

### Description

The Si2176 integrates a complete hybrid tuner with analog TV demodulator supporting all worldwide terrestrial and cable TV standards. Leveraging Silicon Labs' field proven digital low-IF architecture, the Si2176 maintains the unmatched performance and design simplicity of the Si2173 while further reducing footprint size and bill of materials cost. No external LNAs, tracking filters, wirewound inductors or SAW filters are used.

Compared with competing silicon tuners and discrete MOPLL-based tuners, the Si2176 delivers superior picture quality and a higher number of received stations in crowded and near/far real-world reception conditions. The high linearity and low noise RF front-end delivers superior blocking performance and higher sensitivity in the presence of strong undesired channels and interference.

The Si2176 integrates the complete signal path from antenna input to IF incorporating Silicon Labs' third generation field-proven analog demodulator to provide analog video and sound outputs. Compared to traditional discrete MOPLL-based tuners, the Si2176 eliminates hundreds of external components including external LNAs, tracking filter varactors and inductors (unlike competing silicon tuners), and SAW filters, resulting in the simplest, lowest-cost BOM for a hybrid TV tuner.

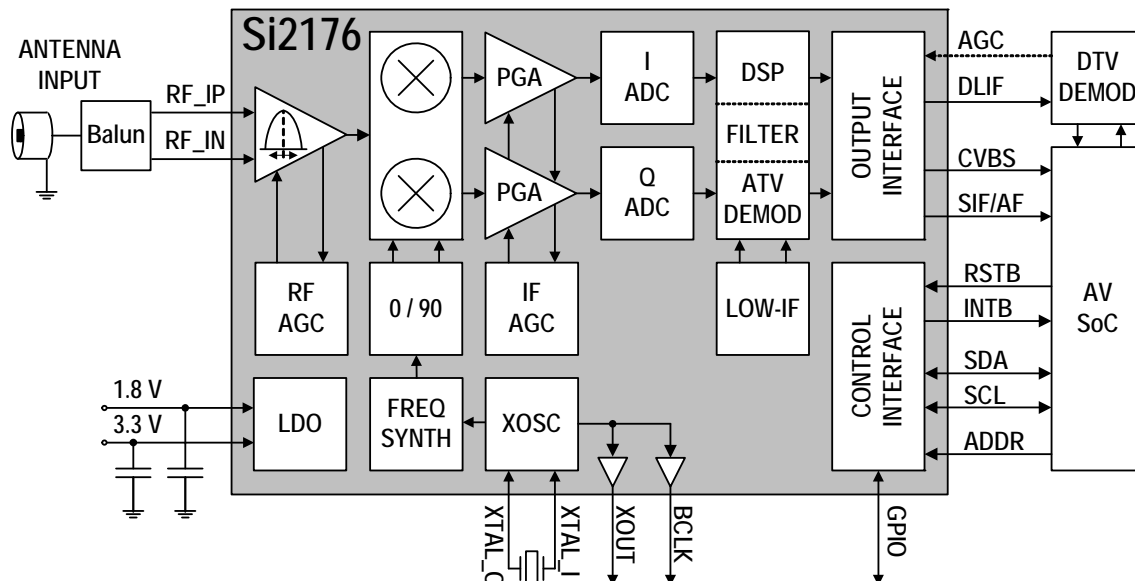
Interfacing the Si2176 seamlessly with the Si2165 DVB-T/C demodulator creates a complete terrestrial and cable hybrid PAL/SECAM and DVB-T/C receiver.

### Features

- Worldwide hybrid TV tuner
  - Analog TV: NTSC, PAL/SECAM
  - Digital TV: ATSC/QAM, DVB-T/T2/C, ISDB-T/C, DTMB
  - 42–1002 MHz frequency range
- Compliance to A/74, NorDig, D-Book, C-Book, ARIB, EN55020, OpenCable™ specifications
- Best-in-class real-world reception
  - Exceeds discrete MOPLL-based tuners
- Highly integrated, lowest BOM
  - No SAW filters or wirewound inductors required
  - Integrated LNAs and complete tracking filters
- No alignment, tuning or calibration required
- Digital low-IF architecture
  - Integrated channel select filters
- Analog TV demodulator
  - Superior video SNR performance
  - Overmodulation and ICPM tolerant
- Customizable ATV and DTV channel filters
- Flexible output interface
  - CVBS + SIF/AF to audio/video processor or SoC
  - DLIF to digital TV demodulator or SoC
- 3.3 and 1.8 V power supplies
- Standard CMOS process technology
- 5 x 5 mm, 32-pin QFN package
- RoHS compliant

