



PRODUCT SPECIFICATION

Document Title: Wireless Charging Coil – Tri-Mode Product Specification

Revision	Responsibility	Date
C	Zhou Tao	2016/12/27

1461792001 Wireless Charging Coil – Tri-Mode

1.0 SCOPE

This Product Specification covers the environmental and mechanical performance requirements for Wireless Charging Coil – Tri-Mode.

2.0 PRODUCT DESCRIPTION

2.1 Product Name

Wireless Charging Coil – Tri-Mode

2.2 Product Description

This high efficiency coil is made of flex and shield, and designed for high performance mobile phones, handheld mobile terminals or any other device / accessory requiring up to 5W power out. Standard PCB construction enables integration with other electronics, high durability, and high yield manufacturing and consistent performance.

2.3 Series No.

146179

2.4 BOM

Molex PN	Part Description
1461792001	Wireless Charging Coil – Tri-Mode

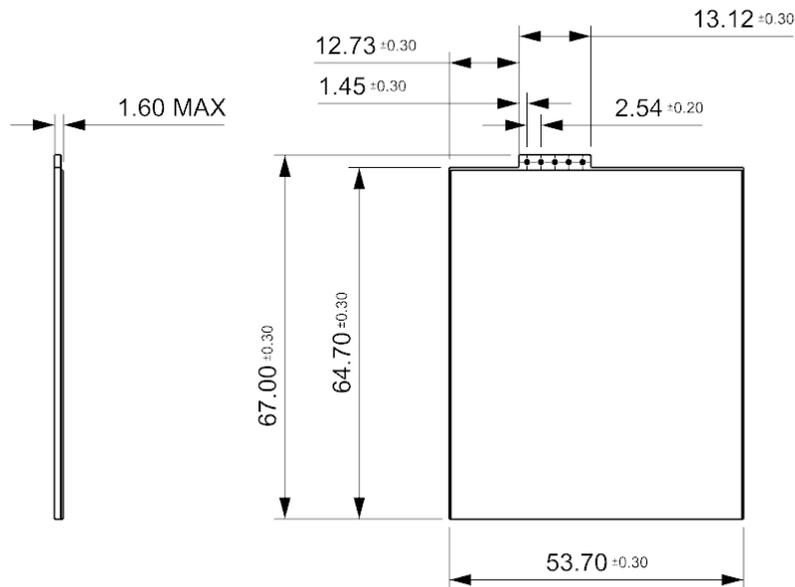
3.0 DESIGN AND CONSTRUCTION

For details, please refer to the 2D drawings at www.molex.com

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4.0 MATERIAL SPECIFICATION

All materials must follow respective drawings and specifications.

5.0 PRODUCT MECHANICAL AND ENVIRONMENT REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	ACCEPTANCE CRITERIA
5.1	Thermal Cycling Test	<ul style="list-style-type: none"> -40°C to 85°C, 23 min dwell, 20°C/min ramp rate, 100 cycles. Verify functionality pre and post-test. 	<ul style="list-style-type: none"> Parts shall not have any peeling off, damage. Parts shall meet the electrical requirement before and after test.
5.2	Heat Soak Test	<ul style="list-style-type: none"> 65°C/90 % RH Humidity, 168 hrs. Verify functionality pre and post-test. 	<ul style="list-style-type: none"> Parts shall not have any peeling off, damage. Parts shall meet the electrical requirement before and after test.
5.3	Salt Mist	<ul style="list-style-type: none"> The device under test is exposed to a spray of a 5%(by volume) resolution of NaCl in water for 48 hours. Visual inspect the part and verify functionality pre and post-test. 	<ul style="list-style-type: none"> Parts shall meet the electrical requirement before and after test.

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6.0 PACKAGING REQUIREMENT

6.1 Packaging Method

Please refer to Molex packaging drawing for the details at www.molex.com

6.2 Packaging Test

Packaging test method refers to Molex documents of IEP-02 & ES-4000-7001:

ITEM	DESCRIPTION	TEST CONDITION	ACCEPTANCE CRITERIA
6.2.1	Drop Test	<ul style="list-style-type: none"> ➤ Drop height: 120 cm ➤ Packed carton box with full product for sufficient gross weight. ➤ Cycle: 1 Cycle ➤ Angle: Test in each ten (10) angles of the carton box onto the floor 	<ul style="list-style-type: none"> ➤ No Permanent Damage Visual / Mechanical ➤ No Appreciable Electrical Degradation Pre / Post Performance
6.2.2	Vibration Test	<ul style="list-style-type: none"> ➤ Test Method: ASTM 5112 or ISO 2247 or ISTA 2A or JIS Z 0200 or equivalent ➤ Start the test machine to vibrate at 25.4 mm / 1 inch total displacement. ➤ The frequency should be 240 cycles per minute and 4.0 Hz with a maximum acceleration $\pm 10.78 \text{ m/s}^2 (\pm 1.1 \text{ G})$ 	<ul style="list-style-type: none"> ➤ No Permanent Damage Visual / Mechanical ➤ No Appreciable Electrical Degradation Pre / Post Performance

7.0 ELECTRICAL REQUIREMENTS

Electrical Parameters at 25°C

Frequency	Inductance +/-2% (uH)	DCR +/- 2% (mOhm)	ESR +/- 2% (mOhm)	Q Factor
200kHz	10.6	190	545	24
6.78MHz	1.3	70	500	110

8.0 OTHERS

Store in package or tightly re-closed box with the following conditions:

Temperature: -10°C to +40 °C

Humidity: 15 % to 85 % RH

Check the terminal function before use, if the product has been stored for more than 6 months.

9.0 DEFINITIONS FOR REFERENCE

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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. For Qi and A4WP, the necessary tuning capacitor values can be calculated using Equation 1:

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

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