Wireless Power Update

Mete YASAN
Oğuzhan DEMİRCİ
Agenda

• Brief Wireless Power Overview
• WPC v1.1 to v1.2
• New Products
• TI Designs
Wireless Power Overview
Market Drivers for Wireless Power

- Convenience
- Water Proof
- No Cables or Connectors
- Rugged Industrial Design
Wireless Power Applications

Smart Phones/Tablets
- <5W Charging like USB
- >10W Fast Charging
- Powerbanks

Automotive
- Charging of Smart Phones
- Charging of Tablets
- EV Vehicle Charging

Wearables
- Smart Watches
- Fitness Bands
- Health Monitors

Medical
- Blood Glucose Meters/Monitors
- Health Patches
- Surgical Tools

Infrastructure
- Integrated into Furniture
- Located in Hotels, Restaurants, Coffee Shops, Airports

Industrial
- Scanners & Point of Sale
- Power Tools and Appliances
- Cordless Instruments
Wireless power overview

- Check out www.ti.com/wirelesspower

Wireless Power Solutions Overview

Wireless Power brings real system advantages to applications, such as: removing connectors to improve reliability and robustness, enabling systems to be waterproof so they are easier to clean plus providing a better user experience through improved convenience. Other applications benefit from the increased safety of removing contacts plus the ability to send power and even data across challenging interfaces. TI is a proven leader in Wireless Power with a broad range of solutions to support Wearables, Smart Phones, Automotive, Industrial and Medical applications.

- **Wide power range**
  - Applications from wearables to Industrial: 1W - 15W.
  - See more applications

- **Total solution you need**
  - Broad portfolio of transmitters and receivers.
  - See TI products

- **Consortium member**
  - TI understands the standards: WPC and AirFuel.
  - See more
How does Wireless Power work?

Inductive Coupling

- The System provides current to flow through the primary coil wire (Transmitter coil).
- Current passing through the wire generates a magnetic field (Ampère's Right-Hand-Rule).
- The magnetic field induces a voltage/current in the secondary coil wire (Receiver coil).
- The newly received current can be used to charge a battery or power a device.
• Power is delivered through shielded coils (like a transformer with separated primary and secondary coils)
• Before delivering power, the TX sends ‘ping’ signals to detect the RX and start system communication
• The RX control system tells the TX how much power to send and when to send it
WPC v1.1 to v1.2 Conversion
WPC v1.1 to v1.2

- WPC v1.2 is **NOT** the resonant extension of the spec
- WPC v1.2 defines requirements for low power and medium power products
  - WPC Low Power (LP) specification adds a new thermal test for transmitters up to 5 W
  - WPC approved the Medium Power (MP) specification for receivers and transmitters up to 15 W
- This document allows LP implementations to take advantage of the MP framework (received power calibration, improved FOD )
  - This specification has both mandatory and optional features
- All WPC v1.1 and v1.2 devices are compatible
# What’s New In WPC v1.2 Low Power

<table>
<thead>
<tr>
<th>Feature</th>
<th>Applies to TX</th>
<th>Applies to RX</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mandatory Features</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Thermal Test</td>
<td>YES</td>
<td>NO</td>
<td>Changed thermal test from v1.1 to improve performance</td>
</tr>
<tr>
<td>New Version Number</td>
<td>NO</td>
<td>YES</td>
<td>RX will declare itself v1.2</td>
</tr>
<tr>
<td>New Timing Requirements</td>
<td>YES</td>
<td>YES</td>
<td>Editorial changes to make the spec more robust</td>
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<tr>
<td><strong>Optional Features</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Two-way Communication</td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>FOD Framework</td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>Negotiation, WPID</td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
</tbody>
</table>
### What's New In WPC v1.2 Medium Power

