

# Engineering Development Model

## Frequency Synthesizer

KSN-EDR10969

### 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.



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CASE STYLE : DK1042

| ELECTRICAL SPECIFICATIONS 50Ω, over -40°C to +85°C |              |      |         |        |
|----------------------------------------------------|--------------|------|---------|--------|
| Parameter                                          | Min.         | Typ. | Max.    | Units  |
| Frequency                                          | 2721.52      |      | 2737.52 | MHz    |
| Step size                                          |              | 80   |         | kHz    |
| Settling Time                                      | Within ±1kHz | 1.5  |         | msec   |
| Output Power                                       | -2           | +2   | +6      | dBm    |
| Phase Noise                                        |              |      |         |        |
| at 100 Hz offset                                   |              | -83  |         | dBc/Hz |
| at 1 kHz offset                                    |              | -90  |         | dBc/Hz |
| at 10 KHz offset                                   |              | -97  | -92     | dBc/Hz |
| at 100 KHz offset                                  |              | -124 | -118    | dBc/Hz |
| at 1000 kHz offset                                 |              | -144 | -138    | dBc/Hz |
| Integrated SSB Phase Noise                         |              | -50  |         | dBc    |
| Reference Spurious Suppression                     |              | -109 |         | dBc    |
| Comparison Spurious Suppression                    |              | -95  |         | dBc    |
| Non-Harm. Spurious Suppression                     |              | -90  |         | dBc    |
| Harmonic Suppression                               |              | -28  | -22     | dBc    |
| Supply voltage                                     | VCO          | 5    |         | V      |
|                                                    | PLL          | 3    |         | V      |
| Supply current                                     | VCO          | 46   | 52      | V      |
|                                                    | PLL          | 13   | 19      | V      |
| Reference In                                       | Frequency    | 10   |         | MHz    |
| (External)                                         | Amplitude    | 1    |         | Vp-p   |
|                                                    | Impedance    | 100  |         | kΩ     |
|                                                    | Ph. N @ 1kHz | -145 |         | dBc/Hz |
| Input Logic                                        | Logic high   | 1.4  | 3       | V      |
| Levels                                             | Logic Low    |      | 0.6     | V      |
| Digital Lock                                       | Locked       | 1.4  | 3       | V      |
| Detect                                             | Unlocked     |      | 0.4     | V      |
| Frequency Synthesizer PLL                          | ADF4153      |      |         |        |

| ABSOLUTE MAXIMUM RATINGS    |                |
|-----------------------------|----------------|
| Operating Temperature       | -40°C to 85°C  |
| Storage Temperature         | -55°C to 100°C |
| VCO Supply Voltage          | 6V             |
| PLL Supply Voltage          | 4V             |
| Reference Frequency voltage | 3.6Vp-p        |
| Data, Clock & LE levels     | 3.3V           |

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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## Typical Performance Data

| FREQ.<br>(MHz) | POWER OUTPUT<br>(dBm) |       |        | HARMONICS<br>(dBc) |        |        |        |        |        | VCO CURRENT<br>(mA) |       |        | PLL CURRENT<br>(mA) |       |        |
|----------------|-----------------------|-------|--------|--------------------|--------|--------|--------|--------|--------|---------------------|-------|--------|---------------------|-------|--------|
|                |                       |       |        | F2                 |        |        | F3     |        |        |                     |       |        |                     |       |        |
|                | -40 °C                | +25°C | +85 °C | -40 °C             | +25°C  | +85 °C | -40 °C | +25°C  | +85 °C | -40 °C              | +25°C | +85 °C | -40 °C              | +25°C | +85 °C |
| 2719.9         | 2.53                  | 2.03  | 1.88   | -27.22             | -27.74 | -27.34 | -51.12 | -52.35 | -50.71 | 44.87               | 46.59 | 47.47  | 12.33               | 13.35 | 16.14  |
| 2721.5         | 2.53                  | 2.04  | 1.86   | -27.05             | -27.76 | -27.31 | -51.19 | -49.46 | -51.58 | 44.88               | 46.60 | 47.53  | 12.50               | 13.59 | 16.32  |
| 2721.8         | 2.53                  | 2.03  | 1.85   | -27.20             | -27.68 | -27.34 | -52.18 | -50.94 | -49.74 | 44.88               | 46.60 | 47.55  | 12.53               | 13.65 | 16.35  |
| 2723.8         | 2.53                  | 2.03  | 1.84   | -27.35             | -27.83 | -27.42 | -52.54 | -51.49 | -50.72 | 44.89               | 46.61 | 47.57  | 12.61               | 13.74 | 16.43  |
| 2725.7         | 2.52                  | 2.03  | 1.84   | -26.98             | -27.68 | -27.20 | -53.81 | -49.47 | -51.26 | 44.87               | 46.61 | 47.58  | 12.62               | 13.77 | 16.45  |
| 2727.6         | 2.52                  | 2.04  | 1.84   | -26.92             | -27.59 | -27.36 | -55.57 | -49.95 | -48.37 | 44.88               | 46.62 | 47.58  | 12.54               | 13.69 | 16.36  |
| 2729.5         | 2.53                  | 2.05  | 1.84   | -27.25             | -27.69 | -27.38 | -56.13 | -51.12 | -47.39 | 44.89               | 46.62 | 47.59  | 12.41               | 13.56 | 16.22  |
| 2731.4         | 2.53                  | 2.06  | 1.84   | -27.43             | -27.78 | -27.24 | -54.80 | -49.62 | -47.11 | 44.90               | 46.63 | 47.60  | 12.48               | 13.64 | 16.29  |
| 2733.4         | 2.53                  | 2.08  | 1.84   | -27.17             | -27.76 | -27.29 | -55.70 | -51.21 | -48.23 | 44.90               | 46.64 | 47.61  | 12.59               | 13.75 | 16.40  |
| 2735.3         | 2.53                  | 2.09  | 1.84   | -27.26             | -27.86 | -27.41 | -56.27 | -52.22 | -48.80 | 44.91               | 46.64 | 47.61  | 12.60               | 13.77 | 16.42  |
| 2737.2         | 2.54                  | 2.09  | 1.83   | -27.21             | -27.86 | -27.42 | -56.52 | -53.24 | -49.55 | 44.92               | 46.65 | 47.62  | 12.57               | 13.73 | 16.39  |
| 2737.5         | 2.54                  | 2.10  | 1.84   | -27.40             | -27.71 | -27.37 | -53.99 | -51.43 | -50.63 | 44.92               | 46.65 | 47.62  | 12.56               | 13.73 | 16.38  |
| 2739.1         | 2.54                  | 2.09  | 1.83   | -27.45             | -27.89 | -27.43 | -55.53 | -51.67 | -51.54 | 44.92               | 46.65 | 47.62  | 12.45               | 13.62 | 16.25  |

| FREQ.<br>(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    |
| 2719.9         | -84.77               | -91.42 | -97.09 | -125.07 | -145.64 | -83.49 | -89.12 | -97.18 | -123.74 | -144.01 | -83.03 | -89.65 | -96.25 | -122.62 | -142.84 |
| 2721.5         | -83.80               | -90.22 | -97.49 | -125.17 | -145.65 | -81.66 | -87.91 | -97.11 | -123.84 | -144.07 | -82.91 | -90.07 | -96.22 | -122.61 | -142.83 |
| 2721.8         | -84.09               | -92.33 | -97.37 | -125.25 | -145.64 | -85.79 | -88.66 | -97.72 | -123.67 | -144.14 | -82.92 | -90.44 | -96.33 | -122.71 | -142.84 |
| 2723.8         | -84.36               | -91.29 | -97.28 | -125.03 | -145.60 | -84.53 | -87.16 | -96.67 | -123.79 | -143.98 | -84.15 | -89.35 | -96.31 | -122.47 | -142.79 |
| 2725.7         | -83.94               | -89.27 | -96.83 | -124.86 | -145.42 | -83.38 | -86.80 | -97.26 | -123.68 | -144.16 | -81.01 | -90.26 | -96.85 | -122.58 | -142.71 |
| 2727.6         | -82.31               | -89.77 | -97.04 | -124.82 | -145.57 | -82.81 | -89.40 | -97.56 | -123.67 | -143.96 | -83.60 | -89.23 | -96.37 | -122.54 | -142.70 |
| 2729.5         | -82.82               | -90.94 | -97.51 | -124.88 | -145.35 | -83.03 | -89.46 | -97.27 | -123.61 | -144.00 | -87.04 | -90.17 | -95.94 | -122.29 | -142.72 |
| 2731.4         | -83.27               | -89.63 | -97.66 | -125.30 | -145.48 | -82.24 | -89.05 | -97.19 | -123.74 | -143.94 | -83.96 | -89.70 | -96.18 | -122.28 | -142.66 |
| 2733.4         | -83.54               | -90.63 | -97.37 | -125.20 | -145.53 | -82.50 | -89.23 | -97.14 | -123.53 | -143.99 | -85.34 | -91.43 | -96.50 | -122.25 | -142.51 |
| 2735.3         | -84.23               | -92.16 | -97.37 | -124.82 | -145.39 | -84.35 | -88.85 | -97.21 | -123.73 | -143.91 | -83.14 | -90.09 | -96.34 | -122.35 | -142.59 |
| 2737.2         | -80.82               | -92.37 | -97.25 | -124.92 | -145.25 | -82.49 | -89.18 | -97.84 | -123.59 | -144.07 | -83.13 | -89.11 | -96.37 | -122.19 | -142.53 |
| 2737.5         | -81.31               | -90.90 | -97.57 | -125.11 | -145.47 | -82.47 | -88.61 | -97.68 | -123.78 | -143.95 | -82.00 | -90.86 | -96.03 | -122.27 | -142.63 |
| 2739.1         | -83.33               | -90.05 | -97.62 | -124.94 | -145.49 | -82.09 | -89.42 | -97.34 | -123.72 | -143.99 | -84.59 | -90.37 | -96.65 | -122.28 | -142.68 |

