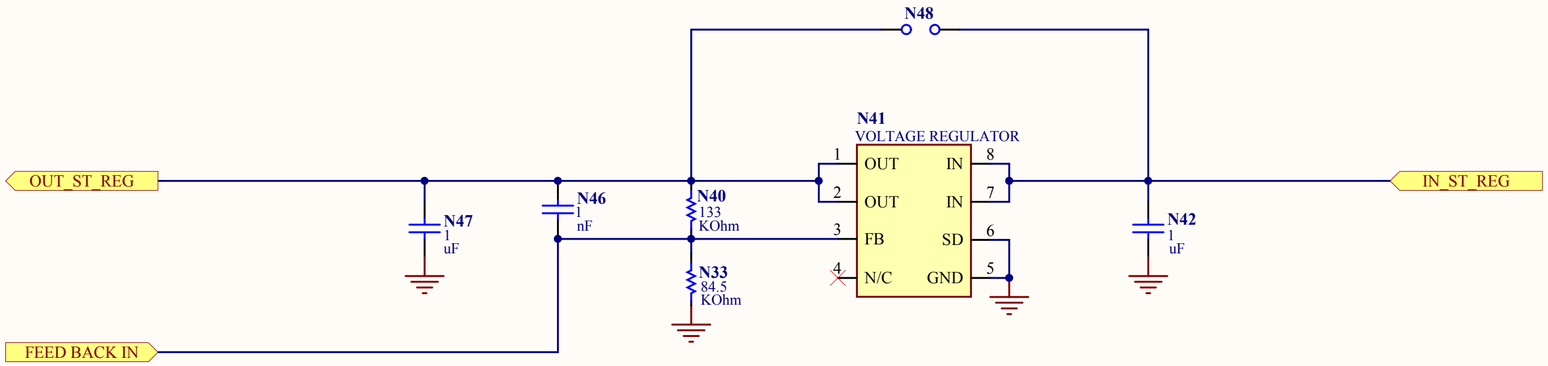
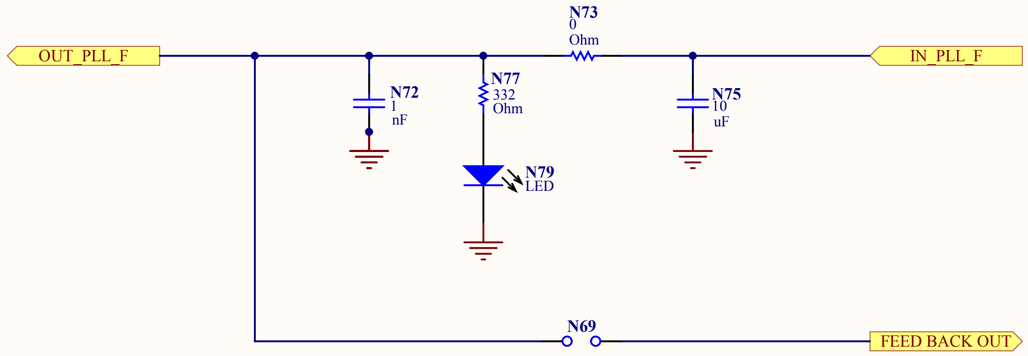
VCC PLL REGULATOR



