26-Cell EIS-Enabled Battery Monitoring IC

KA85010UA
Product Brief

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Support for Industry Standards and Quality Standards

Functional safety standards for automobiles ISO 26262	**Yes**
AEC-Q100	**Yes**
Market failure rate	**10 FIT**

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26-Cell EIS-Enabled Battery Monitoring IC

Features

- Supports up to 26 series-connected cells
- Electrochemical impedance spectroscopy (EIS)
- Measurement accuracy: < 2.0 mV (end of life)
- Redundant measurement system for functional safety
- 4 MHz serial interface with packet error checking
- Bidirectional daisy-chain connection of up to 55 ICs using twisted-pair differential signaling
- Alarm function for OV, UV, OT, and UT
- Intermittent operation mode with low power consumption (stand-alone)
- Cell-balancing options
  - Internal 300 mA cell-balancing with built-in MOSFET
  - External cell-balancing with external N-channel MOSFET
- 14 general-purpose input/output (GPIO) pins total
- 16-bit parallel delta-sigma ADC
- SPI master function
- Designed for ISO 26262-compliant systems (ASIL-D)
- AEC-Q100 compliant
- PKG : 128 pin LQFP

Overview

The KA85010UA is a 26-channel battery stack monitoring IC that measures the voltages of up to 26 series-connected cells, for a total of up to 135.2 V. All cell voltages are measured by two independent measurement paths: data acquisition ADCs and monitoring ADCs, making this solution ideal for high-voltage automotive battery applications that require functional safety.

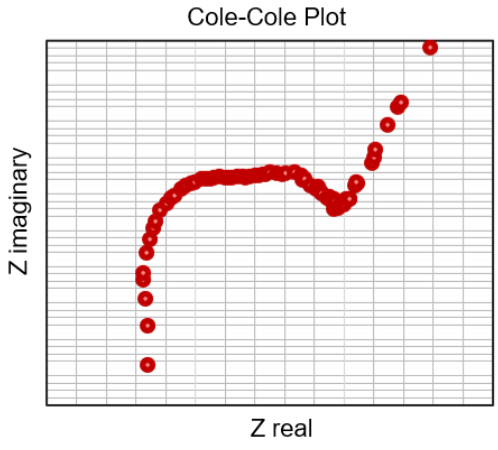
The EIS data obtained with the KA85010UA can be utilized for estimating battery conditions such as degradation and temperature.

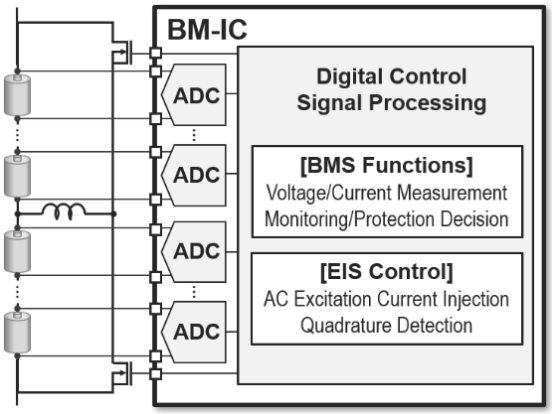
Applications

- Battery Electric Vehicle (BEV)
- Plug-in Hybrid Electric Vehicle (PHEV)
- Hybrid Electric Vehicle (HEV)
- Energy Storage Systems (ESS)
- Data Center Backup Power Systems and UPS
- Other battery-powered applications

