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Jameco Part Number 1993948

LM45B/LM45C

SOT-23 Precision Centigrade Temperature Sensors

General Description

The LM45 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM45 does not require any external calibration or trimming to provide accuracies of $\pm 2^\circ\text{C}$ at room temperature and $\pm 3^\circ\text{C}$ over a full -20 to $+100^\circ\text{C}$ temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM45's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with a single power supply, or with plus and minus supplies. As it draws only $120\ \mu\text{A}$ from its supply, it has very low self-heating, less than 0.2°C in still air. The LM45 is rated to operate over a -20° to $+100^\circ\text{C}$ temperature range.

Applications

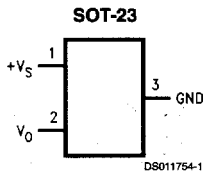
- Battery Management
- FAX Machines
- Printers

- Portable Medical Instruments
- HVAC
- Power Supply Modules
- Disk Drives
- Computers
- Automotive

Features

- Calibrated directly in $^\circ\text{C}$ (Centigrade)
- Linear $+ 10.0\ \text{mV}/^\circ\text{C}$ scale factor
- $\pm 3^\circ\text{C}$ accuracy guaranteed
- Rated for full -20° to $+100^\circ\text{C}$ range
- Suitable for remote applications
- Low cost due to wafer-level trimming
- Operates from 4.0V to 10V
- Less than $120\ \mu\text{A}$ current drain
- Low self-heating, 0.20°C in still air
- Nonlinearity only $\pm 0.8^\circ\text{C}$ max over temp
- Low impedance output, $20\ \Omega$ for $1\ \text{mA}$ load

Connection Diagram



Top View

See NS Package Number MA03B

Order Number	SOT-23 Device Marking	Supplied As
LM45BIM3	T4B	1000 Units on Tape and Reel
LM45BIM3X	T4B	3000 Units on Tape and Reel
LM45CIM3	T4C	1000 Units on Tape and Reel
LM45CIM3X	T4C	3000 Units on Tape and Reel

Typical Applications

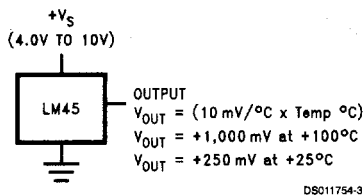
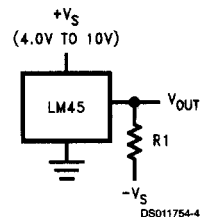


FIGURE 1. Basic Centigrade Temperature Sensor ($+25^\circ\text{C}$ to $+100^\circ\text{C}$)

OUTPUT
 $V_{\text{OUT}} = (10\ \text{mV}/^\circ\text{C} \times \text{Temp } ^\circ\text{C})$
 $V_{\text{OUT}} = +1,000\ \text{mV}$ at $+100^\circ\text{C}$
 $V_{\text{OUT}} = +250\ \text{mV}$ at $+25^\circ\text{C}$



Choose $R_1 = -V_S/50\ \mu\text{A}$
 $V_{\text{OUT}} = (10\ \text{mV}/^\circ\text{C} \times \text{Temp } ^\circ\text{C})$
 $V_{\text{OUT}} = +1,000\ \text{mV}$ at $+100^\circ\text{C}$
 $= +250\ \text{mV}$ at $+25^\circ\text{C}$
 $= -200\ \text{mV}$ at -20°C

FIGURE 2. Full-Range Centigrade Temperature Sensor (-20°C to $+100^\circ\text{C}$)