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## Typical Performance Data

| COMPARISON<br>SPURIOUS ORDER | COMPARISON SPURIOUS<br>@Fcarrier 2721.52 MHz±<br>(n*Fcomparison)<br>(dBc) NOTE 1 |         |         | COMPARISON SPURIOUS<br>@Fcarrier 2729.52 MHz±<br>(n*Fcomparison)<br>(dBc) NOTE 1 |         |         | COMPARISON SPURIOUS<br>@Fcarrier 2737.52 MHz±<br>(n*Fcomparison)<br>(dBc) NOTE 1 |         |         |
|------------------------------|----------------------------------------------------------------------------------|---------|---------|----------------------------------------------------------------------------------|---------|---------|----------------------------------------------------------------------------------|---------|---------|
|                              | -40°C                                                                            | +25°C   | +85°C   | -40°C                                                                            | +25°C   | +85°C   | -40°C                                                                            | +25°C   | +85°C   |
| -5                           | -110.15                                                                          | -105.90 | -114.70 | -112.54                                                                          | -106.90 | -112.98 | -113.27                                                                          | -106.93 | -108.64 |
| -4                           | -110.15                                                                          | -110.42 | -112.83 | -110.64                                                                          | -108.23 | -111.03 | -111.99                                                                          | -107.10 | -108.15 |
| -3                           | -110.35                                                                          | -117.05 | -113.17 | -112.39                                                                          | -109.98 | -116.02 | -111.25                                                                          | -107.60 | -111.76 |
| -2                           | -110.29                                                                          | -120.29 | -112.43 | -105.72                                                                          | -107.63 | -111.61 | -103.50                                                                          | -103.86 | -109.43 |
| -1                           | -96.81                                                                           | -94.11  | -97.00  | -86.98                                                                           | -88.64  | -90.70  | -85.72                                                                           | -85.81  | -86.24  |
| 0 <sup>note 2</sup>          | -                                                                                | -       | -       | -                                                                                | -       | -       | -                                                                                | -       | -       |
| +1                           | -97.49                                                                           | -98.16  | -94.14  | -106.28                                                                          | -101.25 | -98.91  | -98.39                                                                           | -102.61 | -101.45 |
| +2                           | -109.52                                                                          | -108.10 | -106.77 | -106.90                                                                          | -114.13 | -107.78 | -104.71                                                                          | -115.86 | -108.64 |
| +3                           | -105.70                                                                          | -113.39 | -110.00 | -104.08                                                                          | -110.75 | -109.35 | -104.10                                                                          | -110.69 | -107.84 |
| +4                           | -103.07                                                                          | -111.77 | -109.82 | -103.91                                                                          | -111.34 | -110.19 | -103.69                                                                          | -109.46 | -107.88 |
| +5                           | -105.06                                                                          | -110.79 | -110.70 | -104.26                                                                          | -112.55 | -108.20 | -105.73                                                                          | -112.01 | -108.29 |

Note 1: Comparison frequency 200 kHz

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

| REFERENCE<br>SPURIOUS ORDER | REFERENCE SPURIOUS<br>@Fcarrier 2721.52 MHz±<br>(n*Freference)<br>(dBc) NOTE 3 |         |         | REFERENCE SPURIOUS<br>@Fcarrier 2729.52 MHz±<br>(n*Freference)<br>(dBc) NOTE 3 |         |         | REFERENCE SPURIOUS<br>@Fcarrier 2737.52 MHz±<br>(n*Freference)<br>(dBc) NOTE 3 |         |         |
|-----------------------------|--------------------------------------------------------------------------------|---------|---------|--------------------------------------------------------------------------------|---------|---------|--------------------------------------------------------------------------------|---------|---------|
|                             | -40°C                                                                          | +25°C   | +85°C   | -40°C                                                                          | +25°C   | +85°C   | -40°C                                                                          | +25°C   | +85°C   |
| -5                          | -112.10                                                                        | -117.81 | -114.18 | -108.06                                                                        | -103.92 | -104.69 | -106.18                                                                        | -108.38 | -106.85 |
| -4                          | -119.24                                                                        | -124.25 | -119.72 | -104.30                                                                        | -101.47 | -101.90 | -105.61                                                                        | -102.45 | -105.90 |
| -3                          | -118.94                                                                        | -120.90 | -126.85 | -98.07                                                                         | -99.19  | -98.60  | -100.14                                                                        | -97.14  | -99.77  |
| -2                          | -127.11                                                                        | -120.26 | -123.38 | -90.55                                                                         | -90.22  | -90.81  | -87.96                                                                         | -92.60  | -91.75  |
| -1                          | -108.23                                                                        | -107.15 | -108.46 | -76.85                                                                         | -77.06  | -79.28  | -82.95                                                                         | -85.51  | -83.68  |
| 0 <sup>note 4</sup>         | -                                                                              | -       | -       | -                                                                              | -       | -       | -                                                                              | -       | -       |
| +1                          | -112.16                                                                        | -109.84 | -106.11 | -75.64                                                                         | -79.39  | -78.98  | -84.24                                                                         | -86.53  | -85.93  |
| +2                          | -123.94                                                                        | -116.79 | -120.95 | -88.22                                                                         | -90.69  | -92.62  | -90.19                                                                         | -88.71  | -91.36  |
| +3                          | -118.31                                                                        | -120.88 | -122.13 | -100.52                                                                        | -97.88  | -95.62  | -99.09                                                                         | -99.73  | -100.66 |
| +4                          | -126.94                                                                        | -120.76 | -120.53 | -102.39                                                                        | -99.76  | -103.51 | -102.40                                                                        | -104.85 | -101.83 |
| +5                          | -113.69                                                                        | -121.48 | -120.82 | -107.42                                                                        | -108.53 | -107.93 | -107.44                                                                        | -109.23 | -106.74 |

Note 3: Reference frequency 26 MHz

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

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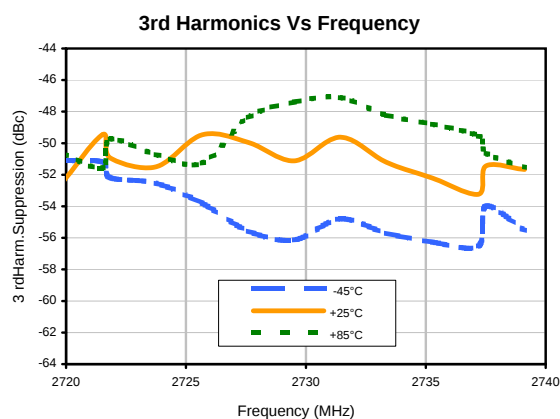
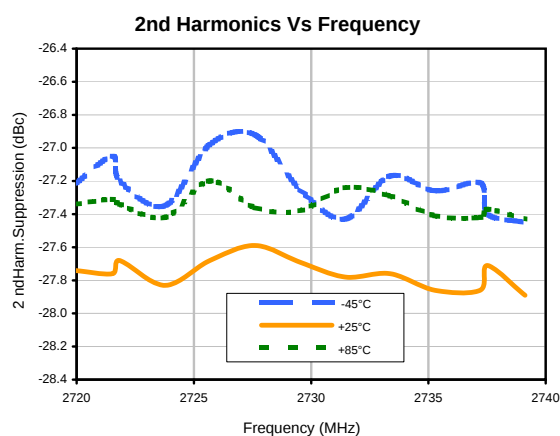
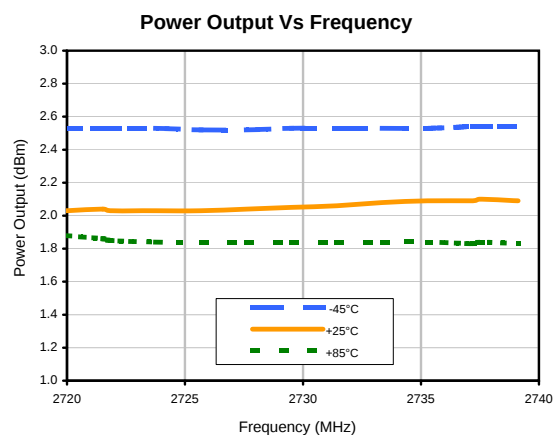
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### Notes

