RFID
Transponder Coils

Transponder Coils (TR4308I) is The Key of Radio Frequency Identification (RFID) System

▶ **Preview**

Token TR4308I transponder coil series is specified for RFID applications for the best performing designed at 125 kHz. The TR4308I covers a wide range of electrical performances and offers better sensitivity, greater read distance and higher SRF than other coils its size.

The TR4308I's length and cross section area are optimized for best sensitivity in the coil axis. The coil is wound on a plastic base, providing great durability and allowing this part to withstand harsh mechanical shock. With operating temperature range to 125°C, these coils are ideal for a wide range of applications.

Radio Frequency Identification (RFID) is the system of using radio signals to send information identifying a particular situation or item. Token TR4308I is suited for wireless data transmission in low frequency RFID products, such as immobilizers, TPMS, keyless entry. Other industrial applications include access control and tracking devices.

In addition to our standard models, Token can design transponder coils to operate at other frequencies. Customized inductance values are available on request.
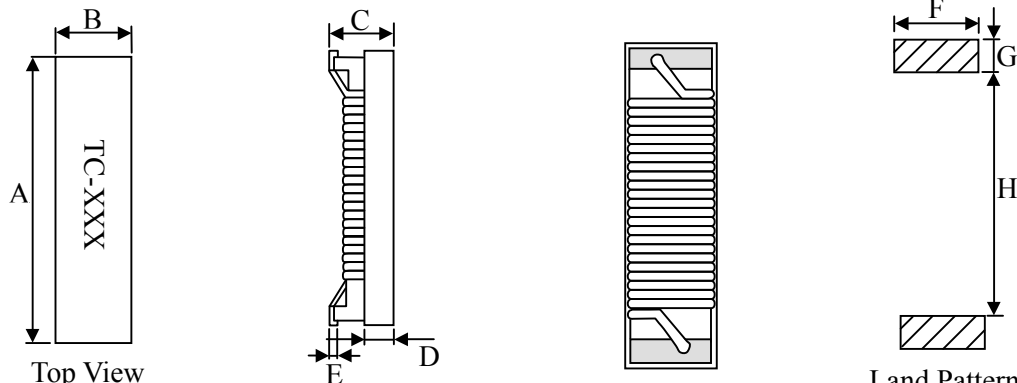
Features :

- High Q value.
- Low profile with an extended length.

Applications :

- Car remote control key.

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▶ **Configurations & Dimensions**

Top View   E   D   Land Pattern

Type	A	B	C	D	E	F	G	H
TC4308I	11.43	3.15	2.74	1.01	0.51	2.79	1.78	8.46

Note: Design as Customer's Requested Specifications.

▶ **Electrical Characteristics**

Part Number	Inductance (mH)	Q (min)	Test Freq. (KHz)	SRF (KHz)(min)	DCR (Ω)(max)
TC4308I - 401J	0.40	15	125	4500	7.4
TC4308I - 901J	0.90	15	125	4000	22
TC4308I - 112J	1.08	15	125	4000	25
TC4308I - 202J	1.97	17	125	2400	34
TC4308I - 242J	2.38	17	125	2200	39
TC4308I - 332J	3.30	17	125	1800	51
TC4308I - 412J	4.15	17	125	1700	74
TC4308I - 492J	4.90	17	125	1300	96
TC4308I - 682J	6.80	17	125	1000	112
TC4308I - 712J	7.10	17	125	1000	115
TC4308I - 812J	8.10	17	125	960	123

Note: Test Freq.: 125KHz / 0.25V.

    Operating Temp.: -40°C+85°C.

Transponder Coils in an RFID Radio Frequency Identification System

RFID, Radio Frequency Identification, is the system of using radio signals to send information identifying a particular item. The most common application of RFID is to track and locate any subject including material, or moving item.

The RFID transponder coil is part of the coupling device and acts as the transmitting antenna. The main specifications of the transponder coil are sensitivity and read distance, however, the inductance of the transponder coil directly influences the sensitivity and the read distance. Generally, a higher inductance provides greater sensitivity resulting in a longer read distance.

There are two major components in an RFID system:

- **Tag**:
  The transponder programmed with unique information. The tag consists of an integrated circuit and a coupling device. The integrated circuit stores specific data unique to that tag.

- **Reader**:
  The interrogator includes a decoder to interpret data. The coupling device interfaces with the reader.

The manufacturer of the tag usually specifies the inductance of the coil to be used. The read distance is defined as the maximum distance from the reader that the transponder responds to the reader's magnetic field. The reader produces a magnetic field that triggers the tag. When the reader receives the transmitted data, it interprets the data and takes appropriate action as shown in figure 1.

When the transponder enters the field produced by the reader, the coil produces a voltage inside the tag. In an active transponder, the voltage is used to wake the tag and use its internal battery. In a passive transponder, this voltage can be used to power the tag. Active transponders generally have longer read distances, shorter operational life and are larger and more costly to manufacture. Passive transponders are generally smaller, have a longer life and are less expensive to manufacture.

For optimum performance, the transponder coil is used in a parallel LC circuit as shown in figure 2. Adding a capacitor to the circuit maximizes the read distance. The LC circuit is designed to resonate at the operating frequency of the reader. To calculate the value of the capacitor, use the following
equation: Capacitance (C) = 1 / (Inductance L x (2π x Frequency ƒ))²
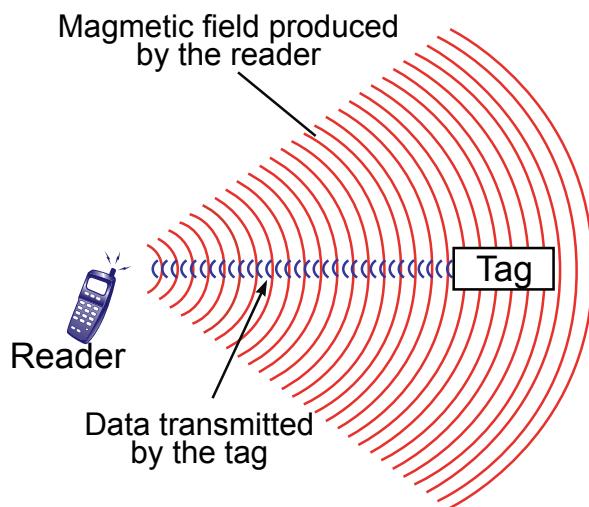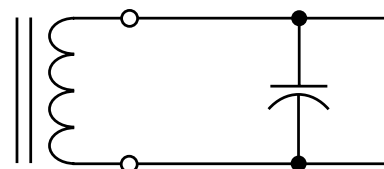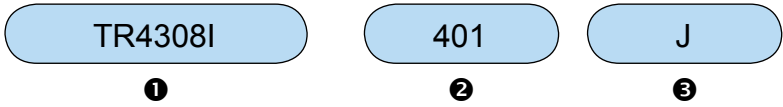
Figure 1. RFID System

Figure 2. LC Circuit

▶ How to Order

TR4308I	401	J
❶	❷	❸

❶ Part Number: TR4308I

❷ Tolerance

Code	Tolerance
401	0.40μH
901	0.90μH
112	1.08μH

❺ Design code

Code	Tolerance
J	5%

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