## Description

These targets function with a number of different resonant inductive sensors from CambridgeIC, including 10mm wide Linear Sensors. Sensors measure the relative position of the target without mechanical or electrical contact.

11mm E-Core Targets have a resonant circuit inside, comprising a wound E-Core ferrite with coil ends connected to a capacitor mounted on a miniature PCB. These form a high Q resonant circuit that is inductively coupled to the sensor.

11mm E-Core Targets are available in product variants with the capacitor PCB to the rear or to the side of the ferrite.

Product variants with different nominal frequencies are also available, to suit different metal environments.

## Applications

- 10mm wide Type 1 Linear Sensors up to 300mm
- 10mm wide Type 2 and Type 6 sensors to 500mm

| **Product identification** | |
|---|---|
| **Part no.** | **Description** |
| 013-1020 | 11mm E-Core Target with Rear PCB |
| 013-1023 | 11mm E-Core Target with Rear PCB -3% Freq |
| 013-1027 | 11mm E-Core Target with Side PCB -1.5% Freq |

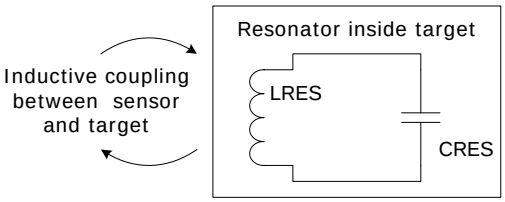


**Figure 1 Equivalent circuit**

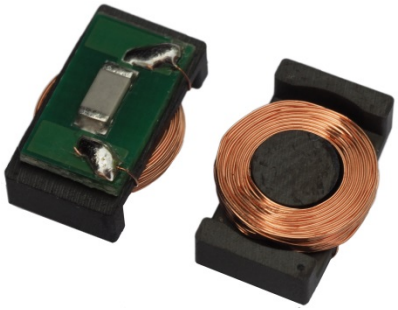

**Figure 2 11mm E-Core Target with Rear PCB**

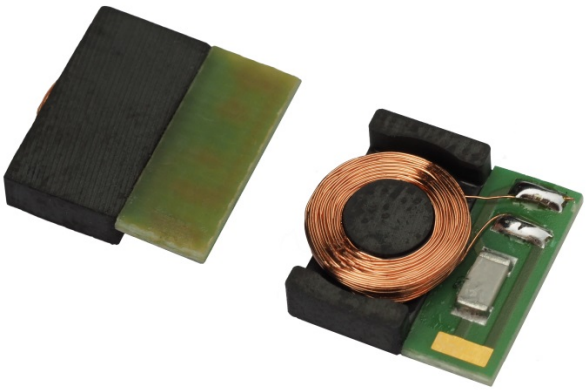

**Figure 3 11mm E-Core Target with Side PCB**

# 1 Mechanical

## 1.1 Rear PCB Version

Figure 4 illustrates the 11mm E-Core Target with Rear PCB, and includes key dimensions. This style, with the PCB to the rear of the ferrite, minimises plan view area (top left of Figure 4).

