We use the C-ADC of the ADBMS6830B to measure the cell voltages of the battery. The maximum lifetime error for voltage measurement is ±2 mV, since the maximum voltage of the cell is 4,2 V. (Fig. 1) [1]

SPECIFICATIONS

Specifications apply over the full V+ operating voltage range and full operating junction temperature range (T_J = −40°C to +125°C), unless otherwise noted.

Table 1. C-ADC DC Specifications

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
MEASUREMENT RESOLUTION				0.15		mV/bit
DIFFERENTIAL INPUT RANGE	V_{DIF}	−0.1 V < (Cx to V−) < 80 V	−2		+5.5	V
ADC OFFSET VOLTAGE[1]				±0.1		mV
ADC GAIN ERROR[1]				±0.01		%
ADC UPDATE RATE			0.9	1	1.1	kHz
ADC TRANSITION NOISE				40		µV rms
LIFETIME CELL TOTAL MEASUREMENT ERROR	C-TME					
		V_{DIF} ≤ ±2.0 V			±1.5	mV
		V_{DIF} ≤ 3.3 V			±1.8	mV
		V_{DIF} ≤ 4.5 V			±2	mV
		V_{DIF} ≤ 5.5 V			±3	mV
INPUT LEAKAGE CURRENT		ADC off		0	±250	nA
DIFFERENTIAL INPUT RESISTANCE	R_{IN_ADC}	ADC on	1.6	2.2	3	MΩ
DIFFERENTIAL INPUT RESISTANCE DURING OPEN WIRE DETECTION				1.75		kΩ
ADC SAMPLING FREQUENCY	f_S		3.7	4.1	4.5	MHz

[1] The ADC specifications are guaranteed by the total measurement error specification.

Table 2. S-ADC DC Specifications

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
MEASUREMENT RESOLUTION				1.5[1]		mV/bit
INPUT RANGE	V_{DIF_S}	−0.1 V < (Sx to V−) < 80 V	−0.3		+5.5	V
ADC OFFSET VOLTAGE[2]				±0.2		mV
ADC GAIN ERROR[2]				±0.03		%
ADC UPDATE RATE			110	125	140	Hz
ADC TRANSITION NOISE				20		µV rms
S-ADC TOTAL MEASUREMENT ERROR	S-TME					
		0 V ≤ V_{DIF_S} ≤ 4.5 V			±7	mV
		V_{DIF_S} ≤ 5.5 V			±8	mV
INPUT LEAKAGE CURRENT		ADC off, V_{DIF_S} = 5.5 V		10	±300	nA
DIFFERENTIAL INPUT RESISTANCE		ADC on	1	1.8	2.6	MΩ
DIFFERENTIAL INPUT RESISTANCE DURING OPEN WIRE DETECTION				20		kΩ
GAIN DURING OPEN WIRE DETECTION		No open wire fault	85	90	95	%
ADC SAMPLING FREQUENCY	f_S		3.7	4.1	4.5	MHz

[1] The S-ADC result registers are normalized to the weight of the C-ADC results, allowing the same voltage conversion function to be applied. See the register description for more details.

[2] The ADC specifications are guaranteed by the total measurement error specification.

Figure 1: ADBMS6830B specifications

Reference

[1] *Data Sheet ADBMS6830B Rev.0 page 5.* analog.com, 01.2024.