DK8102-AQ-25 Product Brief

DKCMS® Core Cell Monitor

The DK8102-AQ-25 Cell Monitor is an intelligent sensing, monitoring, and reporting device. The Cell Monitor is connected to each cell in a battery pack and is powered from the cell itself. It operates as an element within the Dukosi Cell Monitoring System (DKCMS®) along with Dukosi's DK8202-AR-25 System Hub, proprietary C-SynQ® protocol and the DKCMS Library API.

In addition to continually monitoring voltage and temperature, the DK8102-AQ-25 checks the values against user-configured limits before reporting data to the BMS Host controller via the Dukosi DK8202-AR-25 System Hub. Communication to the System Hub is enabled by Dukosi's proprietary C-SynQ® protocol via a single bus antenna, providing a reliable, near field contactless cell monitoring network.

Features

- Per-cell voltage measurement with ±0.6 mV TME
- Multiple temperature measurements per cell:
  - A Die Temperature Sensor (DTS) and inputs to support up to two Thermistors
- Configurable min/max limits with limit breach reporting
- Passive cell balancing with configurable stop mechanisms
- Active, Low Power, and Hibernate operating modes
- Fault reporting
- Time-stamping of cell measurements (with a centralized time provided by the BMS Host)
- Cell Passport enabling lifetime, on-chip storage of cell data
- Secure, robust, near field contactless RF communication to the BMS Host controller via the System Hub
- Unique Device ID stored on-chip
- AEC-Q100 qualified

Benefits

- Optimize battery utilization with high-accuracy voltage and temperature measurements and synchronization of measurements across every cell in the pack
- Enhanced safety with per-cell, 24/7 temperature and voltage monitoring
- Support a wide range of balancing currents with cell measurement accuracy and redundancy unaffected during balancing
- Near field contactless communication using Dukosi C-SynQ and a single bus antenna:
  - Wired-like performance in a star-network configuration with predictable communication latency
  - Inherent isolation of the BMS from the pack HV simplifying the BMS design
  - Reduced BOM, simplified pack design, manufacturing, and test
- Enable a circular economy and sustainable battery chain with Cell Passport data stored on-chip and accessible without the need of a BMS

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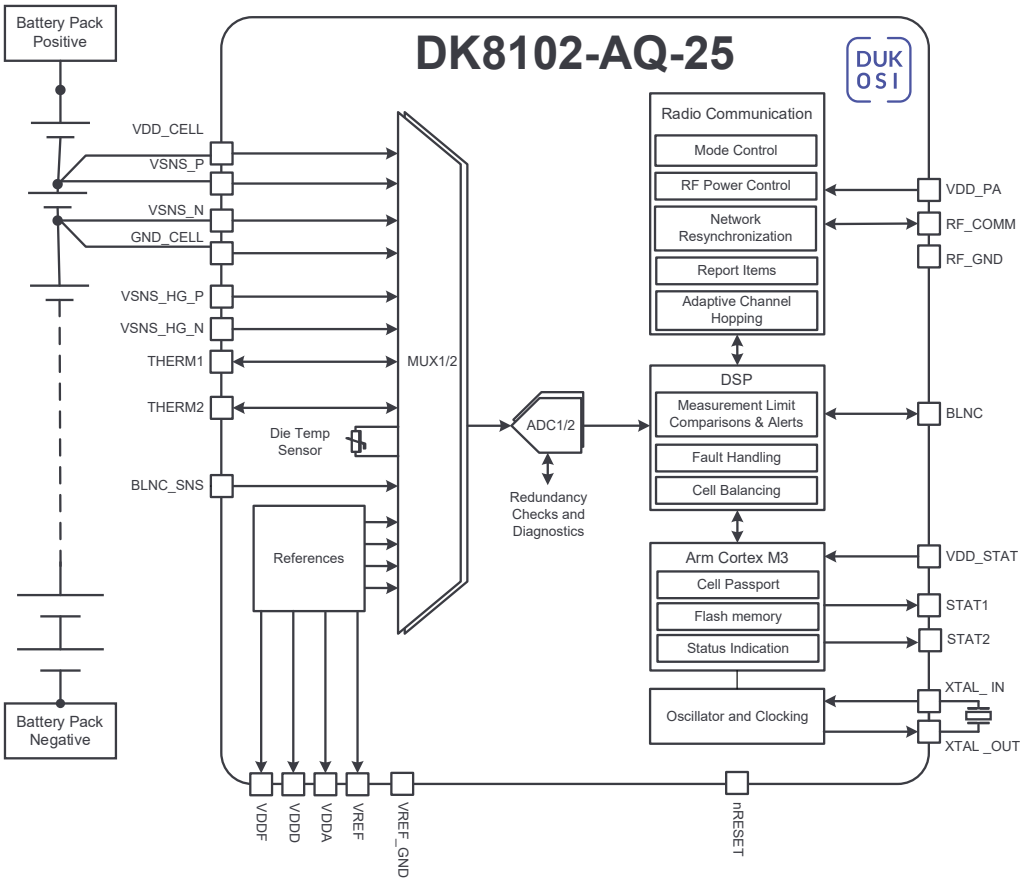
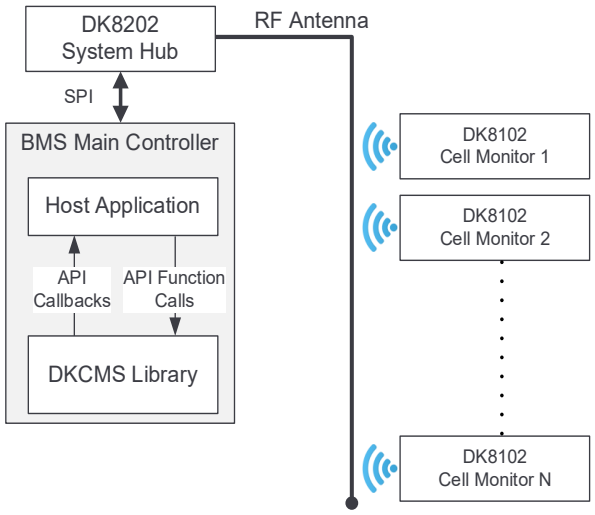
Block Diagram



