

Infineon's Customer Connector TLE9012DQU and TLE9015DQU

Q2 FY2021/22



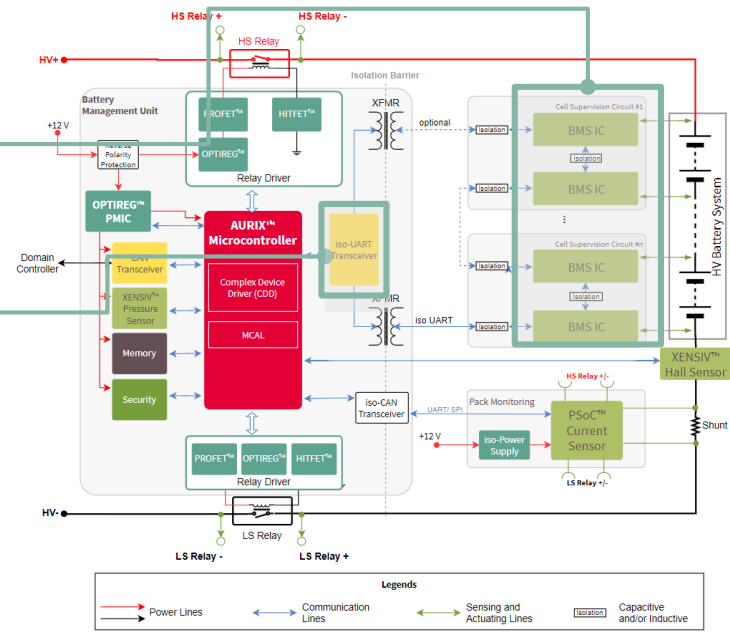
Our components are a perfect match with customer system needs

Li-ion battery monitoring and sensing IC

Main component(s)	Infineon product offering
> TLE9012DQU	> Li-ion battery monitoring and balancing system IC designed for Li-Ion battery packs

Iso UART transceiver IC

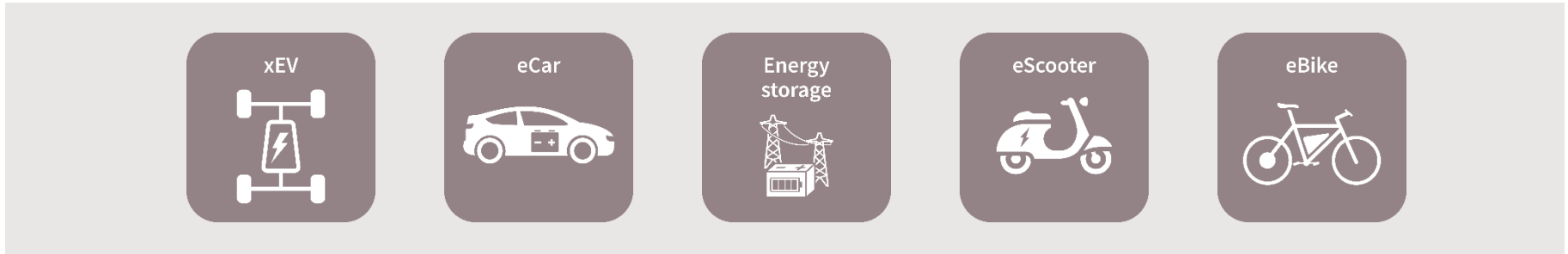
Main component(s)	Infineon product offering
> TLE9015DQU	> Transceiver IC designed for connecting several TLE9012DQU devices in a daisy chain



Target applications

BMS IC

Infineon's battery management ICs offers an optimize solution for cell monitoring and balancing



