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**RF front-end for AM/FM-DSP car radios with IF sampling**

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**Features**

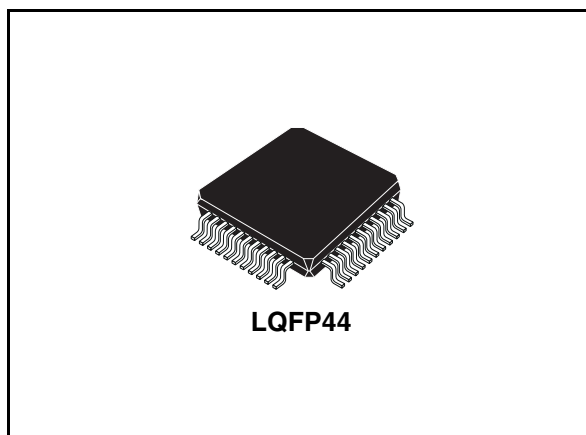
- RF AGC generation by RF and IF detection
- I/Q Mixer for FM IF 10.7MHz with image rejection and programmable IF tank adjust for FM and AM
- Preamplifier and mixer for IF 10.7MHz AM upconversion
- VCO and programmable divider for “world receiver”
- Programmable controlled IF-gain stage
- High performance fast PLL for RDS-system
- Electronic alignment for the preselection stages
- All functions bus-controlled

**Description**

The front-end is a high performance tuner circuit for AM/FM - DSP car radios with 10.7MHz - IF sampling.

**Order codes**

| Part numbers | Package                | Packing       |
|--------------|------------------------|---------------|
| TDA7515      | LQFP44 (10x 10x 1.4mm) | Tray          |
| TDA7515TR    | LQFP44 (10x 10x 1.4mm) | Tape and reel |



It contains mixer and IF amplifiers for AM and FM, VCO and PLL synthesizer on a single chip.

Use of BICMOS technology allows the implementation of several tuning functions and a minimum of external components.



**Table 1. Pin description**

| Pin No. | Pin Name   | Function  |
|---------|------------|---|
| 1       | AMRFAGCin  | AM AGC input for RF detection                                 |
| 2       | AMRFAGCout | AM AGC output for RF AGC                                      |
| 3       | AMPINDR    | AM AGC pin-diode driver                                       |
| 4       | FMPINDR    | FM AGC pin-diode driver                                       |
| 5       | FMIN1      | FM mixer input 1  |
| 6       | RFGND      | RF ground   |
| 7       | FMIN2      | FM mixer input 2  |
| 8       | FMAGCTC    | FM AGC time constant  |
| 9       | TV1        | Tuning voltage 1 output                                       |
| 10      | TV2        | Tuning voltage 2 output                                       |
| 11      | VCCVCO     | Supply voltage VCO  |
| 12      | GNDVCO     | VCO ground  |
| 13      | VCOB       | Base VCO  |
| 14      | VCOE       | Emitter VCO   |
| 15      | VPLL       | PLL supply voltage  |
| 16      | LPAM/SW    | OP AMP input to PLL loop filter AM / switch output (optional) |
| 17      | LPOUT      | OPAMP output to PLL loop filter                               |
| 18      | LPREF      | Voltage reference for PLL                                     |
| 19      | LPFM       | OP AMP input to PLL loop filter FM                            |
| 20      | LPHC       | High current PLL loop filter                                  |
| 21      | GNDPLL     | PLL ground  |
| 22      | SCL        | Bus connection (IIC clock)                                    |
| 23      | SDA        | Bus connection (IIC data)                                     |
| 24      | IFAMAGCTC  | Time constant for AM IF AGC                                   |
| 25      | Fref-      | Reference frequency input                                     |
| 26      | Fref+      | Reference frequency input                                     |
| 27      | Vref       | Reference voltage 5V  |
| 28      | DAGC       | Digital keying AGC input                                      |
| 29      | IFGND      | IF ground   |
| 30      | IFOUT2     | IF amplifier output   |
| 31      | IFOUT1     | IF amplifier output   |
| 32      | VCCIF      | Supply voltage for IF output                                  |
| 33      | IFAGCTC    | IF AGC time constant  |
| 34      | VCC        | Supply voltage  |
| 35      | IFINAM     | IF input for narrowband AM                                    |
| 36      | GND        | Ground  |
| 37      | IFIN1      | IF Input - signal   |
| 38      | IFIN2      | IF Input - blocked  |
| 39      | MIXOUT1    | Mixer output  |
| 40      | MIXOUT2    | Mixer output  |
| 41      | AMAGCTC    | AM AGC time constant  |
| 42      | FMIFAGCin  | IF input for FM AGC   |
| 43      | AMIN2      | AM RF input   |
| 44      | AMIN1      | AM RF input   |

## 2 Electrical specifications

### 2.1 Thermal data

Table 2. Thermal data

| Symbol        | Parameter           | Values |      |      | Unit |
|---------------|---------------------|--------|------|------|------|
|               |                     | Min.   | Typ. | Max. |      |
| $R_{th(j-a)}$ | Thermal resistance  |        |      | 85   | °C/W |
| $T_{amb}$     | Ambient temperature | -40    |      | 85   | °C   |
| $T_{stg}$     | Storage temperature | -55    |      | 150  | °C   |

