High-Precision Current-Sense Amplifier Operates Over Wide CM Voltage Range

STMicroelectronics' TSC240 is a high-precision current-sense amplifier with elevated voltage tolerance and 120-dB PWM rejection for accurate and reliable monitoring in automotive traction inverters, factory automation and robotics, and servers (see the figure). The current-sense amplifier handles common-mode voltages from -4 V to 100 V and is AEC-Q100 qualified, allowing use with industrial dc buses and established automotive boardnet standards including 12 V, 24 V, and 48 V.

The amplifier's tolerance for high voltages reduces dependence on external components to provide protection. In addition, the gain is internally fixed at 20 V/V thereby ensuring precision and repeatability while also saving external resistors. Designers can thus ensure a compact circuit footprint and minimize the bill of materials, says the vendor.

Capable of bidirectional current sensing, the TSC240 offers outstanding precision, with maximum gain error of 0.2% and drift of 2.5 ppm/°C, offset voltage of just ±20 µV, and drift of 150 nV/°C. Its high common-mode rejection ratio (CMRR) ensures accurate current sensing even when the common-mode voltage is changing, such as in motor-control applications, and ensures consistent measurement immunity in electrically noisy environments.

Operating over a broad supply-voltage range of 2.7 V to 5.5 V, and in ambient temperatures from -40°C to 125°C, the TSC240 is easy to design-in, according to the vendor, and can withstand harsh operating conditions. The TSC240 is in production now and available in SO8 and TSSOP8 packages, in industrial and automotive grades, priced from $0.85.

For more information, see the TSC240 product page and to order parts see the e-store page.

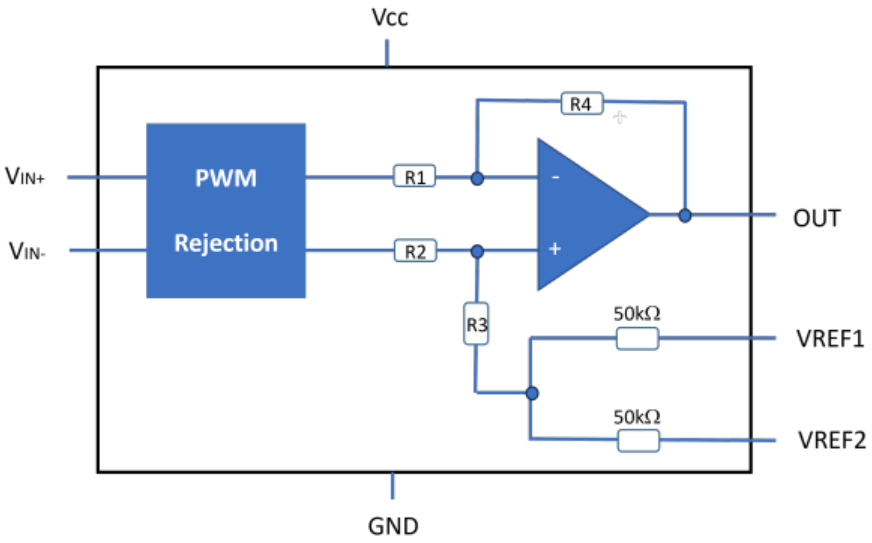

Figure. The TSC240 is a high-precision current sense amplifier with enhanced PWM rejection. It can sense current via a shunt resistor over a wide range of common-mode voltages, from -4 to +100 V, regardless of the supply voltage. It is available with a preset gain of 20 V/V. Thanks to its high precision, it can sense very low voltage drops, minimizing measurement error.