

## Description

CambridgeIC's resonant inductive position sensing technology allows linear or rotary sensors to be built using conventional PCB fabrication processes. Sensors detect inductively coupled targets without contact.

20mm Transponder Coils are wound ferrite cored inductors for surface mounting to a PCB. They form the inductive component of the resonant circuit inside a target, and allow targets to be built using PCB fabrication and assembly processes too.

The 20mm Transponder Coil is also available with capacitance connected across its SMD pads, for use as a resonator assembly.

## Features

- 2 alignment Pins for accurate registration on a PCB
- 4 large solder terminals for secure fixing to a PCB
- High Q-factor for strong signals and high resolution
- Stable inductance
- Magnetic geometry optimised for inductive sensing

## Performance

- Operating Temperature Range -40°C to +125°C

## Applications

- Inductively coupled resonant circuits
- Through hole contactless rotary position sensors
- End shaft contactless rotary position sensors
- Contactless linear position sensors



Figure 1 20mm Transponder Coil 012-1704

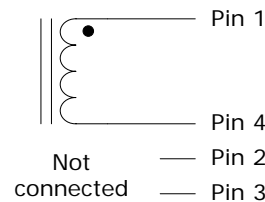


Figure 2 Electrical connections, 012-1704

Product identification	
Part no.	Description
012-1704	20mm Transponder Coil
013-1024	Resonator Assembly, 187.5kHz

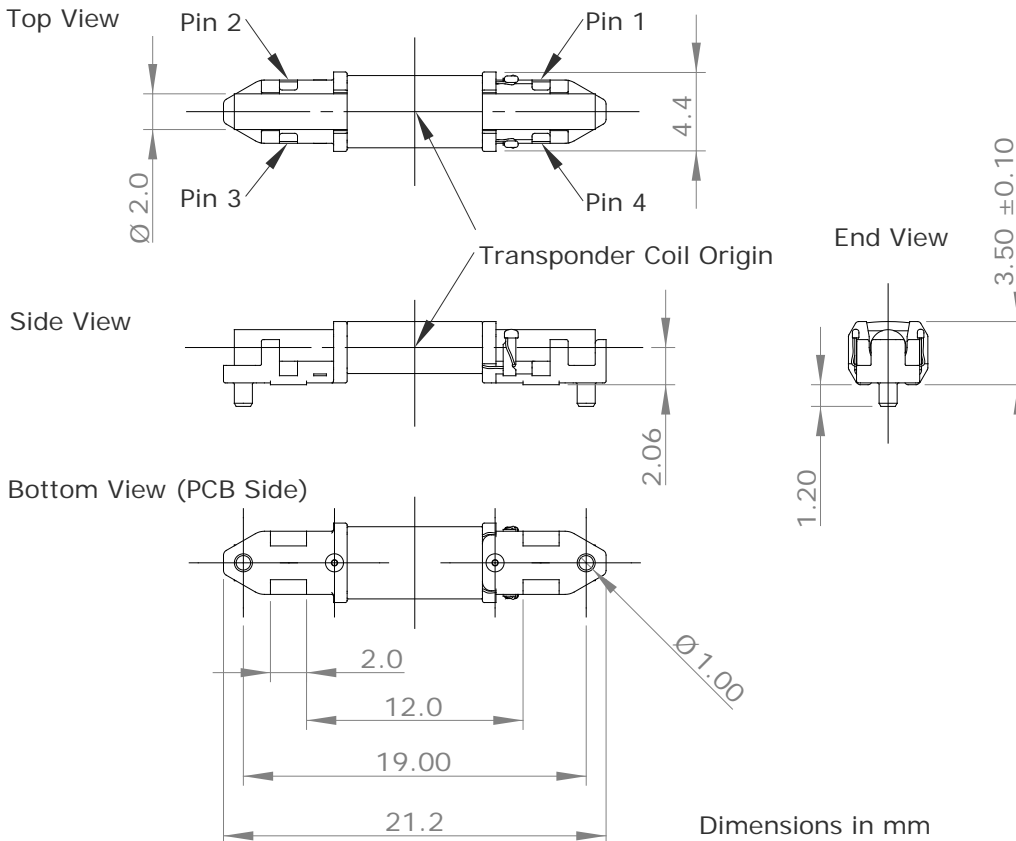


Figure 3 Dimensions, part 012-1704

# 1 Specifications, Transponder Coil

## 1.1 Electrical

**Table 1 Electrical specifications, transponder coil**

Item	Value
Nominal Inductance, free space	935 $\mu$ H
Inductance tolerance at 20°C	$\pm 2\%$
Max Change in inductance across Operating Temperature Range relative to value at 20°C	$\pm 2\%$
Minimum self resonant frequency	1MHz
Typical DC series resistance, 20°C	5.3 $\Omega$

