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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



Description

The Si2181 integrates digital demodulators for the Japanese and South American terrestrial ISDB-T standard and for all first and second generation DVB standards (DVB-T/C/S/S2 and S2X) in a single advanced CMOS die. Leveraging Silicon Labs' proven digital demodulation architecture, the Si2181 achieves excellent reception performance for each media while significantly minimizing front-end design complexity, cost, and power dissipation. Connecting the Si2181 to a hybrid TV tuner or digital only tuner, such as Silicon Labs' Si217x/5x/4x devices, results in a high-performance and cost optimized TV or STB front-end solution.

Leveraging significant field experience in DVB terrestrial demodulation (DVB-T), Silicon Labs' internally-developed ISDB-T demodulator can accept standard or low-IF inputs (differential) and complies with the Brazilian SBTVD-T terrestrial specifications (ABNT NBR 16.601 and 15.604). Main features include fast channel scan, very short lock times, state of the art CCI performance, partial reception, and auxiliary channels decoding.

DVB-T, DVB-C, and DVB-S2/S demodulators are next-generation enhanced versions of proven and broadly-used Silicon Labs' Si2169/68/67/66/64/62/60 devices.

The satellite reception allows demodulating widespread DVB-S, DIRECTV™ (DSS), DVB-S2, DIRECTV™ (AMC) legacy standards, and new Part II of DVB-S2 (S2X) satellite broadcast standard. A zero-IF interface (differential) allows for a seamless connection to market proven satellite silicon tuners. Si2181 embeds DiSEqC™ 2.0 LNB interface for satellite dish control and an equalizer to compensate for echoes in long cable feeds from the antenna to the satellite tuner input.

The cable reception allows demodulating widely deployed DVB-C legacy standard (ITU-T J.83 Annex A/C) and the Americas' cable standard (ITU-T J.83 Annex B).

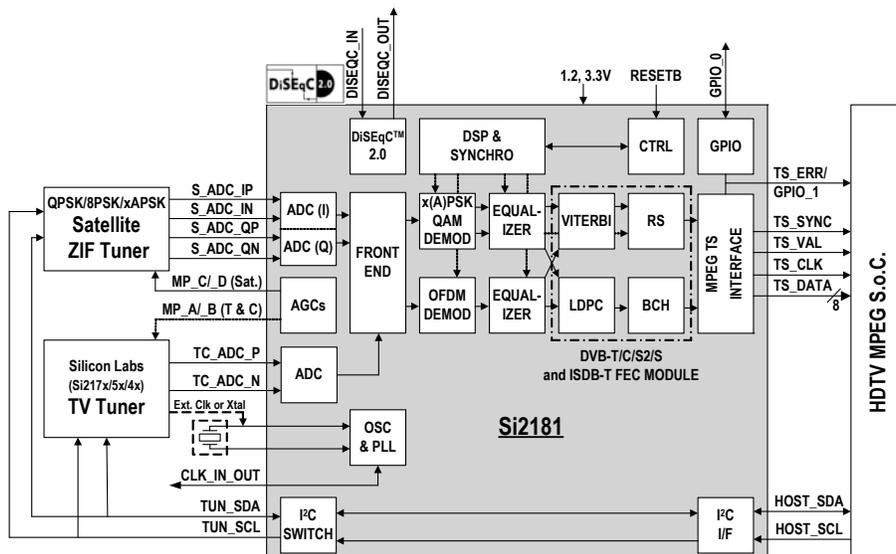
The Si2181 offers an on-chip blind scan algorithm for DVB-S/S2/S2X and DVB-C standards, as well as a blind lock function. The Si2181 programmable transport stream output interface provides a flexible range of output modes and is fully compatible with all MPEG decoders or conditional access modules to support any customer application.

