This compact reference design, based on the NXP NXQ1TXA6 multi-coil wireless charging transmitter controller, delivers exceptional efficiency, and a very low standby power in the smallest available footprint. Integrating the NXP NT3H1201 NTAG I²C solution provides the option to add exciting features. Powered by the NXP GreenChip TEA1720 high efficiency SMPS controller this reference design becomes a highly optimized 12 V wireless charging solution.

**KEY FEATURES**
- A6 transmitter according to Qi standard version 1.1.2
- Optimized BOM with low component count
- Small controller package: HVQFN33 (7 x 7 mm)
- Advanced digital ASK processing
- Foreign object detection (FOD)
- Over-temperature protection
- Status indications by LEDs and buzzer
- Optional NFC “tap to power on” feature
- Automatic configuration for number of coils

**KEY BENEFITS**
- High efficiency and low standby power
- Zero-power standby enabled by NXPs NTAG NFC technology
- Flexible architecture (support for 1, 2, or 3 coils)
- Low component count
- Reliable interoperability
- Safe operation (FOD)
- Optional smart NFC features like Bluetooth pairing, user-configurable charger settings and automatic URL redirect

**APPLICATIONS**
- Wireless charging in automobiles
- Wireless audio accessories like Bluetooth speakers
- Office desks and other work setups
- Professional office desk accessories
- Shop and kiosk furniture for client smartphone charging

The NXP 12 V Qi A6 reference design is a highly optimized solution that gives consumers a better way to charge their battery-operated devices, without using cords, connectors, or electrical plugs. Any wireless charging-enabled device can use the same charging pad, and the pad can be integrated into cars, office furniture, charging kiosks, and other systems. When used in a 3-coil configuration, additional positioning freedom is achieved to guarantee reliable charging operation in designs with larger charging areas as in automobile consoles.
The reference design delivers exceptional efficiency with a significantly lower component count than comparable 12 V wireless charging solutions. By adding smart NFC enhancements, it enables advanced use cases like zero-power standby, automatic Bluetooth pairing, user-defined charger settings, and many more.

The design provides a transmitted output power of over 7W to enable a 5W wireless charger receiver output to the battery, and uses advanced digital ASK signal processing to ensure reliable interoperability with a low component count. The design includes the NXP NXQ1TXA6 wireless transmitter controller, which is housed in an HVQFN33 package that measures just 7 x 7 mm. The NXQ1TXA6 offers a flexible architecture that supports configurations of one, two, or three coils. The NXQ1TXA6 automatically detects the presence and number of connected coils and configures itself accordingly. The design also includes a full-featured NXP NT3H1201 NTAG I²C NFC device, the GreenChip NWP2081 half-bridge driver and the NX2020N2 low Rds-on Trench MOSFETs.

The digitally optimized ASK and FOD processing guarantees reliable communications with the receiver, and protects against heat caused by foreign objects, as specified by the latest version of the Qi A6 standard (V1.1.2). Powered by the NXP GreenChip TEA1720 SMPS in the 12 V supply unit of this Qi A6 wireless charging transmitter design enables a high efficiency wireless charging solution with a very low standby power.
Keys NXP components

<table>
<thead>
<tr>
<th>Product</th>
<th>Package</th>
<th>Dimensions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NXQ1TXA6</td>
<td>HVQFN33</td>
<td>7.0 x 7.0 x 0.85 mm</td>
<td>Qi A6 TX controller (1-3 coil)</td>
</tr>
<tr>
<td>NWP2081</td>
<td>SO8</td>
<td>4.0 x 5.0 x 1.75 mm</td>
<td>Half Bridge Driver</td>
</tr>
<tr>
<td>NX2020N2</td>
<td>SOT1220</td>
<td>2.0 x 2.0 x 0.65 mm</td>
<td>MOSFET</td>
</tr>
<tr>
<td>NT3H1201</td>
<td>XQFN8</td>
<td>1.6 x 1.6 x 0.5 mm</td>
<td>NTAG IC, NFC Forum Type 2 Tag</td>
</tr>
<tr>
<td>BAS21</td>
<td>SOT23</td>
<td>3.0 x 2.5 x 1.1 mm</td>
<td>Diode for AM demodulation</td>
</tr>
<tr>
<td>TEA1720</td>
<td>SO8</td>
<td>4.0 x 5.0 x 1.75 mm</td>
<td>12W Switched Mode Power Supply (SMPS) controller</td>
</tr>
</tbody>
</table>

Shaded components are available from NXP.