



New Product Announcement

ZXCT21xQ

High-Precision Current Monitor for Accurate High-Side and Low-Side Current Measurement in Automotive Applications

The automotive-compliant ZXCT21xQ current monitor family are single-stage instrumentation amplifiers designed to accurately measure very small sense voltages across a wide range of common-mode voltages.

Applications include current sensing of power rail/load currents in BLDC motor control, high-power DC-DC converters, real-time reporting of state-of-health in critical equipment, and battery-charging equipment.

Their low offset voltage ($\pm 30\mu\text{V}$) with zero-drift core (typical $\pm 100\text{nV}/^\circ\text{C}$) enables current sensing across the shunt with maximum full-scale voltage drops as low as 10mV. This allows the use of small-value sense resistors to monitor large currents to reduce a power loss caused by the measurement.

The ZXCT21xQ family has six fixed voltage gain options in 50V/V, 75V/V, 100V/V, 200V/V, 500V/V, and 1000V/V. They can measure voltage across shunts at common-mode voltages from -0.1V to 26V, independent of supply voltage.

These devices operate from a 2.7V to 26V power supply, independent of common-mode sense voltage, consuming a maximum of 100 μA supply current.

All versions are AEC-Q100 grade 1 qualified, supports a -40°C to $+125^\circ\text{C}$ temperature range, and are available in the industry-standard SOT363 package.

Automotive-compliant - AEC qualified, manufactured in IATF 16949 certified sites supporting PPAP documents.

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The DIODES Advantage

This family supports high-precision current sensing of large currents that utilize small sense resistors and voltages to mitigate power loss.

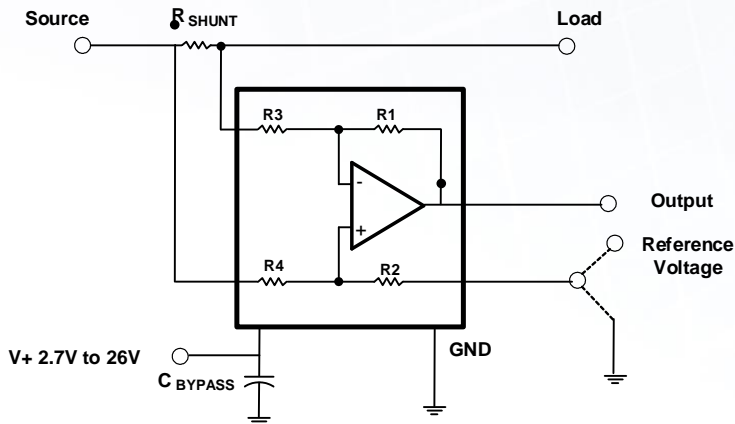
- **Offset Voltage as Low as $\pm 30\mu\text{V}$**
Minimizes errors when using low-value sense resistors
- **Gain Error as Low as 0.5%**
Maintains accurate gain control across temperature and common-mode voltage
- **Common-Mode Range -0.1 to 26V**
Accurately measures high-side and low-side currents, including short-circuited loads
- **Wide Operating Voltage Range of 2.7 to 26V**
Provides options for powering separately or from monitored supply
- **Robust ESD Capability (HBM: 5kV, CDM: 1.5kV)**
Improves system reliability

Applications

Current sensing in:

- BLDC motor controls
- E-compressors
- ADAS power supplies
- EV on-board charger (OBC)
- xEV high-voltage DC-DC converters
- Valve controls
- Body control modules
- USB and wireless charging
- BMS charging and discharging

Typical Application



Output pin is a voltage proportional to the load current. It can then be processed with an ADC.

Uni-directional current sensing

- $V_{OUT} = (I_{LOAD} \times R_{SENSE}) \times \text{Gain}$

Bi-directional current sensing

- $V_{OUT} = (I_{LOAD} \times R_{SENSE}) \times \text{Gain} + V_{REF}$

Automotive-Compliant Precision Current Monitor Portfolio

Part Number	Common-Mode Input Voltage ⁽¹⁾	Supply Voltage	Gain	Gain Error	Maximum V_{OS}	CMRR	Ambient Temperature Range	Package
	V	V		%	μV	dB	$^{\circ}\text{C}$	
ZXCT210Q	-0.3 to 26	2.7 to 26	200	$\pm 0.8, \pm 0.5$	$\pm 35, \pm 30$	100	-40 to +125	SOT363
ZXCT211Q			500		$\pm 35, \pm 30$	100		
ZXCT212Q			1000		$\pm 35, \pm 30$	100		
ZXCT213Q			50		$\pm 100, \pm 95$	95		
ZXCT214Q			100		$\pm 75, \pm 60$	100		
ZXCT215Q			75		$\pm 75, \pm 60$	100		

Note 1. Independent of supply voltage

Ordering Information

Orderable Part Number	Compliance (Only Automotive Supports PPAP)	Gain Error (%)	Package Code	Package	Moisture Sensitivity	Packing	
						Quantity	Carrier
ZXCT21xQADW-7	Automotive	0.8	DW	SOT363	MSL-1	3,000	7" Tape & Reel
ZXCT21xQBDW-7	Automotive	0.8	DW	SOT363	MSL-1	3,000	7" Tape & Reel
ZXCT21xQCDW-7	Automotive	0.5	DW	SOT363	MSL-1	3,000	7" Tape & Reel