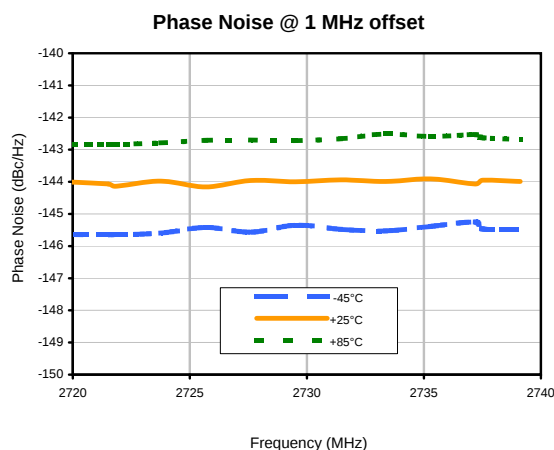
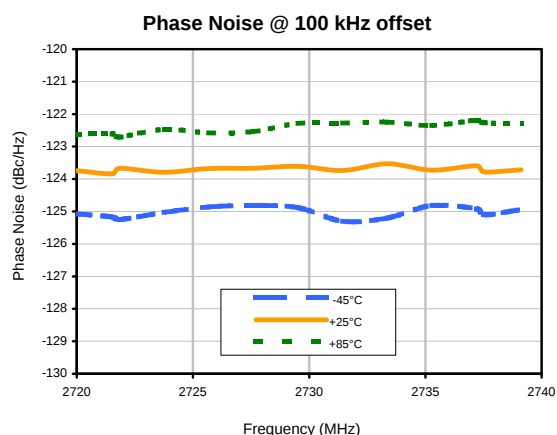
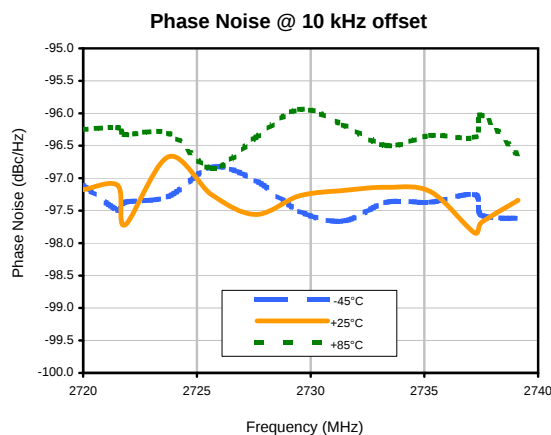
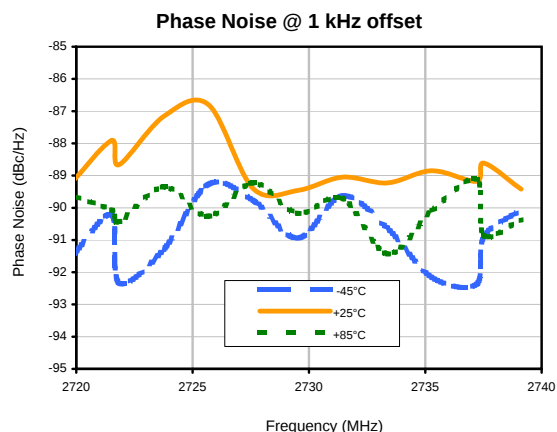
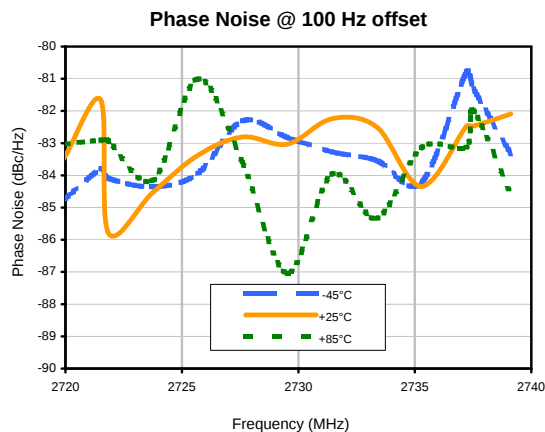
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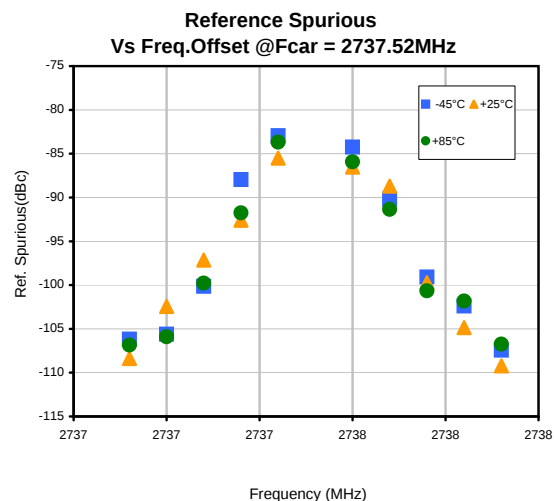
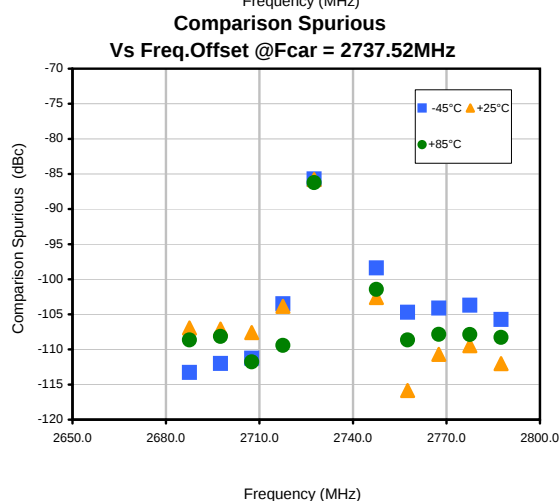
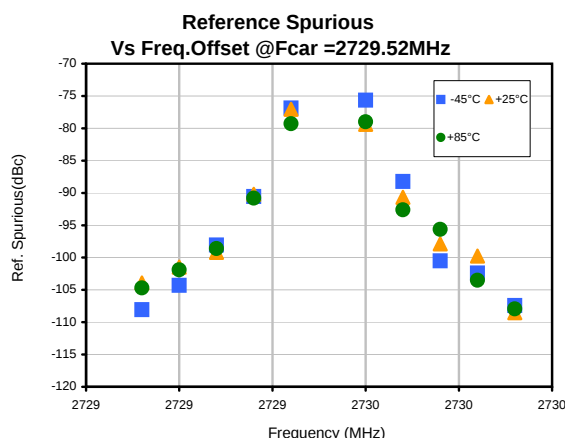
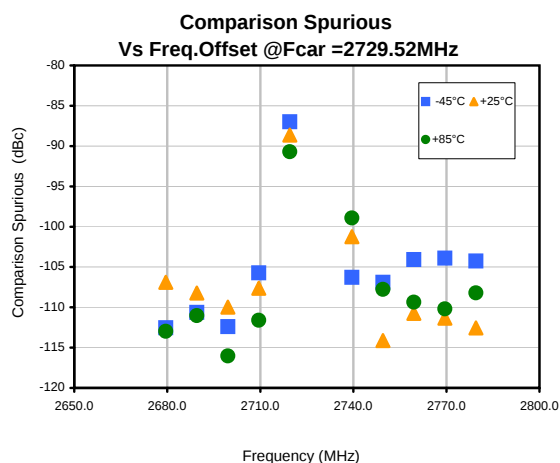
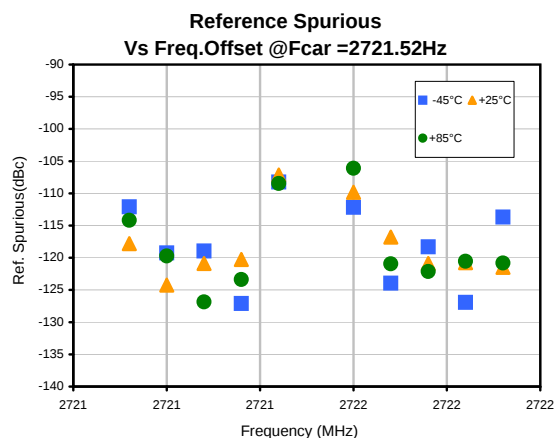
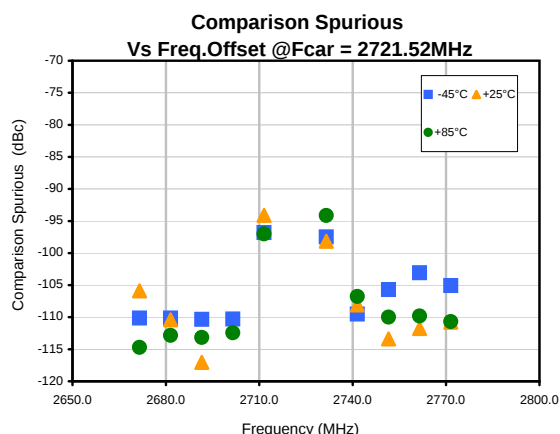
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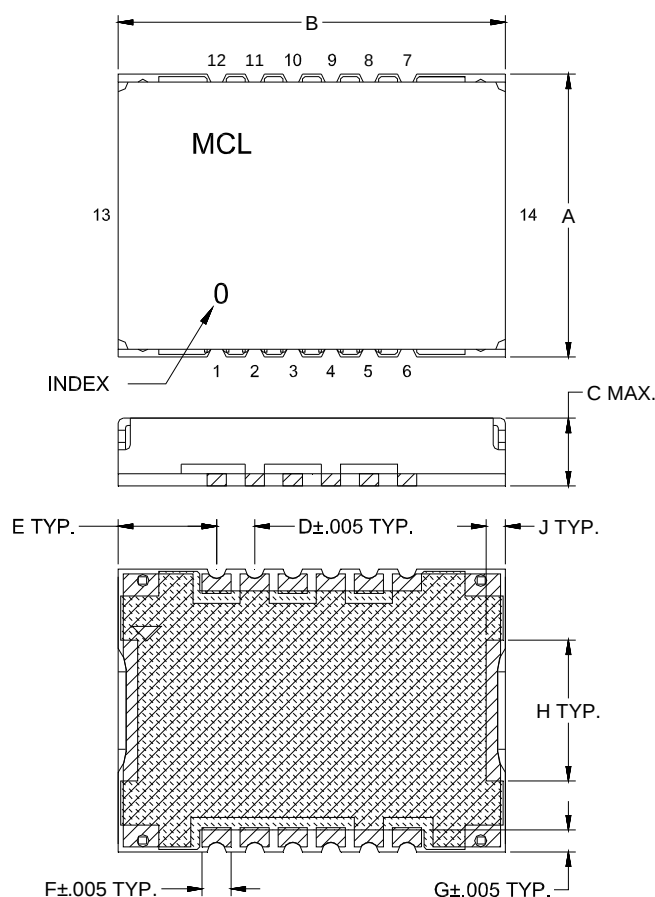


