



# Zero-IF Tuner IC for Direct Broadcast Satellite

## ITD1000

### FEATURES

**Single chip synthesized Zero-IF tuner for satellite receiver**  
**DVB-S, DSS compliant, 950 to 2150 MHz range**  
**Low noise figure: 5 dB**  
**Operating dynamic range -75 to -10 dBm**  
**Compatible with DVB variable symbol rate 1 ~ 45 Msps**  
**Ultra low power consumption:  $I_{CC} < 140$  mA @ 1.8 V supply**  
**Fully programmable bandwidth channel select filter:**  
     **Bandwidth 5 ~ 40 MHz**  
**On chip loop through amplifier**  
**20-bit sigma-delta fractional-N PLL exhibits 30 Hz fine frequency resolution**  
**On-chip low phase noise and wide frequency range VCO eliminates external tank circuits**  
**On-chip linear voltage regulators for single supply application**  
**No external capacitors to remove DC-offset**  
**Additional clock output for demodulator**  
**I<sup>2</sup>C serial bus interface**  
**Small 32 MLF package (5 × 5 mm<sup>2</sup>)**

### GENERAL DESCRIPTION

The ITD1000 is a highly integrated single chip zero-IF tuner for digital broadcasting system-satellite (DBS, DVB-S, DSS). It operates from 950 to 2150 MHz for full DVB-S and DSS standard. It includes an LNA/AGC and direct conversion down mixers and PLL/VCO. A loop through amplifier is also integrated to remove additional discrete RF transistors and passive components. On-chip low phase noise VCO, which eliminates external tank circuits, generates In-phase and Quadrature-phase local oscillation signal for the entire frequency range. For optimized performance with variable symbol rate, baseband channel select filters are fully programmable and their cutoff frequency is digitally tuned to 5 MHz to 40 MHz. The ITD1000 also includes high dynamic range baseband variable gain amplifier. A low noise amplifier and optimized gain control scheme enable wide dynamic range operation.

### FUNCTIONAL BLOCK DIAGRAMS

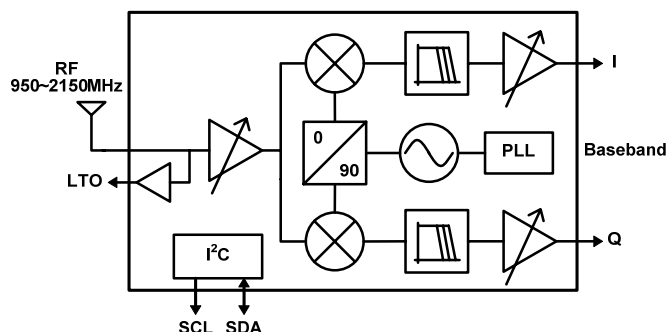


Figure 1.

### APPLICATIONS

**Digital Satellite Receiver and Set-Top Boxes**  
**Digital Satellite TV**  
**Low Power Portable Satellite Receiver**

The ITD1000 exhibits a low power consumption about 270 mW, while conventional tuners consume over 1 watt. And power down function reduces the standby mode current consumption for power hungry system. The Zero-IF IC has on-chip voltage regulator for single power supply application. Using small leadless 32-MLF package, The ITD1000 is the best solution for highly integrated multi-tuner system and portable application where low power consumption is required. ITD1000 has an industry standard I<sup>2</sup>C serial bus interface. Primary application of the ITD1000 is the direct broadcast satellite (DBS).

#### Rev. B

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