INTRODUCTION

First Sensors SSO series offers rugged OEM pressure sensors in a fully welded, media isolated stainless steel construction. These devices are temperature compensated from 0...50 °C when using constant current excitation. This application note describes the design of an appropriate constant current source.

CIRCUIT DESIGN

To achieve a constant current source a circuit with a single operational amplifier is used as shown in Fig. 1. The current source is controlled by a ±1 % band-gap reference diode $Z_R$.

The reference current $I_R$ is defined by

$$I_R = \frac{V_R - V_O}{R_2}$$

where

- $V_R$ = Diode reference voltage (1.235 V ±1 %)
- $V_O$ = Amplifier offset voltage (~0 V)
- $R_2$ = Current set resistor (820 Ω)

Selecting amplifier $A_1$ with an offset voltage <1 mV and a ±0.1 % tolerance resistor $R_2$ with a standard value of 820 Ω delivers a current of $I_R = 1.506$ mA with a typical accuracy of ±1.2 %.

![Figure 1: Constant current source for First Sensors SSO temperature compensated pressure sensors](image-url)