## 1.2 Environmental

**Table 2 Environmental specifications, transponder coil**

Item	Value
Maximum Operating Temperature	+125°C
Minimum Operating Temperature	-40°C
Maximum Temperature, storage in Tape and Reel Packaging	+40°C
Maximum humidity	85%
Maximum humidity, storage in Tape and Reel Packaging	75%

## 1.3 Physical

**Table 3 Physical specifications, transponder coil**

Item	Value
Mass	0.7g

## 2 PCB Footprint, Transponder Coil

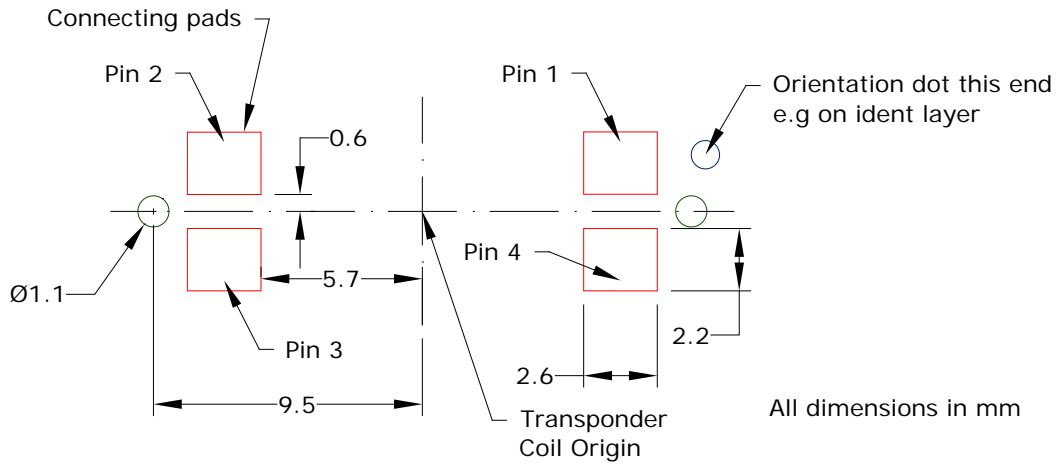


Figure 4 Recommended PCB footprint, top view

### 3 Tape and Reel Specifications

CambridgeIC part 012-1704 is supplied in full reels of 1000 parts each. The reel diameter is 330mm. Figure 5 illustrates the tape dimensions and the orientation of the parts relative to the feed direction.