<table>
<thead>
<tr>
<th>Feature</th>
<th>Applies to TX</th>
<th>Applies to RX</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mandatory Features</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Thermal Test</td>
<td>YES (at 5W)</td>
<td>NO</td>
<td>Changed thermal test from v1.1 to improve performance</td>
</tr>
<tr>
<td>New Version Number</td>
<td>NO</td>
<td>YES</td>
<td>RX will declare itself v1.2</td>
</tr>
<tr>
<td>New Timing Requirements</td>
<td>YES</td>
<td>YES</td>
<td>Editorial changes to make the spec more robust</td>
</tr>
<tr>
<td>Two-way Communication</td>
<td>YES</td>
<td>YES</td>
<td>TX can communicate to RX</td>
</tr>
<tr>
<td>FOD Framework</td>
<td>YES</td>
<td>YES</td>
<td>Added mechanism to detect FO presence before power transfer</td>
</tr>
<tr>
<td>Negotiation</td>
<td>YES</td>
<td>YES</td>
<td>Allow the RX to negotiate for &gt; 5 W</td>
</tr>
<tr>
<td>WPID</td>
<td>YES</td>
<td>YES</td>
<td><strong>OPTIONAL:</strong> Unique MAC address</td>
</tr>
</tbody>
</table>
Wireless Power Portfolio & New Products
Wireless Power Product Portfolio

**bq510XX**
- First fully integrated WPC v1.1
- Power Supply or Direct Charge

**bq51003**
- 2.5W optimized
- Small 30mm² solution
- Dual mode
- 50% lower losses

**bq51221**
- Fully integrated Proprietary 10W
- 80% efficiency
- TX/RX Synergy

**bq51025**
- WPC v1.2 5W RX
- Dual mode

**Smallest RX Solution**
- 10W, 84% Efficiency

**Dual Mode: WPC/PMA**
- Q100 Auto Qualified Auto Transmitter I2C, Low EMI w/ Shield
- 10W Solution
- Proprietary 10W
- TX/RX Synergy

**bq500412**
- A6 Coil Array
- Simplified BOM
- DPL for 5V/USB PWR

**bq500414Q**
- 1W Solution
- Proprietary 10W
- TX/RX Synergy

**bq500215**
- AFE/ Controller
- Gen3 TX, 2-Chip solution
- 5V/A11 design
- Low Power

**bq500212A**
- 5W/A11 design
- Low Power

**15W TX**
- WPC MP 15W TX
- Fixed Frequency

**bq501210**
- AFE/ Controller
- Gen3 TX, 2-Chip solution
- 5V/A11 design
- Low Power

**bq50002**
- Improved communication

**bq500511**
- WPC v1.2 5W RX
- Dual mode

**bq50002A**
- WPC v1.2 5W RX
- Dual mode
### bq51222 – WPC v1.2 + PMA 5-W receiver

#### Features
- WPC v1.2 and PMA Certified Receiver
- Adjustable Output Voltage (4.5 V – 8.0 V)
- Patented Transmitter Pad Detect Function
- I²C Communication with Host
- Up to 80% Efficiency

#### Benefits
- Fully Compliant to Latest WPC v1.2 Specification
- Backwards Compatible to WPC v1.1 Transmitters
- Dual Mode PMA Compatibility
- High Efficiency Allows Minimal Temperature Rise

#### Applications
- Qi-Certified Smart Phones, Tablets, and Other Handhelds
- Smart Watches
- Health Monitors
- Scanners / ePOS
- Cordless Instruments
- Power-banks

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### Diagram

![Diagram of bq51222](image-url)
bq501210 15-W v1.2 Qi-certified transmitter

Features

• Enables High Power Charging
• Bi-Directional Communication
• High Voltage Dedicated Charging Port (HVDCP) support
• Foreign Object Detection (FOD)
• Conforms to Wireless Power Consortium (WPC) MP-A5 Transmitter type specification
• 86% Efficiency

Applications

• Qi-Certified Smart Phones, Tablets, and Other Handhelds
• Point-of-Sale Devices
• Custom Wireless Power Applications
• Industrial/Medical Handheld

Benefits

• Backwards compatible with existing 5-W WPC receivers and TI 10-W proprietary receivers
• Fixed frequency (130 kHz) avoids resonant complexities
• Internal control of rail voltage regulator
• FOD can be tuned to accommodate non-WPC compliant applications

![Diagram of bq501210](image-url)
TI Designs (TIDA)
Wireless Charging for Wearables

