DC-2.5GHz TruePower Detector/Controller

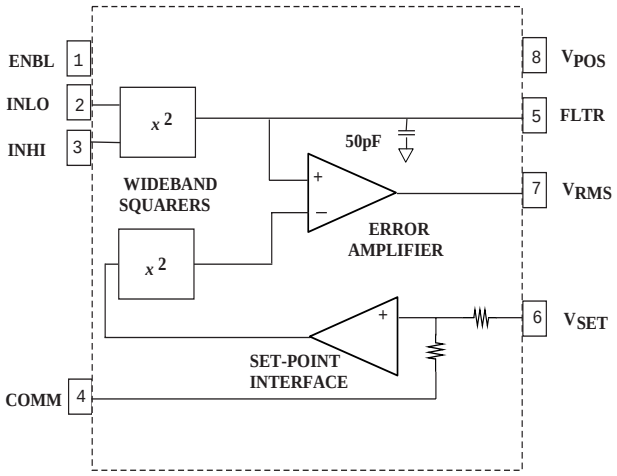
RF/IF PRODUCT CONCEPT — AD8360

FEATURES

- True RMS to DC Conversion
  - Uses Accurate Wideband Square-Law Detector
- Greater Than 20 dB Input Range
- Differential Inputs, 50 Ω
- 100 mV RMS Full-Scale Output
- Flat Response from DC to 2.5 GHz
- Linear Output, 0 to 1.25 V into 50 Ω min. @ V_P= 3V
- Measurement or Control Mode
- Operation at Supply Voltages from 2.4 - 5.5 V
- Error-Integrator Output, 0 to >3V_P @ V =5V
  - External Capacitor Extends $T_{AVERAGE}$
- Rapid Power-down to 1μA max.

APPLICATIONS

- Accurate RMS Measurement of RF Power (in dB)
- Power Amplifier Control Loops



8-PIN MICRO-SO

PRODUCT DESCRIPTION

The AD8360 is a low power RMS-responding RF detector (RMS to DC Converter) for use in high frequency (up to 2.5 GHz) receiver and transmitter signal chains. It is very easy to apply, requiring only a single supply between 2.4 V and 5.5 V, and decoupling and input coupling capacitors, for most applications. Its fully-differential input is DC-coupled, and the averaging filter time-constant may be increased without limit; thus the AD8360 may be used as easily in many low frequency applications.

A wideband square-law detector provides true RMS response to the input. The current-mode output of this cell is compared against the output of an identical cell, whose signal input is derived from the VSET input. Used as a controller, the resulting error is amplified by a precision high-grain low-offset circuit, and presented at the pin VRMS. This output signal may then be used to control the gain of the RF amplifier, and restore a balance between the set-point and the actual signal. The detected signal (at twice the input frequency) is low-pass filtered by an on-chip 50 pF capacitor. The corner frequency of this filter may be lower without limit by the addition of an external capacitor on the FLTR pin.

When used as a true power measurement device, VRMS is strapped to VSET. The voltage at this pin is then linearly proportional to the RMS voltage applied to the signal interface. Excellent linearity is achieved in this mode, over a dynamic range of about 20 dB. The output is insensitive to either the supply voltage or temperature. At frequencies below the filter corner, the output becomes simply the absolute value of the input voltage.

The VRMS output runs from true-zero to about 1.75 V below the supply voltage, and can drive a load of 50 Ω to 1.25 V, when using a 3V supply. The VSET input likewise runs from zero to about +1.25 at a supply of 3 V, and presents a resistive input of about 10kΩ.

The chip may be powered on or off by a voltage applied to the ENBL pin. When this voltage is below the threshold of about 1.5V, the total dissipation will be in the microwatt range. Above this threshold, the chip powers-up within about 200 ns to its normal operating current of 2mA at 25°C. The AD8360 is available in a Micro SO-8 package.

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