

TSC101

High-side current sense amplifier



STMicroelectronics' starts a new family of standard products – current sensing amplifiers – with the release of the TSC101 high-side current sense amplifier.

The TSC101 measures a small differential voltage on a high-side shunt resistor and translates it into a ground-referenced output voltage using an internally-fixed gain.

This current sense amplifier, available in the compact SOT23-5L package and offering a wide input common-mode voltage and low quiescent current, can be used in a wide variety of applications, ranging from battery chargers to automotive current monitoring.

Key features

- Independent supply and input common-mode voltages
- Wide common-mode operating range: 2.8 to 30 V
- Wide common-mode survival range: -0.3 to 60 V (load-dump)
- Wide supply voltage range: 4 to 24 V
- Low current consumption: $I_{CC, max} = 300 \mu A$
- Internally fixed gain: 20 V/V, 50 V/V or 100 V/V
- Buffered output

Main applications

- Battery chargers
- Automotive current monitoring
- Notebook computers
- Photovoltaic systems
- DC motor control
- Precision current sources
- Uninterruptible power supplies
- High-end power supplies

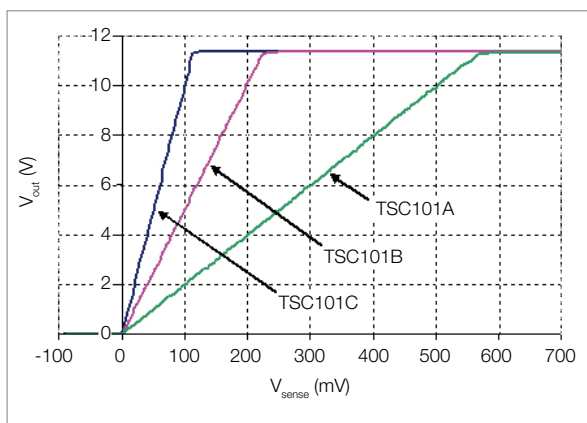
The TSC101 measures very small differences in voltage across a high-side shunt resistor, and using an internally fixed gain, amplifies the difference into a ground-referenced output voltage. There are three choices of internally fixed gains available (20 V/V, 50 V/V or 100 V/V) depending on the sensitivity required in the application.

The devices use independent input common-mode and power supply voltages. Common-mode voltage can range from 2.8 to 30 V in operating conditions, and up to 60 V in absolute maximum ratings.

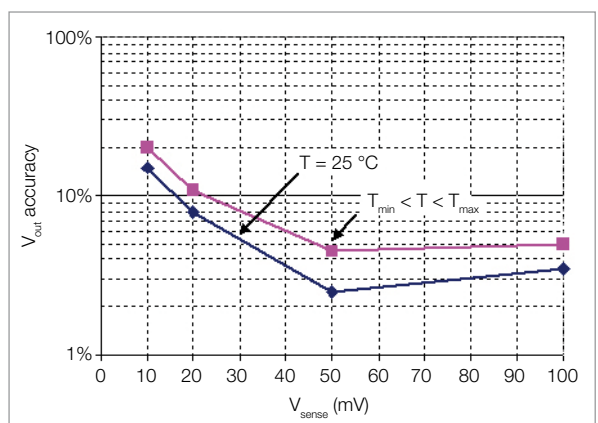
Quiescent current consumption is very low (< 300 μ A), ensuring that the device can operate in battery-operated applications with minimal power consumption. A wide supply voltage range (4 to 24 V) allows the device to connect the power supply to either side of the current measurement shunt with minimal error in most applications.

Performance of the TSC101 is demonstrated by the following electrical characteristic curves. Unless otherwise specified, these measurements were taken under the following test conditions:

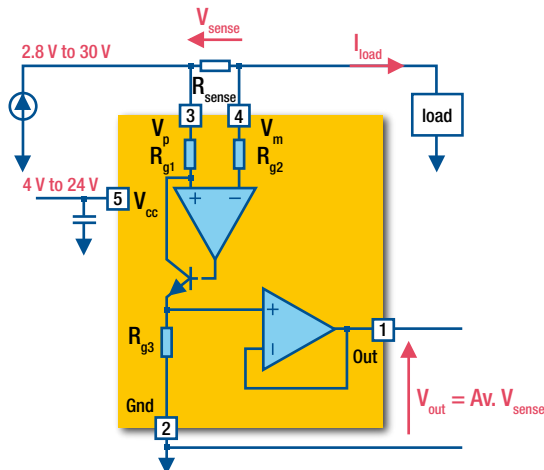
- $T_{amb} = 25\text{ }^{\circ}\text{C}$
- $V_{CC} = 12\text{ V}$
- $V_m = 12\text{ V}$
- No load on OUT



Output voltage versus sense voltage



Total output voltage accuracy



TSC101 internal schematic and typical connections

Part number	Temperature range	Package	Gain
TSC101AILT	-40 to 125 $^{\circ}\text{C}$	SOT23-5L	20
TSC101BILT	-40 to 125 $^{\circ}\text{C}$	SOT23-5L	50
TSC101CILT	-40 to 125 $^{\circ}\text{C}$	SOT23-5L	100
TSC101AIYLT	-40 to 125 $^{\circ}\text{C}$	SOT23-5L (automotive grade*)	20
TSC101BIYLT	-40 to 125 $^{\circ}\text{C}$	SOT23-5L (automotive grade*)	50
TSC101CIYLT	-40 to 125 $^{\circ}\text{C}$	SOT23-5L (automotive grade*)	100

* Qualification and characterization according to AEC Q100 and Q003 or equivalent, advanced screening according to AEC Q001 and Q002 or equivalent are on-going.



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