### Notes

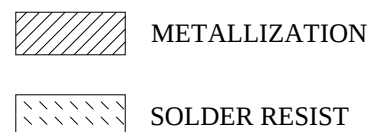
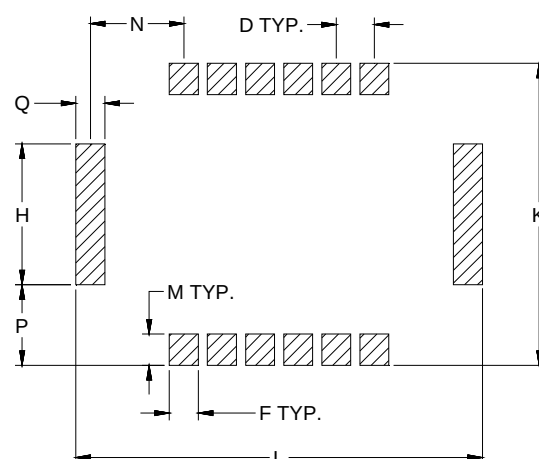
- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
- 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](http://www.minicircuits.com/MCLStore/terms.jsp)



### 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<br>(14.83) | .800<br>(20.32) | .154<br>(3.91) | .079<br>(2.01) | .203<br>(5.16) | .060<br>(1.52) | .045<br>(1.14) | .291<br>(7.39) | .039<br>(1.0) | .624<br>(15.85) | .840<br>(21.34) | .065<br>(1.65) | .193<br>(4.90) | .170<br>(4.32) | .060<br>(1.52) | 1.6      |

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

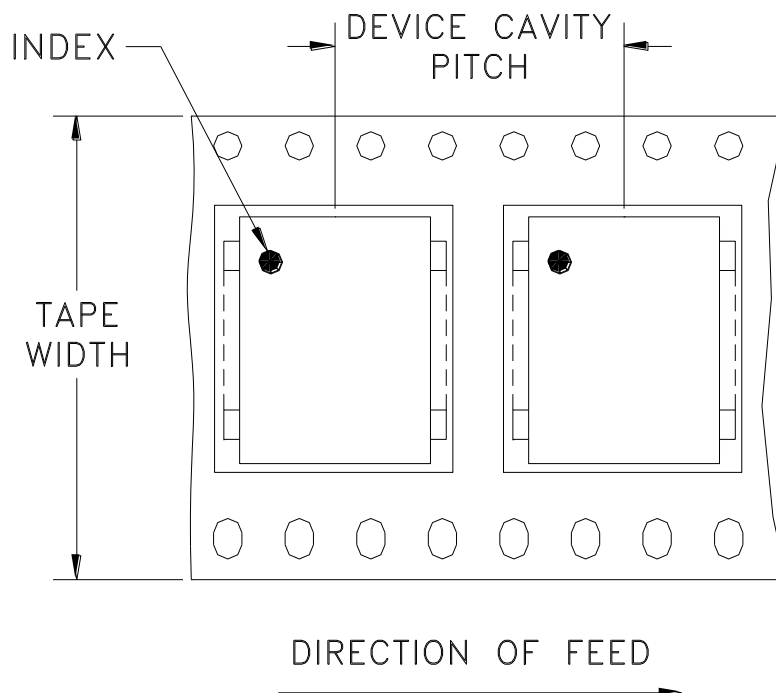
### Notes:

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

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

# Tape & Reel Packaging TR-F28

## DEVICE ORIENTATION IN T&R



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>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](http://www.minicircuits.com/pages/pdfs/tape.pdf)



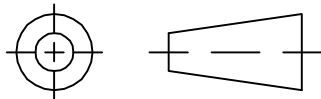
INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

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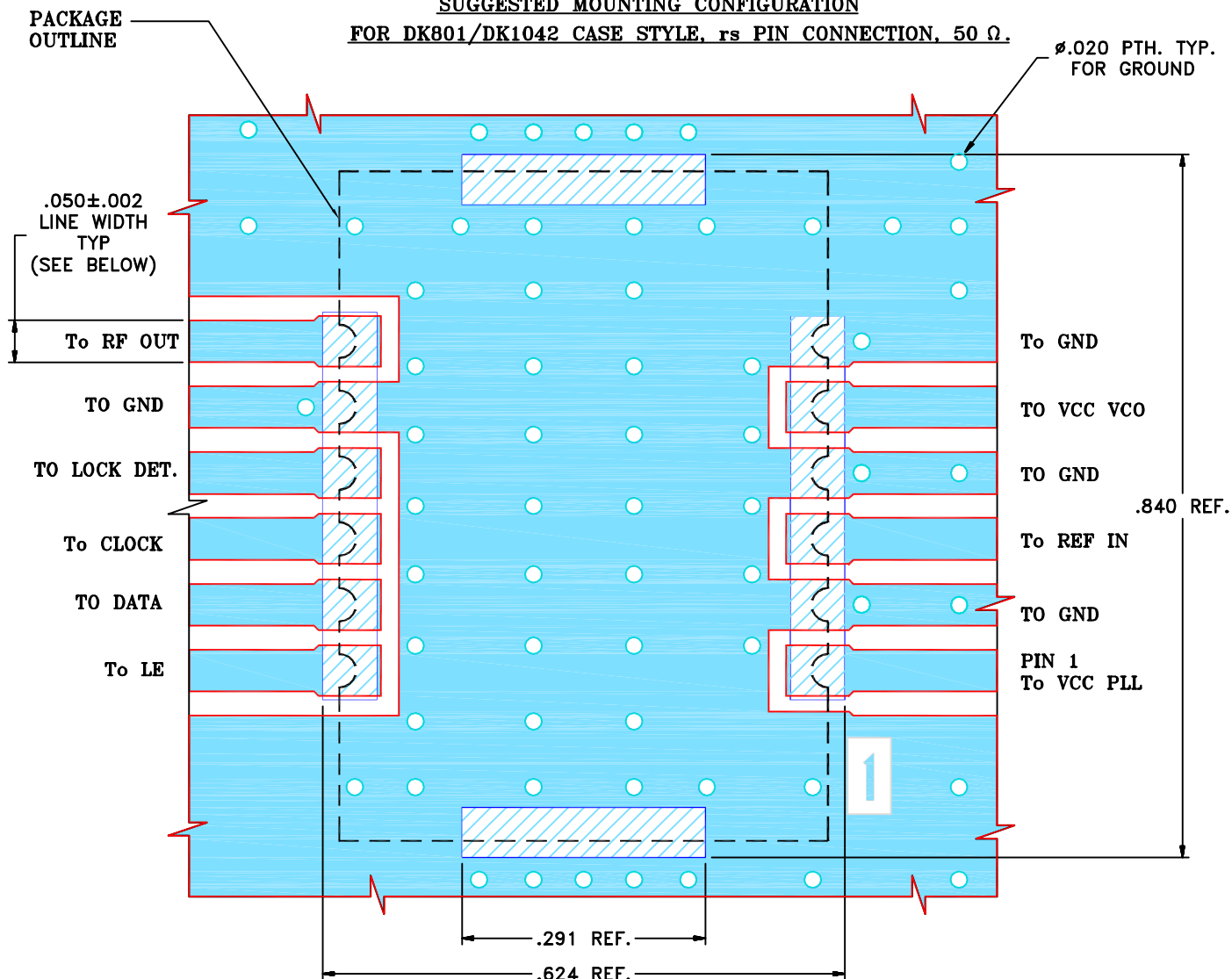
## THIRD ANGLE PROJECTION