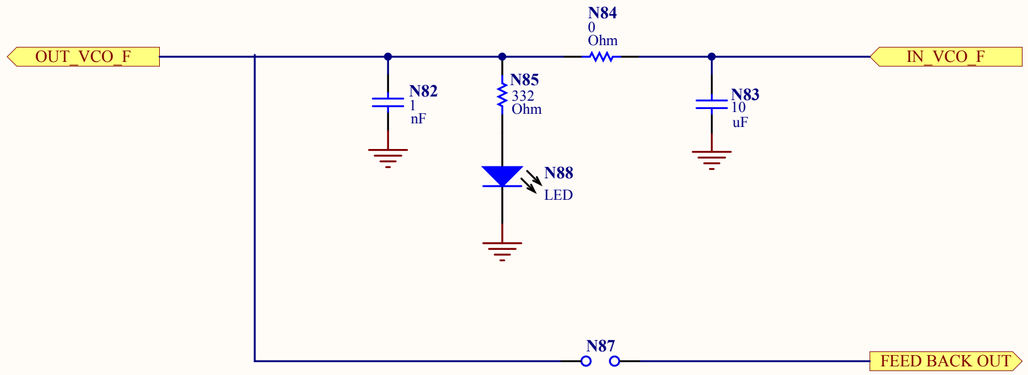
SCHMITT TRIGGER REGULATOR



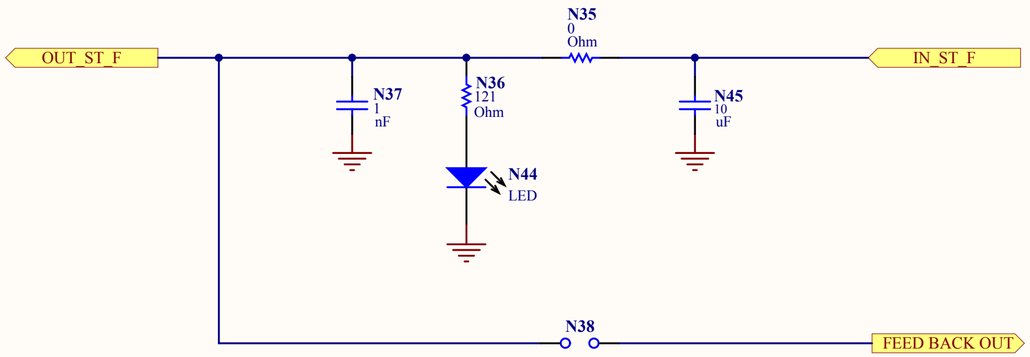
VCC PLL FILTERING



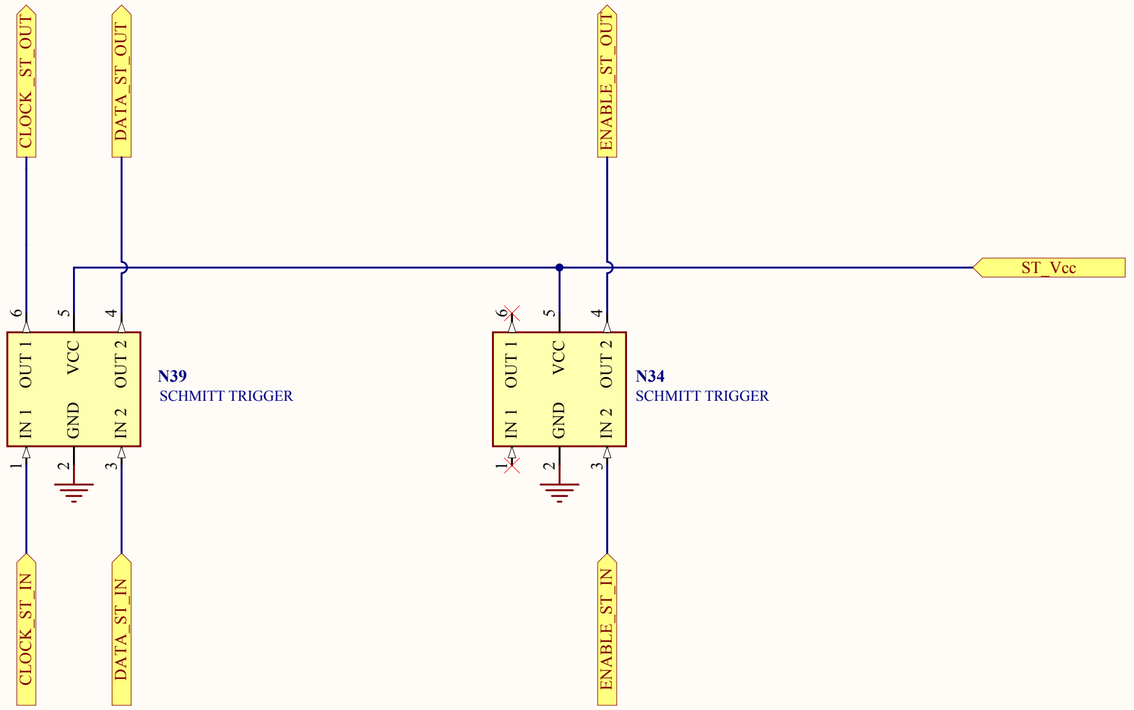
VCC VCO FILTERING



