TRF1400

Question: How can I maximize the sensitivity of the TRF1400?
Answer: One can adjust the value of R3. The greatest sensitivity is achieved when R3 is open. Sensitivity decreases as R3 decreases. This will typically gain 1-2 dBm of sensitivity. Also, one can separate the analog and digital supplies. Keep the analog supply, AVcc, at 5V. The digital supply, DVcc, can be as low as 3.5V. The higher the digital voltage the more noise it generates. Separating the supplies and running the Digital supply a lower voltage typically picks up another 1-2 dBm.

QUESTION: Will the TRF1400 cover the 434 MHz for the European Market?
ANSWER: Not directly, since the design is targeted for 315 MHz. Operation at another frequency would require some changes in the system board. One of the main changes would be the SAW filter. The TRF1400 optimized for direct detection can attain approximately -90 dBm sensitivity at 433.92 MHz.

QUESTION: What are the capacitors shown at the inputs to LNA1 and LNA2?
ANSWER: They are DC blocking caps. Their effects are included in the S-Parameters provided in the datasheet. They are shown on the diagram in order to make the user aware that DC blocking is provided on-chip. Their values can not be changed by the user.

QUESTION: How are the ground termination components for LNA1 and LN2 calculated? Is optimization possible?
ANSWER: The termination components are used for bias control. The LNA bias's can thus be controlled independently. There is sufficient gain when both LNA's are at their maximum gain to make the IC unstable. So the suggested termination's are set to ensure sufficient stable gain. For reference though, the maximum gain is attained when R1 and R2 are approximately 500 ohms.

QUESTION: How does one calculate the low pass capacitor to be connected to PIN 1?
ANSWER: The 0.047 μF capacitor filters the RF ripple in the adaptive threshold circuit. Its value can change up to 50% without effecting the sensitivity.

QUESTION: How can users limit the range of the TRF1400 to a few meters for better security or better privacy?
ANSWER: The TRF1400 provides for coarse and fine reductions in range. If the goal is to reduce the range significantly then disable LNA2. Removing the LNA2 will reduce the sensitivity by 20 - 22 dBm. This will require a minimum of changes to the circuit board. In addition, it will reduce the footprint and parts count. Additional coarse reduction in range should be done by reducing the antenna size or gain and padding the signal after LNA1. For fine control, the internal comparator threshold OFFSET function will reduce sensitivity a few dB. Reduce the resistor value on pin 8 to reduce sensitivity.

QUESTION: The user had questions about gain flatness through LNA1&2.

ANSWER: The SAW filter used on the applications board is a double resonator so the gain will have two peaks on either side of the center frequency. The maximum acceptable gain flatness is about 3 dB.

QUESTION: How can the user ensure that the TRF1400 won't detect a signal (noise) when no actual signal is transmitted and thus consume battery life

ANSWER: We suggest that they use a micro- controller to ping pin 1 high when it receives an unwanted signal. This will temporarily clear the TRF1400 comparator and consume less power.