

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.

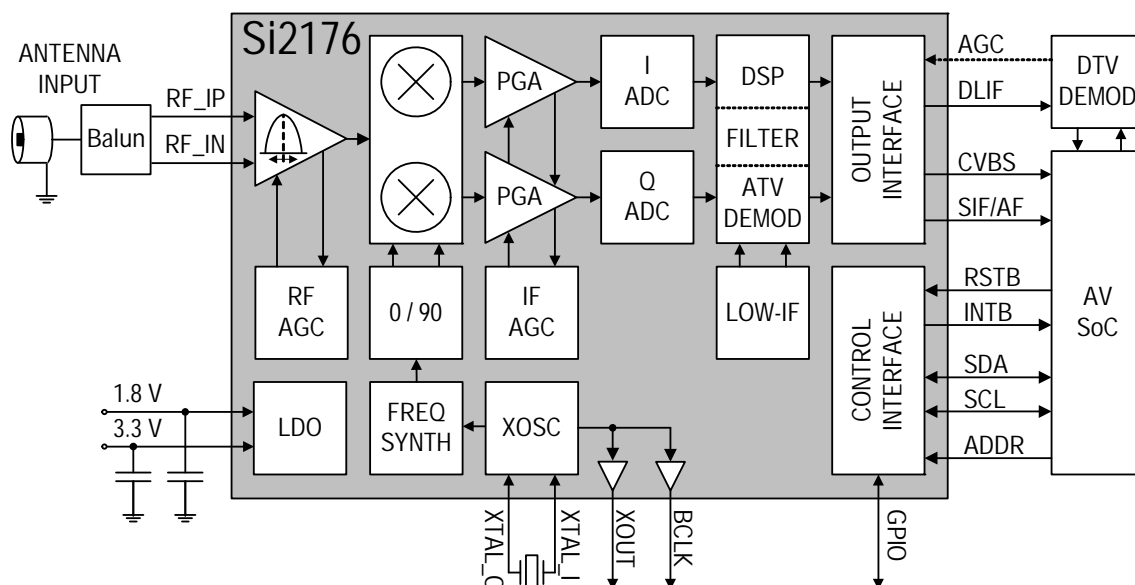
Interfacing the Si2176 seamlessly with the Si2165 DVB-T/C demodulator creates a complete terrestrial and cable hybrid PAL/SECAM and DVB-T/C receiver.

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



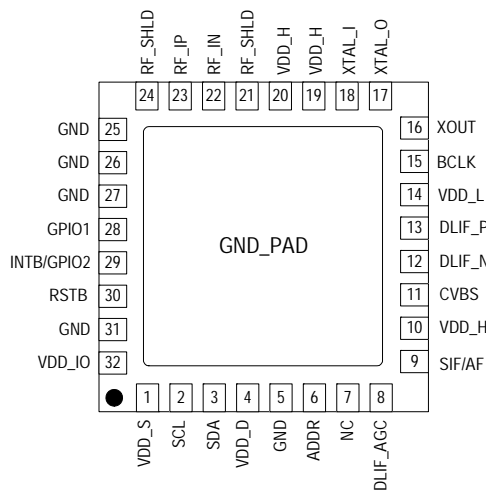
Selected Electrical Specifications

($V_{DD_H} = 3.3\text{ V}$, $V_{DD_L} = 1.8\text{ V}$, $V_{DD_D} = 1.8\text{ V}$, $T_A = 25\text{ }^{\circ}\text{C}$)

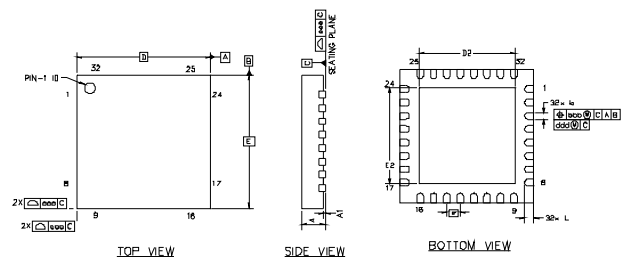
Parameter	Test Condition	Typ	Unit
Supply Voltage		1.8 and 3.3	V
Total Power Consumption	VHF bands UHF bands	0.98 0.87	W
RF Input Frequency Range		42 to 1002	MHz
Noise Figure*	max gain	4.0	dB
Wideband IIP3*	$N_{\pm 18, \pm 36}$; max RF gain	+18	dBm
Inband IIP3*	$N_{\pm 1, \pm 2}$; max RF gain	-7	dBm
LO 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 (-43)	deg. rms (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