SCHMITT TRIGGER FILTERING



SCHMITT TRIGGER



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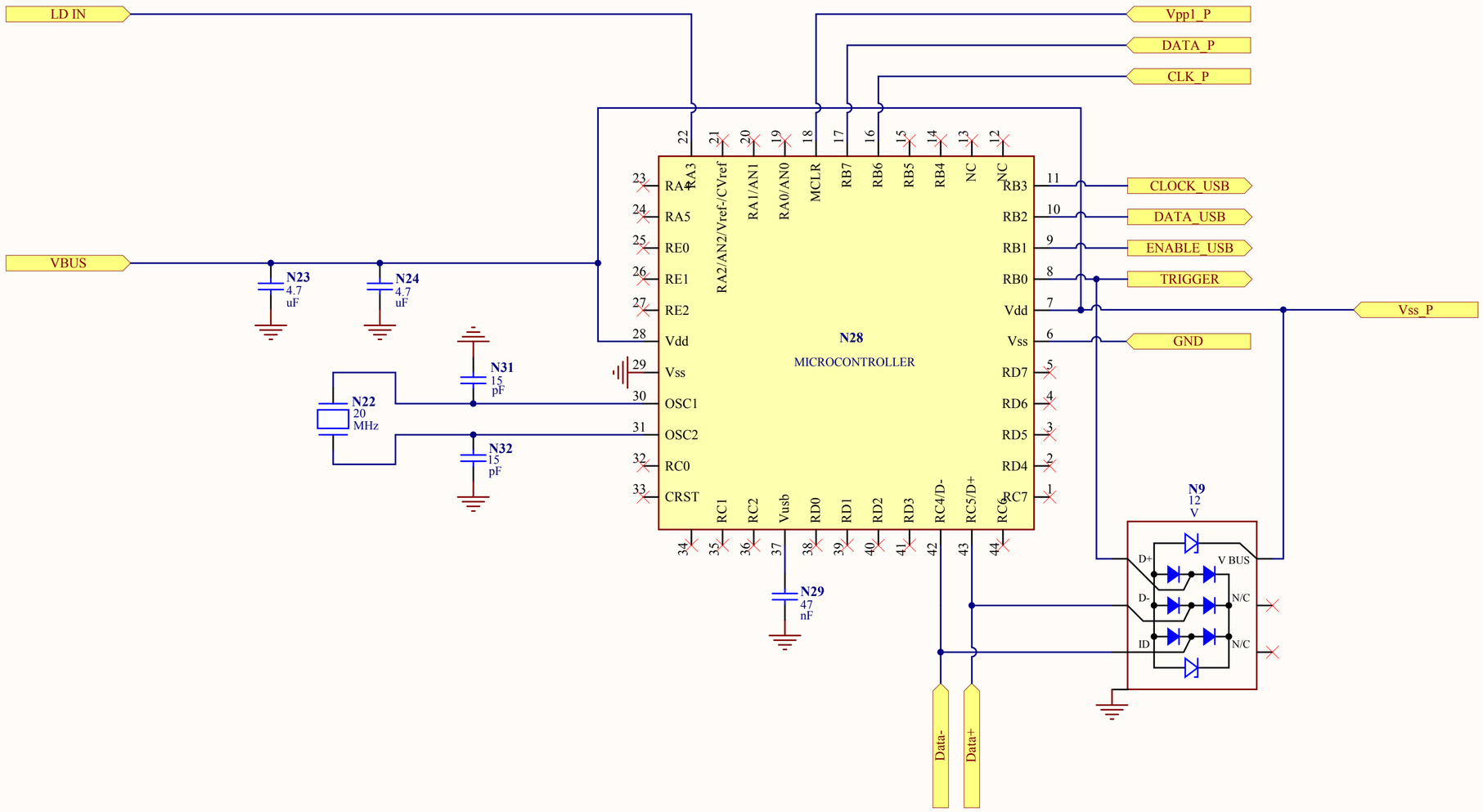
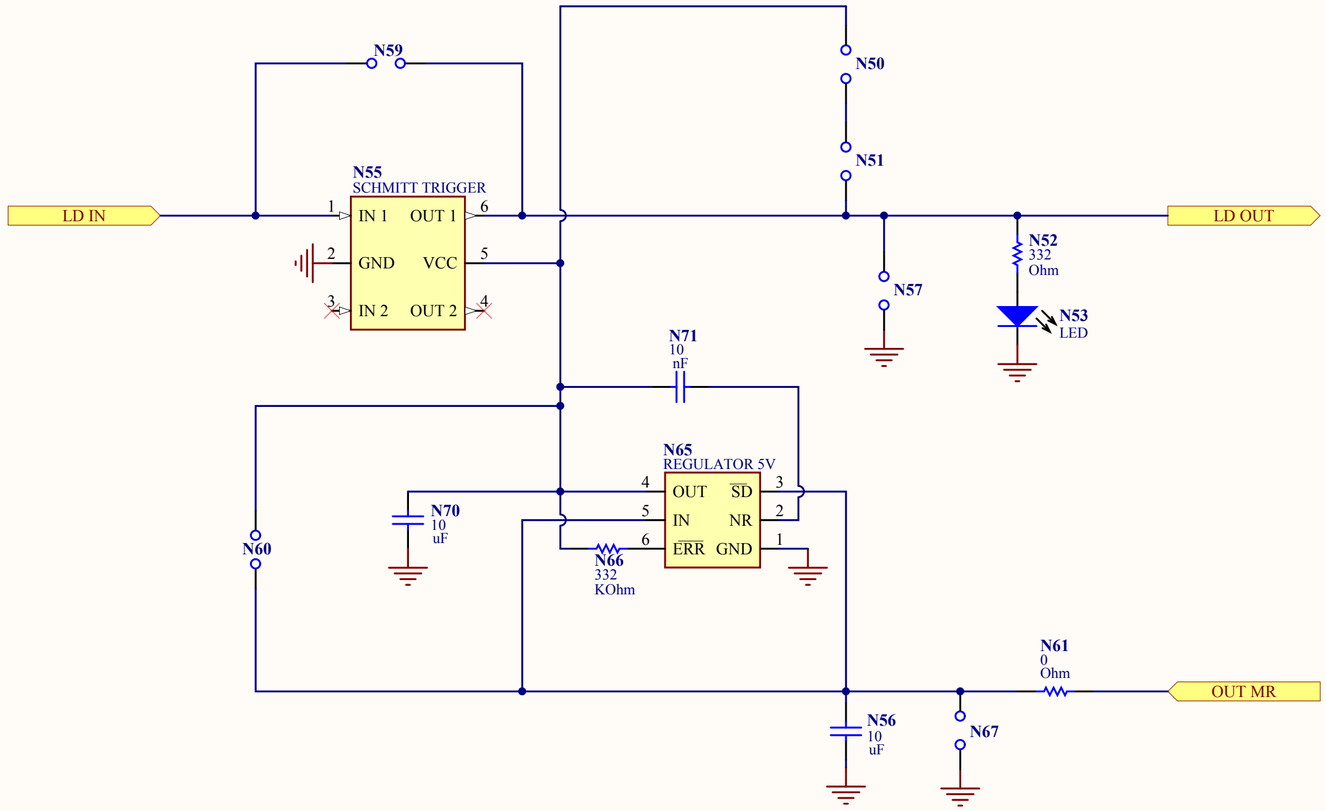
