Kernel driver tmp513

Supported chips:

- Texas Instruments TMP512

  Prefix: 'tmp512'

  Datasheet: https://www.ti.com/lit/ds/symlink/tmp512.pdf

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Description

This driver implements support for Texas Instruments TMP512, and TMP513. The TMP512 (dual-channel) and TMP513 (triple-channel) are system monitors that include remote sensors, a local temperature sensor, and a high-side current shunt monitor. These system monitors have the capability of measuring remote temperatures, on-chip temperatures, and system voltage/power/current consumption.

The temperatures are measured in degrees Celsius with a range of -40 to + 125 degrees with a resolution of 0.0625 degree C.

For hysteresis value, only the first channel is writable. Writing to it will affect all other values since each channels are sharing the same hysteresis value. The hysteresis is in degrees Celsius with a range of 0 to 127.5 degrees with a resolution of 0.5 degree.

The driver exports the temperature values via the following sysfs files:

temp[1-4]_input

temp[1-4]_crit

temp[1-4]_crit_alarm

temp[1-4]_crit_hyst

The driver read the shunt voltage from the chip and convert it to current. The readable range depends on the "ti,pga-gain" property (default to 8) and the shunt resistor value. The value resolution will be equal to 10uV/Rshunt.

The driver exports the shunt currents values via the following sysFs files:

curr1_input

curr1_lcrit

curr1_lcrit_alarm

curr1_crit

curr1_crit_alarm

The bus voltage range is read from the chip with a resolution of 4mV. The chip can be configurable in two different range (32V or 16V) using the ti,bus-range-microvolt property in the devicetree.

The driver exports the bus voltage values via the following sysFs files:

in0_input

in0_lcrit

in0_lcrit_alarm

in0_crit

in0_crit_alarm

The bus power and bus currents range and resolution depends on the calibration register value. Those values are calculate by the hardware using those formulas:

Current = (ShuntVoltage * CalibrationRegister) / 4096 Power = (Current * BusVoltage) / 5000

The driver exports the bus current and bus power values via the following sysFs files:

curr2_input

power1_input

power1_crit

power1_crit_alarm

The calibration process follow the procedure of the datasheet (without overflow) and depend on the shunt resistor value and the pga_gain value.