

**Rx COIL FOR LOW FREQUENCY WEARABLE WIRELESS POWER TRANSFER**

**Product Name**

Wireless Charging Coil – Low Frequency Transmit & Receive

<b>Molex PN</b>	<b>Part Description</b>
1461794011	Wireless Charging Coil – Low Frequency Transmit & Receive

<b>REVISION:</b>  <b>B</b>	<b>ECR/ECN INFORMATION:</b> EC No: 111410 DATE: 2016/12/28	<b>TITLE:</b> <b><u>Rx COIL FOR LOW FREQUENCY WEARABLE WIRELESS</u></b>  <b>POWER TRANSFER</b>		<b>SHEET No.</b>  <b>1 of 8</b>
<b>DOCUMENT NUMBER:</b> <b>AS-1461794011</b>		<b>CREATED / REVISED BY:</b> Benson Liu 2016/12/28	<b>CHECKED BY:</b> Ryan Liu 2016/12/28	<b>APPROVED BY:</b> Welson Tan 2016/12/28

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## Low Frequency Wearable Rx

### Rx COIL FOR LOW FREQUENCY WEARABLE WIRELESS POWER TRANSFER

#### FEATURES

- Industry's highest FPCB Q Factor
- Wearable and small form factor design
- Industry leading thinness of 0.54 mm MAX(w/shield)
- Enables high efficiency solutions
- FPCB construction:
  - Increased durability
  - Repeatable performance
  - Integration with other electronics
- Custom design available

Molex Part Number

1461794011

Designed for use with wearable transmitter

Molex Part Number

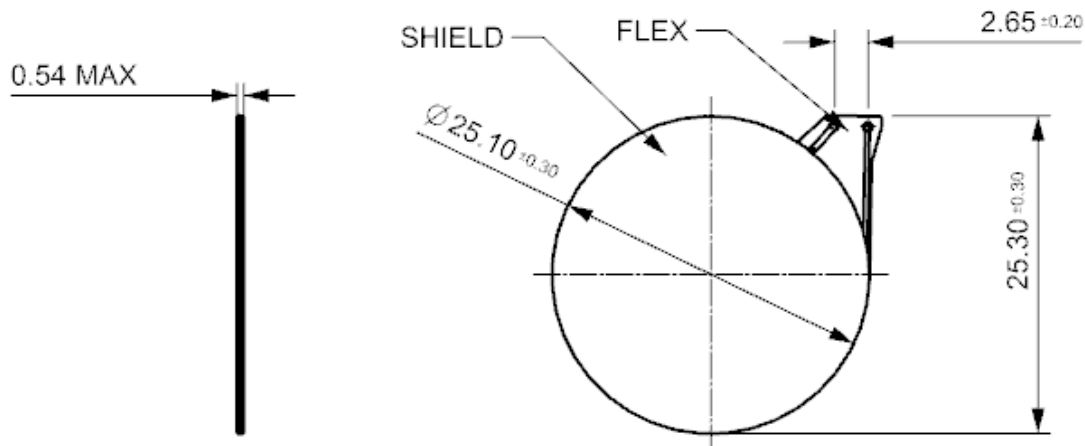
146179011

Electrical Parameters at 25°C

Inductance +/-2%, @ 200kHz (uH)	DCR +/- 2% (mOhm)	ESR +/- 2% (mOhm)	Quality Factor
9.6	550	685	18

Mechanical Parameters (mm)

Coil Thickness	Assembly Thickness (w/shield)	Material
0.24	0.054 MAX	Flex





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## Low Frequency Wearable Rx

### GENERAL DESCRIPTION:

This specification describes a FPCB receiver coil for wireless power transfer at frequencies 100 kHz to 300 kHz. The information in this document is for reference and benchmark purposes only. The user is responsible for validating coil performance based on users own testing environment.

### PRODUCT DESCRIPTION:

This high efficiency coil is designed for high performance wearables or any other small form factor device / accessory requiring up to 2.5W power out. Standard FPCB construction enables integration with other electronics, high durability, high yield manufacturing and consistent performance.

### DEFINITIONS:

**Equivalent Series Resistance (ESR):** resistance measured at or around the operating frequency. ESR accurately characterizes any losses such as skin effect or proximity effect and any additional effects that may occur in the presence of material such as shielding, metal backing, or the housing. Comparison of coil assembly and in situation ESR measurements can accurately determine sources of loss. This metric should be given serious consideration during product selection to ensure full characterization of system electrical parameters.

**Direct Current Resistance (DCR):** resistance measured at DC or measured at very low frequencies (60 Hz - 100 Hz) and is often considered an incomplete measurement in wireless charging environments because it does not take into account actual causes of resistance during operation. NuCurrent recommends ESR as the most relevant measurement of resistance in a wireless power coil, but provides DCR values as well.

### PRODUCT TUNING:

Tuning is a critical aspect that greatly impacts system performance. The receiver coil should be placed in the final housing, placed on desired charging surface, and have situational inductance,  $L_s'$ , measured. The necessary tuning capacitor values can be calculated using Equation 1:

$$C_{tune} = \frac{1}{(2 * \pi * f)^2 * L_s'} \quad (1)$$

\*It is important to note that the equation above should be used as reference, and for additional tuning information, please check appropriate system datasheets for further information.

