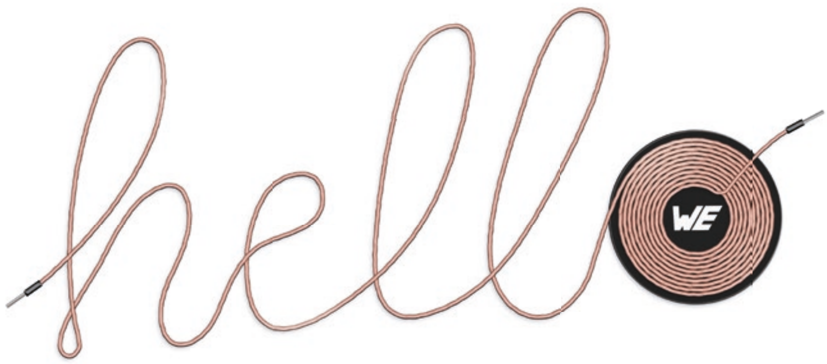
WÜRTH ELEKTRONIK

# Wireless Power Transfer Coils
2018


**Transmitter Coils**
**Coil Arrays**
**Receiver Coils**

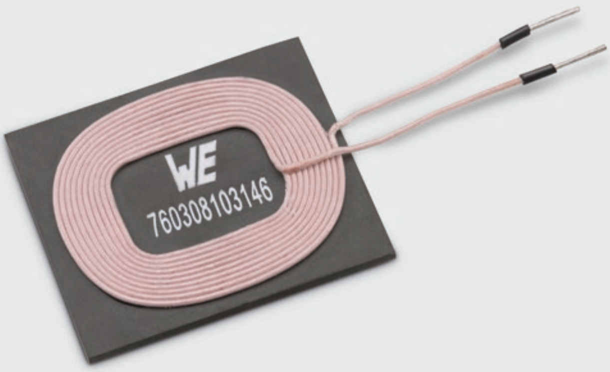


# Content


## Helpful Information

# New Products 2018






## WIRELESS POWER TRANSMITTER COIL
**760 308 103 146 MP-A8**

Compact, high-current coil for applications >100 W in the professional area of medical technology and industry.

- Power up to 150 W applicable (currently no market competitor)
- Works with standard Qi semiconductor devices up to 15 W
- Extremely high quality ratings due to high permeability shielding
- Low $R_{DC}$


## WIRELESS POWER ARRAY
**760 308 103 145 MP-A6**

Transmitter power array for applications <100 W in the professional area of medical technology and industry.

- Power up to 100 W applicable
- Works with standard Qi semiconductor devices up to 15 W
- Extremely high quality ratings due to high permeability shielding
- Low $R_{DC}$

## WIRELESS POWER RECEIVER COIL
**760 308 101 309**

Compact receiver coil for applications <50 W in the professional area of wearables and medical technology.

- Thinnest standard coil on the market which works with the standard Qi IC's up to 15 W
- High Q-factor
- Low $R_{DC}$


## WIRELESS POWER RECEIVER COIL
**760 308 101 221**

Very small receiver coil for applications <5 W in the professional area of wearables and smart textiles.

- Smallest receiver coil on the market which works with the standard Qi IC's up to 5 W
- High Q-factor
- Simple assembly thanks to double-sided adhesive tape on the back which lasts over the wide range of working temperature and during the soldering process

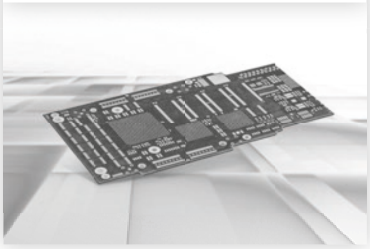
# THE WÜRTH ELEKTRONIK EISOS GROUP IS ONE OF THE FASTEST GROWING AND MOST INNOVATIVE COMPANIES OF THE WÜRTH GROUP

**The Würth Group**
Over 74,025 employees* and 12.72 billion € sales*

**The Würth Elektronik Group**
Over 8,300 employees* and 926 million € sales*

**Electronic & Electromechanical Components**

**Printed Circuit Boards**



**Intelligent Power and Control Systems**

**Standard**

**Custom**

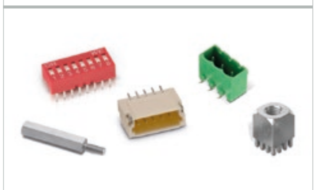
**eiSos**

**eiCan**

**AMBER**

**Passive Components**

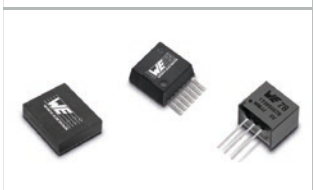
**Electromechanical Components**



**Wireless Connectivity**


**Automotive**


**Power Modules**



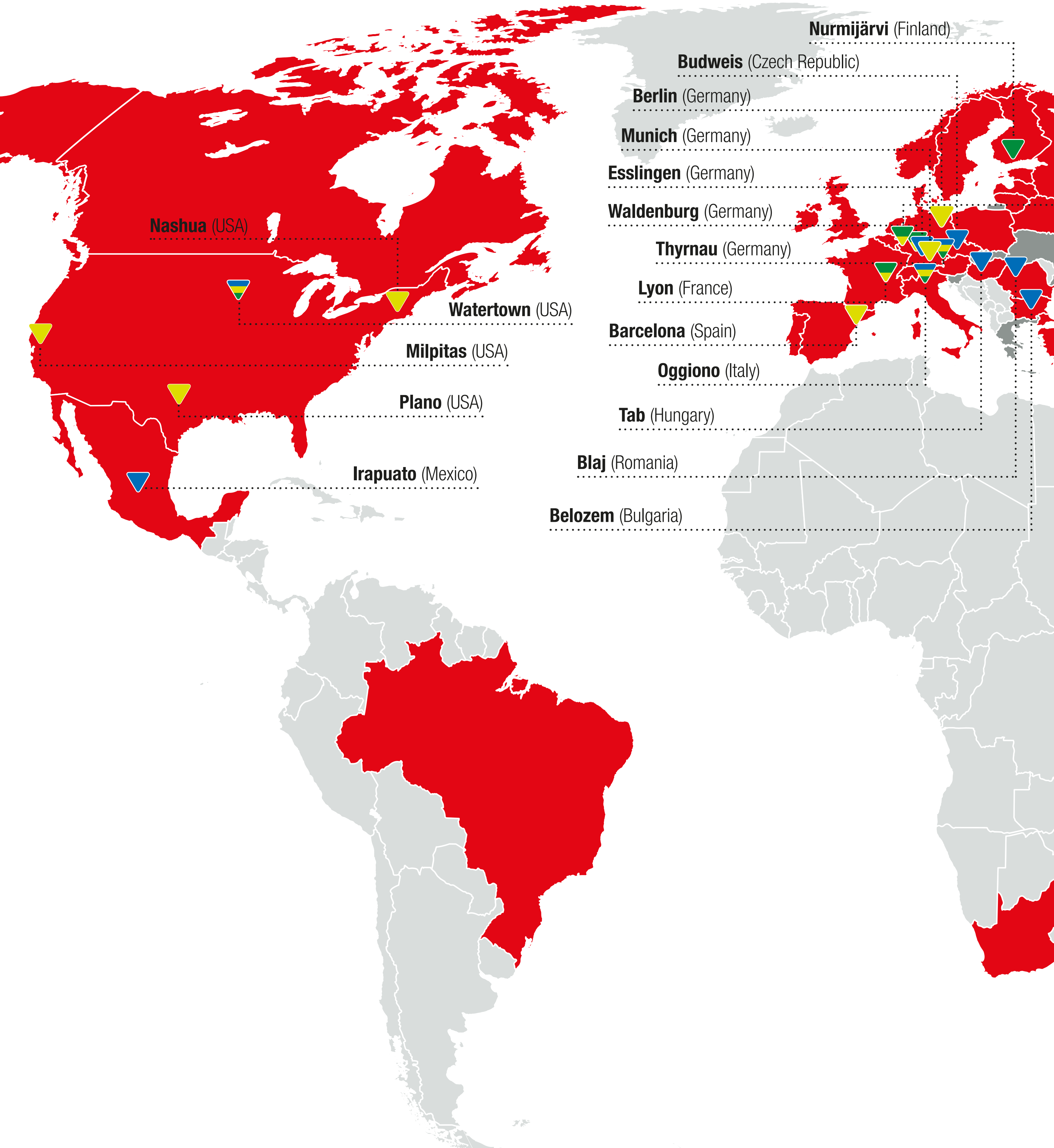
**Magnetics**


**LEDs**

**Connectors**


*2017 (preliminary)

# Globally available. Locally present.




Trier (Germany)
Shenyang (China)
Seoul (South Korea)
Tianjin (China)
Huzhou (China)
Fuling (China)
Taichung (Taiwan)
Longgang (China)
Bangalore (India)
Tongzi (China)
Hong Kong (Hong Kong)
Nakhon Ratchasima (Thailand)
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# more than you expect

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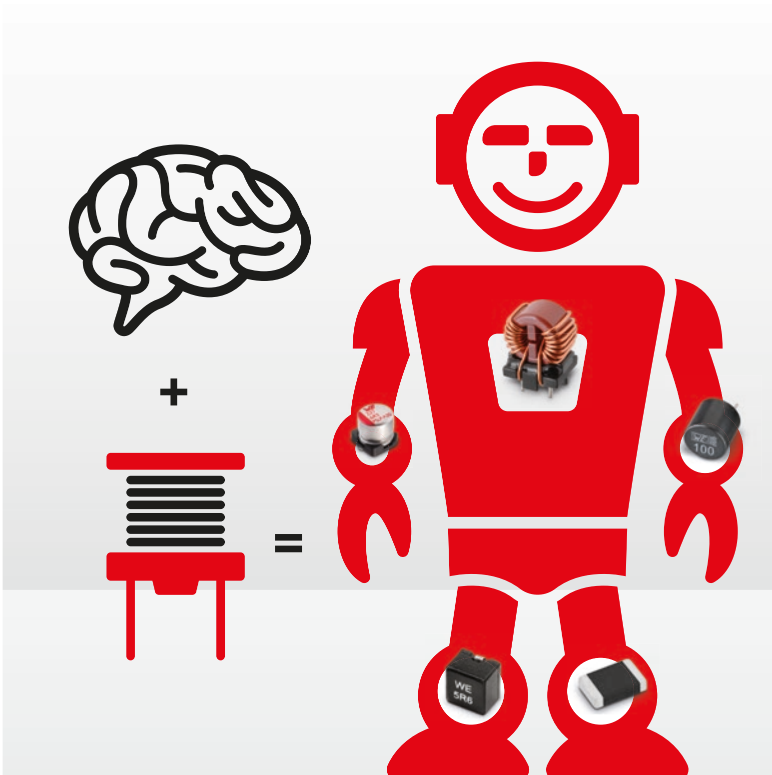


**REFERENCE DESIGNS OF LEADING IC MANUFACTURES**

# eMobility:
# Formula E as a driving innovative force


**Würth Elektronik eiSos,** one of the leading manufacturers of electronic and electromechanical components for the electronic industry, congratulates Lucas di Grassi and ABT Schaeffler Audi Sport for the world championship title in Formula E. As technology partner from the very beginning, we are proud to having reached this common success. And this is just the beginning…

**www.we-speed-up-the-future.com**

# Application Areas of Wireless Power Transfer

## Medical Technology

Wireless Power Transmission allows easy and aseptic cleaning of medical devices. Hermetically sealed housing is possible with no contact degradation by aggressive solvents.

## Industry

Wireless Power Transmission solves problems in harsh, wet and dirty environments and increase the reliability of the device.

## Furniture

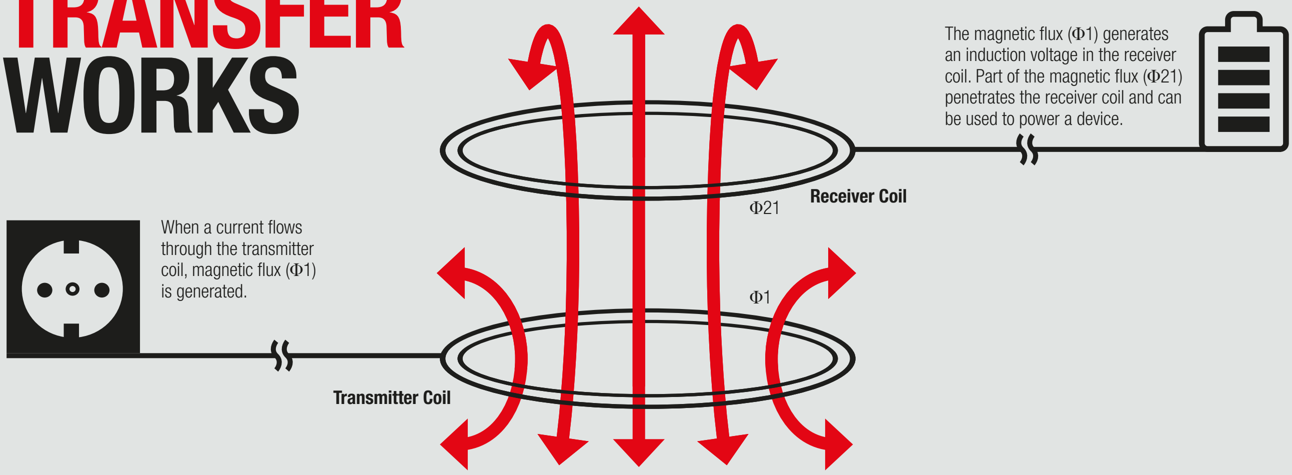
Wireless Power Transmission used in furniture for charging smart phones, tablets and smart watches.

## eMobility

Wireless Power Transmission enables energy transfer for different vehicles and devices in the field of eMobility.

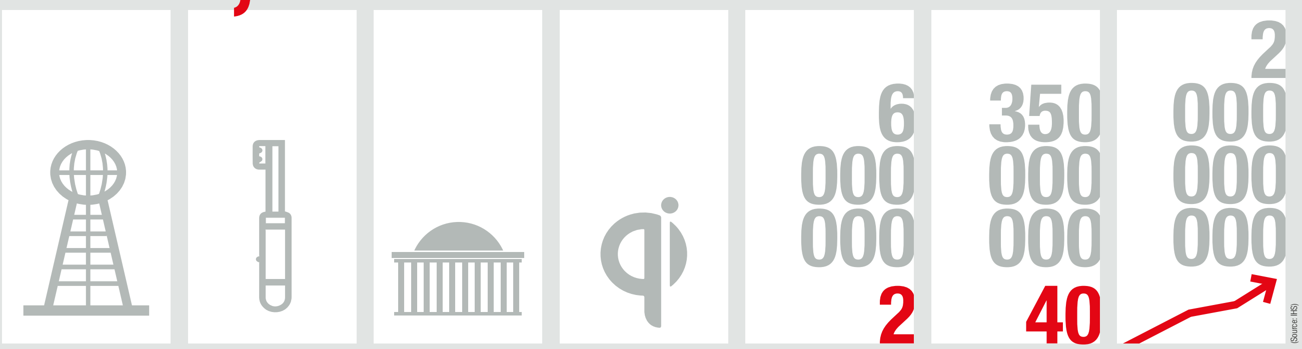
# WE CUT

## HOW WIRELESS POWER TRANSFER WORKS




## APPLICATION AREAS


## WIRELESS POWER PAST, PRESENT & FUTURE




**1899**

Nikola Tesla designs the Wardenclyffe Tower – **the first attempt to transmit electricity wirelessly to the world.**

**1997**

Braun receives **patent for the inductive charging** of electric toothbrushes.

**2007**

The Massachusetts Institute of Technology revives the **principle of wireless power**.

**2008**

**The Wireless Power Consortium is founded.**

Würth Elektronik starts developing **wireless power coils.**

**2011**

**6 million wireless power units in the market.**

Würth Elektronik starts selling **2 wireless power products.**

**2016**

**350 Million wireless power units in the market.**

Würth Elektronik offers **40 different wireless power coils.**

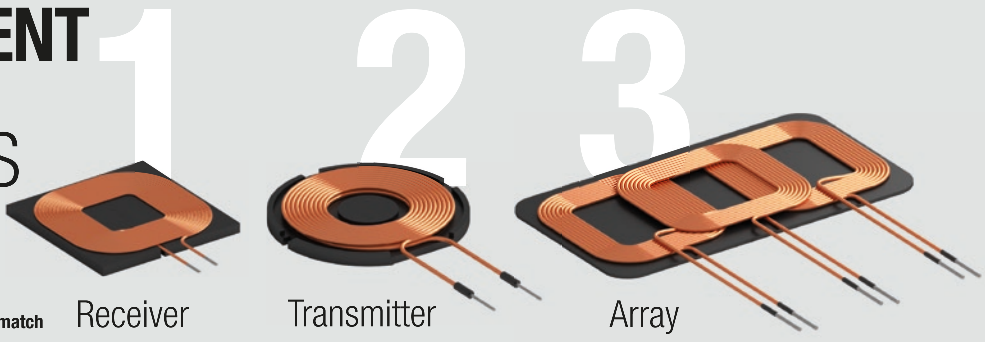
**2020**

**2 Billion wireless power units estimated in the market.**

Würth Elektronik expands the product portfolio of **wireless power coils** into various application areas.

# THE CORD

3 DIFFERENT TYPES OF COILS



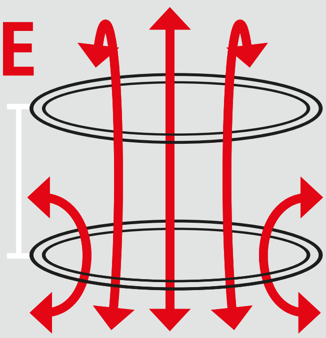

Your tool to find the perfect coil combination for wireless power applications
**www.we-online.com/wirelesspower/mixandmatch**

## SIZE OF COILS

## THE LEADING STANDARD

Wireless Power Consortium

## DISTANCE UP TO 10 mm



## WHY WÜRTH ELEKTRONIK COILS?

- Broadest portfolio of standard wireless power charging coils in the market
- Best efficiency due to best Q-factor and lowest RDC
- High permeability shielding
- Highly reliable construction
- System support

## POWER UP TO 200 W

Find out more about high power wireless transfer
**www.we-online.com/wirelesspower/highpower**

**www.we-online.com/wirelesspower**

# **RED**EXPERT & Mix and Match

## **RED**EXPERT: Online Component Simulation Software

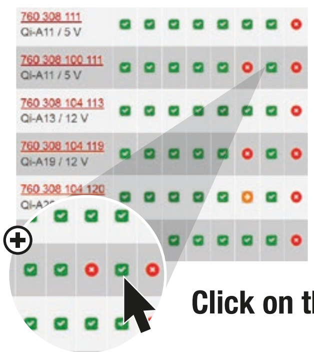
One tool, many uses. Select and compare components, view precise DC- and AC-losses by simulating switching regulators, simulate filter circuits, request samples, share circuits and more with our exclusive **REDEXPERT** tool.

