Temperature sensing for notebook PCs

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Notebook personal computers (PC) have become drastically thinner and smaller, while increasing graphic and computing capabilities. These changes contribute to more heat being generated throughout the system in a smaller space, creating a need for monitoring temperature to prevent overheating.

Commonly used types of temperature sensors are local temperature sensors and temperature switches. Local temperature sensors monitor the temperature at the location in which they are placed and report back to a microcontroller which can take steps to reduce the heat.

Temperature switches provide an alert when a fixed threshold is crossed, removing the need for a microcontroller. The temperature switch threshold can be factory-programmed, pin-selected, or resistor-programmed which allows for a hardware only shut-down circuit.

In addition to monitoring the temperature of the circuit, it is also important to monitor the temperature of the charging device, especially with USB-C interfaces as they support much higher current output than older USB interfaces.

***Figure 1**. Notebook PC*

The TMP102, TMP103, and TMP108 local digital temperature sensors are well-suited for notebook PCs due to their small size and low power.

The TMP709 and TMP302 temperature switches are also a good fit for notebook PCs, again due to their small size and low-power.

See table below for more details on these devices.

Part number	Interface	Accuracy (max)	Operating range	Supply range	Package type	Package footprint
TMP102	I^2C / SMBUS	±2°C	-40°C to 125°C	1.4 V to 3.6 V	SOT-563	1.60 x 1.60 mm
TMP103	I^2C / SMBUS	±2°C	-40°C to 125°C	1.4 V to 3.6 V	DSBGA	0.76 x 0.76 mm
TMP108	I^2C / SMBUS	±0.75°C	-40°C to 125°C	1.4 V to 3.6 V	DSBGA	1.20 x 0.80 mm
TMP709	n/a	±3°C	0°C to 125°C	2.7 V to 5.5 V	SOT-23	2.90 x 1.60 mm
TMP302	n/a	±2°C	-40°C to 125°C	1.4 V to 3.6 V	SOT-563	1.60 x 1.60 mm

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