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## DKCMS™ Core Cell Monitor

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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

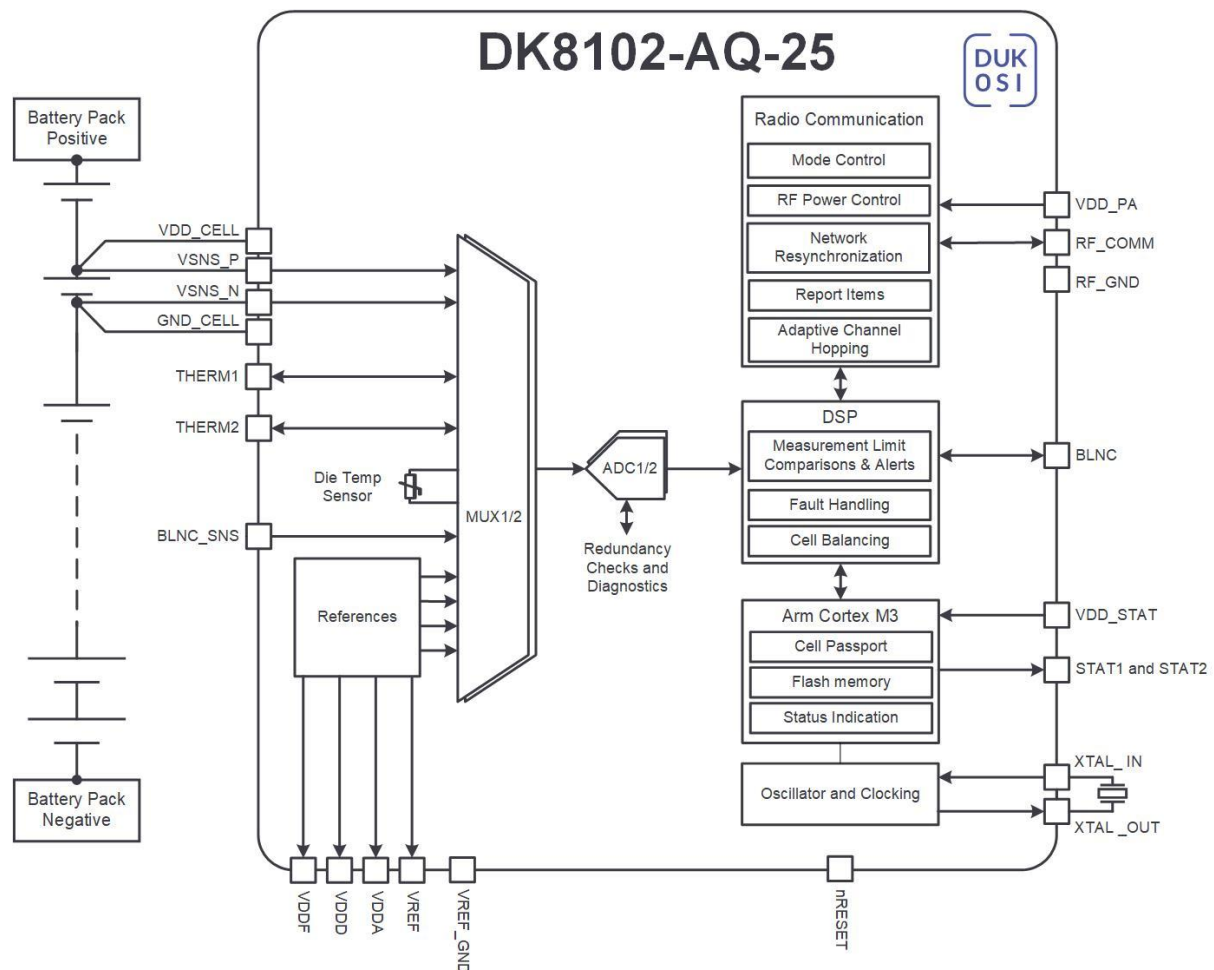
- ◆ Per-cell voltage measurement with  $\pm 0.6$  mV TME
- ◆ Multiple temperature measurements per cell:
  - ❖ A Die Temperature Sensor (DTS) and inputs to support up to two Thermistors
- ◆ Configurable min/max limits with limit breach reporting
- ◆ Passive cell balancing with configurable stop mechanisms
- ◆ Active, Low Power, and Hibernate operating modes
- ◆ Fault reporting
- ◆ 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, with potential failure modes designed out as complexities associated with wire harnesses and connectors are eliminated
  - ❖ 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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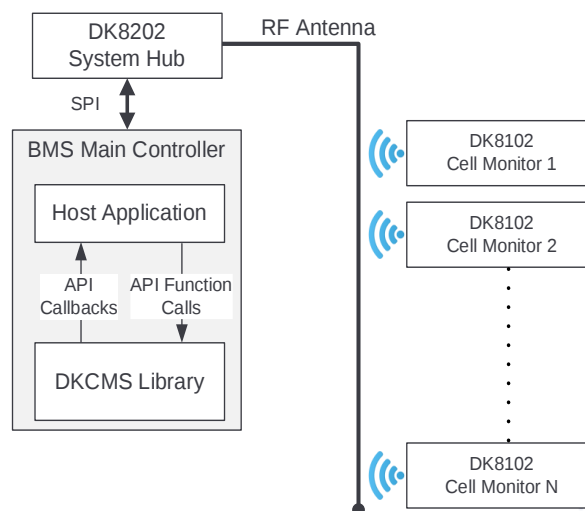
### Block Diagram



## DKCMS™ Core Cell Monitor

### 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.



### 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 <sub>A</sub> = 25 °C) | Comments                                                                                                      |
|---------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Cell Voltage                          | 1.5 V to 5.0 V                         | Supports a wide range of cell chemistries<br><b>Note</b> Full feature set available between 2.4 V and 5 V     |
| Voltage 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                   | 0.1 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                        |                                                                                                               |

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**Ordering Information**

| 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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