TI Designs to demonstrate performance and simplify product development

- **TI Receiver design:** [http://www.ti.com/tool/TIDA-00318](http://www.ti.com/tool/TIDA-00318) (Qi cert w/ Charger)
- **TI Receiver design:** [http://www.ti.com/tool/TIDA-00329](http://www.ti.com/tool/TIDA-00329) (Smallest size, no Qi)
- **TI Transmitter design:** [http://www.ti.com/tool/TIDA-00762](http://www.ti.com/tool/TIDA-00762) (bq50002A based, Non Qi)
- **TI Transmitter design:** [http://www.ti.com/tool/TIDA-00334](http://www.ti.com/tool/TIDA-00334) (Small size, no Qi, 2.5W)
- **TI Transmitter design:** [http://www.ti.com/tool/TIDA-00415](http://www.ti.com/tool/TIDA-00415) (Smallest, 1W no Qi)

![Diagram of Wireless TX (TIDA-00762) and Receiver (bq51003)](image-url)
“To Qi, or not to Qi”

- bq500xxx (TX) and bq51xxx (RX) devices from TI were developed to comply with the Wireless Power Consortium (WPC) - Qi standard
- They can also be used for proprietary, non-standard applications
- Benefits of Qi compliance:
  - Any Qi-certified RX device can be used with any Qi-certified TX pad or system (e.g. chargers built into furniture)
  - OEM for the handheld device does not have to build their charging pad
- Some OEMs do not want Qi compliance
  - Requires that OEM develop both sides of the wireless power system
  - Allows custom form factors, physical matching between TX device and RX in portable device
  - Good for non-planar shapes, or applications where the portable device OEM wants to have full control over the possible charging source (prevent 3rd party “unknown” chargers)
  - Saves time and cost of Qi certification process, but OEM is responsible for certifying their own design including safety
## Tools & software (Transmitter)

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIDA-00415</td>
<td>1W Wireless Power Solution</td>
</tr>
<tr>
<td>TIDA-00762</td>
<td>Compact 1W Wireless Power Solution</td>
</tr>
<tr>
<td>TIDA-00334</td>
<td>Small Wireless Transmitter Solution, 2.5W</td>
</tr>
<tr>
<td>TIDA-00259</td>
<td>5W WPC (Qi) Compliant Wireless Power</td>
</tr>
<tr>
<td>TIDA-00623</td>
<td>Miniaturized 5W Wireless Power Solution</td>
</tr>
</tbody>
</table>

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<th>Name</th>
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<tbody>
<tr>
<td>bq50002AEVM-607</td>
<td>bq500511A and bq50002A Wireless Power Transmitter Evaluation Module</td>
</tr>
<tr>
<td>bq500212AEVM-550</td>
<td>5V, Qi Compliant Wireless Power Transmitter Manager Evaluation Module</td>
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<tr>
<td>bq500215EVM-648</td>
<td>WPC v1.1 Compliant Wireless Power Transmitter Controller Proprietary 10-W Power</td>
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<tr>
<td>bq500410AEVM-085</td>
<td>Qi-Compliant, Free-Positioning Wireless Power Transmitter Manager</td>
</tr>
<tr>
<td>bq500412EVM-584</td>
<td>Free Positioning, Qi-Compliant Wireless Power Transmitter Manager Evaluation Module</td>
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<tr>
<td>bq500414QEVM-629</td>
<td>bq500414Q Evaluation Module Automotive Free Positioning Wireless Power Transmitter Manager</td>
</tr>
<tr>
<td>bq501210EVM-756</td>
<td>bq501210 WPC 1.2 Wireless Power Transmitter Manager Evaluation Module with 15-W Power Delivery</td>
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</table>
# Tools & software (Receiver)

