

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]

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}	$-0.1 V < (C_x \text{ to } V-) < 80 V$	-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	$V_{DIF} \leq \pm 2.0 V$ $V_{DIF} \leq 3.3 V$ $V_{DIF} \leq 4.5 V$ $V_{DIF} \leq 5.5 V$			± 1.5 ± 1.8 ± 2 ± 3	mV mV mV mV
INPUT LEAKAGE CURRENT		ADC off		0	± 250	nA
DIFFERENTIAL INPUT RESISTANCE	R_{IN_ADC}	ADC on	1.6	2.2	3	M Ω
DIFFERENTIAL INPUT RESISTANCE DURING OPEN WIRE DETECTION				1.75		k Ω
ADC SAMPLING FREQUENCY	f_s		3.7	4.1	4.5	MHz

Figure 1: Table 1. C-ADC DC Specifications

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}	$-0.1 V < (S_x \text{ to } V-) < 80 V$	-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	$0 V \leq V_{DIF_S} \leq 4.5 V$ $V_{DIF_S} \leq 5.5 V$			± 7 ± 8	mV 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	M Ω
DIFFERENTIAL INPUT RESISTANCE DURING OPEN WIRE DETECTION				20		k Ω
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 2: Table 2. S-ADC DC Specifications

Reference

[1] *Table 3 Data Sheet ADBMS6830B Rev.0 page 5.* www.analog.com, 01.2024