

### Description

The Si2168 integrates DVB-T2, DVB-T, and DVB-C digital demodulators into a single advanced CMOS technology mixed-signal die for next generation terrestrial and legacy cable TV standards. Leveraging Silicon Labs' proven digital demodulation architecture, the Si2168 achieves excellent reception performance while significantly minimizing front-end design complexity, cost, and power dissipation. Connecting the Si2168 to a terrestrial and cable hybrid TV tuner or digital only tuner, such as Silicon Labs' Si2176/56/46 devices, results in a high performance and cost optimized TV front-end solution.

Silicon Labs internally developed DVB-T2 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, FEF management, fully autonomous signal acquisition including automatic L1 signalling parsing, 600 kHz acquisition range, support for all pilot patterns, and DVB-T/T2 auto-detection. The DVB-T and DVB-C demodulators are enhanced versions of proven and broadly used Si2161/63/65/67 Silicon Labs devices.

The Si2168 offers an on-chip blind scanning algorithm for the DVB-C standards as well as blind lock. The Si2168 can use a crystal, as a reference clock, or be driven by an external clock signal from the tuner.

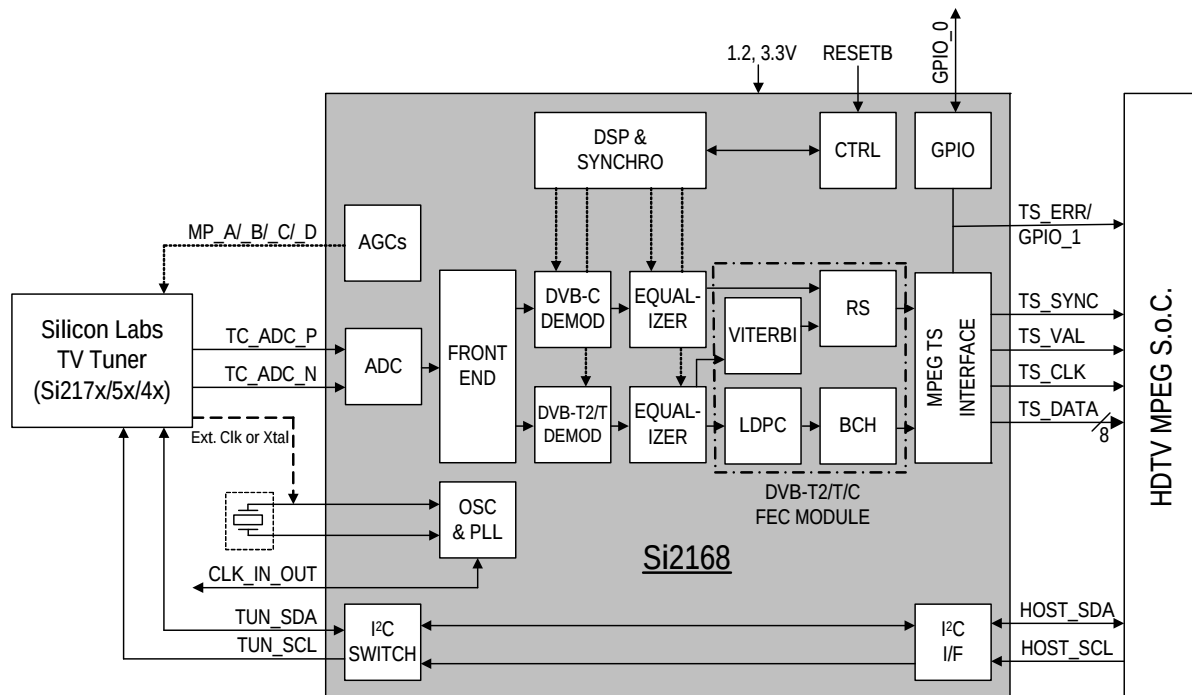
The Si2168 programmable transport stream interface provides a flexible range of output modes and is fully compatible with all MPEG decoders or conditional access modules to support any customer application.

