

# Wireless Charging

**Turnkey Wireless Charging Solutions**



**Wireless Charging ICs Product Outline**



**Innovation for Spatial Freedom**



**ST Value Proposition**



# Turnkey Wireless Charging Solutions

ST is one of the leading suppliers for wireless charging solutions



Wireless charging receivers since day one **for the largest smartphone makers in the world**

**Innovation for industry first** and leading wireless charging solutions

**Unique BCD technology** from the inventor itself



# Tailored for Your Application

## Low power wearable and hearable charging



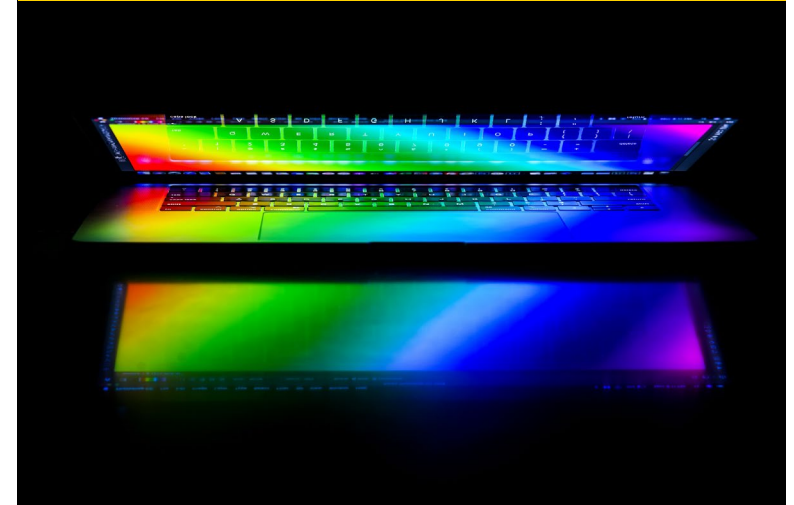
- Highest efficiency for the wide load range
- Enhanced spatial freedom

## Super-fast charging for smartphones



- Qi 1.3 certified
- Smart power sharing (Tx)

## Next generation in wireless high power



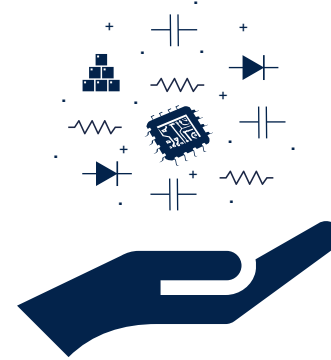
- High efficiency with the best thermal performance
- Custom coil design

# Focus on Enhanced User Experience



## Fast charge with max. safety

Fully integrated analog power devices, digital processing, firmware algorithms and programmable multi-OVP systems enables safe delivery of power



## Optimized device size

Minimizing overall PCB area and BoM to achieve the best performance necessary for wearables with ST's unique monolithic wireless charging IC solutions



## Best-in-class efficiency

High efficiency across the entire power delivery range to strike balance between performance, battery life and building green technologies



## Low charging temperature

User is directly impacted by the temperature of the device right after charging, high efficiency will allow for faster average charging yet at a lower device temperature



# Wireless Charging ICs Product Outline

Wireless Charging **Receiver** with Tx mode

Wireless Charging **Transmitter**

## 120 W

Industrial & Kitchen  
Appliances, Power tools  
Personal electronics

### STWBC2-HP

- Limitless high-power architecture
- 15 W Qi EPP certified Tx
- Qi 1.3 with STSAFE secure MCU
- MP-A2 and MP-A22 topologies
- Full bridge

