

LM50B/LM50C

Single-Supply Centigrade Temperature Sensor

General Description

The LM50 is a precision integrated-circuit temperature sensor that can sense a -40°C to $+125^{\circ}\text{C}$ temperature range using a single positive supply. The LM50's output voltage is linearly proportional to Celsius (Centigrade) temperature ($+10\text{ mV}/^{\circ}\text{C}$) and has a DC offset of $+500\text{ mV}$. The offset allows reading negative temperatures without the need for a negative supply. The ideal output voltage of the LM50 ranges from $+100\text{ mV}$ to $+1.75\text{V}$ for a -40°C to $+125^{\circ}\text{C}$ temperature range. The LM50 does not require any external calibration or trimming to provide accuracies of $\pm 3^{\circ}\text{C}$ at room temperature and $\pm 4^{\circ}\text{C}$ over the full -40°C to $+125^{\circ}\text{C}$ temperature range. Trimming and calibration of the LM50 at the wafer level assure low cost and high accuracy. The LM50's linear output, $+500\text{ mV}$ offset, and factory calibration simplify circuitry required in a single supply environment where reading negative temperatures is required. Because the LM50's quiescent current is less than $130\text{ }\mu\text{A}$, self-heating is limited to a very low 0.2°C in still air.

Applications

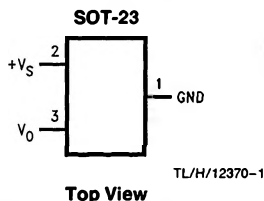
- Computers
- Disk Drives

- Battery Management
- Automotive
- FAX Machines
- Printers
- Portable Medical Instruments
- HVAC
- Power Supply Modules

Features

- Calibrated directly in $^{\circ}\text{C}$ (Centigrade)
- Linear $+10.0\text{ mV}/^{\circ}\text{C}$ scale factor
- $\pm 2^{\circ}\text{C}$ accuracy guaranteed at $+25^{\circ}\text{C}$
- Specified for full -40° to $+125^{\circ}\text{C}$ range
- Suitable for remote applications
- Low cost due to wafer-level trimming
- Operates from 4.5V to 10V
- Less than $130\text{ }\mu\text{A}$ current drain
- Low self-heating, less than 0.2°C in still air
- Nonlinearity less than 0.8°C over temp

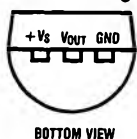
Connection Diagrams



See NS Package Number M03B
(JEDEC Registration TO-236AB)

Order Number	SOT-23 Device Marking	Supplied As
LM50BIM3	T5B	250 Units on Tape and Reel
LM50CIM3	T5C	250 Units on Tape and Reel
LM50BIM3X	T5B	3000 Units on Tape and Reel
LM50CIM3X	T5C	3000 Units on Tape and Reel

TO-92
Plastic Package

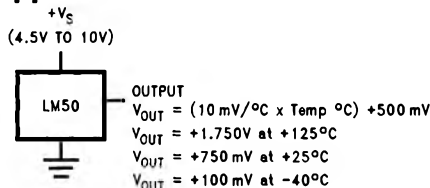


TL/H/12370-2

Order Number LM50BIZ
or LM50CIZ

See NS Package Number Z03A

Typical Applications



TL/H/12370-3

FIGURE 1. Full-Range Centigrade Temperature Sensor (-40°C to $+125^{\circ}\text{C}$)