### GENERAL INFORMATION

| Free online tool | Setup in 30 seconds | Hosted on servers in Germany |
|---|---|---|

## Mix and Match for Wireless Power Coils

Your tool to find the perfect coil combination for wireless power applications.
By clicking on the selected dot you will be forwarded to our online simulation software **REDEXPERT** and get detailed information about the specific pair of coils.




- Easy-to-use tool
- One click to get detailled information about the coil combination
- Complete portfolio of Wireless Power Coils covered

www.we-online.com/**wirelesspower/mixandmatch**

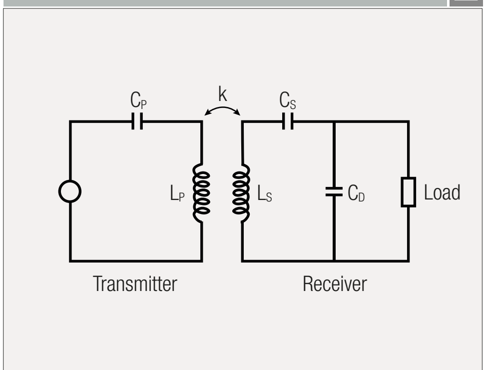
**Click on the Button**

## **RED**EXPERT: Online Simulation for Wireless Power Applications

| | Order Code | Series | Spec | Type | Compliance | L @125kHz | Q @125kHz |
|---|---|---|---|---|---|---|---|
| ✓ | 760308103202 | WE-WPCC | | Receiver | works with Q... | 12.0 µH | 33.0 |
| ✓ | 760308111 | WE-WPCC | | Transmitter | Qi-A11 | 6.30 µH | 80.0 |

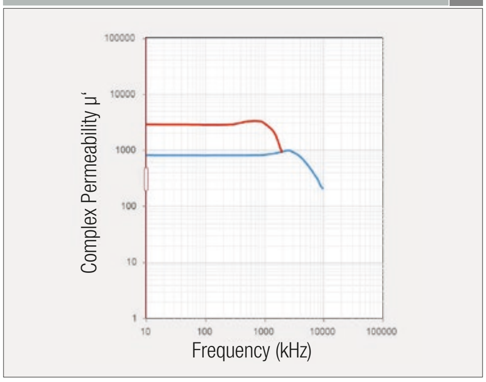
## Selected coil combination out of Mix and Match tool

**Resonance Circuit**




Resonance tank values and coupling factor for every coil combination available

**Complex Permeability µ' / Frequency**

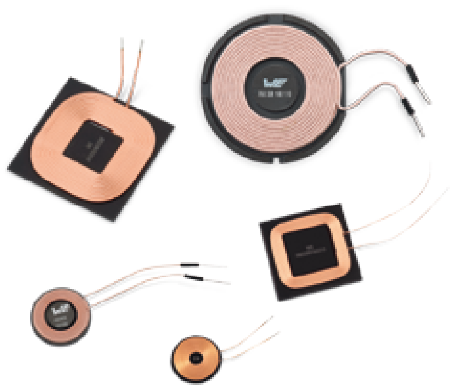



Permeability curve for every wireless power coil plotted


**Mix and Match is „Innovator of the year 2017“!**
Awarded by the German magazine Design & Elektronik

# DEXPERT

# WE-WPCC
# Wireless Power Transfer Coils



## Wireless Power Transfer
## New challenges, but also new opportunities

By Cem Som / Jörg Hantschel

## 1. Introduction

The way consumers use smartphones has changed significantly in recent years. This applies not only to all mobile devices but also to all electric appliances in industrial and medical technology with and without batteries. Ever longer usage times and higher power demands of the end devices either increase the demand for compact and high-capacity batteries or the need to charge the devices wirelessly throughout the day, which would mean the device needs to be integrated with the right wireless charging technology.
To be successful, wireless charging must be simple and convenient to handle for the user and have a charge performance (charge time, efficiency, ...) that is comparable to conventional wire technology.

## 2. Application examples

Once the technology which is driven by consumer products (5–15 W), is established, many kinds of applications over a wide range of industries will follow. We believe it will be possible to charge a variety of devices in the area of mobile communications technology (smartphones, tablets, digital cameras, fitness trackers, smart watches, baby phones etc.) using a single charging device. Nowadays this can't be done because of all the different connectors, so wireless transmission of energy is a gain in convenience and mobility for our customers.

We're already transmitting energy wirelessly to charge batteries e.g. in electrical toothbrushes, beard trimmers, and electric razors. New applications, such as for hairdryers or styling irons, would be possible and would avoid annoying cords and therefore increase the safety significantly.

In our kitchens we could use different appliances (power class 200 W – 2.4 kW) via wireless energy transmission. Applications such as rice cookers, water boilers, breadmakers, mixers, egg boilers and frying pans can be operated directly without having a chargeable battery as energy supply.

In medical technology, wireless energy transfer is used to supply energy to implants and wireless endoscopes, for biomonitoring (heart frequency, EKG, temperature, blood pressure, neural activity), blood composition (oxygen saturation, blood glucose, carbon dioxide, pH values), stimulation (pacemakers, muscle stimulation, neurostimulators), monitoring and adjustment (activity, bladder pressure, implanted insuline pumps) and also for medical machines. Today the charge contacts are worn out by very aggressive disinfection agents. If completely encapsulated, these devices can be sterilized and using wireless energy transfer poses no major challenges for the casing technology, because open contacts are no longer necessary.

In the industrial area, wireless energy supplies offer the solution for many problems that occur today in devices with charging contacts in dirty, dusty or explosion-prone environments. This increases not only the reliability and robustness of industrial applications, but also their durability and thereby maintenance costs will be reduced. Wireless energy transfer can be used in driverless transport systems, suspension tracks, cranes, conveyor systems or for supplying sensors and actuators in pressure containers and tanks.

If helmet lamps and gas detectors have integrated wireless charge technology, this can prevent contact sparks in mining, refineries and chemical production.

Wireless energy transfer works very well under water and can be used with diving robots, diving torches and underwater cameras. This is very important for the water tightness at great depths because the casings can be completely enclosed.

## 3. Transmission paths for wireless power transfer

There are a variety of methods by which energy can be transferred in a contactless manner. The field of wireless power transfer can be divided into several technologies and categories, depending on different factors such as, for example, the distance from the transmission source and modifications of the electromagnetic field.

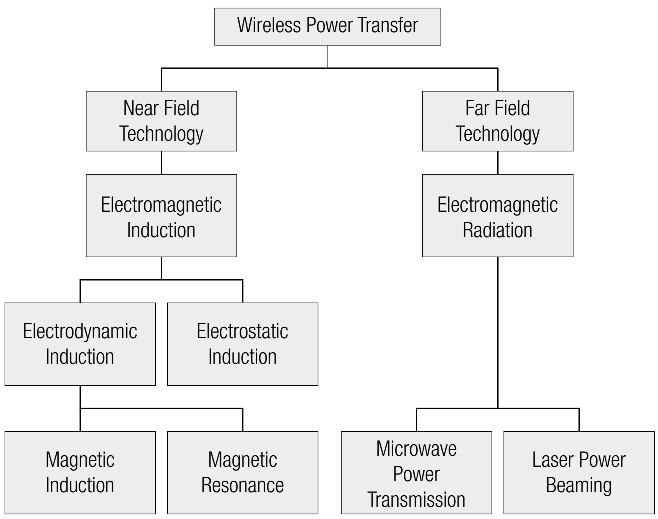



Fig. 1

### 3.1 Near-field technology

Wireless near-field power transfer can transmit energy over a distance measuring one or several external diameters of the transmission coil or shorter than one wavelength (λ). Near-field energy is a non-radiative power-transmission technique, but radiation losses may still occur. In the normal case, only ohmic losses occur.

Near-field technology is subdivided into the following categories:

- Electromagnetic induction
- Electromagnetic resonance
- Electrostatic induction

#### 3.1.1 Electromagnetic induction

Wireless power transfer by means of electromagnetic induction in the near field is transmitted at an in-terval of 1/6 of the wavelength of the transmission frequency. In a current-carrying straight conductor, the magnetic field strength H and the static magnetic field B are created around this conductor. When the wire is twisted to form a coil, this amplifies the magnetic field, which thus takes the form of a magnetic rod around the coil with a north and a south pole.

According to Ampere's law, the magnetic flux around the coil is directly proportional to the current flowing through the coil. The magnetic field strength of a coil is defined by the flux. The more windings the coil has, the greater the magnetic field around the coil.

It is also possible to remove the electric current and instead to position a permanent magnet within the coil. The mechanical movement of the permanent magnet and thus of the magnetic field induces a current in the coil. A current can also be induced when the coil is moved over the permanent magnet (oscillation). In this way, the movement of the coil or the modification of the magnetic field can be used to induce voltage and current. This process is named electromagnetic induction, which constitutes the basic principle of a transmitter.

When the distance between two coils is too great, the total primary magnetic current does not flow through the secondary coil, which leads to a poor coupling and a leakage inductance. Leakage inductance is always present in a coupled coil system, since the magnetic coupling of two coils is never perfect.

#### 3.1.2 Electromagnetic resonance

When the coupling between two galvanic isolated coils is poor, this results in leakage inductance. One of the reasons for a poor efficiency between two coils is secondary leakage inductance, which is much greater than the load used on the secondary coil. This leakage inductance makes it necessary to generate a large inducted voltage in the secondary circuit. Applying a larger current on the primary coil results in a greater induced voltage on the secondary side, thus creating even greater losses. This is why it is conventional practice in inductive couplings to eliminate the secondary leakage inductance by using a capacitance.

#### 3.1.3 Electrostatic induction

Electrostatic induction is a method for the wireless transfer of power between electrodes of a capacitance. A high-frequency alternating voltage is generated on the plates of a capacitance that are positioned close to each other. This generates an electric field, resulting in a current displacement, in turn making the electric field the power source. The power transmission is proportional to the distance between the plates.

### 3.2 Far-field technology

Far-field technology enables power to be transferred over relatively large distances, in many cases even over ranges of several kilometers. This distances are larger than the external diameter of the coils used.

The following wireless power-transfer techniques are available for the far-field sector:

- Microwave power transmission
- Laser beam

#### 3.2.1 Microwave power transmission

The technique behind microwave power transmission involves the conversion of energy into microwaves and the transmission of the waves to a rectifier and an antenna (together a "rectenna"). The transmitted microwaves are then converted by the receiver into conventional electricity.

The following steps are necessary:

- Conversion of the electricity into microwave form by means of a magnetron
- Reception of the microwave energy by means of a rectenna
- Conversion of the microwave energy into electricity

William C. Brown, a pioneer in the area of wireless power transfer, designed and developed a system that demonstrated how energy can be transmitted through free space in the form of microwaves.

#### 3.2.2 Laser radiation

Laser radiation is the wireless transmission of energy (heat or electricity) from transmitter to receiver with laser beams. The harvesting of solar power makes use of the same transmission technique, in which the sunbeams hit photovoltaic cells and convert the sunlight into energy. A special photovoltaic cell converts the laser beams into energy. Laser beams are far stronger than sunbeams, can be directly pointed at target receivers with exceptionally high accuracy, and deliver energy 24 hours a day. This form of power can be transmitted through the atmosphere, through space, or through optical fibers.

The advantages of laser radiation:

- The close collimation of the beams enables energy to be transmitted in highly concentrated form over great distances
- The receivers are very compact and can be easily integrated into available devices
- The power can be transmitted without interfering with high-frequency communica-tion systems (e.g. WiFi or LTE)
- Laser radiation can use all existing sources of energy for the laser
- Energy can be transmitted through free space or by optical-fiber networks

The drawbacks of laser radiation:

- Poor efficiency
- Transmitter and receiver must have a direct line of sight
- The efficiency of the system is susceptible to atmospheric conditions

## 4. The dominating standards

The success of these solutions of course depends on maintaining a standard for transmitters and receivers. Only if there is assurance that the device can be charged hassle-free at any charging station that meets the standard, regardless of the manufacturer, the system will be successful. What kinds of standard approaches are out there and what's the technology behind them?

### 4.1 Wireless Power Consortium (WPC) – Qi Standard

qi WIRELESS POWER CONSORTIUM

- Energy transmission with inductive coupling across short distances (mm range) and also magnetic resonance with distances over 20–30 mm

- Transmitter (Tx) and receiver (Rx) are inductively coupled coils.
- The magnetic field is concentrated in the narrow region between transmitter and receiver coil
- Each transmitter can serve only one receiver
- Different performance classes (5 W, 15 W, higher classes are planned up to 2.4 kW)
- Frequency range 87–205 kHz
- Coil forms: wound on ferrite or printed onto circuit board
- Currently (12/2017) the most well-established solution on the market with over 1000 licensed devices

With the decision of Apple to use the Qi Standard in all new iPhones since September 2017 the competetion of the standards are decided and Qi will be the worldwide standard.

### 4.2 Air Fuel Alliance

AirFuel™ Alliance
Wireless Power

1. First charging principle is the magnetic resonance from the former standard A4WP (Alliance for Wireless Power): A transmitter oscillatory circuit with a resonance frequency provides the energy. Receivers correctly tuned to the resonance frequency can absorb the energy
   - Greater distance in z direction (50 mm), and exact positioning of the receiver is unnecessary
   - One transmitter can handle multiple receivers simultaneously
   - Performance class planned for smartphones and tablets currently up to 22 W
   - Frequency ranges: Energy 6.78 MHz (ISM band), data 2.4 GHz (LP Bluetooth)
2. Second charging principle is the inductive coupled solution from the former standard PMA (Power Matters Alliance)
   - The inductive coupled solution uses a different protocol and transmission frequency band (details for members only) than the Qi solution of WPC
   - No direct compatibility with Qi, dual standard receivers are available

### 4.3 Proprietary system solutions

All standards have their advantages and disadvantages. However, around 30 % of applications in industrial technology or medical technology are not reliant on being compatible with other manufacturers or with other terminal devices. With this fundamental elimination of compatibility, manufacturers from all industries, apart from the consumer and automobile industries, are producing self-developed proprietary system solutions. These proprietary system approaches do not always require customer-specific passive components for wireless power transfer. Instead, WE-WPCC standard transmitter and receiver coils can be used.

Two examples for prprietary system solutions are these two application notes. These can be found at our website: www.we-online.com/wirelesspower/highpower

## 5. Basics

The Faraday Law of Induction describes the basic principle of energy transmission.

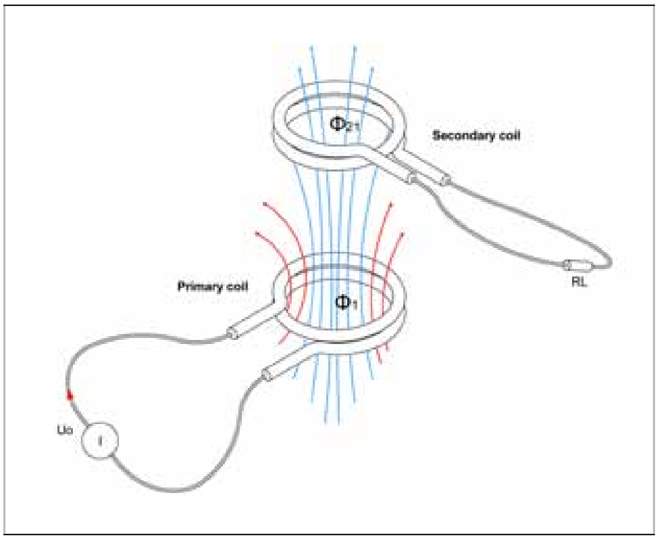



Fig. 2

Current flowing through the primary coil (transmitter coil) generates a magnetic flux $\Phi_1$. This magnetic flux $\Phi_1$ in the winding generates an induction voltage in the secondary coil (receiver coil) based on the faraday´s law of induction (see fig. 1). As transmitter coil and receiver coil are physically separate, only a portion of the magnetic flux $\Phi_{21}$ penetrates the receiver coil (and vice versa) which induces voltage on the coupled coil and eventually supplies an appliance. This magnetic coupling between two coils is described by the relation of the magnetic fluxes $\Phi_{21}/\Phi_1$.

Coupling factor k is defined as follows:

$$k = \frac{M}{\sqrt{L_1 * L_2}}$$

M is the mutual inductance between both coils. $L_1$ and $L_2$ are the self-inductances of both coils. The coupling factor is very dependent on the displacement of the coils in x and z direction. The coupling can be improved by attaching ferromagnetic material to the coil because this bundles the magnetic flux. The ferrite also protects parts of the circuit near to the transmitter and receiver coils by lowering the induced interfering voltage.

