

## 1. Description

The TS1108 Evaluation Board is intended for evaluating the coulomb counter functionality of the TS1108. The TS1108 Coulomb Counter function utilizes an Integrator and a Comparator plus a 90  $\mu$ s Monoshot. The CSA's buffered output is applied to the integrator's input. This signal is integrated by the comparator until it reaches a level which trips the comparator. The comparator's trip level is determined by the voltage applied to the comparator's non-inverting terminal, CIN+. The Monoshot produces a 90  $\mu$ s output pulse at COUT and the integrator is reset. Therefore, each COUT 90  $\mu$ s pulse represents an accumulation of coulombs (Please refer to Coulomb Counter Equations in Applications Information). The TS1108 Integrator works best when the 90  $\mu$ s Monoshot represents less than 2% of the total integration period. Therefore, the minimum integration time for a full-scale  $V_{SENSE}$  should be limited to 4.7 ms. To guarantee stable operation of the OUT buffer, an integration capacitance of 0.1  $\mu$ F should be used for integration capacitor,  $C_{INT}$ . The TS1108's Coulomb Counting interrupt is provided by the internal comparator with a push-pull output configuration.

The following equation can be used to calculate how many ampere-hours (Ah) each comparator interrupt pulse represents:

$$\text{ComparatorPulse} = \frac{R_{INT}C_{INT}(V_{CIN-} - V_{VBIAS})}{3600 \times GAIN \times R_{SENSE}} \text{Ah}$$

**Table 1.1. Component List**

Designation	Quantity	Description
U1	1	TS1108-20, TS1108-200
RS1	1	50 m $\Omega$ $\pm$ 0.5%, 1/2 W (1206)
C1, C6	2	1 $\mu$ F $\pm$ 10%, 10 V (0603)
C2, C4, C7, C9, C10	5	0.1 $\mu$ F $\pm$ 10%, 10 V (0603)
C3	1	1 nF $\pm$ 10%, 25 V (0603)
C5	1	0.47 $\mu$ F $\pm$ 10%, 10 V (0603)
R1	1	4.02 k $\Omega$ $\pm$ 1%, 1/16 W (0603)
R2	1	47 k $\Omega$ $\pm$ 1%, 1/16 W (0603)
R4, R5, R6	3	2 M $\Omega$ $\pm$ 1%, 1/10 W (0603)
J1, J2, J3, J4, J7, J8	6	Header 1x1
JP2, JP3, JP5	3	Header 1x3
JP4, JP6, JP7, JP8, JP9, JP10, JP11, JP12	8	Jumper
JS1, JS2, JS3	3	Jumper Shunt

## 2. Quick Start Procedure

### Required Equipment

- 3 V Power Supply or 3 V Battery
- 2 Digital Multimeters
- 1 Oscilloscope
- 1 Potentiometer

To use the TS1108 evaluation board, perform the following steps:

1. Configure JP3 so that the Jumper Shunt is connecting VDD to VREF.
2. Configure JP5 so that the jumper shunt is connecting COUT and SW\_RST.
3. Connect the 3 V power source to RS+ and VDD.
4. Use a voltmeter to measure the  $V_{BIAS}$  and the  $CIN-$  voltage.  $V_{BIAS}$  should be 50% of VDD, 1.5 V.  $CIN-$  should be 90% of VDD, 2.7 V.
5. Connect a voltmeter to measure  $V_{OUT}$ . With no load connected  $V_{OUT}$  should be equal to  $V_{BIAS}$ . The expression for the  $V_{OUT}$  output voltage is defined by:

$$V_{OUT} = V_{BIAS} - I_{LOAD} \times 50m\Omega \times GAIN$$

6. Connect an ammeter in series from RS- to a potentiometer. Adjust the POT until the ammeter reads:
  - TS1108-20: 500 mA
  - TS1108-200: 50 mA

$V_{OUT}$  should equal 1 V.

7. Connect the oscilloscope to COUT. COUT should produce a periodic pulsing waveform with a period of 11.28 ms, where each monoshot pulse width is 90  $\mu$ s (typ).

