

# **Low Profile SMD Ceramic Chip Antenna for WLAN/Bluetooth/ISM applications**

## **Product Datasheet** **AC10242-01**

---

June, 2023

Rev. 1.0

## Revision History

Date	Rev.	Summary of Changes
28 June 2023	1.0	First version of preliminary product datasheet

# Table of Contents

1	DESCRIPTION AND SPECIFICATIONS.....	4
1.1	Scope and purpose.....	4
1.2	Features.....	4
1.3	Antenna specifications.....	5
1.4	Radiation pattern.....	7
1.5	VSWR and Antenna Efficiency.....	8
2	PRODUCT HANDLING & INTEGRATION.....	9
2.1	Assembly Recommendation.....	9
2.2	Antenna Footprint.....	10
2.3	Evaluation Kit.....	11
2.4	Matching Network Topology.....	12
2.5	Assembly Recommendation: Reflow Profile.....	13
3	PRODUCT MARKING & ORDERING INFORMATION.....	14
3.1	Packaging.....	14
3.2	Product Marking.....	15
3.3	Ordering Information.....	16

# 1 Description and Specifications

## 1.1 Scope and purpose

The AC10242-01 is a compact high efficiency 2400-2500 MHz SMD ceramic antenna optimized for small devices and wearable applications.

The antenna has been designed to support a wide variety of WLAN/Bluetooth and ISM applications:

- Access point
- Smart meters
- Connected health (patient monitoring)
- Sensors and wearables
- OBDII
- Tablets and handheld devices

## 1.2 Features

- Compact high efficiency antenna
- Low profile (< 0.8mm) SMD component for ease of integration
- Surface mount device suitable for automated assembly (SMT process)
- Supplied on tape & reel
- Highly resistant to detuning
- Small form factor of 1.6 x 0.8 x 0.8 (mm)
- Ideal for smaller wearable designs
- Suitable for sealing with resin / potting compounds
- RoHS and REACH compliant
- For WLAN/Bluetooth/ISM applications 2400 - 2500MHz

## 1.3 Antenna specifications

**Table 1: AC10242-01 RF specifications**

Parameters	AC10242-01
Frequency (MHz)	2400 - 2500
Typical efficiency	45% - 62%
VSWR (max)	2.1 : 1
GND plane size	15 x 33.3 mm
Input impedance	50Ω
Polarization	Linear
Peak realized gain	0.77 dBi

**Notes:**

- The characterization is performed with the antennas mounted on the evaluation board AC91242-040 with size W x L = 15 x 39mm.
- The evaluation board is tested in free space.

**Table 2: Physical specifications**

Parameter	AC10242-01
Size (L x W x H)	1.6 x 0.8 x 0.8 mm
Required clearance area	9.5 x 5.0 mm
Weight	<0.5 g
Soldering Type	SMT through reflow

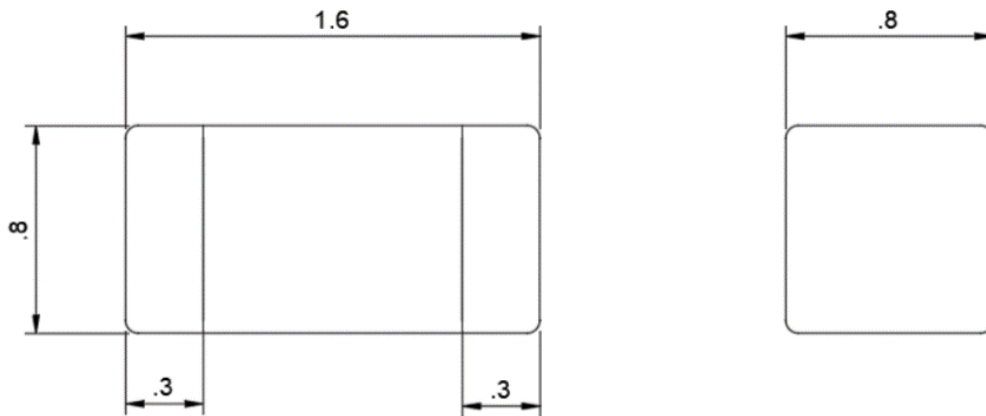
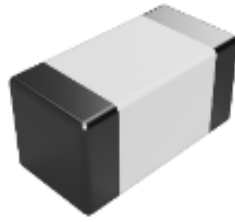
**Notes:**