The coupling factor with an ideal transformer is 1, but maximum coupling in the range of 0.2 – 0.7 can be achieved with an inductively coupled system.

$$Q = \frac{X_L}{R_L} = \frac{\omega_0 * L}{R}$$

The quality factor Q of the coils has a direct impact on the coupling and efficiency of the wireless energy transfer. Quality factor Q is defined as follows:

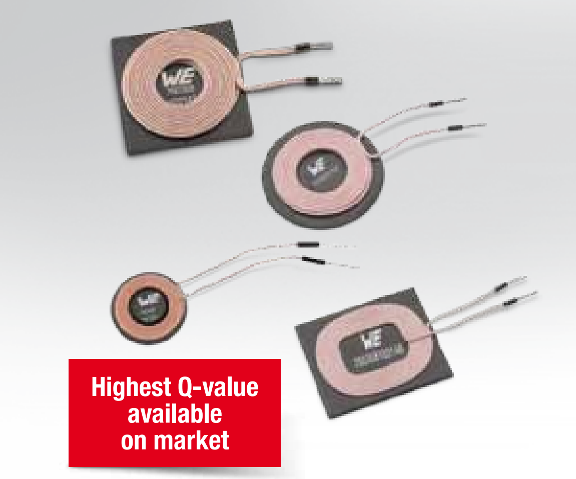
$$\eta = \frac{P_{out}}{P_{in}}$$

R: effective series resistance (ac resistance at operating frequency) of the coil

**Design Kit 760 308MP**


**Find the design kit on www.we-online.com/wirelesspower**

# WE-WPCC
# Wireless Power Transmitter Coil



**Highest Q-value available on market**

## Characteristics

- Qi standard compliant
- Litzwire used – highest Q-value available on market
- Applicable for up to 15 W (up to 300 W outside the standards)
- High permeability shielding
- Cancels charging flux to be not coupled into sensitive components or batteries
- High reliable construction
- Pot core construction limits the stray field in the design
- Mix and match your tool to find the perfect coil combination: www.we-online.com/wirelesspower/mixandmatch

## Applications

- Portable devices used in a clean area, where connectors pose a risk of polluting e.g. medical facilities, (industrial) clean rooms, mining industry
- Devices with a large number of mating cycles to avoid connector damage: e.g. Smart watches, fitness tracker ...
- Consumer products: e.g. Digital cameras, baby phone, remote control, smartphone sleeves, watertight products
- Explosion sensitive area where the use of a physical connection is hazardous

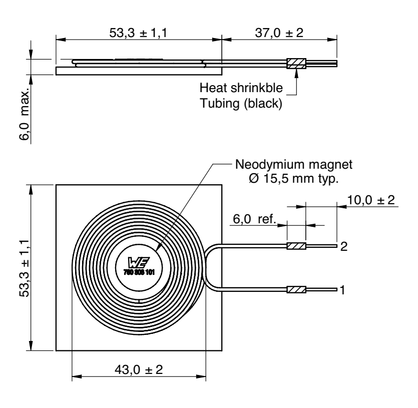
## Strategic partnerships with all major chip set suppliers

## Electrical properties

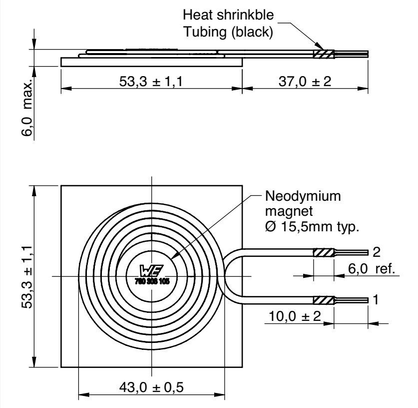
| | Order Code | L (µH) | $R_{DC\,max}$ (Ω) | $I_R$ (A) | $I_{sat}$ (A) | Q | SRF (MHz) | Size | Compliance |
|---|---|---|---|---|---|---|---|---|---|
| | **760 308 101** | 24.0 | 0.100 | 6 | 10 | 90 | 6 | 5353 | Qi – A1 |
| | **760 308 105** | 6.3 | 0.025 | 13 | 16 | 55 | 20 | 5353 | Qi – A5 |
| | **760 308 110** | 24.0 | 0.100 | 6 | 10 | 180 | 5 | 5353 | Qi-A10; MP-A1/A7 |
| | **760 308 100 110** | 24.0 | 0.100 | 6 | 10 | 180 | 5 | Ø 50 | Qi-A10; MP-A1/A7 |
| | **760 308 111** | 6.3 | 0.020 | 13 | 16 | 80 | 20 | 5353 | Qi-A11; MP-A11 |
| | **760 308 100 111** | 6.3 | 0.048 | 6 | 10 | 120 | 24 | Ø 50 | Qi-A11; MP-A11 |
| | **760 308 104 113** | 12.0 | 0.072 | 8 | 12 | 120 | 16 | 6052 | Qi – A13 |
| | **760 308 141** | 10.0 | 0.030 | 9 | 16 | 140 | 11 | 5353 | Qi – A29; MP-A5 |
| | **760 308 100 141** | 10.0 | 0.030 | 9 | 16 | 180 | 11 | Ø 50 | Qi – A29; MP-A5 |
| NEW | **760 308 101 141** | 10.0 | 0.030 | 9 | 16 | 220 | 11 | Ø 50 | Qi – A29; MP-A5 |
| | **760 308 103 102** | 10.0 | 0.055 | 7 | 10 | 130 | 11 | 5353 | Qi – MP-A2 |
| NEW | **760 308 103 146** | 8.5 | 0.056 | 8 | 16 | 140 | 11 | 5547 | Qi-MP-A8 |
| | **760 308 102 142** | 5.8 | 0.012 | 18 | 30 | 100 | 12 | 5353 | works with Qi Tx IC's |
| | **760 308 100 143** | 6.0 | 0.018 | 12 | 24 | 180 | 16 | Ø 50 | works with Qi Tx IC's |
| | **760 308 102 144** | 19.5 | 0.045 | 9.5 | 20 | 220 | 5 | 5555 | works with Qi Tx IC's |
| | **760 308 101 103** | 6.5 | 0.200 | 3 | 8 | 35 | 20 | Ø 30 | works with Qi Tx IC's |
| | **760 308 101 104** | 6.5 | 0.125 | 2.5 | 6 | 42 | 20 | Ø 20 | works with Qi Tx IC's |
| | **760 308 101 105** | 3.3 | 0.083 | 3 | 6 | 30 | 20 | Ø 20 | works with Qi Tx IC's |
| | **760 308 101 302** | 5.3 | 0.035 | 8 | 10 | 100 | 27 | Ø 50 | works with Qi Tx IC's |
| | **760 308 101 304** | 6.3 | 0.048 | 6 | 10 | 115 | 16 | Ø 48 | works with Qi Tx IC's |
| | **760 308 102 308** | 3.0 | 0.030 | 8.5 | 15 | 60 | 27 | 5030 | works with Qi Tx IC's |

# Wireless Power Transmitter Coil

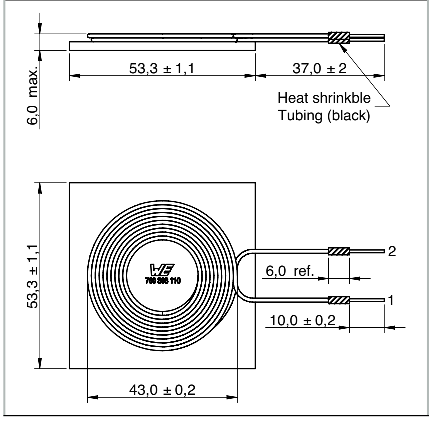
## Dimensions 760 308 101 (in mm)



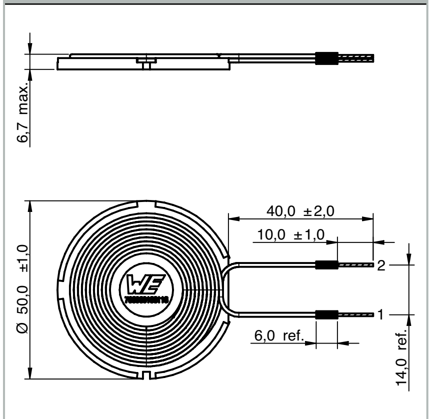

## Dimensions 760 308 105 (in mm)



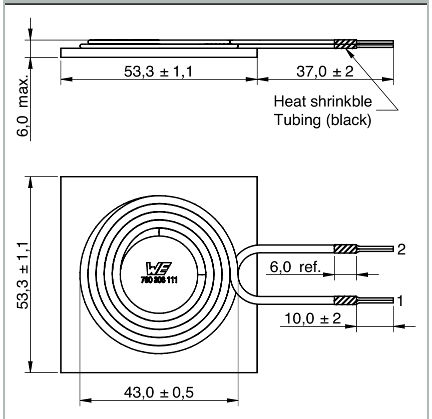

## Dimensions 760 308 110 (in mm)



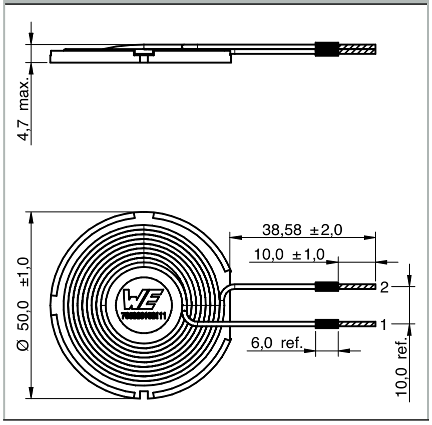

## Dimensions 760 308 100 110 (in mm)



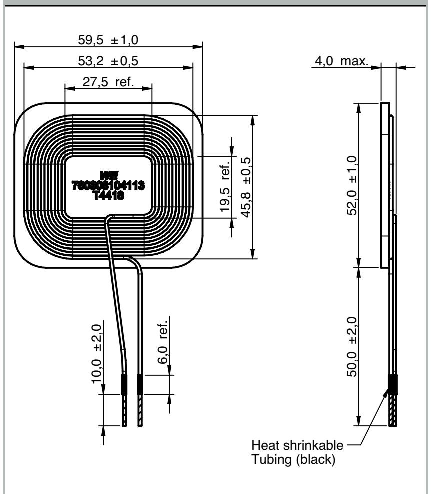

## Dimensions 760 308 111 (in mm)



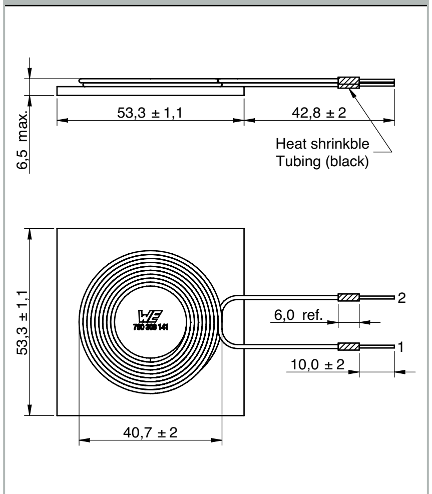

## Dimensions 760 308 100 111 (in mm)



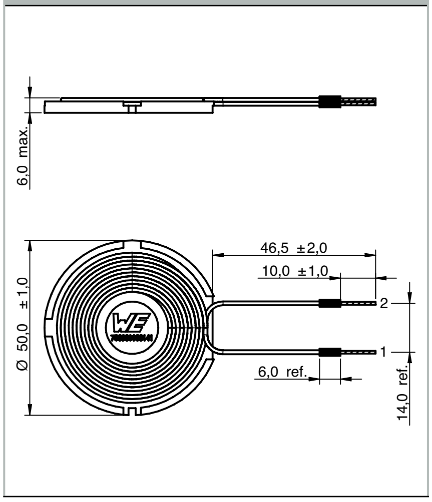

## Dimensions 760 308 104 113 (in mm)




## Dimensions 760 308 141 (in mm)

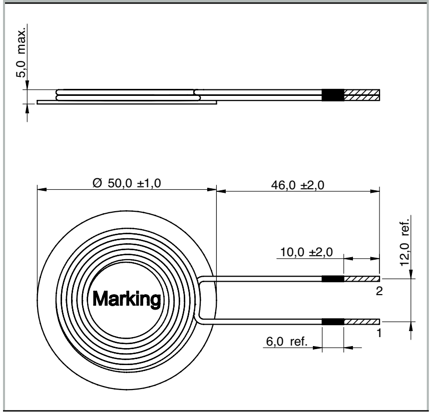



## Dimensions 760 308 100 141 (in mm)

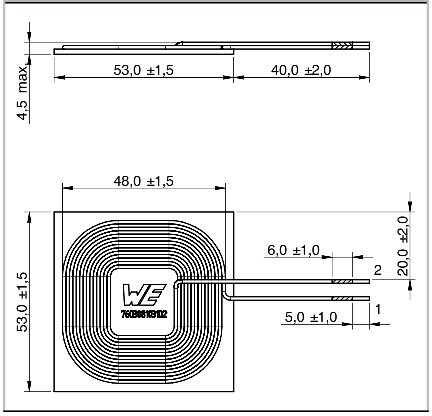


# WE-WPCC
# Wireless Power Transmitter Coil

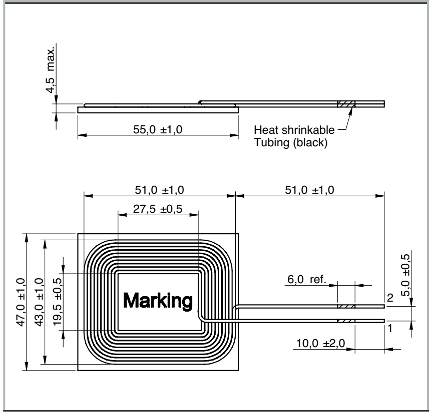
### Dimensions 760 308 101 141 (in mm)



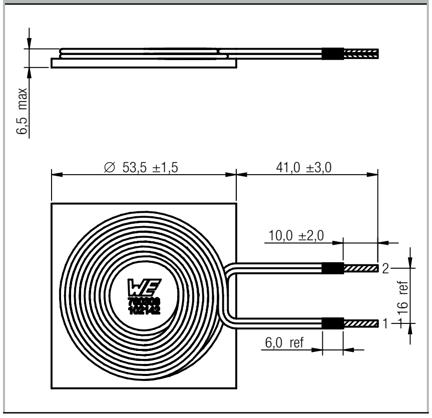

### Dimensions 760 308 103 102 (in mm)



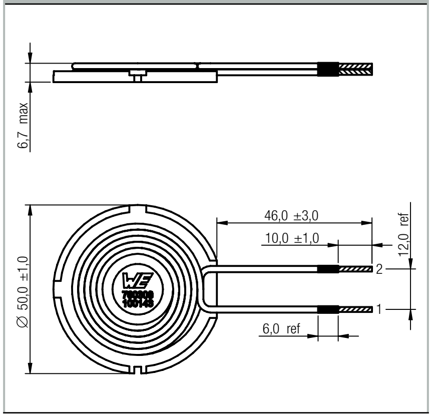

### Dimensions 760 308 103 146 (in mm)



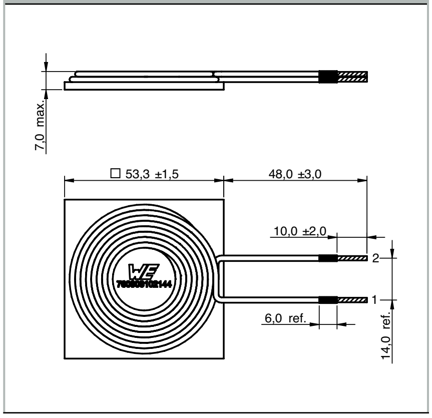

### Dimensions 760 308 102 142 (in mm)



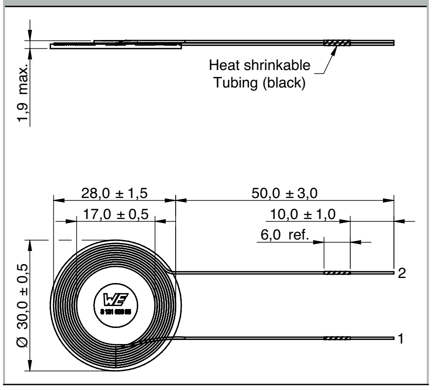

### Dimensions 760 308 100 143 (in mm)



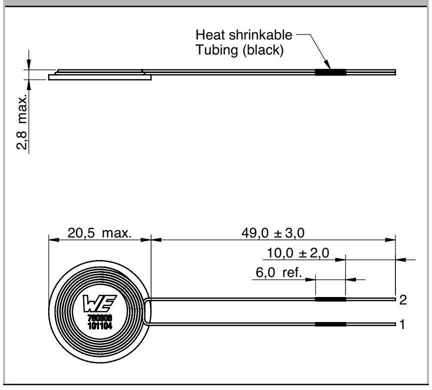

### Dimensions 760 308 102 144 (in mm)



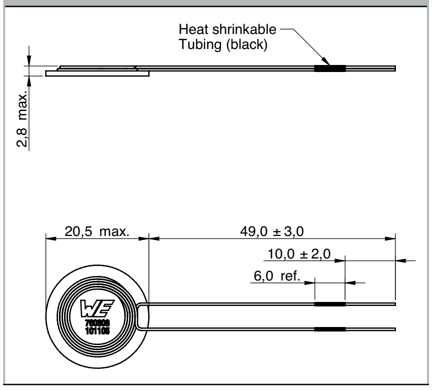

### Dimensions 760 308 101 103 (in mm)



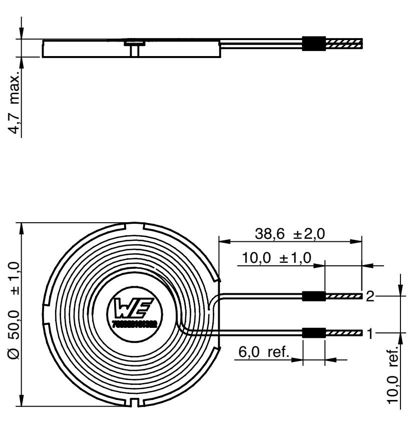

### Dimensions 760 308 101 104 (in mm)



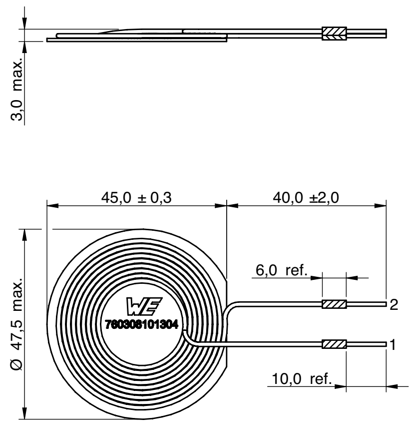

### Dimensions 760 308 101 105 (in mm)



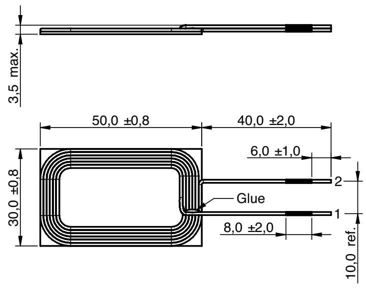
### Dimensions 760 308 101 302 (in mm)