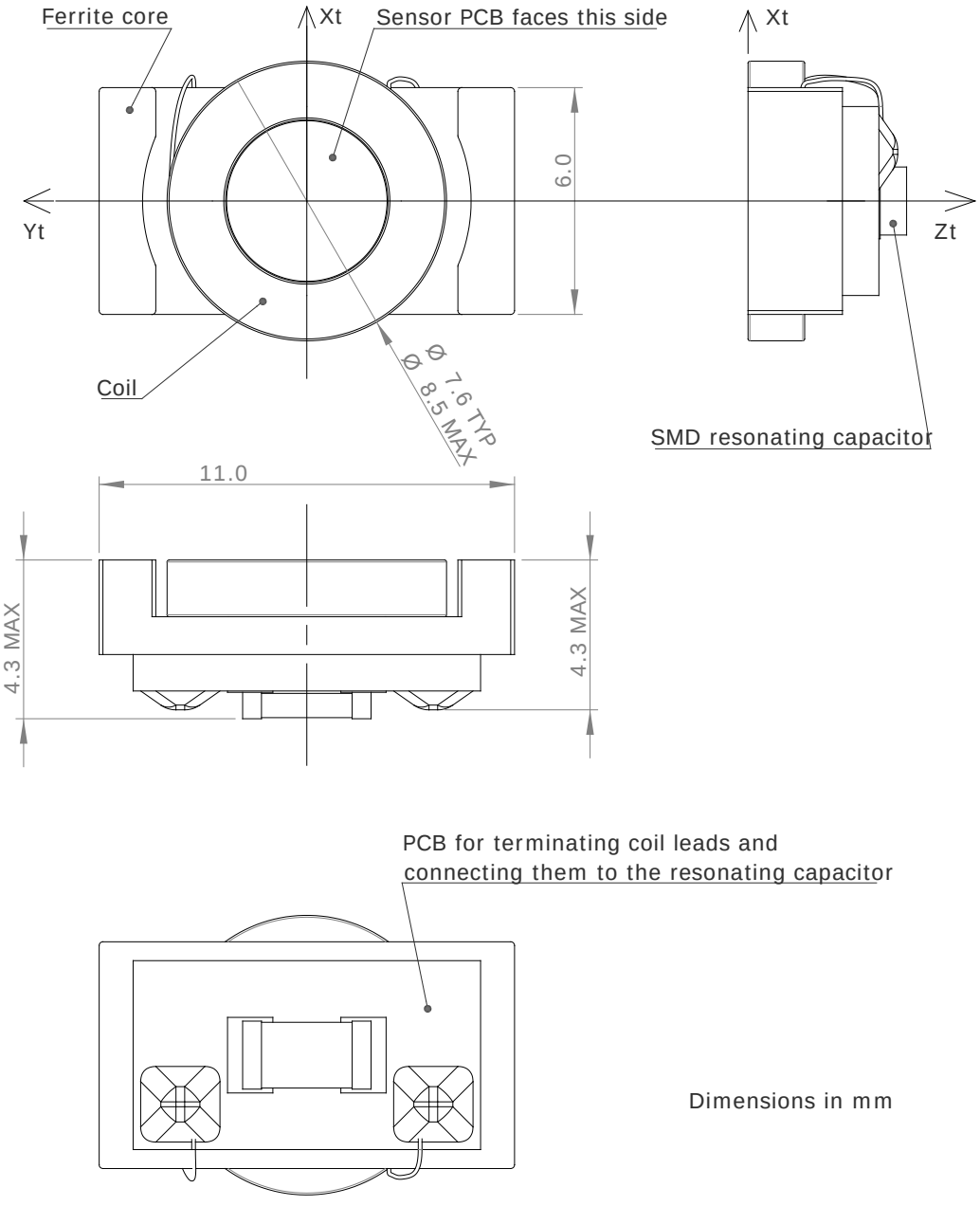


**Figure 4 Mechanical drawing of 11mm E-Core Target with Rear PCB**

The part's Xt Direction runs bottom to top as drawn, and is in the sensor's measuring direction. The part's Zt Direction runs through the thickness of the part, perpendicular to the sensor PCB and in the direction of measurement of the Gap to the sensor PCB. The part's Yt Direction runs perpendicular to Xt and Yt Directions.

## 1.2 Side PCB Version

Figure 4 illustrates the 11mm E-Core Target with Side PCB, and includes key dimensions. This style, with the PCB to the rear of the ferrite, minimises thickness.

