环境温度对集成微沟道温差空气流量传感器的影响及其补偿

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摘　要：

摘　要：本文研究了环境温度对集成微沟道的热式空气流量传感器的影响，并提出了一种空气流量传感器的环境温度补偿方案。这种传感器的测试原理是通过温度场的变化来反映空气流速，由于加热电阻上下游的温度差会随着环境温度的变化而发生变化，从而导致测试结果出现偏差。随着环境温度的增加，上下游温差变小，输出电压也减小，但可测试范围增加。同时，文中提出的一种环境温度补偿方案是在芯片上游放置一环境温度测试电阻，将环境温度转化为电阻信号，以作为环境温度补偿依据，最终使得加热电阻与环境温度的温差保持恒定，这样就减小了环境温度的变化带来的测试误差。当流速为2.5m/s，环境温度分别为0℃，27℃和50℃时，补偿前传感器的输出电压信号分别为 4.5V, 3.6V和2.4V，补偿后传感器的输出电压信号分别为 3.62V, 3.68V和3.75V。

关键词：空气流量传感器,环境温度,测试影响,补偿

The effects of and compensation ambient temperature on an air flow sensor integrated micro channel

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Abstract:

Abstract: In this article, the effect of ambient temperature on an air flow sensor integrated micro channel is studied, and a compensation solution of ambient temperature is proposed. For this flow sensor, the air flow velocity is obtained by testing temperature difference of upstream and downstream, and the temperature difference changes with ambient temperature. This can bring test bias. The increase of ambient temperature would cause the temperature difference of upstream and downstream decrease and output voltage decrease, but measurable range becomes wider. In this article, the compensation solution is that a film resistance used to test ambient temperature is installed in the upstream of chip. By this way the ambient temperature can transfer into voltage signal as the reference of compensation. The compensation solution is aimed to let the temperature difference of ambient and heater resistance maintain constant, meanwhile the measure deviation caused by ambient temperature change would decrease. When the air flow velocity is 2.5m/s and ambient temperature is 0℃，27℃ and 50℃, the output voltage signal is 4.5V，3.6V and 2.4V respectively before compensation, after compensation the output voltage signal is 3.62V, 3.68V and 3.75V respectively.

Keywords: Air flow sensor, Ambient temperature, Test effect, Compensation.

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