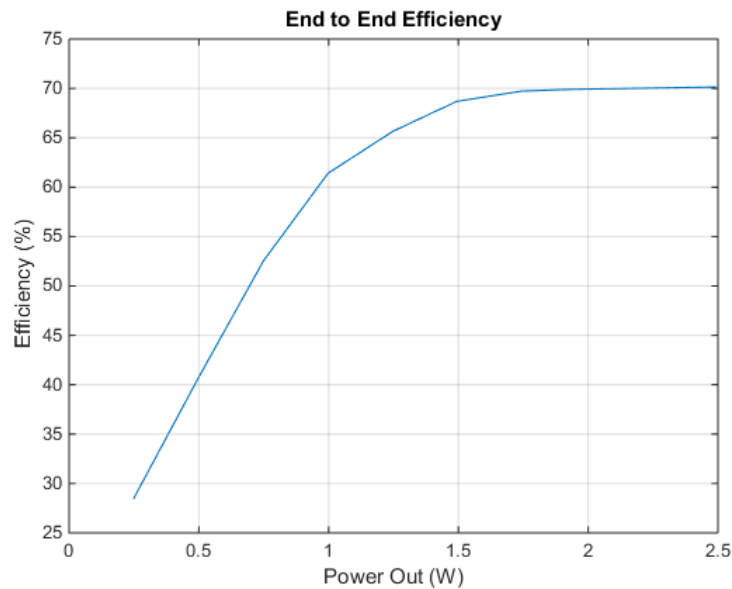
For detailed product specific tuning information, please contact Molex at [www.molex.com](http://www.molex.com) or via phone 1 800-78MOLEX (1 800 786-6539).

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## Low Frequency Wearable Rx

**PERFORMANCE:**

For custom applications, Molex and NuCurrent can optimize antenna assemblies for thickness, price or efficiency. The data below demonstrates the performance of the coil up to 2.5W using a 5V transmitter with the mating transmitter coil.

**Test Equipment used for all tests**

- 5V low frequency transmitter
- 2.5W receiver @ 5V/0.5A out
- Coil assembly (coil and shield)
- Tests done with receiver located in the center of Transmitter

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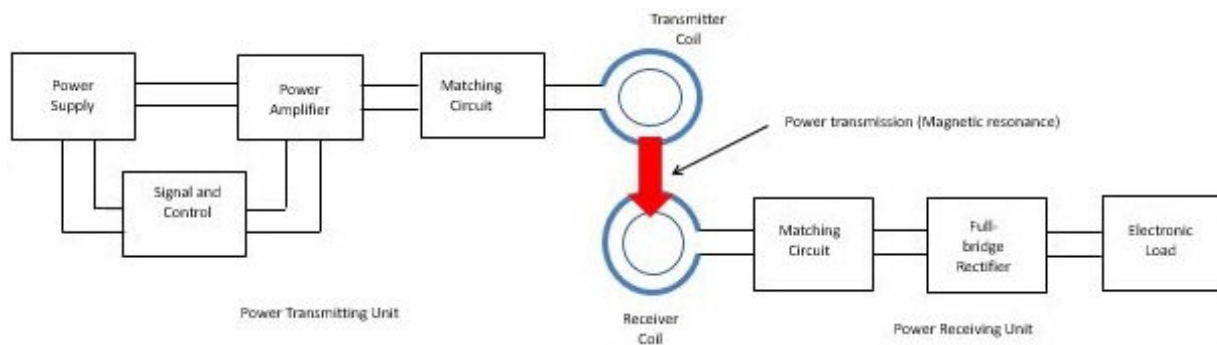
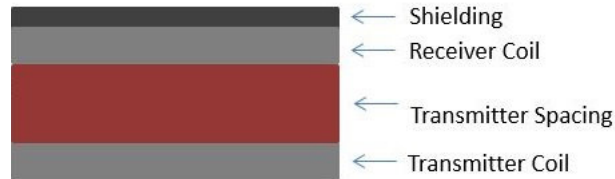
## Low Frequency Wearable Rx

### GENERAL REQUIREMENTS:

#### A. CONNECTIONS FOR TESTING

- I. 28AWG copper wire recommended for pad soldering

#### B. RECOMMENDED TEST SETUP



### REFERENCE DOCUMENTS:

Please see Company website for more information.

