

# TS1110 Electronic Circuit Breaker and TS1107 Current Limiter User's Guide

The TS1110 combines a very low power bidirectional current-sense amplifier (CSA) with a circuit breaker feature. The circuit breaker feature is supplied within the TS1110 as an FET control that drives the gate drive of an external P-channel MOSFET, disconnecting the load from the power supply. The TS1110 provides a comparator that can be used for current limit detection with a latch-capable output. A digital SIGN output that indicates the direction of current flow depending on the external connections to the RS+ and RS- input terminals is also provided. The TS1110 requires a very low 0.68  $\mu\text{A}$  CSA and 1.16  $\mu\text{A}$  VDD supply current while combining a 150  $\mu\text{V}$ (MAX) input offset voltage with a 0.6% gain error (MAX) for high-precision current measurements. The TS1110 provides a buffered CSA output, which can be connected with an RC Filter to reduce noise.

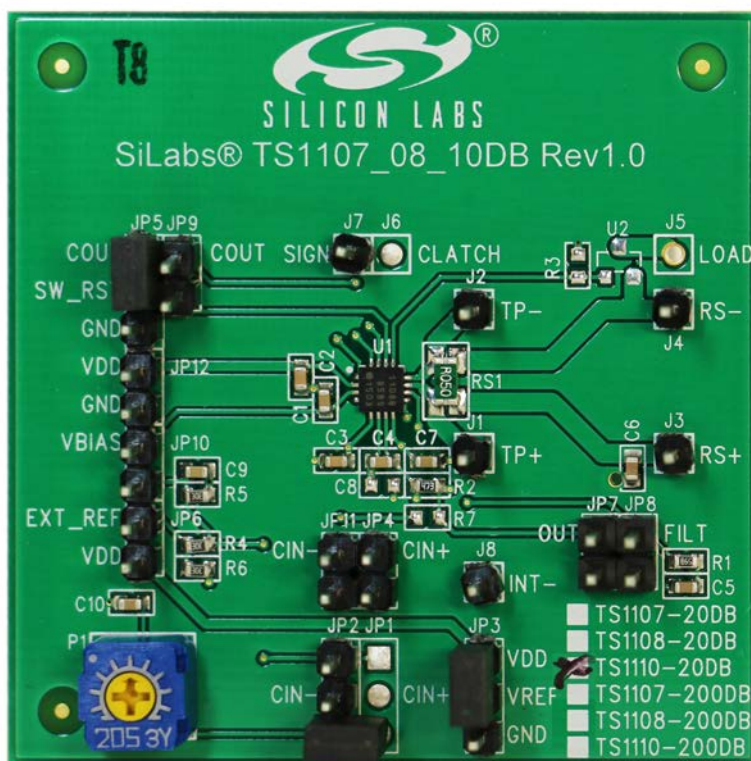
The TS1107 Current Limiter is a subset of the TS1110 Electronic Circuit Breaker and provides the same functionality minus the load disconnect feature. The TS1107 combines the very low power bidirectional current-sense amplifier (CSA) with a latch-capable current limiter comparator featuring an adjustable current threshold. The TS1107's CSA buffered output plus the current limiter comparator require a very low nominal supply current of 1.15  $\mu\text{A}$ .

## KEY FEATURES

- $R_{\text{SENSE}}$ : 50  $\text{m}\Omega \pm 0.5\%$
- External Circuit Breaker PMOS Included
- Adjustable Reference for Current Limiter
- Compatible for Both Gain Options
  - 20 V/V
  - 200 V/V

## ORDERING INFORMATION

- TS1110-20DB
- TS1110-200DB
- TS1107-20DB
- TS1107-200DB



## 1. TS1110-EVB Description

The TS1110 Evaluation Board is intended for evaluating the circuit breaker feature of the TS1110. The evaluation board includes a variable reference scheme so that the threshold for the current limit comparator can be adjusted. The jumper, JP1, can be connected so that the included potentiometer can be used to adjust the threshold. A P-channel MOSFET is included, enabling the circuit breaker feature. When CLATCH is tied HIGH, the current limit comparator's output, COUT, indicates when the load has exceeded the current limit threshold and has thus been disconnected from the power supply. The Quick Start Procedure details two different load connections. The first load connection corresponds to a load under the current limiter's threshold, while the second load connection results in the current limiter's output enabling the circuit breaker.

**Table 1.1. Component List**

Designation	Quantity	Description
U1	1	TS1110-20, TS1110-200
U2	1	DMP2066LSN-7
RS1	1	50 m $\Omega$ $\pm$ 0.5%, 1/2 W (1206)
C1, C6	2	1 $\mu$ F $\pm$ 10%, 10 V (0603)
C2, C7, C9, C10	4	0.1 $\mu$ F $\pm$ 10%, 10 V (0603)
C5	1	0.47 $\mu$ F $\pm$ 10%, 10 V (0603)
C8	1	1 nF $\pm$ 10%, 25 V (0603)
R1	1	4.02 k $\Omega$ $\pm$ 1%, 1/16 W (0603)
R3	1	1 M $\Omega$ $\pm$ 1%, 1/16 W (0603)
R4, R5, R6	3	2 M $\Omega$ $\pm$ 1%, 1/10 W (0603)
R7	1	0 $\Omega$ , 1 A (0603)
J1, J2, J3, J4, J5, J6, J7	7	Header 1x1
JP1, JP3	2	Header 1x3
JP4, JP6, JP7, JP8, JP9, JP10, JP11, JP12	8	Jumper
JS1, JS4	2	Jumper Shunt