### Features

- DVB-T2 (ETSI EN 302 755)
  - COFDM demodulator and FEC (LDPC + BCH) decoder
  - Bandwidth: 1.7, 5, 6, 7 or 8 MHz (and extended BW)
  - Supports up to 255 PLP(s) and outputs the data PLP plus the common PLP on a single TS
  - NorDig-T2 Unified v2.2.1 and D-Book 7.0 compliant
  - Firmware control (loaded in ROM)
- DVB-T (ETSI EN 300 744)
  - COFDM demodulator and FEC decoder
  - NorDig Unified 2.2.1, D-Book 7.0 compliant
- DVB-C (ETSI EN 300 429) / ITU J.83 Annex A/C
  - QAM demodulator and FEC decoder
  - 1 to 7.2 MSymbol/s
  - C-Book compliant
- I<sup>2</sup>C serial bus interfaces (master and host)
- GPIOs and multi-purpose ports for independent AGCs
- 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
- Pin-to-pin and software compatibility with the Si2169 (superset for DVB-T2/T/C/S/S2)
- 7x7 mm, QFN-48 pin package, Pb-free/RoHS compliant

### Applications

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

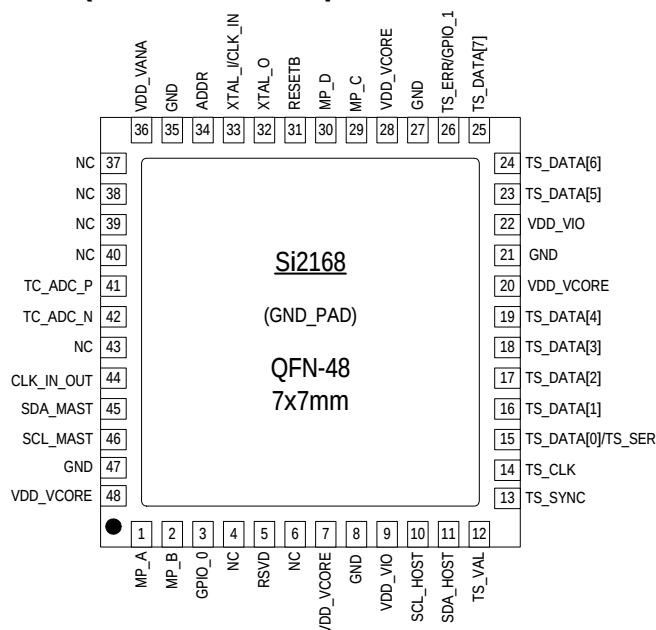


### Selected Electrical Specifications

(T<sub>A</sub> = -10 to 75 °C)

| Parameter                                                                                                   | Test Condition      | Min  | Typ  | Max  | Unit |
|-------------------------------------------------------------------------------------------------------------|---------------------|------|------|------|------|
| <b>General</b>                                                                                              |                     |      |      |      |      |
| Input clock reference                                                                                       |                     | 4    | —    | 30   | MHz  |
| Supported XTAL frequency                                                                                    |                     | 16   | —    | 30   | MHz  |
| Total power consumption                                                                                     | DVB-T2 <sup>1</sup> | —    | 420  | —    | mW   |
|                                                                                                             | DVB-T <sup>2</sup>  | —    | 190  | —    | mW   |
|                                                                                                             | DVB-C <sup>3</sup>  | —    | 180  | —    | mW   |
| Thermal resistance (θ <sub>JA</sub> )                                                                       | 2 layer PCB         | —    | 35   | —    | °C/W |
|                                                                                                             | 4 layer PCB         | —    | 23   | —    | °C/W |
| <b>Input ADC Sampling Clock</b>                                                                             |                     |      |      |      |      |
| DVB-T2/T/C                                                                                                  | 36 MHz IF/low-IF    | —    | 56   | 65   | MHz  |
| <b>Power Supplies</b>                                                                                       |                     |      |      |      |      |
| V <sub>DD_VCORE</sub>                                                                                       |                     | 1.14 | 1.20 | 1.30 | V    |
| V <sub>DD_VANA</sub>                                                                                        |                     | 3.00 | 3.30 | 3.60 | V    |
| V <sub>DD_VIO</sub>                                                                                         |                     | 3.00 | 3.30 | 3.60 | V    |
| <b>Notes:</b>                                                                                               |                     |      |      |      |      |
| 1. Highest power demodulation case: 8 MHz, 256 QAM, 32K FFT, CR=3/5, GI=1/128, PP7, C/N at picture failure. |                     |      |      |      |      |
| 2. Highest power demodulation case: 8 MHz, 64QAM, IF Mode, 8K, Parallel TS Output.                          |                     |      |      |      |      |
| 3. Highest power demodulation case: 6.9 Mbaud, 256 QAM, IF Mode, Parallel TS Output.                        |                     |      |      |      |      |

### Pin Assignments (Pin-to-Pin Compatible with the Si2167 and Si2169)



### Selection Guide

| Part #          | Description                                                                |
|-----------------|----------------------------------------------------------------------------|
| Si2168-A20-GM/R | Terrestrial and Cable Digital TV Demodulator for DVB-T2/T/C, 7x7 mm QFN-48 |