

## AM/FM car radio Front-End receiver for IF sampling tuners

Data Brief

### Feature summary

- High-performance AM/FM front-end chip for if sampling car-radio tuners
- Compatible with AM (LW, MW, SW) / FM (EU, US, JAPAN, OIRT) / WEATHER BAND / HD radio / DRM applications
- Ready for multi-tuner applications (phase diversity, background tuner)
- Image rejection FM mixer with dual input specialized for different front-end circuits
- Integrated AM preamplifier and tank for lower-cost applications
- Image rejection AM mixer
- Fully integrated fractional tuning PLL with two  $V_{CO}$ 's for diversity systems
- world tuning-capable
- Integrated if tank
- If amplifier with agc with four inputs for connection of up to four ceramic filters
- Fully electronically adjustable
- I<sup>2</sup>C /SPI controlled

### Description

The TDA7528 is a frontend module for use in car radio receivers on the 50kHz - 108MHz and 161MHz - 163 MHz frequency bands. Its field of use includes all the current radio broadcast services worldwide for AM radio (long, medium and short wave), FM radio (US, European, Japanese and OIRT bands) and US weather band. Digital standards such as DRM and HD radio (IBOC) can also be handled.



The system is designed to be single super-heterodyne with an intermediate frequency of 10.7 MHz. The IF signal is digitized, filtered and demodulated in the appropriate STA3005 backend IC.

The combination of two independently-operating frontends with the STA3005 backend makes DDA (Digital Directional Antenna) operation possible or the simultaneous reception of two freely-selectable frequencies with any combination of types of demodulation.

The TDA7528 frontend IMR mixer has separate input and output stages for AM frequency bands up to 30MHz (narrowband services) and for FM frequencies above 30MHz (broadband signals). As an option, the AM path can be operated with an integrated preamplifier stage and an integrated low-pass filter to reduce interfering input signals on the IF and image frequencies. The FM mixer has two inputs: the more sensitive (lower noise) input is intended for use with a low-gain, passive pre-selection stage; the second input is intended for use with an active preamplifier stage yielding a high level signal calling for a higher IP3.

### Order codes

Part number	Package	Packing
TDA7528	LQFP64	Tube

---

## Description (continued)

The mixer outputs have a single ended low impedance design to drive one or two IF filters with different bandwidths. A switchable-gain IF amplifier, independent IF AGC and an integrated anti-aliasing stage drive the IF A/D converter of the STA3005 backend. Programmable RF AGCs to actuate adjustable preamplifier stages and two D/A converters for tuning external filter stages complete the reception path.

Two fully integrated VCOs are included in the TDA7528, oscillating in a range around 3.7 GHz and 4.7 GHz respectively. The output signal of the selected VCO drives a programmable divider generating the LO signal for the mixer stage. The PLL, integrated with the exception of the loop filter, allows reception on all the above-mentioned frequencies, swift frequency changes in the standard tuning steps of 50 kHz for FM, 9 or 10 kHz for LW and MW and 5 kHz for SW. The smallest available tuning steps are 12.5 kHz for FM and 1 kHz for all AM bands.

The TDA7528 frontend is controlled by a serial command interface, switchable between SPI and I2C protocol. The external reference clock source is typically 74.1 MHz and intended to be generated within the STA3005 back-end. However, the TDA7528 also features its own reference oscillator typically intended to use a crystal at 74.4 MHz.