### Dimensions 760 308 101 304 (in mm)

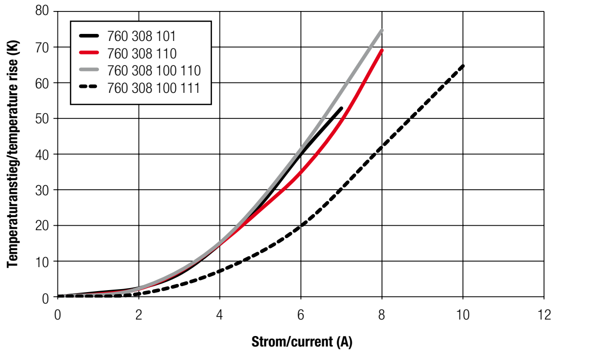



### Dimensions 760 308 102 308 (in mm)

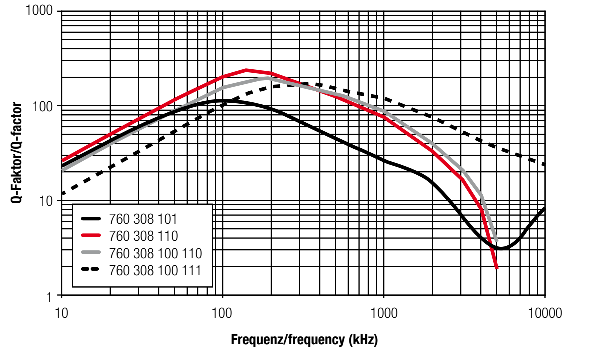


# WE-WPCC
# Wireless Power Transmitter Coil

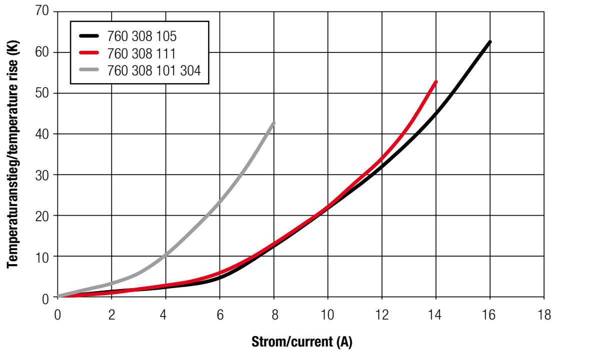
## Temperature vs. Current



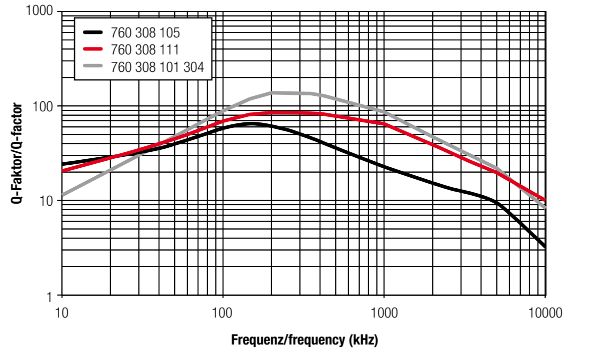

## Q-factor vs. Frequency



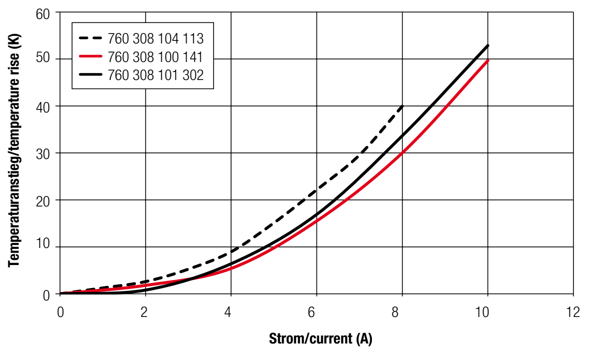

## Temperature vs. Current



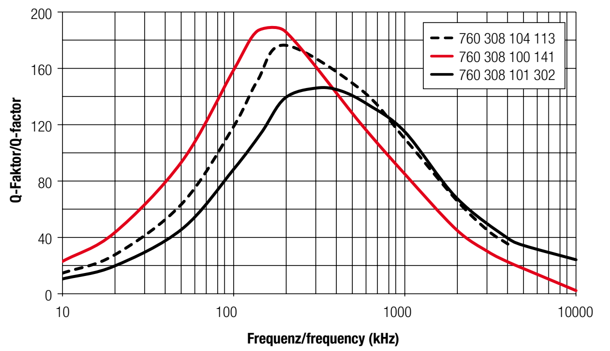

## Q-factor vs. Frequency



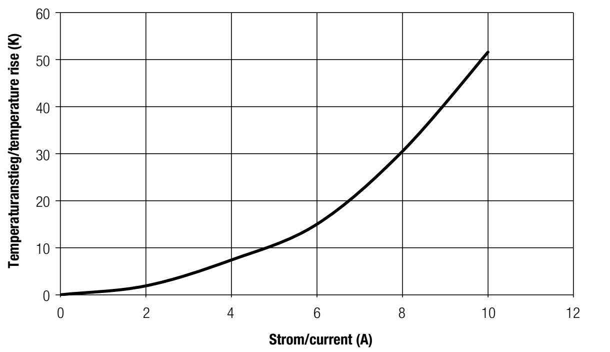

## Temperature vs. Current



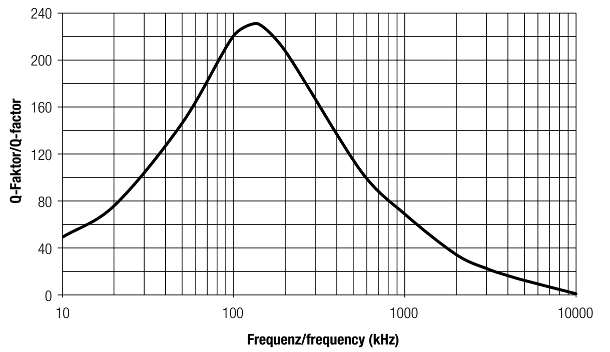

## Q-factor vs. Frequency




## Temperature vs. Current 760 308 101 141

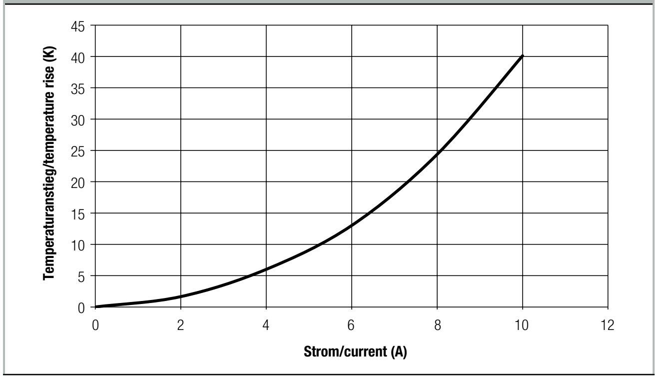



## Q-factor vs. Frequency 760 308 101 141

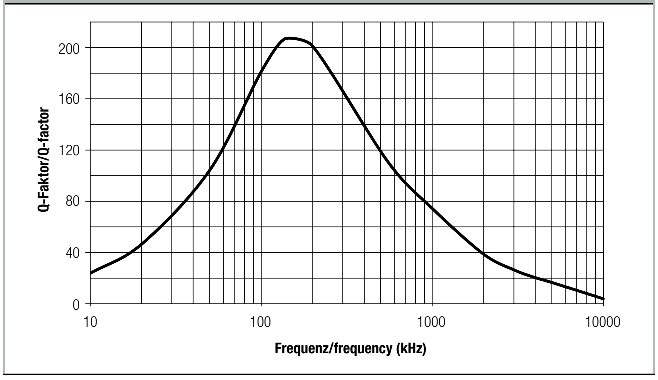


# WE-WPCC
# Wireless Power Transmitter Coil

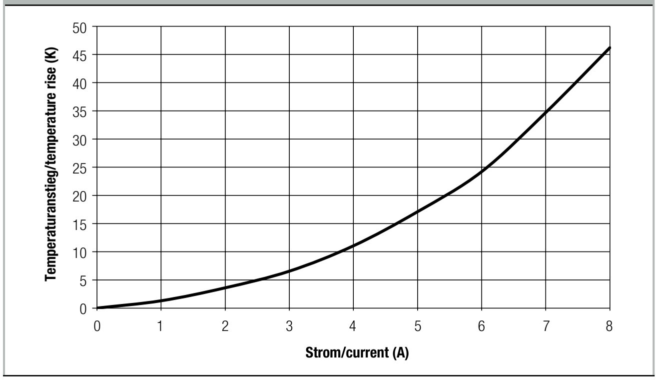
## Temperature vs. Current 760 308 141



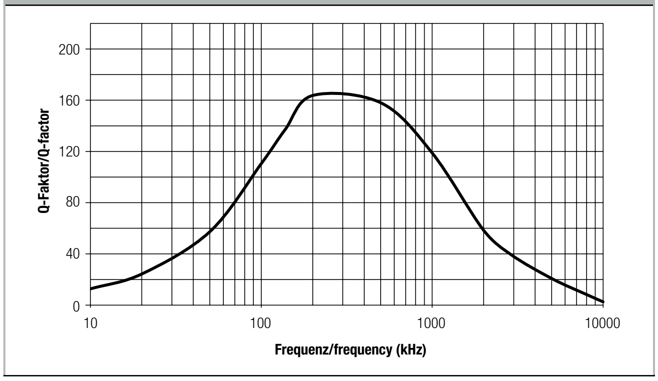

## Q-factor vs. Frequency 760 308 141



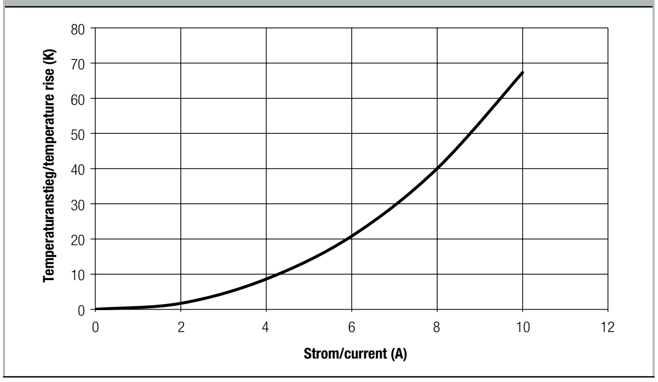

## Temperature vs. Current 760 308 103 102



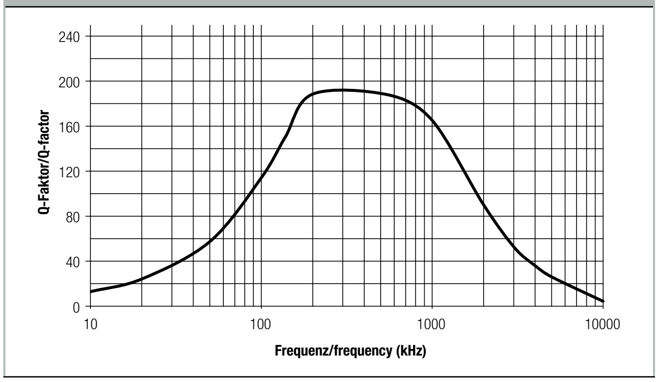

## Q-factor vs. Frequency 760 308 103 102



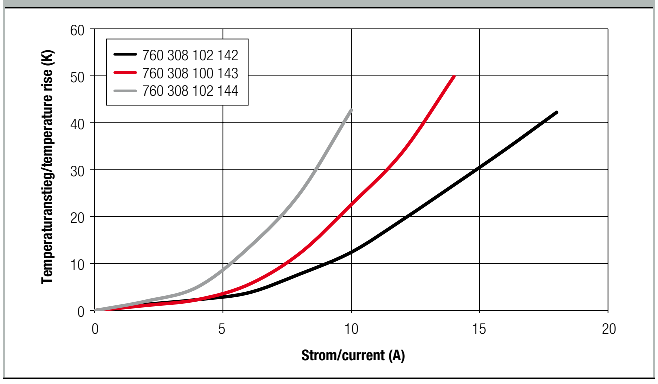

## Temperature vs. Current 760 308 103 146



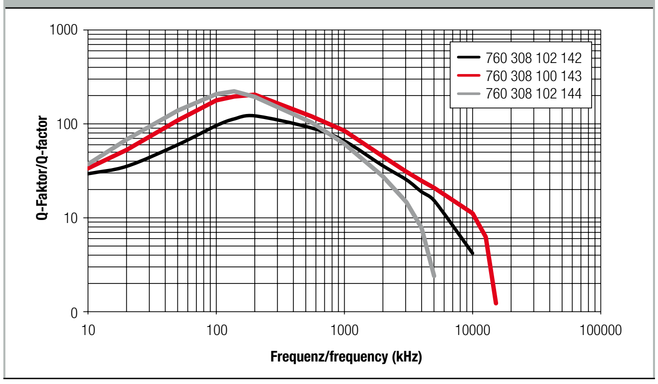

## Q-factor vs. Frequency 760 308 103 146




## Temperature vs. Current

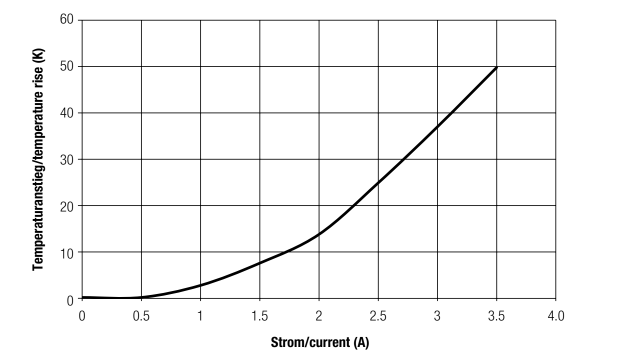



## Q-factor vs. Frequency

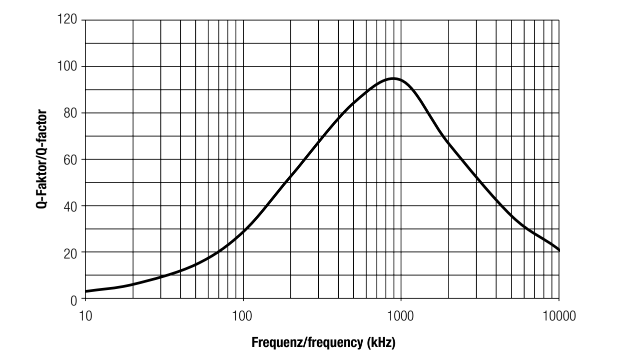


# WE-WPCC
# Wireless Power Transmitter Coil

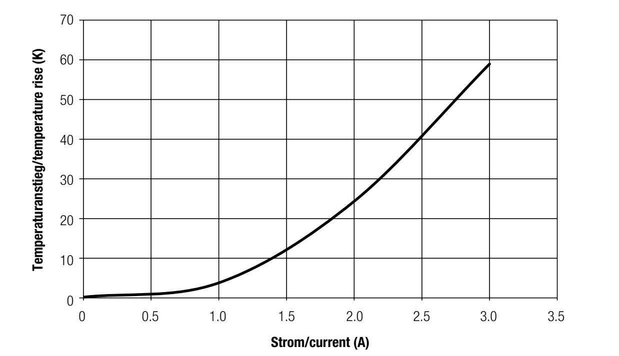
## Temperature vs. Current 760 308 101 103



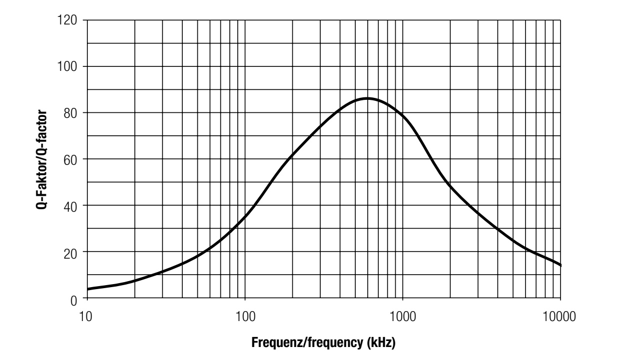

## Q-factor vs. Frequency 760 308 101 103



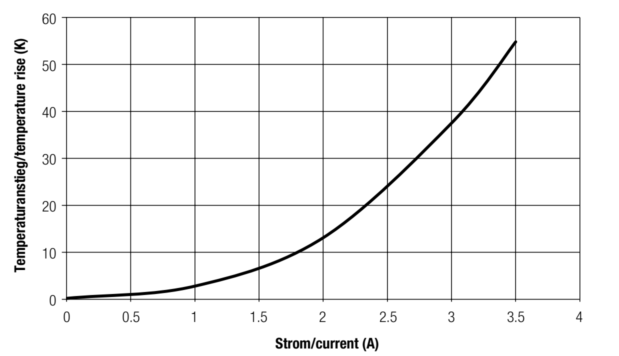

## Temperature vs. Current 760 308 101 104



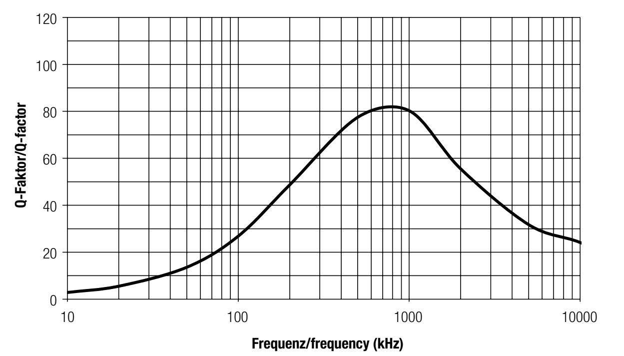

## Q-factor vs. Frequency 760 308 101 104



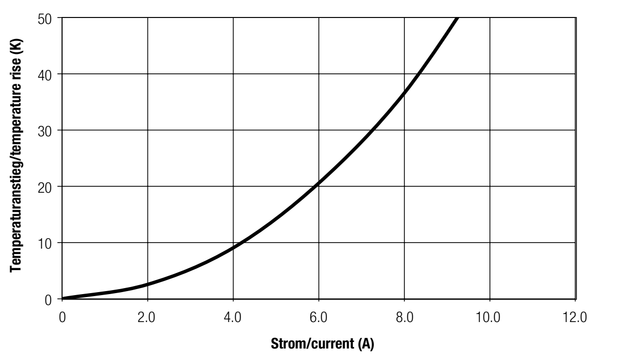

## Temperature vs. Current 760 308 101 105



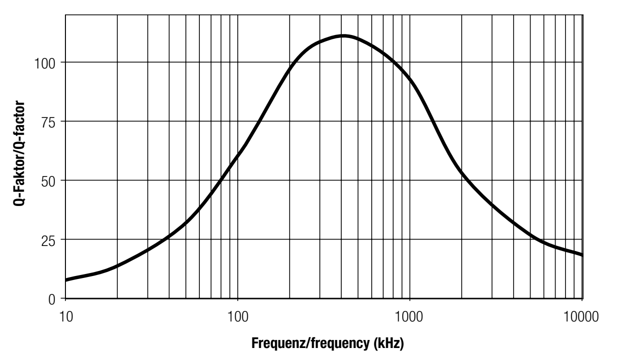

## Q-factor vs. Frequency 760 308 101 105



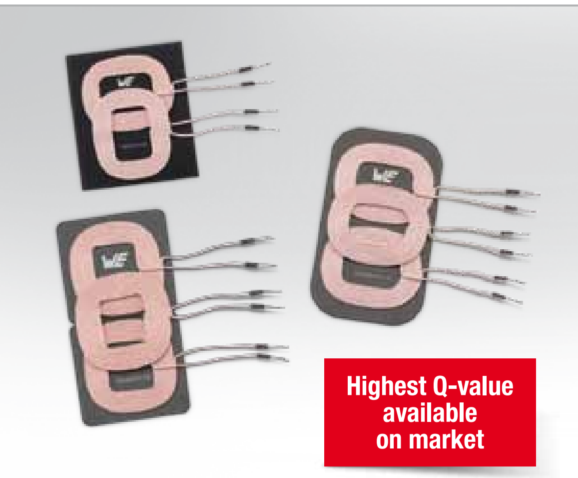

## Temperature vs. Current 760 308 102 308




## Q-factor vs. Frequency 760 308 102 308



# WE-WPCC
# Wireless Power Array




## Characteristics

- Qi standard compliant
- Litzwire used – highest Q-value available on market
- Applicable for up to 15 W (up to 200 W outside the standards)
- High permeability shielding
- Cancels charging flux to be not coupled into sensitive components or batteries
- High reliable construction
- Mix and match your tool to find the perfect coil combination: www.we-online.com/wirelesspower/mixandmatch

