



Figure 206: Circuit configuration no. 6 schematic for QDAA QFN40

Note: For PCB reference layouts, see the product page for the nRF52833 on www.nordicsemi.com.

Designator	Value	Description	Footprint
C1, C2, C15, C16	12 pF	Capacitor, NP0, $\pm 2\%$	0201
C3	1.0 pF	Capacitor, NP0, $\pm 5\%$	0201
C4	1.2 pF	Capacitor, NP0, $\pm 5\%$	0201
C5, C7, C11	100 nF	Capacitor, X7S, $\pm 10\%$	0201
C6	4.7 μ F	Capacitor, X7R, $\pm 10\%$	0603
C8	820 pF	Capacitor, X7R, $\pm 10\%$	0201
C9	N.C.	Not mounted	0201
C10	100 pF	Capacitor, NP0, $\pm 5\%$	0201
C12, C13	1.0 μ F	Capacitor, X7S, $\pm 10\%$	0402
L1	4.7 nH	High frequency chip inductor, $\pm 5\%$	0201
L2	2.2 nH	High frequency chip inductor, $\pm 5\%$	0201
U1	nRF52833-QDAA	Multiprotocol <i>Bluetooth</i> [®] Low Energy, IEEE 802.15.4, ANT, and 2.4 GHz proprietary System on Chip	QFN-40
X1	32 MHz	Crystal SMD 1612, 32 MHz, Cl=8 pF, Total Tol: ± 40 ppm	XTAL_1612
X2	32.768 kHz	Crystal SMD 2012, 32.768 kHz, Cl=9 pF, Total Tol: ± 50 ppm	XTAL_2012

Table 168: Bill of material for circuit configuration no. 6

7.3.13 PCB guidelines

A well designed PCB is necessary to achieve good RF performance. Poor layout can lead to loss in performance or functionality.

A qualified RF layout for the IC and its surrounding components, including matching networks, can be downloaded from www.nordicsemi.com.

To ensure optimal performance it is essential that you follow the schematics and layout references closely. Especially in the case of the antenna matching circuitry (components between device pin ANT and the antenna), any changes to the layout can change the behavior, resulting in degradation of RF performance or a need to change component values. All reference circuits are designed for use with a 50 Ω single-ended antenna.

A PCB with a minimum of four layers, including a ground plane, is recommended for optimal performance. On the inner layers, put a keep-out area on the inner layers directly below the antenna matching circuitry (components between device pin ANT and the antenna) to reduce the stray capacitances that influence RF performance.

A matching network is needed between the RF pin ANT and the antenna, to match the antenna impedance (normally 50 Ω) to the optimum RF load impedance for the chip. For optimum performance, the impedance for the matching network should be set as described in the recommended package reference circuitry in [Reference circuitry](#) on page 564.

The DC supply voltage should be decoupled as close as possible to the VDD pins with high performance RF capacitors. See the schematics for recommended decoupling capacitor values. The supply voltage for the chip should be filtered and routed separately from the supply voltages of any digital circuitry.