



Low Voltage Temperature Sensors

Data Sheet

TMP35/TMP36/TMP37

FEATURES

- Low voltage operation (2.7 V to 5.5 V)
- Calibrated directly in °C
- 10 mV/°C scale factor (20 mV/°C on **TMP37**)
- ±2°C accuracy over temperature (typ)
- ±0.5°C linearity (typ)
- Stable with large capacitive loads
- Specified -40°C to +125°C, operation to +150°C
- Less than 50 µA quiescent current
- Shutdown current 0.5 µA max
- Low self-heating
- Qualified for automotive applications

APPLICATIONS

- Environmental control systems
- Thermal protection
- Industrial process control
- Fire alarms
- Power system monitors
- CPU thermal management

GENERAL DESCRIPTION

The **TMP35/TMP36/TMP37** are low voltage, precision centigrade temperature sensors. They provide a voltage output that is linearly proportional to the Celsius (centigrade) temperature. The **TMP35/TMP36/TMP37** do not require any external calibration to provide typical accuracies of ±1°C at +25°C and ±2°C over the -40°C to +125°C temperature range.

The low output impedance of the **TMP35/TMP36/TMP37** and its linear output and precise calibration simplify interfacing to temperature control circuitry and ADCs. All three devices are intended for single-supply operation from 2.7 V to 5.5 V maximum. The supply current runs well below 50 µA, providing very low self-heating—less than 0.1°C in still air. In addition, a shutdown function is provided to cut the supply current to less than 0.5 µA.

The **TMP35** is functionally compatible with the LM35/LM45 and provides a 250 mV output at 25°C. The **TMP35** reads temperatures from 10°C to 125°C. The **TMP36** is specified from -40°C to +125°C, provides a 750 mV output at 25°C, and operates to 125°C from a single 2.7 V supply. The **TMP36** is functionally compatible with the LM50. Both the **TMP35** and **TMP36** have an output scale factor of 10 mV/°C.

FUNCTIONAL BLOCK DIAGRAM

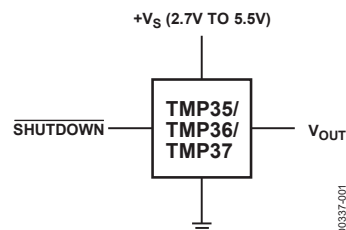


Figure 1.

PIN CONFIGURATIONS

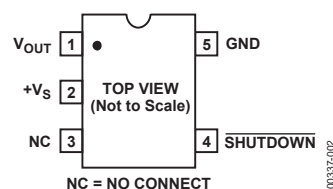


Figure 2. R-5 (SOT-23)

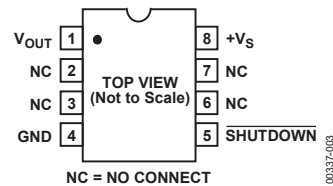


Figure 3. R-8 (SOIC_N)

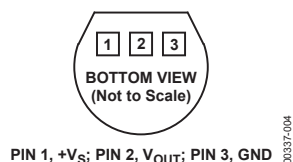


Figure 4. T-3 (TO-92)

The **TMP37** is intended for applications over the range of 5°C to 100°C and provides an output scale factor of 20 mV/°C. The **TMP37** provides a 500 mV output at 25°C. Operation extends to 150°C with reduced accuracy for all devices when operating from a 5 V supply.

The **TMP35/TMP36/TMP37** are available in low cost 3-lead TO-92, 8-lead SOIC_N, and 5-lead SOT-23 surface-mount packages.

Rev. G

Document Feedback

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TYPICAL PERFORMANCE CHARACTERISTICS

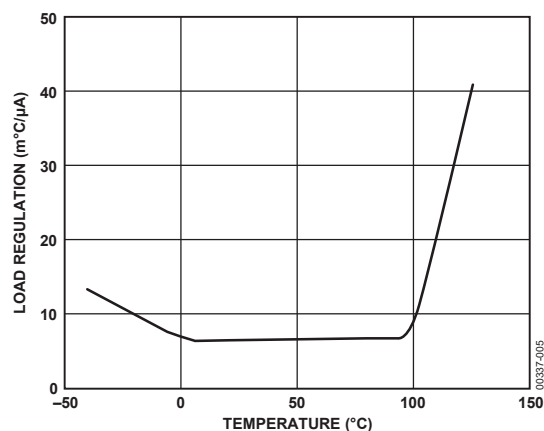


Figure 5. Load Regulation vs. Temperature (m°C/μA)