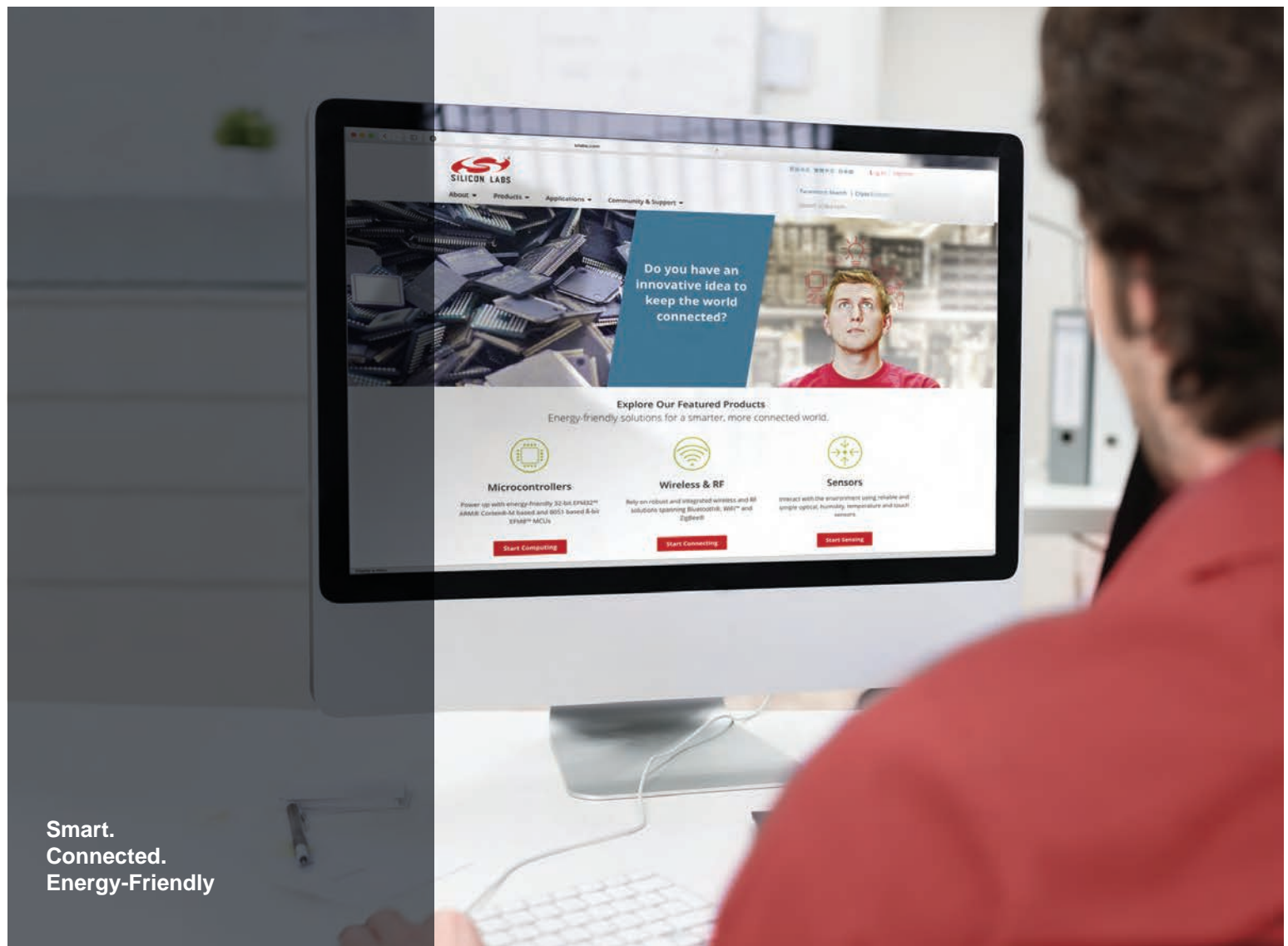
### 3. TS1107-EVB Description

The TS1107 Evaluation Board is intended for evaluating the current limit detection feature of the TS1107. The evaluation board includes a variable reference scheme so that the threshold for the current limit comparator can be adjusted. The jumper, JP1, can be connected so that the included potentiometer can be used to adjust the threshold. When CLATCH is tied HIGH, the current limit comparator's output, COUT, indicates when the load has exceeded the current limit threshold and latches HIGH until the fault condition has been removed and the comparator has been reset. The Quick Start Procedure details two different load connections. The first load connection corresponds to a load under the current limiter's threshold, while the second load connection results in fault condition resulting in COUT latching HIGH.

**Table 3.1. Component List**

Designation	Quantity	Description
U1	1	TS1107-20, TS1107-200
RS1	1	50 mΩ ±0.5%, 1/2 W (1206)
C1, C6	2	1 μF ± 10%, 10 V (0603)
C2, C7, C9, C10	4	0.1 μF ± 10%, 10 V (0603)
C5	1	0.47 μF ± 10%, 10 V (0603)
C8	1	1 nF ± 10%, 25 V (0603)
R1	1	4.02 kΩ ± 1%, 1/16 W (0603)
R4, R5, R6	3	2 MΩ ± 1%, 1/10 W (0603)
R7	1	0 Ω, 1 A (0603)
J1, J2, J3, J4, J5, J6, J7	7	Header 1x1
JP1, JP3	2	Header 1x3
JP4, JP6, JP7, JP8, JP9, JP10, JP11, JP12	8	Jumper
JS1, JS4	2	Jumper Shunt



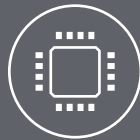


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Silicon Laboratories Inc.  
400 West Cesar Chavez  
Austin, TX 78701  
USA

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