## TI Designs

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>TIDA-00318</td>
<td>1W WPC(Qi) Compliant Wireless Power and Charger</td>
</tr>
<tr>
<td>TIDA-00329</td>
<td>Tiny Wireless Receiver Solution</td>
</tr>
<tr>
<td>TIDA-00668</td>
<td>Wireless Charger Booster Pack</td>
</tr>
<tr>
<td>TIDA-00881</td>
<td>Wireless Charger with 19mm Coil Booster Pack</td>
</tr>
<tr>
<td>TIDA-00712</td>
<td>Smartwatch Battery Management Solution</td>
</tr>
<tr>
<td>PMP11311</td>
<td>Wearable Device with Wireless Charging</td>
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<tr>
<td>TIDA-00669</td>
<td>Wireless Charger Booster Pack with Gauge</td>
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<tr>
<td>TIDA-00243</td>
<td>Dual Mode (WPC&amp;PMA) Wireless Receiver</td>
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## Evaluation Modules

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>bq51003EVM-764</td>
<td>Wireless Power Receiver Evaluation Module</td>
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<tr>
<td>bq51010BEVM-764</td>
<td>Wireless Power Receiver Evaluation Module</td>
</tr>
<tr>
<td>bq51013BEVM-764</td>
<td>WPC 1.1 Compatible Fully Integrated Wireless Power Receiver IC Evaluation Module</td>
</tr>
<tr>
<td>bq51020EVM-520</td>
<td>bq51020 Wireless Power Receiver Evaluation Module</td>
</tr>
<tr>
<td>bq51025EVM-649</td>
<td>bq51025 Wireless Power Receiver Evaluation Module</td>
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<tr>
<td>bq51050BEVM-764</td>
<td>Wireless Power Receiver Evaluation Module</td>
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## Overview of TI Receiver Solutions

<table>
<thead>
<tr>
<th>Part Number</th>
<th>bq51003</th>
<th>bq51013B/51010B</th>
<th>bq51020/12/21/22</th>
<th>bq51025</th>
<th>bq51050/51B/52B</th>
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<tbody>
<tr>
<td><strong>Architecture</strong></td>
<td><img src="image1" alt="Circuit Diagram" /></td>
<td><img src="image2" alt="Circuit Diagram" /></td>
<td><img src="image3" alt="Circuit Diagram" /></td>
<td><img src="image4" alt="Circuit Diagram" /></td>
<td><img src="image5" alt="Circuit Diagram" /></td>
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<tr>
<td><strong>Standard Supported</strong></td>
<td>WPC</td>
<td>WPC</td>
<td>WPC &amp; WPC/PMA</td>
<td>WPC (10W Prop)</td>
<td>WPC</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>&lt;2.5W</td>
<td>2.5 – 3.5W</td>
<td>5W</td>
<td>5-10W</td>
<td>3-4W</td>
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<tr>
<td><strong>CSP (mm²)</strong></td>
<td>3 x 2 x 0.5</td>
<td>3 x 2 x 0.5</td>
<td>3 x 2 x 0.5</td>
<td>3 x 2 x 0.5</td>
<td>3 x 2 x 0.5</td>
</tr>
<tr>
<td><strong>QFN (mm²)</strong></td>
<td>3.5 x 4.5</td>
<td>3.5 x 4.5</td>
<td>3.5 x 4.5</td>
<td>3.5 x 4.5</td>
<td>3.5 x 4.5</td>
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<tr>
<td><strong>IC/Sys Eff</strong></td>
<td>93%/70%</td>
<td>93%/75%</td>
<td>96%/78%</td>
<td>96%/84%</td>
<td>90%/77%</td>
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<tr>
<td><strong>I2C</strong></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td><strong>Pad Det/Alignment Aid</strong></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td><strong>Solution Size</strong></td>
<td>50 mm²</td>
<td>75 mm²</td>
<td>77 mm²</td>
<td>120 mm²</td>
<td>75 mm²</td>
</tr>
<tr>
<td><strong>Typical Coil</strong></td>
<td><img src="image6" alt="Coil Example" /></td>
<td><img src="image7" alt="Coil Example" /></td>
<td><img src="image8" alt="Coil Example" /></td>
<td><img src="image9" alt="Coil Example" /></td>
<td><img src="image10" alt="Coil Example" /></td>
</tr>
</tbody>
</table>
Wireless Power by Application/Power Level

- **<2.5W (Wearable)**
  - RX
    - bq5105x
    - bq51003
    - bq51013B
  - TX
    - bq500212A
    - bq50002A
    - bq500511A

