

# Kernel driver da9052

Supported chips:

- Dialog Semiconductors DA9052-BC and DA9053-AA/Bx PMICs

Prefix: 'da9052'

Datasheet: Datasheet is not publicly available.

Authors: David Dajun Chen <[dchen@diasemi.com](mailto:dchen@diasemi.com)>

## Description

The DA9052/53 provides an Analogue to Digital Converter (ADC) with 10 bits resolution and track and hold circuitry combined with an analogue input multiplexer. The analogue input multiplexer will allow conversion of up to 10 different inputs. The track and hold circuit ensures stable input voltages at the input of the ADC during the conversion.

The ADC is used to measure the following inputs:

Channel 0	VDDOUT - measurement of the system voltage
Channel 1	ICH - internal battery charger current measurement
Channel 2	TBAT - output from the battery NTC
Channel 3	VBAT - measurement of the battery voltage
Channel 4	ADC_IN4 - high impedance input (0 - 2.5V)
Channel 5	ADC_IN5 - high impedance input (0 - 2.5V)
Channel 6	ADC_IN6 - high impedance input (0 - 2.5V)
Channel 7	XY - TSI interface to measure the X and Y voltage of the touch screen resistive potentiometers
Channel 8	Internal Tjunc. - sense (internal temp. sensor)
Channel 9	VBBAT - measurement of the backup battery voltage

By using sysfs attributes we can measure the system voltage VDDOUT, the battery charging current ICH, battery temperature TBAT, battery junction temperature TJUNC, battery voltage VBAT and the back up battery voltage VBBAT.

## Voltage Monitoring

Voltages are sampled by a 10 bit ADC.

The battery voltage is calculated as:

$$\text{Milli volt} = ((\text{ADC value} * 1000) / 512) + 2500$$

The backup battery voltage is calculated as:

$$\text{Milli volt} = (\text{ADC value} * 2500) / 512;$$

The voltages on ADC channels 4, 5 and 6 are calculated as:

$$\text{Milli volt} = (\text{ADC value} * 2500) / 1023$$

## Temperature Monitoring

Temperatures are sampled by a 10 bit ADC. Junction and battery temperatures are monitored by the ADC channels.

The junction temperature is calculated:

$$\text{Degrees celsius} = 1.708 * (\text{TJUNC\_RES} - \text{T\_OFFSET}) - 108.8$$

The junction temperature attribute is supported by the driver.

The battery temperature is calculated:

$$\text{Degree Celsius} = 1 / (t1 + 1/298) - 273$$

where  $t1 = (1/B) * \ln((\text{ADCval} * 2.5) / (\text{R25} * \text{ITBAT} * 255))$

Default values of R25, B, ITBAT are 10e3, 3380 and 50e-6 respectively.