



TDA18212HN

Silicon Tuner for terrestrial and cable digital TV reception

Rev. 2 — 12 August 2010

Product data sheet

1. General description

The TDA18212HN is a Silicon Tuner designed for terrestrial and cable TV reception for digital signals. TDA18212HN/M (Master) is to be used as a stand-alone tuner IC or Master in dual tuner application. TDA18212HN/S (Slave) is only to be used as Slave Silicon Tuner in dual tuner application.

The TDA18212HN supports all digital TV standards and delivers a LOW IF (LIF) signal to a channel demodulator for digital TV.

The TDA18212HN facilitates design-ins by:

- Allowing easy on-board integration
- Drastically reducing the size of the tuner function
- Providing flexibility in system solution development
- Allowing straightforward dual tuner applications optimization

2. Features and benefits

- Fully integrated IF selectivity; eliminating the need for external SAW filters
- Worldwide digital terrestrial and cable including A74
- Fully integrated oscillators
- Alignment free
- Single 3.3 V supply voltage
- Low power consumption
- Integrated wideband gain control
- Crystal oscillator output buffer (16 MHz) for single crystal applications
- I²C-bus interface compatible with 3.3 V microcontrollers
- Slave tuner output function to drive second (slave) Silicon Tuner
- Easy programming
- 5 ms tuning time
- LIF channel center frequency output ranging from 3 MHz to 5 MHz
- 1.7 MHz, 6 MHz, 7 MHz, 8 MHz and 10 MHz channel bandwidths
- Ready for DVB-T2
- Loop-Through (LT)
- RoHS compliant



3. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|------------------------------|--------------------------------------------------------------------------------|-----|-----|-----|------------|
| f_{RF} | RF frequency | full range of RF input | 42 | - | 870 | MHz |
| NF_{tun} | tuner noise figure | 75 Ω source; maximum gain | - | 5.0 | 5.6 | dB |
| ϕ_{jit} | phase jitter | UHF; integrated from 250 Hz to 4 MHz | - | 0.4 | 0.6 | degree |
| α_{image} | image rejection | worst case for image rejection and 4 MHz IF frequency for levels above -50 dBm | 55 | 63 | - | dB |
| ICP_{1dB} | 1 dB input compression point | at tuner input and minimum gain | 124 | - | - | dB μ V |