- For all dimensions, the ISO 2768-mK standard is followed. For the outer dimensions this means a tolerance of ±0.1 mm is applicable

**Table 3: AC10242-01 environmental specifications**

Parameter	AC10242-01
Operational temperature	-40 °C to +125 °C
Storage temperature	-10 °C to +40 °C
Relative humidity	≤75%
RoHS and REACH	Yes

The visual representation and the dimensions of the AC10242-01 antenna are shown in Figure 1.



**Figure 1: AC10242-01 visual representation and dimensions (in mm).**

## 1.4 Radiation pattern

The typical radiation patterns of the AC10242-01 antenna, measured when operating on a 15 x 39 mm host PCB, are depicted in Table 4. The coordinate axes defining the evaluation planes during the measurements are demonstrated in Figure 2.

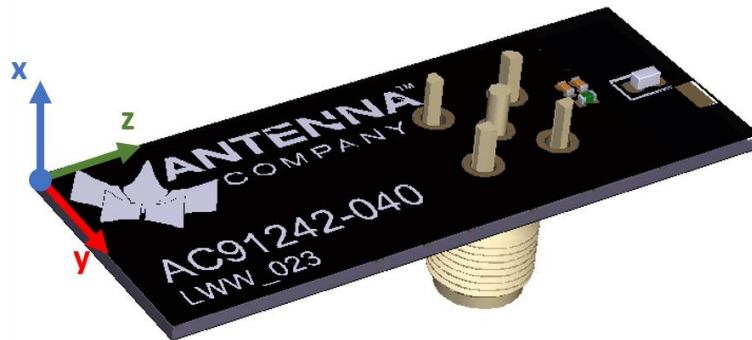


Figure 2: Illustration of radiation pattern evaluation planes

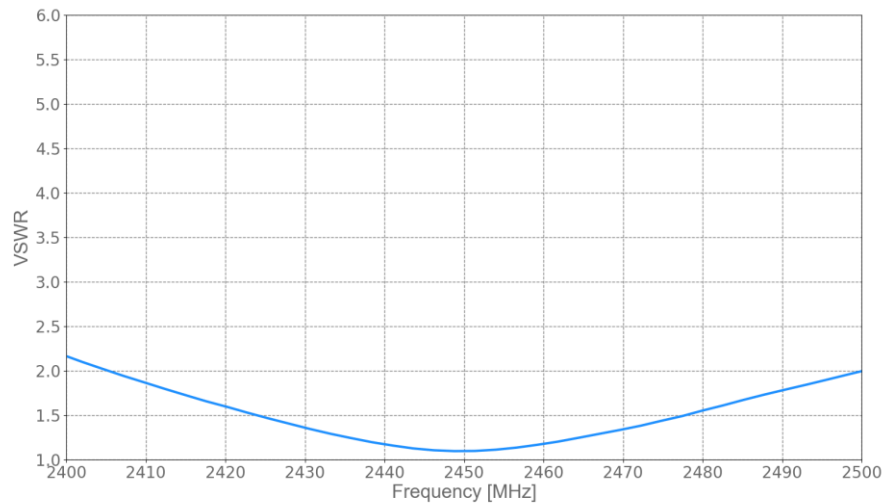
Table 4: Radiation patterns of AC10242-01 in standalone configuration