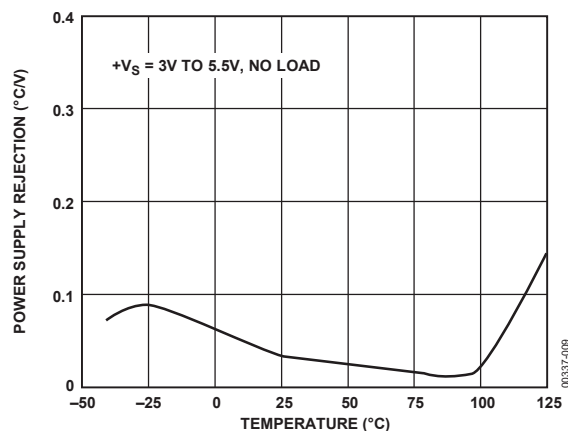


Figure 8. Power Supply Rejection vs. Temperature

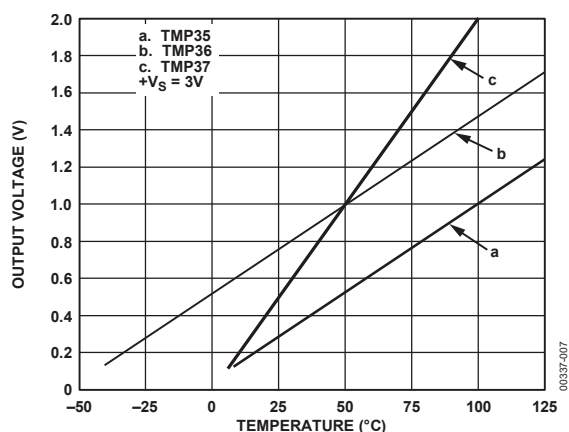


Figure 6. Output Voltage vs. Temperature

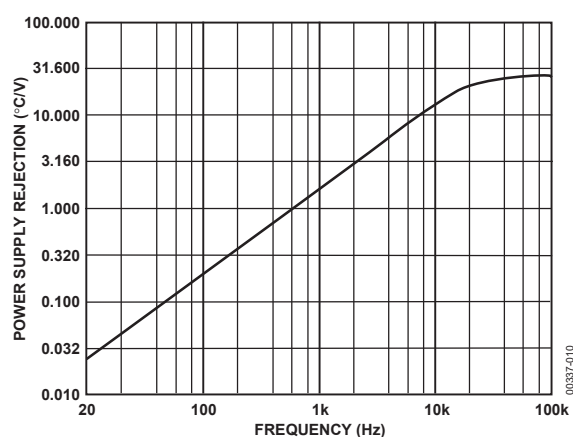


Figure 9. Power Supply Rejection vs. Frequency

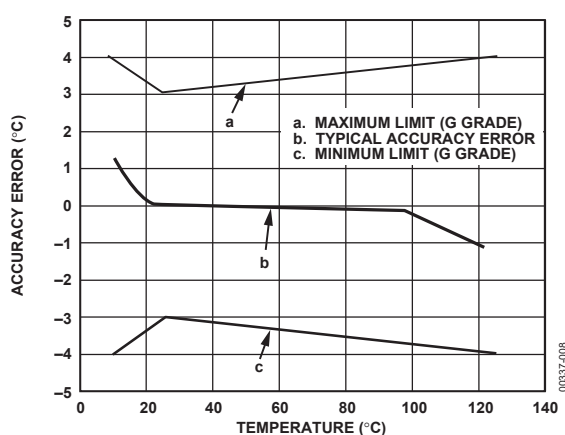


Figure 7. Accuracy Error vs. Temperature

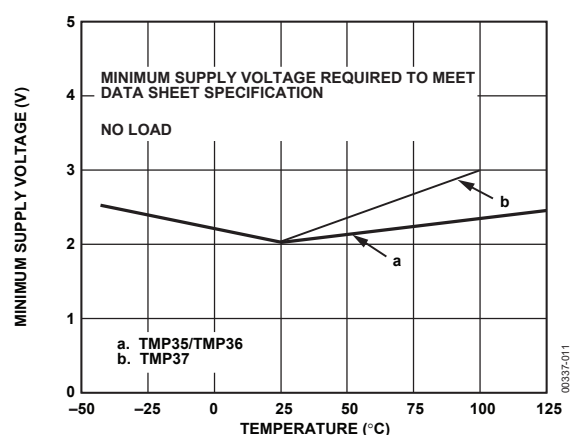


Figure 10. Minimum Supply Voltage vs. Temperature