## Applications

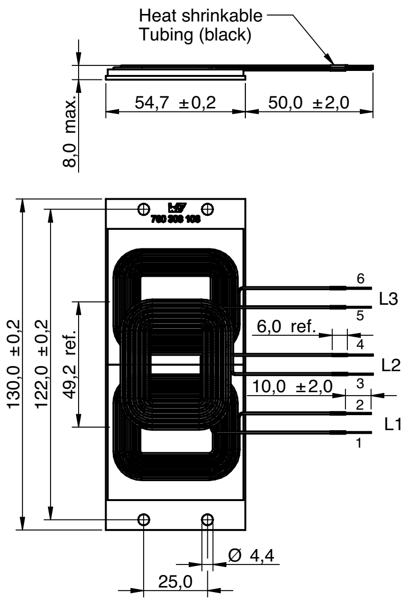
- Portable devices used in a clean area, where connectors pose a risk of polluting e.g. medical facilities, (industrial) clean rooms, mining industry
- Devices with a large number of mating cycles to avoid connector damage: e.g. Smart watches, fitness tracker …
- Consumer products: e.g. Digital cameras, baby phone, remote control, smartphone sleeves, watertight products
- Explosion sensitive area where the use of a physical connection is hazardous

## Strategic partnerships with all major chip set suppliers

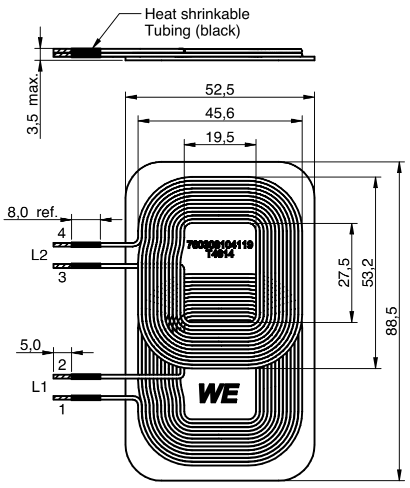
## Electrical properties

| | Order Code | $L_1$ (µH) | $L_2$ (µH) | $L_3$ (µH) | $I_{R1/2/3}$ (A) | $I_{sat1/2/3}$ (A) | $R_{DC1/2/3\ max}$ (Ω) | $SRF_{1/2/3\ max}$ (MHz) | $Q_{1/2/3}$ | Size | Compliance |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 760 308 106 | 12.5 | 11.5 | 12.5 | 9 | 10 | 0.065 | 14 | 125 | 13055 | Qi – A6 |
| | 760 308 104 119 | 12.0 | 11.5 | – | 8 | 12 | 0.068 | 12 | 130 | 8852 | Qi – A19 |
| | 760 308 104 120 | 6.9 | 6.4 | 6.9 | 9 | 12 | 0.045 | 15 | 100 | 9250 | Qi – A28 |
| NEW | 760 308 103 148 | 6.9 | 6.4 | – | 8.5 | 20 | 0.052 | 15 | 120 | 7161 | Qi-A28 |
| NEW | 760 308 103 145 | 11.3 | 11.3 | 11.3 | 8.5 | 24 | 0.083 | 10 | 150 | 10956 | Qi-MP-A6 |
| NEW | 760 308 103 147 | 8.5 | 7.5 | 8.5 | 9 | 18 | 0.056 | 11 | 145 | 10055 | Qi-MP-A8 |

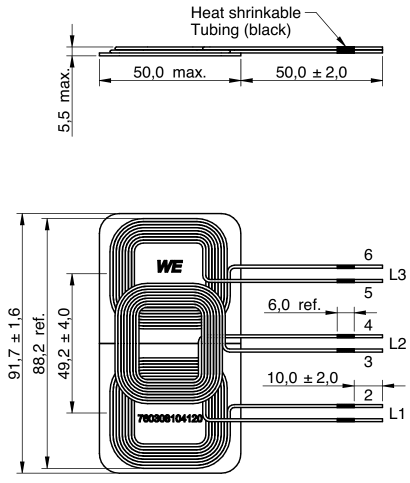
## Dimensions 760 308 106 (in mm)




## Dimensions 760 308 104 119 (in mm)

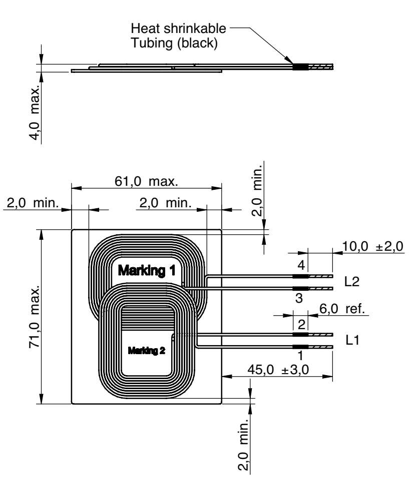



## Dimensions 760 308 104 120 (in mm)

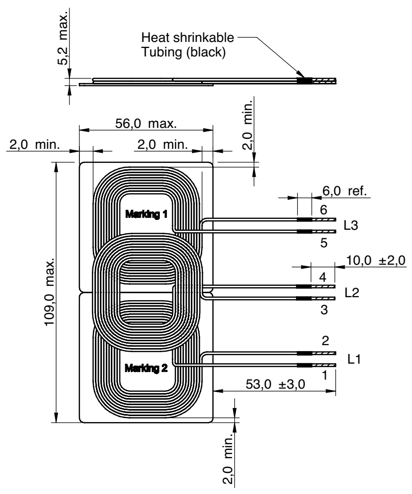


# WE-WPCC
# Wireless Power Array

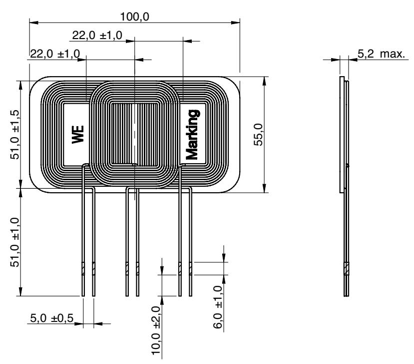
## Dimensions 760 308 103 148 (in mm)



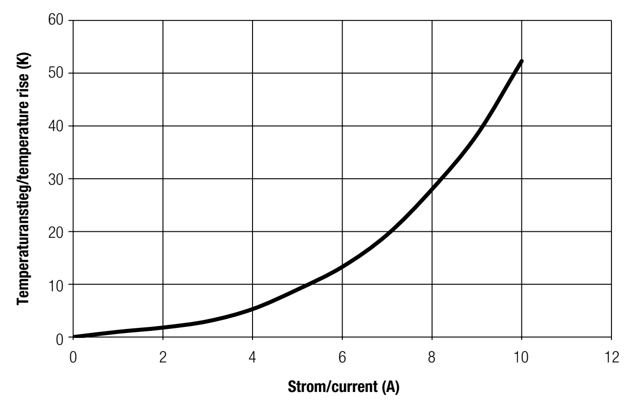

## Dimensions 760 308 103 145 (in mm)



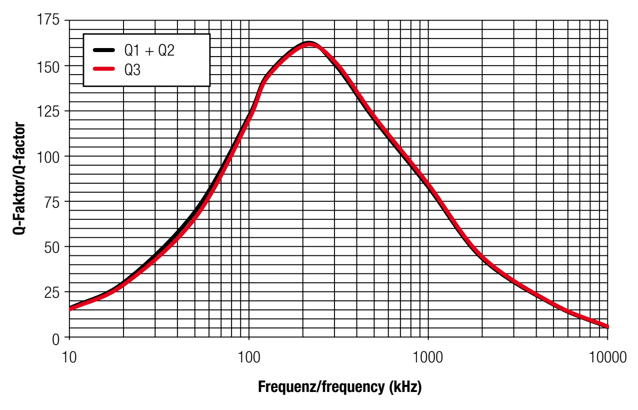

## Dimensions 760 308 103 147 (in mm)



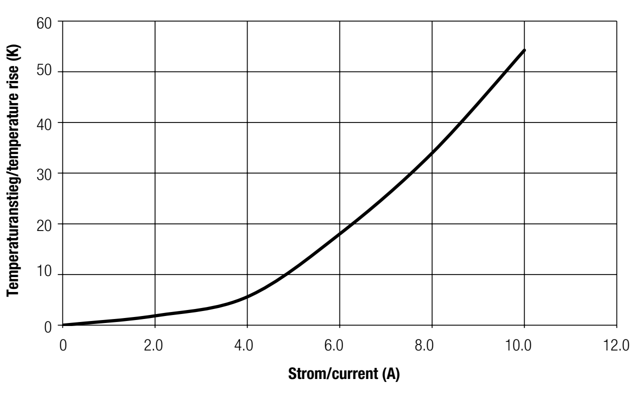
## Temperature vs. Current 760 308 106



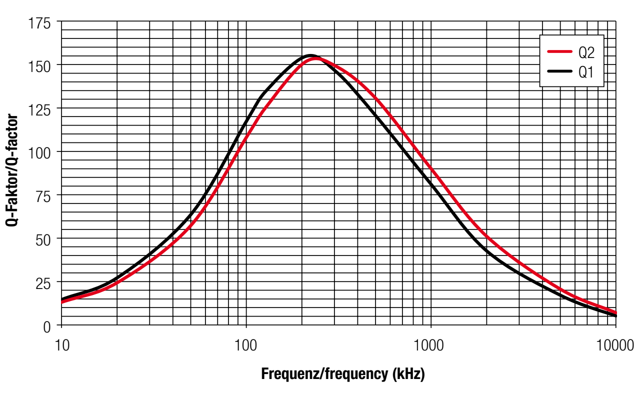

## Q-factor vs. Frequency 760 308 106



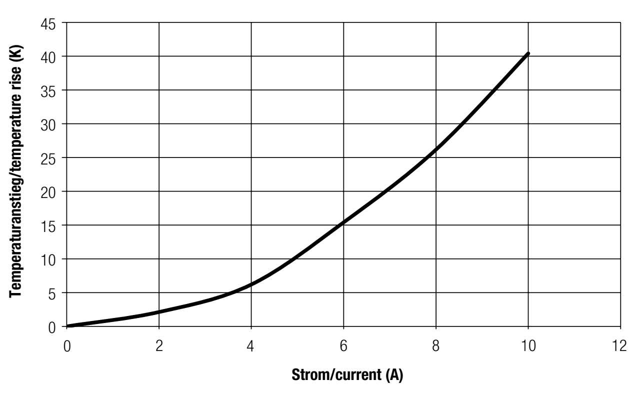

## Temperature vs. Current 760 308 104 119



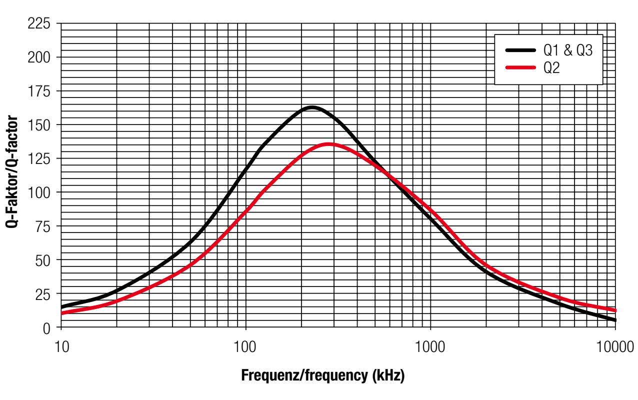

## Q-factor vs. Frequency 760 308 104 119




## Temperature vs. Current 760 308 104 120

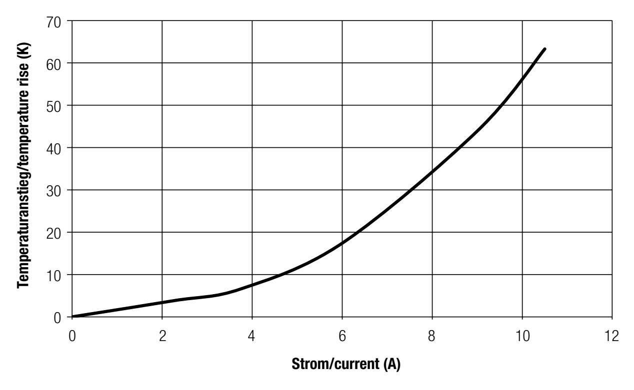



## Q-factor vs. Frequency 760 308 104 120

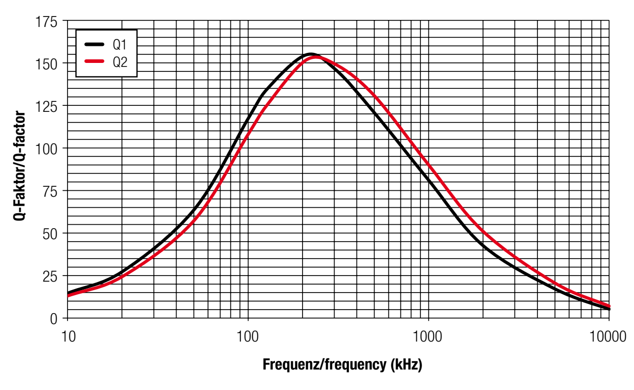


# WE-WPCC
# Wireless Power Array

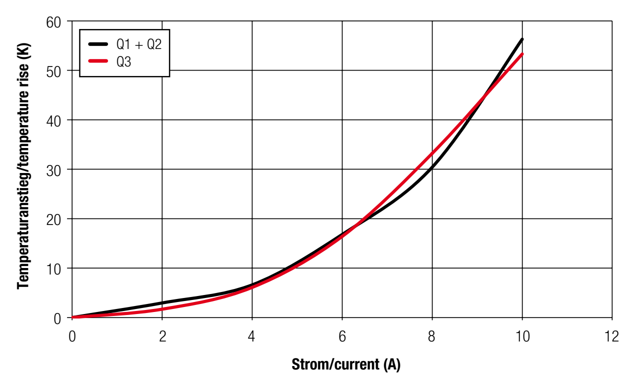
## Temperature vs. Current 760 308 103 148



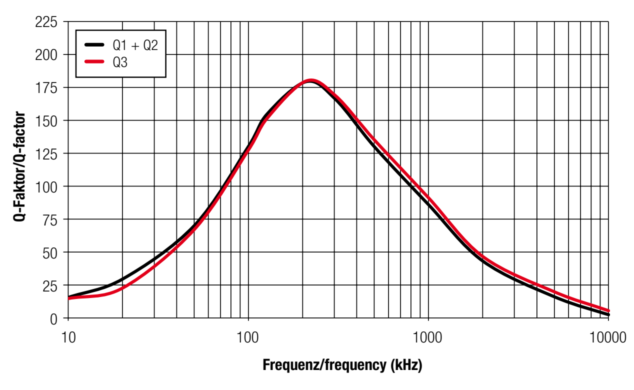

## Q-factor vs. Frequency 760 308 103 148



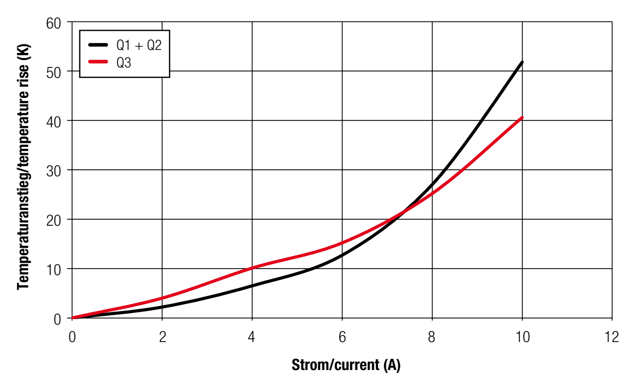

## Temperature vs. Current 760 308 103 145



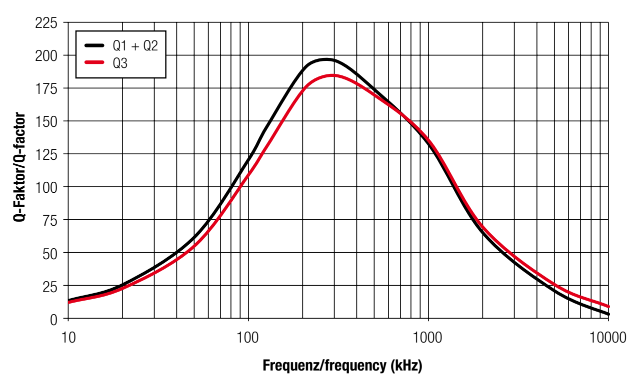

## Q-factor vs. Frequency 760 308 103 145



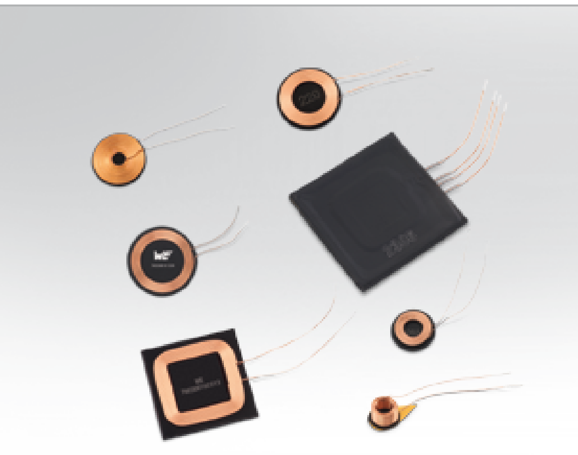

## Temperature vs. Current 760 308 103 147




## Q-factor vs. Frequency 760 308 103 147



# WE-WPCC
# Wireless Power Receiver Coil



## Characteristics

- Qi standard compliant
- Highest Q-value available on market
- Today there are two inductive wireless power standards; the Qi standard of WPC and the Airfuel Alliance standard. We offer dual standard receiver coils. The advantage of this high quality coils are that devices using this solution can be charged on charging stations of both standards.
- Mix and match your tool to find the perfect coil combination: www.we-online.com/wirelesspower/mixandmatch