### Applications

- Hybrid ½-NIM, ¾-NIM and full-NIM
- iDTV (Integrated Digital TV)
- Digital terrestrial and cable STB
- Hybrid PVR and DVD recorder



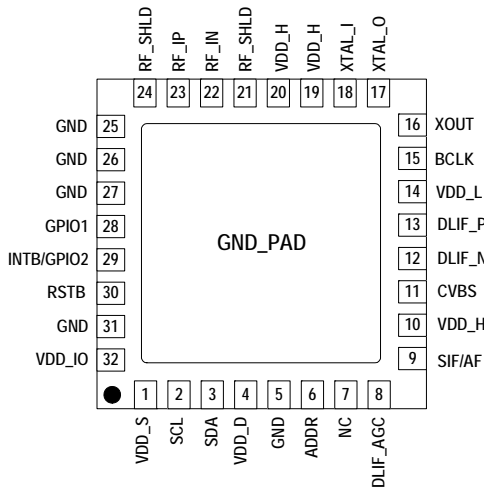
### Selected Electrical Specifications

( $V_{DD\_H} = 3.3\text{ V}$ ,  $V_{DD\_L} = 1.8\text{ V}$ ,  $V_{DD\_D} = 1.8\text{ V}$ ,  $T_A = 25\text{ }^\circ\text{C}$ )

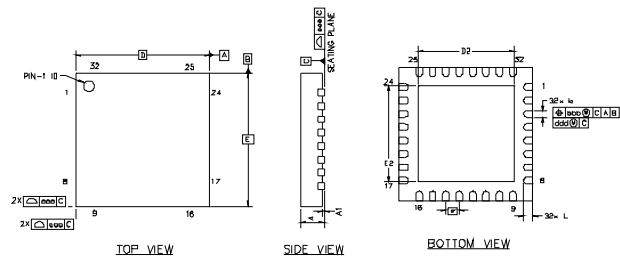
| Parameter                              | Test Condition                                | Typ                          | Unit              |
|--|---|------------------------------|-------------------|
| Supply Voltage                         |   | 1.8 and 3.3                  | V                 |
| Total Power Consumption                | VHF bands   UHF bands                         | 0.98   0.87                  | W                 |
| RF Input Frequency Range               |   | 42 to 1002                   | MHz               |
| Noise Figure*                          | max gain                                      | 4.0                          | dB                |
| Wideband IIP3*                         | $N_{\pm 18, \pm 36}$ ; max RF gain            | +18                          | dBm               |
| Inband IIP3*                           | $N_{\pm 1, \pm 2}$ ; max RF gain              | -7                           | dBm               |
| LO Phase Noise at 860 MHz              | 125 Hz   250 Hz   1 kHz   10 kHz   100 kHz    | -83   -91   -96   -95   -104 | dBc/Hz            |
| LO Integrated Phase Noise at 860 MHz   | DSB: 125 Hz to 4 MHz                          | 0.4<br>(-43)                 | deg. rms<br>(dBc) |
| Adjacent Channel Attenuation           | $N_{\pm 1}$ ; RF input* to DLIF output        | 80                           | dB                |
| ATV Receiver Sensitivity               | 30 dB video SNR; M/N   B/G, D/K   I   L/L'    | -67.5   -67   -66   -68      | dBm               |
| ATV Receiver Unweighted Video SNR      | +1 dBm input level; M/N   B/G, D/K   I   L/L' | 55.5   55   53.5   56.5      | dB                |
| DLIF Output Center Frequency           | channel BW = 6 MHz   7 MHz   8 MHz            | 4 to 7   4.5 to 6.5   5 to 6 | MHz               |
| DLIF Differential Output Voltage Swing | programmable                                  | 0.5 to 2.0                   | $V_{ppd}$         |

\*Note: Measured at the F-connector input of the Si2176 reference design and includes all connector, PCB, and front-end circuit losses.

### Pin Assignments



### 5 x 5 mm QFN-32 Package



| Symbol | Min      | Nom  | Max  | Unit |
|--------|----------|------|------|------|
| A      | 0.80     | 0.85 | 0.90 | mm   |
| D, E   | 5.00 BSC |      |      | mm   |
| e      | 0.50 BSC |      |      | mm   |

### Selection Guide

| Part # | Description  |
|--------|--|
| Si2176 | Worldwide hybrid TV tuner IC with analog demodulator for NTSC, PAL/SECAM, ATSC/QAM, DVB-T/T2/C, ISDB-T/C, DTMB |