

bq27426 System-Side Impedance Track™ Fuel Gauge

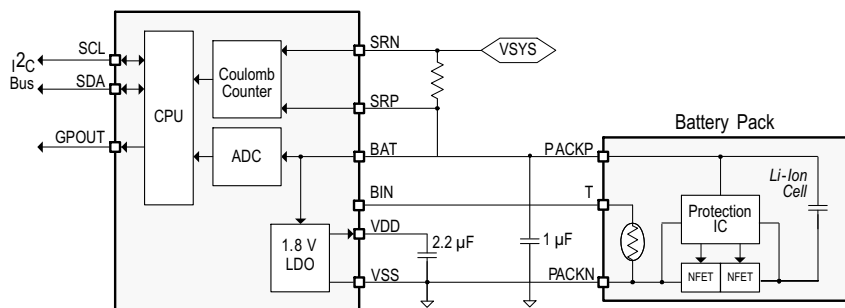
1 Features

- Single-Cell Li-Ion Battery Fuel Gauge
 - Resides on System Board
 - Supports Embedded or Removable Batteries
 - Powers Directly from the Battery with Integrated LDO
 - Supports a Low-Value External Sense Resistor (10 mΩ)
- Ultra Low Power Consumption in NORMAL (50 μA) and SLEEP (9 μA) Modes
- Battery Fuel Gauging Based on Patented Impedance Track™ Technology
 - Provides Three Selectable Pre-Programmed Profiles for 4.2-V, 4.35-V, and 4.4-V Cells
 - Reports Remaining Capacity and State-of-Charge (SOC) with Smoothing Filter
 - Adjusts Automatically for Battery Aging, Self-Discharge, Temperature, and Rate Changes
 - Estimates Battery State-of-Health (Aging)
- Microcontroller Peripheral Interface Supports:
 - 400-kHz I²C™ Serial Interface
 - Configurable SOC Interrupt or Battery Low Digital Output Warning
 - Internal Temperature Sensor OR Host Reported Temperature OR External Thermistor

2 Applications

- Smartphones, Feature Phones, and Tablets
- Wearables
- Building Automation
- Portable Medical/Industrial Handsets
- Portable Audio
- Gaming

4 Simplified Schematic



3 Description

The Texas Instruments bq27426 battery fuel gauge is a single-cell gauge that requires minimal user-configuration and system microcontroller firmware development, leading to quick system bring-up.

Three chemistry profiles are pre-programmed to enable minimum user-configuration, and to help manage customer inventory across projects with different battery chemistries. The bq27426 battery fuel gauge has very low sleep power consumption leading to longer battery run time. Configurable interrupts help save system power and free up the host from continuous polling. Accurate temperature sensing is supported via an external thermistor.

The bq27426 battery fuel gauge uses the patented Impedance Track™ algorithm for fuel gauging, and provides information such as remaining battery capacity (mAh), state-of-charge (%), and battery voltage (mV).

Battery fuel gauging with the bq27426 fuel gauge requires connections only to PACK+ (P+) and PACK– (P–) for a removable battery pack or embedded battery circuit. The tiny, 9-ball, 1.62 mm x 1.58 mm, 0.5 mm pitch NanoFree™ chip scale package (DSBGA) is ideal for space-constrained applications.

Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
bq27426	DSBGA (9)	1.62 mm x 1.58 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.



5 Device and Documentation Support

5.1 Documentation Support

5.1.1 Related Documentation

- *bq27426 Technical Reference Manual* ([SLUUBB0](#))
- *bq27441 EVM: System-Side Impedance Track™ Technology User's Guide* ([SLUUAP4](#))
- *Quickstart Guide for bq27426* ([SLUUAP7](#))
- *Single Cell Gas Gauge Circuit Design* ([SLUA456](#))
- *Key Design Considerations for the bq27500 and bq27501* ([SLUA439](#))
- *Single Cell Impedance Track Printed-Circuit Board Layout Guide* ([SLUA457](#))
- *ESD and RF Mitigation in Handheld Battery Electronics* ([SLUA460](#))

5.2 Community Resources

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

TI E2E™ Online Community *TI's Engineer-to-Engineer (E2E) Community*. Created to foster collaboration among engineers. At e2e.ti.com, you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support *TI's Design Support* Quickly find helpful E2E forums along with design support tools and contact information for technical support.