## Applications

- Cell phones/smartphones/hand-held devices
- Portable devices used in a clean area, where connectors pose a risk of polluting e.g. medical facilities and (industrial) clean rooms
- Devices with a large number of mating cycles to avoid connector damage
- Headsets
- Portable media players

**Thinnest in the market**
**Easy assembly**

## Strategic partnerships with all major chip set suppliers

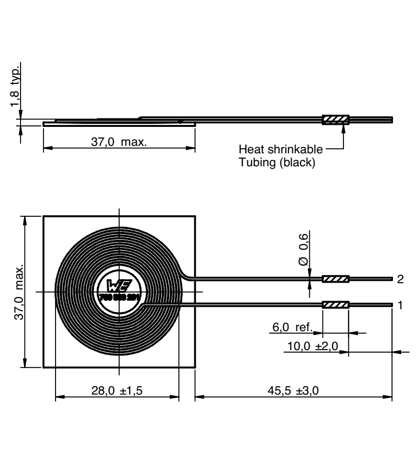
ROHM SEMICONDUCTOR · POWER BY LINEAR · life.augmented · IDT Integrated Device Technology®

## Electrical properties

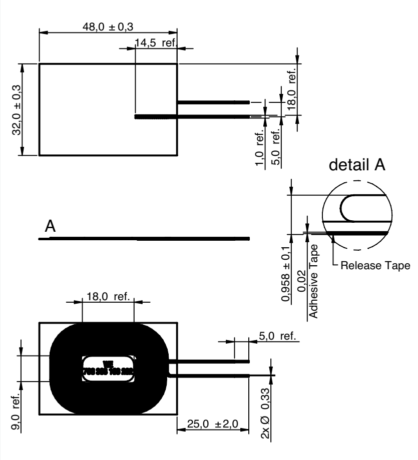
| | Order Code | L (µH) | $R_{DC\ max}$ (Ω) | $I_R$ (A) | $I_{sat}$ (A) | Q | SRF (MHz) | Size | Compliance |
|---|---|---|---|---|---|---|---|---|---|
| | **760 308 201** | 10.0 | 0.20 | 3.50 | 8.0 | 50 | 15 | 3737 | Qi |
| | **760 308 103 202** | 12.0 | 0.20 | 3.00 | 6.0 | 33 | 13 | 4832 | Qi |
| | **760 308 103 203** | 12.0 | 0.36 | 1.55 | 3.0 | 21 | 11 | 4832 | Qi |
| | **760 308 103 204** | 16.7 | 0.43 | 2.00 | 4.0 | 32 | 11 | 3830 | Qi |
| | **760 308 103 205** | 11.0 | 0.20 | 2.50 | 4.0 | 30 | 16 | 3426 | Qi |
| | **760 308 103 206** | 7.5 | 0.38 | 1.55 | 3.0 | 16 | 23 | 2815 | Qi – Airfuel Alliance |
| | **760 308 102 207** | 8.0 | 0.08 | 5.00 | 10.0 | 30 | 16 | 4040 | Qi |
| | **760 308 101 208** | 13.0 | 0.50 | 0.80 | 2.0 | 17 | 26 | Ø 10 | Qi |
| | **760 308 101 208A** | 18.0 | 0.65 | 0.70 | 2.0 | 18 | 24 | Ø 10 | Qi |
| | **760 308 102 210** | 7.5 | 0.18 | 3.00 | 6.0 | 45 | 22 | 3737 | Qi – Airfuel Alliance |
| | **760 308 103 211** | 7.3 | 0.20 | 2.50 | 5.0 | 28 | 12.7 | 4636 | Qi – Airfuel Alliance |
| | **760 308 102 212** | 5.4 | 0.24 | 2.00 | 4.0 | 18 | 25 | 2929 | Qi |
| | **760 308 102 213** | 7.9 | 0.33 | 1.70 | 4.0 | 18 | 21 | 2929 | Qi – Airfuel Alliance |
| | **760 308 101 214** | 26.0 | 0.52 | 1.10 | 2.0 | 25 | 11 | Ø 19 | Qi |
| | **760 308 103 215** | 14.3 | 0.19 | 3.00 | 8.0 | 40 | 8.8 | 4832 | Qi |
| | **760 308 101 216** | 7.2 | 0.44 | 0.5 | 1.0 | 10 | 32 | Ø 6 | Qi |
| | **760 308 101 217** | 24.2 | 1.40 | 0.4 | 1.0 | 13 | 17.5 | Ø 10 | Qi |
| | **760 308 101 219** | 11.8 | 0.75 | 0.7 | 1.5 | 13 | 22 | Ø 15 | Qi |
| | **760 308 101 220** | 12.6 | 0.34 | 1.1 | 2.5 | 20 | 19 | Ø 17 | Qi |
| **NEW** | **760 308 101 221** | 24.0 | 1.15 | 0.4 | 1 | 16 | 10 | Ø 6 | Qi |
| | **760 308 101 303** | 47.0 | 0.50 | 1.50 | 3.0 | 25 | 8 | Ø 26 | Qi |
| | **760 308 103 305** | 8.8 / 1.4 | 0.220 / 0.100 | 2.6 / 5.0 | 5.0 / 5.0 | 30 / 47 | 22 / 16 | 4544 | Qi – Airfuel Alliance – NFC |
| | **760 308 102 306** | 8.0 / 1.4 | 0.400 / 0.100 | 2.0 / 5.0 | 5.0 / 5.0 | 19 / 47 | 17.5 / 19 | 4444 | Qi – Airfuel Alliance – NFC |
| | **760 308 103 307** | 7.8 / 1.6 | 0.340 / 0.90 | 1.5 / 4.0 | 3.0 / 7.0 | 19 / 47 | 22 / 24 | 4027 | Qi – Airfuel Alliance – NFC |
| **NEW** | **760 308 101 309** | 10 | 0.45 | 1.5 | 5 | 20 | 19 | Ø 26 | Qi |

# WE-WPCC
# Wireless Power Receiver Coil

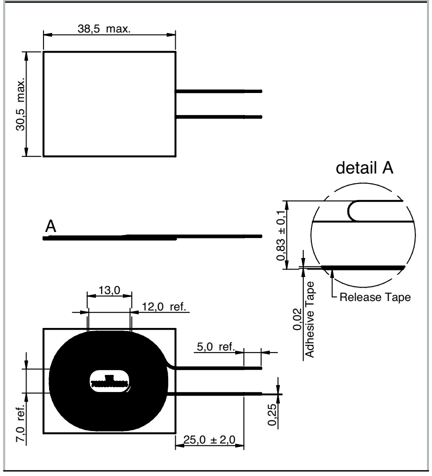
## Dimensions 760 308 201 (in mm)



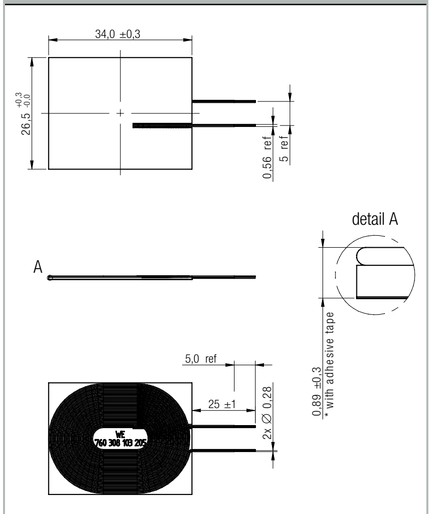

## Dimensions 760 308 103 202/203 (in mm)



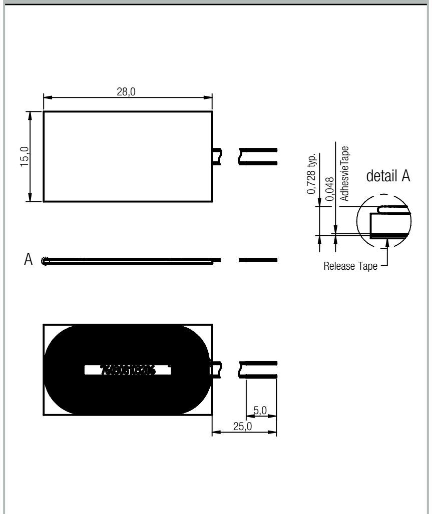

## Dimensions 760 308 103 204 (in mm)



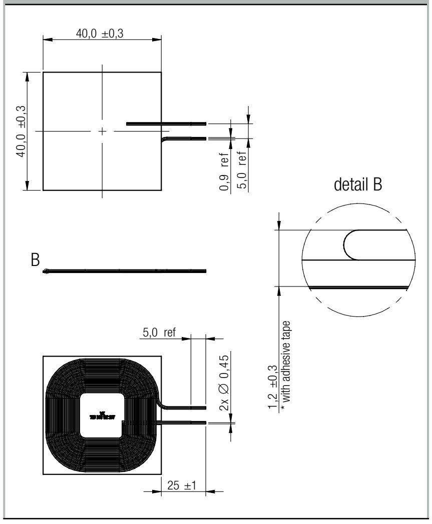

## Dimensions 760 308 103 205 (in mm)



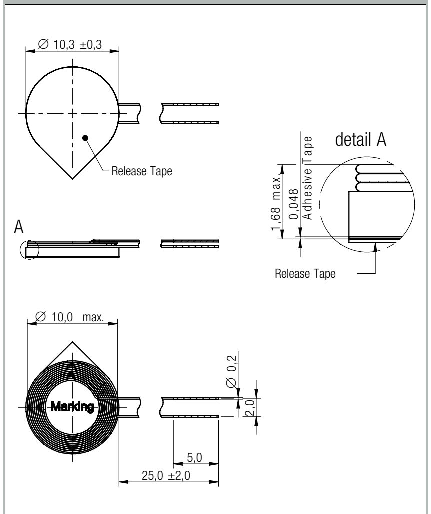

## Dimensions 760 308 103 206 (in mm)



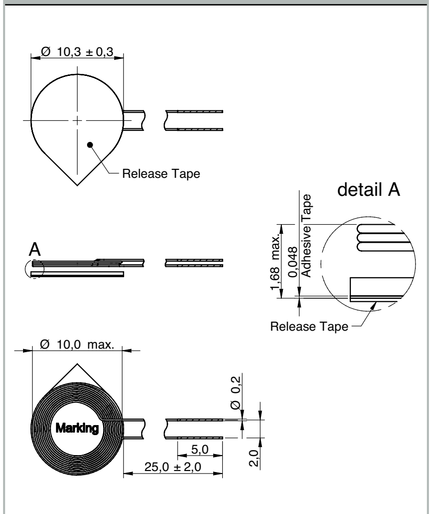

## Dimensions 760 308 102 207 (in mm)



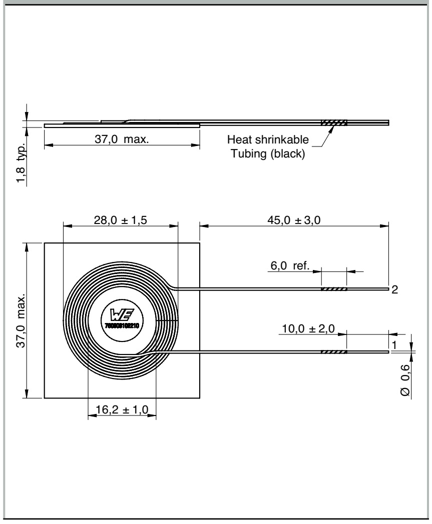

## Dimensions 760 308 101 208 (in mm)




## Dimensions 760 308 101 208A (in mm)

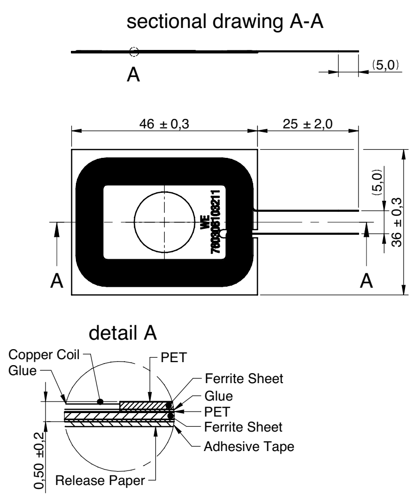



## Dimensions 760 308 102 210 (in mm)

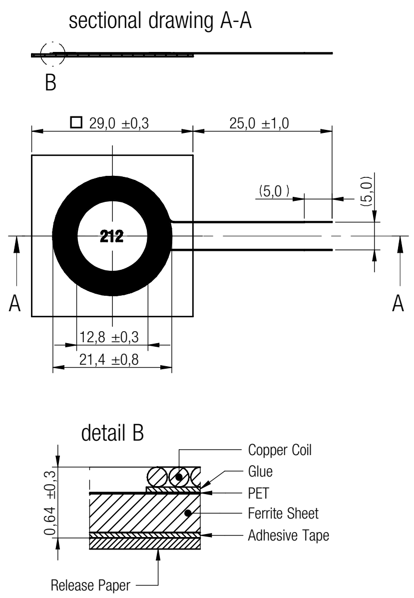


# WE-WPCC
# Wireless Power Receiver Coil

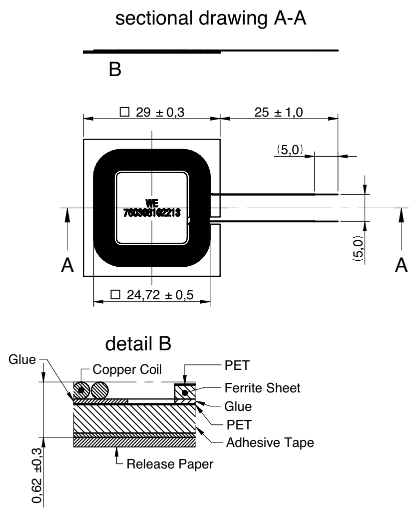
## Dimensions 760 308 103 211 (in mm)



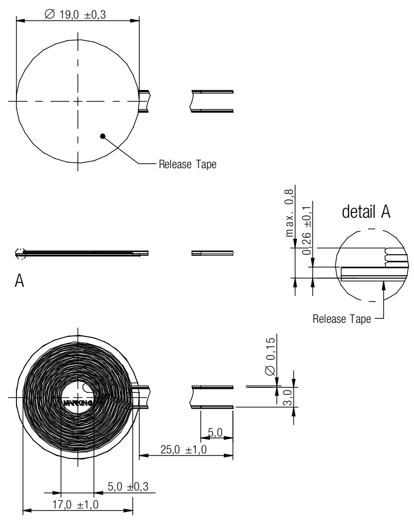

## Dimensions 760 308 102 212 (in mm)



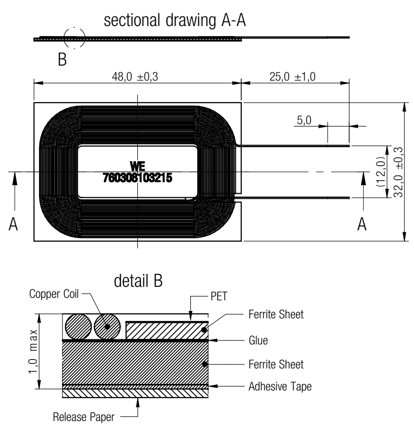

## Dimensions 760 308 102 213 (in mm)



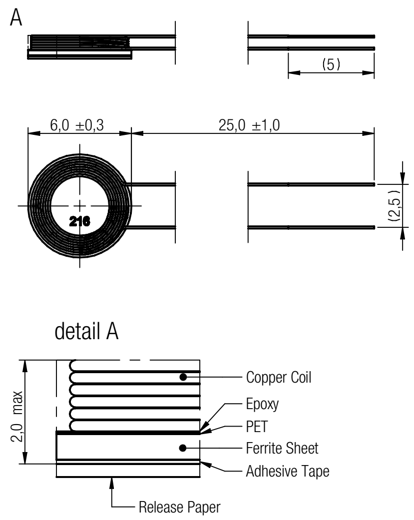

## Dimensions 760 308 101 214 (in mm)




## Dimensions 760 308 103 215 (in mm)

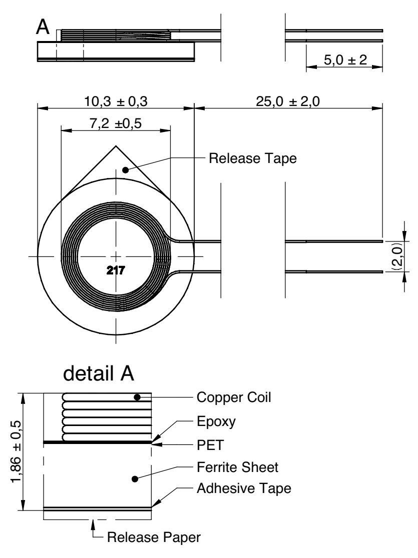



## Dimensions 760 308 101 216 (in mm)

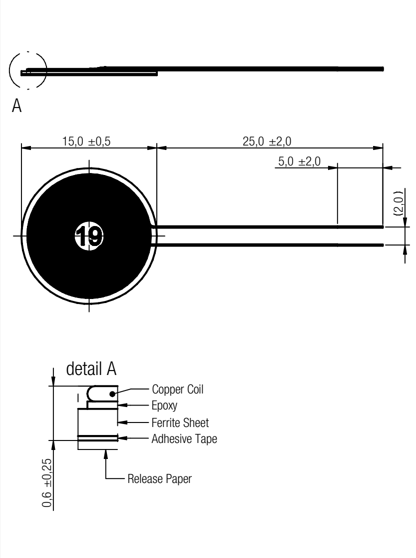


# WE-WPCC
# Wireless Power Receiver Coil

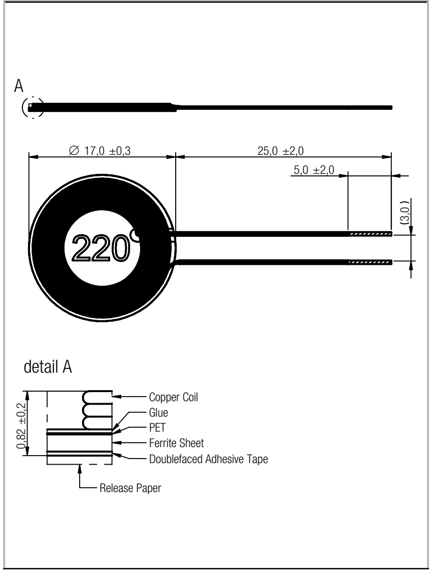
## Dimensions 760 308 101 217 (in mm)



