

### Description

The Si2138 integrates a PAL/SECAM/NTSC analog TV demodulator with a universal TV tuner supporting all worldwide analog TV standards. The Si2138 requires no external balun and offers the lowest-cost BOM for an analog TV tuner with analog demodulator. By combining Silicon Labs' proven digital low-IF architecture with a 4th-generation RF front-end, the Si2138 maintains the highest performance that exceeds MOPLL-based tuners.

Compared with competing silicon TV tuners, the Si2138 delivers an unprecedented level of front-end integration, resulting in the lowest number of external BOM components. No external tracking filters, wire-wound inductors, LNAs, SAW filters or inductive power supply filtering components are needed. The Si2138 offers low power consumption as well as an option for single or dual power supply operation. Also included is an internal power-on reset circuit, eliminating the need for external brownout protection components or additional pins in module applications. A software-selectable cable mode is also included which offers high return-loss performance.

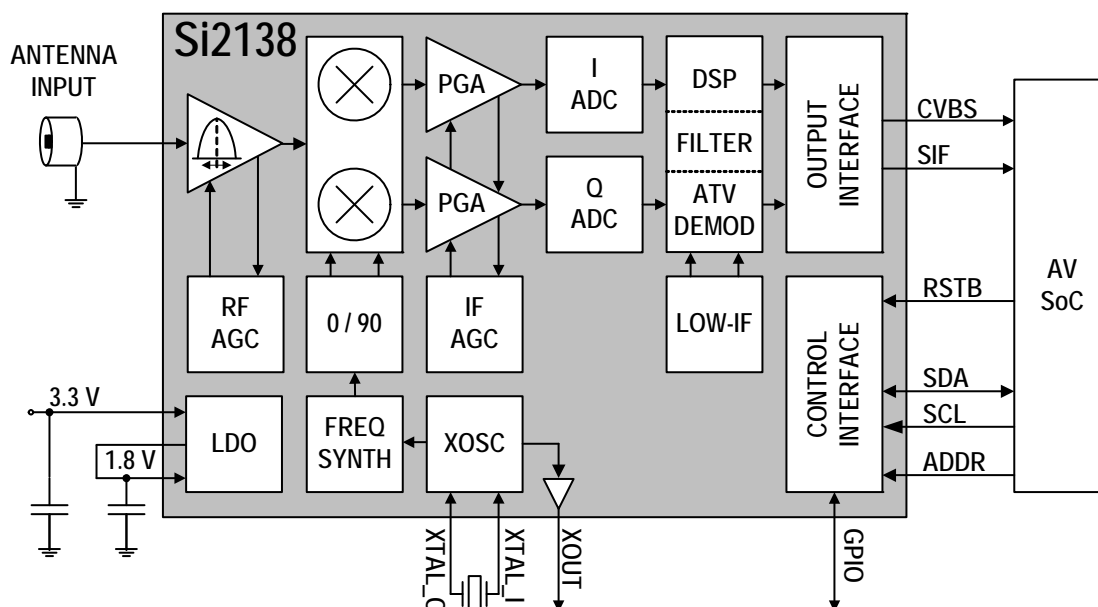
As with prior-generation Silicon Labs TV tuners, the Si2138 delivers superior picture quality and a higher number of received stations when compared to other silicon tuners and discrete MOPLL-based tuners. Both the tuner and analog demodulator incorporate worldwide field testing experience from three previous generations in high-volume production to deliver the highest tolerance to real-world field reception conditions. The Si2138 also incorporates a harmonic-rejection mixer that delivers excellent immunity to Wi-Fi and LTE interference across the full RF input frequency range, with no need for external filtering components.