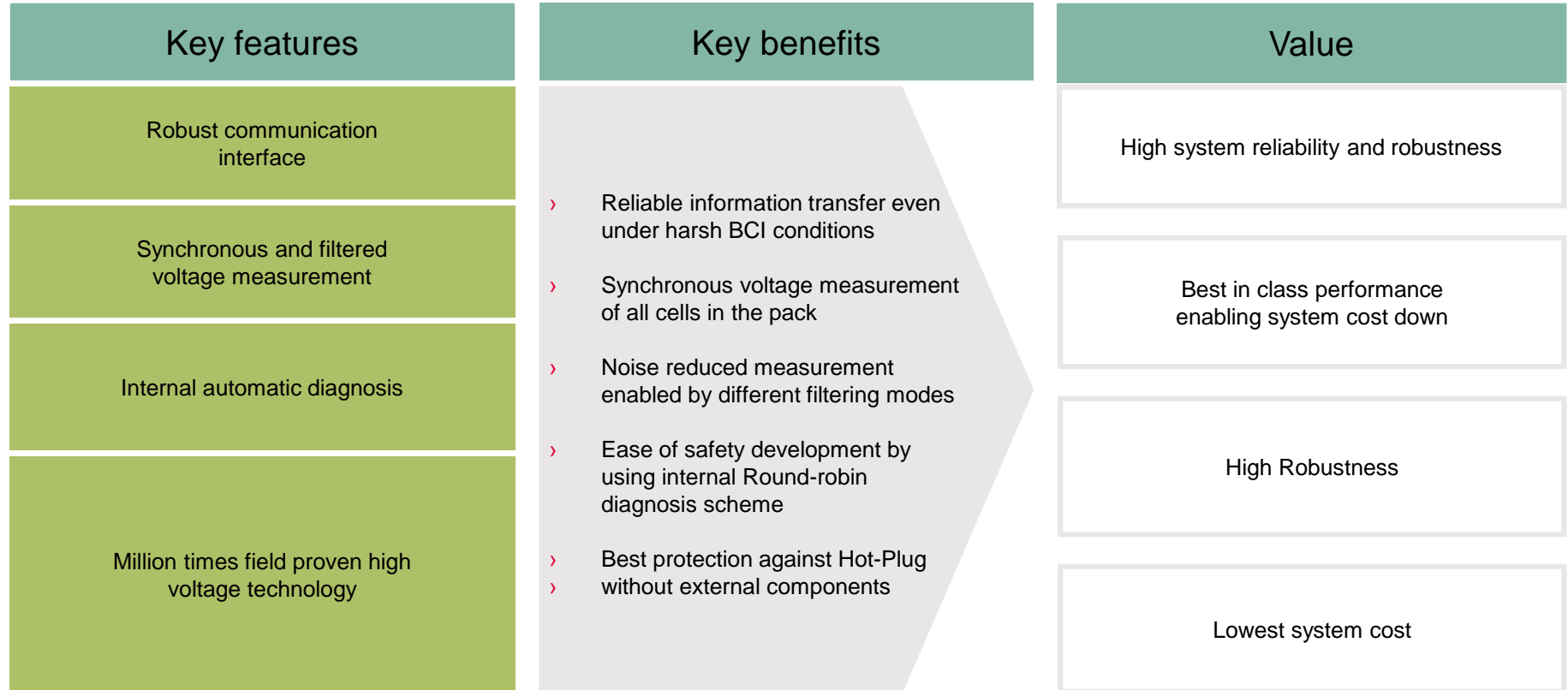
Motivation

- > Certain battery cell chemistries may become unstable in case of over voltage, charging after under voltage or overcurrent. Therefore, the Battery Management System is there to ensure that the cells in the system are always operated inside the SOA of the given chemistry. Infineon products contribute by providing voltage of each cell and temperature measurement through external resistor (NTC) as well as communicating the results to the main microcontroller

Product description

- > Based on Infineon state of the art technologies, our sensing IC is capable of accurately measure voltages and temperatures inside the battery as well as reliably communicate them to the main controller by using the BMS daisy chain transceiver IC

Key features and benefits



Guiding questions

Summary of key arguments

- › Communication interface passed 200mA BCI test using exclusively capacitive isolation
- › Hot plugging up to 4.5V per cell tested and passed even in 96 cell configuration
- › 13x ADCs per chip enable synchronous measurement without data loss
- › Optimized BOM in both size and cost

FAQs

- › **Is it possible to connect directly TLE9012DQU to the microcontroller on the same GND)**
- › Yes, TLE9012DQU can also communicate through UART interface included in the GPIO pins
- › **Is capacitive isolation mandatory?**
- › TLE9012/15DQU family can communicate with either capacitive or inductive isolation. Inductive isolation is only recommended between the BMU and the first slave
- › **What is the minimum cell count which the device that can be used?**
- › Minimum input voltage is 4.75V, therefore depending on chemistry down to 3 cells might be possible

Questions to ask (to customers)

1. **What is the most important feature for a BMS sensing IC?**
(Measurement accuracy, System offering/roadmap, measurement synchronicity, System cost, System robustness, etc)
2. **What are the main noise sources in the application and on which frequencies are they located (inverter, DC/DC, etc..)?**
TLE9012DQU offers different filtering options to improve accuracy in noisy environments
3. **What is the module size now and trend for the future?**
TLE9012DQU is optimized for modules with less 12 cells. Several devices can be combined for higher number of cells.
4. **Is communication in noisy environments a problem in your application?**
TLE9012DQU has been tested showing reliable results for highest BCI standards even using only capacitive coupling that improves the system cost
5. **How many temperature sensors are required by the system and what is the long term trend?**
TLE9012DQU can offer up to 5 NTC sensor connections that can be measured automatically
6. **Is the system distributed or centralized?**
TLE9012DQU offers also the possibility to communicate directly through TTL levels without the need of a transceiver in the chain