### 2.2 Absolute maximum ratings

Table 3. Absolute maximum ratings

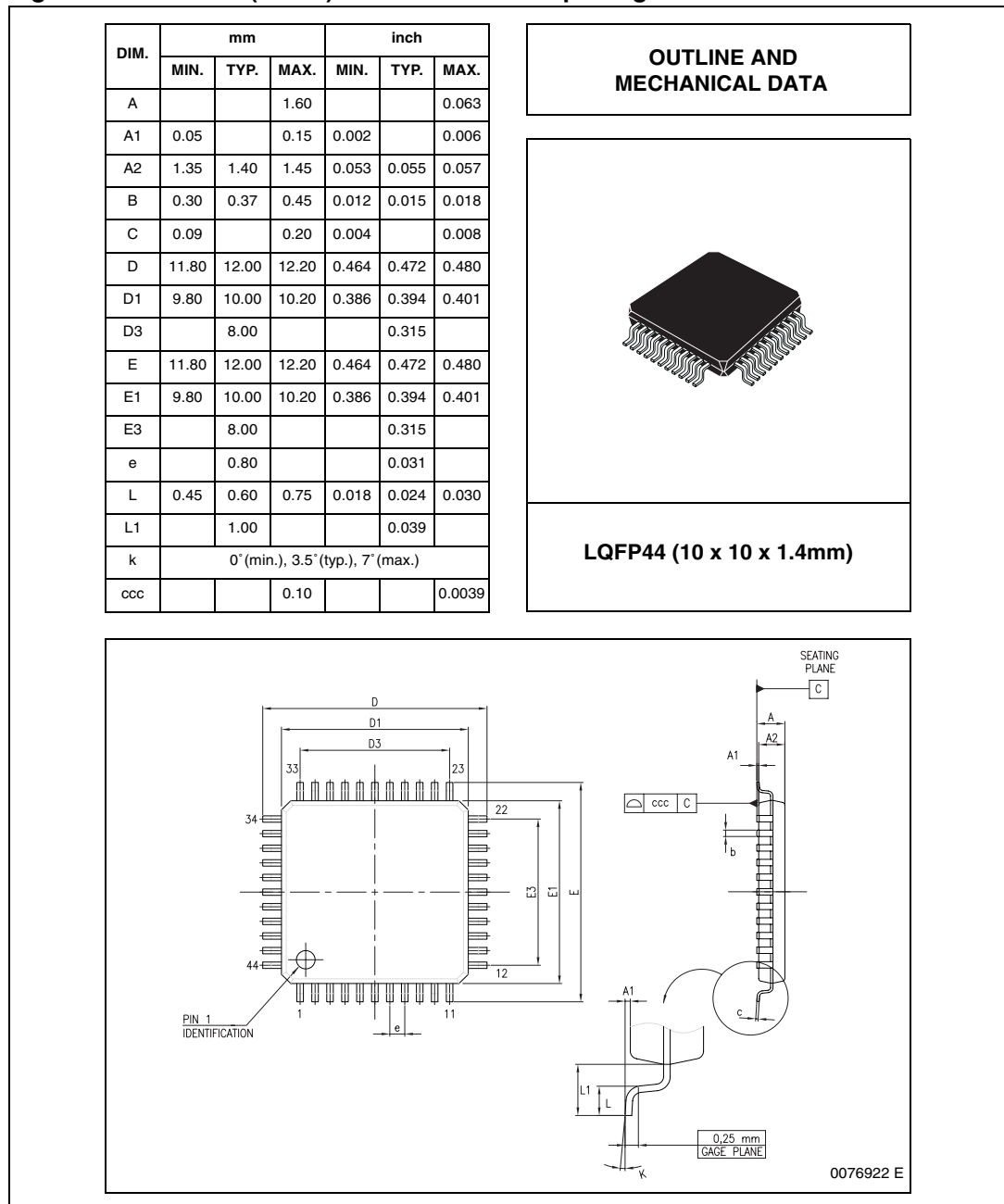
| Symbol          | Parameter                       | Value | Unit |
|-----------------|---------------------------------|-------|------|
| $V_{CCIF}$      | Supply voltage for IF-interface | 12    | V    |
| $V_{PLL}$       | PLL supply voltage              | 12    | V    |
| $V_{CCVCO}$     | VCO supply voltage              | 12    | V    |
| $V_{CC}$        | Supply voltage                  | 12    | V    |
| $V_{MIXOUT1/2}$ | Open collector voltage          | 12    | V    |

### 3 Package information

In order to meet environmental requirements, ST offers these devices in ECOPACK® 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 3. LQFP44 (10x10) Mechanical data & package dimensions**



## 4 Revision history

**Table 4. Document revision history**

| Date        | Revision | Changes   |
|-------------|----------|---|
| 24-Jan-2006 | 1        | Initial release.                                    |
| 24-Nov-2006 | 2        | Package changed, layout changes, text modification. |

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