4. Ordering information

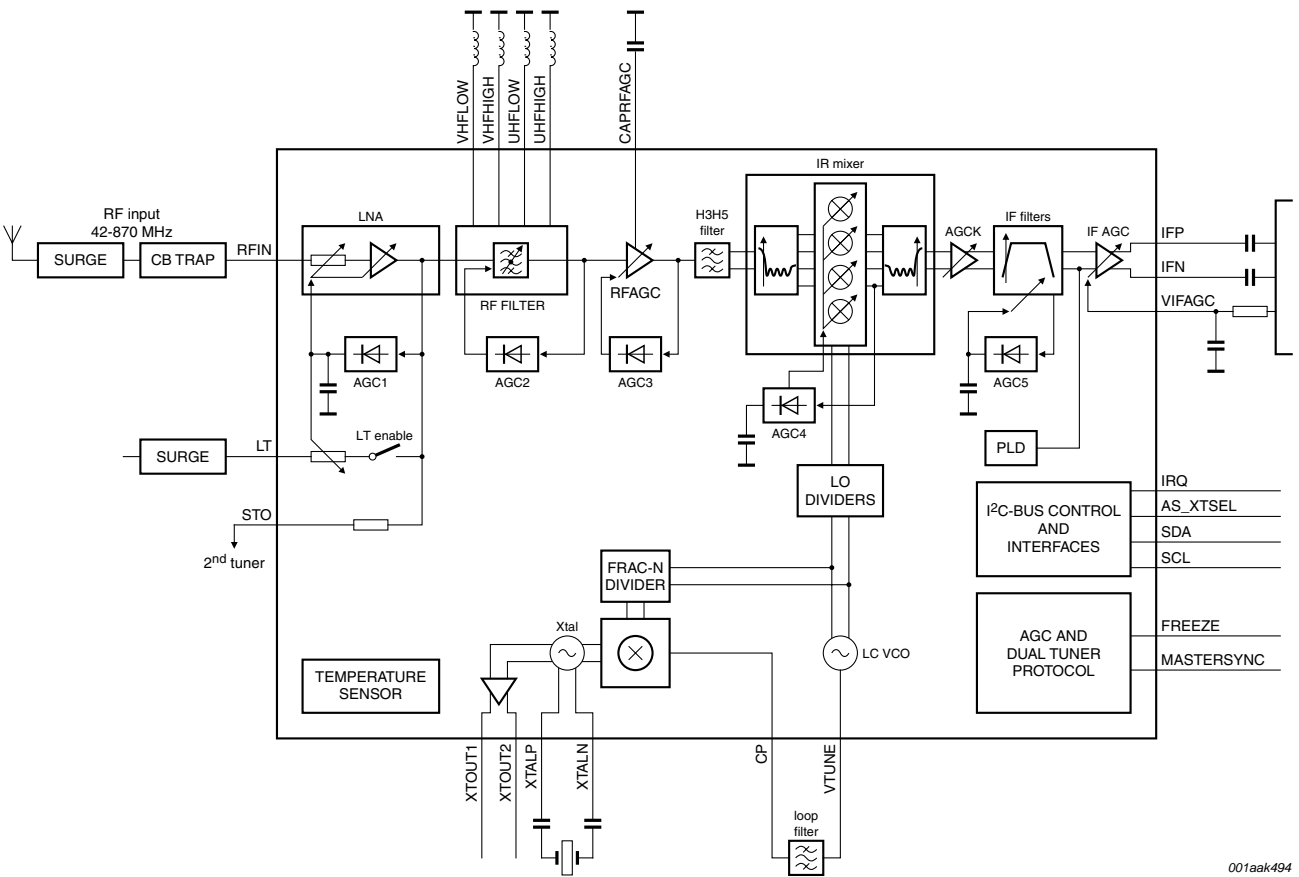
Table 2. Ordering information

| Type number | Package | | |
|--------------------------------|---------|----------------------------------------------------------------------------------------------------|----------|
| | Name | Description | Version |
| TDA18212HN/M/C1 ^[1] | HVQFN40 | plastic thermal enhanced very thin quad flat package; no leads; 40 terminals; body 6 × 6 × 0.85 mm | SOT618-1 |
| TDA18212HN/S/C1 ^[2] | | | |

[1] M for master.

[2] S for slave.

5. Block diagram



001aak494

Fig 1. Block diagram TDA18212HN/M

6. Limiting values

Table 3. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|---------------------------------|---------------------------------------|------|----------------|------|
| V_{CC} | supply voltage | | -0.3 | +3.6 | V |
| V_I | input voltage | pins SDA and SCL | -0.3 | +3.6 | V |
| | | all other pins: | | | |
| | | $V_{CC} < 3.3$ V | -0.3 | $V_{CC} + 0.3$ | V |
| | | $V_{CC} > 3.3$ V | -0.3 | +3.6 | V |
| T_{stg} | storage temperature | | -40 | +150 | °C |
| T_j | junction temperature | | - | 125 | °C |
| T_{amb} | ambient temperature | | -20 | [1] | °C |
| V_{ESD} | electrostatic discharge voltage | EIA/JESD22-A114 (human body model) | -2 | +2 | kV |
| | | EIA/JESD22-C101-C (FCDM) class III[2] | 750 | - | V |

[1] The maximum allowed ambient temperature $T_{amb(max)}$ depends on the assembly conditions of the package and especially on the design of the Printed-Circuit Board (PCB) and die connection. The application mounting must be done in such a way that the maximum junction temperature is never exceeded. The junction temperature can be obtained by reading the temperature sensor bit via I²C-bus. The junction temperature: $T_j = T_{amb} + \Delta T_{j-c}$, where $\Delta T_{j-c} = power \times R_{th}$.