## 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  $\Omega$ . $\phi$ .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  $\Omega$ )

SIZE  
A

CODE IDENT  
15542

DRAWING NO:  
98-PL-249

REV:  
B

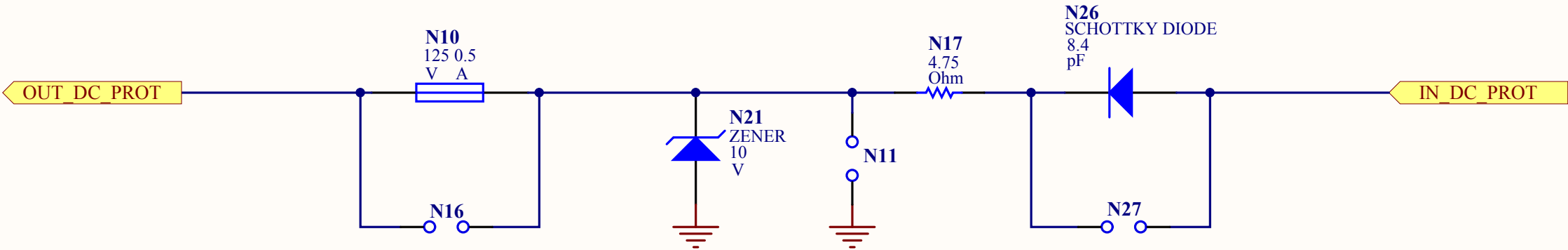
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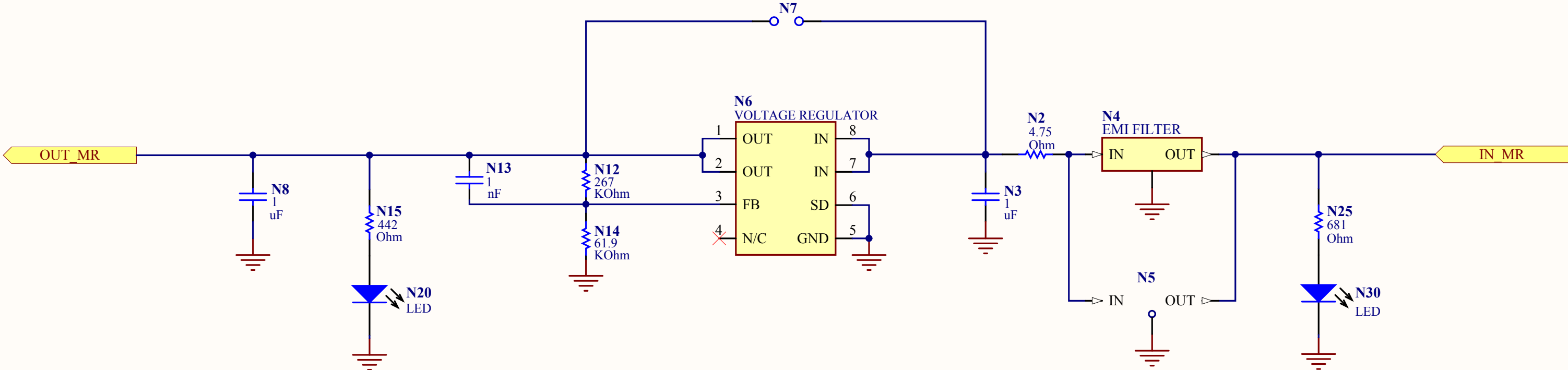
SHEET: 1 OF 1



