

PT 86 (HT) passive UHF transponder

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Intended use and function

Radio frequency identification tags (RFID tags) are used in industrial processes to track goods and the flows of goods. UHF-RFID applications, such as in medical technology or in production and transport logistics, demand long read ranges, including in the vicinity of liquids and metals. The PT 86 (HT) passive UHF transponder is an especially robust and durable transponder. It is suitable for use in the aviation industry under extreme mechanical, chemical and thermal conditions at heights of up to 15,200 meters. The RFID tag is employed to register repair and maintenance cycles (logging) at Lufthansa Technik Logistik GmbH. The selection of a suitable plastic allows a function range of from -50° C to +85° C (reading and writing) and an operative range of from -65° C to +160° C (storage). The passive UHF transponder with a size of 41 x 11 x 5 mm and a weight of 3.2 g achieves a read range of more than 2.5 m when glued onto a metal plate. The chemical-resistant housing has been designed for protection classes IP 64, IP 67 and IP 69K. The Alien Higgs 3 semiconductor chip allows a frequency range of from 860 to 960 MHz and memory of 512 bits (compatible with the corresponding RFID standards EPCglobal UHF Class 1 Gen 2 and ISO/IEC 18000-6C).

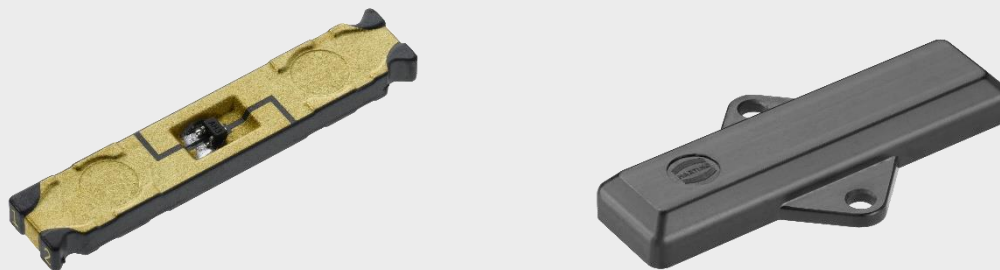


Figure: PT 86 (HT) passive UHF transponder

Advantages of the MID solution

- The use of LCP as the material satisfies the tough requirements for temperature resistance placed by industrial applications.
- The MID method enables lower production costs and higher product quality.
- The RFID chip is structured and assembled directly on the housing of the RFID tag. There is consequently no need to assemble an additional PCB.

Application areas	Aviation
Users	Lufthansa and others
Product	Passive UHF transponder
Main function	RFID (Radio Frequency Identification)



Pushing Performance

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Project implementation

The RFID tag development commenced in September 2008. Lufthansa Systems, the Center for Intelligent Objects (ZIO) at the Fraunhofer Institute for Integrated Circuits (IIS) in Erlangen and HARTING Mitronics cooperated under the management of Lufthansa Technik Logistik. The RFID tag prototypes were intensively and successfully tested in the Lufthansa Technik Logistik laboratory and in independent institutions. The RFID tag was certified in accordance with the SAE aerospace standard. Production kicked off in July 2010.

Functions of the MID component

- Improved power consumption and optimized directional behavior thanks to virtually full-surface metallization. In passive transponders, the energy must be provided by an active component. In addition, a high sampling rate is necessary for short response times, for example, for fast-moving conveyor belts or trains.
- Carrier for the SOT23 component in a cavity.
- Reproduction of the antenna structure on the available surface.

Manufacturing aspects

- The injection molded part is structured by means of LPKF-LDS technology. Metalization is performed without external current and consists of Cu-Ni-Au, which is a typical layer composition for MIDs.
- Due to the rapid development of RFID technology, the use of LDS technology enables very rapid and flexible adjustment of the antenna structure to the requirements of new RFID components. This represents a significant competitive edge over conventional technologies with regard to the response speed and economic factors.

Substrate material	LCP (Vectra E 840i LDS)
Structuring	LDS
Metallization	Chemical Cu-Ni-Au
Connection technology	Soldering (vapor phase)
Number of components	1 (SOT23)
Start of production	2010
Production run	20,000 p.a.
Development period	18 months