[2] Class III: 500 V to 1000 V

7. Abbreviations

Table 4. Abbreviations

| Acronym | Description |
|--------------|--------------------------------------------------------------|
| AGC | Automatic Gain Control |
| AGCK | Automatic Gain Control number K |
| CB | Citizens' Band |
| DTMB | Digital Terrestrial Multimedia Broadcast |
| DVB | Digital Video Broadcasting |
| DVB-T/T2/C/H | DVB-Terrestrial/Terrestrial second generation/Cable/Handheld |
| ESD | ElectroStatic Discharge |
| EU | European Union |
| FCDM | Field-Induced Charged-Device Model |
| FRAC-N | FRActional-N |
| IC | Integrated Circuit |
| IF | Intermediate Frequency |
| IR | Image Rejection |
| ISDB-T | Integrated Services Digital Broadcasting - Terrestrial |
| LC-VCO | Inductors and Capacitors - Voltage Controlled Oscillator |
| LNA | Low-Noise Amplifier |
| LO | Local Oscillator |
| LT | Loop-Through |
| RF | Radio Frequency |

Table 4. Abbreviations ...continued

| Acronym | Description |
|---------|-------------------------------------|
| RoHS | Restriction on Hazardous Substances |
| SAW | Surface Acoustic Wave |
| STO | Slave Tuner Output |
| UHF | Ultra High Frequency |
| US | United States |
| VCO | Voltage Controlled Oscillator |
| VHF | Very High Frequency |

8. Revision history

Table 5. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------------------------|--------------|--------------------|---------------|------------|
| TDA18212HN_SDS v.2 ^[1] | 20100812 | Product data sheet | - | - |

[1] Revision 1 is not available.

9. Legal information

9.1 Data sheet status

| Document status ^{[1][2]} | Product status ^[3] | Definition |
|-----------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

9.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between NXP Semiconductors and its customer, unless NXP Semiconductors and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the NXP Semiconductors product is deemed to offer functions and qualities beyond those described in the Product data sheet.

9.3 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

In no event shall NXP Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, NXP Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the *Terms and conditions of commercial sale* of NXP Semiconductors.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or

malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using NXP Semiconductors products, and NXP Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using NXP Semiconductors products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). NXP does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nxp.com/profile/terms>, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. NXP Semiconductors hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of NXP Semiconductors products by customer.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from national authorities.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

Non-automotive qualified products — Unless this data sheet expressly states that this specific NXP Semiconductors product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. NXP Semiconductors accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without NXP Semiconductors' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond NXP Semiconductors' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies NXP Semiconductors for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond NXP Semiconductors' standard warranty and NXP Semiconductors' product specifications.

10. Contact information

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

9.4 Licenses

ICs with DVB-T or DVB-T2 functionality

Use of this product in any manner that complies with the DVB-T or the DVB-T2 standard may require licenses under applicable patents of the DVB-T respectively the DVB-T2 patent portfolio, which license is available from Sisvel S.p.A., Via Sestriere 100, 10060 None (TO), Italy, and under applicable patents of other parties.

9.5 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

I²C-bus — logo is a trademark of NXP B.V.

Silicon Tuner — is a trademark of NXP B.V.

11. Tables

| | | | |
|-----------------------------------------|---|-------------------------------------|---|
| Table 1. Quick reference data | 2 | Table 4. Abbreviations | 5 |
| Table 2. Ordering information | 2 | Table 5. Revision history | 6 |
| Table 3. Limiting values | 5 | | |

12. Figures

| | |
|---------------------------------------------|---|
| Fig 1. Block diagram TDA18212HN/M. | 3 |
| Fig 2. Block diagram TDA18212HN/S | 4 |

13. Contents

| | | |
|-----------|------------------------------------|-----------|
| 1 | General description | 1 |
| 2 | Features and benefits | 1 |
| 3 | Quick reference data | 2 |
| 4 | Ordering information | 2 |
| 5 | Block diagram | 3 |
| 6 | Limiting values | 5 |
| 7 | Abbreviations | 5 |
| 8 | Revision history | 6 |
| 9 | Legal information | 7 |
| 9.1 | Data sheet status | 7 |
| 9.2 | Definitions | 7 |
| 9.3 | Disclaimers | 7 |
| 9.4 | Licenses | 8 |
| 9.5 | Trademarks | 8 |
| 10 | Contact information | 8 |
| 11 | Tables | 9 |
| 12 | Figures | 9 |
| 13 | Contents | 10 |

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

© NXP B.V. 2010.

All rights reserved.

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 12 August 2010

Document identifier: TDA18212_SDS