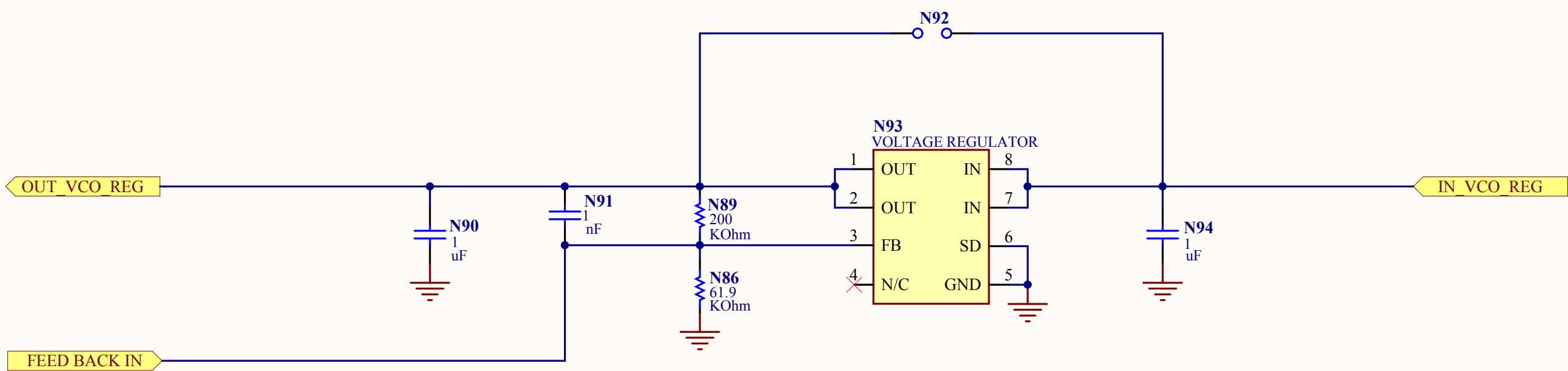
DC PROTECTIONS



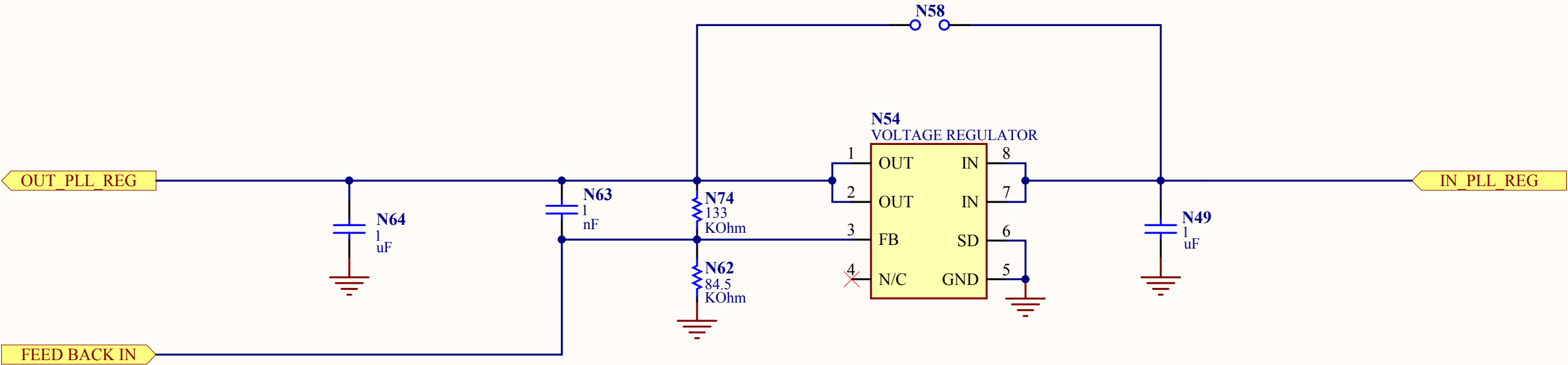
MAIN REGULATOR



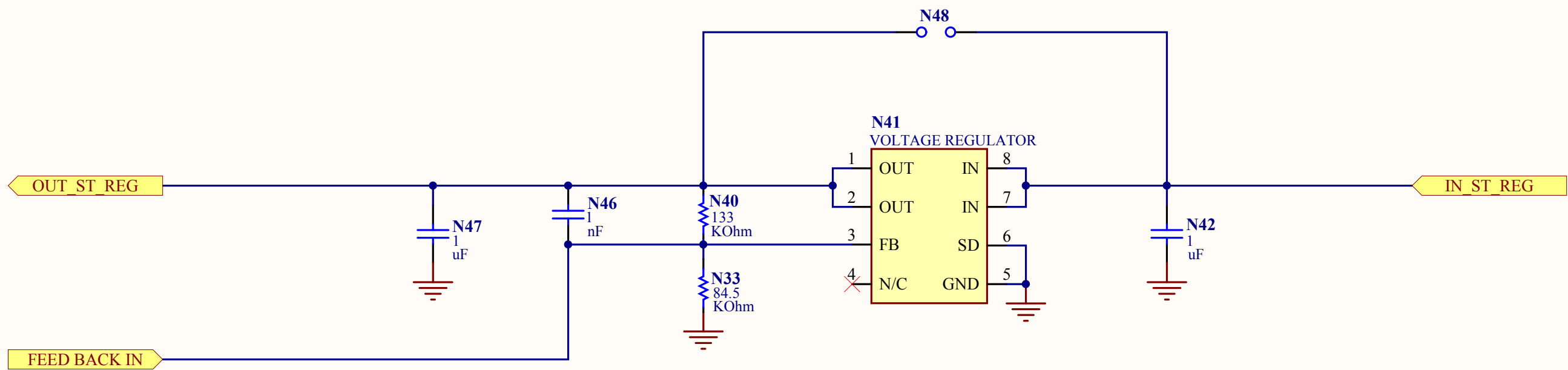
VCC VCO REGULATOR



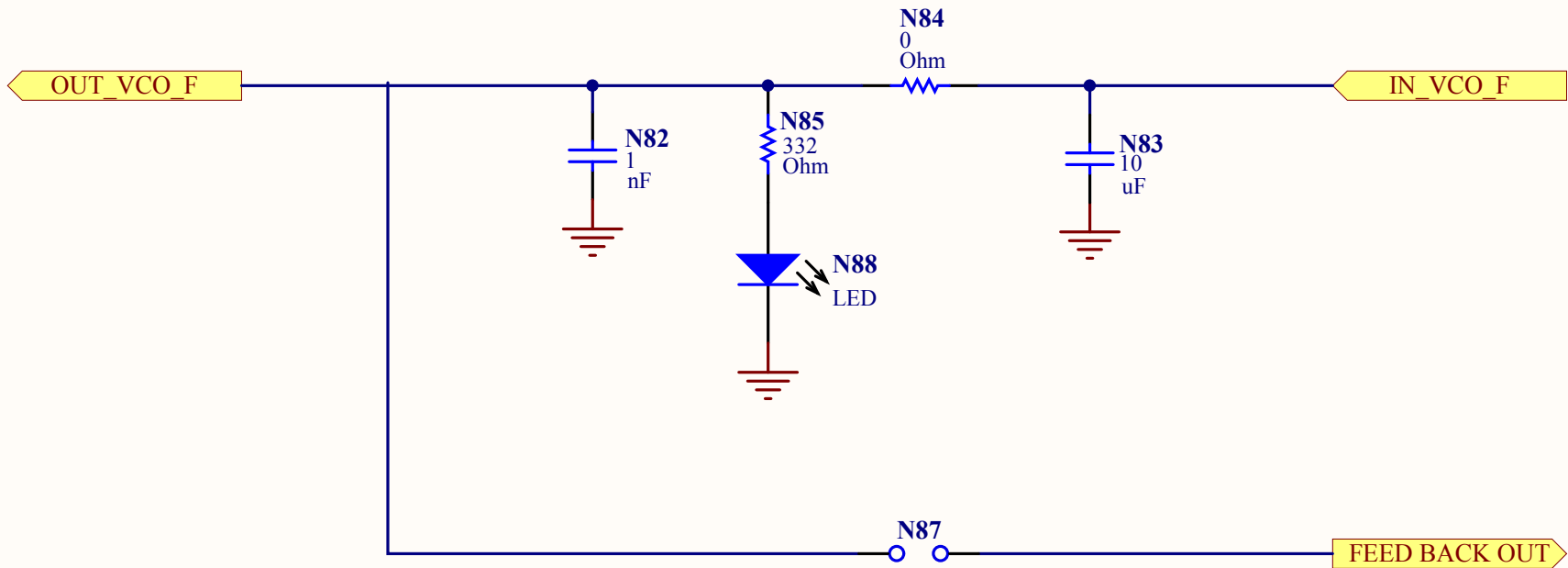
VCC PLL REGULATOR



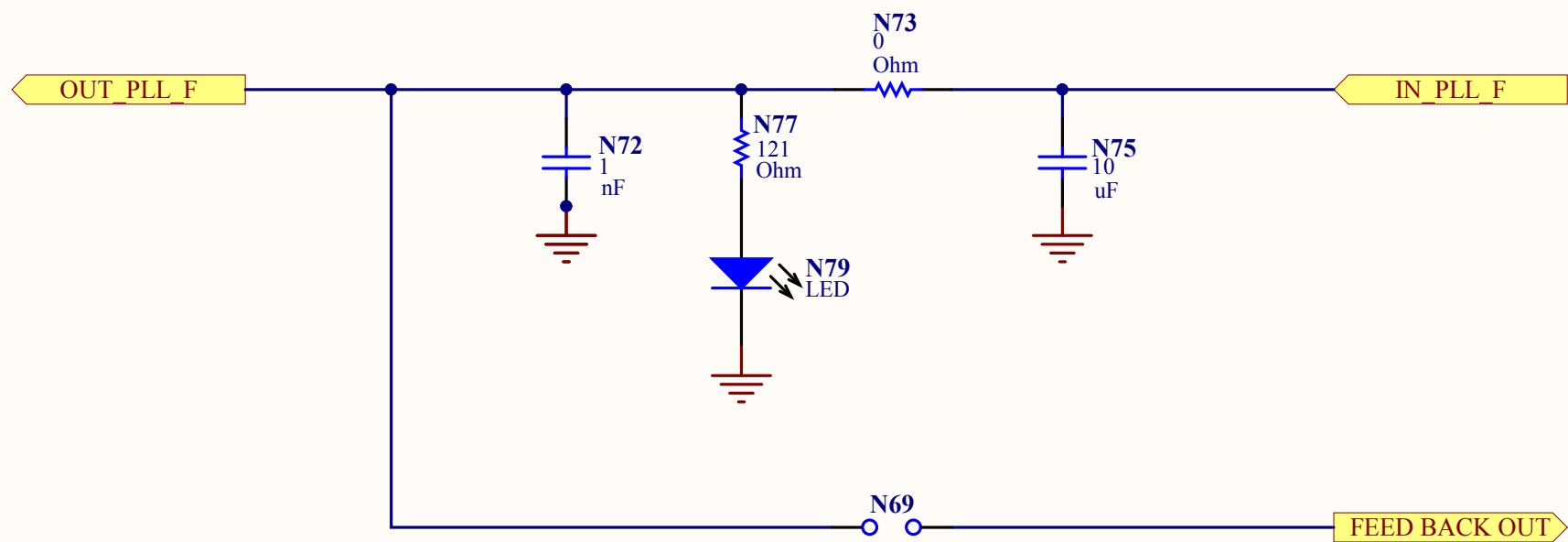
SCHMITT TRIGGER REGULATOR



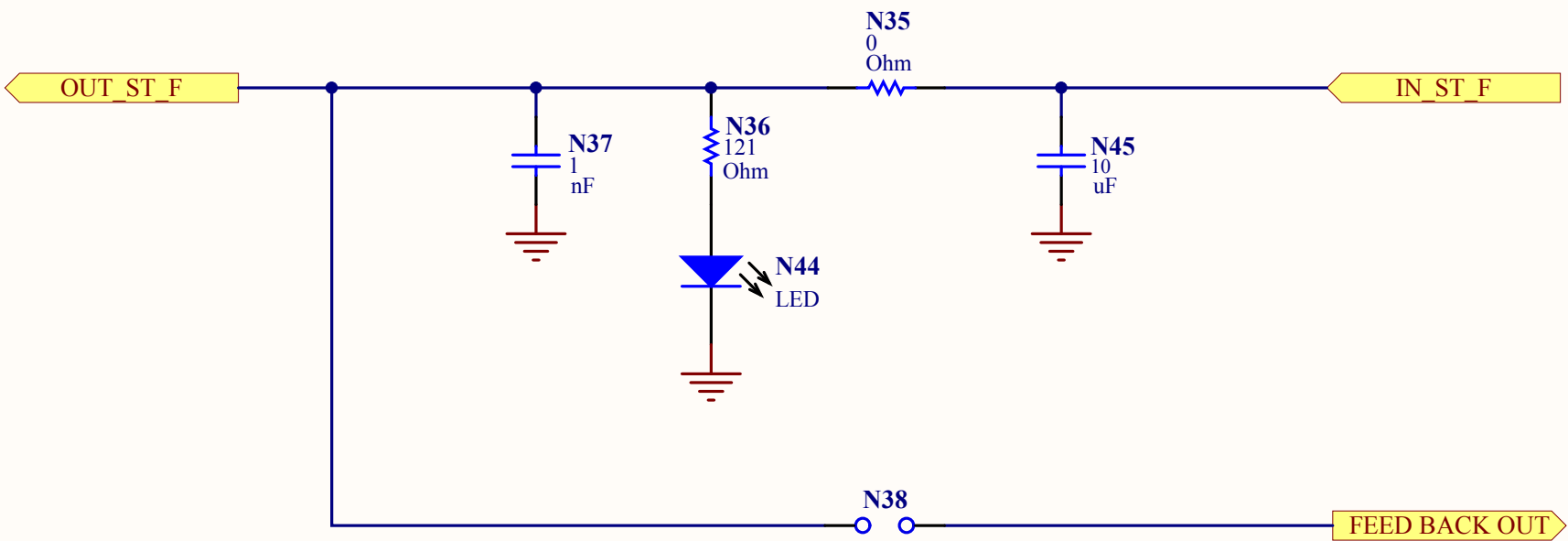
VCC VCO FILTERING



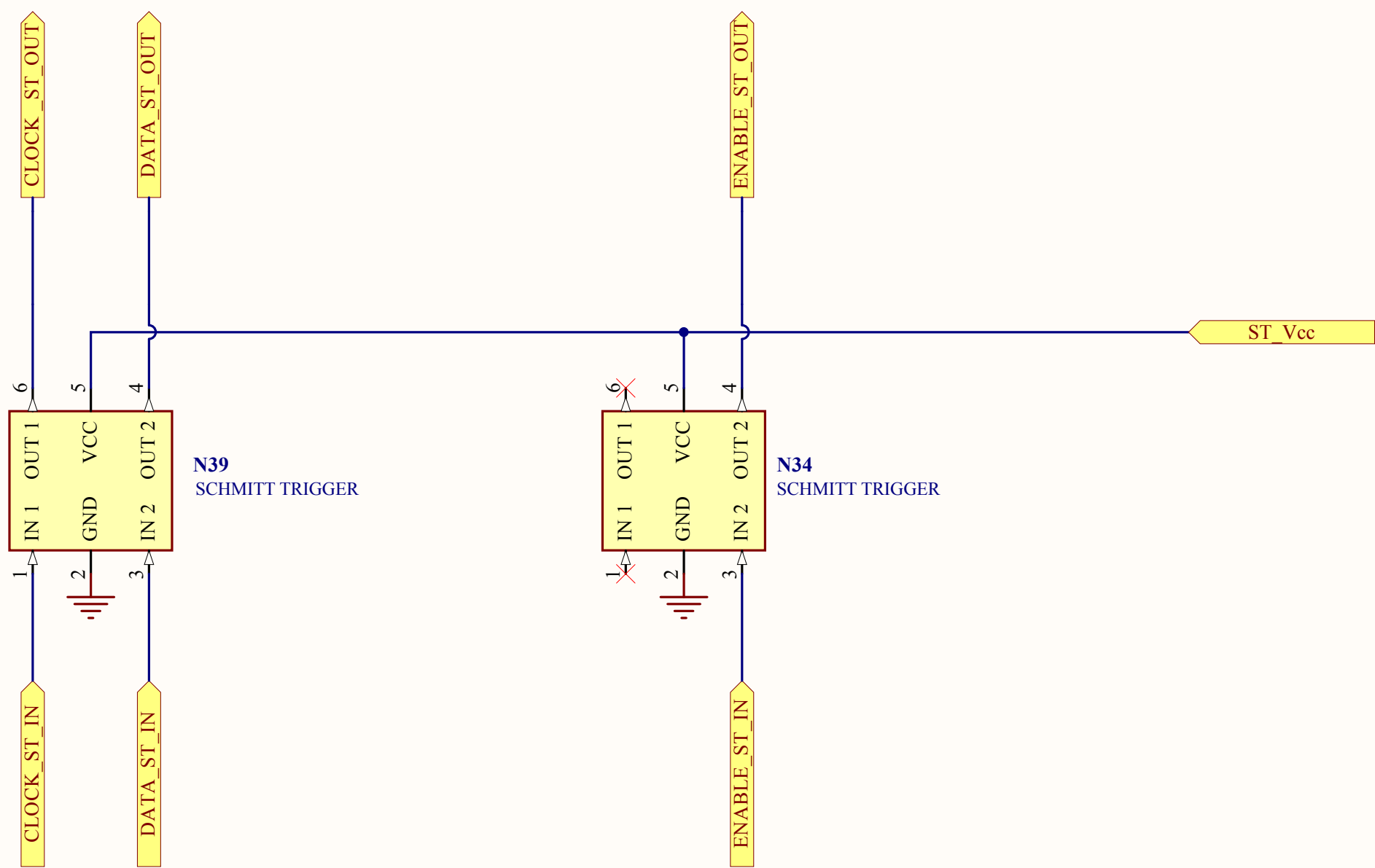