- **<5W**
  - RX
    - bq51013B
    - bq51010B
    - bq5120/1
    - bq51221
    - bq51222
  - TX
    - bq500212A
    - bq50002A
    - bq500511A

- **<15W**
  - RX
    - bq51025
  - TX
    - bq500215
    - bq501210

All devices have EVMs available

New
### Features
- Wireless power transmitter based on bq50002A Analog Front End and bq500511A TX controller
- 5-V Micro-USB DC power input
- 1-W load power (5 V, 200 mA) when combined with the bq51003 (or similar) receiver
- >60% Efficiency
- Small (20 or 30-mm diameter) transmitter coil

### Benefits
- Low parts count (<43) and low cost
- bq50002A & bq500511A plus all passive components fit in the same area as the coil to allow for compact system designs
- Pair with a TIDA-00318 (RX + charger) for a complete wearable wireless power system

### Applications
- Non Qi-Certified wearable solutions
- Watches
- Fitness trackers
- GPS locators

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**Efficiency with:**
20-mm TDK TX coil
bq51003EVM-764

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Efficiency with:
20-mm TDK TX coil
bq51003EVM-764
TIDA-00762 block diagram

http://www.ti.com/tool/TIDA-00762
TIDA-00623 – Size optimized TX (5 W)

Features

- 2-chip solution to enable simple implementation of A11 (A5) WPC transmitter
  - bq50002A AFE designed with analog process
  - bq500511A Digital controller with digital process
- 75% peak efficiency (Low power improved efficiency)
- Low standby power during Ping

Benefits

- Low parts count (<43) and low cost
- Compact solution size < 1 in² (6.45 cm²)
- Pair with any 5-W receiver for a complete solution
- Improved efficiency at light loads

Applications

- Qi-Certified 5-W solutions

![Efficiency comparison graph](image)

- Efficiency better than bq500212A at light load

- bq500212A
- TIDA-00623
TIDA-00623 details

- bq50002A / bq500511A reference design
  - 5-V TX input, 5-W RX output
  - Compact solution size < 1 in\(^2\) (6.45 cm\(^2\))
  - WPC A11 coil (50 mm x 50 mm)
  - bq50002A 32-pin QFN (5 mm x 5 mm)
  - bq500511A 40-pin QFN (6 mm x 6 mm)

http://www.ti.com/tool/TIDA-00623
TIDA-00623 Application Schematic

- **Input & PC connection**
- **Temp / FOD / LED Mode**
- **Current Sense**
- **Power Section Bulk Filter C**
- **TX Coil & Resonant Caps**
- **3.0-V regulator output / filter**
- **Tank voltage sample**
- **Demod filter 1&2**
- **LED & Buzzer**

The schematic includes various components and connections such as 5 Vin, GND, and output filters.
TIDA-00318 – RX & charger for wearables

**Features**

- Wireless power receiver solution featuring bq51003 RX and bq25100 linear charger
- Qi-compliant ensures operation with any WPC transmitter
- Small solution size – 5 mm x 15 mm (75 mm²)
- bq25100
  - Adjustable charging current (10 to 250 mA)
  - Termination current down to 1 mA

**Benefits**

- Qi-certifiable solution
- RX & charger integrated included
- Low leakage (bq25100 < 75 nA)
- Ideal with multiple TIDA transmitters
  - TIDA-00334 (bq500212A based 2.5 W)
  - TIDA-00415 (bq500212A based 1 W)

**Applications**

- Qi-Certifiable 1-W wearable solutions

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**4.2 V 135 mA Charge Cycle with 20 mA Charge Termination**

- VIN
- VBAT
- TIN
- IBAT

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**empa:::electronics**

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**Texas INSTRUMENTS**

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TIDA-00318  Application Schematic

http://www.ti.com/tool/TIDA-00318
## TIDA-00329 – Ultra-small RX for wearables

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
</table>
| • Wireless power receiver solution featuring bq51003 RX  
• Easily adjust maximum current  
  • Efficiency increases with correct current limit  
• Same design for bq51050B | • Tiny solution size < 29 mm²  
• Easily adjustable maximum current  
• Ideal with multiple TIDA transmitters  
  • TIDA-00334 (bq500212A based)  
  • TIDA-00415 (bq500212A based)  
  • TIDA-00762 (bq50002A/bq500511A based) |