XY Plane	XZ Plane	YZ Plane
<b>2440 MHz</b>		

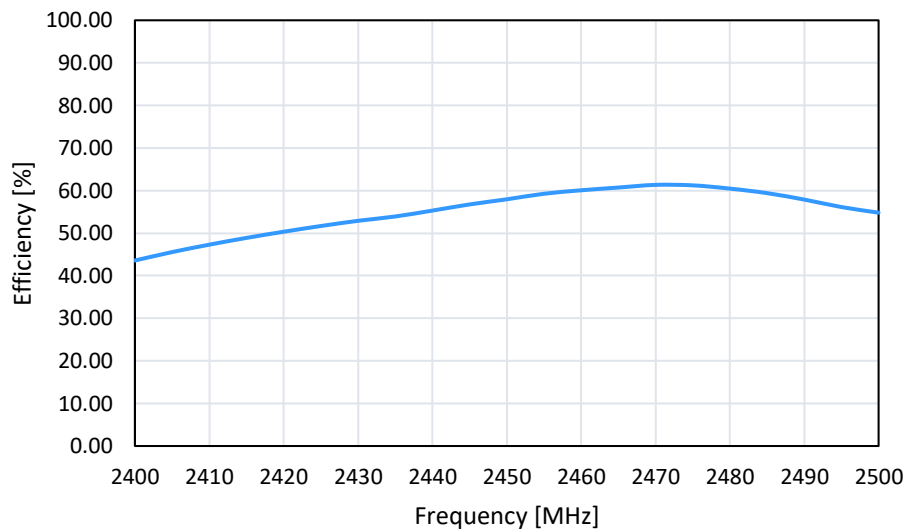
## 1.5 VSWR and Antenna Efficiency

The AC10242-01 has been characterized on the AC91242-040 evaluation board.

The measured VSWR and efficiency as functions of frequency are depicted in Figures 3 and 4, respectively.



**Figure 3: VSWR of the AC10242-01**



**Figure 4: Efficiency of the AC10242-01**



## 2 Product Handling & Integration

### 2.1 Assembly Recommendation

Figures 5 and 6 show the recommended location of the AC10242-01 antenna on the host PCB. The optimum location is at the PCB edge, however, it can also be positioned at the corner of the host PCB. A clearance area is required through all PCB layers; in case of corner mount, a 10 mm clearance is required to the adjacent ground area.