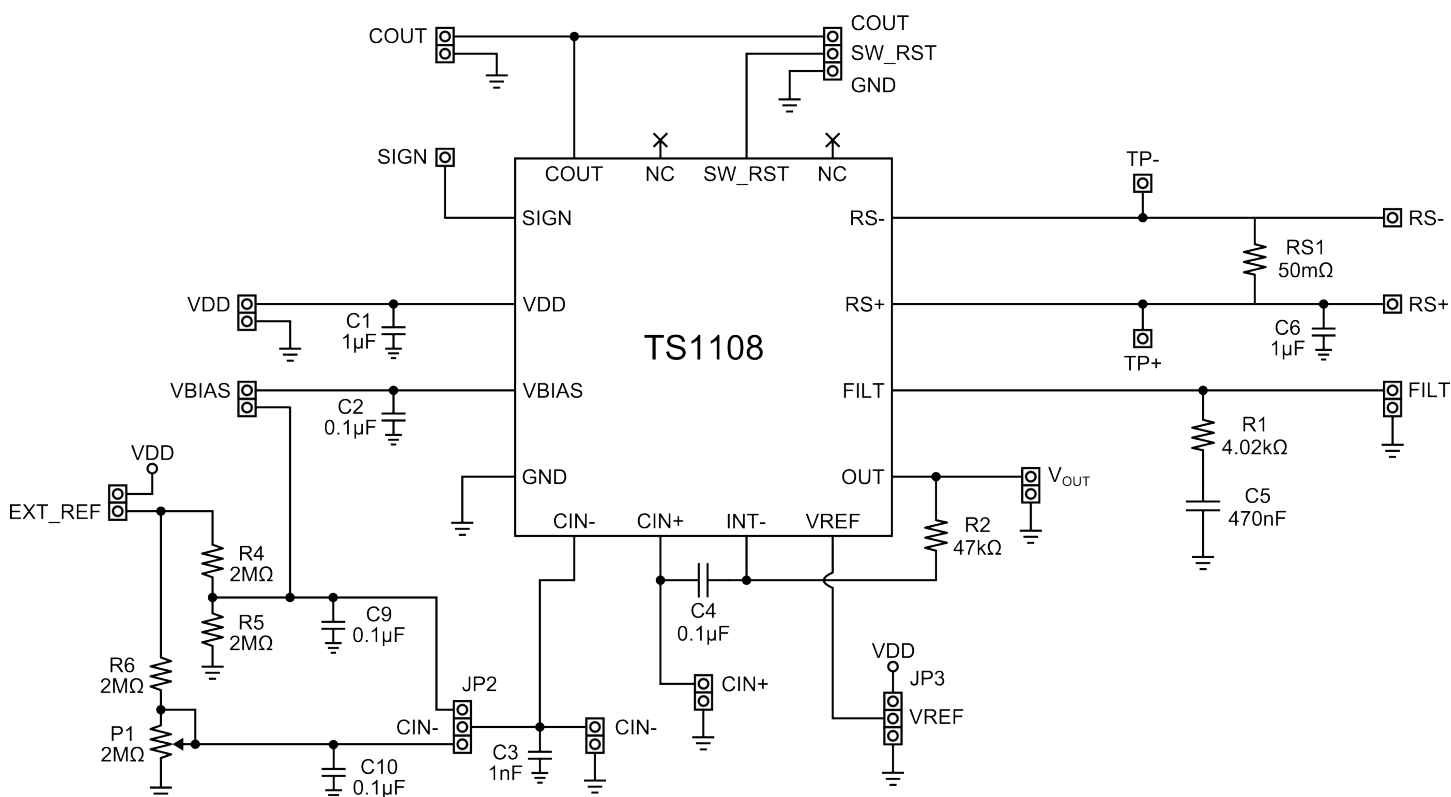
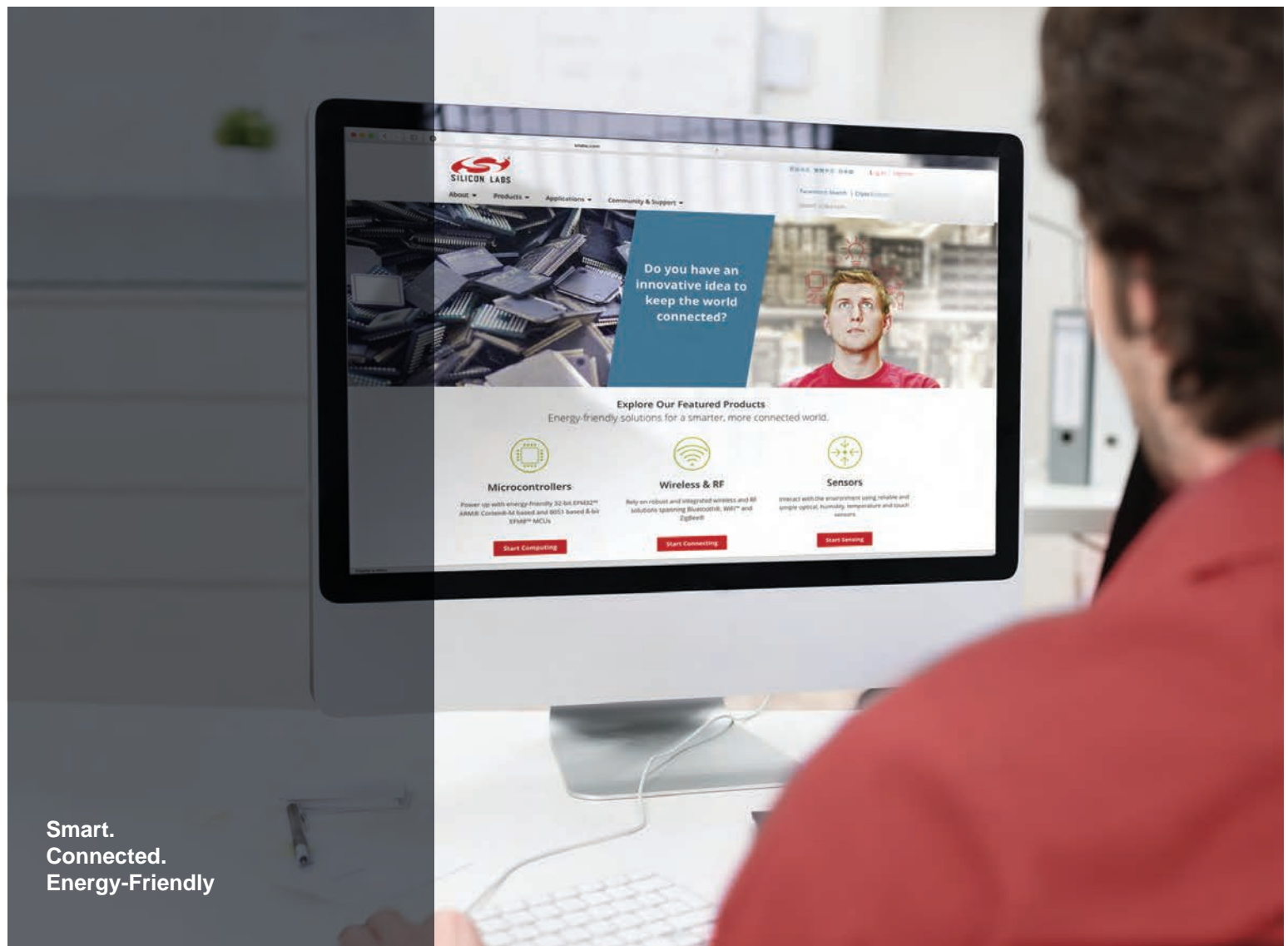


Figure 2.1. TS1108DB Circuit Schematic

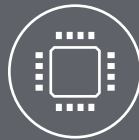


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