Ordering information

OPN Ordering part number	SP number Ordering Code	MDQ/MQQ/MOQ*	Registerable	Package
TLE9012DQUXUMA1	SP003903998	2500	Yes	TQFP-48
TLE9015DQUXUMA1	SP003904018	2500	Yes	TQFP-48

* MDQ: Minimum Design Quantity
 MQQ: Minimum Quote Quantity
 MOQ: Minimum Order Quantity

Support

Product family name



Marketing material

- > Product briefs
- > Presentations
- > Press releases

Technical material

- > Application notes
- > Technical articles
- > Simulation models
- > Datasheets, MCDS files
- > PCB design data

Evaluation boards

- > Evaluation boards

Videos/ Distribution trainings

- > Technical videos
- > Product information videos

- > Link to product pages:
 - <https://www.infineon.com/TLE9012DQU-product-type-page>
 - <https://www.infineon.com/TLE9015DQU-product-type-page>
- > Link to order now
 - <https://www.infineon.com/tle9012dqu/order>
 - <https://www.infineon.com/tle9015dqu/order>
- > Link to family page:
 - <https://www.infineon.com/bmsic>
 - <https://www.infineon.com/battery-management-ic>
- > Link to documents
 - <https://www.infineon.com/tle9012dqu/documents>
 - <https://www.infineon.com/tle9015dqu/documents>
- > Link to simulation
 - <https://www.infineon.com/tle9012dqu/simulation>
 - <https://www.infineon.com/tle9015dqu/simulation>

MyInfineon



The screenshot shows the Infineon website header with navigation links: [Products](#), [Applications](#), [Tools](#), [About Infineon](#), [Careers](#), [Newsletter](#), [Contact](#), [Where to Buy](#), [FAQ](#). A search bar is present with the text "Search". A dropdown menu for "myInfineon login" is open, showing options: "Lorenzo, you are logged in", "My Dashboard", "My Profile", "Log out", and "myInfineon (cid)".

The main content area features a banner for "IoT Security Circle" at "electronica 2016". The text on the banner reads: "Join Infineon's IoT Security Circle (Nov. 8-9, 2016) at electronica 2016 in Munich. Experience security solutions first hand and exchange with renowned experts." Below the banner is a button that says "Register now for free!".

At the bottom, there are three columns of product categories:

- Products**
 - Applications
 - Tools
 - Support
 - Technology
 - Partners
- Power**
 - Automotive System IC
 - ESD, Surge and Fuse
 - HiRel
 - Microcontroller
 - RF & Wireless Control
 - Sensor
 - Security & Smart Card Solutions
- Power Overview**
 - Power MOSFET
 - IGBT
 - Smart Low-Side & High-Side Switches
 - Linear Voltage Regulator
 - DC-DC Converter
 - Lighting ICs
 - Audio Driver ICs
 - Class-D Audio (HiFi)

Support Online tools and services



The screenshot shows the Infineon website's navigation bar with the following items: **infineon**, Products, Appli, **Tools**, About Infineon, and Careers. The 'Tools' menu item is highlighted with a red box and a circled '3'. In the top right corner, there are links for 'Newsletter' (circled '1'), 'Where to Buy' (circled '2'), 'English', and 'Login'. A search bar is also present.

The main content area features a large image of a city skyline at night. Overlaid on the right side of the image is a teal box with the text 'Lighting' and a sub-headline 'New LED controller enables low-wattage luminaire designs August 26th 17:00 CEST'. Below this is a 'Register Now!' button with a right-pointing arrow.

Below the main image is a horizontal menu with three categories: 'Products', 'Power', and 'Power Overview'. Under 'Products', the items are 'Applications', 'Tools', 'Support' (circled '4' and highlighted with a red box), and 'Technology'. Under 'Power', the items are 'Automotive System IC', 'ESD & EMI', 'Microcontroller', 'RF & Wireless Control', 'Security IC', 'Sensor', 'Smart Card IC', 'Interface', and 'Transistor & Diode'. Under 'Power Overview', the items are 'Power MOSFET', 'IGBT', 'Smart Low-Side & High-Side Switches', 'Linear Voltage Regulator', 'DC-DC Converter', 'LED Driver | Lighting ICs', 'Silicon Carbide (SiC)', 'High Power Thyristors & Diodes', 'Motor Control & Gate Driver', and 'AC-DC Supply'.

- 1 **Subscribe to newsletter**
- 2 **Where to buy**
- 3 **Tools, finders and selectors**
- 4 **Support**



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