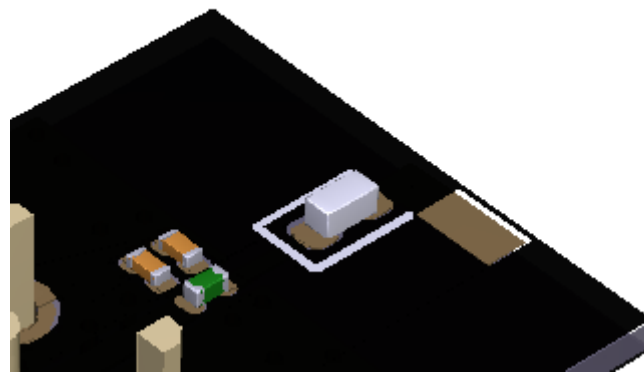


Figure 5: Isometric view of the AC10242-01 placement on the host PCB

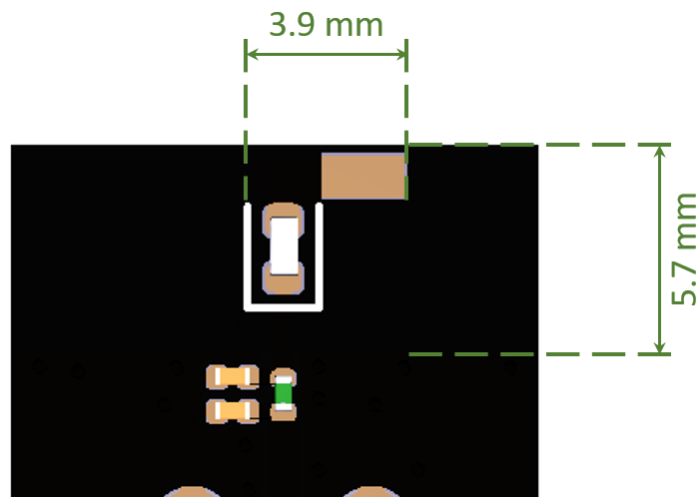
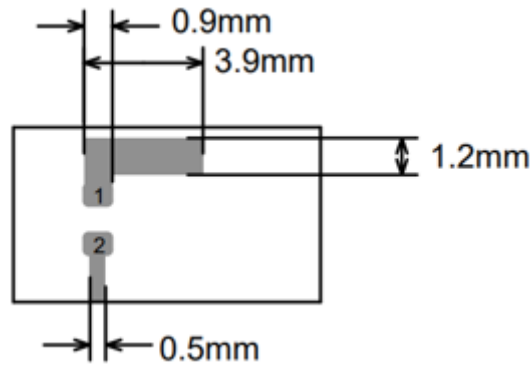


Figure 6: AC10242-01 integration on the top surface of the host PCB

## 2.2 Antenna Footprint

The required PCB footprint is shown in Figure 7. The PCB library files are available on demand.



**Figure 7: Footprint of the AC10242-01 on the top PCB layer. The two soldering pads are marked by the digits “1” and “2”.**

### Additional notes

- Matching network components must be close to the antenna.
- Transmission line to the RF port should be kept as short as possible.
- A minimum of 10 mm distance to adjacent copper on either side is required.
- The top and bottom layers of the PCB should be flooded with GND to optimize the antenna performance.
- For all dimension tolerances, standard PCB manufacturing guidelines should be followed.

## 2.3 Evaluation Kit

The evaluation kit depicted in Figures 8, 9 includes a SMA female connector and can be ordered for evaluation purposes. As shown on the evaluation board, it is recommended to mount the ceramic chip antenna on the shorter side of the PCBA to use the longer GND plane as antenna counterpoise and maximize performance.



Figure 8: Isometric view of the evaluation kit



Figure 9: Top view of the evaluation board

## 2.4 Matching Network Topology

The matching network topology depicted in Figure 10 is required on the main PCB, as close as possible to the AC10242-01 main antenna. The characteristic impedance of all transmission lines should be designed as 50  $\Omega$ . The length of the transmission lines connecting the antenna to the matching circuit and the radio module should be kept as short as possible. Any other part of the RF circuit connected to the antenna, such as power amplifiers, should also be designed with a 50  $\Omega$  impedance.

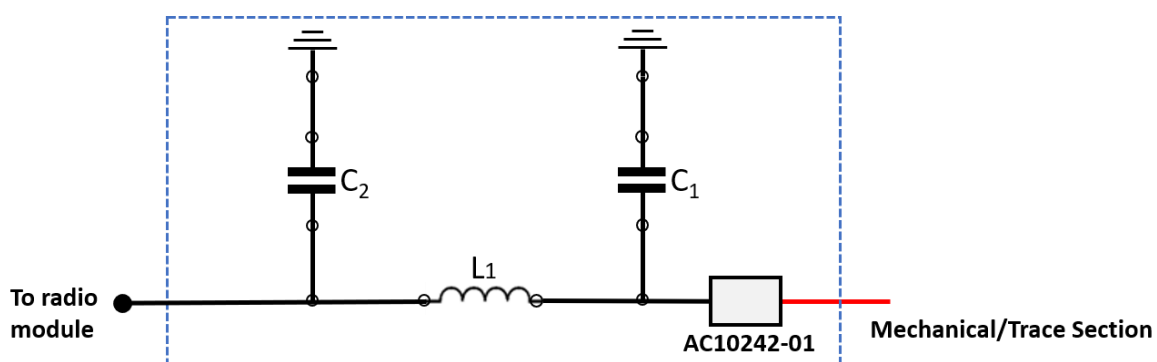


Figure 10: Required Matching Network Topology for AC10242-01

The component values and recommended types are listed in Table 5. Different values might be required depending on the host PCBA and the end-device environment. If you need assistance, please contact [sales@antennacompany.com](mailto:sales@antennacompany.com) for antenna matching network support.