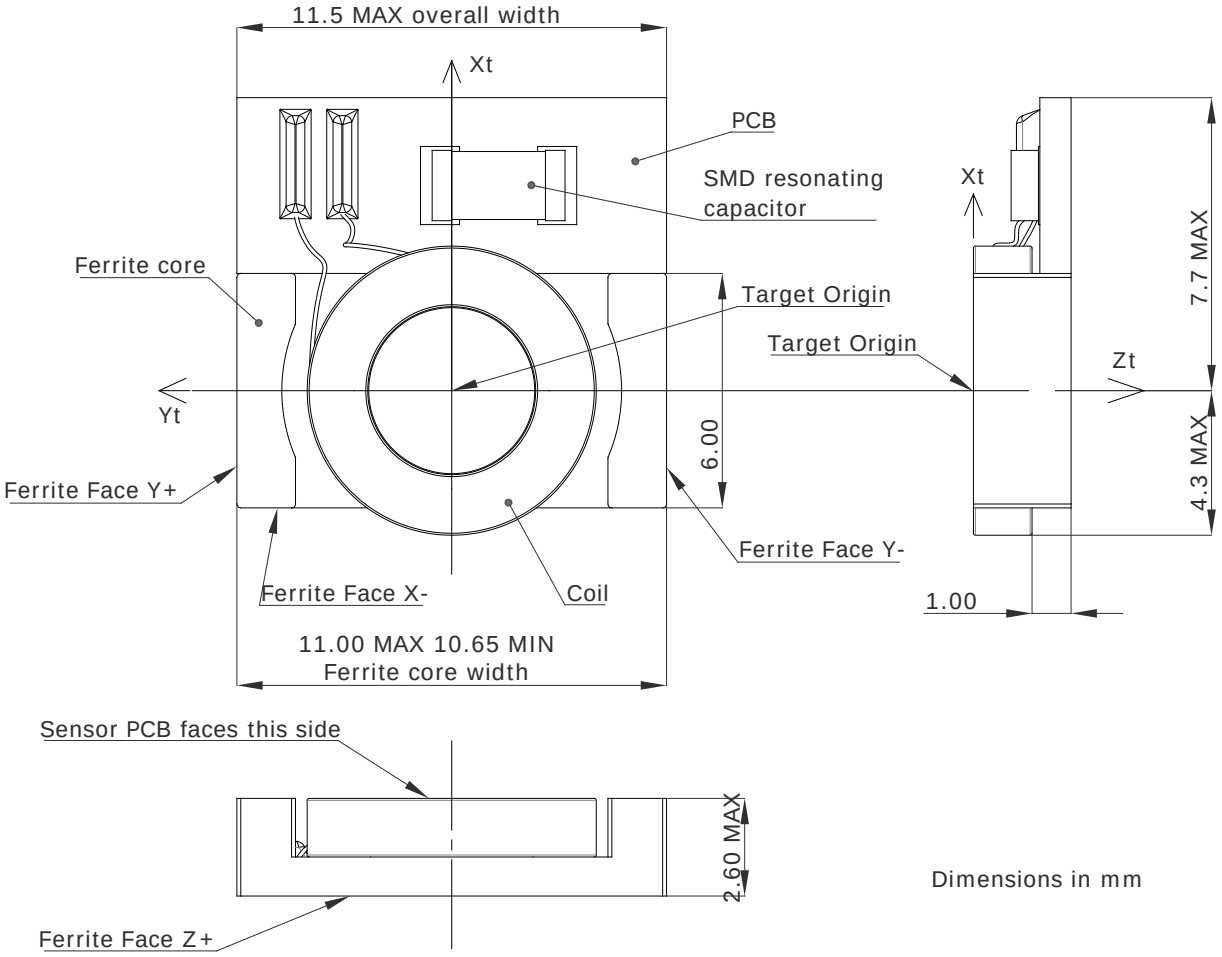


**Figure 5 Mechanical drawing of 11mm E-Core Target with Side PCB**

This style is also easier to mount and align than the Side PCB version, because the rear of the ferrite ("Ferrite face Z+" in Figure 5) is planar and because the overall thickness of the part is better controlled.

As before, the part's Xt Direction runs bottom to top as drawn, and is in the sensor's measuring direction. The part's Zt Direction runs through the thickness of the part, perpendicular to the sensor PCB and in the direction of measurement of the Gap to the sensor PCB. The part's Yt Direction runs perpendicular to Xt and Yt Directions.

Sensors measure the position of the centre of the ferrite ("Target Origin"). For minimum sensor Position Offset Error, it is recommended that mounting features should align the part in the Xt Direction using the Ferrite X- Face. For best lateral alignment with the sensor, it is recommended to align the part in the Yt Direction using the Ferrite Y+ and/or Ferrite Y- Face.

The coil and PCB must not be used for alignment because their dimensional tolerances are not as tight as the ferrite. Adequate clearance should be allowed for the coil and PCB MAX dimensions in the design of the mounting.

The part includes an adhesive bond between ferrite and capacitor PCB allowing shipping, handling and assembly. However this bond is not intended to survive mechanical shock and vibration in a final product without further support. Adhesive is recommended for attachment, for example epoxy, spanning both ferrite and the capacitor PCB.

# 2 Specifications

## 2.1 Electrical

**Table 1 Electrical specifications**

| Part No | 013-1020 | 013-1023 | 013-1027 |
|---|---|---|---|
| Resonator frequency, free space | 187.5kHz | 182.0kHz | 184.6kHz |
| Tolerance at 20°C | ±4% | ±4% | ±3% |
| Max change in resonant frequency across Operating Temperature Range relative to value at 20°C | ±1% | ±1% | ±1% |

Parts with lower nominal frequency suit applications where the part is used with a sensor that has aluminium very close behind. The aluminium will increase the resonant frequency relative to its free space value. The resulting design must be checked to ensure the resonant frequency is within the appropriate tuning limits of the CTU chip used for processing. Please contact CambridgeIC for details.

## 2.2 Environmental

**Table 2 Environmental Specifications**

| Item | Value |
|---|---|
| Maximum Operating Temperature | +85°C |
| Minimum Operating Temperature | -40°C |

## 2.3 Physical

**Table 3 Physical specifications**

| Item | Value |
|---|---|
| Mass, typical | 0.8g |

# 3 Document History

| Revision | Date | Description |
|---|---|---|
| 0001 | 15 October 2014 | First draft, basic information |
| 0002 | 16 September 2015 | Added part 013-1023 to available products (different nominal frequency) |
| 0003 | 29 November 2016 | Figure 4 now created from SolidWorks model |
| 0004 | 30 November 2016 | The maximum height dimension of figure 4 applies to revision _0002 onwards |
| 0005 | 30 November 2016 | Added max coil dimension |
| 0006 | 26 June 2017 | Added Side PCB version |

# 4 Contact Information

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# 5 Legal