VCC PLL FILTERING



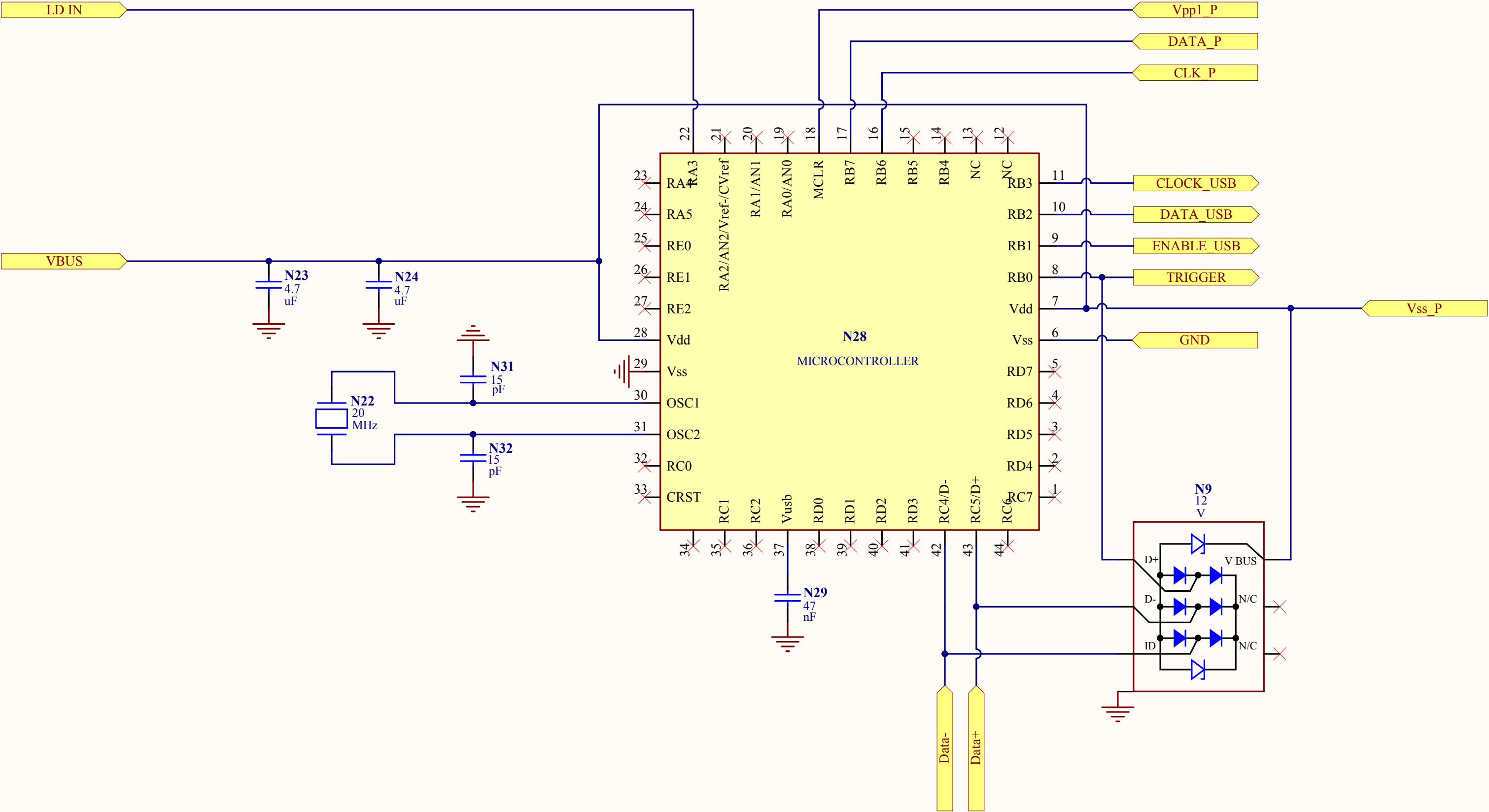
SCHMITT TRIGGER FILTERING



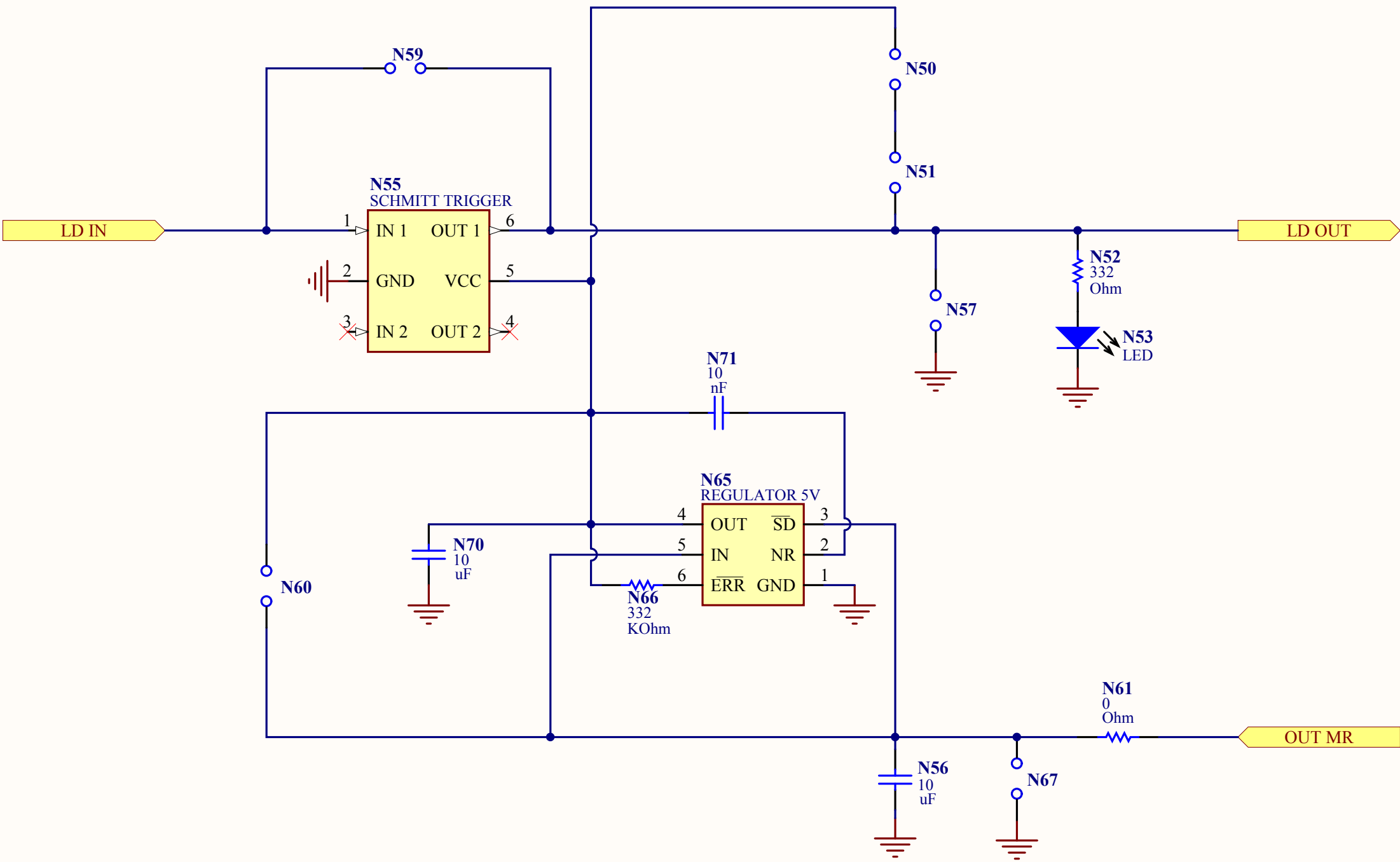
SCHMITT TRIGGER



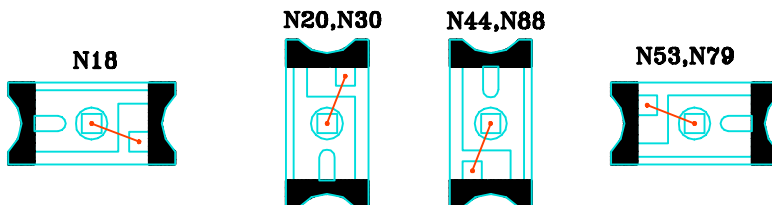
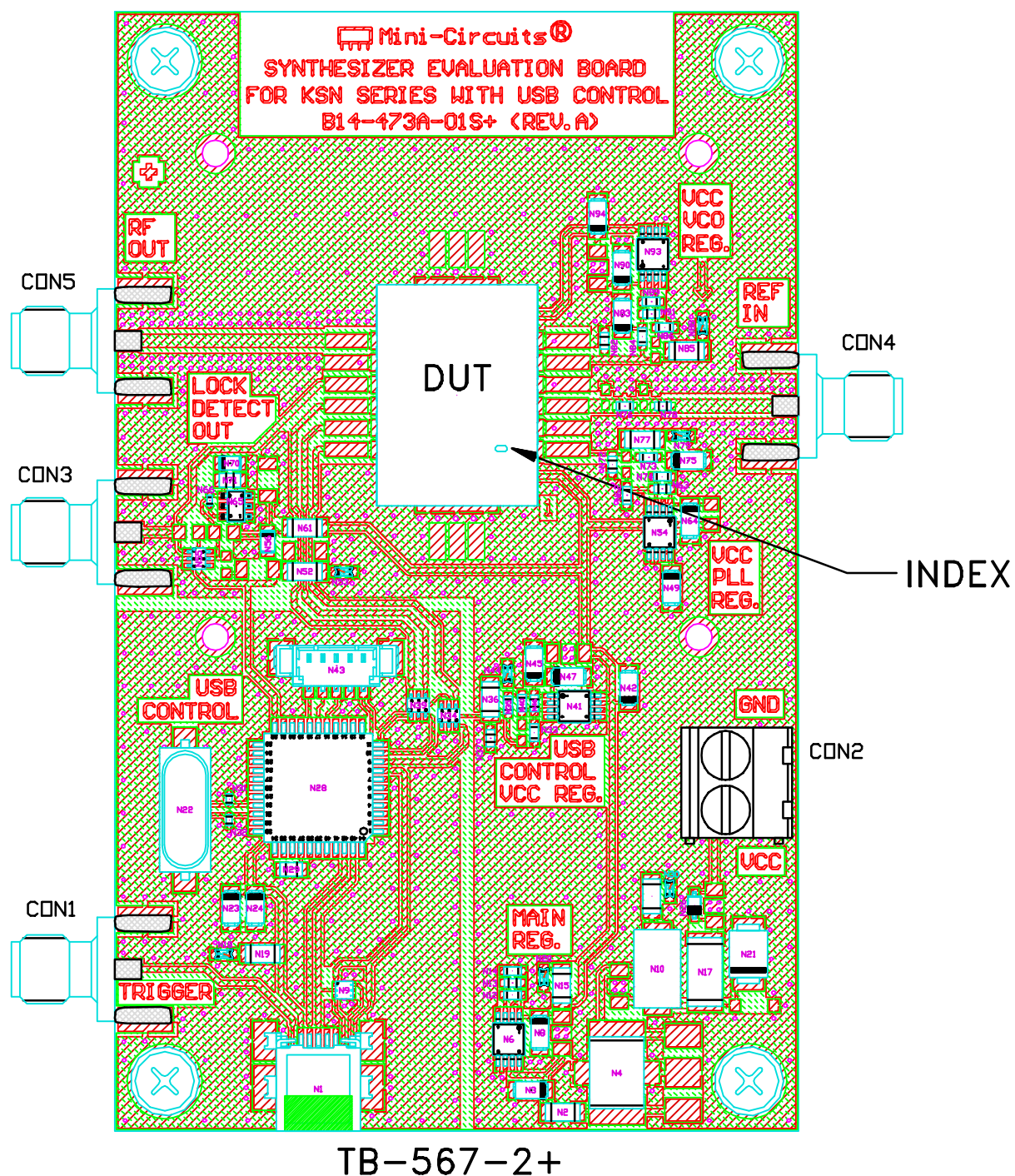
USB CONTROLER



LD REGULATOR SCHMITT TRIGGER AND LED



# Evaluation Board and Circuit



## 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<br>Ambient Environment                                                                                                                             | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>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<br>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;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                                                                              |