## 70 W

Super fast charge  
Smartphones  
Tablets, Laptop PCs

### STWLC98

- 70W Rx
- 15W Tx
- WPC Qi 1.3 with standalone authentication

## 30 W

Super fast charge  
Smartphones, 5G CPE

### STWLC86

- 30W Rx
- 7.5W Tx
- WPC Qi 1.3

## 15 W

Standard Qi EPP  
Fast charge smartphones

### STWLC38

- 15W Rx
- 5W Tx
- WPC Qi 1.3

### STWBC86

- 15W Tx
- 5W Qi BPP Tx
- WPC Qi 1.3

## 5 W

Standard Qi BPP  
Smartphone, Wearables



# Key Products for Wearables & TWS

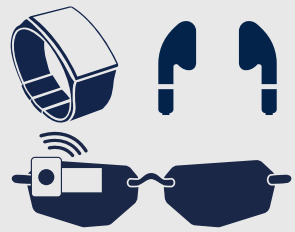
## Receiver Transmitter

Turnkey wireless charging solutions including Rx + Tx and quick design-in tools

**qi 5W – 15W**  
Super fast charge for wearables  
Entry to mid-tier smartphones  
E-cigarettes, portable cameras



**qi 1W – 5W**  
Smartwatches  
Fitness & location trackers  
True Wireless Stereo (TWS)  
Smart stylus, smart glasses



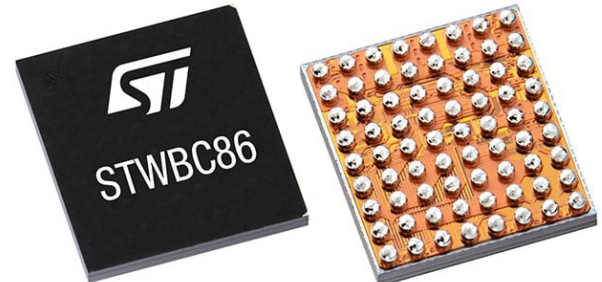
**STWLC38**

- Up to 15W Rx
- Up to 5W Tx
- Wearables and TWS optimized Qi BPP ref. design
- WPC Qi 1.3 BPP & EPP
- ARC mode



**STWBC86**

- Up to 15W Tx
- Monolithic
- Full bridge
- 5W Qi BPP ref. design
- WPC Qi 1.3 BPP

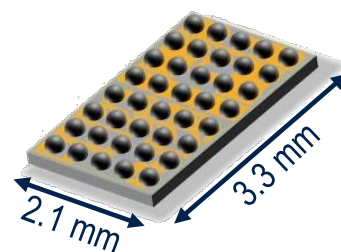
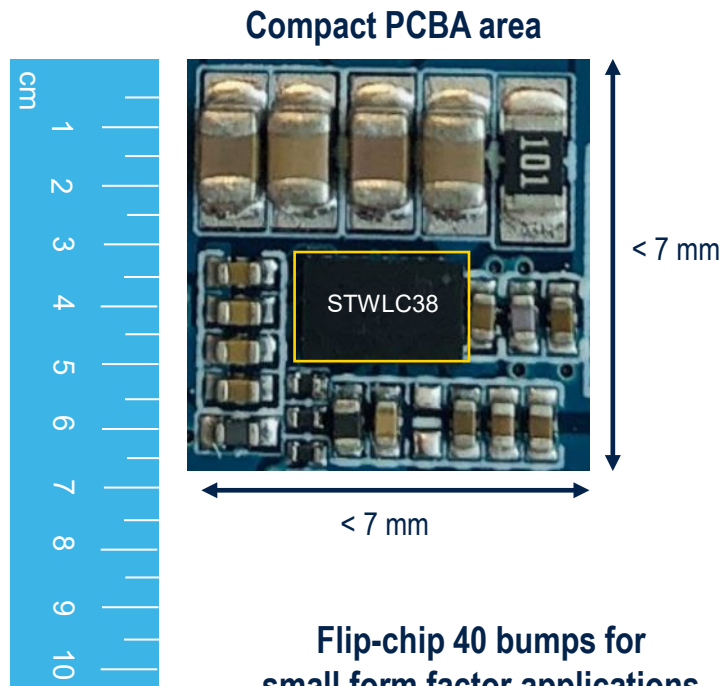


## Qi dual-mode wireless power receiver (Rx)



### Optimized for

- Smartwatches, fitness trackers
- True Wireless Stereo (TWS)
- Entry to mid-tier smartphones