5.3 Trademarks

Impedance Track, NanoFree, E2E are trademarks of Texas Instruments.

I²C is a trademark of NXP Semiconductors N.V.

All other trademarks are the property of their respective owners.

5.4 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

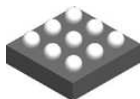
5.5 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

6 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

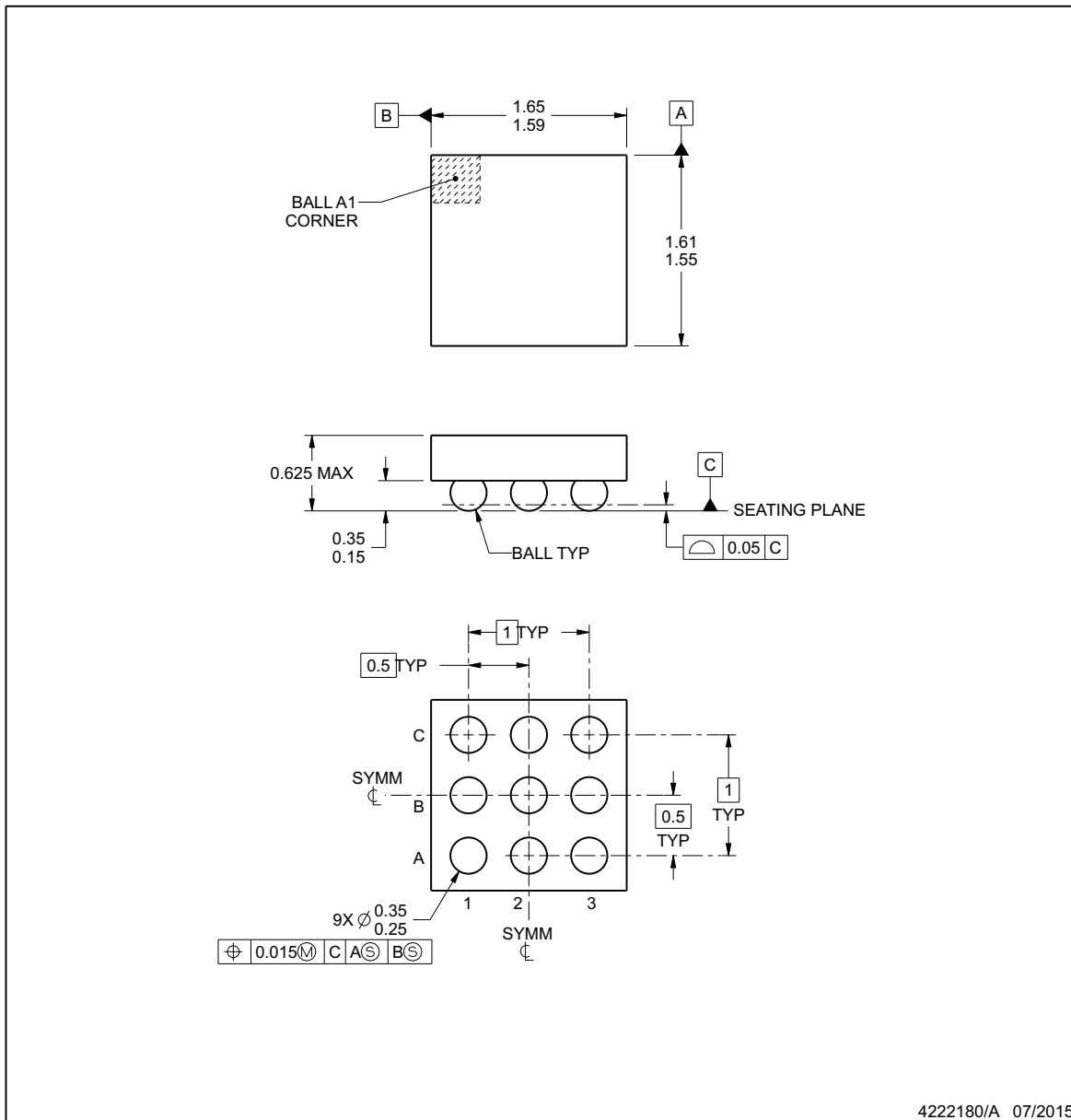


YZF0009-C01

PACKAGE OUTLINE

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



4222180/A 07/2015

NOTES:

NanoFree is a trademark of Texas Instruments.