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## Low Frequency Wearable Tx

### Tx COIL FOR LOW FREQUENCY WEARABLE WIRELESS POWER TRANSFER

#### FEATURES

- Wearable and small form factor design
- Enables high efficiency solutions
- Custom design available

Molex Part Number

1461794011

Designed for use with wearable receiver

Molex Part Number

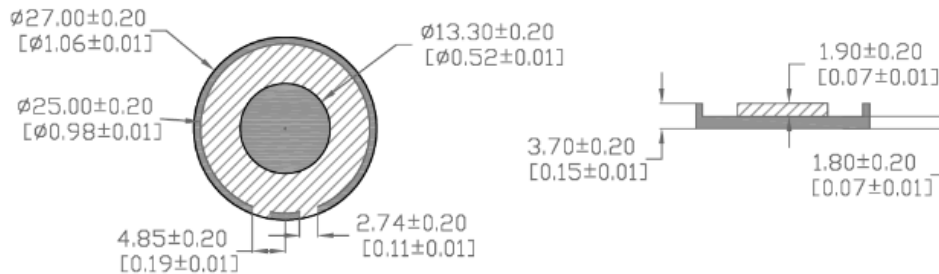
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#### Electrical Parameters at 25°C

Inductance +/-2%, @ 200kHz (uH)	DCR +/- 2% (mOhm)	ESR +/- 2% (mOhm)	Quality Factor
5.6	38	42	160

#### Mechanical Parameters (mm)

Coil Thickness	Assembly Thickness (w/shield)	Material
0.95	3.70	Wire



#### GENERAL DESCRIPTION:

This specification describes a transmitter coil for wireless power transfer at frequencies 100 kHz to 300 kHz. The information in this document is for reference and benchmark purposes only. The user is responsible for validating coil performance based on users own testing environment.

#### PRODUCT DESCRIPTION:

This high efficiency coil is designed for high performance wearables or any other small form factor device / accessory requiring up to 2.5W power out. Standard construction enables integration with other electronics, high durability, high yield manufacturing and consistent performance.



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## Low Frequency Wearable Tx

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### PRODUCT TUNING:

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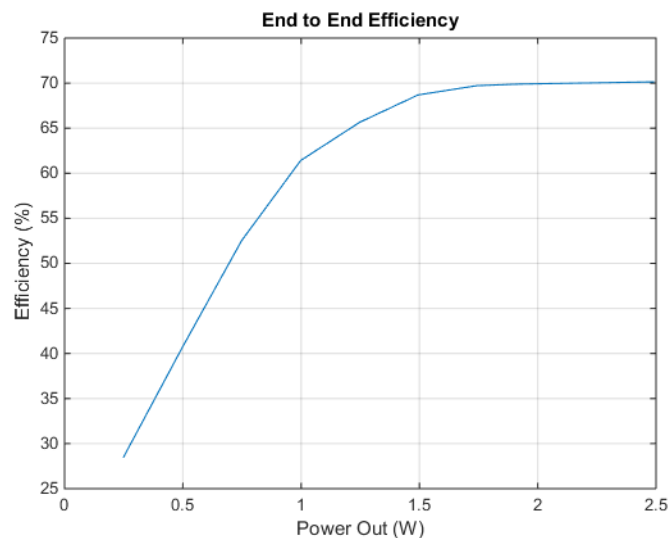
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For detailed product specific tuning information, please contact Molex at [www.molex.com](http://www.molex.com) or via phone 1 800-78MOLEX (1 800 786-6539).

### PERFORMANCE:

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Test Equipment used for all tests

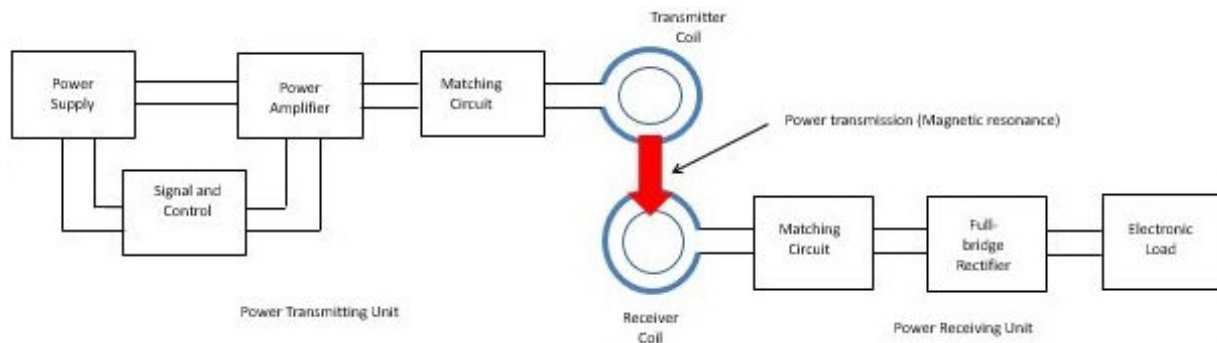
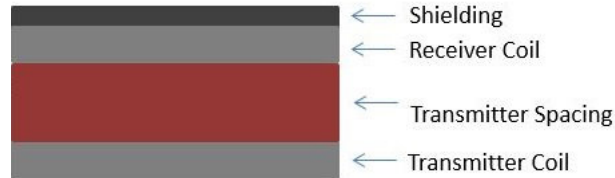
- 5V low frequency transmitter
- 2.5W receiver @ 5V/0.5A out
- Coil assembly (coil and shield)
- Tests done with receiver located in the center of Transmitter

### GENERAL REQUIREMENTS:

#### A. CONNECTIONS FOR TESTING

- Extended wire leads are ready for soldering to transmitter electronics

#### B. RECOMMENDED TEST SETUP



### REFERENCE DOCUMENTS:

Please see Company website for more information