

Crypto IDIC[®] for Transponder

General Description

Contactless **IDentification ICs** (IDICs[®]) are used to build transponder, which are small, smart and robust data storage units. The IDIC[®] is connected to a tuned LC circuit for power supply and R/W data communication between a base station and the IDIC[®].

Reading occurs by damping the coil by an internal load. There are different bitrates and encoding schemes possible. Writing occurs by interrupting the RF field in a special way.

The e5560 is for applications which demand higher security levels as standard R/W transponder ICs can fulfill.

For that purpose, the e5560 has an encryption algorithm block which enables a base station to authenticate the

transponder. Any attempt to fake the base station with a wrong transponder will be recognized immediately. Furthermore, the e5560 is able to do an authentication of the base station, to control the access to its memory.

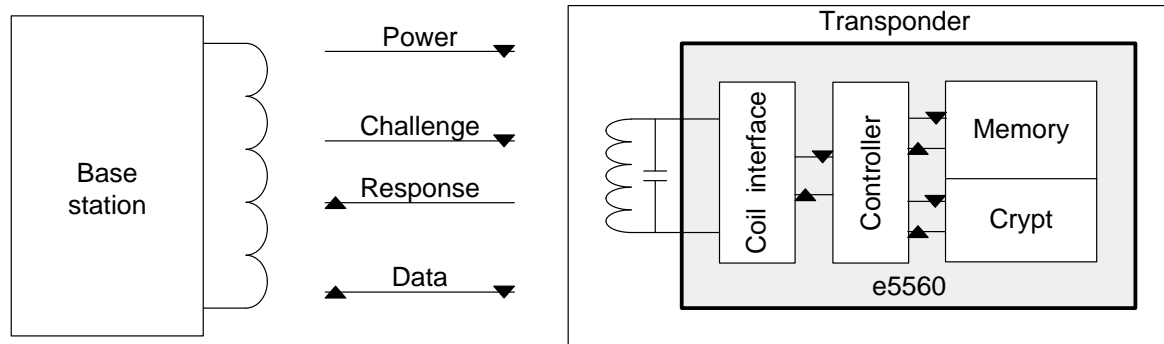
Authentication Procedures

For authentication, the base station transmits a random number to the e5560. This challenge is encrypted by both, IC and base station. As both should possess the same secret key, the results of this encryption are expected to be equal.

To authenticate the transponder, the IC's results are transmitted to the base station for comparison (response). The e5560 can also check a response from the base station for authentication.

Features

- Low power, low voltage CMOS IDIC[®]
- Contactless power supply
- Contactless read/ write data transmission
 - Read: damping load (typ: 1 to 16 kbit/s)
 - Write: field gaps (typ: ~2 kbit/s)
- Radio Frequency (RF) range: 100 to 150 kHz
- 1024 bit EEPROM memory
 - 768 bits free for user data (= 96 byte)
 - 256 bits for encryption (also for user data)
 - lockable memory blocks
- On-chip crypt algorithm for authentication
- Encryption time < 100 ms
- Options set by EEPROM:
 - Bitrate [bit/s]: RF/8, RF/16, RF/32, RF/40, RF/50, RF/64, RF/100, RF/128
 - Modulation: BIN, FSK, PSK, Manchester, Biphase
 - Other: Answer_on_Request, Password_Mode
- Packaging
 - Bare die
 - Plastic transponder (12 × 6 × 3 mm³)
- Applications:
 - Access control
 - Car immobilizer
 - Identification of valuable goods
 - Applications with high memory demand



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Figure 1. Transponder system example using e5560

Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

TEMIC TELEFUNKEN microelectronic GmbH semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

TEMIC can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use TEMIC products for any unintended or unauthorized application, the buyer shall indemnify TEMIC against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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