- **Up to 15 W** receiver output power
- **Up to 5 W** output power in Tx Mode (coil dependent)
- **WPC Qi 1.3 BPP / EPP** compliant
- **CSP 2.1mm x 3.3mm** optimized device size of **6.9mm<sup>2</sup>**
- **Compact PCB** area less than 7mm x 7mm
- Configurable VOUT **4V-12V** with **25/100mV** resolution
- **Accurate** Voltage/Current measurements for FOD by FW
- **Adaptive Rectifier Configuration (ARC) mode** for enhanced spatial freedom
- ARM **32-bit Cortex™-M0+** core up to 64MHz
- 32KB **RRAM** for Firmware patch-ability like flash memory
- 64KB ROM, 16kB RAM
- 3 GPIO

- POVP (Ping OVP) Turn off Device @ Under UVLO , >14V VRECT
- HOVP (Hard OVP) Turn off rectifier @ RECT\_HOVP\_SEL
- SOVP (Soft OVP) VRECT clamping @ RECT\_SOVP\_SEL
- OVTP (Over Temp Protection) Turn off rectifier @ TSHUT\_SEL
- **ARC mode** for mis-alignment Tx-Rx pairing improvement and coil opt.



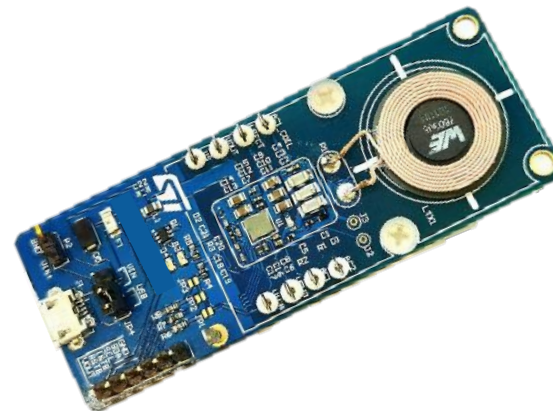
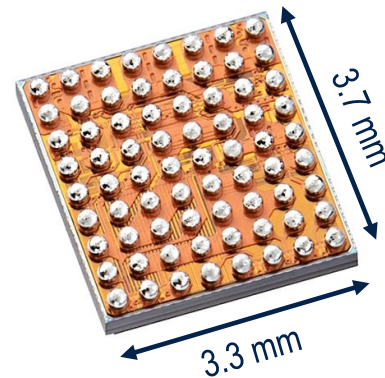
## Qi monolithic wireless power transmitter (Tx)



### Optimized for

- Qi-certified BPP transmitter charging pads
- Smartwatches, wearables, hearables

