

E7900 OMNIKEY NFC ANTENNA

HVIN: E-PLEX E7923OM

FCC ID: Q8S-E7923OM

The NFC antenna is made of custom PCB traces and has an operating frequency of 13.56MHz.

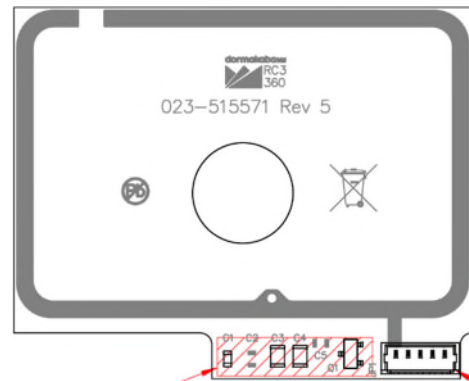
Manufacturer: dormakaba Canada Inc.

Model number: 124-515571-002

Connector type: 5-pin header

Type of modulation: ASK

Antenna information	
Number of layers with identical windings, connected in series	1
Number of windings per layer	2
Antenna Width	20 mils
Antenna Length	12430.6 mils
Trace Spacing	10 mils
Trace Width	20 mils
Material	1oz Copper
PCB thickness	62 mils



Antenna Inductance ==>	L_A = 745.54nH
Antenna Resistance==>	R_A = 0.302Ω
Antenna turns ==>	2 turns

Appendix:

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Trace Resistance Calculator

This calculator determines the resistance of a microstrip trace

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Inputs

Trace Width	20	mil
Trace Length	12430.639	mil
Trace Thickness	1	oz/ft^2
Temperature	25	°C

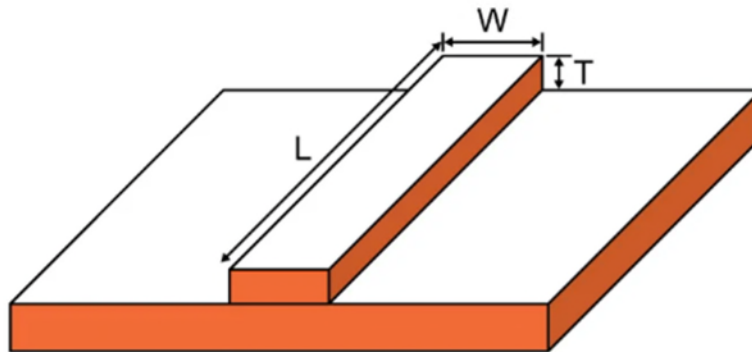
[Calculate](#)

Output

Resistance (R):	0.302	Ohms
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Overview

The trace resistance of a microstrip is important in determining how much power it dissipates. By determining its trace resistance, the contribution of a microstrip to the overall circuit resistance can be evaluated. This tool is designed to calculate the resistance of a microstrip trace with a copper conductor. To use it, specify the trace dimensions and the ambient temperature.



Equation

$$R = \rho \cdot \frac{L}{T \cdot W} \cdot [1 + \alpha \cdot (temp - 25)]$$

Where:

ρ =resistivity

L= length

W=trace width

T=trace height

Note:

$\rho_{\text{copper}} = 1.7 \times 10^{-6} \text{ ohm-cm}$

$\alpha_{\text{copper}} \text{ (temperature coefficient)} = 3.9 \times 10^{-3} \text{ ohm/ohm/C}$

Applications

The microstrip is a popular device in microwave radio technology. It was invented because of the physical limitations to the manufacturing of inductors and capacitors at such very high frequencies. A microstrip is made out of printed circuit boards whose dimensions are carefully set to meet required parameters. One of those required parameters is the trace resistance.

From Ohm's law, we know that resistance is inversely proportional to current. That is, the lower the resistance, the higher the current and vice versa. Current is also proportional to power according to $P = VI$. Thus, resistance also becomes a factor when calculating power consumption. It is important to determine the resistance of the trace of a microstrip so that the power dissipated by it can be determined.



Geometry

Turns

Antenna Length mm

Antenna Width mm

Conductor

Width mm

Spacing mm

Thickness μm

Substrate

Thickness mm

Relative Electrical
Permittivity (ϵ_r)

Antenna Results

Segmentation Mode: Vertical

Segments: 8

Equivalent Inductance: **745.54 nH**
@13.56 MHz