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. NanoFree™ package configuration.

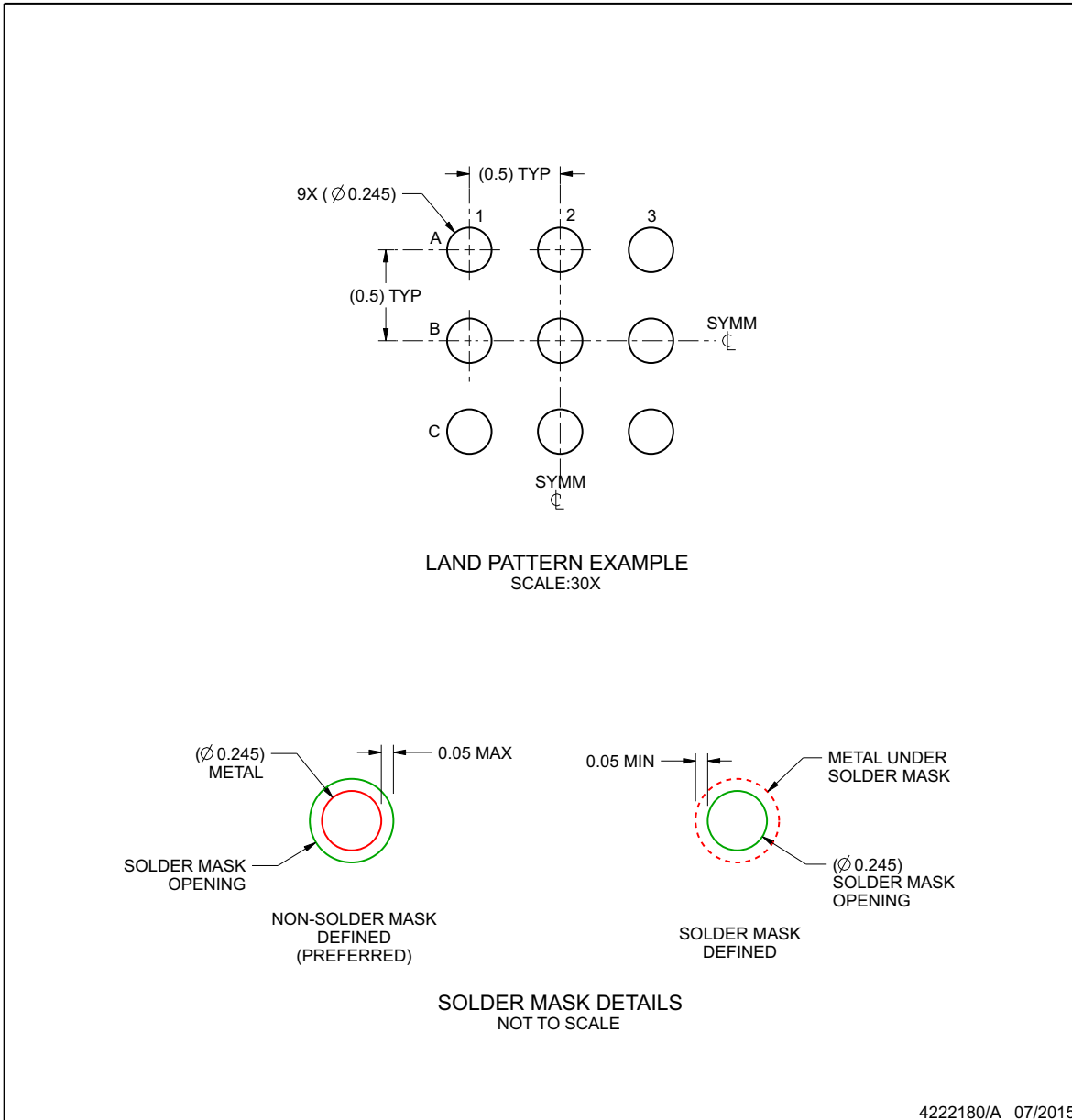
PRODUCT PREVIEW

EXAMPLE BOARD LAYOUT

YZF0009-C01

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



NOTES: (continued)

- 4. Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For more information, see Texas Instruments literature number SNVA009 (www.ti.com/lit/snva009).