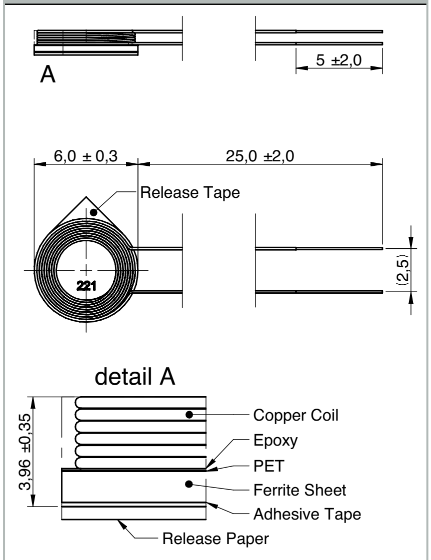

## Dimensions 760 308 101 219 (in mm)



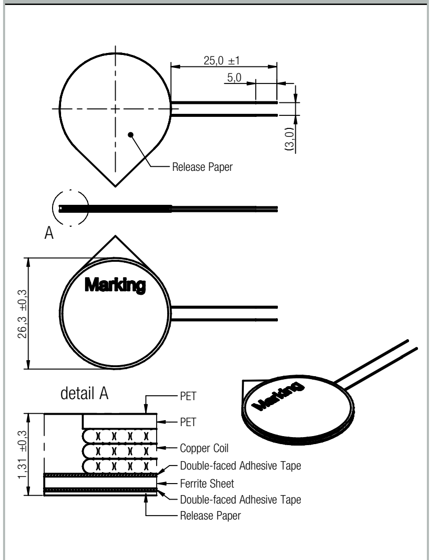

## Dimensions 760 308 101 220 (in mm)



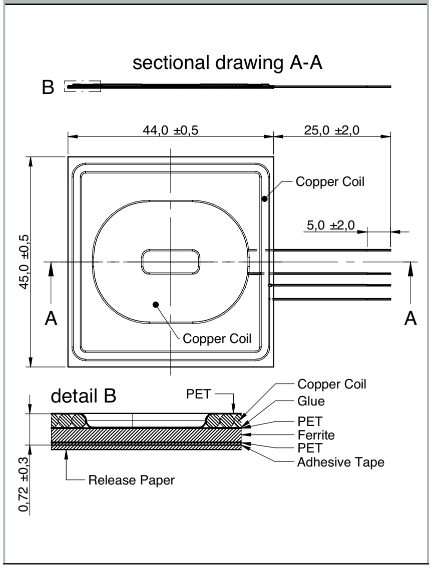

## Dimensions 760 308 101 221 (in mm)



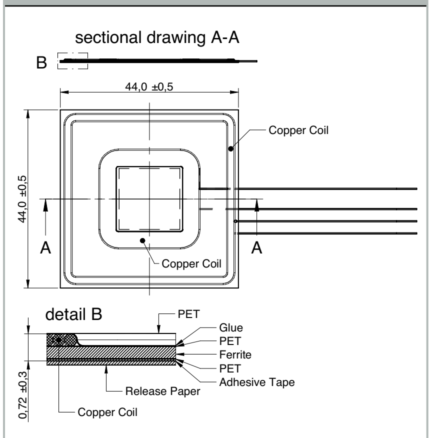

## Dimensions 760 308 101 303 (in mm)



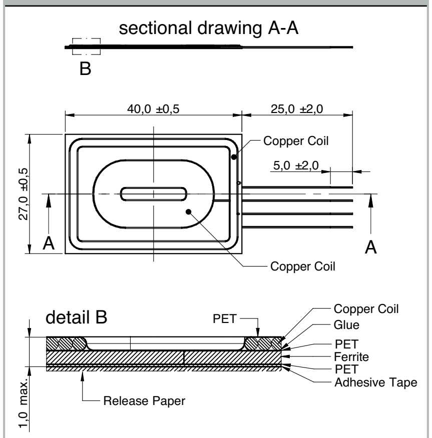

## Dimensions 760 308 103 305 (in mm)



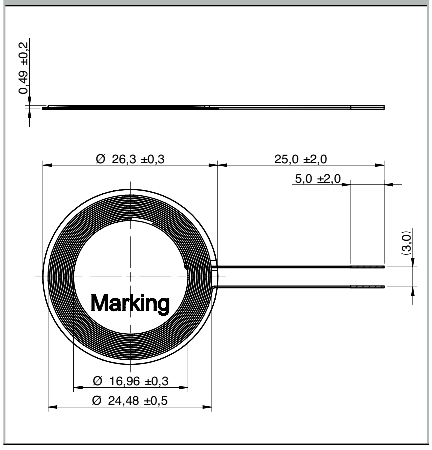

## Dimensions 760 308 102 306 (in mm)




## Dimensions 760 308 103 307 (in mm)

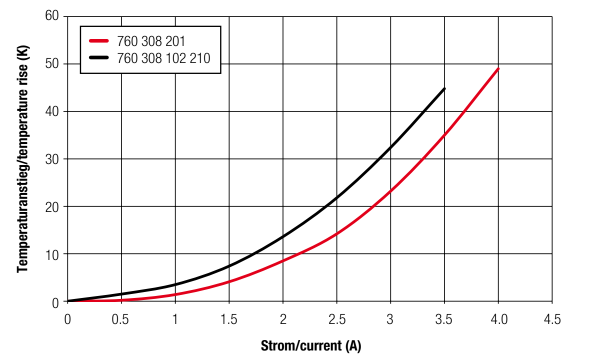



## Dimensions 760 308 101 309 (in mm)

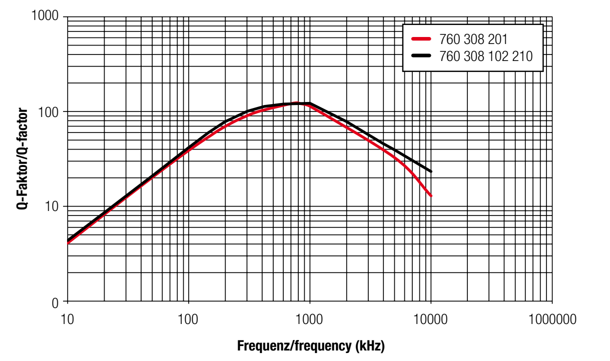


# WE-WPCC
# Wireless Power Receiver Coil

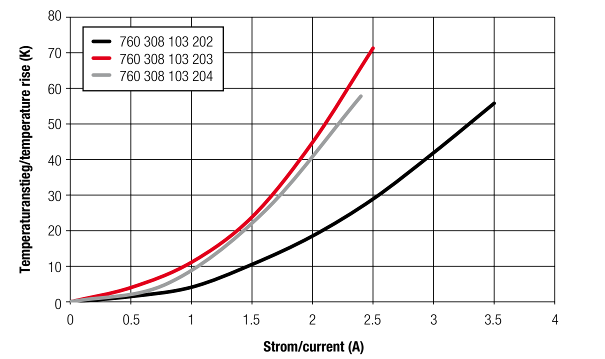
## Temperature vs. Current



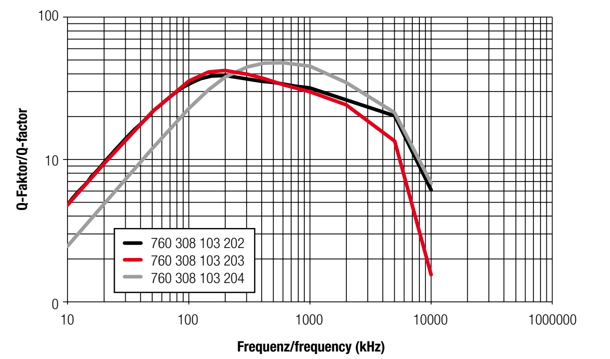

## Q-factor vs. Frequency



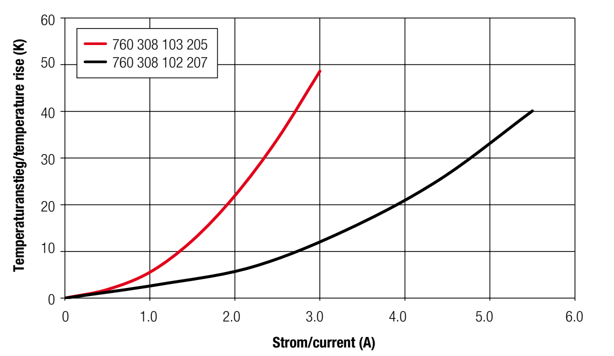

## Temperature vs. Current



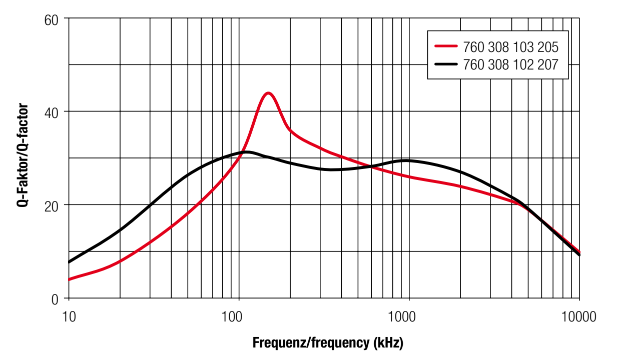

## Q-factor vs. Frequency



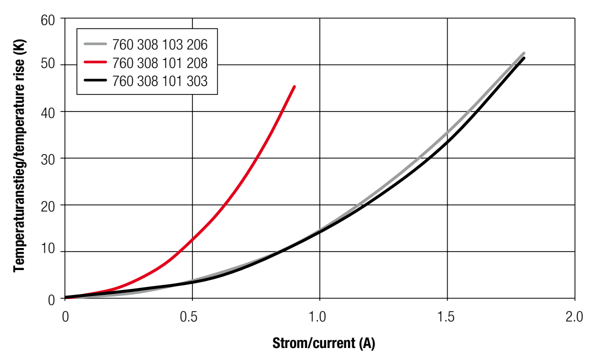

## Temperature vs. Current



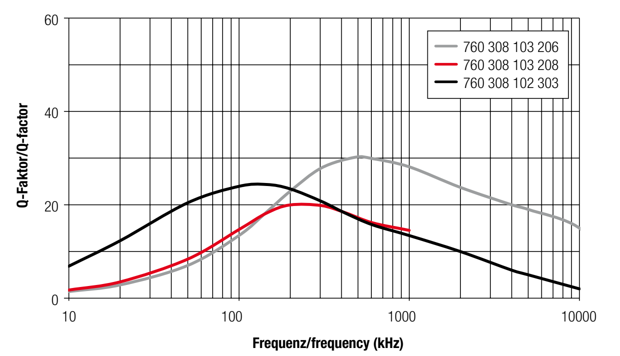

## Q-factor vs. Frequency




## Temperature vs. Current

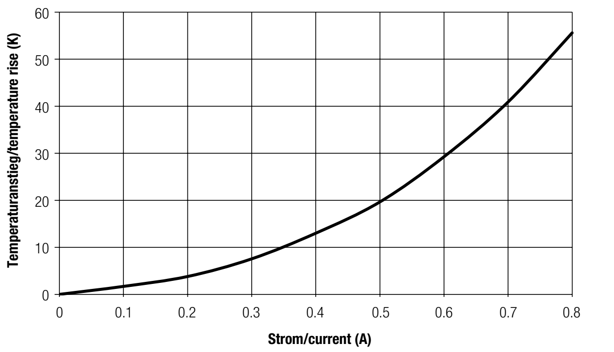



## Q-factor vs. Frequency

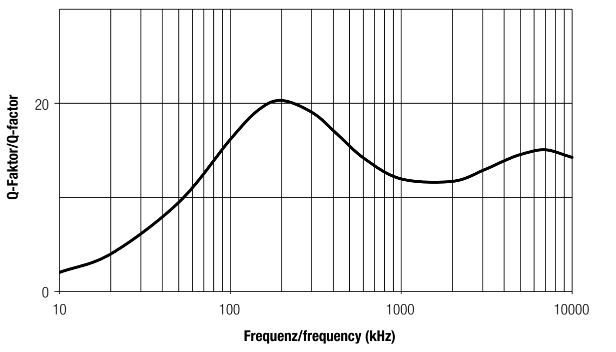


# WE-WPCC
# Wireless Power Receiver Coil

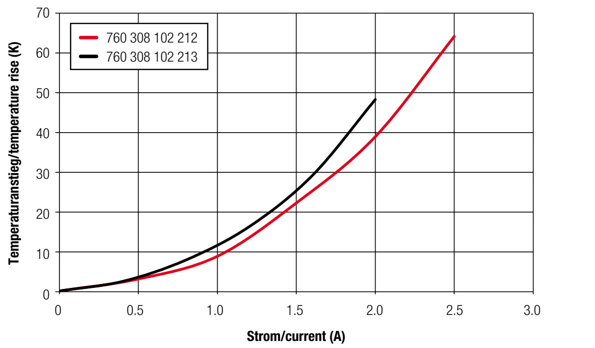
## Temperature vs. Current 760 308 101 208A



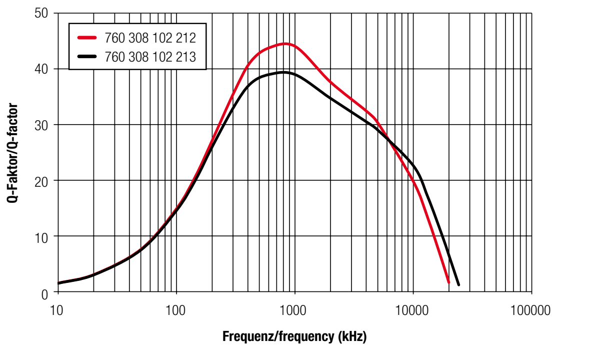

## Q-factor vs. Frequency 760 308 101 208A



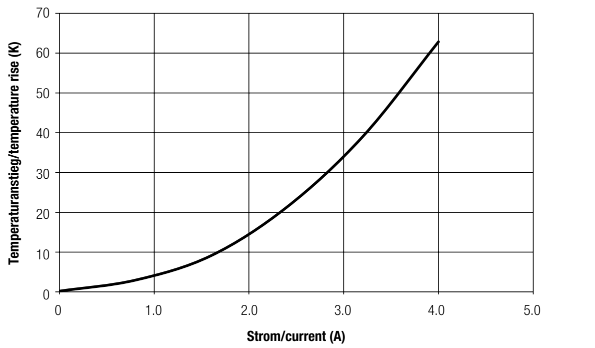

## Temperature vs. Current



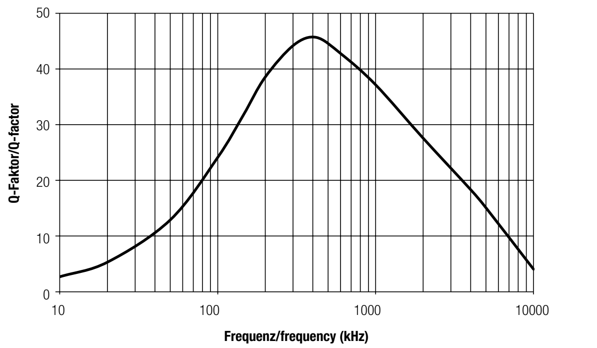

## Q-factor vs. Frequency



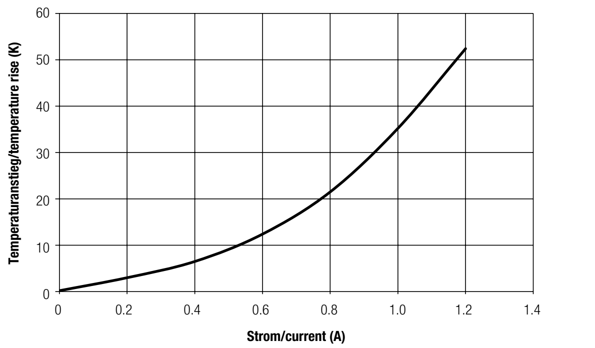

## Temperature vs. Current 760 308 103 211



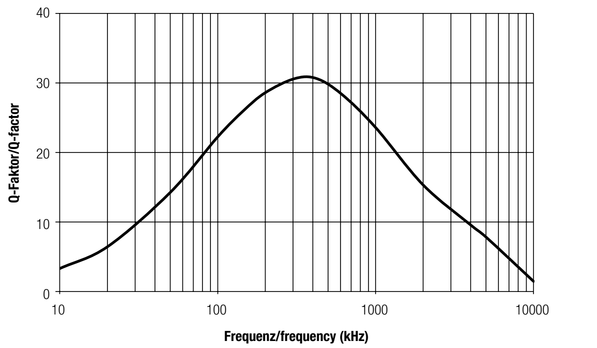

## Q-factor vs. Frequency 760 308 103 211




## Temperature vs. Current 760 308 101 214



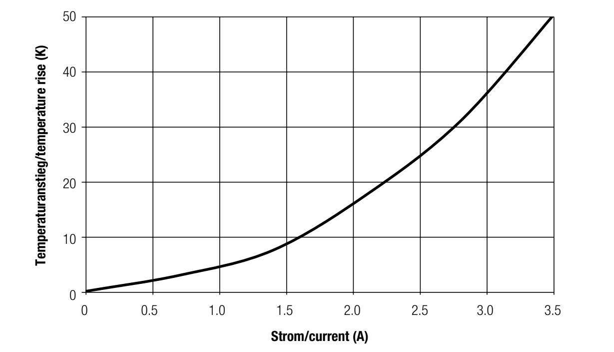

## Q-factor vs. Frequency 760 308 101 214



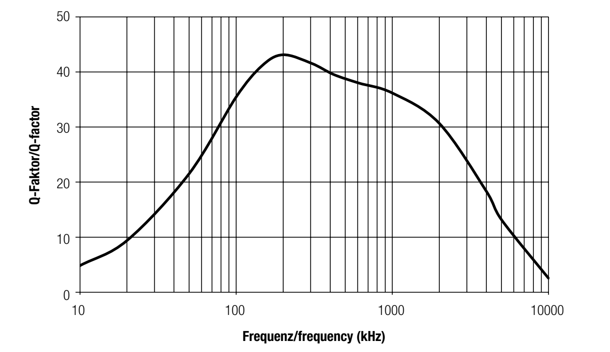
# WE-WPCC
# Wireless Power Receiver Coil

WÜRTH ELEKTRONIK

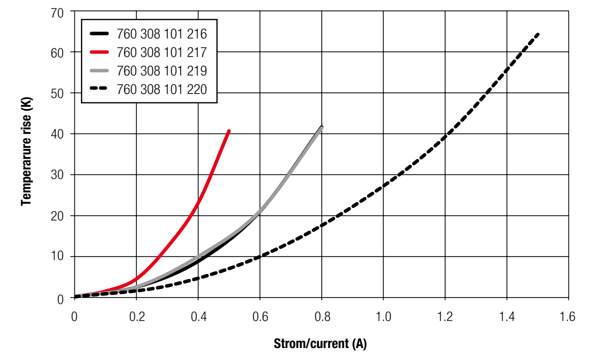
## Temperature vs. Current 760 308 103 215



