

Description

The Si2169B integrates DVB-T2, DVB-T, DVB-C, DVB-S, and DVB-S2 digital demodulators into a single advanced CMOS technology mixed-signal die for next generation terrestrial, cable, and satellite TV standards. Leveraging Silicon Labs' proven digital demodulation architecture, the Si2169B achieves excellent reception performance for each media while significantly minimizing front-end design complexity, cost, and power dissipation. Connecting the Si2169B to a terrestrial and cable hybrid TV tuner or digital only tuner, such as Silicon Labs' Si2178/58/48 devices, results in a high-performance and cost optimized TV front-end solution.

Silicon Labs internally developed DVB-T2, including T2-Lite, demodulator can accept a standard IF (36 MHz) or low-IF input and support all modes specified by the DVB-T2 standard. Main features of the DVB-T2 mode are 256 QAM with rotated constellations, SISO and MISO support, FEC management, fully autonomous signal acquisition including automatic L1 signaling parsing, 600 kHz acquisition range, support for all pilot patterns, and DVB-T2/T auto-detection. The DVB-T and DVB-C demodulators are enhanced versions of proven and broadly used Si2167B/68/69 Silicon Labs devices.

The satellite demodulation functionality allows demodulating widely deployed DVB-S, DIRECTV™ (DSS) legacy standards, and next generation DVB-S2 (AMC compliant) satellite broadcasts. A zero-IF interface allows for a seamless connection to market proven satellite silicon tuners. Constant coding modulation (CCM), 64800 bits frame, and single TS (broadcast profile) are the main specifications of the DVB-S2 demodulator.

The Si2169B offers an on-chip blind scanning algorithm for DVB-S/S2 and DVB-C standards (as well as blind lock). It also integrates DiSEqC™ 2.0 LNB interface for satellite dish control and an equalizer to compensate for echoes in long cable feeds from the LNB to the satellite tuner RF input.

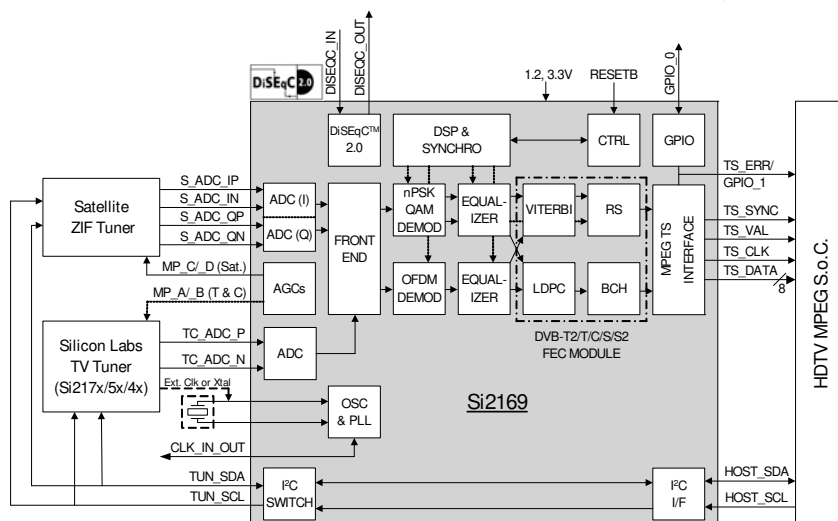
The Si2169B programmable transport stream interface provides a flexible range of output modes and is fully compatible with all MPEG decoders or conditional access modules to support any customer application.