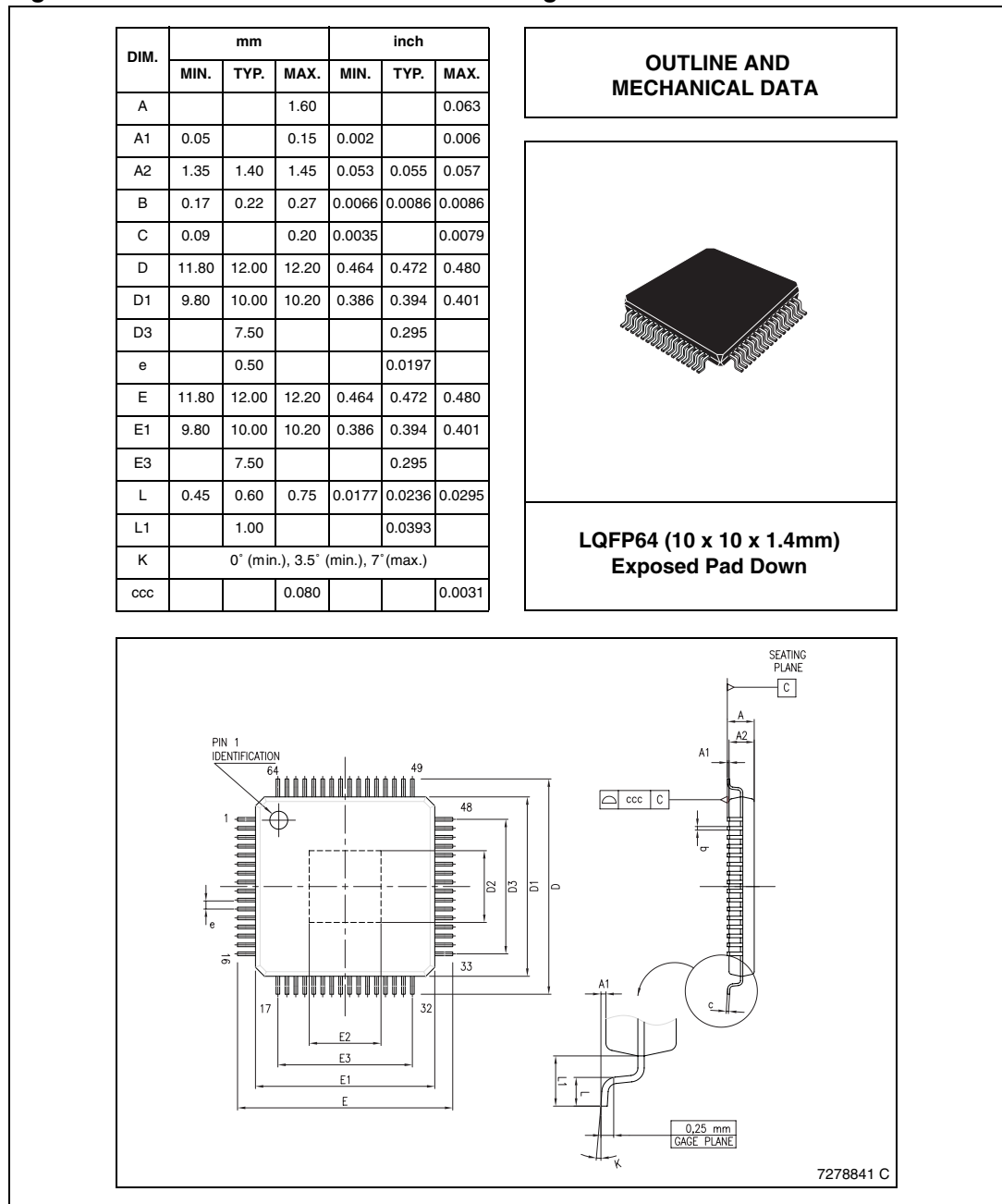
All the necessary calibration steps can be carried out electronically during production. An integrated temperature sensor facilitates the adaptation of various parameters during operation, like IF gain or AGC threshold.

# Package informations

In order to meet environmental requirements, ST offers this device in ECOPACK<sup>®</sup> packages. These packages have a Lead-free second level interconnect. The category of second level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark.

ECOPACK specifications are available at: [www.st.com](http://www.st.com).

**Figure 1. LQFP64 Mechanical Data & Package Dimensions**



## Revision history

**Table 1. Document revision history**

Date	Revision	Changes
28-Jun-2006	1	Initial release.

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED REPRESENTATIVE OF ST, ST PRODUCTS ARE NOT DESIGNED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS, WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2006 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)