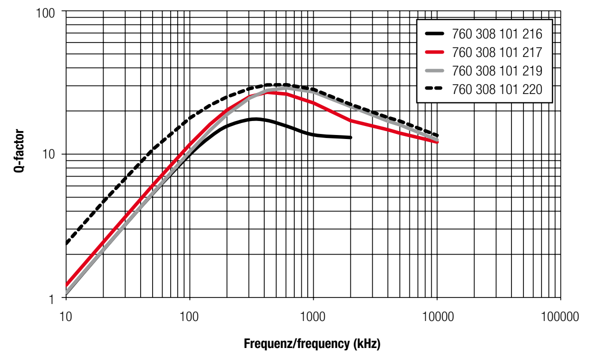

## Q-factor vs. Frequency 760 308 103 215



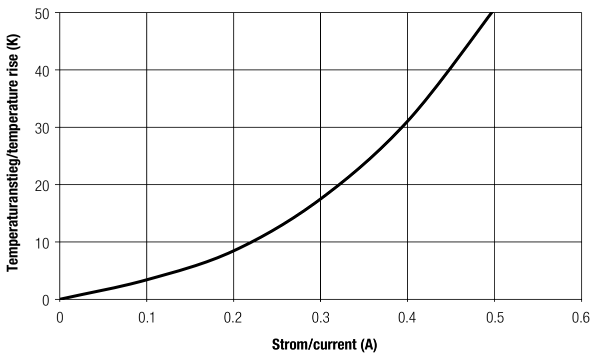

## Temperature vs. Current



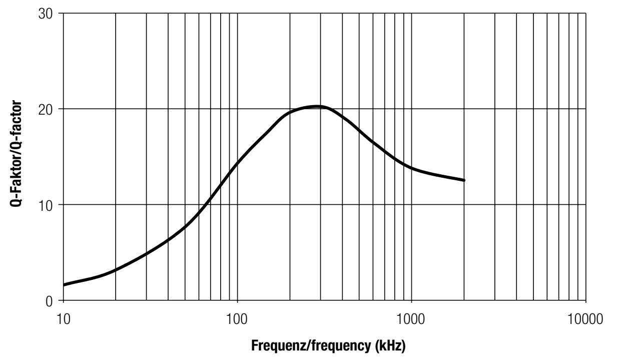

## Q-factor vs. Frequency



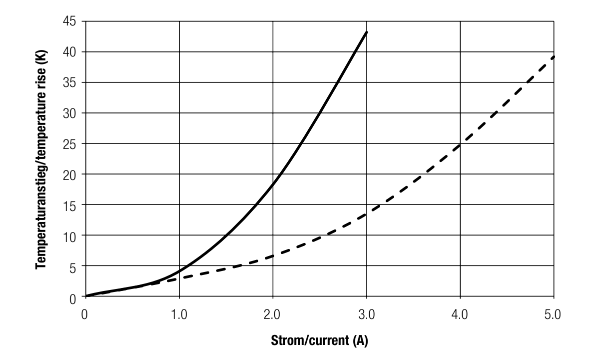

## Temperature vs. Current 760 308 101 221



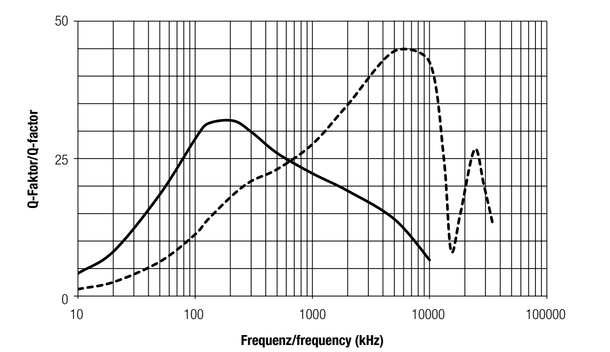

## Q-factor vs. Frequency 760 308 101 221




## Temperature vs. Current 760 308 103 305

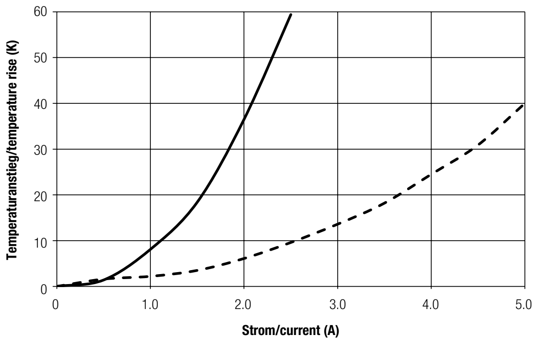



## Q-factor vs. Frequency 760 308 103 305

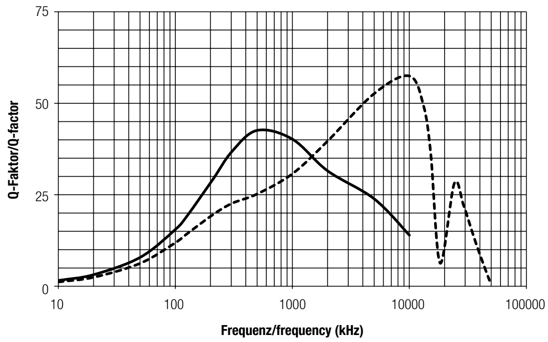


# WE-WPCC
# Wireless Power Receiver Coil

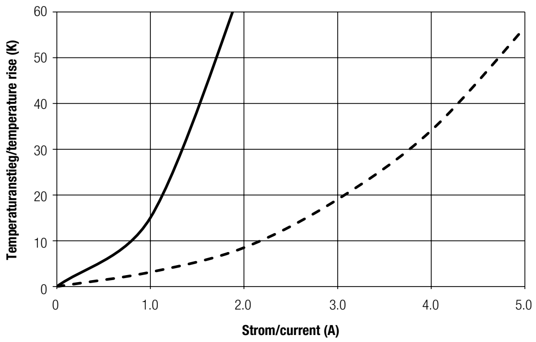
## Temperature vs. Current 760 308 102 306



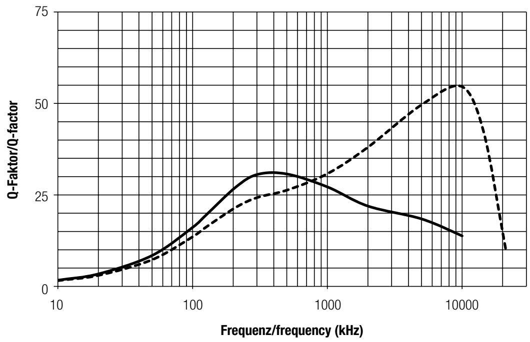

## Q-factor vs. Frequency 760 308 102 306



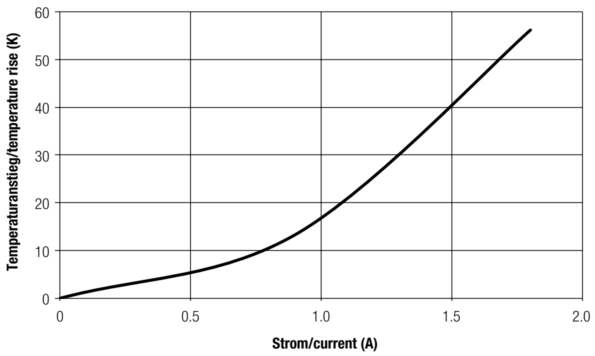

## Temperature vs. Current 760 308 103 307



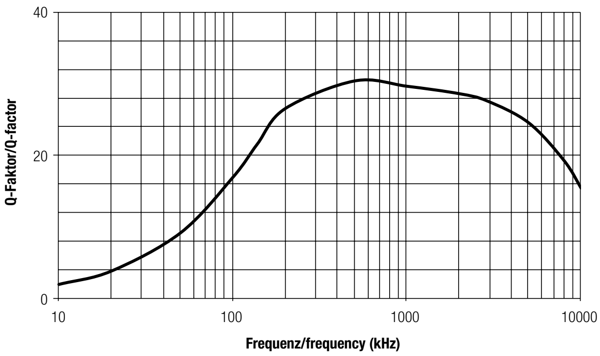

## Q-factor vs. Frequency 760 308 103 307




## Temperature vs. Current 760 308 101 309




## Q-factor vs. Frequency 760 308 101 309



# Design Kit
# Wireless Power Design Kit 15 W

Order Code 760 308MP, Version 1.0

Würth Elektronik and ROHM Semiconductor put together a plug & play wireless power solution to demonstrate the advantages of wireless power and to give you the opportunity to test and integrate a wireless power solution to your product design.

**The Wireless Power Kit provides many added values:**
- Plug & Play 15 W Wireless Power Design Kit, Extended Power Profile (EPP)
- Meets the Qi Standard of the Wireless Power Consortium (WPC)
- Complete solution consisting of Tx, Rx and LED load module
- Flexible and modular approach for fast integration of wireless power in your product design

**Content:**
- ROHM Transmitter Board BD57020MWV with WE 760 308 110
- ROHM Receiver Board with WE 760 308 102 207
- LED Load Module
- Quick Start Guide
- Power supply with EU, US and UK Adapter


**Available at your Würth Elektronik sales representative or online at:**

**www.we-online.com/wirelesspower**

**For further information please visit our FAQ section at:**

**www.we-online.com/wirelesspower/faq**

**Strategic partnerships with all major chip set suppliers**

ROHM SEMICONDUCTOR | POWER BY LINEAR | ST life.augmented | IDT Integrated Device Technology

# Würth Elektronik eiSos Group

## EUROPE, MIDDLE EAST & AFRICA (EMEA)

**Würth Elektronik eiSos GmbH & Co. KG**
Max-Eyth-Str. 1
74638 Waldenburg
Tel. +49 7942 9450
eiSos@we-online.de

**Würth Elektronik Austria**
Hauptplatz 20 – Top 13
2320 Schwechat
Tel. +43 1 7070101 0
eiSos-austria@we-online.com

**Würth Elektronik Belgium**
Tel. +32 3 2309940
Tel. +32 499 58 18 51
eiSos-belgium@we-online.com

**Würth Elektronik Bulgaria**
Zona B-5, bl.16
1303 Sofia
Tel. +359 887 870540
eiSos-bulgaria@we-online.com

**Würth Elektronik Czech Republic**
Přikop 4
602 00 Brno
Tel. +420 539 010 749
eiSos-czech@we-online.com

**Würth Elektronik Finland**
Karhutie 4
01900 Nurmijärvi
Tel. +358 9 878900
eiSos-finland@we-online.com

**Würth Elektronik France**
1861 Avenue Henri Schneider
CS 70029
69881 Meyzieu Cedex
Tel. +33 427 861100
eiSos-france@we-online.com

**Würth Elektronik Hungary**
Népfürdő u. 22. A tower 5th floor
1138 Budapest
Tel. +36 1 877 3000
eiSos-hungary@we-online.com

**Würth Elektronik Ireland**
36, Westbury Drive
Lucan, Co. Dublin
Tel. +353 1 6212061
eiSos-ireland@we-online.com

**Würth Elektronik Israel**
P.O.Box 3585
Hatohen 2
Caesarea Industrial Park
38900 Caesarea
Tel. +972 463 28889
eiSos-israel@we-online.com

**Würth Elektronik Italia**
Via Trento, 26
20871 Vimercate (MB)
Tel. +39 02 66281 701
eiSos-italy@we-online.com

**Würth Elektronik Netherlands**
Het Sterrenbeeld 35
5215 MK's-Hertogenbosch
Tel. +31 73 6291570
eiSos-netherlands@we-online.com

**Würth Elektronik Poland**
ul. Wagonowa 2
53-609 Wrocław
Tel. +48 71 749 76 00
eiSos-poland@we-online.com

**Würth Elektronik Romania**
Str. Gospodarilor Nr. 13/1
400140 Cluj-Napoca
Tel. +40 744 773530
eiSos-romania@we-online.com

**Würth Elektronik Russia**
Tel. +7 916 543 50 30
eiSos-russia@we-online.com

**Würth Elektronik Scandinavia**
Annelundsgatan 17C
74940 Enköping
Tel. +46 171 428400
eiSos-scandinavia@we-online.com

Responsible for: Sweden, Denmark, Norway and Iceland

**Würth Elektronik Slovakia**
Příkop 4
602 00 Brno
Tel. +420 720 370 115
eiSos-slovakia@we-online.com

**Würth Elektronik Slovenia**
Dom in vrt 27
1420 Trbovlje
Tel. +386 30 603644
eiSos-slovenia@we-online.com

**Würth Elektronik Spain**
C/ Balmes, 4 5ª Planta
08007 Barcelona
Tel. +34 935 471 410
eiSos-spain@we-online.com

Responsible for: Portugal

**Würth Elektronik Switzerland**
Industriestrasse 18
8604 Volketswil, ZH
Tel. +41 44 269 6161
eiSos-swiss@we-online.com

**Würth Elektronik Turkey**
Serifali Mh.Cetin
Caddesi Kule Sok No:25/A
34775 Ümraniye/Istanbul
Tel. +90 216 466 4130
eiSos-turkey@we-online.com

**Würth Elektronik UK**
8th Floor, 8 Exchange Quay
Salford Quays,
M5 3EJ – Manchester
Tel. +44 161 872 0431
sales-uk@we-online.com

**Würth Elektronik South Africa**
Plumbago Business Park
Spier Road, Glen Erasmia EXT 17
Kempton Park
1619 Johannesburg
Tel. +27 71 259 9381
eisos-south.africa@we-online.com

**Würth Elektronik iBE GmbH**
Automotive
Gewerbepark 8
94136 Thyrnau
Tel. +49 8501 9001 100
ibe@we-online.de

**AMBER wireless GmbH**
Rudi-Schillings-Strasse 31
54296 Trier
Tel. +49 651 993 550
info@amber-wireless.de

**Erwin Büchele GmbH & Co. KG**
Hauptstraße 6
73730 Esslingen am Neckar
Tel. +49 711 9308000
zentrale@buechele-inductors.com

**Wuerth Elektronik Stelvio Kontek s.p.A:**
Via Mognago, 49
23848 Oggiono LC
Tel. +39 0341 265411
info@stelvio-kontek.com

## AMERICA

**Würth Electronics Midcom Inc.**
121 Airport Drive
Watertown, SD 57201
Tel. +1 605 8864385
midcom@we-online.com

**Würth Elektronik Brazil**
Tel. +55 11 46131755
eiSos-brazil@we-online.com

**Würth Elektronik Canada**
159 Lariviere
JSK 1E5 St.-Colomban, QC
Tel. +1 514 241 6996
eiSos-canada@we-online.com

**Würth Elektronik México**
Parque Tecnológico ITESO
Calle Independencia 1018
Parques del Bosque
45609 Tlaquepaque, Jalisco, México
Tel. +52 33 1922 0000
eisos-mexico@we-online.com

## ASIA & OCEANIA

**Würth Elektronik China**
No.7, Haitai Development 6th.Road
Huayuan Hi-tech Industry Park
300384 Tianjin, China
Tel. +86 22 23858666
eiSos-china@we-online.com

**Würth Elektronik China**
Automotive
Jianshe Road 119, Building 3
European Union Economic
Development Zone
110122 Shenyang City,
Liaoning Province
Tel. +86 24 29877700

**Würth Elektronik Hong Kong**
Unit 08 12/F New Tech Plaza
34 Tai Yau Street
San Po Kong, Kowloon, Hong Kong
Tel. +852 23 278488
eiSos-hongkong@we-online.com

**Würth Elektronik Taiwan**
4th Floor, No. 18-1, Section 6
Mincyuan East Road, Neihu District
Taipei 114, Taiwan
Tel. +886 2 27918625
eiSos-taiwan@we-online.com

Responsible for: South Korea

**Würth Elektronik India**
Prestige Sterling Square
No. 3, Madras Bank Road
560001 Bangalore
Tel: +91 80 40627400
eiSos-India@we-online.com

**Würth Elektronik Singapore**
12 Harper Road
#06-00 Sulisam Building
Singapore 369677
Tel. +65 67 421567
eiSos-singapore@we-online.com

Responsible for: Indonesia, Malaysia, Philippines, Thailand and Vietnam

**Würth Elektronik Australia**
Unit 4 2D Parker Street
3011 Footscray, VIC
Tel. +61 3 8669 0610
eiSos-australia@we-online.com

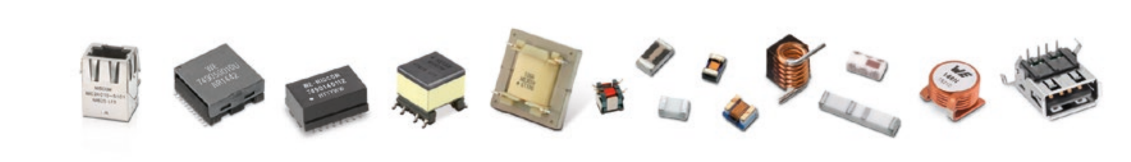
Responsible for: New Zealand

# Electronic & Electromechanical Components

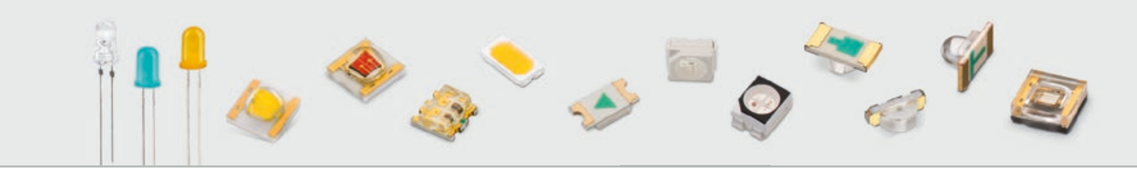
## EMC Components

## Capacitors

## Power Magnetics



## Signal & Communications



## LEDs

## Power Modules

## Connectors

## Fuse Holder & Battery Holder

## Switches

## Assembly Technique

## REDCUBE Terminals

WÜRTH ELEKTRONIK

# more than you expect

**Würth Elektronik eiSos differs from all other component manufacturers in several aspects:**

- We guarantee all catalogue products are available ex stock
- Samples free of charge
- Orders below MOQ
- Design kits with lifelong free refill
- Design Guide Trilogy of Magnetics, Trilogy of Connectors, Abc of Capacitors, Abc of Power Modules & Application Handbook The LTspice IV Simulator
- Design Seminars free of charge
- Reference designs of leading IC manufacturers
- Worldwide technical sales force and field application engineers on site
- Cable Assembler Pool