### Features

- Worldwide analog TV tuner
  - NTSC, PAL/SECAM
  - 42–1002 MHz frequency range
- Analog TV demodulator
  - Superior video SNR performance
  - Overmodulation and ICPM tolerant
- Industry-leading margin to EN55020, OpenCable™ specifications
- Lowest BOM for a silicon hybrid TV tuner
  - No balun at RF input
  - No external SAW filters or wire-wound inductors
  - Integrated LNAs and complete tracking filters
- Best-in-class real-world reception
  - Exceeds discrete MOPLL-based tuners
  - Industry-leading phase noise performance
  - High immunity to Wi-Fi and LTE interference
- Low power consumption
  - 3.3 V and 1.8 V power supplies
  - Single-supply option for 3.3 V-only operation
- Integrated power-on reset circuit
- CVBS + SIF output to audio/video processor or SoC
- Standard CMOS process technology
- 4x4 mm, 28-pin QFN package
- RoHS compliant

### Applications

- Analog tuner module
- TV with on-board analog front-end
- Analog portable TV and portable DVD player
- PC-TV accessories





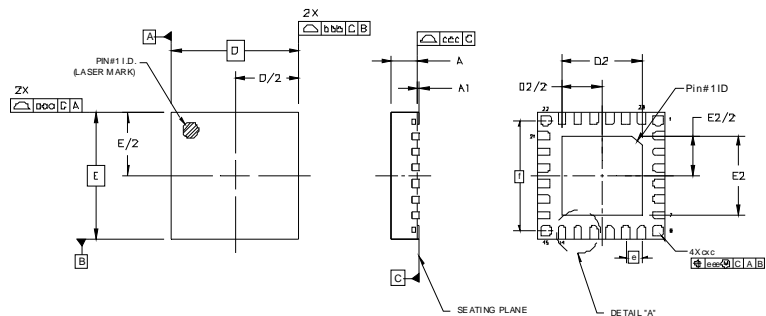
### Analog TV

The diagram illustrates the architecture of an Analog TV system. Key components and their connections include:

- Antenna -OR- Cable**: Connected to the **Analog TV Tuner** within the **Si2138** block.
- Video In**: Connected to the **A/V Switch**.
- CVBS, S-Video, RGB, YPrPb**: These video input types are connected to the **A/V Switch**.
- Si500 Silicon XO**: Provides a clock signal to the **Video Processor**.
- Si2138**: Contains the **Analog TV Tuner** and **Analog TV Demod**, which feed into the **Video Processor**.
- A/V Switch**: Routes video signals from the **Video In** and **Video Processor** to the **Video Processor**.
- Video Processor**: The central unit for video processing, connected to the **Si500**, **Si2138**, **A/V Switch**, and **Audio Decoder & Processor**.
- Si24xx/300x Modem + DAA**: Connected to the **Video Processor** and **PSTN** (Public Switched Telephone Network).
- Audio Decoder & Processor**: Receives signals from the **Video Processor** and the **SL28PCIe30 Clock Generator**. It outputs to **Headphones**, **Audio Out** (L/R), and **Speaker**.
- SL28PCIe30 Clock Generator**: Provides clock signals to the **Audio Decoder & Processor** and the **Video Processor**.
- Output Options**:
  - LCD/Plasma/DLP Panel**: Connected to the **Video Processor**.
  - Composite/S-Video** and **Component/Scart**: Connected to the **Video Processor** via **DAC** and **AMP** blocks.
  - HDMI / DVI**: Connected to the **Video Processor**.

Part #	Description
Si2138	Worldwide for NTSC, PAL/SECAM

Pin configuration diagram for the ATmega328P microcontroller in DIP-28 package. The diagram shows a central square labeled "GND PAD" surrounded by 28 pins. Pin 1 is at the bottom left, pin 28 is at the bottom right, pin 15 is at the top right, and pin 22 is at the top left. The pins are labeled with their functions: GPIO1, GPIO2, GPIO3, SCL, SDA, VDD\_IO, GND, VDD\_D, CVBS, VDD\_H, SIF, NC, VDD\_L, LDO\_ADJ, XOUT, XTAL\_I, XTAL\_O, GND, VDD\_H, VDD\_H, RF\_REF, RF\_IP, RF\_IN, RF\_SHLD, ADDR, RSTB, and NC. A black dot is located at the bottom left corner of the GND PAD, near pin 28.



Symbol	Min	Nom	Max	Unit
A	0.80	0.85	0.90	mm
D, E	4.00 BSC			mm
e	0.50 BSC			mm
f	3.50 BSC			mm