Advanced Battery Diagnostics with EIS

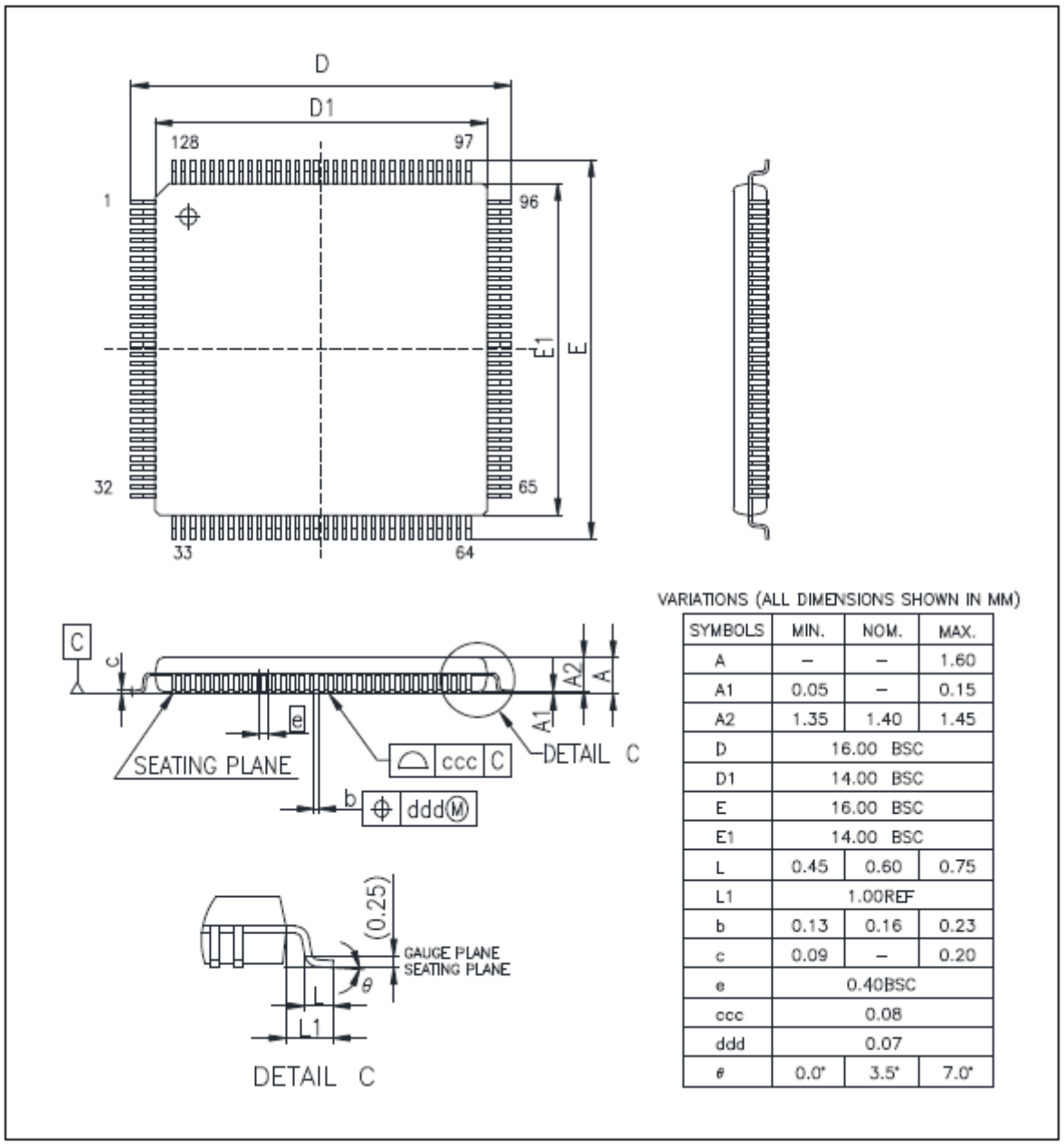
The KA85010UA combines battery monitoring and EIS-based impedance measurement in a single chip, enabling onboard battery diagnostics without dedicated measurement equipment. By analyzing impedance responses across multiple frequency ranges, EIS provides insights into battery terminals, wiring, electrolyte condition, electrode behavior, and internal electrochemical processes. These insights enable the estimation of SOH and internal temperature, lifetime prediction, and early detection of cell abnormalities, thereby enhancing battery safety in automotive and energy storage systems.





Dimensions

LQFP128L 14x14mm², Thickness 1.40mm, Lead Pitch 0.40mm, Lead Length 1.00mm



VARIATIONS (ALL DIMENSIONS SHOWN IN MM)

SYMBOLS	MIN.	NOM.	MAX.
A	–	–	1.60
A1	0.05	–	0.15
A2	1.35	1.40	1.45
D		16.00 BSC	
D1		14.00 BSC	
E		16.00 BSC	
E1		14.00 BSC	
L	0.45	0.60	0.75
L1		1.00REF	
b	0.13	0.16	0.23
c	0.09	–	0.20
e		0.40BSC	
ccc		0.08	
ddd		0.07	
θ	0.0°	3.5°	7.0°

Usage Notes

1. Ensure that the KA85010UA is mounted in the correct orientation. Mounting the device in an incorrect orientation may result in smoke, fire, or damage to the device.
2. Design the PCB layout carefully to prevent shorts between pins.
3. Before applying power, perform a visual inspection of the PCB and verify the assembly quality to ensure that no solder bridges, solder balls, or other conductive contaminants are present. Failure to do so may result in damage to the IC.
4. Take appropriate precautions when using this IC under abnormal conditions such as a short between an output pin and VBAT, a short between an output pin and CVDD, a short between an output pin and GND, a short between output pins, or leakage current between pins. The extent of damage depends on the current capability of the power supply. Therefore, appropriate safety measures, such as fuses, are recommended.
5. The protection circuits are intended to maintain safety under abnormal operating conditions and should not be activated during normal operation. In particular, if the safe operating area or the Absolute Maximum Ratings are exceeded, even momentarily, due to a short between an output pin and VBAT, CVDD, or GND, the IC may be damaged before the thermal protection circuit can respond.
6. Evaluate the potential risks resulting from failures or malfunctions of external components used in the application.

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