Use Case

A DK8102-AQ-25 Cell Monitor is connected to each cell in a battery pack and is powered from the cell itself. Bi-directional communication between the BMS and each Cell Monitor is facilitated by a Dukosi DK8202-AR-25 System Hub, using the Dukosi C-SynQ® protocol with near field contactless communication via a single bus antenna. The BMS main controller hosts the DKCMS Library for interfacing with the rest of the system.



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Applications

- Multi-cell Li-ion battery systems
  - Automotive
  - Grid scale utility, commercial and industrial, and residential BESS
  - Industrial power systems and robotics
  - Marine and rail
- Compatible with a range of cell chemistries, cell formats and pack architectures

Key Parameters

Parameter	Typical Value (T_A = 25 °C)	Comments
Cell Voltage	1.5 V to 5.0 V	Supports a wide range of cell chemistries **Note** Full feature set available between 2.4 V and 5 V
VSNS Total Measurement Error (TME)	± 0.6 mV	Socket measurement, 1.5 V - 5.0 V, -40 °C to +85 °C
	± 0.7 mV	Soldered and measured, 3.7 V, -20 °C to +70 °C
Die Temperature Sensor TME	± 2 °C	Soldered and measured, 3.7 V, -20 °C to +70 °C
Thermistor TME	± 1 °C	Soldered and measured. Includes thermistor part to part variation as well as tolerance. 3.7 V, -20 °C to +70 °C
RF Band	2.402 GHz to 2.480 GHz	Near field communication, employing adaptive channel hopping for robustness and EMC performance
Cell Balancing Current (max.)	200 mA	With internal NFET. Balancing currents >200 mA can be supported through the use of an external FET
Active Mode Rate	10 Hz	Rate is for measurement and reporting
Low Power Mode Rate	0.2 Hz	Rate is for measurement and reporting
Hibernate Mode Rate	0.1 Hz	Rate is for measurement only
Cell Passport Storage	2 KiB	
Operating Temperature Range	-40 °C to +105 °C	

Ordering Table

Part Number	Description	Packaging	MOQ
DK8102-AQ-25/C	Cell Monitor, AEC-Q100 qualified, 32-pin, 5 mm x 5 mm QFN package	Cut Tape	1
DK8102-AQ-25/R		13” Reel	5000

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