Table 5: Matching network component values

AC10242-01		
Component	Value	Type
Capacitor (C1)	Not fitted	NA
Capacitor (C2)	1.8pF	GCM1555C1H1R8BB01
Inductor (L1)	4.3 nH	LQG15HN4N3B02

## 2.5 Assembly Recommendation: Reflow Profile

The recommended reflow profile is presented in Figure 11 and Table 6.

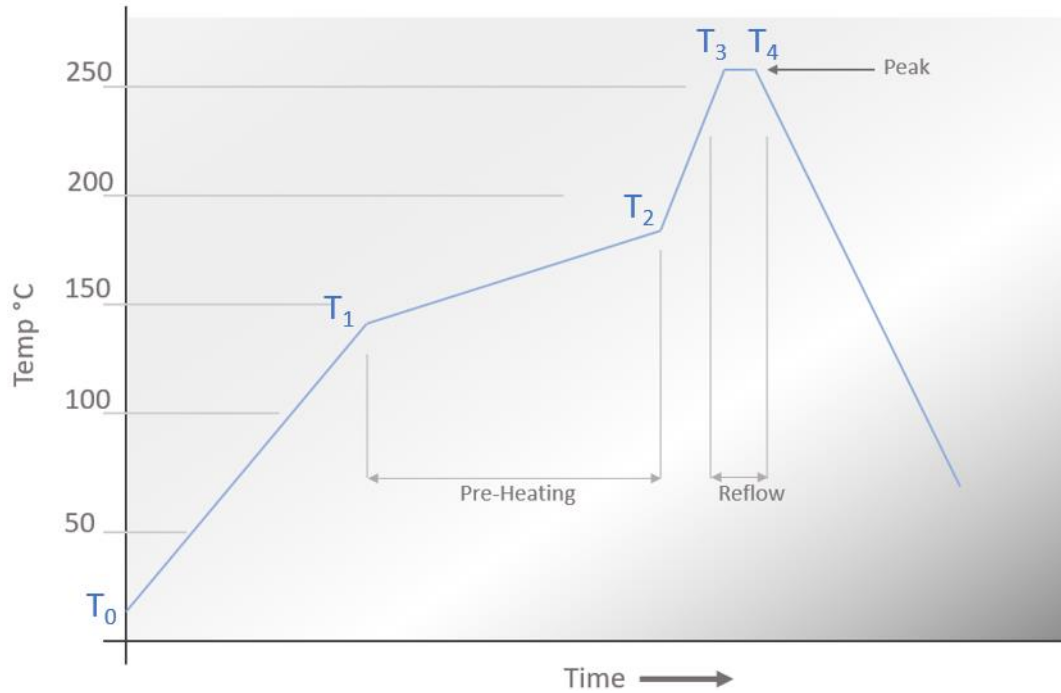


Figure 11: Suggested Reflow profile

Table 6 - Reflow Temperature Table

		Temp Range	Time
T <sub>0</sub> - T <sub>1</sub>	Heating Zone	0 to 130°C	Controlled 1°C~3°C/sec
T <sub>1</sub> - T <sub>2</sub>	Pre-Heating	130°C to 180°C	50s to 190s
T <sub>3</sub> - T <sub>4</sub>	Peak Temperature	260°C	15s to 45s
	Reflow	220°C to 260°C	50s to 160s
T <sub>4</sub> - End	Cooling Zone	Cool down	Controlled~4°C/sec