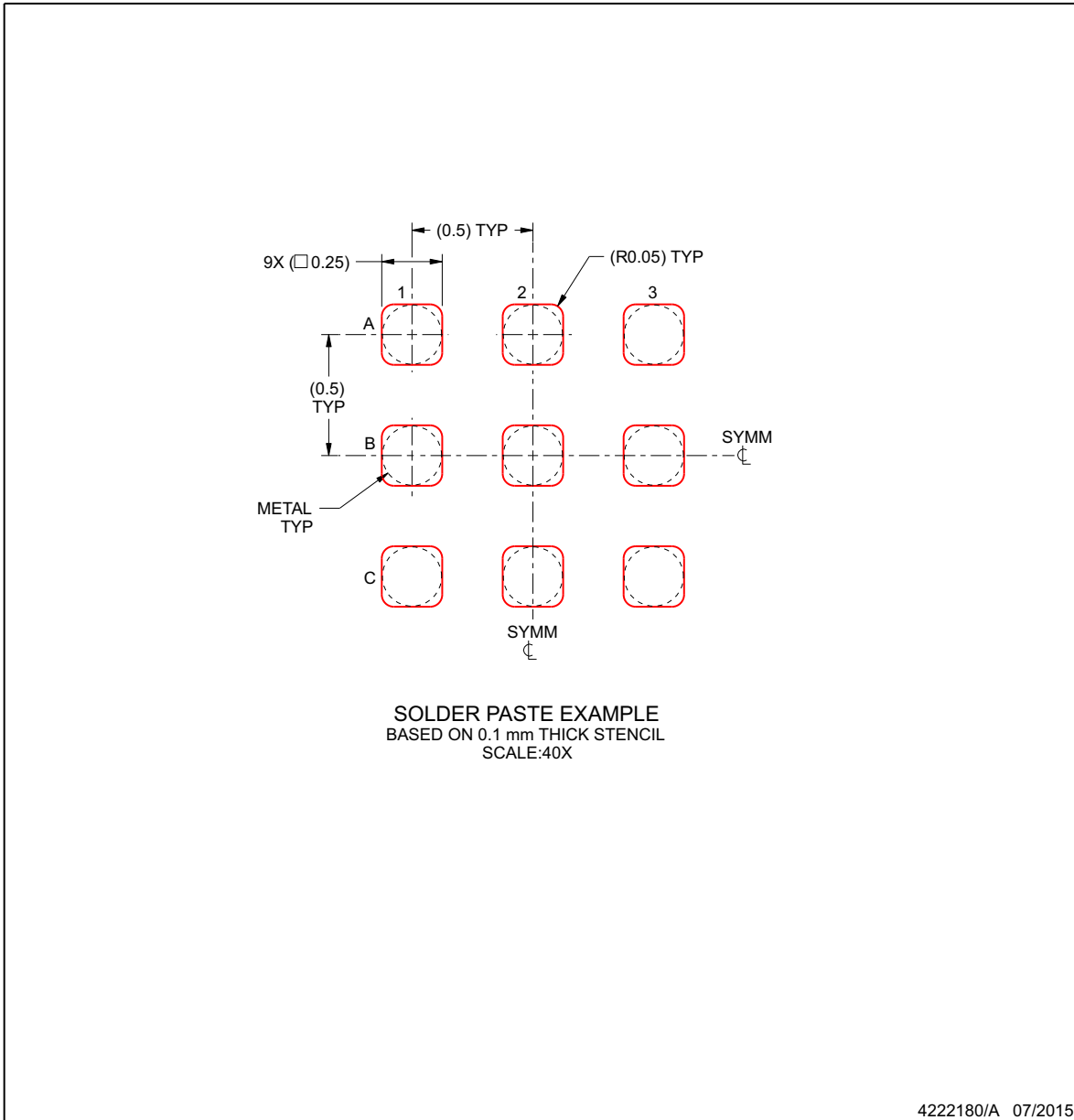
PRODUCT PREVIEW

EXAMPLE STENCIL DESIGN

YZF0009-C01

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



NOTES: (continued)

- 5. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release.

PRODUCT PREVIEW

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
BQ27426YZFR	PREVIEW	DSBGA	YZF	9	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	BQ27426	
BQ27426YZFT	PREVIEW	DSBGA	YZF	9		Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	BQ27426	

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBsolete: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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