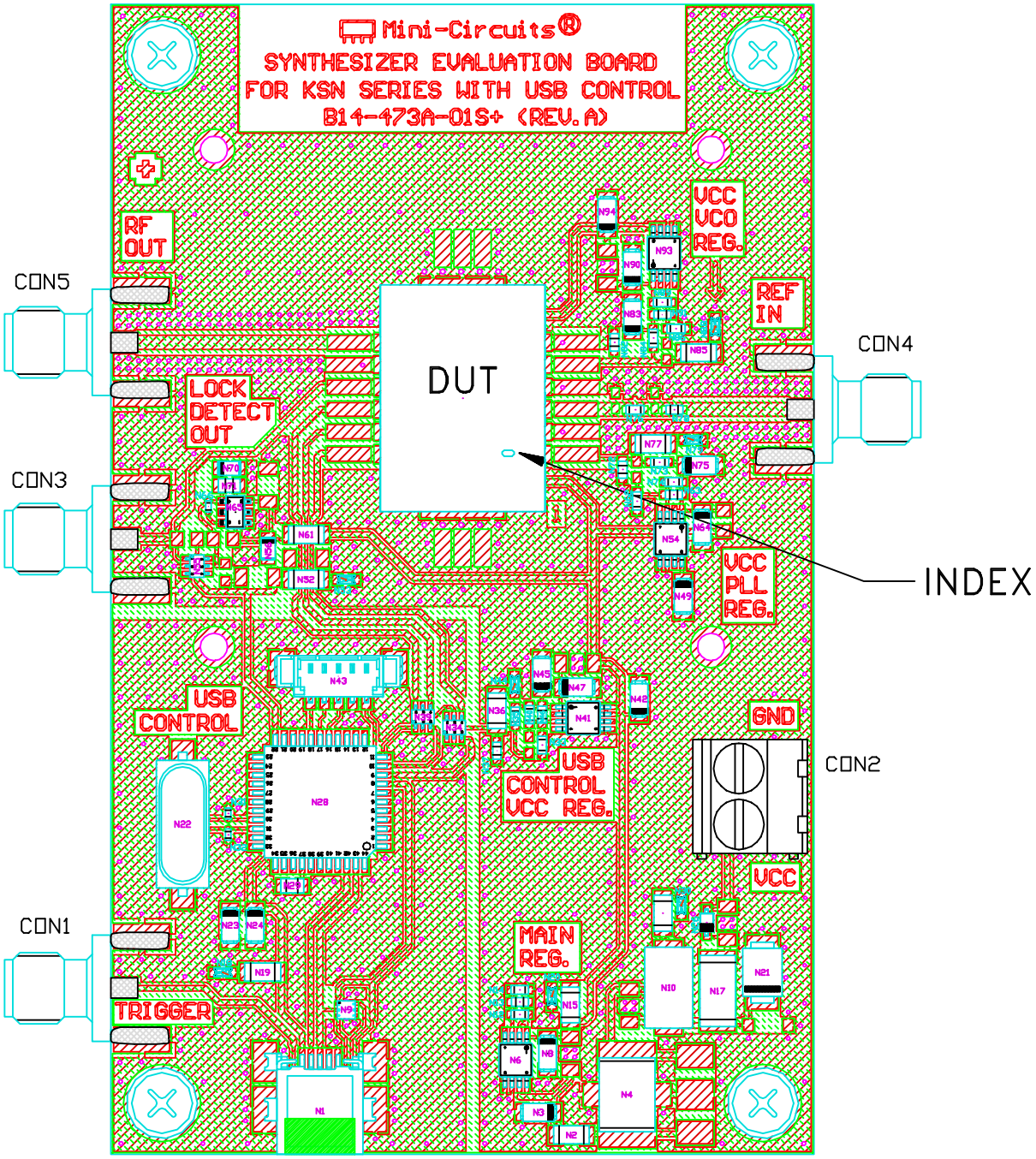
USB CONTROLER



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.

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Mini-Circuits

Environmental Specifications ENV65T1

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	-45° 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

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