### 3 Product Marking & Ordering Information

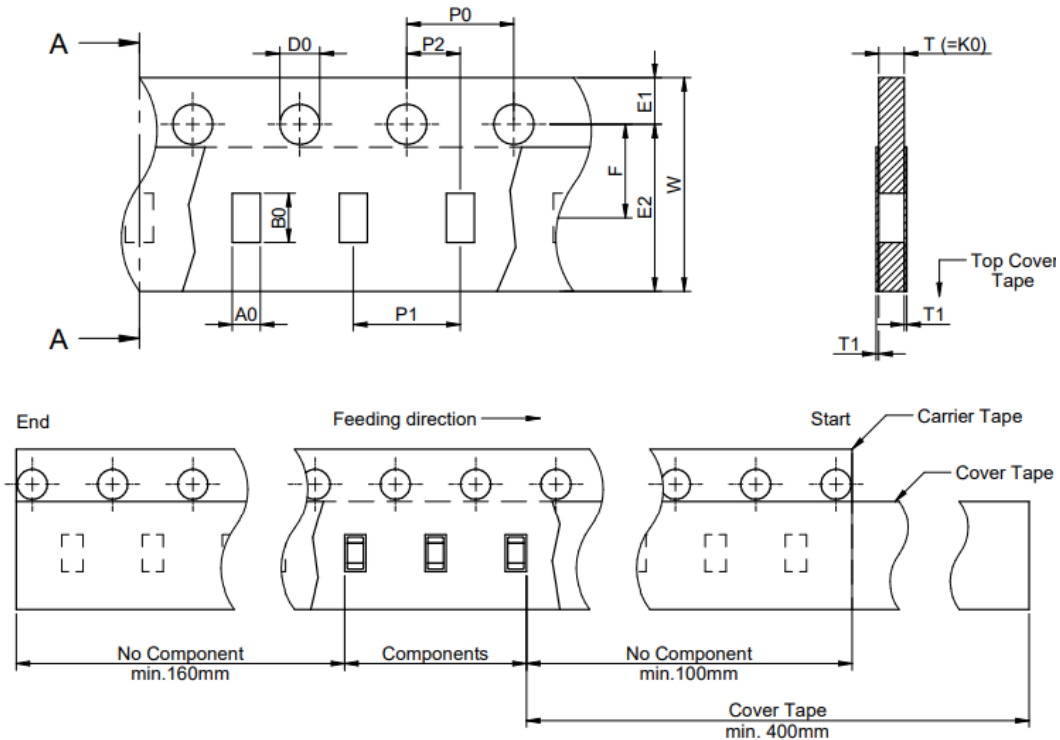
#### 3.1 Packaging

The AC10242-01 main antenna will be delivered in tape and reel. The packaging details are presented in Table 7 and Figures 12, 13. The number of units per reel is 4000pcs.

**Table 7. AC10242-01 packaging details.**

	A0	B0	W	T	T1	P0	P1	P2	D0	E1	E2	F
TOLERANCES	typ.	typ.	+0.3/-0.1	typ.	max	±0.1		+0.05	+0.1/-0.0	±0.1	min.	±0.05
Size (mm)	1.05	1.85	8.00	0.95	0.10	4.00	4.00	2.00	1.50	1.75	6.25	3.50

	A	B	C	D	N	W1	W2	W3	W3	Type	material	VPE
TOLERANCES	±2.0	min.	min.	min.	min.	+1.5	max.	min.	max.			pcs
Size (mm)	178	1.5	12.8	20.2	50	8.4	14.4	7.9	10.9	Paper	polystyrene	4000