Features

- Pin-to-pin compatible with all Si216x/8x single demods family
- API compatible with all single and dual demods families
- ISDB-T (ABNT NBR 16.601 and 15.604)
 - 6, 7, and 8 MHz bandwidth
 - Partial reception supported
 - AC1 and AC2 decoding
- DVB-S2 (ETSI EN 302 307-1 V1.4.1)
 - QPSK/8PSK demodulator
- DVB-S2X (ETSI EN302 307-2 V1.1.1)
 - QPSK/8PSK, 8/16/32APSK demodulator
 - Roll-off factors from 0.05 to 0.35
- DVB-T (ETSI EN 300 744)
 - OFDM demodulator and enhanced FEC decoder
 - NorDig Unified 2.5 and D-Book 8 compliant
- DVB-C (ETSI EN 300 429) and ITU-T J.83 Annex A/B/C
 - QAM demodulator and FEC decoder
 - 1 to 7.2 MSymbol/s
- DVB-S and DSS supported
 - QPSK demodulator and enhanced FEC decoder
- 1 to 45 MSymbol/s for all satellite standards (<40 MSps in 32APSK)
- LDPC and BCH FEC decoding for S2 standard
- I²C serial bus interfaces (master and host)
- Firmware control (embedded ROM/NVM)
- Upgradeable with patch download via I²C or fast SPI
- Flexible TS output interface (serial, parallel, and slave)
- DiSEqC™ 2.0 interface and Unicable™ support for satellite
- Fast lock times for all media
- Low power consumption
- Two power supplies: 1.2 and 3.3 V
- 7x7 mm, QFN-48 pin package, Pb-free/RoHS compliant

Applications

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

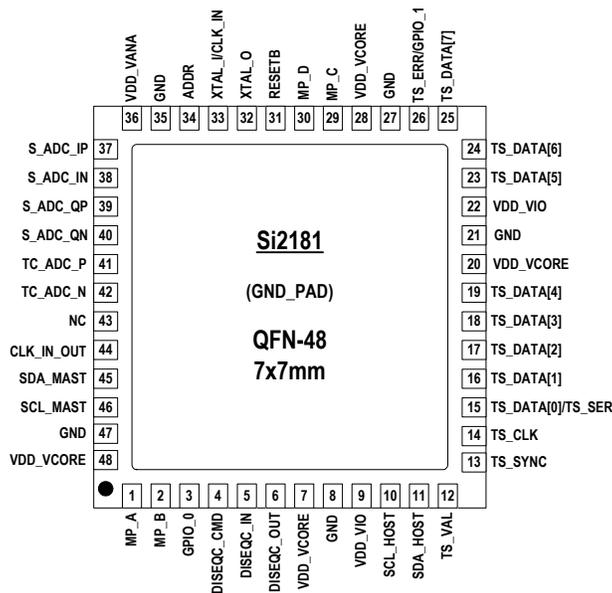


Selected Electrical Specifications

(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 | ISDB-T ¹ | | 168 | | mW |
| | DVB-T ² | — | 182 | — | mW |
| | DVB-C ³ | — | 142 | — | mW |
| | DVB-S2 ⁴ | — | 421 | — | mW |
| | DVB-S ⁵ | — | 230 | — | mW |
| Thermal resistance | 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: 8K, 64-QAM, CR = 7/8, GI = 1/32, 13 segments | | | | | |
| 2. Test conditions: 8 MHz, 8K FFT, 64-QAM, parallel TS. | | | | | |
| 3. Test conditions: 6.9 Mbaud, 256-QAM, parallel TS. | | | | | |
| 4. Test conditions: 32 Mbaud, CR = 3/5, 8PSK, pilots On, parallel TS, C/N at picture failure. | | | | | |
| 5. Test conditions: 30 Mbaud, CR = 7/8, parallel TS, at QEF: BER = 2 x 10 ⁻⁴ . | | | | | |

Pin Assignments



Selection Guide

| Part Number | Description |
|---------------|--------------------------------------------------------|
| Si2181-B60-GM | ISDB-T and DVB-T/C/S/S2/S2X Demodulator, 7x7 mm QFN-48 |