Features

- DVB-T2 and T2-Lite (ETSI EN 302 755-V1.3.1)
 - COFDM demodulator and FEC (LDPC/BCH) decoder
 - Bandwidth: 1.7, 5, 6, 7 or 8 MHz (and extended BW)
 - Supports up to 255 PLPs and outputs the data PLP plus the common PLP (on a single TS)
 - Scrambling of L1 post-signaling supported
 - NorDig Unified 2.4, D-Book 7 V2 compliant
- DVB-T (ETSI EN 300 744)
 - COFDM demodulator and enhanced FEC decoder
 - NorDig Unified 2.4, D-Book 7 V2 compliant
- DVB-C (ETSI EN 300 429) / ITU J.83 Annex A/B/C
 - QAM demodulator and FEC decoder
 - 1 to 7.2 MSymbol/s
 - C-Book compliant
- DVB-S2 (ETSI EN 302 307 and TR102-376)
 - QPSK/8PSK demodulator and FEC (LDPC) decoder
 - 1 to 45 MSymbol/s
- DVB-S (ETSI EN 300 421)
 - QPSK demodulator and enhanced FEC decoder
 - 1 to 45 MSymbol/s
- DiSEqC™ 2.x interface, Unicable support
- Enhanced immunity to co-channel interferers
- I²C serial bus interfaces (master and host)
- Independent differential IF input for T/C tuner and differential ZIF I/Q inputs for satellite tuner
- GPIOs and multi-purpose ports for independent AGCs (up to 4) to control satellite and T/C tuners
- Firmware control for upgradeability
- Flexible TS interface with serial or parallel single output
- Fast lock times for all standards including DVB-T2
- Only two power supplies: 1.2 and 3.3 V
- 7x7 mm, QFN-48 pin package, Pb-free/RoHS compliant
- Pin-to-pin and API compatible with Si2169 and Si2166/67/68B/64/62/60

Applications

- iDTV: on-board or in a NIM
- Advanced multimedia STB
- PC-TV accessories
- PVR, DVD, and Blu-Ray disc recorders



Selected Electrical Specifications

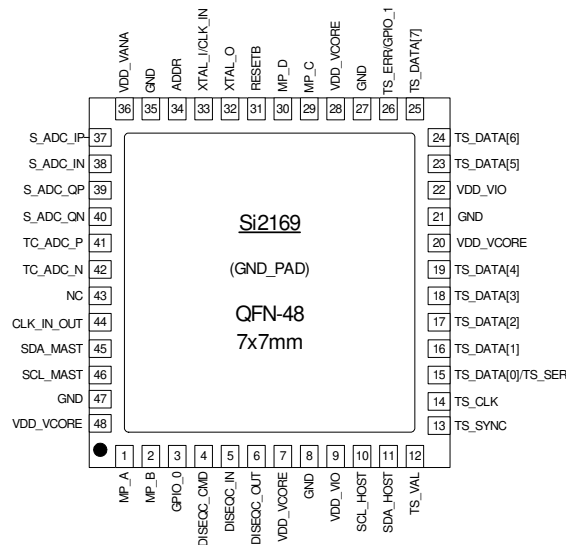
(T_A = -10 to 75 °C).

Parameter	Test Condition	Min	Typ	Max	Unit
General					
Input clock reference		4	—	30	MHz
Supported XTAL frequency		16	—	30	MHz
Total power consumption	DVB-T2 ¹	—	420	—	mW
	DVB-T ² /DVB-C ³	—	190/180	—	mW
	DVB-S ⁴ /DVB-S2 ⁵	—	240/480	—	mW
Thermal resistance (θ _{JA})	2 layer PCB	—	35	—	°C/W
	4 layer PCB	—	23	—	°C/W
Power Supplies					
V _{DD_VCORE}		1.14	1.20	1.30	V
V _{DD_VANA}		3.00	3.30	3.60	V
V _{DD_VIO}		3.00	3.30	3.60	V

Notes:

1. Test conditions: 8 MHz, 256 QAM, 32K FFT, CR=3/5, GI=1/128, PP7, C/N at picture failure.
2. Test conditions: 8 MHz, IF mode, 8K FFT, 64 QAM, parallel TS output.
3. Test conditions: 6.9 Mbaud, IF mode, 256 QAM, parallel TS output.
4. Test conditions: 30 Mbaud, CR=7/8, parallel TS (at QEF: BER = 2 · 10⁻⁴).
5. Test conditions: 32 Mbaud, 3/5 Code Rate, 8PSK, pilots On, parallel TS, C/N at picture failure (PER = 10⁻⁴).

Pin Assignments



Selection Guide

Part #	Description
Si2169-B40-GM/R	Multimedia Digital TV Demodulator for DVB-T2/T/C/S/S2, 7x7 mm QFN-48