### Applications

- Non Qi-Certifiable 1-W wearable solutions

### Features Diagram

- 17 mm diameter US $0.10
- 5.23 mm x 5.48 mm

### Efficiency Chart

- Efficiency increases with maximum current.
TIDA-00329  Application Schematic

http://www.ti.com/tool/TIDA-00329
## TIDA-00415 – Transmitter for wearables (1 W)

### Features

- Wireless power transmitter based on bq500212A TX controller
- 5-V Micro-USB DC power input
- 1-W load power (5 V, 200 mA) when combined with the bq51003 (or similar) receiver
- Built-in output power limit

### Benefits

- Low parts count and cost
- Small (20-mm diameter) coil
- IC and passive components fit into the same area as the coil to allow compact system designs
- Can be easily paired with the TIDA-00318 RX + charger for a complete wearable power system

### Applications

- Non Qi-Certifiable 1-W wearable solutions

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**Diagram:**

![Diagram of wireless power transmitter](http://www.ti.com/tool/TIDA-00415)

**Source:**

**TIDA-00334 – Transmitter for wearables (2.5 W)**

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Wireless power transmitter based on bq500212A TX controller</td>
<td>• Optimized for 2.5-W solutions</td>
</tr>
<tr>
<td>• 5-V Micro-USB DC power input</td>
<td>• Low parts count and cost</td>
</tr>
<tr>
<td>• 2.5-W load power (5 V, 500 mA) when combined with the bq51003 (or similar) receiver</td>
<td>• Small (30-mm diameter) coil</td>
</tr>
<tr>
<td>• Full-bridge power stage</td>
<td>• IC and passive components fit into the same area as the coil to allow compact system designs</td>
</tr>
<tr>
<td>• Built-in output power limit</td>
<td>• Can be easily paired with the TIDA-00318 RX + charger for a complete wearable power system</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Applications</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>• Non Qi-Certifiable 2.5-W wearable solutions</td>
<td></td>
</tr>
</tbody>
</table>

Efficiency with:
30-mm Wurth coil
bq51003EVM-764

http://www.ti.com/tool/TIDA-00334
### Features

- Power management reference design for a wearable device with wireless charging
- Wireless power (bq51003)
- Power management (bq25120)
  - 300-mA charger with power path
  - 100-mA LDO
  - 300-mA DCDC

### Benefits

- Highly configurable battery management solution
- Integrated wireless power
- Integrated Li-Ion battery charger
- Boost converter for display or heart rate monitor
- Buck converter for radio or dual core LDO
- bq25120 features ship mode with ultra-low IQ (<50 nA) for long shelf-life

### Applications

- Activity trackers
- Watches

![Efficiency graph with TIDA-00334 reference](image)
PMP11311 Power Tree

http://www.ti.com/tool/PMP1131
**TIDA-00668 – Booster pack**

**Features**
- 50-mA wireless charger booster pack
- Wireless charger booster pack designed for any low power Launchpad
- bq51003 receiver, bq25100 charger, bq29707 protection
- TPS61220 boost, TPS62736 buck
- Complete low power battery management and power supply solution

**Benefits**
- Qi-compatible – recharge the battery from any Qi transmitter
- 3.3-V buck for Launchpad power
- 5.0-V boost for power supply circuitry
- Stackable design allows for creating a complete solution

**Applications**
- Launchpad booster packs

http://www.ti.com/tool/TIDA-00668
### Features

- Wireless power receiver compatible with both WPC and PMA standards
- Designed for 5-W applications (5 V at 1 A)
- Adjustable output voltage
- I²C interface for system design flexibility
- Low RDSON FETs for minimal power dissipation

### Benefits

- Works with both WPC and PMA standards
- Compact design 13 mm x 9 mm
- High efficiency
- Flexible configuration (external components or I²C)

### Applications

- Dual mode (WPC / PMA) solutions
- Phones, cameras, portable media players

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Efficiency during Charge cycle

http://www.ti.com/tool/TIDA-00243
Thank You!

Ti.com/WirelessPower