Flip-chip 72 bumps  
monolithic Tx



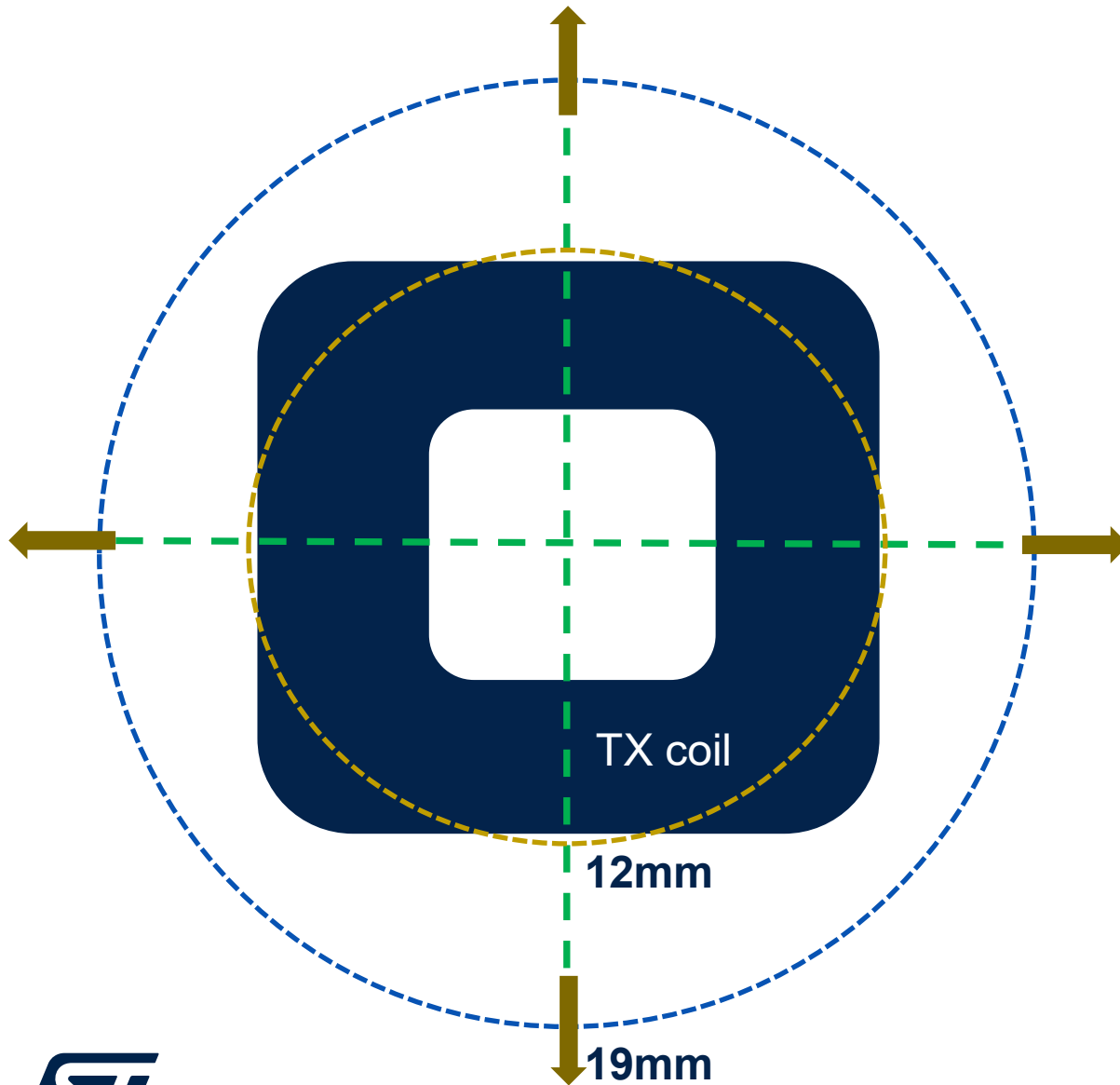
- Monolithic solution **with integrated full inverter bridge**
- **Up to 5 W** transmitter (coil dependent)
- **Up to 15 W** with proprietary mode
- **WPC Qi 1.3 BPP** compatible
- Low Rds-on inverter for **higher efficiency**
- ARM 32-bit Cortex™-M0+ core up to 64MHz
- **8 kB FTP** for **firmware patch-ability**
- 8 kB RAM

- **Optimized device size** for small form factor applications
- **Lowest BOM** with A11a topology for **Qi BPP** certified TX products
- **Class-leading** efficiency for low power wearable applications
- **Reliable ASK / FSK** communication





# Innovation for Spatial Freedom



- **ARC (Adaptive Rectifier Configuration)** mode improves the ping up and power transfer spatial freedom of the system in both X and Y direction
- **Without any change** in hardware or **optimization of the coil**, the ping up distance is **enhanced up to 50% in all directions** by enabling ARC mode
- This transforms the **whole surface** of the TX as usable area
- Further enhancement is possible by customization of the coil
- **Coil cost reduction** as stringent coil tolerance requirements is **widely enlarged** thanks to ARC mode assist

X-Y freedom ping up is critical to wearable and hearable applications whereby the coils are of smaller dimensions

# ST Value Proposition

01

## Optimized device size for small form factor applications

- Wearables, hearables, TWS
- Mid-tier smartphones

02

## High efficiency across the entire operating range

- From 1W to 15 W device charging

03

## ARC mode to improve ping up flexibility in application

- Application specific coil optimization to achieve best size, efficiency, maximum power and coil cost reduction



04

## Qi-certified turnkey TX and RX solutions

- Robust in-band communication
- Qi-certified reference designs
- Design and certification guidance with in-house test equipment and engineering support

05

## Wireless charging coil development support

- Simulation capabilities
- Strong partnerships with coil makers

06

## Design-in tools for the fast time-to-market

- Turnkey TX + RX bundle
- Full solution including eval boards and software GUI tools