**Figure 12: Tape packaging details of AC10242-01**

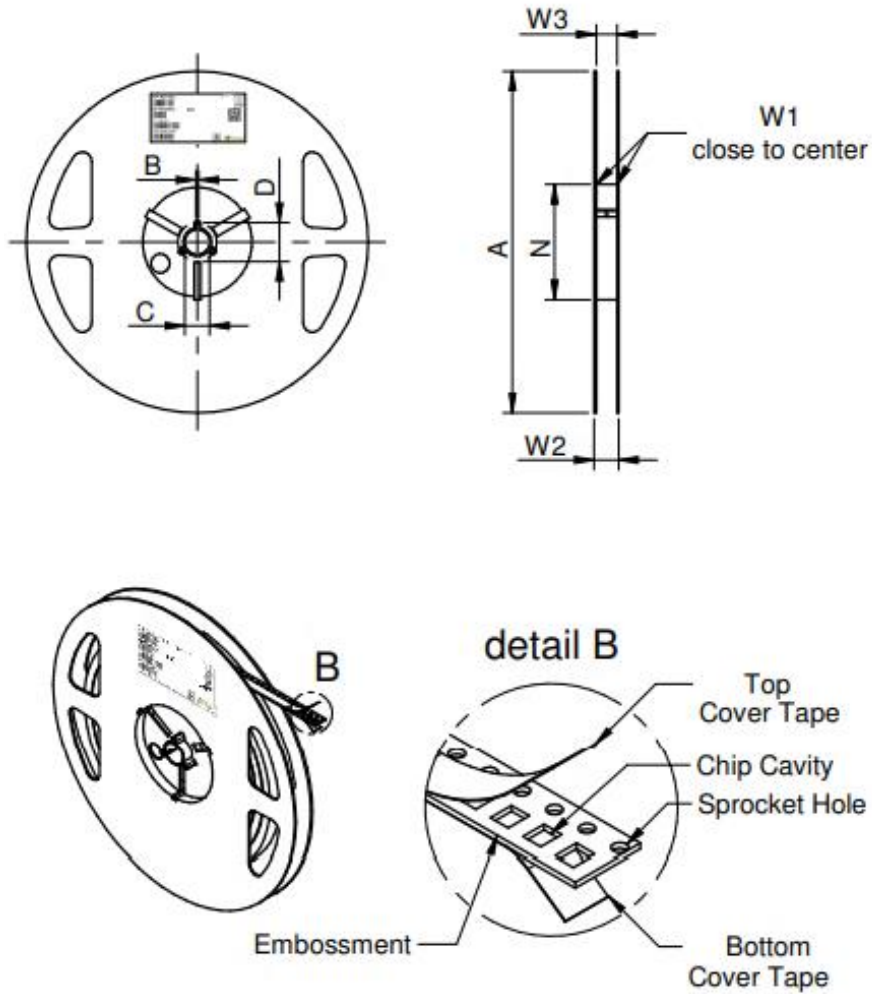


Figure 13: Reel packaging details of AC10242-01

### 3.2 Product Marking

There will be no markings on the ceramic chip antenna.

### 3.3 Ordering Information

Orders should be placed at [orders@antennacompany.com](mailto:orders@antennacompany.com).

For purchase orders please state: part number, description, quantity, and price

**Table 8: AC10242-01, ordering information**

Part number	Description	Minimum Order Quantity [pcs]	Order multiple [pcs]
AC10242-01	Low profile SMD ceramic chip antenna	4000	4000

For sample quantities, please contact [sales@antennacompany.com](mailto:sales@antennacompany.com).

The information furnished by Antenna Company and its agents is believed to be accurate and reliable. Responsibility for the use and application of Antenna Company materials rests with the end user since Antenna Company and its agents cannot be aware of all potential uses. Antenna Company makes no warranties as to the fitness, merchantability, or suitability of Antenna Company materials or products for any specific or general uses. Antenna Company shall not be liable for incidental or consequential damages of any kind. All Antenna Company products are sold pursuant to the Antenna Company terms and conditions of sale in effect from time to time, a copy of which will be furnished upon request. All Antenna Company's products are sold pursuant to the Antenna Company's domestic terms and conditions of sale in effect from time to time, a copy of which will be furnished upon request.

Antenna Company is a registered trademark of The Antenna Company International N.V. Other product and brand names used in this document may be trademarks or registered trademarks of their respective owners.

© 2023 Antenna Company. All rights reserved.