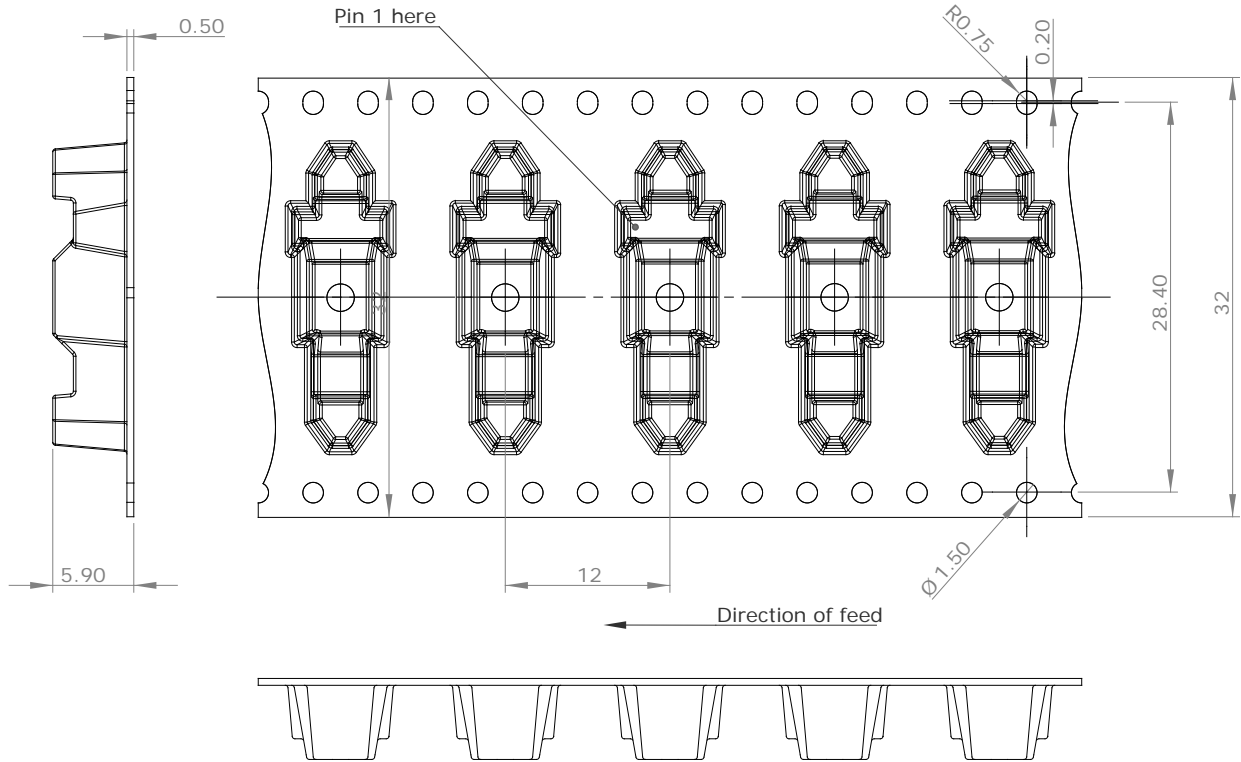


Figure 5 Tape and Reel Illustration

## 4 Resonator Assemblies

The 20mm Transponder coil is available with SMD capacitor(s) soldered across pins 1 and 4 to form a resonator assembly. The part is available with different nominal resonant frequencies to suit different metal environments.

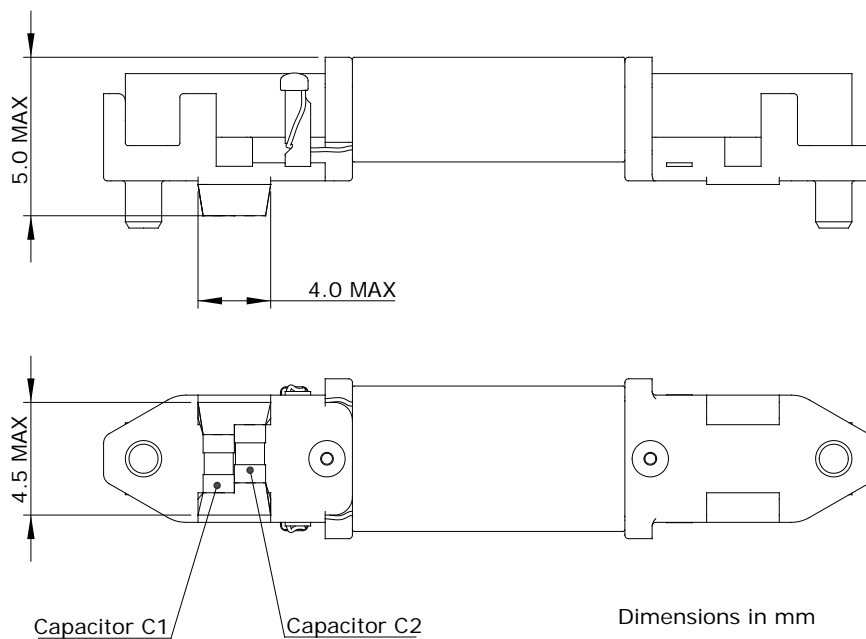
### 4.1 Mechanical

One or more capacitors are soldered across pins 1 and 4 as illustrated in Figure 6.



**Figure 6 Location of added capacitance**

Figure 7 illustrates the increase in physical envelope of the part in the area of the added capacitors, to allow for the capacitors and their soldering.



**Figure 7 Dimensions, part 013-1024**

## 4.2 Electrical

**Table 4 Electrical specifications, resonator assemblies**

Part No	013-1024
Item	
Resonator nominal frequency, free space, 20°C	187.5kHz
Tolerance at 20°C	±3.5%
Max change in resonant frequency across Resonator Assembly Operating Temperature Range	±2%
Min Resonator Q-factor, free space, 20°C	100

## 4.3 Environmental

**Table 5 Environmental specifications, resonator assemblies**

Item	Value
Minimum Resonator Assembly Operating Temperature	-40°C
Maximum Resonator Assembly Operating Temperature	+85°C
Maximum Resonator Assembly Storage Temperature	+125°C

## 5 RoHS Compliance

CambridgeIC certifies, to the best of its knowledge and understanding, that parts 012-1704 and 013-1024 are in compliance with EU RoHS directive 2011/65/EU, China RoHS and Korea RoHS.

## 6 Document History

Revision	Date	Description
0001	11 January 2016	First draft
0002	29 January 2016	Added Resonator Assembly 013-1024
0003	24 February 2016	Confirmed nominal inductance at 935 $\mu$ H Updated drawing to include height tolerance
0004	22 July 2016	Changed nominal width dimension from 4.3 to 4.4mm to match latest supplier data. Added tape and reel specifications. Added humidity specification. Changed storage temperature to temperature in package.
0005	22 June 2017	Added photo
0006	12 December 2017	Changed tape and reel feed direction to match production reels Added RoHS statement

## 7 Contact Information

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